# TONGARIRO

## the Annual

DECEMBER 2002 VOL 11


Department of Conservation
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# Tongariro

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Cover photo: Twilight picks up the highlights of Mt Tauhara at the northern end of Lake Taupo. (Photo: Dave Wakelin)
Above: Weathered volcanic rocks on a Tongariro National Park stream. (Photo: Jack Bedford)
Back cover: Taupo-Nui-a-Tia College students Sarah Dawson, Eidlih Bocker and teacher Mark Dawson show their excitement at winning the coverted Bernhard Stretch Memorial Award, presented for the most outstanding school environmental project. (Photo: Dave Wakelin)

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This year is UNESCO's International Year of the Mountain (IYM), recognising the significant role mountains play in our daily lives as cradles of biodiversity, weather makers, boundary markers and home for millions of mountain people.

# There's nothing to see!

About 10 years ago my wife and I were driving through the north-western corner of Victoria, Australia when suddenly she said "Look!".

I did.

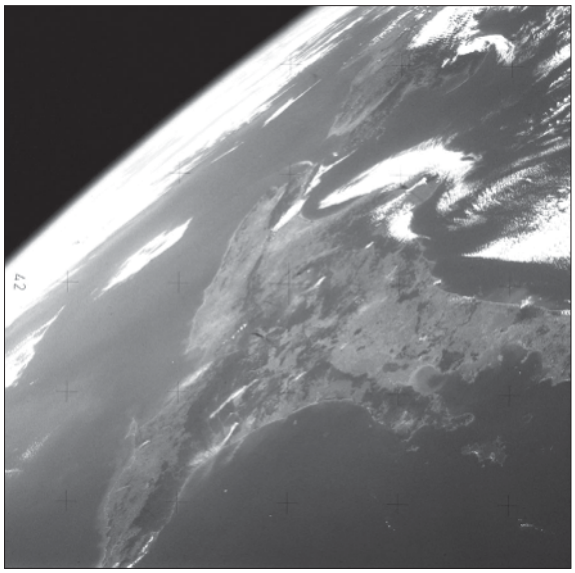
I looked all around and behind me thinking that I had been concentrating on my driving so much that I had missed the Australian event of a lifetime.

"I don't see anything?" I said, disappointed that I had missed whatever it was that had excited her so much.

"Exactly!" She said, "There's nothing to see!" It gets hot in Australia and we had been driving for some time but she had never got so excited about nothing before!

"Look around you," she countered, "What can't you see?" Its not easy looking for something you can't see especially when your partner can't see it either. Then it dawned on me - and it was so obvious.

All around us they weren't there - mountains! Not even a bump, a hillock, a rise, a ridge. It was weird, strange, uncanny. A landscape without mountains. Now, think about it - where in New Zealand can you stand and not see a hill, a ridge or a mountain in one direction or another? You can't! We grow up with mountains around us, they are part of our childhood, our teenage years and our adulthood. We see them, we climb them, we drive over and round them, we recreate on them, we revere them and we protect them. I'm sure everyone has their mountain or hill they associate with childhood and those growing years. For me it was Mount Maunganui. Nowhere near the scale of Aoraki (Mt. Cook) or Mt. Ruapehu, granted, but to a young boy scrambling up this 232m blip on the Bay of Plenty coastline it was an adventure in itself and from the top you could see forever. Later I discovered the Kaimai Ranges and then Mt. Ruapehu and after that the grandeur of the Southern Alps. I've since climbed other peaks overseas and stood on top of erupting volcanoes but the 'Mount' still holds a special place in my memory.



If you look very closely you can see my mountain, Mt Maunganui, a blip along the sweeping coastline of the Bay of Plenty! This space shuttle photo clearly shows the main mountain ranges of the North Island. (Photo: NASA)

It is easy to appreciate the mana of mountains - I can feel it when the evening light reflects of a snow clad peak. I can understand why peaks can be held in awe and why gods should want to reside there. I don't have to subscribe to a particular faith or religion to appreciate why mountains are sacred and why they can be places of solitude. I don't have to stand on a narrow ice-ridged peak to feel the rush mountaineers speak off when there is nothing more above them to reach for and everything below them to look forward to. I don't have to be a rocket scientist to realise that mountains provide shelter, food, recreation and the weather. I need mountains around me to feel secure, to see, to appreciate and give my life familiar boundaries.

This year I climbed Mt Maunganui again, the first time for about 16 or so years. Perceptions change with age and my mountain had certainly got steeper! The thrill of standing above everything with a fresh sea breeze and forever before me brought it all rushing back and the IYM phrase took on its special meaning - We Are All Mountain People!

Dave Wakelin
Editor

# Conservator's comments

Tongariro Taupo Conservator, Paul Green. (Photo: Herwi Scheltus)

This year we have had a significantly higher staff turnover than usual. Those departing include three retirees: Dave Rothschild, Vicky McLean and Brian Taylor. Thanks and best wishes to them all for many years' service to our Conservancy. We have also lost Alison Rothschild to Area Manager at Nelson Lakes. This is a well deserved promotion for Alison whom many of you will know as being the long term Manager of Whakapapa Visitor Centre. We were fortunate to keep Alison to oversee the recent upgrade to the Visitor Centre before her departure. At Labour Weekend Cam Speedy left to work in a private consultancy. This is a huge loss for us as Cam brought a vast ecological understanding to the Conservancy and had a rare talent of being able to transfer technical information in a way that it could be readily understood.

The Department is continuing to make changes to its systems as part of ongoing improvement. Key changes being undertaken at present are in visitor management, development of a Natural Heritage Management System that will assist in making the best choices for ecological management and a strategy for 'Working with Communities'.

The Government decision to increase funding of visitor facilities by $349 million is very welcome. The funding ramps up significantly over the next ten years to $82 million PA and means that we have funding to maintain and upgrade our current assets to the appropriate standard. In Tongariro National Park we will be able to maintain and upgrade our eroded track system. This will help ensure erosion impacts are reduced. The Mangatepopo Valley is a priority area for this work.

A key feature of the Natural Heritage Management System is the development of a Geographic Information System (GIS). This will be a major focus of our work in the next few years.

The Departments new strategy for "Working with Communities" emphasises that good conservation outcomes can't be attained by the Department alone and that communities want to be involved in conservation work. Within our Conservancy this has been of increasing importance to us over the last five years. Good progress has been made with key examples being the work of the Tongariro Natural History Society, the Tongariro National Trout Centre, the Mangawhero River Walkway and the Karioi Rahui and Opepe Historic & Scenic Reserve projects. From this point on all our work projects will be examined as they are developed to ensure we are taking opportunities to include the community. Cam's efforts are a timely example that all staff have responsibility for this work not just community relations staff.

The Tongariro Natural History Society has had a difficult year as it has commenced implementation of its strategic plan. Anja Hambach resigned as Executive Officer to undertake a new career and was replaced by Sarah Gibb. Both have provided enthusiasm and skill to the position but the Society is very keen to strengthen contacts to help with fundraising and sponsorship. On the volunteer front a key focus is the need to strengthen relationships with other organisations who can assist. In spite of difficulties significant progress has been made. If anyone has any ideas, particularly for fundraising and sponsorship please contact Sarah, President Bob Stothart or myself.

Progress at the Tongariro National Trout Centre has been rapid. The new Visitor Centre has been completed and displays are currently being constructed. The

A family of Blue Duck which will benefit from the establishment of the Central North Island Blue Duck Trust. (Photo: DOC)

Society has done a great job of fundraising and managing these developments. They have many other ideas to implement at the Trout Centre and we can expect to see continual changes there over the next few years.

At Opepe Historic & Scenic Reserve the Department has formed a Management Committee with tangata whenua and is now moving to establish a 'Friends of Opepe' group to help undertake restoration and maintenance work at the Reserve. Tangata whenua have been closely involved in the preparation of an Opepe History being written by a departmental historian.

Our Conservation Management Strategy has finally been approved and a good start made towards reviewing the Tongariro National Park Management Plan. This has been released for public input after which submissions will be analysed and hearings held before passing the plan over to the Conservation Board for their consideration.

In the last few months the Conservancy has signed off on three significant resource consent issues. We are pleased we have been able to reach agreement with Genesis (Tongariro River) and TrustPower (Hinemaiaia River) that have enabled appeals to the Environment Court to be withdrawn. A Blue Duck Conservation Trust has been established from a previous agreement reached with Genesis and these benefits are starting to be evident as plans are made for the restoration of blue duck. The Tongariro consents in particular are the culmination of many years of research and analysis followed by intense negotiations. I believe the outcomes are good for both parties and a reflection that the Resource Management Act can work in a successful manner. Along with the Waikato and Bay of Plenty Conservancies and other ecological interest groups we have reached agreement with Mighty River Power in respect of resource consents for the Waikato River.

Good progress continues to be made with the kiwi project in Tongariro Forest. Last year's 1080 operation gave a window of opportunity to ensure a significant number of kiwi chicks survived, but work is now being planned to introduce stoat control as part of the project.

A new project being assessed is the establishment of ecological restoration of Lake Rotopounamu. This area, including Mt Pihanga, has benefited from recent Animal Health Board 1080 operations and drawn our attention to its potential. Our other two integrated conservation management projects at Karioi Rahui and the Tongariro Kiwi Sanctuary are both outside the National Park and World Heritage Area and that will be a major consideration in deciding the appropriateness and feasibility of restoration at Rotopounamu. Another factor is that its easy access makes it an ideal site to involve the community.

Our botanist, Nick Singers, has drawn our attention to the significance of Lake Rotoaira basin wetlands and the threat of willow invasion. We are working with our neighbours firstly to assess the presence of willows and then to undertake control work. We would like to be able to undertake similar work in the Tokaanu Wetlands but need to be assured that the work is feasible.

Finally, I would like to thank all staff, Conservation Board members, Taupo Fishery Advisory Committee members, volunteers and associates for their assistance in what has been another busy and challenging year.

Paul Green
Conservator

# That was the year that was

The Tongariro Naitonal Trout Centre, on State Highway 1, just south of Turangi, is a delightful place to visit. Recent work by the Tongariro National Trout Centre Society will soon see the opening of a new audiovisual and display centre.
(Photo: Dave Wakelin)

The Department of Conservation (DOC) has been around since 1987 so we've nearly completed 15 years. In that time an amazing amount has been achieved. Most of the department's successes have been achieved in a quiet fashion by dedicated staff, who, once the goal was reached, moved on to the next project.

Many conservation projects have succeeded in spite of limited funding, relying heavily on the skill and resourcefulness of staff and the enormous contribution made by volunteers.

The list below is by no means complete but multiply this by 13 (twelve other conservancies and Head Office) and you start to appreciate the scale of the achievement made by the Department of Conservation every year.

- The formation of the Central North Island Blue Duck Trust and an allocation of $1.5M in funding from Genesis Power Ltd. over ten years marks a major step forward in the management of, and research into, this unique river bird.
- The bund along the true left bank of the Whangaehu River on the lower slopes of Mt. Ruapehu has been completed. This is designed to deflect the lahar away from overflowing the banks of the river at that point and possibly spilling into the Tongariro River via the Waikato Stream.
- The geophones and sensor and transmission equipment for all three sensor sites (Crater Lake, NZ Alpine Club hut and Tukino Skifield) have been installed and tested.
- The Tongariro National Park Management Plan, published in 1990, is currently undergoing a review.
- A major step forward for the conservancy has been completion of the Conservation Management Strategy (CMS), a document that will determine the future directions for us for the next ten years as well as bring together an invaluable inventory of resource data.
- Hut warden coordinator, Jimmy Johnson, has trained 100 hut wardens over the last seven years. The conservancy training programme has been requested by six areas conservancy areas in New Zealand. Volunteer hut wardens now wear a neat Tongariro Natural History Society "Hut Warden" cap and do their bit to promote the society.
- Tongariro Crossing information is now available in three formats; as an A4 information sheet, a full colour brochure and on the DOC website.
- The Summer Programme of guided walks and activities is now into its 39th year and continues to be popular.
- Working with communities has been a major focus of this year's work. A Pukawa community group is helping with predator control in local reserves; with help from the Kiamahi Te Tangata Charitable Trust, the local school and kohanga reo, a stretch of the Mangakoura reserve near Taupo has been cleared of weeds and replanted in kowhai, flax and other native plants; the Tongariro Natural History Society (TNHS) has continued with restoration planting at Tukino and the Whanganui headwaters; the Girl Guides once again assisted

with planting at Whakaipo Bay; a management committee has been formed to assist DOC at the Opepe Historic and Scenic Reserve and TNHS and DOC have plans for a community predator control project at Lake Rotopounamu.

- Craters of the Moon exploded into action again this year with an ash and pumice eruption sending dust 50m into the air. A section of the track was closed for several weeks until the activity settled down and the boardwalk re-routed.
- New interpretation signs, sponsored by Contact Energy, are installed at Craters of the Moon and a 20-page information booklet will be published early next year. The booklet, coordinated by DOC, is written by Dr Mike Mongillo, a retired GNS geothermal scientist and sponsored by the Craters of the Moon Trust, a group of volunteers who tirelessly work at both Craters and Huka Falls.
- Sponsorship and partnerships have enabled several projects to continue this year. The Waikato River planting is organised by DOC and is on land administered by the Taupo District Council (TDC). Taupo McDonald's Family Restaurant sponsor transport enabling students from Taupo Intermediate to travel to the site. McDonald's also pay for St Johns Ambulance to be present and give each student a Big Mac voucher as well as provide a welcome lunch for all helpers on the day. The Taupo Native Plant Nursery sponsor the 600 or so native plants that are planted with the help of students, parents, Environment Waikato staff, the police, Forest and Bird members, TDC and DOC staff .


Right: Danger signs such as this one are a reminder that Craters of the Moon is an active thermal area. (Photo: Jan Neilson)

- A joint venture between the Taupo District Council, Geological and Nuclear Sciences and DOC has kept the local Schools' Environmental Education Awards going for another year. The awards recognise environmentally sustainable projects involving environmental education across the curriculum. Three winning projects each receive $1000, a riverstone trophy and certificate. This year Taupo Passenger Services sponsored buses which transported more than 300 students to the Great Lake Centre to attend the award ceremony. Local businesses Bin Inn and M-21 sponsored refreshments.
- Nick Tupara, an expert timber restorer carried out repairs and restorative work to the headstones at Opepe Historic Reserve. Plans are in place to restore the historic water trough on the southern side of the reserve.
- Rain and bad weather caused windfalls and slips that both created track work and thwarted plans to upgrade others. Work to replace two wooden bridges along Clements Mill Road took longer than anticipated. However, concrete box culverts are now in place and recent grading of the road puts it in good condition for the busy summer period.
- As usual, the Tongariro Crossing received high visitor use and new track surface trials are in place to better manage water damage on sections of the track. A new colour souvenir brochure and a free fact sheet were produced.
- Bridges were replaced on the Mangawhero Forest walk, Taranaki Falls, and Whakapapaiti walks.

ONE - Operation Nest Egg is part of the Kiwi Recovery Programme sponsored by the Bank of New Zealand.

Senior Community Relations Officer, Dave Wakelin, with Wairakei students, Fae Edmonds (standing) and Chevy Poroa during a Native Trees in Schools planting at their school. (Photo: Jessica Campbell)

- To date 25 ONE kiwi have been released in Tongariro Forest and 15 in Karioi Rahui. No ONE chicks were taken from Tongariro Forest last season. Instead 14 chicks were left in the wild and monitored to assess the effectiveness of aerial 1080 in improving wild kiwi chick survival. This season 16 ONE chicks have already hatched from the first clutch (for both forests), with another 9 nests currently underway in the second clutch.
- Tongariro Forest Kiwi Sanctuary staff had a successful year. They found their first 3rd generation ONE kiwi chick in a nest while robbing it for eggs. Monty trained as a specialist kiwi dog undergoing successful avian aversion training.
- As part of an established programme to complete deferred maintenance work, huts in Kaimanawa Forest Park and on the Tongariro Northern Circuit were painted, had fire escapes improved and other minor works carried out.
- Biodiversity work continues with predator control and weed eradication. Wilding pines have been removed from Te Hapua, Kaipo, Lake Rotokawa and Rangitaiki and much effort has been put into removing broom from the Desert Road. Work has recently been carried out to get rid of a particularly unwelcome rhododendron discovered alongside the Waikato River.
- Once again staff braved freezing temperatures and rain while camped out in the Otamateanui powelliphanta snail area. By controlling possum populations it's hoped to increase protection of these special snails.
- The Tongariro Taupo Conservation Awards, established in 1993 to recognise excellence in conservation, have been awarded to many individuals and organisations. Further awards will be made in December this year.
- During the year staff also represented the department at conferences and workshops in Australia, Canada, Italy, Poland and Britain.
- The Tongariro National Trout Centre Trust was formed and immediately took on the role of establishing first class interpretation facilities at the centre. They purchased the old Hatchery workshop from the department, raised finance and are nearing completion of the auditorium and display area.
- More than 120 pages of conservancy information have been placed on the DOC website www.doc.govt.nz, with more to be added.
- Volunteers again assisted the full-time hut wardens in supervising Tongariro National Park's huts (Mangatepopo, Ketetahi, Oturere and Waihohonu) on the Northern Circuit Great Walk.

Jimmy Johnson
Lianne Fraser
Katrina Knill
Dave Wakelin

- Some of the piping required for sewage disposal from the Whakapapa Ski Area, Iwikau Ski Village, and Whakapapa village has been laid underground, taking advantage of trenching work being carried out by Ruapehu Alpine lifts during their redevelopment of the Happy Valley ski area.

# Ruapehu Ski Patrol

Bob Stothart is a former president President of the Mt Ruapehu Ski Patrol and also of the Tongariro Natural History Society. He was a ski patroller for more than a decade and is currently a member of Serac Ski Club.
(The contributions of Arnold Heine, Sue Webb and Graeme Bryant in the preparation of this article are acknowledged.)

For fifty years or so, suitably qualified volunteers have provided safety services to generations of skiers on the challenging slopes of Mt Ruapehu at Whakapapa. In an irony not lost on past members, in 2001, the International Year of the Volunteer, the patrol became a fully professional patrol operated by Ruapehu Alpine Lifts (RAL) and the volunteer component was no longer required by the company.

It all started in the early 1950s before the first single chair lift was installed in 1954, when volunteers from the ski clubs and tramping clubs at Whakapapa were co-ordinated by Bill Bridge and other visionaries. The Federation of Mountain Clubs (FMC) had taken action during 1951 by establishing a sub-committee which included Noel Thompson who represented FMC on the Park Board, Bill Bridge FMC representative on the Search and Rescue (SAR) national committee and Rod Syme of the New Zealand Ski Council. Following communication with the Tourist Department (who ran the Chateau and the rudimentary rope tows) a meeting of clubs was convened at Aorangi Lodge on 29 March 1952. A 'static' ski accident service was the outcome with members coming from the mountain clubs. Initially, a club was rostered to provide a rudimentary service and later on, teams of patrollers, not all of whom could ski, were available to attend to skiers in difficulties each weekend of the ski season. Attired in red shirts, woollen gloves, leather boots and on wooden skis, they were pioneers in every sense.

Given the rough nature of the area for skiing, mountaineering skills were emphasised along with good first-aid techniques. Over the years the skiing improved and paramedical skills, mountaineering techniques and search and rescue procedures were up-graded. It is interesting to record that there was early resistance to women being in the patrol. Mr Dennis, who was the manager of the Chateau during the 1950s and 60s, remarked *"… that women were not effective patrol members as they were not able to carry stretchers and were often untrained in first aid."* This view was not a universal one as women have served as patrol leaders, training officers, advanced first aiders and leading mountaineers.

Below: Ski Patrollers received extensive training so as to be able to cope with any incident on the mountain. (Photo: Bob Stothart)

Commitment to the patrol varied but many patrollers served more than ten consecutive years, some did twenty and a couple gave more than thirty years of devoted service.

By the 1970s four teams patrolled on a four weekly roster and the patrols were made up of doctors, nurses, teachers, professors, wharfies, physiotherapists, architects, managers, shopkeepers, public servants, farmers, truck drivers, plumbers, carpenters, all of whom loved the mountain and all of whom could relate tales of epic rescues, faultless patient management in often adverse weather and first-aid of high quality. It was a wonderful cross-section of New Zealand society and at the end of the day, fortified with the ubiquitous gluvein, the de-

bates were many and varied. There was an additional dimension to this cross-section of society, however, as people brought their specific skills in medicine, carpentry, management, nursing, engineering and so on, to the benefit of the patrol. They in turn learned skills as ski patrollers that were transferable to their lives as members of communities throughout New Zealand

Clubs were invited to recommend candidates for the patrol and a strong relationship existed between regular skiers and the patrollers. Candidates did a probationary year and were then, if deemed suitable, assigned to one of the four patrols. Uniforms bearing the international green cross for safety were introduced and patrollers carried self-evacuation kits to get themselves off a chairlift should it be stopped in an emergency. Training was integral to performance and many of the present operational procedures were trialled and implemented by the volunteers. Equipment too was designed and refined by volunteer patrollers: radios were tested for better communication replacing an antiquated telephone system, chair lift evacuation procedures were introduced and the 'banana' boats were made lighter and more skiable. Some patrollers designed and built the depots, which dotted the ski field in strategic locations. The contribution to operational procedures went beyond Ruapehu and some innovations were recognised internationally: specifically, Mike Lamont's work as a physiotherapist, Graham Painter's system of lift evacuation and the contributions of Sue Webb and Arnold Heine in outdoor first-aid.

Most of the patrollers became advanced first-aiders and many did additional training at the ambulance officers' training school reaching paramedical levels of skill. Some volunteers did courses in avalanche training, some were licensed to administer pain relief and many were advanced mountaineers. Each team within the patrol was a mix of these skills and experiences: training was on going as each weekend members spent time refining skills to better serve the public.

The original members however, were a mixture of skiers, trampers and mountaineers, some of whom could not ski. For several years from 1957 the Chateau provided leadership with the appointment of John Haper as Ski Patrol Supervisor. Gradually the rudimentary skills of the patrol improved as the numbers of skiers increased and the organisation became an incorporated society, Ski Patrol (Ruapehu) Inc., in 1967. A strong relationship developed with the Department of Lands and Survey was responsible for all national parks and the ranger staff in the parks. The Patrol numbered some 80 plus members, divided into four patrols, each with a leader and a deputy leader.

Heavy ice conditions make for difficult working conditions and treacherous skiing . (Photo: Bob Stothart)

An elected committee managed the patrol, determined standards, conducted training, raised funds and maintained the interaction with Lands and Survey and, from 1987, the Department of Conservation. One staff member from the department was assigned the responsibility for safety in the park and he had a major role in the operations of the patrol.

When the ancient Land Rover used as an ambulance became troublesome, patrol members raised significant amounts of money to replace it with a modern, fully equipped ambulance.

Trained to cope with most eventualitiies there was little patrollers could do to stop cars being buried by heavy snow fall! (Photo: Bob Stothart)

Patients with fractures of the leg, or with other severe injuries were transported to Taumarunui Hospital for treatment. More urgent cases were, and still are, transported by helicopter. Taumarunui doctors became experts in the orthopaedic evaluation and treatment of mountain injuries. Injuries of a less severe nature were usually treated in Iwikau Shelter, at the Top-o-the Bruce Road. The shelter was in effect, a small hospital with three beds where patients could be sutured, plastered, diagnosed and released back into the care of family or friends.

As visitor numbers to the ski field grew during the 1980s, and visitors came to ski on weekdays as well as weekends, demands on the volunteer patrollers increased and a small, full-time, paid component of the patrol was introduced essentially to cover the increase in mid-week skiing. Gradually the number of paid patrollers grew, with some members being recruited from among the volunteers. There was always, however, a predominance of volunteer patrollers. DOC appointed a Ski Patrol Director, as distinct from a Safety Services Officer, and he exerted a strong influence on standards of performance. Gradually the paid component of the patrol was increased, the overall standards of skiing and first aid were raised and volunteers were expected to match their skills with the full time patrollers.

Being a member of the volunteer patrol was immensely rewarding. New skills were learned and refined, skiing took place in all kinds of weather and competence to handle oneself on the mountain in varying conditions increased. The safe, efficient management of a severe accident, often in adverse weather, bringing the patient downhill, gave rise to feelings of personal satisfaction only fully appreciated by other patrollers. Beyond the management of accidents, most members of the patrol would mention things like, 'love of the mountain', 'giving something back', 'wanting to serve the public' as reasons for their involvement. For many Ruapehu skiers, the patrollers were a first point of reference for information about the mountain, about safe skiing areas, the best runs, absence of queues and other morsels of local knowledge. The sense of belonging and camaraderie within the patrol was strong and admission to the ranks was carefully monitored.

With Ruapehu Alpine Lifts now responsible for safety services at both Whakapapa and Turoa, the company decided not to use the volunteer component of the patrol and to rely wholly on paid patrollers. This was a severe disappointment to the serving volunteers and to those who had given their services, skills and ideas over the decades. There was recognition, however, by the proud wearers of the green cross that the need for a fully operational patrol seven days a week throughout the ski season was essential. A small reminder of the volunteer patrol's presence remains on the mountain however, in the form of Bridge Hut at the top of the first chairlift, so named to commemorate Bill Bridge, the founder of the patrol. The contribution of volunteers, over fifty years, to the rescue, safety and enjoyment of Ruapehu skiers will not readily be forgotten.

Bob Stothart
Wellington

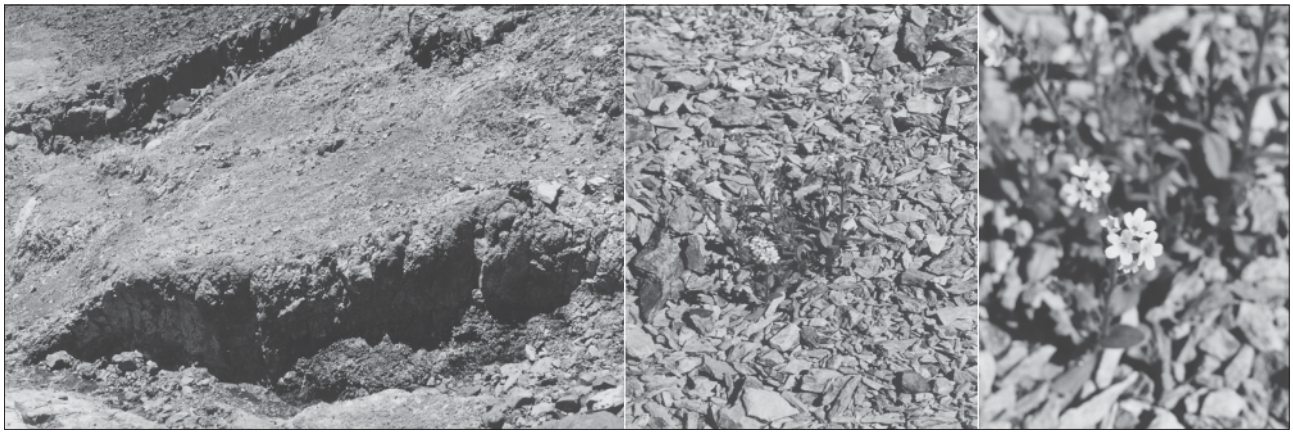
# Our alpine environment

New Zealand is a mountainous country with ranges and isolated peaks occurring almost throughout its entire length. Mountains support alpine plants and they occur from the Raukumara Range on the East Coast of the North Island, through the South Island and on Stewart Island. Officially the alpine zone that supports alpine plants is the area above the natural tree-line, (the upper limit of trees and tall shrubs), but below the nival zone, the permanent snow line. The tree-line is highest on Mt. Ruapehu at 1500m, falling to 900m in Southern Fiordland. However, alpine plants have increased their abundance to lower areas in the last 1000 years as a result of widespread human induced fires. This is most apparent in eastern Otago and in the central volcanic plateau of the North Island. The tussock and desert areas of the Desert Road are one of the most accessible areas in the North Island where alpine plants occur. However, this area was probably forest only 600 years ago, and small remnant beech stands that escaped fires are still present.

Above and below: Mountain buttercup (*Ranunculus insignis)* on an alpine flush at the head on the Whakapapaiti valley in January 2002. (Photo: Nick Singers)

Beech trees are the most common species occurring at the tree-line. However in some locations where beech is absent, other conifer and broadleaf trees take its place at a similar altitude e.g. on Mt Taranaki. The New Zealand tree-line corresponds to a mean air temperature of about 10°C in the warmest month . The tree-line is comparatively low in New Zealand when compared to other alpine areas throughout the world. The likely reason for this is due to the inability of New Zealand's trees to grow at higher altitudes. This theory is supported by the ability of introduced conifers, such as *Pinus contorta,* to invade areas well above the natural tree-line and on Mt. Ruapehu they have been found growing to 2200m. Some natural areas with alpine vegetation do occur below the alpine zone in frosty basins and river valleys and are particularly notable in the central North Island.

New Zealand has approximately 2500 native plants, of which about 600 (24%) occur in the alpine environment. This is a disproportionately large amount compared to the available land area that they occupy. The majority (93%) of these plants are endemic to New Zealand, i.e. they grow nowhere else. This has puzzled many scientists because New Zealand's alpine environment is comparatively young in geological time, being only two million years old. One possible explanation is that the evolution of New Zealand's alpine



Above: Whakapapaiti headwaters alpine flush with Mountain Buttercup, *Ranunculus insignis*. Centre and right: Yellow forget-me-not, *Myosotis australis*, on a scree slope in the Southern Kaimanawa mountains. This is one of a few locations where this plant grows in the North Island, while being common in the South Island. (Photo: Nick Singers)

plants has occurred quickly because of the large variety of possible habitats and environments available. One of the best examples of this is the *Hebe*, which has over 40 species occurring in the alpine environment.

The mountains of the central North Island contain the largest area of alpine vegetation in the North Island. Alpine vegetation is almost continuous between the ranges of the Kaweka, Kaimanawa, Moawhango, Northern Ruahine and the central volcanoes. The alpine vegetation of the central volcanoes in Tongariro National Park is relatively depauperate compared to the adjoining ranges and no endemic plants occur here. This is possibly due to their young geological age and the regular volcanic activity which modify the environment. However, even considering this paucity, some spectacular areas of alpine plants occur including the alpine flush zones of the upper Whakapapaiti valley and the South basin where large patches of yellow flowering *Ranunculus insignis* occur. Mt Hauhungatahi, one of the oldest volcanoes in Tongariro National Park also has the some fantastic herbfields with notable areas of alpine daisies (*Celmisia* species).

In the Southern Kaimanawa and Moawhango Ranges east of the volcanic mountains, the landscape has been stable for a longer period of time and as a result contains more alpine plant species. This area contains several endemic species that are not found anywhere else in New Zealand including two minute species of Forget-me-not (*Myosotis*) both of which are rare and threatened. Other species only occur in this location in the North Island but more commonly in the South Island.

Unfortunately the very existence of our alpine environment is being threatened. Introduced animal pests such as the ubiquitous hare, widespread deer and localised horses browse and remove palatable plants, damage tussocklands and help to spread weeds such as hawkweed (*Heiracium*) allowing them to dominate. However, today the greatest threat to the survival of the alpine environment is from global warming. It has been predicted that within the next one hundred years forest will increase in altitude as the temperature rises. This may result in the loss of alpine vegetation from smaller mountains such as Mts Pihanga, Tihia and parts of the Kaimanawa Ranges. Ironically our only possible and simple management tool to prevent this occurring may be the careful use of controlled burns to eliminate trees and shrubs dominating. What will we do?

Nick Singers
Conservancy Botanist

# We are all mountain people

"We Are All Mountain People' was the official slogan for the International Year of the Mountain (IYM)

This article uses and has adapted material from www.mountains2002.org, an excellent site celebrating the UNESCO International Year of the Mountain.

Mountains. The majority of the world's population is influenced daily by mountains whether through the effect mountains have in shaping the weather or the supply of water and food. Mountains move people. Close to the edges of the earth's crustal plates volcanoes are active. Indonesia alone has about 120 active volcanoes at any one time. Volcanic eruptions build the land, influence the weather, change the composition of the atmosphere, improve the fertility of the soil through ash deposits, drive communities away from their homes and are themselves major tourist attractions. Elsewhere plates in collision go about their business in a more leisurely fashion, grinding, subducting and sliding as they go about the continual reshaping of the land.

Mountains move people spiritually. Virtually every religion and belief has connections to mountains - the abode of gods and supernatural beings and long the refuge of those seeking peace and spiritual solitude. Mountains feature in many of the world's classic children's stories and it is mountains that give excitement, drama and foreboding to fantasy classics like Lord of the Rings.

Mountains are among the world's greatest sources of biodiversity, providing refuge to untold varieties of plants and animals. Many exist nowhere else but on mountains. All people, wherever they live, share the responsibility of protecting mountain biodiversity. Too often mountains have been treated with disdain, with arrogance and contempt with little understanding of how they are a key factor in our continued existence.

## A mountain of life

Mountains have been described as islands of biodiversity surrounded by an ocean of monocultures and human-altered landscapes. Many plants and animals found in mountain habitats have disappeared from lowland regions, crowded out by human activities.

Of all the world's mountain ranges, tropical mountain environments are the greatest source of biodiversity. Tumbling down from peaks that cut through Argentina, Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela, the eastern slopes of the Andes possess a mind-boggling array of ecosystems - from tropical rainforest, subalpine forest, alpine heath and cloud forest to alpine grassland, tundra, snow and ice fields. Each of these zones, including the ice fields, has its own habitats and assemblages of plants and animals.

Not all mountain ecosystems are the same. Yet they all, whether in cloud forests, on alpine grasslands or along glacier-fed streams, have two things in common: altitude and diversity. Rapid changes in elevation, slope and orientation to the sun have a tremendous influence on temperature, wind, moisture availability and soil composition over very short distances. These subtle changes create pockets of life found nowhere else but at a particular elevation and on a specific mountain or range.

For the people who struggle to survive in these harsh environments, understanding and respecting this delicate balance is crucial. Farmers in the mountains of

From on top of a steaming Red Crater trampers look across to Blue Lake and Lake Taupo in the distance.
(Photo: Peter Blaxter)

Burundi and Rwanda, for example, plant between six and 30 different varieties of beans in order to exploit subtle differences in elevation, climate and soil while in the mountains of Nepal, they farm approximately 2000 varieties of rice.

## Climate change

Human activities are profoundly affecting the world's climate, and mountains are a barometer of that effect. Each day, fossil fuel-burning technologies produce greenhouse gases that enhance the heat-trapping capability of the earth's atmosphere, gradually raising the planet's temperature. Because of their altitude, slope and orientation to the sun, mountain ecosystems are easily disrupted by variations in temperature. As the world heats up, mountain glaciers are melting at unprecedented rates, while rare plants and animals struggle to survive over increasingly smaller ranges, and mountain people, already among the world's poorest citizens, face greater hardships.

Many things we do contribute to world climate change. Industrial processes and farming activities as well as unfettered enthusiasm for cars all generate gases that trap the sun's rays in the atmosphere. These gases, which include methane, nitrous oxide and especially carbon dioxide, enhance the "greenhouse" effect that naturally takes place in the environment.

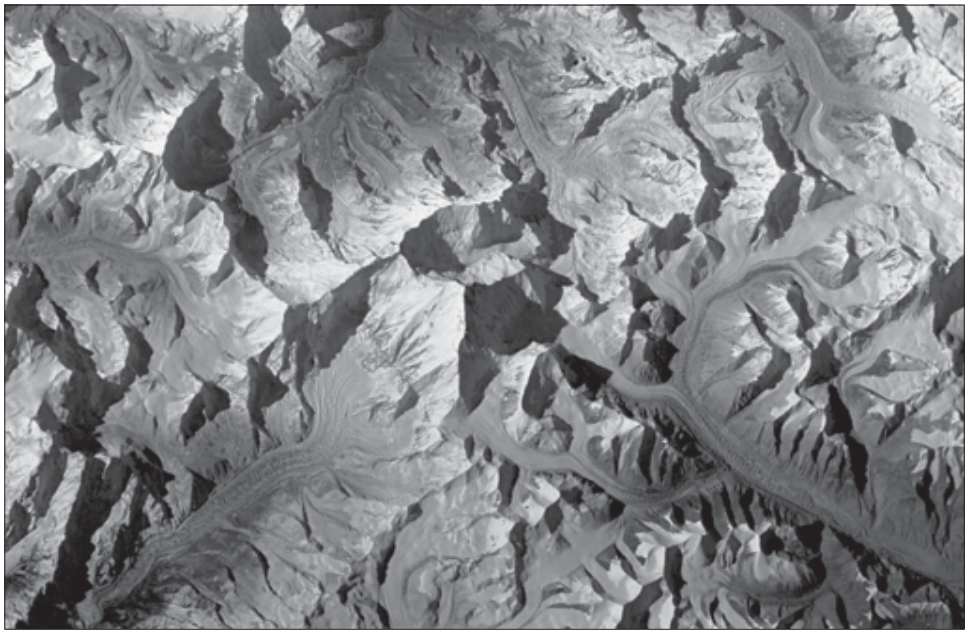
Some climate models predict that global temperatures will rise between 1 and 3.5°C by the year 2100. Although a few degrees might appear insignificant, an increase of this kind is far greater than any climate change experienced since the last ice age, 10000 years ago. Among the consequences imagined, sea levels are expected to rise by 15 to 95 cm, causing flooding and untold damage to island nations and low-lying coastal communities. Already, the 11000 residents of Tuvalu are being forced to abandon their island nation because of the rising sea level.

Mountain glaciers are melting at unprecedented rates. Changes in the depth of mountain glaciers and in their seasonal melting patterns will have an enormous impact on water resources in many parts of the world.

Rapid glacial melting is expected to disrupt agriculture and cause flooding. Many climatologists believe that the decline in mountain glaciers is one of the first observable signs of human-induced global warming.

The Franz Josef Glacier in Westland National Park has been melting at a rapid rate and consequent floods down the Waiho River have aggraded the river bed by eight metres in the last 15 years, raising the river level to two metres above parts of the Franz Josef township.

Because of their shape and size, mountains support a wide range of climatic conditions. Climbing just 100m up a mountain slope can offer as much climatic variety as travelling 100km across flat terrain. Mountain climates are like narrow bands, each stacked on top of the other. Every rise in altitude generates different conditions, supporting unique and often isolated ecosystems with some of the world's



Mt Everest, 8850m, (centre of the photo) also known as Sagaramatha, goddess of the sky in Nepal and Chomolungma,mother goddess of the universe in Tibet. The first to reach the top of the highest mountain in the world were Sir Edmund Hillary, New Zealand and Tenzing Norgay, Nepal, via the South Col Route on May 29,1953. (Photo: NASA)

greatest variety of plant and animal life. As the world heats up, however, conditions within each of these narrow bands is changing. Already scientists have witnessed examples of species moving uphill in search of more suitable habitat.
Climatologists believe that a predicted rise in global temperatures of 3.25°C would be equivalent to an ecological shift upwards of about 500m in altitude. Not all species will be able to move. Those confined to the tops of mountains or below impassable barriers may face extinction as their habitat grows smaller.

## Mountain waters

Mountains are often called nature's water towers. Because of their size and shape, they intercept air circulating around the globe and force it upwards where it condenses into clouds, which provide rain and snow. All the major rivers in the world have their headwaters in mountains. As a consequence, more than half the world's people rely on mountain water to grow food, to produce electricity, to sustain industries and, most importantly, to drink. As populations increase and demand for clean water grows, the potential for conflict also rises. Careful management of mountain ecosystems and the water resources they support has never been more important to our long-term security and survival.

*While the number of people on the planet has doubled over the last century, the demand for freshwater has jumped sixfold. If current trends continue, by 2050 as many as 4.2 billion people will be living in countries that cannot meet the daily minimum requirement of 50 litres of water per person, according to a recent report by the United Nations Population Fund.*

## Mountain water and a thirsty world

Each day, one of every two people on the planet quenches his or her thirst with water that originates in mountains. One billion Chinese, Indians and Bangladeshis, 250 million people in Africa, and the entire population of California, United States, are among the 3 billion people who rely on the continuous flow of fresh, clean mountain water.
Deforestation of mountain woodlands, mining, agriculture, urban sprawl and global warming are all taking their toll on mountain watersheds. At the same time, the worldwide demand for freshwater continues to soar unabated.

Mt Ngauruhoe in eruption in 1975, viewed from Oturere Hut. (Photo: Jack Bedford)

Already, 2.3 billion people worldwide endure chronic water shortages. A disproportionate number live in developing countries where water scarcities are so great that the ability to grow food and to build a stable economy have been severely hindered.

## Mountain glaciers are melting

Some of the freshwater obtained from mountains is stored in glaciers. Runoff from the Quelcaya Ice Cap, for example, has been the traditional water source for residents of Lima, Peru. Now, however, because of the effects of global warming, many mountain glaciers are melting at unprecedented rates. Over the last decade, melting of the Quelcaya Ice Cap has increased from three to 30 m a year, putting freshwater at risk for ten million people.

## Fighting for freshwater resources

Water is a shared resource. What begins in mountain watersheds trickles down into streams and rivers, meanders across borders, flows into lakes, fills aquifers and, eventually, empties into oceans. Worldwide, 214 river basins - host to 40 percent of the world's population - are shared by two or more countries. Too often, however, where there is need for cooperation there is potential for conflict. In 1995, the distribution of water from mountains was the cause of 14 international disputes.

Many water-use disagreements arise locally between highlands and lowlands or regions within a country. Mount Kenya, for example, is the source of water for more than 2 million people in Africa. But in recent years, farmers living in the mountain's highlands have been using increasing amounts of water to irrigate crops. As a consequence, downstream water flow has been severely reduced, fuelling hostility from those whose survival depends on lowland pastures, cattle ranching and tourism in wildlife parks.

Cooperation is a key to the protection and equitable distribution of the world's freshwater resources. Watershed management must take into account the needs of all those who depend on mountain water, including those who have the greatest stake in preserving healthy mountain ecosystems - the mountain people themselves. In many areas, mountain people are among the poorest residents and those with the least amount of influence, forced to scratch out a living on marginal lands and to cut trees at unsustainable rates. Breaking the cycle of poverty and involving mountain people in decision-making processes is an essential first step to ensuring the flow of fresh mountain water.

**The wettest place on earth**

Mountains are home to some of the wettest environments on earth. Cherrapunji, India, for example, sits on the southern slopes of the Himalaya's Meghalaya Hills and receives an annual rainfall of as much as 12 m. Like all mountains, the Himalaya force air to rise and cool, triggering large amounts of precipitation. This phenomenon is known as the orographic effect. As altitude increases, generally speaking, the greater the orographic effect and the wetter the environment. Since the Himalaya are home to some of the world's highest peaks, it is not surprising that Cherrapunji receives the greatest amount of rainfall.

## Left out in the cold

The cold climates of mountain regions mean that more energy is required for heating than in lowlands. And energy requirements are growing fast as mountain dwellers seek modern appliances and local industries, especially tourism, expand. Demand is also rising

in lowland regions, which look to mountains to supply much of their energy. Mountain dwellers receive little compensation for electricity, wood and charcoal derived from their homelands. But they do bear the brunt of the negative social and environmental effects.

Many energy sources currently used in mountain regions have a damaging effect on fragile mountain ecosystems.

- Biomass fuels provide more than 90 percent of energy in mountain regions, with fuelwood making up the bulk of this.
- As populations grow supplies are threatened, and there are other drawbacks in using biomass fuels. Smoke from the fires and stoves used for cooking and heating pollutes the environment and damages the health of mountain people.
- The use of animal dung and agricultural waste as fuel deprives the soil of valuable organic fertilizer.
- To meet growing energy demands, some mountain communities are turning to non-renewable fuels such as kerosene, diesel and dry-cell batteries, which are harmful to the environment.

The need is for energy policies and programmes that take into account the vulnerability of mountain ecosystems and the nature of mountain communities.

### Traditional and modern agriculture: striking a balance

By virtue of their shape and height, mountains are unstable places. At higher altitudes, soils form more slowly and are poorly anchored, making it more difficult to grow food than in fertile lowlands.

Generations of mountain farmers have learned to exploit fragile mountain environments sustainably by cultivating many varieties of plant species, terracing mountain hillsides and grazing animals over a wide area.

At higher elevations, however:

- temperatures are colder,
- soils are less fertile and oxygen levels are lower.
- More caloric energy is needed just to survive, yet mountain people often have less to eat.
- Making matters worse, low air pressure greatly increases the amount of time and fuel required to cook many staple foods, such as whole grains and legumes.
- Homes, too, must be heated for much of the year in these higher, colder climates, where wood fuel is a scarce resource.
- Mountain people must often make difficult choices — either expend more time and energy finding wood, or live in a cold house and eat less food.

### Green energy - clean and plentiful

By virtue of their altitude, gradient and other physical characteristics, mountains are the world's powerhouses for clean, renewable energy. Their towering peaks have tremendous potential for producing hydro, solar, wind, geothermal and other forms of power for mountain communities and populations downhill. But only a fraction of the world's mountain renewable power resources is being harnessed. Consider that:

- less than 5% of the world's small-scale hydropower potential has been ex-

ploited;

- the sun could produce at least 1000 times more usable energy than humans need;
- land-based turbines could provide 20000 terawatt hours of wind-powered electricity a year, twice as much as the world consumed between 1987 and 1988;
- more than 50 developing countries could produce as much energy from the residues of sugar production as they currently use from imported oil.
- Renewable energy sources are becoming more viable as prices decrease and technologies become more efficient. But mountain dwellers need better access to credit, technology and information.

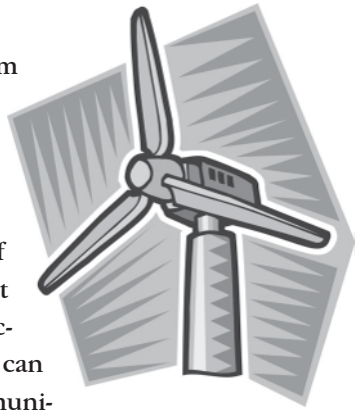
### An ancient source of power

With their steep slopes, high levels of precipitation and stores of water in the form of snow and ice, mountains can be major sources of hydropower. Today, hydropower provides 19 percent of the world's total electricity supply; more than 150 countries use it, and 50 countries rely on it for more than half of their electricity needs. But the promise of hydropower has yet to be tapped in much of the developing world. Today, people are increasingly aware that the building of large hydropower plants in mountain settings can have dire environmental and social consequences.

### Sun, wind and hot springs

The altitude and slope of mountains give them an advantage over lowland areas in the ability to produce solar energy, especially within 35 degrees of the Equator. This is because lower latitudes have more diffuse radiation and less cloud cover than higher latitudes. Also, snowy mountain peaks act as giant reflectors of solar energy, making it possible to capture reflected light. The most reliable technology uses photovoltaic cells to convert light into electricity. It uses no fuel and is noiseless and clean. Solar photovoltaic systems can be used to pump water for people and livestock, to generate power for electric fences and in communication.
Solar power is really taking off in mountain areas around the world.

- Solar cookers are widely used in the mountain areas of China and India and solar space heating is used increasingly in the buildings of Tibet.
- In the highlands of Bolivia, where only 20 percent of households are connected to the national grid and fuelwood is scarce, solar systems in 2000 homes are providing heat, light and cooking power.
- Almost all remote airport and telecommunication facilities in Nepal are powered by solar energy.
- The Eastern Ruapehu Lahar Alarm Warning System (ERLAWS) relies on solar panels to keep the sensor batteries charged up. (See photo on page 50)



Wind power is currently growing at 30 percent a year and now represents the cheapest source of electricity in the United States of America. It has great potential in many mountain locations, and its successful use in Switzerland and Norway has proved it can be a viable source for some highland farming communi-

Cloud forests are the result of persistent, seasonal or frequent wind-driven clouds that blow over mountain regions and provide forests with moisture well above normal rainfall. In some cases, this additional moisture can amount to nearly 20 percent of ordinary rainfall, or hundreds of millimetres of water.
As recently as 30 years ago, cloud forests ranged over more than 50 million ha in narrow mountain belts. Found in tropical and subtropical parts of the world, they exist at heights of as low as 500 m and as high as 3000 m above sea level. In 1999, a number of conservation organizations, including the United Nations Environment Programme, the World Conservation Union and the World Wide Fund for Nature, launched a programme to raise awareness and promote conservation of cloud forests.

ties. In the Swiss Alps there are plans to use wind energy to power snow cannons in tourist areas in order to limit the damage inflicted on the environment by tourist infrastructure. Wind power has great potential in New Zealand but to date has been used in a very limited fashion.

## Mountain forests

Healthy mountain forests are crucial to the ecological health of the world. Yet in many parts of the world mountain forests are under threat as never before. Protecting these forests and making sure they are carefully managed is an important step towards sustainable mountain development. While we have lost much of our native forest in New Zealand, fortunately national and forest parks and reserves protect much of that remaining.

In the last decade, tropical mountain forests have been disappearing at an astounding rate. Deforestation, while a complex phenomenon, is generally driven by population growth, uncertain land tenure, inequitable land distribution and the absence of strong and stable institutions. The illegal international trade in timber almost equals the drug trade, as forests are stripped bare often with the connivance of corrupt officials and governments.

The destabilisation of mountain forests creates an ever-escalating spiral of destruction. When too many trees are cut, runoff and soil erosion increase at rates 20 to 40 times faster than soil can be stabilised, impairing water quality in streams and rivers and harming fish and other aquatic species. As more land is degraded, it increases the likelihood of natural hazards, such as avalanches, landslides and floods.

## Cloud forests - keeping their "heads" in the clouds

Cloud forests are among the world's unique ecosystems. Bathed in fog and mist, they provide food and shelter to thousands of people as well as untold numbers of plants and animals. Yet, in as little as ten years time, the great majority of cloud forests may be gone, cleared for cattle grazing, logged and mined for resources and dried out by the effects of global warming and deforestation in lowland areas. As much as 90 percent of cloud forests in the northern Andes has already disappeared.

When cloud forests are cleared, the extra water extracted from the atmosphere is lost, along with the important functions that all forested headwaters play in maintaining water quality, stabilizing water flow and preventing hillside erosion.

No other ecosystem on earth produces as much living matter as the world's coastal temperate rain forests. Found in wet, cool climates where marine air collides with coastal mountains and generates large amounts of rainfall, these giant forests create as much as 500 to 2000 tonnes of wood, foliage, leaf litter, moss, plant life and soil per hectare. But far from wasteful, this immense organic output produces food and shelter for countless species of insects, reptiles, birds and mammals and also contributes directly to the health of ocean life nearby.

*I was ploughing my field, I looked for a stick to hit my ox with and I went to the other hillside but I could not even find one stick … the grass cutters cut everything so the plants didn't have the chance to grow big. Then the people used to cut the forest and grow beds of millet…. I stopped the people from [growing] millet in the jungle and asked them to keep [it] in their fields…. But still the people kept on cutting the grass and the plants (trees) along with it, so I gathered all the villagers and passed the resolution and told them that if anyone was seen cutting the grass along with the saplings they will be fined. Only then did people stop… and finally the trees could grow big. So now we have quite a dense forest everywhere."*

Jay, 55 year old Nepal is farmer

New Zealand's coastal temperate rainforests are protected in a number of South Island national parks - Kahurangi, Paparoa, Westland, Aspiring and Fiordland as well as Rakuira on Stewart Island.

Once found on five continents, coastal rain forests survive only on two. Today only about 30 to 40 million ha of coastal temperate rain forest remain, mostly along 8 000 km of coastline in Chile and the Pacific Northwest of North America. Of the world's remaining coastal temperate rain forests, only 16 percent are protected with over two-thirds of that in Alaska.

## Mountain forests for the future

Too often in the global market economy, the most widely accepted thing of value in a forest is timber. In mountain communities, timber is often less important than the ecosystem that produces water for drinking and irrigation, and plants and animals for food, fodder and medicines.

Mountain people see the forest and not just the trees. Like everyone, they depend on the entire forest ecosystem for their survival. Mountain forest policies should acknowledge the needs of local communities first, before taking into consideration the interests of other parties, such as the commercial forestry and tourism sectors.

## Mining

The forces that shaped the world's mountains also made them rich in minerals and metals. Mining can bring large benefits to mountain communities; but it can also be devastating to fragile mountain ecosystems, mountain cultures and the environments and communities both above and below. The challenge is to balance mining opportunities with environmental and social responsibility, and to ensure the protection of traditional mountain cultures.

Hundreds of millions of years ago, massive movements of the continents reshaped the earth's landscape, forming the Alps, Rockies, Andes, Appalachians, Pamirs, Himalaya and many more of the world's majestic mountain ranges. These same forces created deposits of metals and minerals in the rocks beneath the surface of the earth. That's why today's mountain ranges are the major source of many of the world's most important metals and minerals, including gold, copper, iron, silver and zinc - all vital to the global economy. Mountains are also especially attractive to

prospectors because the topsoil and overlying rock in many areas make it easier to determine what lies beneath the surface.

### Environmental consequences

The most serious environmental degradation issues in mining are:

- damage to water quality and quantity;
- loss of biodiversity and vegetative cover;
- and the atmospheric effects of pollution and global warming.

In the Khaniara area of India's Himachal Pradesh nearly 1000 small to medium-sized slate mines have stripped up to 60 percent of the forest and triggered countless landslides.

In many parts of the world mountains are sacred sites and, especially their summits, have a spiritual significance for ethnic mountain communities. The peaks of Tongariro National Park are sacred to Ngati Tuwharetoa and Ngati Rangi. This spiritual attachment to the mountains led to the establishment of a new associative cultural status for World Heritage sites with the first inscription under the new criteria going to Tongariro National Park.

To some cultures, mining is seen as an act of sacrilege. More than a dozen World Heritage sites identified by the United Nations Educational, Scientific and Cultural Organization (UNESCO) are currently considered to be threatened or potentially threatened by mining operations and proposals.

### Some successes:

- In most of the world's modern mines, the use of ammonium nitrate blasting agents has helped to reduce environmental damage.
- New processes have been developed that use fewer chemicals during extraction and processing and make leaching ponds safer.
- The United States National Mining Association and the United States Department of Energy have forged a partnership to research and develop new technologies that will improve environmental performance in the mining industry.
- In 1998, 17 multinational mining companies formed the Industrial Network for Acid Prevention, which undertakes research and development to reduce the effects of acidic drainage.

Mountain mining around the world could benefit from improved regulation and more independent monitoring to enable interventions before environmental and social problems spiral out of control. The result would be savings for companies, countries and communities.

Changes in the landscape. The Taupo eruption of 186AD blanketed the central North Island with ignimbrite, flowing over Pihanga, Tongariro and Ngauruhoe. This roadside cutting on the way to Whakapapa shows a dense layering of pumice overlying earlier ash deposits. (Photo: Dave Wakelin)

### Alien invaders

Like island habitats, mountain ecosystems have no naturally evolved defences against invading species. Often, these alien invaders are introduced by human visitors or as a consequence of planting

non-native crops or ornamental plants. Because they generally arrive without the predators or pests with which they evolved, these invasive species easily outcompete native flora and fauna. Examples of some of the most damaging alien species include feral pigs in Hawaii in the United States and Costa Rica, goats in Venezuela, alien trout in the United States' Yellowstone National Park, Pinus contorta, heather and possums in New Zealand.

> *"Before, when there wasn't the road, when people from the plains came to steal, they would steal one tree. Now one truck can seat ten people, so many trees were easily taken. But since last year there isn't a single tree to cut. Now it's barren."*
> - a Miao woman in China

## Putting a price on sustainable mountain development

Mountain resources are often undervalued or given away for free. Governments can help mountain communities by assigning dollar values to mountain resources and ensuring that this money circulates in the local economy. Examples of user fees include:

- leasing land for mountain resorts at a fair market value,
- charging royalties for timber harvesting and mountain trekking,
- licensing tour operators and
- charging entrance fees to mountain parks,

These ensure tourism revenues contribute to local community development and providing incentives for tour operators to train and hire local men and women.
Most of the world's major rivers, for example, originate in mountains. Lowlanders who depend on mountain water, for drinking, for industry and for power generation, would be wise to compensate mountain communities for the protection and sustainable management of mountain watersheds.

## Peace and conflict

For many countries mountains form high physical barriers between themselves and their neighbours. In 1999, 23 of the 27 major armed conflicts in the world were being fought in mountain regions. Mountainous areas - ranging from Afghanistan to the Balkans, the Caucasus, the Andes, parts of the Near East and Africa - are the flash points of conflicts afflicting the world today. Occupying the high ground has always been of strategic importance when opposing forces have fought for local or regional supremacy.
Mountains are the primary battleground in international efforts to control illegal drug trade. Both the coca bush, the leaves of which are used to produce cocaine, and the opium poppy, which is used to produce heroin, are native to mountain areas. For international criminal organizations, cocaine and heroin mean big money. For many mountain farmers in developing countries, with no other sources of income, the drug trade simply means survival.
In 1995, the inability to manage mountain waters was the source of 14 international conflicts. Rivers rarely follow national borders - two or more countries share 214 river basins, covering more than half of the earth's surface and home to 40 percent of the world's population. As populations increase and the demand for water intensifies, the potential for international wars over water resources escalates.

## Tourism

Mountains are one of the world's most important tourist destinations. Their soaring peaks and beautiful landscapes are becoming increasingly attractive as a place of escape in a stressful, urbanized world. Worldwide more than 50 million people visit mountains each year. They are drawn to these areas by the physical beauty of alpine environments, the many forms of recreation available in mountainous terrain and the opportunities for experiencing cultural heritage in the communities found there. The clean, cool air and awe-inspiring scenery of mountain areas, combined with the unique customs, arts, crafts and culinary traditions of the communities that live there, make trips to the mountains attractive holiday options.

In New Zealand the majority of our national parks are mountain parks and have long been established as prime tourist areas complete with roading, accommodation and tourist facilities. The majority of international tourists visit at least one of our mountain parks during their stay in New Zealand.

But tourism presents both opportunities and dangers for mountain regions. Yet, the influx of visitors into mountain regions poses a threat to these unique and often pristine environments. In countries where mountain people are the stewards of mountain ecosystems, any decision to develop tourism must be made with their involvement and agreement. Tourism must be sustainable, carefully planned to ensure that the beauty of mountains can be enjoyed by present and future generations.

Sport-based tourism in particular has boomed in mountain regions over the past 30 years. It has expanded from the traditional areas of North America and the European Alps to largely untouched mountain regions, including parts of Central Asia, the Himalaya, Karakorum, Caucasus, Andes and even Antarctica. Typical mountain activities include hiking, skiing, snowboarding, climbing and birdwatching. However, extreme sports, such as bungy jumping, rafting, paragliding and canyoning are becoming increasingly popular, especially with affluent urban thrill-seekers. Another growth area for alpine tourism focuses on mountains as a source of well-being and health. An ever-increasing number of mountain tours offer opportunities for contemplation and meditation.

The tourism boom has undoubtedly brought benefits to many of the world's mountain regions. Thanks to tourism revenues, mountain people, many of whom are economically disadvantaged, can aspire to greatly improved living standards. Mountain tourism has given young men and women the option of building a future in their home community, instead of becoming part of the rural exodus to cities.

Mountains have an attraction for young and old. A party makes their way down from the summit of Mt Ruapehu through layers of ash from the 1996 ash eruption of the volcano.
(Photo: Peter Blaxter)

The influx of visitors has also created a market for products made by local crafts workers, as well as for produce from the land.
Yet although tourism - and mountain tourism in particular - is one of the fastest growing economic sectors in the world, it is also one of the least regulated. Short-term profits need to be balanced against long-term losses if the industry is to become a lasting source of benefit for mountain people.

## A double-edged sword

Mountain tourism can have a range of damaging effects.

- It can degrade and stress fragile mountain ecosystems, destroying the qualities that make these environments so alluring.
- Mountains are among the world's most important repositories of biodiversity yet construction, pollution and noise associated with tourism can threaten this precious asset.
- In many of the developing world's most beautiful mountain regions, litter and waste have emerged as key problems. The felling of trees to supply timber and fuelwood is denuding mountainsides.
- The mysticism of sacred mountain sites is often diminished by the numbers of people who come from all over the world to make pilgrimages.
- Tourism means more transportation networks and links, which can blight the mountain environment, disrupt traditional ways of life and threaten the existence of local languages.

If mountains become the world's playgrounds, there is a risk that mountain people will lose their own cultural identity.

## Counting the cost of fun in the snow

Winter sports are booming, with resorts now operating all over the world. The snow sport business has spawned a large and complex commercial network that includes hotels, shops, restaurants, cable cars and ski schools. For many isolated mountain communities, it has meant a new lease on life. But in some cases, it has also come at a high price:

- Building ski runs often involves destroying swathes of forest, planting pylons for chairlifts and cable cars and building roads and tunnels.
- In the Alps, emissions from the millions of vehicles that bring visitors to the slopes threaten the health of trees and worsen the effects of global warming.
- Paths and ski runs harm sensitive mountain ecosystems and disturb plant and animal life.
- Constructions that look acceptable under a mantle of snow can become a scar on the landscape once the winter fun is over.

## How not to kill the golden goose

Tourism can provide benefits for mountain communities and visitors alike if sensitively planned and managed. Often, the development of tourism in mountain areas is concentrated in the hands of outside interests, with little of the profits going to local communities.
Mountain tourism needs to be developed according to:

- Specific local conditions and cultures, an approach that will help communities

gain a niche in an increasingly competitive market.

- Policy-makers could favour activities that build on local knowledge and traditions to ensure that tourists respect the natural and cultural diversity of the places they visit and encourage mountain people to view their home as a source of pride.
- Because it is notoriously volatile, and often seasonal, the tourism industry needs to be developed as part of an overall economic development strategy, with diversification to ensure local economies do not become reliant solely on tourism revenue.
- Governments can help mountain communities by investing profits in programmes to ensure sustainable livelihoods for local people.
- Non-governmental organizations and the private sector can also help get the tourism equation right by offering education and training in responsible tourism practices.

### Ecotourism in mountains

One promising answer to the challenge of developing mountains wisely for recreation is ecotourism. As well as being the International Year of Mountains, 2002 is also the International Year of Ecotourism, and there is a strong and important link between the two. Ecotourism can help reduce poverty and hunger, a key issue in mountain areas where a high proportion of the world's poor and food-insecure live. It also has considerable potential for strengthening communities and for protecting mountain ecosystems.

Defined by the International Ecotourism Society as "responsible travel to natural areas which conserves the environment and improves the welfare of local people," ecotourism currently accounts for between two and four percent of global tourism. But that figure is expected to grow.

This form of holidaymaking makes a point of putting something back into the area and culture being visited, in terms of revenue and financial support for conservation projects, but often also in-kind. Some tourism operators plant trees to combat desertification, collect garbage from trekking regions and ensure tourists use biodegradable wrapping on food and drink. During many eco-holidays, tourists help out with projects that protect endangered species and habitats. Handled properly, ecotourism can be a valuable tool in advancing tourism, especially for poor mountain communities in the developing world, without destroying natural resources and the environment.

### Lessons from Switzerland

Wealthy though Switzerland may be today, not long ago life was so unpromising in many mountain communities that people regularly fled to lowland towns and cities in search of a better existence. Faced with losing many cherished Swiss traditions, people in the mountains and the lowlands began to debate what might be done to make mountain life more appealing. As a result, policies were developed which have turned Switzerland's mountains into some of the most prosperous regions in the country. Among these policies:

- mountain communities were given more power to determine their region's development path and how local resources were used;
- national subsidies were created for agriculture and other forms of development in mountain regions;
- health care and education were improved;
- to a great extent, profits from tourism were put into the hands of local people rather than being siphoned off to urban centres.

*There was nothing but the blue heavens above to relieve the frigid glare of the ice, the cold glitter of the snows, and the dreary tints of the frowning fire-scorched rocks. We now seemed to be in a new world, where solitude reigned supreme, and where Nature, casting aside her most radiant charms, looked stern and awe-inspiring in her mantle of ice and snow.*
J. Kerry-Nichols 1884 (description of an ascent of Mt. Ruapehu)
(Photo: Dave Wakelin)

## We are all mountain people

Mountains undergo a cycle of life similar to us but usually at a much slower rate. They are born from the depths of the ocean, through fiery outpourings or from the slow inexorable grinding uplift of fault against fault, tectonic plate against plate.

Initially they are naked. Slowly the simplest of plants clothe them and as soils build up in crevices and hollows more and more advanced plants cover the vast bare spaces. Mountain plant cover attracts animal life, invertebrate and vertebrate, to live and graze on their slopes - the biodiversity of mountains increases with age.

Mountains hold back, channel and diversify the weather, creating their own special light shows. Mountain thunder and lightning is an awesome and frightening spectacle. Little wonder that the power and presence of mountains exert such influence on the world's religions. Gods speak from mountains, religious treasures and edicts have their own place in the mountains. Many devotees seek inspiration and pious solitude in the mountains.

Mountains collect, store and release precious water and provide us with sustenance through the many food plants that grow on mountain soils. Mountains influence our lifestyle daily.

Most of us visit mountains for tourist and recreational pursuits but for many millions mountains are their home. We do need to give more consideration to the role mountain people play in living with and protecting our mountains.

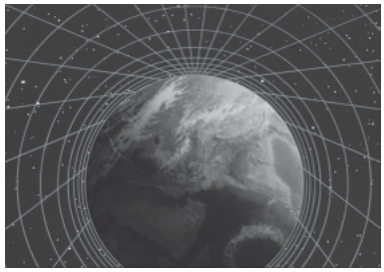
Mountains age and die. Earthquakes, plate movement, severe weather induced erosion all take their toll on mountains. Eventually mountains end up as grains of sand on a sea floor where time and continual change will see them at some time in the future reborn.

Mountains deserve our respect and our protection for they influence and change our lives more than we imagine.

We are inextricably tied to mountains, for - we are all mountain people.

Dave Wakelin
Senior Community Relations Officer

# Conservation on the Net



The greatest revolution of recent times (or not, depending on how you view it) has been the rise and rise of the Internet. What started out a mere 20 years ago as an attempt by the US military to connect a few computers to enable continuity of command spread to universities and over the last 10 years to the rest of the world.

With millions of sites now online finding what you want can be daunting. Internet search engines are a boon, trying their best to rank and list sites according to your search parameters. My favourite is www.google.com which is not only very fast but seems to be able to come up with relevant hits near the top of the list every time.

I typed in 'conservation' and was rewarded with 7,800,000 possible sites in 0.2 seconds! Staggering but wait ... there's more. A week later I typed in the same request and the tally this time was 7,990,000 in 0.22 seconds - proof that conservation is a growing phenomenon.

By the time you read this the search tally will have crossed the 8 million threshold so to save you some effort I've listed some (by no means all) of the significant conservation sites around.

**New Zealand**

**www.doc.govt.nz** - the first place you should look for conservation information!
**www.kiwirecovery.org.nz** - the Kiwi Recovery Programme web site
**www.tongariro.org.nz** - Tongariro Natural History Society
**www.projectcrimson.org.nz** - protecting endangered pohutukawa and rata trees
**www.conservationvolunteers.org.nz** - always looking for volunteers
**www.nationalparks.org.nz** - conservation and protection of NZ natural heritage
**www.eco.org.nz** - represents many NZ environment & conservation organisations
**www.cmag.org.nz** - co-ordinating body for the native captive industry.
**www.greenpages.org.nz** - directory of non-profit organisations active in the areas of conservation and environmental protection, education, and restoration.
**www.forest-bird.org.nz** - NZ's largest national conservation organisation
**www.natureandco.co.nz** - extensive information about NZ nature
**www.nzbirds.com** - site devoted to New Zealand birds native & introduced
**www.heritage-antarctica.org** - preserving NZ's Antarctic history
**www.penguin.net.nz/** - devoted to the conservation of New Zealand penguins

**Elsewhere**

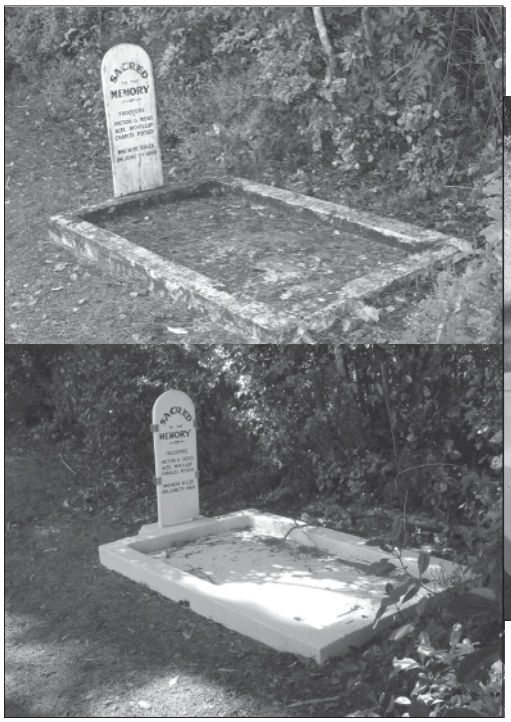
**www.conservation.org** - great information source on global conservation issues
**www.iucn.org** - global conservation union spread across 140 countries
**www.unep-wcmc.org** - policy & action to conserve the living world.
**www.conservationfoundation.co.uk** - promoting positive conservation action
**www.npca.org** - information on US national parks - very good site
**http://forests.org** - vast rainforest, forest and biodiversity conservation news
**www.oceanconservancy.org** - organisation dedicated solely to ocean protection
**www.conservationfund.org** - partnerships to preserve US outdoor heritage
**www.swcs.org** - fosters the science and the art of soil, water and related natural resource management to achieve sustainability

# Opepe Graves restoration

A chapter in Taupo's history was written on 7 June 1887 when an advance party of Te Kooti Rikirangi surprised the Armed Constabulary garrison at Opepe, 17 kilometres out of Taupo or Tapuaeharuru as it was then known. Nine troopers died in a hail of bullets in a matter of minutes while four escaped and made their way, without horses or equipment, across the inhospitable Galatea Plains to Fort Galatea 50 kilometres away. Another had also escaped and made it to Galatea ten days later.

The troopers were buried at Opepe. A small cemetery just off the Napier Taupo highway contains the graves of the troopers plus those of several others from the small Opepe settlement.

The graves fell into disrepair but recent work has restored the graves, especially the Totara headboards, to close to their original state. The restoration work was carried by one of only two in New Zealand qualified to undertake ancient timber restoration. Nick Tupara from the Gisborne City Council spent several months restoring the headboards.





Above and to right: Before and after photos of the restored Opepe graves.
Centre: Back view of one of the headboards showing the specially designed stainless steel brackets holding the headboard in place.
(Photos: Dave Wakelin)

The restored headboards have been mounted on specially designed stainless steel bracket raising them above the graves to reduce the effects of dampness rising up through the headboard base. Rather than drill holes through the timber the headboards are held in clamps .

In the future Nick will undertake the restoration of the historic Opepe water trough. Because of its size the trough will be dismantled and the slab sections flown out from the site then transported to Nick's workshop in Gisborne for restoration.

[Visit the recently renovated Taupo Museum and Art Gallery where among the newly developed displays is one on the Armed Constabulary in Taupo.]

The New Zealand Armed Constabulary was brought into being in 1867, designed to recruit fit men , either European or Maori, for the purpose of, "*Putting down rebellion, quelling disturbances, preserving the peace, preventing robberies and other felonies, and apprehending offenders against the peace.*"

# Lake Taupo - tourism hub of the North Island

Right: Lake Taupo - lake with an explosive origin and long association with Maori. (Photo: Dave Wakelin)

## The beginning

Eighteen hundred years ago Taupo looked very different. What was a central North Island area of previous thermal and volcanic activity with some small lakes to the western side of the present lake changed in a matter of hours. A cataclysmic eruption tore the heart out of the North Island sending hot ash and pumice 50 kilometres into the atmosphere before the descending material blanketed everything around in layers of ignimbrite. (See article on page 39)

In geological terms 1800 years is but a blink in the eye of time, making the prime tourist area of Taupo one of the newest parts of New Zealand.

Taupo is also one of the most exciting areas in the country, a combination of thermal attractions, exhilarating adventure activities, dynamic mountains to climb and ski and lush forest to explore as well as lake and mountain views to die for. Few areas in the world can boast as many multisport events held among such stunning scenery. You have to admire the athletes for being able to concentrate on the task in hand and not be continually distracted by the lake, mountain and river vistas around them.

## Mountains take their stand

Maori settled in the area 800-1000 years ago drawn by its thermal areas and abundance of food. Local legends tells of conflict between the mountains over the one female mountain, Pihanga and how those who lost out to Tongariro had to depart the region before dawn. Taranaki dragged his feet on his way to the easy coast where he stands today, leaving behind him the Whanganui River created from his footprints. Putuaki made haste to the Bay of Plenty and stands today behind Whakatane. The slowest to depart was Tauhara, forever looking back over his shoulder and when dawn broke had only made it as far as the northern end of Lake Taupo where he stands today overlooking the township of Taupo.

**A few Taupo facts:**
Lake Taupo is 359 metres above sea level, 40km long and 30km wide with an area of 616 sq. km.
Yearly sunshine hours: 2002
Yearly ave. rainfall: 1045mm
Average temperatures
Summer: 22.8°C
Winter: 11.7°C

"Tuwharetoa"
A history of the Maori people of the Taupo District
by John Te H. Grace
Published by Reed Books 1959
Reprinted 1966,1992

## The journeys of Tia and Ngatoroirangi

Early Maori explorers left their indelible mark on the region.

John Grace, author of the authoritative book, "*Tuwharetoa*", records that Tia and his followers from the Te Arawa canoe made their way inland at the same time as Ngatoroirangi, navigator and high priest headed inland from Maketu. Tia followed the Waikato River noting that it was discoloured, taking this as a message and a warning that someone had already made it to the interior. He continued his journey however and where he crossed the Waikato he named Atiamuri (Tia who follows behind.) Further on he came to step like rapids and named these Aratiatia (the stairway of Tia).

On arrival at Lake Taupo Tia found a large tribe, Ngati Hotu, already occupying the northern end of lake. Tia ventured on, not realising that Ngatoroirangi was watching him from the top of Tauhara where he had set an altar. It was Ngatoroirangi who discoloured the lake water to prove his ownership of the lake and it was this dirty water that Tia saw at Atiamuri.

Tia and his men continued their journey without attempting to disturb the occupants. They circumnavigated much of the lake, travelling round the eastern shore passing Te Rangiita, Tokaanu and Pukawa to arrive at Titiraupenga at the foot of a mountain of the same name. Under Tia's chieftainship, the party made it their permanent home.

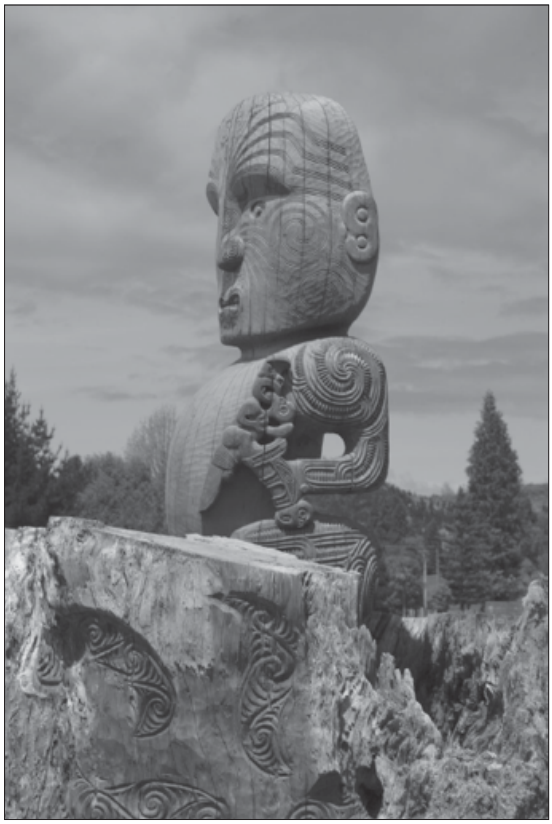
Grace records that Tia noticed standing a high, rocky cliff which faced the lake and that the peculiar formation and colouring of the laval rock resembled the cloak that he wore about his shoulders. "The cloak was called a taupo (a word that is now obsolete) and was made of closely woven material with an outer covering of flax leaves, coloured yellow and black. It was used as an outer garment to shed the rain. Tia went toward the cliff and under it made a post of sacrifices that he named Hikurangi. There he recited the incantations considered needful to propitiate the local deities. Rising up he removed his cloak and fastened it to the post and named the great cliffs Tauponui a Tia (the great cloak of Tia). The name Tauponui a Tia, during the occupation of the tribes that followed, was given to the lake itself and then to the vast tract of land surrounding it ..."

Ngatoroirangi a little later also travelled round the lake and observing the mountain Tongariro decided he would ascend it as he had done Tauhara. "He travelled to Rangipo where he met a man called Hapekituarangi and said to him, 'What brings you to this cold and barren country where there is nothing to eat?' Hapekituarangi, while looking toward Kaimanawa range, replied, 'My breath is my food!' The range to this day is known by that name (kai, meaning eat; and manawa, in this case, breath)."

Hapekituarangi told Ngatoroirangi that like the navigator he too had come to claim the land for himself and his people. Ngatoroirangi, began to climb Tongariro in order to be able to claim the land from its summit. From on high he warned Hapekituarangi not to come any higher, *"E Hape e! Kaua koe e piki ake. Kite piki mai koe, ka heke te po o te rangi!"* (Do not dare climb this mountain. If you do I will cause the darkness of the heavens to descend upon you!)

Hapekituarangi ignored Ngatoroirangi and started to

Below: Whilst Ngatoroirangi prayed for fire and warmth to avoid perishing on Tongariro nowadays many Taupo area visitors prefer the colder temperatures especially if their intention is to ski the slopes of Ruapehu. Snowmakers at work on part of the Whakapapa Skifield. (Photo: Ruapehu Alpine Lifts)



Above: A dramatic carving of Ngati Tuwharetoa navigator and explorer Ngatoroirangi at Wairakei Terraces, Wairakei Park.
(Photo: NETCOR)

climb. Ngatoroirangi, called upon his gods and especially Ruaimoko, god of volcanoes, to destroy Hapekituarangi whom he saw as a trespasser. The skies blackened, snow fell and sleet swept the desert, and in the intense cold Hapekituarangi and his company perished. Even today Rangipo Desert (the plains of the dark sky) is a same bleak windswept area in which Hapekituarangi died.

### Fire comes to the mountains

However, Ngatoroirangi now faced the same danger that destroyed Hapekituarangi.

In a severely weakened state at the summit of the mountain, Grace records that, "... Ngatoroirangi cried aloud to his ancestral spirits and to his sisters, Kuiwai and Haungaroa who were in Hawaiki, to come to his assistance and send him fire. He exclaimed, “Kuiwai e! Haungaroa e! Ka riro au i te tonga, tukuna mai te ahi!” (0 Kuiwai! 0 Haungaroa! I am seized by the cold wind from the south. Send me fire!) They heard him and, with the assistance of Pupu and Te Hoata, the fire gods, heat was sent him from Hawaiki. It came underground and passed White Island, Moutohora, Okakaru, Rotoehu, Rotoiti, Tarawera, Paeroa, Orakeikorako, Taupo and Tokaanu. He then threw down on the mountain the fourth of the five ara (sacred stones) brought from Hawaiki. Where it struck, a burning volcano burst open. The fire and heat revived him and he was saved."

Not so fortunate was Ngatoroirangi's slave Ngauruhoe who was sacrificed as an offering to the gods. When fire burst forth Ngatoroirangi threw the body into the crater of the volcano that today still bears the name of the unfortunate slave.

The name Tongariro also comes from that perilous time, derived from the words tonga (south wind) and riro (seize).

Another explorer, Tamatea-arikinui, travelled thorough the central North Island. When he arrived at Taupo he remarked that the ground underneath was hollow, for his footsteps resounded as he walked. That place was ever after known as Tapuaeharuru (resounding footsteps). The area of Taupo township was known as Tapuaeharuru and the bay of sandy beaches summer holidaymakers enjoy is called Tapuaeharuru Bay.

Right: Tapuaeharuru Bay, Taupo is a popular swimming beach during summer.
(Photo: Dave Wakelin)

Right: The central North Island is a cyclist's mecca, whether racing for a transition point in the Tongariro Mountain Classic (pictured above) or in one of the many other multisport events, or joining 7500 others in the mighty Great Lake Cycle Challenge (Photo: New Zealand Multisports Charitable Trust)

## Taupo - the tourist hub of the North Island

Today the Taupo region is a bustling thriving tourist area very much dependent on the 'fire' Ngatoroirangi's invocations brought to the region.

Taupo is many things to many people. Ask a skier and his mind turns to the two largest commercial skifields in the North Island, now both owned and operated by one company, Ruapehu Alpine Lifts. Lake Taupo and its tributaries are world famous for rainbow trout fishing. Our forests, rivers and mountains provide some of the most exhilarating outdoor activity to be found anywhere in the world. Where else can you ski a live volcano, catch a trout, raft a wild river, sit amid tall green trees and finish off with a tandem sky dive or a death defying bungy jump all in one day?

The most visited tourist attraction in New Zealand is Huka Falls, where Tamatea-arikinui, ignoring the advice of Ngatoroirangi about the perils of the river further downstream, rode the falls and while he survived others of his party perished. An estimated 800,000 visit the Falls each year. Close by the boardwalk around the Craters of the Moon thermal area keeps visitors off the fragile surroundings. This area is spectacular but unpredictable and occasionally sections of boardwalk are re-routed around vents that have become too overly active for public safety.

Huka Falls and Craters of the Moon are situated in Wairakei Tourist Park, an area of joint ownership and combined management with a wide variety of tourist activities and events.

The natural attractions of the central North Island are impressive and benefits from the protection afforded many of the natural features. Tongariro National Park, Kaimanawa Forest Park, Tongariro and Erua Forests, parts of Wairakei Tourist Park, lakeshore and other reserves come under the administration and management of the Department of Conservation. The Lake Taupo fishery is also managed by the department with extensive monitoring and research ensuring this valuable sporting asset is always in prime condition. To ensure that areas that attract the visitor are not spoiled DOC carefully manages the assets and issues concessions to operate businesses in these natural areas after careful vetting of the operators.

Taupo, New Zealand's largest lake, is full of trout, or so it would seem given the numbers caught each year. The staggering fact is that the lake has not been stocked

If you want to find out all the events happening in the Taupo district look for the Lake Taupo Events Calendar Summer 2002/ 2003 from visitor centres. Alternatively go online and check the most up to date information on Destination Lake Taupo's website, www.laketauponz.com

The waters of the Taupo district cater for many activities
Above: The quiet contemplative art of trout fishing at Waitahanui, the famous 'picket fence' at the mouth of the river.
(Photo: Dave Wakelin)
The wildly exhausting and exhilarating sport of kayaking during the Tongariro Mountain Classic.
(Photo: New Zealand Multisports Charitable Trust)

with trout for more than 40 years. The rivers and streams that feed into Lake Taupo are such fertile spawning grounds and the lake so rich in feed that there is no need. This is the place to fish - ask the thousands of anglers who return year after year to fly cast into the lake and rivers, or troll or down-rigger fish the lake.

Trout fishing is a major tourist industry for the region. Not only do the accommodation and service industries benefit from the fishing but numerous fishing guides and lake charter boats exist solely to provide local knowledge and skills for the visitor. Even if you are not an angler, fishing can be a spectator sport too. There is something very relaxing and pleasurable involved in watching the art of fly fishing. Fortunately there are plenty of places from which to engage in the noble art of angler watching! The Waitahanui Stream mouth 'Picket Fence' must be one of the most photographed fishing scenes around, especially at sunset with a line of anglers silhouetted against a red lake.

Tourism sustains the Taupo area, provides employment directly or indirectly for a large part of the population and is partly responsible for the healthy community we live in with its modern amenities. The abundance of quality accommodation, restaurants and shopping make the region a magnetic attraction for both New Zealand and overseas visitors.

We enjoy a mix of tourists to the area. Internationals comprise 24% of all visitor nights. The value of international visitors to the area is estimated at $44 million (those staying in commercial accommodation) plus another $12 million for those staying in private accommodation, a total of $56 million. Domestic and international tourism creates about 1600 jobs and if the retail sector is added (and much of this is based on tourism) then this increases to 3,000 jobs. One in three in the district are in tourist related employment.

Total visitor nights in the region is 1.4 million, staying an average of 2 nights with direct spend of $136 million, $219 million with the downstream effect.

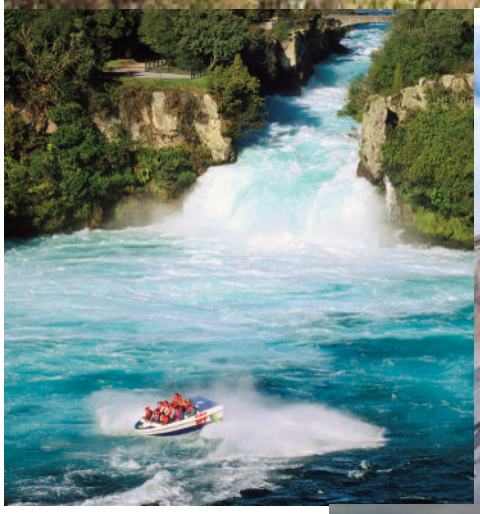
Whichever way you look at it Taupo is the hub of almost every aspect of the North Island tourist industry.

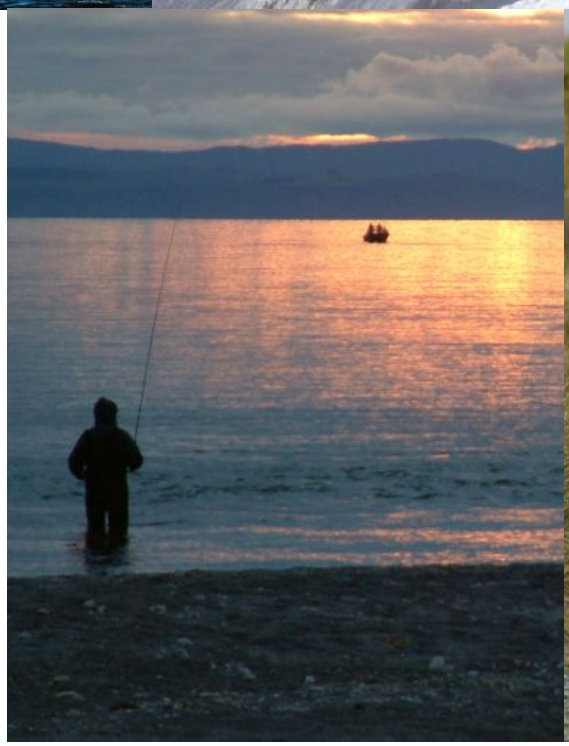
**Looking for Information on the Taupo Area?**

**Destination Lake Taupo**
**Lake Taupo Convention Bureau**
66 Paora Hape Street
Private Bag 2002
Taupo
New Zealand
Telephoe: +64 7 376 0400
Fascimile: +64 7 376 0410
email: info@laketauponz.com
Internet: http://www.laketauponz.com

**Taupo Visitor Centre**
Tongariro Street, Taupo
Telephone: +64 7 376 0027
Fascimile: +64 7 378 9003
email: taupovc@laketauponz.com

**Turangi Visitor Centre**
Ngawaka Place, Turangi
Telephone: +64 7 386 8999
Fascimile: +64 7 386 0074
email: turangivc@laketauponz.com

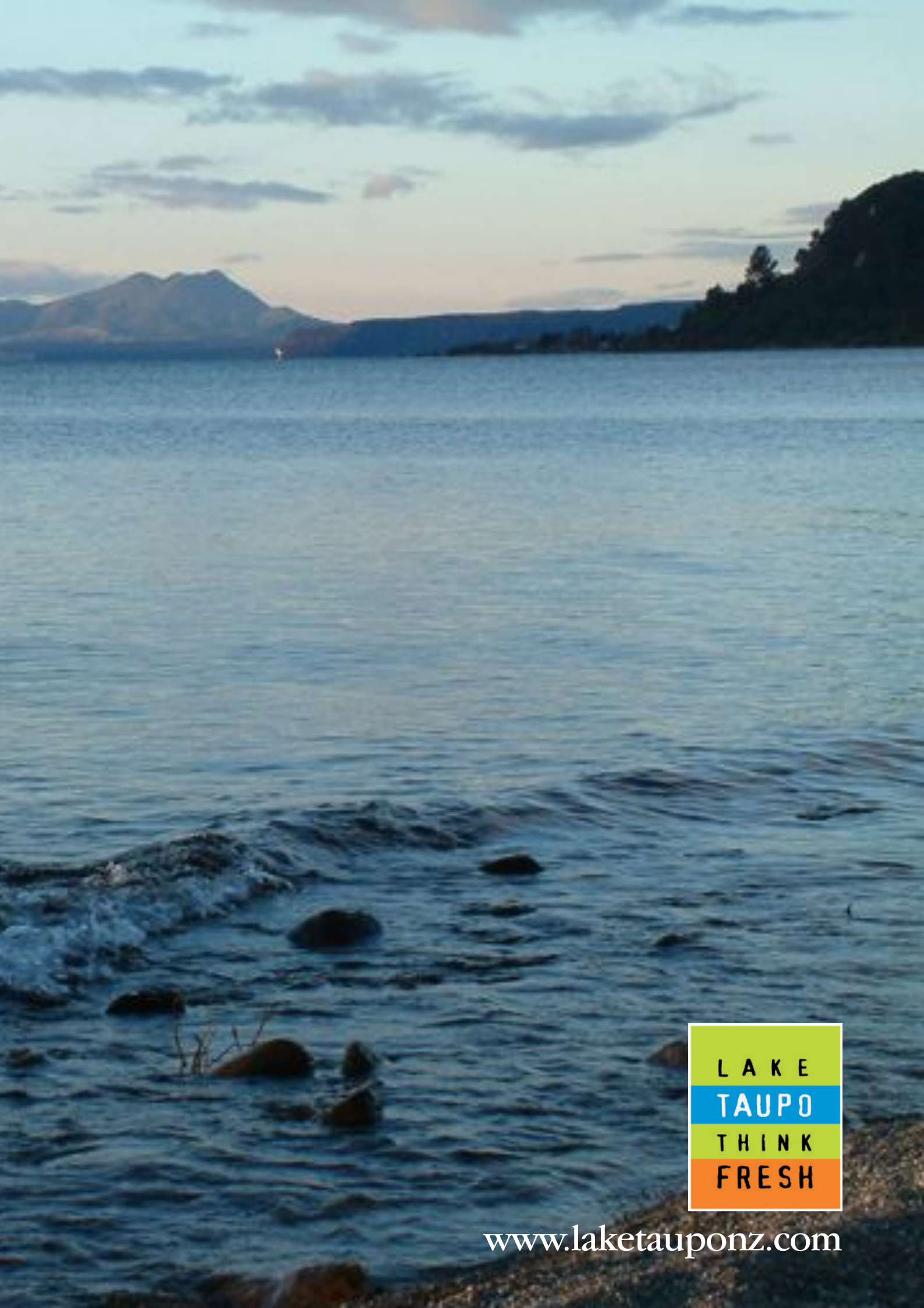




The varied landscape around the Taupo region caters for a variety of interests and pursuits. Above: Jet boat thrills and excitement aplenty on the Waikato River below the Huka Falls, New Zealand's most visited tourist attraction. (Photo: Huka Jet) Top: Ambling through sub-alpine vegetation on Mt Tihia during the Conservancy's Summer Programme. (Photo: Dave Wakelin) Upper right: Ruapehu's peaks and Crater Lake are highlights of scenic flights over the mountains. (Photo: Dave Wakelin) Far right: The pain and enjoyment of multisport events draws thousands of competitors and supporters to the Taupo region every year. (Photo: NZ Multisports Charitable Trust) Right: Sunset angling at the mouth of the Waitahanui River. (Photo: Dave Wakelin)

Department of Conservation
*Te Papa Atawhai*

www.doc.govt.nz




www.laketauponz.com


**A Day at the office!**
Conservancy scientist Harry Keys checks the lahar sensor equipment at Crater Lake, the NZ Alpine Club hut and at Tukino Skifield above the Whangaehu River, down which the lahar from the Crater Lake will flow on a regular basis.
Above: Harry Keys and Nic Etheridge venture down one of the spurs leading to Crater Lake; Above top: Regional Manager (Central), John Ombler, puts management by walking about into practice; Top right: Harry attempts to locate the sensor equipment, about five metres under snow using kiwi tracking equipment; Top right centre: Showing off skiing prowess with Mt Ngauruhoe in the background; Far right: Harry digs deep to check snow condition at the Crate Lake; Right: Harry measure snow conditions while Nic does the recording. (Photos: John Ombler)

# Lake Taupo - explosive beginnings

We are privileged in New Zealand to have many large freshwater lakes on which to recreate. Spending time boating, sailing, fishing, water skiing, or relaxing around the shores epitomises holidays for many New Zealanders. Our lakes range from those filling huge, deep valleys slowly carved out by retreating glaciers to those formed by violent volcanic activity.

The mountains of Tongariro National Park from Mission Bay on the shore of Lake Taupo. The pyroclastic flow of ignimbrite from the 186AD eruption of Taupo flowed over Mts Pihanga, Tihia and Kakaramea , Tongariro and Ngauruhoe and the northern slopes of Mt Rupaehu. (Photo: Dave Wakelin)

Lake Taupo is part of the Taupo Volcanic Zone which is made up of five major areas of activity: Tongariro, Taupo, Maroa, Rotorua and Okataina. This zone stretches in a north-east/south-west direction from White Island to Ohakune. It is a trough some three to five km deep, filled with volcanic material. The zone is characterised by down-faulting and is expanding across its width at about 10mm a year. Of the five centres, Taupo has produced some of the most massive and violent eruptions – not only on a local but also on a world scale. Looking out across Lake Taupo on one of those scorching hot mill-pond days in the middle of summer it is difficult to imagine the huge forces that formed the lake, even though we are surrounded by the evidence of past volcanic eruptions. The Taupo area has a very complex volcanic history dating back over 300,000 years. In the last 26,000 years there have been two major pumice eruptions and over 20 smaller eruptions - a complex story. The following article is an introduction to the formation of Lake Taupo, and a description of this evidence.

To start this story we need to describe some of the words used by the volcanologists. Magma is the raw material of volcanoes that forms volcanic (igneous) rocks. Magma is called lava once it reaches the earth's surface. The mineral silica is an important component of magma and volcanic rocks are divided into three broad groups according to the amount of silica in them (Table 1).

Table 1. Volcanic rock groups as defined by the amounts of silica

| Common Name | Pecentage Silica | Colour | Volcano Form |
|---|---|---|---|
| Rhyolite | > 67% silica | Light coloured | Caldera/Dome |
| Andesite | 53-67% silica | Light grey to black | Cone |
| Basalt | < 53% silica | Black | Scoria Cones |

**Basalt** is rare in the Taupo catchment. It is usually associated with lava eruptions such as in Hawaii and the volcanoes in and around Auckland. However, basalt was erupted in the Taupo region 500,000 to 300,000 years ago - K Trig behind Acacia Bay is an example.

**Andesite** is the type of rock that forms the bulk of Tongariro National Park and the peaks contained within it. Andesite volcanoes erupt quite frequently and can be explosive, generating rock and ashfalls. Lava flows can also occur.

**Rhyolite** is the type of rock that has been erupted from Taupo, and makes up 98%

By Jon Palmer. Jon Palmer is the Programme Manager Service for the Taupo Fishery Area.

Jon acknowledges the assistance of Brad Scott from the Institute of Geological and Nuclear Sciences in writing this article.

of all material erupted from this volcano. Rhyolite can be erupted in many forms ranging from thick sluggish lava domes/flows to welded pumice flows (ignimbrite) to frothy pumice. Chemically they are similar, but the differing names relate to how the rhyolite rocks were formed.

- Rhyolite lava domes and flows are formed when gas-poor magma is pushed up to the surface through a vent, like toothpaste through a tube, to form domes or steep mounds of viscous lava. The domes may be large enough to form substantial hills.
- Rhyolite can also be erupted in vast amounts from vents, usually as the magma reservoir collapses. The material forms unstable eruption columns that collapse and generate avalanches of hot molten rock, gas and pumice – a pyroclastic or pumice flow. These flows slowly cool, fusing rock fragments together to form ignimbrite. Material is distributed away from the vent so no distinctive cone or dome is formed, just a large plateau.
- Rhyolite can be erupted explosively from vents when it contains a lot of gas. The gases expand further as the magma reaches the surface, causing it to froth. This gaseous magma cools quickly to become pumice.

The formation of the depression, or caldera, which is now filled by Lake Taupo began about 500,000 years ago. A caldera is a large volcanic depression usually 15-20km in diameter, but can be up to 50km across, and is formed by collapse during and after an eruption. The initial genesis of the Taupo Volcano coincided with the beginning of the uplifting that created the Kaimanawa and Hauhungaroa Ranges. Between 500,000 and 300,000 years ago this depression contained lakes of various sizes that existed intermittently in this area because of volcanic activity in the north, south and west. Cores from deep boreholes at Wairakei illustrate alternating layers of lake sediments and volcanic rock from this period. A large lake may have occupied much of the low-lying land between Reporoa and Turangi at some stage.

Figure 1: Map of the Taupo Volcanic Zone
Courtesy of the Tongariro Natural History Society

The next major episode in the formation of Lake Taupo occurred between 300,000 and 230,000 years ago. Voluminous eruptions from a large caldera underlying the northern Taupo-Maroa-Mangakino-Whakamaru areas deposited possibly up to 1000 cubic kilometres of ash and bedrock called Whakamaru Ignimbrite that now makes up the cliffs of Western Bays and the massive rock formations near the Whakamaru Dam. Ignimbrite from this eruption is also now exposed along State Highway 1 at Te Toki, Bulli and Ohoumahanga Points along the eastern lakeshore. A "solid" sheet of this rock once covered all the landscape now forming the northern half of the lake. At about the same time this caldera also erupted Rangataiki Ignimbrite that forms the southern portion of the Kaiangaroa Plateau. Following those eruptions lakes formed. A gritty-pumiceous sandstone called the Huka Formation is the remains of an ancient lake bed from this time. This mixture of volcanic and sedimentary material is found today at Huka Falls, and makes up those soft, slippery rock outcrops along the Taupo lakefront around to Five Mile Bay.

Between 300,000 and 30,000 years ago several smaller volcanic

The view south from State Highway 1 just south of Taupo township – the distinctive topography of the Lake Taupo Basin is the result of numerous volcanic events over the last 300,000 years. (Photo Dave Wakelin)

events helped determine the present shape of Lake Taupo. The southern shore (and boundary) of the lake started to take form with the development of the andesitic volcanoes Kakaramea and Tihia. The eruptive history of this complex is not well known but radio-carbon dating indicates many of the eruptions occurred between 100,000 and 230,000 years ago. Tephra was last erupted from a vent near the eastern end around 40,000 years ago (tephra is a collective term for all unconsolidated volcanic material erupted explosively, including ash, pumice, scoria and volcanic bombs). The Kakaramea-Tihia massif has since been extensively modified by faulting. Water and steam reach the surface along a fault scarp at Hipaua Thermal Area, easily visible on the northern slope of Kakaramea. The faulting and hydrothermal activity weakens the mountainside and modifies the rock into clay. Several landslides have occurred from Kakaramea and Tihia, further defining the southern lakeshore line. The most infamous landslide swept through the Maori settlement of Te Rapa in 1846, killing 55 people including Te Heu Heu Tukino II, the Paramount Chief of Ngati Tuwharetoa. The site of the village was moved to be clear of future landslides and renamed Waihi. Pihanga, immediately south of Turangi, is much younger than Kakaramea. The prominent slip visible from the north has exposed a mantle of Taupo pumice and brown andesitic ash from Tongariro National Park volcanoes. This mantle makes it hard to locate the last active crater. The headlands of the northern bays were formed during this period by rhyolite rock pushing up through the Whakamaru Ignimbrite to form lava domes. These headlands define Whangamata, Whakaipo and Mine Bays. The associated valleys that form these main bays and the smaller bays on the northern shores of the lake have also been modified by subsequent faulting. The north-easternmost boundary of the lake was defined with the formation of Mount Tauhara. Tauhara is a complex volcano made up of five overlapping dacite domes. Dacite is a volcanic rock with a composition between that of rhyolite and andesite. The south-western edge of the lake was defined later in this period when further eruptions produced the lava domes of Rangitukua, Pukekaikiore and Kuharua.

The first major pumice eruption from the Taupo Volcanic Centre was the Oruanui eruption 26,500 years ago. This is the largest known eruption in the history of the volcano and one of the largest in the world during the last million years; its enormity is almost beyond comprehension. This eruption, centred near the present-day Western Bay, produced 300 cubic kilometres of ignimbrite and 500 cubic kilometres of pumice and ash. Lake Taupo contains 59 cubic kilometres of water in

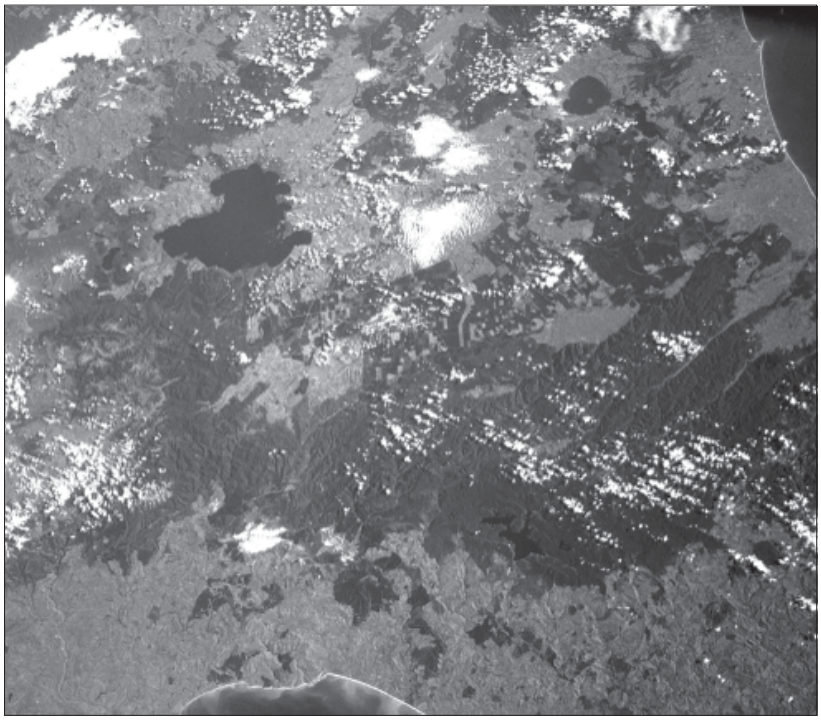
comparison. This eruption distributed air-fall pumice across the entire North Island, being thick from the Bay of Plenty to Mahia Peninsula, and west to Taranaki. The ash was distributed even further with the Chatham Islands, 800km east, being coated with 11cm. This eruption produced enough material to build three Ruapehu-sized cones.

The Oruanui eruption largely determined the present shape of Lake Taupo. Because so much material was removed from depth during the eruption, the surrounding landscape collapsed, forming the northern and western Lake Taupo basins. It was this collapse of the landscape and the displacement of the existing Whakamaru Ignimbrite that exposed the cliffs of Western Bay and the outcrops now visible along the eastern side of the lake adjacent to State Highway 1. The fine grain size of the ash suggests the presence of a large lake prior to the eruption. The eruption formed what the geologists have named the Kawakawa Formation, a layer of pumice up to 100m deep near Taupo. This pumice covered the ignimbrite plateaus formed by previous eruptions north and east of the lake. The devastation on the central North Island must have been catastrophic.

There were around 26 smaller pumice eruptions between the Oruanui eruption and the Taupo eruption 1800 years ago. These formed shallower layers of pumice across most of the district. 3400 years ago the significant Waimihia eruption produced nine cubic kilometres of rhyolitic pumice from the Horomatangi Reefs area. More rhyolite lava pushed up through the landscape around 5000 years ago to form Motutaiko Island, and again at least 2000 years ago to form the Motuoapa Peninsula. Around 3000 years ago there was a significant explosive eruption that produced lava and pumice. This eruption resulted in the formation of the Ouaha ridge adjacent to the White Cliffs, thus defining a large section of Lake Taupo's eastern shoreline. Around 1800 years ago rhyolite domed to form Maunganamu, that small hill near the Bonshaw Park subdivision east of Taupo. At around the same time the small dacite cone, also called Manganamu, formed on the southern shores of the lake, adjacent to the Tokaanu Tailrace.

The Taupo eruption 1800 years ago is the volcanic event that most people are aware of. This eruption happened before humans settled in New Zealand, but its effects on atmospheric conditions have been recorded in Chinese and Roman literature. This literature tells of blood-red sunsets and poor summers over following years. From these references it has been possible to date the eruption at AD 186. The centre of this eruption is thought to be near the Horomatangi Reefs because of the orientation of buried trees, and because of the deep holes adjacent to the reefs which are possibly the remains of the vent. The submerged trees, visible from the air or boat, lying in the shallows offshore from White Cliffs were buried by either the Taupo or Waimihia Eruption, and subsequently uncovered by erosion.

This eruption was the most violent and powerful in the world during the last 5000 years. About 45 cubic kilometres of pumice and 50 cubic kilometres of other material were erupted. This eruption was very complex, comprising six stages. Initially the eruption rate was relatively small, creating a small fall deposit close to the lake. As magma pushed the vent above the lake level the eruption rate dramatically increased, producing a high column that rained pumice over a large area. Lake water eventually entered the vent, causing the eruption to slow and producing a thin, fine pumice layer. After a break of between hours and weeks, water



A satellite photo of the central North Island with Lake Taupo near the centre and Hawkes Bay to the bottom. The airfall ash deposits and the pyroclastic flow from the Taupo eruption of 1800 years ago cover much of the area in this photo.
(Photo: NASA)

eventually met the magma source, producing a high water-rich plume. The eruption rate increased again when the vent was again cleared of water, covering the entire central North Island, from Taupo to Gisborne, with pumice. The final stage caused the most damage. So much magma had been erupted that the now-unsupported roof of the magma reservoir collapsed, inducing the remaining magma to catastrophically erupt. The resulting eruption column, 50km high, soon collapsed, producing the most violent pyroclastic flow yet recorded. This mixture of hot pumice and rock fragments flowed outwards from the vent at speeds of 600-900km/hour, travelling up to 90kms from the vent and annihilating everything in its path. The resulting deposit is called Taupo Ignimbrite. All major valleys in the central North Island were filled with debris, up to 30m thick in places. Pumice from this eruption exists on Mount Tongariro and at Iwikau Village on Mount Ruapehu, 1000m above the level of Lake Taupo. The collapsed magma reservoir now forms the north-eastern arm of Lake Taupo including Tapuaeharuru Bay.

Two-thirds of all flora and fauna within Tongariro National Park were wiped out, the only survivors being situated in the lee of the larger volcanoes. The pyroclastic flow rushed through the gap between the volcanoes and the Kaimanawas, clearing forest to Waiouru. The former forests of the Rangipo area have never recovered because of a combination of ongoing volcanic activity and extreme climate. Vast areas of other forests in the central North Island, such as Pureora, were also buried. However, not all life was extinguished during this eruption. A small grove of black beech trees can be found growing above the cliffs at the northern end of Whanganui Bay. The parent trees or seeds must have survived the eruption, as the seeds could not have been blown here (they are too heavy and the grove is very isolated) and birds do not distribute beech seeds.

Imagine what the landscape of the central North Island would have looked like after this eruption. Basically there was no visible life, no vegetation, little water; just 20,000 square kilometres of pumice and rock fragments. The Lake Taupo basin would have resembled a huge meteor crater. The environment for all intents and purposes was sterile. The loose pumice and ash were easily eroded by rains, and were washed into the basin as mud flows (lahars). Streams in the catchments were choked with sediment and the main rivers originating in the central North Island carried huge loads of sediments to the sea. The sites of Napier, Hastings, Hamilton and Wanganui were buried with debris in the years following. As the lake refilled with water the highly mobile waterlogged pumice also filled in the basin, and being levelled by wave action created a relatively flat floored lake bed. Because so

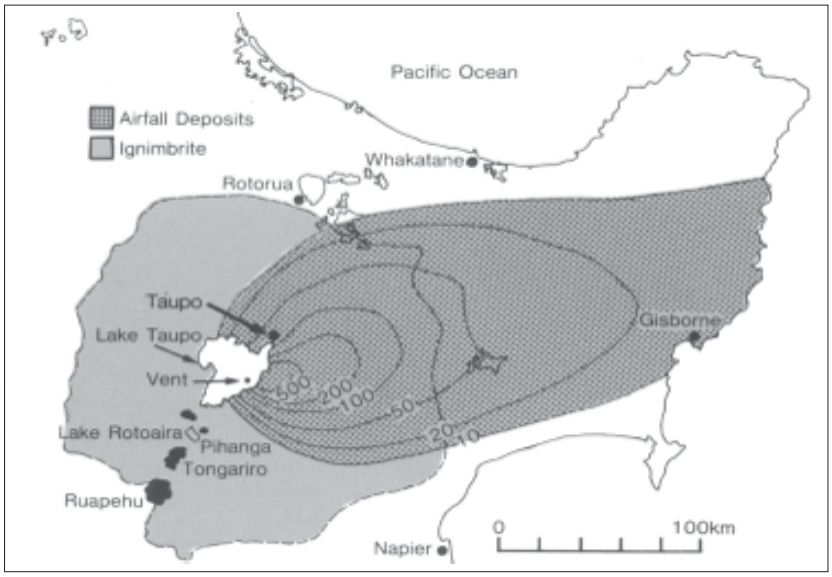



Figure 2: The extent of airfall deposits and ignimbrite flows from the Taupo Eruption courtesy of the Tongariro Natural History Society

much pumice was washed into the basin the lake outlet was blocked and the lake level rose 33m above its present datum. This blockage eventually eroded and the water level dropped to the present-day (pre-control gates) level, exposing remnant beach terraces which are visible around the lake, especially at Mine Bay.

Around 30 years after the Taupo Eruption the most recent eruptive event occurred from this volcano. Lava domes were erupted under the lake, forming the Horomatangi Reefs and the Waitahanui Bank.

Life gradually returned to the district. Tussocks, grasses and plants with light wind-blown seeds would have been the first vegetation cover followed by pioneer forest species such as manuka and kanuka. As deeper soils started to form, the regenerating scrub and forest would have diversified and been able to support increasing numbers of birds and insects migrating in from neighbouring districts. The birds would have helped with the regeneration by dispersing seeds from neighbouring forests.

As vegetation covered the loose sediments, erosion slowly decreased, allowing the waters of the new lake to clear. It is not known whether the native fish species present in the lake when Europeans arrived (koaro, bullies and koura) migrated up from the Waikato River, or were introduced by Maori. Of course in post-European times trout and catfish along with other native (to New Zealand) and introduced species have been introduced to Lake Taupo.

Since this eruption the Taupo Volcano and its many associated features have been in slumber. Erosion continues to shape the lake, but to a lesser degree because of the present vegetation cover. Pumice soils now cover 1.6 million hectares of the central plateau. These nutrient-poor soils require fertilising to maintain good pasture growth. In areas where vegetation and soils are removed, the underlying pumice continues to be highly susceptible to erosion. This is highlighted with the erosion of river banks and cliffs, particularly during major flood events. The Tongariro River in the past 1800 years has carried with it eroded pumice, ash and tephra from Taupo eruptions, and debris from the volcanoes of Tongariro National Park to the lake. Also greywacke from the Kaimanawa Mountains has been washed down into the lake. This eroded material has formed the Tongariro delta at the mouth of the river. The Tauranga-Taupo, Waimarino and Waiotaka Rivers, along with the Tongariro River, have all contributed to the flood plains on the south-eastern edge of Lake Taupo.

Today Lake Taupo is peaceful but can also be spectacularly wild. The storms that roll up the lake can produce waves in excess of two metres high that continue to shape its shores. There is no reason to believe that Taupo will remain dormant. Taupo continues to be regarded as the most frequently active and productive rhyolite volcano in the world. It is important to note that the Taupo Volcano has


Figure 3: Map of the Taupo district, showing geological features. Source: New Zealand Land Resource Inventory. Courtesy of Environment Waikato

erupted 26 times over the last 22,000 years, but only two of these eruptions have been catastrophic. Many of the eruptions, such as the event that formed Motutaiko Island, were small in scale (similar to Ruapehu in 1995/96) and could have been safely observed from the lakefront at Taupo or Kuratau. Scientists continually monitor the lake bed and surrounding district using networks of seismometers and lake level recorders (like giant spirit levels). Indicators such as certain types of earthquake, changes in lake level, and changes in land surface can provide warning of impending eruptions.

The passage of geological time is so immense that it is easy for us in our lifetime to presume that the earth has finished building itself, has stopped evolving and is static. This is not the case at all. It is a dynamic living entity that is still reshaping itself; just the short span of our lifetime gives us a very minor chance of witnessing a huge earth-shaping event such as an eruption from the Taupo Volcano.

Whakangarongaro te tangata toitu te whenua

Man passes but the land endures

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Environment Waikato (www.ew.govt.nz)
GeoNet (www.geonet.org.nz)

# Mountain buildings

Mountains at their best are awe-inspiring, at their worst, bleak forbidding places best kept away from. Shelter from the storm or a resting place from a day's leisure activity has led to the construction of a variety of buildings in Tongariro National Park. The pattern has been repeated around New Zealand in the mountains, remote valleys and offshore islands. Many of these building are classed as historic buildings and are receiving restoration and protective management from the Department of Conservation. Three of the Tongariro National Park's historic buildings are described here.

## Waihohonu Hut (Built 1904)

Right: Waihohonu Hut, 1904, carefully restored by DOC staff and members of the Tongariro Natural History Society. (Photo: DOC)

Waihohonu is an 18m$^2$ timber framed hut, clad in corrugated iron and occupies an attractive site backed by beech trees with a grassed clearing in front. There are two rooms, the main or men's bunkroom and the women's bunkroom each sleeping six people. The walls are lined on the interior with corrugated iron, behind which is an infill of pumice. The floor is tongue and groove boarding.

This hut was built in 1904 by the Tourist and Health Resorts Department for park visitors and tourists travelling by coach from Waiouru or Tokaanu. Intensive tourist use dropped off in 1908 with the opening of the Main Trunk railway on the other side of the park. In 1913 it became the base for the first recreational skiing in New Zealand. Its use ended in 1968, when it was replaced by a new Waihohonu hut nearby. It has been maintained as an unused historic hut since then.

This is the oldest example of a typical early two-room mountain hut in New Zealand. It employs the innovative, and possibly unique use of pumice infill for insulation. It is also an attractive vernacular building on a splendid site.

This was the first hut built in Tongariro National Park, oldest mountain hut in existance in New Zealand and oldest existing building erected by the Tourist and Health Resorts Department. It was the base for the first recreational skiing in New Zealand. It was in active use for over 60 years and remains standing on its original site. The hut was registered category one by the Historic Places Trust is in 1993.

The Tongariro Natural History Society (TNHS) and DOC staff carried out extensive restoration work on the hut in 1998. (See Tongariro 1998 Vol 7 for an article on the restoration.)

## Glacier Hut (Built 1923)

Glacier Hut, a skiing museum in Tongariro National Park, is owned and managed by the Ruapehu Ski Club. It is the second oldest building in the park.

Located at a height of 1740m at Hut Flat, Whakapapa Ski field, Glacier Hut is a small, one-roomed, timber-framed hut clad in corrugated iron, with a porch attached. The interior has six bunks and a stove and is lined with malthoid. The hut contains skiing memorabilia, interpretative panels and a glass viewing screen.

Built in 1923 by Bill Salt and a team of volunteers from the Ruapehu Ski Club ten years after the club, New Zealand's first, was established. The materials for the hut

Above: Glacier Hut - the first building constructed by the Ruapehu Ski Club for skiing on Mt Rupaehu.
(Photo: DOC)
Below: Fergusson Cottage, the oldest building in Whakapapa Village
(Photo: Dave Wakelin)

were carted up the mountain and erected entirely by hand. It was the only structure on the ski field for 13 years. It was eventually superceded as facilities on the mountain improved. It was enlarged in 1946 and used as a storeroom from 1949. It was later cleaned out, in 1961, to display club memorabilia. In 1989 it was restored and converted to a skiing museum.

Glacier Hut was New Zealand's first purpose-built structure for the sport of skiing. It was built by New Zealand's first ski club, whose founders were the first in New Zealand to try recreational mountain skiing. Maintained on site since 1961, it is a very early example of a private initiative to conserve an historic building. Registration with the Historic Places Trust is in progress.

## Fergusson Cottage (Built 1925)

Fergusson Cottage was the third structure built at Whakapapa and it is now the oldest remaining building. The designer is not known. The name of the cottage commemorates Lady Alice Fergusson, wife of Sir Charles Fergusson, Governor General of New Zealand, 1924 – 1930, who stayed in it during the winter of 1926. The cottage was built as accommodation for visitors to the National Park. When the Chateau was being built (1929) it was used as accommodation for the site workers. This cottage is a simple gable-roofed structure with a verandah across the front elevation (north), and projecting wing with a pitched roof on the back elevation (south). It is timber famed with vertical board and batten sheathing; the rear wing is rusticated weather-boarding on the south and east walls. The roof is corrugated iron and there was once a brick chimney at the east end which served the fireplace in the living room. A small gable roofed laundry, again clad with vertical board and batten, sits next to the cottage. The cottage is set at an unusual angle on Bruce Road allowing it to take advantage of the spectacular views out over the lower slopes of Mt Ruapehu.

In 1994 KAH Corporation, the current owners of the Grand Chateau and associated complex, converted this cottage and an adjacent building into a café. Additions were required to provide a link between these two buildings and to afford adequate space to operate a modern kitchen. Unfortunately this modification also necessitated the removal of the original chimney.

Fergusson Cottage has a simple and distinctive architectural form, characteristic of early colonial architecture in New Zealand. The cottage was built in what was then a difficult location. The fact it has survived in good condition for some 75 years is testimony to the skill of its designers and builders. The cottage is an essential element in a precinct of buildings of similar age and scale which gives Whakapapa Village a distinct character.

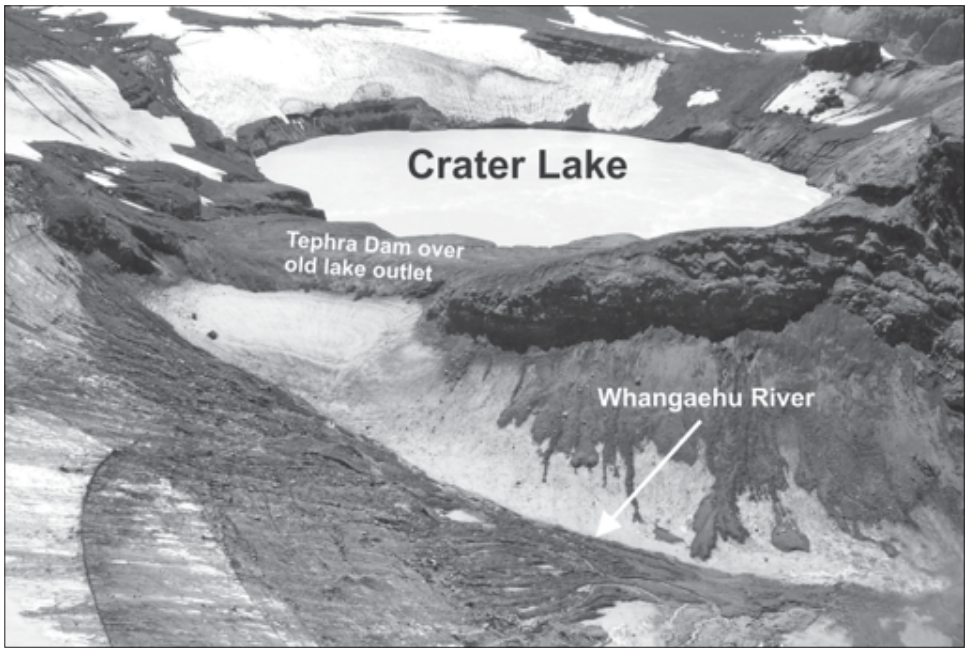
It provides a tangible link with the early recreational development of Tongariro National Park . The cottage has a Historic Places Trust rating of two.


Information on these historic Tongariro National Park buildings came from DOC's website, www.doc.govt.nz
For information on other historic buildings under DOC's care visit www.doc.govt.nz/Conservation/Historic/Historic-Huts/

# The Crater Lake issue

Crater Lake is still refilling after the 1995-1996 eruptions (see graph in Volcano Watch article). These created a barrier of unconsolidated, generally sandy tephra over the former outlet of the lake. This barrier will only temporarily retain the rising water. When it fails sometime probably between late 2003 and 2006, a lahar (volcanic mudflow) is expected which could be large enough to threaten public safety and infrastructure for about 50 km down the Whangaehu River.

### Progress since last year




Aerial view of Crater Lake, Mt Ruapehu, taken in February 2002 showing the lake, the area of the tephra dam (loosely consolidated volcanic debris and ash from the 1995/1996 eruptions) and the Whangaehu River down which a lahar would flow. The Site 1 Sensor is positioned across the tephra dam area. (Photo: Dave Wakelin)

The year since this issue was reported on in the 2001 Journal has seen periods of further intense work.

Numerous presentations and talks have also been made to Ministers of the Crown, local government agencies, other stakeholders, clubs and other organisations, some associated with Year of the Mountain talks. Other agencies are doing similar presentations.

Specific projects have included:

- The East Ruapehu Lahar Alarm and Warning System (ERLAWS) has been installed, commissioned and its performance monitored (DOC Tongariro/Taupo).
- Additional lahar warning sites have been installed by Genesis Power Ltd. who have also upgraded their communication system
- A Lahar Website has been developed for better monitoring of ERLAWS (DOC Head Office).
- A 300m embankment (bund) has been built to prevent lahars spilling from the Whangaehu River into the Tongariro Catchment (DOC Tongariro/Taupo).
- Traffic warning signals and lights have been installed on SH1 and road barrier arms are being built at Tangiwai on SH49 by Transit. These will be electronically connected to ERLAWS and wired into the Tranzrail alarm system as a

Updated versions of that 2001 Tongariro Journal article referred to were published in the Tephra Magazine in June 2002, (volume 19, Ministry of Civil Defence and Emergency Management) and the New Zealand Alpine Journal in December 2002.

The sensor equipment at Site 3 with the Whangaehu River gorge in the background. Batteries for the equipment are charged using the solar panel.
(Photo: Dave Wakelin)

backup.

- Response plans have been or are being prepared by Ruapehu District Council, the police, Taupo District Council, Genesis Power and others. The responses will be initiated by ERLAWS with backups to and ongoing communications from police communications centres and Tranzrail to exclude the public from areas at risk from lahar.
- Tephra mapping and depth assessment on the tephra barrier (DOC Tongariro/Taupo).

During the year getting up to the crater to install equipment and to monitor the water level has provided welcome breaks from the office. 20 trips have been made this year with various people including ski patrol, Department of Conservation staff and others. In winter this can involve snow stability assessment, traversing fields of rime, digging down to ERLAWS equipment (see photographs on page 38), navigating (or trying to) in whiteouts, and skiing down the mountain in fantastic snow.

The Department of Conservation wishes to acknowledge the support of Stefan Sporli, Andy Hoyle, Steve Mananui and other patrollers, Dennis Drinkrow and Genesis staff, Richard Balm and Barbara Dempsey (RDC), the police, Dave Goodwin (Enginuity), Jim Comber and Chris Coyle (Alcom), Kevin Box and Mark Mullins (Microtech), Trevor Butler and other Frame Group staff, Colin McGrath and Doug Hood Contractors, John Mangos and the Army, Brad Scott plus Hugh Cowen and other GNS scientists, Peter Otway and Steve Currie (surveyors), the Ministers' science panel, Bruce McGregor plus other people and agencies who have helped during the year.

## Residual Risk Assessment

In December 2001, following four months of consultation the Minister of Conservation, Sandra Lee, ruled out intervention at Crater Lake, after meetings with the Minister of Civil Defence and other relevant ministers. However in May 2002 the Ministry of Civil Defence and Emergency Management contracted Dr Tony Taig, a British Risk Assessor, to make a quantitative assessment of 'residual risk' to public safety. His conclusion was that after the management actions already made or planned, residual risk could be equated to a small probability (less than one to several percent) of a fatal accident.

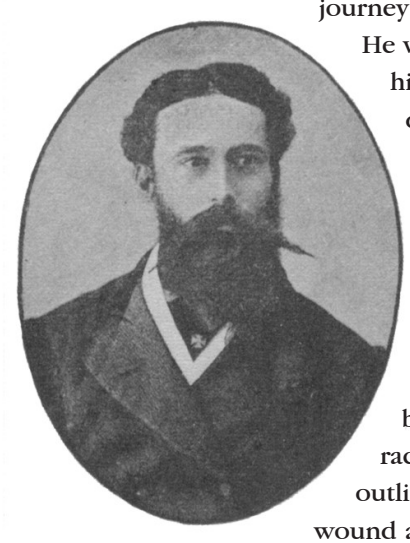
Some see this level of residual risk as too high. Therefore work is planned to reduce the uncertainty in the likely size of the lahar. Ongoing discussions are being held on other ways to reduce residual risks to public safety and risk to infrastructure. For example work on structures in the lahar flood plain would have long term benefits and not threaten World Heritage values. It remains to be seen whether intervention at the Crater can still be avoided.

Harry Keys
Conservancy Scientist

# Wairakei - thermal wonderland

J.H Kerry-Nichols was one of those Victorian gentleman explorers with the independent means to travel, explore and write for an audience keen to devour any description of the 'newly settled' lands of the Pacific and Asia.

In 1883 he began a trip into the 'interior' that was to take him on a 600 mile journey from Tauranga into the centre of the North Island and back again. He visited the Taupo region, climbed Mt. Ruapehu twice and through his copious notes and beautifully descriptive style of writing introduced the outside world to a previously 'forbidden land'.



J.H.Kerry-Nicholls, Victorian explorer.

He describes the Wairakei thermal area as it was in the days before the need for additional electricity led to the construction of the Wairakei Geothermal power station and the decline of the natural thermal wonders.

Kerry-Nichol's first impressions of Wairakei were:

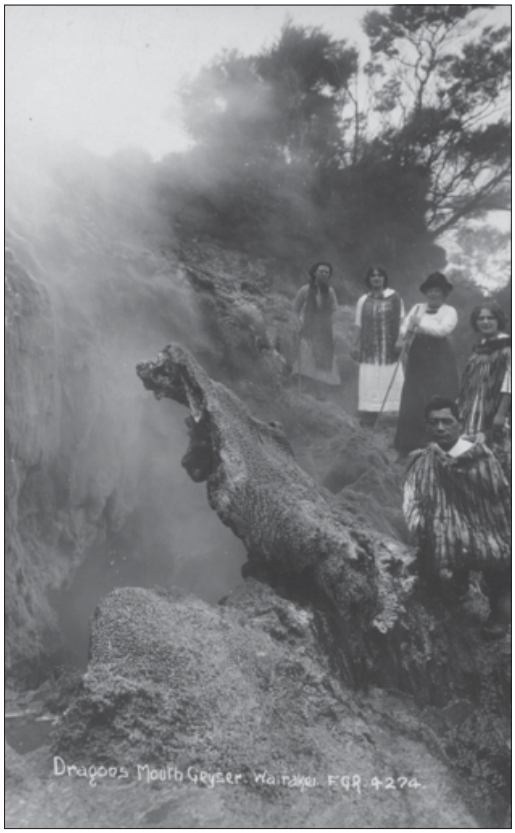
"By reason of the terrace formation, so remarkable in this part of the valley of the Waikato, the whole place appeared as if it had been artificially designed by the hand of man. Small pumice terraces, with flat tops and shelving sides, so regular and distinct in outline that they seemed as if they had been fashioned but yesterday, wound about on every side, while the trees and wide patches of manuka scrub imparted to the whole surroundings the appearance of an English park."

"Beyond, to the east, Mount Tauhara, the 'Lone Lover' of the Maoris, rose forest-clad to its summit, while in the background a prairie-like expanse of open country rolled away to the distant ranges. High conical mountains, clothed with a luxuriant growth of bush, mounted up in the north, rolling hills stretched away to the west, while in the centre of the attractive landscape the Waikato River wound through its grand terraced valley to leap with a terrific roar over the Huka Falls."

He described the Wairakei Geyser Valley as, "... one of the most marvellous creations of its kind to be found perhaps in any part of the world. It forms, as it were, one of the principal arteries of thermal action which would seem to extend from the volcano of Tongariro in the south through the Lake region to Whakari, the active crater in the Bay of Plenty, in the east."

He made comparisons with other thermal areas to the north - "There is one great charm about the Geyser Valley of Wairakei, and that is that it is not a melancholy, dismal-looking place. It has not the Hades-like appearance of Tikitere nor the Valley-of-Death-like look of Whakarewarewa. One is at once struck with the varied growth of vegetation which everywhere abounds, the luxuriance of the trees, the rich beauty of the ferns, and the vivid green of the thick carpet of rare and beautiful mosses which spreads itself everywhere about, from the margin of the stream below to the very tops of the steep, smoking cliffs. Every geyser, spring, and mudhole has its clustering vegetation, and as you grope your way through the thick undergrowth along the tortuous stream, each thermal wonder bursts suddenly upon the view with a fresh and startling beauty."

As his party made their way in the valley, "... the noise of hissing steam burst upon the ear, the heated ground seemed to quake beneath our feet, the boiling mudholes sent forth a noise like the incessant 'thud' of a steam-hammer, which mingled




Above: Dragon's Mouth Geyser, Wairakei Geyser Valley - a tourist attraction from well before the turn of the twentieth century. (Photo: Frederick George Radcliffe c. 1915. Taupo Library's Heritage 2000 Collection)
Below: Eagles' Nest Geyser, Wairakei Geyser Valley. (Photo:Taupo Library's Heritage 2000 Collection)

in a weird way with the loud roar and splashing of the geysers as they threw up their columns of boiling water above the trees."
The Valley was noted for its geysers and Kerry-Nichols made his way to, "... Tahuatahi, a powerful intermittent geyser, with steep, rugged sides, flanked by enormous buttresses of white silica rock. The cauldron was formed by a deep hole, about twenty feet in circumference, from which a column of boiling water shot up now and again from a dense cloud of steam as it overflowed into the stream below." The ground temperature he measured at 210o Fahrenheit. Further along he encountered Terekirike, "... a large geyser, situated on the very margin of the stream... the rounded, boulder-like masses of which it was built up being of a delicate cream-colour, while the silicious crystals, assuming the most fantastic forms, tinged here and there with a pinkish hue, imparted to the whole a singularly beautiful and delicate appearance. Next to this was the 'Whistling Geyser', which threw up a column of boiling water at the summit of a terrace of silicious rock ..."
Elsewhere, "... a number of boiling mud-holes vomited forth vast quantities of white, silicious mud, of the consistency of thick gruel. All were nearly circular in form, and about six feet deep by twenty in circumference, and, while one had a pinkish tint, caused evidently by red oxide of iron, another next to it was of a milky-white colour. When the mud had become hardened, it was of the consistency of cheese, with a greasy feel, while it could be fashioned by the aid of a knife into any form."
Kerry-Nichols and party visited silica terraces that may have rivalled the Pink and White Terraces of Rotomahana near Rotorua.
"On the southern side of the stream, we came suddenly up to the Big Geyser, which every now and again threw up vast volumes of boiling water from an oval-shaped cauldron of pure white, crystallized silica. The water, of the purest blue, flowed over a terrace-like formation, which was being gradually built up just as the famed terraces of Rotomahana must have been, each fold, or lamination, of the rock being distinctively formed with tablets beautifully designed by the silica-charged waters. Climbing up a ridge by the side of this big fountain, we peered over a precipice, which opened out beneath in a semicircular form, and at the bottom of which was a large oval-shaped spring-dark water, shining, and steaming hot, while the silicious rocks which walled it in were tinged a deep red by oxide of iron. This was a very warm though interesting region. The red and white-streaked walls of the chasm steamed and bubbled, the boiling mud-springs displayed a wonderful activity, while the green lakelet on the opposite side of the valley sent down its emerald-coloured water to mingle with Te Wairakei, which foamed and hissed as it rushed furiously over its rocky bed below."
The party visited the Great Wairakei, which according


The journeys of Kerry-Nichols. A map of his venture, the black line charting their journey.

to Maori legend, was said to have been called after an old woman who plunged into its boiling cauldron to end her days. "Perhaps, however, one of the most curious features of this geyser was that the edges of the pool were beautifully fringed with white incrustations of silica, pointed and fretted in the form of the most delicate lacework, while down beneath the water might be seen huge masses of silica rock, which had the appearance of the most fantastic coralline formations. White, yellow, and pink were the prevailing colours of these splendid incrustations, and when shining beneath the sun the contrast of the deep blue of the water and the white foam of the geyser, as it threw up its column of steaming water, was very attractive. Right in the centre of the broad basin the hot-fountain surged and rolled, bursting up now and again in the form of a sparkling column, and subsiding with a loud, rumbling sound, ..."

Kerry Nichols named one geyser the Eagle's Nest - "... Around the deep, cavernous aperture the dead branches of manuka had fallen in a circle, and had interlaced and spread themselves around in the form of a large nest of the most delicate construction, while the water, falling upon the netted twigs and branches, had covered them completely with a pearly incrustation of snowy silica, converting the whole into a pure white nest of stone ... when we first came upon it, (it) looked like the petrified nest of some gigantic antediluvian bird."

Within a short distance to the west of the Geyser Valley, and at the summit of a high range of hills, they explored another interesting region of thermal action.

Close by they came across, "... a small lake of oblong shape, with steep, rock-bound, precipitous sides, which rose perpendicularly from the edge of the water to a height of about sixty feet. The water, of a thick, opaque blue, like cloudy turquoise, lay undisturbed, without a ripple upon its surface, save where innumerable gas-bubbles rose from the depths below to give off their sulphuretted hydrogen. At its western end, embowered amidst a dense growth of fern and mosses, was a picturesque cave, through which ran a cold, icy spring of delicious water. Near to the lake were several large mud-pools in a state of great activity, and still further along, close under a steep, rocky bluff, whose hot, quaking sides sent forth innumerable jets of steam, was an extensive chain of sulphur-pools, one of which was over 100 feet in diameter. In the vicinity of these pools were large deposits of bright yellow sulphur, with hematite iron, the red oxide, silica, alum, and other mineral products peculiar to thermal action. The colour of the water varied in appearance from dark green to steel-grey, but all were evidently highly charged with sulphur and other minerals, and I believe that their curative properties would be found very efficacious in cutaneous and rheumatic affections."

To the south of the Kiriohinekai stream, and about a mile distant, there was another broad valley, the bottom of which was covered with innumerable fumaroles that sent up their coils of steam in every direction. Here at the foot of a hill sloping towards the south was situated Te Karapiti, the largest fumarole in the Lake Country. It was formed by a deep and apparently fathomless aperture, rounded like a


Above: Karapiti Blowhole. This blowhole was about 1.2 km south of the Wairakei Valley and situated on a south facing slope in the area now known as Craters of the Moon.
(Photo: Taupo Library's Heritage 2000 Collection)
Right: The Wairakei Terraces are recreating some of the majesty and wonder that tourists once saw during a visit to the geyers and silica terraces of the Wairakei Thermal Valley.
(Photo: NETCOR)

funnel, and from which issued with a terrific force and unearthly screeching noise, a spiral column of transparent steam, which mounted high into the air as if forced up-ward from below by a 100 horse-power engine. So great was the force of this column of steam as it issued from the earth, that the branches of trees we threw into the funnel were at once ejected and hurled upwards with tremendous power. When I tested its heat, the thermometer rose to 220° Fahr. This curious steam-hole, which carries on its eruptions incessantly, may be distinctly seen all over the Taupo country.

Kerry-Nichols and his party continued on around Lake Taupo encountering a number of groups of Maori. They ventured onto the central North Island peaks, climbing Tongariro and making two ascents of Ruapehu. So impressed was he with the area and its beauty that he recommended much of the area be made a public park. This was four years before Te Heu Heu Tukino IV Horonuku gifted the sacred peaks of the mountains as the nucleus of a national park.

Dave Wakelin,
with extracts from "The King Country" by J.H. Kerry-Nicholls
Publ. Sampson Low, Marston, Searle & Rivington Lonndon 1884.
Reprinted Capper Press 1974

Although the magnificent geysers of Wairakei disappeared with the development of the Geothermal power station in the 1950s, a new venture located in the Waiora Valley, Wairakei, has grown from a shared vision between NETCOR and Contact Energy resulting in a recreation of some of the spectacles that once existed here. Attributed to the original Wairakei terraces, the main feature in this mystical place is undoubtedly the 'silica terraces'. While the initial foundations have been fashioned by mans hand, only mother nature can orchestrate the production of colours and perfect the overlaying of silica that will bear a resemblance to the pink and white terraces that were destroyed at Tarawera in 1886. Posted throughout a one hour guided or self governed walk, are carvings that depict the stories and history of Ngatoroirangi and Ngati Tuwharetoa, the Te Kiri o Hinekai stream and pool known world-wide as the Honeymoon Pool and valued for its therapeutic powers. Other pools and attractions abound.

Wairakei Park,
State Highway 1,
PO Box 1546, Taupo
Contact: Penny Reweti & Raewyn Hill Ph: 378 0913 Fax: 378 0913

# The mustelid programme in the Karioi Rahui 2002

During April/May 2002 the Department of Conservation undertook a pilot mustelid programme in the Karioi Rahui core area, covering an area of 300ha.

Right: The Department of Conservation is putting a lot of time and money into Mustelid research.
(Photo: DOC)

The conservation outcome was to learn about predator control in order to protect species in this area in the future. Our targets were to attract and catch any mustelids or rodents in the area within eight weeks and to develop an understanding of how these animals are utilising the environment.

The methods used were:

- Fenn Mk6 traps arranged in double sets were placed at 100m intervals along existing bait station lines A (1-48), N (1-49), I (1-58) , & M (38-96),
- Run through tunnels (900x200x200mm) with wire mesh on each end with 7x7cm openings were staked to ground. The bait used was initially egg, as meat can later act as a lure to chicks.

## Results

From 11715 trap nights we caught a total of

- 8 stoats (2 female, 6 male)
- 26 rats
- 3 possums
- 1 weasel
- 1 cat
- 2 hedgehogs.

All stoats were caught along the Omarae Stream Lines A and N. Possums, hedgehogs, cat and weasel were all caught along the pine forest boundary. Rats were caught on all lines.

From a sample of the caught predators, the focus of prey source they were found utilising at this time of year was mainly invertebrates (wetas) and aquatic freshwater crayfish.

## Lessons Learned

- From gut sampling we learnt many of the stoats were feeding on freshwater crayfish along the Omarae Stream.
- All the stoats caught were along N line next to the Omarae Stream indicating this as a main route and feeding resource.
- No ferrets were caught along the boundary and may indicate low numbers at this time.
- Anecdotally ferret numbers were low throughout the country and with our

results may indicate that during periods of low ferret numbers kiwi are not under threat by them. We lost no radio tagged Operation Nest Egg (ONE) birds during this time.

- Juvenile possums were along the pine forest boundary indicating reinvasion.
- Caught rats in all lines indicating they are throughout the block. Some were gut sampled and results showed these ones were mainly feeding on foliage and seeds.

Result monitoring was purely numbers in traps and therefore do not know what else is out there. Time and financial constraints meant we did not monitor stoat/rodent numbers through tracking tunnel index and we are aware this is a limitation.

## To the Future

- Stoat and rodent monitoring will be implemented. This will become effective December 2002.
- Predator control long-term and ongoing is established to meet objectives of the Karioi Rahui operational plan.

GUT CONTENTS FROM SAMPLE OF PREDATORS CAUGHT DURING THE MUSTELID PROGRAM, APRIL/MAY 2002

| Animal<br>M=Male<br>F=Female<br>A=Adult<br>J=Juvenile | Line No. | Diet - Known Contents |
|---|---|---|
| Stoat m/a | N36 | Small passerine (dark feathers), weta |
| Rat | A46 | Fat, vegetation, parasite worms |
| Weasel m/a | MB2 | Weta, possible mouse |
| Stoat m/a | A32 | Wetas |
| Rat | | Meat contents indefinable |
| Stoat m/a | A35 | Mouse, crayfish |
| Stoat f/a | N42 | Crayfish |
| Stoat f/a | N48 | No food in stomach |
| Stoat m/a | A46 | Crayfish |
| Cat | M65 | Weta, small passerine |

Petra Specht
Ranger Biodiversity
Whakapapa

# Volcano watch

## Ruapehu

Small steam eruptions probably occurred at Crater Lake in January and February 2002, the first since 1999. Several steam clouds observed from the tephra barrier area at the former outlet of the Lake were not generated by eruptions. Observations of a series of plumes from Ohakune on 10 February suggested they may have been created from small eruptions but this could not be confirmed. No ash deposits were produced during this period and no signs of surges were seen on the lakeshore despite many visits to the crater area.

Crater Lake, Mt Ruapehu on a beautiful winter's day winter 2002. (Photo: John Ombler)

The steam was produced by increased hydrothermal activity in the Lake in January - February. Following small steam eruptions in September - October 1999 the Lake had cooled (see graph) and seismicity eased off. Moderate volcanic tremor in February 2001 coincided with Lake warming to 32-39°C in February - March, but no eruptions, and thereafter the Lake cooled again to 21°C. On 7 December 2001 the Institute of Geological and Nuclear Sciences (GNS) recorded two small long-period earthquakes beneath the volcano plus two minor tremors. By 3 January 2002 the Lake had warmed to 39°C before cooling to 28°C by early April. These short periods of heating were typical and common every 6 - 12 months or so before the 1995 - 96 eruptions and were usually accompanied by small steam eruptions when the surface temperature rose above about 35°C. So the activity in January - February 2002 was not unexpected. GNS kept the Scientific Alert Level at 1.

Since then the Lake cooled with temperatures staying around 18-20°C from mid June. Short-lived bursts of volcanic tremor on May 17, 28, June 17 and July 15 were not matched by detectable warming in Crater Lake. Nor did four similar bursts up to 40 hours long between September 2 - 16 or a series of volcanic quakes on 24 October produce any changes in Lake chemistry (preliminary information from GNS) or temperature.

Graph 1: The rise in the level and volume of Crater Lake and water temperature changes. Volume is expressed as fullness with 100% calibrated to the former overflow level at 2530m. High and low rates of future fillings are shown as projections calculated in July

The level of Crater Lake continues to rise most significantly in summer. However the rise during the cool 2001/02 summer was only about half (by volume) that of the long warm 2000/01 summer despite the greater snowfall in the 2001 winter (see snow graph with the 2002 winter article). Intense precipitation during late May to the end of June 2002 produced a rise of 3.5m evident on the Lake graph. The Lake rise clearly has a strong seasonal signal with much variability dependent mostly on climate apparently. Lake temperature and heavy precipitation also affect the rate of rise. A recent short-lived drop in level of 0.20m between October 3 and 23 was apparently due to evaporation even though the Lake was relatively cool.

## Ngauruhoe and Tongariro

Ngauruhoe remains quiet with no seismicity reported. The more extensive appearance of bare ground in Ngauruhoe's northeast rim and pre-1954 crater rim to the north following snowfalls, as reported last year, appears to have continued. The bareness has extended down the northern slope of Ngauruhoe where fumaroles temperatures of 47°C and 66°C were measured on 31 August. However temperatures at the old fumaroles on the northeast rim are unchanged. The lack of good baseline data on the area of ground with elevated temperatures means any change in heat flow is difficult to determine, if indeed any has occurred.

Tongariro's seismicity centred at Te Maari Crater has been further investigated by GNS. Sixteen seismometers were deployed mid year around Te Maari to study the distinctive long screw-shaped signals (known as tornillos) detected since last year and how they may have been generated. These signals have been detected at several volcanoes overseas including Galeras in Columbia, South America, where they sometimes precede eruptions. The analysis of the Te Maari tornillos is continuing.

## Other Volcanoes with Ski Areas

Several volcanoes overseas with skifields have been mentioned in the GVP/USGS Weekly Volcanic Activity Reports or GVN Bulletins.

A space shuttle view of Mt. Etna in eruption during October 2002. (Photo: NASA)

Mount Etna (3315m) on Sicily continues to be very active. After a 14 month long relatively quiet period with some ash emissions, a swarm of earthquakes commenced on 26 October 2002. Three hours from the beginning of the swarm a new flank eruption commenced with two eruptive fissures producing lava on the northeast and south flanks at around 2700m. Lava fountains rose 100-200m, and significant lava flows and ash plumes were produced. Ditches were dug and aeroplanes doused the lava flows in an attempt to control them to no avail. The popular ski town of Linguaglossa (6000 residents) was not in danger but above it some hotels, restaurants, a ski school, ski lift pylons, and power lines were destroyed. Lava flows also cut roads and ignited forest fires before the flows ended on 3 November. Up to 20,000 tonnes per day of sulphur dioxide have been produced, more than that from Ruapehu in 1995-96.

Avachinski volcano near Petropavlovsk city in Kamchatka produced small mud flows late in 2001 during an increase in fumarolic activity. Explosive strombolian activity at Villarica volcano in Chile quietened in early 2002.

Increased seismic activity was detected at Asama, Japan for a few days in mid June. Steam plumes were seen and fumarole temperatures increased. Intense seismicity was also recorded at Nevado del Ruiz, Columbia from 9 - 13 June. Some of this seismicity was felt by people near the volcano and strong smells of sulphur dioxide were reported. Melting of del Ruiz's summit ice cap during historical eruptions has resulted in devastating lahars including one in 1985 that killed 23,000 people in South America's deadliest eruption. Seismicity remains low at South Sister volcano, Oregon, where slow but steady uplift and spring water composition suggest magma is slowly accumulating at 6 - 7 km depth a few miles north of Mt Batchelor.

Harry Keys
Conservancy Advisory Scientist

# Tongariro Forest kiwi sanctuary

The Tongariro Forest Kiwi Sanctuary has had an interesting and successful year. An aerial 1080 poison drop over 19980 hectares, aimed at controlling possums in order to reduce both bovine Tb and damage to the forest due to browsing was carried out in September 2001. This drop offered the additional benefit of allowing kiwi sanctuary staff to monitor how the secondary kill of stoats could affect the survival rate of kiwi.

32 radio-tagged kiwi were monitored throughout the operation. All of these birds are still alive today. Fourteen chicks hatched in the wild during the 2001/02 breeding season were also tracked. Six of these wild kiwi chicks made it through their first vulnerable six months and are still alive. This represents a significant 38% increase on the current usual 5% wild kiwi chick survival rate, suggesting that stoat numbers were seriously reduced by the 1080 operation.

While the 1080 operation benefited kiwi, its effects were short-lived. Four months after the poison drop, stoats reappeared in the centre of the forest. The Operation Nest Egg (ONE) programme has restarted this year with a 'bumper crop' of 16 chicks hatched so far. These chicks are raised at Warrenheip, a 14 hectare predator proof enclosure near Cambridge, until they are large enough (about 1200 grams) to survive in the wild, when they will be re-released into Tongariro Forest. Sanctuary staff expect to be able to collect more eggs in the second clutch later this summer.

A milestone was reached for our ONE project in September this year when two Operation Nest Egg-reared birds produced their first offspring. Whilst carrying out routine nest robs, kiwi sanctuary staff were ecstatic to discover a chick and an egg produced by Te Aukaha (5.5 yr old male) and Koha (3.5 yr old female). This is the first time that a pair of ONE birds have successfully bred in the Tongariro Forest. The chick was taken to Warrenheip and will become the first second generation ONE bird to be released into the Tongariro Forest. Not to be outdone, a pair of ONE kiwi on the other side of the mountain, in the Karioi Rahui, appear to be courting and have DOC Ohakune staff eagerly awaiting the arrival of their first ONE offspring.

A further success of the ONE programme has been the use of Warrenheip. Kiwi chicks hatched at Rainbow Springs are now "grown on" in the larger enclosure at Warrenheip. This new enclosure allows the chicks to grow

Above right: Kiwi Ranger Mike Brown carefully removes a live kiwi egg from the nest of "Toejam". Toejam earned his name after being caught in a possum trap set on the ground in private farmland. Shortly after this photograph was taken Toejam was finally killed by a ferret. The egg hatched successfully, the chick "Tia Kariti" was raised as a part of Operation Nest Egg and subsequently released into the Karioi Rahui. Tia Kariti has now gone on to form the first ONE kiwi pair in the Karioi Rahui. (Photo: Sheena Haywood )
Below: A kiwi's bill is measured, this helps determine the growth rate and sex of the bird (females have significantly longer bills). (Peter Morton)

Right: A kiwi is inspected for lice and mites on the bare skin under its tiny wings. A heavy burden of these parasites usually indicates an underlying health problem. (Photo: Sheena Haywood )
Below: An xray of a female kiwi showing the size of the egg the female carries. (Photo: DOC)

up in a more natural environment, allowing them to be better prepared for release into the wild. Rumbo, Karen & QTPi, the first chicks to be released from Warrenheip have all put on up to 100 grams within one month of release.

To date approximately 50 kiwi are being tracked in the Tongariro Forest and 12 in the Karioi Rahui. The kiwi sanctuary is well on the way to meeting its target of increasing the local kiwi population by 12% by June 2004.

While ONE is preventing the extinction of kiwi in Tongariro Forest , the long term survival of kiwi relies on effective, long term stoat control . It is hoped to establish a network of stoat traps over up to 10000ha of the forest by summer 04/05. As well as protecting kiwi, stoat trapping would benefit vulnerable species such as blue duck and kaka which are currently unprotected.

Peter Morton
Programme Manager,
Biodiversity Assets

# Conservation Awards 2001

Right: Conservator Paul Green hands John Milner his Conservation Award during the 2001 award ceremonies, which were held beside the Childrens' Fishing Pond at the Tongariro National Trout Centre.
(Photo: Herwi Scheltus)
Below: Roy Dench (centre) talks to a Summer Programme group during a wet trip up Mt Tihia while Annette (checked Swannie) looks on.
(Photo: Dave Wakelin)

Every December for the past ten years the Tongariro Taupo Conservancy has given Conservation Awards to individuals, organisations and companies whose conservation efforts have made a difference to the Central North Island. In some cases the award recognises specific conservation projects, in others it applauds a lifetime of quiet dedicated work. In all cases the recipients have not outwardly sought recognition for their efforts.
Those receiving awards in 2001 were:

## John Milner

John Milner, a long term Chair of the former Tongariro National Trout Centre Trust and current Chair of the newly formed Tongariro National Trout Centre Society. John has had a long involvement as a volunteer on the kids 'fish out days' at the Centre and in recent years has been the co-ordinator.
Not content with this John worked at establishing the new Tongariro National Trout Centre Society with its aim of advocating for sports and freshwater fish conservation.

## Roy and Annette Dench

Roy and Annette Dench are both long time members of the Tongariro Natural History Society of which Roy is currently president. Roy and Annette have assisted on the Summer Programme for many years as well as contributing to many

If you know of someone or an organisation who deserves recognition please let us know by nominating them for an award. Drop us a line including as much detail as possible and send it to:
Conservation Awards
Tongariro Taupo Conservancy
Department of Conservation
Private Bag
Turangi
or email us at ttcinfo@doc.govt.nz with **Conservation Awards Nomination** in the subject line.

volunteer projects.
Their efforts have not been confined to the park but throughout the North Island in places like Pureora and Little Barrier Island. Roy was one of the instigators and long term chair of the Otorohanga Kiwi Trust. He also served as a long term member of the Forest Restoration Trust.

## The New Zealand Army

The New Zealand Army has a long association with the central North Island as a land owner and user. The army has made a commitment to producing a land use strategy to ensure their land practices meet specific conservation goals whilst still allowing training.
The Army has been criticised in the past but the appointment of a Land Management Officer has led to significant improvements in roading construction and maintenance and continued efforts at animal pest and weed control.

Right: Dr Murray Potter received a Conservation Award for his years of dedicated work with Tongariro kiwi. (Photo: DOC)

## Dr Murray Potter

Dr Murray Potter from Massey University has devoted thousands of hours to kiwi research over the past 20 years.
Murray is internationally recognised as an expert in this field but is no boffin in an ivory tower. Despite a busy schedule lecturing and supervising post graduate students, he still finds the time to undertake field work to assist kiwi protection projects throughout the country.
In the Tongariro Forest Kiwi Sanctuary Dr Potter has worked many long nights in the bush capturing wild kiwi, as well as contributing expert advice on the incubation, transport and causes of failure of kiwi eggs.

## Tararua Tramping Club, Hutt Valley Tramping Club, Wanganui Tramping Club and the Toi Toi Trekkers

Four tramping clubs have taken their love of Tongariro National Park one step further by devoting more than 30 years to the *Pinus contorta* eradication programme.
The members of Tararua Tramping Club, Hutt Valley Tramping Club, Wanganui Tramping Club and the Toi Toi Trekkers have devoted thousands of hours hacking, cutting and pulling pines across a vast expanse of eastern Ruapehu.
In the mid 1960s a group of Ranger staff, including the late Bill Cooper, saw the potential for an ecological disaster on the eastern side of the park if the wilding pines were not checked. The project has continued unabated since then with the help of these clubs and other groups and DOC has the spread of pines inside the park under control.

# The 2002 winter snow season on Ruapehu

It's a tough life having to monitor the Crater Lake so often! Harry Keys and Nic Etheridge make their way up to Crater lake. (Photo: John Ombler)

2002 saw the deepest snow accumulation since 1995. Several significant early snowfalls had been followed by periods of fine weather and had melted at the Crater Lake outlet area (2537m) by mid May. But that was about the last of the good weather. In marked contrast to 2001, 2002 will be remembered for long periods of poor weather and few fine days. Although there were only six major snowfalls or snowfall periods (greater than 10cm) between mid June and mid October, Whakapapa was closed about 35 percent of the time, compared to the normal 20 percent. Whakapapa ski patrol recorded wind strengths of moderate or stronger 56 percent of the time. The most severe rime build-ups for many years produced serious damage at lifts to both Whakapapa and Turoa. The Ruapehu ski season started earlier than average and the snow pack was still very deep on the upper mountain when the fields closed. Turoa officially opened on 21 June but bad weather kept the lifts quiet and Whakapapa on 28 June. Whakapapa closed at Labour weekend, 28 October, and Turoa on the weekend of the 9-10 November, potentially a five month big season. Typical for the season weather closed both fields on their last scheduled days. On the John Mazey Scale Whakapapa had a good year although below about 1400m it would have been classed as a fair year. Turoa's snow pack was still building and had an excellent snow fall during the last week. Snow conditions were superb skiing down Gliding Glady's above Turoa on 8 November and we took our skis off just above the base buildings.

In April I suggested there was a greater than normal chance of a relatively early and relatively heavy snow season based on the climate forecast and previous snow-climate relationships. Then following NIWA'S national seasonal forecast for average to warmer than average air temperatures from May - July I revised this, wrongly as it turned out, to a more average season with a later than average start at Whakapapa. However 2002 turned out, instrumentally at least, to be equal to the warmest winter on record at Whakapapa Village (+4.2°C, 1971), 0.8°C above the mean June-August temperature, due to above average overnight minimum temperatures and higher than normal sea temperatures. The winter was windier than normal, more frequent southwesterlies, but importantly precipitation was up to one and a half times normal. Again this underscores the key importance of precipitation and atmosphere circulation patterns in determining snow pack depth.

The extremely warm winter not resulting in a poor snow year is counter-intuitive to many people and emphasises the importance of having reliable information,

Graph 1: Snow pack depths at Knoll Ridge (2000 metres) for the winters of 2000, 2001 and 2002 compared to the long tern mean at Knoll (left hand axis) and the 2002 snow pack depth at the tephra barrier by Crater Lake (2543 metes) (right hand axis). Note that the latter greater depth is on a different scale.

such as long time series of data, to compare records and forecast snow trends. Even with the improving reliability of NIWA's seasonal forecasts and the Southern Oscillation forecast, weather and snow patterns on Ruapehu are not easy to predict. New information on the Pacific Decadal Oscillation, also known as the Interdecadal Pacific Oscillation, may help forecasting once effects of variations within its two phases are better known.

Walter Haensli, ski instructor and ski lift pioneer of Whakapapa, still has clear recollections of snow accumulation during the 1949-1953 winters. He recalls being able to ski down to the Chateau only after major snowfalls. The absence of a snow base meant it was not great skiing and the snow would melt back quite quickly. This does not sound very different from the 1990-1995 periods. However the 1949 -1953 period was a period with average to below average snowfalls for that earlier era, whereas 1990-1995 had mostly well above average snow depth for on the upper and lower mountain slopes for modern times. This is consistent with a gradually receding snowline.

Fortunately neither this trend nor that of mean winter air temperatures is matched by any significant trend in snow depths at 2000 metres. While Ruapehu glaciers have resumed their rapid wasting, there looks like being enough snow in winter for many years yet. The improved snowmaking that the ski company is installing will help compensate for increased variability in snow cover especially at lower altitudes.

I acknowledge the use of data from the Ruapehu Alpine Lifts and the National Institute of Water and Atmospheric Research in this article.

Harry Keys
Conservancy Scientist

# Conservation is a TREET

School students in the Taupo District are increasingly informed, inspired and involved in environmental matters. The students, who range in age from 5 to 18, understand the importance of controlling erosion, why stormwater and other discharges shouldn't enter lakes and waterways, how to recycle, make compost and reduce waste. They have discussed and planned outdoor areas for their schools, know about carrying capacities, the value of our native plants, how to grow organic vegetables and several have taken on landscaping projects that many adults would find daunting.

Above: Nicky Fisher's Room 8 class from Wairakei Primary School perform their Enviroschools song to Taupo-Nui-a-Tia College. Below right: A Wairakei School junior art class show off their enviro artwork. (Photos: Lynette Brown)

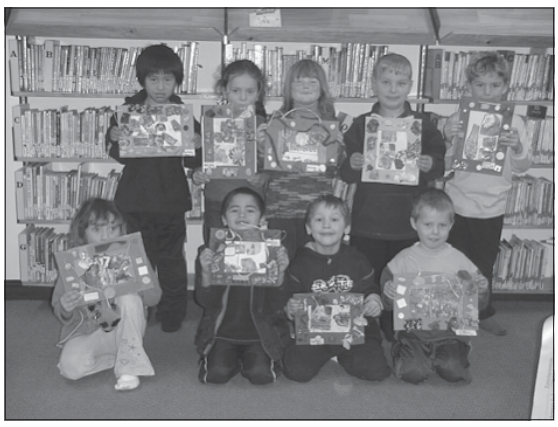
These days if you ask your average Taupo school kid why we should bother about protecting the environment you'll not only get a knowledgeable and provocative reply, you may well end up feeling a little abashed because their understanding, followed up by action is often way ahead of many 'grown-ups'. For many students 'sustainability' isn't the latest buzz word in environmental jargon, it's fundamental to where they are heading.

Having motivated teachers is one reason for the surge in environmental education; another is the introduction of the Enviroschools programme.

The programme, which is integrated over three years, is a 'whole school' approach to sustainability and aims to integrate environmental education across the curriculum and into school life. Three schools, Wairakei, Taupo Primary and St Patrick's are currently half way through their first year of the Enviroschools programme and there are several more hoping to join next year.

During the next three years, trained Enviroschools facilitators, Lynette Brown and Vicki Te Wano will support each of the schools and help them establish and work toward becoming self-sufficient. The schools have appointed a coordinator and established enviro-groups consisting of the principal, staff, and board of trustee members, parents and students.

''Each school is at a different stage of the continuum,'' says Lynette Brown, ''and working steadily towards projects to enhance the environment of the schools as well as integrating environmental education into the curriculum.''



At Wairakei, environmental education is incorporated into the curriculum at all levels. Earlier in the year Nicky Fisher's class

wrote, recorded and released 'the Enviroschools' song and have produced a CD. The students have established links with Taupo-Nui-a-Tia College through environmental activities. St Patrick's and Taupo Primary schools are focusing on recycling and waste reduction. They also have plans for projects to enhance their school environments and like Wairakei St Pat's is also collecting food scraps to feed the school pigs.

The Enviroschools programme is supported by Café for Youth Health, REAP, Taupo District Council, Compass, Bay of Plenty Community Trust and the Enviroschools trust. The programme is completely self-funding.

Earlier this year the Taupo Region Environmental Education Trust (TREET) was formed. To date the trust has secured more than $20,000 funding to facilitate the Enviroschools process in local schools and hopes to be able to gain funding for additional facilitators in 2003.

The trust's membership has grown from a few to more than 35 and representatives are from a wide range of interest groups including kindergarten, primary and secondary school teachers and principals, the Tongariro Natural History Society, Department of Conservation, Taupo District Council, Environment Waikato, REAP and the Taupo Herb Society.

Ngati Tuwharetoa Paramount Chief, Tumu Te Heuheu, is the patron of TREET.

The Schools' Environmental Education Awards, first held in 2001, also encourage schools to become involved in environmental education. The awards are jointly sponsored by the Taupo District Council, Department of Conservation and Geological and Nuclear Sciences. The awards aim to support and help schools pursue environmental education. This year's winners, Hilltop, Wairakei and Broadlands Primary Schools were each presented with a cheque for $1000, a river stone trophy and certificate by Taupo's Mayor, Clayton Stent. Taupo-nui-a-Tia College received the prestigious Bernhard Stretch Memorial Award. This award acknowledged the efforts of the students and the enormous potential of their project. Bernhard Stretch worked with GNS and his ideas, vision and efforts helped launch the awards. Mr Stretch died in July this year.

Above right: Pupils at Wairakei Primary School trying out some environmental awareness games. (Photo: Lynette Brown)
Below: Science Teacher, Mark Gibson, Eliot Stretch, Sarah Dawson and Eidlih Bocker from Taupo-Nui-a-Tia College with the Bernhard Stretch Memorial Award. Eliot presented the award to the college on behalf of his late father who did so much to get the Enviroschools project underway. (Photo: Dave Wakelin)

A total of eight projects were judged for the awards. The judges, Laura Dawson, Lynette Brown and Shamus Howard were impressed with the range of ideas, depth of knowledge and passion for caring for the environment that the students displayed.

The awards, together with Enviroschools and TREET, work to support students to learn and take charge of their environments. The vision that Taupo could become a national leader in environmental education gets closer to reality each day.

Lianne Fraser
Programme Manager,
Community Relations

# Friends of Tongariro National Park

**- A Good Model for Conservation**

The rugged austere nature of Tongariro National Park is also part of its beauty and attrraction to those who belong to the Tongariro Natural History Society. (Photo: Jack Bedford)

When a night-flying helicopter crashed into the desolate slopes of Mt Ruapehu in 1982 and all on board were killed, the grief and sorrow engulfing the mountain community was profound. But Phoenix-like, rising from the ashes of the wreck, a unique and lasting memorial was born. This took the form of an organisation informally referred to as 'friends of the park' or more formally, the Tongariro Natural History Society. During the last twenty years the society has contributed close to $200,000 to projects in Tongariro National Park and has kept to the fore the concept of a living memorial to the unlucky night flyers.

The five people in the helicopter had been testing powerful lights for possible future use in search and rescue but in the darkness they became disorientated and flew at speed into the mountain. Tragically there were no survivors. A sad and moving memorial service was held at the Chateau. Families, friends and mountain people from far and near gathered to express their grief and anguish.

Family members and friends offered some money for a memorial. Bruce Jefferies, the Chief Park Ranger at the time, took the notion of a memorial seriously and from his discussions with a wide range of regular park users, the idea of a natural history society was born. Natural history societies are common in America but the Tongariro Natural History Society was the first to be formed in New Zealand and at the time of writing it is the only one.

The Tongariro Natural History Society was inaugurated in 1984 with the lofty aims of promoting knowledge and understanding about the park, publishing information and generally making the park's geology, ecology, climate, flora and fauna more widely known and understood. Almost immediately the fledgling society was able to publish *Volcanoes of the South Wind* (Karen Williams: 1984, TNHS). This book is a runaway success for the society, selling over 15,000 copies and has been reprinted three times. The income from *Volcanoes* provided the finance for other books about Tongariro National Park to be published and for significant financial contributions for park interpretation.

It was not only publishing books, however, that attracted the interest of members. They wanted to get to know the park better, meet like-minded people and contribute time and energy to preserve what they had come to know and love. Membership come from people who enjoy the park in all its moods, from tramping and ski clubs and from the Forest and Bird Society. The society traditionally organises about three activity weekends a year when members explore the park, often in

For additional information about membership or about the Society in general, a copy of the current Volunteer Calendar or booklists, please contact:

**The Secretary,**
**Tongariro Natural History Society,**
**PO Box 238,**
**Turangi,**
or e-mail:
**sgibb@doc.govt.nz**
or visit the website:
**www.tongariro.org.nz**


Members of TNHS often assist with the conservancy's Summer Programme of guided activities (Photo: Dave Wakelin)

untracked areas away from the regular tourist routes, like Sigley Falls or the eastern side of the mountain around Tukino. They also spend some time working on projects in association with Department of Conservation staff. It is a harmonious and formal relationship with DOC. The Conservator is a member of the society's executive and some DOC staff and their families join members in their activities. It is a partnership respected and supported by both parties.

Over the past twenty years, the Society has contributed to many projects within the park. In 1999 they provided substantial funding to assist with the publication of the park handbook, *The Restless Land*. Other financial contributions have been made to interpretation panels and displays in the visitor centres in Ohakune and at Whakapapa. Volunteers assisted with the restoration of the historic Waihohonu Hut, the original hut in the park and each year members of the Society return to help with DOC's Summer Programme. The Society has also been involved with the production of audiovisual presentations, with plant restoration, especially in restoration after Lord of the Rings filming, the collection of archives and with the translation of track information. Through publishing a wide range of books, the Society has been able to share its knowledge and reverence for the park with many New Zealand and international visitors.

The Society has also established Memorial Awards, available to tertiary students for thesis work of interest to the park. The most recent awards were for the study of rock formations in the Crater Lake area and another for research into stoat behaviour. Completed theses, stored in the DOC offices at Turangi and in the Turangi Public Library, are available for public reading.

The society is now increasing its commitment to various voluntary park projects beyond the regular three weekends per year. The Annual Volunteer Calendar offers an increasing number of opportunities for members to become involved at first hand in conservation or interpretation. An executive officer, Sarah Gibb, has been appointed to help visitors and school groups gain a heightened appreciation of the park through lectures and activity weekends for specific groups. Sarah will also examine sponsorship proposals to enhance the work of the Society. Revenue will continue to be returned to the park, thus meeting the original aims and keeping in the forefront the concept of a living memorial.

The ongoing work of the Society was publicly acknowledged in 1995 when it was the recipient of a Tongariro/Taupo conservation award in recognition of its contribution towards conservation in the area.

The people who quietly gathered in the ballroom of the Chateau, to mourn the deaths of their children, friends or colleagues, on that windswept day in 1982, have seen the 'friends of the park' grow from an idea to reality. From the initial memorial fund, the Society's revenue has grown and has allowed the return of substantial amounts of money to the park. They will watch with quiet pleasure over the next few years as the Society increases its influence and continues to offer a good model for conservation.

Bob Stodhart
ex President TNHS

# Ngarau Tarawa

Ngarau Tarawa, Tongariro Taupo Conservation Board Member

Protecting the land is essential to the well being of the people – and this is why Ngarau Tarawa, one of the newest members of the Tongariro/Taupo Conservation Board, is so enthusiastic about her latest role. Ngarau was appointed in 2001 and has really enjoyed her first year as a board member. She has found that the concerns of a conservation board are closely aligned with her own values and experiences as a Maori.

Ngarau (Ngati Tuwharetoa, Ngapuhi) was born in Tokaanu and raised at Waihi, on the southern shores of Lake Taupo. In 1953 Ngarau moved with her family to Taumarunui. She later met and married Herewini (of Ngapuhi descent) and they had 11 children. They also have 23 mokopuna – many of whom were born at their home.

Once her children were older Ngarau returned to paid work, spending 14 years with Central King Country REAP (Rural Education Activities Programme) in office administration. She later became the Maori course co-ordinator.

In 1999 Ngarau decided a more specialised approach to Maori learning was required. She was instrumental in setting up Te Waka Pu Whenua, a self-funded centre which facilitates a range of adult education programmes. Te Waka Pu Whenua has been a real success story. In the first year of operation the centre registered 700 enrolments in its activities and numbers have remained at that high level ever since.

Some of the many programmes initiated by Te Waka Pu Whenua include Maori language, traditional and contemporary weaving, treaties and negotiation, Maori art and design, courses on health and well-being and approaches to Maori teaching and learning. The name *Te Waka Pu Whenua* encapsulates Ngarau's mission: *the vehicle for that which emanates from the land, e.g. traditions, knowledge and language*.

During her time on the Tongariro Taupo Conservation Board Ngarau hopes to "make a contribution in a way that reflects her life and values as a Maori". One of the main undertakings for the Tongariro Taupo Conservation Board in 2003 will be its involvement in the Tongariro National Park Management Plan review, an ideal way for Ngarau to make her personal contribution to conservation.

**Conservation Boards**

Conservation boards are independent statutory bodies that ensure there is a community voice in conservation management. The majority of board members are appointed as a result of a public nomination process and they have a wide range of skills and experiences. There are 14 conservation boards, each with a defined geographical area which, in most cases, coincides with the boundaries of one of the 13 DOC conservancies (the Chatham Islands is part of Wellington Conservancy but has its own conservation board).

The functions of conservation boards are set out in Section 6M of the Conservation Act 1987 and in the National Parks, Reserves and Walkways Acts. The boards focus on planning and strategic direction, rather than the day-to-day operational details of the department's work. Major responsibilities for the Tongariro Taupo Conservation Board in 2003 include: monitoring the implementation of the Tongariro Taupo Conservation Management Strategy; reviewing the Tongariro National Park Management Plan; considering the impact of concessions for tourism and other activities on public conservation land; and pursuing the strategic priorities established by the board.

For further information about the Tongariro Taupo Conservation Board contact Rowena Cudby at the Department of Conservation, Private Bag, Turangi, or phone 07 386 8607, email rcudby@doc.govt.nz.

# A reason to celebrate.

*Whether we live at sea level or at the highest elevations, we are all mountain people. We are connected to mountains and are affected by mountains in more ways than we can imagine. Mountains provide most of the world's fresh water, harbour as much or more biodiversity than any other areas and are home to at least one in ten people. Yet, war, poverty, hunger, climate change and environmental degradation are threatening the web of life that mountains support. The International Year of Mountains is an opportunity to take steps to protect mountain ecosystems, to promote peace and stability in mountain regions and to help mountain people attain their goals and aspirations. By taking care of the world's mountains, we help to ensure the long-term security and survival of all that is connected to them, including ourselves.*

www.mountains2002.org

Above: Even the cat joined in! Whakapapa's Community Relation's Officer, Katrina Knill, helps children from Ngamatea School with their mountain collages.
Below: The cards printed from the collages designed by the Ruapehu Area schools. The cards are for sale at the Whakapapa Visotr Centre. (Photos: Sarah Gibb)

The Tongariro Natural History Society (TNHS) worked in partnership with DOC to support this international theme. Two projects were developed to celebrate the mountains within Tongariro National Park - the production of some blank cards and an event at Whakapapa on 2 November.

Five primary schools in the Ruapehu Area were invited to design blank cards, depicting the importance of the mountains to these local children.

TNHS and DOC staff visited the schools during Conservation Week, and took with them the makings of collages. Materials had been provided by 'The Box', a community art and education recycled resource centre in Taupo. This was a great experience for everyone involved. The children were challenged with an opportunity to express their opinion in an art form that would be available for other people to share.

The schools involved were Ngamatea, Owhango, Kakahi, Ohakune and Orautoha. Six year old Caitlin Brennan and Hoyden Tennent aged seven, of Owhango School, worked together on their card. Caitlin said "The mountains are important because not everyone is lucky enough to live by them like me." That was a view shared by many.

Ten pictures were chosen to be printed up as blank cards and these were launched at the Year of the Mountain event on November 2 at Whakapapa.

A Festival of Walks was the theme for the event held from Whakapapa Village on Mount Ruapehu. TNHS, in conjunction with the Department of Conservation, organised a fantastic day of activities and exhibitions that were free, for all to celebrate and learn more about our prominent peak and the park that surrounds it.

Fortunately keen walkers and supporters were not deterred by the horrendous weather and drenching they received while enjoying the various activities.

A Crater Lake walk had been the main planned attraction but instead

40 people headed off to examine the bund and early lahar warning system on the eastern side of the mountain, led by DOC geologist Harry Keys. All seemed to find this interesting and were eager to retell their tales of "an aerobics class in the snow". Only Harry must know the reason why?

The auditorium was filled with people to watch and hear a photographic presentation by Albert Aanensen. It was a wonderful collection of images put to music and had the audience in awe of this mountain environment.

So, official celebrations end on December 31, 2002, but members of TNHS are always thinking of their mountains in the National Park and the opportunities it provides to enable others to enjoy its unique natural, historical and cultural features.

Sarah Gibb
Executive Officer,
Togariro Natural
History Society

# Part of a bigger picture

**An example of the efforts by The Tongariro Natural History Society.**

It was blowing hard and we were dressed up in polyprops and warm gloves, not the kind you would usually use for planting, but this was different.

Terry Slee, DOC programme manager Biodiversity, had asked the TNHS for their help in setting up a 'trial' revegetation project in an area beside the Desert Road and Tukino Road.

The area had been subject to marram grass control, and is now quite bare and there are concerns that the ash would eventually blow onto the Desert Road. The marram grass had been securing the sand/ash dunes. With the wind blowing so hard into our faces we got a good understanding of why this trial was worth a go.

So there we were with our spades, boots and heavy planting gear – playing in sand! It was great. Paul Green, Conservator, said he'd never planted so fast before. He was using his spade like a trowel to make the holes.

The planting, predominantly red tussock with some *olearia* and *dracoplylum* for variety was done in three sections – those with fertiliser and water crystals, those with just fertiliser and those with no extras. Terry will observe the planting over the next two years and see what will be successful and further planting will be done.

Right: Smiling despite the conditions a member of the Tongariro Natural History Society prepares to plant Red Tussock on the Tukino Road sand dunes. Below: The planting of the sand dunes takes shape. (Photos: Sarah Gibb)

# Of travellers and toilets

Right: Life at the reception counter of the Whakapapa Visitor Centre gets very hectic at times. Below: If you havent been to the visitor centre for some time you'll be impressed with the totally new displays and re-edited audiovisuals (Photos: Dave Wakelin)

Life behind the reception counter of the Whakapapa Visitor Centre is never dull especially when answering the hundreds of questions from interested, puzzled, and confused visitors.

"*So you work in a visitor's centre.*"

"*What do you do?*"

"*Where are the toilets?*" - Even in the shadow of a mighty mountain, basic human needs are foremost.

Outside the sky is blue but - "*What is the weather like?*" - people want to have their perception confirmed that yes, it is sunny, rainy, windy etc.

Through the winter hundreds of vehicles head resolutely up the Bruce Road carrying skis and snowboards, yet lovely people ask - "*Which way is the snow?*"

Language can be a problem at times.

"*You need chains or a four wheel drive vehicle to go up the Bruce Road today.*"

Reply - a puzzled, "*I have four wheels?*"

On being told that on this particular day it is not safe to attempt the Tongariro Crossing the reaction was an impassioned "*Oh my heart is hot!*" in an attempt to explain his disappointment.

The one that had our brains ticking was:

"*Where is the orchard at Taupo?*"

"*Cherry Island?*"

"*No.*"

A quick look though local guides revealed zilch.

"*What do they grow at this orchard?*"

"*Prunes.*"

"*Prunes?*"

A light-bulb flash moment!

"*Prunes - Prawns - The Prawn Farm!*"

Smiles all round, and one more happy traveller.

Many queries relate to the Tongariro Crossing

"*Is there a supermarket on the Tongariro Crossing?*"

"*Can I take a wheelchair up the Tongariro Crossing.*"

A call from Auckland Airport.

"*Can I book a cruise on the Mt Ruapehu Crater Lake please!*"

Hand gestures, sound effects, diagrams, all in the pursuit of communication. Was that really me making a bus noise trying to explain to the French tourist how the Tongariro shuttle works?

Lost cameras.

Lost trampers.

Bee stings.

Keys locked in vehicles.

One thing is sure .

Every day is different.

Elaine Warr

Whakapapa Receptionist

# John Mazey - man of the mountain

Right: John Mazey and wife Elizabeth celebrating on the slopes of Mt Ruapehu. (Photo: Scotty Barry)

Eighteen months ago John Mazey passed away after a short illness. His funeral in Taupo was a little like a reunion of the National Park Rangers Association as friends and colleagues from the days before DOC came to pay their respects. John represented a group of Chief Rangers and senior park staff from an era when first principles applied. As John would have told you in his distinctive style, "If something had to be done - you just went out and did it!" Of course there were plans and organisation but the days of the 60s and 70s in National Parks and Reserves in New Zealand were the formative years and much of the smorgasbord of recreational facilities and infrastructure we enjoy today was laid down during this period. This is the time when most of the major tracks were brought up to acceptable standards and many 20-30 bunk huts established.

When John took up his post of Chief Ranger of Tongariro National Park in the 1960s he arrived to virtually nothing - few staff and even less in the way of facilities. Undeterred he set about changing things. It took a lot of hard work as Bruce Jefferies and others who worked at Whakapapa in those early days will testify but the efforts of John and other Chief Rangers throughout the country - Wally Sander, Harold Jacobs, George Lyons, Gordon Nicholls, Gordon Atkinson and others - shaped the park service that existed up until the creation of DOC in 1987.

John was instrumental in getting more staff, resources and a Park Headquarters (initially the Chief Ranger's house with a front office). He realised that formal qualifications for Park staff were essential if the park service was to progress to a modern organisation. From his role as Supervisor of National Parks - he vacated the Tongariro Chief Ranger's chair for one in Head Office - John worked closely with Lincoln College to help set in place the Diploma in Parks and Recreation Administration, a three year practical and academic course. To make sure that existing rangers didn't miss out he organised a block course system whereby Rangers could gain the diploma through five spells at Lincoln.

John oversaw the training of overseas rangers through the establishment of a training school in Turangi. Over the years park rangers from Africa to Peru spent time in Turangi, became acquainted with the national park, improved their English and went on to study at Lincoln College (now University).

Those of us who worked with John and the other Chief Rangers of the era know that the guidance of those men not only saw the creation of a world class parks and reserves system but moulded the attitudes and behaviour of many who today hold senior positions in the Department of Conservation.

Good on you, John!

One page is not enough to do justice ot the work of John Mazey and others from the formative years of the National Parks and Reserves Service in New Zealand. Next year the theme for the Tongariro Journal will be 'Looking Back' when a series of in depth articles will explore how people like John shaped and 'built' our national and forest parks and reserves.

# Summer Programme

## Guided Activities

**27 December 2002 - 27 January 2003**

**The Department of Conservation's Tongariro Taupo Summer Programme**


**Discover** the real wonder and beauty of the Central North Island.

**Experience** the delights and treasures of Tongariro National Park, Kaimanawa Forest Park,Tongariro Forest, Tongariro River and Lake Taupo Reserves with Department of Conservation staff and volunteers.

**Explore** the fascinating underground life in a cave and hidden valleys.

**Feel** the aura of our forests and streams.

**Share** in the excitement of scaling a volcanic peak, heli-hiking, and finding glimpses of our past.

Department of Conservation
*Te Papa Atawhai*

**ENJOY A SEISMIC EXPERIENCE**

Visit the Whakapapa Visitor Centre in Tongariro National Park, dual World Heritage area.

Be safe on the Tongariro Crossing by checking at the visitor centre for:

- Track, weather and park information and hut tickets
- Multimedia audiovisuals and displays
- Conservation retail shop

State Highway 48, Whakapapa Village, Mt. Ruapehu 3830, New Zealand
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