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Overview and updates in brief

This third newsletter is a little later than originally planned. To some degree this is because there is a new format: we have dropped the colour printing, which reduces costs and allows the newsletter to be more widely circulated; and we have increased the contributions from Tuawhenua Trust members. The trust has asked that this newsletter communicate broadly about any issues relevant to the management of Tuawhenua forests.

Also, in part the delay was caused by restructuring taking place within Manaaki Whenua. The purpose of this is to provide a simple structure with increasing science opportunities and benefits to end-users like the Tuawhenua Trust.

PROJECT UPDATE: PAST LOGGING AND CURRENT SOILS

Past removal of rimu, toromiro, etc. through logging has created an opportunity to understand the long-term impacts on soil processes. The Manaaki Whenua team has been determining how soil nutrients vary around existing rimu trees and how this compares with around rimu stumps. In addition bags of leaf litter have been placed around trees and stumps to determine how logging has affected processes such as litter decomposition.

MATAURANGA KERERŪ

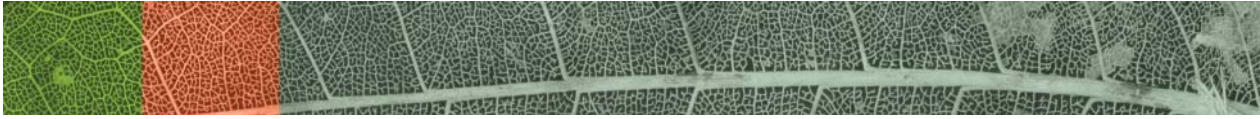
Over a year ago a study was initiated to record the knowledge of elders on the distribution, survival and breeding of kererū. The purpose of this work is to help in the development of kererū restoration plans. Several elders have been interviewed and it is planned to interview a couple more before preparing a report on that work.

OUTCOME-BASED INVESTMENT

Research by Manaaki Whenua has begun on Tuawhenua lands, using long-term funding from the Foundation for Research, Science and Technology. Initially this work will focus on the potential effects of climate change on the species found in trust forests.



For more information about the overall project:
 Contact: **Rob Allen**
 Phone (03) 325 6700
 Email allenr@landcareresearch.co.nz



Tūhoe Tuawhenua Trust

The Tūhoe Tuawhenua Trust was established in 1987 after the lands about Ruatahuna were removed from an amalgamation of titles through a High Court action taken by owners. Most of the bush blocks of the lands about Ruatahuna are under the Tuawhenua Trust. The Trust is responsible for 25 blocks of land covering 22,000 acres.

Trust lands are, in general, native bush blocks, many of them logged in the 1950s and 1960s. Opportunities for realising timber assets or developing lands for farming are very limited, because the land in general is difficult to work, and regulations constrain the harvest of native timbers. At the same time, Ruatahuna is a community disadvantaged by a range of factors that are largely economic and geographic in nature. There has been little economic development in Ruatahuna – few or no new businesses have been established in Ruatahuna in over a decade and existing industries around deer and possums have slumped or been fickle.

While the Trust has a focus on economic development, its principal goals are to protect the lands and preserve and restore the bush. Understanding how to do this is a key driver of the Trust’s interest in research and its relationship with research entities such as Manaaki Whenua.

A brief on current trustees and the secretary of the Trust follows.

JAMES DOHERTY (CHAIR)

James was appointed trustee to the original Tuawhenua Trust formed in the 1980s and later appointed chairman during the mid-90s. He is the longest serving member on the trust and contributes to a wide variety of wealth and knowledge. He was recently invited by Manaaki Whenua to accompany Rob Allen and represent the Trust on a three-week visit to Europe.

James is currently on the Māori Regional Representative Committee of the Whakatāne Regional Council (i.e. Environment Bay of Plenty); a member of the Māori National Network ERMA (Environment Risk Management Authority); sits on Landcare OBI governance bodies; is a member of the review committee for 1080, and of a number of researching bodies under the Tuawhenua Trust.

James’ main interest is always about the preservation of our indigenous forest.

KOROTAU TAMIANA MEIHANA TAIT (TRUSTEE)

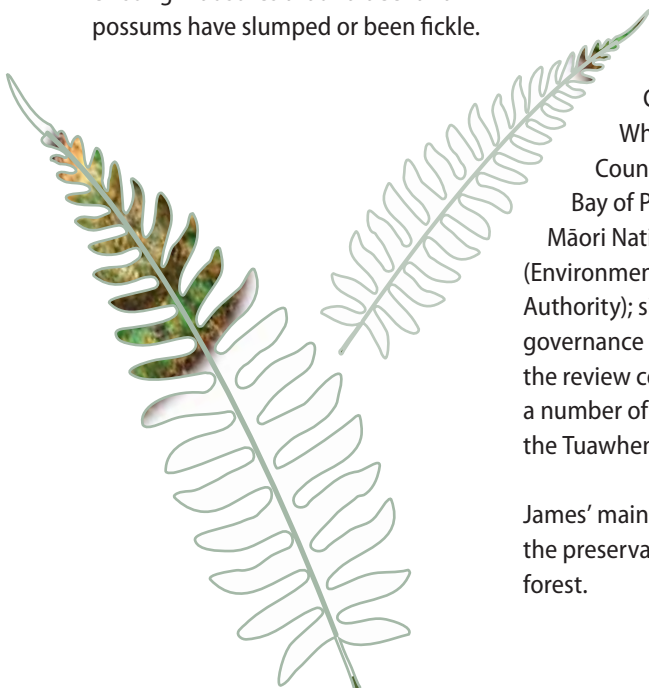
Korotau was raised in Ruatāhuna by his grandparents and educated at the local Huiarau Native School. His grandfather said there was no future at school for him but that his future lay with the land. He was taken out of school and taught everything about the bush and all its contents. Korotau heeded his grandfather’s teachings and learnt the tricks of his grandfather’s “trade” by being his “side kick”. He learnt how to hunt, fish, and snare. Korotau learnt all the bush skills necessary for survival and to identify the forest plants and animals.

Out in the field in 1974 Korotau became a maintenance hand for the Lands and Survey Department and honorary ranger for that department and the Tūhoe Waikaremoana Māori Trust Board until 1980. During the years 1977 – 1979 he was employed by Te Rehuwai Safaris as tour guide. His bush skills and knowledge are unsurpassed.

Korotau is one of the longest serving members of the Trust. He believes in the future of his mokopuna, his hapu, his iwi and in pursuing the best interests of all beneficiaries of the Tuawhenua lands.

HEKE TE KURAPA (TRUSTEE)

Heke was appointed as a trustee in 2005, through nomination by his koroua and hapū of Te Urewera to succeed the late Wharekiri Biddle. Heke has had considerable years’ experience with forestry work in and around Rotorua. He was also





contracted for the planting of approximately 400 ha of eucalypts in Ruatāhuna.

As a boy, Heke was dux of the local Huiarau Primary School and furthered his education at Auckland Grammar. He is currently a member of local committees including the 1080 Pest Eradication Control group and was responsible for the co-ordination and smooth running of the historic Waitangi Tribunal Hearing held in Ruatahuna 2004.

Heke enjoys meeting and socialising with influential people. He is a keen hunter, has catered timelessly for children during school holiday periods and is especially obliging to his elders. Heke has a strong interest in the Trust's aim of retention and development of the lands.

BRENDA TAHI (TRUSTEE)

Brenda was appointed as a trustee in 2005 and has long been associated with the Tuawhenua lands. Her husband Aperahama Tahī was one of the original applicants for the Tuawhenua land case in the 1980s, and Brenda was the secretary for the Tuawhenua Lands Steering Committee of that time. It was out of all of this early work for the lands that the Tuhoe Tuawhenua Trust emerged.

Brenda is Whanau o Ruataupare of Ngati Porou but lives at Mataatua, Ruatahuna, and is committed to furthering the aims of the Tuawhenua Trust. She has a particular interest in research and enterprise development in Ruatahuna, at the same time preserving the special nature of the

Urewera.

Brenda has considerable experience in governance and management after a successful career in the public service in the 1990s and with appointments to the boards of a number of entities in the public and private sector, including ACC, GNS Science, and Huia New Zealand.

MARGARET BIDDLE (SECRETARY)

Margaret is of Ngāti Raukawa, Ngāti Maniapoto descent. She is the widow of the late Wharekiri Biddle and has lived in Ruatahuna for many years. They shared a common interest with their horse trekking, fishing, homestay tourism business and hosted people from all over the world. They were the guests of Manaaki Whenua during 2003 which visit resulted in a research

programme between Tūhoe and Manaaki Whenua dedicated to Maori tourism.

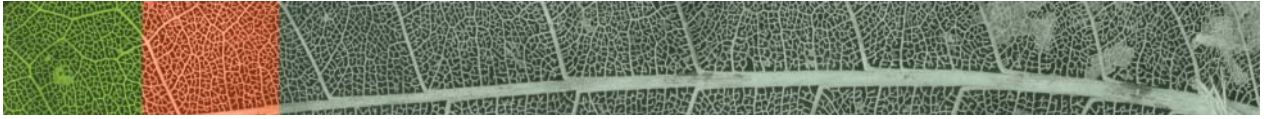
Margaret has been secretary to the Trust for about 12 years ago. She brings to the Trust her years of skill as a shorthand typist, and as an administrative and executive assistant during her long term of employment with the Public Service. She was also instrumental in setting up a Fur Fabrication Module under the Internal Affairs Department and trained local people in the art of manufacturing possum fur into small goods.

Margaret has always worked alongside her late husband Wharekiri in the interests of the hapu of Ruatahuna and owners of the Tuawhenua lands.



Contact: **Brenda Tahī**
Phone (07) 366 3166





Honey production in the Tuawhenua

“TE NANAŌ MIERE”

Tūhoe have pursued the sweet food of the honey bee since its first introduction to New Zealand. “Te nanao miere” or the gathering of wild honey was the preserve of many of the old people, who used only smoke as their protective screen for this hazardous activity! Some families were well known for the apparent ease with which they were able to recover the honey.

PAST INVESTIGATIONS

Because the people of Ruatahuna had a background in recovering wild honey, a pilot project involving 10 hives was conducted in the 1980s. This project found that Ruatahuna had a short but productive season for honey, with abundant food supplies for the bees on farms as well as in the bush on both sides of the valley. A fully fledged enterprise was not developed at that time as

then there was not a market demand for bush honey. However, in recent years Tuawhenua Trust has been reconsidering the potential for honey production in the Tuawhenua region. Their first line of investigation involved engaging the well-known-company Comvita to investigate the potential for production of mānuka honey. Different parts of the Tuawhenua lands were considered for this specialty but it was found that the tracts of mānuka were either



Collecting honey in the Ureweras c.1930. Photo from Whakatane District Museum Gallery- Urewera Scrapbook 2, Tuawhenua archives, Ruatahuna.



mixed with other species or too small to reliably produce pure mānuka honey. Instead investigation led to production of mānuka honey at Maungapohatu.

RECENT ACTIVITIES

The Tuawhenua Trust has maintained its interest in honey production despite the early setbacks. The Trust knew it needed to lift its skills if an industry was to be developed on Tuawhenua lands. In 2005, Korotau Tamiana, one of the trustees for the Tuawhenua, completed the main part of a course in beekeeping at the Tairāwhiti Polytechnic. Korotau will go on in the next year to complete this course.

In the summer of 2004/05, the Tuawhenua Trust also arranged for Grant Stanley of Lucky Bee Apiaries to place hives on Tuawhenua lands, principally at Tarapounamu, as part of a further investigation into the feasibility of honey production in Ruatahuna. The trial was considered a success with major conclusions drawn about the number of hives that could be sustained in the valley, the possibility of setting up an extraction plant in Ruatahuna, and the creation of a number of jobs for budding beekeepers.

It is clear to the Tuawhenua Trust that a more formally constituted feasibility study is worthwhile. The opportunities for honey production

in Ruatahuna range from basic bush honey to specialties such as tawari honey, and cosmetics or foods using honey as an ingredient. Premium prices would be paid for honey or bee products with special properties, such as are demanded for mānuka honey. The Tuawhenua Trust is initiating some research to investigate the properties of honey gathered in the Urewera region. Over the next year, the Trust is planning to take this interest in honey and bee products to another level of development.

Contact: **Brenda Tahī**
Phone/Fax (07) 366 3166
Email brenda.tahi@xtra.co.nz

BioDiscovery heads back to Mataatua Marae

BY OLIVER SUTHERLAND

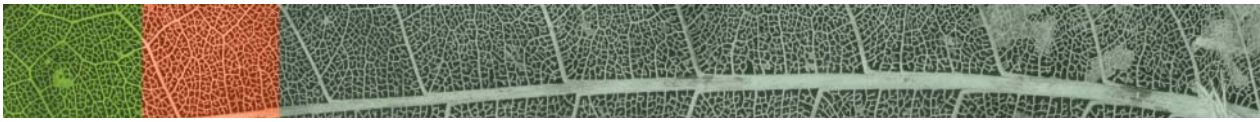
The links between BioDiscovery NZ and the Tuhoe Tuawhenua Trust were further strengthened in late October 2005 when an ope from the company spent two days at Mataatua Marae. When the hui was being planned several staff, including some who had never been on a marae before, jumped at the opportunity and in the end a group of eight went to Ruatahuna. Actually, having hosted the Trust in Tamaki Makaurau on two earlier occasions, this enthusiasm of the BioDiscovery staff to head for Te Urewera was not unexpected, if only because people hoped to enjoy more of the famous hospitality!

Although I was unable to go due to

having surgery on my shoulder at the time, I have had very positive feedback from everyone since. The hui was particularly useful in providing an opportunity for new Trustees to learn the full story about BioDiscovery's bioprospecting enterprise and the Trust's role in this. At the same time, the visitors were able to brief the Trustees on the latest results of testing of samples from the Trust forests. BioDiscovery Director Dr Peter Wigley explained that a total of 2617 microbes had been isolated from soil, litter and leaf samples and of these 275 had been active against insects or nematodes or fungi. Sixty-two of these are now being "bulked up" so that BioDiscovery's team of

chemists can investigate them further, hopefully discovering the chemicals responsible for the activity.

Peter also outlined future new directions for collaborative work with the Tuawhenua Trust, which will include a search for bioprotectants, microbes that increase plant resistance to pest and disease attack; anti-infective products, which have antiviral and anti-bacterial properties; and nutraceuticals, compounds that are beneficial to human health as food additives. BioDiscovery plans to include this research in its forthcoming bid for funding later this year.



Te Tapoitanga Māori

WHO'S INVOLVED?

Tuhoe Tourism Federation; Te Urewera Tairawhiti Tourism Forum: Brenda Tahī, Joanna Doherty, Makere Biddle
Manaaki Whenua: Phil Hart, Chrys Horn, Helen Fitt, Jude Wilson
Takuahi Research and Development (of Wairewa Runanga, Ngai Tahu): Robin Wybrow, laean Cranwell

Why are we doing the research?

Tourism may be one way for Māori in rural areas to develop economically. Manaaki Whenua staff are working with people from Tūhoe as well as with rūnanga from Ngai Tahu on Banks Peninsula to help tourism businesses develop. One part of this is looking at what tourists understand about Māori culture and how interested they are in it. This information can then help Māori businesses market themselves in ways that might be more attractive to tourists.

WHAT HAVE WE DONE?

We interviewed 26 tourists in the North Island and 27 tourists in the South Island who were doing or had just completed some kind of Māori tourism activity. We wanted to find out what they noticed and liked about the tourism activity they had done and whether they had done it because it had a Māori component to it.

WHAT ARE THE RESEARCH RESULTS?

We found that international tourists do not always recognise Māori culture or Māori people. They often did not even know that they had participated in Māori tourism, because they do not really know what to look for. When asked about what they knew about Māori culture they gave answers like: Dancing, singing, hangi traditional rituals and marae are Māori – traditional things are Māori. They thought that Māori people, ...do the

haka or ...wear grass skirts and stick their tongues out. Another woman being interviewed after a Māori tourism trip and having been given a coffee by a Māori woman said, I haven't done any Māori stuff – and in fact I think I have only seen one Māori person. When asked if she had noticed that a Māori woman who had served her, she said she had not. What tourists know about Māori culture seems to be very superficial and affected by the way Māori are shown in advertising material.

Visitors interviewed in Rotorua (who had not been to East Cape or Te Urewera) felt that Māori cultural shows were authentic, cultural experiences: "The authenticity of it... we were really involved as if we were a tribe and we'd been invited into their house". In contrast, visitors to Te Urewera and East Cape tended to view Māori cultural shows as being 'put on' for the tourists. They said things like, "it was very commercialised – it was a show" or "In the big cities, what you experience is put on for you. When you come and see it for yourself it's a bit more authentic". If tourists met Māori people personally that changed how they judged a show.

Overall, tourists were interested in Māori cultural tourism activities that they recognised as such and this tended to be traditional performances. However, tourists did not connect Māori culture to Māori tourism. As one tourist said, I knew that there were more Māori things to see in the North Island – more attractions for tourists, but not that there were more Māori. Another person said We would like to find out more about Māori culture



Te Urewera-Tairawhiti Tourism Forum and Tuhoe Tourism Federation board members at a recent meeting in Rotorua with Researchers in the Te Tapoitanga Maori programme





– everything is geared up for tourism but we would like to mix on a one to one basis.

Most tourists are not specifically interested in Māori culture and tend to see it as a good addition to other activities such as horse riding, boat cruising, and learning about New Zealand plants and animals. In most cases, the tourists we interviewed had chosen the Māori tourism activity for reasons such as the scenery, the adventure or the activity rather than the Māori component. Many did not know there was a Māori component.

When asked whether they would pay more for this Māori component they said things like No, I wouldn't pay a substantial amount more but

it would have swayed my decision. Others noted that there are Māori components in many tourism experiences in New Zealand. As one person put it, No, I wouldn't pay more. Māori is part of almost everything that you do – the bus driver, the guides – they will tell you about the Māori stuff.

Despite this, the Māori elements of a tourism experience did increase tourists' enjoyment of the product. Tourists talking about this said things like it added a richer dimension to the experience and it made me appreciate that there is more to this land – there is history so that it makes it a whole picture rather than just a pretty picture.

It seems that Māori operators cannot charge more for offering a tourist experience, however Māori components in a tourism product can increase the satisfaction of customers. We need to give some thought to the way Māori tourism is marketed to overseas tourists because at the current time, what they might expect from a Māori product may not be what they get in Te Urewera or on Banks Peninsula.

Contact: **Phil Hart**
Phone (03) 325 6700
Email hartp@landcareresearch.co.nz

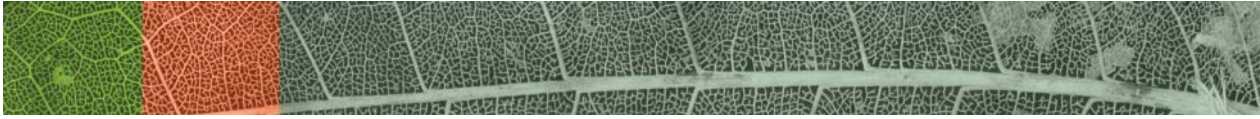
Keeping track of the kererū

Over the past 6 months the Landcare Research team has been attempting to capture adult kererū in canopy mist nets to attach small radio-tracking transmitters. The reason for putting the transmitters on the birds is so we can locate their nests to monitor how successful the parent kererū are at raising young, and to identify what predators might be taking eggs or killing chicks or adults.

The low numbers of kererū in the area have made catching difficult for the team, however with the assistance of DOC staff that are experts in catching kererū, we have managed to capture and attach transmitters to 4 kererū with transmitters. Each month the team comes up to Ruatahuna to check on the location and welfare of the



A radio transmitter is attached to an adult kererū at Tarapounamu.
Credit: Kerry Borkin



birds. Feathers that the birds dropped while handling were taken for DNA sexing. We know we have tagged 3 male and 1 female kererū. Knowing the sex of the bird helps immensely if you are trying to locate nests during the breeding season. A male kererū will generally incubate the eggs or guard the young chicks during the day while the female kererū takes the night shift. So if you have tagged a male bird and want to locate a nest, you need to be out looking for it between mid-morning (9:00am) and late afternoon (5:00pm) when the male is still sitting on the nest. Usually around 4:00-6:00pm the male swaps over with the female and heads off to

feed. The opposite applies if you have tagged a female kererū. You need to be looking for her either early morning or early evening, while it is still light enough to see.

Even with transmitters attached, finding the kererū and their nests can be extremely difficult in the tall forest canopy and rugged terrain of Te Urewera. You need to be in line-of-sight of the birds before you can pick up their signal. So a bird might not be too far away but down in a gully and you might not pick up its signal.

We think this is what has happened to one of the radio-tagged kererū. A month after tagging one of the birds disappeared and we have not been able to locate it since. It is likely the bird has flown out of range of our radio receiver and we can not detect its signal. We do not believe it has

trees. However, three of the kererū (K10–male; K12–female; K20–male) have stuck around and we have been monitoring their whereabouts since late June. In this time they have not moved far from where they were captured (refer map below).



Adult kererū arriving at its nest to begin incubating. Credit: Geoff Moon (Birds International 1990, Vol 2)

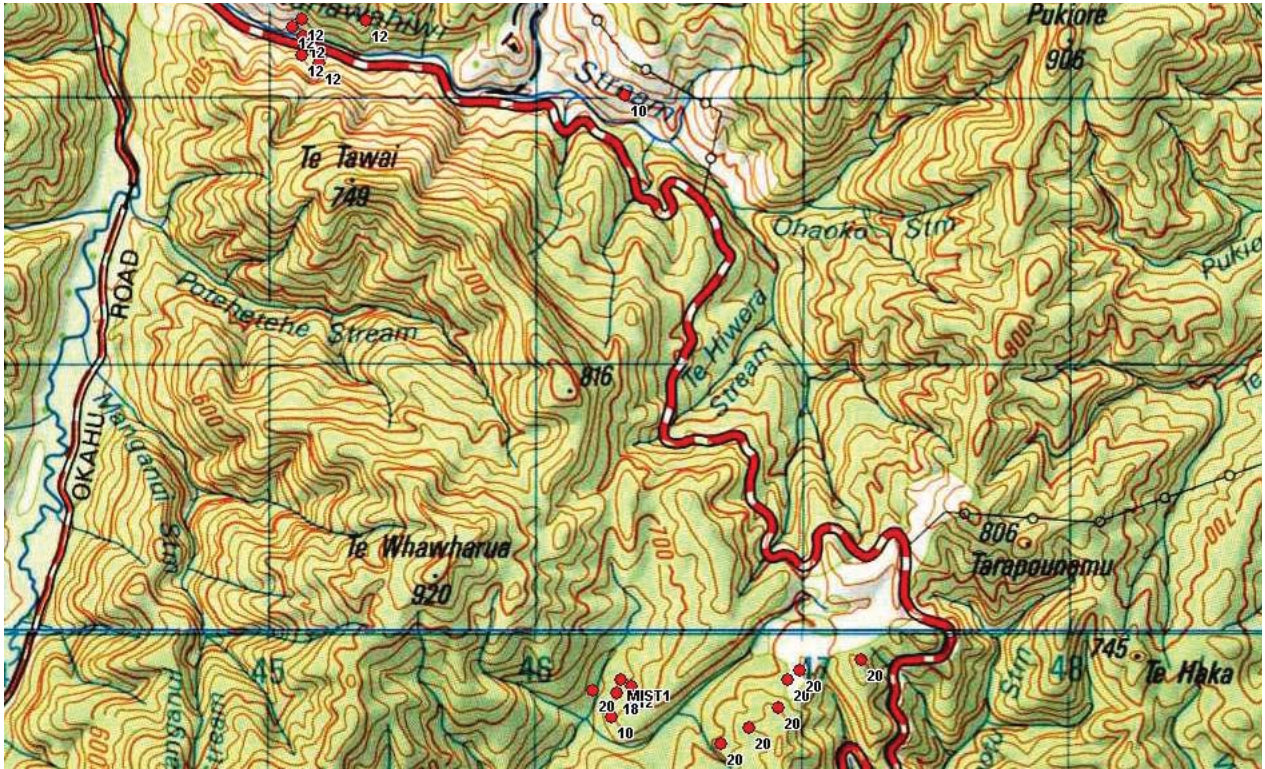
died in the local area because each transmitter is fitted with a “mortality mode” which sends out a rapid signal if the bird does not move after a period of 12 hours. Generally, if a bird hasn’t moved in that time it has usually died or been killed. Since the kererū were captured and tagged in late June when the birds come from miles to feed on the toromiro, it is possible the missing bird could have returned to its home area which is too far away for us to pick up its signal. A nearby study found that they were moving up to 50 km to preferred food

ground. A motion-activated video camera was positioned at one of the nests for three days to monitor the movements of the birds and check whether any predators visited the nest during that time. Unfortunately we are still waiting on the data logger to arrive from Australia which will be used to identify individually marked possums or rats so we were not able to test that.

However, we were able to live-capture and deploy GPS collars on five possums in logged areas of forest and five

In February 2006 the research team came up to Ruatahuna to try and locate kererū nests and use the opportunity to test some of the equipment we have had developed for the project. The team was able to locate two active kererū nests with an egg in each. The first nest was located in tawa approximately 25 m up, while the second nest was in a small mahoe and only about 3 m above the





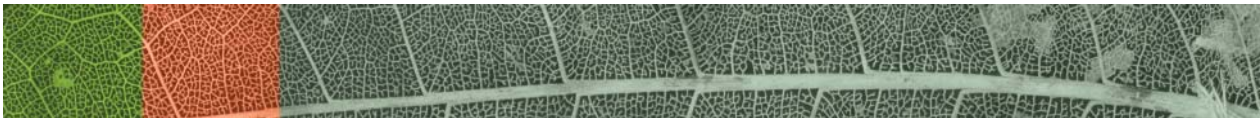
Location of kererū capture and radio-tagging and the subsequent movements of Bird-12 and Bird-20 since late June 2005.



Jim Doherty (Tuawhenua Trust), Morgan Coleman (Manaaki Whenua), and Peter Dilks (Department of Conservation) listen for the tracking signal from a radio-tagged bird. Credit: Moira Pryde

possums in unlogged areas of forest. The purpose of the collars is to track the movements of each individual possum over the next few months and give us an idea about the size of their home ranges in logged and unlogged forest. Each collar has a VHF radio-tracking device so we will attempt to recover the collars around mid-May. We ask if you catch one of the collared possums before we do, could you please give the collar to Jim Doherty, Brenda Tahī or Margaret Biddle. This would be very much appreciated.

Contact: **Phil Lyver**
 Phone (03) 325 6700
 Email lyverp@landcareresearch.co.nz



Living with forests: people and forests in southern Germany

In Bavaria, there is a long history of managing forests for a wide range of purposes. In part this is because people have lived in those forests for thousands of years and have developed ways of using products from their forests while maintaining the forests. As such, there are similarities with Tūhoe and their forests. For these reasons a study tour was made of Bavarian forests to understand how people live within, gain an income from, yet maintain the forests. This article describes some aspects of the tour made in September 2005. Tour participants were Jim Doherty (Tūhoe Tuawhenua Trust), Udo Benecke (Forestry Consultant), Susan Wisser (Manaaki Whenua) and Rob Allen (Manaaki Whenua). In Germany many individuals helped with components of the tour particularly Berndt Deckelmann and Hans Soyer.

The long history of managing forests was seen in a visit to a salt mine. Long ago people living way inland did not have ready access to salt – yet salt is essential, for example, in the preservation of food. Rock salt was first discovered in the area visited by Celtic people 3000 years ago. To purify the salt it was dissolved in water and then the water boiled off to produce pure salt as we use to cook today. Because the salt was used by people over an increasingly large area significant amounts of wood were required to boil off the water. Eventually there were no forests left in the immediate area around the salt mine. About 300 years ago the local government passed laws restricting the amount of timber that could be harvested to the amount that was growing in the forest. This was the

first law determining the sustainable use of a natural resource. After 3000 years of nearly continuous use the salt mines were closed in 1987. Now they operate as a tourist attraction. The history of use of forests for glass production has similarities to the salt industry with wood demand by the glass blowers to melt the glass.

Timber remains an important product from Bavarian forests – but there are lots of changes taking place in just how this is done. Over the last 300 years (not long when you consider the life time of a tree) forest managers have developed a number of timber harvesting systems that have minimal impact on the environment. In one of these, only single trees are harvested (the Germans call it “Plenterwald”) rather than whole patches of forest. Over time the area is revisited and further single trees harvested. The end result is a forest with a mixture of tree sizes in any one patch. As

you can see in the photograph it certainly doesn't look like harvesting in Kaiangaroa Forest. Advantages of the single-tree system include minimal visual impact, minor impacts on water runoff and a forest better able to withstand the impacts of storms. Of course it is more difficult to harvest trees as single individuals throughout the forest. What also has to be remembered is that the seedlings of some tree species require more light to grow than other species. In Bavaria the single-tree system favours fir, over spruce, as fir is able to grow and survive in shady conditions. This shows how such management systems are being used to convert single-tree-species plantations, found in parts of Germany, to mixed species forests which are less susceptible to storm and insect damage. Maybe such principles could provide a basis for converting single tree species exotic plantations in New Zealand to forests containing a mixture of



Communal forests managed by the village of Kreuzberg for timber production using a single-tree harvesting system. The dominant trees are spruce and fir. Credit: Susan Wisser.



indigenous species of various sizes.

As in New Zealand, Germany has areas of forest now managed as national parks where the key goals are conservation and recreation. Because the forests within their national parks have been impacted upon by people for thousands of years it can be hard to determine the conservation goals. This was clear when the tour group visited dieback forests (see photograph) in the Bavarian National Park. In the 1980s it was widely considered that the reason for the extensive tree death was acid rain. Certainly the rain is acid in this area as a result of fumes from factories and vehicles being incorporated into the rain drops. The acid rain washes some of the essential nutrients out of the soil and eventually the trees die. More recently research has shown the tree dieback is largely due to an outbreak of beetles that attack the trees. As the beetle is indigenous to the area the dieback is now considered natural and the national park management now allows the dieback to proceed. This is not so in the adjacent forests managed primarily for timber production where the forest managers control the beetle. It was also interesting to hear of wild animals such as wolves and lynx recently moving back into the national park from the east, as well as the attempts to re-establish these species. There are similarities to our attempts in New Zealand to re-establish indigenous species lost from an area.

Most forests, whether owned privately or by the state, are managed for multiple purposes. Where forests are managed for multiple purposes there is usually a priority given to specific uses. On steep slopes the primary goal is protection of roads and villages in the valley below from



Sepp Spann describes the management of his family's forest to the tour group. The result is a forest with more tree species than found in many of the other managed forests in the locality. Credit: Susan Wisser.

landslides, snow avalanches and rock falls, yet there is still usually some timber harvesting to offset the cost of management needed for protection. Many families manage their lands to produce a range of products – and there is a strong history of creating opportunities on the land for the wider family. The tour group visited a family well known for producing a diverse range of products from their land including:

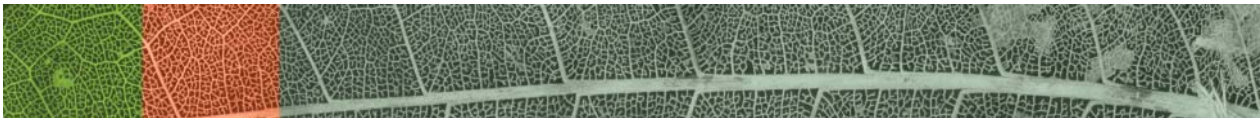
- Timber production from 17 ha of forest. The forest has been managed to contain a mixture of tree species (photograph) and provides an income from sales of timber to local small sawmills.
- Dairy production from 33 ha of grass. The 50-cow dairy herd is large for Germany and kept inside all of the year with the feed brought to the animals.
- Flats for tourists. The farm is on a major cycle route and provides accommodation for cyclists.
- Alcohol production from fruit. A common drink is called "Schnapps"

and is made from various fruits (for example plums and apples) on the farm.

The family is continually looking for new opportunities for products from their land – but they also have important bottom lines. For example, their strong will to retain their forests.

Clearly many of the problems facing forest management in Germany have similarities to what we face in New Zealand. For some of these problems the Bavarian examples show a possible way forward. On the other hand forestry is currently being restructured in Germany much the same way as it was restructured in New Zealand in the 1980s – so there are risks to their traditional ways of managing forests.

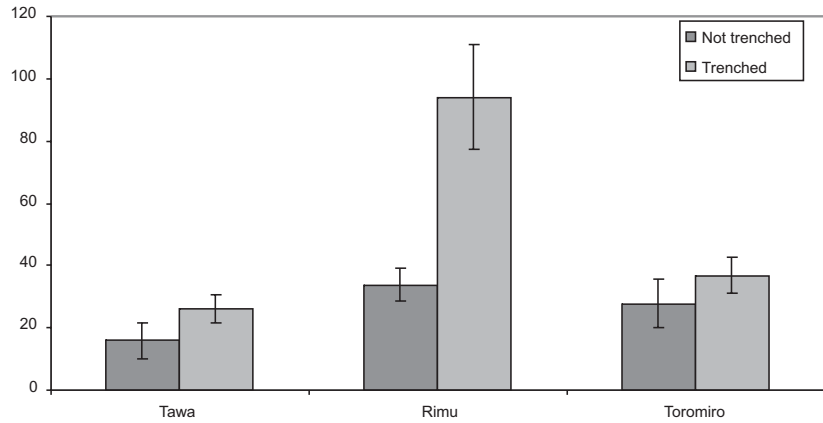
Contact: **Rob Allen**
 Phone (03) 325 6700
 Email allenr@landcareresearch.co.nz



Regeneration of Tuawhenua forests

WHY ARE WE DOING THE RESEARCH?

The Tuawhenua Trust has been concerned that some forest tree species (toromiro, rimu, matai, tōtara and kahikatea) have not been regenerating as well as they used to. We are trying to discover exactly where these species are regenerating and then to see if their growth is restricted because of light or nutrients. Maybe tawa is better able to survive in the current conditions following past logging of Tuawhenua forests? We have tagged 300 seedlings of tawa, toromiro and rimu and Katiana has dug trenches



Percentage shoot growth of marked shoots of seedlings in three tree species growing in Tuawhenua forests. Half the seedlings had trenches round them (Trenched) and half were left untouched (Not trenched). Growth was measured two years after trenching.



Myra reapplies twink to one of the trenched seedlings so that we can measure growth from exactly the same spot on the plant next year. Credit: Fiona Carswell

round half of them to stop tree roots of big trees nearby from stealing all the nutrients from the seedlings. We will now see if this has allowed them to grow more than where there are no trenches. We have these seedlings in the light and in the shade so we will see if plants in the light grow faster than ones in the shade.

to trenching with a mean shoot growth of 94% in trenched plants as opposed to 34% in rimu plants that were not trenched.

Competition for nutrients may be significant in determining how well rimu seedlings grow. At the end of the study we will be able to test whether trenched individuals had higher concentrations of nutrients in them or not.

WHAT ARE THE RESEARCH RESULTS?

Shoots of trenched seedlings of all species have grown more than the shoots on the plants that were not trenched (see figure above). However, rimu has shown the biggest response

Contact: **Fiona Carswell**
 Phone (03) 325 6700
 Email carswellf@landcareresearch.co.nz



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Editors:	Fiona Carswell	Published by:	Manaaki Whenua	Telephone:	+64 3 325 6700
	Rob Allen		Landcare Research	Facsimile:	+64 3 325 2418
Layout:	Anouk Wanrooy		PO Box 69		
Thanks to:	Christine Bezar		Lincoln 8152		www.landcareresearch.co.nz
			New Zealand		