In the matter of The Resource Management Act 1991

And

In the matter of Proposed Change 10 to the Bay of Plenty Regional Water and Land Plan

Evidence of Lindsay Hugh Moore on behalf of himself and Alison Lyndsay Moore

Mr Chairman
Commissioners:

Personal Background

In terms of our professional careers my wife Alison and I are both fully retired, but we are far from inactive. These days we are deer and cattle farmers, forest owners and (on a modest scale) investors. In Rotorua, in particular, we are very busy gardeners and orchardists for the benefit of birds, our livestock, our extended family and ourselves – mostly in that order. This last activity has widened our understanding of the potential productivity of our land.

I am conscious of the potential smaller centre dislike of folk with Auckland postal addresses involving themselves in local problems. To see us in that way would be very misleading.

Alison's grandfather Joseph Everard Martin (JE), his brother Herbert Munro Martin (Roy) and their father Rueben Martin came to Rotorua in 1894 (the year the Frankton/Rotorua railway was opened) looking for land the brothers could farm. They acquired land at Mamaku and Ngongotaha. Although they had separate properties at Ngongotaha they worked closely together. Roy's Riverdale farm is now in part (including his house) the local showgrounds. JE's house (Northdale Farm) was on the rise across Hall Road from where the Ngongotaha hotel now stands. He donated the land for both the Anglican and Presbyterian churches in the village. After his wife died aged 51 he donated what is now Jessie Martin Park as a memorial to her.

Roy became County Chairman, JE was focussed on farming organisations including the Rotorua Co-operative Dairy Co which was at Ngongotaha. The brothers were dairy farmers, including town supply, as well as sheep and beef farmers. Once land was cleared at Mamaku it was soon found to be bush sick. Ruminants did not thrive there until after the introduction of cobalt in fertiliser. JE bred horses on a significant scale for the large sales at Oxford (Tirau).

Alison's father, Robert Henry Martin, was JE's second son. He farmed at Ngongotaha and Mamaku, was provincial chairman of Federated Farmers, a founder and director of what is now Ballance Fertilisers, and a member of the Tauranga Harbour Board. Alison was brought up on Westhill farm which bounded the Ngongotaha Stream for well over a kilometre. She attended Ngongotaha School, Rotorua High School and then, after it was split, Rotorua Girls' High School.

I came to Whakatane from Christchurch as a young qualified lawyer in May 1964. The trout fishing in the BOP was one of the attractions which led to that move. That year I started fishing in

Lake Rotorua and the other major lakes in the area and continue to do so to this day. In Lake Rotorua I waded around the stream mouths and the Ohau Channel entrance. It was only this century that I started doing any significant trolling in that lake.

Alison and I met in late 1967 and married the following year. We lived in Whakatane until late November, 1972. My involvement in water quality issues touching Lake Rotorua and its tributaries started earlier.

A Very Longstanding Community Problem Solved

Some background is required. Pinus radiata logs rapidly deteriorate unless a good proportion of the bark is promptly removed from them. Depending on a number of factors, full bark removal prior to milling may be desirable. In addition, sawmilling generates considerable quantities of sawdust and other waste. Until at least the mid 1970's, possibly even later, there was little use for bark and other mill waste. It was dumped, sometimes close to the mill, as in the case of the old Pine Milling site near Koutu corner in Rotorua which remains largely unusable still. Such dumps were prone to spontaneous combustion and, as they aged, leached tannic material which had a huge BOD. A gully across Dansey Road from Alison's parents' home had been used as a woodwaste dump then partially covered with soil. Much to their annoyance it periodically took fire and smoked, often for many weeks on end. It leached a foul dark treacle coloured liquid into areas which drained into the Ngongotaha Stream.

Application was made to the Rotorua County for consent to establish a large woodwaste dump on the property between Alison's parents' house and the showgrounds, in line of sight of their view across rural land to the lake. They objected without success so I had to bring an appeal for them. They took a little persuading that destruction of their outlook was unlikely to be a successful ground but we were able to tap into local discontent and some scientific opinion against such wood dumps, particularly near important fishing streams. Thus Martin v Rotorua County (1970) 3 NZTCPA 289. The attached copy is of the Appeal Board's signed decision which is clearer than the report copy I have obtained. I believe it was the first successful case of its type. Although the decision left the way open for a further similar application there never was one.

Within a few years the timber dump issue faded. Sawmill waste became widely used as fuel in steam plants and electrical co-generation plants, bark became a fashionable gardening aid. Technology and the marketplace solved the problem, as they often do – especially if nudged. The present significance of Martin v Rotorua County, as with the other historic cases to which I will now turn, lies not in my personal involvement but in the context of issues I raise later in this evidence.

Our Years in Rotorua

We moved to Rotorua at the end of November, 1972. From then until I changed jobs in mid 1985 I was counsel in all the planning appeals involving Rotorua City Council and, after the amalgamation, Rotorua District Council. In about May 1973 I was appointed to be the first Crown Solicitor for Rotorua. My district extended from Cape Runaway to Waihi and inland to the central plateau behind Turangi though I had amiable understandings with my counterparts in Gisborne and Hamilton as to overlaps at the periphery in the context that departmental areas of responsibility did not always coincide with Crown Solicitors' boundaries. From the outset I had an understanding with

the Solicitor General that if there was a conflict between the interests of the Crown and the Rotorua Council I would be able to represent the Council.

In my years of practice in Rotorua there were two ongoing environmental hot topics: the water quality in Lake Rotorua and the other lakes in the district; and the over exploitation of the geothermal resource in Rotorua City. Every year or 18 months there was a case touching one or the other, sometimes both. There was considerable public interest and concern, as well as the inevitable conflicts of interest, on both topics. I was fortunate in having good friends in the scientific community who kept me up to date with developments in their disciplines, sometimes even prior to publication. The two topics overlapped slightly - geothermal originated water contained nutrients – but what they had most in common was that last year's science was out of date in some significant way by the time this year's case came along. I sense that may still be so.

Initial concerns about Lake Rotorua water quality largely focused on the weed problem. Prolonged spells of strongish winds from the same quarter led to buildups of weed on the lee shore. It rotted, stank, and attracted or provided a breeding ground for hordes of insects. Lakeside property attractiveness and thus values suffered. The cure initially chosen was to spray the weed with diquat or paraquat. The consent for that went through unopposed but for some unknown reason omitted Lake Rotoma. Thus Rotorua Fishing and Shooting Federation and Ors v NWSCA (1976) 6 NZTPA. I have a copy of the report but have distributed copies of the signed decision.

Although the subject of that case was Rotoma much of the evidence related to what had occurred on other lakes where spraying had taken place. There was a strong organised group of Rotoiti residents much concerned about the spread of weed inhibiting their enjoyment of that lake. Quite a number had little jetties and modest displacement type launches. Keeping a weed free channel to their jetty had become a concern for those folk. There was evidence of evening tossing of an open bottle or two of diquat into the lake at strategic spots leading to or alongside jetties. Also evidence that most folk drew their domestic water supplies from pipes laid under and to the end of jetties or to buoys a little further out into the lake. My recollection is that both counsel and the Appeal Board (particularly its staunchly teetotal Chairman) were puzzled and a little astounded at the absence of any suggestion of poisonings, not to say fatalities, but informally concluded that the elderly gentlemen in question had not been guilty of overly polluting their whisky with water.

There was then a period of apparent progress in that the area of Lagarosiphon was seen to diminish. Secchi Disc readings in Lake Rotorua gave a very different picture. (I went on a couple of those exercises and as best I can recollect the 12 inch all white marine disc was used rather than the 8 inch black and white quartered freshwater version. In any event the disc very rapidly disappeared from sight.) It was soon obvious that the reduction in the area of Lagarosiphon was not an indication that lakewater quality had improved but that increased biomass in the water had reduced light penetration and thus the area of suitable habitat for the nuisance weed.

It was routine in those days for experts of various types to start by defining the Lake Rotorua problem along these lines: in terms of the ratio of people to lake volume (as opposed to surface area) it was the most heavily populated lake catchment in the world. Also, some of its nutrient input was from natural sources unrelated to human activity and not controllable by people. Whether that first proposition still holds good I do not know but it was certainly generally accepted then.

Even after Rotorua became a borough in 1922 and the Rotorua Town Lands Act of that year provided for freeholding of what, until then, had been leasehold land titles, it was still in many ways a small government department dominated town until well after World War 2. Then it grew rapidly. I have been unable to locate a table of population records through the years and there are indications that some counts may have been by electorate rather than urban area. At times the Rotorua electorate encompassed much of the Bay of Plenty and Central Plateau, at times there was no Rotorua electorate. I am hoping to arrange access to census records from 1926 at least. If that happens and anything useful comes to light I will put it in an appendix, meantime Statistics Department websites have yielded the following:

1951 census	14,693
1956 "	19,004
1961 "	25,068
2006 "	65,898
2013 "	65,280

As best I can tell these are permanent residents totals with tourists adding a further 10,000 or so to the later counts.

Looking at current issues through historical eyes one might be tempted to see population growth projections as a vital guide to waste water treatment plant nutrient outflows. However, improvements to that plant and future likely upgrades continue to reduce its overall significance as a source of nutrients reaching the lake. What may be relevant, but beyond the scope of the present hearing, is increased urban runoff resulting from urban intensification and expansion.

Returning to historic matters. The Lake Rotorua water quality problem increasingly became a matter of national as well as local comment and concern. The Ministry of Works, then an immensely powerful Ministry, became involved to an increasing degree and the District Council found itself in a situation where it was apparent that crucial decisions concerning waste water disposal options might well be made in Wellington rather than Rotorua. To protect its situation the District Council sought rights (in the alternative) to discharge treated waste into Lake Rotorua via the Puarenga Stream and into the Kaituna River via a pipeline. This last was very much a Ministry of Works proposal. The rights sought were granted but on terms as to the Kaituna option which seemed too short, timewise, given the capital commitment involved. The Rotorua District Council v B.O.P Regional Water Board judgment of the Planning Tribunal followed. Two sections of the decision are separately reported (1983) 9 NZTPA but for present purposes the whole decision may be useful so I attach it. The appendix is from the decision of the special tribunal constituted by the regional water board. It starts at p.7 (headed "Appendix"). I have been unable to locate p.22. Even Tribunals' Division lacks that. To lessen confusion I have separately stapled the Planning Tribunal's decision and the appendix.

The Ministry of Works offered the Council a handsome subsidy for the pipeline proposal but none for any alternative. The Council needed the subsidy for whatever option it chose. The Ministry's stand left the Council with no realistic choice though many councillors were concerned by community doubts about the pipeline. Dumping rubbish in one's neighbour's yard has never been well regarded. Maori opposition was particularly apparent. In accepting the Ministry's project and subsidy the Council had to undertake to advocate for that proposal. The Waitangi Tribunal hearing which followed (and in which the Ministry participated while keeping up the pressure on the Council

and me as its advocate to be wholehearted in advancing the merits of the pipeline scheme) was not pleasant but its outcome forced the Ministry to reconsider.

Ultimately discharge into plantation forest was adopted. It was never likely to be a permanent solution but it has provided time during which the Rotorua wastewater treatment process has been considerably upgraded. I understand from Council staff that further improvements are planned. In proportionate terms the treated waste water component of nutrients entering the lake has greatly reduced. Emerging technology, such as ion exchange, offers the prospect of reducing the nutrient content of the discharge even further to the point where it ceases to be a practical issue. For example Clean TeQ in Australia told me they expect their process (first plant currently under on site development in China) to be capable of reducing nitrogen and phosphate in discharge water to about 1ppm. District Council staff advised me that they are monitoring a number of new technologies.

It was never suggested that the Lake Rotorua nutrient input problem could be solved by eliminating the input of treated waste water, rather that, as a point discharge, it was the most convenient starting point. It was always clear that farming systems, including fertiliser input, would have to be addressed in the longer term.

From about 1980 the Bay of Plenty Catchment Commission tackled the problem of stock access to streams in the Lake Rotorua catchment. There was ample thoughtful publicity about the problems being created for the streams and for the lake (bank damage, silt and nutrients). The matter was handled exceptionally well. The Commission's approach was farm by farm and very much "on the ground". Where water systems, fence layouts and farm tracks clearly needed altering that was immediately accepted as a proper cost over and above the compensation payable for land retired from grazing and the fencing entailed in that. I had several relatives, friends and clients who were affected. I never heard a suggestion, from anyone, of resort to litigation. As far as I know there was none: a great saving in time and cost.

Why favour dairying?

Long before relatively recent expansion and intensification of dairying in the Lake Rotorua catchment, the lake water quality problems were well known to the rural community, as was the near certainty of the introduction of further remedial measures touching farming. Aggressive expansion/intensification in the face of that situation carried obvious risks. Because something is permitted does not make it a wise choice or guarantee that it will be permitted to be long lasting. Problems caused by dairy farming have arisen in many parts of New Zealand. The cost of remedying those problems needs to be borne by the dairy industry, not by other farmers who have kept to less intensive and polluting regimes. The regional council appears to have been captured by the dairy industry to the detriment of the wider farming community.

Our Deer Farming Experience

We bought our first red hinds at the very beginning of 1979 and very slowly built up a herd of reds as finance permitted. Reds were then very expensive: $3000 plus for a hind that today would be regarded as too small to breed from. We also bought fallow deer which were about 20% of the red price. Initially we ran our deer with those of other investors on "Westhill" which by then was farmed by my youngest brother in law. We learned how to handle deer, much more has been learned since.

In early 1981 we purchased our present property in Oturoa Road. It was a run down block that had long been owned by a stock trader. Our vendor had owned the property but briefly before eyesight problems forced him to sell. He had put in a large shed, three phase power and a well with a modern bottom of the well pump. He told us that the well drill had been 120 feet of rhyolitic sand before the acquifer was reached. That would put the pump slightly below the bottom of the lake. The unfiltered well water is superb. Laboratory tests by our scientific eldest daughter showed it to be the purest of a wide range of municipal and rural water samples from in and around Rotorua, Mamaku, Hamilton and Auckland.

After some deer fencing was erected we shifted our deer onto that property and slowly developed it into a fully fenced deer farm. In the early years Alison and I did the routine farm work. About 1983 I participated in the first North Island advanced deer farming course at Flock House over three days. After our shift to Auckland in May 1987 we employed a part time contract manager with me as an extra labour unit as required at weekends and during holidays. I have always done all buying and selling, culling and replacement selection as well as maintaining our detailed computerised stock records. Initially, when deer velvet prices were very high (c. $250/lb), we kept the stag fawns. One year we (or rather the vet on our behalf) velveted over 30 stags. As we slowly built up hind numbers and velvet prices dropped we reduced stag numbers down to breeding stags only.

For about three decades we have been solely a breeding and finishing operation with a small velvet yield from breeding stags (usually no more than four) and spikers (which are not able to be sent for slaughter with over 6cm of velvet). We cut velvet to minimise vet bills rather than maximise grade or yield. Larger deer farmers obtain licences to do their own velveting (and save substantial vet bills) but because of our size, and because in about 1980 I saw close up the effect on a vet of the drugs used in velveting, I have never wished to hold such potent drugs.

In 2015/16 we received $2641.09 nett of all fees, levies, commissions, charges and GST for 25.75kg of first cut velvet and a further $79.97 (on the same nett basis) for 1.73 kg of regrowth. A specialist velvet farmer cutting each animal when grade and yield were maximised would achieve significantly higher average prices per kilo. In 2016/17 prices came back because of changes and uncertainty concerning imports into China. Our equivalent results were 28.51kg of first cut yielding $2260.04 nett and (on a rising recent market which paid $95 plus GST for Regrowth 4 grade) $219.66 nett for 3.31kg of regrowth. We still have 1.61kg of Regrowth 2 awaiting sale.

Over recent years we have had all spikers to the works before the end of the chilled season (last week in October or very early in November – after that schedule prices drop) at average hookweights around 58kg. They are then aged about 11 months. This season our 45-70kg spikers went for $8.75/kg (plus GST) hot hookweight, other classes of stock for slightly less. Courtesy of Deer Industry NZ I attach graphs and tables showing: venison production and pricing trends 2005/6 to 2014/15; velvet production and pricing trends 1994/5 to 2013/14; and deer stock unit calculations showing also Beef + Lamb NZ SU figures for sheep and cattle. I invite you to compare our results and that organisation sourced material with the theoretical equivalent material submitted on behalf of the regional council. To me that material seems bizarre and totally unrealistic.

Deer farming has greatly changed and developed over the years. There are now three distinct foci: venison production; velvet production; trophy stags. Within the venison industry some, like us,

breed and finish. Others breed and sell progeny as weaners to farmers who specialise in finishing. The different emphases have translated into distinctly different bloodlines. Large operations may cover two or even three areas, small operations (like ours) can accommodate but one focus. Our emphasis is on 11-12 month weights. That is what we breed for, these days using Deer Improvement stags of known genetic merit. In earlier years most of our spikers did not achieve desirable kill weights until after New Year, now they are all off the property by the beginning of November and our lower level yearling hinds (we keep only the best for replacements) are gone by Christmas.

In the early days of deer farming attempts were made to farm each of the species present in this country but, for various reasons, three species now dominate the industry: red deer (cervus elaphus – many subspecies and races across Europe and Asia); wapiti/elk (cervus elaphus canadensis sometimes shown as cervus canadensis – essentially cold climate giant subspecies of red deer and hybridises readily with them – many subspecies and races across North America and Asia from Altai east); fallow deer (dama dama – including some upgrading with bloodlines partly derived from the slightly larger but very rare Iranian subspecies d.d. mesopotamica). I should add that taxonomy is an ever evolving science and my books on it are rather old.

We farmed fallow for more than 25 years but they are extremely susceptible to facial eczema and, after ours had been hit by that for a third time, we went out of fallow. There was then no effective pasture treatment which lasted more than a few days. Now there is and on the steeper parts of our property fallow would be our preference as they do not wallow or cause sheet erosion. The liveweight of a fallow doe is around 45kg, a red hind should be comfortably over 110kg, an elk cow approaching or exceeding double that, and a wapiti hybrid cow somewhere in between – depending on the degree of elk in its genetic makeup.

Dansey Road Property

In April, 2009 we purchased, at public auction, our 2.3699 ha property at 85 Dansey Road. This had been part of the farm on which Alison was brought up so she has known it all her life and I have been very familiar with it since New Year 1968. On this land our contract farm manager from time to time runs a few sheep and we have built up a small herd of Dexter cattle. Those are Alison's special pride and project.

Dexters are not a miniature breed but are small, quiet animals derived from traditional Irish house cows. The Dexter Cattle Society's logo showing a farmer with his hands down at his side, his cow's nose at hand level and the animal's back slightly below elbow level, is very apt. Dexters are ideal on small blocks. They like a proportion of trees and shrubs in their diet (prunings much appreciated) as well as fruit especially plums. Dexters can readily be stocked at rates well in excess of those appropriate for dairy cattle or larger beef breeds.

Property drainage

Neither of our properties has any stream or pond. Neither drain down to a stream. Both have light volcanically derived soils which are very free draining. Both have water systems fed from deep wells. When the well serving the Dansey Road house was replaced some years ago by a larger well serving all the blocks into which the original farm had been subdivided, the water from the new well (about 100 metres from the earlier one) was markedly different and better. Most noticeable was its

much reduced iron content. Our Oturoa Road well yields far better water again with no apparent iron content or any other minerals.

Rotorua Water Age

The principal (it may still be the only) source of water for the Rotorua urban area was springs near the Utahina Stream upstream of Pukehangi Road. It was excellent water. In the 1970's I was told it last saw the light of day as rain on the Mamaku's over 20,000 years before. I am unaware of the basis for that proposition and my sources have long since joined their ancestors. Dating water "age" is easily done as the recent events in Hawkes Bay illustrated.

Most Rotorua streams are at least partly spring fed and ageing the water from each spring should be easy and in my opinion ought to have been carried out by the regional council long ago. Rural properties from Mamaku down generally have or share water supply bores. The depths of those will mostly be known. Water samples from those could readily be obtained and dated so that patterns can be established. There are some tomo systems on the Mamakus so rainfall on particular areas may reach streams relatively quickly while that from nearby places percolates very slowly.

The geology is not simple. As road cuttings show, the soil at Mamaku is heavy and underlain by rock. My late father-in-law, a very skilful farmer, would not have a narrow race on his Mamaku farm as once an area was pugged by stock or vehicles it would remain in that state all through the long Mamaku winter. As one goes downhill from the Mamakus soils become lighter and much better drained but there is considerable apparent variation. If Mamaku winters are hard, summers there are productive if not pleasant. It stays green whereas grass on our properties and those around them is quite often burnt off by Christmas.

Kaharoa was notorious for dry summers during which water supplies grew short or non existent. One of my early tasks in Rotorua was, on behalf of aggrieved cost conscious landowners, to (successfully) overturn a special rating area to fund a Kaharoa water supply scheme. Fortunately for the district, the County Chairman, John Keaney, succeeded in getting his council to fund the project from general revenue. The scheme has been a notable success. Its water source can readily be sampled and dated.

Water ageing alone will not produce an adequate picture. Chemical analysis is required to establish whether or not the water in the catchment can be treated as a single coherent source. Partly because of the very different water quality in the wells I have mentioned, I believe that it is not and that there are obvious distinctions to be drawn between land which drains down into streams and therefore produces runoff containing nutrients and land from which water percolates downwards, quite possibly shedding nutrients (which become locked into subsoils and minerals lower down) as it goes. Then too the percentage of runoff as opposed to water which soaks into the ground will vary markedly with surface slope and soil type. The contrast between the rocky slopes and thin soils of the sides of Mt Ngongotaha and flat or near flat land is obvious.

Small scale experiments of limited dimensions and depth are of no use. What is required is proper investigation of the realities. I have indicated at least some lines of enquiry.

Similarly there needs to be proper analysis of the extent to which, and from where, rain falling on the catchment finds its way into the lake as opposed to acquifers which drain away elsewhere.

For example, Rotoiti at its western end has similarities to Lake Rotorua but to the east and north it is a deep lake with extensive bottom areas far below the lowest part of Lake Rotorua. There is geothermal activity across the bottom of Rotoiti and very possibly other springs as well. Tikitere (Hell's Gate) is the offspring of a perched water table. Beneath that, and far more extensive, is a steam field which the Ministry of Works looked at several times as a possible geothermal source. I gather that it may still be under consideration. Where does the water feeding that steam field come from if not from beneath Lake Rotorua? There are numerous springs and streams entering the Bay of Plenty from the hills atop which the chain of lakes from Rotorua to Rotoma lies.

Treasuring the Land

People come and go; climate, fashions and economic circumstances change. People may alter small areas but elevation, aspect, gradient and essential soil type long outlive the human races' time in this land. The future is unpredictable, particularly as to politics, markets and economics. An historical perspective shows: see for example Landes "The Wealth and Poverty of Nations" (Little, Brown and Company, 1998) that societies which limit intellectual enquiry or changes in economic activity are societies going backwards and in that process diminishing the productivity and prosperity of their citizens. This applies not only to nations but to localities and particular groupings of people. One needs only to wander around the Rotorua CBD and observe the number of empty shops and offices to appreciate that this is a community under considerable economic stress.

In fixing upon current land use and giving special advantages to dairy farmers the regional council is grossly unfair. It confers an inequitable advantage. It tends to lock in a land use (dairy farming) which throughout New Zealand is causing major environmental problems, particularly when associated, as it often is, with the pursuit of productivity increases without regard to wider interests such as the environment. Land farmed less intensively or in forest, whatever its potential, is penalised to the advantage of the dairy industry. The concept of "best and highest use" adapts to changing environmental, economic and social circumstances. The regional council's approach does not. Quite apart from its undesirable increase in bureaucracy and complexity the proposed system does not start with a level playing field. It thus imposes unfair costs and burdens on the owners, present and future, of land not in dairying at present.

Although for some years the dairy industry has been a major contributor to the prosperity of New Zealand (albeit at an unsustainable environmental cost) that has not always been so and may well not be so in the future. Recent events have made all too clear that there are no guarantees that the dairy industry will necessarily be prosperous or even profitable. What is indisputable is that growing plants for food will always produce far more food per unit area than any form of livestock farming. There is no sound basis for any assumption that dairy farming is, let alone will always be, the highest and best use of any land in the Rotorua catchment.

The starting point in structuring nutrient controls must be the contribution (if any) of particular land to nutrient input to the lake. Does it contribute surface runoff and if so to what extent? Does it contribute to underground water and if so to what extent? Does that underground water go into the lake? If so after how long and to what extent does it contain nutrients still?

If the regional council promptly carries out proper research, land classification along those lines should pose no great problems. New Zealand has had long experience in formulating and applying land classifications for drainage and flood protection works. It is grossly unfair to treat all land in the

asserted catchment the same whilst having no idea whether or not that is so in the relevant respects. This is a typical bureaucratic approach: avoid investigating some areas as the answers might not fit a convenient current theory; create the need for additional bureaucracy and bureaucrats in other areas.

Time

A realistic approach to time is essential. If water falling on a property takes hundreds or even thousands of years to enter Lake Rotorua what is the utility and justification for now limiting nutrient input to that property? Our submission was that a line should be drawn at 200 years. That may be too long. Much will have changed in the interim. It may be wisest to adopt a considerably shorter period and leave to future generations the task of deciding what constraints (if any) are needed in light of the situation then presenting.

Approach to Proposed Change 10

Our approach to the proposed change has been consistent throughout. It started with our letter of 13 October, 2014 (copy attached). Then see our submission form of 19 March, 2016 (copy attached) which was prepared under pressure of time as is apparent from the N.B. Please treat that material as part of my evidence.

The starting point must surely be the lake itself. It is in volcanic country, much of which is porous. Though terraces in the land above it tell an earlier story, it is now shallow. Around its margins fishermen can often wade out a long way – as I found in my younger years. Even the deepest parts are only about 20m. and there are shallow areas well away from the lake margin. Like most trollers Alison and I keep the depth sounder running while we fish.

Silt buildup continues. Areas near the mouths of the Ngongotaha and Waiteti streams where I caught some notable trout in my younger days are now dry land or too shallow to fish. I cannot speak from recent personal experience of the present state of the other stream mouths. The gradual filling of shallow lakes such as this appears to be an inevitable geological process.

At its lowest point the lake is more than 260 metres above sea level. Volcanic activity around, beneath and near the lake (and also Rotoiti) gives rise to hot water and steam which must arise from depths well below the lake's low point. Outside the urban area many properties rely on wells extracting water from depths which in some instances are below the lake's low point. Clearly the lake does not define the lower limit of groundwater depth in its catchment. Thus not all rain falling on the catchment finishes up in the lake or earlier returns to the air by evaporation/transpiration.

Conclusion

Any analysis or reasoning is only as sound as its underlying assumptions of fact or reasoning. That is: the facts or reasons not tested, but taken for granted, ultimately determine the outcome.

Here the regional council's assumptions appear to be:

1. All water falling on the asserted catchment either evaporates, is transpired, or drains into Lake Rotorua.

2. Nutrients applied to or generated on any land within the asserted catchment contribute to the nutrient input into Lake Rotorua.
3. The water and nutrients referred to in 1 and 2 enter the lake within a timeframe relevant to the present exercise.
4. Present land use rather than the fundamental characteristics of the land should determine the permitted nutrient input to that land.
5. Dairy farming is entitled to special treatment.

The regional council has not established any of those propositions and adoption of a change based on them is unreasonable and perverse.