

tongariro

December 2016

The journal for Tongariro National Park is produced by **Project Tongariro** with assistance from the Department of Conservation

32

years since Project Tongariro (Tongariro Natural History Society) was formed

15

Who released in the North Island from the Whio Hardening Facility

11

years ago Kiwi Forever began its vital work saving kiwi

6993

volunteer hours worked in the park and area during the year

TONGARIRO
NATURAL
HISTORY
SOCIETY



Department of
Conservation
Te Papa Atawhai



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President's corner

Paul Green
President Project Tongariro

The Tongariro journal provides an opportunity to share the work of DOC, Project Tongariro and others working in Tongariro National Park and the Central North Island

I sincerely thank DOC for their great assistance in enabling preparation and printing of the Journal. And Dave Wakelin for his commitment to the project.

Once again the journal relates great stories about conservation work undertaken by the Department and the community in the central north island.

The Project Tongariro executive has been focused on preparing a Strategic Plan to help direct its priorities and work over the next three to five years. We have been increasingly working with a great variety of organisations in recent years and see these partnerships and collaborations as the future of conservation in the coming years. This includes business, other community groups, iwi, hapu, māori land owners, local authorities as well as our traditional partner DOC.

Our new Strategic Plan will highlight these opportunities. We are keen to strengthen our commitment in Tongariro National Park. This will often be in projects working with other parties.

Project Tongariro is often a 'facilitator' or 'initiator' for conservation projects that will often involve both members and supporters for the work we do. The involvement of supporters is a change from our inception or even ten years ago. Our role in Greening Taupō and

Kids Greening Taupō highlights this shift. Our traditional members are not very involved in these projects but we have been able to gain support in the community to good effect.

Project Tongariro has placed its Memorial Fund of \$85,000 with the Geyser Foundation who are a community trust able to invest wisely and able to promote our organisation more broadly in the community. We are excited to have gained a bequest this year from a member and hope that in the next 10-15 years we can build a capital fund that can provide the type of annual earning stream that can greatly assist our work.

I am greatly encouraged by the Government's Pest Free New Zealand announcement. Regardless of whether it can be achieved in the designated time frame it indicates identification of the problem and commitment to a solution by the Government. Secondly the support from the philanthropic sector is evident and significant. The Next Foundation has gained important and encouraging momentum.

I thank everyone who has helped during the year. DOC has provided invaluable support and encouragement. Our staff, members and supporters have all worked tirelessly on our projects.

tongariro the journal

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Red Crater on the Tongariro Alpine Crossing.

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Wonderful Walter: 1921 - 2016

Karen Williams
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Walter Haensli, a pivotal figure in the establishment of Ruapehu Alpine Lifts, died in February 2016.

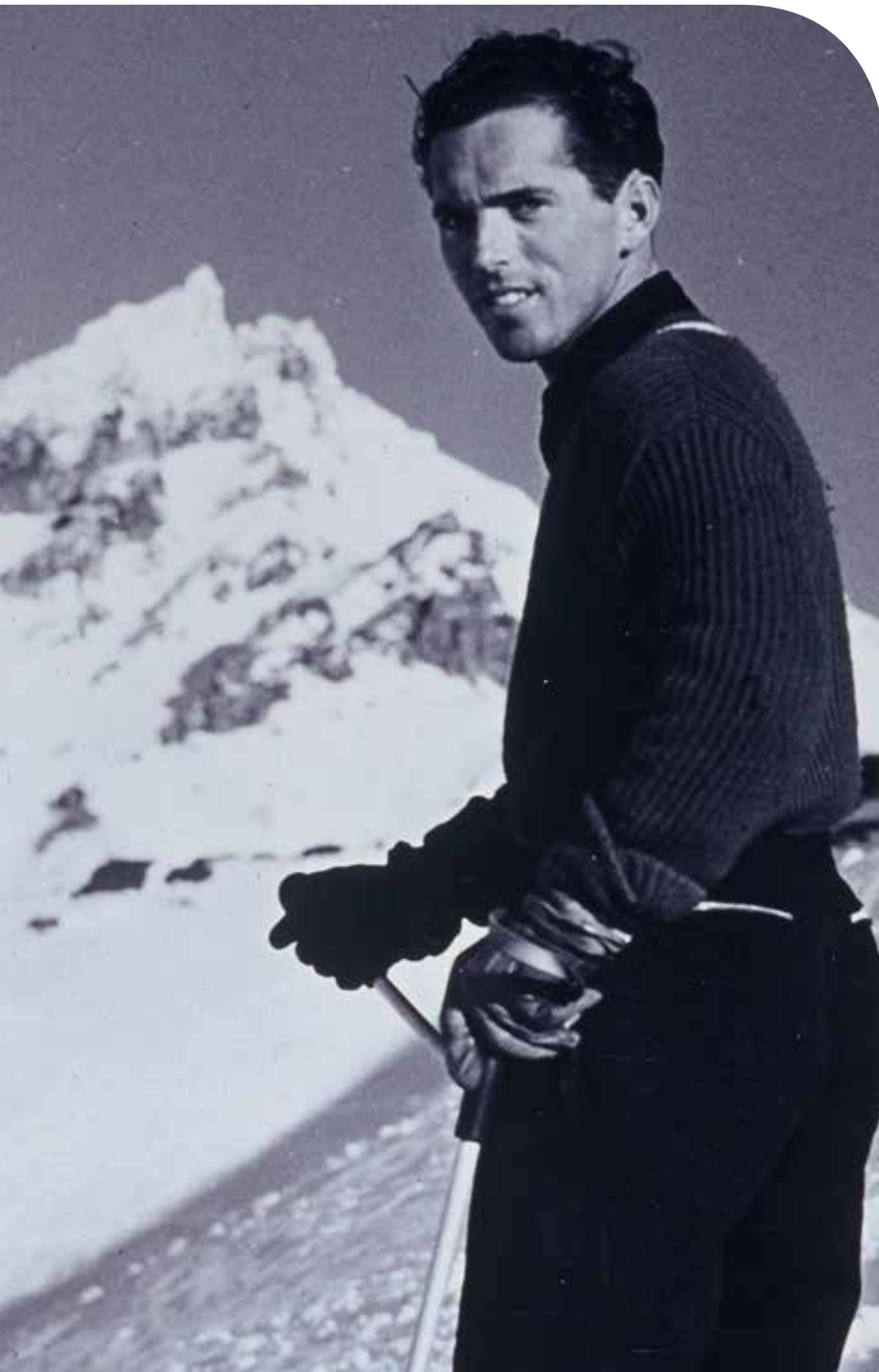
Born in Klosters, Switzerland, Walter was a superb skier. Following WW II he became a member of the Swiss ski team and then, in 1948, he coached



Below: Walter Haensli, Ruapehu, 1949.

Right: Walter, aged five, and already on skis.

Photo: Haensli Family Collection



the American women's ski team for the 1948 St Moritz Olympics. At those games, American skier Gretchen Fraser won gold and silver, the first ever US alpine medals. Following this success, Walter was invited to join the prestigious Sun Valley Ski School in Idaho.

During the 1948-49 winter, New Zealand businessman Bryan Todd, on holiday in the States, sought out Walter for ski lessons. Todd was so impressed by Haensli's credentials he convinced the New Zealand Government to bring him here to develop our fledgling ski industry.

Walter arrived at Ruapehu in June 1949 and set about transforming the on-mountain operation at Whakapapa over the next three seasons. He met and made many lifelong friends, most of whom were ski club members. Walter, an avid ski racer established a new race at Ruapehu in 1950 to encourage open competition between instructors and amateurs to find the fastest man and fastest woman on the mountain. The race became known as the Haensli Cup.

In the early 1950s, a group of key people committed to the idea of creating a lift company dedicated to bringing modern ski lift facilities to Ruapehu. Walter, a charismatic figure well known to the ski fraternity, travelled the country and



convinced people to invest in the new venture. As a result the capital was raised mainly from hundreds of small subscriptions from ski club members. Ruapehu Alpine Lifts (RAL), a company for skiers, was launched in 1953.

Walter sold the skifield licence to RAL and returned to Europe. He had been involved in testing the first composite metal and plastic skis and was rewarded for his efforts with the sole distributorship of Head Skis in Europe. For 20 years, Heads were the top-selling ski in the world and Walter was a big part of their promotion and success.

Since 1960, with Walter's input, a Swiss ski instructor has been hosted every year by the Ruapehu Ski Club. This arrangement continues today. Walter returned to New Zealand in 1961 and 1964 – noting with pleasure that “the standard of skiing was now comparable with that at many European resorts.”

Since 2003, the Ruapehu Ski Club (RSC) has hosted 'Walter's race', the Haensli Cup, now a teams' event that is part of the annual series of interclub races at Whakapapa. As a special accolade to

Walter, RSC held the 2016 event on the Haensli Face, a ski run named for him many years ago at Whakapapa.

Karen Williams, author of Walter's story, ('Barrel Staves to Carving Skis' published in 1999), was invited by RSC to speak at a special function to celebrate his life at the Knoll Ridge Café on 21 August 2016. It was a beautiful evening and the torchlight parade on skis down the mountainside in the dark was a final tribute to a very special man .

Above: Torchlight parade, winter 2016.
Photo: Conrad Smith .



Skiing in the family

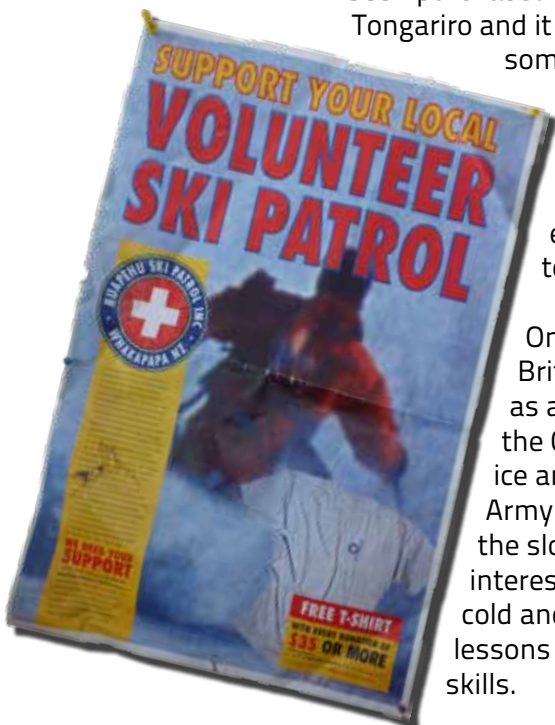
Bob Stothart
ex President Project Tongariro

I first went skiing at Whakapapa in 1954 as part of a small scout group. We camped in the car park in a large tent, cooked over an open fire and spread a bale of straw inside the tent to keep out the persistent cold. It was love at first site despite the falls, the frustrating bindings, the woollen clothing, oilskin parkas and rope tows. Soggy, wet woollen gloves on Hutt Flat rope tows were a frustrating combination. I skied again the following year as a student and we spent a week in the cold and dilapidated Salt Hut which has subsequently been removed from the mountain.

Marriage and small children kept me away from the mountain for a few years but my enthusiasm was rekindled when I joined the staff at the Recreation Centre at Victoria University and discovered a small artificial ski slope in a corner of the gymnasium. The plastic toothbrush matting had been purchased from the Chateau Tongariro and it served students and

some university staff with several years of basic instruction. Where possible we followed up the artificial experience with a trip to the mountain.

On sabbatical leave in Britain in 1974 we skied as a family in Scotland in the Cairngorms. The blue ice and helmeted British Army soldiers bombing the slopes made for an interesting venue. It was cold and windy but we took lessons and improved our skills.



Sadly, Bob Stothart passed away on the 2nd November after a period of ill health and contracting pneumonia. Bob was a foundation member and a life member of Project Tongariro. Deepest sympathy to Margaret and her family. An obituary recording Bob's life and contribution will be recorded in next year's Tongariro Journal.

Returning to New Zealand we joined a ski club and I joined the Ruapehu Ski Patrol and got myself to the mountain on a regular basis. Usually, I took one of the children but in the school holidays we tended to go as a family.

An American researcher in outdoor recreation Jubenville, developed a theory of the outdoor recreational experience. He described the journey to the site, the anticipation of the activities, the on-site experience, the journey home and the reflection upon the experience. It was a theory I embraced as we waxed our skis, packed our gear for each trip, filled the car, stopped at favourite places on our journey, negotiated the then winding Mangawekas, bought chocolate éclairs in Ohakune and went to our warm club lodge at Whakapapa. We skied and enjoyed ourselves to the maximum, carrying out the shared chores in the lodge and returning to Wellington flushed with physical exertion and buoyed by the sheer pleasure of beautiful movement in a wonderful environment.

Fitting chains with frozen hands, digging the car out after a southerly blizzard or holding on to the car doors and all the gear during a blizzard, finding a convenient park on Friday nights, the children hoping to be snowed in to avoid going back to school,



Left: The Stothart family and friends picnicking out at the Far West on Whakakapa skifield.

Photo: Megan Stothart

are all part of the Ruapehu experience. On several occasions it was necessary to dig out our car, completely buried under a huge dump of snow. I always carried a small shovel for this task.

Skiing with one's children is a special bonding experience and we skied all over the mountain, including Turoa, as it developed, always discovering fresh places to ski and taking turns to lead. Our mantra was, the lifts are going, we should be skiing, so we skied in all kinds of weather. Ski Patrol duties in the holidays often resulted in high levels of need for first aid assistance. My daughter assisted once when all patrollers were engaged in dealing with accidents, by hauling a 'banana' boat across Hutt Flat and, she claims, half way up the Staircase T Bar, by herself.

White-outs were frightening, not knowing which way was up or down and the ever present ice in the Ruapehu snow was a constant learning experience. We were often the first ones out of the lodge and the last ones back to the warmth and friendship of the lodge. The South Island beckoned us and we skied at Mt Hutt. The road

up impressed us as did the expanse of the field. We also skied at Tekapo and Porters Heights. When Ruapehu was out of action during massive eruptions I skied at Rainbow ski field at the top of the South Island and took opportunities to ski at Coronet Peak, The Remarkables and in Canada.

We changed our gear as technology (and pragmatism) indicated a change was essential. On many occasions we bought second hand gear at well-organised ski swaps, catering for growing children. We endured plate bindings (Besser and Getze) and the no-toe clip of the Spademan binding, said to have been invented by an American orthopaedic surgeon. We changed from granddad's woollen long johns to the new polypropylene materials and welcomed the breathable Gortex clothing as we did the change from stiff, leather boots to plastic ones, long skis were swapped for



the shorter, fatter iterations. Helmets became essential for this rocky field.

We endured the lengthy queues (45 minute waits at times) at the Knoll Ridge poma, and other runs, until the fearsome pomas were replaced by T bars then chairlifts. My daughter recalls being briefly suspended as the Knoll Ridge poma swished around the bend half way up the lift line. We loved the introduction of grooming the piste.

We welcomed the introduction of season passes which replaced fiddly cardboard tickets held on to our clothing with a rubber band. The old, Staircase T Bar from Hutt Flat used to require a small tear-off ticket each

run as the T Bar was used. Not entirely convenient with wind and wet gloves. A lasting memory for my wife, on her first trip up the old single-seater First Chair, was to have a crate of beer flagons dumped her lap with a cheery assurance that someone would lift them off at the top.

The up-grading, sealing and re-alignment of the access road was a joy to behold. The original road was always severely corrugated as it wound its way up quite steeply. On one occasion the corrugations were almost too much for our laden Fiat 128 and the bumps jerked the gear stick frighteningly out of the gearbox. Not long afterwards I bought a Subaru 4WD wagon and took pleasure in passing people putting on chains

Below: Ski patroller on RAL's No 2 Chairlift, Waterfall area, built 1955.

Photo: Ruapehu Alpine Lifts



at the bottom of the Bruce Road. The sealing and re-alignment of the road was one of the greatest improvements on the mountain. The Tongariro Natural history Society (now Project Tongariro), planted a long strip at the edges of the new road with tussocks only to find the next morning that hares had reduced the tussocks to stubby bristles. Most of all, however, we rejoiced when the irritating RAL Members' queue was abolished. And the food outlets changed beyond recognition including the provision of 'proper' coffee. The new Knoll Ridge café is a haven of comfort, warmth and satisfying food.

Our children married non-skiers but it wasn't long before new partners became part of the culture of the ski club and ardent skiers in their own right and in turn introducing their children to the life long sport. My wife Margaret made a significant contribution to our club by acting as the Maintenance Officer for our Ohakune lodge for 25 years. This involved organising two or three working parties each year, maintaining contact with local trades people, responding to plaintive phone calls from members unable to resolve matters for themselves and keeping the lodge up to the high standards expected by members.

A point of personal satisfaction is that our son John completed a ski instructor's qualification in written and oral German, at a resort in Austria. In turn, John's son Alex completed a ski instructor's qualification at Coronet Peak while doing his medical degree and instructed between academic years in Canada. Skiing with one's children is special but skiing with one's grandchildren is surreal and produces a most wonderful feeling of bonding and pleasure. Skiing together, back to the lodge at the end of a good day is a very special feeling. This wonderful sport has certainly had a big impact on our family and we reflect on our diverse and collective experiences with great satisfaction.



NOTE: I acknowledge the help of my wife Margaret and my daughter Megan in the preparation of this article.

Above: 1965 aerial photo showing Staircase T-bar and No 2 chairlift, Whakapapa.
Photo: DOC Collection



Successful Kaimanawa Horse muster

Amelia Willis
Community Ranger

The 2016 Kaimanawa wild horse muster has been hailed by many involved as 'the best muster yet' – not only for the successful re-homing rate, but for the calm and condition of the horses and the professionalism and efficiency of the operation.

It has been a long road since the period of conflict between 1991 and 1998. The lessons learned from the Kaimanawa wild horses (KWH) in New Zealand were the reason why representatives from the Hunter Valley and Victorian Brumby Associations came to see the muster in action this year.

The Department leads a biennial muster in the Waiouru Military Training Area in order to protect the fragile ecosystems unique to the Moawhango Ecological zone and manage the herd at 300 horses, a sustainable level to maintain the best condition of the horses.

From challenging beginnings, when the population reached almost 2,000 horses, to today, things have changed significantly.



The formation of a working group in 1994 was the first step towards ensuring the success of the muster today. The Kaimanawa Wild Horse Advisory Group, as it is now known, is made up of representatives from DOC, the New Zealand Defence Force, iwi, neighbouring land owners, New Zealand Veterinary Association, horse welfare groups, the RNZSPCA and Forest and Bird. This group was charged with the development of the KWH Management Plan, and ongoing advice and involvement in the management process.

Twenty five years on and differing agendas have come together; the now common purpose of the different interest groups has made for an exceptionally professional operation. Re-homing of captured horses is undertaken by two not-for-profit organisations working to a common protocol. In the past, a high proportion of horses captured were sent to an abattoir. However, in 2014 the number was only 15 horses, and this year none were sent to the abattoir.

In Victoria and the Hunter Valley, the plight of the Brumbies is a different story, where both groups are still in the early stages. Colleen O'Brien and Kath Massey joined us for the entire operation, and went back to Australia 'filled with optimism' for the future.

Colleen shared a few highlights with us:

Top right: The highly professional vets and stockmen sorting the horses in the yards.

Below: The horses become quiet once in the yards.

Photos: Kimber Brown





Left: Colleen and Kath sharing some of their Australian story with the group.

Right: Technical advisor Bill Fleury tells the story of the horses.

Photo: Amelia Willis

Below: Highly skilled and experienced pilots bring the horses quietly into the yards.

Photo: Kimber Brown



'One of the things that stood out was the high regard in which the Kaimanawa horses are held by the community. In addition to my work here in Australia for our brumbies, I have observed musters of mustangs and burros in the USA and arrived with some trepidation, but was really blown away by how professionally, humanely and empathetically the Kaimanawa muster is conducted.

I'd like to credit the muster team, both in the air and on the ground. To be able to muster such a large number of wild horses in such a short timeframe and not have any injuries occurring in the yards or during the muster speaks very highly of the muster crew.

DOC's open and transparent manner, in allowing media and observers onsite, I feel is a great step forward. It helps the community feel comfortable there aren't 'back door deals' going on and takes away much of the angst and rumours that can fly around with such a potentially hot topic as wild horse management.

The Kaimanawa Heritage Horses re-homing group clearly has a significant committee who put a huge amount of work into re-homing efforts in the lead up to the muster, [judging by] the spectacular result this muster! The team members we met and spent time with are knowledgeable, honest and passionate about their work with the horses and work hard to maintain good relationships with the other key people, such as DOC and the Army.

I came home filled with optimism for our brumbies and more determined

than ever to continue working towards a situation where our brumbies are as highly respected and treated as well as the Kaimanawa horses of New Zealand. Clearly we are a long way behind you yet, but it does give me hope to see such a successful model!"

The entire operation involved well over 70 people, from DOC and New Zealand Defence Force staff, to helicopter pilots, stockmen and vets, re-homing groups, media and observers all coming together for what turned out to be fantastic weather and a smooth operation. As my first muster it was difficult to witness the end of life in the wild for the horses, but seeing everyone working together for the best interest of both the landscape and the horses made me proud to be part of the process. I look forward to the next muster in 2018.





Volcano Watch 2015-16

Harry Keys
Technical Advisor-Volcanology
DOC

Introduction

2015-16 has been another relatively quiet period for volcanic activity in Tongariro National Park. The final management action following the 2012 Te Maari eruption episode took place in November. Ruapehu heating and cooling cycles continue to create interest and keep managers and RAL on their toes.

Te Maari and Tongariro

GNS lowered the Volcanic Alert Level (VAL) for the Upper Te Maari vent system down to 0 (no volcanic unrest) on 19 August 2015, just over three years after it was raised prior to the 6 August eruption. They noted that all monitoring indicators suggest that the unrest episode that triggered the 2012 eruptions was now over. While high temperature fumaroles are still present at the Te Maari crater sustained from cooling magma remnants at depth, chemical analyses suggest that the gases are mostly from the hydrothermal system (steam). The visible fumaroles have become much smaller and gas emission has become very low – normally less than 10 tonnes of sulphur dioxide per day.

In November three years after the last eruption Ngati Hikairo supported by DOC removed the Rahui with a quiet ceremony on the side of SH46 looking up at the volcano. The Te Maari Rahui was put in place as part of a combined management approach to the Te Maari eruption episode (2012-2015) by the Department of Conservation and Ngati Tūwharetoa, to help manage volcanic risks to visitors and staff on the popular Tongariro Alpine Crossing (TAC).

We issued a joint media release with Ngati Hikairo noting that the Rahui was seen as having served its purpose. It had originally been put in place in August 2012 to advise manuhiri (visitors) that it was not safe to approach the eruption area, in case there was another eruption. Iwi have used Rahui

for many different reasons in the past, such as respecting the deceased, protecting people or conserving food resources. In October 2012, following the August eruption, the crossing was reopened with the Rahui extending for a radius of a kilometre around Upper Te Maari crater (second circle from middle of Upper Te Maari crater in Figure 1). At that time we considered the eruption was probably over but no-one could be sure. The 1 km Rahui was put in place based on past knowledge of eruptions during previous eruption episodes. Five weeks after the reopening a second eruption did occur. As predicted, its hazards extended only for a limited distance, 500 metres (first or innermost circle around Upper Te Maari crater in Figure 1 and see Figures 5-6 on pages 15-16 of Tongariro 2014), so were entirely contained within the Rahui. People on the Tongariro Alpine Crossing at the time were never threatened despite some perceptions they were. Hence the Rahui proved to be a practical and powerful example of traditional cultural- and science-based methods working together to achieve a common goal.

The Department of Conservation and Ngati Tūwharetoa advise visitors thinking of approaching the crater that they still need to be wary of volcanic and alpine hazards that are still present. Toxic gases are still being emitted with temperatures still very hot in places (380 °C when last measured by GNS in April 2015). The ground is still unstable in places, especially around the crater rim, and rockfall continues intermittently in many areas. DOC continues to work closely with GNS Science who monitor Mt Tongariro for volcanic unrest (e.g. increase in seismicity or gas emission). Any significant changes to volcanic hazards or risk in the area will be notified to visitors as quickly as possible but generally volcanic risks from Te Maari are now low.

Other volcanic work on Tongariro has assisted visitor management on the Tongariro Alpine Crossing. Visitor growth is putting pressure on the track management (see separate article) including existing

toilets so volcanic risk assessments have been made for various sites for possible new toilets (e.g. Figure 1). This suggests that facilities at most sites have a reasonable life expectancy of 50-500 years which is longer than their normal asset design lifetime (35 years for toilets, 50-60 years for huts). However at Emerald Lakes expectancy may be as short as 20 years. However the tephra layer history suggests that if one of the vents like Red Crater entered a more active phase of activity with multiple eruptions over many years associated with ballistics and blasts (pyroclastic density currents) the life expectancy at other sites would be less, perhaps less than 20 years. These quantitative estimates have many uncertainties both on the high and low sides, but are a reasonable basis for decision-making as far as risk to structures goes. The risk to people using such facilities were not included in this new analysis because it was assessed previously and is manageable entirely separately by the volcanic risk mitigation system for Tongariro National Park. It should not be regarded as a reason to not build at any of the sites considered here.

A heavy rainfall event early in 2016 led to rerouting of the stream back towards its original course in the TAC lahar zone near the Ketetahi road end. We have to expect ongoing events like this at decreasing frequencies over the coming few years until the stream above has stabilised following the dam break in October 2012 (see also articles in the previous two Tongariro annuals).

Ruapehu

Crater Lake has been through another complete heating and cooling cycle over the last 12 months (Figure 2). While such cycling is the normal behaviour for Ruapehu, the extremes reached have been unusual for this current 1995-2000 period of lake activity. This resulted in probably the largest temperature variation (34 degrees) over a 12-month period since the 1994/95 heating cycle and the 1986 and 1990-1991 cooling cycles. GNS have made the GeoNet lake temperature log available on line (see Figure 2).

The lake reached 46°C in early May 2016 accompanied by increased seismicity and gas emission. After several days of enhanced monitoring during which at least two probable but small hydrothermal events

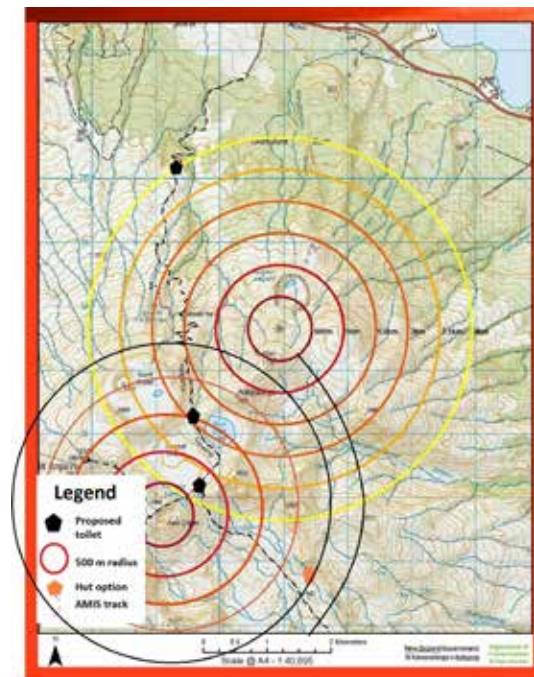


Figure 1: Circles spaced at 500m intervals around Upper Te Maari crater (top) and Red Crater (bottom) used for risk assessment and management. Black symbols are locations of possible new toilets on the Tongariro Alpine Crossing.

occurred, GNS raised the VAL to 2 on 11 May. DOC issued an advisory recommending people should not enter the Summit Hazard Zone (SHZ 2 km from Crater Lake). It was pointed out that no ski areas, other facilities or roads on Ruapehu or elsewhere in Tongariro National Park were affected by this warning, but international media and others falsely declared that people were being warned away from the volcano (erroneously referred to as Mt Doom aka Mt Ngauruhoe). Discussions with RAL concerned access to the High Noon chair at Turoa which is within the SHZ. As a consequence we did some additional work on our guideline plan for volcano response summarising unrest indicators that might suggest additional access precautions should be taken. As it happened the temperature started to decline shortly after and on 24 May DOC decreased the warning area to the crater basin only (within 400 m of the lake). Gas and seismicity

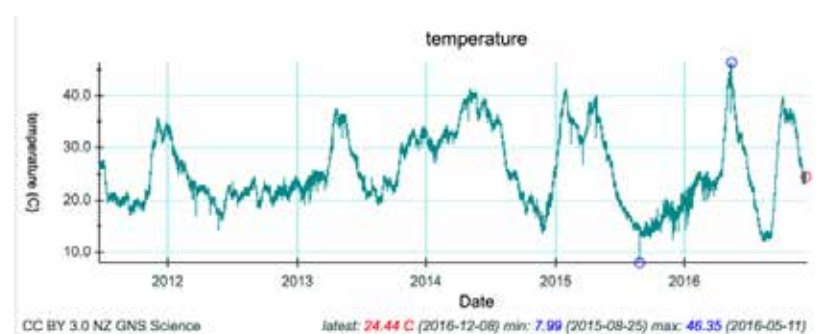


Figure 2. Crater Lake temperatures between 2011 and late October 2016 showing the pattern of lake heating and cooling cycles (from GeoNet) at <https://fits.geonet.nz/plot?sites=VO.RU001&typeID=t&days=2000>.

remained elevated for some time after that. However by 5 July the unrest was clearly over GNS lowered the VAL to 1 and DOC removed the access advisory the same day.

By mid-July the lake had cooled to 20°C which is the DOC-Tongariro volcano team's initial "cool mode watch temperature". Following our internal procedures we increased our monitoring and testing of the Eruption Detection System. We also worked closely with Whakapapa Ski Area to enhance risk mitigation until further GNS results became available from gas and lake sampling. While they confirmed that seismicity had become negligible as normal during these cool periods they were also able to confirm there was no abnormal gas emission. And importantly they noted there was still intermittent upwelling in the lake indicating the vent system was not blocked and that lake gas chemistry was consistent with cool temperatures deep in the vent system rather than a blockage.

This was clearly a different situation from September 2007 when understanding was less developed. Our visit on 8 September that year (Figure 3) showed that the temperature was low (14°C) and there was no upwelling visible but there was an anomalously strong throat-burning gas presence. Just over two weeks later the volcano erupted. The new understanding and enhanced monitoring by GNS-GeoNet may represent a significant advance in risk mitigation on Ruapehu in that we may be learning how to better discriminate between lake cooling due to

cooling at depth in the vent (e.g. 2016) and cooling due to a vent blockage with gas pressure building up (2007). So DOC decided not to issue an access advisory in August 2016.

For the record the temperature reached 12°C in mid-August the coolest measured since June 1993. (The 8°C temperature on 25 August 2015 shown in Figure 2 was a short term anomaly due to avalanches entering the lake after which the lake rapidly warmed back to the pre-avalanche temperature of 14-15°C).

From early September the next heating cycle began. The lake warmed steadily reaching 37°C on 30 September. That morning dawned clear and cool. At the Tongariro Alpine weather station at 9 am the relative humidity was 97% and air temperature was 2.7°C (equivalent temperature at Crater Lake about -2°C). Around this time a low steam plume was seen above the mountain and the phones started ringing. But it was not a dense convoluting steam column or rising fast so it looked like normal condensation of warm moist air rising and condensing in the cool humid air above the mountain. There were no seismicity or acoustic signals (normally indicative of some explosive event) though and GNS issued a VAB confirming that later in the day. This observation and others (Table 1) suggest confirm plumes may be seen most widely rising above the crater rim when lake temperatures are above about 35°C and weather on Tongariro is cool with relative humidity above 90%. The temperature peaked at 40°C on 4 October and has since fluctuated around 35-37°C (as at 3 November, Table 1, Figure 2). Tremor levels were higher than normal in late October.

New research

Several research projects are underway at present in Tongariro National Park. A large number of applications were made this year to the Project Tongariro's Tongariro Natural History Society Memorial Award and results of some will be reported in future years. The new geological map of TNP is currently being peer reviewed and will be available in 2017 from the DOC Visitor Centre at Whakapapa.

Figure 3. Skinning out of the crater basin after monitoring the lake on 8 September 2007 17 days before the eruption that seriously injured a climber at Dome shed and narrowly missed a groomer driver on the Turnpipe run near the Far West T bar.

Photo: Paul Bradshaw



Date	Lake °C	Observations	Time	wind direction	humidity %	air temp
30/09/2016	37	GNS VAB, all round mtn	9:10	ENE	92	2.7
4/10/2016	40	(none visible from Whakapapa)	8am	W	80	2.0
10/10/2016	37	Mtn Air, GeoNet south cam	8:10 & 8:30	SSE	90	-1.5
13/10/2016	36	Small, from SH1 & Tukino (not visible from Whakapapa)	8:45-11am	SW	50 to 74	0 to 2
31/10/16	37	None visible from SH1 etc	9-11am	E	61-67	0

Table 1. Observations of steam clouds above Crater Lake compared to weather at the time at the Mt Tongariro. The data was recorded at the Tongariro Alpine weather station located at 1700 m -see <http://harvestalarms.com/w.cgi?hsn=11617&grp=Main>. Air temperatures over Crater Lake are about 5 degrees cooler than at the weather station.



Student leaders voyage to subantarctic islands

Amelia Willis
Community Ranger

In February 2016 Taupō Community Ranger Amelia Willis travelled with the Sir Peter Blake Trust to the Subantarctic Auckland Islands.

DOC on the expedition, joining the students, four scientists, an environmental educator, two media personnel, a doctor, an environmental engineer, an aquarist, two Blake leaders and of course the Royal New Zealand Navy crew of the HMNZS Otago.



Above: The whole crew on the flight deck before our final day.

Photo: Brendon O'Hagan.

Following in the footsteps of Sir Peter Blake, the ten-day Young Blake Expedition took 14 students on an adventure aboard the HMNZS Otago to the Auckland Islands, 465 kilometres south of Stewart Island.

The student voyagers were there to carry out important research alongside a team of experts and, in doing so, hopefully gain inspiration for their future careers.

Shay van der Hurk and I represented

The most rewarding part of the experience was watching the young voyagers get excited about everything from the tiniest plankton, to charismatic megafauna, to the bigger picture of global climate change.

The first few days of the trip were spent on orientation – getting our sea legs and introducing the science modules we would be undertaking on the islands. This gave Shay, who has been with DOC for nine years, and myself, a relative newcomer, the opportunity to get to



know the students, talk with them about the 'Subs' and what we might see and experience when we arrived. Just like everyone on board the HMNZS Otago we brought different experiences and strengths, offering a wide variety for the students to engage with and learn from.

The student voyagers came from all over New Zealand, with a wide variety of backgrounds and interests. Shay and I were impressed with the motivation and maturity of the students. They asked smart questions, and we had some really interesting discussions about the differing values associated with the subantarctic, i.e. how do you get the average kiwi to care about flora they've never heard of, found on islands hundreds of kilometres away from their daily lives?

After crossing through the roaring forties and into the furious fifties (where swells reached up to eight metres) everyone was pleased to step ashore on the first day and get straight into work with the scientists. Four days of sampling what we couldn't really see – microorganisms, plankton, algae and sediment – were complemented by two final days spent at the DOC visitor sites with sea lion, albatross, historic huts and yellow eyed penguins.

As blown away by the impressive wildlife as we all were, it was also wonderful to see the human history of the islands so well preserved. The Southern Islands team have done a fantastic restoration of the WWII-era Ranui coastwatchers' hut and lookout. It was pretty cool to add our names to a visitors' book



Left: Students on the boardwalk on Enderby – a chance to get up close to young Southern royal albatross.

Right: Shay with student voyager Guy McDonald.

Photos: *Brendon O'Hagan.*

dating from 1963 which had Governor General Sir Jerry Mataparae's entry on the previous page. As a great supporter and patron of the Sir Peter Blake Trust, he visited the islands with them last year, and even farewelled us when we departed Auckland.

To see such a range of unique species and the harsh nature of existence in such a remote and windswept place really put life into perspective for many of the students. At our final debrief, 17-year-old Tama Poutaka shared his thoughts with a whakatauki: 'Ahakoa he iti, he mapihi pounamu - even though it's small, it has great meaning.' Appreciating the significance of little things within the ecosystem encourages the young leaders to make a difference, no matter how small or big their contribution.

Below: A special encounter with a sea lion and her pup – step back!

Photo: *Amelia Willis.*



Left: Putting it in perspective: Tama, Nina and Isla taking a closer look at plankton with marine expert Sally Carson.

Photo: Brendon O'Hagan.

Right: Visitors' book at Ranui Cove.

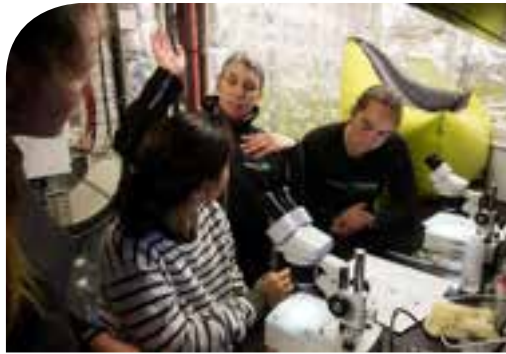
Photo: Oxana Repina.

Lower right: Thriving despite the wild nature of the islands, beautiful Southern rata in full bloom.

Photo: Oxana Repina.

Below: HMNZS Otago in Port Ross as we explore Enderby Island.

Photo: Amelia Willis



Although it was tough for everyone to step off the ship the final day, the students disembarked knowing the journey wasn't over. Sharing the experience and passing on all they learned is just as important as the expedition itself.



About the Young Blake Expeditions

This was the Sir Peter Blake Trust's second expedition to the Auckland Islands. Educational initiatives such as the Young Blake Expeditions and Blake Ambassador Programme are part of the Trust's commitment to supporting Sir Peter Blake's legacy. More information at <http://sirpeterblaketrust.org/expeditions>

DOC supports the work of the Trust as part of our commitment to growing strong and effective environmental leaders for tomorrow.



Bio Brats (Dream Makers Trust)

Marie McDonald
Community Ranger

While assisting DOC staff with trapping a thought occurred to a local volunteer, Marianne, that trapping would be a great experience for children. From there a lot of brainstorming and discussion happened between Marianne and her partner George. Next step was to identify

removal, survey and monitoring of wildlife, and planting. Marianne wants to make sure that the kids get something out of coming along. They have been completing a number of Department of Conservation courses. They are also learning about Risk management, how



how, who, when, and where all this was going to happen. The group started in 2016 with three children and now they have 13 children involved to help DOC with its fight against pests.

Volunteers, Marianne and George are the two behind setting up the group. They wanted to set up a youth organisation that would give the kids a focus towards something other than getting into trouble, teaching them life skills such as hunting, trapping, bush skills, and ecology.

The next step was talking to DOC about a long-term project/area that they could use. An area was identified as Mangaehuehu Scenic reserve which is around 80 hectares. After a discussion with DOC a plan of attack was put together for the group to be responsible for protecting the area. Meeting fortnightly the boys and girls are responsible for pest control (plant and animal), track clearing and vegetation

to make radio call's, trapping, tracking tunnels, how to read the weather.

The group is evolving and their next project is to fund raise for a trailer so they can educate the public about the work they are doing. The kids will be fronting this and passing information onto members of the public.

Left: The Bio Brats team.

Above: Tracking tunnel sheets from the areas the bio brats worked.

Photos: Marie McDonald



Towards a Predator Free 2050

Lou Sanson
 Director General of
 Conservation

The Tongariro region is a fantastic playground for visitors to enjoy the best of 'Our Nature' and all the New Zealand natural environment has to offer.

From the Tongariro Alpine Crossing to the Whanganui River, swimming in Lake Taupō, skiing and climbing on the slopes of Mt Ruapehu, cycling and walking in forests and hills, to playing golf or enjoying the thermal wonders at Wairakei, the area is packed with a huge variety of recreational opportunities.

Project Tongariro and other local groups work thousands of hours each year to help preserve and enhance these areas so they can be enjoyed by everyone. Projects range from predator control

to planting and there are many groups playing their part, including tangata whenua, volunteers, businesses, landowners, philanthropists, councils and government agencies.

It is the passionate efforts of Kiwis of all ages and interests that will achieve the goal for New Zealand to be predator free by 2050.

Since the Prime Minister's announcement in July, we've seen a hugely positive response indicating people feel really connected to the vision of a predator free New Zealand to rid the country of possums, stoats and rats.

Shortly before he passed away in 2012, Sir Paul Callaghan said a predator free

Below: Ray Willett, a veteran supporter of conservation in Fiordland National Park leads a group of volunteers carrying stoat traps along the Kepler Track.
Photo: DOC collection



New Zealand could be this country's 'moon shot'. It's also a concept advocated by conservationist Les Kelly for several years.

Predator Free 2050 is an ambitious goal we can't yet achieve. We will need to rethink traditional approaches around pest control in specific areas rather than eradication on a broader scale. But we believe it is possible over a 34-year horizon, based on the successes of predator eradication efforts to date, the potential of new technologies and the opportunities generated by greater philanthropic and community involvement.

Already we have seen communities like Wellington, Picton, Nelson and Taranaki make the commitment to becoming predator free, and increased predator control work by communities and philanthropists, including more fenced sanctuaries and initiatives such as Project Janszoon and Cape to City.

A much more integrated approach to predator management through the collective efforts of individuals, communities, central and local government brings together the efforts and resources of the Department of Conservation, Ministry for Primary Industries, OSPRI, Regional Councils, QE II and Nga Whenua Rahui. This together with the community component supercharged by leveraging new commercial and philanthropic funding is what will allow us to deliver this goal. Our relationship with our Treaty partners will also be critical to this initiative.

The goal aligns strongly with DOC's strategy of working with others to achieve much more for conservation than we could alone. It's a natural fit with our existing goals, programmes and relationships.

With new ways to make New Zealand predator free yet to be developed, our current tools remain in place, including



using aerial 1080 as the best option to knock down predators across large areas and in difficult terrain. It remains a critical tool in the Battle for our Birds, DOC's national predator control programme to protect our most vulnerable native species.

Our initial focus remains on halting the decline of at-risk species, through pest control and the translocation and reintroduction of threatened species. Predator Free 2050 will see us linking up these initiatives to improve pest suppression and eventually, with the right technology, pest eradications can begin.

Achieving the goal will deliver huge benefits across New Zealand – for the social and cultural links with our environment, for our regional economies through primary industries and tourism, and for our threatened native species.

With all these efforts and everyone working together, a predator free New Zealand for our grandchildren will be our legacy so they will continue to enjoy the natural wonders of Tongariro.

Above: Pest control efforts by volunteers in Pureora Forest have contributed to the kokako population reaching 500 - (self sustaining).

Photo: Waikato Regional Council



Who Creche Update 2015/16 Season

Heather Morison
Biodiversity Ranger

The who crèche, located at the Tongariro National Trout Centre in Turangi, completed a second successful season, running from early December through to early April.

As you may already be aware if you have visited recently, the facility is made up of two large aviaries with fast-flowing water and space for training flights for who ducklings bred in captivity and preparing for their release into the wild.

Who normally inhabit fast-flowing rivers and streams and past experience has shown that these ducklings stand a much better chance of adapting after release, once they've had at least two weeks honing their white-water skills, diving and feeding on invertebrates in a safe environment. They are social birds and learn from each other whilst 'hanging out' at the spa.

2015/16 Season

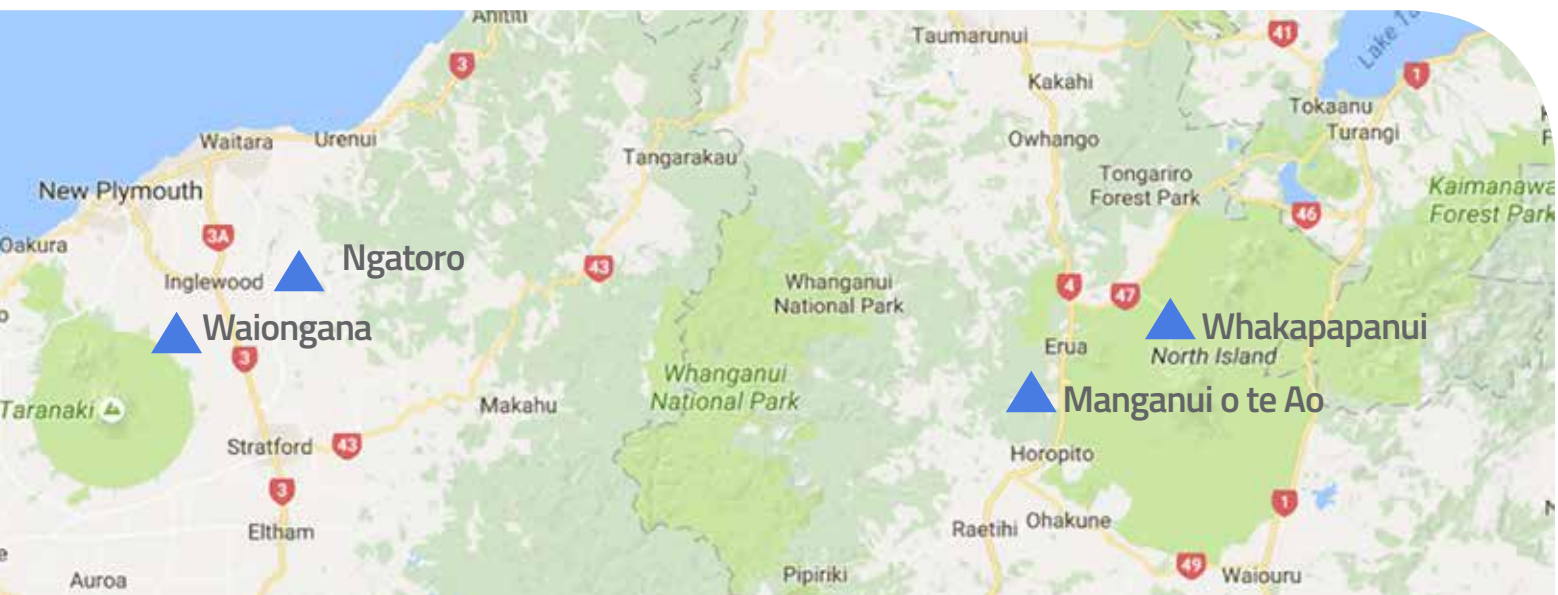
It was a slow breeding season this year, both in the wild and in captivity, with various possibilities discussed, such as



a late breeding season combined with an early moult, but no particular reason appears to have been identified as of yet.

The first three arrivals from Isaac Wildlife and Conservation Trust flew courtesy of Air New Zealand from Christchurch to Rotorua airport on 10th December 2015. After a quick health

Below: Map showing 2016 release sites



check they were introduced to their summer spa sojourn, and settled in quickly.

On the 7th January a further seven birds arrived from Christchurch via Palmerston North: four were from Isaac Wildlife and Conservation Trust and three from Orana Wildlife Park, who soon joined in the diving, flying and surfing lessons on the rapids with the others.

A further three birds arrived from Pukaha Mt Bruce in February, followed by a final two from Isaac Wildlife and Conservation Trust during March, bringing the total number of birds at the crèche for the season to fifteen birds.

One of the first arrivals failed to thrive despite consuming a healthy diet of both pellets and invertebrates and was transported to Wildbase for a thorough assessment. After a couple of weeks it was decided she was merely homesick and returned home to Christchurch until March, when she joined in with the others being released on the Manganui o te ao River, Whanganui.

The Turangi facility was once again staffed by an amazing group of volunteers with local DOC staff filling in any gaps. The volunteers were a mix of university students, local primary school teacher (and her daughter), overseas students and a recent graduate from the DOC trainee ranger programme in Nelson.

Support was once again received from Wildbase in Palmerston North, VetPlus in Taupō and the Whio Recovery Group.

This season we introduced a 12 day health check for every bird throughout their stay, this included dosing for tapeworm and general parasites. This made a significant difference in maintaining the health of the birds with associated growth and development.



Above: Health check
Photo: DOC

Microchipping was undertaken during their first 12 day health check so we could monitor the chips prior to release. Virbac provided a new style of microchips for us to trial which are much smaller and easier to insert than the previous ones. These have proven to be ideal and a huge thanks goes to Virbac for their continued support.

We trialled some night vision cameras in the raceways at various times during the season to monitor for bullying of





any new arrivals and learn about their night time activity. When reviewing the footage we realised the three resident who on the Tongariro River adjacent to the crèche were visiting nightly.

Both the captive and wild birds appeared very interested in each other with only the glass viewing windows separating them.

Releases

This year we were lucky with all three of our 'graduation' days, the weather was perfect and all birds were seen to manage the fast flows and start feeding on invertebrates almost immediately at each release site.

Taranaki Release 26th Feb (Ngatoro & Waiongana)

Isaac – 4 birds (1 female, 3 males)
Orana – 2 birds (2 females)

Whanganui Release 3rd March (Manganui o tea ao)

Isaac – 3 birds (1 female, 2 males)*
Mt Bruce – 1 bird (female)
Orana – 1 bird (male)

Tongariro Release –6th April (Whakapapanui)

Mt Bruce – 2 birds (1 female, 1 male)
Isaac – 2 birds (1 female, 1 male)



Top left: Professional pooper scooper Becky O'Sullivan (recent AUT graduate)

Above Whio crusaders arriving at bootcamp.

Middle left: Bird observations prove entertaining, the teenage birds are real characters

Bottom left: Freedom! Release onto the Whakapapanui River with Kiwi Forever students.

Photos: Sarah O'Sullivan

Our next season is anticipated to start again in early December 2016 so come along and visit the Trout Centre aquarium, hatchery and aviaries and check out what we are up to. As we are 'seasonal' and arrival/release dates are not set in concrete, it might pay to give the Trout Centre a call first to ensure who are resident in the creche when planning your visit (07 386 8085), checkout the website for opening hours and location map - <http://www.troutcentre.com/>



Cashless Camping

Marie McDonald
Community Ranger

Wow! Time is changing and DOC is catching up to the 21st century in regard to technology in camping areas. This year hut rangers in the Tongariro National Park will be trialling a new payment system.

In the past if you 'rocked' up to a camping site and if you had not booked in with the ranger, then the ranger would have to play a game of 'cat and mouse' with Whakapapa visitor centre over the radio to see if any spaces were available.

For the last two years' rangers have been able to use 'band expanders' and are able now to do bookings from the huts.

This year Tongariro will be trialling a 'cashless' payment method for paying at camping areas so you will be able to pay without having to bring along any cash. It will be similar to when you use your phone account to pay for council parking. If the system works well in Tongariro then it will be implemented in other areas around New Zealand next year.





Tongariro Summer Ranger — the best job ever!

**Sian Moffitt,
Tongariro Summer Ranger**

Over the summer I have been given so many amazing opportunities to get out and experience what DOC has on offer as a Tongariro Summer Ranger.

As a keen environmentalist working here has been 'a dream come true'. I've had amazing experiences day after day!

In the past six weeks at DOC I have developed so much confidence in my abilities thanks to all of the great opportunities. I have been writing media releases, stories, blogs, updating the website, entering whio data, organising Kids Greening Taupō activities and gaining lots of knowledge from talking to other staff members and researching.

I have been lucky enough to attend the Taupō DOC carving unveiling, worked with the whio/blue ducks at the Turangi National Trout Centre crèche, taken photos of takahē and kārearea chicks, been out on Check, Clean, Dry advocacy runs and helped out with three wetsuit dip stations, assisted at Tongariro National Trout Centre fish-out days, helped out on the Kaimanawa Horse trip at Waiouru Army Base with the Mahi Aroha summer programme and worked with the 'Find a Whio' competition winner and her family.

One of my highlights was working with the whio at Turangi. Initially I attended the training day for volunteers where I learnt how much effort goes into the whio behind the scenes. I then attended both December and January whio releases into the crèche and assisted in one of the health checks. Through working with the whio I have gained knowledge and love being able to answer questions from the public when out and about with DOC.

Another highlight was being able to observe and capture images of the beautiful takahē parents and chick at Wairakei Golf+Sanctuary. This was definitely a special experience and I really enjoyed watching the parents feed the chick and browse in the long grasses. As a passionate photographer any chance I have to photograph our



Above: My first day working with Check, Clean, Dry: A Wetsuit dipping station for the Half Ironman.

Photo: Sian Moffitt

On my first day of work we released two kiwi at Wairakei Golf + Sanctuary. Retallick the larger kiwi chick (named after All Black Brody Retallick) was 39 days old and weighed 602 grams. The other kiwi was 61 days old, and weighed in at 443 grams and didn't yet have a name.

I was so lucky to hold the unnamed ginger kiwi chick while ranger Jenny put on its transmitter. This was a very special moment for me and marked the beginning of the many new experiences coming my way.



unique New Zealand species I grab hold of and make the most of the time I am given.

I was also lucky enough to meet the 2015 Conservation week 'Find a Whio' winner; eight year old Olive and her family from Blenheim. Her excitement and enthusiasm were infectious. I loved being able to spend time with her and ten year old sister Alice talking about all the environmental opportunities I have had since I was their age.

It was also great to hear about her environmental involvement so far and what her school has been doing as an eco-school.

Part of Olive's prize was to head out on the river with Fern the whio dog and several DOC rangers to 'find' four whio. We found two parents with two fledgling ducks and carried out the capture, checks and watched the micro chipping before Olive and her family released them back onto the river.

Olive kissed her little fledgling on the head before watching it swim back up the river with its family, thrilled it was 'in the lead'.



Left: On the job with Greening Taupō
Right: Up close with a kiwi!

Photos: Sian Moffit

We went river rafting, fishing at the Turangi National Trout Centre, fed the whio ducklings in the crèche and Olive, Alice and Dad Mike had a 45 minute helicopter flight around the Tongariro Forest and National Park.

Working with the Department of Conservation has been the highlight of my year and it has definitely opened new doors full of future possibilities for me. I'd like to say a huge thank you to the Taupō DOC office and to

Spending the day with the "Find a Whio" winner.

Photo: Sian Moffit





Right: Speaking at the Kids Greening Taupō launch about the logo which I had designed.

Photo: Sian Moffit

Natasha Hayward, Robyn Orchard and Tania Wells for giving me this amazing opportunity and to Amelia Willis for letting me have many of these wicked experiences out in the field.

Before heading to Wellington and Victoria University to study my first year of a Bachelor of Science majoring in Ecology and Biodiversity next month I am off to the NZAEE Conference where I am speaking as part of a Collaborative Community Conservation Education Model youth presentation.

The presentation is with two other students from Kids Restore the Kepler and Project Janzoon. I will present on Kids Greening Taupō and the opportunities this programme has offered me, including my work as a summer partnership ranger. We are hoping to see many programmes introduced throughout New Zealand with student leadership and involvement in environmental education to work towards fixing some of our local problems.

I am excited to see what this brings and look forward to the new possibilities waiting for me in Wellington.

Mahi Aroha 2017

The 2017 programme will incorporate exciting opportunities for audiences of all ages.

Keep up to date with the latest news, trips and information through our Facebook page at **Mahi Aroha - Doing it for Conservation.** www.facebook.com/ProjectTongariro



A volunteer year to remember!

During the period from 1 July 2015 to 30 June 2016 Project Tongariro members and community volunteers contributed approximately 6993 hours to projects around Tongariro. That's more than 1,165 days through various activities!

Volunteer days are valued at \$150 per day to cover time, materials, petrol and other resources. On this basis, Project Tongariro volunteers contributed the equivalent of a whopping \$174,750 during the 2015/2016 year.

Success breeds success and Project Tongariro, with the community's help, is making a huge difference to conservation in the Central North Island.





Taupō ranger helps develop new e-bike

Amelia Willis
Community Ranger



Right: Roy Baker testing out the newly arrive Ubco 2x2 on the high use Rotary Ride to Huka Falls track.

Photo: Ian McNickle

Central Plateau Operations Ranger Roy Baker's past life as a bike builder has proved valuable, giving his team the opportunity to lead the way with a new, safe, efficient and environmentally friendly tool for DOC.

The Ubco 2x2 is a kiwi-designed, electric off-road bike which debuted at the 2014 Fieldays as a farm utility vehicle. Roy's long history in the cycling world tipped him off to the innovative new bike, so went along to Fieldays to see it first-hand.

After a test drive and a chat with designers Anthony Clyde and Daryl Neal, Roy was asked to take a prototype home for a closer look.

Roy is a motor and push bike expert – whether it's wheel building, mechanics

or frame design, motorbikes, bmx or mountain bikes, Roy knows his stuff. He owned and operated 'Roy's Cycle World' in Taupō from the age of 19, was a founding member of the NZ BMX Association and even participated in the first ever Round the Lake Cyclethon forty years ago.

After taking the Ubco 2x2 home, Roy wasted no time taking it to pieces, analysing its features and mechanics – always with DOC use in mind. He made a series of recommendations to Anthony and Daryl, who worked with the manufacturers in China to upgrade and correct some of the issues Roy had noted.

Roy says he is happy to have picked up on the bike early to be able to promote its benefits for the Department.



Following further trials, and a comprehensive business case, the Central Plateau team now have two Ubco bikes at the field centre.

With hundreds of kilometres of popular walking and mountain bike tracks in the district, it is important to be able to respond quickly to windfalls and other issues. Quad bikes are no longer used due to safety risks and other side-by-sides are unable to navigate the narrow tracks and tight turns making the new Ubco bike the ideal option. It can go where mountain bikes go, but can carry chainsaws, fuel, gear and other tools.

The Ubco 2x2 is battery powered making it quiet, cost effective and environmentally friendly; it has a range of 100 km and is both powerful and agile enough to navigate our range of tracks. It's lightweight meaning there's no risk of being crushed, and with its low centre of gravity and step-through design it is easy and safe to manoeuvre.

'The real plus with the Ubco bikes is allowing us to work more efficiently,' says Operations Manager for the Central Plateau, Dave Lumley. 'Not only will high-use tracks like Huka Falls be attended to quickly, but on our backcountry tracks in the Kaimanawa Forest Park we will have easy access to windfalls, completing work in one day, where previously it involved either tramping or flying in, camping and doing the work over several days.'



Left: The bikes are lightweight and easy to manoeuvre.

Photo: Ian McNickle

Right: A close up look at the innovative new bikes. **Photo:** Ubco

Below: Stopping to take in the view of Lake Taupō while clearing windfalls, Kawakawa Bay.

Photos: Roy Baker

The use of electric powered bikes (e-bikes) is a relatively new activity in New Zealand, and raises questions about what bikes can legally be used on public conservation land. According to DOC's newly formed guidelines, the 2 kilowatt Ubco 2x2 and any other bike with more than 300 watts of power is classed as a motorbike, and subject to the same regulations as motor vehicles.





National Park Tourism - what are the trends and what are the options for management?

Dave Bamford
ex President Project Tongariro

A presentation to the Otago and Southland Conservation Boards, October 2016

Good afternoon – Nga mihi o te po.

Today I want to share insights into national park tourism and visitors. My talk is going to cover some of what I see as big issues facing tourism in our national parks, with a focus, but not exclusively, on mountain tourism - the issues and solutions are broad.

I will touch on environmental and natural hazards, the cultural values of, and social impacts on, our mountain lands. I will discuss the key market changes and how

we could learn from what's going on in New Zealand and overseas national parks and World Heritage sites. Finally I will discuss some options for policies and management approaches.

I have been closely involved with and have thought a lot about national park tourism over the last 40 years and especially so in the last three when we have seen the rise and rise of NZ tourism. It is interesting to reflect that 60 years ago we had 110,000 visitors per year to NZ - this year that number of people went over the Tongariro Alpine Crossing!

At times, I feel that National Park tourism is treated as the poor cousin of New

Below: Crowds at the Ketetahi end of the Tongariro Alpine Crossing.

Photos Dave Bamford

Opposite top: Crowds on the Lhotse Face of Everest., Nepal.

Photos Dave Bamford

Opposite bottom: Uluru Kata Juta.

Photo: Unkown Photographer



Zealand tourism and that many people believe that that's all that national parks exist for.

On the one hand, well over half of our international visitors visit our national parks.

On the other hand, these areas are underfunded and understaffed, and at times overwhelmed with national park tourism issues.

I'm going to start by saying that national parks, World Heritage areas and other protected areas have special values. When we discuss tourism in these areas we are not talking about Auckland tourism, Waikato tourism or Hobbiton tourism - we are talking about special areas that are protected by legislation, in perpetuity, for their protection and our enjoyment. The UNESCO World Heritage site of Te Waihipounamu in Fiordland and Mount Aspiring, Aoraki/Mount Cook and Westland National Parks have many really special places.

I really believe that if one is to operate a business in a national park a range of values need to be applied, and at times some operators do not understand the special values of protected areas. I think there is the potential for these perceptions, by some to continue and intensify as the growth of New Zealand tourism, particularly in our national parks, continues. Meetings like today will, I hope, go some way towards creating a greater understanding of how we can manage our protected areas and provide for tourism opportunities.

Recently I attended the Sustainable Summits global conference at Aoraki/Mt Cook. The conference was attended by over 100 people and a quarter of the attendees were from overseas.

We looked at the current issues both globally and within New Zealand and learned lessons about practical approaches to managing, in a sustainable manner, our mountain lands.



There were four big takeouts for me:

- the mountains are changing
- the environmental impacts are increasing
- the importance of the social, cultural and intrinsic values of our mountains
- the growth of mass tourism.

What do I mean by the mountains are changing? We heard excellent examples of how alpine landscapes are being affected whether they be on Mont Blanc,

Mt Everest (in the Ice fall and on the Hillary Step (it's gone)) or here locally on Aoraki/Mount Cook, the Dart River rock fall and subsequent floods and the access onto Mt Aspiring's NW ridge - it is losing its shape - the mountains are changing. As Simon Cox, one of New Zealand's eminent geologists, said, the mountains are falling down and he has a sobering story to tell about our mountains.

In addition, our glaciers are retreating. The conference was provided with an excellent case study by Dr Brian Anderson of the considerable retreat of our major glaciers in the Southern Alps - the geological impacts on the landscapes in our mountain national parks are dramatic eg Ball Glacier Road.

These changes will impact on the access by climbers and other visitors into our mountains and we need to consider this when preparing park management plans.

Secondly, the environmental impacts from people's behaviour in our mountains are increasing. When we roam the world looking at the iconic mountains we see huge numbers of visitors, for example Mont Blanc, with 30,000 summit attempts each year; Mount Everest with about 600 ascents each year; over 55,000 ascents of Kilimanjaro (and 200,000 staff) a year; and here at home over 110,000 walking the Tongariro Alpine Crossing. We have considerable pressures on our summits (mention Taranaki - Hooker Valley).

In addition to those enthusiastically wanting to summit mountains, the gateways to our mountains in New Zealand are increasingly popular. This is a key issue - the connection between tourism towns/villages - the highways/roads to the carparks. And the need for carparks, toilets, huts, campgrounds, information guides etc.

You heard this morning about some of these numbers with over 700,000 visiting Milford Sound, 500,000 visiting Aoraki/Mount Cook, about 600,000 visiting Franz

Josef and 400,000 visiting Fox Glacier (they had 150,000 visitors to the glaciers 40 years ago). The increased numbers obviously place pressure on how we manage human waste, water quality and noise to name a few impacts - we are talking about tons of waste.

When one moves away from the popular road ends or iconic attractions, often the visitor use in remote valleys is similar to what it was 20 or 30 years ago. There is not a lot of evidence that there is increased usage of many of the more remote valleys of Fiordland and Otago.

A key influencer for impacts on our mountain lands is how we transport people from outside the national parks and protected areas and to the hotspots. Traditionally our land-based transport has been dominated by private cars along with tour buses, and in the last 50 years transport on the sea and in the rivers has become important. The growth of glacier or lake tourism in Zodiac boats in Aoraki Mount Cook National Park has been spectacular in the last decade. There are now over 40,000 visitors taking lake tours each year, a direct result of the retreating Tasman Glacier. The growth of campervans and freedom camping (that term is a contradiction) is known to you all. Interestingly, the web-based application Campermate has driven the growth of camping at national park road ends enormously - eg Haast Highway, Blue Pools, Milford Sound, Key Summit - Eglinton.

Let's not lose sight of the potential for social media to continue to influence demand. I wonder about the future role of visitor centres as more than retail.

We are all familiar with some of the issues facing air access into our mountains. One of the key takeouts for many of the international visitors at the Sustainable Summits Conference was their considerable surprise at the widespread use of helicopters for recreation in the Southern Alps. The European, North American and Asian

delegates shared with us how tight the regulations are on aircraft access into their mountain national parks. The lack of easy snow landings by helicopter or plane elsewhere in the world may be a driver of why we're seeing so much growth in this area in the Southern Alps.

The third key takeout from our Sustainable Summits Conference was the increasing recognition of indigenous people's values of their mountains. The importance of the sacredness of mountains in Alaska, Nepal and the Southern Alps is receiving greater recognition. A concern that was raised was the potential, particularly in New Zealand, to exclude parts of our society from visiting national parks because of possible costs or any user pay fees.

Sustainable Summits also discussed the acceptance by society of minimising waste in the mountains through "leave no trace" behaviour, to the extent of mountaineers carrying out their human waste, is becoming widespread. The long-recognised value of natural quiet in considering the management of noise was another important point raised.

As mentioned this morning the growth of tourism in New Zealand is well documented. We are seeing international markets being discerning about what they want to see and do – for example, Hobbiton, Huka Falls. It's interesting to note that the types of users are broadening, such as mountain bikers, those wanting to snow shoe and many who just want an outdoor experience. You will all be familiar with the PERCEIVED demand by some of the Chinese market for snow landings on the Ngapunatoru Plateau.

New Zealand is well recognized for its innovative approaches to product development – jet boating, bungy jumping, whale watching and, more recently, mountain bike tourism. I do think it is important to be wary of encouraging more and more similar activities in our parks. There is a real

danger of permitting too many transport operators such as gondolas, or building too many mountain bike Great Rides. In the case of mountain biking we have not given enough thought into the future management, marketing and maintenance of the thousands of kilometres of new mountain bike tracks built in the last decade.

How does one learn from what's going on in the New Zealand and international mountain parks?

It is far easier to manage national parks when you do not have a corrupt government. We are very fortunate here in New Zealand that there are no outside business influences that impact on decision-making about infrastructure and concessions. I think it's fair to say that national park management in Asia and





Latin America sometimes faces these problems and it's reflected in the lack of sustainable management.

Your two boards are starting the planning process for both Fiordland and Aspiring National Parks in the next few months and this planning process is crucial. There is considerable evidence to support strong stakeholder involvement with an open consultation with them when developing draft plans. Whilst your two parks are collaborating in a process approach one wonders whether it would be better to have just one plan that covers both parks. This approach could also be taken for Westland and Aoraki Mt Cook National Parks. For too long I have believed that we have compartmentalised the Southern Alps into paddocks that we manage like a farmer without recognition of what's going on in the neighbouring farm – let's manage the station!

We are also fortunate that we can learn lessons from overseas national parks which have had to use management approaches in their national parks that we thought we would never need in New Zealand. An example is the introduction of shuttle buses into Cradle Mountain National Park in Tasmania. Due to the pressure on carparks this park has closed, the use of the main access road into the national park is barred to all except shuttle buses and visitors staying in

hotels in the park. When I look at the challenges of managing congested traffic at peak periods in some of our parks such as Mount Aspiring (Rob Roy Glacier), Westland, Milford and Tongariro, user pays concepts such as Park and Ride need to be seriously investigated.

Managing air access into our national parks needs a greater collaborative approach amongst stakeholders. It seems to me that there is an insatiable demand for snow landings and scenic flights in our Alps and, if we want to stick to quality experiences and our 100% Pure NZ branding, we need to seriously consider when we say enough is enough. On the other hand, there will be a need to be pragmatic about limits and for this I use the example of landings at Bevan Col in a very small area on the saddle. It may be logical (if snow landings are going to continue) that the limits are increased and the area extended to allow for the frequent challenges with weather on Bevan Col. Issues like this need collaboration in planning and today is part of that process.

I have mentioned the need to accept and embrace limits and we have done this in places like the Milford Track accommodation, Antarctica and the Subantarctic Islands. We do this in our everyday life – car parks, test matches etc. When I look at the pressure on the Tongariro Alpine Crossing, Milford Sound, maybe Rob Roy Glacier carpark, I see no alternative to applying limits, whether they be car parking permits or closing road access to ensure that the experiences of the visitors to hot spots in our national parks are as expected.

Whilst there is a range of different mechanisms to manage visitors I think we need to ensure we have a better understanding of who is coming to our parks, how many and what the likely future trends will be. The figures that I have used today for visitation to New Zealand's national parks are indicative rather than factual. We do know that the numbers to New Zealand generally, and consequently to our popular tourism areas eg Milford Sound, Aoraki/Mount

Cook, are trending upwards at 10 to 15% a year and we see this continuing into the foreseeable future (5 years). It is good to see so many concessionaires here today and they have a major role to play in advocacy for conservation, sharing our national parks and assisting with funding them and the conservation estate. There are opportunities to have tighter concession regulations and at times fewer concessionaires in return for guaranteed quality services and regular income into the Department of Conservation – we should not be scared of sole concessionaires. The Kaikoura whale watch industry is a good example of the benefits of a sole concession. High value wildlife viewing could be another. I reflect on how in Rwanda the non-corrupt National Park Service charge a 1000 dollars US! per person to view a gorilla family and caps it at 80 visitors a day.

I believe that DOC is seriously underfunded in its work of managing the burgeoning number of tourists that visit some of our conservation estate. I believe that without adequate funding for policy development, research and management including frontline ranger staff, the quality of visitor experiences in our national parks is in jeopardy. I applaud how hard the DOC staff work but when you see the pressures on places such as Eglington Valley and the Hooker Valley, one needs to look at ways to ensure the experiences are delivered and the conservation values are maintained. Whilst partnerships and volunteerism can be very effective, supporting DOC's funding is also needed.

So how do we address the funding issue?

The GST take from international tourism currently exceeds \$2.5 billion. More of this should go back to DOC. A departure tax for visitors should continue to be assessed. I believe that it is being addressed by central government. There is the potential for differential user charges for New Zealanders and internationals when user pays applies for example and a dual

charging system in places like the Milford Track accommodation.

So, in conclusion, I believe that conservation and tourism can, and must, be good partners for the future well-being of our national parks. Today's forum is a useful step in the process of developing sensible sustainable management plans for your two parks. Please remember our national parks are here forever. They are preserved in perpetuity. We, the tourism industry, have a huge responsibility to contribute and support the national parks. Our tourism numbers, both international and domestic - let's not forget the latter - will continue to grow. So, these special places – aren't the fiords and mountains of Te Wahipounamu magnificent – need strong brave management. If we don't they will no longer be special.

I encourage you, the boards, not to be timid in bringing forward long-term environmental, social and responsible policy and management solutions.

Thank you.



Volcanic dunes information day – getting to grips with the volcanic dunes of the Rangipo Dunefield, an internationally rare ecosystem.

Graeme La Cock
Botanist
DOC, Wellington

Photo 1: Bund under construction in 2001/02. Note the vegetation in the natural area to the right of the bund.

Photo: *H Keys.*

Photo 2: Bund on 5 January 2010, showing established vegetation (appears to be bristle tussock) 8 years after construction.

Photo: *A Sheppard*

‘I’m away for four months from tomorrow’ – just what you need to hear from one of the main players (Harry Keys, DOC volcanologist) when you’ve committed to organising an information day on one of New Zealand’s rarest and least understood ecosystems. But we got there, learnt a lot, and had a lot of fun in our visit to the volcanic dunes of the Rangipo Desert on 2 May 2016. And Harry

was back in time to share his vast knowledge on the site and the research he’s arranged over the years, so all was forgiven.

Where are New Zealand’s volcanic dunes, and what are they? Most New Zealanders don’t realise that we have one of the rarest ecosystems in the world, namely volcanic dunes. Volcanic dunes comprise drifting sand derived from volcanic deposits that accumulate on volcanic ring plains during major eruptions, and are then reworked by wind and water. This results in a chaotic assortment of mounds and hollows on a matrix of flat gravels, whereas coastal dunes have a linear sequence of crests and swales in foredunes and rear dunes.

The only site in New Zealand where volcanic dunes occur is on the central Plateau of the North Island (Figure 1), where they cover around 3000 ha of the Rangipo Desert, or Onetapu (Māori for ‘forbidden sands’). Onetapu is located in the wind funnel between the Central North Island volcanoes and the Kaimanawa Mountains to the east. Volcanic dunes are rare internationally, with a cluster of sites on the west coast of the USA down to Mexico, and in Peru, Hawaii, Iceland, and Indonesia. They’re also poorly studied; the only publication that I could find on the international distribution of volcanic dunes was by NASA scientists.

Why are the dunes of interest to DOC? DOC’s interest in the dunes stems from the need to manage the northern end of the dunefield, which occurs in



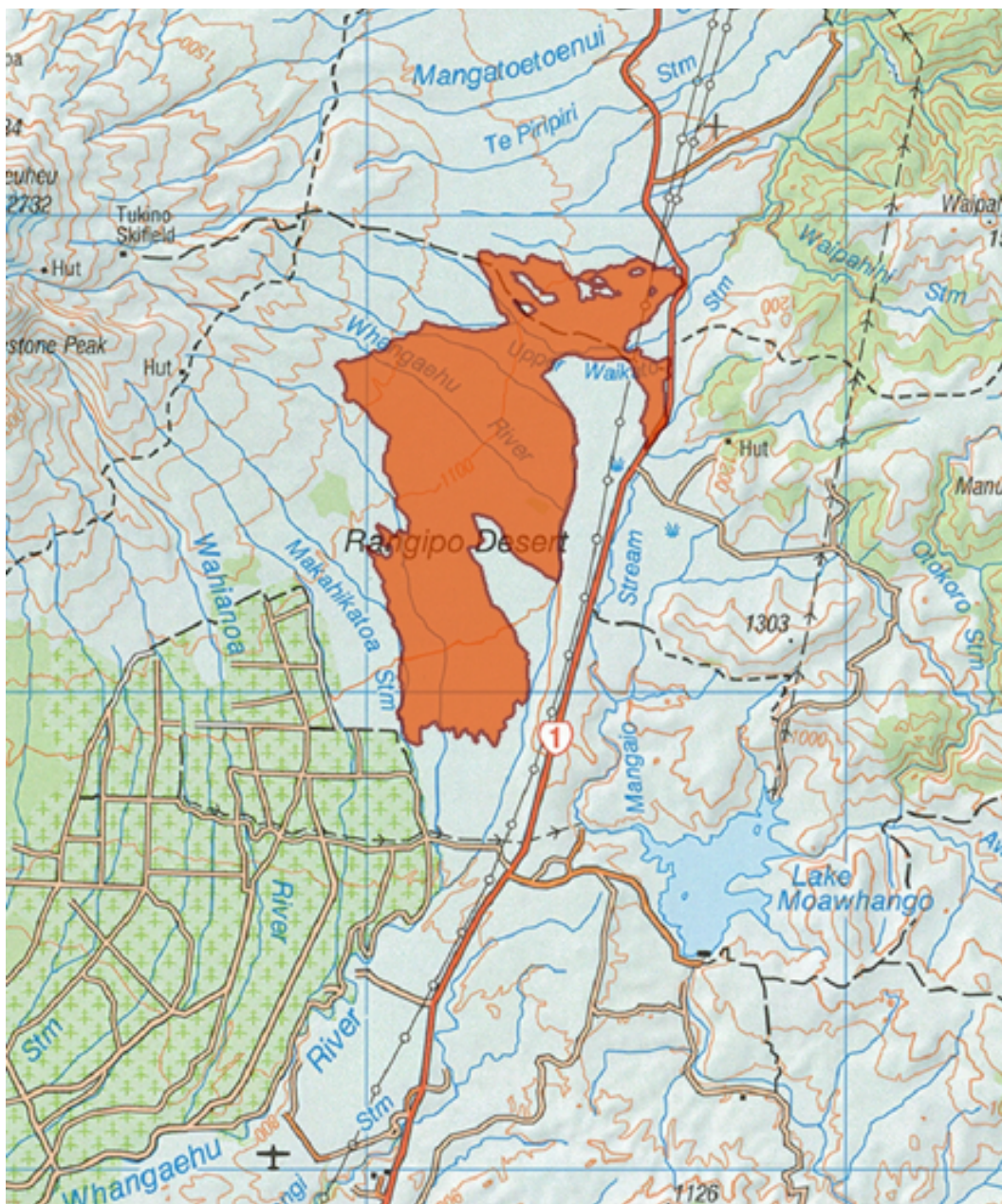


Figure 1. Rangipo Dunefield (orange), between SH1 and Mt Ruapehu. Scale: blue squares are 10 km x 10 km.

part of Tongariro National Park. The rest of the dunefield is in the Waiouru army training ground. One of the main management concerns was the failed plantings of red tussock near the turnoff to Tukino Rd.

There didn't seem to be a lot of information on the functioning of this ecosystem, so I synthesised the available knowledge on the dunes. Thanks to Harry Keys, who has been instrumental in identifying research topics and helping researchers over the years, and Mark Smale, who led a Landcare Research study on the age and formation of the dunes, I was able

to pull together a fair bit of information. This article covers some of the pertinent points, particularly around vegetation and plantings. If you're interested in the different names used for the dunes, threat status, function, age, and early, recent and current research, I suggest you read the synthesis (If you'd like a copy please contact me at glacock@doc.govt.nz).

Vegetation sequences and dune age

Mark Smale's Landcare Research group did a comprehensive study on



Above left: Major Patrick Hibbs and Mark Smale discussing the dunes.

Above right: So where do the dunes end? Harry and Angelina facing camera.

Photos: Michael Bergin



the succession and dynamics of the dunes. They studied vegetation height at 178 sites, using vegetation height as a surrogate for dune age, and studied vegetation and environmental variables at a further 201 sites. They found 106 plant species associated with the dunes, of which nine were weeds. DOC has undertaken marram grass control on these dunes for the past few years, so it's encouraging to note that this study did not come across any marram grass in their plots.

Most dunes were under 50 cm tall, and only 1% reach 2.5 m and 250 years old. Hummock dunes cover over 80% of the dunefield. Dune formation and primary succession are widely pioneered by subshrubs colonising

scoria and trapping aeolian sand. There's a vegetation gradient from sub-shrubs through to angiosperm shrubs and then conifers on the older dunes.

Initially, young (<10 years), very short vegetation (<0.5 m tall) on incipient dunes is dominated by subshrubs (especially *Raoulia albosericea* and *Leucopogon fraseri*), with lichens, small grasses (especially bristle tussock and *Poa cita*), and herbs (especially *Wahlenbergia pygmaea*, *Celmisia gracilentia* and adventive *Pilosella officinarum*) also prominent.

For the next few decades, short shrubs, initially *Ozothamnus leptophyllus*, then *Veronica venustula* and *Dracophyllum subulatum*, and later *Olearia nummulariifolia*, dominate. The oldest (mean age 81 years) dunes with the tallest (>2 m) vegetation typically support short forest of the large shrub/small tree *Phyllocladus alpinus* with understories dominated by the shrub *Leptecophylla juniperina*.

They did find that, despite the incipient nature of the hummock dunes, there was a general decrease in vegetation (and hence dune) height towards the higher-elevation northern end of the dunefield, which will be windier, cooler and wetter than the southern end.

Dr Shunichi (Shun) Kikuchi and colleagues from Yamagata and Hokkaido University in Japan specialise in the interactions between microtopography and vegetation, and has visited the site most years since first visiting in 2005. Although these results are not yet available, they and Harry Keys did document the natural establishment of vegetation on a lahar bund in the Whangehu Valley since its construction in 2002/3 (Photo 1). The 300 x 20 m bund is man-made and its principle purpose is to protect property and infrastructure from the impacts of unusually large lahars.

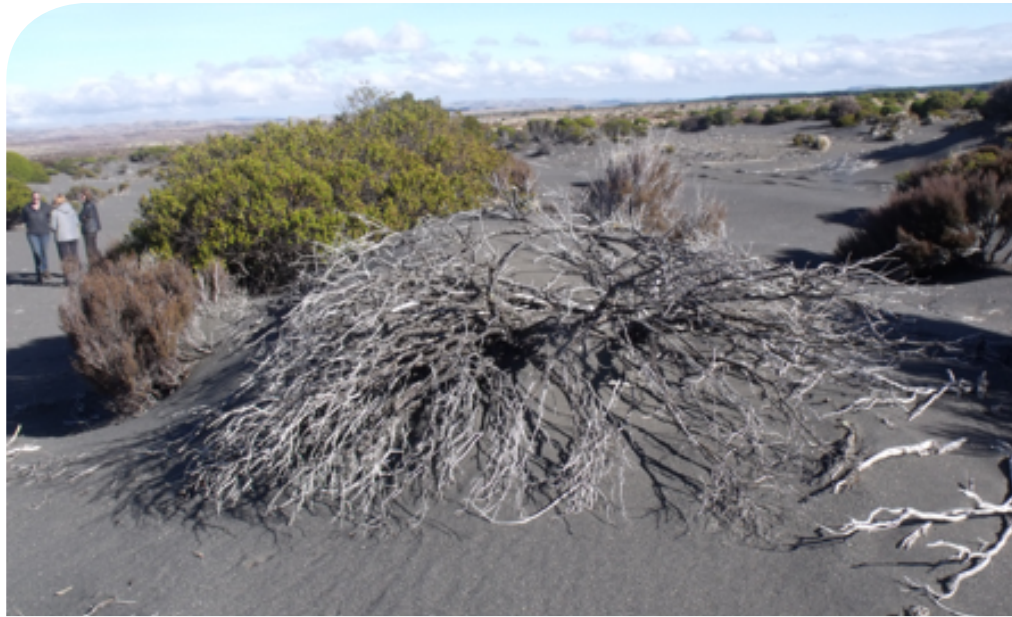
The first plant recorded from the bund was a bristle tussock (*Rytidosperma setifolium*) in 03/04, but it didn't survive. The first species to survive and become



established was *Luzula banksiana* var *migrata*, which established in 04/05. Species richness has increased gradually, with 25 species found in 11/12. The only weed recorded on the bund is catsear.

The main benefit of this work is it provides a guide to which plants are able to establish on broken ground in the area, if this is ever deemed necessary. Photo 2, taken in January 2010, gives a good indication of how sparse the naturally occurring vegetation in the surrounding areas is, and how vegetation is establishing on the man-made bund. Photo 2 also provides an idea of how well the bund has weathered, to a point where it resembles its surroundings, unlike Photo 1 where its footprint is clearly evident.

None of the vegetation studies identified red tussock as a pioneer plant responsible for dune establishment, and it didn't establish on the bund, so its use in revegetation programmes in the Rangipo Desert is not supported by current research.



Angelina Smith (2014) studied vehicle damage to the general area of the volcanic dunes. She found that vehicle passage compacted soils and caused plant dieback, but that most tracks were restricted to within 50 m of a formed legal road. Few vehicles ventured into the desert ecosystem, and when they did they preferred to drive on unvegetated or low stature vegetation, and probably had a greater impact on newly forming dunes than on older vegetated ones. In her experiments she demonstrated that substrate that has been driven over eroded at a greater rate than intact substrate, and that a single passage

Above: Plants die, and the dune formation process starts again. Vehicle tracks in background.

Below: The Rangipo dunefield.

Photos: Michael Bergin



was sufficient to impact on the erodibility of the dunes and substrate. Under the circumstances vehicle management may be more beneficial to the environment than plantings. There have been numerous geological studies in the area, including one in which Moebes et al (2011) demonstrated the benefit of having undisturbed sequences of tephra and lahar layers of substrate to study. Their work increased the known age of Ngauruhoe to 7000 years, 4500 years older than previously thought. This work would not have been possible had the substrate been destroyed, so it is important to minimise disturbance to this area from a geological perspective as well.

The information day

The army and their new environmental manager were taking a renewed interest in the management of the dunes. It made a lot of sense to get together on site to discuss the functioning of the dunes and future management, so we set up a field day to share research and visit the dunes.

Twenty of us, including biodiversity planners, trainee to senior rangers, visitor centre, partnerships and technical staff from DOC, range control and environmental staff from the army, invited speakers, and a rehabilitation and coastal dunes expert, gathered in an old house behind the army museum for a series of talks on 2 May 2016. The programme was:

Graeme La Cock: Volcanic dunes of the Rangipo Dunefield. A synthesis of information

Harry Keys: Disturbance ecology and conservation management at Rangipo, Tongariro National Park World Heritage Area

Mark Smale: Ecology of the Rangipo Desert

Angelina Smith: Vehicle damage to the Rangipo Desert: the potential of vehicles to change the environment

After a safety briefing Major Patrick Hibbs led our convoy into the dunefield. The philosophical debates around why it's a desert if it has two metres of rainfall a year, and whether it really is a dunefield, were mixed with practical discussions: Major Hibbs outlined the army's use of the site; Mark Smale discussed the age, vegetation and ephemeral nature of the dunes; Angelina Smith spoke about the impacts of vehicles on the desert; and Alison Pickett spoke about the army's management of weeds, particularly wilding pines. We ended with a discussion on whether we should be (re)vegetating the dunes near Tukino Rd. Based on the information gathered from monitoring the natural establishment of vegetation on a new bund, the results of Mark Smale's work, some earlier work from Geoff Rogers, Angelina's MSc, and what we saw on site, it was pretty evident that trying to establish vegetation on the dunes, particularly red tussock, was a fruitless exercise, and that efforts should rather be put into limiting damage by vehicles and rabbits.

Overall the day was of great value. Everybody seemed to learn something. Major Hibbs appreciated the opportunity to get out with experts, and to share his knowledge gathered over many years on the site, the biodiversity planners have a lot more information on which to base management prescriptions, and for some people the idea that revegetation is a last resort, not a quick fix, came as a bit of a surprise. Bill Fleury has even speculated on whether *Logania depressa*, a presumed extinct plant known from its first and only collection by William Colenso in the vicinity in 1847, may have been from this habitat. Many of us weren't aware of the impact rabbits were having. So there was plenty to pique our interest. I'm particularly pleased that visitor centre staff and hut wardens will have some new information to share with visitors.

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Owhango Alive

Marie McDonald
Community Ranger

In the past the thought of New Zealand being predator free has been a dream for many. However, it is starting to become reality requiring a massive team effort. This would not be possible without community groups. One such group is 'Owhango Alive'.

In 2013 a trapping line with 20 traps was passed onto Mark Fredericks. Over a beverage with Sally Lashmar and a discussion about their concern for wildlife in the area a plan was hatched to form a community group (Owhango

Alive). They then approached DOC to get some assistance to start the trapping line. However, all good things take time. With a lot of persistence, a 'plan of attack was hatched'.

Owhango Alive mission statement and aims are:

To protect and enhance the environment of the Ohinetonga Reserve, Whakapapa River, Owhango village, and surrounds for the benefit of the native flora and fauna especially kiwi and Whio.

Owhango alive aims include:

- Eradication of plants and pest's animals
- Increase public awareness, and involvement;
- Monitor outcomes; and
- Build stronger relationships with DOC and other relevant agencies and groups.

Now the group has 15 active volunteers that check the traps with a further 50-60 supporters that help with working bees. Table 1 illustrates the impressive number of cats, rats, ferrets and other little beasts that Owhango Alive have caught. The group started out with 20 traps and that has now grown to 130. All traps are checked every week. The youngest person checking the traps is 50 and the oldest is 86 years young. At present the area the group looks after is 152 ha and growing.

The team wish to extend their trapping line further upstream and to start working with other organisations. They also wish to get the message out though education about their project and hope to be able to attract some younger people to help them out.

Below: Volunteers from front Marion Johnston followed by Colleen Boston and David Johnston.

Photo: Marie McDonald



Predators	Number caught since 2013
Cats	42
Weasels	20
Stoats	81
Ferrets	4
Rats	1000
Wasps nest removed	100
Hedgehogs	58
Possums	22

Table 1: Trapping record of predators caught since the group started 3 years ago

To assist with funding for traps the group has had to think outside the box! Some traps have been sponsored by people outside the area within New Zealand and Australia. Other fundraising methods have included pub Quiz nights. BNZ staff have assisted with planting and pest control during 2014-15.

Like many other volunteer groups, Owhango Alive have the passion and drive to protect their local flora and fauna including 'whio'. The whio population has tripled in the Tongariro forest in the last 10 years. Some of this has been because of the predator control work carried out by Owhango Alive. Other species that have benefited from the groups trapping for whio (blue duck) include weweia (dabchick), popokatea (whitehead), toutouwai (North Island robin), and kereru (NZ pigeon) and many more.

Sally's last comment was" We have a fantastic relationship and support from DOC. We are very thankful for the help from staff in the Tongariro District especially Dave, Allison, Steve, Dan, and all the other staff".

From a DOCs point of view we would like to thank Owhango Alive and all the other amazing, passionate, caring volunteers, who work alongside us.



Left: One of Owhango Live's aims is the protection of kiwi through enhanced habitat.

Below left: Sally Lashmar with two volunteers (Zita and her daughter)

Centre: Volunteer Barry Boston

Right: An inquisitive robin checks out progress!

Photos: Marie McDonald





Much more than an office

Anna Elwarth
Community Ranger

Much more than an office, the Taupō DOC office was built in the heart of community, with the community, and its eco-features will benefit generations to come. Opened in August 2014 the staff have settled in with a grin.

In the heart of the community

The complex in Motutaiko Street is adjacent to Waiora House from which

a lot of community social services are run from. Director of Operations of the Central North Island Meirene Hardy-Birch said that the office location was a conscious choice.

"It allowed us to immerse ourselves in the midst of the local community. Conservation cannot be achieved without New Zealanders' help," she explains.

The Taupō Office is the regional hub for the Central North Island DOC districts, from Te Urewera in the East to Whanganui in the West, Tongariro in the South to Tauranga in the North.

A community meeting space was an important concept to head the complex. The wharenuī is a facility freely available to the community. It seats up to twenty people and includes a kitchen. When opened the significant conversations that would be had within the walls were honoured.

Welcoming carvings

The community wharenuī is called Te Kahukura o Tane Mahuta. The story behind this name will be told in a later edition. The walls are decorated with five pou (carvings) with the distinguished task of welcoming visitors. They are named Tauhara, Kaimanawa, Pihanga, Tongariro – Ngā Kahui Maunga, and Hauhungaroa. Collectively the pou represent 27 mountains, five lakes, three rivers and two islands of the Tūwharetoa iwi rohe (district). They were carved at Te Puia from a tōtara log from the bed of Lake Taupō by master carver James Rickard.

Another pou to welcome visitors through the main entrance of the office was commissioned from local carver Delani Brown. In a special project, he invited

Top: Taupō Office from Motutaiko St
Below: Community whare on Kaimanawa St.
Photos: Anna Elwarth





secondary students from 12 Taupō district schools to join him in learning how to carve. His lessons immersed the creative students in a holistic spiritual journey that DOC was delighted to be a part of. The wood was also full of meaning, with the central piece also being tōtara from the lake bed, and old telegraph poles from Opepe holding the art and stories of communication.

Built in partnership with iwi

Under a joint agreement the land on which the complex is built is leased to Opepe Trust by DOC; the buildings are owned by a commercial entity of the Tauhara hapū, and leased back to DOC. The buildings have been designed so that they are easily transported and relocated. A Tauhara working party was part of the



planning and building throughout the project. Representative Matiu Heperi Northcroft says it is not just about a building. "First and foremost, it was about the whenua (the land) and this re-sets the cultural context for the future in an environment of courtesy and respect." He says the building project marks the start of a bigger ongoing working relationship between the two parties. This model of working has also been held up high for others to follow.

Eco-features a sense of pride

The building was also built with sustainable principles to minimise the environmental footprint and use materials with low embodied energy. An important part of the vision was to be an advocacy building for the community

Above: The whareniui carvings were carved at Te Puia, led by master carver James Rickard.

Below: The Taupō Office pou was carved by local master carver Delani Brown and mentored secondary school students.

Photos: Herwi Scheltus





Above: Catching the rays and NZ made recycled plastic Jakmat draining driveway.

Photos: Anna Elwarth

wanting to build with these principles says Herwi Scheltus DOC senior works officer who designed the building and managed the project. "People enquire and come to visit which excites me, as this was exactly what we hoped for"

Blending in

The office building is designed in the residential style of a traditional Taupō black creosote weatherboard bach with white windows and red roof; intentionally blending in with the residential area which it is situated.

Solar power-features

Herwi says solar panels (photo-voltaic) on the wharenui roof produce 10kW of electricity. "I'm proud to say we are self-

sufficient and have not used any power from the national grid".

Large floor to ceiling windows make the most of natural lighting, and solar tubes light up the toilet rooms.

The large north facing wooden deck acts as an alternative fresh air meeting room and a gathering space for staff and visitors. The director's second desk is out on the deck at a pew under the big oak tree.

An east-west alignment takes advantage of maximum solar gain.

Water saving features

A rainwater collection tank – under the deck – recycles storm water for toilet and car washing.



Below: Staff enjoying the sunny deck and the light open ambience of the offices.

Photos: Anna Elwarth



A low impact car park design uses NZ designed and made Jakmat Geocell made from recycled plastic. It is a geogrid matting filled with gravel, soil and grass seed, allowing rain water to drain back into the water table, rather than run off into the stormwater system and potentially washing pollution into drains and placing pressure on infrastructure.

Smaller carbon footprints

Having four rooms with video conferencing encourages staff to travel less and a cloakroom/wet room/bike storage and shower encourages staff to bike to work.

Hearty staff

Staff love coming to work, especially in winter as the offices are warm and friendly. Visitors have commented on the 'friendly' feel to the office. An interesting note is that fewer staff have been getting sick.

Pete Shepherd Taupō Fishery ranger describes his experience of working in the new office: "I have a great affinity with my work space. The sustainable elements incorporated in the design and function of the building, the kaupapa and openness of the wharenuī, to the amazing carvings that greet visitors as they arrive at the office, are all elements that resonate with me. I'm proud to show visitors around the office, as for me it reflects the values DOC represents."

Credit also to Robyn Orchard, Communications Advisor Central North Island, who wrote a previous article from which some of this article is sourced.



Sustainable Summits Conference

Dave Bamford
ex President Project Tongariro

In August 2016 New Zealand hosted a successful international Sustainable Summits conference at Aoraki/Mount Cook National Park. The conference focused on practical solutions for adapting to a changing mountain environment, responding to changing visitor patterns and behaviour and preserving mountains for the enjoyment of future generations.

The core conference themes were:

- Environmental Impacts - human waste, water contamination, noise from helicopters and other machines, tracks and erosion, huts, bridges and tracks – visual impacts
- Natural Hazards - large rockfall (e.g. South Face of Aoraki / Mount Cook 2014), ice recession and unstable geology, avalanches, adverse weather conditions, floods, earthquakes, volcanic eruptions
- Social Impacts / Cultural Values - pressures on popular mountain routes – increasing numbers, out-of-season use of tracks, hut and track development, commercialism in the mountains, influences of social media, cultural awareness and visitor implications, Tōpuni areas (sacred), water protection.

The conference built on the successful previous Sustainable Summits conferences in the USA in 2009 and 2014, which were led by the American Alpine Club and American Park Service.

New Zealand had representatives at both previous conferences. At the 2014 conference in Colorado, New Zealand attendees, John Cocks and Dave Bamford, on behalf of the NZAC and with support from the New Zealand Department of Conservation, offered to host the 2016 conference in New Zealand. This offer was accepted. Over

the last two years Cocks and Bamford, along with a small working committee, arranged a successful three-day event (see <http://sustainable-summits.com/>).

The conference themes were the focus of 30 presenters who, through presentations, panel discussions and field trips, shared practical insights into the core issues.

Key speakers included presenters from Borneo, France, America, Nepal, Canada, Australia and New Zealand.

From New Zealand, a wide range of speakers included the Director General of DOC, Lou Sanson who presented on mountain management issues from Antarctica to New Zealand. The presentations on natural hazards of our mountains - the collapse of our mountains - by Dr Simon Cox, and the retreat of our glaciers by Dr Brian Anderson were insightful and the impacts of these issues are concerning. Guy Cotter of Adventure Consultants shared insights into sustainable guiding practices. Mike Davies discussed the importance of the review of Aoraki/Mount Cook National Park Plan. Project Tongariro member Dr Harry Keys shared the sustainability challenges of the Tongariro Alpine Crossing and Dave Bamford talked on mountain tourism issues and solutions.

Presentations on mountain sustainability issues on Mount Everest, Mont Blanc, Denali and Mount Kinabalu were interesting in how far the challenges of managing sustainability issues around the world are being managed. Of particular interest was the challenges of managing natural hazards (rock fall) on all these mountains, along with the pressure from increasing use.

Below: A field excursion at Aoraki/Mt Cook by conference attendees.

Photo: Dave Bamford



The social and environmental impacts of mountaineering were addressed in case studies including accommodation and waste management in the New Zealand Alps, and sustainable accommodation in the Canadian mountains. The increasing awareness of the need to carry out human waste was notable. Denali National Park managers lead the way with this issue.

The conference had three excellent short field trips looking at ecological processes including rockfalls around the Mount Cook Village, avalanche management, and park management.

The conference was fully subscribed with over 100 attendees from a wide range of organisations. There were 24 international representatives from Asia, Australia, America and Europe. DOC were well represented. It was pleasing to see a wide cross section from the New Zealand mountain world, including mountain guides, tramping and mountaineering clubs, and four young professionals who were hosted by the organisers. There was considerable consensus for the need to continue the sharing of issues and solutions to managing our mountain lands.

The Central North Island was well represented with several DOC, iwi and Project Tongariro members present, including Dr Harry Keys, Karen Williams, Kathy Ombler, Paul Carr, Ted Smith, Bubs Smith, Dave Milner, Taina Tahī, Dave Bamford and Will Bamford, one of the Young Professional attendees.

Big takeouts from the conference included:

- the increasing importance of the mountains to iwi and mountain users from a spiritual perspective
- the long-term negative environmental impacts of human waste in the mountains – faeces lives for years – even in glaciers
- the Southern Alps landforms are collapsing, and the glaciers are retreating and these factors



significantly impact on the future management of the mountains. This issue is particularly relevant to the NZ Alpine National Parks

- climate change, geological change, earthquake risks and rockfall hazards are affecting the viability of mountain hut sites and it is likely to get worse. Portable huts may need to be considered
- the significance of mass tourism and its effects on mountain lands and the need for proactive management. The Tongariro Alpine Crossing was an often-cited example of the need to manage tourism in our national parks.

So, in summing up, the Sustainable Summits 2016 was an enjoyable and rewarding conference that provided knowledge, solutions and advocacy for mountain lands. The next conference is to be hosted in Chamonix, France in June 2018.

Above: The young professionals. From Left Nicola Whelan-Henderson, Will Bamford, Karina Brenan Evans and Ben Ermitageh.
Photo: Dave Bamford



Tongariro Alpine Crossing - where to from here

Harry Keys
Technical Advisor, DOC

Introduction and Summary

The Tongariro Alpine Crossing (TAC) is a challenging 20 km trek across the scenic and active volcanic landscape of the Tongariro massif in Tongariro National Park (TNP), World Heritage Area. Lonely Planet describes it as "one of the world's greatest one day hikes". Spurred by word of mouth and social media, visitor numbers have been growing at a compound rate of about 9% per year (Figure 2). In the 2015 calendar year visitors hiking the TAC exceeded 100,000 for the first time and totalled about 120,000 between 1 October 2015 and 30 April 2016. Numbers could exceed 130,000 in the 2016-2017 season depending on weather. The expression the "TAC phenomenon" has developed locally to describe the situation.

While the TAC provides good experiences for the visitors and valuable local income the growing numbers of people and vehicles involved are creating ongoing and growing challenges for environmental protection and visitor management. These increased numbers are both a positive and a negative. Perceptions of crowding on the TAC and at carparks, the impacts of trampling and costs of waste disposal are all increasing. The Department of Conservation (DOC) has expended a lot of effort on facility upgrades on the TAC since the 1990s. The capital and ongoing cost of management is significant and we need to use experience and analysis to plan ahead and make timely decisions to keep up. We need to avoid ruining the visitor experience ("killing the goose that laid the golden egg"). New management approaches are necessary.

Because of the TAC's profile in New Zealand conference co-organiser Dave Bamford asked me to talk about management concerns and issues at the Sustainable Summits conference (8-10 August 2016, see separate article). This conference was organised by the NZ Alpine Club, at The Hermitage, Mt Cook with DOC support. This article is based on the talk with some recent work added.

History of the Crossing

While tangata whenua have lived beneath Tongariro for centuries, pakeha have been visiting as tourists for a little over 120 years. Before the 1900s local Maori trails led to Ketetahi Springs for medicinal and cultural purposes, and to higher areas for seasonal gathering of birds for food. In the early 1900s a bridle trail was developed from near the current location of Papakai Marae to the coach road at Waihohonu Hut (the first of three huts there and the first of nine huts and replacements built along tracks around the massif). In the selective logging era (1920s-40s) tramways were built in Ketetahi bush with log dragways almost up to the bushline at 1000m.

In the 1950s and 60s the Tongariro National Park Board developed what is now the Crossing with the assistance of the Auckland and Tararua tramping clubs. Tracks near roadways at the Ketetahi and Mangatepopo sides were built to connect with the easier terrain and the bridle track above. The track became popular especially the hikes up to Ketetahi Springs (legally outside the Park). The Mangatepopo Valley was also quite popular but people there were threatened (mostly unknowingly!) by occasional

eruptions from Ngauruhoe until the last major events in 1974-1975. By the late 1960s trampling had led to severe erosion by rainwater runoff (narrow ditches more than two metres deep in places). So from the 1960s to the early 90s successive major track restorations and upgrades took place. In 2011 a major track deviation was built to avoid the eroded "devil's staircase" at the head of Mangatepopo Valley. The Ketetahi Trust land was also circumvented.

To overcome the lack of transport, park rangers started leading trips, including on the TNP Summer Programme, which continued into the 1990s. The first public transport was offered in 1986.

With easier access numbers rose. Safety had been a concern for many years but crowding of facilities became something of an issue in the 1990s. Analysis showed the four huts were crowded on relatively few days per year: this problem was solved by a hut booking system. From 1993 and the new Occupational Health and Safety law, numbers of visitors to the Springs led to negotiations with Ketetahi Trust over safety, access, cultural interpretation and fee options. There were serious steam and hot water burn accidents most years there caused by careless visitors, in addition to accidents including occasional fatalities from slips, falls and hypothermia on the rest of the massif. In 2007 the word "Alpine" was added to the name Tongariro Crossing because of these safety concerns. The intention was to draw users attention to the area's natural hazards including weather. The routing of the track around the Ketetahi Trust land in 2008 ended public access to this unique geothermal area.

The eruption of Te Maari vents on 6 August 2012 was the start of the largest disruption of access in the track's history. It was the first eruption on the massif since the 1974-1977 eruption episode of Ngauruhoe which had also affected the track. A second small eruption on 21 November proved the episode was not over. The need to mitigate volcanic risk



led to closure of all or part of the TAC for up to nine months until May 2013 impacting on visitor use (Figure 2) and revenue particularly for accommodation providers in the district.

Visitor numbers and demographics

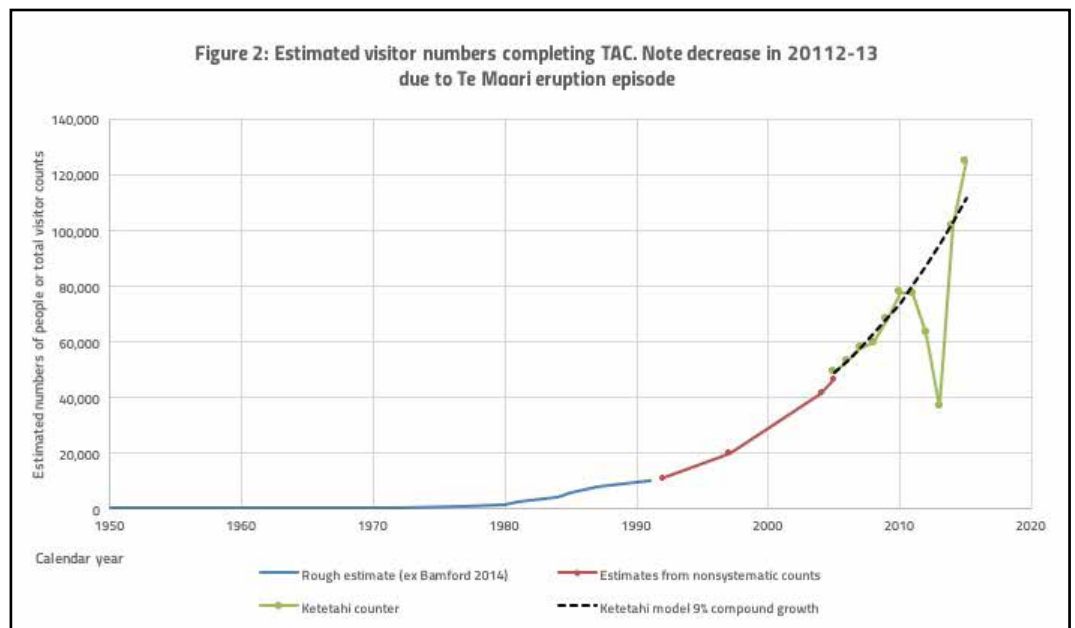
Visitor surveys and visitor counters have provided a good understanding of numbers. Prior to the early days of visitor counters, numbers each financial year were estimated anecdotally (Bamford 2014). These have been converted to calendar years in Figure 2. From 2005, counter technology and placement has improved. However visitor counters proven operable in the TAC environment cannot distinguish between:

- the direction people are hiking
- those going on short walks
- those passing a particular counter twice in a day.

So these counts are higher than actual numbers. At present our best estimate is that the number of visitors hiking the TAC exceeded 100,000 for the first time in 2015 and a total of about 140,000 people visited the 20 km of track network that year. The graph detail shows the influence of public transport becoming available in 1986, the global financial crisis in 2007 and 2008 and, most obviously, the Te Maari eruption episode.

Figure 1: Tourists at upper Emerald Lake Date may be prior to 1927 when James Cowan's book was published (containing a reference to four lakes where today there are only three).

Photo: Bubs Smith collection, photographer unknown.



Six visitor surveys and annual monitoring since the 1990s have resulted in good characterisation of visitor demographics and transport logistics. While there are some uncertainties in some of the datasets, especially where survey questions may be answered in different ways, the margin of error is generally low enough to be confident in conclusions drawn.

The age demographic is generally young with about half the respondents falling into the 20- to 30-year age bracket, especially international visitors. Reflecting this young age profile, respondents in 2012 were mostly at the pre-children life-stage and single (Angus & Associates 2012). While more domestic visitors are “*couples with younger children*” only a small proportion of visitors walk the TAC with children. About 4% of the visitors are older than 60, although the most recent survey suggested that age group comprised about 11% of those in the Mangatepopo Valley last summer reflecting the importance of that short walk. There is an even gender ratio.

The growth in international visitors resulted in them surpassing NZ visitors in the early 1990s. They now average about 76% of the TAC users with the ratio tending to stabilise recently (Figure 3). Despite perceptions by some New Zealanders, there has been no reduction in the number of New Zealanders (Figure

3). While the majority of people still use public (concessionaire) transport, the proportion using private or rental transport appears to be steadily increasing (Figure 4) increasing their relative pressure on carparking. The average compound growth in numbers on the TAC is about 9% (Figure 2) with trends in international visitor arrivals from the Ministry of Business, Innovation and Employment explaining part of this growth. However none of the individual datasets of the International Visitor Survey (e.g. hikers, visitors to national parks or film locations, 20-29 year age group) match the TAC growth patterns.

Visitor likes, dislikes, perceptions and overall level of satisfaction

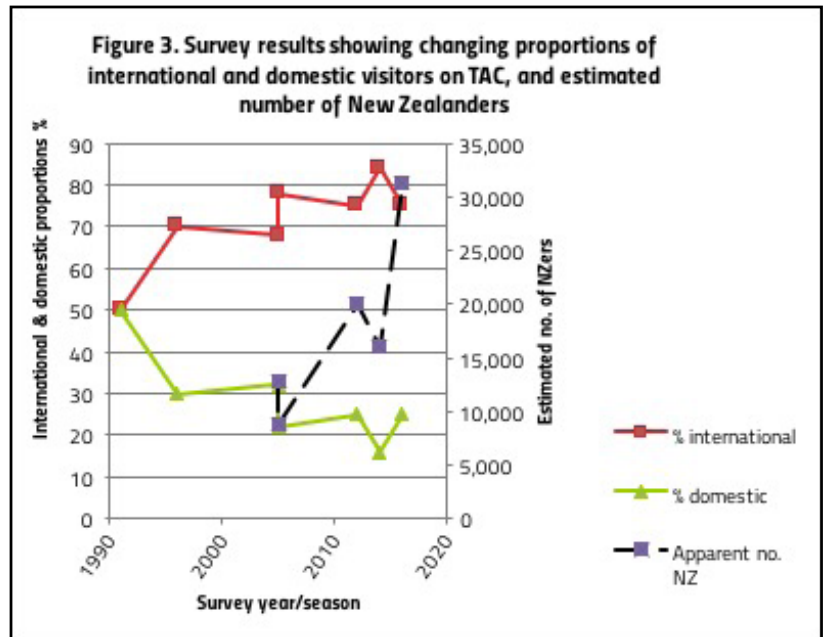
Most people who are attracted to the TAC have great experiences: for many it will be a memorable highlight of their visit to NZ. Visitor expectations and experiences are fundamentally important so these benefits have been specifically surveyed. The most recent study to do this, Angus Associates (2012) concluded

“61% of visitors had as their most important expectation of the TAC its scenic quality, with 39% also believing it was important they experienced an unspoiled environment. The standard of the facilities and busy-ness of the track were less important.”

The TAC phenomenon also brings many economic benefits to the region although quantification of this is out of date because it is 13 years since the last economic study was carried out. Table 1 summarises the benefits.

Surveys have also examined what visitors do not like and potential impacts on their levels of satisfaction with their TAC experience. Satisfaction is complex, depending on several subjective and objective factors. It is measured in different ways and results may vary depending on where and when surveys are undertaken. So results may not be comparable from survey to survey especially if the expectations or other characteristics of those people hiking the TAC has changed. Relevant factors may include the number and country of origin of hikers (including at the start of a hike and in specific places), the weather, the number and condition of toilets (and other facilities) and impacts like litter, seeing human waste, and erosion (Figure 5).

and “seeing too many large groups”. Two thirds of these people felt some degree of crowding but 94% were satisfied with their trip experiences (Table 2). Crowding was scored slightly higher on weekends when the proportion of New Zealanders was about 50% (compared to



The first TAC survey of visitors was carried out from January to April 1996 (Gibson 1996) when there were less than 20,000 people using the TAC, indicated that most people were bothered by “seeing too many others on the track”

12% on weekdays), but not to the point of degrading the visitor’s experience. In the 2005 survey, a similar proportion of people overall felt some degree of crowding but satisfaction levels were still very high (95%). This survey by

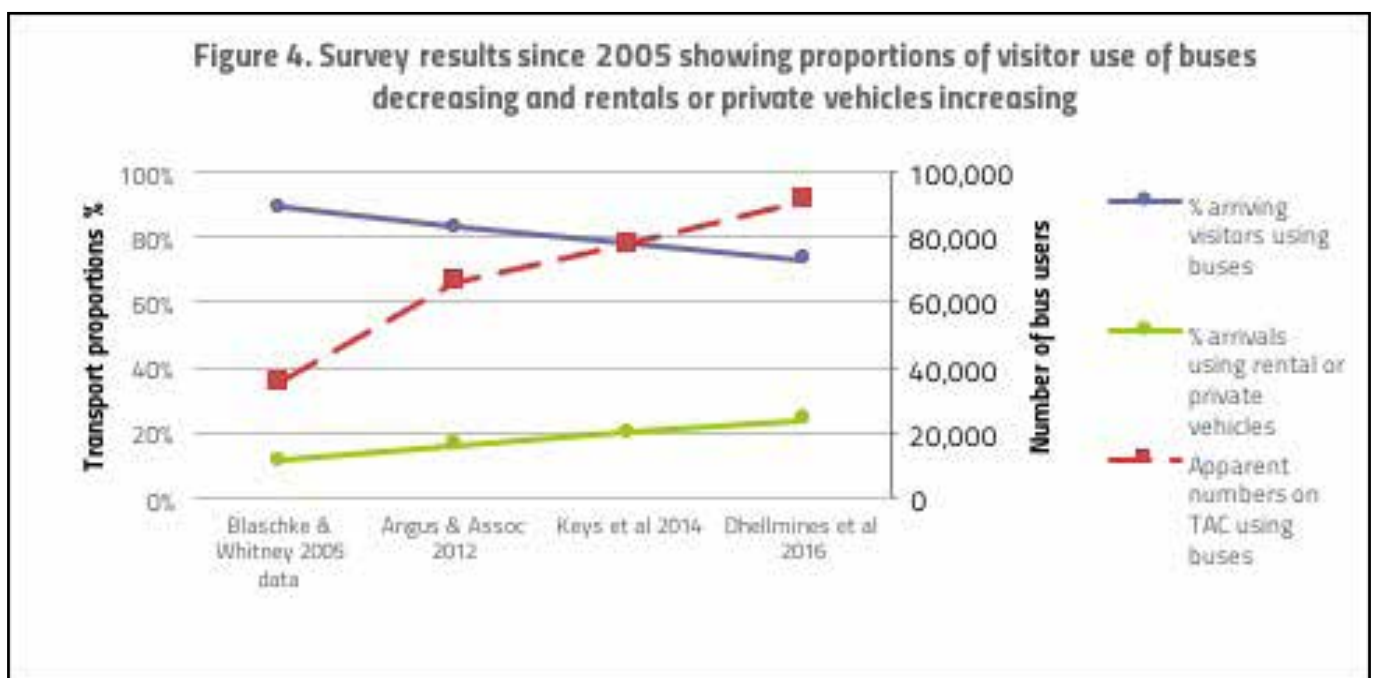


Table 1. Summary of benefits to visitors, the economy and strategic goals

Visitors	"strong benefits", "clear majority satisfied". Enjoyment of volcanic scenery, landscape, views, craters, lakes, nature etc, positive outdoor active experiences, huge sense of achievement, enjoyed the company of friends
Economic	\$200/person/day expenditure by TNP visitors on accommodation around TNP and transport, estimated \$20 million spent per year in relation to the TAC, strong growth mostly sustained for 15 years now (Figure 2)
	Many companies directly involved with the TAC (21 transport & 22 guiding concessions mostly local, >50 bus & rental vehicle companies); significant local employment
Management and strategic	Large number of NZ residents and international visitors are enriched by outdoor experiences and connect with nature in TNP
	Increased number of school/youth visits & benefits from education
	The TAC and TNP make significant contributions to the reasons why people visit NZ
	Increased economic development of local communities

Blaschke and Whitney (2007) was the first to measure the effect of daily visitor numbers on their enjoyment, noting some reduction in enjoyment with more than 350 counts per day. They noted about 40% of respondents said that

little difference between the perceptions of domestic or international visitors or nationalities. But they did measure an increase in perception of crowding as daily numbers increased: 20% of people



Figure 5. Comments made by respondents when asked to comment on the least enjoyable aspects of their TAC experience in an open question format. Verbatim comments are categorised into key themes and are illustrated in the graphics that follow (where the size of typeface represents frequency) (Angus & Associates 2012)

crowding detracted from their enjoyment when there were more than 550 counts per day.

Angus & Associates (2012) examined this relationship between visitor numbers and enjoyment in more detail. Like the previous surveys, they found that when people were surveyed crowds of people were one of the "least enjoyable" aspects of their TAC experience (Figure 5). They found very

said that crowding detracted from their experience when there were 600 counts per day and 30% when there were 1000 counts per day. The overall survey concluded that while "crowding can have a negative effect on how visitors perceive their experience of the track. However, this appears to have little impact on overall satisfaction with the TAC experience" (Table 2). It is interesting to compare these scientifically based social surveys with

Study (authors)	Survey period	Standardised estimate of annual visitor numbers on TAC	"Some crowding" perceived?	Very satisfied to satisfied	Overall experience score
Gibson	Jan-April 1996	17,000	59%	94%	-
Blaschke & Whitney	Mar-April 2004, Feb-May 2005	45,000	64%	95%	-
Angus & Associates	Jan-April 2012	87,000	Increased crowding perceived as numbers increase	-	8.5/10

internet-based ratings. The latter are not scientific, tending not to control the variable influences on visitor responses so well. One of the most well-known sites, Trip Advisor, summarised the results of 1056 reviews (cumulative to mid-2016) as 85% of them ranking the TAC as "excellent", 12% "very good" and only 0.2% as "terrible".

Management concerns and issues

While the high levels of visitor satisfaction found in the 2012 survey, and since from very favourable reviews in Trip Advisor, are heartening they are no cause for complacency in the light of increasing visitor pressure. At the Tourism Industry Awards 2016 Prime Minister John Key referred to the importance of making sure visitors want to return rather than merely continuing to grow our visitor numbers. He emphasised that consistency is an important factor in our tourism industry's future. The following sections explain some of the concerns in more detail.

Track management

This is well understood in TNP. It includes design, construction techniques and the importance of maintenance to prevent erosion. History has shown that the volcanic vegetation and ash soils are very prone to trampling and erosion: we are seeing this around Emerald Lakes where people wander off the TAC track presumably to explore on their own

or have a private lunch. Informal trails are developing. Despite some loss of experienced staff recently track design and upgrades (Figure 6) are now planned well: track work can be expensive and although work on the TAC has been well-funded, sometimes planning timeframes (and restructuring) have resulted in work delays. Policy supports high track standards at destinations like the TAC near road-ends (i.e. the well visited "front country"). Those high standards are less appropriate at the "wild" volcanic higher altitude areas but there is ongoing pressure from concessionaires and within DOC to build wider tracks to higher standards there to increase "carrying capacity" or improve safety. DOC track designers recognise that visitors do not like lots of steps (Figure 5) so aim to maintain easier gradients and design to prevent cutting of corners: this is difficult in narrow steeper areas like over Red Crater.

Widening tracks and building them in prominent places can also create visual impacts. This runs counter to the desire or need for them to remain natural (e.g. no foreign material including the load-bearing greywacke gravels widely used in TNP) and blend in, especially in the culturally significant tuku area on Tongariro where additional tracks are not favoured in the TNP Management Plan. Such factors constrain upgrade options or new tracks in the mountains above about 1700 m. The popular fashion of recording one's presence by building cairns and graffiti (e.g. people's names,

Table 2. Visitor surveys of crowding and satisfaction on the TAC. Given the complexity in measuring satisfaction and experience with the TAC, a five-fold increase in visitor numbers from 1996 to 2012 appears to have seen only a relatively small decrease in overall satisfaction.

Table 3. Main management concerns and issues about the TAC. Note that in Figure 5 visitors made little or no mention of management imperatives such as track works, SAR operations, volcanic risk etc. This suggests visitors take these things for granted until they are directly impacted by them (e.g. injury or eruption)

Management work or concern	Approximate cost of management per person (2015)	Comment
Track maintenance	\$3.50 maintenance model	New track deviations cost up to \$250 per metre
Visitor safety (Search & Rescue and volcanic risk management costs)	\$2	Excludes some salaries and volunteer hours
Toilets and human waste management (financial depreciation and environmental costs)	\$1.50	Probably more than \$1.50 pp is necessary. \$1.2 million budgeted for 16 additional new toilet pans at four new sites 2016/17-2018/19 will increase it
Road maintenance	\$0.65	Tensions between maintenance cost/status quo and sealing/benefits for concessionaires and visitors
Traffic management especially at Ketetahi and SH46	\$0.50 but projected to need \$2	Only recently necessary but is becoming essential on an increasing number of days over the main season
Concession management	Not calculated	Legal and monitoring challenges, some policy failures (e.g. Blaschke & Whitney 2007). Increasing understanding that visitor experience is important
Meet and greet staff	Not calculated	Hut Ranger role but could be expanded
Crowding on track and maintaining visitor experiences/satisfaction with increasing numbers of visitors	Not calculated	See above and below. Effect of crowding has had a minor effect on satisfaction to date but trends are apparent
Protecting cultural values and identity	Not calculated	Need to be given more weight, especially with increasing numbers, consistent with World Heritage values and future co-management
Car parking and existing parks becoming too small during an increasing number of busy periods	Not calculated (ongoing maintenance and upgrades). \$708,000 spent in 2010/11	Inappropriate use of national parks: Mangatepopo expansion in 2010/11 is already too small despite some future-proofing
Effective planning and consultation	Not calculated	Good relationships and long term, strategic thinking is essential; working better in recent years

heart symbols etc) beside or near the track is causing increased environmental damage and visual impact. There appears to be limited understanding of such impacts, among many visitors, some tourist-based agencies and even some DOC staff.

Visitor safety

This has been a concern on Tongariro for at least 50 years. Ease of access for inexperienced people has always resulted in people getting into trouble. A significant part (17%) of the first TNP management plan (1965) covered Search and Rescue (SAR). In contrast, only

0.4% of the current plan deals with SAR because there is now an efficient, well-developed free rescue system operated by the NZ Police, often involving helicopters supported by volunteers such as RARO (Ruapehu Alpine Rescue Organisation). Many rescues occur and while there have been no trauma fatalities for five years there is usually at least one near-miss each year (typically from hypothermia, rockfall on Ngauruhoe or slips) and about one medical fatality (e.g. heart attack).

Over the last six years on average about 30 people per year are rescued on the TAC and Ngauruhoe, including several false alarms. Variability between years is high ranging from 0.016 to 0.04% of TAC visitors per year. But the average (0.03%) is much less than in the high-risk sectors of industry in NZ, with similar numbers of people involved i.e. agriculture (0.1% fatalities, 0.35% serious-harm incidents) or construction (0.02% fatalities, 0.33% serious harm incidents) (www.worksafe.govt.nz, www.stats.govt.nz). On Ruapehu ski areas RAL patrol statistics indicate the accident rate is 0.3% attended by ski patrol (Andy Hoyle personal communication). The current concern is driven by a large proportion of minor and some serious-harm incidents caused by people or groups doing things well beyond their capabilities or common sense, plus the cost of helicopter rescues. There are also perceptions that overseas visitors are not paying enough through GST and other levies and that NZ's ACC system represents a nett cost to the country rather than a benefit.

Volcanic risk management

Volcanic safety and risk management received little attention before the 2012 eruption. Compared to Ruapehu, there had been few eruptions. No eruptions had occurred in the "modern era" of the TAC before public transport became available. Demands for risk mitigation at Ruapehu due to several near miss events outweighed the lessons from a set of near miss events on the massif



during the February 1975 eruptions on Ngauruhoe. Hence only the GeoNet system owned and operated by the Earthquake Commission and GNS Science provided mitigation. One hut (Ketetahi, built in the 1970s) was located within one of the Summit Hazard Zones on the massif.

The 2012 eruption episode changed all that. The damage to Ketetahi hut and the track during the 6 August eruption represented a major near miss for visitors. The 21 November eruption was a near miss for four scientists and a helicopter pilot but did not threaten the public (despite some misperceptions that it did). It is now clear that eruptions pose serious potential threats to visitor safety, disrupt visitor use and impact on commercial activity. The prominence of the TAC and the continued growth of visitor numbers have also highlighted significant risks. Risk assessments

Figure 6. Capital upgrade on the northern part of the TAC in January 2013 to avoid a part of the track that was steeper than a new standard. The photo shows the plastic "jak mat" that has been laid prior to infilling it with greywacke sourced from the gravel dumps produced during the excavation of the tunnels of the Tongariro Power Scheme.

Photo: Harry Keys.

show that many tens of fatalities could occur if an eruption occurred without warning on a busy day. As a result, GeoNet has had major additions to its sensor network, electronic warning light signs have been developed, the first in situ gas monitoring system in TNP was installed to monitor Te Maari gas emission supported by a weather station installed at a high elevation on Tongariro (see Tongariro Journal 2015, pages 48 and 40). In addition, an experimental early warning “Tongariro Eruption Detection System” has been developed to improve the likelihood an eruption will be detected quickly and response will be fast. These systems to mitigate volcanic risk cost \$174,000. Plans to respond to volcanic unrest and eruptions at Tongariro-Ngauruhoe were prepared and then integrated for the whole of TNP, and better communication was developed with concessionaires and schools, as well as iwi. With support from Don Bogie (DOC Christchurch) we now calculate that mitigation efforts should reduce the chance of major eruption consequences (including a mass fatality event) to one event in about 100 years compared to one event in 19-20 years without mitigation. But maintaining readiness will be an ongoing challenge.

Toilet waste management

The rapid growth in visitor numbers in recent years has placed heavy demands on toilets on the TAC. Keeping them clean can be a challenge on busy days. While helicopter operators and DOC have improved the cost-effectiveness and regular removal of human waste the number of toilets had become inadequate by the 2015/2016 summer. The Angus & Associates survey in 2012 concluded that “dissatisfaction rates with the toilets were relatively high” (when annual numbers were about 85,000). Following recovery of visitor numbers after 2013 and a large increase in 2015 (Figure 2) DOC developed a plan to double the number of toilet pans and locations and to attempt to reduce

waste volume within two-three years. A CAPEX bid of approximately \$1.2 million was fast-tracked and accepted, with the first toilets at two new sites and a replacement site near the existing Soda Springs site due to be installed in December 2016 to January 2017. A further two planned sites require difficult siting decisions in 2017 to minimise impact on scenic, cultural and aesthetic values.

Management of crowding on the track, carparks and roads

Some people ask the question whether the extent of crowding at current visitor numbers really matters, given that visitors are still rating their experience highly. But there are two broad sets of unanswered concerns about the current unmanaged increase in visitor numbers:

- The expectation is growing that numbers will not continue to increase indefinitely and that at some level of growth crowding or related social impacts will cause that growth to cease or decline (risk of “killing the goose”). The risk is that eventually the negative effects of crowding will start to affect overall satisfaction with the TAC experience, fuelled by social media, despite it not having had a very noticeable effect yet (e.g. Table 2).
- The increase in vehicles is resulting in the TAC carparks at Mangatepopo and Ketetahi overflowing: this affects visitor experiences and safety, causes impacts on vegetation, increased wear and tear on roads, and sets poor examples and precedents.

Recent visitor growth plus early indications in late 2016 strongly suggest that visitor numbers on the TAC will likely be at least 40% higher in 2016/17 than 2011/12. This means that depending on weather, about a third of the days in 2016/17 may experience more than 1000 visitor counts per day. This is the

approximate daily count rate at which the 2012 survey by Angus & Associates found that 30% of visitors experienced significant crowding and said that the number of people on the track detracted from their experience. It is almost twice the number of 550-600 where the 2005 and 2012 surveys reported negative perceptions with a sense of crowding detracting from some visitor experience.

At about 1000-1100 counts, preliminary estimates suggest that the two road-end car parks are overfull, with excess vehicles parking down the roads, and traffic management becoming necessary.

At more than 1300 counts there can be more than 400 people per hour for 1-3 hours at peak times of the day and queues will form at some places.

At 1700-1800 counts, large queues or continuous lines of people form (Figure 7). Vehicle use patterns changing to proportionally more use of rental/private vehicles since 2005 and especially since 2012 (Figures 4, 8) is aggravating effects of the underlying growth trends at carparks particularly at Ketetahi.



The increase in people and vehicles is heading toward some undetermined and undefined state. It is possible that 1000-1100 counts per day might represent a state or a target where adverse impacts could be managed in more defined and sustainable ways.

Common sense and the precautionary principle suggest the current growth and impact of over-crowding need to be managed better. A multi-faceted solution will be needed but some solutions do not seem consistent with the TNP Management Plan, impact mitigation

Figure 7. Queue at the new chain, installed at the request of concessionaires, on the steep section formerly bypassed by a narrow benched track, 12 March 2016 (1816 counts on the Ketetahi counter).

Photo: Neil Stott

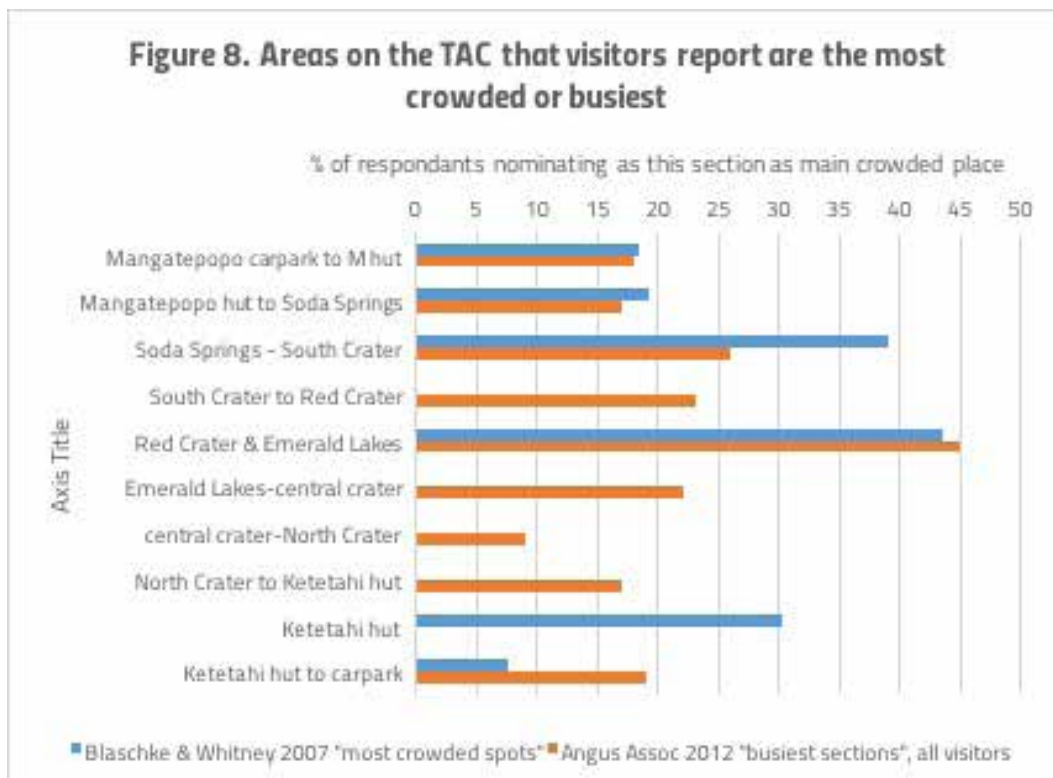


Table 4. Main management tools and options suggested, implemented or possible

Management tools or options	Comment
Track upgrades and deviations to increase carrying capacity and easier, safer hiking	Achieved below 1700 m but less feasible above that (see text). Result in “Whittaker’s confounding” effect deferring management to solve crowding issues. Enable more “unsafe acts” to occur at higher elevations where more severe conditions occur
Carparks enlarged or further ones built inside TNP to cope with more vehicles	The parking capacity of the most recent capital upgrades (2011, Table 3) which were built to allow for growth at the time are already very overcrowded more than 15% of the time. Further development is not preferred inside TNP
Staggering of drop-off times at the start of the TAC (often suggested since 1990s)	Surveys have shown this has been occurring for at least 10 years and has spread out start times at the road ends. The crowding is still intense at times and crowding periods are now extending later in the morning. The problem of periodic crowding at road ends and elsewhere is not solved and is becoming worse at the Ketetahi end (Figure 8). It has a confounding effect of increasing the likelihood of someone being in a hazard zone during an eruption and increases the likelihood of someone dying
Development of alternative tracks elsewhere has also often been suggested and is sometimes used to justify them	Possible partial solution in future but to date development or use of other tracks has not slowed growth of TAC use. The scenic volcanic environment and views on the TAC are seen as its major draw card (Angus & Associates) so the efficacy of alternatives is questionable. Other agencies need to promote the alternatives more
Concession limits or other management and restrictions on further concessionaires, including TNP Management Plan	Planning processes and the TNP Management Plan have not slowed growth in visitor numbers and may not prevent development of “inappropriate” facilities inside TNP. Legal issues have prevented constraints being applied to slow the growth in numbers of concessionaires. Possibly safety and environmental arguments could take precedence eventually. Consultation with concessionaires (e.g. Tongariro Alpine Crossing Transport and Guides TACTAG) seems to have become focussed and effective since the eruption
Transport management	Most visitors use concession transport although the percentage using it is decreasing (Figure 4) probably not just because of cost. Regulating transport concessionaires could regulate part of the visitor growth. High prices in the past have provoked backlashes by NZ domestic visitors
Traffic management	Traffic now needs to be managed on busy days especially on SH46 at Ketetahi. Days where this is necessary are increasing with increasing cost. Increased numbers and proportions of rental vehicles and private cars (Figure 4) and increased parking/crowding at the Ketetahi end (Figure 8) are driving this
Booking or quota system or user-charge	These are examples of tools that are used overseas to regulate visitor numbers. Concern not to provoke domestic backlash could be alleviated by taxpayer discounts or subsidy
Concepts known as “park and ride” are where people park outside TNP and are shuttled or bussed to and from the track ends	“Park and ride” is increasingly common overseas and in NZ (e.g. Hobbiton). Carpark spaces are available near both ends of the TAC. This is starting to happen with the development of a supervised carpark near Ketetahi roadend and its online booking system. Funding by other government agencies would assist

or environmental protection (Table 4). Previous approaches that increased the carrying capacity of the track and toilet facilities at lower altitudes and the sizes of the car parks have provided temporary solutions to some more obvious problems. With hindsight, these have merely deferred the development of a durable and equitable solution to the overall problem. Visitors continue to feel that the busiest, most crowded areas are towards the central part of the TAC, particularly between Red Crater and Emerald Lakes (Figure 8) but numbers have increased dramatically. This is typical of what Whittaker (2014) referred to as the confounding effects of facility development although such crowding is also due to people going slower on the ascents/more difficult areas, as well taking lunch at the very scenic area at the half-way point. Higher standard, wider tracks also encourage greater use by poorly equipped people into higher parts of the TAC with greater alpine hazards. New approaches that are different from those in the past are necessary.

Work since the conference Visitor preparedness and safety

Ongoing concerns of DOC, other government agencies and iwi are driving research, case study analysis and consultation to try to determine new management that might reduce accidents. Visitor preparedness is one focus with a goal to refine existing tools or develop additional ones such as new messaging aimed at reducing risks. A

note of caution is necessary however – such work should not overshadow other important management decisions that need to be made.

An overwhelming majority of visitors have not previously walked the track so there has been a widespread perception that a large number of hikers on the TAC are not aware of the physically demanding nature of the TAC and that they are ill-equipped and ill-prepared, especially to cope with poor or changeable weather conditions (Blaschke & Whitney 2007). Dhellemines et al (2016) confirmed that most people on the TAC are not very experienced with hiking in alpine terrain, with most of them hiking rarely in alpine terrain (Table 5). In contrast about half the people in the set of surveys done to date have ranked themselves as being “experienced” which therefore appears to be an exaggeration. Limited understanding or acceptance of personal responsibility is shown by statements heard during surveys such as “they’d close the track if it wasn’t safe”. The time taken to complete the walk usually ranges from six to eight hours with about 10% of people taking longer than eight hours which is longer than most people find comfortable.

TAC research is currently seeking to further clarify aspects of visitor preparedness, accidents and behaviours. Worksafe NZ is currently investigating at least one recent near-miss hypothermia event. Some previous investigations of specific incidents have pointed to inexperience, poor decision-making or

Visitor experience	Percentage	Number of people based on 100,000 visitors
First-time hikers	11%	11,000
Beginner/novice at challenging day hikes in alpine, volcanic terrain	48%	48,000
Visitor preparedness		
Well-equipped for bad weather	40%	40,000
Moderately equipped	42%	42,000
Poorly equipped	12%	12,000
Very poorly equipped	6%	6,000

Table 5: Visitor experience and preparedness (from Don Bogie and Jeff Dalley drawing on Dhellemines et al 2016)

Figure 9. Hikers heading for “Mt Doom” are attempting the ascent in jandals (almost barefoot like Frodo and Sam). Unfortunately, soon after this they entered the cloud clearly visible above, could not find their way and had to be rescued.

Photo: Boyd Goodwin



poor leadership. Informal “braiding” of tracks at intersections can lead people off the main track in poor visibility. The trouble is that even if only a small percentage of people are poorly prepared or equipped for such a hike or are unable to keep on the track or look after themselves or their party in the alpine environment, the large number of people this represents (Table 5) means that there are many accident-prone visitors! It is likely that many people make unsafe acts without knowing (e.g. Figure 9) but fortunately only a small percentage of them have accidents or need outside help. There is clearly a lot of potential for random accidents.

The most recent TAC survey suggests that most respondents appeared aware of weather conditions on the TAC (71% said this could compromise their safety) and most people interviewed (88%) said they had checked the weather forecast on the night before or in the morning (Dhellemines et al 2016). Regarding clothing, 97% had boots or good hiking shoes, 94% had a water/windproof jacket, and 82% had additional warm clothes. Most were carrying a mobile phone and probably every party had at least one. Respondents seemed well informed about the track. 82% said they sought or had information, and most

of them knew about the time, distance and elevation of the TAC. Apparently, most hikers in early 2016 had some awareness of the difficulty of the TAC.

Almost 80% of the respondents selected the day to hike the TAC because of their schedule which was relatively inflexible (Table 6). While 33% chose that day because the weather was suitable, one third of them (11% of the total respondents) also had schedule constraints. There was no link between age and the reason why they chose that particular day to go on the TAC. However more people said they intended to do side trips (e.g. up Ngauruhoe or to Tongariro summit) with a good weather forecast than when conditions are less favourable. Country of residence seems to have only a minor influence (Table 6) contrary to some stereotyping that is heard in the local community.

The TAC is being used as a case study led by DOC’s Don Bogie (Senior Advisor, Business Assurance) with assistance from Dr Jeff Dalley (Technical Advisor, Monitoring – Recreation and Historic). It is regarded as a “high-use-high-risk” site with a useful amount of information for risk assessment and good opportunities for learning how to optimise management. High-use-high-risk sites on public conservation land have the following characteristics:

- High visitor use
- High-risk natural hazards present that can affect multiple people
- Generally low skilled visitors
- Tourism icons
- Businesses and communities are dependent on them

All such sites have potential for mass casualty incidents. These sites need managing well to provide high-quality visitor experiences and minimise risk to visitors and to DOC.

Experience over recent years has confirmed there is a potential for mass casualties by either hypothermia during bad weather or trauma from sudden

	Weather conditions	Schedule	Availability of travel companions	Various other reasons	No specific reason
Overseas residents	32%	78%	2%	1%	1%
NZ residents	35%	74%	8%	5%	1%
TOTAL OBS.	37%	77%	3%	2%	1%

Table 6: (Dhellemines et al 2016). Cross tabulation between country of residence and why respondents chose the particular day for their hike.

volcanic eruptions on the TAC. The site is classed by DOC primarily as a Day Visitor site but most visitors would meet the definition of vulnerable visitors in that their skill levels and ability to make outdoor risk decisions is not very high. What we have learnt to date is that it is highly likely that the majority of visitors on the TAC do not think they are taking above-normal risks during their hike. With TAC users sharing (and expecting to share) the trail with many others (Figure 10), they will also consciously or

subconsciously derive reassurance from knowing other people will be present. Research, including with outdoor hazards like avalanches, shows that the human tendency in unfamiliar situations is to suspend one's own decision-making process in favour of others who appear to have familiarity: the greater the presence of people, the more likely that individual decision-making will devolve to the crowd. On the TAC this is aggravated because visitors have little flexibility as to the timing of their hike (Table 6) so their

Figure 10: A 'stampede' of hikers descend from Red Crater down to Emerald Lakes. Note some are sitting down in the middle of the track. Labour weekend October 2016.

Photo: Andrew Murphy.



motivation is to undertake the crossing, irrespective of conditions on the day.

Preliminary findings of the case study to date include an assessment that currently individual risk from volcanic risk is likely to be acceptable during periods without volcanic unrest but weather risks may be too high with current management. During periods of volcanic unrest individual risks will become much higher and society's view of them may change. There is no New Zealand standard for risk acceptability – acceptable will be whatever the public and government decide is tolerable. Recent experience with other events, including earthquakes, indicates acceptability in general is less after an event than before it, especially after a tragedy.

Recent traffic and visitor management initiatives

Since the Sustainable Summits conference in August, DOC-Tongariro has been addressing options for methods to better cope with traffic and car parks over the summer of 2016/17. Operations Managers Paul Carr and Bhrent Guy supporting him, have been consulting with Ngati Hikairo and Tuwharetoa, TAC transport and guiding concessionaires and representatives of regional tourism organisations and local councils. The collective wants to ensure the TAC remains a quality visitor experience, including being resilient when there are eruptions, as well as protecting the dual world heritage status of the TNP environment and culture. Letters to the NZ IUCN National Committee and the Minister of Conservation and Prime Minister plus growing publicity since the conference have helped focus management. Contractors now manage traffic on SH 46 at the Ketetahi road on some busy days. A longer-term solution is being investigated by an additional group of internal and external departmental staff.

A conclusion - sustainability goals presented at the conference

Preparation of the Sustainable Summits presentation and this article involved summarising a large amount of data and information in ways that have not been attempted or documented before. It coincided with a wider realisation that since the recovery from the Te Maari eruption episode, visitor numbers had increased faster than expected only two years ago. Consequently, it became clear that demand has begun to pressure or outstrip facilities more often, despite recent upgrading of facilities. The presentation at the conference suggested a revision of objectives and options was necessary from those examined by DOC and Ngati Hikairo after the eruption episode (Bamford 2014) and more recently.

The suggestions for new goals floated at the conference are:

1. **Limit numbers:** ensure the world-class visitor experience is protected and provides ongoing economic benefits to tangata whenua and other local communities
2. **Manage transport logistics:** work with concessionaires to ensure their businesses assist with goal 1. Since the conference further data and analysis indicates this should explicitly include enhanced **management or minimisation of traffic on TAC access roads**
3. **Optimise risk management:** pay more heed to the alpine volcanic environment (including weather risks): consider the pros and cons of making more decisions for TAC visitors rather than continuing the NZ ethic of letting them make their own decisions and be responsible for their own safety
4. **Protect the heritage:** cherish the environmental and cultural values

of Tongariro National Park World Heritage Area

5. **Emphasise TAC's value:** bring together and unify mountain communities to assist with the other goals.

The aim of these suggestions was and is to emphasise that management needs to be more proactive in, and give more weight, to protecting the World Heritage and other environmental values, and reducing risks to visitor experience. In the contexts of both "Sustainable Summits" and rapidly increasing use, some previous objectives appear to give too much weight to developing the TAC to promote economic and commercial benefits. Despite some reluctance to do so, managing numbers of people and vehicles should be an explicit goal or target, possibly needing a formal process or regulation, as has been done in places overseas. Otherwise the status quo growth will continue to add pressures and risks. Hazards and risks due to the alpine volcanic environment need to be taken into account better than they have been. It is recognised that the concerns of New Zealanders who want to retain easy access to the TAC need to be accommodated to avoid a backlash. The previously recognised objective of using the TAC to successfully bring together mountain communities including tangata whenua and transport concessionaires, remains essential and appears to be having more success than previously.

The 2016/17 season has already seen major congestion on a few days and seems likely to provide further major challenges that will influence the future of the TAC. (Figure 10). Acknowledgements to Dave Bamford, Paul Green, DOC and police colleagues, Terry Blumhardt, GNS Science, Bubs Smith, other photographers, Karen Williams and Margi Keys.

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Weeds can teach you a lot

Anna Elwarth
Community Ranger

Hilltop School Weedbuster Story

Tackling a reserve of weeds with 80 pairs of young energetic hands was genius enough, to then have the multi-layered learning potential revealed to Taupō

dawned on me of viewing my class of students as a resource of energy to tap into," says Ms Taylor.

An army of year 7 and 8 classes geared with loppers, secateurs and 'Cut n Paste' herbicide gel was a formidable force to



All photos Hilltop School Weedbusters

Hilltop School teacher Collette Taylor was a bonus.

Many hands make light work

"I was tackling weeds in a conservation reserve in my neighbourhood by myself in the weekends, saddened by how little I was achieving, and daunted by what was needed to be done, when the idea first

fight the War on Weeds. All in a day's work, the kids put big holes in walls of weeds such as broom, cotoneaster and carpets of tradescantia. Since 2013 the students have cleared the equivalent of three rugby fields of weeds in the Oruatua Conservation Reserve near the Tauranga-Taupō River.

Below: Before and after shots – weeds going; trees in.





Weedbusting hidden life messages

"Little did I know then that the idea would turn into a three year curriculum-linked programme and would become part of the culture of the school and bring such a sense of pride. Some of the most valuable learnings for the students were about character building."

Surprise lessons were in stamina, stickability, team work, giving back to the community, keeping fit and the mental benefits of being outdoors and in nature. Student Samuel Richardson said Weedbusters is like homework.

"Sometimes we don't enjoy doing it but the outcome is for the greater good." According to community ranger Anna Elwarth planting trees is the romantic side of conservation where you may get some dirt under your fingernails.

"But weedbusting is hard sweaty work, you may end up with a blackberry thorn under your finger nail" she says. The students learnt that you just can't weed and walk away. The piles of weeds have to be removed or they regrow, areas cleared have to be planted with native trees to prevent re-infestation, and the new trees have to be watered and protected from rabbits.

Technology fit for purpose

The students created solutions to their Weedbusting challenges in their technology class. Student Grace Davies explains that mats and wagons helped carry the dead weeds, they sewed heavy-duty tool belts and gaiters.

"It was a long way to drag the weeds to the trailer so it was really satisfying to see other students using them, making the job easier."

Above: Hilltop School Weedbusters in action!

Below left: Bio-degradable tree protectors keeping the rabbits out.

Below: Fun with technology solutions to Weedbusting problems.





Above: Hilltop students show off their Weddbuster posters.
tStudents from Years 7 & * with a webbusters 'watch this space!' sign.

Using wood-work skills they made predator traps, and learnt to make QR codes so that passers-by could inform them if they had caught something in their trap.

For Tauhara College technology teacher Fiona Holdsworth a learning highlight was harvesting and using harakeke from the reserve, and then weaving it into plant protectors and weed mats that would biodegrade.

"This was a lesson in completing the lifecycle taken from the land, repurposed, and returned to the area as a protective role," she explained.

The more the merrier

Spreading the word about not spreading weeds has been another branch to the



project. The students wrote posters on why weedbusting is important and have placed one in the petrol station window adjacent to the reserve. They also did a presentation at a youth enviro expo and ran their own blog site which their families could follow.

Many parents joined the working bees helping with everything from the chopping and dragging to running wood chippers and post hole borers. Even the bus driver brought old clothes and picked up tools. Many more parents would have heard about the day's adventures over the family meal, and seen weeds pulled from backyards.

Locals have rallied to the effort. Project Tongariro and Oruatua residents Shirley Potter and Karen Ardin, who also have their own weed war a few metres

Below: Parents chipping in with the wood-chipper.
Below right: Local Weedbusters Karen Ardin & Shirley Potter inspired to join in.





upstream, join in the school working bees. Project Tongariro bought a scrub bar from local shop Turangi Chainsaws and Mowers which gave them a great price and generously donated a chainsaw. On the job, Shirley powers ahead with a good health and safety lead and the energetic youth clear the carnage. "The amount of work they can get through in a day is fantastic!" she says, "having young people leading this kind of work is good news for our environment." Local Ian Jenkins raised native plants and donated them to the project. Local business Wairakei Estate also donated trees, as have local community conservation group Project Tongariro.

The cost of conservation

It is much easier to raise money for a cute fluffy kākāpō chick, but a lot harder to find money for clearing weeds. Although the school was successful in formal funding rounds such as \$5000 from the O-I Environmental fund of Recycle Glass NZ, many of the parents and their businesses also came forward and the school was able to buy its own set of tools and cover the cost of busing the students the 40 kilometres from school to the reserve.

Reaping what you sow

Being rewarded for hard work is a joyful and proud lesson in life. Impressed by the hard work and sustainability of this program, the Hilltop School Weedbusters won the Tongariro Taupō Conservation Board award for school project in 2015.



One of the classes attended a local kiwi release learning more about the benefits of conservation, and the benefits of our flora and fauna being in ecological balance.

On the last working bee for 2016 the kererū were singing from the flowering kōwhai – singing a big thank you to the rolling generations of Hilltop weedbusting students.

Above left: DOC contributed \$1000 towards the fundraising effort

Above: Teachers Collette Taylor and Alan Murphy, and students accepting their conservation award.



Working with Extremes

Ruapehu Alpine Lifts CEO Dave Mazey Retires

Karen Williams

It was always going to take a special individual with a wealth of knowledge and expertise to manage the Whakapapa ski area. Ruapehu may be a magic mountain but it is also an extreme alpine environment and an active volcano.

In the early 1990s, the ski area got quieter as mains power steadily extended its electrical tentacles to the west. A major investment in a snowmaking network began. This, combined with more efficient snow management techniques, goes a long way towards combatting some of the effects of variable mountain weather and climate warming.

By 1992, early in Dave's watch, Ruapehu Alpine Lifts (RAL) had taken control of every facet of the Whakapapa operation, from the National Downhill to Happy Valley, ski instruction, ski patrol, the Bruce Road, cafes and toilets. Six concessionaires were reduced to one, enabling integrated mountain management for the first time. Après Ski came to the Top of the Bruce in 1994, with the opening of Lorenz's Bar & Café.

The 1995-96 eruptions of Ruapehu were awe-inspiring but the ash was thick and abrasive, closing both Whakapapa and Turoa from time to time during two consecutive ski seasons. It was a king hit for the private company running Turoa. After much debate, and a review by the Commerce Commission, Dave led RAL's purchase of the Turoa operation in 2001. Overnight, Dave's job doubled in size and season pass holders could ski two resorts for the price of one.

Dave Mazey's environmental contribution to Tongariro National Park is little known. After the park achieved dual World Heritage status in the 1990s, it was obvious that it was time to resolve the inadequacies of the sewerage system at Whakapapa. "The current situation was untenable but the \$4 million price tag was a stumbling block," said former DOC conservator Paul Green. "DOC needed everyone's help to fund the



Above: Dave Mazey, ex-CEO Ruapehu Alpine Lifts, who oversaw many major changes to the mountain's skifields during his time at the helm of the company.

Photo: Ruapehu Alpine Lifts

Dave Mazey, a skier since the age of five who also spent part of his youth in Whakakapapa Village, was just the man for the job. Perhaps he should have known better! After all, his dad, Tongariro National Park chief ranger John Mazey, had tracked Ruapehu's erratic winter snowfalls from the 1960s.

Dave's early immersion in conservation eventually led him into a job as a ranger with the Department of Lands and Survey, DOC's predecessor. This was useful background when he switched sides and took on the challenges of running a commercial ski area operation within the national park. When Joe Judge retired in February 1987, Dave was appointed the new general manager.

scheme. Dave Mazey's leadership and support helped convince the Chateau, Skotel and all the ski clubs to come on board. He had the vision to understand that the sustainability of the ski field and Whakapapa Village was dependent on committing to this investment to help mitigate environmental and cultural concerns and improve the visitor experience." The new scheme was completed in 2004.

In 2007, Turoa was invigorated by the construction and commissioning of the six-seater High Noon Express chairlift that moves more than 3,200 people per hour. Other lifts were installed and the layout of others reconfigured. A massive expansion of the snow-making system and redevelopment of the base area café ensure Turoa's ongoing popularity.

Ruapehu gets more than its fair share of closed days due to bad weather. Severe icing events have collapsed chairlifts and buildings, and create an extremely tough operational environment. Volcanic activity can play havoc with the balance sheet as well. While challenging for the company and park managers, natural events also drive improvements such as Ruapehu's volcanic warning systems. RAL, under Dave, has been an active partner in a three-way joint venture with GNS Science and DOC. RAL's ski patrol and lift staff have become full partners in helping to take volcanic-risk management on the mountain to a new level.

Reflect for a few moments on just how much has changed on Dave's watch. The Bruce Road and car parking have been streamlined, full-time professionals have replaced the volunteer ski patrol, and the rope tows have disappeared. Mobile phones arrived. Mechanised snow management speeds up snow clearance after storms, and fleets of snow groomers deliver quality piste day after day. Snowmobiles help staff zip around the field and troubleshoot where needed. Electronic passes control access to the lower lifts.



Two recent man-made events were disastrous – the catastrophic arson of 2009 and the diesel spill of 2013 that contaminated Raetihi's community's water supply. Dave has faced up to the hard issues courageously. He has led the way in recognising the company's significant ongoing commitment and responsibilities, in terms of environmental care, to tangata whenua and the communities around the mountain.

According to Murray Gribben, chairman of RAL, Dave's most significant recent contribution was his guidance of the license approval processes at Whakapapa to give the company operational certainty. Dave will continue as a consultant to RAL to manage Turoa's license renewal process and will also progress the installation of more new lifts at Whakapapa in the near future.

In November 2016, the board of RAL appointed a new CEO. He is Ross Copland, ski area manager of Coronet Peak for the past four seasons. Project Tongariro wishes Ross all the best for the future, and extends its thanks to Dave Mazey for a job well done.

Above: After a snow fall on Ruapehu skifield, Mt Ruapehu.

Photo: Karen Williams

Project Tongariro Cornerstone Projects

Project Tongariro has four cornerstone projects to which it devotes much of its finances and effort.

They are:

- Te Matapuna - Waiotaka Wetland Restoration
- Mt Pihanga - Lake Rotopounamu Forest Restoration
- Greening Taupō
- Kids Greening Taupō

All four projects show the power and results that can be achieved by community volunteers.



Greening Taupō

Robyn Ellis
Greening Taupō Coordinator

Greening Taupō has been fortunate to be involved in some exciting local events and fundraising opportunities over the last year.

Below: Shawn Vennell, King of the Ring and incredible fund raiser.

Photo: Greening Taupō

A highlight was Quality Print's Shawn Vennell who not only put his body on the line in **Zero Risk King of the Ring** fundraising amateur boxing event but also set about, and achieved, raising the most amount of money for his chosen charity, Greening Taupō. Shawn raised an incredible \$95,675 which led GT to receive a further \$10,000 from the 100% Lake Taupō Charitable Trust being the charity that had raised the most money. This amazing effort significantly helped raise our profile in the media and the community. Shawn's vision is to replant the Wairakei Corridor to attract birds and enhance the scenic and ecological values of the area and is well underway.

Greening Taupō was also fortunate to once again be the recipient of the Wairakei Golf and Sanctuary local's day, a sell out event, which saw us receive \$9754 from the proceeds.

In early 2015 we secured \$100,000 funding spread over three years from the Waikato Catchment Ecological Enhancement Trust (WCEET) for restoration work alongside the Waikato River above and below





Huka Falls. We've partnered with Bike Taupō who are powering ahead, getting rid of pest plants and restoration planting. WCEET also granted us \$35000 for the next five years to continue restoration plantings at Whakaipo Bay which, with continued support from DOC, is an iconic event in the community.

With help from a group of regular volunteers our planting sites are being well cared for, ensuring they're weed-free, mulched and tended.

Partnerships and collaboration with a range of groups, organisations and landowners have helped develop a calendar of community planting days throughout the year. More than 11,000 trees have been planted, which goes a long way to helping GT achieve its long-term goal to improve Taupō's environment for people and native wildlife.



Above right: Robyn Ellis accepts a cheque for the proceeds of the Wairakei Corridor and Sanctuary local's day.

Right: Planting day at Wairakei Drive.

Photos: Greening Taupō



Kids Greening Taupō

Jack McNeill
Tauhara College

The exciting 18-month pilot project, Kids Greening Taupō, provided project-based learning to students from kindergarten through to high school and has actively helped Greening Taupō achieve its vision to restore ecological corridors throughout the town. Along the way it's given young people real life, hands-on learning experiences in restoration and conservation work and equipped them with knowledge, skills, values and the motivation to become caretakers of our natural environment.

As well, participating kindergartens and schools created their own environmental or restoration projects, resulting in

curiosity and resilience in the outdoors while older participants improved self-confidence and commitment towards improving the environment.

The pilot programme officially ended in June but is set to continue with senior students already working towards a large restoration project at Spa Park; a planned conservation club aims to give all Taupō youth an opportunity to connect and engage in the natural environment.

We and the members of Kids Greening Taupō were honoured last month by a special visit to the DOC Office from a very important member of our government.

This special person was none other than Sir Jerry Mateparae, our nation's Governor General. His Excellency, a Wanganui native, has the privileged position of being Her Majesty, Queen Elizabeth the Second's representative to New Zealand.

From the very moment he stepped out of his bulletproof Rolls-Royce, all eyes were set upon him. He was greeted by a waiata from Anianiwa Drose-Tapp, a Tauhara College student. Soon after entering the door accompanied by his wife Lady Janine, several other Tauhara College students presented His Excellency with a welcome speech about what our program is all about. He followed on by giving a speech of his own.

After the speeches, Their Excellencies and their small group of companions were given a tour around the DOC garden area. The children from Taupō Primary had set up a plant potting station using disposable pots they had made themselves. Waipahihi had a station where visitors were tasked to match up "prints and poos" with the animal that left them. And finally, Bush Kindergarten



Above: Sir Gerry Mataparae, Governor General get involved with a bush kindergarten.
Photo: Kids Greening Taupō

around 2000 native trees being planted. The students also learned about propagation, pest control and cultural diversity in the environment. Together they worked on a range of events including filming a Kids Greening Taupō documentary for TV3's news programme, The Story.

Of the programmes many positive outcomes teachers noticed that younger students developed an increasing

(comprised of two local preschools) were set up too.

These four schools weren't the only ones in attendance. Tauhara College attended also and aided the children with their stations. Also there for the event were past Taupō Primary and Waipahihi students now attending Taupō Intermediate. The school hopes to join the program later in the year.

Sir Jerry certainly seemed to enjoy the tour, ever smiling and seemed genuinely interested in what the children had to say. One conversation with a young Taupō Primary boy named Tajshan involved their birthdays, prompting the comment by His Excellency, "I'm older than you," which was met by laughs from all.

I was honoured to have a talk with Sir Jerry after the tour. He said that his favourite thing about KGT was that *"young people were outside, getting involved and doing stuff, not relying on adults to do the job for them. Kids Greening Taupō is important because it's all about teamwork and looking after the environment. We need to learn early about how to look after the planet for all of us, because if we don't, that's going to be pretty sad. It's great that you can keep New Zealand beautiful while*



having some fun."

We also talked about leadership and what he thinks makes a good leader.

"You have to know yourself. You have to be able to look yourself in the mirror and say, 'This is how I can improve.' It's very important to have your own set of values because it's a lot easier to lead others when you can lead yourself. Even I get nervous sometimes, but you have to lead by example. That's what leadership is."

It was inspiring how a man of such power, such authority, could still be so humble and calm. His Excellency sets an example for all of us.

Top: The students involved with Sir Jerry Mataparāe and Lady Janine.

Above: Taupō Primary Schools demonstrate their eco-sourced seed potting to Lady Janine

Left: Check out the Governor General's car!

Photos: Kids Greening Taupō





Kids Greening Taupō AGM Report

Thea Depetris
Greening Taupō education coordinator

Below: Kids Greening Taupō is all about getting stuck in!

Photo: *Greening Taupō*

Opposite top: Waipahihi student setting tracking tunnel cards for the “prints and poos” module

Opposite bottom: Spot the pre-schoolers! Out and about exploring with bush kindergarten

Photos: *Greening Taupō*

Today, the use of project-based learning using authentic contexts has become a key ingredient to education in the 21st century. Kids Greening Taupō is providing some of our community’s schools with exactly this opportunity as the programme utilises Greening Taupō’s vision to restore ecological corridors throughout the town.

Based on a collaborative community education model, Kids Greening Taupō sees local organisations, businesses and experts teaming up with Taupō’s kindergartens and schools to provide

the town’s young people with real life, hands-on learning experiences in relation to restoration and conservation work. Through this programme educational outcomes are achieved alongside of the ecological outcomes – leading to a cohort of young people with the necessary knowledge, skills, values and motivation to become stewards of the natural environment.

The Kids Greening Taupō 18-month pilot project officially finished in June 2016, through which a number of achievements have been accomplished. In conjunction with assistance from the community partners (e.g., Greening Taupō, Tūwharetoa Māori Trust Board, Taupō District Council and the Department of Conservation), the participating kindergartens and schools undertook their own environmental and/or restoration projects, resulting in approximately 2000 natives being planted within their respective project areas, and a large amount of upskilling for both students and teachers was undertaken in relation to plant propagation, pest tracking and trapping and Māori perspectives about the environment.

Additionally, the kindergartens and schools collectively worked on a number of different events such as the programme’s official launch and the filming of a Kids Greening documentary for *The Story*, a TV3 news programme. Teachers observed numerous developments within the participating students’ cognitive and personal capacity.

With respect to the younger children (i.e., four to nine years old), teachers commented on their increased resilience within the outdoors and curiosity about



nature, while improved self-confidence and commitment towards improving the environment was identified in the more senior students (i.e., ten to fourteen years old).

With the completion of the pilot, also came the resignation of the first Kids Greening education coordinator, Amanda Jones. Having just finished my masters thesis focusing on the development of the Kids Greening programme, I was able to take over this position with a good amount of relevant knowledge and experience under my belt.

Thanks to the on-going support and expertise of our community partners, the next few years are set to be exciting times as the Kids Greening student leaders establish a large restoration project at Spa Park. Additionally, the establishment of a conservation club will also enable all Taupō young people experiences to connect with nature and participate in ecological restoration activities, no matter which kindergarten or school they attend in the district.





Te Matapuna- Waiotaka Wetland Restoration

Shirley Potter
Project Tongariro Executive Board member
Weedbuster and Rat Killer Extraordinaire!

Five thousand six hundred native plants were planted at our Waiotaka and Waimarino restoration sites last year. 1 July 2015 - 30 June 2016. A conservative 800 voluntary hours in this area alone, has been given by our keen helpers.

Stump Bay is our latest planting area. The very generous Bryan donated his time and rotary slasher to chop the sprayed dead broom, blackberry etc in preparation for planting.

Two trailer loads of rubbish were unfortunately 'unearthed'. A great team of 31 volunteers gathered on 20th March and planted 1100 natives, not all were able to dodge the damn wasps!

Sadly, no treasure was found. Turangi Marine generously gave their time and sponsored the 'after planting' BBQ. Ian and Frances Jenkins donated around 600 plants for the site and of course helped us plant them. Thanks, we'll keep you on!

The Waimarino River site was given some attention in June with another 300 plants used to fill an area with a poor survival rate from previous plantings. Watch this space as you drive by.

Oruatua - Waitetoko Conservation Area.

We have recently been successful with a bid from the Turangi Tongariro Community Grant to set up a trap network at Waitetoko. The funding of \$3760 has purchased us 40 DOC 200 traps, two live capture cat traps and four Timms traps. There is 70 hectares of public conservation land surrounding the Christian Camp which already has a few tomtits and robins so protecting these vulnerable birds is vital. Local volunteers will begin trap placement and monitoring. The plan is that MiCamp students will assist with trap monitoring once the trap network is set up. With any luck they will all become weed busters too and start



Above: Establishing the fenceline at Waiotaka.
Photo: Greening Taupō

The amazing effort before last year's AGM of "3000 trees before lunch" has been our most successful planting site yet. A success rate of around 95%, with many self-seeded cabbage trees establishing. Sadly, some clowns broke the gate and damaged around 80 trees to get willow firewood recently. A sturdier gate has been installed by our enthusiastic corrections officer Warrick and his crew.

Much of the ongoing success of our plantings can be attributed to the dedication of Warrick and his small crew. They are carrying out most of the releasing and spray work at present, their help is invaluable.



removing the invasive cotoneaster from the area.

The Hilltop school has again been working hard in the neighbourhood. Concentrating on another weedy patch of land at the end of Kapua St slowly changing the look back to native

vegetation. We value their help in the war on weeds.

Two keen Project Tongariro volunteers, Mark and Stella Usherwood have adopted a weedy patch of public conservation land at the end of Oruatua Ave, Tauranga-Taupō. Their volunteer time is easily 30 hours a week and they have been working in this location for the last two years. A large area has been planted with plants donated by Mark, Stella and some from locals, hopefully Project Tongariro can assist with funding for plants in the future. The area at the end of Oruatua Ave is adjacent to a wetland that has been the focus of some willow removal as part of the larger Te Matapuna wetland restoration project.

Above: Planting out at Waiotaka.

Left: Even the young ones get to enjoy the planting!

Photos: Greening Taupō



Mt Pihanga - Lake Rotopounamu Forest Restoration

This year is following on from one of the most effective aerial 1080 pest control operations ever undertaken in TNP and Rotopounamu. The control undertaken in Aug 2015 resulted in a very low rat population for eight months. We also

boundary - which will target the extra evil ferrets and feral cats. If you're keen to help us out with trap checking - and putting in a new trap line, please contact Kiri. Any excuse to spend time in this special forest is a bonus for your soul.

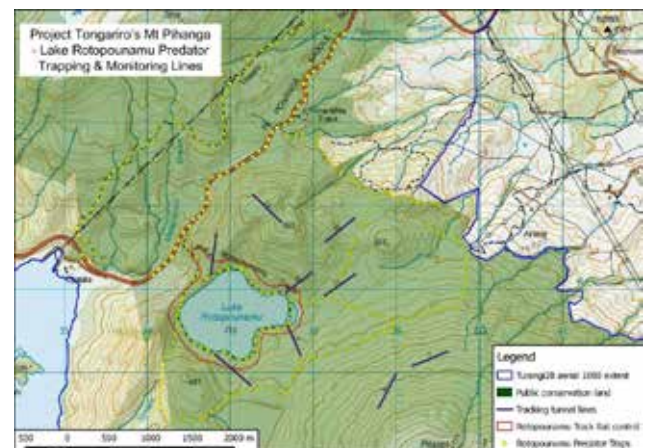
Pest control regime	Aerial 1080 (Pihanga) + rat control 500Ha + mustelid trapping 1100Ha	Rat control 500Ha + mustelid trapping 1100Ha	Aerial 1080 (Northern volcanoes) + rat control 35 Ha + mustelid trapping 1100Ha
Pests caught	2013/14 Season	2014/15 Season	2015/16 Season
Stoats	16	47	9
Weasels	14	104	11
Total mustelids caught	30	151	20
Rats	453	641	245
Hedgehogs	25	8	13

had the lowest catch rates of stoats and weasels we've ever had! (see table below).

Our observations suggest the birds had a spectacular breeding season. One young kaka was recently spotted at Kuratau lake edge (starting off on its big OE)

The next planned aerial 1080 operation is now two years away and we're expecting a 'bumper season' of pests (the little buggers). This means upping our game - checking the traps monthly from August to May, and fortnightly in November to January, to protect our lovely birds! We're also putting in another trap line on the farm

We're still considering translocating weka - but we've got a bit more work to do on the planning. If approved we would hope to release weka following the next 1080 operation in 2018.





Beach Ridge Planting Day
Photo: Greening Taupō