



# TONGARIRO

## the Annual

DECEMBER 1999 VOL. 8



Department of Conservation  
*Te Papa Atawhai*



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# Tongariro

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**Editor: Dave Wakelin**

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**Cover photo: Sunset on Lake Taupo, with a wispy ash plume drifting from the crater of Mt. Ruapehu.**

**Above: Fishing a tranquil section of the Tongariro River. Each year almost 70,000 anglers fish Lake Taupo and the rivers and streams that flow into it. Management of the fishery is the responsibility of the Department of Conservation. (Photos: Destination Lake Taupo)**

**Back cover: Tree planting - serious business. (Photo: Dave Wakelin)**

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# Connor's World

We have just had a delightful visit from our four-month old grandson, Connor, summed up by a message on a card sent to us by a friend - "If I had known how much fun grandchildren were I would have had them first."

Twenty-seven years ago we were getting similar enjoyment from Connor's mother, which set me to thinking. What has happened in New Zealand over the last 27 years since Casey was born and what will Connor's world be like in the next 27?

The last 27 years has been nothing short of remarkable. In that time we have seen the rise and rise of the computer to the extent that our modern lives are totally ruled by small silicon chips – from EFTPOS and barcode readers at supermarket check-out counters to the tiny transmitters Department of Conservation staff and volunteers fix to kiwi and other birds to track their movement through the forest. Important conservation legislation has been passed over the past 27 years, including a new National Parks Act, the Conservation Act, the Resource Management Act and others. New national parks have been created, a Department of Conservation established and conservation strategies written. Three New Zealand areas have been given World Heritage status. Covenant schemes have assisted private land-owners to protect natural features of their properties. Unfortunately all of this has not stopped the decline of many of our native plant and animal species.

Twenty seven years ago only five Kakapo were known to exist in Fiordland, a number boosted by the discovery a few years later of about 40 more Kakapo on Stewart Island. Cat predation forced the removal of all birds onto smaller predator free islands and the survival of Kakapo is still precarious. Innovative techniques by Wildlife staff and the remarkable breeding success of 'Old Blue' brought the Chatham Islands Black Robin back from the verge of extinction. This success has unfortunately been counterbalanced by the dramatic dive in kiwi numbers nationwide to the extent where, unless the current kiwi recovery work is successful the national icon could become extinct in the wild within 20 years.

The last three decades have seen a meteoric rise in possum numbers to the extent that whole forests are under threat. Stoat populations have increased dramatically. Increased funding to combat the forest invaders is essential if we are to "turn the tide" of extinction. Our Director General, Hugh Logan, came up with the phrase "Restoring the Dawn Chorus" to symbolise the goals the department has set before it into the next millennium. They are achievable with continued government and community support. We are winning battles and 'holding the line' on others, largely as the result of hundreds of thousands of hours of work put in not only by dedicated staff but an army of volunteers. People are our greatest resource.

I can't predict the future nor can DOC. With vision and planning though we can build what we believe are the right paths to follow.

Over the next twenty-seven years I hope Connor's world will continue to be a place where the community places natural and cultural values high on the list of things that matter. Hopefully Connor will not have to rely on the 'virtual world' of whatever enhanced version of the Internet is around as the only place view kiwi, kakapo, takahe or mistletoe or pohutukawa. With careful planning, dedicated staff and new technology directed to conserving New Zealand, Connor's world will include much of the same excitement and pleasure I have experienced seeing and hearing and touching our unique taonga.

Dave Wakelin  
Editor

# Conservator's Comment

As we enter the new millennium we must reflect more than ever on our responsibilities as site managers of this unique National Park and World Heritage Site. In March 2000 we have the exciting challenge of planning and hosting a Regional World Heritage Site Managers' Workshop. The region covers Australasia, the South Pacific, and South East Asia. The programme is still being finalised but key themes will be monitoring management performance, field management issues e.g. risk management, information availability and dispersal.

It is hoped to have a strong community and iwi presence during the workshop. Community participation has become a key feature of conservation work. I was vividly reminded of this when I attended a Best Practice Conference in Brisbane and listened in awe to a presentation by Greg Moore, Executive Director of the Golden Gate National Parks' Association. Greg told us that his association provides 184 person years of volunteer assistance each year and has raised more than \$25 million US dollars over the last five years for conservation projects in the Park. He emphasised that the success of his association's efforts was very much a result of park managers and staff incorporating volunteer work into every day management of the National Park. It did not happen immediately and in fact took certain staff changes to enable it to happen!

Listening to Greg was timely because I have spent considerable time this year working through ideas with the Tongariro Natural History Society looking at ways to increase their involvement in Tongariro National Park. Key features will be the employment of an officer to help plan and organise education extension activities based on the Park. A second focus will be a small group to identify sponsorship opportunities and to pursue them in a professional manner. Thirdly, the Tongariro Natural History Society will be asked to co-ordinate volunteer activities on a planned basis and in conjunction with our conservancy's business plan.

At the same time we have reached agreement with Heurisko Ltd to deliver the LEARNZ 2K programme focused on the World Heritage Area. With funding from the Ministry of Education a LEARNZ teacher will be based in Tongariro National Park for the purpose of developing educational programmes on World Heritage. Mount Ruapehu has been volcanically quiet during the year and this combined with reasonable snowfalls has provided for good ski conditions for much of the winter. Numbers of skiers were less than pre 1995 eruption days probably as a result of several years uncertainty and a lack of new skiers during these years. The skifields and local communities have certainly appreciated the snow and I believe everyone can plan with more confidence for the new millennium.

We have been given approval to proceed with a major upgrade of the Whakapapa Visitor Centre. The upgrade will see the relocation of the volcanic audio visual into the main theatre with direct access being provided from reception as part of a revamped display area complete with new displays. Lost office space will be incorporated into a small extension of the building. Work is planned to start on the offices early in the New Year and the whole project should be completed in September.

At Ohakune, replacement of the displays has been completed thanks to funding



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

Paul Green started in conservation working initially as a ranger at Ohakune before being promoted to Senior Ranger at Whakapapa. Following participation in a ranger exchange scheme with New South Wales, Australia he was appointed as Chief Ranger, Hauraki Gulf Maritime Park. Chief Ranger of Fiordland and Tongariro national parks followed before appointment as District Conservator in the newly formed DOC. Paul was made Regional Conservator after a restructure of the Department in 1989 and Conservator following the 1997 restructure. In recent years Paul has been involved in overseas projects in Argentina and China

from the Tongariro Natural History Society and a significant input into display preparation by Ngati Rangi. We enjoyed a small opening ceremony in August. Work has continued on the installation of a new Eruption Detection System for Mount Ruapehu and stage one has now been completed including a digital monitoring display at the visitor centre. The Crater Lake hazard has required a great deal of public consultation and an Assessment of Environmental Effects (AEE) has been prepared. The lake is filling more slowly than anticipated and the Minister of Conservation is still to make a decision as whether intervention is appropriate. A great number of bridges and other structures have been upgraded throughout the National Park as a result of additional funding to the department. Many of these structures were built in the 1960s and have reached the end of their life.

Kiwi management remains focused on Tongariro Forest just outside the Park boundary. The 1998/99 breeding season was very poor but there are encouraging signs this summer with a number of fertile eggs being removed to Rainbow Springs and other nests being monitored. Mistletoe and *Dactylanthus* monitoring has continued and mistletoe in the Karioi Rahui is now the largest surveyed population in the North Island. Concentrated animal control in the Karioi Rahui area is giving great ecological benefit to the area. We have made giant steps with implementation of ecological monitoring throughout the Conservancy and this has only been done with the utilisation of a large team of volunteers.



Mt. Ruapehu.  
(Photo: Ruapehu Alpine Lifts)

Other key achievements outside the National Park include the upgrade of facilities at the National Trout Centre and the reorganisation of the popular fishing days for children. This has proved most successful and once again demonstrates the value of working with highly motivated volunteers. Fishery staff are relieved at the decision not to import Canadian trout.

At Huka Falls we have gained funding to construct new toilets and information displays. Huka Falls receives approximately 650,000 visitors per annum and it is important to provide high quality toilets and sewerage disposal at this site.

Finally, I would like to thank staff and our associates and volunteers for another year of quality achievements. Changes have been made to the Conservation Board and we are particularly sad to say farewell to Kevin Hackwell after many years' tireless effort. Also to Laura Dawson who has been an excellent Chairperson. Laura will be missed by our staff for her willingness to always participate in conservation. We look forward to the new millennium and hope that enjoyment of the occasion is matched by care with fire and good sense and safety in the mountains.

Paul Green  
Conservator



# Those were the years that were

The Department of Conservation (DOC) has been around since 1987. In that time an amazing amount has been achieved. Most of the department's successes have not been heralded in a blaze of media publicity. Rather they have been achieved in quiet fashion by dedicated staff, who, once the goal was reached, moved on to the next project.

DOC has never been a department flush with finance. Many of the 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.

Rather than try and cover all that has been achieved nationwide we have concentrated on achievements and issues, large and small in the Tongariro Taupo Conservancy.

The list below is by no means complete. 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 in 12 short years.

- The Kiwi Recovery programme, sponsored by the Bank of New Zealand, has enabled practical research and management to be carried out. Locally, the Tongariro Forest Conservation Area kiwi project has provided a "flagship" for conservation. It has encouraged many individuals and organisations within the local community to start to recognise the wide range of conservation issues associated with managing our national icon.
- Operation Nest Egg (ONE), part of the national Kiwi Recovery programme, has seen dozens of kiwi eggs removed from nests in our forests, incubated and hatched in Rotorua's Rainbow Springs Kiwi House, raised and then released back into the forest at an age where they are more able to fend for themselves against the predation of stoats.



The Whakapapa Visitor Centre, one of the busiest in the country, received a government redevelopment grant. Work will include a new reception and sales area, interpretive displays and relocation of the Ring of Fire audiovisual into the main auditorium and is due to be completed by September 2000.

(Photo: Dave Wakelin)

- Short-tailed bats (about 7000) were discovered on the southern side of Mt. Ruapehu in the Rangataua block and in Kaimanawa Forest Park. There is an ongoing research and management programme in place.
- Blue duck research and monitoring, as part of the Tongariro Power Development water consent process, has increased our ability to manage the species in the central North Island. Valuable management information was gained from a Tongariro River recreation survey, also part of TPD investigations.
- Concern has been expressed at the fate of *Powelliphanta marchanti*, a large carnivorous snail found in the Kaimanawas and under threat from possum predation.
- For a period of about four to five years public opinion was polarised over the fate of the Kaimanawa horses. For a while the original inhabitants, the rare and endangered plants and the unique central North Island landscape, seemed to have been forgotten. Surveys put the numbers of horses at between 1700 and 1800. Subsequent capture has reduced the number to a manageable 600 horses.
- No other event in the conservancy's 12-year history attracted as much national and international media attention as the 1995-96 eruptions of Mt. Ruapehu, the

The 17 June 1996 ash eruption of Mt. Ruapehu provided plenty of excitement and drama in Whakapapa Village.  
(Photo: Maureen Smith)



volcano's most active period for 50 years. Communities and businesses are still recovering from the economic effects of the 'fallout'. The department's role in professionally managing the event has been widely recognised.

- The 1995-96 eruptions of Mt. Ruapehu spelt trouble for the two commercial skifields because of continued closure and for the surrounding towns, which rely on the 'downstream' effects of winter skiing.
- The eruption of Mt. Ruapehu provided scientists, managers and concessionaires with a great opportunity to learn more about the behaviour of lahars (volcanic mudflows) and other volcanic hazards.
- The conservancy has taken a leading role in assessing the implications of the buildup of volcanic debris on the original (pre 1995) outlet of the Crater Lake. It has assessed all options and compiled a report to the Minister of Conservation who will make a decision in the New Year on what action, if any, to be undertaken.
- Stage one of a new Eruption Detection System (EDS) has been installed including a digital display in the Whakapapa Visitor Centre.
- Tu Kakariki (the department's tree planting programme) has been sponsored by McDonalds Family Restaurant Taupo. Despite setbacks with the plantings at Wairakei Tourist Park and Five Mile Bay the programme is continuing at a Taupo District Council reserve on the Waikato River, helped by children from Taupo Intermediate School.
- Other planting programmes have also been very successful including the foreshore planting of Whakaipo Bay and the planting out of the Jubilee Walkway in Ohakune.
- We have put in more than 100 kilometres of boundary fencing to keep stock out of reserve areas.
- Effective possum control regimes have been carried out on over 60000 hectares of land under DOC management. Rare plants such as Mistletoe, Dactylanthus and Pittosporum turneri have recovered as a result of such pest-control operations.

- Control of *Pinus contorta* is now at a stage where most has been cleared from Tongariro National Park and the first sweep through the Rangitaiki frost flats off the Napier Taupo highway has been undertaken.
- Bio-control of wild weeds is underway with a heather beetle released into selected areas of heather. Four years of intensive trials with the beetle were carried out in Britain and New Zealand before its release.
- An exotic forest management plan called for the removal of exotic trees in areas under Department of Conservation management, many of these areas passed over to the conservancy during the split up of the Forest Service and subsequent State Owned Enterprises. Revenue from the sale of the timber has helped fund local projects.
- Toilets are an essential part of life and over the last 12 years staff have built road-end toilets at both ends of the Tongariro Crossing and at most huts. Closed vault toilets have also been constructed at access spots around Lake Taupo.
- The Bruce Road from Whakapapa to Iwikau was realigned, beginning in 1987, with great attention given to construction and landscaping and restoration of the disturbed areas.



A kuia of well-known Maori conservationist and member of Nga Whenua Rahui committee, Kevin Prime of Ngati Hine, Taitokerau, places their taonga from Maungapohatu in the urupa during the World Heritage celebrations.  
(Photo: Dave Wakelin)

- The revised Tongariro National Park Management Plan was published in 1990, after receiving numerous submissions. The Kaimanawa Forest Park Management Plan was completed in 1990.
- A major development for the Whakapapa Visitor Centre was the completion of the Auditorium in 1989. An audiovisual, specially written in consultation with representatives of Ngati Tuwharetoa and Ngati Rangī, tells the story of the creation of the mountains and of the park's special cultural and natural significance.
- The centennial of Tongariro National Park, New Zealand's first national park, on 23 September 1987, drew up to 5000 people to share in the celebrations. A highlight of the day was the haka, led by Sir Hepi Te Heuheu.
- Tongariro National Park is one of the few sites in the world with dual World Heritage status for its landscape and cultural features. Landscape recognition was granted in 1990 and cultural status in 1993. In November 1998 the dual status of Tongariro National Park was formally recognised and celebrated with ceremonies at Whakapapa and the handing over of certificates from the World Heritage Committee by Dr. Bern von Droste the Director of the World Heritage Centre.
- In DOC's first year, as part of the park centennial celebrations, we held an International Training Course in Turangi for 21 rangers from 15 countries.
- The department has implemented a Quality Conservation Management (QCM) programme.
- A major undertaking in Tongariro National Park was the replacement of ten bridges during 1996.
- Government funding was approved in 1999 to commence a redevelopment of the Whakapapa Visitor Centre in 2000.



Pat and John Newton were worthy recipients of a Tongariro Taupo Conservation Award for their tireless work for the Tongariro Natural History Society and other conservation volunteer projects.  
(Photo: Dave Wakelin)



- Over the years the Summer Programme of guided walks has seen changes in the way it is run and the length of the programme but still continues to be popular.
- New displays have been established at the Ohakune Visitor Centre and in the Turangi Visitor Centre. Portable conservancy and fisheries display stands have meant it is easier for staff to attend shows and field days.
- Target Taupo has reached its tenth anniversary. This publication, aimed mainly at the hunting and fishing fraternity but written to have wider appeal, began life as a small booklet with the occasional black and white photo but has graduated to a full colour A4 publication.
- The Restless Land, Tongariro National Park's handbook has been totally rewritten and published in a larger B5 format. The handbook was a joint venture between the Department of Conservation and the Tongariro Natural History Society. James Cowan wrote the first handbook on Tongariro National Park in 1927.
- Nationally recognised artist, Val Raymond, held a major exhibition of paintings (oil and watercolour) on Tongariro National Park, in Taupo.
- The Tongariro Taupo Conservation Awards were established in 1993 to recognise excellence in conservation and to date have been awarded to 16 individuals and organisations.
- The 42 Traverse in Tongariro Forest has been developed as the most challenging one-day mountain bike route in the North Island.
- Surveys of walkers on the Tongariro Crossing, often described as the best one-day walk in the country, provided valuable management information on visitor perceptions and dynamics. Most of the track has been rebuilt in the last ten years.
- A new Ohakune water supply through part of the park was established after considerable negotiations with the Ruapehu District Council.
- Facilities at Huka Falls have been upgraded but still receive overwhelming tour-

Right: Opepe township about  
1875.  
(Photo: Alexander Turnbull  
Library)



ist pressure. A new toilet complex is being built on a new site and will be manned during the day to reduce theft and vandalism.

- The department has worked closely with the Turoa and Whakapapa skifields to ensure environmental and cultural considerations have been uppermost in each development phase of the skifields.
- Both fields are now electrified by over ground cabling. In the case of Turoa, King Country Energy received a Conservation Award for the way in which they laid the cable from Ohakune to the skifield with minimal disturbance to the forest the cable passed through.
- Archaeological research at Opepe bush revealed much about the early settlements in the area.
- Staff expertise and knowledge was used on overseas projects in Indonesia, China, Argentina, Antarctica, Vanuatu, Japan and Fiji. Staff also represented the department at conferences and workshops in Australia, Malaysia, Peru, Canada, Fiji and Britain.
- Fishery management established and continued on a professional level underpinned by scientific research and monitoring with strategic direction from the Taupo Sports Fishery Management Plan which became operative in 1995. Fisheries staff managed the recovery and enhancement of the Taupo fishery from the impacts of over-harvest and low production in the early 1990s. In 1998 the centennial of the release of Rainbow Trout in the area was celebrated.
- Severe floods in 1998 caused considerable damage to the Tongariro National Trout Centre, wiping out about 12 metres of riverbank and twice flooding the viewing chamber. As a result major reconstruction work at the Centre has been undertaken.
- DOC underwent a major restructuring in 1997 to provide for 'line management', clarity of role and accountability. The Tongariro Taupoconservancy now has a conservancy office and three management areas.
- Teams of volunteers, largely from overseas, have carried out intensive forest health monitoring work in the conservancy's forests.
- Other volunteers have assisted the full-time hut wardens in supervising Tongariro National Park's huts (Mangatepopo, Ketetahi, Oturere and Waihohonu)

on the Northern Circuit Great Walk.

- Planning still continues to resolve sewage disposal from the Whakapapa Ski Area, Iwikau Ski Village, and Whakapapa village.
- The realignment of the Desert Road, especially those sections which pass through parts of Tongariro National Park, has been approached with great sensitivity after negotiation by Department of Conservation staff and careful placement of site boundaries.
- Fire control in the conservancy is well organized. All staff receive comprehensive fire training to ensure a quick response at any time to a fire callout.
- Negotiations with Contact Energy have been ongoing over the boundaries for scenic reserves in the thermal areas of Wairakei Tourist Park to ensure that valuable features such as Huka Falls, Craters of the Moon and Alum Lakes are protected.
- The Conservation Management Strategy for the conservancy has been a long drawn-out affair with negotiations and legal opinions delaying its publication. The final document will serve as an extremely valuable management tool well into the next millennium.
- In 1989 six army personnel lost their lives when caught in a severe blizzard on top of Mt. Ruapehu during an exercise. Several visitors to the Park have died from hypothermia on the Tongariro Crossing in separate incidents. An avalanche claimed two lives at the Tukino Ski Field in 1991 during an avalanche awareness training course. In 1994 two boys slid into Skippers Canyon near the

Below: By using sophisticated GPS navigation equipment and guiding positional lights helicopter application of 1080 poison pellets on aerial possum control work is a precise and accurate operation.  
(Photo: Dave Wakelin)



Whakapapa Ski Area. Four years later two more lives were lost to avalanche during blizzard conditions at Whakapapa. As a consequence of the Army tragedy RARO (Ruapehu Alpine Rescue Organisation) was formed. This is a highly skilled and trained volunteer group that since its formation has saved lives on Ruapehu and the other mountains.

- The conservancy puts out a weekly track, avalanche, volcanic activity and snow report which is sent to the media, visitor centres and posted onto the Internet. Weather and track conditions can be obtained from the Whakapapa Visitor Centre seven days a week.
- A significant step forward was made in 1995 with the return of the bed of Lake Taupo to Ngati Tuwharetoa and the appointment of the Taupo nui a Tia Management Board.
- The Tongariro Natural History Society continued to grow in its support of Tongariro National Park and conservation in general and as an organisation.
- The Rangataua Conservation Area is a significant piece of conservation land; being old forest untouched by the 186AD Taupo eruption and containing New Zealand's longest forested lava flow. The Karioi Rahui is based on a memorandum of understanding between Ngati Rangi and the department concerning the management of part of this area as a "mainland island." The area has very high cultural significance for Ngati Rangi.

Dave Wakelin  
Senior Community Relations  
Officer



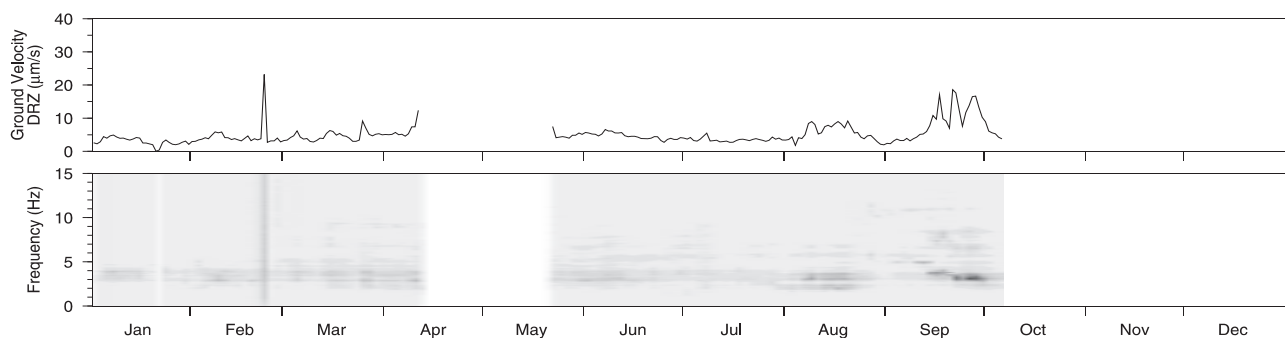
# Volcano Watch 1999

## RUAPEHU

### Volcanic activity at Ruapehu

Ruapehu has had two periods of slightly enhanced activity in the past twelve months, in November 1998 and July-October 1999. Crater Lake has remained hot (55-69° C) and wispy stream puffs have been seen at other times due to favourable meteorological conditions (calm or light winds from the southeasterly quarter). Small steam eruptions in November 1998 coincided with a short but intensive period of lake heating and some seismic tremor. A volcanic earthquake on 27 October 1998 and broad low peaks of tremor preceded these steam eruptions. The July-October 1999 period appeared to start with tremors and a small volcanic quake in late July. A dense steam puff was noted from the Whakapapa Visitor Cen-

Figure 1. Average seismicity from the new broadband seismometer on The Dome provided by Steve Sherburn, Institute of Geological and Nuclear Sciences. Top. Daily average ground velocity derived from readings taken every 10 minutes. The higher signals in August and September indicate periods of stronger seismic tremor. The gaps in January and April-May are results of signal failure and are not real. Bottom. The frequency content of the signal is mainly the result of volcanic tremor (volcanic earthquakes have a duration of a few minutes at most and do not contribute to a daily average). The darker the shade the more energy is present at that particular frequency. Throughout most of the year most tremor has had a frequency of 3 to 4 Hertz which is "intermediate frequency".



tre on 29 July several hours after the quake. Tremor intensity (amplitude) built up to stay above background in August with lower frequencies of 2 Hertz being evident in the vibration spectrum as well as the usual 3-4 Hz frequency (Steven Sherburn, Institute of Geological and Nuclear Sciences, personal communication, see Figure 1). On 21 August a series of four volcanic earthquakes occurred, increasing in size. The last was large enough to potentially have been associated with an eruption (Brad Scott, GNS, personal communication). No eruption was confirmed or eruption products seen but this was a period with much snowfall. Tremor then died off for a few hours. On 27 August high pressure gas venting was observed near the western shore of the lake close to the site of the lava spines observed in March 1996 and October 1997. Tremor died away some days later but by mid September strong tremor had resumed. Steam puffs rising 200 metres above



Photo of Dave Rothchild's new charging system inside Dome Shelter. The system which uses a diesel generator (bottom left) seems foolproof, and as yet no-one who has tried to start it has failed. (Photo: Harry Keys)

the lake were observed on 17 September. Brad Scott noted an increase in the ratio of seismic energy measured at Dome compared to that measured at Whakapapa Village and interpreted this as a shallowing of the seismic source below Crater Lake. Tremor levels began to exhibit strong peaks (Figure 1). The output of volcanic gas, particularly hydrogen sulphide began to increase to annoyance levels within 3 km downwind (the first time since 1996). Tremor reduced in October but small steam eruptions and associated gas "bursts" continued. The lake temperature, which had warmed slightly in mid September lowered to 55°C, the lowest measured since January (when large volumes of cold melt water were flowing into the lake). A small volcanic quake occurred on 9 October followed by a moderately dense steam plume 200 metres high. No fresh ash was seen during aerial observations (courtesy of Mountain Air). Reported ash was confirmed as being due to wind distribution of old ash and snowmelt.

The July to October period has two possible explanations according to GNS scientists. The one that seems to fit the most observations is that a small, possibly fresh batch of magma has been destabilised or is otherwise degassing below Crater Lake. This has increased heat flow into the lake, raised the concentration of indicator chemical species, and increased gas output (Bruce Christenson, GNS,

personal communication). The other explanation is that the active hydrothermal system below the lake has merely become more active.

This activity is similar to that which occurred after the 1945 eruption. Table 1 suggests that post-eruptive activity has been similar in magnitude and frequency after the 1995-96 eruption as it was after the 1945 eruption, given the increased scrutiny that Ruapehu is subject to these days and the difficulty of determining the precise ends of eruption sequences. We can probably expect similar activity to continue for a few years yet. If Ruapehu resumes its normal activity we might expect further small ash eruptions sometime in the next 3 to 10 years and eruptions large enough to cause significant lahars sometime in the next 20 or so years.

### **Hazardous secondary lahars continue**

The 1995-96 eruption claimed its fourth bridge in autumn. In early May a tramper reported the Whangaehu footbridge was missing. Investigations then revealed that a heavy and warm rain event probably in mid April augmented by melting fresh snow remobilised 1995-96 tephra in the Whangaehu Glacier area producing a significant secondary lahar about three metres deep at the bridge site. The steel-girder bridge had been in place less than three years (since spring 1996), replacing a similar bridge destroyed by an eruption lahar on 18 September 1995. That bridge was built in 1985/86 replacing a suspension bridge that in turn replaced a similar bridge destroyed in the 1975 eruption.

Two other footbridges were destroyed earlier by secondary lahars. The Mangatoenui bridge disintegrated when hit by a large event on 28 October 1995 while the Ohinepango bridge near the start of the track to the Waihohonu huts finally went

Table 1. Volcanic activity of Ruapehu following the 1945 and 1995-96 eruptions

Year interval after end of eruption.	After 1945 (March 45-Jan 46) eruption. (Information from Gregg 1960, DSIR Bulletin No. 40)	After 1995-96 (June 95-Sept 96) eruption. (Information from De C, GNS, Peter Obway, Mountain Air)
0-1	April 1946 ash eruption	May 1997 probable steam eruptions
	June 1946 ash eruption	June 1997 possible steam eruptions
1-2	February 1947 steam eruption	2-18 October 1997 ash eruptions
	15-16 March 1947 ash eruption	3-7 November 1997 ash eruptions
	28 April 1947 ash eruption	1-2 January 1998 ash eruptions
	31 May 1947 ash eruption	May 1998 possible eruption
2-3	1 May 1948 steam eruption	8-26 Nov 1998 steam eruptions
		29 July (- August?) 1999 steam (and ash?) eruption(s)
3-4	No activity reported	17 Sept-[16] Oct 1999 steam eruptions
4-5	26 June 1950 steam eruption	[Sept 2000- Aug 2001]
5-6	19 March 1951 steam eruption	[Sept 2001- Aug 2002]
6-7	July 1952 steam eruption	[Sept 2002- Aug 2003]

in March 1998 after surviving at least four earlier secondary lahars. Both replacement bridges survived the secondary lahars that flowed down their streams in April because they had been built higher above normal water level. The former was erected on one metre high abutments and the latter was built at a more upstream site. The new Whangaehu bridge will also be erected at a higher site a few metres downstream. The Waihanoa bridge is also going to be replaced as erosion since the eruption is now threatening the true left abutment.

#### **Whangaehu landslide area**

An area of landsliding 400-700 metres west of Mitre Peak near the head of the upper Whangaehu Valley is becoming more noticeable. In 1999 the first casual comments were received from members of the public about this area which we have been watching since 1995. The earliest photos we have that show slumping here were taken in February 1992. The area was completely covered by snow and glacier ice probably up to the 1980s so photos of this area taken in the late 1980s would be useful. This area is now the first north-facing area at that altitude (2500 metres) to show exposed rock following snowfalls.

Close inspection in October revealed that a vertical scarp composed of several unconsolidated tephra layers overlies a mass of hydrothermally weathered and weakened material. Pat Browne from the Geothermal Institute at Auckland University is examining a sample to determine what the minerals present, in addition to sulphur, might tell us. The scarp is eroding back and is very unstable, producing frequent hazardous rockfalls. Possibly hundreds of square metres of loose, weathered material has been exposed since March 1996. The wind continues to blow fine rock material off it onto surrounding snow producing ash-like deposits. There





Photo from Stump Saddle on the crater rim of the landslide area west of Mitre Peak in April 1999 showing tephra scarp and area of weathered volcanic rock below it (Photo: Harry Keys)

is a potential that sudden massive earth failure here might block the upper Whangaehu River and create an unstable dam. Such an event could occur after intense rainfall.

## NGAURUHOE AND TONGARIRO

Steam is still seen occasionally (with binoculars) from the northeast rim of Ngauruhoe in suitable meteorological conditions. Ngauruhoe had an average eruption recurrence interval of 3-8 years up to its last eruptions of lava in 1954 and ash in February 1975. The current 25 year period without any eruptions is the longest since written records began. This length of time that has elapsed does not necessarily mean that another eruption is imminent.

Tongariro's last confirmed eruption was the 1896-97 eruption of Upper Te Maari Crater. The average recurrence interval is probably many decades to hundreds of years.

### Knowledge gain from recent eruptions

More than 100 scientific and other publications and reports have been produced following Ruapehu's 1995-96 eruption. David Johnston from GNS has compiled a bibliography of them. We have learnt a large amount from this eruption about volcano processes, hazards, impacts and management. While much of the detailed information on processes and hazards is new knowledge, a lot about impact has been reinforced or actually had to be re-learned from the 1945 eruption. At the 1996 debriefing workshop, convened by DOC, Kevin Hackwell urged that lessons of Ruapehu's eruption be learnt and documented well. While it appears we are doing that and modifying our lahar response plans, existing information does not appear to be passed on efficiently outside scientific circles over time periods of decades. The question remains - how we can best maintain a broad knowledge base over this time frame?

Scientists Barbara Hobden, Bruce Houghton, Ian Nairn and others have carried out detailed studies of lava and tephra deposits on the Tongariro-Ngauruhoe massif over the last few years while John Gamble, Bill McIntosh, Vince Neall and others have done related work on Ruapehu. It appears that during the last 1000 or so years the magma that feeds vents on these volcanoes has tended to have come in small batches (volumes 0.01 to less than 1 cubic km) with short life span (years to a few centuries). Perhaps the last eruptions of Ngauruhoe sufficiently depleted the most recent magma intrusions so that any remaining material is of low volume and stable beneath a frozen-closed vent system. Several small volume and shallow magma bodies and a more or less open vent system beneath Crater Lake might explain why eruptions from there are common, including the "blue sky" events that have no useful precursors. Injection of two or more low volume batches of fresh magma from greater depths or conjunction of pre-existing shallow bodies to create instabilities might have triggered the 1995 and 1996 eruption episodes. On long time scales the TNP volcanoes in general had their last very active period 10,000-20,000 years ago perhaps during a period of rifting in the Taupo Volcanic Zone, and before that 70,000-140,000 years ago. Magma bodies would have been much

larger than and eruptions were more voluminous, with more powerful explosions.

### **Other Volcanoes in New Zealand**

White Island has had small ash eruptions and produced impressive steam columns during the year but perhaps of more interest was the discovery of other active volcanoes further offshore. In March 1999 a joint New Zealand - United States scientific expedition found clear evidence of hydrothermal activity at five submarine volcanoes northeast of the Bay of Plenty. The most active is Brother Volcano, 400 km northeast of White Island. It has a caldera (large crater) 3 km in diameter and a vent near its rim pumps large amounts of mineral-rich fluids into the ocean.

### **Other volcanoes with skifields**

Three of the other 29 or more active volcanoes in the world with skifields have been erupting in the last 12 months. Mt. Etna on Sicily has been very active for much of 1999 with strombolian lava fountaining, explosions and extensive lava flows. Scoria was deposited over the southern part of the volcano in January disrupting the ski field there. The current eruption at the summit craters started in July 1995 with intense strombolian activity and lava production starting in the Southeast Crater in 1997 (from Boris Behncke's Italian volcanoes website - [www.geo.mtu.edu/~Boris/Stromboli.html](http://www.geo.mtu.edu/~Boris/Stromboli.html)). Following an increase in harmonic (low frequency) seismic tremor, Villarrica Volcano in Chile erupted in September with lava lake activity, strombolian fountaining and explosive ash eruptions (report by Observatorio Volcanologico de Los Andes del Sur to Arizona State University Volcano List, October 1999). Ash deposition may have affected the ski area. Fumarolic gas and ash plumes were observed from Lliama Volcano also in Chile in November 1998 (report by Smithsonian Institute Global Volcanism Network, March 1999). Unusual seismicity has been reported at Mt. Hood (Oregon) in January this year and Iwate (Honshu) in both the last two years. At any one time about 10% of the world's known volcanoes are erupting so the current activity of skifield volcanoes is consistent with that.

### **Acknowledgements:**

Thanks to GNS, Peter Otway, Mountain Air, RAL and Pat Browne for support during the year.

Harry Keys  
Conservancy Advisory  
Scientist

# Kaupapa Atawhai Conservation, a magnificent pursuit

## Ramblings from a Participant

The end of the age is upon us as we plan our farewell to the second millennium and make-ready to celebrate and usher in the next. But our mood is melancholic because despite all that the spin-doctors can devise, an air of gloom imposes a depressing influence upon the national consciousness.



Hemi Kingi, Kaupapa Atawhai  
Manager for Tongariro Taupo  
Conservancy.  
(Photo: Hemi Kingi)

It's there when we think of the human suffering in places like East Timor, Kosovo and Rwanda. It's there when we think of the prizes that sports commentators everywhere said were to be ours, the World Netball and Rugby Cups, ignoring the fact that we hadn't yet played and won the respective final or semifinal as the case certainly was.

But fate stepped in and decreed that 'our prizes' were 'their prizes', the Aussies' I mean. They don't read the script do they? I mean even the Melbourne Cup was to be ours because didn't they know we had 'five of NZ's best' in that race? Born of one of our great stayers they were. Again the commentators predicted that one of this group would sweep all others aside to result in yet another grand New Zealand victory. And it was meant to be victory again in the latest Aussie-Kiwi League clash. But the outcome in both cases was the same as for the netball and rugby. Aue! Alas! Dam! Curses! Grrrr!

And if that's not enough to dampen our spirit it soon happens when it dawns on us that it's time again for 'the triennial slug-fest', when the politicians proclaim their gospel of 'good news'. 'We've got the answers' they tell us, therefore 'we promise to .....'. So 'vote for me and my party' and you're certain to get New Zealand the way you want it'. But we've heard it all before. Haven't we. Can you feel it? The gloom and depression I mean. It's all pervading isn't it?

Well enough of this wallowing in self pity because

that's what it is.

There is good news about and it's called Kaupapa Atawhai, Conservation, a grand work and mission if ever there was one. In many quarters it's one of the best kept secrets about. Forever competing for a fair share of media exposure against those things that human nature seems to feed itself and thrive on, like sex and scandal, conservation continues nevertheless to make progress towards the goal of 'Restoring the Dawn Chorus' to our land.

The writer has the privilege of participating in this work and recently completed

Right: The Kiwi Recovery Programme, sponsored by the Bank of New Zealand has received the whole-hearted support of Ngati Tuwharetoa and Ngati Rangi. The Operation Nest Egg (O.N.E.) project has seen a number of kiwi released back into Tongariro Forest after removal of eggs, incubation, hatching and raising of chicks at the Rainbow Springs Kiwi House  
(Photo: Dave Wakelin)

five years service with Te Papa Atawhai - The Department of Conservation. It's been great and a rewarding experience to get out, in and upon the land. So on this, the eve of the 21st century, it's time for a bit of old-fashioned 'chest-beating'. Not about us though, but about what the Kaihanga, Creator, has bequeathed to our conservancy. To me there's nothing to compare with the mauri and majesty of Tongariro



National Park and its sacred mountains, the solitude and wilderness of Kaimanawa and other forests, the fishing and recreation in our many rivers and lakes, particularly that great jewel Taupo-nui-a-Tia. There's no substitute for first-hand experience of these places but it's a blessing that too few of us have sought or enjoyed. Other people do though, from all around the globe. Each year they come in their thousands leaving ever more footprints in the landscape than us locals. We really must do something about that.

Recall November last year when we celebrated the dual World Heritage status of Tongariro National Park at Whakapapa. Starting with a dawn ceremony at Waikato-iti stream on the Tukino road, it was a time during which kawa (protocol) and tikanga Maori (custom) were to the fore providing the appropriate korowai (garment) for the various activities which made up the celebration.

Who could forget the number of Pakeha at Waikato-iti (nearly outnumbering Ngati Tuwharetoa and our relatives from Ngati Rangi) on that dark-grey and wet dawn. Not understanding the words of the karakia didn't keep them from identifying with their Maori brethren, and experiencing the ritual. So in the sense that it's 'better felt than telt', perhaps they could give the lie to those people who continue to promote arid intellectual arguments and aspersions to undermine the value of Te Reo, the Maori language. Such people can't change the fact however that it's the first language of kaupapa atawhai, conservation, as witness a journal entry by an early government agent, Donald MacLean (later a Knight and Minister of Native Affairs) when writing of the death of Mananui, Te Heuheu Tukino II, in 1846:

.... the very pride and boast of the New Zealand chieftains is now gone, nor will successive generations replace this with a more intelligent or well disposed man, well versed in every tradition and history of his country's people, as well as the productions of his country, of all of which, from the largest tree to the smallest shrub, he had some tradition or knowledge. He was a skilful botanist, and knew the physical uses of many herbs and plants. Nor was he ignorant of the insects and birds of the country .....

Although present-day Maori probably fall short of that mark, there's no doubt that some exciting projects are happening in the conservancy between Maori, Pakeha



and the Department. The Karioi Rahui at Ohakune is an example (see Harry Keys' article elsewhere for more on this). Then there are Maori from this conservancy, and from the bordering Wanganui Conservancy, who are supporting and participating in our Kiwi Recovery Programme.

Then there's the Taupo-nui-a-Tia Management Board, a mechanism whose eight members are appointed by the Minister of Conservation (4) and the Tuwharetoa Maori Trust Board (4). It's a true Crown-Iwi Management Partnership and, contrary to the proclamations of prophets of doom in 1993, it's working in the way envisaged by the Treaty of Waitangi.

And, now that development of the Pukenga Atawhai Training Programme (one of three departmental spearhead programmes) has been completed and successfully trialled, things don't look too bad in conservation. Roll on 2000 and the next five years.

Hemi Kingi

Kaupapa Atawhai Manager

## Barrel staves to carving skis

"Barrel Staves To Carving Skis - A skier's story" by Karen Williams chronicles the life of Walter Werner Haensli of Klosters, Switzerland.

Walter Haensli is a talented skier whose experiences span many facets of the ski industry from the 1930s to the present day. He was a member of the Swiss ski team,

an Olympic ski coach and a ski instructor at the United States Sun Valley ski resort.

His long-standing affair with Ruapehu began in 1949 when he was engaged by the Department of Tourist and Health Resorts to promote skiing in New Zealand. From 1949 to 1951 Haensli ran the ski school at the Chateau ski fields (now called the Whakapapa Ski Area) and it was Haensli who masterminded the transition from rope tows to modern ski lifts at Ruapehu through the formation of Ruapehu Alpine Lifts (RAL).

Then in the 1950s he played an important role in the testing and sales of the first Head skis which were made of a revolutionary aluminium sandwich construction invented by American Howard Head.

Walter had a close association with the Ruapehu Ski Club and it was Sir Bryan Todd, a Ruapehu Ski Club member, who persuaded Haensli to work in New Zealand.

Several RSC members (including the late Ross Campbell) arranged for Karen to travel to Switzerland to meet and interview Walter Haensli. She skied with Walter at the Gotschna ski area near Klosters and has also interviewed many of his old associates in New Zealand.

Karen Williams is a former New Zealand giant slalom ski champion who lives in Taupo and has written several books about the Ruapehu region, including *Volcanoes of the South Wind*, *Skiing on the Volcano* (with Dave Bamford) and *Coming Round the Mountain*. She is currently revising the *Volcanoes of the South Wind* for its third edition and is also a researcher for the Taupo Heritage 2000 group.

*Barrel Staves to Carving Skis* (\$29.95) is available directly from Karen at 10 Waihora St, Taupo 2730, Ph 07-377-1962 Fax 07-378-1962, email: fireanddice@clear.net.nz



Walter Haensli, top skier and major influence on the development of the Whakapapa Ski Area.

(Photo: Haensli Collection)

# Think Fresh

Right: Lake Terrace along Taupo township's foreshore provided a great viewpoint from which to watch the eruptions of Tongariro National Park's Mt. Ruapehu during 1995 and 1996.

Below: Kayakers enjoy the rapids and tranquil spots on the Tongariro River near Turangi. (Photos: Destination Lake Taupo)



My earliest memories of Taupo are probably not very encouraging. I remember dusty pumice roads, limited accommodation and a small shopping area. I remember at about the age of five staying at de Bretts Hotel. Memories fade but I remember a very large dining room and a huge fluffy cat that seemed to own the dining room floor.

That was all a long time ago. How things have changed. Today Taupo is a thriving vibrant tourist town and the roads are certainly not pumice paved. Most days I drive from Taupo to Turangi where the Department of Conservation Offices are situated. There can't be any more pleasant drive to work anywhere in New Zealand.

Every day lake is a different colour and hue. Driving home at night it is probably the best time of the day as the late evening sun casts its fingers across the lake.

I have to admit that I'm a convert. Although born and raised in the North Island I moved to the South Island for my education and there remained for 25 years. After living and working in among the magnificent lakes and fiords, forests and mountains of Fiordland it was difficult to make the move back to the North Island. I was very dismissive of Lake Taupo and openly said that I did not want to live anywhere in the North Island because nothing matched up to the South Island's beauty. That was 14 years ago. We have not regretted the move and daily as I travel to and from Taupo to Turangi I realise how narrow my thinking was. This is a fabulous place to live and work.

Back in the "good old days" there was a lot of rivalry between national parks. In Fiordland we saw Tongariro National Park as "the half-day park" whereas Tongariro Rangers thought Fiordland had a phallic complex because any time we spoke about the great national park it always seemed to have something to do with size!

Since arriving in the area I learnt very quickly that the two nation-



Looking for up to date information on the Taupo region? Want to know where to stay, where to eat, places to see and things to do? Check out Destination Lake Taupo's web site [www.thinkfresh.co.nz](http://www.thinkfresh.co.nz) Haven't got a connection to the Internet? Then visit any VIN Visitor Centre around New Zealand and ask for the Visitor Guide 2000 Lake Taupo New Zealand.

al parks are very different and quite rightly so. The beauty of Tongariro National Park and the surrounding area continually overwhelms me, including magnificent Lake Taupo and the lush green forests of Kaimanawa Forest Park.

Sitting sipping a cappuccino at a Ponsonby cafe on a humid afternoon an Aucklander might be excused for believing the world was centred on the city of sails. Those in the know will readily announce that the world is really centred on Lake Taupo.

Taupo is many things to many people. Ask a skier and his mind turns to the two largest commercial skifields in the North Island. 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 and all in one day?

The prime reason tourists come to this area is not because of theme parks or some other man-made attraction. It is for that breathtaking spread of nature that is laid out before you when you arrive on Taupo's shore.

The natural attractions of the central North Island are impressive. The area 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's attractions are world renowned.

### Tongariro National Park

Tongariro National Park was the first of our national parks to be established, following the gift of the sacred peaks by Te Heuheu Tukino IV Horonuku in 1887. It also now enjoys the distinction of being one of only twenty sites in the world to have been accorded dual World Heritage Status for its natural and cultural values. The walks around and over active volcanoes and ancient lava fields attract visitors from around the world and across New Zealand. Two major skifields on Mt. Ruapehu, Whakapapa and Turoa cater for the North Island's passion for skiing and are increasingly attracting overseas snow enthusiasts in-



Above right: There are many ways to enjoy the mighty Waikato River which drains Lake Taupo. One of the more adventurous is to throw yourself off one of the high cliffs - attached to a bungy cord of course! Below: Lake Taupo and its tributaries provide the finest trout fishing in the world. The size of the catches backs that up time and time again. (Photos: Destination Lake Taupo)





Right: Whitewater rafting is one of the many adventures in the area to satisfy thrillseeker.

Below: If more tranquil pursuits are to your liking cruising around Lake Taupo offers many quiet bays and anchorages and sights such as the modern Maori Rock carvings.

(Photos: Destination Lake Taupo)



cluding South Islanders! Despite setbacks caused by the spectacular eruptions of Mt. Ruapehu that played to a world-wide audience in 1995 and 1996 skiing has bounced back and the 1999 winter was a shot-in-the-arm for all involved in the ski industry. One of the big attractions for many visitors is to walk around the mountains using a series of well equipped huts for the overnight stopovers. One interconnected series of tracks is known as the Northern Circuit Great Walk and is promoted as one of a handful of top New Zealand walks.

### **Kaimanawa Forest Park**

The forest park forms a green border to the lake district, running along almost its entire eastern boundary. Hunters know the park well as it is one of the island's favourite domains for seeking a Sika or Red deer trophy. Those who prefer walking can enjoy boundless tracks through lush beech and podocarp forest vegetation. Access to the park is either off the Napier Taupo highway or from a number of roads off State Highway 1. Another alternative is to fly, by fixed wing or helicopter, to several landing points in or adjacent to the forest park where accommodation is waiting at well-spaced and equipped huts.



### **Geothermal delights**

To me, these are one of the most exciting aspects of living here. We live on the cold skin of a very hot planet. Cracks and pits in the skin allow some of that intense heat and activity to escape from time to time. The Taupo Volcanic Zone, stretches from Mt. Ruapehu through Lake Taupo, Rotorua Lakes and White Island out into the Pacific to connect with the Pacific Ring of Fire. The 'hot spots' where ground water comes in contact with friction heated rock deep below the surface gives rise to geysers, mud-pools, mineral pools, steaming ground and





Above: Skiing or snowboarding on Mt. Ruapehu, either at Whakapapa Ski Area (pictured above) or Turoa Ski Resort, attracts visitors from throughout the North Island and further afield.  
(Photo: Ruapehu Alpine Lifts)

vibrant colour where soil and rock are cooked.

Visit Craters of the Moon in Wairakei Tourist Park and enjoy a 45-minute walk through a steam-shrouded landscape that is continually changing. For most of the walk Department of Conservation staff have laid wooden boardwalk to protect visitors from the hot ground and to reduce the amount of environmental damage that would be caused by thousands of feet trampling through the area.

The underground heat has been tapped at a number of hot pool complexes, including one in Tokaanu at the southern end of the lake and another on the Napier/Taupo highway. Here you can soak in hot mineral waters straight out of the ground or heated swimming pools, which use heat exchangers.

### Fishing Paradise

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 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 67,000 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 when the line of anglers is silhouetted against a red lake.

### Adventure Heaven

Lateral thinking is a fantastic innovator. Many innovative ideas can be found around the Taupo area. Bungy off a Waikato cliff to within millimetres of the river (or head and shoulders into the river if you wish); fly like a bird for a minute or two from on high above Taupo on a tandem skydive; test your nerves on a high level ropes course (we have two in the region); cruise quietly through New Zealand's largest river delta (Tongariro) where if you are quiet you could see up to 40 of our bird species; get wet pounding down a river in a raft or a kayak, or spin 360° on a thrilling jet boat ride to the Huka Falls, or put on hiking boots to make the Tongariro Crossing over a spectacular volcanic landscape. Finish the day in a hot mineral pool - conveniently located at either end of the lake!

If cycling is your thing then get into practice for the Great Lake Cycle Challenge. If you prefer multisports try the Tongariro Mountain Classic, Crater to Lake, Lakes Express, or the big one, the Taupo International Ironman.

A few Taupo facts:

Lake Taupo is 359 metres above sea level, 40 km long, 30 km wide with an area of 616 sq km.

Taupo township has a population of 21,257; Turangi has 5,484 with 2,373 in the rural areas.

Yearly sunshine hours: 2,002

Yearly ave. rainfall 1,045 mm

Average temperatures:

Summer 22.8°C

Winter 11.7°C



Above: Close to Taupo is Pureora Forest where forest walks take you into a lush green paradise.  
 Below: Paradise of another sort as a patient angler casts into still green waters in search of the next catch.  
 (Photos: Destination Lake Taupo)

Dave Wakelin  
 Senior Community Relations  
 Officer

### Give me the Facts

The facts speak for themselves and show how valuable tourism is to the area. All around the world culture and natural features are big tourist attractions. Tongariro National Park is one of only twenty World Heritage culture and natural heritage sites.

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 interchange between 'local' and incoming visitors is very healthy for the community. That a large proportion of the attractions are on government land leads to regular dialogue and often shared management decision-making between local and regional authorities, community groups and iwi.

We enjoy a mix of tourists to the area. About 20% of all the visitors or 130,000 are international and all up are worth \$44 million a year to the region, supporting about 1600 jobs in tourism. This percentage is likely to grow in the new millennium. The domestic market brings 548,000 New Zealanders to the area, mainly from around the North Island.

The benefits to the Taupo area are tremendous. These visitors (international and domestic) generate over 1.4 million nights a year, staying an average of at least two nights. Directly they spend over \$130 million each year in the district, with downstream spending increasing this figure to \$208 million.

Taupo gets to you. I've lived here 14 years now, twelve years in Turangi and the last two in Taupo. There's a 'feel good' factor to the area where a balance of wonderful natural features, easy access, good local and government administration and management engender a willingness to recognise that the tourist is a key factor in the area's well-being. Destination Lake Taupo, the marketing wing of the Taupo District Council, works closely with the Department of Conservation to market and promote the attractions of the region while remaining sensitive to the need to protect the region's very special features and values.

Taupo is an area where relaxation is a key factor in enjoyment – where better to enjoy some relaxation therapy which is after all “development of regular and conscious control of physiological processes and their related emotional and mental states, and of muscular tensions in the body, as a way of relieving stress and its results.” Now that’s living!



# The Blue Duck Alpine River Specialist

I have studied the endemic Blue Duck (*Hymenolaimus malacorhynchos*) or Whio on the upper reaches of the Manganui a te ao River, Tongariro National Park, for 13 years from 1986 to 1999.

The first 3 ½ years of the project focused on defining territories of resident pairs on a section of the river from 1 km below the S. H. 4 road bridge, upstream to approx. 4 km above the S. H. 4 road bridge at Pokaka, referred to in this text as Area 1.



Above: A male Blue Duck keeps a watchful eye for intruders atop a midstream rock while his partner incubates a clutch of eggs.

Below: The best way to observe Whio in this habitat is to river walk.

(Photos: M Simmonds)



has greatly modified their habitat, and along with hunting pressure by Maori and early European explorers, and a host of introduced mammalian predators, their range has contracted greatly and become fragmented. Now Blue Ducks are confined to least modified streams with high water quality, stable stream banks, low transport of fine or suspended sediments, standing native riparian scrub or forest, with a wide diversity and abundance of aquatic invertebrates (Collier et.al), and are generally at higher altitudes in heavily forested areas.

Both sexes are alike in appearance, with males being slightly larger than females and slightly darker in colouring with more chestnut mottling on the breast. To the un-initiated, the only distinguishing feature is their distinctive calls. The male gives a shrill piercing whistle of "Whee-oo" which led to the Maori naming them Whio, while the female makes a low, grating "Grrr" sound.

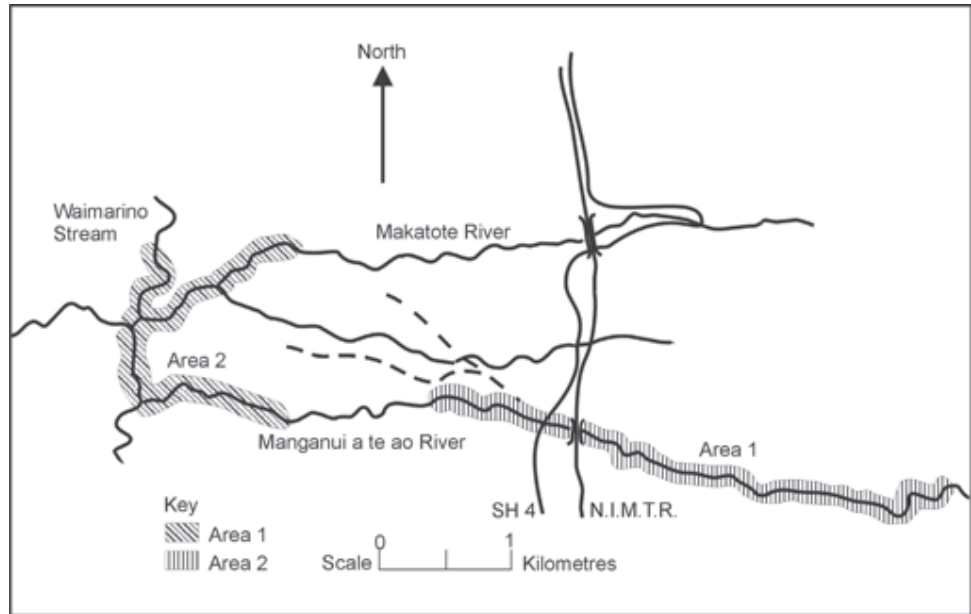
Blue Ducks mate for life and defend a territory year round. They live for approximately 10 years in the wild and usually commence breeding at two years of age, although pair bonds may be formed earlier than this.

I defined the territories of three pairs of Blue Duck in Area 1 over a 40 month period, September 1986 to December 1989. This was done by numbering and labelling every pool (Areas of smooth surfaced water), and riffle (areas of broken turbulent water) within the study area, I then mapped the area showing every pool and riffle and recorded all sightings of Blue Duck, in code form, per visit on transparent overlay

I also recorded annual productivity of pairs in Area 1 from 1986 - 1998, and in Area 2, located downstream of Area 1 at the Waimarino, Makatote, Manganui a te ao confluence area, from 1994 - 1998 (See Map).

Blue Ducks occur only in New Zealand and are one of only four ducks worldwide to inhabit fast flowing streams and rivers. However, historical records show that their distribution was once widespread and they were found at much lower altitudes than they are today.

The clearing of forests for farming and development and the damming of rivers for hydro electric power development



Map 1: The Blue Duck Study Areas

sheets on a master map. Over time a pattern formed showing where sightings most frequently occurred. This indicated preferred areas in each territory. Territory boundaries were defined by following pairs that were swimming at will, up or down stream until they reached a point at which they became visibly agitated or would turn around and fly back into their territory. These points were then repeatedly tested by trying to coax pairs beyond the point. After five consecutive tests at the same point at which pairs would not go beyond, the territory boundary was defined and marked on the master map.

Annual Productivity per Pair (Area 1)							
Year	Territorial Pairs	No. of Singles	Pairs Fled. Young	Total Fled. young	Fledglings Breed Pair	Fledglings Per Pair	Total No. of Birds
1988	3	1	1	2	2	0.67	9
1987	3	0	1	4	4	1.3	10
1988	3	2	0	0	0	0	8
1989	3	2	1	1	1	0.3	9
1990	2	0	1	1	1	0.5	5
1991	1	1	1	2	2	2	5
1992	1	1	0	0	0	0	3
1993	0	1	0	0	0	0	1
1994	0	1	0	0	0	0	1
1995	1	0	0	0	0	0	2
1998	1	1	0	0	0	0	3
1997	1	2	0	0	0	0	4
1998	2	1	0	0	0	0	5
<b>Mean</b>	<b>1.6</b>	<b>1</b>	<b>0.4</b>	<b>0.8</b>	<b>0.8</b>	<b>0.37</b>	<b>5</b>

Table 1: Annual productivity per pair in Area 1





Above: A typical calling pose; body low to the water, tail flat, head and neck extended forward.

Right: The white water specialist. (Photos: M Simmonds)

in the last two years. Annual productivity per pair was extremely low in all years except 1991.

The average output per pair over all 13 years was only .37 young per year. It would therefore take 16.2 years to replace the original three pairs of ducks. Given that the average breeding life span of Blue Duck is eight years, this population was not

replenishing their numbers, at a sufficient rate to be viably self-sustaining. In years that breeding occurred only one pair produced young reaching independence in any given year, further reducing the rate of recruitment per pair, within the population. This also showed that breeding effort per pair varied greatly with some pairs being more successful than others.

During years that breeding occurred (1986-91), four pairs were recorded in Area 1. Only two of these pairs produced young. One pair (L/M-0) produced seven young in four years, 1.75 per year. The other pair (R/G-M) produced three young in two years, 1.5 per year.

If all pairs had maintained a similar output rate in all years, then the population would have replaced itself every second year, with a surplus of 15.2 birds after eight years of average breeding life span.

#### Area 2:

Table 2 shows that productivity was also very low in Area 2, and in most years only one pair produced young. However, productivity did occur in all years, and total numbers declined only slightly overall.

On average, only .43 young per pair, per year reached independence. It would therefore take 22.3 years to replace the mean population size of 4.8 pairs, giving a recovery rate in Area 2, 72% lower than that of Area 1, but an annual output rate 16% higher than that of Area 1.

Of the three pairs studied, the territory lengths were similar. Pair 1 = 23 pools and riffles. Pair 2 = 29 pools and riffles, and pair 3 = 17 pools and riffles. The three territories were of similar physical length and were approximately 1.2 km long.

#### Area 1:

Table 1 shows that no productivity occurred in Area 1 since 1991, and that a steady decline in overall numbers occurred between 1992 and 1996. Numbers recovered slightly



Kerry Oates joined the Ornithological Society in 1986, and quickly became involved in many bird study projects around New Zealand. He was elected chairman of the Wellington branch in 1988. At that time he was a signwriter based in Wellington and spent all his holidays working as a volunteer for DOC, on many remote off shore islands such as the Chathams and Stewart Island.

In 1996 he took 12 months sabbatical leave to pursue his passion for Blue Duck research. He secured private sponsorship to undertake a 12 month predator trapping programme, and moved to Horopito, near the Manganui a te ao River. During this time many job opportunities of an environmental consultancy nature arose. In 1997 he resigned from the advertising industry to form his own consultancy/contracting business specialising in endangered species work, Whakamanu Wildlife Management.

Table 2: Annual Productivity per pair in Area 2

Annual Productivity per Pair (Area 2)							
Year	Territorial Pairs	No. of Singles	Pairs Fled. Young	Total Fled Young	Fledglings Breed Pair	Fledglings Per Pair	Total No. birds
1994	4	6	1	1	1	0.25	15
1995	4	5	2	4	2	1	17
1996	6	1	2	2	1	0.3	15
1997	5	3	1	2	2	0.4	15
1998	5	2	1	1	1	0.2	13
Mean	4.8	3.4	1.4	2	1.4	0.43	15

### Discussion:

The low annual productivity recorded in both areas may be an indicative characteristic of alpine populations, affected by a combination of factors influencing breeding success.

For example:

The deep incised nature of the river channel maybe more susceptible to riverbank disturbance during peak flows occurring in late spring as winter snows melt on the mountain.

Overall colder air and water temperatures at higher altitudes may affect the energy expenditure of Blue Duck leaving insufficient reserve for the breeding effort.

Invertebrate depletion caused by peak floods may also contribute to low energy reserves at crucial times of the year.

Little evidence of predation was found during the study period, however a trapping regime conducted throughout 1996 showed that mustelids, particularly stoats and rats were in high numbers throughout Areas 1 and 2.

The high dispersal rate of juveniles, particularly from Area 1 and a male bias in the populations may have affected mate selection opportunities, and an ageing adult population reaching the end of its natural life expectancy had little or no opportunity for replacement.

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I would especially like to thank Dr. Murray Williams for his patience and encouragement throughout my project.

Kerry Oates  
Whakamanu Wildlife Management

# Early Climbing in Tongariro National Park

Ruapehu from the south eastern slopes of Ngauruhoe, April 1898. Malcolm Ross took the photograph and his wife Forrestina (Bessie) Ross is the woman shown. Both were pioneering New Zealand climbers, ascending Ngauruhoe on this trip. M. Ross A Climber in New Zealand 1914. (Photo: Malcom Ross)



Dr. Graham Langton is an historian who has specialised in the history of mountain climbing in New Zealand.

Most people know that Tongariro National Park is a place for recreation, particularly skiing and walking or tramping. Less well-known is the park's extensive mountain climbing story. Since the 19th century the peaks of the park have been ascended for the achievement in doing so. They have also become a place to learn or practise climbing, especially in winter, perhaps as preparation for higher South Island mountains.

Mountain climbing is primarily a Pakeha recreation, but possession of the peaks has always been significant to Maori. There are stories of Maori ascents of Tongariro and Ngauruhoe before they became especially tapu in about the 17th century. The first Pakeha to Ngauruhoe's summit was James Bidwill on 3 March 1839, and there were other occasional ascents of Tongariro and Ngauruhoe between 1840 and 1870. Governor George Grey was probably the first Pakeha to consider climbing Ruapehu. Twice he went part way up north peak's leading spur in the early 1850s, but he did not reach the top.

These early ascents, some kept secret from Maori, often showed Pakeha ignorance of Maoritanga, especially the concepts of mana and tapu. They caused Maori to prevent ascents of the peaks, especially the most sacred, Tongariro, of which Ngauruhoe was a part. The wars of the 1860s and the move of Tainui and the Maori King into the lands of the Ngati Maniapoto, which became known as the King Country, made access to the central volcanoes more difficult for Pakeha till the 1880s. There were climbs from the late 1870s, but the approach was often from the south or east to avoid contact with Ngati Tuwharetoa in particular.

The Pakeha desire to appropriate the landscape through exploration, mapping and ascents was an expression of an intention to dominate, yet Pakeha curiosity about the novel volcanic landscape was perfectly natural. Accessible volcanoes were interesting and exciting to people brought up in a more stable landscape on

the other side of the world. The gift of the three peaks to the government by Te Heuheu Horonuku in 1887 preserved the mana of the mountains and made them available for study and recreation.

Up to the beginning of the 20th century, most of those who reached the summits were not climbers but occasional adventurers, tourists, photographers, surveyors and geologists. Tongariro and Ngauruhoe were usually the aim, needing no special skills or equipment in summer conditions. On the other hand, the peaks of Ruapehu, with their snow and ice, might require the use of alpine techniques at any time of year. Methods of recreational climbing with rope and ice axe were first worked out in Europe in the 1850s, and brought to New Zealand in the 1880s and 1890s. Just as important as climbing techniques and individual initiative were the provision of access and accommodation. The growth of mountaineering on the volcanoes depended on improved transport, tracks through the bush, and accommodation which could be used in winter as well as summer. Both private enterprise and the government had a part to play in creating facilities to encourage would-be climbers.

### **The beginnings of adventure tourism**

There were a few ascents of Tongariro and Ngauruhoe in the 1870s, and by the end of that decade Maori attitudes seem to have been changing.

An American tourist named Manson gained considerable newspaper coverage claiming that his ascent of Ngauruhoe on 14 December 1881 was the first time Maori had “given leave to any Pakeha to ascend the mountain”. That was possibly true, but his suggestion that “the natives have named it Manson Tongariro” was ridiculed. Local Maori had learned the commercial ethic. They first tried to charge him £100 for the ascent, then settled for £10 plus fees for the five Maori ‘guides’ they insisted on.

J. H. Kerry-Nicholls, an English gentleman-explorer, and his companion-interpreter J. A. Turner also gained attention in 1883 for ascents of Ngauruhoe and Te Heuheu, the north peak of Ruapehu. Peak-bagging and publicity were in style in the early 1880s.

Others had different interests. Henry Hill, Roderick Gray, Russell Duncan, Malcolm and Bessie Ross and others discovered, in the later 1880s and 1890s, some of the joys of wandering all over Tongariro and Ngauruhoe. Such visitors were drawn by the volcanic activity and the unusual landscape, as well as by the summits. They were also in the forefront of changing attitudes which were beginning to encourage sport and recreation.

### **Early Alpine Ascents**

Greater height and more difficult climbing conditions were to be found on Ruapehu. The Allison brothers, Thomas and John, made the first known ascent of Te Heuheu, on 12 December 1877, but the only snow they found was near the top. Their expedition was energetic but involved little more than uphill walking and scrambling.

The first alpine climb to the summit of Ruapehu, the south peak, now Tahurangi, was made by George Beetham and Joseph Maxwell in February 1879, from the south. The previous year Beetham had made an attempt from the east, using an alpenstock, a rope and a tomahawk to cut steps in the ice. Thwarted by the conditions, Beetham returned with Maxwell eleven months later for a successful ascent



from a camp near the edge of the bush. They also discovered the crater lake, not then steaming, and realised the lake was the source of the Whangaehu river.

Two years later, in a more extensive climb, the first woman, Ethel Birch, reached the summit of Ruapehu, with her husband, William, of Erewhon Station near Moawhango, and the Russell brothers, Arthur and Herbert, of Hawkes Bay. With Mr. Berkley, the manager of Erewhon, they camped near Ohinepango Springs. Early on 9 March 1881 Mrs Birch was instrumental in getting the party going early in the morning and she was first to the top of Te Heuheu. By that time they were on snow, using homemade alpenstocks, and they also needed a rope ladder. The Birches and Russells went on, round the crater lake to the west and up onto Tahurangi. Again the lake was not obviously warm. Then they had the long trek back to camp, after a thoroughly enjoyable climb.

### Climbing Surveyors and Geologists

For some years there were few recreational alpine climbs, but the opening up of the King Country and the gifting of the peaks led to official activity by surveyors and geologists as Pakeha located and annexed this part of the country for themselves. William Cussen led the first survey of the area in March 1883. The work was supported by Ngati Tuwharetoa but not by other Maori further south which necessitated some circumspection. Lawrence Grace and Hoko Patena played a prominent part in the ascents required to establish a trig on Ngauruhoe and Cussen also reached one of Ruapehu's summits, probably the west peak, now Paretaitonga. The geologist, James Park, climbed Ruapehu's southeast peak, now Girdlestone, and Tahurangi, on 8 January 1886, with surveying staff Dunnage and Dalin. On 5 April 1894, with Goodger and Noonan, Walter Dunnage made a further climb of Tahurangi, to examine the crater lake and take photographs of it. Unfortunately the first one published in government reports was the wrong way round! Lawrence Cussen, brother of William, climbed Tahurangi on 11 April 1886 and probably some peaks of Ruapehu again in April 1891 as part of surveys of the King



Tent camp near the edge of the bush above Rangataua.  
Oliver and Walker  
(Photo: The Weekly Graphic and New Zealand Mail  
19 April 1911)

Country and the volcanic plateau. He realised that the lake was warm, and perhaps boiling. On Ngauruhoe he found the continual small tremors made it impossible to take accurate sightings, so he moved the trig to Tongariro.

The geologist and occasional mountaineer Peter Marshall made separate ascents of Te Heuheu and Tahurangi in 1890-91 to study the rocks first hand. Surveyors continued to report on the volcanoes, most notably H. E. Girdlestone in 1909.

### Facilities and climbs 1898 - 1914

In 1898-99 a bridle track was formed from near Lake Rotoaira, up past Ketetahi Springs to Blue Lake, encouraging people onto Tongariro. Early in the new century the Tourist Department took responsibility for huts and tracks, and publicising the area. Arrangements were made for Mr. McSweeney of Tokaanu to guide people on Tongariro. Then two huts were built 1903-4, at Ketetahi and Waihohonu. The latter

Jane Thomson took this photograph on the summit of Tahurangi in January 1911, with Girdlestone peak behind. It shows two guides, E and D.O. Snow of Rangataua, D. Grant of Masterton and Mr. Allsop of South Africa. Miss B Higgle, the other member of the party, is not in the photograph.  
(Photo: Jane Thompson)



soon proved to be a good base for climbs of both Ngauruhoe and Te Heuheu.

Samuel Turner, a Manchester merchant who later settled in Wellington, climbed Ngauruhoe in October 1905 from Waihohonu hut. This was a solo effort because McSweeney would not venture onto the mountain in the wintry conditions and the local roadman soon found it too much. Turner was forced to cut steps most of the way up. His descent was even more difficult as snow blindness led to a lengthy overnight journey back, and a stay in a Wellington hospital.

The completion of the North Island Main Trunk railway in 1908 gave a considerable boost to recreation in Tongariro National Park, and climbing activity increased significantly, especially on the southern side. Two routes were cut through the bush by the end of 1908, from Ohakune and Rangataua, encouraging people onto the mountain. At Rangataua, the Snows, father and two sons, guided people up Ruapehu from the time they cut their track. An Ohakune Ruapehu Mountain Club was also formed on 3 March 1910. Both settlements established tent camps near the edge of the bush which served mountaineers till the war halted most activity. One notable climb in this period was a traverse of Ruapehu from Rangataua to Waihohonu in January 1911. Jane Thomson, later a significant climber in the Southern Alps, another woman and several men including guides rode from Rangataua to the tent camp. Next day they ascended Tahurangi and then went round the cra-



ter lake heading for Te Heuheu. However, they ran into a thick mist and had to navigate by compass in a north easterly direction, even after they had crossed the ridge from Dome to Te Heuheu. At one point Jane Thomson took the lead across a steep face because the guide was occupied with the other woman. Eventually they dropped out of the cloud and walked the further miles to Waihohonu hut.

Another climb in August 1914 was significant for its participants who were all to feature in the continuing history of Tongariro National Park recreation. After some skiing, William and Arthur Mead, J.W. (Skipper) Gittos, Bill Salt and Horace Holl made the first winter climb of Te Heuheu, with one pair of crampons between them!

### Horace Holl

Holl is the least known of the five 1914 pioneers, but for climbing developments he was the most important. One of New Zealand's finest all-round mountaineers who climbed extensively in the Southern Alps, he devoted considerable energy to making the central volcanoes available to recreationalists. Holl was an enthusiast for all aspects of the mountain world and he wanted National Parks New Zealanders.

In about 1916 Holl established a tent camp at Rapahurahura Bush beside the park and led the mass of people to the same places. He was always providing accommodation for "the mass of people" and his climbing and rock climbing ability. He was always to the same places. He was encouraging to women uncommon. Ronald Al-pioneer, considered than anyone else "to turn their thoughts to wife, Helen Adair McMaster, in 1917 at one of Holl's "economically priced tented holiday camps".



to be for all ordinary

established a tent camp at low the Tawhai Falls to tion on the Whakapapa the people". He publi-tramping, skiing, climb-trips, for people of any discovering more about also happy to return was particularly en-at a time when this was gie, another Ruapehu that Holl did more induce Aucklanders to the hills". Algie met his

In 1919 Peter Graham, the famous Southern Alps guide, decided Whakapapa should become the main base for Tongariro National Park. The first cottage specifically for recreationalists was completed at Whakapapa on 2 February 1920, funded by a £500 allocation from the Tourist Department the year before. Other buildings were added, including a kitchen, dining room and social room. There was also the 'Haunted Whare' a little distance away, formerly a shepherd's hut. Soon this little village, reached by road from 1926, supplanted Holl's tent camp and he used the buildings for his own parties. He also continued to wander, using a packhorse he kept at Waimarino for his gear, a camp in the Mangaturuturu valley to the west of Ruapehu, and the Ohakune Mountain Hut which had been constructed by Bill Salt and 'Joey' Blyth in 1921.

Holl was the central figure in the discovery of climbing possibilities all over the park, on snow, ice and rock, and often in winter. The Pinnacles on the Whakapapa side were one of his favourite climbs, and he first traversed them with Professor

Right: Horace Holl, one of New Zealand's finest all-round climbers made with four others the first winter ascent of Te Heuheu in August 1914.  
(Photo: S.P. Andrew)



Above: H.A.Holl (right), pictured during a climbing expedition on Mt. Ruapehu drowned while attempting to cross a flooded Mangaturuturu River on 27 May 1927.

(Photo: C.S.Pees)

Inset: J.A. Bartrum, a lecturer in geology at Auckland University and Holl's climbing companion on the ill-fated expedition.

(Photo: Schmidt)

F. P. Worley. Another preferred spot was Holl's Rock, a rock face above Tama lakes to the south of Ngauruhoe. He also tried to get the members of his parties up to at least the crater lake, if not higher. A 1925 party, for example, circumnavigated the crater lake as well as reaching the summit of Taurangi. Ngauruhoe and Tongariro were other popular objectives, using Waihohonu hut and Mangatepopo hut, first put on site in 1918. Holl also made the first ascent of the south-east ridge of Girdlestone. He enjoyed the rock and often led others over the hole in the ridge known as 'The Window', to Girdlestone's summit and on to Taurangi.

Only months before his death Holl led four others up Girdlestone, on a climb which was perhaps his most exciting ever. They climbed in a thunderstorm, and experienced lightning strikes, electrical shocks, hissing rocks and humming steel on the ice axes, as well as difficult weather and climbing conditions. An enthusiast such as Holl probably enjoyed the whole occasion.

Like many other New Zealanders Horace Holl died of misjudgement on a river crossing. On 27 May 1927 he and John Bartrum, lecturer in geology at Auckland University College, made their way up the flooded Mangaturuturu towards Holl's camp, fording the river a number of times. About two kilometres below the camp Holl, wearing a heavy pack, began another crossing with the pack-horse, without consulting his companion or pausing to consider the ford. Holl was forced to hold on to the "horse's trappings" but a short distance from the further bank he lost his footing and was swept away and drowned - a tragic end to an enterprising life at the early age of 48. His initiative, infectious enthusiasm, concern for others and achievements are commemorated in a cairn and inscription in the Mangaturuturu valley.

By the time of Holl's death, climbing and other recreational activities were well established in Tongariro National Park, and people from as far away as Wellington and Auckland regularly visited the mountains. Holl and others had shown that there was climbing of all sorts to be had in the park, summer and winter, whether it was preparation for Southern Alps climbing, or to be enjoyed for its own sake.

Dr. Graham Langton





Top: The famous 'picket fence' at the mouth of the Waitahanui Stream.

Above: Wind surfing is one of many activities carried out on Lake Taupo.

Above right: The historic 'Ernest Kemp' carries passengers on excursions around Lake Taupo with the peaks of Tongariro National Park as a backdrop.

Right: The Emerald Lakes, formed as a result of explosion craters, are a feature of the walk over the Tongariro Crossing.



Overleaf, centre pages: Sunset on Lake Taupo with the mountains of Tongariro National Park, World Heritage area in the background. An eruption plume from Mt. Rupaehu drifts away to the east.  
(Photos: Destination Lake Taupo)





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*Te Papa Atawhai*

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[www.thinkfresh.co.nz](http://www.thinkfresh.co.nz)





Top: Huka Falls attracts about 800,000 visitors a year making it New Zealand's most visited scenic attraction.

Above: Kayaking is one of many popular adventure activities in the Taupo area.

Above right: The area abounds in native forest from the Kaimanawa Forest Park to Tongariro and Erua Forests, Pureora Forest and many smaller reserve areas.

Right: Two major commercial ski-fields on Mt. Ruapehu attract hundreds of thousands of skiers to the slopes each winter.

(Photos: Destination Lake Taupo)



# Ruapehu - a big part of Scotty's life



Scotty on the job, 1989 winter.  
(Photo: Scotty Barrie Collection)

Karen Williams is an author and researcher who lives in Taupo. A past New Zealand ski champion she has written extensively about the mountains of the central North Island. Her publications include *Volcanoes of the South Wind* and *Coming Round the Mountain* published by the Tongariro Natural History Society, *Skiing on the Volcano* and a just published book on Swiss ski instructor and entrepreneur Walter Haensli, *Barrel Staves to Carving Skis*.

Karen has also published her family history and designed displays for Ruapehu Alpine Lifts. She is currently a researcher for Taupo Heritage 2000, a group collecting the Taupo's district's rich historical heritage.

Think of skiing at Whakapapa and, chances are, you'll think of Scotty Barrie. For the past 20 years Scotty has been in charge of operations at this busy ski area. He started out as a 'liftie' during the winter of 1969, joined the permanent staff in 1971 and stayed with the company for 27 years. For many people Scotty was the face of RAL - a cheerful, no-nonsense, radio-clad, burly mountain-man.

Three decades of working on the mountain have given Scotty a unique perspective. He's experienced good winters and bad and been involved with the company's emergence as a ski industry leader.

Forbes (Scotty) Barrie, from Linlithgow, Scotland, came to New Zealand 33 years ago to work on a Lands and Survey farm near National Park. He worked on the Taurewa block for John Piebenga who christened him Scotty and the name has stuck. After two years, working seven days a week on the farm, Scotty was ready for a change. The Tongariro hydro development was in full flight and he drove a huge fork hoist for awhile unloading equipment such as penstocks for the Tokaanu Power station at the National Park railhead. He already knew the mountain staff because the only local entertainment was the staff bar at the Chateau and the National Park pub in the days of the six o'clock swill. In the winter of 1968 he got a job as a garbiologist for the Chateau and moved up to Whakapapa. On his days off he worked for Ruapehu Transport Ltd driving skiers up the mountain road. Then it was back to the power project for the summer.

At the end of April 1969 Scotty joined RAL's casual staff working for them initially under a fictitious name. This was a tax dodge as he was still employed on a contract basis and didn't want to pay secondary tax. He got a hard time about his so-called name but Lorenz Rieser, the man in charge, said "Don't worry - just pay him the wages."

In June 1969 Scotty had his first taste of volcanic activity. Late one night he saw





Above: At the wheel of a mountain goat, winter 1970. Below right: Scotty the liftie - at work on the old Staircase T-bar in 1969.

This was in what Scotty calls the 'archaic days' of RAL when there was a members queue and a general queue. Those with members privileges got more frequent rides.

(Photos: Scotty Barrie Collection)

incandescence in the sky above Ruapehu's crater and next day saw the aftermath of a mudflow (lahar) which came down through the skifield and trashed the Staircase kiosk. He reckons the drama of eruptions just added another dimension to a job he was beginning to enjoy. But outspoken Scotty fell out with RAL's foreman Sam Bolliger and the following winter he was back driving goats up and down the Bruce Road.

Scotty headed to Mt. Buller in Australia for the 1971 winter. There was hardly any snow and he came back to New Zealand in early August. Whakakapa was desperate for staff and Scotty started the next day. He couldn't ski and one day was shown up by some Auckland women who tempted him to the top of the Staircase T-bar and left him there. It took him about an hour and a half to get back down the short but steep run on skis. Scotty then had a lesson with Kent Fugazzi on Hut Flat and by the following weekend he was skiing all over the mountain. This time when summer came

he stayed on with RAL. In the following year he got friendly with Australian Lynette Craven who started as a receptionist with the Chateau in October 1972.

In the early 70s Whakapapa employed about 22 staff, mainly lift crew, led by Lorenz Rieser, Sam Bolliger and John Bouleregard, a huge and lanky New Yorker, who looked after the staff. According to Scotty, Lorenz Rieser was practical, capable and very good mechanically. "He made the company strong at the base because he did everything to a high standard. He always built things to last at least 100 years. Everything had to be galvanised and then painted to protect it. Lorenz was right. You wander round the facilities and look at the presentation and see that he set the standard - and it's still there."

Scotty shudders when he recalls the RAL staff uniform in those days. "It was a set of overalls and either green or yellow PVC jackets and trousers. These were horrible plastic-like things that became stiff and tore easily. I still hate the thought of climbing into that uncomfortable gear! We worked a six day, 48 hour week, and were paid around \$20 per week in 1972."

The lift crew moved as a group, in uniform, outside the work environment. "We partied hard," says Scotty. "We were an obnoxious, unfriendly wild bunch and no-one crossed us. That culture came from Lorenz who was a nuts and bolts man not a people person. It was a whole decade before we had to change our attitude and began to move towards a culture of customer service."

Scotty and Lynette married in 1975. They arrived back in Taupo after their honeymoon just in time to see Mt. Ngauruhoe erupting. "As we drove through Taupo the bus driver said 'look out to your right and you'll see Ngauruhoe going off.' He was so casual about it."

In April 1975, Ruapehu erupted again ejecting mud and debris. A mudflow down the Whaka-



Key players in RAL's formative years: company directors Roger Manthel, (Bruce Jefferies - TNP chief ranger), Dick Duncan, Fergus Taylor, Roy McKenzie, Arthur Salek, Peter Scott, Julian Temm, Scotty Barrie (RAL staff), Lorenz Rieser (RAL staff), Bryan Todd (founding chairman), Joe Judge, Tomas Huppert and Jim McComish - in May 1981, Whakapapa Village.  
(Photo: Scotty Barrie Collection)



papa Glacier scoured out the route used by Warren Newland's Oversno Transport operation to the Crater Lake. He joined RAL as foreman during the winter of 1976. Warren experimented with snow grooming using a packer bar he built to tow behind his Nodwell tracked vehicle and had good results. In 1977, the company purchased its first Kassbohrer snow groomer ushering in a new era of snow management in New Zealand.

Scotty recalls that the first real move to improve customer service at Whakapapa came when Marcus Letica joined RAL. Marcus was involved with staff employment and he started to make inroads. Then Nancy, who later became Lorenz's wife, came on the scene. She had worked on the cruise liner system and knew what service was all about.

There was a change in the viewpoint of the directors of RAL as well and in 1977, Scotty was promoted to foreman to run the staff side of the operation. A year later Joe Judge came on board as general manager and the mountain manager's job was officially split into two. Lorenz became chief engineer and Scotty became field services supervisor. From then on, Scotty gradually took over the daily operational decisions.

In 1978, a new commercial skifield started up on the southwestern slopes providing Whakapapa with competition for the first time. RAL was forced to take stock and work on its image. Scotty says although there were still plenty of people still coming to Whakapapa, numbers were affected, no question about that. "Turoa had a big influence on RAL picking up its act and we had to raise the standard of customer service. That change, to RAL's credit happened really fast. We got decent uniforms with the company name on them, hostesses were employed where prior to that there had only been lift crew, and then, God help us, 'staff training' happened."

Scotty says although Lorenz was no longer involved in the daily operational decisions in times of crisis he still came to the fore. "Like the time a big storm badly iced-up the Far West T-bar and before we could clear it we had high winds and it fell over. Lorenz realised quickly what needed to be done and had it fixed in four days. He would work in difficult conditions, would come up with masterful solutions and could pull the company out of the shit."

Lorenz Rieser, who had been with RAL since 1958, died suddenly in 1993. His name is remembered on the mountain in Lorenz's Bar and Cafe at the Top o' the

Bruce.

By the early 80s RAL had become an industry leader with high-class management and staff. The company was very sound financially and it could take great pride in its more sophisticated operation. There were fewer dramas and everything was running well. However, it was still very hard for the company to efficiently manage the ski area due to the fact RAL did not have total control of the whole mountain operation until 1988. "For instance", Scotty says, "Lands and Survey, the park managers of that time, who also ran the ski patrol, would try to call the shots. They would say: 'we believe it's too dangerous to operate and we want you to shut the skifield.' RAL had built up a lot of expertise over the years and we didn't need that kind of pressure."

"It's been a lot more straightforward in the last decade now the Tourist Hotel Corporation, Happy Ski Valley Ltd, Department of Conservation and others are no longer involved in the day to day operations of the ski area. Whakapapa, has gone through a huge change from just a lift company to a complete ski resort capable of giving better deals. Before it was purely out there to sell lift tickets. Now each individual part of the operation helps out."

Scotty acknowledges that DOC has moved on substantially from the days of the old Department of Lands and Survey. "There's business plans now as well as park management plans and the rules are much clearer. Managers are employed for their business acumen and anyone wanting to operate in the park knows the parameters. Before they were still making up the rules and some of the people administering the park appeared to want to keep it locked up rather than to see it expand for the enjoyment of the user. That era was very frustrating for the company. At times, we had to sneak around and blow up rocks which were a hazard. It was a dilemma, the administrators still wanted you to make it safe but they wouldn't give RAL the power to do so."

Scotty says the company was founded by skiers for skiers and it always had a background of conservation. "At one stage we didn't always live up to it. We spilled a lot of oil and fuel in the past and weren't too good with our rubbish handling. But there's been a shift in the company culture in this area too and now it's in the

Scotty and team clearing a thick coating of rime from the West Ridge quad during the winter of 1993.  
(Photo: Scotty Barrie Collection)



company's interest to have conservation at the forefront." He believes Dave Mazey, the current manager, who has a conservation as well as business background, has led this change.

Scotty explains that increasingly RAL has begun to look at ways of working within the rules without trying to change the environment. "Take snowmaking - you can now put in temporary pipes for the winter which are removed in the summer so they're not an eyesore. And after 20 years of snow management, the techniques have improved so much it is not as crucial to do rock grooming anymore. Up to a point, the company has the ability to excavate and shift the snow to where it wants it using snow trailers and the latest innovation is a winch cat. It is also getting easier to make snow under a wider variety of conditions."

Scotty believes that, without a doubt, running a ski area is so much easier now than it was 20 years ago with things like radios, skidoos and better weather observations all helping to run the mountain more efficiently. However, he's seen quite a few eruptions over the years and comments that management of a ski area on a live volcano is a different matter.

"The big ash eruptions from Ngauruhoe eruptions of 1975 stand out and we were worried when Ruapehu was really honking in 1995-96," says Scotty. "Just when the company was on a roll after some super winters volcanic ash affected two ski seasons and then we've had these last few snow-poor seasons. But, actually, it's the volcanic activity and the extreme conditions that have always made the mountain so interesting."

Ironically, it was these factors which forced Scotty to leave Ruapehu Alpine Lifts at the end of 1998 after 27 years. He was unable to accept the financial constraints forced on the company by the difficult years and chose to leave RAL. Scotty now runs a passenger transport service from Taupo to the Tongariro National Park and boat cruises on Lake Taupo and the upper reaches of the Waikato River. He and Lynette, who continues to work at the Chateau as financial controller, live at Waitahanui, near Taupo, and now commute to the mountain to work. They are both as enthusiastic as ever about introducing people to skiing and to the park. Ruapehu is still Scotty's favourite haunt and if he's not up the mountain he can often be found at his 'office' at Replete Cafe in Taupo.

Karen Williams  
Fire and Ice Consultants  
Taupo



A DOC/RAL meeting, winter 1987, to look at possible sites for a new T-bar in the Far West area. Left to right: Lorenz Rieser (chief engineer), Ian Goodison (DOC), Dave Mazey (in his first year as general manager of RAL), Ben Kirsten driving the Kassbohrer, and Paul Green (district conservator - Tongariro).  
Photo: Scotty Barrie Collection)



# Ecological restoration on the mainland- a conservation strategy for the new millennium

## Workshop and summary of progress to date

A workshop on 12–14 October 1999 confirmed that ecological restoration (ER) in specific areas is a useful part of the DOC's conservation management spectrum. Ecological restoration (also known as mainland island restoration and nature recovery) projects can be characterised by four features: ecological restoration goals with a tendency toward an ecosystem focus, intensive integrated multi species



The lake of Rotokura in Rangataua Forest, a sacred place to Ngati Rangī and a feature of the Karioi Rahui extends from the lake area up the slopes of Mt. Ruapehu in the background.

(Photo: Harry Keys)

pest control, detailed monitoring, and high costs and returns. These features set them apart from other conservation management projects.

The Department of Conservation established six official mainland ER sites in 1995-97 including Trounson (Northland), Northern Te Urewera, Boundary Stream (Hawkes Bay), Paengaroa (near Taihape), Rotoiti (Nelson Lakes National Park) and Hurunui (inland Canterbury). They range in size from 117 ha to 6000 ha. Possums, rodents, mustelids (e.g. stoats), cats, ungulates (goats, pigs, red deer), and weeds have been targeted at 3-6 sites. Wasps have been controlled (almost to the 100% level) at Rotoiti and other pests such as hedgehogs, rabbits, hares, chamois, myna and magpie are

informally controlled or are being considered for further control in the range of sites. As a result of this effort, pests have been reduced to lower levels and maintained there for longer than is normal in pest control operations.

Reported outcomes are significant in that they indicate, virtually for the first time, that populations of a range of native species can be enhanced and ecological processes revitalised at mainland sites as a result of intensive pest control (Saunders 1999). Some key conservation outcomes of this effort include:

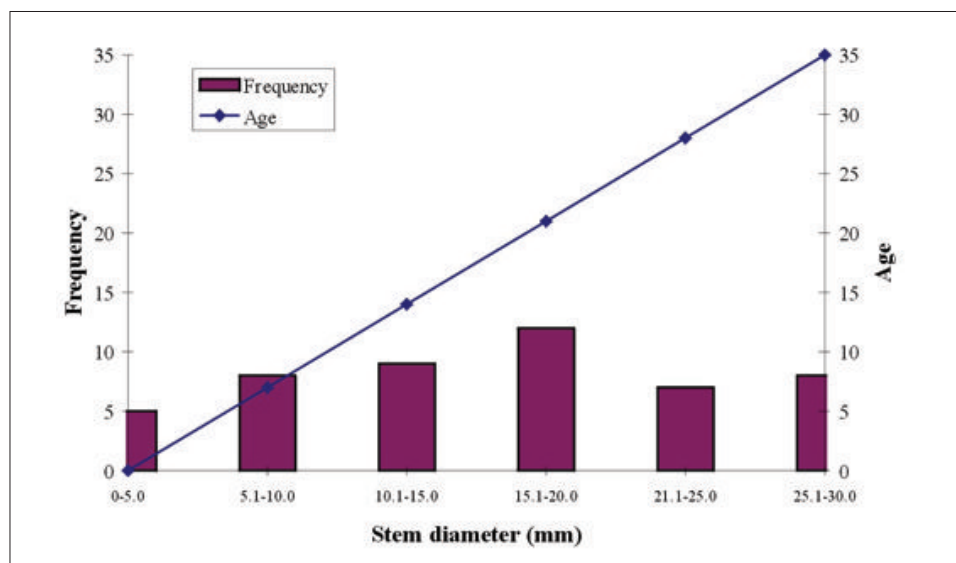
- Highest kiwi chick survival rates recorded in New Zealand at Trounson (29-58% cf 5% normally) with none killed by mammalian predators. Survivorship in the core area at Northern Te Urewera has averaged 43% (stoats still killing half the chicks). North Island brown kiwi populations are increasing in these areas
- Significant increases in populations of other birds including kereru, tui, fantail, robins, kokako, mohua (yellowheads) and kaka
- Significant recovery of forest canopy and other vegetation tiers, and increased fruiting and fruitfall
- Significant reduction in browse of and increased health of vulnerable or threatened plants such as northern rata, pirirangi (mistletoe including pollination rates of 99%) and kakabeak
- Energy level of honeydew in Rotoiti beech ecosystem kept above 2500 joules which has been shown by Landcare to be a level that birds can feed on

The *Alepis flavida* mistletoe population near Mangaehuehu Hut is the largest most viable population known in the North Island although it may be declining. The graph shows two parameters:

(a) the frequency of various sizes of stem in the population is shown as vertical columns with the most numerous diameter being 15.1 to 20 mm

(b) the predicted age of plants in each of these size classes is shown as a sloping line, and was calculated using the method of David Norton and others. There has not yet been a pulse in regeneration or any increase in mean plant size as a result of possum control and some plants are old. Therefore it is unlikely that possum browse is the main reason for an *Alepis flavida* decline here. Some plants had abundant fruit with a lot seemingly going to waste despite the observed foraging by bell-birds. Therefore declining bird numbers could have limited fruit dispersal and regeneration. If so it will be important to control bird predators.

(Graph: Nick Singers)



productively

- Good progress in building and maintaining good neighbour relations
- Important progress in relation to some other public awareness objectives, including community support, although measurements are subjective

The value and necessity of ER has now been clearly demonstrated on the mainland as it has on true islands. For some ecosystems and species it may be the best or only way of achieving outcomes required by the Convention of Biological Diversity, Environment 2010 and New Zealand's draft Biodiversity Strategy. There is some very preliminary indication that some ER projects may be more cost-effective and less risky than some single species projects but this has not yet been proven either way.

ER on the mainland has great potential for increasing Department of Conservation's and New Zealand's capacity to conserve biodiversity including increasing capacity and support outside DOC. Priorities including research themes have been identified that could lead to further development of that capacity and the network of existing and potential ER sites. Research and monitoring is also required to address some outstanding concerns with ER projects such as ongoing application of long-lived toxins.

The goals and objectives of the workshop were mostly achieved. A series of conclusions and recommendations for priority actions were refined or elaborated through plenary and working group sessions at the workshop.

### **Karioi Rahui ecological restoration candidate project**

The Tongariro/Taupo Conservancy and Ngati Rangi established the Karioi Rahui ecological restoration project in 1996/97 (see Tongariro, December 1997, page 17). Four goals are presently recognised:

1. prevent local extinction of North Island brown kiwi
2. enhance populations of other threatened species
3. ensure security of pekapeka (short-tailed bat)
4. work closely with tangata whenua and local community

Milestones of the project to date include:

- Support of Ngati Rangi has been achieved
- A Memorandum of Agreement between the iwi and Department of Conserva-

Right: A red beech tree in Karioi Rahui in which hundreds to thousands of short-tailed bats periodically roost in winter. DOC bat scientist Brian Lloyd provides scale. A slit hole about 3.5 metres above the ground on the right is the entrance to the colonial roost.  
(Photo: Harry Keys)



- tion has been gazetted
- The partnership is working well at a local level and is starting to have wider benefits to conservation
  - Possum control has been carried out over 3000 ha
  - Two maintenance bait station network have been established
  - There has been extensive bat research, information gathering and ongoing monitoring
  - No adverse impact has been detected on the bat population
  - An extensive baseline has been established for vegetation monitoring
  - This has shown that rongoa (Maori medicinal plants) are useful and appropriate indicators of possum browse and that possum control has provided significant benefits for them
  - The largest mistletoe population in the North Island has been discovered which has high diversity, and a pollination rate of 62% was measured in 1998/99
  - A base funding of \$58,500 has been established
  - The Rahui has gained a high national profile as an ecological restoration candidate

In addition, kiwi eggs have been removed from nearby Waimarino Forest in a cooperative project between Tamahaki, Winstones, Whakamanu Wildlife Management and DOC. There is agreement that some juvenile kiwi growing to 1000 grams weight from these eggs will be released into the Rahui.

Following the workshop there are several lessons that we need to address and take up in the Karioi Rahui project:

1. We need to emphasise both its multi-species and ecosystem goals. These are key defining characteristics of ER projects and important ways in which they gain synergies that make them effective.
2. Therefore we need to move to (a) integrated multi species pest control and (b) more outcome monitoring. Both (a) and (b) are also characteristics of successful ER projects.
3. It would be good to establish a Technical Advisory Group to assist the co-management of the Rahui. Specific comments and assistance from Ngati Rangi will be essential to progress through potential steps such as agreement-in-principle, identification of the sorts of people that might be represented, and identification of specific people.
4. One of the early tasks of such a group would be to help review the projects feasibility study (July 1997) and in particular advise on the design of threat control and outcome monitoring.

Generally however the Karioi Rahui ecological restoration project seems well positioned to be able to be part of the next step nationally in ecological restoration on the New Zealand mainland.

#### Acknowledgement

The Department of Conservation is pleased to acknowledge the support and enthusiasm of Ngati Rangi in the Karioi Rahui project

#### Reference

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Harry Keys  
Conservancy Advisory  
Scientist

# Future Directions of Tongariro National Park

The Grand Chateau, Whakapapa Village, with Mt. Ruapehu in the background. The village is the only site of permanent habitation in the national park and as such has its own volume, as part of the Tongariro National Park Management Plan.

(Photo: Ruapehu Alpine Lifts)



The new millennium is an appropriate time to look at the future of our protected areas and the management challenges that lie ahead. I will focus my comments on Tongariro National Park but many of the issues will apply to other protected areas. Tongariro National Park Management Plan will be reviewed once the Conservancies Conservation Management Strategy is in place. The Management Plan will need to look ahead and guide management over the next ten years. If we look back over the last thirty years we can see how each management plan has evolved. Early plans were more like development plans followed by a strong focus on zonal planning with the introduction of amenity areas, wilderness areas etc. The current management plan is specific as to what is allowed and what is not allowed in the Park. It has given strong direction to both managers and the public; there have only been a few grey areas that have needed careful interpretation. When it was prepared in 1989 there was extensive public debate on some issues e.g. the height of the skifield and the use of helicopters.

Since the management plan was completed the Resource Management Act has been enacted and it has given a focus on 'effects' rather than on a 'zonal' or 'activity' planning approach. At the same time there have been questions raised as to whether any management plan policies can be so absolute as to 'fetter' the decision of the minister. This means there has been a move towards management plans that are more generic.

Tongariro National Park is unique in New Zealand as a National Park with both national and cultural World Heritage status. It is a comparatively small national park at 79598 ha with easy access as a result of having both a 'ring' roading network and three internal roads rising to an altitude of over 1600 m. Being sited in the middle of the North Island and being the only area suitable for commercial skiing means it is inevitable the Park will have a high number of visitors. It is true that visitation has





Snowmaking equipment has become an essential part of modern skifield management (Photo: Ruapehu Alpine Lifts)  
 Below: The new DOC signs in their distinctive layout and colours (yellow and green) clearly define land the department manages.  
 (Photo: Herwi Scheltus)

Paul Green  
 Conservator

dropped in recent years as a result of the skifields being closed as a result of volcanic eruptions and a couple of poor snow seasons but it would be naïve not to expect winter visitation to rise back to the numbers of the early 1990s. Summer visitation is continuing to steadily rise. If we are unable to provide prescriptive policies in the management plan we must try and predict the types of pressures that may apply to Tongariro and ensure that the philosophy and principles of the plan are clear enough to guide any evaluation of the 'effects' of any development or management proposals. It is not always easy to identify future issues, for example there are many new recreational activities such as bungy

jumping, hang gliding, mountain bike riding that were not in vogue 20 years ago. Similarly snow making, snow grooming, quarrying and transporting snow were not issues 20 years ago.

Cultural World Heritage Status emphasises the need for Tongariro to give appropriate recognition of its cultural values including the way that tangata whenua are involved in management. These are comparatively new concepts and are threatening to some members of the community. At the same time we can expect to see new methods developed to cope with pests such as stoats, possums and heather if we are to maintain the Park's natural values. Intensive visitor use will need to be managed in policies relating to overnight accommodation, tracks, treatment of sewerage etc.

To sum up, I believe that the management plan must have policies that ensure Tongariro National Park has its integrity protected forever and this can only be achieved by the management plan philosophy and management principles giving clear direction to the various policies. The philosophy and management principles must reflect the cultural and natural values of the Park. If there is any doubt these cultural and natural values must have priority. If there is a need for management to be conservative I believe that this will be a strength in the long term rather than a weakness.



# Ruapehu Crater Lake issue

The 1995-96 eruptions of Ruapehu deposited a mantle of volcanic ash up to 6.5 metres thick over the former outlet of Crater Lake. A sudden failure of this ash dam when the lake rises against it is likely to release a flood (lahar) eastwards down into the Whangaehu Valley. This problem and what to do about it is known as the Crater Lake issue. The Department of Conservation has carried out an environmental and risk assessment of the issue, using scientific investigations of the stability of the crater rim and associated hazards, and how they might be mitigated.

The final Assessment of Environmental Effects report on the Crater Lake issue was sent to the Minister of Conservation in August 1999. This followed its completion in March after extensive consultations with the Tongariro/Taupo Conservation Board, iwi and other groups, and after taking



Peter Otway, ex GNS, one of many scientists whose years of careful research into Mt. Ruapehu has increased the overall knowledge of the volcano. (Photo: Helen Mitchell)

into account 45 submissions received from members of the public, recreational groups, local and regional government, industries or organisations with assets in the hazard area, scientific groups and others. The World Heritage Committee in Paris has also been kept informed.

Work after March involved monitoring the crater rim, learning more about possible components of a suitable alarm system and legal issues (some of which were raised by the Conservation Authority at its December 1998 meeting). Ian Nairn inspected the outlet area and noted that considerable gully erosion in the tephra mantle has occurred to the northwest of the

divide. Gullies are still shallow to the north but inroads are again being made in the 1995 tephra despite the relatively less erodible nature of the overlying coarser 1996 tephra. The divide itself has lowered about 10-15 centimetres by wind action. Peter Otway remeasured the rim survey markers and concluded that only two on the eastern rim could be classed as at all significant. These are close to the crack and fumarole system that developed during the 1995-96 eruption.

Crater Lake is filling 12 % slower on average than it did in the period leading up to the Tangiwai Disaster in 1953 following the 1945 eruption. On 27 August the lake level was 2473 m, 57 m below the old overflow level. The lake was 20% full down from the 25% full peak level to date (reached in March 1999). We expect it to rise above the 2479m level this summer due to meltwater influx. If the lake continues filling at the current rate it will not reach the former overflow level before August 2003 at the earliest and may not reach it until after 2006. After that it will take another one to two years for the lake to rise enough to overtop the ash dam although the flood could occur at any time in this one to two year period.

Scientists from the United States Geological Survey responsible for development of lahar alarm systems at Mts. St Helens and Ranier in Washington state have confirmed that their technology will be available at cost for Ruapehu. We are confident that a reliable alarm system can be designed and built in the lake outlet area and upper Whangaehu Valley. It will give at least 45 minutes warning of an impending lahar reaching State Highway 1 and almost two hours for Tangiwai. This will allow transport authorities and others time after receiving the alarm message to take the

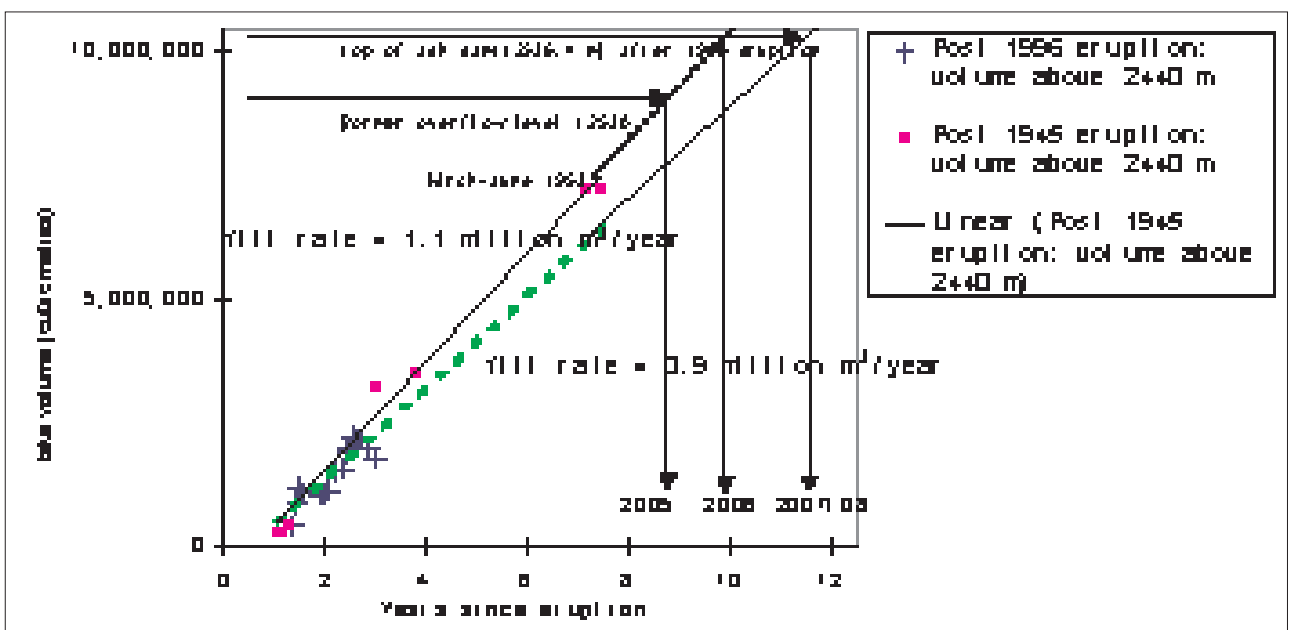
Crater Lake, Mt. Ruapehu before the 1995 eruption when it was at its normal overflow level. In August 1999 the lake was 57 metres lower than in this photo. (Photo: Helen Mitchell)



necessary steps to secure bridges, roads and power supplies that would be threatened. Therefore public safety in these places at Tangiwai and along the Desert Road will largely be assured.

Based on all this, the Department of Conservation's opinion is that the alarm and response system is the most preferred way to reduce the risks associated with the mantle of volcanic ash at Crater Lake. There is no lahar hazard from collapse of the ash dam until the lake fills to that level and this will take several more years yet. In the meantime natural erosion will have more time to reduce the severity of the potential lahar hazard. The Minister of Conservation must resolve between deciding to create an artificial breach in the ash dam or letting a natural process occur and rely on a comprehensive alarm and response system to mitigate the risks. The Crater Lake is perhaps the most special part of Tongariro National Park - a World Heritage Area and such a breach would have a major impact on cultural and "philosophical" values and would raise concerns about precedence. Two other points to consider are whether natural erosion will continue at the ash dam or whether a further eruption might occur and fill in the breach before the lake rose to that level. There is some justification for building a bund to stop the lahar from spilling over

Below: Graph showing the volume of Crater Lake at various times after the 1996 eruption (crosses) compared to after the 1945 eruption (squares). The volume of the crater is greater now than it was after the 1945 eruption and the lake is filling more slowly (0.9 million cubic metres per year, cf. 1.1 million cubic metres per year after 1945). These fill rates allow predictions of filling time assuming filling processes remain the same.



into the Tongariro system, as is expected. In addition to a spill-over lahar, ongoing evolution of the active Whangaehu outwash fan has meant that spill-over of Crater Lake water is likely to become more frequent than in the past. In fact there is strong geological evidence provided by Massey University that the Tongariro could become the natural route of Crater Lake water off the mountain. The timing of such potential capture can not be determined other than by monitoring. It would have major and unacceptable environmental and social effects in the Tongariro-Taupo-Waikato catchment.

An Emergency Management Group needs to be set up under Manawatu Wanganui Regional Council and the new emergency management legislation. The Department of Conservation will participate in this to ensure adequate warning response systems and contingency plans are set up and to pursue the option of a bund to prevent spill-over into the Tongariro.

Minister of Conservation will be releasing his decision on the matter shortly.

Harry Keys  
 Conservancy Advisory  
 Scientist



Above right: 1968, and a new set of signs are about to be installed on the Tongariro Crossing. The young fellow second from the left still works in the area, as General Manager of Ruapehu Alpine Lifts!

(Photo: John Mazey)

Right: Now we know why Picton Area Manager, Roy Grose, put so much effort into the board walks out to Silica Rapids when he worked at Whakapapa in the late 1980s. Perhaps the Marlborough Sounds have made him soft, or perhaps he is starting to get old, but there was once a time when Roy could carry a stag like this back to the village on his back. Roy managed to shoot two stags and a hind this roar during his annual 'week up the mountain'.

(Photo: Cam Speedy)





# The heather debate - 75 years ago!

If you've travelled in Scotland you will know how magnificent the heather looks, clothing hills and dales, turning the landscape a delicate shade of purple and



Above: The vast tussock slopes of Mt. Ruapehu, today often tinged with purple (foreground of photo) because of the work of honorary warden John Cullen during the early part of this century in spreading heather seed and planting thousands of seedlings.  
(Photo: Destination Lake Taupo)

evoking many a Scottish lament. Into these same heather-clad hills came the English landlords, evicting Scottish tenants and establishing the gentlemanly sport of grouse, pheasant, deer and partridge shooting. Many evicted tenants made their way to New Zealand where land was more freely available and a feudal system of ownership did not exist.

Fortunately some areas remained relatively untouched because of the remoteness and rugged nature, unfit for settlement or farming. These areas formed the basis for our national parks.

Tongariro National Park was our first national park, expanded over years by successive governments after the initial gifting of the sacred mountain peaks by paramount Ngati Tuwharetoa chief, Te Heuheu Tukino IV Horonuku.

Few visited the park in its early years largely because of the limited and difficult access into the central North Island. Those that did were overwhelmed by its beauty. The awe inspiring volcanic peaks were offset by the swathe of red tussock that covered the lower slopes and plains of the national park and surrounding area.

That scene was to change forever, largely due to the vision of one man - John Cullen. Cullen was born in Ireland on 28 March 1850. In 1869 he joined the Royal Irish Constabulary but in 1876 he left the force to journey to New Zealand with his wife and five children. He had no sooner arrived than he joined the Armed Constabulary and rose very quickly through the ranks. He was described as being a disciplinarian and over bearing towards his men. In his own words he was "... naturally a strict man." In 1912 he became Commissioner of the New Zealand

Police, the first ever to rise to that position from the ranks. Cullen had close personal friends in high places notably Alexander Herdman, then Minister of Police and Prime Minister William Massey. In 1912 management of Tongariro National Park was passed to the Department of Tourist and Health Resorts and about this time John Cullen was appointed as an honorary warden.

Some of Cullen's actions as warden were commendable. He convinced the Mayor of Auckland, Sir James Gunson, that the park was "The national playground for the people of Auckland". This was at a time not long after the North Island Main Trunk Line had been completed and motor transport was the fashionable thing. Gunson embraced the idea and with the assistance of the Ruapehu Ski Club, Tararua Tramping Club and the Tongariro Sports Club they were able to persuade parliament to extend the park's boundaries by land purchase to include most of the slopes of the mountains in the park and in 1922 have the Tongariro National Park's Act passed through parliament. The new act saw the park increase in size to 58700 ha (today it is 79598 ha) and a Tongariro National Park Board replace the

John Cullen, Commissioner of Police, honorary Tongariro National Park warden, park board member and responsible sowing and planting heather in the park.

(Photo: Alexander Turnbull Library)



Tourist and Hotel Resorts Department administration.

It is the other side of Cullen's endeavours that have left the most lasting influence on the park. He had a vision: the park had the potential to rival the great moorland grouse and partridge heath of Scotland. His record with the police showed that he was a determined single-minded person who would brook no interference. Once again he received support from William Massey and Sir James Gunson.

As early as 1912, not long after his appointment, he began his grand plan. There are indications that several deliberate fires were lit to remove the tussock cover to provide better prepared ground for the heather seed to

establish. Through his determination and influence he was able to import 10 tonnes of Scottish, Irish and French heather seed and also arrange for the government nursery in Rotorua to grow about 15000 bell heather and common heather seedlings. His friend Herdman was also the Minister of Justice and Prisons as well as Police so perhaps it isn't surprising that local prisoners carried out much of the planting.

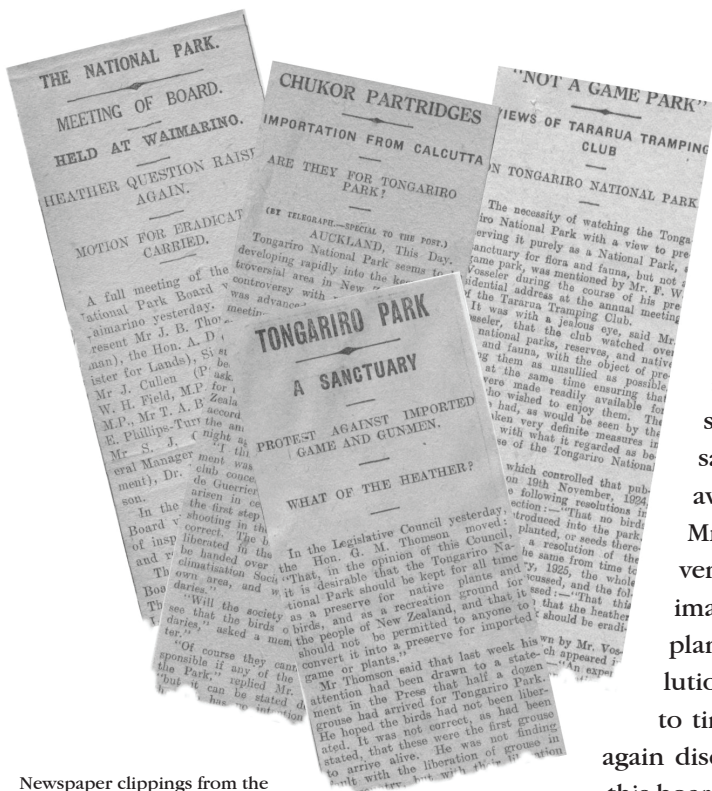
Despite growing opposition to the heather project (Professor Kirk from Victoria University voiced his objection to the Prime Minister in 1914 and the issue was raised in the house in 1917) Cullen has fortune on his side. World War I took the country's attention and its young men elsewhere. Cullen used the war years to quietly work away at his project.

He was sufficiently relaxed about his project to issue this public statement in 1917: Work is under way fitting out part of the Tongariro Park as a moor for game. For a long time Mr. John Cullen has been working quietly with a little financial assistance from the Government to replace the tussock with heather - later on it is proposed to import grouse, woodcock and other fancy table birds.... Thousands of plants have been spread over the Waimarino Plains and are doing well. Thousands more, are in the Government nursery, at Rotorua nearly ready for planting out...

Opposition was building and the newspapers began to play a significant role in reporting the debate and offering editorial on the issue.

The New Zealand Post on 26 September 1924 reported that in parliament the Hon. G. M. Thomson moved: "That, in the opinion of this Council, it is desirable that the Tongariro National Park should be kept for all time as a preserve for native plants and animals and as a recreation ground for the people of New Zealand, and that it should not be permitted for anyone to convert it into a preserve for imported game or plants."

Mr. Thomson noted that half a dozen grouse had arrived for Tongariro Park. He did not find fault with the liberation of grouse in this country, but with their liberation in a game sanctuary. Heather was, he observed, a most aggressive plant, which



Newspaper clippings from the 1920s show that interest in the heather debate was high among the Park Board, members of parliament and interest groups such as the Tararua Tramping Club, Ruapehu Ski Club and others.

might grow to the detriment of native flora. Other MPs supported Mr. Thomson's stance whereas some believed there was no need to be afraid of heather.

The Evening Post reported on a lively meeting of the Tararua Tramping Club on 20 June 1925 where the president Mr. F. W. Vosseler said the club watched over the national parks, reserves, and native flora and fauna, with the object of preserving them as unsullied as possible, while at the same time ensuring that they were made readily available for those who wished to enjoy them.

Mr. Vosseler noted that the park board on 18 November, 1924 passed a resolution "That no birds animals be introduced into the park, or trees or plants planted, or seeds thereof be sown, without a resolution of the board authorising the same from time to time." Three months later the whole subject was again discussed, with the an additional resolution "That this board is of the opinion that the heather now growing in the park should be eradicated."

However the following appeared in 'The Post' on 12 June, 1925 - "An expenditure of £100 on the importation of chukor and seese partridges, under the auspices of the Auckland Acclimatisation Society, has been sanctioned by the Tongariro National Park Sports Club. The secretary, Mr. John Cullen said that after much negotiation, the zoological authorities at Calcutta had agreed to procure and forward a large number of these birds, on receipt of £100 or £150. They would provide splendid shooting in the area in which they were liberated, and would doubtless thrive, being accustomed to upland districts at the base of the Himalayas. Mr. Cullen also stated that two brace of francolin, a species of partridge, had been procured by Mr. Justice Ostler from South Africa, and negotiations were proceeding for a further supply."

It is clear from the report of the tramping club meeting that it and other clubs that used the national park saw themselves as self-appointed watchdogs with a special interest in conserving the natural features of the park. Mr. Vosseler pointed out that the Mr. Cullen mentioned in the paragraph as secretary to the Tongariro National Park Sports Club was also an honorary warden of the park, and in the face of the board's resolutions, it seemed to the speaker that the warden if not the instigator, was at least a party to the effort to defeat the board's desires. Vosseler summed up his report by saying, "I think it likely that these chukor and seese would not be liberated in the park itself but if they are liberated adjacent thereto it is little difference. If such is the intention, then I consider Mr. Cullen is undesirable as the warden of the National Park. He cannot be warden of the park and secretary to a body antagonistic to it."

Only a few months later the park board passed another resolution on heather: "The board being of opinion that it is impossible to eradicate the heather save at cost beyond the means of the board, resolves that no further heather seed be planted, and that steps be taken to prevent the further spreading of the heather



now growing in the park. The board confirms its policy of opposition to the planting in the park of anything (except under domestication) not indigenous to the park, and that the previous resolution to eradicate the heather is thus automatically rescinded, together with the permission granted to plant Mount Cook lilies." Cullen was reported as openly defiant at one board meeting where there was clearly quite an exchange of views. "Mr Cullen said he introduced the heather to the Park before the Board was ever formed and he was proud of it. Heather was a useful plant and was the most prolific honey producer in Europe. He had four hives of bees at his hut in the Park and they were doing remarkably well on heather. It was impossible to eradicate the heather already planted while several varieties of birds foreign to New Zealand also had been liberated."

Public pressure was clearly being directed at the park board and this shows in its 1926 annual report where it states: "...the board took steps in the direction of demarcating the boundaries of some of the patches with the object of carrying out a series of observations as to whether the plant was spreading to any appreciable extent . . . Much of the criticism which has been levelled at the board in this connection is based on an imperfect knowledge of the true position, and can serve no other purpose than to convey the false impression that the whole area of the Park is a blazing mass of heather choking out all native plant-life. This as will be seen by the report of the subcommittee, is contrary to fact."

The depth of feeling at the time about the seeding and planting of heather is summed up by an editorial in *The Dominion* on 10 December 1926, which shares the blame equally between the Tongariro National Park Board and John Cullen.

"The Tongariro National Park Board cannot be congratulated on its attitude towards the project to establish in the park a heather-covered preserve for imported game birds. The sole object in the creation of the great national parks of New Zealand has been to preserve inviolate in their primeval condition the tracts of country so reserved. A board of control, which administers a park with any other object, is betraying the trust reposed in it by the people of New Zealand.

...Some years ago it was plainly intimated that public opinion was very properly against the whole misguided project, and as a result a resolution was adopted by the board that the heather be eradicated. No steps whatsoever have been taken to eradicate the heather. One of the original prime movers in planting it was Mr. James Cullen, warden of the park who by a totally improper provision in the Tongariro National Park Act is both 'a member of the board and its servant.

...Another strong advocate of the game preserve scheme is Sir James Gunson who was for some years a member of the board as Mayor of Auckland and who has recently been reappointed as a nominated member. It has been stated that appointment of Sir James has given the game preserve advocates a majority on the board in favour of rescinding the resolution against the heather.

Both these gentlemen have been active in the liberation of game birds in the vicinity. Under the Act it is an offence to take firearms in the park. In face of this it is remarkable to find

Below: Conservation Officer, Keith Brown removing an old heather bush from the summit area of Hauhangatahi as part of a control experiment. (Photo: Harry Keys)







Tongariro National Park, looking across a heather-covered landscape towards Mt. Ngauruhoe. The area shown in the photograph is where Cullen first established the heather. (Photo: Harry Keys)

Dave Wakelin  
Senior Community Relations  
Officer

an announcement in the newspapers, so recently as October last, that the warden of the park presumably with the approval of the board was liberating imported grouse therein.

...It needs little perspicacity to foresee that so long as the board maintains in office a warden who has throughout shown himself totally unsympathetic to either eradicating or controlling the heather the above resolution is so much wastepaper. And there are every reason for believing that a majority of the members of the board will accept such all outcome with complacency."

The board's resolution not to attempt to eradicate heather and the reports of grouse having been released drew quick comment in the papers. For instance:

"As the heather in the Tongariro National Park failed to eradicate itself when so directed by resolution of the park board, the board is now trying the effect of requesting it in a very firm tone of voice to control itself."

"The society (Waimarino Acclimatisation), so it was stated, cannot be held responsible if any of the birds get into the park, but we presume that straying birds will be severely dealt with. They will be fined heavily, and any application for suppression of their names will be firmly refused. Let us hope, however, that these partridges, belonging as they do to

an order that has contributed so much to the support of aristocracy, will be well bred enough to keep to their own domain."

I have not been able to find out when John Cullen gave up his warden's role but clearly it was some time after 1927 by which time the heather had been established for 15 years and despite even the Ruapehu Ski Club offering money towards the eradication of heather it was seen as a hopeless task. We do know that Cullen died at Auckland on 26 October 1939.

How should we see Cullen today - an over enthusiastic warden or an under-informed extremist? Whatever he was he did have the support of the Prime Minister and the Minister of Tourist and Health Resorts. His determination to persevere with his plan could be seen as almost inexcusable. Yet it is the same sort of determination that saw possums, rabbits, gorse and sheep brought to New Zealand.

There are no complaints about Cullen's sterling efforts which led to the protection of a large area of the national park, much of which is now covered in heather. The department, using modern bio-control techniques is attempting to reduce the vigour of the heather through the carefully monitored and controlled release of a heather beetle. If the releases prove to be successful then, with time, it is hoped native species will replace the heather though not necessarily in the same ratio as existed before the introduction of the purple tide. Others believe that the heather, over a time frame of decades may aid the reversion of tussockland back to the forest that existed before the eruption of Taupo.

# Waimarino Forest Kiwi Project

## Support for the Karioi Rahui

As part of an on-going environmental enhancement programme focusing on native bird survival and habitat use in the Waimarino Pine Forest, four kiwi were captured and fitted with radio transmitters in April 1999.

These kiwi are being regularly “radio tracked” by wildlife manager Kerry Oates, to determine their territory requirements, such as territory size, nest locations, day roost locations, and preferred feeding areas. The data collected through regular monitoring of these birds helps to make an informed assessment of the potential impact of pine harvest on the Kiwi population within the Forest.



Above: Day roosts are located by following the direction of the strongest signal received from the bird's leg-mounted transmitter.

Below right: "Taiko" returns to her safe haven amidst dense fern and scrub.

(Photos: G.D. Hollier)

To determine territory size the kiwi are followed at night and various points that they visit are accurately recorded by using a GPS unit, these locations are later plotted on a map, and over a six month period a good picture of their territory size develops.

Day roosts and nest sites have also been recorded using the GPS unit, and with assistance from the Tongariro Taupo conservancy of DOC it has been possible to use this information to conduct an “Operation Nest Egg” scheme. Kiwi eggs are taken from nests to Rainbow Springs in Rotorua, incubated and chicks raised to an age and size where they can be put back into the forest with little or no threat from introduced predators such as stoats.

The operation has been a joint effort between the forest proprietors (being Winstone Pulp International, Atihau Incorporation, Pipiriki Incorporation, and Ngaporo Waimarino Trust) and the Tangata Whenua (Tamahaki Incorporated Society and Ngati Rangī Trust), with support from the Department of Conservation.

The forest proprietors have been particularly pro-active not only with the current Operation Nest Egg project, but also in other programmes including an initial bird health survey, on-going kiwi survival and habitat research, and the recent transfer of robins from

Waimarino Forest to the Paengaroa Mainland Island reserve, at Mataroa just north of Taihape.

Waimarino Forest is situated between Raetihi and the Whanganui River, near Pipiriki. It is 13000 ha in size and contains many native podocarp/hardwood reserved areas within it. Annual call count surveys of kiwi numbers in the forest have shown that the total population is estimated at between 120 and 180 individuals, making this a nationally significant population of the endangered North Island Brown Kiwi.



Right: "Taiko" undergoes a general health check and transmitter mounting check every 4-6 months.  
(Photo: G.D. Hollier)

Kiwi research worker Kerry Oates has found that each pair's territory contains a small percentage of native riparian reserve which remains untouched when pine trees are harvested, and this reserve may be enough to ensure kiwi survival after logging operations.

However, forest managers have many options available to them, including transferring Kiwi to larger reserved areas within the forest, staggering the timing and location of harvest operations to provide corridors and buffer zones for kiwi dispersal and survival.

So far it has been found that kiwi in Waimarino Forest do not change day roost sites as often as other populations. This suggests that there is an abundance of food available, and territory sizes may therefore be relatively small.

This on-going project provided an opportunity to conduct an "Operation Nest Egg" operation in the forest, and on 30 September 1999, three eggs were taken from two nests, and were flown to Rainbow Springs in Rotorua for final incubation and chick raising.

The first chick named "Mawhitiwhiti" hatched on 20 October, and the second chick named "Pango" hatched four days later on 24 October. The third egg had internally pipped at time of writing, and all involved are eagerly following the progress of these new recruits.

In a joint decision between all Iwi involved in the kiwi project it was decided that 50% of the chicks raised would return to Waimarino Forest, and 50% would be released into the Karioi Rahui - Rangataua Mainland Island Reserve, on the southern slopes of Mt. Ruapehu. The Karioi Rahui is a special conservation area jointly administered by the Ngati Rangi Trust and the Department of Conservation's Tongariro Taupo Conservancy. It is hoped to reintroduce a self sustaining viable kiwi population within the Rahui, returning kiwi to their former range and status within this area.

This project, instigated by the forest proprietors, has become a community project with both physical and financial support from many community based groups and organisations, and the forest proprietors are to be commended for their commitment to these programmes. In particular, I would like to acknowledge the financial support of:

The Pacific Development Conservation Trust  
New Zealand Lottery Grants Board (Environment & Heritage Committee)  
The Four Friends' Memorial Trust  
and the physical support of:  
Tamahaki Incorporated Society  
Waimarino Ngaporo Trust  
Ngati Rangi Trust  
Mr. M. Hawira



Ohakune 2000 Group  
DOC Tongariro Taupo Conservancy  
Atihau Whanganui Incorporation  
Pipiriki Incorporation  
Winstone Pulp International Ltd.

Kerry Oates,  
Whakamanu Wildlife Management.

# Whakapapa Village 80 years old

Development of accommodation to service the growing number of skiers and tourists commenced in February 1920 with the opening of the first permanent building at Whakapapa, the "Ruapehu Hermitage", also known as Whakapapa Cottage, Top Hut or No 1 Hut. This was a three-roomed accommodation house able to sleep 22 people in rather cramped conditions.

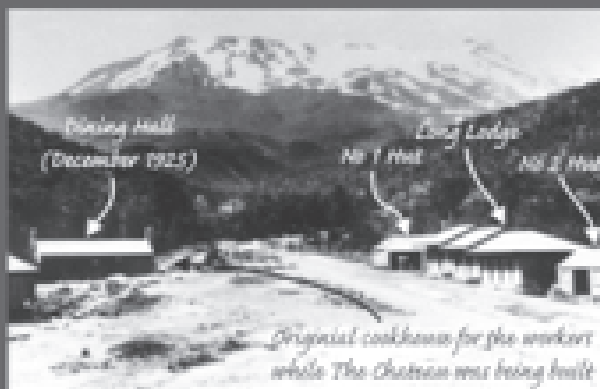
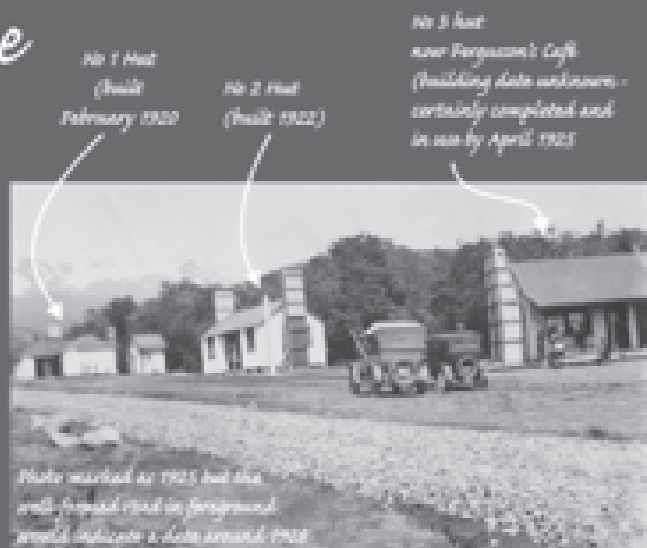


Photo of Whakapapa Village about 1925 - note well formed road



The Chateau - built 1929 - this photo early 1940s

In October 1921 William Salt designed and built the No 2 Hut, the second building at Whakapapa, which was completed on 5 April 1922. It was a symmetrical two-roomed hut with a verandah within the form of the gabled roof, the walls and roof being clad in corrugated iron. It slept six people in each room.

No 3 Hut, now known as Fergusson Cottage, was the third building at Whakapapa. It differed from the earlier buildings in being clad in timber (vertical board and batten), in having a full width verandah, and in being sited to take advantage of the most spectacular views that the site offered.

Fergusson Cottage slept six people in bunks in each of two rooms; internal linings were tongue and groove boards. Possibly during the 1930s, the rear wing extension containing the kitchen and second bedroom was added to the cottage.

The building takes its name from Lady Alice Fergusson, wife of Sir Charles Fergusson, Governor General of New Zealand who visited the area in 1926. During her visit, Lady Fergusson rode to the Tama Lakes, skied and sketched.

From as early as 1923, the Tongariro National Park Board had considered possible sites and the means by which a hotel could be built in the Park. The Tongariro Park Tourist Company under the chairmanship of R.L. Wigley was formed in 1928 with the primary objective "to exploit the valuable concession granted to the Company by the Tongariro Park Board". This concession was a 42 year lease, allowing the company to erect a hotel in the National Park; the rent was \$75 per annum plus a 5% share of the net profits or 11/2% of the gross takings. R.L. Wigley was the founder of the Mount Cook and Southern Lakes Tourist Company, and possibly in that capacity had used the services of the architect chosen to design the Chateau, Herbert W. Hall of Taranaki.

The builders of the Chateau were Fletcher Construction Co Ltd, a young company in 1929 and now one of the country's largest and best known. By May 1929, 120 men were employed on the task of building a luxury hotel in a remote and mountainous region.



By Christmas 1925 a fourth building, a dining hall, had been completed. It was used for social occasions as well as dining, and also as overflow accommodation at busy times. It was the first building to be sited on the east side of the Bruce Road, in front of the present Park Headquarters building. At about the same time a fifth building was erected and was known as the Caretaker's Hut. Extra accommodation was available in this building in the busy season. Mattresses and pillows were supplied on the bunks and visitors brought their own bedding, food and utensils. Hot baths were



*Photo taken about 1936 after construction of the Lodge Accommodation.*



*Photo taken about late 60s or early 70s judging by the cars*

Ngauruhoe Place and was demolished sometime in the 1980s.

The new buildings provided much better facilities than the huts, with sheets and eiderdowns on the beds and housemaids in attendance. With the standard of accommodation improving and the Bruce Road now formed and metalled up to Whakapapa, visitor numbers continued to increase. Today, 80 years on Whakapapa has a permanent resident population of 80 and plays host to more than 800,000 visitors a year. A far cry from humble ski accommodation of yesteryear.

available in the ablution blocks adjacent to Huts No 1 and No 3. The charge was 2/6 per night in the huts, and tent accommodation was available at 1/- per night.

A more substantial building known as the Lodge (later Long Lodge) was built in 1928 by the Tongariro Park Tourist Company. It had wide horizontal eaves and a distinctive stepped shape as it was built parallel with the Bruce Road running down the slope; it contained 20 two-bedded cubicles. Associated with it were two separate buildings, a dining room and kitchen, and a toilet block; all three buildings were stylistically similar with vertical flush boarding as wall cladding. The Long Lodge was later relocated to



*Looking up the righthand side of Whakapapa's "main street" today*

*Photographs and historic detail researched and annotated by Jo Heath, Community Relations Officer, Whakapapa*

# The 1999 Winter and Prospects for the next Millennium

## Successful Season Forecast

The October 1998 forecast of a poor winter in 1999 but one with at least 100 cm of snow on Knoll Ridge on 1 September was more detailed and had a higher degree of accuracy than has been achieved before. Although probabilistic it was based on:

- a good correlation established in this research since 1991 between poor winters and La Nino Southern Oscillation events and
- the snow-climate model developed since 1994.

This was the first readily testable forecast made using the model. Warmer sea surface temperatures north of New Zealand and west of Australia (Figure 1) underscored these forecasting tools.

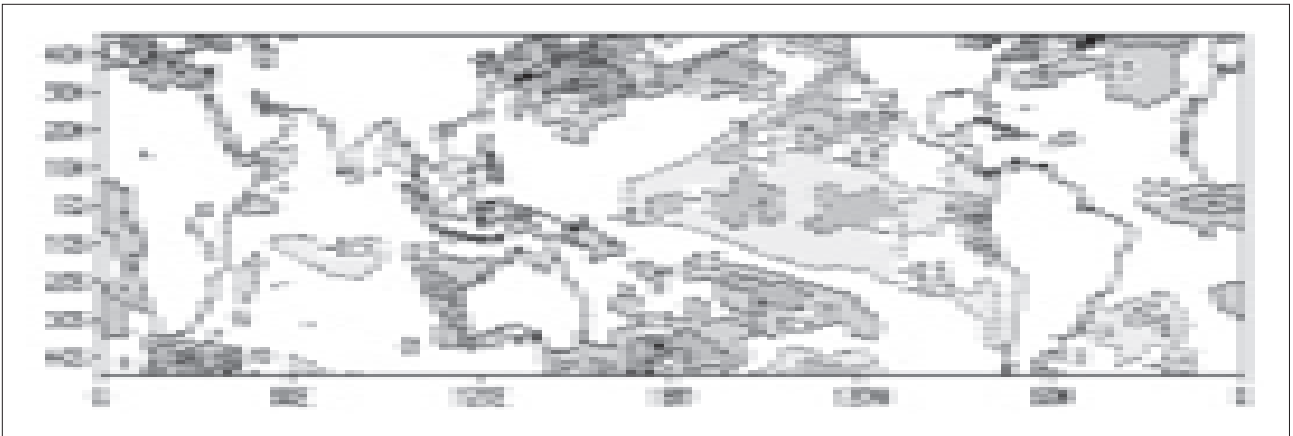


Figure 1: Sea surface temperature anomalies averaged over the period June to August 1999 (Experimental Long-lead forecast Bulletin 8 (3) 1999 at <http://www.iges.org.ellfb/>). Average temperatures around NZ and western Australia were up to a degree warmer than usual.

The 1999 winter started later than usual for the third winter in a row. Turoa opened on 28 July and Whakapapa on 6 August, although Happy Valley opened much earlier on 25 June due to good snowmaking conditions. Wind transport of snow was much less than normal so gullies were not filled to the same extent and there were few avalanches. This might suggest that the ratio of measured snow depths to average depths was larger than usual. However the snow-climate model calculated the snow depth within 1 cm of the actual depth on 1 September so the measured values seem appropriate to use in multiyear comparisons. Like in other years with relatively low amounts of snowfall, there appeared to be a relatively high number of skiable days.

## Climate Change and Snow

Most casual conversations with skiers about climate change (e.g. global warming) indicate that there is a common expectation of a poor future for skiing on Ruapehu. However it is clear that:

- this is not necessarily true at least to the middle of the 21st century and that
- the community does not understand all the complex issues.

There are two general aspects involved in this context: the debates over whether

Happy Vally and Whakapapa Ski-field on Mt. Ruapehu in a heavy snow year.  
(Photo: Ruapehu Alpine Lifts)



climate change is real, and whether humans have contributed to it; and what the effects might be on Ruapehu in particular.

### **Is climate change real and have humans contributed to it?**

The scientific consensus is that “the balance of evidence suggests a discernible human influence on the global climate” (1996 Statement of the Intergovernmental Panel on Climate Change, a United Nations sponsored organisation representing more than 2000 scientists from around the world). The Union of Concerned Scientists (representing more than 1500 scientists including 58% of the living Nobel prize winners in science) issued a declaration in October 1996 which stated “global warming is underway and our overuse of fossil fuels is partly to blame”.

There is agreement that carbon dioxide, the most important contributor to human forcing of climate change, has risen dramatically above pre-industrial levels. There are no simple constraints on how the planet will respond to this. There appears to be consensus that sulphate aerosols (themselves partly human-induced) appear to dispose of about half the excess greenhouse warming due to a combination of thickening clouds and direct reflection of solar energy. Our inability to model changes in atmospheric water vapour and clouds creates the largest uncertainty (1.5 to 4.5°C) in climate sensitivity.

There is widespread agreement that temperatures have warmed this century, particularly in Northern Hemisphere areas in winter, but debate over how much human have contributed to it. Temperatures are currently at record or near record highs historically and rates of increase are very high in places (e.g. Antarctic Peninsula, Alaska). However the significance of the observed temperatures changes in relation to the magnitudes and rates of previous changes over various temporal and spatial scopes is controversial. Climate warming is not unique to the 20th century (e.g. the medieval climatic optimum about 1000 years ago) but looking further back than about 2000 years may be of limited use because of effects due to changes in the Earth’s orbital parameters. The high rates of temperature warming widely measured in the last 50 years are matched by very few similar globally rep-

representative records in the last 2000 years.

Temperature change may not be the real issue. Regional changes in precipitation, climate fluctuation and their impacts may be more important. There is evidence that climate change has dramatically affected various civilisations in the past. Now of course, the natural world is trying to cope with rapid change with 6 billion people underfoot and relatively little area of natural terrestrial ecosystem remaining. Although computer models can still not reproduce the various 20th century records completely (and hence future predictions are still uncertain) they are clearly improving all the time. On the other hand they are less able to predict the detail of major fluctuations on the time scale of years to decades such as the Southern Oscillation or “instabilities” like those during and immediately after the last ice age. The socio-economic and political stakes are very high in this issue. The potential damage from extreme events and climate – related environmental change (e.g. disease) could be huge. So too, of course, might be the true cost of sufficient reductions in fossil fuel use, especially if they were hurried. So far the complexities, uncertainties and lobby groups have prevented effective international action. How much more time will be spent accumulating evidence and risking the need for drastic response? It would be better if a concerted global effort was started now to meet the modest reduction targets for 2008-2012 agreed to at Kyoto. If by then we have learned that global warming will not be so troublesome we would be able to moderate the carbon restrictions. But if a significant problem is revealed we will at least have started addressing it and be well positioned to accelerate reducing emissions.

### **How might snow on Ruapehu be affected?**

Two reports on climate change were produced from my research during the year. Among other things this shows:

- Mean daily temperatures in winter increased by 0.5 degrees C between 1933 and 1998 ( $p = 0.03$ ) but only by 0.1 degrees in the second half of the century which is not significant (see graph in 1998 Tongariro Journal, page 44). Annual mean temperatures rose 0.5 degrees between 1940 and 1996. NZ average mean air temperatures increased by 0.7 degrees between 1941 and 1990 according to Jim Salinger. Any winter warming at Whakapapa since 1947 is much less.
- No overall trend in precipitation totals but changes over time scale of 5–10 years (as for temperature).
- Wetter in late winter – early spring, drier in autumn and increased number of days with precipitation greater than 75mm.
- No apparent trend in end of winter snow depth at 2000 m.
- “Extreme” temperatures, precipitation events and high variability in snow depths in last 12–14 years (see 1998 Tongariro Journal).
- Snow depth response to Southern Oscillation extremes and large sulphur-rich volcanic ash plumes in Southeast Asia.
- Possibly increased probability of hazardous slush avalanches.
- Skier patronage and snow depth are not linearly related probably because there are more days closed due to poor weather in heavy snow years. An obvious corollary is that ski fields are “under patronised” during light snow years.

Other possible implications or hypotheses include reduced snowfall frequency, higher snowlines and later or shorter snow seasons. While the first two have often

#### Reference:

There is a huge and rapidly growing literature on global change. In this article I have drawn on various studies, referred to the US Climate Diagnostic Bulletin, and quoted from debates in EOS (Transactions American Geophysical Union), particularly articles by CF Keller, RE Dickinson and SF Singer (a well known “opponent” of global warming) (e.g. EOS 80(33) p 368 – 372, 1999).



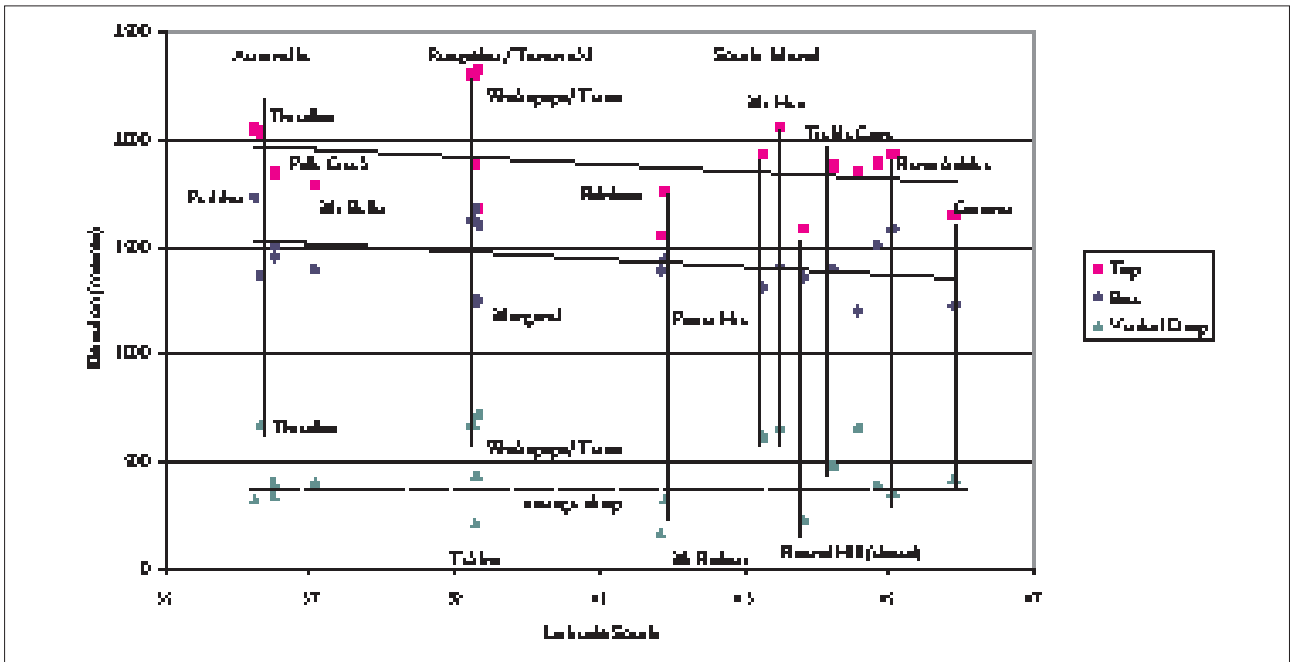


Figure 2: Top and base elevations and vertical drops of some Australasian skifields, as a function of their latitude (data modified from Andrew Grimwade, Turoa Ski Resort Ltd). Turoa and Whakapapa plot well above the average lines of all three parameters. This graph does not represent effects of snow accumulation and melting such as exposure to wind transport, solar radiation or weather patterns. However the graph suggests lack of snow would more likely be a problem for skifields at low elevations without snowmaking than on Ruapehu. Coronet, Rainbow and Porter Heights have invested in snowmaking and Round Hill has closed, consistent with how these skifields are represented on the graph.

been postulated and there is some anecdotal evidence for them, the only hard scientific evidence I know of is from a Waikato University study. This suggested that snowfalls have decreased in frequency at Whakapapa Village (1100 metres) but this is much lower than and therefore not directly relevant to the skifields. Various overseas studies addressing these hypotheses give mixed results. Swiss records and Australian predictions suggest decreased snow season duration but this is not consistently evident from northwest Italian records. Northern hemisphere winter snowfall records and snow extent are also mixed with patterns best described as highly variable. A preliminary examination has not shown any significant difference between the date in 1961–1974 that Whakapapa was first skiable to 1750 m (John Mazey data) and opening dates at Whakapapa in the period 1988–1999 (RAL data). I believe Whakapapa and Turoa skifields are insulated from many postulated effects of climate warming because of their high elevation and vertical drop. Figure 2 shows how these skifields plot well above the lines of best fit or averages for Australasian skifields. Ruapehu fields may be more affected by circulation “fluctuations” (e.g. La Nina) if their more northern locations exposes them to longer term latitudinal change in atmospheric pressure or sea surface temperature anomalies. My climate model suggests the biggest problem will be large year to year differences in snow depths.

Forecasts for the 2000 winter are more difficult than for 1999. Climate model predictions for July 2000 are spread but there is most support for neutral conditions (i.e. neither La Nina or El Nino). Optimistically my model might also suggest a thicker snow pack by 1 September 2000 than in 1998 and 1999. The fate of the sea temperature anomaly at present around New Zealand (Fig. 1) may be an important indicator because sea water masses change more slowly than air masses. And who knows, the imminent peak in solar cycle 23, which is expected to be strong, could be a wild card!

Harry Keys  
 Conservancy Advisory  
 Scientist

# Changes at the Tongariro National Trout Centre

A series of devastating floods last year wreaked havoc with the Tongariro National Trout Centre. Because considerable rebuilding was going to be necessary it became an appropriate time to plan for the future direction of the Tongariro National Trout Centre. This plan (Target Taupo, issue 30) focuses on developing the advocacy role of the centre to promote trout, trout fishing and the freshwater environment in general. The plan is now complete and a number of the developments identified are in the process of being implemented.

The moving of the building, which previously had been over the underwater viewing chamber, to the area beside the children's fishing pond has already been completed.



The new kiosk overlooks the children's fishing pond.  
(Photo: DOC)

The Lions Club of Turangi originally built this building. In its old site the building was occasionally exposed to flooding and it would then take several months to dry out because of the restricted airflow around the chamber underneath. Each time, this prolonged dampness caused further structural damage to the building. The development plan identified the need for a kiosk beside the children's pond to service the fishing days and to also provide a focal point where visitors could meet and talk with department staff. Given that significant repairs were required to the viewing chamber following last July's floods anyway, it was decided to take the opportunity to move the building and establish the kiosk.

Local builder Gordon Hydes undertook the work with assistance from fisheries staff. The

building was carefully dismantled, the materials shifted to the new site by hand and then reconstructed. The large bay windows were retained and the only major change was the installation of French doors, which open out onto a large deck overlooking the pond. The new kiosk blends in well amongst the trees and we are very pleased with the result.

During open hours staff are based at the kiosk and can be approached either here or around the grounds to answer any questions.

Plans for a new roof for the underwater viewing chamber have also been completed and the job let for tender. The roof involves two overlapping iron curves which are sufficient to keep the rain out but which are open at the sides. This will enable people in the chamber to hear and smell the stream while they are watching the fish outside the window. It also means the chamber will be easy to pump out and dry if it does flood again.

While work is underway several other smaller tasks have also been undertaken. For example it was necessary to dig a trench to run a power cable to the kiosk so at the same time the opportunity was taken to run the cabling for the track lighting identified in the plan.

Following on from the new track built by Department of Corrections' inmates to



Above: Fishery Area staff Shirley Oates (left) and Nadine Gibbs planting trees as part of the revegetation project at the National Trout Centre. (Photo: DOC)

the mouth of the Waihukahuka (hatchery) stream this summer, staff have cleared the area of blackberry and broom and sprayed the regrowth. The Women in Conservation group in the conservancy office then planted over 400 native shrubs and flax, which they will tend until the plants become established.

The next major project, which is getting underway, is the conversion of the old workshop building into an interpretation centre, which will include an auditorium. This is a joint project between the Department and the National Trout Centre Trust. A concept plan for the new building has been discussed and detailed plans will shortly be drawn up. It is intended to have the building, though not

necessarily the displays, completed by this time next year so that we are in a position to apply for funding for a full-time teaching position to be based here starting in January 2001.

Coinciding with these improvements have been several changes to how we operate the Tongariro National Trout Centre (TNTC) facility. Recent visitors will have noticed that open hours are now 10am to 3pm. The later opening of the gates is to allow us to undertake necessary service activities outside the open period so that visitors are not disturbed by the lawns being mowed, the paths being swept and so on which are activities not in keeping with the experience being offered. A sign detailing the opening hours has been erected on the entrance gate so that when the gate is shut the hours are clearly obvious. And on special occasions when we wish to open the complex earlier, for example the children's fishing days, the sign swings out of view when the gate is opened.

In the longer term a small entrance fee may be charged. This raises the issue as to how anglers will be able to access the Tongariro River through the TNTC grounds without being charged for access, which is clearly not acceptable. Currently both anglers and rafters are using the old entranceway but this access will shortly be closed to the public, as it is not appropriate for people to have unrestricted access through this area. This area is the site of our workshop and related activities and also where a number of staff live.

Several options for alternative access to the Tongariro have been identified. The favoured option is an angling track leading down from the northern end of the TNTC carpark, which would cross the Waihukahuka stream just downstream of the site of the fish trap. As the crossing would primarily be used by anglers wearing waders one option is simply for anglers to wade the stream, which is only 200 mm deep, rather than construct a bridge.

The other major change that has occurred has been in the way we operate the children's fishing days. The Childrens' Fishing days had



Right: Children at the fishing days receive individual tuition from volunteer anglers. (Photo: DOC)

become so popular that it was no longer possible to provide each child with the full angling experience. As a consequence, this year we have introduced a limit of 30 children per hour or a total of 180 children per day. This means that the volunteer anglers can spend approximately 10 minutes with each child but it does require prior booking the day before to ensure they can be fitted in.

To date, three fishing days have been held under the new system and the response has been very encouraging. Much more time can be spent with each child and it is not so demanding for the volunteers. The other benefit that we had not considered is that the parents also appreciate having a defined time rather than having to wait around for several hours while their child gets a turn.

So next time you visit the Tongariro National Trout Centre some big changes will be evident - call in and check them out.

Shirley Oates  
Conservation Officer  
Fisheries Area

## The Rock

It was a weekend of cultural awareness, intermingling of people, protocol, ceremony, tension and laughter but overall one of celebration.

During the weekend of 21-22 November 1998 Maori and Pakeha joined as one to celebrate events that began when Te Heuheu Tukino IV Horonuku, on behalf of

his people, gifted to the nation the nucleus of Tongariro National Park. One hundred and thirteen years later, Dr. Bernd von Droste, Director of the World Heritage Centre in Paris presented certificates inscribing Tongariro National Park on the World Heritage List for its landscape and cultural values.

Tongariro is one of only 20 sites in the world to receive dual recognition and the first to receive associative cultural listing. Associative cultural listing, a new criteria written largely because of Tongariro's original application, recognises that sites may have strong cultural and religious significance to an indigenous people without occupation of the site or the presence of physical structures in the landscape.

In effect the day began eight years before, in 1990, when Tongariro National Park



Above: The bronze bust of Te Heuheu Tukino IV Horonuku, Paramount Chief of Ngati Tuwharetoa who in 1887 gifted to the nation the sacred peaks of the central North Island mountains (Ruapehu, Ngauruhoe and Tongariro) as the nucleus of Tongariro National Park.

Right: Ngati Tuwharetoa and Ngati Awa warriors face off against each other in a ground shaking haka following the arrival of Ngati Awa onto the temporary marae set up below the Grand Chateau.

(Photos: Dave Wakelin)







Above: Paramount Chief, Tumu Te Heuheu and Whanganui Kauramatua, Rangitihī Tahuparae at the interment of the kohatu.

(Photo: Dave Wakelin)

Below: Outside the Whakapapa Visitor Centre, Ngāti Tuwharetoa warriors, Tiaki Williams and Elton Smallman, place the World

Heritage inscribed plaque over the urupa where the taonga lie.

(Photo: Dave Wakelin)

Dave Wakelin  
Senior Community Relations  
Officer

was recognised for its natural landscape features. At the time application had also been made for recognition of its cultural features but the existing criteria, written largely for the Northern Hemisphere, failed to recognise Tongariro's situation. A powerful presentation to a World Heritage workshop in Berlin in 1993 by Tumu Te Heuheu, now paramount chief of Ngāti Tuwharetoa, reawakened the concerns of South Pacific countries about the existing cultural criteria.

Talks and reminiscences filled the days before the weekend while staff led walks in the park through Saturday. Sunday was the official day of commemoration. An area below the Grand Chateau had been declared a marae and it was to here that the dignitaries of the day including the Governor General, Sir Michael Hardy-Boys, the Minister of Conservation, Dr. Nick Smith,

Dr. von Droste and iwi from around New Zealand were challenged and welcomed. The strongest spiritual symbolism of the day was reserved for an area beside the Whakapapa Visitor Centre where a giant rock had been hollowed out to form the urupa (place of burial). Into the urupa were placed taonga kohatu (sacred stones) from the 'visiting mountains' from around New Zealand. Warriors from Ngāti Tuwharetoa placed a specially inscribed plaque over the rock.

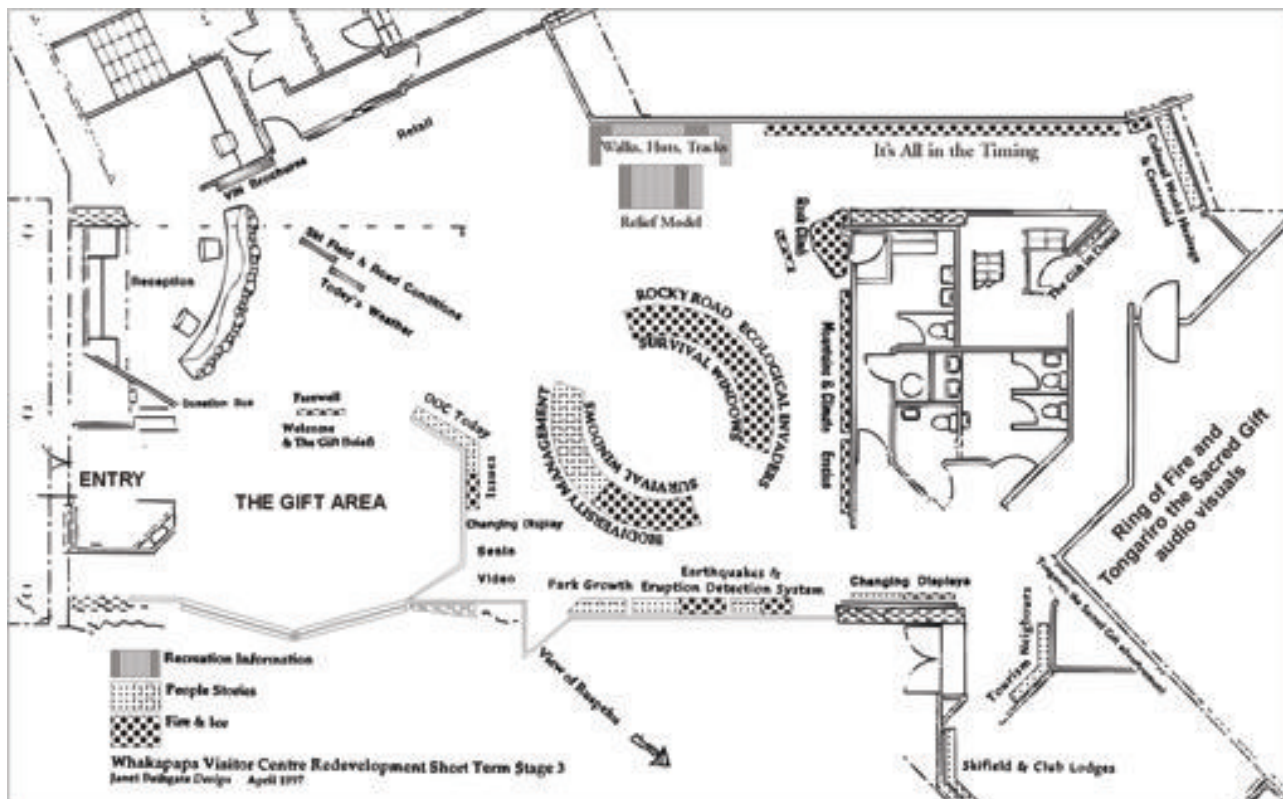
Lunch, catered by the NZ Army, Waiouru, in the giant marquee followed. Speeches by the Governor General, the Minister of Conservation, Dr. von Droste, Rangitihī Tahuparae of Ngāti Rangī and Tumu Te Heuheu with waiata from the iwi occupied the post lunch period.

Dr. von Droste presented to Ngāti Tuwharetoa, Ngāti Rangī and to the Minister of Conservation certificates inscribing Tongariro National Park on the World Heritage List for its landscape and cultural values. As a parting gesture, Tumu Te Heuheu presented each of the visiting iwi with a rock, laser inscribed with a Tongariro National Park World Heritage logo designed for the occasion.

A rousing haka by Ngāti Tuwharetoa, led by Tumu Te Heuheu, shook the ground, a fitting way to end the celebration and ceremony.



# Whakapapa Visitor Centre - from house to modern centre



The concept plan for the redevelopment of the Whakapapa Visitor Centre.

Features to note include the relocation of the reception area and positioning of the Ring of Fire audiovisual into the auditorium with The Sacred Gift.

The new displays follow three themes - recreation information, 'people stories', and fire and ice - to tell the volcanic and cultural heritage of the national park.

(Plan: Janet Bathgate Design)

In the 1992 Tongariro Annual, I rather naively wrote of the final stage of the Whakapapa Visitor Centre Redevelopment. This referred to the building of a 120-seat auditorium, ski history extension and the development and installation of the Tongariro Sacred Gift audiovisual. As we move into the new millennium the high-profile visitor centre is again going to move with the times with a further upgrade.

On 3 November 1999 the Minister of Conservation, the Hon. Nick Smith, announced the redevelopment of the Whakapapa Visitor Centre into the Cultural and Volcanic World Heritage Centre for Tongariro National Park.

This is the culmination of four years planning which included an initial operational review in 1995, feasibility study, full working drawings and tender documentation, development of display concepts, storylines and themes and the formulation of a capital bid to the department's national funding body.

The 1995 review of the centre's operation identified a number of fundamental problems including:

- building layout and visitor flows
- dated displays with limited information on current conservation issues
- lack of information on the Park's cultural and natural World Heritage status
- insufficient display space to cater for current and changing issues
- limited seating in Ring of Fire audiovisual theatre
- problems with the location and functional efficiency of the reception area

Right: A momentous day on 12 May 1962 when the Tongariro National Park Headquarters was opened. Prior to this staff had worked out of a front office of the Chief Ranger's house.

(Photo: 20th Century Photography, Taumarunui)

Below: The park headquarters in the 1960s.

(Photos: Department of Conservation)



As a result of the review a project management team was formed. This team received input and advice from internal and external specialists in various fields, including local iwi and community groups, consultants, and Department of Conservation Head Office, conservancy and area staff.

In working through the review of the visitor centre and planning for the redevelopment we kept our minds on the vision we had for the centre: Whakapapa Visitor Centre will develop a reputation, both nationally and internationally, as the cultural and volcanic centre of Tongariro National Park's unique World Heritage area that every visitor, domestic and international must see.

The Whakapapa Visitor Centre is one of the Department of Conservation's largest visitor centres and the main interpretive centre for Tongariro National Park. Each year approximately 200,000 visitors walk through the doors including up to 300 educational groups. The visitor centre experiences distinct summer and winter seasons with December to March being the peak months, with up to 1300 visitors per day. While the summer focus at the visitor centre is on tramping, walking and sightseeing in the Park, with an estimated visitor mix of 35% national and 65% international, the winter is dominated by snow-related activities with a shift to mainly national visitors (90%).

A key result of the review was the identification of two primary themes for the visitor centre, the gifting of the sacred peaks, which form the nucleus of the Park and the dynamic volcanism of the area. These two themes are integral to Tongariro National Park's dual natural and cultural World Heritage status.

A number of recommendations came from the review, all designed to address the current and foreseeable future needs of the centre.

- The Gift Area, with the bust of Te Heuheu Tukino IV Horonuku as centrepiece, is to be left untouched
- The Ring of Fire audiovisual is to be removed, increasing the area available for displays and removing the narrow bottleneck that at present impedes visitor flow
- An upgraded Ring of Fire audiovisual will be incorporated into the main auditorium. Both the Ring of Fire and The Sacred Gift of Tongariro audiovisuals will

Alison Rothschild's official title is Programme Manager – Community Relations and Visitor Centres for the Ruapehu Area but she is more commonly known as the WVC manager.

Her areas of responsibility cover staff and functions in the Ruapehu Area involved with Ohakune and Whakapapa Visitor Centres, volunteer co-ordination, Summer Programme, interpretation, publications, working with the community and educational groups. One of her prime focuses in recent years has been the planning of the WVC upgrade.

Alison has, in recent years, been appointed to a number of working groups related to visitor centre operations and functions, including the DOC Visitor Centre Steering Group, the VIN (Visitor Information Centre) Advisory Committee and the Information Centres New Zealand Executive.



operate from the one theatre providing the total Tongariro Experience

- Displays will be updated with some interactive components and with a greater focus on the cultural and volcanic themes of the centre
- The reception area will be relocated to a more functional position, which will provide an improved working area for staff and improve visitor-flow. This will allow an extension of retail and visitor information areas



Key contractors in the process have been Opus International Consultants who pro-

duced the concepts and full working drawings; Janet Bathgate Design who designed the displays and will supervise the construction and installation; Karen Grimwade who coordinated the development of story lines and themes; and Tony Lilleby of Cognita, producer of the Ring of Fire audiovisual.

In December 1999 the main contract will go out to tender with April 2000 marked as the start of the display upgrade and visitor centre extensions. The timing of the upgrade was determined by two main factors - weather (for external construction) and lowest visitation period. Disruption to the public will be minimised as much as possible. The visitor centre will remain functional (open) throughout. However there will be a period where the display portion of the centre will be closed off to the public.

The work is due to be completed in time for an opening on 23 September, the 113<sup>th</sup> anniversary of the gifting of the sacred peaks to the nation by Te Heuheu Tukino IV Horonuku in 1887. Visitors should leave the new centre with a better understanding and appreciation of the volcanic landscape, cultural values, biodiversity, management and recreational opportunities in and around the Park.

Alison Rothschild  
Manager  
Whakapapa Visitor Centre

Top right: The World Heritage Logo designed for the Tongariro National Park World Heritage celebrations last year. The national park's natural and cultural values that led to it becoming only one of 20 dual heritage sites in the world will be explored through the new displays.

Right: Minister of Conservation, Dr. Nick Smith, with DOC staff on the steps of the Whakapapa Visitor Centre after announcing the approval of a government grant of \$800,000 for the redevelopment of the visitor centre.  
(Photo: Dave Wakelin)





# Rats, Cats and Mutineers

In 1997 and 1998 two visits were made to the Pitcairn Islands lasting six months, by a team of New Zealand wildlife managers trying to eradicate rats and feral cats from three of the four islands in the group.

The Pitcairn Islands are situated in the central South Pacific approximately 1200 nautical miles south-east of Tahiti. The group consists of two small coral atolls, Oeno and Ducie, at 62 ha and 74 ha respectively, Henderson Island (a world heritage site), a raised coralline island with a maximum height above sea level of 33.5m, and a total area of 3720 ha, and Pitcairn Island, the only permanently inhabited island in the group with a population of about 40 people. It was formed by volcanic action, has a land area of approximately 460 ha and reaches a height of 347 metres above sea level.

Pitcairn Island lies just below latitude 25, has a tropical climate, is densely vegetated with a mixture of forest (roseapple, Taupau, and

Pandanus palm), scrub (Guava and lantana), and many ferns and grasses. There are many large cultivated areas of vegetables and fruits like banana, pineapple, papaya and mango. Its extremely rough broken topography makes the surface area much larger than the 460 ha suggests. There is no harbour or beaches and rugged cliffs and boulder beaches with the occasional wave platform surround the island.

In April 1997 a team of six New Zealanders led by Brian Bell of Wildlife Management International Ltd., made their way to Pitcairn via Tahiti and Mangareva Island in the French Gambiers. From Mangareva we left behind the luxury of aircraft and sailed by yacht for three days and nights, eastward to Pitcairn. There are no airstrips on Pitcairn and it is out of range to choppers unless accompanied by ship. We visited all four islands in the group and laid anticoagulant brodifacoum poison pellets for Pacific Rats (*Kiore*), *Rattus exulans*, on all islands except Henderson, on a 25 metre grid.

On Henderson Island we conducted bait trials with non-toxic baits to ascertain whether endemic bird species such as the Henderson Island fruit dove, lorikeet, and rail (spotless crane) would be at risk from an application of poison. Henderson is too large and extremely rugged to conduct a ground hand-laid poison operation.

Looking back, we were unprepared for Pitcairn's' rugged and steep landscape and lush dense vegetation with its abundance of fruits, seeds, nuts and vegetables available to rats all year round. Despite our intensive efforts to eradi-



Above: The Rat Team. Members of the rat eradication team posing in front of their hut on Pitcairn Island.

Below right: The grids and tracks arduously cut over the entire Pitcairn Island, 25 metres apart so bait lines could be laid. (Photos: Brian Bell)



cate rats from Pitcairn, within one week of our departure in late August, rats had been seen.

We returned in April 1998, this time via container ship from Auckland, better equipped and prepared for a concentrated effort confined to Pitcairn. We did manage to visit both Oeno and Ducie Islands to check on our previous efforts and were delighted to find that both atolls were now rat-free.

The job on Pitcairn was a long and arduous task, starting with cutting tracks or grid lines at 25 metre intervals over the entire island, cliffs included. It took nine weeks of solid slashing with machetes to complete the grid system with only four days off during this period. Then we

marked every track with a name and number, and then marked and numbered bait stations at 25 metre intervals along each track. There were a total of 880 tracks and 7635 bait stations individually numbered. It took six people four days to check every bait station for signs of rat feeding; this process of monitoring was constantly repeated until our departure in late September.

The entire Island was "open laid" twice, a handful of pellets were placed on the ground at each station, along each track. After two open lays, baits were pegged out in small "lolly bags", plastic bags which rats chewed through, and at every fifth station on odd numbered tracks, baits were placed in Novacoil tubes pegged to the ground. Six pellets were placed in each station so that we would know if bait had been taken. Each station was checked at least once a week and any signs of feeding prompted an open lay in a 100 m radius of the feeding sign.

Slowly but surely this long slow process of elimination started to pay off with feeding sign diminishing in all but one area by the end of August. Monitoring continued for nine weeks and the last live rat was seen on 28 August. The last fresh dead rats were seen on 11 September and we were starting to feel a little more confident

that we had finally done it ...

Feral cats were quickly eliminated during the 1997 visit. They only occur on Pitcairn Island and are a serious threat to land nesting sea-birds such as, Red Tailed Tropic bird, lesser and Greater Frigate bird, Murphys, Heralds, and Kermadec Petrels, Fairy Terns, and the only terrestrial bird, the Pitcairn Island Warbler.

Cats were trapped, shot and poisoned but most were killed through secondary poisoning by feeding on poisoned rats. Thorough checks were made during our 1998 visit which showed that none remained.

The Pitcairn Islanders are all descendants from



Above right: Bounty Bay on Pitcairn Island, showing the rugged terrain in which the party worked.

Below: The long boat used to ferry supplies and personnel ashore onto Pitcairn Island.

(Photos: Brian Bell)





The Pitcairn Warbler, one of the endemic birds under threat from introduced cats and rats.  
(Photo: Brian Bell)

Fletcher Christian of the infamous mutiny on the Bounty in 1790. They speak their own language known as Pitkern (a mixture of old English and Tahitian) and also speak excellent English making communication straight forward. The people are reasonably self sufficient in most things except meat. However fish is abundant around the coastal waters. The island is serviced every four months by a supply ship, container vessels travelling from New Zealand to the United States via the Panama Canal; stop briefly at Pitcairn to unload supplies by hand into long boats. The long boats then return to shore and are unloaded

again by hand, on to a small landing jetty in Bounty Bay.

Electricity is generated by diesel powered generators for three hours each morning and six hours each afternoon/evening. There is one general store which stocks basic food items and house hold commodities. Pitcairn's main source of national income is from the sale of stamps. Pitcairn is the most remote inhabited island in the world and has its own post office and postmark, which is highly sought after by collectors around the world. Most islanders have "Government jobs", like postmaster, storekeeper, and tractor by trading or selling hand-made curios or souvenirs with passing ships or yachts.

They are an extremely generous friendly people living in harmony with their environment. They know neither crime nor violence, and their relaxed idyllic lifestyle was most refreshing after the stress and bustle of our very regimented daily routines.

We left Pitcairn on 20 September 1998 and arrived in Auckland a week later. No reports of rats or rat-feeding signs had been received from the Island for three months. Things were looking good! Then suddenly the phones start ringing, the Pitcairn Island Commissioner based in Auckland had received word from the Island Magistrate that four rats had been seen in garden areas near the top of the island. Our hearts sank! We had worked so hard for so long only to find that after three months rats were still alive on Pitcairn.

It seems that the Pacific Rat on Pitcairn, caches food in burrows under dense vegetation or underground. This behaviour is not known from Kiore elsewhere but may be possible on Pitcairn where there is an abundance of food and a huge variety of foods available to rats all-year-round. Bait shyness may also be a problem with some rats seeing the effect of poison pellets on other rats, and therefore choosing alternative foods.

We immediately sent two tonnes of bait up to Pitcairn and the Islanders are now busy distributing this in an effort to control the spread of these very resilient rodents who are capable of reproducing at an incredibly fast rate.

I wish the Pitcairn people every success in this task and hope they can finally conquer the rat problem and so protect their indigenous bird life and protect their own valuable food and income resources.

Kerry Oates  
Whakamanu Wildlife  
Management



# What day is it?

Are you confused? I am. In a few short weeks we all celebrate the millennium, the end of a century, the birth of the third millennium and start of the 21st century - or do we? Some say that we are a year too early and that the real end of the millennium is still a year away and the new millennium starts on 1 January 2001. The cynics say that we should have been doing all this four years ago because on the present western calendar Christ was born in 4 BC, so we are already at the year 2004! Put away all the fireworks but please note that the planes did not fall out of the sky in 1996 nor did we suffer power blackouts (except of course for Auckland).

## What is all the fuss about?

Next year, the year 2000, after the celebrations and the hangovers for most of the six billion on Earth it will be

- 5760 according to the Jewish calendar
- 1420 according to the Moslem calendar
- 2544 according to the Buddhist calendar
- 1997 according to Christ's actual birth circa 4 BC
- 2753 according to the old Roman calendar
- 2749 according to the ancient Babylonian calendar
- 6236 according to the first Egyptian calendar
- 1716 according to the Coptic calendar
- 5119 in the current Maya great cycle

populous country on Earth, China, the year of the Dragon.

## Solution

Thank Julius Caesar for the conquest of much of Europe, the and some great lines for a few of Shakespeare's plays. Caesar reigned, the calendar in use was off by about three months. It was by observations and had been fiddled with by Roman bureaucrats in their terms in office. This meant that the seasons were off by three months as well. Julius Caesar ordered his Greek astronomer Sosigenes to develop what would become known as the Julian calendar.

Astronomers at the time knew that a year (the time it takes for the Earth to revolve around the Sun) was not 365 days but slightly longer, at 365 days, 5 hours, 48 minutes and 36 seconds, nearly six hours. Sosigenes's solution appeared simple - just add 24 hours (x 6), an extra day, every four years.

In 45 BCE (BC) was given 445 days to correct the accumulated errors of the old calendar, and every future year was to have 365 days and every fourth year to be designated a leap year with 366 days, adding the extra day to put the actual time to revolve around the sun isn't 6 hours but 5 hours, 48 minutes and 36 seconds and over time this difference of 11 minutes and 36 seconds adds up.

The leap year rule created three leap years too many every 385 years, which would cause the Vernal (Spring) Equinox to fall on the 11th day of the month of the traditional 21st day of May (ten days off). Since Easter, the Christian holiday, was defined as the first Sunday after the full moon on the Vernal Equinox, Pope Gregory XIII was concerned. Additionally, Christ-





mas and Lent were also drifting off course. He commissioned another astronomer, Christopher Clavius, to produce a calendar to correct the error. The Gregorian calendar was born.

### **Sorting out the Leap years**

To implement this new calendar, the Pope declared that the following Thursday, 4 October 1582 was to be Friday, 15 October 1582. As well, the Julian calendar was to be modified to assure long range accuracy. Since an extra day every four years produced too many leap year days, the rule would not be employed for years ending in 00 (1600, 1700, 1800, 1900 etc.). But this produced too few leap year days so a new rule was made - a year ending in 00 would be a leap year only if it was divisible by 400, as in the year 2000. Though a great improvement on the Julian calendar, the current leap year rule is still out by one day every 3300 years.

Since this change was mandated by the Catholic Church, Protestant Europe was reluctant to accept it and remained on the Julian calendar. Germany finally accepted the Gregorian calendar 118 years later in 1700. Russia converted 336 years later in 1918 and Greece in 1923. England and her American colonies remained on the Julian calendar until 1752. By this time, the discrepancy between the Julian calendar and the Gregorian calendar had grown to 11 days. To adjust to the Gregorian calendar, 3 September 1752 was changed to 14 September 1752. This prompted riots in which the people yelled "Give us back our eleven days!"

### **What about AD and BC?**

In ancient calendars, years were usually numbered according to the year of the ruler's reign. A Scythian monk named Dionysius Exiguus wrote a history of the Christian Era called "Cyclus Paschalis" and used the birth of Christ as 'Year One' for historical events. Using this system 1 AD would be the year of Christ's birth and 1 BC would be the year previous to 1 AD. Under this system the writing of "Cyclus Paschalis" would have occurred in 525 AD.

This system became the standard reckoning in the western world when the English historian Bede (673 - 735) used it to fix events in his writings on history and when the Frankish emperor Charlemagne (742 - 814) decreed that this system would be used throughout his empire. During the 16th and 17th centuries, the system was spread throughout the world by the colonial powers. The system has since been de-Christianised by changing BC (before Christ) to BCE (before the common era) and AD (anno Domini) to CE (common era).

Today there are still a number of calendars other than the Gregorian calendar in official use but most of the computer dates used in the conduct of business internationally are Gregorian based. Also, since there is no 0 AD, the time goes from 1 BC to 1 AD, then 100 year intervals go from 1 to 100.

This means that the 1st century began in 1 AD and ran through 100 AD, so the 20th century runs from 1901 through to 2000. The end of the 20th century is 31 December 2000, not 31 December 1999.

Enjoy your New Year's Eve this year safe in the knowledge that thanks to all this stuffing around with time you get to celebrate the new millennium not once but twice. On behalf of all in the Department of Conservation who, you will be pleased to know are more concerned about conserving nature than time, enjoy!

Dave Wakelin  
Senior Community Relations  
Officer

# Millennium Walking!

The Department of Conservation's  
Tongariro Taupo Summer Programme  
27 December 1999 - 9 January 2000

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