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Significance of Decision: Receives Only - No Decisions



Report To: Strategy, Policy and Planning Committee
Meeting Date: 11 April 2013
Report From: David Phizacklea, Regional Integrated Planning Manager

Coastal Occupation Charges

Executive Summary

This report provides an overview of coastal occupation charges, including the current regulatory frameworks; issues experienced to date by regional councils attempting to implement coastal occupation charging regimes; previous work undertaken by Bay of Plenty Regional Council and outlines a future work programme for progressing Coastal Occupation Charges.

There are significant hurdles to the successful implementation of coastal occupation charges. Efforts have been made by the Upper North Island councils to persuade central government to develop policy guidance and undertake legislative reform to reduce these hurdles. Despite repeated requests since 2006, no change has eventuated.

The deadline under the Resource Management Act for making a decision on whether coastal occupation charges will, or will not, be included in a Coastal Plan has been extended to 1 October 2014. A number of regional councils are now starting to revisit the prospect of coastal occupation charges given the pending deadline. There is opportunity to work collaboratively with other regional councils – especially those in the Upper North Island on this issue, which has the potential to result in more robust principles and methodologies and the possibility of sharing costs in developing and defending any proposed charging regime.

1 Recommendations

That the Strategy, Policy and Planning Committee under its delegated authority:

- 1 Receives the report, Coastal Occupation Charges.**
- 2 Notes that staff have commenced collaboration with other North Island Regional Councils to explore a coastal occupation charging regime.**

2 Introduction

The development of a new Regional Coastal Environment Plan is being overseen by a Subcommittee of the Strategy, Policy and Planning Committee. The potential use of coastal occupation charges has been discussed by the Regional Coastal Environment Plan Subcommittee during its workshops.

The Subcommittee generally supports the concept of coastal occupation charges, but notes that there are some practical and potential legal difficulties regarding successful implementation of a charging scheme. Therefore, the Subcommittee has agreed that the

new coastal plan should signal that the Council is further investigating the adoption of a coastal occupation charging regime, and that staff should work on developing a programme of work to more fully investigate, and if appropriate develop, a charging proposal over the next 2-3 years.

6 Background

Under Section 64A of the Resource Management Act (the RMA), regional councils are required to decide whether to impose coastal occupation charges. There is no obligation to impose charges and each regional council is required to make its own decision.

A decision on whether or not to impose charges must be made by 1 October 2014 or within the next plan change after this date (s401A(5) RMA).

To date the only regional council or unitary authority in New Zealand to impose coastal occupation charges is Environment Southland. Their charging system is based on the previous coastal rental charges set by the *Resource Management (Transitional, Fees, Rents and Royalties) Regulations* adjusted for the Consumer Price Index for inflation and are an arbitrary charge.

6.1 What are Coastal Occupation Charges?

Coastal occupation charges are an annual fee that can be charged for structures and activities such as jetties, wharves, marinas and marine farms that occupy public space in the coastal marine area. The charging regime must be included in the Regional Coastal Environment Plan, and to be adopted it has to go through the full Plan change process set out in Schedule 1 of the RMA.

Coastal occupation charges are not a cost recovery mechanism (payment of actual and reasonable costs incurred) or a type of rate (a tax paid to local government to fund services that directly or indirectly benefit the payer).

The RMA states that the revenue must be spent on 'promoting the sustainable management of the coastal marine area'. There is no obligation to spend the revenue on actions that directly or indirectly benefit those paying the charges.

Coastal occupation charges are discretionary – Council decides whether to impose them, set the level of charges and decides when to discount or waive them. In making those decisions Council must have regard to:

1. the public benefits from the coastal marine area that are lost or gained; and
2. the private benefit obtained from occupation of the coastal marine area.

Private benefits from occupation of the CMA include commercial gain (such as marine farms, marinas), financial gain (trading of moorings and marina berths), security (marinas, moorings) and convenience (marinas, mooring, jetties). Public benefits can include improved access to the coastal marine area; public costs are mainly restrictions to access, reduced amenity and lost opportunities.

6.2 History of coastal charges

In 1997, coastal occupation charges replaced the largely unimplemented Coastal Rental Regulations 1991 which in turn replaced the lease and licence fees charged under the Harbours Act 1950.

The rental regulations were only adopted by Environment Southland. The key reason that the regulations have not been adopted by other councils is that the income derived is

directed to central rather than local government. In 2005, Environment Southland transferred the coastal rentals into coastal occupation charges in their Regional Coastal Plan, enabling revenue to be spent regionally. This was a relatively easy transition as some form of charging had remained in place since the enactment of the RMA in 1991.

A number of councils investigated the use of coastal occupation charges about 10 years ago (as the previous deadline for making a decision on their inclusion in Regional Coastal Plans was 1 July 2007). During this process a number of practical and legal difficulties were encountered – these are explained further in section 5 of this report.

None of the councils proceeded with a coastal occupation charging regime. Instead, regional councils resolved to work with central government agencies to amend the RMA by repealing the coastal occupation charging provisions and relocating them to a more appropriate place. To date, the only legislative change that has occurred is the extension of the deadline for making a decision on coastal occupation charges.

7 What are the potential benefits?

Any revenue from imposing coastal occupation charge has to be spent on the purpose of promoting the sustainable management for the coastal marine area. The key Ten Year Plan work programme that ‘fits’ this purpose is the Sustainable Coastal Management Activity, which includes three programmes:

- Sustainable Coastal Implementation – currently funded 100% from general funds;
- Tauranga Harbour programme – currently funded 100% from general funds; and
- Maritime Operations – currently funded 80% from general funds and 20% from fees and charges.

Budgeted expenditure for the 2013/2014 year is:

Sustainable Coastal Implementation:	\$1.8M
Tauranga Harbour programme:	\$0.5M ¹
Maritime Operations:	\$2.5M
Total Budget:	\$4.8M

The Sustainable Coastal Implementation programme includes significant operational and capital expenditure for the Kaituna River re-diversion. The Ten Year Plan 2012-2022 states that these will be funded by the investment reserve.

Depending on the level of charges imposed, a coastal occupation charging scheme could provide a significant contribution to funding the sustainable coastal implementation programme – which is currently largely paid for using general rates and investment funds. The revenue from such a charge could be used to fund additional services for Bay of Plenty communities such as:

- Boat waste water pump out facilities
- Additional sea lettuce clean-up
- Channel dredging

¹ The \$0.5 m identified in this paper is a component of the \$3.8m total expenditure budgeted for the Tauranga Harbour and associated catchment programmes in the Ten Year Plan

- Improved harbour access, such as boat ramps
- Coastal erosion protection.

There are parts of other work programmes that could also fall under the umbrella of sustainable coastal management:

- Strategic Policy – including development and implementation of the Regional Policy Statement, Regional Coastal Environment Plan and non-statutory strategies (all funded by general rates);
- Sustainable land management – biodiversity (some High Value Ecological Sites are in the coastal environment); catchment management (Ōhiwa and Tauranga Harbours are a particular focus); and biosecurity
- Regional Monitoring – a number of coastal indicators are included in the NERMN programme.

Although coastal occupation charges are not intended to be an economic method to manage use of coastal resources, their use may influence decisions by resource users as they add a cost to the use of public space. In economic terms, marine space can be regarded as under-valued (as no rental or land purchase price is imposed) which may encourage its use over terrestrial options (for activities such as boat storage) which have an associated cost.

8 What are the Issues?

The Bay of Plenty Regional Council undertook considerable work on coastal occupation charges in the early 2000s, culminating in public consultation in 2005 on a draft charging regime. This scheme used market information provided by professional valuers or the adjoining land value to determine a 'value' for the coastal marine area. The proposed rental rate (charge) proposed was 5.5% of the 'value' of the space. Discounts were provided for structures that had less impact on public access.

A brief synopsis of this work undertaken on coastal occupation charges is included in Appendix 1 to this report. Over 400 responses were received during the consultation process – the majority of these opposed the proposed charging regime.

Due to the significant issues that were identified during the consultation process, Council resolved to work with central government to resolve concerns before pursuing a charging regime. The key issues identified were:

- 1 There is little guidance on what a charge is - it is not a rental or a cost-recovery mechanism and the coastal marine area is 'common' land publicly owned. Therefore, there is no clear or established methodology to 'value' coastal space. Without an agreed methodology there is potential for significant inconsistencies between regional councils intending to pursue a charging regime.
- 2 There are significant equity matters, particularly with transitional permits (such as those applying to port occupied areas under s384A RMA) potentially being exempt from charges – the legal position is still unclear in this regard, but legal opinions suggest the Port of Tauranga would be exempt from charges.
- 3 The removal of land in the coastal marine area from Crown ownership as a result of the Marine and Coastal Area Act 2011 potentially creates an additional barrier to implementation. Section 401B of the RMA places a requirement on existing consents to pay coastal occupation changes once they are introduced to a Plan;

however, this section specifically refers to 'land of the Crown' in the coastal marine area. Therefore, existing consents could potentially be exempt from coastal occupation charges, creating further inequity.

- 4 Due to the long period of time that we (and most other regions) have been without occupation charges or coastal rentals, many occupiers have no history of paying for their space, and have developed the expectation that they should not have to.
- 5 A full Schedule 1 RMA process is required, which will be costly and contentious – exasperated by the points identified above. The lack of clarity in the legislation, and the need for councils to justify any charges and any methodology chosen, means there is a high risk of litigation, with considerable uncertainty as to the outcomes, and likely costs for all parties.
- 6 A lack of presumption – the RMA doesn't state that coastal occupation charges should apply – the default position is that no charges exist. The Council has to decide whether charges they are appropriate and there is no clear framework or criteria to guide decision-making. This makes any charging scheme vulnerable to legal challenge as the presence or absence of charges must be established from first principles. However, having limited substantiation to a decision may be of benefit in regards to legal challenge, as points of appeal will be limited.

Changes to the Resource Management Act and New Zealand Coastal Policy Statement since 2005 have not addressed these concerns. The current Local Government New Zealand position² on the imposition of coastal charges reflects the above findings:

“Coastal occupation charging:

There is a need for an effective and workable charging regime to recognise the value in exclusive use of public space and also to recognise local government costs in undertaking coastal management functions.

There is an inherent problem with setting a charging regime through a Schedule 1 plan process.

We have recommended that options for the rentals of the private use of public space are investigated comprehensively as soon as possible.”

As do the findings of the 2007 review by the Department of Internal Affairs of local government rating systems:

8.48 A particular area of difficulty appears to be obstacles to levying appropriate coastal occupation charges. Submissions to the Panel indicated that councils were prevented from recouping costs of managing coastal activities because of the lengthy and unwieldy process required under the RMA.

Recommendation

That the relevant provisions of the Resource Management Act 1991 be reviewed to streamline the power to charge a resource rental for occupation of coastal space.

9 **Status of coastal occupation charges in New Zealand**

Northland Regional Council and Waikato Regional Council have both indicated in their proposed Regional Policy Statements that the issue of coastal occupation charges will be addressed in future Regional Coastal Plan reviews – scheduled to commence in 2014 and 2015 respectively. Marlborough District Council has also signalled that it proposes to

² Pers comm. from Clare Wooding, Senior Policy Advisor, LGNZ – December 2012

introduce provisions dealing with coastal occupation charges into the next Marlborough Regional Policy Statement.

Auckland Council is undertaking further investigation into the potential application of coastal occupation charges, but has not included a charging regime in the draft Auckland Unitary Plan, which was released for public consultation on 16 March 2013.

Gisborne District Council has resolved not to introduce coastal occupation charges due to the uncertainties regarding their use and application; uncertainty over future ownership and management of the foreshore and seabed; the likelihood of a lengthy process holding up other priorities; low level of coastal occupation and lack of support from tangata whenua.

It would appear that those authorities considering the application of coastal occupation charges are those where marine-based aquaculture and other commercial ventures are most prevalent.

10 **Developing a coastal occupation charging regime**

There are potentially financial and resource management benefits to implementing a coastal occupation charging scheme; however, the level of benefit derived is dependent on the level of charges set, the ability to capture existing as well as new activities, and the cost of developing and implementing a charging regime.

Previous work demonstrates that there is likely to be significant opposition to any proposed charging scheme. This will potentially add significant legal and staff costs to the resource required to develop and defend a charging regime. Any proposal will need to be robust and supported by appropriate technical evidence and legal reviews. Meaningful consultation and engagement during development will also be important.

There is potential to work in collaboration with the upper north island regional councils on the development of a coastal occupation charging regime over the next 2-3 years - especially with regard to seeking technical and legal advice, and establishing agreed principles for the imposition of coastal occupation charges. This may defray some of the costs, enable a more robust scheme to be developed and also mitigate any arguments regarding inequity that may apply if only one regional council proposes a charging scheme. Each council could still choose its own charging regime tailored to suit its region's needs.

11 **Next Steps**

Staff will develop a project plan to revisit the application of Coastal Occupation Charges – initial work will commence in the 2013/2014 financial year; however staff note that the other Upper North Island councils are not intending to start any substantive work in this area until 2014.

The project plan will cover the following matters:

Preliminary Work (phase 1)

- Clearly establish what the regional council seeks to achieve by imposing a scheme – establish the objective.
- Compile current information on current occupation consents – type of structures; area occupied and degree of public access or exclusion
- Identify any data gaps or 'missing' structures or activities.

- Seek legal advice on the status of existing consents and the ability to impose coastal occupation charges.
- Preliminary cost benefit analysis of imposing a coastal occupation charging scheme – the outcomes of this analysis will guide future work.

Working with others (on-going)

- Collaboration other regional councils and integration of approach were possible.
- Involvement of iwi and hapū.
- Consultation and engagement with stakeholders and the wider community.

Progressing Coastal Occupation Charges (phase 2)

- Assess potential charging options – the charging scheme proposed in 2005 relied on the use of valuation methods, which requires assumptions about market forces and potentially a significant amount of academic debate. This could result in considerable delays and uncertainties in the Environment Court. In addition a resource consent imposes greater constraints on how the marine space can be used compared to a rental tenancy agreement. For that reason a market rental may not be an appropriate level for a coastal occupation charge.
- Develop a preferred charging regime (note, this could be a revamp of the system proposed in 2005).
- Assess costs of developing and implementing a charging scheme against potential benefits

Jo Noble
Senior Planner

for Regional Integrated Planning Manager

3 April 2013

APPENDIX

Coastal Occupation Charges - a synopsis of previous work undertaken by BOPRC

A brief synopsis of previous work undertaken by, or on behalf of, BOPRC on Coastal Occupation Charges

- 2001** Bay of Plenty Regional Council initiated an occupation charges project to investigate the options for coastal occupation charging
- Mar 2002** *Economic Analysis of Coastal Occupation Charges* – Resource and Environmental Management Limited. This report recommends adopting a charging regime as a means of obtaining revenue to promote sustainable management of the coastal marine area. The report sets out a basic framework for establishing charges – note, this framework contains some legal flaws.
- Aug 2003** Legal opinion on whether a contingency valuation (where a charge is calculated based on the environmental effects of a proposal) or rental approach should be adopted in a coastal occupation charging regime. Advice provided was that the contingency valuation approach is flawed, as the concept of occupation focusses on public access considerations.
- 2003-2004** Work on a joint approach to coastal occupation charging with Auckland, Waikato and Northland regional councils (upper North Island councils).
- Feb 2005** *The Options and Basis for a Coastal Marine Occupations Charging Regime* - Property Solutions Bay of Plenty Ltd. A review and analysis of market information and an analysis of the options and viability of establishing a coastal occupation charging regime.
- Mar 2005** *Peer Review of 'The Options and Basis for a Coastal Marine Occupations Charging Regime'* Property Solutions Bay of Plenty Ltd – by Professor Bob Hargreaves, Massey University. Generally supports approach subject to some amendments.
- Oct 2005** **Discussion Document: Coastal Occupation Charges** –BOPRC. An overview of coastal occupation charges and a proposed charging regime. Produced to generate public feedback prior to development of a Plan Change to introduce coastal occupation charges to the Regional Coastal Environment Plan
- 2005-2006** Work on a joint approach to finding a way to overcome the hurdles to implementing coastal occupation charging with Auckland, Waikato and Northland regional councils – focus on seeking stronger direction from central government and legislative change that removes the need for charging regime to be subject to the full Plan change process.
- Mar 2006** Legal opinion from Alan Galbraith QC – unlikely to be able to charge the Port of Tauranga coastal occupation charges – although the situation is not clear and legislative action is required to determine this matter with any certainty.

- Apr 2006** Regional Chief Executives meeting. Agreed that Regional councils will not proceed with promoting coastal occupation charges under the current legislation. Agreed to work with central government agencies to amend the RMA.
- May 2006** Strategy and Policy Committee resolved not to proceed with a coastal occupation charges (COC) plan change due to the unresolved issues and uncertainty in the current legislation.
- Sep 2009** Draft Plan Change to NOT introduce Coastal Occupation Charges released for comment
- 2010** Plan Change 'on hold' a result of an extension to the deadline imposed by the Resource Management Act 1991 (RMA) for the decision on use of coastal occupation charges.

File Reference: 4.00865

Significance of Decision: Low



Report To: Strategy, Policy and Planning Committee

Meeting Date: 11 April 2013

Report From: Andy Bruere, Lakes Operations Manager and Stephen Lamb, Natural Resources Policy Manager

The proposed Lake Ōkātina Action Plan and actions

Executive Summary

This report provides an update on the development of the Lake Ōkātina Action Plan, and seeks the Committee's endorsement of the document. Following this, the Action Plan will be presented to the Rotorua Te Arawa Lakes Strategy Group (RTALSG) for approval.

Over and above the on-going actions occurring within this Lake's catchment (such as monitoring and aquatic weed control), the Action Plan proposes four new actions. Three of these are Council-led actions: Action 2, 3, and 4. The new actions are as follows:

Action 1 Investigate and measure the impact of native bush understory health on water quality

Action 2 Update community on Lake Ōkātina's water quality trends, including Lake Ōkātina Scenic Reserve Board and Ngāti Tarāwhai Iwi Trust

Action 3 Provide support for meeting the nitrogen reduction target by converting pasture to forestry

Action 4 Consider opportunities and methods to further reduce phosphorus by supporting large scale land use change.

Actions 1, 2 and 3 are covered within the existing programme budget. The resourcing for Action 4 will need to be considered by the Regional Council within the next Ten Year Plan development process in 2014.

1 Recommendations

That the Strategy, Policy and Planning Committee under its delegated authority:

- 1 Receives the report, "*The proposed Lake Ōkātina Action Plan and actions*".
- 2 Endorses the proposed Lake Ōkātina Action Plan and recommends the Action Plan goes to the Rotorua Te Arawa Lakes Strategy Group for its consideration and approval.
- 3 Notes that proposed Action 4 will need to be considered as a part of the Regional Council's next Ten Year Plan development process.

4 Confirms that the decision is within the Bay of Plenty Regional Council's strategic planning framework (Council's Ten Year Plan, and planning documents and processes under the Resource Management Act 1991, Biosecurity Act 1993, Land Transport Management Act 2003, Civil Defence and Emergency Management Act 2002, and Local Government Acts 1974 and 2002).

2 Purpose

The report seeks the endorsement of the proposed Lake Ōkātina Action Plan and the Committee's recommendation of the Action Plan to the Rotorua Te Arawa Lakes Strategy Group (RTALSG).

3 Background

Lake Ōkātina has good water quality but is not meeting its target because the nutrient levels in the lake are too high.

The Bay of Plenty Regional Council has led the task of developing an action plan for Lake Ōkātina. The Lake Ōkātina Action Plan is a non-statutory document – it describes what we know and don't know about the lake, and identifies actions to improve water quality in Lake Ōkātina.

Scientists estimated that we need to reduce the nutrient load going into the lake by 860 kg of nitrogen and 380 kg of phosphorus per year to meet the lake's target trophic level (TLI 2.6). We also estimated a reduction of 671 kg of nitrogen and 37 kg of phosphorus has already been achieved through a recent voluntary land use change.

While the nitrogen reduction target is nearly achieved, the phosphorus target is more difficult to achieve. If all the farm land within the catchment was converted to forestry, then there would still be a shortfall in the phosphorus reduction target. It is unlikely that all the farm land will be converted to forestry.

The RTALSG released the Draft Lake Ōkātina Action Plan in October 2012 for public feedback and ideas. Staff then scoped and estimated further potential actions for Lake Ōkātina. For this lake there are very few other 'known and proven' opportunities to reduce phosphorus in the catchment.

4 Community Views

The draft Lake Ōkātina Action Plan was publicly consulted on in October 2012. A total of five written submissions were received. Support was expressed for the proposed actions (proposed Action 1 and 2). While no one opposed any specific proposed action, there were suggestions about moving towards land uses that can retain more nutrients on land.

Overall, submitters agreed that Lake Ōkātina is highly valued and its situation is unique. Most (but not all) agree there is a need to reduce the amount of nutrients going into the lake. One submitter asked about the influence of natural fluctuations in the trophic level index. The natural fluctuation is difficult for scientist to quantify.

Public feedback also identified community priorities for maintaining or improving water quality, including:

- Encourage land use change as it is currently the only proven way to reduce nutrient input into Lake Ōkātina
- Timeframe for research including potential responses if research shows how phosphorus is leaching into Lake Ōkātina

- Tight control on hornwort in Lake Ōkātaina
- Strong iwi ownership.

Given the priority identified by the feedback, two additional actions have been proposed (Action 3 and 4), and more details have been provided in Action 1.

5 Proposed Actions

The proposed actions are new activities in addition to existing or programmed activities (as listed in Appendix 1). A number of options had been considered but only a few were likely to be effective for Lake Ōkātaina (see Appendix 2). These proposed actions are:

Action 1 (2013 – 2016) Investigate and measure the impacts of native bush understory health on lake water quality. Led by University of Waikato. Lead by Chair in Lakes Management and Restoration

Action 2 (Ongoing action from 2013) Update community on Lake Ōkātaina’s water quality trends, including Lake Ōkātaina Scenic Reserve Board and Ngāti Tarāwhai Iwi Trust. Led by Bay of Plenty Regional Council

Action 3 (2013 – 2018) Provide support for meeting the nitrogen reduction target by converting pastures to forestry. Aiming to reduce 189 kg nitrogen (meeting the target) and 10.3 kg phosphorus. Led by Bay of Plenty Regional Council

Action 4 (2017 – 2023) Consider opportunity and methods to further reduce phosphorus by supporting large scale land use change. Aiming to reduce 120 kg phosphorus (to contribute to the target and further reduce nitrogen input by 2,200 kg). Led by Bay of Plenty Regional Council

Action 4 is subject to Council decision-making within the next Ten Year Plan process. It is a future action that may change as research and further information about the state of the catchment is acquired over time (such as through Action 1). Any funding decisions are subject to Council’s decision-making process.

5.1 Proposed actions in the draft Lake Ōkātaina Action Plan

Action 1 and 2 were proposed and consulted on through the draft Action Plan. The purpose of these actions is to build awareness and knowledge about water quality issues specifically to Lake Ōkātaina.

Action 1 proposes to investigate the role of the bush and forestry catchment in contributing to the phosphorus load reaching Lake Ōkātaina. We expect this action will provide scientific evidence of whether restoring the native bush in the Ōkātaina catchment could help to achieve the phosphorus reduction target.

The proposed Action 1 implements Policy 22, Method 68 and Method 72 of the Operative Regional Water and Land Plan (see Appendix 3). This action will also contribute to Council Outcome - Environmental Knowledge.

The proposed Action 2 aims to inform the Lake Ōkātaina communities on lake water quality related information. This action can be carried out by providing easy access to electronic and hard copies of relevant reports or publications as they become available. We suggest using the new Lakes Programme website as a support tool, with a “subscribe” function providing interested people with updates.

The proposed Action 2 implements Policy 25, Policy 26, Policy 31 and Method 28 of the Regional Water and Land Plan (see Appendix 3). This action will contribute to Council Outcomes - Social Contribution and Māori Participation.

Benefits of these two actions include:

- They respond to the general support expressed in workshops and comments received on the draft Action Plan
- The cost for the Council and partner agencies is relatively small
- The research action presents an opportunity to improve knowledge, which can help inform lake water quality management in general.

Issues for the Council to consider include:

- These actions do not contribute to achieving the nutrient reduction target directly.

5.2 **Newly proposed land use change incentive actions**

In addition to the two actions consulted on in the draft Lake Ōkātina Action Plan, staff have proposed two additional actions to target reducing nutrient input, as a response to public feedback. These actions are designed to meet the Lake Ōkātina nitrogen reduction target and to contribute to phosphorus reduction. Estimates of the effectiveness and efficiency of these actions (and in comparison with other options) are listed in Appendix 4.

Action 3 proposes to provide support for meeting the nitrogen reduction target by converting pasture to forestry. We expect this action will reduce 189 kg of nitrogen and 10.3 kg of phosphorus by converting 17.2 ha of farmland to either forestry or native bush. An appropriate location will be negotiated between landowners and the Land Management Manager (Rotorua).

Action 4 seeks to consider opportunities and methods to further reduce phosphorus by supporting large scale land use change. We expect this action would further reduce 120 kg of phosphorus (and 2,200 kg nitrogen) in the long-term (2017 – 2023) by providing conditional assistance to landowners in the catchment. Decision-making and the future implementation of this action are dependent on evidence being provided (including the results from proposed Action 1 native bush understory health, groundwater and gorse management studies) and landowner uptake.

Both proposed Action 3 and 4 implement Policy 21, Policy 32 and particularly Policy 33 and Method 43 of the Regional Water and Land Plan (see Appendix 3). This action will contribute to Council Outcome - Water Quality.

Benefits of these two actions include:

- These actions can help meet Lake Ōkātina's annual nitrogen reduction target and contribute towards the annual phosphorus reduction target
- There is a willingness for land use change and these opportunities could increase the uptake of actions
- These actions are more cost-effective compared to other options (see Appendix 4)
- They are consistent with the Regional Water and Land Plan (see Appendix 3)

- There are limited alternative options in this catchment (see Appendix 2 Preliminary consideration of proven nutrient reduction options for Lake Ōkātaina).

Issues for the Council to consider include:

- These actions are costly (e.g. it could cost nearly 2.4 cents of every dollar received through general rates in year 2017/2018, not including subsidies, grants, targeted rate, dividends and financial income)
- Of the five submissions received, only two were supportive of land use change. The other three submissions did not raise current pasture land use as an issue
- There is no clear evidence suggesting there has been more intensive or extensive land use since 1994 that has caused the water quality in Lake Ōkātaina to decline.

The draft Action Plan recognises Lake Ōkātaina is a unique and valued lake. The Plan is obliged to identify management objectives for managing nitrogen or phosphorus in the lake. There are limited options available for effectively reducing nutrients in Lake Ōkātaina so land use change options are proposed to be included as the best available future option at this time.

6 Discussion on decision-making

The Te Arawa Rotorua Lakes Partners Steering Group (on 15 March 2013), Water Quality Technical Advisory Group (on 18 February 2013) and the Te Arawa Rotorua Lakes Workstream Leaders Group (on 22 January 2013) considered the proposed actions and the Action Plan, and recommended the actions to be endorsed. An update of the public feedback on the Draft Lake Ōkātaina Action Plan was presented to the Rotorua Te Arawa Lakes Strategy Group on 7 December 2012 as a part of the Programme Report.

Rotorua Te Arawa Strategy Group has been informed and updated about the progress of the Lake Ōkātaina Action Plan development. The Strategic Policy and Planning Committee has a delegated function of setting the strategic direction for the Region by formulating policy that clearly identifies Regional Council's role and direction on issues.

The Rotorua Te Arawa Lakes Strategy Group, under its delegated function, has overseen the development of the draft Lake Ōkātaina Action Plan and approved its public release. The Group also has been briefed on the analysis of submissions received on the draft Lake Ōkātaina Plan.

The approval of lake action plans for Rotorua Lakes sits with the Rotorua Te Arawa Lakes Strategy Group. This authority comes from its statutory basis and Council's terms of reference. A draft Lake Ōkātaina Action Plan (clear copy that incorporates recommended changes in response to community feedback) is attached as Appendix 5.

It is also noted that this Committee has previously expressed its concerns at the lack of clarification from Central Government in respect of the jurisdiction and responsibility of the Rotorua Te Arawa Lakes Strategy Group (under the *Te Arawa Lakes Deed of Settlement (2004)*) to approve non-statutory Plans.

However, the decisions relate to the proposed Council-led actions sit with the Council. The Council has the responsibility under the Local Government Act 2002 to make decision on its budget through the Annual Plan and Ten Year Plan processes. Therefore, it will be Council's decision to progress the proposed actions either now or in the future.

7 **Next Steps**

If the Committee endorses the Action Plan it will be submitted for approval to the Rotorua Te Arawa Lakes Strategy Group at their meeting on 19 April 2013.

8 **Financial Implications**

Current Budget

The proposed actions in the Action Plan do not require additional financial costs in the current budget. Proposed Action 1, Action 2 and Action 3 can be accommodated within the current programme budget. Action 1 and Action 2 can be covered within the existing planned budget. Proposed Action 3 requires a programme variation within Lakes Programme activity budget to accommodate a lump sum \$60,000 in the next five years' Annual Plans.

Future Implications

Proposed Action 4 is a new activity (estimated \$550,000) for the future (2017 - 2023), and will need to be considered as part of Council's decision-making process as part of the next Ten Year Plan 2015 - 2025.

Michelle Lee
Planner (Natural Resources Policy)

for Lakes Operations Manager and Natural Resources Policy Manager

4 April 2013

APPENDIX 1

Existing or programmed activities for reducing nutrient input and improving water quality in Lake Okataina

Appendix 1

Existing or programmed activities for reducing nutrient input and improving water quality in Lake Ōkātina

Actions we take	Timeframe	Led by	Effectiveness in reducing nitrogen and phosphorus
Reducing nutrient input			
Voluntary change to less nutrient-leaching land use	Ongoing	Landowners, if supported by financial conditions	A recent voluntary land use change is estimated to have reduced 671 kg per year of nitrogen (78 % of the target 860 kg per year), and 37 kg of phosphorus per year (nearly 10 % of the target 380 kg per year). Further changes could remove 2,009kg of nitrogen and 110kg of phosphorus per year.
Voluntary land and farm management practice that reduces the potential for erosion, sediment loss or nutrient loss into waterways (stewardship management approach)	Ongoing	Landowners, assisted by Bay of Plenty Regional Council (advice and possible subsidy)	Relatively effective depending on farm conditions.
Looking into pest control options in the catchment	Ongoing	Department of Conservation, assisted by local iwi and lake community	The effectiveness is being investigated. If new evidence suggests this action is highly effective it will become a priority area.
An effluent treatment rule: by 1 December 2013 septic tanks within 200m of lakes are required to install an Aerated Wastewater Treatment System with nutrient reducing capabilities or obtain a resource consent	Rule is enforceable from December 2012	Bay of Plenty Regional Council	Effect will be minor, due to the small population around the lake.
A policy that sets nutrient discharge limits in the Regional Water and Land Plan for all Rotorua Te Arawa Lakes	Proposed Regional Policy Statement requirement	Bay of Plenty Regional Council	Yet to be determined.
Review regulatory interventions for all Rotorua Te Arawa Lake catchments	Ongoing	Bay of Plenty Regional Council and Rotorua District Council	Yet to be determined.

Actions we take	Timeframe	Led by	Effectiveness in reducing nitrogen and phosphorus
Building awareness and knowledge about nutrient sources			
Invite interested Lake Ōkātina stakeholders to forums presenting lake science	Ongoing	Bay of Plenty Regional Council	No direct nutrient reduction.
Monitor Trophic Level Index and de-oxygenation rates	Ongoing, monthly	Bay of Plenty Regional Council	No direct nutrient reduction.
Report to the Lake Ōkātina community on water quality	Ongoing, annually	Bay of Plenty Regional Council	No direct nutrient reduction.
Provide sustainable land-use information through workshops, field days and discussion groups. Workshops have been held with the forestry sector about earthworks and harvest practices	Ongoing	Bay of Plenty Regional Council and partners	No direct nutrient reduction.
On-farm benchmarking	Ongoing	Farms across the border between Lake Ōkātina and Lake Rotorua catchments, supported by Bay of Plenty Regional Council, the effectiveness is yet to determined	
Ensuring the amenity of the lake			
A rule to ban jet-skis and water-skiing on the lake. Other boats must travel 5 knots within 200m of the shore	Completed	Rotorua District Council / Bay of Plenty Regional Council	No nutrient reduction that we know of.
Control aquatic weed. A hornwort incursion response plan was formulated in response to a 2010 hornwort incursion	In progress	Bay of Plenty Regional Council	No nutrient reduction that we know of.

APPENDIX 2

Preliminary consideration of nutrient reduction options

Appendix 2

Preliminary consideration of nutrient reduction options

Actions that have proven to be effective in other Rotorua lakes	Will this action be effective for Lake Ōkātina?	Why
Treating the nutrients in the lake directly		
Diversion Structures To divert a nutrient-enriched tributary around the lake	No	No one single nutrient-enriched tributary (surface or groundwater) has been identified at Lake Ōkātina
Geothermal water treatment Construct a treatment plant at the geothermal water source	No	No significant geothermal water inflow to Lake Ōkātina is observed
Floating wetland Construct a wetland on the surface of the lake at the lake's mouth(s)	No	No one single nutrient-enriched tributary has been identified at Lake Ōkātina and the nitrogen concentration in Lake Ōkātina is low
Sediment capping Spread a chemical locking material on the lake to create a barrier layer preventing the release of phosphorus from bottom sediments	Maybe but unlikely. Only considered if the lake has lost its pristine nature	Unlike Lake Rotorua, Lake Ōkāreka and some parts of Lake Rotoiti, Lake Ōkātina has better water quality and a valued "natural" environment
Weed harvesting Use a weed-harvest machine to collect aquatic weed 1.5 m from below the lake surface	Maybe but unlikely. Only considered if weeds were prolific in shallow areas	Unlike Lake Rotoehu, very little weed is found in Lake Ōkātina due to its depth and bathymetry. Commercial-scale harvesting risks spreading the weed.
Lake oxygenation Install a machine in the lake to pump oxygen into deeper water to prevent nutrient release from sediments	Maybe but unlikely. Only considered if the anoxia in sediments is prolonged	The low oxygen level in Ōkātina's deep water could cause the water quality to become worse due to the release of nutrients from sediments. Oxygenation is expensive, and installation might not be possible.
Treating the nutrient input from the catchment		
Phosphorus locking Construct a treatment plant adding a chemical flocculation agent to phosphorus-rich stream water to bind up and settle out phosphorus	No	Unlike Lake Rotorua and Lake Rotoehu, no one single nutrient-enriched tributary has been identified in Lake Ōkātina
Community wastewater schemes	No	Unlike Lake Rotorua, Rotoiti, Ōkāreka, Rotomā and Tikitapu, septic tanks are thought to be a very low nutrient contributor because of the number of people using them
Enhanced on-site wastewater systems	Yes but low impact	It is a rule that septic tanks within 200m of the lake edge have to install a system with nutrient reducing capabilities or obtain a resource consent. But it will have little impact on the lake due to low loading from this source
Land-use change	Yes	A range of land-use options for landowners to reduce nutrient losses from land use
Land-use management	Yes but low impact	Currently the pasture use is relatively low intensity. Management changes impacts will be minimal at best

Actions that have proven to be effective in other Rotorua lakes	Will this action be effective for Lake Ōkātina?	Why
<p>Constructed wetland</p> <p>Construct a wetland at the lake edge areas that are rich in nutrients</p>	<p>Maybe but unlikely</p>	<p>The highest nitrate-nitrogen level in Lake Ōkātina catchment is 0.05mg/l – too low (3%) for wetlands to be effective.</p>
<p>Restore native bush</p> <p>Control pest animals in the native bush around Lake Ōkātina to restore forest health and conserve soil</p> <p>Control pest plants in the native bush around Lake Ōkātina to restore forest health</p>	<p>Maybe</p>	<p>The poor state of the native bush around Ōkātina is mostly caused by animal pests and pest plants.</p> <p>We do not yet know if there is a difference in nutrient retention abilities between a healthy forest and a forest damaged by pest animals.</p>

APPENDIX 3

Proposed actions and relevant Policies and Methods in the Regional Water and Land Plan

Appendix 3

Proposed actions and relevant Policies and Methods in the Regional Water and Land Plan

Proposed Action 1 Investigate and measure the impact of native bush understory health to lake water quality

Policy 22 To research and monitor the effects of land use practices on surface and groundwater quality, and take appropriate action within the framework of this regional plan (including future plan changes) where such investigations indicate land use has significant adverse effects on water quality, or there is a high risk that future development would adversely affect water quality. This is particularly relevant to lakes, and groundwater used for municipal water supply.

Method 68 Continue to investigate and clarify the nutrient exports of different land uses, and best nutrient management practices.

Method 72 Undertake research where monitoring indicates an environmental problem that is not currently understood or explained, and research is necessary, appropriate and practicable. Research may be in conjunction with the city council, district councils, other resource management agencies, tangata whenua, industry organisations and other organisations as appropriate.

Proposed Action 2 Update community on Lake Ōkātina's water quality trends, including Lake Ōkātina Scenic Reserve Board, Ngāti Tarāwhai Iwi Trust

Policy 25 To encourage and provide for community involvement in the management of water, and land resources.

Policy 26 To continue to raise community awareness about water quality and integrated management issues.

Policy 31 To promote the adoption of the stewardship of soil and water resources, ecosystems, and cultural, amenity, natural character and landscape values.

Method 28 Provide information to the community on:

- (a) The natural influences on water quality, including geothermal inputs, and the subsequent limitations on the use of that water.
- (b) The water quality of rivers and lakes where this information is available.

Proposed Action 3 and 4 Supporting land use change for lake water quality improvement

Policy 21 To manage land and water resources in the Bay of Plenty within an integrated catchment management framework to:

- (a) Maintain or enhance water quality in individual lakes to meet their Trophic Level Index ('TLI') and Water Quality Classification.
- (b) Require the management of nitrogen or phosphorus in individual Rotorua lake catchments.
- (c) Reduce cyanobacterial algal blooms on the Rotorua Lakes by managing nutrient inputs in the lake catchment.
- (d) Maintain or improve water quality in streams and rivers to meet their Water Quality Classification.
- (e) Have full regard to the water quality classifications for coastal waters (including harbours and estuaries), and policies relevant to the coastal environment in the Bay of Plenty Regional Coastal Environment Plan.
- (f) Recognise and provide for heritage values in resource management decisions.

- (g) Maintain existing high quality groundwater, where the following have been identified:
 - (i) Potable water, including aquifers used for municipal water supply.
 - (ii) Natural water quality that has not been adversely affected by land use or point source discharges.
 - (iii) Recharge areas of aquifers related to areas specified in (i) and (ii). and
 - (iv) In the groundwater catchments of the Rotorua lakes, Ohiwa and Tauranga harbours.
- (h) Avoid, remedy or mitigate adverse effects on groundwater quality in other areas not otherwise addressed by (g).
- (i) Ensure the levels of bacteria in those rivers and streams that have been identified as important swimming sites and in lakes in Schedule 10 meet the Ministry of Health/Ministry for the Environment Recreational Water Quality Guidelines (1999) as a minimum.
- (j) Understand the effects of changing land cover and land use practices on water flows and levels in rivers, streams, lakes.
- (k) Promote and encourage the adoption of sustainable land management practices that are appropriate to the environmental characteristics and limitations of the site to:
 - (i) Protect the soil and avoid, remedy or mitigate the adverse effects of erosion.
 - (ii) Maintain the health of the region's soil resources for future generations.
 - (iii) Achieve the appropriate management of riparian areas, including the retirement and planting of riparian areas of streams, rivers, lakes, wetlands and estuaries.
 - (iv) Avoid, remedy or mitigate adverse effects on water quality in the receiving environment.
 - (v) Take into account the assimilative capacity of the soil.
 - (vi) Recognise and provide for heritage values of the site.
 - (vii) Maintain or improve the protective function of coastal sand dunes.
 - (viii) Control sediment entering estuaries and harbours from use and development activities.
- (l) Manage land and water resources according to realistic management goals that are appropriate to the existing environmental quality and heritage values (including ecosystem values) of the location.

Policy 32 To allow resource use and development where there are beneficial effects on the social, cultural and economic wellbeing of people and communities; and adverse effects on the environment are avoided, remedied or mitigated.

Policy 33 To promote and support land use change and/or land management practices in the catchments of the Rotorua Lakes that will achieve lake water quality improvement. (Cross-Reference: Also refer to policies in sections 15.3.1, 16.3.1 and 16.3.2 of the Bay of Plenty Regional Policy Statement in relation to heritage values.)

Method 43 Support land use changes, and changes to land use rules, that:

- (a) Achieve lake management objectives identified in lake Action Plans developed in accordance with Method 41.
- (b) Integrate land use planning and rules in Environment Bay of Plenty's resource management plans and Rotorua District Council's District Plan for lake catchments.
- (c) Recognise that land use change and land management practices are an important part of lake management.
- (d) Actively promote and support low nutrient loss land uses and land management practices in the catchments of the Rotorua Lakes.


APPENDIX 4

Preliminary estimation (indicative) for options for additional actions

Appendix 4

Preliminary estimation (indicative¹) of options for additional actions

Comparing possible new actions targeting reducing nitrogen going into Lake Ōkātina every year

Targeted nitrogen reduction through land-use change	Estimated options for Lake Ōkātina catchment	Estimated cost and who would have to pay?	Area in Ōkātina catchment (reach)	Estimated potential nutrient reduction per year ² (impact and cost-efficiency) Move TLI 2.9 to 2.6 = -380kgP/yr, -860kgN/yr			
				Phosphorus 380kg/yr = 100%		Nitrogen 860kg/yr = 100%	
 (completed)	Changing from pasture to exotic forest	Landowners with AGS ³	61.0ha Estimation based on reduction ratio: P -0.6kg/ha/yr N -11kg/ha/yr	36.6kg	9.6%	671.0kg	78.0%
				Supported by AGS programme		Supported by AGS programme	
Proposed Action 3: Land Use Change	Option 1 (recommended)	Landowners with agencies targeted support. Estimated establishment support up to \$60,000 ²	17.2ha Estimation based on reduction ratio: P -0.6kg/ha/yr N -11kg/ha/yr	10.3kg	2.7%	189.2kg	22.0%
				at \$4,174/kg (\$5,825/kg incl. estimated maximum staff time)		at \$227/kg (\$317kg incl. estimated maximum staff time)	
	Option 2	Estimated cost \$86,000. Possibly paid for by landowners	17.2ha Estimation based on reduction ratio: P -0.6kg/ha/yr N -11kg/ha/yr	10.3kg	2.7%	189.2kg	22.0%
				at \$8,350/kg		at \$455/kg	
	Option 3	Estimated cost between \$236,000 and \$394,000 Possibly paid for by landowners	15.75ha Estimation based on reduction ratio: P -0.72kg/ha/yr N -12kg/ha/yr	11.4kg	3.0%	189.0kg	22.0%
				between \$20,724/kg – \$34,539/kg		between \$1,250/kg – \$2,083/kg	
Wetland idea 1	Restoring natural wetland on pasture land	Cost estimate \$795,000. Possibly paid for by landowners	Up to 5.8ha Estimation based on reduction ratio: P -1.0kg/ha/yr N -36.0kg/ha/yr ⁴ \$137k/ha	5.8kg	1.5%	208.8kg	24.3%
				at \$137,069/kg		at \$3,807/kg	
Wetland idea 2	Constructing wetland on pasture land	Cost estimated \$2,450,000 but feasibility highly dependent on geological conditions. Possibly paid for by landowners	Up to 14.0ha Estimation based on reduction ratio: P -1.0kg/ha/yr N -36.0kg/ha/yr \$175k/ha	14.0kg	3.7%	504.0kg	59.0%
				at \$175,000/kg		at \$4,861/kg	
Other idea	Removing sewage	The on-going cost of daily removal could be \$146,000 or more a year. Possibly paid for by business owners and RDC ⁵	Up to two septic tanks: One public; one private Estimation based on 100% removal	0.01kg	0.003%	0.11kg	0.01%
				at \$14.6m/kg/yr or more		at \$1.3m/kg/yr or more	

¹ Indicative – the figures used in the preliminary estimation are indicative only, so could change depending on the specific methods and staff time required.

² The estimated potential nutrient reduction may be lower in this catchment in practice. For example, many parts of the pasture area are covered by scrub (including manuka, kanuka, naturalised broadleaf), which has lower nutrient leach than the estimated ratio for deer/beef/sheep pasture land.

³ AGS refers to the Afforestation Grant Scheme provided to landowners to establish forestry within sensitive catchments by the Ministry of Agriculture and Forestry (merged into the Ministry for the Primary Industry since 2011).

⁴ Nutrient removal rate used in the Lake Rerewhakaaitu Nutrient Budget 2012, based on Rutherford and Nguyen (2004) and Sukias (2010). However, Hamill's report (2010) shows wetlands are effective nutrient reduction options only when the nitrogen concentration is higher than 1.50mg/l, with high hydraulic load and high vegetation cover. The highest nitrate-nitrogen level in Lake Ōkātina catchment is 0.05mg/l, which is too low for wetlands to be an effective nutrient reduction option.

⁵ RDC refers to Rotorua District Council.

Comparing possible new actions targeting reducing phosphorus

Long-term phosphorus reduction through land-use change	Estimated options for Lake Ōkātaina catchment	Estimated cost and who would have to pay?	Area in Ōkātaina catchment (reach)	Estimated potential nutrient reduction per year ⁶ (impact and cost efficiency) Move TLI 2.9 to 2.6 = -380kgP/yr, -860kgN/yr				
				Phosphorus 380kg/yr = 100%		Nitrogen 860kg/yr = 100%		
✓ (completed)	Completed land use change with AGS	See table above	See table above	36.6kg	9.6%	671.0kg	78.0%	
Proposed Action 3	Proposed target land use change with regional council incentive	See table above	See table above	10.3kg	2.7%	189.2kg	22.0%	
Proposed Action 4: Land Use Change	Option 1	Changing from pasture to exotic forest	Cost estimate \$490,000. Possibly paid for by landowners (voluntary)	182.6ha Estimation based on reduction ratio: P -0.6kg/ha/yr N -11kg/ha/yr	109.6 kg	28.8%	2008.6 kg	233.6%
					at \$4,471/kg		at \$244/kg	
	Option 2 (recommended)	Changing from pasture to exotic forest	Cost estimate \$550,000. contestable fund (voluntary) administration (case-by-case assessment) by Council	200ha Estimation based on reduction ratio: P -0.6kg/ha/yr N -11kg/ha/yr	120 kg	31.6%	2,200 kg	255.8%
					at \$4,483/kg		at \$250/kg	
	Option 3	Changing from pasture to exotic forest (Joint venture investment)	Cost estimate \$550,000 administered by Council with cost return in 36 years' time (voluntary)	200ha Estimation based on reduction ratio: P -0.6kg/ha/yr N -11kg/ha/yr	120 kg	31.6%	2,200 kg	255.8%
					at \$4,483/kg with a 36 year return time		at \$250/kg with a 36 year return time	
Targeted phosphorus reduction through pest control	Native forest restoration Possible actions include: animal pest control (ground based, aerial based or combination) silver wattle pest plant control	Cost (for controlling animal pest in the forest) varies between \$345,000 to \$1,800,000 over five years ⁷ Tree injection is about \$3,500/ha, the size of the silver wattle area has not been assessed. Possibly paid for by landowners with potential DoC ⁸ and Regional Council support.	Between 500 ha and 6,815 ha depending on the chosen method or the mix of methods. Estimation reduction ratio unknown	Unknown ?	Potentially high due to poor forest understorey health	Unknown	Don't know	
Proposed Action 1: Research Action								

⁶ The estimated potential nutrient reduction may be lower in this catchment in practice. For example, many parts of the pasture area are covered by scrub (including manuka, kanuka, naturalised broadleaf), which has lower nutrient leach than the estimated ratio for deer/beef/sheep pasture land.

⁷ Speedy, C. and Singers, N. (2012) Lake Okātaina Scenic Reserves: Issues and Options for an Effective Pest Management Programme – initial draft for comment, Prepared for Department of Conservation – Rotorua Lakes Area

⁸ DoC refers to The Department of Conservation

APPENDIX 5

Proposed Lake Okataina Action Plan (clear copy)

Appendix 5

Te kaupapa mo ngā taonga o Rotorua

Draft Lake Ōkātina Action Plan

- for better water quality

Ko te wai te ora o ngā mea katoa
Water is the life giver of all things

This is a non-statutory document to improve water quality in Lake Ōkātaina.

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Contents

The lake of laughter - Te moana-i-kataina-ā-Te Rangitakaroro	1
1.1 Purpose of a lake action plan	3
1.2 Why do we develop a lake action plan?	3
1.3 What does the community want for Lake Ōkataina?	4
1.4 Water quality in the lake	5
1.5 What is causing the drop in water quality?	7
1.6 What other factors could be affecting water quality?	9
1.7 What would happen if we did nothing?	10
1.8 What are our assumptions?	10
1.9 Actions to improve water quality	10
1.10 Action plan review: What will we do if circumstances change?	14
References	17

The lake of laughter - Te moana-i-kataina-ā-Te Rangitakaroro

Lake Ōkataina is one of the 12 Rotorua Te Arawa Lakes. It is remote, deep and surrounded by native bush. Its name comes from Māori chief Te Rangitakaroro (son of Tarāwhai), who laughed when he heard one of his warriors call the lake an ocean¹.

Lake Ōkataina was formed 7,000 years ago by volcanic activity. It is 1,080 hectares in size and has a catchment area of 62.9 square kilometres. Nearly 81 percent of the catchment is in the surrounding scenic reserve. In 1921, the Chief of Ngāti Tarāwhai gifted the lake shore to be protected as reserve. Other than the reserve area, about 10 percent of the catchment is pasture, eight percent is in exotic forest and the remainder is wetland, buildings and bare ground.

Lake Ōkataina is 79 metres at its deepest point, with an average depth of 39 metres. While the lake level rises and falls, Lake Ōkataina has no surface outlets. Subsurface flow is thought to drain towards Lake Tarawera – a nearby larger lake that is about 13 metres lower than Lake Ōkataina in elevation.

The steep inclines along the lake edge and the pumice soils in the catchment cause fast run-off of rainwater into the lake, increasing the risk of erosion. Occasionally, landslides leave scars on the landscape.

Lake Ōkataina's water quality is good and reasonably stable compared to some of the other 12 Rotorua Te Arawa Lakes². The lake is also safe for swimming. However, its trophic level (the indicator that measures overall lake health) is not quite as good as we would like it to be.



Figure 1. Waharia o Te Koutū Pā

¹ Gosling (2002) Lake Ōkataina Scenic Reserve, Super Site Resource 4, Department of Conservation.

² Scholes, P, Bay of Plenty Regional Council (2009) Rotorua Lakes Water Quality Report.

1.1 Purpose of a lake action plan

A lake action plan describes what we know and don't know about a particular lake, and what we need to do to improve lake water quality. The intention of developing actions is to meet the lake health target or trophic level index (TLI) target. Lake Ōkātaina's target trophic level index is set at the 1994 level of 2.6.

As a key partner of the Rotorua Lakes Protection and Restoration Action Programme, the Bay of Plenty Regional Council has led the task of developing an action plan for Lake Ōkātaina.

Trophic Level Index

The trophic level index (TLI) is a number used to indicate the overall health of lakes. The number is calculated using four separate water quality measurements: total nitrogen, total phosphorus, water clarity and chlorophyll-a. The worse the water quality, the higher the number.

Nitrogen and phosphorus are nutrients that plants thrive on. Large amounts of these nutrients in lakes encourage the growth of algae, which can lead to poor water quality. Water clarity is how clear the water in the lake is. Clear water usually means better water quality. Chlorophyll-a is the green colour in plants. Knowing how much chlorophyll-a is in a lake gives us a good idea of how concentrated algae biomass is in the lake. More algae means poorer water quality.

These four measurements are combined into one number – the Trophic Level Index.

1.2 Why do we develop a lake action plan?

In order to improve lake water quality, one of the tasks in the Rotorua Lakes Protection and Restoration Action Programme is to develop action plans for the Rotorua Te Arawa lakes.

The Regional Water and Land Plan further stipulates that an action plan is required if the water quality (defined by the three-year average of TLI) of a lake is higher than its target TLI by 0.2 or more for two years in a row.

Lake Ōkātaina has a Trophic Level Index target of 2.6 that has been set in the Bay of Plenty Regional Water and Land Plan. The lake's current (2012) three year average TLI is 2.9 (Figure 2).

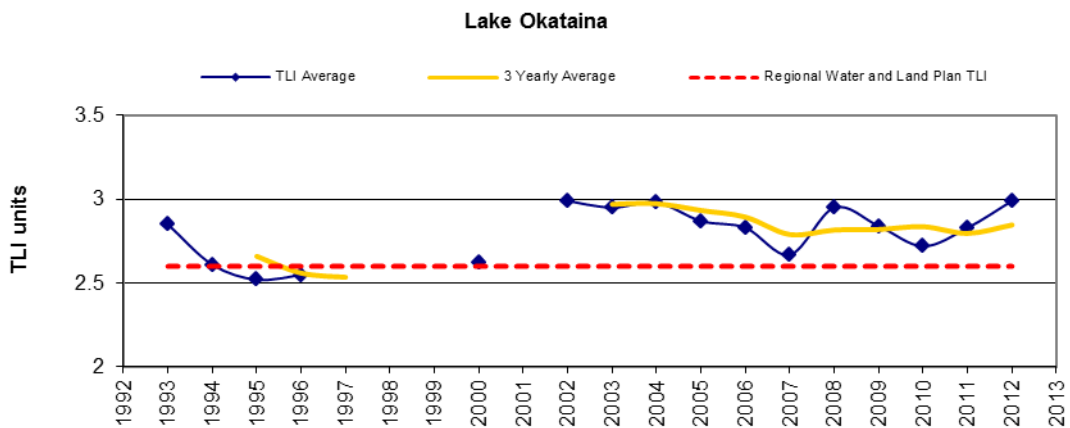


Figure 2. Lake Ōkātaina's water quality trend measured by the TLI

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In developing this draft action plan we have:

- Examined what we know about the lake, its characteristics and its surroundings
- Researched lake water quality trends
- Talked with the local community and iwi about the water quality trend of the lake
- Asked the local community and iwi what they want for the lake
- Considered potential actions.

This process has helped us understand what is happening at Lake Ōkataina, what the community's expectations are, and how we can improve water quality.

For more details and information about the research behind the draft Lake Ōkataina Action Plan, please see the background document "*Lake Ōkataina Water Quality Background Information 2012*".

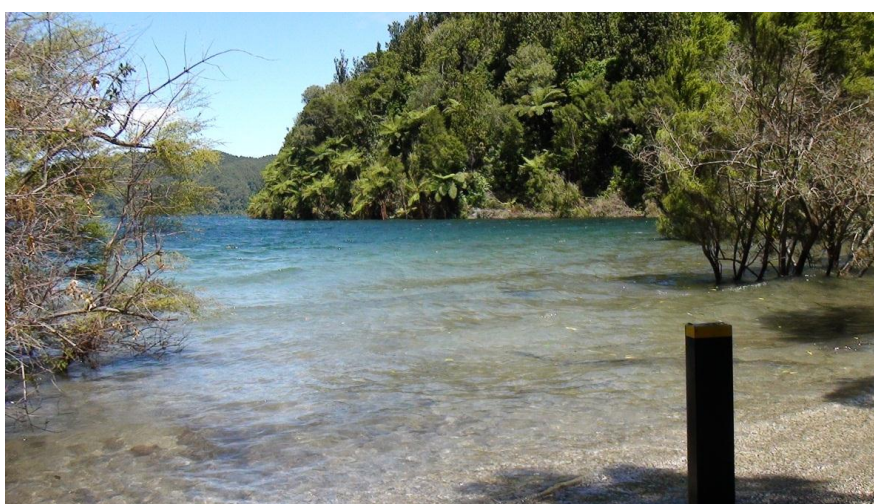


Figure 3. Lake Ōkataina at Ngahaua Bay

1.3 What does the community want for Lake Ōkataina?

Lake Ōkataina is a unique, tranquil and unspoilt wilderness. This lake is highly valued for its historical and cultural significance, as well as its prized fishing opportunities.

Almost 10 years ago, stakeholders said they wanted the lake water quality to be at the level it was in 1994, which was a TLI of 2.6, and so this is our target for the lake.

In workshops held during March and April 2012, the Lake Ōkataina community expressed their ideal future for Lake Ōkataina:

- Unspoilt wilderness, deep clear water reflecting natural bush, tranquillity
- Drinkable water and edible kōura (freshwater crayfish)
- Keeping the lake unique
- Historic and cultural sites protected.

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The community also told us that they would like to see:

- The lake as clean as possible with good water quality
- The environment and current good water quality maintained
- Lake Ōkātaina as a showcase for New Zealand flora and fauna with a healthy ecosystem that is free of pests
- Lake Ōkātaina as a fishing destination
- Boat-users check and clean boats for weed before entering the lake
- The effect that visitors have on the lake managed, monitored and reported – with enough toilets available for any events held at the lake
- Local iwi playing a primary role in looking after the lake and land
- A programme in place to look after the lake
- Updated, easy-to-understand science information available.

1.4 **Water quality in the lake**

Lake Ōkātaina has good water quality - but not as good as it was in 1994 (the target level).

The current TLI at Lake Ōkātaina is 2.9. The trend over the last 10 years shows this lake's TLI is steady compared with other lakes, and more detailed analysis shows that nitrogen has been declining and phosphorus has been increasing.

While phosphorus and nitrogen are the key nutrients we focus on for improving water quality, scientists are also concerned about low oxygen levels in the deep water in autumn. This could lead to higher levels of nitrogen and phosphorus in the winter and prompt algal blooms.

There is also some concern that the underwater ecology is threatened by invasive aquatic weeds, such as hornwort. The hornwort infestation discovered in the lake several years ago is controlled. To date the control programme has had good results. A plan aiming to eradicate hornwort is currently being implemented. Progress will be reviewed annually.

For more details about water quality in Lake Ōkātaina, please see the background document "*Lake Ōkātaina Water Quality Background Information 2012*".



Figure 4. Lake Ōkataina at Tauranganui Bay with weed cordon

1.5 What is causing the drop in water quality?

Lake Ōkātaina is somewhat of a unique case. The lake has many characteristics that would normally ensure good water quality:

- It is a deep lake surrounded by native bush
- It is reasonably isolated
- Most of its surface catchment is covered by native bush
- Little wastewater is released in the catchment.

Further, based on the data available, the Lake Ōkātaina catchment has not significantly changed since the TLI was first recorded. Changes would have most likely led to higher nutrient levels. The catchment is still mostly covered in native bush, farming remains stable and while visitors numbers have varied over the years, the scale is still small.

The combination of these factors leaves us uncertain about what has caused the water quality to drop.

What we do know is that this catchment is vulnerable to water pollution because of its natural characteristics. The steep surroundings and loose volcanic soils make it sensitive to erosion. It is important for Lake Ōkātaina that we keep nutrients on land and in the soil as much as possible.

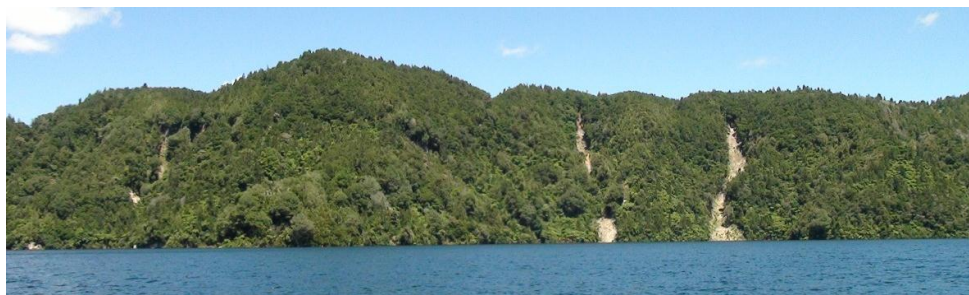


Figure 5. Lake Ōkātaina around Tikitiki

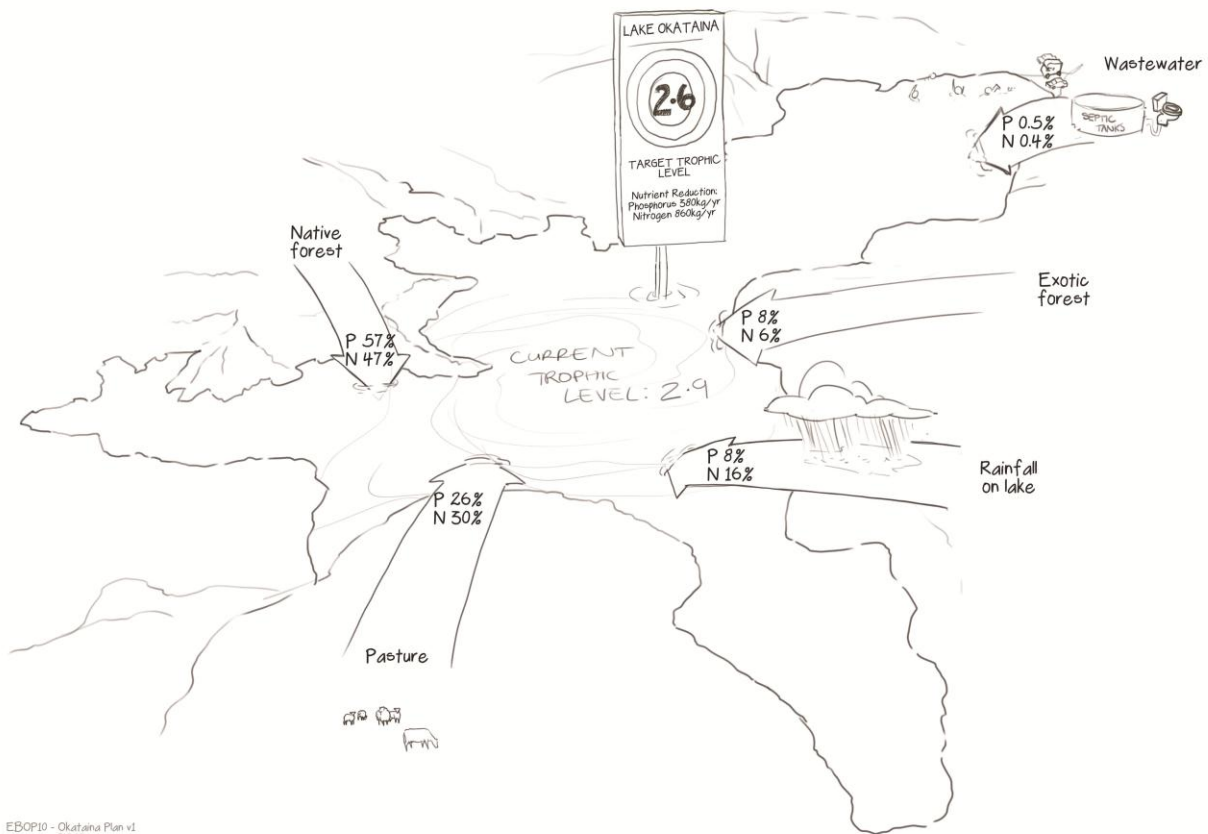
Scientists estimate the levels of nutrients entering the lake annually are:

- Nitrogen: 27,112 kilograms per year
- Phosphorus: 2,079 kilograms per year

The amount of nutrients going into the lake has resulted in the current lake trophic level of 2.9. Work has been done to identify where the nutrients are coming from³ (Box 1).

³ McIntosh (2011) nutrient budget for Lake Ōkātaina

Box 1. Where are the nutrients coming from?



EBOP10 - Ōkātina Plan v1
9.5.12
*Notified

Land Use	% area (including lake)	% Nitrogen entering lake	% Phosphorus entering lake
Native bush	67%	47%	57%
Grassland (pasture)	9%	30%	26%
Rainfall on lake	17%	16%	8%
Exotic forest	7%	6%	8%
Stormwater	<0.1%	0.3%	<0.1%
Septic tanks	-	0.4%	0.5%

More information about land cover and nutrient source estimation can be found in Appendix One, or in the supporting document *Lake Ōkātina water quality background information 2012*.

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In order to achieve a TLI of 2.6, the amount of nitrogen and phosphorus going into Lake Ōkātina needs to be reduced by 860 kg of nitrogen and 380 kg of phosphorus each year. While it is important to reduce both nutrients going into the lake, it appears that removing a large proportion of the phosphorus entering the lake will help us meet the desired water quality.

1.6 What other factors could be affecting water quality?

The community identified other factors that could be causing a drop in the water quality in Lake Ōkātina⁴:

- Animal pests damaging the native bush could cause higher levels of nutrients going into the lake
- Aquatic pests could upset the balance of the lake
- A need for more facilities (toilets) for visitors and events around the lake.

We don't know to what degree the water quality is affected by pest animals degrading the native bush. The community has observed a significant impact on the native bush and scientists recognise that it is an area that requires further investigation.

The community is also concerned about having enough public toilets available, particularly during events. The presence of *E. coli*⁵ usually means that faeces has entered the water. The good news is that the Lake Ōkātina swimming area has consistently low levels of *E. coli* in the water, and it is safe for swimming.

Figure 6. Differences in native bush when animal pests are excluded



The community is concerned about damage to native bush from pests. Understory vegetation is important for the forest ecosystem. The photos show the difference 10 years after the animal pest exclusion area (near Oruaruoa) was installed – the left photo shows outside of the pest animal excluding area, and the right photo shows inside of the pest animal excluding area.

⁴ Bay of Plenty Regional Council, Te Arawa Lakes Trust, Rotorua District Council and key lake stakeholders (2012) Lake Ōkātina Water Quality Workshop

⁵ *Escherichia coli*, a type of human and animal gut bacteria.

1.7 What would happen if we did nothing?

If current actions continue and the environment (for example, the climate or the land use) stays the same, it is likely that Lake Ōkātaina's water quality will remain steady. Current actions are listed as "ongoing" actions in Table 1 and 2.

There is an unknown risk of the increasing trend of phosphorus entering the lake. There is also a risk around the high oxygen depletion rates, where the amount of oxygen diminishes more quickly in the deep parts of the lake.

Once oxygen levels drop to a certain point, nutrients would increasingly be released from the bottom of the lake. Once this process has started, it is very difficult to reverse. Nutrients from lakebed sediments would have a significant effect on the lake water quality, leading to rapid growth of unwanted algae and a reduction in the clarity and visibility of the lake water. Low oxygen levels also increase the risk to the health of fish in the lake. The oxygen levels are currently being monitored monthly by the Bay of Plenty Regional Council.

1.8 What are our assumptions?

Scientists have had to make certain assumptions in order to undertake the difficult task of estimating the nutrient budget for Lake Ōkātaina⁶. These assumptions include:

- The lake level will remain stable
- The water flow of the Lake Ōkātaina catchment is similar to other Rotorua lake catchments
- Nutrients entering the lake as a result of land use occurs at a similar rate as recorded in other Rotorua lakes
- No significant land use change has occurred in the last ten years.

Scientists also make estimates around the nutrient budget. These estimates include:

- The amount of nutrient that stays in the lake
- The amount of nutrients coming from sewage and stormwater.
- The accuracy of the nutrient budget is affected by data availability.

1.9 Actions to improve water quality

Lake Ōkātaina is somewhat of a unique situation – a lake with good water quality, where the activities in its catchment suggest the lake should have a low trophic level index.

However, we need to reduce the nutrients entering the lake by 860 kg of nitrogen and 380 kg of phosphorus every year for Lake Ōkātaina to achieve its water quality target.

We are reasonably confident that the nitrogen target could be achieved by land use change from agriculture to forestry. However, this would only happen if the landowners are supported by financial conditions.

⁶ McIntosh prepared a Lake Ōkātaina Nutrient Budget in 2011.

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To assist landowner decision making, the Regional Council will provide support for a one-off land use change to help Lake Ōkātaina meet its nitrogen reduction target.

At this stage, we do not have enough information about how the phosphorus target can be achieved. Approximately 57% of the phosphorus entering the lake comes from native bush. As yet, we know very little about how to reduce nutrients entering the lake from native bush.

One of the key actions proposed in this plan is to investigate how the water quality is affected by the state of the native bush. This would provide us with new evidence on whether animal pest control will significantly reduce the nutrient input.

As new evidence becomes available, we will take an adaptive approach – that is to act (and consult) on the most effective, efficient and appropriate options available for improving water quality in Lake Ōkātaina.

In the meantime, there are still actions that can be taken to protect and restore this sensitive and vulnerable lake catchment. We know that further land use change can help lowering the level of phosphorus. In the future, the Regional Council will consider supporting land use change proposals that clearly contribute to lake water quality improvement.

While many of the on-going actions are funded through current work programmes (for example, the Sustainable Land Use Programme), no specific funding is allocated to the Lake Ōkātaina catchment.

Table 1 and 2 below outlines what work is being done and can be done to help protect the water quality of Lake Ōkātaina.

Table 1. Actions for reducing nutrient input and improving water quality

Actions we can take	Timeframe	Led by	Effectiveness in reducing nitrogen and phosphorus
Reducing nutrient input			
Voluntary change to less nutrient-leaching land use	Ongoing	Landowners, if supported by financial conditions	A recent voluntary land use change is estimated to have met 78 % (671 kg out of 860 kg per year) of the nitrogen reduction target, and nearly 10 % (37 kg out of 380 kg per year) of the phosphorus reduction target.
Provide support for meeting the nitrogen reduction target by converting some pastures to forestry	2013 – 2018	Bay of Plenty Regional Council	A one-off support aiming to reduce 189 kg of nitrogen (meeting the target) and 10 kg of phosphorus.
Consider opportunities and methods to further reduce phosphorus by supporting large scale land use change	2017 – 2023	Bay of Plenty Regional Council	A support aiming to reduce 120 kg of phosphorus and further reduce 2,200 kg of nitrogen.
Looking into pest control options in the catchment	Initiated, and will continue if funding is available	Department of Conservation, assisted by local iwi and lake community	The effectiveness is being investigated. If new evidence suggests this action is highly effective it will become a priority area.
Voluntary land and farm management practice that reduces the potential for erosion, sediment loss or nutrient loss into waterways (stewardship management approach)	Ongoing	Landowners, assisted by Bay of Plenty Regional Council (advice and possible subsidy)	Relatively effective depending on farm conditions.
An effluent treatment rule: septic tanks within 200m of lakes are required to install an Aerated Wastewater Treatment System with nutrient reduction capabilities or obtain a resource consent	Rule is enforceable from 1 December 2013	Bay of Plenty Regional Council	Effect will be minor, due to the small population around the lake.
A policy that sets nutrient discharge limits in the Regional Water and Land Plan for all Rotorua Te Arawa Lakes	Proposed Regional Policy Statement requirement	Bay of Plenty Regional Council	Yet to be determined.
Review regulatory interventions for all Rotorua Te Arawa Lake catchments	Ongoing	Bay of Plenty Regional Council and Rotorua District Council	Yet to be determined.

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Table 2. Other actions for reducing nutrient input and improving water quality

Actions	Timeframe	Led by
Building awareness and knowledge about nutrient sources		
Investigate and measure the impacts of native bush understory health to lake water quality	2013 - 2016	University of Waikato, led by Chair in Lakes Management and Restoration
Update community on Lake Ōkātina’s water quality trends, including Lake Ōkātina Scenic Reserve Board, Ngāti Tarāwhai Iwi Trust	Starting from 2013	Bay of Plenty Regional Council
Invite interested Lake Ōkātina stakeholders to forums presenting lake science	Ongoing	Bay of Plenty Regional Council
Monitor Trophic Level Index and de-oxygenation rates	Ongoing, monthly	Bay of Plenty Regional Council
Report to the Lake Ōkātina community on water quality	Ongoing, annually	Bay of Plenty Regional Council
Provide sustainable land-use information through workshops, field days and discussion groups Workshops have been held with the forestry sector about earthworks and harvest practices	Ongoing	Bay of Plenty Regional Council and partners
On-farm benchmarking	Ongoing	Farmers across border between Lake Ōkātina and Lake Rotorua catchments, supported by Bay of Plenty Regional Council
Ensuring the amenity of the lake		
A rule to ban jet-skis and water-skiing on the lake. Other boats must travel 5 knots within 200m of the shore	Completed	Rotorua District Council / Bay of Plenty Regional Council
Control aquatic weed. A hornwort incursion response plan was formulated in response to a 2010 hornwort incursion	Completed with on-going observation	Bay of Plenty Regional Council

1.10 **Action plan review: What will we do if circumstances change?**

An action plan is developed based on our current knowledge. In the case of Lake Ōkātina, there are things we know, and some things we are yet to learn. For example, we don't know what specifically caused the water quality to change, and to what degree restoring the native bush will help improve the lake's water quality.

Sometimes new information or evidence becomes available, and this provides us with more opportunities for new action. We will be alert to the possibility of new information and will review our options if and when new evidence emerges. In this way, we will focus our efforts on the most effective and suitable actions to protect and improve the water quality of Lake Ōkātina.

Appendix One

Map Lake Ōkātina surface catchment (2006) and land-use (2003) indicative map

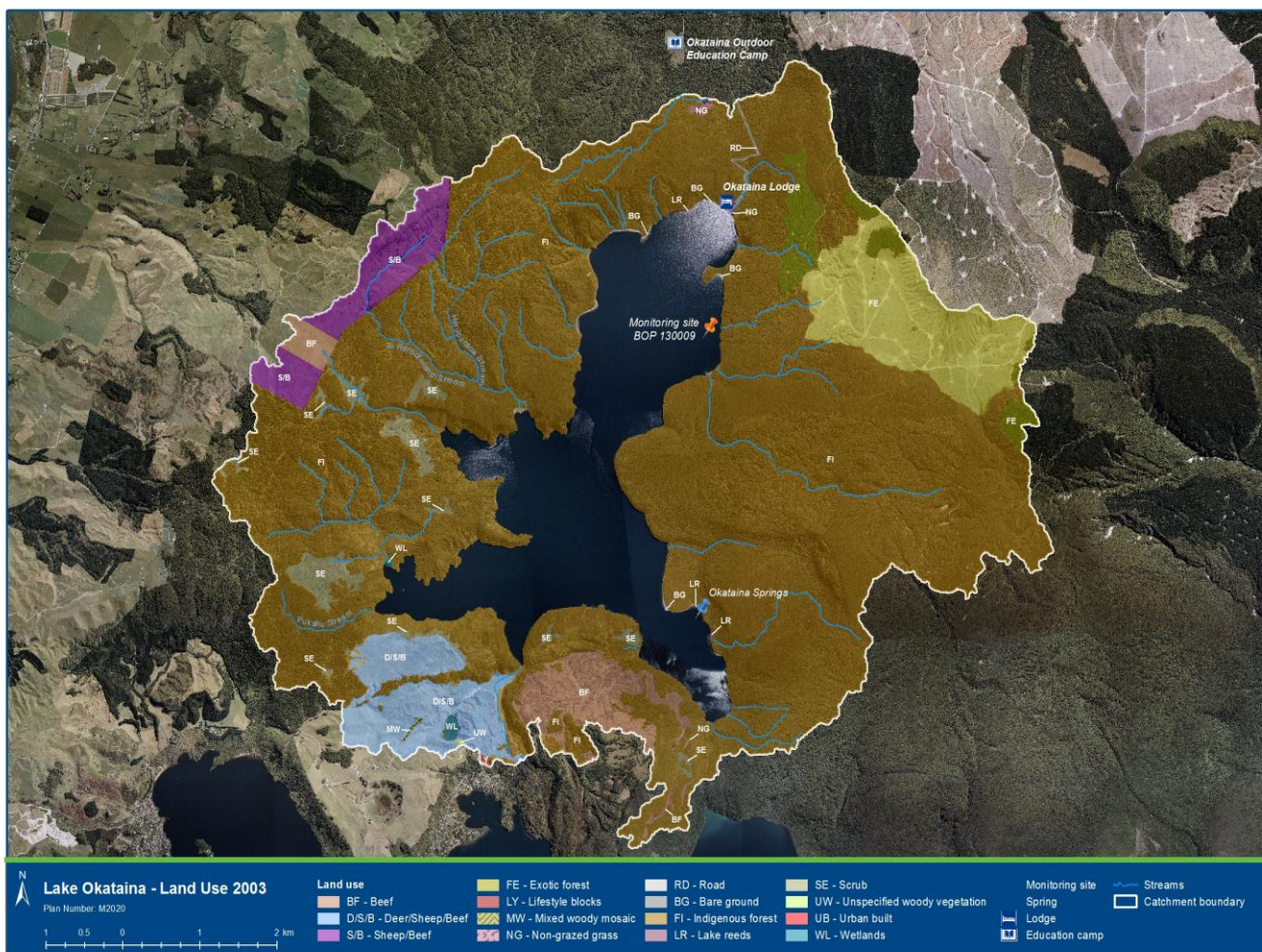


Table Estimated nutrient budget based on land-use loss estimates (data extract from Lake Ōkātina Nutrient Budget)

	Area ha	Rate of P loss kg/ha/yr	Rate of N loss kg/ha/yr	P Load kg/yr	N Load kg/yr
Bare ground	2.7	0.15	4	0.4	10.8
Exotic forest	436.0	0.40	4	174.4	1744.0
Indigenous forest	4224.8	0.28	3	1182.9	12674.4
Pastoral land	548.7	1.00	15	548.7	8230.5
Reserve, buildings, parking wetlands	2.8 7.6			0.9 0.0	71.0 0.0
Sewage, septic waste (30 persons/d; 3.65 kgN/p/yr, 0.37 kgP/p/yr)				11.00	110.00
Rainfall on lake*	1067.9	0.15	4	160.2	4271.6
TOTAL	6291			2079	27112

Stormwater (reserve and parking area) estimates are from Williamson (1985), Rainfall nutrients to lake (Hoare, 1987)

*Rainfall on lake is not a loss from the land catchment.

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