ANNUAL REPORT

FOR THE YEAR ENDED 31 DECEMBER 2008

ADVOCATES FOR THE TONGARIRO RIVER

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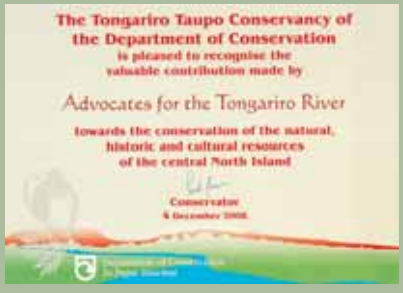
Cover: Conservation Award



Received in December 2008 in recognition of the Advocates' initiatives in clearing and replanting, and eradicating feral pine trees to enable native plants to regenerate along the Tongariro River.

COMMITTEE 2008

Bob Appleton
Ross Baker
Robert Brace
Mark Cosgrove » IMMEDIATE PAST PRESIDENT
Stuart Crosbie
Richard Kemp » VICE-PRESIDENT
Heather Macdonald » PRESIDENT
Julian Proctor
Tuatea Smallman
John Toogood
Eric Wilson » SECRETARY/TREASURER
John Wheeler

Note: Graeme Nahkies is an adviser to the Committee. Bob Appleton is our representative on the Taupo Fishery Advisory Committee.

The Registered Office of
Advocates for the Tongariro River
Incorporated is care of
213 Taupahi Road, Turangi.
The postal address is
P O Box 335 Turangi 3353.
www.tongariroriver.org.nz

NOTICE OF ANNUAL GENERAL MEETING

The Seventh Annual Meeting of the Advocates for the Tongariro River Inc. will be held at the Tongariro River Bridge Fishing Lodge, State Highway 1, Turangi, on Easter Sunday, 12th April 2009, at 3.00 pm. All welcome.

≈ AGENDA

The business of the Annual General Meeting will be to:

1 Record those present and note apologies.

2 Receive the Minutes of the Sixth Annual General Meeting held on 8th April 2008 (see below).

3 Receive the President's Report and approve the Financial Statements.

4 Consider any other motions of which due notice has been provided. The full Rules of the Advocates for the Tongariro River Inc. are printed in the 2004 Annual Report and are also available on the Advocates' website: **www.tongariroriver.org.nz**

5 Appoint an executive committee comprising a president, a vice-president, a secretary, a treasurer (or a secretary/treasurer) and committee members.

Note: A nomination form for the executive committee is enclosed with this Annual Report.

6 Consider any other matters.

Guest Speaker Glenn Mclean, Technical Support Manager, DoC Fishery, will provide an up-date on the genetic research project and state of the Fishery.

At the conclusion of the meeting, afternoon tea will be provided at the Tongariro River Bridge Fishing Lodge.

≈ MINUTES

Minutes of the Sixth Annual General Meeting of the Advocates for the Tongariro River Inc., 24 March 2008 at 1.30pm, Bridge Lodge Conference Room, Turangi.

President

Heather Macdonald

Vice-President

Richard Kemp

Secretary/Treasurer *(acting)*

Ross Baker

Attendance

Bob Appleton, Robert Brace, Ross Baker, Laurie Burdett, Tony Charlton, Stuart Crosbie, Colleen Croce, Laurie Croxen, Richard Kemp, Heather Macdonald, Jock McNab, Graeme Nahkies, Natasha Nahkies, Julian Proctor, Jenny Shieff, Tuatea Smallman, Rosie Small, Mike Stent, Jenny Wilcox, Paul Williams, Gwyn Williams, Betty Wheeler, John Wheeler, Richard (Dick) Truebridge.

Apologies

Mark Cosgrove, Alison Cosgrove, Edie Tonks, Will Kemp, Eric Wilson.

Apologies accepted, moved by Heather Macdonald, seconded by Richard Kemp. Agreed.

President's Report

Heather referred to the 2007 Annual Report and elaborated on some key issues. The first was the major milestone for the Advocates, reached in 2007, with agreement to proceed with an Integrated Catchment Management Plan for the Tongariro.

She commented that in 2007 all parties to the River Management Forum agreed to proceed with the development of an Integrated Catchment Management Plan. This was an indication of what could be achieved through advocacy at its best.

Heather paid tribute to Mark Cosgrove, and said that it was Mark's vision and persistence over the last five years that have enabled us to reach this significant milestone, which will mean more systematic, integrated and effective management of the river and its catchment in the future. Heather acknowledged the role of Advocate and adviser to the committee, Graeme Nahkies, in helping reach this milestone. The evaluation by Graeme of Environment Waikato (EW)'s 2006 Management Plan, and his recommendations to the committee for a way forward in lobbying for a comprehensive integrated catchment plan, as well as his facilitation of discussion at the last three Forum meetings, have helped enormously in gaining the necessary agreement and the will to work collectively towards producing the plan.

Other issues Heather commented on were:

- Didymo – the Advocates continuing to lobby for better controls. After the scare from dead cells, Genesis Energy cancelled its contract with the National Institute of Water and Atmospheric Research (NIWA) and has contracted Waikato University to collect and test water samplings. Heather expressed thanks to the Pharazyn Trust for its financial support and showed the didymo brochure which its donation had helped fund. Heather referred to the paper the Advocates produced in 2007 with the New Zealand Federation of Freshwater Anglers, "Stronger Measures Essential to Control the Spread of Didymo", and to the public meeting held in association with it, at which the National Party's biosecurity spokesperson, Shane Ardern, spoke.

- Lake Taupo levels – in preparing for a possible review of Mighty River Powers consent conditions, Stuart Crosbie has developed a model for keeping the lake at more natural levels.

- Mangamawhitiwhiti Stream subdivision proposal – Advocates' concerns at likely ecological and environmental damage issues and plans to be a diligent watchdog.

- Fish-quality concerns – The Department of Conservation (DoC) has been claiming that there is no problem with the quality of trout but, rather, that it is a late season. Based on widely reported experience, the Advocates' committee does not agree with DoC's conclusion, and expressed this in a submission to the fisheries manager. No response had been received by the end of 2007. The Advocates' submission also sought information on the Taupo Fishery's research and monitoring programme.

- Access – John Wheeler's efforts re paper roads and public access were acknowledged, and frustration with Taupo District Council (TDC)'s response to our queries.

- Website improvements – Heather thanked Eric Wilson for his work on improving the Advocates' website and said she hoped we would have more interaction with members as a result.

- The work done by John Toogood in managing the poisoning of feral pines along the river. John Toogood and John Wheeler were thanked. John Toogood commented on the positive impact the project has had on DoC's attitude to feral pines. The funding received for the work done in 2007 from WEET (Waikato Ecological Enhancement Trust) was gratefully acknowledged.

- Tuatea Smallman's hapu, Ngati Turangitukua, was congratulated on its initiatives in clearing the lower river and on the sound engineering advice it took in deciding on that action. Major clearing and removal of willows, logs and silt has taken place, funded by Genesis mitigation monies.

Distinguished Membership

After noting the newly established Distinguished Member category outlined in the President's Report, Heather, supported by Vice-President Richard Kemp, took pleasure in announcing Dr Mark Cosgrove as the first Distinguished Member of the Advocates. This award is in recognition of the very significant contribution made to the Advocates by Mark as founding president (see page 7). The meeting affirmed the recognition given Dr Cosgrove through distinguished membership.

Heather moved that the President's Report be accepted, seconded by Julian Proctor. Agreed.

Questions – Julian Proctor asked about the likelihood of the Mangamawhitiwhiti proposal going ahead. Graham Nahkies replied it was only one of three possible growth areas identified by TDC and all were being appraised as part of a structured plan which the TDC had asked the developers to produce. Julian replied the loss of the Mangamawhitwhiti would be devastating as it was the main brown trout spawning bed and nursery.

Treasurer's Report

Acting Secretary/Treasurer Ross Baker summarised the financial situation from the Annual Report, and moved the accounts be accepted. John Wheeler seconded the motion. Agreed.

Graham Nahkies asked why subscriptions were down from $6,937 (in 2006) to $3,932 (in 2007) while membership increased. This was explained by Bob Appleton whereby previously grants were included and this year they have been reported under a separate "Grants" heading. Heather confirmed this.

Rule Change to Incorporate Associate Membership

Richard Kemp proposed a notice of motion that Associate Membership be accepted under rule item no. 4. Richard Kemp explained the legal reasons for the change. Seconded by Stuart Crosbie. Carried.

Appointment of New Committee

Eleven nominations had been received and seconded, for 11 positions. The names were read out by the acting Secretary as follows:

Bob Appleton
Ross Baker
Robert Brace
Stuart Crosbie
Richard Kemp
Heather Macdonald
Julian Proctor
John Toogood
Tuatea Smallman
Eric Wilson
John Wheeler.

The above-named were appointed as committee members.

Nomination of Officers

President – Heather Macdonald – Nominated by Richard Kemp, seconded by John Wheeler. Agreed.

Vice-President – Richard Kemp – Nominated by Heather Macdonald, seconded by Bob Appleton. Agreed.

Secretary/Treasurer – Eric Wilson – Nominated by Graham Nahkies, seconded by Jenny Wilcox. Agreed.

Mark Cosgrove continues in the role of Immediate Past President.

Other Matters

Environment Waikato (EW) Councillor Laurie Burdett commented on funding issues following the 2004 flood. The damage is still being paid for. The fund is between $2.9 million and $3 million in debt. Councillor Burdett requested the Advocates prepare a submission for the EW Annual Plan. The levy per household in the Taupo region has been reduced from $18 – by $1.50 – due to the greater number of contributing households, while the gross amount remains the same. Laurie mentioned the revegetation for lake erosion control issues.

Heather Macdonald thanked Laurie for her support of the Advocates and referred to the previous meeting when she and Mark Cosgrove met with EW to present a paper warning the existing model was unsustainable and recommending that EW needed to investigate a new model for funding river works. Heather urged that EW seek an alternative funding system. Heather then spoke of the Advocates' concern about lake levels and asked Councillor Burdett to do all she could to ensure that the scheduled review of Mighty River Power (MRP)'s Resource Consent conditions went ahead. Councillor Burdett advised she would be pleased to assist and that she needed the Advocates to prepare a submission for the 2009 "Project Watershed". She also reminded Advocates that the two-year period for rural property owners to fence off waterways has now expired.

Jenny Shieff commented on the high quality of the Advocates' Annual Report and Stuart Crosbie's strategic management plan. She expressed concern about the number of plants that have been removed from the riverbanks, and offered her services to manage future planting projects by the Advocates.

Heather Macdonald spoke briefly of the value Stuart Crosbie has added to the Advocates through the work he has done with the committee over the past year in the development of a strategic management plan, and thanked Stuart and committee members for their work.

Heather closed the formal part of the meeting at 4.15pm and invited Stuart Crosbie to follow as guest speaker with his presentation on "Strategy and Action" – how the "Statement of Purpose" applies to the Advocates.

Distinguished Members

Dr Mark Cosgrove

The first award for distinguished membership of the Advocates for the Tongariro River was bestowed on Mark Cosgrove at the 6th Annual General Meeting on 24th March 2008. This honour was made in recognition of the outstanding contribution Mark has made to the Advocates.

As the founding president, Mark's vision, his knowledge and his passion for the Tongariro River provided a particularly solid foundation for the Advocates. He put the Advocates on the map as a stakeholder to be taken seriously. The credibility earned by the Advocates is due in large part to Mark's commitment to working from a basis of sound knowledge and good science, to separating myths and half-truths about the river from facts, to extending what is known, and to making that information widely available.

He was instrumental in helping shape the Virginia Church submission in 2002, the document which has become the Advocates' foundation piece. We are fortunate to continue to have his input to the committee.

≈ THE ANNUAL REPORT FOR 2008

President Heather Macdonald reports

The committee has continued to be guided by its mission statement, "to speak out for the Tongariro River and promote management strategies intended to preserve and enhance the values inherent in the river and its fishery."

2008 was a year of anticipated consolidation, except for the work on lake levels which was a new initiative. Achievements in 2008 include:

- Production of a report proposing a model for fine-tuning the regime used by MRP for managing the water level of Lake Taupo. The depth of analysis and the high quality of this report are a tribute to its author, committee member Dr Stuart Crosbie (see Appendix 1).

- A successful funding application, with the support of DoC Turangi, was made to EW to enable the continuation of the pine tree eradication project. The Advocates received a grant of $35,000 from EW in March 2008 for this work.

- An independent assessment of what might constitute a research agenda for the Taupo Fishery in light of apparent problems in the food chain, by Dr Bob McDowall, internationally renowned freshwater scientist with first-hand experience of the Taupo Fishery. Bob presented his assessment to a public meeting in Turangi at Labour Weekend and also gave pointers for future fisheries management actions (see Appendix 2).

- An award from DoC in recognition of the Advocates' achievements in conserving natural environmental values in the Central North Island through our riverbank planting and feral pine tree eradication work.

I will now report on achievements in 2008 against the Advocates' Strategic Plan which is at the end of this Annual Report.

Membership Focus

At the end of 2008 membership was 191, from 136 households. This represents a disappointing decline in membership numbers, despite our having held subscriptions at $25 per member or $30 per household for a number of years. The membership drive initiated in 2008 failed to produce the results hoped for as we were badly let down by the mail distribution company.

We do, however, have a solid core of dedicated and generous members whom I thank for their continuing input and expressions of support. Many members are now using the online facility to renew subscriptions and I trust that is an added convenience. I urge members to please invite friends and family who have a passion for the Tongariro River, for fishing or for the spectacular natural values of the Central North Island, to lend their weight by becoming Advocates members. They can do this online at **www.tongariroriver.org.nz** or through the post to P O Box 335 Turangi. Our subscriptions fee will remain unchanged for 2009. A subscription to the Advocates also makes a good gift.

What are the issues that you think we should be speaking out on? Please use the website or drop us a line to let us know.

Communications

Our aim is to make information available to members and others interested in river-related matters through hosting public meetings, sending out newsletters and providing press releases. We have continued to do this. For example:

- Two newsletters were produced and sent to members, as well as to some 40 other individuals and organisations, including interested Members of Parliament, local and regional councils in the area and public libraries.
- As usual, this Annual Report will be distributed to all who received the newsletters.
- Two public meetings were held in 2008, one in conjunction with our AGM at Easter, and the other at Labour Weekend, referred to above, which was an initiative in response to the widely expressed concerns about the condition of trout in the Taupo Fishery.

- Press releases were published in local newspapers reporting on funding the Advocates received from EW for the feral pines eradication programme, and on Advocates' concern about the risks associated with the proposed Mangatawhitiwhiti development, now abandoned.

- Our website provides up-to-date news and information about the river and is a valuable archive, holding papers presented at our public meetings and seminars. We are keen that it be a means for two-way communication between members and the committee so please don't hesitate to use the website in that way. One of our aims is to build a rich photographic archive on the website as an historical record of the river, and we will be pleased to receive any digital photos of the river you can send through the site.

In 2008 I was invited to write a piece for the Tongariro and Lake Taupo Anglers Club (TALTAC) newsletter and to speak to the Turangi Rotary Club and guest members from Waikanae.

Stakeholder Focus

Our aim is to engage effectively with key stakeholders and tangata whenua. Building and maintaining open and constructive links with groups with a similar advocacy role, and/or with an involvement with the Tongariro River, is crucial, and generally we have established constructive links with such groups.

The Advocates' involvement with other stakeholders in developing an Integrated Catchment Management Plan for the Tongariro, is a priority. Disappointingly, however, little progress has been made on this in 2008 due to administrative delays by EW.

We continue to be represented on the Taupo Fishery Advisory Committee by Bob Appleton, and I appreciate the work he does for us.

We have enjoyed the good working relationship, now well established, with DoC Turangi, and in particular with Leith Ryland, Dave Lumley and, more recently, Joel Peters, through the planting and pine tree eradication projects. The partnership activities we have developed with DoC and the community in clearing and replanting the town river bank area have become an annual feature.

In 2008 we established a valuable working relationship with MRP, the company which manages the Lake Taupo control gates and lake levels, and have engaged with MRP in frank discussions about lake-level management. The decision to make a direct approach to MRP management was made in preference to lodging a submission under the possible 2008 review of MRP's Resource Consent conditions, as we considered the approach more likely to lead to positive outcomes. I am indebted to Stuart Crosbie for producing the report which has been the basis for our discussions with MRP. I also thank Gavin Williamson, MRP's Hydro Generation Manager, for keeping the MRP door open during the year and for involving his staff in our discussions, which are continuing.

Early in the year we approached representatives of the Tuwharetoa Trust Board and Ngati Turangitukua suggesting a joint approach in developing a submission for the possible review of MRP's Resource Consent conditions, but our offer was not taken up.

Our constructive relationship with Genesis Energy, Tokaanu, has continued and we appreciate the willingness of General Manager Tracey Hickman and Renewable Resources Manager Jarod Bowler to support us and share information.

Issues

The following six issues from our strategic plan provided the focus for advocacy in 2008.

Issue 1: Didymo

Our aim for 2008 was to continue to lobby for the North Island to be didymo free.

We advocated for:

- Felt-soled wading boots, known as a major vector for didymo, to be banned in New Zealand fresh water.
- Comprehensive inter-island border controls, including airport cleaning stations, implemented at both departure and arrival points.
- Improved strategies implemented by Biosecurity New Zealand to better protect the North Island from didymo incursions.
- Check–Clean–Dry procedures adopted by users of the Tongariro and other rivers in the area.

Advocacy Action

- Participating in the Central North Island Regional Didymo Prevention Group and advocating for national and regional action on the aims outlined above. Committee members Ross Baker and John Wheeler represent the Advocates on the Regional Group.
- Supporting the drive by Bryce Johnston, CEO of New Zealand Fish and Game, to have the government ban felt-soled waders from New Zealand waters.
- With the professional expertise of Bob McDonnell and the staff of Cognito Advertising, Wellington, designing and printing 1,000 postcards, "Could You be a Didymo Carrier?", which were distributed locally.

Advocacy Achievements

- The government acted to ban felt-soled waders from New Zealand waters from 1st October 2008.
- DoC, supported by the Regional Didymo Prevention Group, introduced a voluntary "Clean gear licence" which anglers were invited to sign up to when purchasing their Taupo licence, an initiative we began advocating for in 2007.
- DoC, in conjunction with the Regional Didymo Prevention Group, displayed large, eye-catching Didymo-awareness banners at visible spots throughout the Central North Island during summer.
- Systematic and regular monitoring of waterways in the Central North Island (and other parts of the country) is now well established as a means of checking for early detection. The Regional Didymo Prevention Group oversees this.
- Checking procedures at the Picton ferry terminal have improved and become more consistent.

Issue 2: Feral Pine Trees

Our aim in 2008 was to facilitate restoration of the natural vegetation at the river margins by continuing the poisoning of feral pine trees, a project we began in 2007.

The rationale for this project is that, increasingly, wilding or feral pines are crowding out the natural vegetation along the river, are leaching unwanted elements into the water and have reduced the habitat for bird and insect life. Although the browning trees may be seen as unattractive in the short term, in a few years, once they have disintegrated, manuka and other natives trees will regenerate, will be visually pleasing and will significantly improve the insect and bird life along the river.

Advocacy Action

- The following have been contacted to ascertain support, explore funding possibilities and gain general knowledge of the problem: DoC, EW, EW Councillor Laurie Burdett, EW Environment Initiatives Fund, TDC, TDC councillors, New Zealand Forest Owners Ltd, New Zealand Forest and Bird, the Tongariro Natural History Society, EW's Environment Initiative Fund, Waikato Catchment Ecological Enhancement Trust, QE II Trust, Biodiversity Condition Fund, and others.
- A funding application for $40,000 was made to EW, with the support of DoC.
- A contractor was employed to dose trees and DoC provided much-appreciated technical advice, tree survey data, support and equipment.
- Continuing to press DoC and EW to act on their undertakings, to arrange eradication of feral pines adjacent to walking tracks and the river margin.
- Continuing to advocate to have the removal of wilding pines included as a strategy in the Integrated Tongariro Catchment Management Plan once it is developed.

Advocacy Achievements

- 1,260 trees have been treated to date from the State Highway 1 bridge to the Fence Pool on the true right bank.
- Our funding application succeeded and we received a grant of $36,000 from EW's Environment Initiative Fund. $13,000 went to contractors in 2008. The remaining funds will be used for continuation of the work in 2009. We appreciate the funding support received from EW.

- The Advocates received an award in December from the Tongariro/Taupo Conservancy of DoC "in recognition of the valuable contribution made towards the conservation of the natural, historic and cultural resources of the Central North Island" (see this report's cover photo).

My thanks go to committee member John Toogood whose dedication to this project has ensured its success, and to John Wheeler, Richard Kemp and Eric Wilson for their involvement. Thanks also to contractor Will Kemp. The project will continue in 2009.

Issue 3: Lake Levels

Our aim for 2008 was to seek MRP's cooperation in changing their lake-level profile to have a lower median.

Our underlying premise is that a small lowering of the median lake level (approximately 10 cm) is expected to assist the rivers to flush the bars at their mouths (Professor Paul Williams, Auckland University, 2005). The flood plain of Tokaanu Stream has been compromised by artificially high lake levels that do not follow the natural regime (data held by Alasdair McNab, Tokaanu). Large areas of farmland are now swamp or flooded around the Tongariro delta. There is evidence that the delta now backs up to the State Highway 1 bridge (a combination of hydraulic dam effect and agrading, the lake levels making the river flow backwards).

Other aspects relevant to this issue include:

1. Ngati Turangitukua have a strong resolve to "pull the plug at the mouth" by dredging the mouth; lake-level lowering may be a means of achieving this (a dredge at the mouth was promised when the power scheme was built in 1968).

2. Others advocating for a lowering of lake levels include property owners around the foreshore who are dealing with erosion issues.

3. There is also the view that a lowered median lake level would enhance smelt reproduction conditions leading to a greater abundance of smelt and therefore a healthier fishery.

4. A lower lake is a facilitating factor in the water turning over (churning or thermo-siphoning), essential for maintaining nutrients for food cycles.

EW was the authority responsible for determining whether there was cause for a review of MRP's Resource Consent conditions for Lake Taupo when the provision for review became due in 2008. Despite a number of submissions advocating for a review, EW decided a review was not warranted.

Advocacy Action

- The Advocates met with Gavin Williamson, Hydro Generation Manager of MRP, in April 2008 seeking to engage in discussion with the Advocates about lake levels. Subsequently we withdraw our submission in return for the opportunity to work with MRP in a bid to refine management of lake levels towards restoring the "natural" variation of lake levels without compromising MRP's commercial imperatives.

- MRP kindly gave the Advocates access to daily lake records spanning the past 100 years and we were able to combine these with daily river flow-rate data for the past 50 years, provided in good faith by Genesis Energy.

- Stuart Crosbie analysed the data and presented it in a 30-page report entitled, "Fine Tuning the Resource Consent Conditions for Lake Taupo Control Levels" (Appendix 1). In short, the analysis was less than convincing in conclusively showing that lake levels are higher than they used to be when the river is in flood. Put another way, the river is no less able to flush itself now (during the past 10 years) than in the past (the previous 40 years) because of observed changes in lake level management per se. That said, the analysis does indicate that since the control gates were installed the lake has been in the top quarter of its operating range for 40% of those occasions when the Tongariro River has come into flood (ie, reaching flow rates >250 cumecs). We would like to see a management regime in which this 40% figure is reduced considerably to under 10%. See Appendix 1 for the full report.

This is the first time that Tongariro River and lake-level data have been correlated.

Advocacy Achievement

- In November 2008 Stuart Crosbie and other committee members presented the report to MRP management for their consideration. The report's key recommendation, arising from the analysis, is that MRP attempt to manage lake levels to follow a "normal distribution" centered on the midpoint of MRP's existing consented range of operation.

We recognise that achieving this distribution in an exact manner will not be possible year on year and so have suggested some upper limits on the degree of non-normality that is acceptable in any one year.

- We will reconvene with MRP early in 2009 to receive and discuss their responses to Stuart's report.
- Trust and the opportunity for a frank exchange of views have been established with MRP, and regardless of the outcome of our lake-level discussions, we are now in a position to maintain dialogue with MRP and can be confident that we have provided a high quality analysis and proposal.

We are fortunate to have the benefit of Stuart's statistical expertise and I thank him for the time which he has so generously given to analysing, reporting and presenting the data.

Of further note is the scientific contribution from Ray Haddon in his report on lakeshore erosion, a report worthy of support (see p. 37).

Issue 4: River Environment

The Mangamawhitiwhiti Block

Our aim in 2007 was to encourage the TDC to modify its District Plan to recognise the ecological importance of river and stream.

The Mangamawhitiwhiti Block of land is situated on the true right bank from the State Highway 1 Bridge upstream beyond the Mangamawhitiwhiti Stream, which runs into the Hydro Pool. It has been identified by TDC as the first of three land areas in the Turangi area for development. Our understanding was that development into several hundred residential blocks was to proceed in 2008.

The Advocates' concerns related to:

1. the risk of destroying the Mangamawhitiwhiti stream as a major spawning ground for trophy brown trout in the Taupo Fishery
2. increased nitrogen in the river and the Lake as a result of run-off and seepage from residential blocks

3. loss of public access and enjoyment

4. loss of corridors for birds and insects.

Advocacy Action

- The committee decided that the local community had a right to know about concept plans that were being drawn up by various consultancies under contract to the developers, and be made aware of the associated environmental risks. We therefore contacted news reporters suggesting they search the facts and make the information public.

- Subsequent newspaper articles on the development led to the developers' project managers asking for a meeting with the Advocates. This provided opportunity for a full and frank exchange of information about the proposal and our concerns about environmental risks. We promised ongoing vigilance by the Advocates until we were assured that our concerns had been adequately addressed.

Advocacy Achievements

- Late in 2008 we learnt that the Mangamawhitiwhiti development was not going ahead.

Issue 5: Trout Quality

Our aim in 2008 was to encourage DoC to better manage the fishery using more up-to-date food-chain and biomass data.

Advocacy Action

- Early in 2008 we met with the manager and staff of DoC fisheries to discuss the widely expressed concerns about the fishery, ie, the continuing poor condition and size of trout in Lake Taupo and the rivers feeding into the lake. In our meeting with DoC we endeavoured to explore key knowledge and research gaps – and additional resourcing that might be needed to address the gaps – and what the Advocates could do to best support DoC in addressing the concerns. Disappointingly, the meeting resulted in a stalemate as DoC claimed there was no problem that would not right itself, that no additional research would change their management practices and that it would not be feasible to put another injection of smelt into the lake.

- Advocates received reports from anglers throughout the year about a sustained decline in the general condition of trout in the lake and river. Possibly the most significant progress in relation to the concern over trout size and condition was obtaining an acknowledgement from DoC that the quality of fish is of concern and is not just the consequence of a late season, as had previously been suggested by DoC. To obtain this acknowledgement pressure was applied not only by the Advocates but by Fish and Game New Zealand and others.

Advocacy Achievements

- As noted above, Dr Bob McDowall, an eminent freshwater scientist with first-hand experience of the Taupo Fishery, spoke at a public meeting convened by the Advocates in Turangi at Labour Weekend. As an internationally respected expert on freshwater matters, Bob was invited to provide an independent assessment of what might constitute a research agenda for the Taupo Fishery, given current concerns. The pointers which Bob offered for future action were insightful, clear and concise (see page 72). We are hopeful that these matters will be picked up as soon as possible by DoC fisheries management personnel.

Please see Appendix 2 for Bob McDowall's address. We would expect DoC Fisheries manager to give careful examination to the issues raised by Dr McDowall in his paper, and follow through with appropriate action.

Issue 6: Access

Our aim in 2008 was to gain improved access for anglers and non-anglers alike to a greater proportion of the Tongariro River.

Advocacy Action

- Early in the year we met with Rob Williams, CEO of TDC to request Council help in getting access for both anglers and walkers to a greater proportion of the river. In putting the case for more access we pointed out that

  – access to parts of the river have been lost over the last few years as a result of floods which have wiped out sections of tracks

- some tracks designated as legal paper roads which provided public access in the past have been blocked off by landowners
- some of the upper reaches where there is spectacular scenery can only be reached legally by raft, and yet there are access tracks in the area
- there are insufficient walking tracks in the Turangi river area to meet the demand, particularly when visitors cannot walk the Tongariro Crossing.

Rob Williams was supportive of the case we made and agreed that Council staff could help by convening a meeting of relevant landowners and interested parties to examine the issue. He undertook to make some initial contacts and get back to us.

Advocacy Achievements

- At the time this report went to print we had not received a follow-up from Rob Williams. However, we intend to schedule a further meeting with him in early 2009.

We express our appreciation to DoC for the work they do in keeping existing river access tracks cut and upgraded as necessary.

Conclusion

The decline in the size and condition of trout in the Taupo Fishery remains a fundamental concern, and will be a major focus of our advocacy in 2009.

The disappointment of 2008 has been the lack of progress we have been able to make in working with members of the River Management Forum to develop an Integrated Catchment Management Plan for the Tongariro given the willingness of all parties to advance this work. The delay has resulted from staff changes in EW and a long delay in their response to the Forum's proposal and request for support in developing the plan. The response which the Advocates eventually received from Group Manager, Policy and Strategy in December 2008 advised that EW will not make resourcing available for this project in the immediate future. The River Management Forum will meet early in 2009 to consider its response to EW and decide on future action. I thank Advocate and adviser to the committee, Graeme Nahkies, for the time and expertise he has given to assisting Forum members reach a shared view.

I extend particular thanks to the Pharazyn Trust for its $10,000 donation this year. The Trust strongly supports the values inherent in the work of the Advocates, and the generosity shown not only helps us to meet costs but is a real encouragement to hard-working committee members.

We are grateful to Mark Alston, Manager of the Tongariro Bridge Fishing Lodge, Turangi for so kindly making the meeting room available to us for our AGM each year, free of charge.

I thank Vice-President Richard Kemp, Secretary/Treasurer Eric Wilson, and the Committee for the time and expertise they have contributed.

Please refer to the Strategic Plan at the back of this Annual Report for the issues we will focus on in 2009. If there are particular matters that you think need our attention and which are not covered, please let us know.

I am pleased to move the adoption of this the sixth annual report of the Advocates for the Tongariro River.

Heather Macdonald
President, March 2009

≈ FINANCIAL STATEMENTS

For the twelve-month period ended 31 December 2008

	2008 $	*2007* $
Income		
Subscriptions and donations	4,674	3,932
Grant (Environment Waikato)	36,000	-
WEET (Waikato Ecological Enhancement Trust)	-	5,000
IRD Refund	188	-
Interest Deposit	1,959	986
Pharazyn Trust Grant	5,000	-
	47,821	**19,918**
Expenditure		
Advertising and Promotion	1,130	164
Postbox rental	135	125
Website	765	1,058
Newsletter	2,327	736
AGM, Seminar, Report and Expense	3,515	2,548
Postage, Stationery and Banking	1,017	409
Didymo	804	2,419
Seminar Rotorua Lakes Water Quality	490	-
Planting For The Future	500	-
Wilding Pines	12,880	5,844
Lake Level	216	-
Other	1,075	450
	24,955	**13,754**
Excess Income over Expenditure	**22,866**	**6,164**

Statement of Financial Position

As at 31 December 2008

		2008 $	*2007* $
Current assets			
Bank	Current Account	1,639	3,968
	Term Deposit	42,562	18,103
Total Assets		**44,201**	**22,071**
Current Liabilities			
Creditors		-	736
Net Assets		**44,201**	**21,335**
Accumulated Funds			
Balance at 31 December 2008		21,335	15,171
Net Surplus for year		22,866	6,164
Total Surplus		**44,201**	**21,335**

Eric Wilson
Treasurer

≈ NOTES TO THE FINANCIAL STATEMENTS

For the period ended 31 December 2008

Statement of Accounting Policies

Reporting Entity

The Advocates for the Tongariro River Society Inc. is incorporated under the Incorporated Societies Act 1908.

The financial statements of the Advocates for the Tongariro River Society Inc. have been prepared in accordance with generally accepted accounting practice.

Measurement Base

The accounting principles recognised as appropriate for the measurement and reporting of earnings and financial position on a historical cost basis are followed by the Society.

Specific Accounting Policies

The following specific accounting policies which materially affect the measurement of financial performance and financial position have been applied:

- Subscriptions are recorded on a cash received basis.

Changes in Accounting Policies

There have been no changes in accounting policies. All policies have been applied on bases consistent with those used in the previous year.

Preparation of Accounts

The accounts have been produced on information provided by your Treasurer and have been verified by R H Glover a retired Chartered Accountant and show the financial position as at 31/12/2008.

R H Glover

≈ APPENDICES

≈ APPENDIX 1 FINE TUNING THE RESOURCE CONSENT CONDITIONS FOR LAKE TAUPO CONTROL LEVELS

Dr Stuart Crosbie, 3C Consulting (and Advocates committee member)
A report presented by the Advocates for the Tongariro River to Mighty River Power in November 2008

Table of Contents

SUMMARY

This submission shows that the historic natural distribution of lake levels, pre-gate control, was approximately a 'bell-shaped' normal distribution with a median (and mean) of around 356.7 masl.

Current control level consent conditions are a slightly simplified version of those inherited from ECNZ (minus the 'summer step') and basically require MRP to operate between prescribed minimum and maximum values, being 355.85 and 357.25 respectively. We contest this is a rather 'blunt' tool for managing a resource of immense environmental, social and cultural value to the nation alongside its economic value for hydro electricity generation.

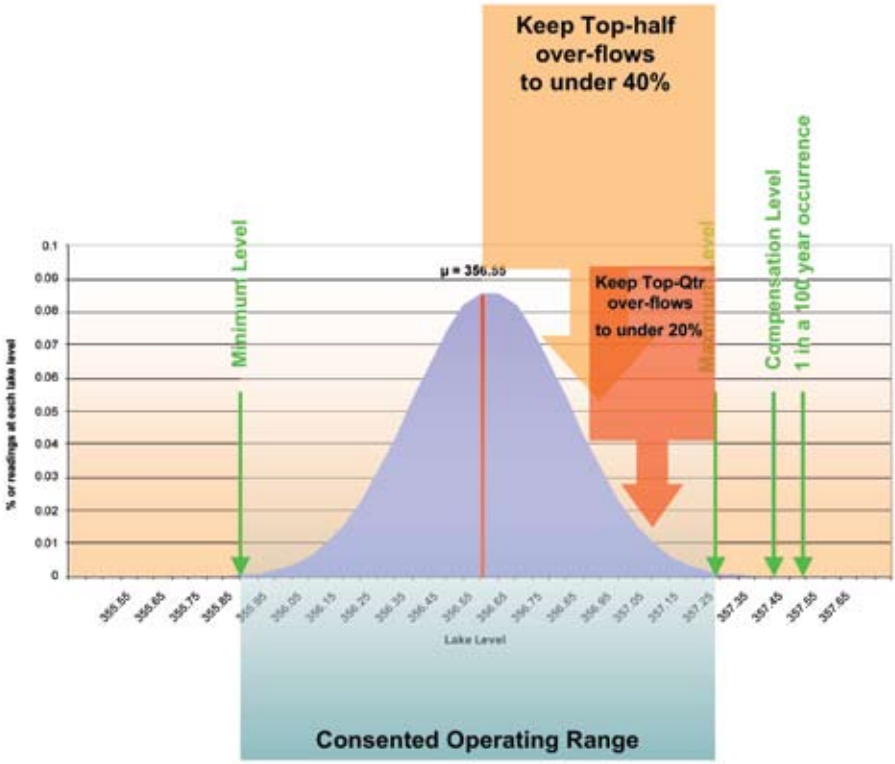
Other hydro lakes, Lakes Te Anau & Manapouri in particular, have a number of additional constraints to integrate nature conservation with hydro-electric development; these include partitioning the operating range into three zones (high, main and low) and prescribing 'duration limits' and 'draw-down rates'.

We, the Advocates for the Tongariro River (AFTR), believe Lake Taupo warrants an equivalent level of refinement, although it is not yet clear exactly what the parameters for such refinements should be; the detailed ecological and geomorphological baseline studies needed to determine these parameters are still being put in place. However, there is a growing body of evidence to suggest that higher than normal lake levels (both frequency and duration) are causing problems around the shoreline and in the lower reaches of tributaries feeding the lake, particularly the Tongariro River.

Accordingly, as an interim measure at least, we would like to see MRP adopt a management regime that restores a more 'bell shaped' normal distribution to lake levels. This paper, using existing minimum, maximum and exceedence level criteria, puts forward for consideration an underlying normal distribution with mean $\mu = 356.55$ and standard deviation value of $\delta = 0.23$ as a proposed management regime.

To quantify levels of conformance, two inter-related performance statistics have been constructed to measure the percentage deviation from normality (see diagram below).

- one is the *overflow from normal in the top-half of the consented operating range* which we suggest should be no higher than 40 percentage points in any given year;
- the other is the *overflow from normal in the top-quarter of the consented operating range* which we suggest should be no higher than 20 percentage points in any given year.



As a way of MRP demonstrating responsible corporate citizenship, the Advocates would like to see MRP incorporate these new metrics and their target performance levels as indicators in their performance scorecard.

In so doing, most of the detrimental effects highlighted in past submissions may well be alleviated or at least reduced until such time as a more refined operating regime can be agreed and validated.

INTRODUCTION

This submission is in four parts. Part A highlights the current resource consent provisions and the resulting distribution of lake levels. Part B outlines the case for change and highlights the principal concerns and issues being raised by residents and other interested stakeholders. Part C develops a way forward by providing a transparent measurement tool for quantifying normality and assessing future performance. Finally, Part D summarises our recommendation.

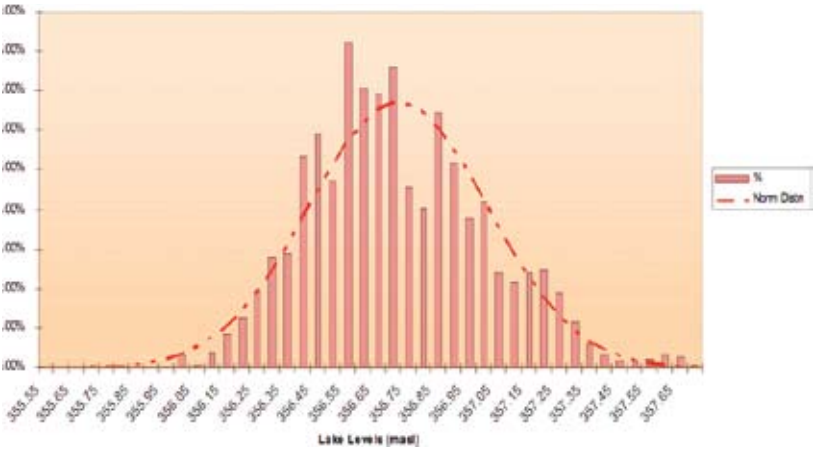
PART A: MODELLING FOR 'NORMALITY'

In the beginning . . .

Records capturing the levels of Lake Taupo date back to July 1905. It is therefore possible to establish what the distribution of lake levels was like during the pre-gate control period of July 1905 through to October 1941.

Figure 1 graphs the distribution of lake levels pre-gate control and shows it is approximately normal in shape (the red dotted line) . . . ie, symmetrical about an average level which back then was around 356.7 masl with a standard deviation of 0.31.[1]

Figure 1: 1905–1941 Taupo Lake Level Distribution



1 Figure 1 is an analysis of daily average readings for the period 13th July 1905 through to 31st October 1941 as kindly provided by Mighty River Power (with permission from Environment Waikato).

The notion of lake levels in their natural state being normally distributed is the fundamental premise upon which this paper is based. Although a controlled lake can never be entirely natural, by definition, it can nevertheless be managed in a manner that is as natural as possible. The purpose of this paper is to explore what this could mean in practice, especially with regard to controlled lake levels closely following an 'appropriate' normal distribution. But what is the 'right' or 'appropriate' normal distribution?

What is a normal distribution anyway?

The 'normal distribution' is the most common of all distributions observed in nature – hence its name. So long as only common causes of variation are impacting on lake levels (such as the usual weather patterns of rainfall, wind and temperature) statistical theory tells us that lake levels will be 'in statistical control' and the distribution approximately normal. There will be occasions when special causes will impact and cause periods of non-normality (such as floods and prolonged control gate manipulation of flow rates), but on the whole normality should prevail. We have already observed that the pre-gate control lake level distribution (Figure 1) strongly supports such a notion of natural behaviour of lake levels.

A normal distribution is defined by two characteristics, its mean μ and standard deviation δ. The mean is a measure of central tendency, ie, it tells you where the 'middle' of the distribution is. The standard deviation is a measure of spread, ie, it tells you how spread out the distribution is around the mean.

So, as an example, suppose the control gates had never been put in and Lake Taupo had been left in its natural state. Then the analysis of the data shown in Figure 1 tells us that the best predictor of future lake level patterns of distribution is that of a normal distribution with mean value of $\mu = 356.7$ masl and standard deviation value of $\delta = 0.3$.

This distribution means that

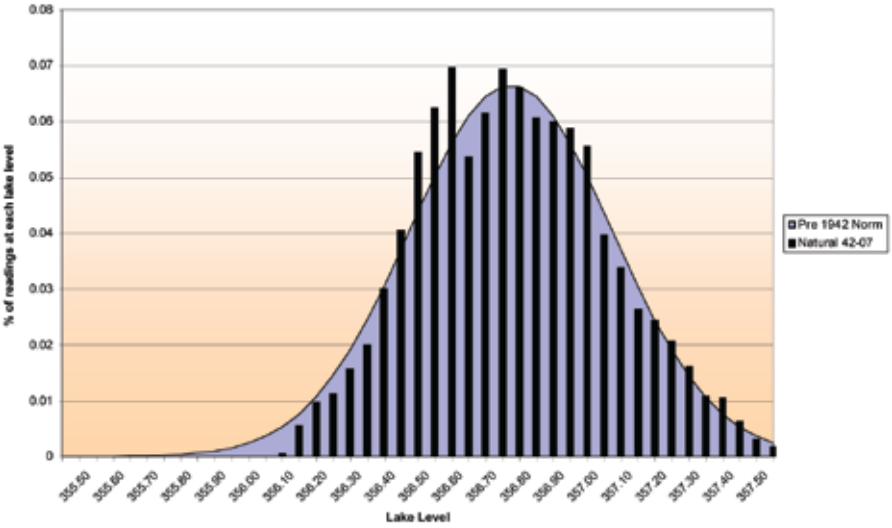
(i) roughly ⅔ of the time, lake levels would range between the level $\mu \pm \delta$
ie, 356.4 to 357.0

(ii) roughly 95% of the time, lake levels would range between the level $\mu \pm 2\delta$
ie 356.1 to 357.3

(iii) roughly 99.9% of the time, lake levels would range between the level $\mu \pm 3\delta$ ie 355.8 to 357.6.

The following blue shaded area – Figure 1a – is a graphical portrayal of the above.

Figure 1a: Underlying Historic Normal Distribution of Daily Lake Levels



Interestingly, the black superimposed histogram is that of daily 'natural' simulated lake levels for the period 1942 through to 2007, further attesting to the concept of normality.

The Advocates would like to see the Resource Consent conditions built on so that this criterion of normality becomes an explicit managing requirement for MRP.

Mighty River Power's current Resource Consent Conditions

These conditions are detailed in Table 1 and are taken from the Mighty River Power Waikato Hydro System Consents (Doc # 1093785).

Table 1: Summary of MRP's Resource Consent Conditions

Minimum	*Low operating level:* 355.85 masl *Conditions:* The flow rates at Taupo gates must be at least 50 m^3/s under normal operating conditions. However, once levels fall below 355.95 masl, but remain above the minimum, the Taupo gates must be operated to provide a flow rate sufficient to maintain an average flow at Karapiro between 140–150 m^3/s (cumecs). In the event of Lake Taupo falling below minimum level, Taupo outflows shall not exceed Taupo inflows and when, in these circumstances, Taupo inflows are sufficient to exceed the minimum flow at Karapiro, such excess inflow shall be managed to raise the lake level.
Maximum	*High operating level:* 357.25 masl *Conditions:* Can exceed this once every five years but an exceedance above the 'compensation level' of 357.39 masl should be a 1 in 20 year occurrence and above 357.50 masl a 1 in 100 year occurrence. *NB* Compensation levels are legislated for in the Taupo Compensation Claims Act 1947 and other historical legislation – with claims made after 1947 and 1960 exceedances.
Operating Range	Not defined other than as above. There are, however, provisions for the above operating constraints to be waived under certain exceptional/emergency conditions.

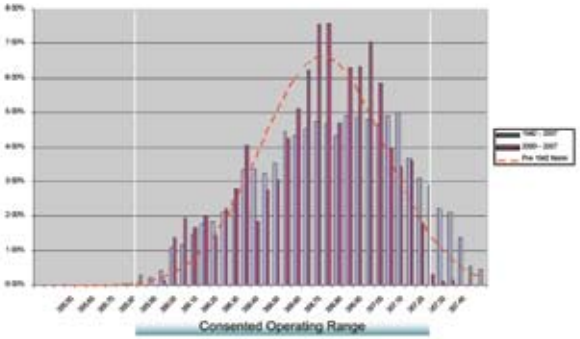
Note that the Operating Range is a band of 1.4 metres with its mid-point at 356.55 masl.

What is the 'right' normal distribution for future management of lake levels?

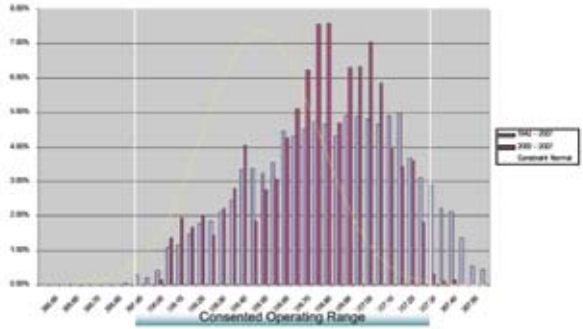
There are three possible candidates considered below, each superimposed on top of the distribution of actual lake levels for the period 1942–2007 since the control gates have been operational (the period during which MRP has been managing the resource is also shown, namely the years 2000–2007).

Figure 2: Different Normal Distribution Options

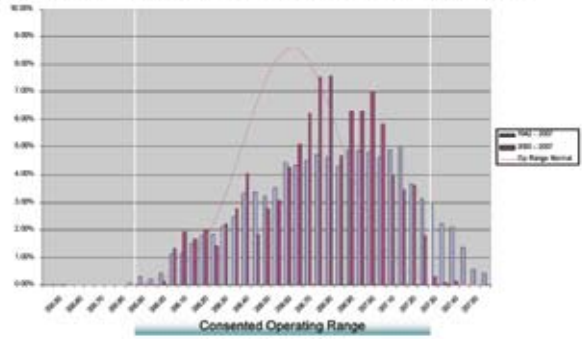
Option 1: 'Historic' Normal Distribution



Option 2: 'Exceedance Levels' Normal Distribution



Option 3: 'Operating Range' Normal Distribution



Option 1: 'Historic' Normal

Taking the distribution that best reflects how lake levels varied before the control gates were installed is *not* suitable as the upper end of the distribution violates part of the Resource Consent conditions, namely the levels set for a 1 in 20 and 1 in 100 year occurrence. These levels would be exceeded on a regular basis under this option.

Option 2: 'Exceedance Levels' Normal

Mighty River Power's Resource Consents for the Waikato Hydro System, under Part A Normal Operating Regime, specify the following probability constraints for the lake exceeding specified levels on a given day – see section 2.5 relating to Maximum Control Levels.

The actual lake level measurement is specified in section 2.2 as 'a rolling average of levels taken over a 24 hour period'.

Table 2: Exceedance Level Consent Conditions

Operating Constraint	**Lake level threshold masl**	**Probability of exceedance**
a)	357.25	An average 1 in 5 year recurrence interval
b)	357.39	An average 1 in 20 year recurrence interval
c)	357.50	An average 1 in 100 year recurrence interval

Operating constraints a) – c) are more than sufficient to define the lake level distribution's mean (μ) and standard error (δ). We do this by working with the more long-term constraints b) and c).

What constraint b) implies

This constraint implies that lake levels are to be managed such that under normal operations there will only be one day in twenty years (ie, 365*20=7300 days) when a reading will be above 357.39 masl. That is, the probability of a daily reading being above 357.39 is

$1/7300 = 0.014\%$

For this to be so, normal distribution theory says that

$\mu + 3.63\ \delta = 357.39$ . . . equation (1)

What constraint c) implies

This constraint implies that lake levels are to be managed such that under normal operations there will only be one day in 100 years (ie, 365*100 = 36500 days) when a reading will be above 357.39 masl. That is, the probability of a daily reading being above 357.39 is

1/36500 = 0.0027%

For this to be so, normal distribution theory says that

$\mu + 4.04\ \delta = 357.50$ . . . equation (2)

Solving simultaneous equations

Using elementary algebra, equations (1) and (2) can be solved to render the following values for the underlying normal distribution's mean and standard error:

$\mu = 356.41$

$\delta = 0.27$

This is the distribution shown in Fig. 2 with the yellow curve.[2]

2 *Comments on colloquialisms:*

The Resource Consent conditions a)–c) take the operational definitions of Table 2 and express them in more colloquial terms. For example, constraint b) is paraphrased as a '5% annual exceedance probability of 357.39 masl'. It is important to appreciate that this is NOT saying that the probability of a daily lake level reading being over 357.39 is 5%.

Another way of perhaps understanding the subtlety is to show how the two relate algebraically.

Pr (lake level >357.39 in a annual period)

= 1 - Pr (lake level <357.39 throughout the period)
= 1 - Pr (lake level <357.39 for all 365 days in the period)
= 1 - {Pr (lake level <357.39 for a daily reading)}365
= 1 - {1 - Pr (lake level > 357.39 for a daily reading)}365

What's on the left hand side of the equation is the 5% value and relates to an exceedance in a continuous 365 day period. What's on the right hand side of the equation is the 0.014% value and relates to the likelihood of an exceedance on a single day when a measurement is taken (as used to derive equation (1) above).

The reader can always verify the validity of the algebra by putting in the numbers, ie,

$0.05 = 1 - \{1 - 0.014\%\}^{365}$

The feasibility of Option 2 as a lake level management regime

Despite being the mathematically correct solution, the distribution is centred too far to the left to be a feasible option in practice . . . the reality is that MRP has to maintain a reasonable buffer above minimal levels most of the time to ensure security of power supply to the upper North Island in times of drought and low lake levels in the South Island.

Option 3: 'Operating Range' (OR) Normal Distribution

If we accept the current consented operating range of Table 1 is to remain intact, then it makes sense to have the mean of the distribution at the mid-point of the range, ie,

$\mu = 356.55$

Putting this value into equation (1) implies a value for δ of 0.231 is needed for the 1 in 20 year condition to be upheld; on the other hand, doing the same for equation (2) implies a value for δ of 0.235 is needed for the 1 in 100 year condition to be upheld. And so we can approximately meet both conditions by having a standard error of

$\delta = 0.23$

This is the distribution shown in Fig. 2 with the purple curve and the option being put forward as the pragmatic approach to achieving a degree of normality in managing lake levels for the future.

PART B: QUANTIFYING THE NEED FOR CHANGE

Too high too often

In a recent study on lake levels,[3] the writers note that, 'Lake level analysis . . . has shown that the control of the lake level results in periods when the lake is held higher than it would be naturally'. As a means of demonstrating the extent of the problem, our OR Normal Distribution (Option 3) suggests the lake should have around 9 days a year when it is as high as 357.00 masl; contrast this with the data in Table 3 documenting the occasions over the past 7 years when lake levels have been above 357.00 masl and the duration of each such occasion.

3 'Lake Taupo Shoreline Erosion Study', Beca Report, December 2006 – page 44

Table 3: Periods when Lake Taupo has been Held Above 357.00 masl in Recent Past[4]

Dates when lake level above 357.00 masl	**Duration (days)**
11 Dec 01–5 Feb 02	56
13 Feb 02–20 Feb 02	8
5 Mar 02–6 Mar 02	2
6 July 02–25 July 02	20
12 Dec 03–31 Mar 04	109
20 June 04–9 July 04	20
18 July 04–24 July 04	7
31 Oct 04–1 Nov 04	2
26 Dec 04–6 Feb 05	43
8 Feb 05	1
9 Oct 05–2 Nov 05	25
4 Jan 06–11 Jan 06	8
13 Jan 06–18 Jan 06	6
22 Jan 06–4 Mar 06	42
26 Apr 06–9 May 06	14
8 Aug 06–22 Aug 06	15
29 Aug 06	1
15 Jan 07–23 Jan 07	9
28 Jan 07–1 Feb 07	5

4 Data comes from records kept by Mr Alasdair McNab, Tokaanu.

Shoreline erosion

Of particular concern is the increased likelihood of shoreline erosion when the lake is at these high levels. The Beca report (page 44) reports on a 'Threshold Analysis' looking at the number of high lake level (above 357.0 masl) and high wind events (above 20 knots). It notes that, 'There were more events under the actual controlled regime than there would have been under the simulated natural regime' at certain points around the lake. One of these locations is at Waitahanui where MRP has recently constructed a breakwater reef to absorb wave energy and thereby minimise further erosion.

A local representative of the Five Mile Bay Residents Association, Ray Haddon, has recently drafted a comprehensive paper entitled 'On the primary cause of erosion of Lake Taupo beaches'. Since the paper has yet to be published, Haddon's Executive Summary is reproduced in full below:

> *Large amounts of wave energy are generated by strong winds passing over Lake Taupo. This energy propagates over the lake's surface in waves until it reaches the vicinity of the windward shore. The waves first begin to interact with sediment on the bottom of the lake in a region called the shoaling zone and, as a consequence, wave height increases and wave number decreases in a process called shoaling. After shoaling the waves become unstable and break producing surf. In normal circumstances, most of the incoming wave energy becomes transformed into turbulent eddies and eventually dissipated into heat inside a region called the surf zone. The remaining wave energy that is not dissipated in this way reaches the foreshore and the waves that carry it run up the beach as swash. In normal conditions this swash gradually slows as its elevation increases, and then eventually returns back down the beach as backwash: the bed profile in the foreshore remains unchanged and erosion does not occur.*
>
> *In circumstances in which the lake levels have become systematically raised and sustained at unusually high levels, the shoaling and breaking processes become shifted closer to the shore (as a result of the increased water depth) with the result that a smaller proportion of the wave energy is then dissipated inside the surf zone, and the swash is consequently more energetic than in normal conditions. This more energetic swash interacts more violently with returning backwash (from earlier waves) creating higher than normal levels of turbulence (seen as white water) in the swash zone. This turbulence generally scours sediment from the beach and thereby erodes the foreshore.*

For as long as the above particular circumstances continue, the sediment eroded from the foreshore is carried offshore where it increases the elevation of the near shore lake bed. This consequently reduces the depth of the water where it is deposited, which then acts to cause the surf zone to gradually migrate back towards where it usually would be in normal conditions. The concomitant increase in length of the surf zone then acts to reduce the amount of energy reaching the foreshore to produce swash, and consequently also the rate of erosion of the foreshore. Given sufficient time, a balance is eventually struck in this way in which most of the incoming wave energy again becomes dissipated offshore, and erosion in the foreshore then ceases. As a result of the above processes, the entire foreshore bed profile essentially becomes shifted landwards. If conditions were to subsequently return to normal, then, given sufficient time, the profile would return to its original location as a result of accretion processes that take place whenever the wave energy in the swash is sufficiently small. The sediment involved in this accretion generally involves the very same sediment that was previously deposited offshore during the earlier erosion of the foreshore.

As a consequence of the above effects, near shore lake bed profiles generally alternately migrate landwards and lakewards when natural mean lake levels are gradually systematically varied about some mean value. The responses of near shore bed profiles to changed mean lake levels generally have time scales ranging from a day (or less), to more than a decade with the result that actual bed profiles, and consequently the potential for severe erosion to happen at any particular time, generally depends upon both mean lake levels and the concurrent storm activity over many previous years. It is shown in this report that erosion is an absolutely inevitable consequence of sustained high lake levels and that much, if not most, of the recent erosion that has occurred at all sedimentary bays around Lake Taupo is most probably a simple consequence of the controlled lake level regime during at least the past decade and during the last five years in particular.

Importantly, the presently existing severe erosion at many of Lake Taupo's foreshores could, at least in principle, be eventually fully restored by natural accretion processes, if future mean lake levels were to be purposefully controlled in order to achieve this objective.

A brief description of some past submissions and/or reports addressing concerns about how lake levels are being managed may be found in Appendix A. These reports are counterbalanced to some degree by a very recent Opus report[5] which concludes that,

> *Lake Taupo has been significantly windier since 2000, with calm conditions decreasing by at least 7%. There has also been a significant increase in the duration and magnitude of westerly conditions. As a result, the waves breaking on the eastern shore of Lake Taupo have been larger, more frequent, and contain more energy than 2000.*
>
> *It is likely that the shift in the wind regime has had a greater effect on erosion rates on the eastern shore of Lake Taupo than the relatively minor changes in the lake level regime over the same period.*

Abnormal fluctuations of managed lake levels

Another concern is the rapid fluctuations in lake levels at times when there are no contributing adverse weather conditions, such as prolonged heavy rain. Table 4a provides a summary of abnormal fluctuations over the past several years, correlating changes in lake levels to daily rainfall during the period.

5 'Recent Trends in Water Levels and Wind on Lake Taupo', Opus, July 2008

Table 4a: Aberrations in Lake Levels as from August 2000[6]

Date/Period	# of days	Change in lake level	Rainfall at Tokaanu	# of days on which rain fell
14/10/00–29/10/00	16	+ 50 mm	10 mm	2
10/08/01–02/04/01	24	- 235 mm	23 mm	4
15/04/01–02/05/01	18	- 143 mm	4 mm	3
19/06/01–15/07/01	27	- 178 mm	11 mm	5
21/07/01–12/08/01	23	- 84 mm	33 mm	6
26/08/01–04/10/01	40	- 78 mm	58 mm	9
10/10/01–18/10/01	9	+ 21 mm	22 mm	3
14/12/01–09/01/02	27	- 30 mm	111 mm	18
26/05/03–03/06/03	9	+ 4 mm	2 mm	1
18/07/03–07/08/03	20	- 256 mm	-	-
22/01/04–27/02/04	37	+ 71 mm	337 mm	23
06/12/04–16/12/04	11	+ 13 mm	11 mm	2
12/01/05–02/02/05	22	- 113 mm	-	-
13/08/05–14/09/05	33	+ 37 mm	37 mm	6
07/01/06–24/01/06	18	+ 1 mm	9 mm	1
12/02/06–06/03/06	23	- 253 mm	-	-

6 Data comes from records kept by Mr Alasdair McNab, Tokaanu.

In particular, many of these aberrations are notable reductions in lake levels even in times of reasonable rainfall (for example, Feb 2004). There are also times of rapid daily increases in excess of 40 mm per day – these are documented in Table 4b.

Table 4b: Rises Over 40mm in a Day (from Nov 06 readings given as cm)[7]

Date	Increase (mm)	Date	Increase (mm)	Date	Increase (mm)
10/09/00	41	05/10/03	54	25/01/06	70
07/12/01	105	03/02/04	61	11/02/06	61
09/12/01	101	29/02/04	98	14/10/06	40
10/12/01	119	19/06/04	75	19/10/06	60
11/12/01	61	20/06/04	43	14/01/07	40
07/07/02	59	21/06/04	95	13/03/07	40
08/07/02	87	22/06/04	49	01/07/07	50
24/05/03	46	17/07/04	44	03/07/07	60
05/09/03	42	31/12/04	63	06/07/07	50
29/09/03	55	19/09/05	55	05/08/07	50
01/10/03	40	09/10/05	135	18/10/07	40
04/10/03	86	18/12/05	59	20/12/07	50

The Advocates are particularly concerned about the risk rapid fluctuations may have on micro-flora and fauna in the shallows of the lake, especially that of smelt breeding cycles during the two-week period after eggs are laid. It is believed that stable lake levels are a critical determinant to successful smelt breeding which, in turn, provides a key food source for the trout population in the lake and its tributaries.

7 Data comes from records kept by Mr Alasdair McNab, Tokaanu.

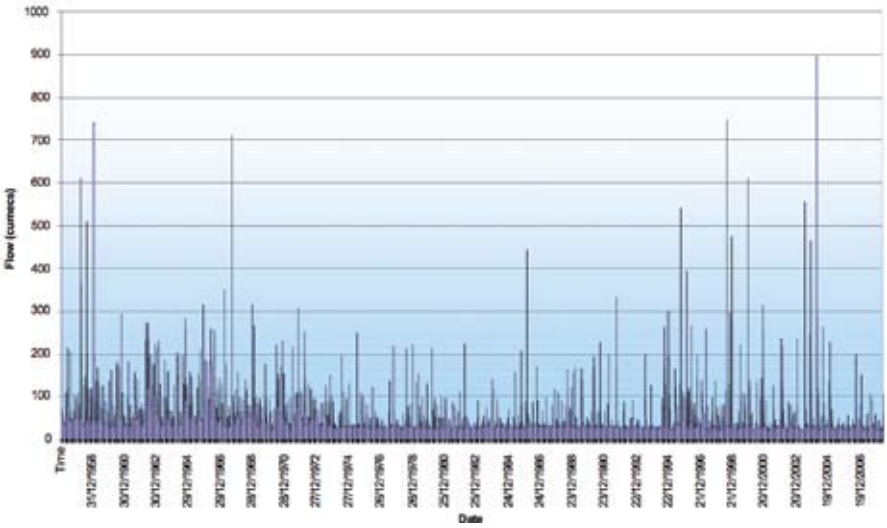
Flushing capability of the Tongariro River

The Advocates' primary concern is the impact of high lake levels on the river; the following extract from the Advocates' most recent newsletter (June 2008) summarises the issue as follows:

> *The river, at its mouth (the delta), instead of flowing freely out into the lake, hits a wall of lake water. This forces the river to lose its energy, drop its bed load of silt and sand, and recede progressively, back upstream. The compounding effect of this is that the lower river loses its capacity to channel and shallows out, and once more productive land has become swampland. Sacred burial sites have been decimated, spawning gravel is smothered and log jams bank up, further reducing the river's energy.*

This section seeks to bring together daily lake level data and river flow-rate data to illustrate the extent to which high lake levels could be causing an hydraulic dam effect, or agrading. The daily flow-rates of the Tongariro River for the past half-century are graphed in Figure 3.[8]

Figure 3: Tongariro River Daily Flow-rate Data



8 Data kindly sourced from Genesis Energy – daily records taken at 6:00am from Turangi from 1957 through to 2008.

It is important to appreciate the river flow-management regime that has been in place since the development of the Tongariro Power Scheme (TPS). There are four key structures located within the Tongariro River catchment – the Rangipo Dam, Waihohonu Intake, Poutu Intake and Poutu Dam. As a general 'rule of thumb' the intakes of the TPS are generally designed to take up to twice the mean flow of the Tongariro River (which is around 25 cumecs). The scheme is essentially 'run of the river' in so far as the ability of the TPS to modify flood flows is extremely limited due to intake, power station and canal capacities – see Appendix B for more information on minimum river flow rates and the commissioning sequence of the TPS.

As expected, flow rates have almost halved on the Tongariro River since the commissioning of the TPS in 1973. A summary of key statistics is provided below:

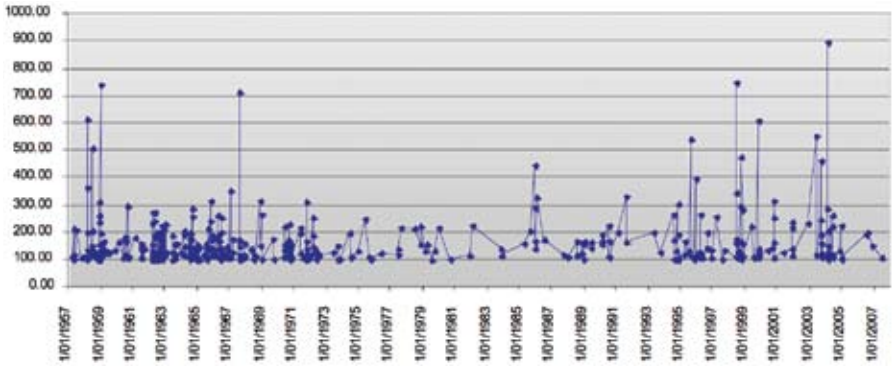
Table 5: Tongariro River Flow Rate Summary Statistics[9]

Statistic	**Pre-TPS**	**Post-TPS**
Mean Flow Rate	53.13	32.33
Standard Error of Mean	0.42	0.20
Median Flow Rate	45.56	28.05
Minimum Flow Rate	21.27	16.61
Maximum Flow Rate	740.27	898.83

For the river to flush, the flow rate needs to be well above average and ideally an order of magnitude above average, ie, 250 cumecs or more. Such occurrences are relatively rare and so the scope of our analysis begins by taking Figure 3 and highlighting those occasions where flows exceeded 100 cumecs – see Figure 4a.

9 Taken for daily records of flow-rates at the Major Jones Pool: Source Genesis Energy.

Figure 4a: Flow Rate Occurrences of 100 cumecs or More



The next series of graphs plots the minimum levels of Lake Taupo in the week leading up to these times of high river flow rates; we begin with all the occasions when the Tongariro reached flows of at least 100 cumecs (Figure 4b), and then progressively filter out more of the events by looking at flows of >150 cumecs (Figure 4c), >200 cumecs (Figure 4d) and finally >250 cumecs (Figure 4e).

Figure 4b: Minimum Lake Level During Week Prior to Peak River Flow of 100 cumecs or More

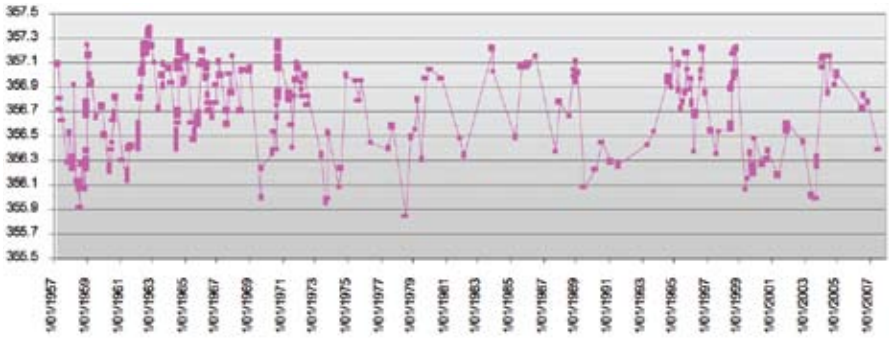


Figure 4c: Minimum Lake Level During Week Prior to Peak River Flow of 150 cumecs or More

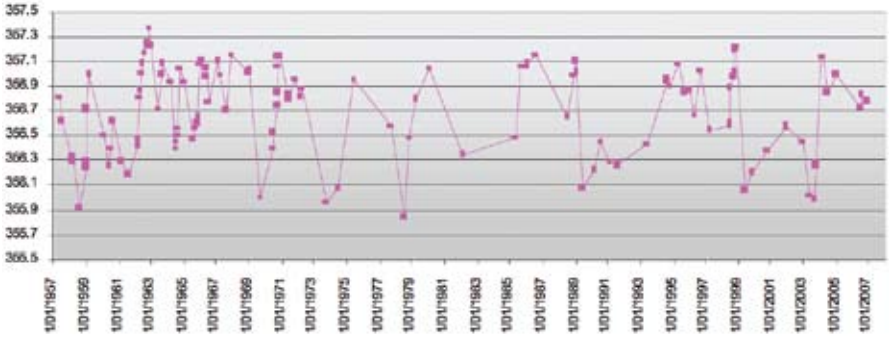


Figure 4d: Minimum Lake Level During Week Prior to Peak River Flow of 200 cumecs or More

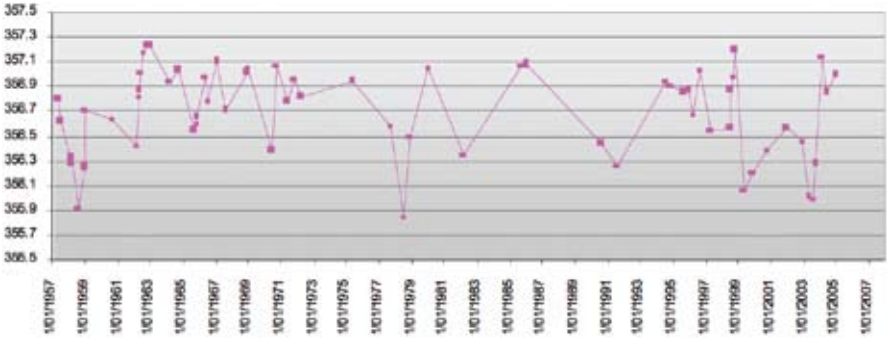
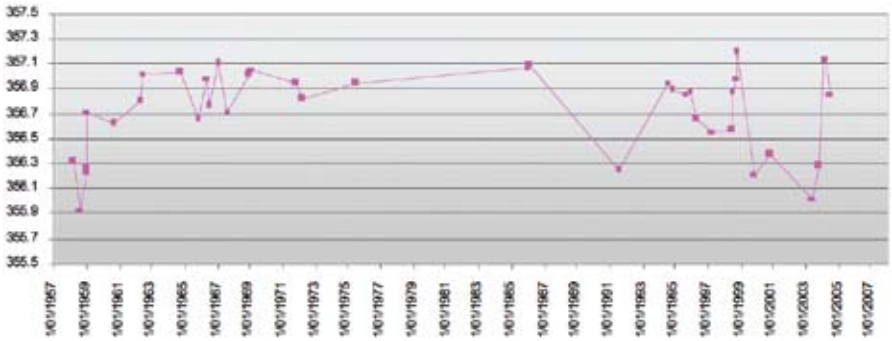


Figure 4e: Minimum Lake Level During Week Prior to Peak River Flow of 250 cumecs or More



Looking at Figures 4a–4e, we would note that:

1. The frequency of high river flow events dropped away significantly after the commissioning of the TPS in 1973 and for the next 2 decades the river only exceeded a flow rate of 250 cumecs on three occasions (Figure 4e).

2. These flooding events have become more frequent again (post-1995); the most serious on record happened in Feb 2004 (Figure 4a) when some 900 cumecs flowed down the river at a time when the lake was within 12 centimetres of its maximum allowable level throughout the fortnight leading up to this period of peak flow.

3. Throughout the past half century, lake levels have been in the upper quarter of the lake's consented Operating Range (ie, 356.9 masl–357.25 masl) for around 40% of the significant flooding events on the Tongariro River (Figure 4e); compare this with Figure 2 option 3 – the OR Normal Distribution – where lake levels would be in the upper quarter of the range less than 7% of the time were this distribution being followed as a management regime.

4. There have been times of flooding, however, when Lake Taupo has been in the lower quarter of its Operating Range and a good number of these have occurred in the earlier part of this decade (1999–2003).

5. With the exception of this year's flood, lake levels have again tended to be high whenever there have been periods of high river flows in the past 3–4 years (Figure 4c.)

The case for dredging the mouth of the Tongariro River to complement lake level lowering[10]

Figure 3 and Table 5 show a significant reduction in the river's flow rates since the commissioning of the TPS in the early 1970s. Historically, the need to dredge the Tongariro River mouth after the completion of the hydro scheme and the diversions was seen by the then Commissioner of Works, who advised that there be a dredge available permanently.[11]

In 1989, DoC published a commissioned report by R.T.T. Stephens.[12] This report identified the relationship between the river as a trout nursery, the nature of the bedload and the likely adverse effects of the new flow regime on the river's capacity to be a nursery. Stephens identified five undesirable features of the then flow regime:

- artificially induced surges
- abrupt truncated flood recessions
- minimum flows soon after rainfall and higher flows in droughts
- absence of seasonal variation in the base flow, and
- sandy bedload accumulation.

The last of these five factors is of particular interest here. Irrespective of the causes, there is evidence that sediment has built up in the lower reaches of the river; the river is unable to keep sediment moving until it reaches the lake. One inhibition is well known, where raised river beds mean that the river passes through willows which seem to have grown out of and into the river (in fact the beds have been raised some 2 m or more in places). Consequentially, drag is induced, water flow is slowed and transport capacity is reduced. A second interference is brought about by lake levels being high, causing an hydraulic dam effect, or agrading, so that the river's flow is reduced, and again sediment transport is curtailed.

10 The comments herein have for the most part been provided by the Advocates' past President, Dr Mark Cosgrove.

11 Refer to Virginia Church submission in the First Annual Report of the Advocates for the Tongariro River, 2002.

12 R.T.T. Stephens, 'Flow Management in the Tongariro River'. Science and Research Series no. 16

These observations are well supported; fishing pools such as Downs, Delatours, Jones and Reed were once well regarded as fishing places because of their shingle bottoms. These places are different now.

Stephens (op. cit. p.87) points out that 'practically all food organisms for river dwelling trout live amongst boulders and gravel. Sand substrate, particularly moving sand bedload, is considered to be the poorest substrate for habitation and production of food organisms. If the interstices between the stones become filled with sand, trout food production is reduced and the quality of juvenile trout habitat deteriorates.'

So the questions are, 'Can trout nursery habitat be improved by moving fine sandy sediment out of the river?' 'Will a faster-flowing mouth speed up the transport rate?' 'Will dredging the bar at the mouth of the river assist this process?'

The Advocates for the Tongariro River (AFTR) contend that the lower reaches of the Tongariro River need help in the form of engineering solutions irrespective of the perceived causes of the damaging changes.

The science available to the AFTR indicates that three strategies are available, viz:

- lake level lowering
- channel clearance and riverbed lowering
- dredging.

The first of these strategies is the overall focus of this paper.

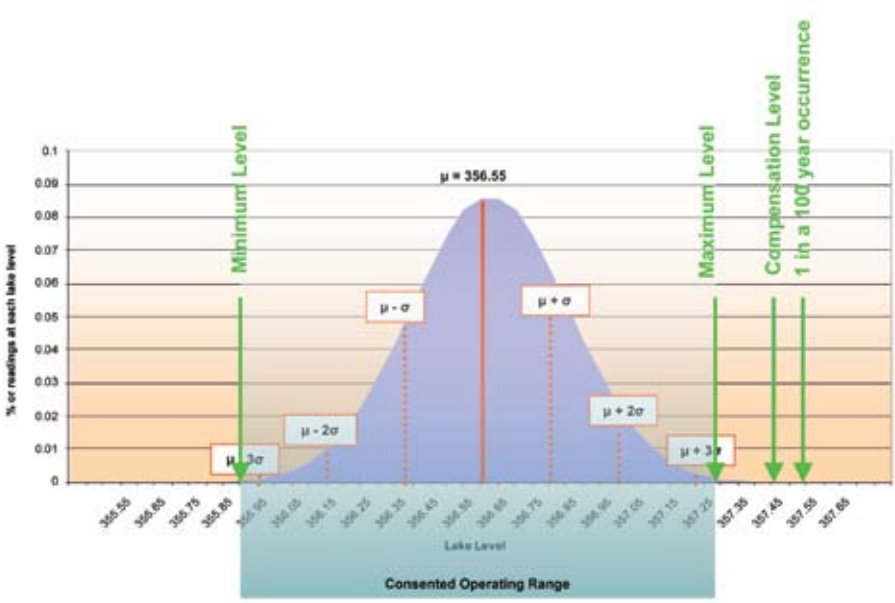
The second strategy is in effect, and the Ngati Turangitukua Environment Committee has, this winter, cleared several kilometres of river bank below Delatours (the river is running notably faster there).

The Advocates for the Tongariro River would welcome the third strategy being pursued, on a trial basis as an experiment, to assess the improvement in the river as a nursery habitat for juvenile trout by assisting the river to shed fine sandy sediments.

PART C: FURTHER REFINEMENT OF THE OPERATING RANGE NORMAL DISTRIBUTION AS A TOOL TO MANAGE LAKE LEVELS

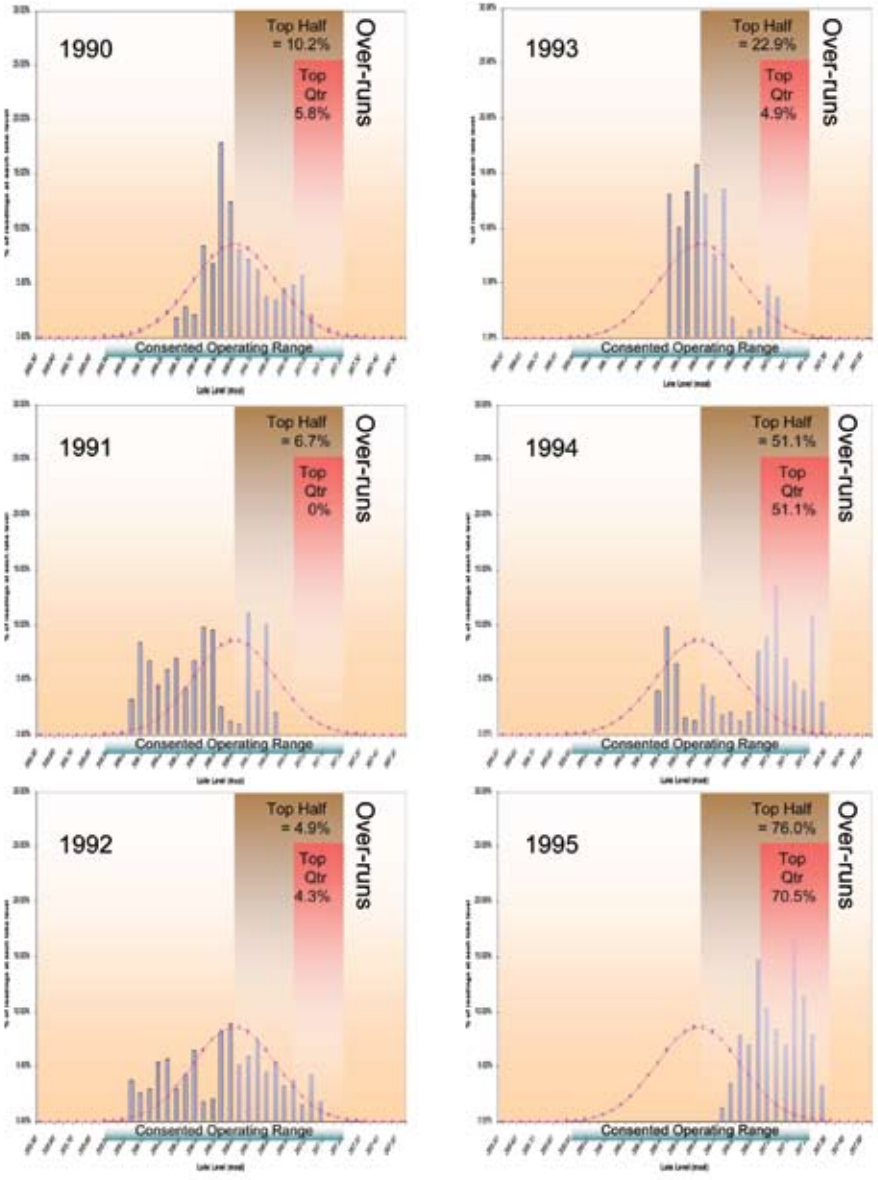
Option 3 of Figure 2 is a Normal Distribution with $\mu = 356.55$ and $\delta = 0.23$. Were lake levels to follow this distribution, the spread of daily readings would be as depicted in Figure 5 below.

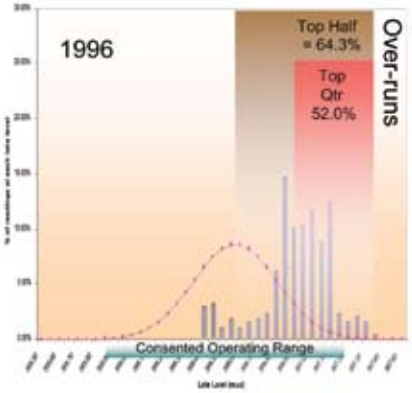
Figure 5: 'Operating Range' Normal Distribution

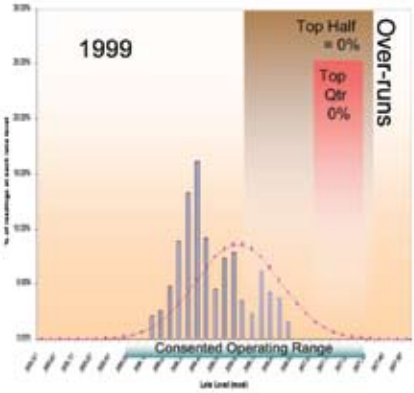


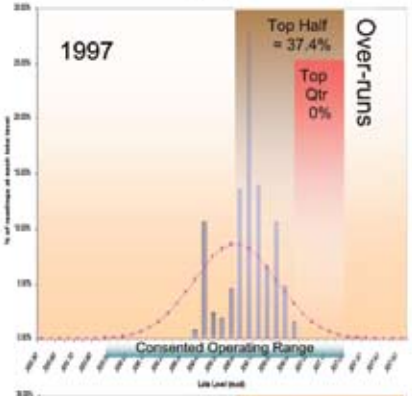
While Figure 2 provides an overall assessment on how actual levels compare since the control gates were installed, it is useful to consider how lake level patterns compare with this OR Normal Distribution year by year. The next series of graphs in Figure 6 does exactly this since 1990. Also shown is the extent to which there have been 'over-runs' in each of these years – both in the 'top half' of the consented operating range and in the 'top quarter' of the consented operating range.

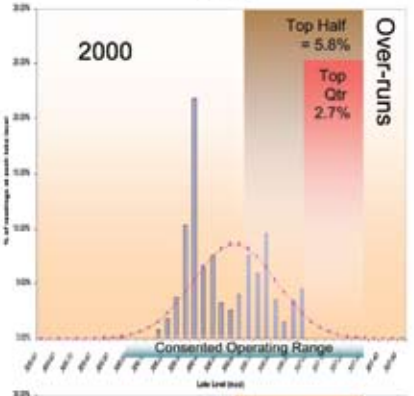
Figure 6: Annual Lake Level Distributions Since 1990 and their Degree of Alignment to the Proposed OR Normal Distribution

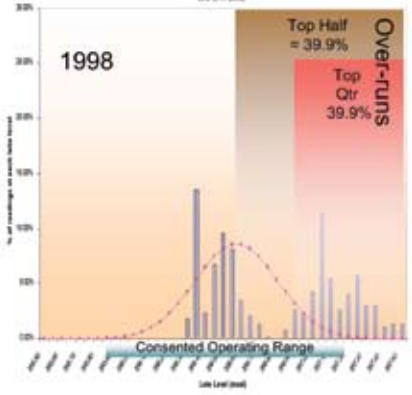


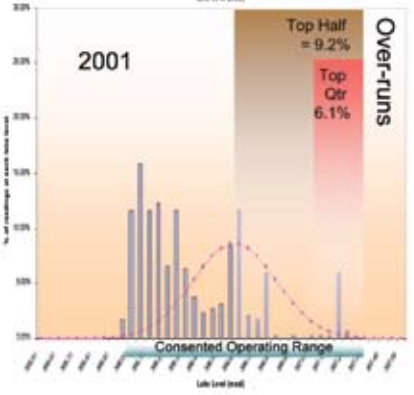

1996
Top Half
= 64.3%
Top
Qtr
52.0%
Over-runs
Consented Operating Range

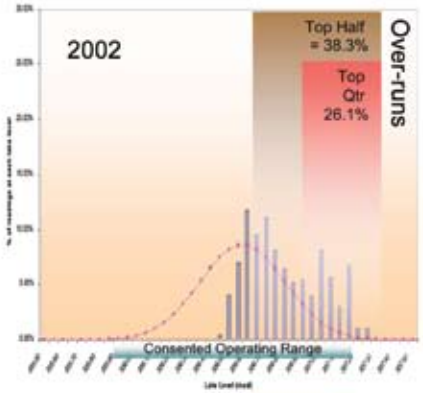

1999
Top Half
= 0%
Top
Qtr
0%
Over-runs
Consented Operating Range

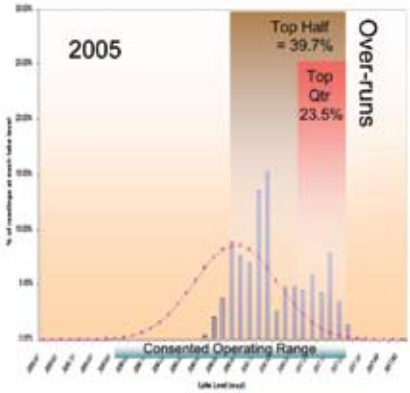

1997
Top Half
= 37.4%
Top
Qtr
0%
Over-runs
Consented Operating Range

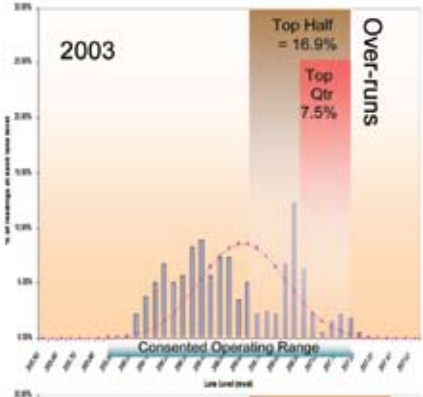

2000
Top Half
= 5.8%
Top
Qtr
2.7%
Over-runs
Consented Operating Range

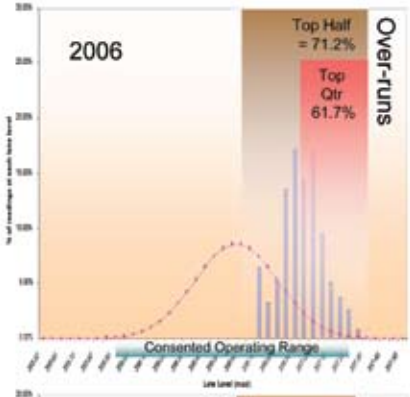

1998
Top Half
= 39.9%
Top
Qtr
39.9%
Over-runs
Consented Operating Range

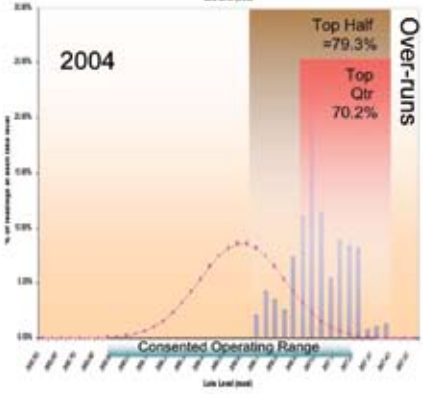

2001
Top Half
= 9.2%
Top
Qtr
6.1%
Over-runs
Consented Operating Range

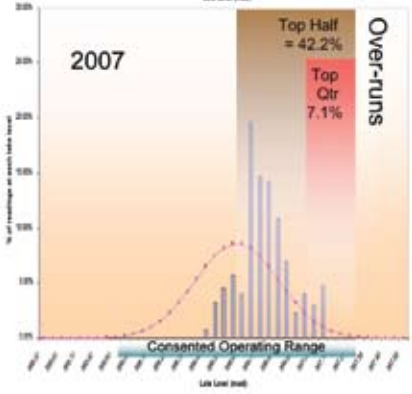

2002
Top Half
= 38.3%
Top
Qtr
26.1%
Over-runs
Consented Operating Range


2005
Top Half
= 39.7%
Top
Qtr
23.5%
Over-runs
Consented Operating Range


2003
Top Half
= 16.9%
Top
Qtr
7.5%
Over-runs
Consented Operating Range


2006
Top Half
= 71.2%
Top
Qtr
61.7%
Over-runs
Consented Operating Range


2004
Top Half
=79.3%
Top
Qtr
70.2%
Over-runs
Consented Operating Range


2007
Top Half
= 42.2%
Top
Qtr
7.1%
Over-runs
Consented Operating Range

Bringing all this together, we conclude by plotting graphs of the over-runs across years as shown below, and propose target upper levels for over-runs of 40% and 20% for top half and top quarter respectively.

Figure 7a: Top half Over-runs Compared with 'Operating Range' Normal Distribution

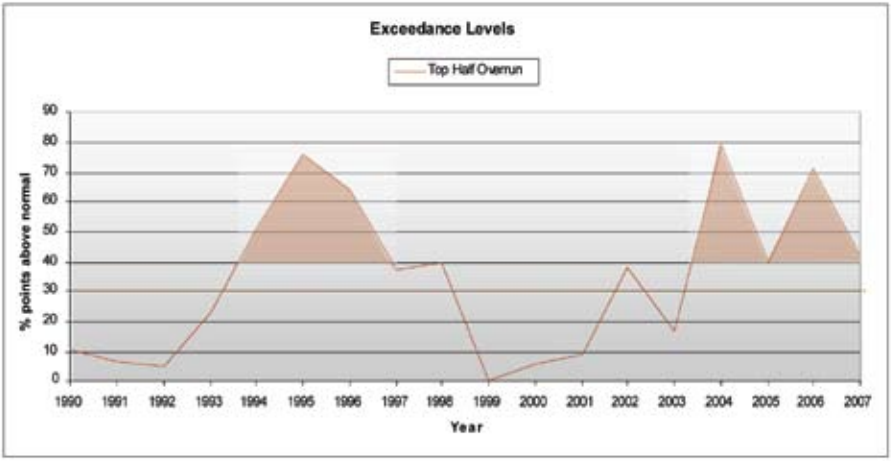
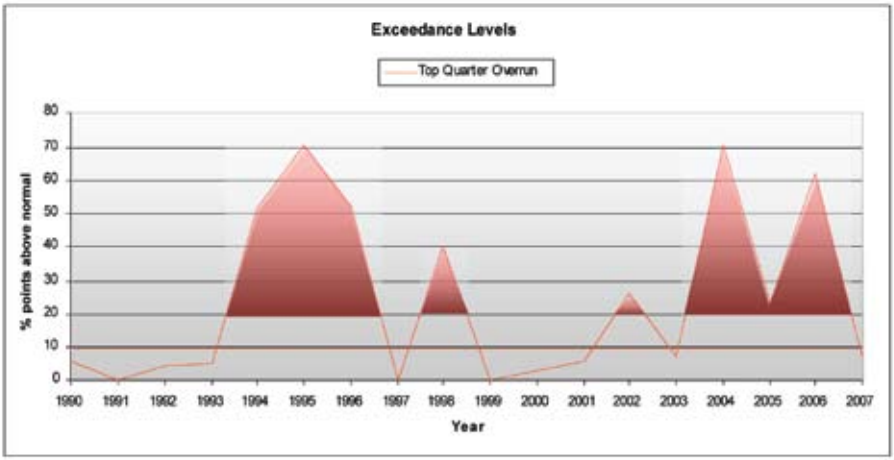


Figure 7b: Top quarter Over-runs Compared with 'Operating Range' Normal Distribution



PART D: RECOMMENDATION

Consistent with the existing conditions of MRP's Resource Consents, it is recommended that the following operating provisions be overlayed:

Normal Distribution	*Normal range of operation:* that daily lake levels for Lake Taupo be managed to follow a normal distribution with mean $\mu = 356.55$ and standard deviation value of $\delta = 0.23$ *Condition:* the annual percentage over-runs from normality must not exceed 40% in the top half of the consented operating range nor exceed 20% in the top quarter of the consented operating range *Purpose:* to have the variation in lake levels being as normal as possible and, in particular, avoid holding the lake for prolonged periods at significantly higher than normal levels
Minimum	*Low operating level:* 355.85 masl *Condition:* can be held for up to 7 days, once annually *Purpose:* to avoid prolonged low levels, which cause • excessive weed growth • difficulty using boat launching ramps
Maximum	*High operating level:* 357.04 masl *Condition:* can be held for 1 day only in every 100 days *Purpose:* • loss of property, damage to infrastructures, drainage and septic tanks, boat ramps, etc • protect woody shoreline, shrubs and trees against flooding • tributary rivers, especially the Tongariro, not flushing naturally and even 'agrading', becoming braided • prolonged high water levels causing vegetation to die and productive land becoming permanent wetland

Maximum daily movement	*Condition:* except during periods of heavy rainfall, daily movements should not exceed 10mm *Purpose:* to avoid excessively fluctuating levels, which cause • potential adverse effects on all micro-flora and fauna in shallows, especially smelt breeding cycles during two-week period after eggs are laid • growth of exotic species around the shoreline (eg, willows) at the expense of natives which are crowded out

APPENDIX A: PAST SUBMISSIONS SUGGESTING MODIFICATION TO MRP'S RESOURCE CONSENT CONDITIONS

Omori/Kuratau Ratepayers' Association Inc. Submission (Aug 2001)

The Association challenged MRP's inference that their consent application was reasonable based on the fact that their proposed control regime was simply a continuation of what had already been passed in legislation. In fact, the very formation of MRP through the splitting up of the electricity sector into a number of independent profit centres itself posed a threat in so far as Lake Taupo's levels would now be potentially manipulated to maximize MRP's profits (eg, through chasing peak power loadings) rather than dynamically optimising the efficiency of the nation's power generation needs as a whole.

Their submission asserts that the unnatural control regime was having the following adverse effects:

- Change in river deltas and mouths, particularly those affected by other power operations such as Tongariro and Tokaanu with siltation in lower reaches
- Encourages exotic vegetation into wetland areas at the expense of native species
- Created shoreline erosion
- Damages infrastructure and drainage
- Restricts recreational use
- Prevents the use of some boat ramps and jetties, when the lake is at a low level

- Damages shoreline and wetland ecosystems
- Destroys waterfowl breeding sites and upsets feeding sites
- Creates fluctuating flows over the Huka Falls and diminishes tourist expectation and enjoyment
- Adversely affects fish breeding
- At times of prolonged low lake levels, encourages exotic weed growth
- Ability to control flood waters at Taupo to prevent flooding in the lower reaches of the Waikato River downstream of the control gates creates local problems arising from higher lake levels
- Endangers shoreline and low-lying properties.

The same list forms a part of the other submissions noted below and will not be repeated.

The submission notes that there is only 14 cm difference between the maximum control level and 'compensation level' set at 357.39 masl and proposes widening the buffer by lowering the maximum level to 356.75 with a raised minimum level of 356.25 masl.

Tokaanu Residents and Landowners Submission (Sept 2001)

Concerned that Tokaanu Stream not able to operate efficiently, both because of:

(i) TPD (Tongariro Power Development) diversion precluding full flooding and therefore flushing of the mouth, together with

(ii) MRP holding the lake at high levels for sustained periods of time, posing a flood risk to the Tokaanu village and, again, dampening the hydraulic capacity to move sediment and have the stream flush itself.

The submission draws on evidence that high lake levels have contributed to the serious erosion and flooding of large areas of pastoral land in the lower Tongariro River and seeks to reduce the maximum control level to 356.75 masl with an 0.5m operating range (so the minimum is lifted to 356.25 masl).

Lake and Waterways Action Group Submission (Nov 2002)

Lake and Waterways Action Group (LWAG) similarly proposed reducing the control range from 1.5 m to 0.5 m by setting maximum and minimum values of 356.75 and 356.25 masl respectively. LWAG emphasised that consent needs to demonstrate that optimal power generation has to be balanced against producing positive local ecological and environmental outcomes.

Lake Taupo Shoreline Erosion Study 2006/2007 – the Beca Report

This study looks at the likely causes of erosion and maps the broad levels of risk from erosion around the lake. It downplays the likelihood of controlled lake levels significantly increasing the risk of erosion on the grounds that recorded lake levels over the last 10 years are not significantly different from natural 'simulated' levels.

The study does acknowledge, however, that controlled lake levels have been held higher than is natural during summer months over the past 3–5 years and that erosion is most evident when high winds coincide with high lake levels.

Most importantly, the study highlights a significant lack of long-term monitoring of the shoreline to better understand longer term trends and cycles that affect foreshore erosion.

Taupo District Flood Hazard Study 2008 – the Opus Report

This study concluded that lake level variations and wave run-up have the greatest potential effect on the extent and depth of flooding.

Submission on Lake Taupo Erosion Study – Stage 4 (2008)

This submission by Waitahanui property owners provides a critique of the Opus and Beca reports and the conclusions that have been drawn from them. Part of the submission's Executive Summary reads as follows:

> *Increased erosion energy on Lake Taupo is adversely influenced by the control of the lake level regime by Environment Waikato and the Hydro Operators. Their activities, flood control and hydro generation, are, at worst, directly responsible for causing erosion or, at best, adversely influencing erosion in a manner that accelerates erosion pressures on Lake Taupo.*

The lake level regime found on Lake Taupo is also influenced by the way the lake is managed.

- *The wave environment is increased as a result of hydro management of lake levels. Different lake level management styles affect the wave environment. The more aggressively lake levels are managed the greater will be the effect on the wave environment experienced on the beach. Water levels between the mean water level and the maximum water level have been increased relative to the natural water level regime.*

- *The wave environment is increased as a result of flood management activities on the Waikato by Environment Waikato (EW). The Taupo control gates are used by EW to mitigate flooding on the lower Waikato. Flood management activities have historically caused flooding on Lake Taupo (1998 floods).*

- *The wave environment is increased because, due to lake level management, on average the lake is held at higher levels than high natural levels. This results in less lake volume being available to store significant flood inflows. From time to time lake levels will overshoot natural lake levels and increase the wave environment and hence increase erosion energy.*

- *The lake is held higher than is natural during periods of seasonally high winds, thus the combined probability of high lake levels and high wind will increase the wave environment and erosion pressures.*

- *The new consented maximum control level during the spring and summer period has been increased. This change will adversely affect the long run wave environment.*

  The management of the lake should be reviewed and the four exacerbators identified should be constrained to operate collectively under one consent based on long term sustainable performance conditions that limit factors that adversely influence erosion on the shores of Lake Taupo. The existing consent conditions do not achieve this sustainable outcome.

As a minimum the maximum control levels that existed prior to the 2003 consent should be reinstated until such time as the exacerbators can collectively prove they are not and will not damage the environment or adversely affect their neighbours.

APPENDIX B: MANAGEMENT OF THE TONGARIRO RIVER FOR ELECTRICITY GENERATION

The author is indebted to Genesis Energy for supplying the following notes as an aid to interpreting flow-rate data.

Water transfer on the Tongariro River and the history of minimum flows

The TPS dams and diverts (both into and out of) the Tongariro River for hydro electric generation. Water from Lake Moawhango is discharged into the Tongariro River via Moawhango Tunnel upstream of Rangipo Dam. This water joins the natural flow of the Tongariro River and the diverted flow from Waihohonu Stream (a natural tributary of the Tongariro River) above Rangipo Dam. This water is taken into Rangipo Power Station and released just above Poutu Intake. A minimum flow of 0.6 cumecs is maintained downstream of Rangipo Dam.

At Poutu Intake water is diverted from the Tongariro River into Poutu Canal and thence into Lake Rotoaira. At present a minimum flow of 16 cumecs is maintained downstream of Poutu Intake.

Minimum flows downstream of Poutu Intake have varied over time. Prior to 1994 ECNZ maintained a minimum flow in the Tongariro River below Poutu Intake of 11.3 cumecs and at Major Jones Pool (Turangi) of 27.2 cumecs.

In 1994 the minimum flow at Major Jones Pool in Turangi was reduced to 22 cumecs and the minimum flow below Poutu Intake was increased to 16 cumecs. In December 2004 the minimum flow below Poutu Intake was maintained at 16 cumecs and the Major Jones minimum flow was removed.

The Poutu Dam dams the natural outlet of Lake Rotoaira, the Poutu Stream. Genesis Energy maintains a minimum flow downstream of Poutu Dam of between 0.3–0.6 cumecs.

Key dates in the commissioning of the TPS on the Tongariro River

- Poutu Intake was commissioned in 1973, resulting in flow reductions downstream of the structure.
- Moawhango Tunnel was commissioned in 1979 resulting in increased flow to the Tongariro River (above Rangipo Dam).

- 1983 Rangipo Power Station was commissioned.
- 1986 The Waihohonu Tunnel was commissioned increasing flows to the Tongariro River above Rangipo Dam. Please note the Waihohonu Stream is a natural tributary of the Tongariro River.

≈ APPENDIX 2 THOUGHTS ON A RESEARCH AGENDA FOR LAKE TAUPO

R M McDowall, National Institute of Water and Atmospheric Research, Christchurch

A paper presented to a public meeting in Turangi by Dr Bob McDowall on 26 October 2008

In the early 1950s, 1953 I think, our family headed for summer holidays to camp at Lake Rotoiti, where both my father and I would catch our first trout, and on the way back to Palmerston North, we camped for a night at Mission Bay, and were hugely seduced by Lake Taupo. On getting home my father made some enquiries, and found that a group of his colleagues from Massey College, as it was then, were camping at Mission Point, and we joined them the following summer, cutting out a patch in the blackberries and gorse, and pitching out 'green-top' tents there. Our family never went anywhere else for our summer holidays. The camping area was overseen by an elderly Maori named Tauri Paul who lived in a little hut near the mouth of the Waitetoko Stream, and he would ensure that our rapidly 'traditional' camping site was available for us, as also for other families who holidayed there, each year. If someone began to settle into one of 'our' spots, he would boot them out and say 'The McDowalls, or the Webbys . . . camp there.' He watched over us all with geniality and generosity.

And so began a long history of holidaying at Mission Point. In the early days we hired a great, heavy, leaky clinker boat from Flight's garage on the Tauranga-Taupo and would row it down the river and then to Mission Bay, where we hauled it out, and we trolled around the bay, rowing the boat. Before long, my father decided that we should have our own dinghy, and I recall him negotiating with a wealthy farming family, to purchase a little, second-hand Johnson outboard, because that family was getting a bigger one – a magnificent 10 hp Johnson, one of the first with a remote tank. At that time, in the post-war economy, such items were hard to obtain but, as it happened, my father had connections with McEwens Engineering, in Wellington, and through them bought a new 5 hp Johnson, and that marvellous little motor served us for years and years.

We began, also, to fish the rips around the lake shore during the summer, especially the Tauranga-Taupo and Waitahanui, but from time to time fished virtually all of the mouths of the small streams around the lake – Kurutau, Waimarino, Hatepe, Pukawa, and others,

mostly at night, where my mother would accompany us and help us untangle our lines in the dark. Before long, perhaps out of self defence, she too took up trout fishing and became one of very few woman anglers around the lake in the 1950s. She was a cunning and successful angler, and was still fishing the Tauranga-Taupo in her 80s, when she could still cast a line but was too frail to clamber down the bank to land her fish, which friendly anglers around the river were happy to assist with. In the early days, we waded in shorts, which rather limited how long we could fish for, but eventually 'splashed out' and bought waders. One day, in mid-January around 1954 or 5, my Dad said, let's look in on the Tongariro on our way home, and we found our way into the old Hut Pool behind a nascent Turangi, and I can still see a big, red-sided rainbow that I hooked, but lost, that morning, on a little split cane Sealey 'Rainbow' rod. That was the first of many encounters with the Tongariro and we began as a family – my parents, brother and me – to fish the river in the autumn and winter. There was a small triangle of land near the old main road bridge across the Tongariro, opposite the old Bridge Lodge that no one seemed to own, and we would camp there among the broom and manuka, and I have memories of going to bed with every bit of clothing I had on to keep warm, and waking in the morning and having to crack the ice from the milk bottles so we could have breakfast. We had wonderful family days wandering the Tongariro, more often than not going back to the incomparable Hut Pool, enjoying the sparkling sunny, mountain days. I recall once my father just for fun, left Palmerston North in the very early hours of the morning, drove to Turangi, fished the Tongariro all day, and then drove home again – really just to see if it was possible. Of course there were then the Mangaweka hills, and the road north of Taihape was mostly gravel in those days. The river then was a different proposition too, compared with what it is now with its major abstractions for the power scheme. Wading was difficult and you had to be very careful. I once took a friend and showed him the river, and remember him fishing ahead of me down the Major Jones, and I noticed him getting further and further out into the lower reaches of the pool and he was getting too much water behind him and was very nearly in trouble. You could not, then, wade down the river and onto the island, and he had some trouble backing out to safety on the right bank. I also recall fishing the Major Jones, with a couple of old men sitting on a bench looking down, and I'd cast across, start to retrieve, and they'd shout, 'No, let it sink!' and they were of course right. One morning I saw a rather disorientated blue duck paddling around the pool. I loved to be on the river and watch it turn a misty gold as the sun began to hit it. I recall arriving there early one morning and found two anglers camped at the top of the pool, not moving at all.

Eventually, I sneaked past them and entered the lower pool, out of sight, and before long they had moved down far enough to see me as I landed a fish, and then another. On hooking a third, I heard a despairing cry 'Not another one!.'

One day the river was in moderate flood, and we went down to the Hut Pool just to have a look, and with nothing else to do, I cast a line out and hooked and landed a fish, despite the swirling brown water. And that fish landed I cast again and before long hooked and landed another. A couple of other anglers came for a look and expressed surprise that I was fishing in such dirty water, and I told to them to look under the bushes. They then expressed even more surprise. I had actually seen another fish porpoise down near the head of the 'Boat' – a branch of the river that broke away to the left, and so I said 'There's another one down there!', and I cast and hooked that too; I don't think they asked me if I could walk on water, but they were certainly impressed!

Of course, this was mostly before the great flood in 1958, which destroyed the Hut Pool, so I imagine that there are few people still around who really know anything about it from firsthand experience.

Over the years, our family would return to Taupo every summer, and be there for shorter trips several times a winter, and as my father predicted it would, trout fishing ended up taking up too much of his time, but he just loved it. He last fished the pool below the bridge in his mid-70s, just a few months before he died. For many years, I would gut all the fish we caught and record their diets – I guess the very beginnings of my career in fisheries science.

Why do I tell you all this? Well it's because I want you to understand that the river and lake have been a very special part of my life, and that I do not come here to talk about something that is only known to me from books! I've not enjoyed it as much in recent years, which I find disappointing, but it is a long way from Christchurch.

Lake Taupo and its rivers have a history all of their own. The lake was formed in its present state by a huge eruption nearly 2000 years ago – the largest volcanic eruption in human history – so great that the effects of it were noticed in China and Rome – the lake is basically a huge collapsed caldera, and the eruption of which I talk was just the last of many over 50,000 years or more. Every now and then, the central North Island volcanoes remind us that we are in a very active volcanic zone, and the lumps of pumice that slop around the lake shores are a persistent reminder of this (see an article in *Fish and Game New Zealand* # 58 – 'Return of the big bang').

Of course, after the last major eruption in about 186 AD nothing could have survived in the lake, and the various animals now found there must have arrived after the water conditions improved, and it probably took a great many years. How the fish got there is uncertain, but there are Maori legends that tell of a man named Ngatoroirangi who introduced the koaro, *Galaxias brevipinnis*, into the lake. This may well be what happened, and the same may be true of the koura or freshwater crayfish, *Paranephrops planifrons*, and kakahi or freshwater mussels, *Hyridella menziesii*, that now live there.

Not a great deal is recorded about the importance of these species to the Maori communities that lived around the lake, and much that is recorded is erroneous in detail, but clearly, substantial populations of Maori lived around the lake shores and I have no doubt that the fish in the lakes provided a major source of food. The abundance of the juveniles of the koaro in the lake (called inanga by local Maori) must have been prodigious. And yet, early colonial history relates how Maori could catch the inanga by the 'hundredweight' using large seine nets around the shores of the lake, and these fish were provided for many of the early colonial Pakeha visiting the lake – people like Bishop Selwyn, Governor George Grey, Austrian scientist Ernst Dieffenbach, explorer John Bidwell, missionary Thomas Grace, and others.

There are several accounts that tell how, after heavy storms, Maori could walk around the lake shores and pick up adult koaro (that they called kokopu) that were swept ashore by the waves to the extent that it was a significant source of food – Maori who did so were called 'kai pangare' – people who picked up the food around the lake shores. I've sometimes wondered whether these accounts were in part apocryphal. I originally read this in John Grace's book on Tuwharetoa, and I imagine that Grace himself might not have actually seen this. But Florence Harsant, the daughter of an early missionary teacher, who grew up at Waitahanui, wrote of this from her own experience in the early 1900s, and most recently, I have seen it recorded in the 1845 diary of noted early colonial politician and bureaucrat Donald McLean. So there is no doubt that it happened as Grace described. In addition, on our first experience camping at Mission Bay, more than a century later, we actually collected koura washed ashore by the waves in what must have been much the same way.

And so we come to the trout introduced into Lake Taupo. Firstly it was brown trout, in the late 1800s, and these flourished and grew in huge abundance. Then rainbow trout were introduced a little later and they, too, flourished and grew in a way that caused amazement.

I don't need, I suspect, to relate the nature and extent of the early history of this remarkable fishery – it is recorded all over the place, and phenomenal angling ensued.

Why did the trout do so well? Well, there is no doubt a series of contributors:

1. The quality of the water was well-nigh perfect – pure and clear, and cold – even across the summer; any fool could have predicted the success of the trout (though it is of course much easier with hindsight.

2. There were almost endless gravels in the tributaries entering the lake in which the trout could spawn. And:

3. The food supply in the lake was also highly prolific – the fish that had made it possible for Maori to live around the lake were the energy that initially drove the fishery which soon became internationally famous and lured such celebrities as Zane Grey and the Duchess of York (later to become Queen Elizabeth as wife of King George VI).

Let me here put to rest a fable that is not infrequently told of the lake. It is sometimes said that eels could not live in Taupo because of some toxic materials in the water that relate to the extent of volcanism around the lake. Newspaper editor, angler and author Budge Hintz is among those who have stated this. It has to be total poppycock. All sorts of fish have been able to thrive in the lake, both native and introduced – two trout species, native koaro and common bullies, smelt introduced from elsewhere, goldfish and most recently brown bullhead catfish, and I have not the slightest doubt that eels would do just fine in the lake, too. The reason they are absent is that they were never able to penetrate up the Waikato River past the Mangatautari rapids, near where the Atiamuri Dam was constructed. Had the eels been able to get past that obstacle (as some now can because a few can climb the dam), they would probably not have made it past the Aratiatia Rapids and the Huka Falls, as many others have suggested. Clearly Pat Burstall had concerns that eels would do well in the lake, given the effort and expense he invested in trying to ensure that they did not enter the lake when the water diversion from the upper Whanganui (Whakapapa) diversion was established.

After the trout were introduced, there was rapid collapse of the koaro population in the lake (discussed in my article 'A matter of opinion' in *Fish and Game New Zealand* # 59). Historically, concerns about the decline of the koaro, and also of the koura and kakahi populations, on the Maori population around the lake were given little or no consideration

– the real Pakeha concern was for the trout stocks. It was not until the early 1920s that there was a study of what the trout were eating in the lake, and in a report of that research we can read of the author's complaint that Maori harvesting of koaro from the lake was having adverse impacts on the trout population. I have no doubt that if local Maori had known that this complaint had been made, they would have had real difficulty understanding why the needs of Taupo trout were regarded as more important than their own. New Zealand's most notable freshwater fisheries biologist from the 1950s is on record as saying that 'sentiment' was playing too strong a role in the attitudes of some people concerned about the decline of native fish as a result of trout predation. Apparently it was inappropriate to care about the native fish – only the trout populations mattered, or so it seems!

Once the trout had become established, the native fish were no longer available in former numbers and this caused major problems for Maori communities living around the shores of the lake. I have little doubt that it was the availability of these fish that made it possible for Maori to live there. Within a few decades trout predation had destroyed the koaro populations and the condition of the trout deteriorated seriously. In response to this, the government introduced smelt into the lake, and to an extent this was the saviour of the trout stocks. Smelt soon provided the 'engine' that drove the modern trout fishery. But, even with smelt present, there were times when the condition of the trout deteriorated very seriously. It was during the 1950s or early 1960s, I think, that there was no trout bag limit at all – anglers could catch as many as they liked, and there are stories of great heaps of slabby, dead trout lying around at river mouths that anglers regarded as not worth taking home.

This did not persist for long, and for many years there was a bag limit of 10. In a way, a bag limit of 10 was little different from no bag limit at all, as relatively few people would actually reach that limit, and the number might end up as more of a number to be achieved than as a measure to limit catch – in fact the limit bag of 10 might actually have resulted in more fish being taken rather than fewer. However, at times it was easily possible to reach 10, and I recall one night returning from the 'delta' with 26 fish taken by three of us, and wondering whatever we were going to do with all these fish!

Now, it seems, the Taupo trout fishery might be in crisis, with talk of serious dissatisfaction with the trout fishing this year. The DoC fishery managers have reduced the minimum size for fish taken because too few fish are being caught around Christmas that exceeded the previous minimum size limit. You might say that to do that is crazy – why allow anglers to catch even smaller fish, if so few of them are reaching the previous minimum size?

Wouldn't you think that the size should even be increased to ensure that enough fish are surviving through to maturity, to increase the spawning production? At this point I suspect we are seeing something of a conflict of interests between the ecological health of the fishery and its financial health – the need to obtain revenue from licence sales to fund the fishery's management. But, in the end, if you are going to harvest fish from the lake, it really doesn't matter how big they are: if they are dead, they are dead!!

So, what is going on, and how can we manage our way through this apparent crisis and see some restoration of the fishery we would like? At this point I will ask more questions than provide answers. I have no magic bullet that will suddenly solve it all.

I think we need to look broadly across the ecology of the lake and see if we can identify where in the population cycle things might be going wrong. Let's see if we can identify some potential bottlenecks that might become the target for research and management. What I would like to do now is to explore the life cycle of trout in the lake and ask some questions about what might be its trouble.

In order to get to grips with what goes on in a fish population, like the trout in Taupo and its tributaries, we need to recognise the presence of several biological/environmental cycles. These emerge in informal ways in nearly all of what is written about the fishery, though this may not always be precisely stated.

One of these is the life cycle of the trout themselves, and we are all pretty much aware of at least the basic elements such as spawning, feeding, migrating and so on. A second cycle is the changes in the lake itself, and probably an outcome of the seasonal shifts and how the lake responds to these. A third involves the micro-organisms in the lake, in essence phytoplankton production that fuels the zooplankton, the small crustaceans that drive the seasonal production of the smelt (and formerly koaro) populations in the lake, and these are the primary food of the trout. From my reading of *Target Taupo*, it has seemed to me that the DoC managers of the fishery have struggled to both predict the spawning seasons, year after year, and to explain what has happened afterwards. This is really quite difficult. Also, I think it is difficult to manage a fishery that is exploited as heavily as the Taupo Fishery is – a bit like keeping a Ferrari racing car tuned.

I'd like from here to spend a fair bit of time exploring the most fundamental of the cycles discussed above, that of the trout population. Let me say, at this point, that I understand

that there are some serious concerns among anglers that even the smallest, maiden fish in the lake are in poor condition and that anglers are finding that they have little or no food in their stomachs. If this is so, then there are some serious concerns about smelt production in the lake, about which there is no published information. But DoC carries out seasonal surveys of the smelt stocks, and should have some kind of a 'handle' on what is going on.

In managing a fish population at a stable level, all that is needed is that each spawning pair must, on average, produce only enough progeny to allow another pair of fish to spawn successfully. Of course, the range of actual number of recruits varies widely, with many not producing any recruits at all, as they are harvested before spawning. But this should not matter. So, let's look in a bit of detail at the cycle and begin with:

1. **Eggs buried in a redd in the spawning streams**, and they are there for several weeks. All they need is plenty of clear, cold, well-oxygenated water, and there is generally plenty of that. A trout produces about 1500 eggs per kilogram of weight and about half the population is male. *Target Taupo* states that in the 1998 spawning run into the Waipa Stream it counted about 2000 fish, and so 1000 females, through the trap. If we assume an average weight of 1.5 kg (probably a bit low), then egg production was a minimum of around 2.5 million. However, the trap count did not include fish that got past the trap in floods, and so the egg production may have been much higher, perhaps 4 million. The 2004 run was much higher, perhaps 8,500 fish giving egg production of around 9.5 million. Typically egg survival is good, though there can be adverse impacts from floods, but these have always happened, and of course we are looking at only one of the spawning streams. Whatever way we look at this and however you 'tweak' these numbers, there are a lot of eggs and plenty to support the fishery. Clearly DoC had some concerns when it reduced the bag limit from 10 down to 8, and most recently 3, but whether this was needed is clearly arguable. There seem, to me, to have been plenty of fish spawning, and maybe, if nothing else, the reduced bag limit primarily meant that the catch was being shared among more fishermen.

2. **The alevins hatch and spend a few weeks buried in the gravel**. I think this is probably a tactic that results in bigger fish emerging from the redds and may increase survival, making them better swimmers. My hunch is that survival to 'swim up' is probably usually good, though again there can be catastrophic floods, though these have always happened.

3. **The alevins swim up into the river and begin life as fry/juveniles**. At times in the spring there can be huge numbers of small fry around and my hunch is that this is a time of major mortality.

4. **Juvenile life in the rivers and lake**. This seems, to me, to be a stage about which relatively little is known in Lake Taupo and its tributaries, as the fish compete for space and food. Some stay in the streams and rivers, but many may move down into the lake at very small size. DoC information suggests that fish have to be over 90 mm at emigration into the lake to have a good chance of survival. However, and this is important, if huge numbers of very small fish move down to the lake it requires only a very small proportion to survive to make a major contribution to the adult population. Certainly, at times, small post-fry rainbows can be common around the lake shores – I've watched children with buckets and nets catching them. Massive early migration into the lake is probably a result of competition for space and food. However, if juvenile rearing in the rivers is a key element in trout production, the amount of quality space in the rivers is a key issue. I have memories of what were clearly small rainbows 'blipping' at the surface around the lake shores in the summer. I also recall one day in February catching 13 fish in the Birch Pool in a couple of hours, most of them 25–30 cm long, well undersize, and so it is obvious that some important rearing does go on in the rivers. My angling experience is that very few fish of this size were taken in the lake, but it is unclear to me whether that was because they weren't there or because they were not accessible to angling. So, I think this is an area that needs research that is of fundamental importance to the fishery. What is the optimum size for emigration to the lake? – and this is not just a question of the proportion that reaches the fishery, but also of absolute numbers, and these are very different figures. Which fish survive, and why? This is a rather difficult question to study. But I think that some studies of daily growth rings in the otoliths might be informative to identify where growth happens.

5. **Feeding and growth in the lake**. This is of course a critical phase as it is when the fish are taken by anglers. There is a wide assumption that growth is driven by smelt, and I don't doubt that. It seems to me that the dependency of trout on smelt is a matter of some seriousness and isn't easily manipulated. *Target Taupo* suggests that 'Scientific studies have shown that there is far more juvenile smelt production than there is zooplankton to support them.' If that is so, then I wonder how the smelt grow? Regardless of that issue, this seems a pivotal issue and I wonder whether enough

is known about smelt ecology, given its importance. In the past there have sometimes been other important foods – like green beetles that were once very important in summer, they disappeared perhaps as a result of the use of DDT superphosphate fertilisers, came back when DDT was banned, but seem to have disappeared again. Frogs were important one year when the lake was very full for a long time (see my article 'The year of the frog' in *Fish and Game New Zealand* # 17). I heard concerns about planting of pines around the lake, but know nothing quantitative, and of course now the pines are being removed and dairy farming is intruding. If it's not one thing its another, or so it seems. I would be interested in some figures on the proportion of trout taken in the lake as opposed to in the rivers, and how this might affect recruitment. Has jigging placed an unsustainable burden on the fishery? Some are blaming shags (see my article in *Fish and Game New Zealand* # 38), though one wise soul argued that shag abundance may indicate just how abundant the trout are! But, as I stated early, it seems that enough eggs are being deposited to support the fishery.

6. **Adult fish mature and return to the rivers to spawn**. A significant element here is that there is probably very strong homing by fish back to the stream where they themselves hatched. If that is true, then we are looking at a situation where we are not managing one Taupo population, but a number of them. Work done by DoC suggests that the fish move widely around the lake, and so the populations become much mixed, but then segregate when they return to spawn. This makes it almost impossible to manage exploitation in the lake based on numbers spawning in the various tributaries.

One point that is unmistakeable is that the seasonality of the spawning runs has changed over the decades. I can recall, as a lad in the 1950s, going up the Waimarino in May, and the pools were black with fish – almost uncatchable, and scarcely worth catching as they were in declining condition, but there were heaps of them. And I have memories of rainbows spawning in the back channel of the Island Pool in May. Do they do that any more? *Target Taupo* has reported over the past few years that the spawning runs of rainbows, at least in the Tongariro, have been getting later and later, with talk of fish spawning even in November. *Target Taupo* # 50 tells that by 2006 nearly 70% of the run took place after 1 September and that more fish ran in November and December than in June to August.

I can't remember when the open fishing season in winter was first introduced but I think it would have been in the late 1950s or 1960s. But what I can remember is that it became

increasingly difficult to get good fishing in the Tongariro in May and early June through the 1970s. Maybe I wasn't there on the right days, but it was certainly tough at times. Most recently, of course, flows in the river have become much lower and this has made the river easier to wade, and that, added to the advent of 'nymphing' may have increased the ease of fishing. To that, add increasing numbers of anglers, and I have little doubt that harvest has been intense. I therefore ask, have reduced flows and nymphing, all additional to the open winter season, had adverse effects on the populations? We have to continually remind ourselves, though, that it seems that enough fish are spawning to generate sufficient eggs to maintain recruitment, though clearly the timing has changed. Timing of spawning is almost certainly an inherited trait, and if we are going to consistently and heavily select out the early spawners, then later and later spawning is, I think, inevitable.

Interestingly, *Target Taupo* states that anglers tend to reduce activity in the late winter and spring, and perhaps that is a part of our fish culture. Or, perhaps they are catching too many spent and poor-condition fish to bother. And, maybe it's just as well, or maybe no fish would get through to spawn. But, here we are, back to the beginning of the cycle that I started off with, with the fish spawning in the spawning streams.

One of the implications of the later spawning is that the fish have not been reaching takeable size in the summer when they would be expected to contribute to the summer trolling fishery. That may, at least partly, be because they have just not had long enough to grow owing to late spawning and late hatch. As I stated earlier, it really doesn't matter how big a fish is when you kill it – it is not going to spawn, regardless, and on this basis DoC cut the minimum size from 45 to 40 cm. I had a look back at our family's catch diary for the 1956–57 summer when we took nearly 100 fish in three weeks. We would have had to return only three fish as being below 45 cm – so much has changed in 50 years.

Target Taupo states that, 'As the autumn running fish support the fishery throughout the winter, the fishing pressure *could* potentially affect the size of this autumn run. However, this is unlikely . . . Even if fishing pressure in winter was responsible for the decrease in numbers of early running fish, it still wouldn't explain why the spring run is getting larger' (my emphasis). My response to this is, how could anything else be possible? As I have said, timing of spawning almost certainly has a very strong inherited component, and if angler harvest is selecting (killing) all or most of the earlier running fish, then a shift to a later spawning season is inevitable. Angler harvest may be the primary driver of the later run.

So, where to from here?

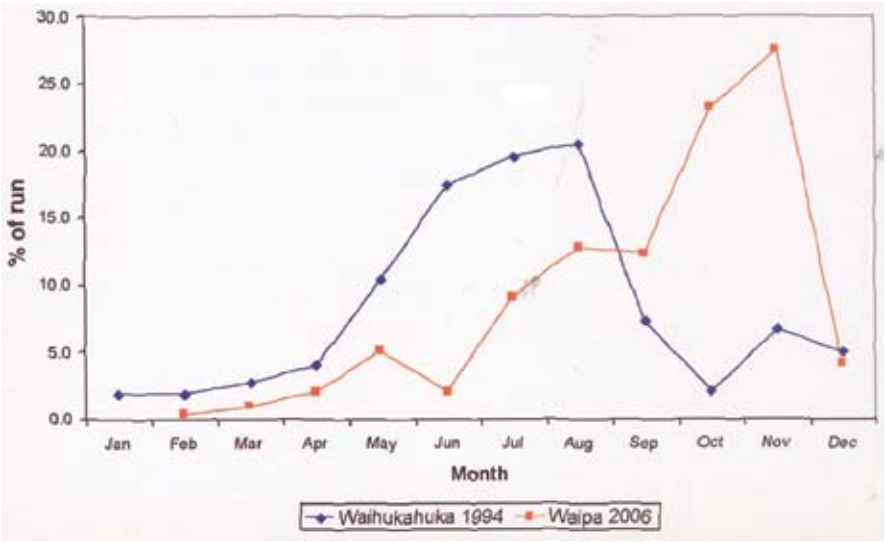
If I were managing the Taupo trout populations, I would focus on several aspects:

1. I would take a careful look at juvenile rainbow trout ecology in the lake and its rivers, as this is pivotal to trout production; I would include some studies of daily growth rings in the fish otoliths as this might help to highlight where best juvenile survival and growth take place.

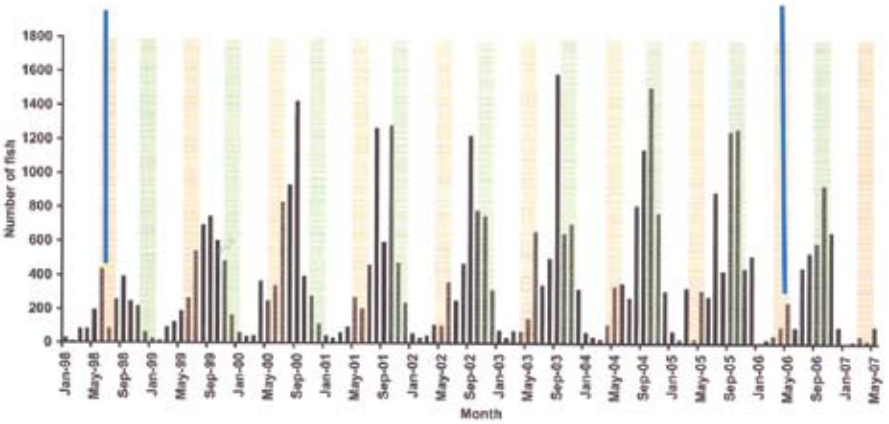
2. I would seek a better understanding of smelt ecology, as the engine that drives the fishery; there seem to be some issues that relate to trout growth, condition and diet in the lake.

3. I think it would be useful to do some trout population modelling as this might help to highlight where the populations are vulnerable to decline, including the effects of heavy winter harvest on spawning season.

4. It might be interesting to see what would happen to the fishery if a winter closure were re-instituted; I recognise that there are some serious economic implications for the management of the fishery from doing so, but I suspect that there is really 'Hobson's choice'.

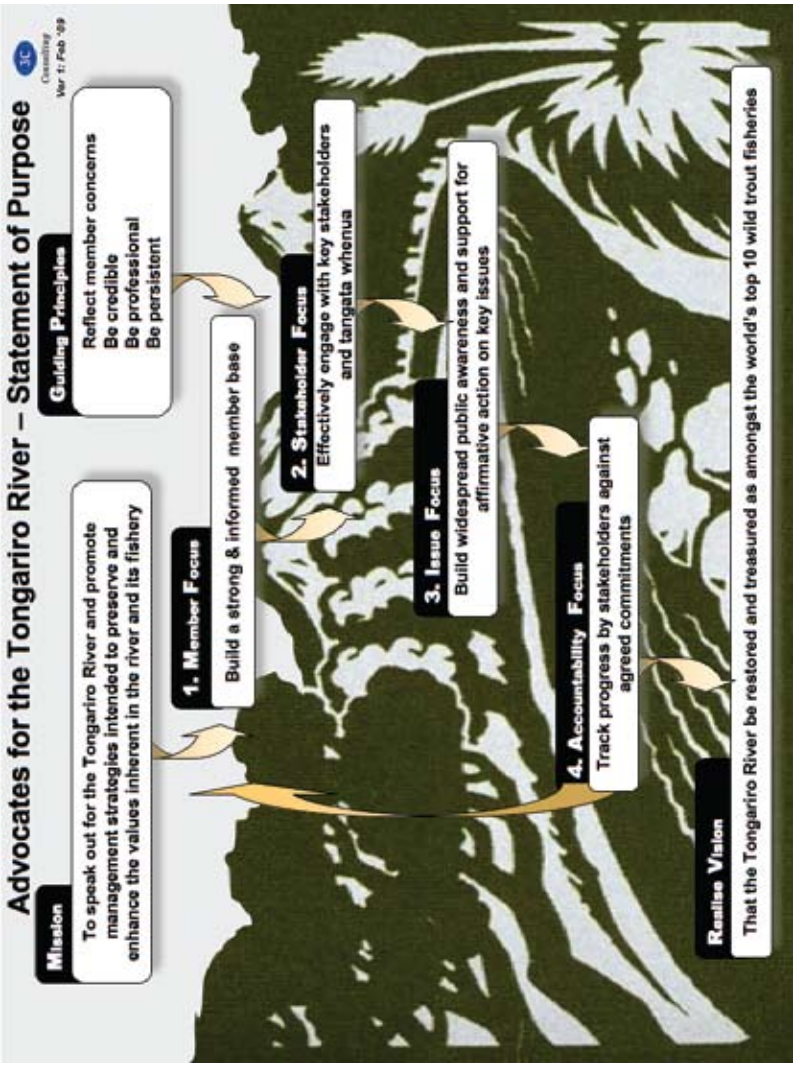


This plot is from *Target Taupo* and shows numbers of migrants through two admittedly different tributaries in 1994 and 2006, and it shows the extent of difference in numbers across the years.



This plot is also from *Target Taupo* and shows the frequency of spawning in a Tongariro tributary across nearly a decade. I have added the blue line at May 1998 and May 2006 to highlight how the spawning period has shifted.

≈ APPENDIX 3: THE ADVOCATES' STRATEGIC PLAN



1. Member Focus

Build a strong & informed member base

3C Consulting
Ver 3: Feb '09

Strategies

- **M1** Gain public involvement and support for the Advocates as an entity and build membership
- **M2** Be informed and credible through increasing Advocates' collective knowledge of all aspects of the river
- **M3** Sustain financial viability to fund planned activities

Achievements to date

- Have developed respect from stakeholders as a credible organisation
- Current membership ..... 191 (Dec '08)
- Funds on hand $12,000
- Website developed
- A strong dedicated committee
- Passionate core membership
- Grants of $74,000 to date
- Each year member donations have equaled subscriptions

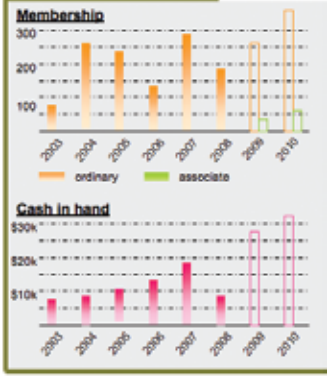
Destination by 2012

- Have more than 100 Turangi members
- Have a membership in excess of 350
- Fishing clubs and other recreational groups of the Tongariro are associate members
- Cash reserves at least $30,000
- 40% of annual income derived from non-subscription sources
- Comprehensive knowledge base established, maintained and communicated on all aspects of the Tongariro River

Actions for 2008/2009

	WHAT	WHO	WHEN	BUDGET
MA1	Maintain website to ensure it is dynamic and user friendly	Eric/Ross	Ongoing	$700
MA2	Initiate membership drive by referrals from existing membership base (with some incentive perhaps); provide membership badges; utilise retail outlets (New World) and look at refreshing brand	Ross/Cmte	Dec 07	$750
MA3	Regularly communicate with members -through website, seminars, newsletters (2/annum), Annual Report & AGM	Heather	4 monthly	$5,500
MA4	Assemble reference material on the Tongariro River and publish/ reference on website. Support establishment of Tongariro River reference section in Turangi Public Library	Eric/Cttee	Ongoing	See MA8
MA5	Survey member satisfaction levels annually and test for emerging issues (synchronize with newsletter 2)	Heather	Annual	See MA4
MA6	Network with other like advocacy bodies (eg Freshwater Anglers, National Trout Centre)	Cttee	Ongoing	See MA8
MA7	Develop and maintain Strategic & Annual Action Plan	Stuart	Ongoing	See MA8
MA8	Undertake routine administration, prepare Annual Budget and gain appropriate funding sources for approved projects	Eric	Ongoing	$1,675
			Total	$8,625

Scorecard



2. Stakeholder Focus

Effectively engage with key stakeholders

3C Consulting
Ver 2: Feb '09

Strategies

- **S1** Ensure there is a robust and Integrated Management Plan for the Tongariro based on credible scientific information and sound river management methodology
- **S2** Establish effective relationships with stakeholders with a cultural, management, recreational and/or commercial stake in the Tongariro
- **S3** Liaise effectively with Ngati Tuwharetoa & Ngati Turangitukua

Achievements to date

- Brought about establishment of Tongariro River Management Forum and agreement to develop ICM Plan
- Gained agreement from MRP to meet and discuss Crosbie report on lake level regime.
- 'Community award' acknowledgement by DoC of AFTR's achievements
- Constructive working relationships with all primary stakeholders & good local networks
- National level contacts initiated in some areas as necessary

Destination by 2012

- All primary stakeholders respect and value the Advocates' balance between (i) working alongside stakeholders and (ii) retaining its discretion to act independently
- Comprehensive local and national networks in place
- Comprehensive Tongariro River Management & Catchment Plans in place

Actions for 2009/2010

	WHAT	WHO	WHEN	BUDGET
SA1	Liaise with DoC to find (i) a means of addressing knowledge gaps identified by Bob McDowall and (ii) agree on interventions to increase smelt numbers in Lake Taupo	Richard Heather Graeme N	Dec 09	
SA2	Maintain strong working relationships with the primary stakeholders – Environmental Waikato, DoC, Genesis and Ngati Tuwharetoa. Conduct annual 'feedback assessment'	Heather	On-going	
SA3	Continue discussions with MRP and maintain open communication	Stuart	Dec 09	
SA4	Contribute to development of Tongariro River Catchment Mgmt Plan (whole catchment)	Heather, Mark, Eric, Graeme N	On-going	$2,000
SA5	Ensure River Mgmt Plans (i) utilise assessment reports; (ii) have well informed intervention strategies; (iii) include monitoring, reporting & review procedures and (iv) have statutory status.	Mark & Graeme N	On-going	
SA6	Build & maintain good local networks – including Turangi Tongariro Community Board, Ngati Turangitukua, the River Management Forum, Taupo Fishery Advisory Committee, National Trout Centre Trust, TALTAC, and with community through planting/clearing programme	Heather/ Eric	On-going	
SA7	Develop national networks – including DoC, Ministry for the Environment, Biosecurity NZ – as appropriate	Richard/ Robert	On-going	
			Total	$2,000

Scorecard

<u>Integrated Catchment Management Plan</u>
- Benchmarking shows it is best in class with regular review and updating

<u>Stakeholder Feedback</u>
- Annual feedback assessment affirms a constructive relationship with all key stakeholders

3. Issue Focus

Build widespread public awareness and support for affirmative action on key issues

3C Consulting
Ver 2: Feb '09

Strategies

- I1 Maintain watching brief on current and emerging issues – their potential impact and mitigation strategies being advocated
- I2 Generate increased awareness of value of the river, its heritage, potential and the risks to its sustainability if not well managed
- I3 Advocate for actions that will protect and enhance the in- stream values of the fishery and the river environment

Achievements to date

- Raised awareness of potential risks of didymo incursion and stimulated local action; national ban of felt-soled waders
- DoC-AFTR partnership in riverside planting
- EW grant of $36,000 for pine eradication
- Mangamawhitiwhiti development not proceeding
- TDC agreed to facilitate improved access through liaison with property owners
- Science pertaining to the river has been made available to the public via seminars
- Analysis of lake level and river flow rate data for past 50-100 years

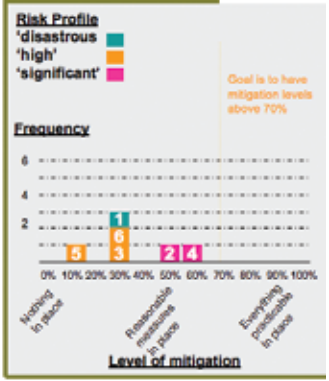
Destination by 2012

- North Island remains didymo free
- The public (particularly river users) highly attuned to the seriousness of didymo threat and act accordingly
- Developed AFTR position on industrial vs recreational use of water, balancing economic and amenity values.
- All 'disastrous', 'high' and 'significant' issues are being managed responsibly

Actions for 2009/2010

	WHAT	WHO	WHEN	BUDGET
IA1	Didymo prevention – advocate for NI to be didymo free and for special preventative controls for the Taupo Fishery 1	John W & Ross	On-going	$6,000
IA2	Feral pines & planting – facilitate restoration of the river margin and continue with planting programme 2	John T / John W	Ongoing	$40,000 $9,000
IA3	Lake levels – seek Mighty River's cooperation in changing their lake level profile to have a lower median level 3	Stuart, Mark & Heather	June 09	
IA4	Mangamawhitiwhiti Block– encourage Council to modify District Plan to recognise eco importance of river and stream catchments 4	Eric & Tuatea	Ongoing	
IA5	Trout condition – ensure our world class fishery is sustained through good science and effective management strategies 5	Richard & Heather	Ongoing	
IA6	Access – gain improved access (for anglers and non-anglers alike) to a greater proportion of the Tongariro River 6	John W. , Robert & Ross	Ongoing	
IA7	Utilise multiple communication channels (newsletters, website, media releases, seminars, etc.) to raise public awareness & support for taking affirmative action on issues	Heather Richard Eric	On-going	
			Total	$55,000

Scorecard



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4. Accountability Focus

Track progress by stakeholders against agreed commitments

Strategies

A1 Monitor plans and proposals of local and regional government on catchment management and relevant resource consents

A2 Adopt 'critical friend role' to statutory bodies

Achievements to date

- Presented paper on state of Tongariro River to Parliamentary Select Committee for Local Gov. and the Environment
- Lobbied Central Govt, EW and TDC government agencies (elected members and senior managers)
- Key submissions in 2008 (Mighty River Power on lake levels; Ministry for the Environment on freshwater policy; EW on support for development of ICMP)

Destination by 2012

- EW Integrated Catchment Management Plan operating with regular reviews and updates
- In line with the Conservation Act 1988, DoC leaders in (i) maintaining a full scientific description of the fishery and in (ii) proactively managing river nursery and the restoration of the Taupo Fishery back to 1960-1980s status

Actions for 2009/2010

WHAT	WHO	WHEN	BUDGET
AA1 Monitor Environmental Waikato's overall governance of the river via their river and catchment management plans as they are implemented and updated drawing on up to date scientific and engineering information.	Mark	On-going	
AA2 Monitor adherence by Genesis and Mighty River Power to their 35 year Resource Consent provisions for electricity generation, and the need to have provisions reviewed periodically.	Stuart & Heather	On-going	
AA3 Monitor DoC longitudinal data on trout catch rates, size and condition in the Tongariro River and the associated causal factors pertaining to the Taupo Fishery as a whole	Bob & Eric	On-going	
AA4 Canvas Management Forum members on an annual basis to ascertain member views on the effectiveness of the forum against its initial terms of reference	Heather	On-going	
		Total	$0

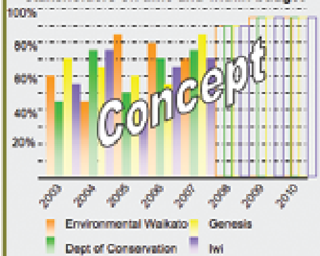
Scorecard

Tongariro River's World Ranking

- International Fly Fishing Rating in Top 10

Planned Milestones (against ICMP)

- % of agreed milestones achieved by key stakeholders on time and within budget



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