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NEWSLETTER OF THE
LAKESWATER QUALITY SOCIETY

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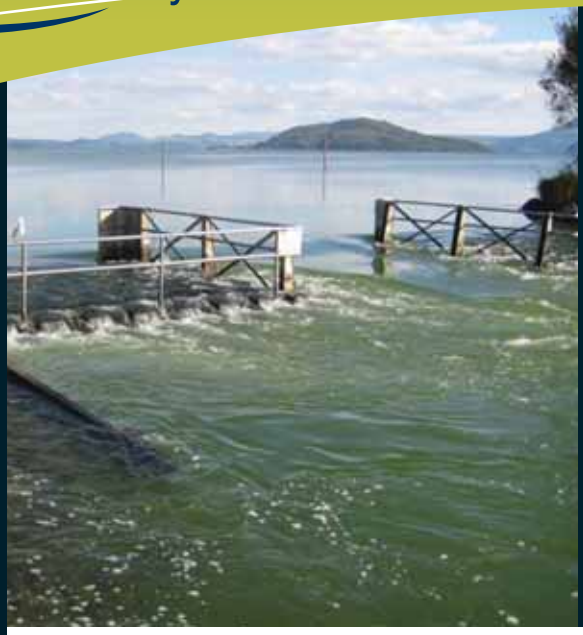


this issue

Acknowledgements : content for this newsletter is derived from various sources and is referenced wherever possible.

Acknowledgements

The Lakeswater Quality Society wishes to gratefully acknowledge the generous financial support of the following businesses and organisations that have contributed to the cost of producing this newsletter.

Further offers of support for future newsletters would be most appreciated – please contact our Treasurer whose contact details are on page 8 of this newsletter.

Capers

Lake Okareka Cottage & Loft

Pig & Whistle

Rotorua Energy Trust

Scion

Unusual Bloom

In late June a highly unusual *Microcystis wesengergii* bloom event occurred on Lake Rotorua. There were large quantities of dense teal-green scum, sometimes quite sparse and fragmented, but often in larger grey-green clumps with a teal-green overlay. The size was up to 20 cms across but more typically under 10cms.

Experts had never seen a bloom just like this before, but it is not regarded as toxic.

The community is urged to report such unusual events – **vigilant bio-surveillance** is a critical component of lakes water care.

Positive Directions for Lake Rotorua

EBOP's Special Projects Committee has been doing some great work towards improving water quality in Lake Rotorua. The Regional Council Meeting on 4th June approved the Committee's proposals for Lake Rotorua.

An important decision was the revised 2019 target for reduction in nitrogen export to the Lake Rotorua catchment. Nitrogen pollution will now come down from the current 746tN to a sustainable load of 435tN. CEO Bill Bayfield regards this as **"an ambitious but important yardstick".**

The costs and benefits of possible measures will be reassessed, and a set of projects and actions devised. Further investigations will be undertaken, but decisions must be made for specific measures before the triennial review of the Funding Deed with Central Government due March 2011. Hence this work must be completed by December 2010.

The decline in water quality caused by the discharge of nitrogen and phosphorus from land (especially from farming) is a long-running environmental issue. Sensible land use is crucial to achieving the nutrient reduction targets. This is one of the most significant challenges facing EBOP and the Rotorua community. The Special Projects Committee has concluded that **major land use change is the only viable option to achieve required targets.**

Six significant recommendations are to be progressed as a single package – The Land Package. This will include -

- a review of the nutrient reduction targets for Lake Rotorua
- 'in-lake' and 'within-catchment' actions
- a cost-effectiveness analysis of interventions to which EBOP is already committed
- further consideration of regulatory mechanisms
- an exploration of options for land-use change (including options for rural land retirement, cost assistance programmes to reduce nutrients, and reverse tenders)

A surprising recommendation – and contrary to LWQS views - was the rejection of both **'best-farming practice'** and **nutrient trading**. Such **voluntary stewardship** is not considered by EBOP as a preferred option – these approaches, in the absence of assistance programmes and back-stop regulations, were thought by the Special Projects Committee as unlikely to significantly reduce nutrient inputs to Lake Rotorua.

Gorse also comes in for the chop. It is estimated that 43t N is leached from about 900 ha of gorse within the catchment. Getting rid of gorse is to be encouraged and implemented as part of the recently proposed Regional Pest Management Strategy.

(ref. Regional Special Projects Committee Position Paper on Lake Rotorua)

Rotorua Energy Charitable Trust
Lake Okareka Cottage and Loft
Historic Pub PIG & WHISTLE
CAPERS
SCION Next generation biomaterials

Rotorua Lakes Protection Restoration Programme

Floating Wetlands

EBOP and the Te Arawa Lakes Trust now have a resource consent that allows the development of floating wetlands in eleven of the Rotorua Lakes. This is an exciting development that allows community groups to initiate a useful intervention which contributes to the programme of restoration, but also helps lift community awareness about lake restoration work.

The first wetland to be developed under this consent will be located adjacent to the Taheke Marae, an initiative led by Hakopa Paul.

For further details contact EBOP Rotorua Lakes Section staff.

The **Rotorua Lakes Protection Restoration Programme** is a joint venture between Environment Bay of Plenty (EBOP), Te Arawa Lakes Trust (TALT), and the Rotorua District Council (RDC). It is aimed at protecting and restoring water quality in the twelve Rotorua Lakes. A number of these lakes are eutrophic with excess nutrients in the water column causing proliferation of algae growth.

The programme includes development of Action Plans for each of the lakes, with specific methods and actions recommended to the partners to guide protection and restoration actions. Generally these will include such interventions as sewage reticulation (managed by RDC) and other means of addressing the input of nutrients from point and diffuse sources within each lake catchment (managed by EBOP). – eg. algae and weed harvesting, sediment capping, and nutrient locking.

Algae Biomass Harvesting

Since early May two large blue containers have been in place adjacent to the Ohau Channel, clearly visible from the main road. These house a pilot-plant to trial the concept of algae harvesting and hence the removal of associated nutrients (N and P). This is part of the Rotorua-Rotoiti Action Plan to investigate biomass harvesting, and is a 'proof of concept' trial to investigate the relevance of algae harvesting within the action programme. The project is being undertaken in conjunction with Aquaflow Bionomics Ltd - a Nelson company which designed the harvesting equipment - and NZ Trade and Enterprise, who are a funding partner. The aim is to test the quantities of wild algae that can be harvested.

Algae can have a number of economic end uses such as production of bio-diesel and activated carbon for filtration uses, so there is interest in assessing potential harvest quantities.

The equipment is located on land belonging to the Waiatuhi Trust and access to this land has been supported by the Trustees, Mr Fred Whata and Cr. Tai Eru.

Water is taken from the Ohau Channel, dosed with flocculent, and algae separated for further analysis. Treated water is returned to the Ohau Channel with most algae and flocculent removed.

Lake Rotoehu Initiatives

It is an exciting time for projects in Lake Rotoehu - there are a number of initiatives coming to fruition now that community consultation has been completed and consents confirmed. A **phosphorus-locking plant** at the Waitangi Soda Springs will be located on Trust property and is aimed at removing from the stream, the total annual target of 700kgP. The development of this plant has relied on the support of three Māori Trusts and this is greatly appreciated.

Floating wetlands have been trialled on the Tautara-Matawhaura Farm to assess their value in removing nutrients from water. This trial will be completed in August 2010 and the results are expected to facilitate a funding application to the Ministry for the Environment (MfE) for a full-scale floating wetland in Lake Rotoehu. Pending funding, this will be implemented in early 2011.

Consent applications are anticipated for **bio-treatment applications** in Otautu Bay. This technology uses concentrated soil bacteria to break down organic material in sediment and the water column. It has been used by EBOP scientists to treat a small lake in Whakatane and this technology will now be assessed at Lake Rotoehu in terms of improvements to water quality and bottom sediments. This technology is unlikely to be economic if applied to the whole lake, but may be of benefit if used strategically in selected areas.

Weed harvesting has also continued in Lake Rotoehu. The results have been impressive, with 3000 tonnes of weed harvested last year, equating to the total N and P target for that lake. EBOP has also completed the 2010 programme for Rotoehu, and harvesting was completed in March for Okawa Bay, Lake Rotoiti.

Continued vigilance is required from boat owners to ensure trailers are fastidiously cleaned. It would be a shame indeed if hornwort were transferred to Lake Rotoma – it would only take a fragment the size of a thumbnail!

EBOP continues to work with landowners to reduce nutrient losses from the Lake Rotoehu catchment. All properties have been benchmarked and considerable progress has been made on the retirement of lake edge farmland and the planting of native species.

Perspective from the Chair

John Green

In the last six months we have seen significant progress in the way the Rotorua Te Arawa Lakes Strategy Group partners are addressing lake water quality issues.

In our October 2009 newsletter we expressed our disappointment in the 240 years time frame being proposed to achieve a 311 tonne reduction in nitrogen loss in the Lake Rotorua catchment. On 16 April 2010 an amendment was proposed to the Strategy Group as follows:

- the Regional Special Projects Committee confirms that the nitrogen export target from land to Lake Rotorua shall NOT exceed 435 tonnes in 2019 as set out in the Draft Regional Policy Statement
- the Regional Special Projects Committee has concluded that major land use change is the only viable option to reach the nitrogen export target of 435 tonnes in 2019

This proposal was adopted and is now EBOP policy. What this means is the target has now been "reined-in" to 9 years rather than 240 years. This is a huge turn around and we congratulate all those who were involved in this very significant decision for Lake Rotorua. The challenge will be to get 311 tonnes of N out of the catchment by 2019. However with a combination of "best farming" practices and incentives for land use change the targets should be achievable.

Our committee recently visited several dairy farms in the Waikato region where the farmers have been concerned about the environmental impacts of their operations. They had implemented 'nutrient management plans' and were able to demonstrate by using the "Overseer" model, that they could achieve significant reductions in nutrient leaching, whilst not impacting adversely on profitability.

Research clearly demonstrates achievable leaching reductions from the typical 50kgN/ha/yr down to 26kgN/ha/yr, and for sheep and beef farms down from 18kgN/ha/yr to 12kgN/ha/yr.

Question - How would such reductions impact on Lake Rotorua's catchment?

Answer – 217tN or 94% of the 231 tonne pastoral farming target would be met if achievable research targets were adopted in the Lake Rotorua catchment. (refer table below)

These targets do not include the benefits of wintering dairy cows outside the lake catchment. In our submissions to EBOP and RDC we continue to stress the high level of nutrient leaching that occurs from grazing cattle and dairy cows over the winter period in the Lake Rotorua catchment.

Obviously there are a lot of differences between catchment systems. However, through the use of 'best management farming practices' and an innovative range of tools to assist farmers, the revised nutrient leaching targets set by EBOP do appear to be achievable. **As a Society we accept that there is some gap between possible reductions and practical outcomes; in our vision for the catchment (p.5), therefore, we have taken a far more conservative view.**

Freshwater Policies

Two key documents which will underpin the future sustainability of the Rotorua Te Arawa Lakes are the Regional Policy Statement (RPS) and the District Plan. LWQS has made strong submissions on both draft documents and will continue to monitor their progress to finalisation. These have been listed on our website for those who wish to read the detail.

Finally, I would like to go on record to say how impressed our committee was with the Draft Report on the National Policy Statement for freshwater management in New Zealand. The authors have developed an outstanding set of policies which we trust will find their way into a government mandated National Policy Statement. It is important for both the freshwater environment and for certainty for dairy farming that clear guidelines are established as soon as possible. What is more, the experience with the Rotorua Lakes, which is one of the most sensitive zones in New Zealand, shows that technical and economic solutions should not be as difficult as once thought.

We strongly encourage Dr Nick Smith, Minister for the Environment, to expeditiously see this process through to a finalised NPS.

LWQS is currently putting great emphasis on Lake Rotorua. At the same time we are keeping strong pressure on the authorities to fix all the lakes. It would be the depth of stupidity to defer action on pristine lakes until they had become degraded.

LAKE ROTORUA CATCHMENT	kg/N leached/ha/yr (000 kgs)
Total exports from catchment	746
Less Target	435
Total reduction required	**311**
Less Non-pastoral targets	80
Reduction required from Pastoral Farming	**231**
Research targets applied to Lake Rotorua catchment	
• Dairy – 5,883 ha x (50 – 26 kg/ha/yr)	141
• Sheep & beef – 12,759 ha x (18 – 12 kg/ha/yr)	76
Reduction in N loss in catchment	**217**

Waiora – Teachers' Resource

This resource was initiated by LWQS

Waiora (Healthy Water) – A Teachers' Resource is a 162 page publication produced several years ago by Environment BOP as a means of enhancing Environmental Educational teaching within primary and intermediate school classes (designed for Levels 2-4) as part of the Ministry of Education Curriculum Framework.

It's aim is to promote the key factors of *Awareness and Sensitivity* to the environment and related issues; *Knowledge and Understanding* of the environment and the impact of people on it; *Attitudes and Values* that reflect feelings of concern for the environment; *Skills* involved in identifying, investigating, and problem solving associated with environmental issues; and a sense of responsibility through *Participation and Action* as individuals, or members of groups, whanau or iwi in addressing environmental issues.

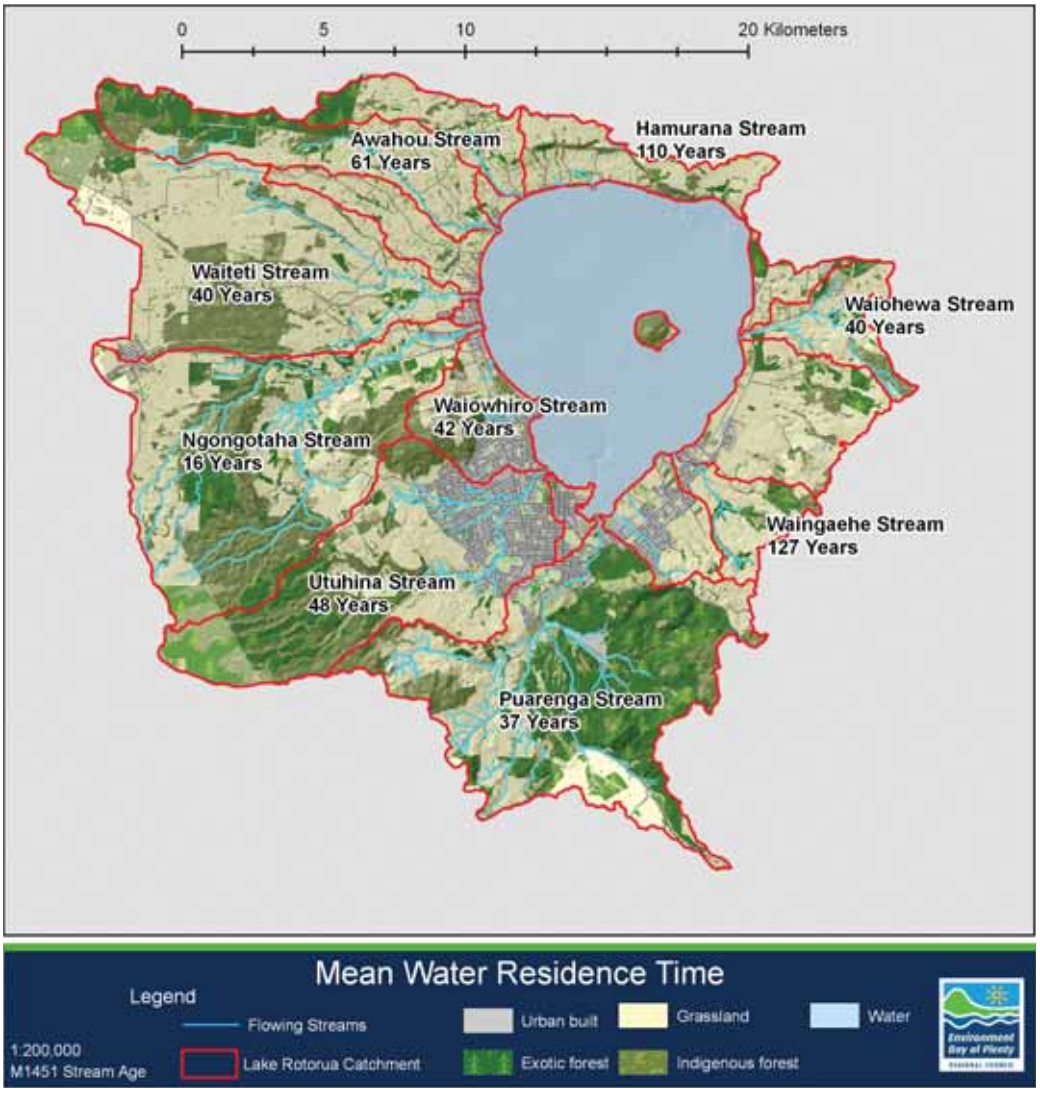
Its main focus is on water quality issues within the Bay of Plenty and it encourages teachers and students to examine and explore the concepts surrounding the natural cycle of water and the impacts that arise from people's use of water and land. The publication has been compiled with the assistance of several other teaching groups and is an excellent resource for the purpose of elevating the attitudes and values of our upcoming generation towards sustainable resource management both within the region and wider afield.

Further information with regard to this publication can be obtained from Environment BOP, phone 0800 ENV BOP (3638 267).

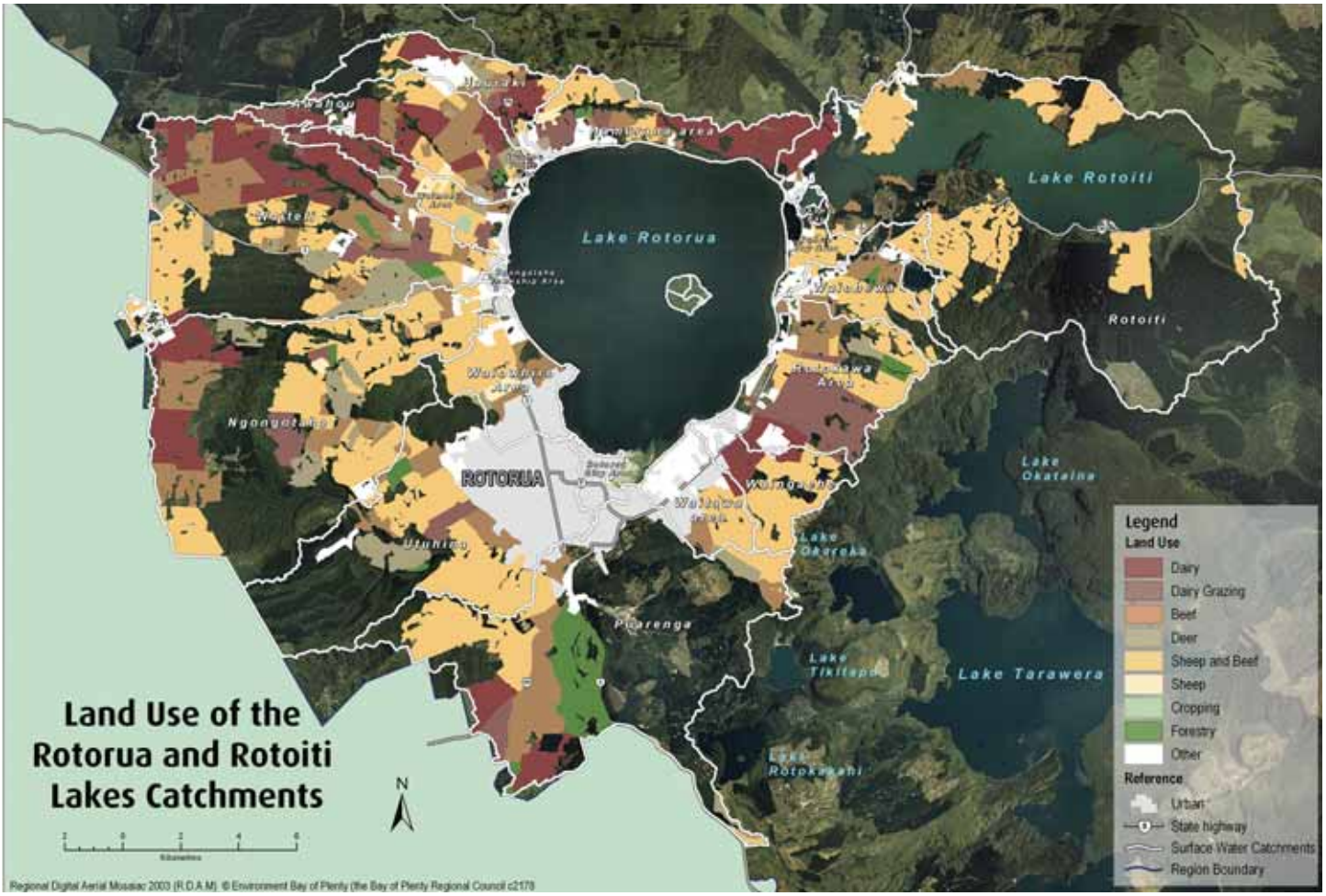
Groundwater Age

The time taken for nutrients to pass through the groundwater system towards the lake is called “the groundwater lagtime.” In some sub-catchments it will be 150 years before some of the nutrients in groundwater actually enter the lake. This will cause problems long into the future.

This lag is the reason why current exports from land (747tN) do not immediately reach the lake. In fact the current inputs to the lake are somewhat less at 556t N and 39.1t P – some nutrients are still in transit. Without significant in-lake mitigation, it is therefore anticipated that Lake Rotorua water quality will worsen before it improves. It also means that the level of required nitrogen reduction will increase with time.



GRAPHIC COURTESY OF ENVIRONMENT BAY OF PLENTY



GRAPHIC COURTESY OF ENVIRONMENT BAY OF PLENTY

LakesWater Quality Society - Vision for Lake Rotorua

Lake Rotorua has been labeled *'the monster'* but our Society believes this over-states the actual restoration challenge. Based on analysis of the science, and our understanding of the problem facing Lake Rotorua, the LakesWater Quality Society is promoting a solution which could see our lake restored at an affordable cost within a decade. Our proposal embraces sustainable dairy and sheep farming, more forestry, a more diverse economy with 30% of the catchment retired from farming, and a wealthier community.

Nutrient laden waters entering the lake are the principal problem and 80% of these nutrients come from farming - this is the indisputable consensus of sound science. We are now obliged to find, as a matter of urgency, an economically viable and sustainable solution to this issue. A reduction of 231t of nitrogen from the pastoral catchment represents 41% of all N currently exported from farming and this needs to be eliminated. While daunting to some, through a multi-faceted approach, this target is readily achievable. To ensure the solution is fair to all, a **regulatory framework will need to be in place** – and in an ideal world, this framework would be negotiated with stakeholder involvement.

The adoption of 'best-farming practice' is fundamental to achieving the required reductions. It is necessary to implement practices which do not significantly impact on farming profitability; such measures will require a higher level of management skill, but we are sure our farmers can rise to the task. We have focused on achieving a 20% reduction of nutrients from dairying and 10% from other livestock classes - readily achievable when compared to results under research conditions. A reduction of approx. 60t is required through this mechanism, representing 25% of the total 231t required.

A further and similar level of reduction is required from pastoral land through a second suite of actions on farms. Our Society acknowledges that these changes will impact on farm profitability, and that public funding of interventions will be needed, as is the case with the Lake Taupo strategy. Examples of this type of expenditure would be assistance to construct herd homes, planting of forestry, establishment of wetlands and the implementation of filtration barriers. In Taupo, nutrient discharge rights are being purchased for approximately $400 per kg of nitrogen. At that price $25m would need to be invested in the Rotorua catchment – a relatively small cost for lake restoration.

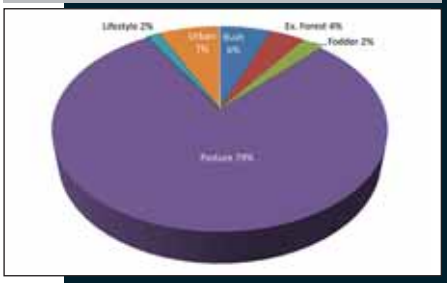
The above two mechanisms would achieve a reduction of 120t of nitrogen - the remaining 110t is likely to be difficult to remove from farming without significant impact on profitability. As a community, therefore, we need to facilitate and encourage substantial land use change through the retirement of land from intensive farming. About 30% of the whole catchment needs to be retired and there is no funding committed to achieve this. So how can we do it? **The key** is to allow residential and lifestyle subdivision of 30% of farmland, in a manner which permanently removes nitrogen from the catchment eg. the right to subdivide one lot for every 180kgN permanently removed. A target of 109tN is required from this mechanism and would be achieved if approximately 600 lots were subdivided – perhaps 60 per year for ten years.

Given Rotorua's current low rate of growth this is an ambitious target, and tangible support from Council would be required to promote the Rotorua District as a preferred place to live. The market is subdued at present but cycles do come and go. The aesthetic character of the district would inevitably change and our very best sites would need to be offered-up to attract buyer interest. The result would be more houses around the lake, sited for the most attractive views.

Sorting out the catchment within a decade will put us well on the way to recovery for Lake Rotorua. In the short term, improvement in water quality will need to come from in-lake and in-stream treatments. EBOP has already engaged a range of interventions which are supported by good science, but has still to address the release of nutrient from the sediments. We understand research is ongoing and there are some interesting prospects. A strong and continuing effort is needed to ensure an answer is found so that once again we can enjoy and take pride in our lake.

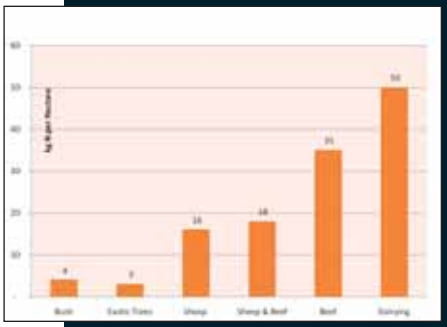
Land Use in Catchment

Nutrient Losses from Catchment



Farming Land Use

Nitrogen Leaching kg/ha



Catchment Nutrient Targets	
	Leached/ha/yr
Current exports from catchment	746t N
Less Sustainable load	435t N
Total Reduction required	**311t N**
Less Non-farming targets	80t N
41% Reduction required from farming	**231t N**

The Bucket of Solutions	
Requires combination of options	Reduction/ha/yr
Optimum Outcome	
• Best-farming practice – 70% of land Dairying 20%, Sheep Beef Deer 10%	59t N
• Assisted nutrient reductions Dairying and establishment of forest	63t N
• Retired farm land – 30% of land Subdivisional rights granted	109t N
Total	**231t N**

NUTRIENT BUDGET

ie. 'nutrients in and out'

A nutrient budget essentially looks at the mineral inputs to a farm, from things such as fertiliser, feed, effluent sources, clover fixation, and nutrients released from the soil. The outputs include milk, wool, meat, supplements sold, and transfers. It takes into account gaseous losses and minerals locking up in the soil – this varies by soil type. The outputs also measure losses from the farm (diffuse losses). A nutrient budget **does not tell you how to fix things**, or what to do about an issue.

NUTRIENT MANAGEMENT PLAN

ie. 'nutrients in and out', plus 'how to reduce losses'

This combines a nutrient budget, with the **steps of how to reduce nutrient and sediment losses from a farm system.**

WHOLE FARM PLAN

ie. 'nutrients & farm resources', 'reducing losses', 'farm system style' and 'economic impacts'

A whole farm plan takes into account all of the above, but in addition considers the business goals and constraints that influence farm system design. Changing some things like N use may influence the whole system; therefore it needs to be considered as part of a larger plan, and the economics of change need to be addressed. The "Whole Farm Plan" does this, and gives an **environmental footprint for the business; it looks at the whole farm system, and the impact on profit of any changes.**

Nutrient Budget vs. Whole Farm Plan - is there a difference?

Alison Dewes

What is diffuse pollution?

There is a lot of talk around this topic, and some of it is quite confusing. Diffuse pollution is what leaks from farms over time. It is not the effluent spills, or runoff from things like silage stacks or dirty drains, but it is the more general, widespread loss of nutrients across the whole farm. Some of these diffuse losses include -

Nitrogen Leaching (N Loss) – this is the nitrogen that enters soil water from high concentrations in animal urine, but also from leakage through soil that is already full of nitrogen. It is more pronounced on free draining and younger soils (ash and pumice), where there is high rainfall. This N eventually makes its way into groundwater, and then on into the rivers & lakes. Nitrogen leaves the farm underground in the subterranean water.

Phosphate Runoff (P Loss) – Phosphate is typically lost by above ground runoff, and enters rivers and waterways more directly than nitrogen. Phosphate also contributes significantly to the degradation of waterways, with losses derived from silt erosion and surface dung patches. It is worse when soils are already high in phosphate levels, and when more P fertiliser is applied.

Coliform Losses (bacteria from cow dung) – this is from animal excreta that is washed off hillsides and pastures, especially in high rainfall months. This can result from effluent applications in wet weather, but also from heavy stocking, and soil damage in the wet months of the year. Coliforms can also make their way to our groundwater, leaching down through the soil.

Sediment Losses – this is essentially about the loss of topsoil. So any actions on-farm that damage the integrity of soils can increase the risk of losses.

Can we fix it?

In many cases, if we are aware of it, and understand the issues, there are many things done to reduce "diffuse leaking" from farms.

It is possible to manage these things, still be profitable, and run a good farming business.

There have been studies to show this, and there are plenty of good farmers already combining profitable businesses with low impact, low leaching farming systems.

Some "standard practice" could be handled a little differently. The applicability of each option will differ between farms. In all cases, it is really important to consider a well-thought-out plan of how a farming system could look, in a way that suits the operator's goals, business constraints, the herd, and the particular soil type. Farming is a business, and responsible environmental management is now part of the public expectation. That is a tough call, as we all know, because farms have cross-over with several biological systems, all of which can be a management challenge at the best of times.

Good planning for farm systems is now essential, and there is some great technology and software tools available for advisors to ask the "what if" questions for a farm business. This technology helps farm owners to plan appropriate pathways forward that make good sense from business, farming and environmental perspectives.

In all cases, a 'whole-farm plan' will look at the economics of change to lower the environmental impact of a farm.

It will take into account the business goals, the capability, and also match a system to the special physical attributes of the land and herd.

Management Options to Reduce Nitrogen Runoff

MANAGEMENT OPTION	POTENTIAL % REDUCTION OF NITROGEN LEACHING	ISSUES TO CONSIDER
Lower nitrogen use (lower overall with no winter use)	↓10-20%	No use of N in winter, strategic use of N during other high growth rate periods can be profitable.
Better capture of effluent and use of grazeable forage crops without extra nitrogen use	↓ 10-15%	Crops such as chicory or millet do not allow soil mineralization. Minimum tillage and effluent application help nutrient efficiency and protect the soil.
Reduce stocking rate by 10-25%	↓ 3-20%	Results can be variable. This can be a profitable option on highly stocked farms.
Use of nitrification inhibitor DCD	↓ 0-10%	Variable results. Depends on soil type.
Feed-pad use, winter stand-off, improved effluent capture	↓ 3-15%	Removal of cows from wet soils and feeding on pads in winter, capture of effluent with reuse on crops. Welfare of animals needs management if standing-off for long periods.
Higher per cow, lower stocking rate, use of low protein feeds	↓ 3-10%	Improved N efficiency in the system. If feeds sourced at 5-7% of milk price and well-managed can be a profitable option. High skill levels required.
Winter cows off	↓ 15-25%	This is an option that is acceptable if cows are grazed outside a sensitive catchment. This offers the most cost-effective N reduction option.

Herd Homes

In early May the LWQS Committee visited David & Clare Beuth's dairy farm near Mamaku. This is a 95ha property with a 41ha run-off carrying 300 cows and replacements. High average rainfall usually protects from summer drought – although this year has been an exception – but poor-draining rhyolite sub-soils predispose to drainage and pugging issues over winter and spring. Partly to counteract these physical limitations, a Herd Homes® shelter was built on this property in 2008, so we were interested to gain an insight into the impact of such technology upon farm operations and lake catchments.

Specific management of Herd Homes® varies according to the dynamics of each farm operation, but on this property the whole herd is housed from late-July until end-September. During this period the herd is housed for 18-20hrs per day and fed grass silage supplements at 5-8kgDM/cow/day (approx. 2/3 of the diet), with the remaining 4-5kgDM provided as break-fed pasture, which pre-calving and during spring is also dusted with Causmag to mitigate potential metabolic problems. Calving is also managed mostly under the Herd Homes® shelter with extra straw bedding provided for cow comfort.

Effluent Management

Beneath the slatted concrete floor panels is a sealed double concrete bunker. Effluent is caught and stored in these bunkers so there is no need for hosing down, pumping, scraping, or daily effluent disposal. Effluent, along with any feed debris, is trampled or drops through the slats and a natural dehydration process converts the wet slurry into a drier more manageable product which can be recovered by a FEL tractor once the slats have been removed. Consolidated effluent is generally removed once per annum although on some properties this may be less frequent. Recent developments now enable users to separate the liquid effluent for more immediate use as a nitrogen fertilizer source; automated systems for spray irrigation of any liquid fraction should carry the caveat that this is best avoided under very wet soil conditions or when rain is anticipated. Storage bunkers in a 60m Herd Homes® shelter hold about 500t of effluent; at current values this is equivalent to approximately $20,000 worth of fertiliser. AgResearch studies report high nutrient value in the stored effluent, especially for Nitrogen, Phosphorus, Potassium and Sulphur. Long storage capabilities also allow flexibility around when the effluent is utilised and mitigates the possible negative environmental impacts often associated with traditional effluent disposal systems.

Nutrients Applied at 10 tonne per hectare				
	N %	K %	Total N	Total K
Liquid	0.20	0.56	20kg/ha	56kg/ha
Slurry	0.32	0.50	32kg/ha	50kg/ha
Solid	0.60	0.80	60kg/ha	80kg/ha

Table courtesy of Bob Longhurst, AgResearch

What's the Verdict?

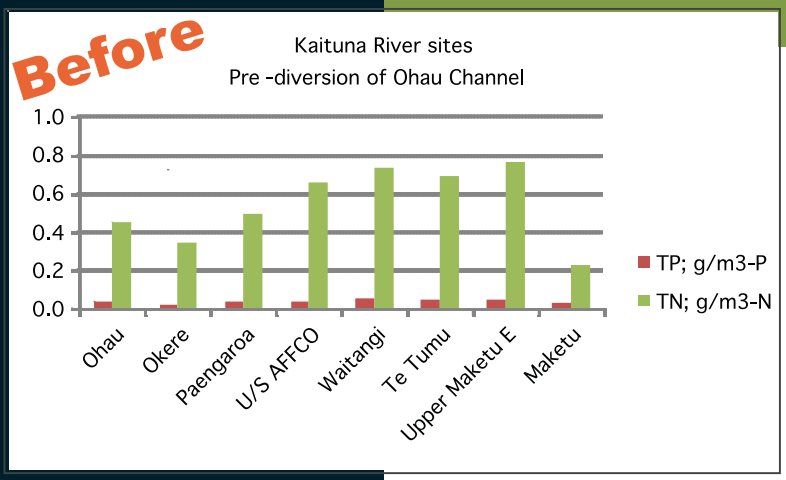
The herd 'voted with their feet' – willing to enter and reluctant to leave – and the utilisation of silage supplements seemed considerably better than that achievable under typical paddock-feeding conditions. In contrast with previous seasons, the Beuth's had silage remaining at the end of September when pasture growth exceeded herd intake.

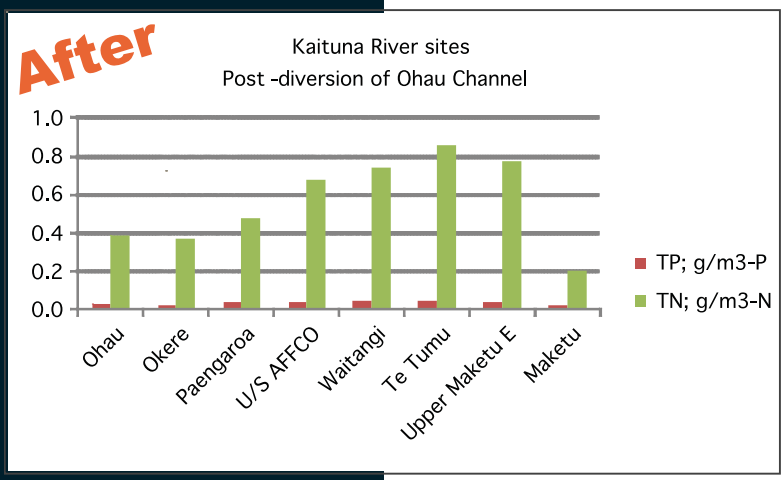
Many farmers who have incorporated a Herd Homes® shelter into their farming system are reported to have experienced substantial lifts in milk solids production and profitability; however, each farming system is unique and such increases are often multi-factorial. Experience on this farm in 2009-2010, with no other significant management changes, was a 5% increase in production in a drought year when the district average was down by approximately 5%.

Herd Homes® technology does seem to be a useful tool in a suite of potential interventions under the umbrella of 'best-farming practice'. The improved effluent management of this system shows promise to facilitate reductions in both point and diffuse pollution from rural land. Nonetheless, management care, and perhaps even regulation, may be required to limit any consequent intensification in sensitive catchments.

Potential Gains

- Reduced pasture damage from compaction and pugging
- Improved pasture growth rates from better management of residual pasture height and reduced treading damage
- Reduced need for conventional fertilizer inputs
- More even spread of 'natural' effluent
- Less nitrogen leaching
- Improved management and utilization of supplement inputs
- Shelter and shade for herd





Kaituna Changes Since the Ohau Diversion Wall

Reference : June 2010 Report to EBOP by John McIntosh

Lake Rotoiti water quality has improved considerably with construction of the Ohau diversion wall. The most remarkable effect has been a reduction in total nitrogen levels. Nitrogen was reduced immediately Lake Rotorua water was excluded.

Lake Rotorua by contrast displayed a deteriorating condition last autumn. A blue-green algal bloom affected parts of Lake Rotorua in the autumn of 2009 until the start of winter. The bloom was transported down the Ohau Channel and severely affected the Okere Arm. A similar event occurred in the late summer and autumn of 2010.

Charts on this page compare nutrient levels **before** and **after** the diversion wall became fully operative in August 2008.The measurement periods are of different lengths (approximately 10yr average before and 18mths after) so the before measurements will reflect a wider range of weather conditions – therefore, it is the *relative difference* between sites which is more important.

A relative increase in total nitrogen is recorded between Ohau and Okere as an expected impact of the diversion; however, to date, no actual increase has occurred in the average total nitrogen level at Paengaroa. Relative changes beyond Paengaroa relate to events in the lower Kaituna catchment.

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$10m funding for Rotorua lakes

More than $10m was allocated in the May 2010 budget for on-going work to improve water quality in the Rotorua lakes.

This was part of a Central Government commitment in 2004 to provide $72m over 10 years to improve the region's lakes.

A total of $93.5m will be spent over the next 5 years on central North Island initiatives. Funding for water quality initiatives will see $2.7m allocated to a reduction of nitrogen entering Lake Taupo, a $7m clean-up for the Waikato River, and $10.3m for improving water quality in the Rotorua lakes.

Lake Taupo Protection Trust

Lake Taupo also faces water quality issues and 93% of manageable Nitrogen discharge is derived from agriculture. The Lake Taupo Protection Trust (LTPT) is a multi-stakeholder group formed to address nutrient issues using both regulatory and economic tools. Variation 5 of their Regional Plan now requires **controlled activity resource consent for all farming activities** in the catchment. Nitrogen discharge from farms has been 'capped', and farm data processed for benchmarking purposes via Overseer software. Properties are bench-marked at their highest N discharge levels between 2001 and 2005, and the trading of N between farmers is permitted; however, consent amendment is required for any major change of farm practice, sale or lease.

The Lake Taupo Protection Trust was formed as a joint venture between Environment Waikato, Central Government, and the Taupo District Council; trustees also include Ngati Tuwharetoa. There is a $81.5m funding deed with annual increments payable until 2018 based on the estimated cost of land-use change required to effect a 153t N (20%) reduction from the catchment.

To date 53t N has been removed through a combination of farm purchase with on-sell to low-N users, and the purchase of N reductions from existing owners. Title covenants and monitoring tools have been used to ensure compliance. Forestry provides the main opportunity with carbon-offset agreements helping to bridge the land-value gap between forested land and historical usage.

Lakes WATER QUALITY Society

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