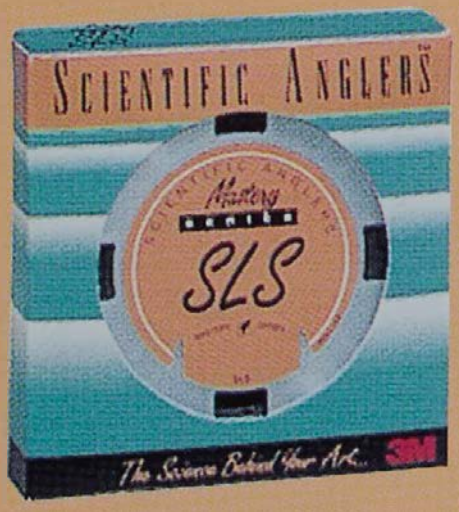
TARGET TAUPO

A Newsletter for Hunters and Anglers
in the Tongariro/Taupo Conservancy

MARCH 1999, ISSUE 30

Department of Conservation
Te Papa Atawhai



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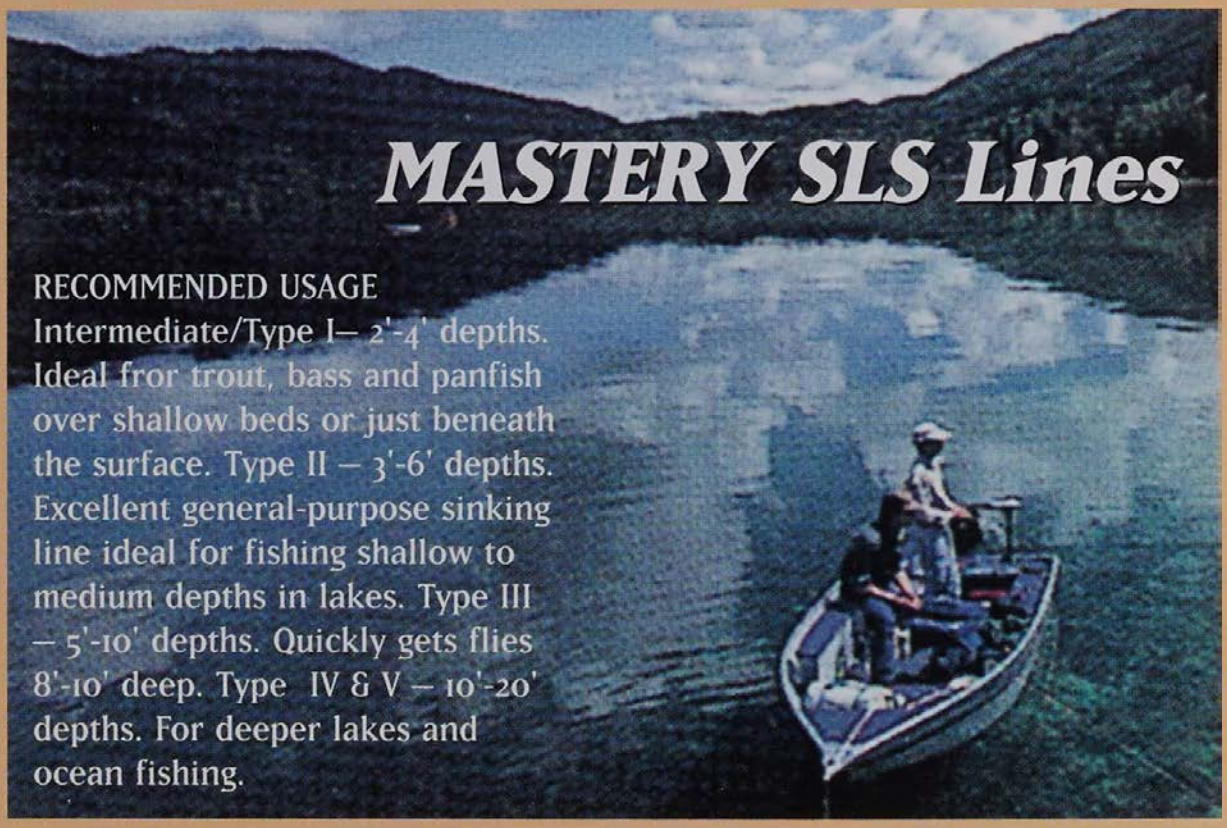

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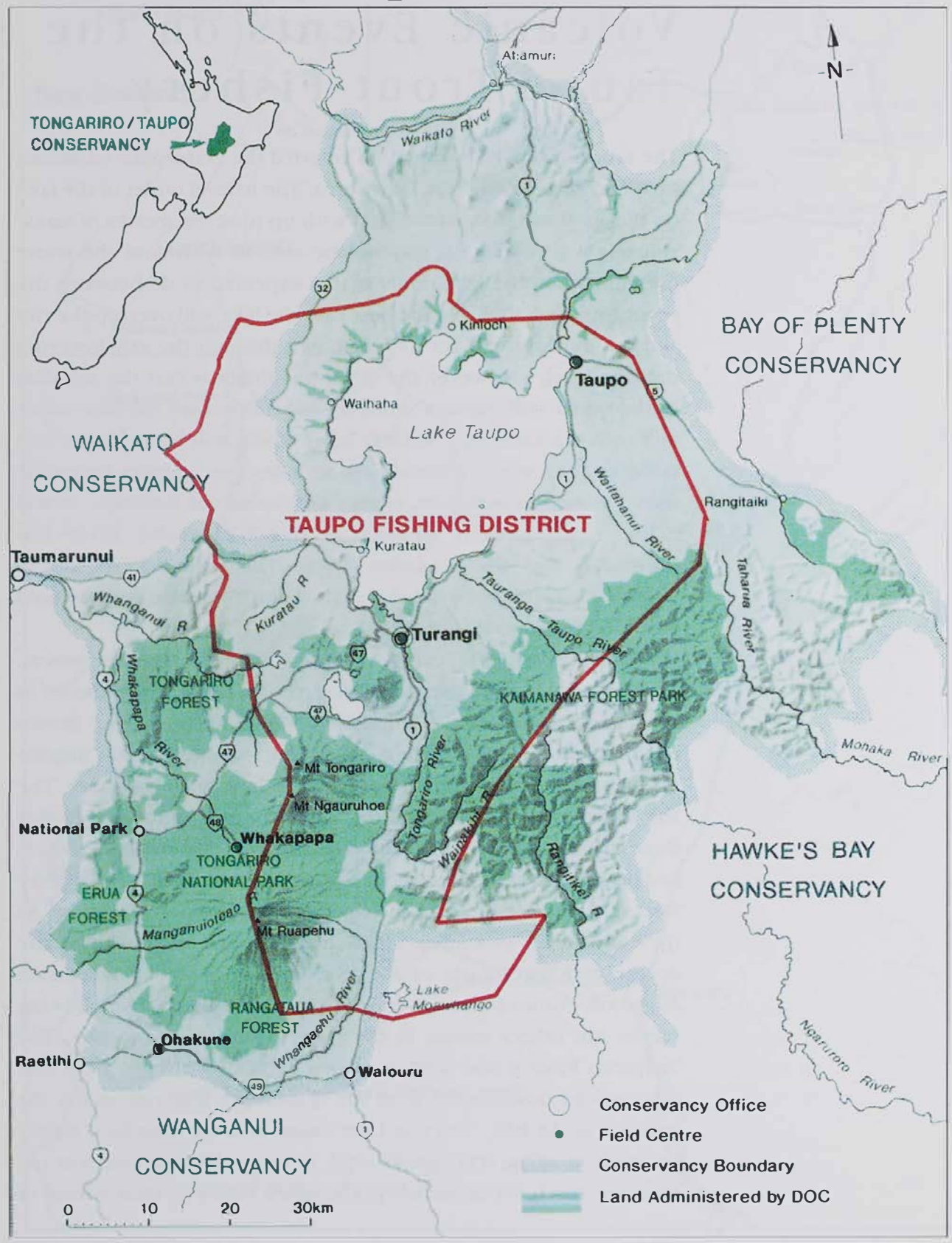
Tongariro/Taupo Conservancy

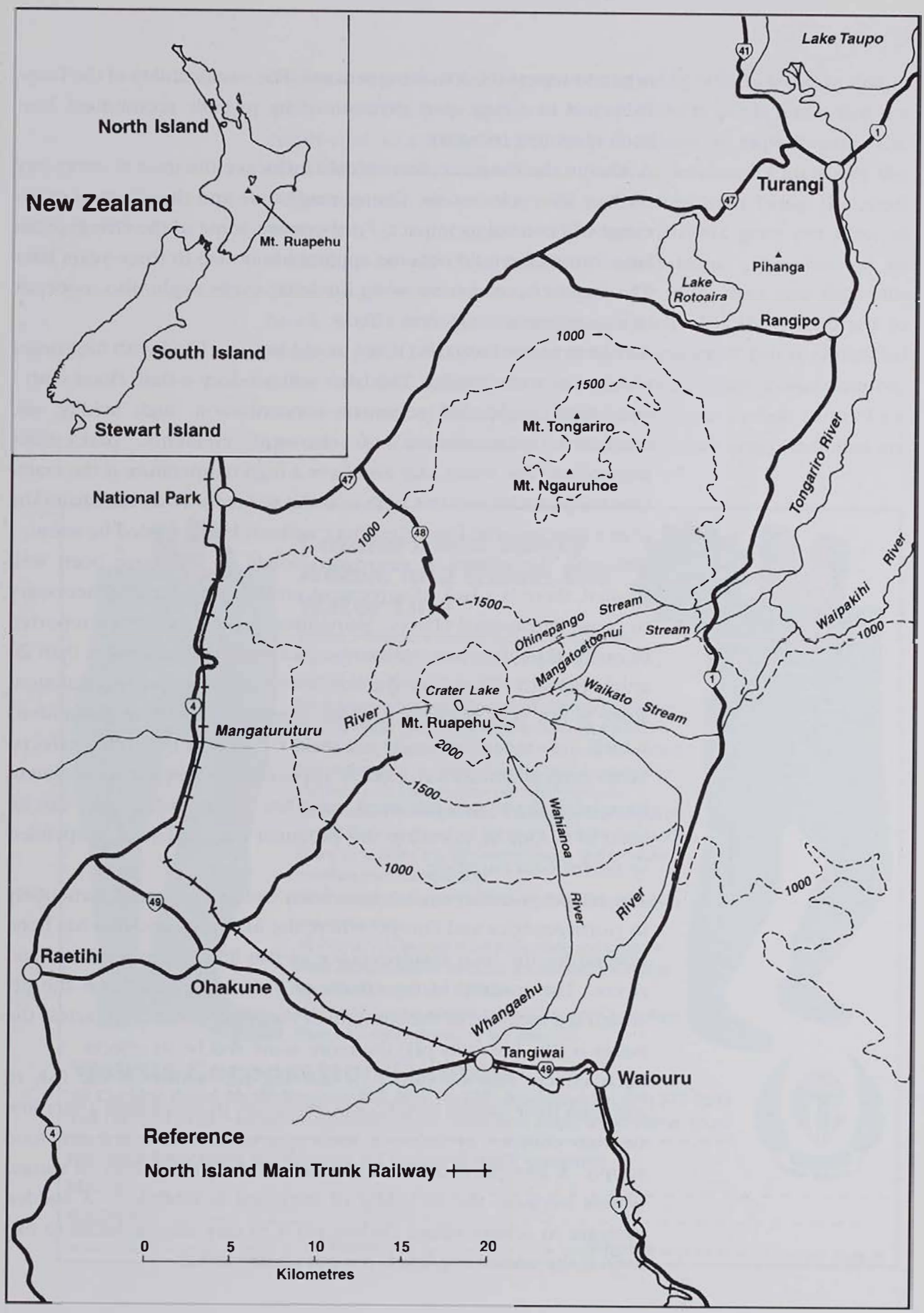


Potential Effects of Volcanic Events on the Taupo Trout Fishery

by Michel Dedual and Errol Cudby

The eruptions of 1995 and 1996 emptied the crater lake on Mount Ruapehu and changed the crater area. The natural outlet of the lake on the southern side was infilled with up to seven metres of sandy volcanic ash. This ash may not be able to withstand the water pressure when the lake refills as it is expected to do between the years 2000 and 2005. In the best case the lake will overtop the rim and the outflow will cut its way down through the ash, lowering the lake level. However, the other possibility is that the ash dam in the outlet will rupture suddenly. If this occurs the lake water will rush out, creating a sizeable lahar which will hurtle down into water courses where it could have serious consequences for public safety as well as transport, energy and industrial facilities. It will cause environmental damage in the Whangaehu River but potentially also the Tongariro River. This article looks at the potential effects that a lahar reaching the Tongariro River would have on the Taupo fishery.

Firstly, it is necessary to review the trout life cycle in this river system. The Tongariro River and its tributaries provide the greatest amount of spawning habitat for Lake Taupo brown and rainbow trout. Brown trout migrate from March to June but rainbow trout migrate throughout the year with a peak between June and September. The fish larvae start to hatch from the eggs deposited in the gravel after three to four months of incubation depending on water temperature, and hatching peaks in December. The limited swimming ability of fry forces them to use the slow and shallow parts of the river to grow. As they grow their swimming ability increases and they colonise the deeper and faster parts of the river with an overall downstream migration. Some of these juvenile fish reach the lake by the following winter but others remain in the river for up to 18 months. The Tongariro River is also used as rearing habitat by juvenile trout that have moved downstream from the spawning tributaries and is the corridor to the lake. Once in Lake Taupo, juvenile trout feed mainly on smelt, growing very rapidly until, as rising three or four year old fish, they reach sexual maturity. They then return to their stream of


North Island
New Zealand
Mt. Ruapehu
South Island
Stewart Island
Lake Taupo
41
1
Turangi
47
Pihanga
Lake Rotoaira
Rangipo
1000
1500
Mt. Tongariro
Mt. Ngauruhoe
Tongariro River
National Park
47
48
1000
1500
Ohinepango Stream
Mangatoetoenui Stream
Waipakihi River
1000
Crater Lake
Waikato Stream
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4
Mangaturuturu River
Mt. Ruapehu
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1500
Wahianoa River
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River
1000
49
Raetihi
Ohakune
Whangaehu River
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Waiouru
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North Island Main Trunk Railway
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Kilometres

origin to repeat the spawning process. The sustainability of the Taupo fishery is in a large part determined by juvenile recruitment from each spawning tributary.

A lahar in the Tongariro River would influence the trout at every step of their life cycle but the timing, magnitude and the duration of the event will control its impact. Furthermore, some of the effects of the lahar on trout would become apparent only two to three years later. The weather pattern following the lahar event might also moderate or exacerbate its long-term effects.

Any lahar in the Tongariro River would be associated with four major changes in water quality. The lahar will produce a flash flood with a very high suspended sediment concentration, high acidity and increased concentration of chemical elements, particularly aluminium. The water may also have a high temperature if the crater lake temperature remains high or if the water flows directly from the crater lake into the Tongariro River without being cooled by snow.

Although the effects of suspended solids on fish have been well studied, there is a lack of agreement on the concentration necessary to cause detrimental effects. Mortalities of trout have been reported to occur though, when sediment concentrations are greater than 20 grams per litre. However, the concentration of suspended sediment alone is not very relevant, it is the dose (concentration x duration) which is more strongly correlated with negative effects. Mathematical simulation models applicable to suspended sediment have been developed but need some fine tuning before they can be used as a tool in assessing the potential effect of high suspended sediment concentration.

The effects of acidity on fish have been well documented particularly in North America and Europe, where the infamous acid rain has been blamed for the total disappearance of fish life from many lakes and rivers. The severity of the effects on fish is dependent on the pH which is a measure of the strength of the acidity. The more acidic the water is (the lower its pH) the more acute will be its effects.

Such effects may be direct by altering the ability of the fish to maintain their natural metabolism, especially in water with a very low calcium content, or indirect, such as arising from a reduced food supply. A low pH causes a reduction in the productivity of natural waters because the recycling of nutrients is inhibited. A sudden increase in acidity values (below pH 4.5) may also be lethal to fish even if the underlying levels are not usually lethal.

Overseas surveys of fish populations in acidic waters indicate that in many cases there are apparent harmful effects at pH levels that are considered acceptable on the basis of laboratory experiments. The cause of this extra toxicity arises from the leaching of metals by the acids from the underlying rock, with aluminium being the most important. A concentration of 200μgL^{-1} (0.0002 gram per litre) of aluminium at pH 5 is lethal to brown trout. Exposure to an aluminium concentration of 225μgL^{-1} for more than two days kills brook trout. Maximum aluminium toxicity has been reported to occur at pH 5.2-6.0. At lower pH the mortality of fish is controlled more by the acidity than by the aluminium concentration. Concentrations of fluoride on dissolved organic carbon can reduce the toxicity of aluminium by forming aluminium complexes that are

less toxic. Generally fish sensitivity to acidity decreases with age whereas sensitivity to aluminium increases with the age of the fish.
Trout have had to cope with volcanic hazards since almost immediately after their introduction to Taupo waters at the turn of last century. It is interesting to see that some eruptions, particularly those accompanied by lahars which contaminate the rivers, were generally much more dramatic for the fish life than others. Let's have a look at what effects on fisheries have been recorded in previous volcanic eruptions.

1895

"On 10 March 1895 the crater lake erupted violently. At about noon a column of steam rose to 5000 feet above the summit. The contents of the lake were ejected and vast torrents of mud (lahars) and water ran down the mountain sides. Great quantities of volcanic sand and gravel were cast out and rocks of half-ton weight were thrown in a north-easterly direction for four miles. The Wanganui River was discoloured down to the sea. The Mangatoetoenui became for a while a mere sludge channel. The Whangaehu was for several days a river of mud of the consistency and colour of thick gruel. On 5 April the lake was 10 to 12 ft lower than a year earlier." (Gregg, 1961.)
This eruption undoubtedly affected the Tongariro River via the Mangatoetoenui and Upper Waikato streams. It has been suggested that this eruption may have helped the rainbow trout, which were first released in the Waikato headwaters in 1898 to more easily establish themselves in Lake Taupo in the absence of competitors and predators.

1945

In 1945 vast quantities of ash were erupted and later washed into water courses. There are no records of any immediate toxic effects on the fish population. However, the long-term effects were severe and for many years a very valuable angling area was ruined. The ash was conveyed into the Tongariro River system, both directly during the eruption and for many years afterwards during summer thaws. Ash blanketed the river bed immediately upstream of Lake Taupo. This seriously affected smelt spawning, diatom growth and invertebrate production and consequently the production of young trout in the Tongariro River. The ash brought down by the Tongariro

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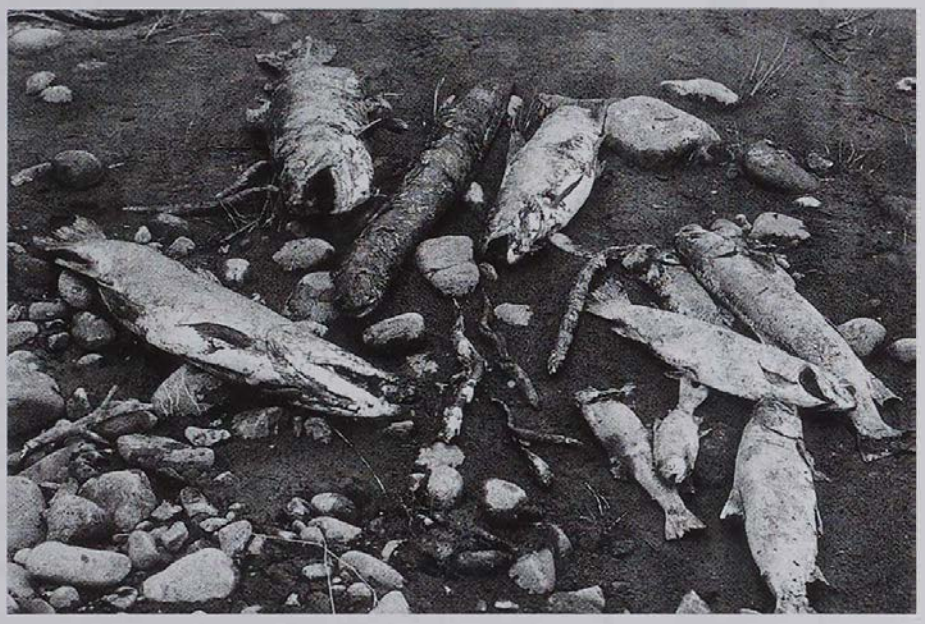


Photograph 1: Dead trout and eels recovered along the Whanganui River following the eruption in June 1969. Note the open mouth of the fish, indicating an intense seizure before dying

River slowly diminished until the infamous 1958 flood which again increased the load carried by the river.

1969

Reports mention that lahars affected the Whangaehu, Whakapapanui, Whakapapaiti, Whakapapa, Mangaturuturu, Manganuiateao and Wanganui rivers and that the ashfall occurred in a north-westerly direction. In the Whakapapaiti Stream sand was deposited on the river bed to a thickness of 1m. The level of the Whanganui River at Taumarunui rose 0.6m and 150mm of sand were deposited. Two days after the eruption, ash from the Top of the Bruce area was analysed with a water leachate which measured as pH 4.4, arsenic 400μL^{-1}, fluoride 6mg/l. The Whakapapanui Stream at the Chateau was analysed at the same time giving pH 5.3, arsenic <0.01mg/l, fluoride <0.5mg/l.
Dead brown and rainbow trout ranging from fingerlings to fish of 2kg were found along the Whakapapa and Whanganui riverbanks to 25km downstream from Taumarunui. Dead eels from 100mm to 1m in length were also found in this area. At Taumarunui a dead trout or eel was recorded each 1.2m on average along the riverbanks. Similar effects were reported from the Manganuiateao River.

1974

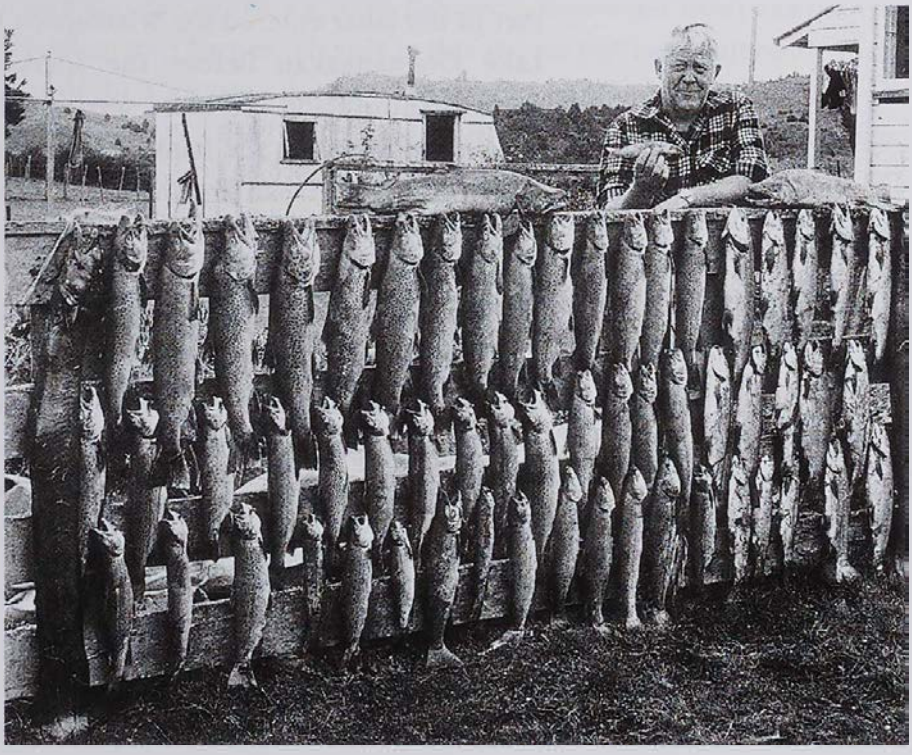
This year it was the turn of Mount Ngauruhoe to erupt and ash discoloured the Mangatepopo and Whanganui Streams and intakes of

the Western Diversion of the Tongariro Power Development (TPD) scheme were closed to prevent fish being affected in lakes Otamangakau, Rotoaira and Taupo. Both streams were "black with ash". pH remained above 7 and no dead or distressed fish were seen.

1975

The Mount Ruapehu eruption in April 1975 was the largest single eruption whose effects have been monitored. At least 1.6 million cubic metres of crater lake water, lake floor deposits and blocks of hot rock were erupted onto the summit area, generating lahars in all catchments but particularly in the Whakapapa, Mangaturuturu and Wangaehu. All fish in the rivers that received effluent died within a short time of the lahar passing. In the Taumarunui area dead bullies, torrent fish, eels and trout were reported. Upstream of Taumarunui one dead eel was recovered per metre of the bank and 59 trout in the 1-4.5kg size range (smaller fish were ignored) were collected along one bank of 1.6km of river.

In the Manganuiateao River there was a dead trout or eel every metre along the banks at the places examined. Dead fish were found floating and washed up on the river banks in the lower reaches of the Whanganui River between the township of Wanganui and Pipiriki.



Photograph 2: Dead trout and eels recovered from the Whakapapa River in April 1975

Photograph 3: Dead eels in the Whakapapa River following the eruption in April 1975 showing the typical "caking of mud"

These included brown trout, eels, smelt, bullies, yellow-eyed mullet and sprats. The gills of trout examined were choked with silt and eroded and the mucous covering the trout and eels had formed a coating, similar to a caking of mud, which could be peeled and rubbed off. Reports were received of dead trout in the Tongariro River but no carcasses were recovered.

Part of the lahar entered the Whakapapa Tunnel, Lake Te Whaiau and Lake Otamangakau before the intake gates could be closed. Distressed trout and eels were seen in Lake Te Whaiau and two dead trout were found on the banks. There was a large concentration of trout in the Te Whaiau Stream which was unaffected. Diversion of water from Lake Otamangakau was stopped to protect Lake Rotoaira. Within six to eight hours of the eruption, pH values ranging from 1.0 (Whangaehu River) to 4.2 (Tongariro River) were recorded with most being close to pH 3. The water was also highly contaminated by aluminium. Toxic levels are likely to have persisted in the upper reaches until at least nine to ten hours after the lahar passed.

Flesh analyses from Lake Otamangakau trout, caught and killed eight days after the eruption, gave low (normal) results for the elements tested for in muscle and liver samples.

1995-96

Our water quality monitoring showed that the day after the major ash

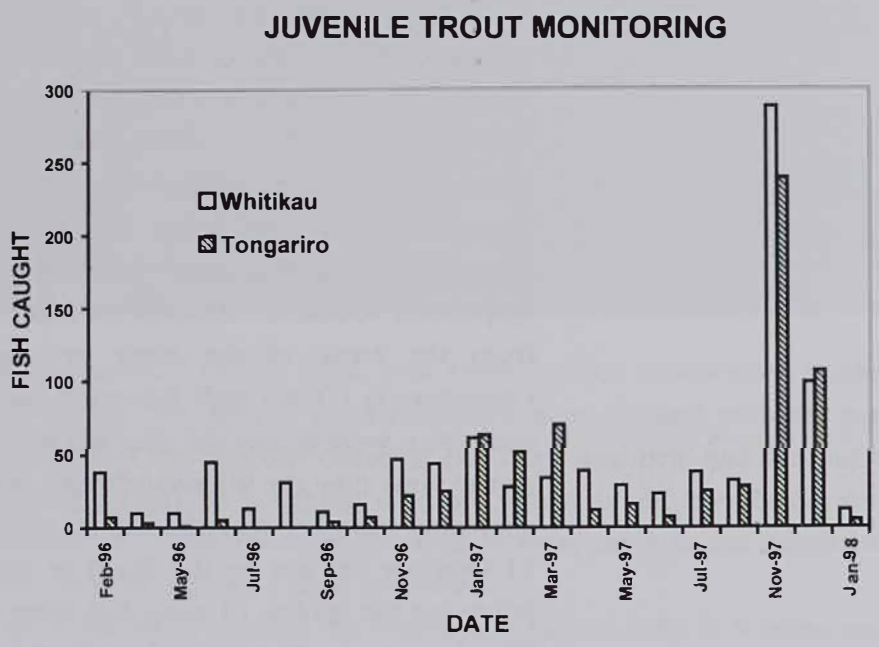
eruption of 11 October 1995 the pH of the water in the Tongariro River at the Poutu Intake was 5.76 but it had returned to 7.64 by 16 October. Further down the river at the Major Jones Pool the water had a pH value of 6.93 on 12 October and 7.34 on 16 October. For the same dates the aluminium concentration was 191 and 85μL^{-1}. The relative low acidity recorded suggested that the overall effects of the 11 October ashfall were less than those of an eruption lahar as occurred in 1975. On 28 October heavy rain remobilised the recent ash deposits, causing secondary lahars and a further input of sandy sediment in the Tongariro River. Radio-tracking of rainbow trout during October showed that the immediate response of the adult trout to the 11 October ashfall was to stop their upstream migration and move downstream (*Target Taupo*, issues 21 and 22). However, by the end of October some trout had resumed their upstream movement even though the river was still heavily loaded with suspended sediment. Around 20 adult trout were recovered dead from the bank of the river by anglers and Department of Conservation (DOC) staff following the first ashfall but no further dead trout were recovered after the secondary lahar.

At the same time the Whitikau Stream, which is the Tongariro's major spawning tributary, was affected by ashfall during the night of 10 to 11 October but not by the flood or secondary lahar. Immediately following the ashfall 14 adult fish were recovered dead against the Whitikau trap barrier. The pH in this stream behaved differently from that of the Tongariro, decreasing from 7.3 to 6.51 between 12 and 16 October 1995. On 12 October the aluminium concentration was 318μL^{-1} but on 14 October it was only 13μL^{-1}.

From our observations it appeared that the effects of the ashfall on adult trout occurred almost immediately after the 10-11 October 1995 eruption and that they were short lived. Although the exact cause of mortality has not been identified it was probably the result of exposure to aluminium well in excess of reported lethal concentrations.

The effects on juvenile trout were more severe and went beyond direct mortality caused by water contamination. Our electric fishing monitoring (see Graph 1) shows that in the Tongariro River juvenile trout use the river throughout the year. The juvenile abundance peaks between November and March and there is normally the same pattern of juvenile trout abundance in the Whitikau Stream and Tongariro River. However, between February 1996 and September 1996, when secondary lahars and sediment flushing from Rangipo

Dam continued, juvenile trout had recolonised the Whitikau Stream but not the Tongariro River. It was only after September 1996 that young fish reappeared in the Tongariro. By November 1997 juvenile trout had fully recolonised both rivers. These results suggest that although the loss of juveniles was substantial, especially in the Tongariro, the extended spawning period of Taupo trout and the resulting continual output of fry from unaffected tributaries allowed



Graph 1: Results of the juvenile trout monitoring in the Tongariro River and Whitikau Stream following the 1995-96 volcanic eruption of Mount Ruapehu. The number of trout caught is the number caught with a single sweep of the electric fishing machine over an area of 60m².

the Tongariro trout to withstand the temporary disturbance.

The fate of eggs which were still incubating in the gravel is less clear although eggs are known to be less sensitive to acidity than older fish. It is possible that in tributaries which were affected only by the ashfall, substantial egg mortality occurred but clean gravel was available and new batches of eggs could be deposited and survive as soon as the water chemistry returned to normal. In the Tongariro the egg mortality caused by water contamination was probably lower than in the Whitikau Stream but the clogging of the gravel by fine sediment following the secondary lahars may have suffocated and killed the incubating eggs. Volcanic sediment and particularly sand are still being mobilised today in some sections of the Tongariro. In these sections they still clog the river bed gravel making it unsuitable for trout spawning.

The full effects of the loss of juvenile trout caused by the 1995-96 eruptions became apparent during the 1998 spawning run. Indeed

the low catch rate measured in the Tongariro River during winter 1998 (*Target Taupo*, issue 29) strongly suggests that adult trout (which were juvenile trout in 1995 and 1996) were not as numerous as in previous years. Since trout spawn at about three years of age it is reasonable to expect a reduced run for this year as well. The extent of the reduction is, however, difficult to assess because it will be further affected by the total harvest in the lake before spawning migration starts and by the natural fluctuations in lake rearing conditions. The increase in the minimum size limit was put in place to limit the negative effects of the reduced juvenile production in the Tongariro in 1995 and 1996. If the catch rate monitored during next winter improves in comparison to 1998 it would mean that the effects of 1995-96 eruptions are over and that the new size limit was effective and achieved its objective. On a more positive note the run for the new millennium is shaping up nicely, as attested by the good number of juvenile trout present in the river at the end of 1997.

The streams flowing down the western side of Mount Ruapehu were also affected by the 1995 eruptions. On 12 October 1995 dead trout were recovered from the Mangaturuturu Stream and Manganuiateao Stream below the Mangaturuturu confluence. The same day the pH measured in the Mangatuturu was 3.2 and live drifting trout were observed gasping for air while desperately trying to avoid the water conditions.

Effects of a future lahar in the Tongariro River

The volcanic events previously recorded, our current knowledge of the trout life cycle in the Taupo fishery, and the physico-chemical conditions which would prevail allow us to assess the effects that a future lahar would have on Taupo trout. As we have seen above the effects of a lahar on the fishery will depend on the timing, the intensity and the duration of the event.

In the best case a lahar is generated but does not enter the Tongariro catchment. This has been the most common outcome over recent decades and would not affect the Taupo fishery.

Another possibility is that only a small part (up to 5% or 75,000m3) of the original crater lake water would overflow the Wangaehu River and flow into the Tongariro via the Upper Waikato River. The wave front associated with the overflowing lahar would arrive in the Tongariro approximately one hour after leaving the crater lake and peak flow would reach 50-200 cumecs shortly thereafter. The discharge would take up to an hour to return to zero. The lahar would have an initial pH of 0.63, an aluminium concentration of 2,000,000μgL^{-1}, and a temperature of up to 30°C (similar conditions as crater lake water analysed on 20 September 1995).

Assuming that the peak flow of the wave front is only 50 cumecs we estimate that during the 20 minutes following the wave, the flow in the Tongariro River would rise from 50 (mean flow with Poutu Intake shut) to 100 cumecs. The pH of the water in the river would drop from 7.3 to 0.9 meaning that within 20 minutes the water will become one million times more acidic than under normal conditions. The aluminium concentration would reach 1,000,000μgL^{-1} and the temperature rise to around 20°C. During the next 40 minutes the flow, acidity, aluminium concentration and water temperature would return to values similar to pre-lahar conditions. We are not aware of any toxicity study of such a cocktail on fish but we can safely predict

that even though the exposure time would be short every fish present in the river at the time would die almost instantly.

At any time of the year there would be juvenile trout present which would be killed, but the most severe effects would arise if the lahar occurred during late spring or summer (November to March). This is when the abundance of fry and juveniles in the Tongariro River is at a maximum. It is anticipated that the entire population of fry present in the river at the time would be lost. Furthermore, the population of adult trout in the Tongariro during this period is substantial with two distinct types of adult fish using the river: the spent fish on their way back to the lake and the "late" spawners. Previous drift dive surveys carried out at this time of the year suggest that as many as 7000 adult trout could be lost.

The least severe effects would occur if the lahar happened between April and June when the abundance of juvenile trout present in the river and the number of adults migrating towards the spawning grounds are small. We anticipate that almost all adults present would die, the only survivors being those that could immediately seek shelter in the unaffected tributaries.

In the case of a lahar hitting the river between July and October, the losses will be minimal for juvenile trout but more severe for the adults and the eggs incubating in the gravel. We can estimate that as many as 10,000 adult trout could be lost at this time.

In Lake Taupo the trout that want to return to the Tongariro system to spawn would be deterred from ascending the river only as long as the conditions are obnoxious. Therefore, the mortality amongst these trout should be negligible. However, the Tongariro River at the time of the lahar would have water warmer than the water of Lake Taupo. This would create a plume of warm water at the surface of the lake that could spread across the whole lake. If the timing of the lahar coincides with the smelt spawning period (November to March), we expect that smelt spawning would be affected to some degree.

In terms of recovery, the short duration of such a lahar event means that the Tongariro River would rebound and so would the fishery it supports. The rainfall pattern in the Tongariro River catchment following the lahar would be important in dictating how quickly the sediment trapped in the river would be flushed towards the lake and so how quickly suitable conditions redevelop for spawning, egg incubation, and juvenile trout food production and habitat. The most efficient sediment transport would be achieved by a variable flow in

the river. From our observations following the 1995 and 1996 eruptions we expect that within a year conditions would again be suitable for juvenile rearing. The fishery management has the ability to assist this recovery through the hatchery. With its protected water supply, large numbers of juveniles could be quickly reared to kick-start the fishery again.

However, some effects of a lahar hitting the Tongariro may last as long as the volcanic material remains along the river. On 1 April 1998 following a small flood in the Tongariro River, dead trout were reported and recovered from the Poutu Canal and subsequently from the banks of the Tongariro River. Twelve trout were recovered or counted in the canal and 25 from 1km of the river bank. Both rainbow and brown trout were present, ranging in size from 20cm to 60cm, and the cause of death could not be determined. However, the fish were found at the maximum level of the flood and it was apparent that the heavy rainfall on Mount Ruapehu had moved volcanic mud into the Tongariro which had been ejected during the 1995-96 eruptions from the crater lake. This suggests that ash re-suspended in water may have the potential to kill fish even three years after having been ejected from the crater. This in turn highlights the need to have the volcanic material transported right down to the lake rather than being deposited along the lower stretches of the river.

The effect of a lahar on Lake Taupo is more speculative. However we believe that the overall Taupo fishery would not be affected beyond repair by a single lahar hitting the lake. Following the 1995 and 1996 eruptions, smelt in Lake Taupo had smaller size and lower fat content, indicating the food chain was at least temporarily upset. It is interesting to note though that the excellent condition of trout caught in 1997 and particularly in 1998 suggests that trout did not suffer from the reduction in smelt condition.

In the worst case the crater lake dam collapses and the crater lake overflow becomes permanently re-routed into the Tongariro River. In these conditions the whole river system would no longer be used by trout and within three years the whole trout production of the Tongariro River would disappear. Even though the major spawning tributaries of the Tongariro River would not be affected, the adult and juvenile fish would not be able to use the river as a corridor.

The overflow of the crater lake varies according to climatic conditions and occasionally periods with no overflow would occur, mainly in winter. This means that, theoretically, adult fish could still

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run through the Tongariro and reach their home tributary and spawn successfully. However, the period without overflow needs to be at least as long as the travel time through the Tongariro River. We observed during winter 1995 that it took on average 23 days for the adult trout to travel from Lake Taupo to the Whitikau Stream. This requirement for such a long period with no crater lake overflow means that the odds of trout running successfully through the river would be remote. The progeny of any successful fish would face an even bigger task when they attempted to return to Lake Taupo as juveniles. They would need a period of no crater lake overflow between late spring and autumn when crater lake overflow is most likely. Therefore, we expect that no trout would be produced by the Tongariro River system. In the very worst case, the permanent re-routing of crater lake overflow into the Tongariro River would have sufficient impact to upset the ecological processes in Lake Taupo, making conditions in the lake also unbearable for trout. Obviously if the crater lake were to permanently flow into the Tongariro River the Taupo fishery would be only a shadow of its current self. Given the importance of the Tongariro River and the Taupo fishery it is likely there would then be considerable pressure to re-route the crater lake outfall back into its natural catchment of the Whangaehu.

Who knows what the future will bring! All that is certain is that the fishery exists amidst an active volcano area. Volcanic activity has affected the fishery before and will almost certainly affect it again.

Kaimanawa Mountain Beech - A Perplexing Problem

by Sean Husheer

A recent survey of deer impacts in Kaweka Forest Park has shown that on some sites deer browse was preventing mountain beech seedling regeneration. This means that over a period of decades (a very short time in terms of forest dynamics) large areas of tall forest were becoming head high, dense scrub. This is not a desirable situation for conservation, water quality, deer populations or hunters. A survey being undertaken of forests in Kaimanawa Forest Park this summer aims to determine if sika deer are having a similar effect on the regeneration dynamics of mountain beech forest in this area.

The problem is a perplexing one, and raises many questions. What level of impact are deer having? Why is the impact greater on some forest types and sites than on others? What does the future hold for Kaimanawa mountain beech forest? What effect will the phenomenon have on sika deer hunting over the next few decades? In this article the general biology of mountain beech and issues specific to Kaimanawa Forest Park will be discussed.

The southern beeches are found in South America, Australia, Tasmania, Papua New Guinea and New Caledonia, as well as four species in New Zealand. There are even fossil remains in Antarctica. Their distribution is clearly related to continental drift and the ancient super continent Gondwanaland. Southern beeches have been evolving in isolation from their northern, deciduous relatives for many millions of years and are now quite different.

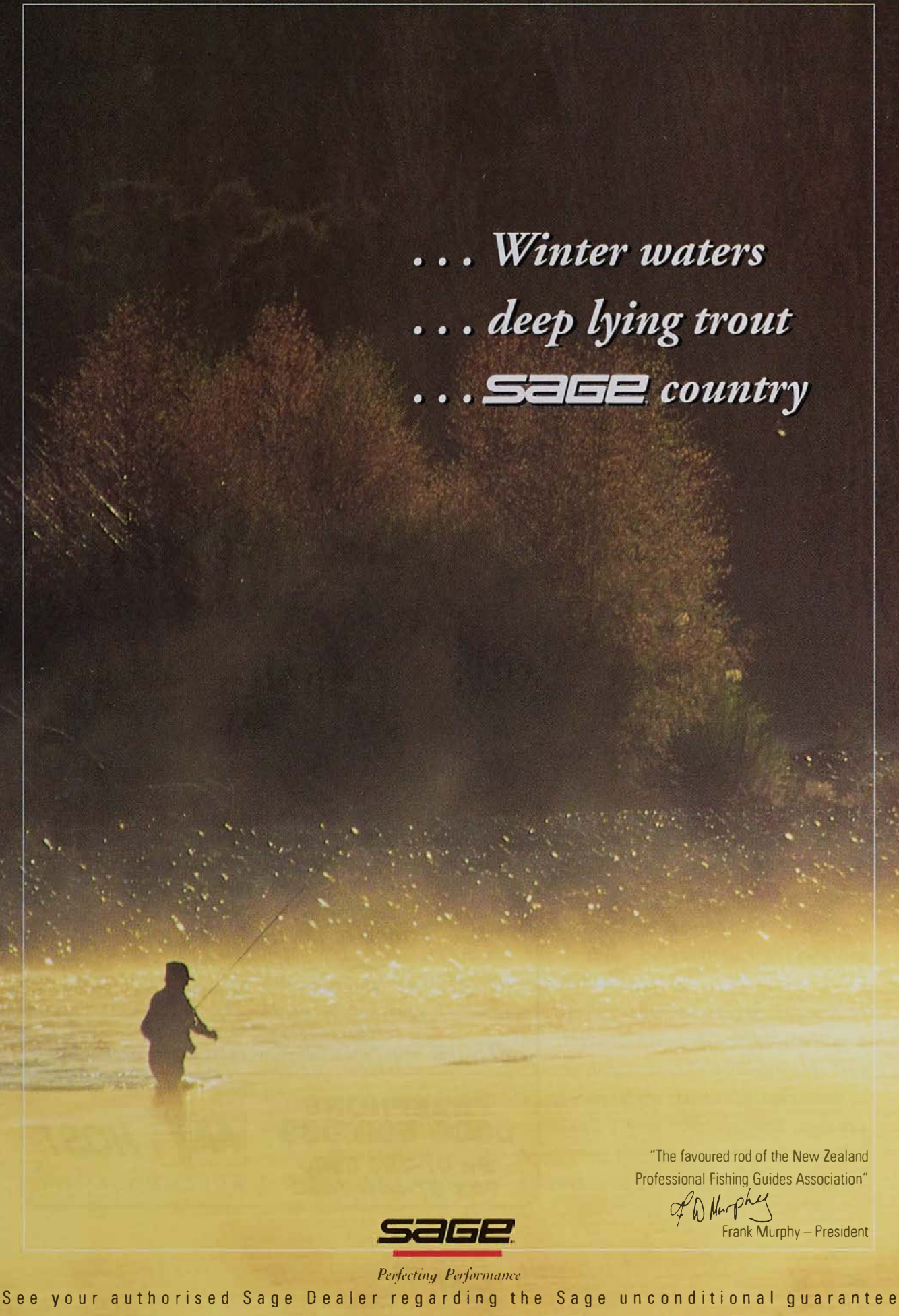
Beech is special among New Zealand trees, having a combination of small, hard leaves and unisex wind-pollinated flowers. They have relatively fast seedling growth in high light conditions, and a dependence on mycorrhizal fungi through small rootlets. This relationship with fungi allows beech to more efficiently obtain nutrients in low fertility soils.

Mountain beech forest occurs over most of the Kaimanawa and Kaweka Forest Parks, forming a pure forest over large areas, especially between 1100 metres and the upper timberline. For example, mountain beech dominates the southern Kaimanawas which are cold

and dry, being in the rain-shadow of Mounts Ruapehu, Tongariro and Ngauruhoe. The under-storey is often simple and usually includes *Coprosma parviflora,* three-finger (*Raukaua simplex*), broadleaf (*Grisilenia litoralis*) and snowberry (*Gaultheria antipoda*). Stinkwood (*Coprosma foetidissima*), *Leucopogon fasciculatus* and *Cyathodes juniperina* are also important below 1100 metres but are replaced by *Coprosma pseudocuneata* and mountain celery pine (*Phyllocladus asplenifolius var. Alpinus*) higher up. The mosses *Dendroligotrichum* (giant moss) and *Dicranoloma* may cover the forest floor on wetter sites. Higher altitude mountain beech forest is often prime deer habitat and one of my favourite places to go hunting. Because of higher deer abundance in this more fragile montain forest, deer impacts can be more dramatic here too. At heavily impacted sites beech seedlings are often dramatically hedged and a browse-resistant turfy layer has developed. This turfy layer comprises many grass and herbaceous species.

During this summer, teams of volunteers and DOC staff have collected information on the forest composition in the Kaimanawas as well as various environmental parameters, in order to determine if the same regeneration failure is occurring as in the Kawekas. This entails measurement of 20 by 20 metre forest monitoring plots scattered around the Kaimanawas and also the environmental parameters at each site. Environmental parameters that are likely to be important include soil nutrient status, altitude, rainfall and total solar radiation received. This data will be analysed as part of a PhD study in collaboration with Massey and Lincoln Universities and Landcare Research.

Compared to a lot of areas in New Zealand, Kaimanawa Ecological District vegetation (which includes Kaweka and Kaimanawa Forest Parks) is not particularly outstanding. There are few native species that are found only here. It does not have the stunning rata stands of Westland, the diverse tussock grasslands of the Moawhango, or Campbell Island megaherbs or Pureora podocaps. But to people like me, who have grown up in the central North Island beech forests, it has a special charm. The Kaimanawa has beautiful examples of dense stands of tall beeches, branches dripping moss and long, deep valleys reminiscent of the South Island. It is worth looking after for future generations. Once data from the summer survey is analysed and written up managers will have better information on which to base decisions so that Kaimanawa forests can be looked after sustainably.



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For example, if recreational hunting is to contribute to forest conservation, managers must have a complete understanding of the complex relationship between deer and forest vegetation. This includes an appreciation of natural irregularities in forest dynamics and an understanding of acceptable limits of deer impact. Definitions of an acceptable limit of deer impact are open to debate. At one extreme some argue that no impact should be tolerated, while at the other extreme, others argue that any impact can be tolerated. In the end, some sort of compromise may have to be made. This survey will help to ensure that such decisions are based on high quality information.

Development of the Tongariro National Trout Centre

by Glenn Maclean and Herwi Scheltus

As discussed in recent issues of Target Taupo the Department of Conservation has been producing a master plan to guide the development of the Tongariro National Trout Centre (NTC) into the new millennium. This plan, which is now complete, has been endorsed by the NTC Trust and work on the first projects is underway. The plan covers the next decade and it is intended that new projects will be undertaken each year so that the facility continues to develop. However, to mark the start of the development, several major projects are planned for this year.

The Master Plan

First and foremost, the facility is what we might term the ambulance at the bottom of the cliff. As a hatchery, it needs to be in a state of readiness should the unexpected occur. Should the Taupo fishery suffer a catastrophic event the hatchery can be used to rear large numbers of young trout to kick-start the fishery again. Such events, while unlikely, are quite conceivable. For example, a lahar from the Mount Ruapehu crater lake wiping out trout production in the Tongariro River, as discussed in Michel Dedual and Errol Cudby's article. While with time nature would inevitably repair the damage and the fishery rebound, we must acknowledge that the Taupo fishery is essential to the local community for all sorts of reasons which would necessitate intervention to hasten the recovery. So whatever development occurs on the site it must be such that it does not restrict the use of the facility as a hatchery.

However the natural qualities of the site, situated as it is adjacent to State Highway 1 and beside the Tongariro River, also lends itself as a place to visit to learn about the Taupo fishery and its management. This advocacy role should be an integral part of the day-to-day operation of the facility. Currently 50,000 visitors a year visit the NTC and the master plan concentrates on developing the site, in terms of both the facilities and the operational procedures so as to maximise this role.

The objectives of the plan are to develop a facility to provide:

- information of interest and practical value to anglers and the public about the Taupo fishery including its ecology, history, and use
- a picture of the Department's fishery management and research activity
- an educational role to inform young New Zealanders about the freshwater environment and trout fishing.

Within these objectives four basic principles to guide future development have been identified. These principles are:

1 *To keep the development of the site in scale with the intimate setting and where possible let the natural qualities of the site dictate the style of the displays.*

2 *That there should be no commercial development below the escarpment but there is the opportunity for sponsorship.*

3 *That an entry fee be charged and that the Department provide a quality experience in return.*

4 *That there is an opportunity to provide interpretation on wider conservation issues.*

In keeping with these objectives and guiding principles, the following development plan has been adopted.

Figure 1 illustrates the proposed layout of the NTC grounds. The numbers relate to specific projects which are described below. In some instances the work to be carried out is quite straightforward and little further detail is required. Several other projects though, such as the aquarium, are complex and require a great deal of further work to turn the concept into reality. As well as the improvements to the facilities there are also significant operational changes identified.

Operational Changes

Entry fees and opening hours - The NTC will open between 10 a.m. and 3 p.m. each day. During this time all of the facilities will be open, staff will be on site and available to the public and no activities will be undertaken, such as lawn mowing, which are inappropriate to the overall visitor experience. As the development progresses and there is more to see, a small fee will be charged. Outside of this period the

gates may be open and no fee will be charged. However, visitors take their chances and it is likely that some of the facility will be closed and staff busy with those activities that cannot be done between 10 a.m. and 3 p.m.

Roving ranger - A staff member will be readily available within the grounds to answer visitors' questions. They will be based in the building beside the children's pond, but when around the grounds will be easy to approach or to contact via a simple paging system.

Teacher - In the first instance an application will be made to employ a suitably qualified teacher under the Learning Experiences Outside the Classroom (LEOTC) programme administered by the Ministry of Education. This person will be based at the NTC and undertake three

roles. Firstly, they will interpret and instruct school groups that visit, secondly they will develop packages on the freshwater environment, trout and fishing which can be distributed to schools, and thirdly they will assist with the development of educational facilities around the grounds.

Vehicles - Cars and trucks within the grounds are not in keeping with the tranquil setting. Instead staff will use an electric cart to move around.

Changes to the Grounds and Facilities

Note the numbers beside each heading refer to the numbers shown on figure 1.

1 **Car park and entrance** - An application will be made to Transit New Zealand to erect a large direction sign on State Highway 1 indicating the entry to the car park. At the start of the walking track down the escarpment an entry sign will inform visitors about the walkways and activities, picnic areas and the need

to pay an entry fee. The sign will include a brochure rack so that visitors can take a brochure outlining the path to follow.Low level lighting will be erected along the pathway for use when the facility is open for special functions at night.

2 **Entry gate over the Waihukahuka (hatchery) Stream** - This will be an automated gate which will require the insertion of coins to open between the hours of 10 a.m. and 3 p.m. Outside this period entry will be free.

3 **Stripping pens** - These pens are used to hold mature trout in the Waihukahuka Stream prior to stripping them to obtain fertilised eggs for the hatchery. These pens will be reconstructed to improve their effectiveness and designed so that upstream migrating fish can be trapped in the slot between the pens. Fish suitable for stripping can then be transferred across into the holding pens rather than having to transport fish from one of our other fish traps.

4 **The hatchery building** - This building will be maintained as a hatchery in an immediate state of readiness. All of the incubation trays, rearing pens and associated equipment will be laid out ready should the fishery ever need to be re-stocked. However, because in the course of a normal year we rear only a few thousand fish for the children's pond there will not be a lot of activity to see. Displays will explain this and how trout are reared in a hatchery.

5 **Aquarium site** - This is intended to be one of the highlights. One of the advantages of this site is a constant supply of clear, cold water and a natural setting amongst the ferns and streamside bush. Rather than a series of tanks along a wall this aquarium will be a much more encompassing experience where the visitor walks within and under the tank which nestles amongst the vegetation complete with the sound and smell of the stream. It will require a lot of planning and design to achieve the desired result and this will come at a considerable cost. The tank or tanks will display fish and aquatic plants which occur in the central North Island rather than species from elsewhere.

6 **Fish ladder and pond** - One of the criticisms of the NTC in the past has been that depending on the time of the year people visit, they have not seen any trout. Such is the nature of a wild fishery where the fish are free to come and go. One of the key messages we are trying to get across is that the Taupo fishery is a wild fishery which is sustained by natural spawning in streams like the

Waihukahuka. The fish you see are no different, either in size or numbers, from what are present in similar streams throughout the fishery or what you can expect to catch. However, to try and ensure some fish are present year-round we are re-installing the dam that used to exist on the Waihukahuka Stream. The pond created makes an ideal picnic site and regular feeding of the fish will ensure that there are always fish to see.

The development of the pond is already underway and a consent for the pond has been obtained from Environment Waikato. In early December the vegetation was cleared and the pond filled and already it is looking attractive and fish are taking up residence. If approached quietly these fish will take food thrown to them.

At the dam wall a fish ladder has been installed to provide trout passage to the spawning areas upstream. A viewing platform is currently being designed and will be built shortly. Displays will interpret how the ladder works as well as the administrative procedures which under the Resource Management Act one must go through in order to dam or divert a stream.

7 **Staff quarters, office/service area** - This area will be screened off by planting from the rest of the NTC and accessed from the old entrance way off State Highway 1. The gate will be moved out close to the highway and public access restricted. This is where staff live and will also be the site where repairs and maintenance are undertaken and equipment and chemicals stored, and it is not appropriate the public wander around in this area. We are making a commitment to have a staff member available within the public area and staff within the restricted area do not expect to be disturbed without prior arrangement.

8 **Workshop** - It is not appropriate to have the existing workshop in the middle of the visitor area. This function will be moved into the restricted area described above. The building will then be stripped and relined to become a "dry display" area. This may include an angling museum, auditorium, teaching room and an area for management-related and other displays. The building needs to be soundproof and secure and could be extended to the north and east.

9 **Raceways** - These are retained in case they are needed for fish production. We need to also explain why they are empty. Rearing of some fish is necessary for the children's pond and it is possible to

stage this so that there are always a few fish present in the hatchery and raceways.

10 **Smokehouse** - This is close to the site of the original smokehouse which was used by people staying in the anglers' camp many years ago. Half of the smokehouse would be built as a prop so that visitors could see inside and also how it functions. The other half would be a real smokehouse complete with the smell of burning manuka sawdust and smoking trout.

11 **Riverside tracks** - The July floods last year washed away large areas of the river bank, and with it most of the walking track along the river. This is likely to be an ongoing problem. However people want to walk along the river and the most appropriate route is close to the edge. We therefore are reinstating the track close to the river

accepting that occasionally it will flood and be damaged. The track needs to be constructed so that it is cheap and easy to repair. This in turn provides an advocacy opportunity to highlight working with the river rather than trying to dominate it.

12 **Historic angler's hut** - This is a link back to the anglers' camp which used to exist on the site. The 1930s period hut will be constructed and fitted out complete with anglers' tackle of the time. The room will be viewed through a front window with no internal access to the display. It will be built on high ground above the level of the July 1998 floods.

13 **Extension to the Tongariro River walk** - This extension will add approximately 15 minutes to the river walk and take the visitor to the confluence of the Waihukahuka Stream and the Tongariro River before looping back past the children's pond. People will have the option of taking this extension or using the existing track to return to the pond. To improve the flow of visitors all other existing tracks will be dug up and replanted.

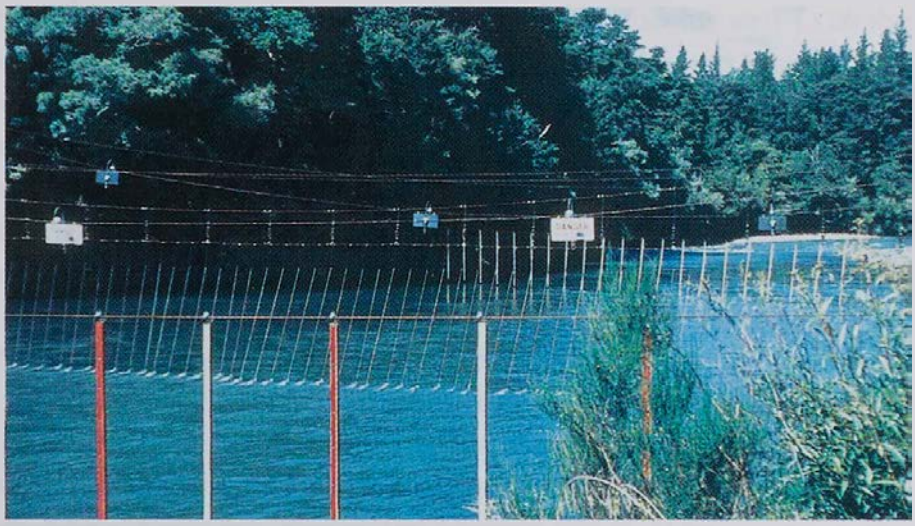
Work on repairing and rationalising the tracks and constructing the new track is already well advanced. Inmates from the Department of Corrections have been working on these, with occasional assistance from a local contractor using a bobcat digger. The new tracks are being built using compacted pumice and crusher dust which provides a hard-wearing surface but which can be easily repaired at low cost.

14 **Flood level marker** - A marker recording the height of the different flood events will be erected. Presently the levels of the two July floods are recorded on the wooden bridge at the southern end of the river walkway. This will provide a means of comparison with future flood levels.

15 **Electric fish barrier and counting chamber** - In the late 1960s an electric fish barrier was constructed across the Tongariro River to divert migrating trout into a concrete chamber situated in the hatchery grounds. The chamber contained an electronic fish counter and the intention was to obtain an annual estimate of the number of trout migrating through the river so that any effects from the construction of the Tongariro Power Development (TPD) could be measured.

The battleship chain which was used as the earth strap along with the chamber and hardware are still at the NTC and attract comment from

Photograph 4: The electric fish barrier in place across the lower Birch Pool in the late 1960s. An interesting obstacle for any other users of the river



anyone who sees them. It is planned to re-create in part the barrier and counter as a display.

16 **Hatchery trap** - The hatchery fish trap was installed in 1963 and operated until 1995. It was used to monitor the run of spawning trout in the Waihukahuka Stream and also to trap fish from which eggs were obtained for the hatchery. Fish traps on the Waipa Stream (a tributary of the Tongariro River) and Te Whaiau Stream (Lake Otamangakau) are essential tools in the management of the Taupo fishery and by re-installing this trap we can demonstrate a working trap in operation.

17 **Fish passage through a culvert** - Numerous roads cross the spawning tributaries which sustain the Taupo fishery. If fish are unable to get through the road culverts they lose access to what may be large areas of otherwise suitable spawning water. As part of managing the fishery a lot of effort is put into checking that fish passage is not impeded. One tool that is regularly used is to place baffles within the culvert. This is used when either the velocity through the pipe is too great for the fish to negotiate or the water depth is too shallow. It is planned to install a working example of an instream fish passage structure above the trap site where a high bank provides an ideal site from which to look down into a half pipe fitted with baffles.

18 **Children's fishing pond** - This pond was originally built to act as a settling pond into which water from all of the hatchery raceways and ponds flowed prior to being discharged back into the Waihukahuka Stream. Built by members of the Corrective Training Institution it was also

an ideal facility around which to base the children's fishing days. These have become an integral part of the NTC operation. They are great fun for children but also provide a valuable opportunity to pass on important messages about trout fishing. However, over time, the days have become so popular that sometimes the only way volunteers can get all the children through is to restrict their experience to little more than reeling in a hooked fish. The experience should offer more than this. We believe the only way to achieve our objectives is to limit the number of children so that sufficient time can be spent with each child. We can also make much more use of the whole NTC facility in this regard. Once we have a teacher on site there is the opportunity to develop class units on trout and trout fishing which could culminate in a visit to the NTC. Catching a fish from the pond may well be the main attraction but while the children are in the grounds they will also be taken through the other displays and receive a talk from the teacher or other staff. (See Something Fishy for the dates of the children's fishing days this winter and changes to how they will be run.) The new kiosk will be the centre of the fishing activity and the surrounds of the pool separated off with a low fence to control the movement of people. This should remove the risk of someone being accidentally hooked on a back cast and assist the flow of children on busy days.

19 **Fishout kiosk/front desk** - Previously a tattered old caravan served as the working space for the volunteers assisting with the children's fishing days. This will be replaced by a kiosk set back in the trees. The building will also serve as a front desk for the staff member on duty. Visitors will be able to ask questions and talk with this person or if the staff member is absent there will be a system to locate them in the grounds.

20 **Lunch shelter** - Occasionally a visit by a group of school children coincides with a rainy day and they need somewhere to shelter while they await their turn beside the fishing pond or eat their lunch. It is therefore proposed to build a simple shelter open to the sides and with seating.

21 **Underwater viewing chamber** - The underwater viewing chamber was built by the Turangi Lions Club in 1983 and has proved to be one of the highlights for visitors to the NTC. However in major floods, such as the two which occurred last July, the chamber fills up with water which must then be pumped out. Drying the structure is difficult, taking many months, and as a consequence the building above

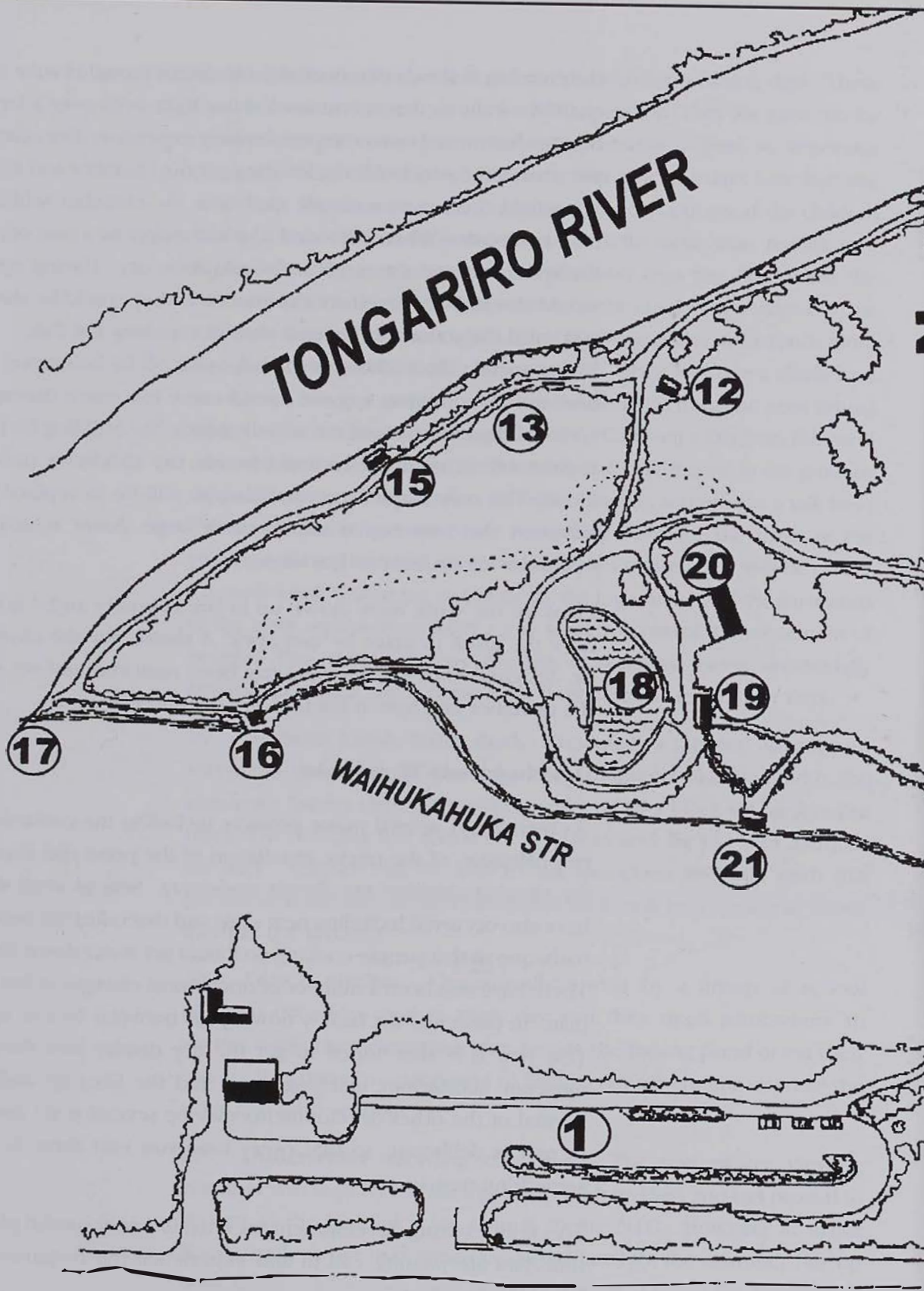
the chamber is slowly deteriorating. Our initial thoughts were to lift the chamber walls so that it remained water tight even over a large flood but this has turned out to be prohibitively expensive. The other option we considered was to lift the building off the chamber and relocate it. We would then erect a simple roof over the chamber which would have open sides. When it flooded it would simply be a case of pumping the water out and the structure would soon dry. Having open sides would also add to the visitors' experience as they would be able to hear and smell the stream at the same time as watching the fish.
Unfortunately the building is too big to lift off by helicopter without dismantling and using a crane would cause too much damage to the surrounding site. Instead we will dismantle the building by hand and re-assemble it amongst the trees beside the children's pond as the kiosk. The only major structural change will be to replace the wall between the two bay windows with large doors which can be opened wide on busy or hot days.

Plans for the work were drawn up in late February and it is hoped to have the kiosk in place by mid-April. A shelter for the chamber will be designed once the building has been removed and we can view the chamber and how it fits into the surrounding site.

Development Timetable

As mentioned, several major projects, including the construction and rationalisation of the tracks, installation of the pond and alterations to the viewing chamber are already underway. Several small alterations have also occurred including new signs and extending the roof over the barbeque so that people cooking no longer get water down their backs. There have also been a number of operational changes in line with this plan. In particular the facility now opens between 10 a.m. and 3 p.m. This year it is also hoped to get the dry display area (housing the museum, auditorium, teaching room and the like) up and running. Several of the other developments may be several years away, which in part is deliberate, so that every time you visit there is hopefully something new to see.

This is an exciting development for what is a very special place. Next time you are passing, call in and experience the Tongariro National Trout Centre.



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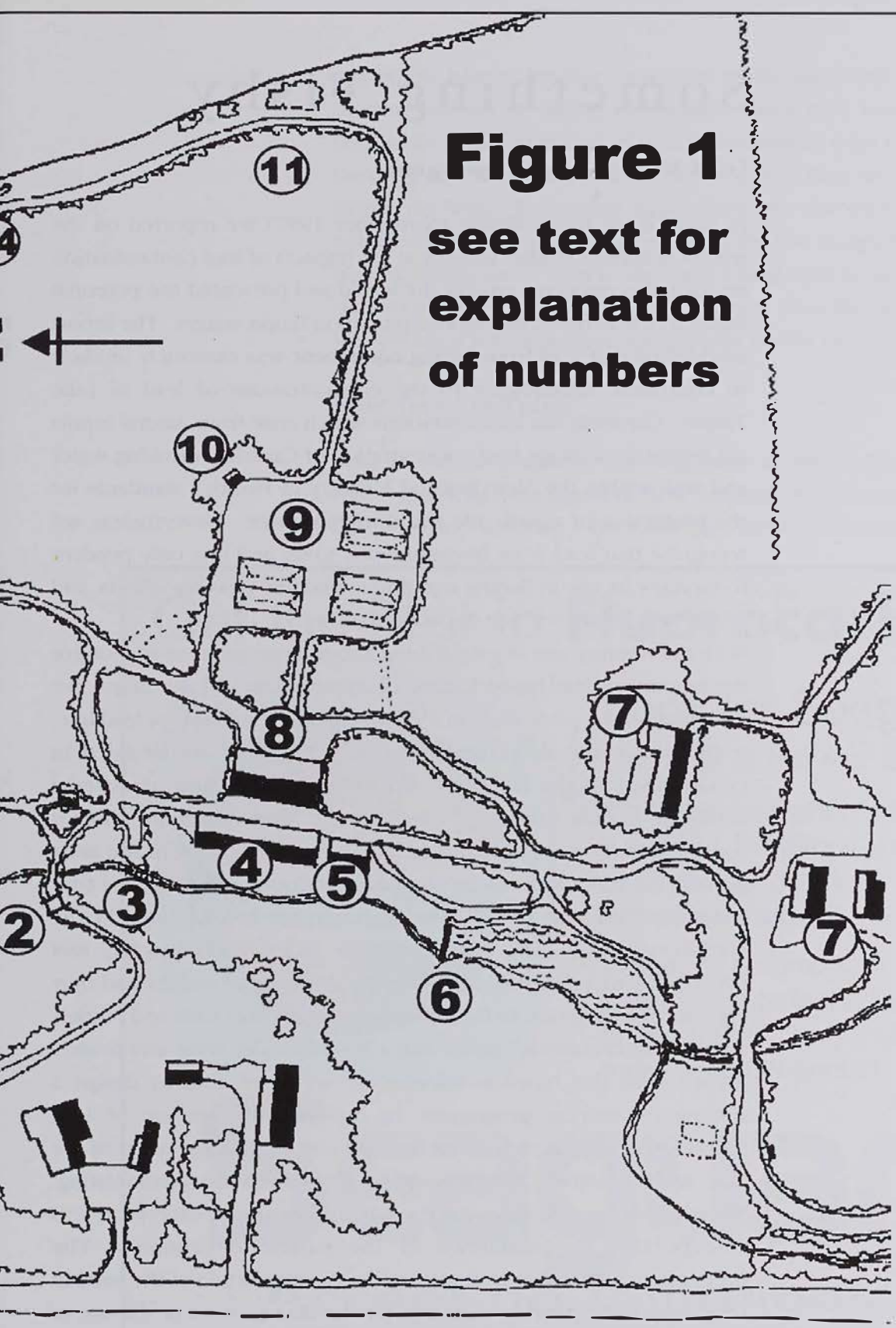


Figure 1

see text for explanation of numbers

WAIOURU

T CENTRE MASTER PLAN **Feb 99**

Something Fishy

Lead Monitoring Programme

In issue 26 of *Target Taupo* (November 1997) we reported on the results of various studies looking at the impacts of lead contamination on natural ecosystems around the world and presented the potential impacts of lead-based fishing equipment on Taupo waters. The report established that lead from fishing equipment was extremely unlikely to contribute significantly to the concentrations of lead in Lake Taupo. Currently the concentrations which arise from natural inputs are below the average lead concentration of Canadian drinking water and well within the New Zealand Ministry of Health's standards for the protection of aquatic life and drinking water. Nevertheless, we recognise that lead is an environmental toxin and it is only prudent to monitor its use in fishing equipment and any possible effects, and in the long term seek non-toxic alternatives.

With the ultimate aim of establishing a routine programme to monitor the amount of lead-based fishing equipment lost in Lake Taupo, we commissioned a pilot study in 1997 to assess the amount of lead line, trolling lures and downrigger weights which had accumulated in certain areas of the lake. Not surprisingly the amount of material collected at each site varied based on the level of angling effort it received. For example, Rangatira Point, considered one of the most popular trolling locations on the lake, produced 3068.2 grams (dry weight) of leadline, two downrigger weights and 21 lures in the 5000m^2 searched. The less extensively fished Whakaipo Bay reef produced 740.7 grams of leadline, one downrigger weight and only eight lures. In addition to fishing equipment, 31 beer cans and bottles, an old Seagull outboard motor and a few old shoes were also found.

Armed with this baseline information we were able to design a routine monitoring programme to establish the amount of lead products present in high, moderate and low angling use areas of the lake, and to monitor how quickly such products are accumulating. We will also be able to assess the rate and nature of each product's susceptibility to breakdown in the natural environment. The programme will enable us to determine the magnitude of the issue in Lake Taupo, and provide direction for the management of the use of lead by anglers in the future.

Divers will be collecting the lead from 2500m^2 quadrats at three sites

around the lake in October every year. At the same time they will also recover samples of fishing equipment which have been left on the bottom for a known period of time to measure at what rate the lead is breaking down. Should you encounter divers' flags on display, please follow the Water Recreation Regulations (do not exceed five knots within 200 metres of the flag) or avoid the site completely if you are trolling fishing lines. This is obviously a long-term project that should start to provide some valuable information over the next few years. We will keep you up to date with annual results via *Target Taupo*.

Lead-free Fly Tying

Lead in the environment has long been an issue. With the recent removal of lead from petrol in New Zealand other sources of lead are under closer scrutiny. For example, whether shotgun cartridges

should contain lead shot is currently being debated. A recent review of the uses of lead-based fishing products in Lake Taupo (see *Target Taupo* November 1997, issue 26) concluded that they did not pose an immediate risk. However, lead is an environmental toxin and the report suggests where non-lead alternatives exist the most responsible action is to make use of them. As users of the sports fishery and environments we all are responsible for maintaining the health of these resources now and into the future. The key to actually achieving this goal is to share this responsibility, with each individual doing their bit. Using non-lead materials to weight your fly patterns is one such way.

Where sports fishing regulations allow weight to be added to the nylon, split shot, lead sleeves, strips and putty are all very effective and efficient means of getting flies to sink quickly. These products are available in non-toxic (lead free) materials with the putty in particular readily available in New Zealand. Putty has advantages over split shot such as re-usability, it snags less and in turn pulls free more easily, does not damage the nylon and is easier to attach. At Taupo however, the Taupo Fishing Regulations (1984) allow weight to be incorporated only in the fly and not attached directly to the nylon. When weighting flies lead can be easily replaced using non-toxic (lead free) wire, copper wire, water-absorbing materials, non-lead beads, resins and by adopting fly tying methods which reduce the amount of weight required.

Materials and tying tips - Non-toxic (lead free) wire is manufactured but is not readily available in New Zealand. However, in the USA, fly fishing catalogues list a variety of non-toxic wire, split shot and beads at comparative prices to the lead products. Copper wire is the main non-toxic weighting material presently available for fly tying in New Zealand. To prevent the wire sliding, dub a thin layer of fur along the hook shank; lay the wire over the fur in closely spaced wraps and then run the tying thread across the various layers of wire to lock it in. A coating of thick lacquer, resin or epoxy aids the fly's longevity and the sleek profile greatly increases the sinking ability. Beads, cone heads and dumb-bell eyes made from brass, copper, silver and tungsten come in a variety of colours and sizes. Tungsten is actually heavier than lead and not a great deal more costly. Beads are used mainly for heads of nymphs but also make good nymph thoraxes. Several small beads in a row make an excellent segmented body.

The fly with lead (left) weighs 1.4 grams, the fly with copper weighs 1.2 grams. Both comply with the Taupo Fishing Regulations' hook size requirements

Dumb-bell eyes or bead chain are often used but flies weighted with these do not sink as well, snag more easily and cast badly compared to bead or conehead flies. A list of the comparative weights of different materials is presented in Table 1.

Materials that absorb water rather than trap air bubbles also greatly aid sinking. Such materials include rabbit underfur, chenille, wool and cotton floss. Check their wet colour if pattern colour is important. Streamlined patterns sink quicker, cast easier and snag less than heavy bulky ones. Just try dropping two flies of similar weight but completely different profiles in a long glass of water to see the difference a sleek profile makes.

Table 1: A list of the comparative weights of different materials

Comparative weights of different materials commonly used to weight flies	
Large chain eyes	0.54 grams
Medium lead dumb-bells	0.67 grams
4mm tungsten bead	0.42 grams
4mm silver bead	0.18 grams
4mm copper bead	0.19 grams
4mm gold bead	0.18 grams
4mm lead shot	0.35 grams
100mm 0.2mm lead wire	0.22 grams
100mm fine copper wire	0.05 grams

This fly weighs 2.6 grams but its bulky appearance and fur dubbing will hinder its ability to sink. A much lighter fly but tied with a stream-lined appearance will sink just as quickly and be a great deal easier to cast

Casting and presentation tips - Even on the Tongariro River you can use a fly that is over-weighted. Heavy flies are difficult and even dangerous to cast, false strikes from a sinking indicator are frustrating and snagging gets expensive. A lighter fly will reduce these problems and will often catch fish more effectively. To get a lighter fly drifting along at or near the riverbed, cast well upstream of the fish's lie and over or under power the cast so as to create "s" shaped curves in the leader and fly line. The slack line created may not look as polished as having the line lying straight out but it will allow the fly to sink unhindered. Mend the line by throwing a loop upstream, long before drag sets in. Remember any drag will prevent the fly sinking quickly and often actually drags the flies back to the surface. Fine diameter nylon sinks faster than heavy nylon (that streamlined effect again) and a single length of nylon in the 2kg to 3kg range will be sufficient. With lighter flies smaller indicators can be used with obvious benefits to casting and presentation.

Removing lead used in fly fishing is practical and will not handicap your fishing success. Lead alternatives are becoming more available as manufacturers respond to anglers' concerns over lead in the environment. Look for these products in your local sports shop and give them a go. By adopting some of these ideas in your fly tying, not only will your angling be likely to be more enjoyable but you will have the satisfaction of doing your bit in keeping our fishing environment healthy.

Simple tip - Casting two weighted flies is a sure way to get tangles. Instead, use one weighted fly with a small unweighted fly trailing. Not only is it much easier to cast but the unweighted fly wafting around close to the bottom is much more effective than a "bomb".

1998 Waipa Trap Summary

The Waipa Stream fish trap is designed to capture trout running the stream to spawn, providing information on the timing of the spawning run, the size and condition of the fish (all of which are weighed and measured), the total number of fish using the stream and many other aspects of the population. Although the information obtained last year, the first year of operation, is interesting, its true

value won't become apparent until at least three years of data is collected and analysed. As we have seen with the Te Whaiau trap at Lake Otamangakau, the greater number of years trapped the better the understanding of the dynamics of the fishery. Needless to say, we will keep you informed of the results of each year's trapping and provide comparisons with previous years along the way.

The Waipa trap successfully survived its first year in operation. This was a very pleasing outcome, considering the stream overtopped the trap on 10 separate occasions and had to be partially rebuilt after the two major July floods. Normally the first year's operation of a fish trap is very much a trial in which the inevitable teething problems are identified and smoothed out. Certainly a few problems arose and were dealt with, but the overall quality and usefulness of the data collected have exceeded our expectations for the inaugural season.

Two thousand, six hundred and four trout (2604) were trapped from January to December 1998. Of these, 525 were brown trout (20%). This is quite a high percentage when compared to the Whitikau Stream (another tributary of the Tongariro River), the run in which in 1995 consisted of only 11% brown trout. Being able to trap and monitor the wellbeing of the brown trout population in addition to rainbow population is important as they provide many angling opportunities, and offer something a little different to the Taupo angler.

As mentioned earlier the trap is sometimes overtopped when the stream is in flood, which allows fish to pass upstream without being trapped and processed. Therefore the actual number of fish that ran the Waipa Stream is likely to be somewhat greater than 2604. All fish trapped have a portion of one fin clipped before they are released upstream of the trap. As the fish move downstream once spawning is complete, they are trapped again and the proportion of fish without fin clips is established. From this proportion we are able to estimate the number of fish missed during floods and add that figure to the number of fish actually trapped to provide a total number running the stream. To obtain the most accurate figures it is necessary to know just how long fish spend on average in the stream spawning (the residence time) so that the run can be adjusted on a monthly basis rather than making a gross adjustment of the annual run. This year fish will be individually tagged as they pass upstream through the trap so that when they return back downstream the number of days spent spawning can be calculated. The 1998 results will then be adjusted

to obtain an accurate estimate of the total run. Quite a few fish would have missed the trap this year due to the damage caused by the July floods, which left the trap out of operation for almost a month. Therefore it is expected that the adjusted figure will be around 3500 trout.

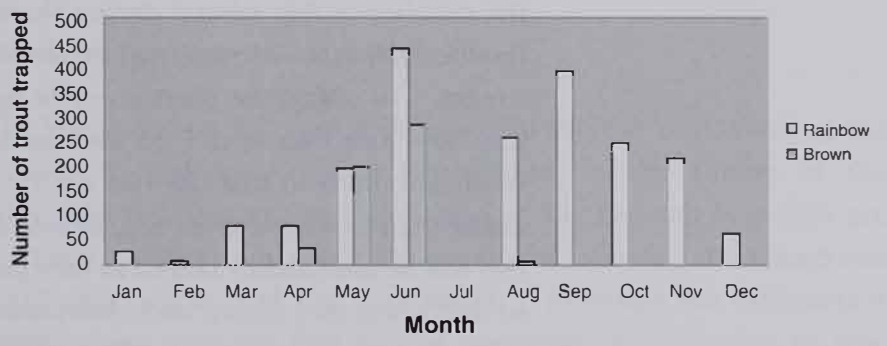
Table 2: Average weight and length of rainbow and brown trout trapped in the Waipa Stream

Species and sex	Average weight (kg)	Average length (mm)
Rainbow female	2.48	581
Rainbow male	2.29	579
Brown female	3.17	622
Brown male	3.39	647

Table 2 confirms that last year certainly was one to remember, with the average rainbow trout weighing 2.4kg (5.3lb) and the average brown 3.3kg (7.2lb). On average these trout were heavier than trout trapped in the Whitikau Stream in 1994 and 1995. Not only was the average size of trout impressive, but the number of really big brown trout is also worth noting. For instance 5.3% of brown trout trapped were over the magical 4.54kg (10lb) mark with the largest weighing 5.9kg (13lb). Fewer (0.2%) rainbows reached this size, though many were just under, the biggest weighing 5.0kg (11lb). All quite a handful if hooked on a fly rod in the Tongariro River.

Graph 2 shows the timing of the spawning run throughout the year. No data is available for July due to damage suffered in the July floods. As expected, the peak of the rainbow trout run occurs in mid-winter (June to September) and continues to some extent all year round. Brown trout appear to make a more concentrated run, appearing in the trap run between April and August. As many anglers are aware, brown trout begin to accumulate at stream mouths in January and February, and start to appear in the lower reaches of most streams

Graph 2: Timing of the annual spawning migration of rainbow and brown trout through the Waipa trap



shortly after. The fact that they are not trapped on the upper spawning grounds to any degree until May highlights the extended length of time they remain in the lower sections of the rivers, in most cases available to anglers. In general brown trout tend to take longer to reach the upper river to spawn than rainbows.

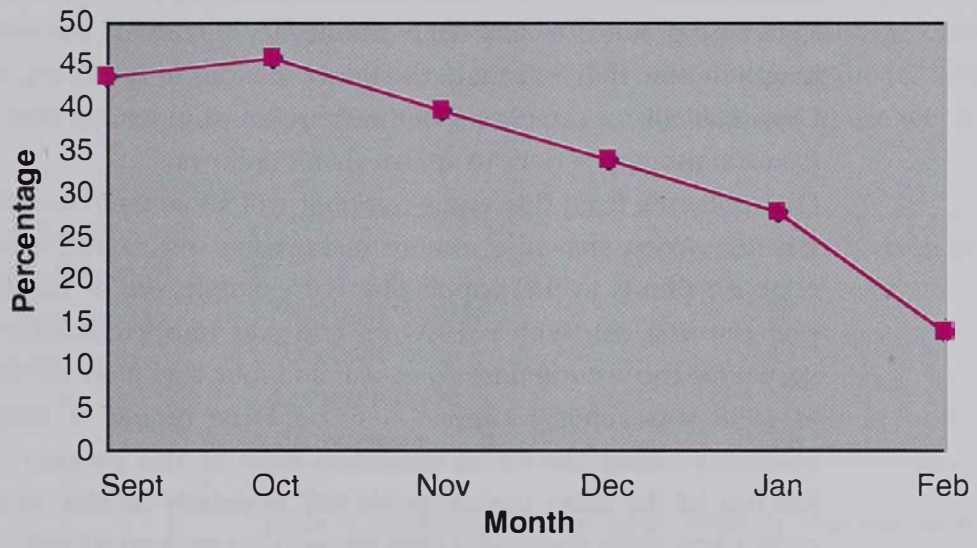
Data obtained from this year's trapping will allow us to look further into the Waipa spawning run, to make comparisons and eventually establish trends in the population. For example, on 16 January this year the first fish with a 1998 fin clip was trapped, attempting to spawn for the second time - one year and four days after the first fish of 1998 was actually clipped. Could the timing of successive spawning migrations for an individual trout be this precise? This is just one of the many questions we will hopefully be able to answer once a few more successful trapping seasons are completed.

Summer angling

The weather this summer was unusually settled. The extended dry, windless periods have allowed anglers access to the lake on most days. Local and visiting anglers made the most of the conditions during the Christmas-New Year period, and activity on the lake was high. As part of our annual harvest monitoring, we fly over the lake on randomly chosen days, counting the number of boats fishing. This year the counts were similar to last year (250 to 450 boats at any one time) which in part is likely to be due to the weather, and possibly the quality of the fishing experienced last year, which may have encouraged anglers back to the area.

Fishing on the lake this year has been somewhat different from last year in that reports of many small fish being caught have been common. Some anglers recounted landing 20 to 30 undersized fish in a day early in spring.

The number of undersized trout caught as a percentage of the total catch is shown in Graph 3. Certainly a proportion of these undersized fish would have been legal and able to be kept before the minimum size limit was raised from 35cm to 45cm in 1997. Nevertheless it is important to remember that the objective of increasing the minimum size limit was to protect the 1995/96 year classes of trout, that were depleted by the eruption of Mount Ruapehu. Last year the vast majority of fish caught were over 45cm long therefore comment about the impact of the new limit was



Graph 3:
The percentage of all trout caught that were undersized and had to be returned over the summer

minimal. This year the growth of trout in Lake Taupo followed a more typical pattern and the regulation change actually impacted on anglers, who had to release more undersized fish in Lake Taupo than ever before. The high proportion of fish released in early summer highlights the need for anglers to take care when releasing these fish to ensure they survive and are not wasted. The fish are growing at approximately 1mm a day and Graph 3 illustrates how just a couple of months' extra growth can make a big difference to the number of fish anglers are able to take home. It will obviously take anglers some time to adjust to the change but hopefully the benefits of protecting these fish will become apparent in the near future. The fish put back will add to the numbers of fish running the rivers this winter to spawn and those fish which were returned, for example as 43cm or 44cm fish, may be caught again as much larger fish.

Data from our summer angling surveys on the lake shows the average weight of trout caught between September 1998 and February 1999 was 1.6kg (3.5lb), which was approximately half a kilogram less than last year. As part of the summer angling survey we also question anglers about their degree of satisfaction with certain aspects of the fishing. So far this summer 1382 anglers have been interviewed. On average they continued to rate their "angling enjoyment" very highly, even when slightly less satisfied than last year with the "size and condition" of the trout. It is important to remember that last year was a superb year for catching quality fish. While the fish this season are

on average smaller, their average size still compares very favourably with most years and the fish are in excellent condition.

Our acoustic counts of the number of fish over 35cm in length present in the lake in November indicated only an average sized trout population (Table 3).

While the average size is slightly less this year, some very good fish have been caught. These three fish (7, 8 and 9lb) were caught in half an hour at the mouth of the Tauranga-Taupo in early February

Table 3: November acoustic counts of the number of trout greater than 35cm in Lake Taupo

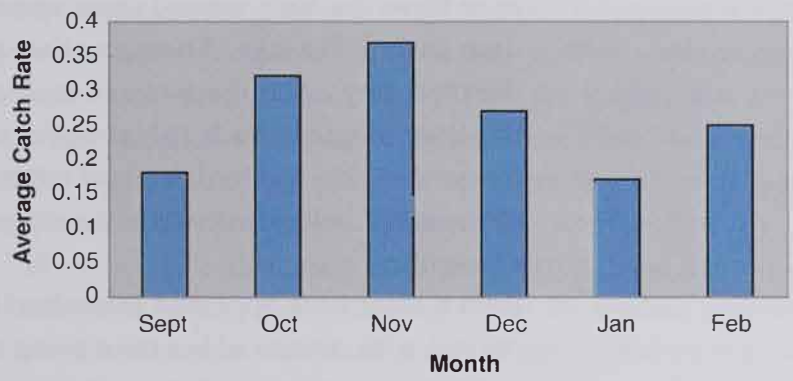
Year	Number of trout (000s)
1988	89.9
1989	67.7
1990	-
1991	108
1992	115
1993	145
1994	205.2
1995	144.7
1996	117.8
1997	186.8
1998	112.5

An even smaller estimate was expected as a consequence of the effect of the 1995 and 1996 eruptions on the survival of juvenile trout, hence the increase in the minimum size limit to reduce the angling harvest. Such a count reflects a fairly typical Taupo season, yet overall the fishing has been better than this count might indicate.

Fishing over spring was quite productive,with early morning harling providing some exciting action at times. The highlight though, was the fishing for "smelting" fish along the lakeshore in October and November. For many anglers it was their first experience of smelting as described by old time anglers. Many of the fish were recovering kelts (spent fish) but they made for a lot of fun. Overall, the spring and early summer angling was good, but as the graph shows a large number of undersized fish were being caught. The average catch rate

(number of fish caught by the average angler per hour) was relatively high in early summer at 0.3 fish per hour or one fish every 3.5 hours (Graph 4).

Graph 4: 1998/99 Lake Taupo catch rates



In January, the increased boating activity and lake temperature saw the catch rate reduce to one fish every six hours. This fall in catch rates is typical at this time of year as most fish move deeper out of reach unless anglers are prepared to use wirelines or downriggers. Horomatangi Reef and the south-western end of the lake around Kuratau and the Karangahape Cliffs seemed to be the most consistent locations this year.

Prior to Christmas, fishing the mouths of streams such as the Waimarino, Omori and Waipehi was also very good on occasions. While quite a few poorly conditioned fish yet to recover from spawning were caught, many well conditioned maiden fish provided good sport. Fishing at some stream mouths during the day, especially the Waitahanui and Waihaha, has also been successful as fish move in seeking the colder inflows of the lake's tributaries, and the smelt and bullies that are attracted for the same reason. One bright, hot January day fishing the Waihaha Stream mouth, over 20 trout were caught by three anglers. Large numbers of trout were seen slashing in and out of the rip chasing a visible shoal of smelt. Two of the anglers were visiting from Switzerland. Needless to say they were more than impressed with Lake Taupo and thought it was *"like fishing in a giant fish pond for giant fish"*.

Anglers have commented on the large numbers of kelts hanging around the stream mouths and that many are in poor condition. This reflects the very dry summer. Following spawning the spent fish

passively make their way back to the lake. If a good flood occurs as happened in early spring these fish are swept all the way back into the lake where they can gorge on the spawning smelt and quickly recover condition. Indeed there are some superbly conditioned previous spawners in the lake at present. However, under low settled river flows (as have existed since spring) kelts may take months to drop back to the lake. These trout are extremely tired and weak by the time they reach the lake and seek out the easy pickings around the river mouths. Such fish struggle to recover condition and the many who have survived this year reflects the fact that there are a lot of smelt and bullies around. In poorer years many would simply have succumbed.

Brown trout have appeared in anglers' bags earlier this season than normal, with reports of big trout being caught at Waitahanui, Kuratau and Omori stream mouths in early January. Some have been reported at over 4.45kg (10lb), and one caught from the Waitahanui mouth on a late February morning was weighed at 5.7kg (12.5lb). Some well conditioned brown trout have also been caught trolling around Motuoapa and Whakaipo bays.

Our summer survey continues for another two months and a detailed report of the entire summer's lake fishing will be in the next issue of *Target Taupo*. With autumn drawing near we should see an improvement in stream mouth fishing as fish prepare to run the rivers to spawn.

The large number of fish returned by anglers will add to the size of the spawning runs in the Taupo tributaries this winter. Given this, and the size and condition of many of the fish in the lake, we believe it will be a good winter for river anglers. The run in the Tongariro however, is still likely to reflect the impacts of the last eruption but is expected to be a significant improvement on last year.

We will be on the rivers during the coming winter, surveying anglers as we have done on the lake. Should you be approached by a fishery ranger please give a minute of your time to answer a few questions. The information you provide in these surveys is an integral part of managing the fishery.

Catfish update

Six large catfish caught in Motuoapa Bay have been fitted with an acoustic transmitter. These tags not only transmit the location of the

fish but also the depth at which it is swimming. This information is transmitted every one and a half minutes and recorded on automatic data loggers. Three data loggers have been deployed between Motuoapa Bay and the mouth of the Tauranga-Taupo River four kilometres north. The first 1600 records of catfish locations have just been downloaded and already provide some interesting results. It is clear that catfish are not confined to very shallow water as previously thought. So far our data shows that the catfish use any depth between one and ten metres, often moving from one depth to the other. What is puzzling is the fact that these fish, when behaving like this, are not shy and can be easily approached by divers. Furthermore, it is extremely difficult to catch these fish on a hook, which suggests that this behaviour is not for feeding reasons. The behaviour may represent more a sort of pre-nuptial or nuptial ballet in mid-water. The reproduction behaviour of catfish in Lake Taupo remains unclear and a previous study could not identify the behaviour, location and the exact timing of the spawning. A second observation is that many large catfish have moved outside of Motuoapa Bay and are now tracked in the vicinity of the Tauranga-Taupo River mouth. Simultaneously to the acoustic tracking, we have initiated a marking/re-capture experiment involving 600 catfish. The first two re-captures of tagged catfish also suggest that since November the large catfish have vacated the shallow habitat where they were caught, tagged and released. The exciting question now is whether these large catfish are going to return to where they were tagged or do they move for good once they have reached a certain size?

We will keep you informed in a following issue of *Target Taupo* once both experiments have been completed.

Juvenile trout along the margins of Lake Taupo

The Department of Conservation has been involved in an ecological impact study of the possible effects of Lake Taupo level management. One of the major concerns of fishery managers is that a change of lake levels can potentially affect the fish which inhabit the margins. The knowledge of the biology of juvenile trout in Lake Taupo remains fragmentary and so we have carried out, in association with the National Institute for Water and Atmosphere Research, sampling of the juvenile trout along the margins of the lake. Different types of habitat

that could be affected by changes of lake level were sampled. These included sandy, rocky, weedy bottoms in the vicinity of river mouths. The results show that in January fry and larger juvenile trout were present in good numbers (one fish every five metres) along the beach at Waitahanui. Good numbers of juvenile trout were also caught at Kinloch around the entrance of the marina. The analysis of the gut content of these fish is currently being examined in order to assess if these fish are surviving on the food produced by the lake or if they rely on the food drifting down from the streams. The results should tell us if the lake is important as a rearing habitat for juvenile trout. We will keep you updated when the final results are available.

Use of rod holders when trolling

Previously under the Taupo Fishing Regulations, the use of rod holders was prohibited unless the angler was the only person in the boat. This was because of the difficulty for rangers, if there were not enough licences for the number of rods in use, to ascertain whether one person was fishing without a licence or another person was fishing with two rods. By requiring an angler to hold the rod then the person responsible for each rod was clearly identifiable.

However, when downriggers were permitted it was necessary to allow the use of rod holders as they are an essential component of a downrigger set-up. To overcome the compliance issues though, it was necessary to require everyone on board to be the holder of a current licence if rod holders are in use, unless the anglers are in physical contact with the rods. Under the Taupo Fishing Regulations the skipper of the boat is responsible for any contravention of this provision.

Over summer we have stopped a few boats where rod holders are being used and not everyone is licensed. Skippers are reminded of the need to ensure everyone has a licence or is in contact with the rod in such circumstances.

Changes to the children's fishing days at National Trout Centre

For many years the children's fishing days have been a very popular attraction and the chance to catch a trout from the pond has been enjoyed by thousands of youngsters. The days, which have been run

by volunteers of the Tongariro and Lake Taupo Anglers' Club (TALTAC), were initiated to provide children with an opportunity to discover the sport of trout fishing, complete with some instruction and guidance on the art. However, in a way, these days have been their own worst enemy, for the more successful they have been the greater the number of children, and in turn the greater the demands on the volunteers and the facility.

Occasionally numbers have been so large that the only way to give everyone a chance to catch a fish has been for the child to simply reel in a fish hooked for them by the adult helper. This is obviously a long way removed from the underlying objectives of the day and not very satisfying for either the child or the volunteer.

As discussed in the feature article on the development plans for the Tongariro National Trout Centre we have reviewed the whole operation of the facility. Long term we see the major role of the children's pond as the attraction for school groups to visit the complex during which time we can instruct them on other aspects of freshwater ecology, trout and trout fishing. However the open days are now an integral part of the community and we are aware that there would be major concern if we were to discontinue them.

This year after nearly 20 years of organising and assisting with the children's fishing days TALTAC has advised it is no longer able to continue in this role. This decision, coinciding with the review of the operation of the facility, has meant we need to re-assess how we organise the days this year. The underlying premise we have worked from is that while it is marvellous that the children have a great time, the event has to offer more to the Taupo fishery. If we are able to offer the full trout fishing experience to the children involved, then the benefit is certainly there but we are not in the business of simply providing entertainment.

The only way to provide the desired

The children's fishing days have been a highlight for many children over the years

experience is to limit the number of children so that sufficient time can be devoted to each child. This unfortunately means some children may miss out on any one particular day.

This year we are running five days, timed so that they occur over the various school breaks. A limit of 200 children a day has been set which will allow each child approximately 10 minutes with the adult helper. During this time the child will be encouraged and instructed so as to do as much as possible of the casting, hooking and landing of the fish.

Bookings will be organised on an hourly basis with a limit of 30 children per hour. To book it is necessary to ring Shirley Oates at Department of Conservation (telephone (07) 386 9243) who will take the child's name and address. It is best to telephone, as a particular hourly slot may be fully booked, but in discussion with Shirley another slot may be suitable. For this reason no written or faxed bookings will be taken unless confirmed with a telephone call. Sorry - but no booking, no fishing.

The dates for the days this year are 9 May, 13 June, 4 July, 15 August and 26 September.

In association with the Department, the days will be organised by

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John Milner, a local fishing identity who was previously involved with the TALTAC days. John has kindly offered to take up this time-consuming role, though hopefully the restriction on numbers will require fewer volunteers at any one time and allow their attendance to be spaced out. Anyone interested in assisting with the days should contact John on (07) 386 6318.

Bill Colston, who over recent years organised the days, continues his association including undertaking the maintenance of all the gear.

To all those members of TALTAC who have assisted over the years through rain and shine, we thank you very much.

Monitoring of the koura population

Koura (freshwater crayfish) are an important component of the ecology of Lake Taupo. They occur in huge numbers in the depths of the lake, moving into the shallows in search of dead fish and other food at night. Despite their numbers they are only a minor food source for most trout in the lake, which feed almost exclusively on smelt. Significantly though, many of the larger rainbow trout caught in the lake have the distended anus and orange-tinged fins characteristic of a diet of koura. Why more fish don't take the opportunity to prey on koura, which at depth are all over the lake bed, their little pincers waving at any intruder, is unknown.

However, koura have been shown to be a regular item in the diet of larger catfish. Concern has been expressed that in areas where large numbers of catfish occur such as in the Tokaanu and Omori areas, the koura numbers are greatly reduced. To try and get some measure of the impact we are currently instigating a monitoring programme to follow koura numbers at two sites around the lake.

The methodology involves running out 100 metre ropes at sites in Whakaipo Bay and Omori. One end of each rope is set in 20 metres of water and the rope laid out so that it runs up the shelf to end in about five metres of water. Approximately one hour after sunset two divers, one carrying a two metre long pole, descend over the deep end of the rope. One diver swims along the rope so that the end of the pole is directly over the rope. This diver counts all the koura that pass under the pole between the rope and a distance one metre out. The second diver counts from one metre out to the other end of the pole. By swimming along the length of the rope an area of 200 square metres is covered. Two transects are done at each site which

will be repeated every four months.

A trial of the methodology recently undertaken in Whakaipo Bay proved very successful with slightly over one koura per square metre counted. These koura were of all sizes and interestingly only two catfish were seen. It will be revealing to compare these results with those for Omori.

Note that when the work is being undertaken there will be large orange buoys used to indicate either end of the sunken rope. These will be run out just before dark and will have cyalume light sticks attached. If fishing, please don't run between them or you risk snagging your gear. Similarly, in the dark, don't approach too close as there are likely to be divers in the water.

Camping in the western bays of Lake Taupo

Campers have been enjoying the tranquillity and trout fishing of the western bays of Lake Taupo for many years. Recently we have received a number of queries about the rights of campers to utilise places like Waihaha and Waihora. Although as fishery managers we are not responsible for camping around Lake Taupo, we have researched the issue to provide anglers with information about the opportunities for camping.

The legal rights of access to the margins of Lake Taupo are defined in the Maori Land Amendment and Maori Land Claims Adjustment Act 1926. This Act enshrined an agreement between the Crown and Ngati Tuwharetoa and arose over concerns that the fishery should be accessible to all New Zealanders. The Act guarantees a licensed angler foot access to fish the streams and lake, and the general public access to the lake and foot access around the lake shore. The Tuwharetoa Maori Trust Board was paid 3000 pounds per annum plus a sum equivalent to half of the revenue from fishing licences, licensing of commercial boats, camp ground fees and fishing fines in excess of this. Not until 1938 did licence revenue exceed 3000 pounds. Today the cost is borne by taxpayers and not anglers, in recognition of the benefits to all New Zealanders of this agreement. It is very easy to take the access for granted but it is one of the major attributes of the Act and therefore the Taupo fishery. There is, however, no legal right to camp on private land anywhere around the lake and the provision of camp sites is entirely at the discretion of the private landowners.

So as to be able to respond to the queries received from anglers we

have discussed the issue with the owners of the land around the lake. Without exception they have been very helpful and provided information that will allow people to plan enjoyable camping and angling experiences. Some quite reasonable conditions are set down by the landowners, which if followed, will hopefully see the opportunity to camp in the western bays continue for a long time to come.

Waihaha (NZMS 260 T18 489720) - Waihaha is one of the most extensively used camping areas in the western bays and has been for many years. In the last few years the landowners have changed the way they manage the area with respect to camping. Instead of campers being allowed to set up anywhere beside the river there are now 10 designated tent sites with long drop toilet facilities available. Each camp site costs $10 per night.

As has been the case for many years, people can pull their boats up the riverbank or beach and sleep on board. The cost of doing this is only $5 a night, which covers the use of the camp toilet facilities. David Chrystall, a member of the Waihaha Maori Trust, is responsible for the camp sites and bookings and he can be contacted on (07) 347 8515.

The conditions imposed on campers utilising Waihaha are similar to the unwritten rules of any outdoor area and are common-sense. They are set out here so as to reinforce the need to look after and respect other people's land and property.

* All rubbish is to be removed from the site when you leave. Nobody likes arriving at a camp site or beach to find it littered with rubbish.
* No open fires are to be lit in the bay. There is far too much at stake simply for the sake of a camp fire. Campers and people sleeping on their boats need to be prepared to cook on some form of gas or spirit cooker only.
* The landowners require strict compliance with all angling and boating regulations. Non-compliance by people staying on their land will not be tolerated and campers caught breaking angling regulations will be reported to the Department of Conservation and asked to leave the camp site.

Waihora Bay (NZMS 260 T18 528773) - Waihora Bay is situated to the north of Waihaha. Camp sites are located in the northern corner of the bay, where the Waihora Stream flows into the lake. This area

of land is owned and administered by the Waihora Trust.

There are only two camp sites available, with no toilet facilities. It doesn't cost anything to camp at Waihora, though the owners request that people wishing to use the area telephone and book. Sam Andrews and Bob Andrews are responsible for the sites and can be contacted on (07) 333 9331 and (07) 333 9311 respectively. As with Waihaha, many people sleep on their boats either up the stream or pulled up on the beach. The Waihora Trust is quite happy for this to continue and in this case does not require people to ring and book. Again the ability to camp in Waihora is subject to the meeting of similar conditions to those imposed at Waihaha.

*There have been problems in the past with campers and/or anglers leaving all manner of rubbish on the beach. Please remove all your

rubbish when you leave.

* No open fires are to be lit in the bay. Campers and people sleeping on their boats need to be prepared to cook on some form of gas or spirit cooker only.

Boat Harbour (NZMS 260 T18 553765) - Boat Harbour is well known as an anchorage for boats venturing to the western bays. The western bays are relatively exposed, especially to winds from an easterly quarter, and under such conditions secure anchorages are extremely limited. One of the safest is Boat Harbour which, not surprisingly, can become very crowded. Many boats tie up to the shore when room inside the bay is at a premium. The Waihora Trust, which also owns this land, appreciate that Boat Harbour is a safe anchorage for boats and therefore does not expect people to contact it when either anchoring or camping in the bay, provided it remains clean and tidy. The same conditions as listed for Waihora Bay apply to Boat Harbour.

Whanganui Bay (NZMS 260 T18 474653) - Whanganui Bay is a large bay south of Waihaha, with a north-eastern aspect. It is owned and administered by the Whanganui Maori Trustees whose representative, Mere Brown, lives in the bay. When the issue of camping in the bay was broached with Mrs Brown, her response, with special reference to anglers, was far from favourable. Examples of poor behaviour by anglers camping in the bay are numerous, with stories of permanent residents being abused and numerous bags of rubbish being dumped on the beach. Unfortunately, the behaviour of a few individuals has impacted on the opportunities available to responsible anglers. The bottom line in this case is that camping in general in Whanganui Bay is not permitted. Vehicle access along the private road for the purpose of angling is also prohibited. Day trippers are more than welcome on the northern side of the river provided that all rubbish is removed and dogs are kept under control. The landowners are quite prepared to share the bay providing visitors respect the land and the people living there, hardly an unreasonable request.

Department of Conservation lake shore reserves - The Department administers a large amount of land adjacent to Lake Taupo, most of which is physically impossible to camp on as it plunges to the lake over cliffs or rock faces. In the few areas where camping would be possible, such as the beaches and surrounding land of Whakaipo, Kawakawa and Te Hapua (Scenic) Bays, it is the

Boat Harbour is a wonderful spot - look after it!

Department's policy to prohibit camping on the grounds that the risk of fire and the environmental impacts are too great.

This article may come as a surprise to those anglers who see camping in the western bays as a right which they have enjoyed for decades with family and friends. Many such people will have respected and looked after the land as if it were their own, others unfortunately have not.

The bottom line is that all of the camping opportunities in the western bays occur on private land at the goodwill of the owners. Treat the land with respect and abide by what are very reasonable conditions and hopefully the opportunity to camp in what is a wonderful area will always exist.

Spear fishing for catfish in Lake Taupo

Staff have responded to several reports from observant and concerned anglers regarding people seen spear fishing in Lake Taupo. Checking out these incidents and interviewing the people concerned revealed that the divers were spearing catfish. Catfish are not a sports fish and spear fishing for them is permitted in Lake Taupo with some constraints.

The Conservation Act 1987 makes it an offence to be in possession of a spear in the vicinity of any river or stream where sports fish are congregating for spawning (Section 26 (2)), so if you are spear fishing for catfish in Lake Taupo make sure you are at least 300 metres away from stream and river mouths. Similarly, the onus is on the diver to ensure they don't have any trout in their possession. If you are planning to spear catfish in Lake Taupo a call to the Fishery Area office at DOC, Turangi, will assist compliance officers and save you possible embarrassment or worse! Please return any tags found on the catfish you harvest with information such as the size and weight of the fish and the location from which it was taken.

Anglers who observe people spear fishing, please continue to report your observations giving as many relevant details as possible, especially location, time and vehicle details. Fisheries staff will continue to check all spear fishing reports.

Maintenance of angling tracks and bridges

Track maintenance this summer was on a much smaller scale than in previous years. As a consequence for the first time in many years we did not employ any university students to assist us over the Christmas break. Instead maintenance of the tracks will be undertaken by contractors. Contracts for both track maintenance and the spraying of regenerating willows are currently out for tender with the work planned to occur in April. Fisheries staff did however carry out urgent clearing of tracks off Mill Road, Waitahanui where blackberry had prevented walking access.

A contractor was also used to replace the wooden decking and wire netting on the seven arched foot-bridges along the Waitahanui River.

We have only received a couple of submissions asking for the vehicle access to be re-instated to the Blue Pool on the Tongariro River. There has been much more support for the status quo, with rafters exiting above the Breakaway Pool and anglers and rafters using the car park on the terrace above this pool. At this stage we intend not to reopen the road past this point

though there is still a need to improve the way the car park functions. If anglers in particular parked with a degree of consideration for other users, especially the rafters trying to retrieve their boats, then the current car park may well be satisfactory. However, in light of how anglers used this car park last winter this may be a somewhat optimistic expectation.

Whangamata Stream update

Over the last 20 years this stream has been the centre of a long-term restoration project. It is providing fishery and land managers with valuable information on the practicalities of stream restoration and on the many benefits and values. The longevity of the Whangamata Stream project is quite unique and it provides insight to the stages of

In areas where the streambed is shaded, monkey musk weed is not a problem

In open areas monkey musk weed grows across the whole stream, blocking fish passage and hindering the stream flow

vegetation establishment from heavily grazed pasture to native bush along with changes to water quality, fish passage and habitat. Along the way mistakes have been made, especially in the types and locations of tree plantings but from these errors have come valuable lessons for the future. For example, early plantings of flax adjacent to the stream are now creating problems as the flax bushes either grow into the stream or collapse and topple in, blocking passage for spawning fish. Already many species of flora and fauna have become established, many of them positive like the fern bird but others not quite so. One negative example recently spotted by Fisheries Officer Roy Baker is stout reed sweetgrass (*Glyceria Maxima*). This grass is a weed common in the Waikato and Hauraki Plains where it impacts on lowland lakes and rivers.

Current management work - Every summer fisheries staff spray the monkey musk weed that invades the stream. This weed, which needs high levels of light, grows profusely over the stream surface, preventing fish passage and hindering flows. However, as stream-bank vegetation grows and shades the stream, musk weed growth is reduced to small patches, eliminating the need to spray it. Large areas of the lower stream have been planted with *Carex* sp. to try and

shade the musk weed. These grass-like plants overhang the stream, providing shade while still allowing the stream to flow unimpeded underneath. These plantings have proven very successful and plans to plant the only section of the stream where musk weed is still a problem are underway. As described, previous planting of flax close to the stream bank has turned out to be a problem in some stream sections and these flax bushes will have to be removed. Crack willows are not a major problem in the Whangamata Stream but the few there are will also need removing as crack willows spreading along the lake foreshore are likely sprouting from twigs washed down from these original trees.

It is going to be most interesting to examine this project after 30 years when it is predicted the vegetation will be in its final transition stage into trees and shubbery. One thing is certain: projects like this are long term, ever-changing and require flexible management to ensure the desired outcomes.

Fishing for King (Quinnat) salmon on the Willow Creek in Alaska. Who said the Tongariro River was crowded!! Photograph: John Leybourne

OBE Award

When fishery rangers undertake licence checks and harvest surveys we aim to complete them with the minimum of inconvenience to

anglers. However, an incident during a recent lake survey must have left the anglers being interviewed wondering what sort of show they had tickets to!

Rob Hood (Bob) was interviewing the two anglers when he heard a splash and saw his fellow ranger's warrant card and holder (which had come unclipped from his pocket) trying its best to imitate a "toby", on its way to the bottom of the lake.

His partner, who was obviously aware of the amount of paperwork required to replace the card, dived in in pursuit - uniform, glasses, hearing aid and all! Amazingly he surfaced with it. He managed to get hold of the anglers' boat and Rob, grabbing hold of his leg, hauled him back on board.

While he tried to get his breath he handed Rob his precious card which somehow slipped from his fingers, flew across the boat and straight back over the side from where it had just been retrieved. Rob, knowing that his fellow ranger would probably be a little upset about the second loss, promptly reached over the side and once again saved it from Taupo's depths.

Rob informed the two stunned anglers that they had now completed their survey, it was not their usual practice to put on such a show, and left them to carry on fishing.

As for his fellow ranger, we recommend him for an OBE (over board experience) for his actions over and above (and under the surface for that matter) the call of duty.

Nice one Roy!

Managing Deer Impact in the Rangitikei Remote Experience Zone

by Cam Speedy

Helicopter access for recreational hunters to the Remote Experience Zone (REZ) within the Rangitikei River headwater catchments of Kaimanawa Forest Park has been authorised to four landing sites for a seven-week period between Labour Weekend and Christmas each spring since 1993. This is an attempt to increase the hunting effort and therefore harvest of the area's red and sika deer populations. This article looks at how things went in 1998 and what this harvest regime is achieving in the catchment.

The sika and red deer populations of central North Island can have a serious, undesirable impact on native forests through selective browsing of preferred plant species. Such browsing can inhibit regeneration, which on critical sites can compromise canopy replacement following natural collapse events as a result of old age, cyclones, snow storms, drought and/or disease. To complicate this situation, deer impact is incremental over time and the condition of the habitat is not just an artefact of the current deer density - it is a result of the 100 or so years that deer have been present. The forest present today reflects changes incurred throughout this time due to varying deer densities and proportions of the two deer species present.

Interest in visiting the Rangitikei REZ within Kaimanawa Forest Park by hunters to help reduce the deer impact over the past few years has been consistently high. However, 1998 saw a decline in interest for the first time since 1993 following declines in deer harvest rates in recent years. Still, 13 separate parties involving 38 hunters visited the four available landing sites between 25 October and 19 December 1998. Two of the sites are in the alpine habitat - one in the head of the Otamateanui Stream catchment in the south-west of the REZ, the other on

Whakamarumaru Ridge in the north-east. The other two sites are in the heavily forested valley habitat: one at the Ecology Stream Exclosure Plot site, the other at the junction of the Rangitikei River and Ecology Stream, although this site was shifted upstream a little this year to open up new country. These sites provide access opportunities to hunt sika and red deer in a range of habitat types within the REZ.

Eleven hunting parties have so far returned hunting data from the 1998 period and this information is summarised in Table 5, together with information from previous years. The feedback and harvest information provided by hunters visiting the area over the past six years, which include jaw bones from most animals shot, are starting to provide some indication of trends in the population as a result of the harvest regime. While the data tends to reflect variable spring hunting conditions from year to year - strong winds, heavy rain and even snow are often experienced overall the trend in the deer population has been down. This is backed up by the age structure of the 1998 jaw sample (sample size 22), which is finally beginning to favour younger animals, a sign that adult survival rates have declined. Anecdotal reports from hunters of improved deer condition, an increase in the proportion of female deer of breeding age reported as being pregnant or in milk during spring (including two 23 month old sika hinds in fawn), the fact that red deer encounter and harvest rates have declined and the increasing amount of bush-lawyer (a heavily utilised winter food source for deer now that significant habitat modification has occurred) all support this information. Of concern, however, is that sika deer encounter and harvest rates have not declined to the same degree as those for red deer. This suggests the current regime has been more successful in reducing red deer numbers, probably because they favour the more easily hunted open habitat, but that the regime has been far less effective at reducing sika deer density. This is likely to be related to their strong preference for heavy escape cover which makes them generally less vulnerable to hunters. The result is similar to that observed during the helicopter deer recovery era when sika deer started to become more dominant in many areas following the selected removal of the larger, more sought after red deer.

Table 5: Hunting data collected from the Rangitikei Remote Experience Zone during spring helicopter access periods - 1993 to 1998

Landing site by year 1993 to 1998		No. of hunters	Hunting effort (days)	Sika seen	Sika killed	Red seen	Red killed
Ecology Exclosure	93	24	102	31	2	7	0
	94	8	20	3	4	20	4
	95	3	10	2	2	3	0
	96	10	39	16	4	6	1
	97	16	60	27	4	5	3
	98	5	35	24	7	13	5
Ecology Junction	93	24	84	13	3	28	7
	94	12	49	5	1	19	8
	95	23	68	24	6	29	14
	96	19	96	18	2	21	9
	97	28	108	17	5	37	10
	98	15	61	16	4	6	4
Trick Creek	93	23	87	27	8	34	16
	94	18	51	13	6	19	6
Whakamaru Tops	95 *	15	63	19	14	72	22
	96	15	90	13	8	21	10
	97	18	43	17	6	8	5
	98	0	0	0	0	0	0
OtamateanuiTops	94 #	13	37	0	0	28	14
	95	4	10	0	0	11	7
	96	10	24	0	0	24	6
	97	12	34	2	2	22	4
	98	7	14	1	1	9	6
Totals	1993	71	273	61	13	69	23
	1994	51	157	21	11	86	32
	1995	45	151	45	22	115	43
	1996	54	259	47	14	82	26
	1997	74	245	63	17	72	22
	1998	35	130	31	12	28	15

*** = Site shifted to tops following feedback from hunters that the tops' hunting was more productive**

 # = Site not used in 1993

In combination with hunter feedback and harvest and deer jaw information, the summer of 1998/99 saw a major increase in habitat data collection through the establishment and/or remeasurement of a series of forest plots located at representative locations throughout the catchment. This information will provide quantitative data on how much impact the current deer population is having on forest structure and regeneration, and will be used as a baseline to compare future changes which may result from the management regimes currently in use. An overview of the forest monitoring work underway in the Kaimanawa Ranges appears in this issue of Target Taupo and we hope to keep you up to date with details on the results of this work in later issues.

Bitz 'n' Pieces

News Items from Around the Conservancy

Kaimanawa Bovine Tb Survey

The Department of Conservation authorised an aerial deer recovery operation over summer involving the removal of up to 100 deer from the northern Kaimanawa Range for disease autopsy purposes. The survey was at the request of the Animal Health Board and Environment Waikato, and had two separate components:

a To look at possible vectors following an outbreak of Bovine Tb on a cattle farm at Opepe, east of Taupo in early November. This survey involved the removal of 55 deer from 40,000ha east of the Tauranga-Taupo River in the north- eastern part of Kaimanawa Forest Park. The area included the Recreational Hunting Area (Clements Road, Hinemaiaia, Kaipo, Oamaru) and the Tiraki Ecological Area. This component was part of a larger survey of pigs, deer, possums and ferrets in the Opepe area aimed at ascertaining the level of infection and the types of feral animals carrying the disease. Generally the condition of deer sampled was poor, with few of the breeding-age hinds either pregnant or in milk. The exception was the Clements Road and eastern boundary areas where deer condition was excellent and reproductive rates much higher. From the 55 deer sampled, a single, young sika female cultured positive for Bovine Tb. This animal came from the Clements Road area.

b To look at the incidence of Bovine Tb in feral deer following aerial 1080 poisoning of possums. For this survey 38 deer and two pigs were removed from a 15,000ha area west of the Waimarino River in the north-western part of the Kaimanawa Range as part of an ongoing investigation being conducted by Maanaki Whenua - Landcare Research New Zealand Limited, on behalf of the Animal Health Board. The Kaimanawa study site is one of a number around the country. Encouragingly, the incidence of Bovine Tb in feral deer at this study site, as determined by this year's survey, was low with just two deer, an old red stag and an old red hind both born before the poison operation showing lesions typical of Tb infection. One of the pigs also had lesions typical of Tb infection. It is expected that all three samples will culture positive for Tb. In 1993, prior to the aerial

1080 possum poisoning operation, the incidence of Bovine Tb in feral deer in this area was as high as 41%. The quality of deer harvested this year was generally very good with reproductive rates considerably higher than the north-eastern component of the survey.

A number of large velvet stags were seen during both components of the disease survey this year. These animals were specifically excluded from the survey and should provide some excellent trophies this roar.

A full report on the study will be made available in a later issue of *Target Taupo*. In the meantime, if hunters shoot deer or pigs which they suspect show signs of Bovine Tb, they should provide as much detail as possible, either on their hunting diaries, to Environment Waikato or EPRO Limited, Taupo.

Sika Competition

This competition is on again this year, although organisation is a little behind schedule at present. If you shoot a deer head (red or sika) anywhere in the country over the roar, bring it along to the Great Lake Centre in Taupo on competition day, Sunday 27 June 1999. This year's competition promises to be bigger and better than ever before!

Remember, you need the lower jaw with your head to be eligible for entry. Any head shot since last year's competition can be entered. You can either register on the day or through Custom Cartridges, Taupo (telephone (07) 378 4593). Watch out for further details in the hunting and outdoor magazines over the next few months.

Autumn Pest Control Operations Involving Toxins

1080 Poison will be/has been laid at only two locations on conservation lands within the conservancy through the autumn hunting permit period.

1 1080 pellet baits were distributed by helicopter on the true right (eastern) bank of the Tongariro River between the Whitikau Stream and opposite the Tongariro National Trout Centre during February 1999. The operation was conducted by EPRO Limited on behalf of Environment Waikato and the Animal Health Board. This operation should not affect hunters to any degree, although there are a still few pigs in this area at present.

2 1080 pellets stapled to trees in biodegradable paper bags will be used in a possum maintenance control operation in the Mangamingi Stream Ecological Area of Erua Forest during the March to May period. Hunters in this area through April should take care to clearly identify their target, as up to four contractors will be working the area. While a danger to dogs, the toxin will generally be unavailable to other non-target animal species.

Brodifacoum Poison in the form of "Talon" or "Pest-Off" baits has been laid at numerous sites around the conservancy as a means of maintaining low pest densities where successful knock-down operations have occurred. This bait is laid in bait stations, but pigs may get access to bait either directly out of bait stations or by consuming rats or possums carcasseses that have died from eating

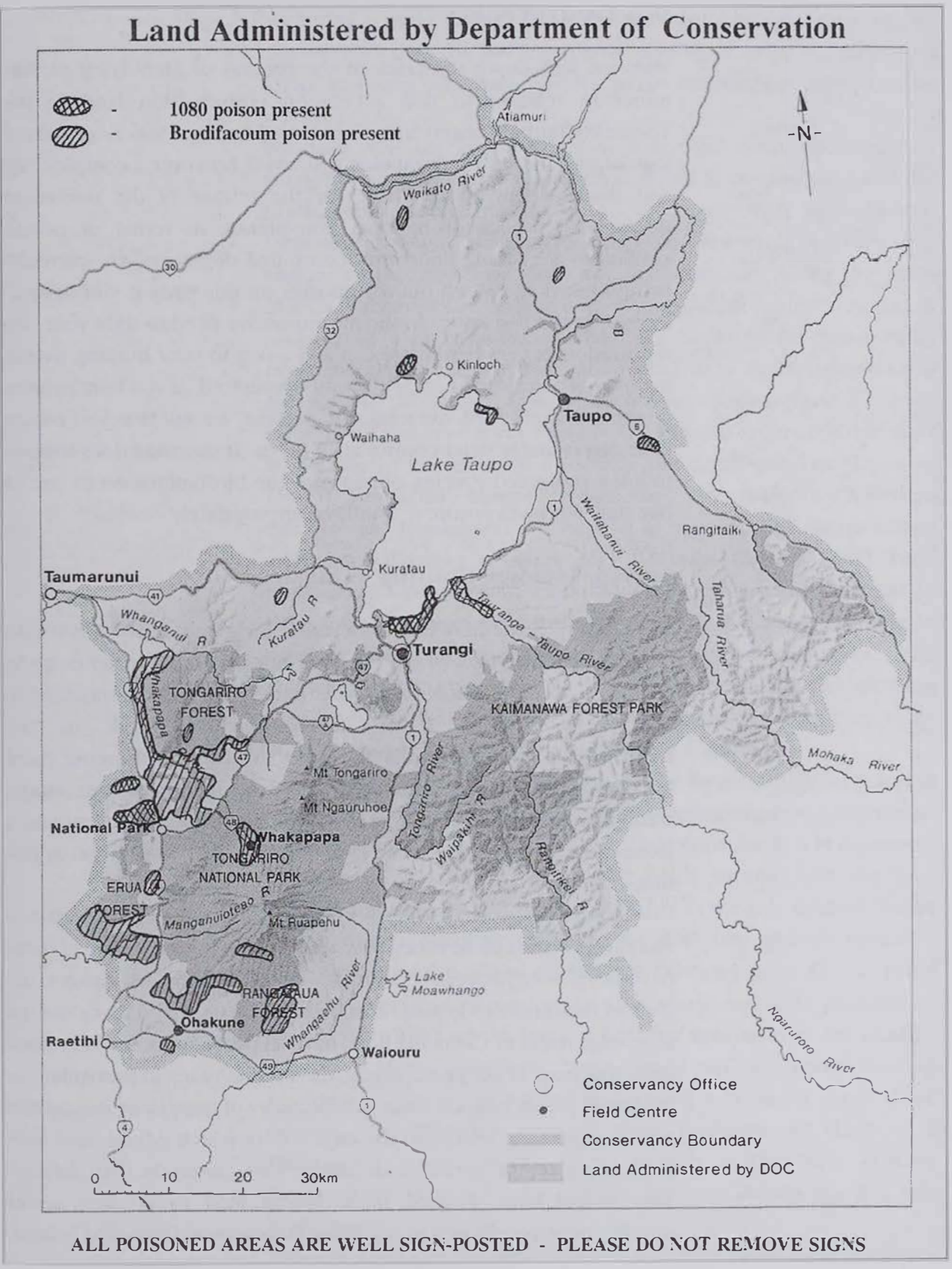
bait. **It is recommended that hunters do not eat the liver of any game animal taken from the following areas:**

- In the vicinity of the Whakapapa Village and Ohakune Mountain Road within Tongariro National Park.
- Rangataua Forest around Rotokura and Dry Lake and on the lower lava flow east of the lakes.
- The Kapoors Road Frost Flats in Tongariro Forest.
- Waituhi/Kuratau Scenic Reserve - 100 acre bush block.
- Around extensive areas of Erua Forest south of Erua Road, including the Mangamingi Ecological Area, Erua Sanctuary and Middle Road areas.
- Taupo Scenic Reserves (Opepe SR, Tirohanga SR, Pakuri SR).
- Ohakune Lakes Scenic Reserve.
- Lower Tauranga-Taupo River at Te Rangiita.
- Ohinetonga Scenic Reserve.
- Whakapapa Gorge Scenic Reserve and the adjoining north-western boundary of Tongariro Forest.
- The farm boundaries of the Taurewa and Raurimu Landcorp Farm blocks in southern Tongariro Forest.
- Kaiapo Bay Scenic Reserve between Kinloch and Taupo on the northern lake shore.

See the attached map for more specific details of these areas. All poisoned areas are well sign-posted. Please do not remove signs. If dogs get access to carcasses in these areas, an antidote in the form of a Vitamin K injection can be obtained from your local vet.

National Deer Control Plan

Since the publishing of the 114 page analysis of submissions in June 1998, there has been no more news to report regarding this process. Copies of the analysis of submissions on the Department of Conservation document "Issues and Options for Managing the Impacts of Deer on Native Forests and Other Ecosystems" can still be obtained at a cost of $5.00 per copy from the Department of Conservation, PO Box 10420, Wellington.



ALL POISONED AREAS ARE WELL SIGN-POSTED - PLEASE DO NOT REMOVE SIGNS

Dog Control Policy

Staff are well down the track in the process of identifying various issues in relation to dog access on conservation land in the Tongariro/Taupo Conservancy as required by the 1996 Dog Control legislation. The public discussion process is, however, a complex one and there is still no timetable for the release of the discussion document. Issues of national consistency in terms of permit conditions for taking dogs into "controlled dog areas" are currently being looked at. Watch out for updates on this issue if you have an interest in the dog issue. In the meantime, we need to sight your dog registration papers before we can add a dog to your hunting permit for areas where dog access is currently permitted. If you hunt in areas where vulnerable wildlife might be present, we ask that you ensure your dog is under strict control at all times. If your dog does happen to kill a protected species, please pass the bird/animal on to one of our staff who will ensure it is utilised appropriately.

Spring/Summer Hunting Summary

Hot and dry is the best way to describe the summer of 1998/99. In contrast to most years where the bush gets drier the further east you go, as a result of the La Nina weather pattern this year it was drier in the west. While it is never easy to think of the Kaimanawa/Kaweka/Ahimanawa Ranges as "damp" in summer, there has been a surprising amount of moisture in the eastern ranges through summer. Although rivers are low and the bush "crunchy", things are not as dry given the lack of rain as they usually get at this time of year.

Hunters have reported some very good velvet stags (both red and sika) around the conservancy over the summer period. Some of these have been very impressive animals. In the Kaimanawa Ranges, the back of the Tongariro Prison Farm, Ngapuketurua, Kaipo River and the pine edge north of Clements Road have all produced some very good stags this year. In Tongariro Forest, the Waione Valley in particular has produced plenty of good stags. The number of large stags around this season is possibly related to the mild winter which would have seen stags come out of winter with better body condition than normal. This would have allowed more spring feed to go into antler development as opposed to regaining fat reserves. Improved habitat,

with the general decrease in deer numbers in many parts of the conservancy over the last few years, is also likely to be a contributing factor as young deer born into the better habitat now start to reach maturity.

February saw the conservancy deer harvest made up largely of stags, probably as much as anything related to the hot days and the hinds being tucked away in heavy cover with their fawns. Generally though, hunting through January and February has tended to be hard with deer not that obvious. Along the main Middle Range of the Kaimanawa Ranges, staff reported seeing a number of well conditioned red deer hinds while doing Pinus contorta control. These hinds will attract stags in the roar, so keep an eye on the upper Makomiko Stream during April if alpine hunting for red deer is your scene. Other areas where the odd deer is starting to be seen again include the north-western slopes of Mount Tongariro, Mount Urchin and the Waiotaka/Whitikau catchments. These areas are starting to become well worth a little attention following a major deer decrease due to aerial 1080 poisoning of possums in 1994. The subsequent improvement in the habitat has been dramatic and the result is a major increase in quality among the young deer born since the operation. The challenge nearly five years on is to keep the lid on the growing deer population as it begins to push back harder than ever, in an attempt to maintain the increase in habitat quality.

Time has not allowed processing of the large sample of hunting diaries received to date from the spring/summer period. Thanks to all the hunters who have provided this information, it is extremely valuable. This will be analysed through autumn and the final hunting figures for 1998 will be available in the July issue of *Target Taupo*. To those of you waiting for deer jaw analysis results, a training seminar in Taupo during late February gave 23 interested hunters the skills to undertake this work and it is planned to significantly increase the level of deer jaw analysis over the next 12 months. Many jaws have been "saved up" for these training sessions. If you are interested in learning a bit more about these training opportunities, contact Mark Bridgman at Hunters & Habitats in Taupo, or the Taupo Branch of the New Zealand Deerstalkers' Association (see below for more details on what this is all about).

Winners of the spring/summer Hunter Diary Prize Draws were as follows:

Air Transport from Lakeland Helicopters: Wallace McFadyen, Raetihi
Air Transport from Air Charter Taupo: Terry Brown, Auckland
$100 voucher from "The Fly & Gun" shop Taupo: Noel Sheppard, Ohakune
100 rounds Federal ammo from New Zealand Ammunition Co.: Callum Jackson, Te Awamutu
Hunting garment from "Stoney Creek": G Styles, Cambridge
Hunting video from Neil Philpott: Brent Hazeldine, Auckland

Get out and enjoy what the autumn hunting period has to offer and we look forward to receiving your hunting diaries, wildlife sightings, stag trophies and deer jaws when current hunting permits expire on 31 May 1999. As always, identify your target, have respect for our forests as well as the wildlife that depend on their health and productivity, and have a safe and successful autumn period.

This red stag is typical of the sort of quality hunters can start to expect from areas which have shown a dramatic increase in habitat quality following successful possum control and/or reduction in game density. This 180kg, 15 point red stag was taken by local Turangi hunting identity, Graeme Weller, in Tongariro Forest during February

Graeme Weller with an impressive red stag, February 1999 Photograph by Kevin Singer

Another view of Graeme Weller's red stag Photograph by Graeme Weller

of this year. At 6.5 years old, this is one of the better animals to be shot locally in recent times. You will get a chance to see this impressive head on the Sika Competition measure-up day at the Great Lake Centre, Taupo, on 27 June 1999.

Deer Jaws

Thanks to those hunters who continue to supply deer jaws from their successful hunting trips to the central North Island. These provide vital information on herd structure and nutrition which, together with forest plot data and hunting diaries, reveals a lot about what is going on in the hills in terms of forest/deer/hunter relationships. These relationships involve complex biological systems and our understanding, and therefore our management, of them is only as good as the information we have to work with.

There is a big push from the East Coast/Hawkes Bay Conservancy of the Department of Conservation and the Hawkes Bay Branch of the New Zealand Deerstalkers' Association (NZDA) to increase the level of support from hunters in providing deer jaws and hunting diaries as the new deer impact management regime is implemented in the Kaweka Ranges. Part of this is a trophy competition this autumn, parallel with and complementary to the well established Taupo version.

The Hunters & Habitats Club (PO Box 794, Taupo) and the NZDA in association with the International Sika Society, are also trying to instigate a more comprehensive data collection system for the central

North Island sika herd. This is part of a collaboration by East Coast/Hawkes Bay and Tongariro/Taupo DOC conservancies, Hunters & Habitats (which also runs the annual sika competition), NZDA and the International Sika Society to improve the information base on the central North Island sika herd.

If you are interested in seeing a better understanding and therefore management of what is going on in the mountains, please consider taking deer jaws, returning hunting diary information and supporting these groups over the coming months.

If you do have a jaw you would like to contribute (and we certainly hope you do), please ensure it is cleaned and dry if you go putting it in the post to us!!! Rotten jaw bones make a most unpleasant addition to the Turangi office mail room in the heat of summer. Once the jaw is removed, cut off as much flesh as you can and put it on the roof of the shed for the sparrows, maggots, wind and sun to clean up. It only takes a couple of weeks and you will save us more than a few headaches! Don't forget to record as much information about your jaw as you can, including your name and address. Alternatively, you can leave jaws in the jaw boxes at huts, on Clements Road, at the Hunters & Habitats base (38a Arthur Crescent, Taupo), or at your local NZDA.

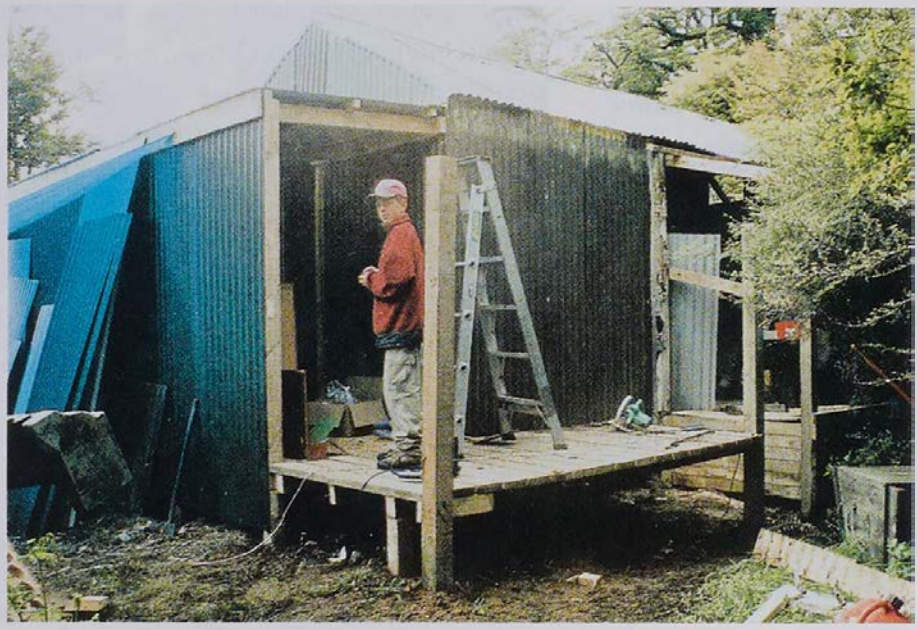
If you want to see better management of the high country, start by participating in data collection - up to you !

Tongariro Forest Douglas Fir Removal

Those of you who hunt Tongariro Forest will know the 35ha stand of 45 year old Douglas fir trees which occurs along Slab Road. A market currently exists for this timber and plans are now well advanced for its removal between March 1999 and May 2000. Hunters visiting this area in April can expect some small delays during working hours as they travel along Slab Road. We apologise for any inconvenience this may cause and hope the logging activity does not seriously interrupt your enjoyment of this special area. On the plus side, hunters should watch the felled areas next spring as the new growth attracts deer into a situation where they will be more vulnerable to harvest.

Te Iringa Hut Burns Down

Te Iringa hut in the northern Kaimanawa Forest Park burned to the ground in the early hours of Tuesday 23 February 1999.



Te Iringa Hut, showing Hunters & Habitats' members working on its refurbishment before the fire Photograph: John Church

The fire started when a white spirit cooker, usually used outdoors, exploded and ignited the tiny wooden hut. A hunter attempted to put the fire out, but had to abandon his efforts when ammunition in his pack began to explode.

Department of Conservation staff are particularly sad at the loss of the hut. The hut, built in 1964 by the old New Zealand Forest Service, was one of the oldest in the park and had tremendous character. It was popular with family groups as well as deer hunters as it was an easy hour's tramp from a car park at Clements Mill Road, off the Napier-Taupo highway.

Restoration of the hut had recently been started by a local hunting group, Hunters & Habitats, which had spent hundreds of volunteer hours upgrading and adding to the hut's facilities.

"The twisted and wrecked iron was a tragic sight," says Ralph Turner, DOC's Taupo Field Centre Supervisor. "We'd recently visited the hut to install a new fire extinguisher and to look at the excellent work carried out by Hunters & Habitats. As well as re-lining the hut, the group had replaced six bunks with four to give more cooking space and had put in a wood-burning stove. It's a pity the hunter hadn't used it."

Mr Turner says people should take extreme care and follow operating instructions to the letter when using any outdoor cookers. White spirit stoves, like the one that exploded, have caused many accidents over the years. They are usually used outdoors where they are well ventilated, he says.

The loss of the hut means the nearest accommodation to Clements Mill Road is Oamaru Hut, a further five to seven hours' walk.

After the fire that razed the hut in February this year. Even the water tanks boiled dry

A decision regarding the possible re-building of the hut will be made in the future. It's doubtful the Department of Conservation could provide funds to rebuild the hut, but other options will be explored.

Wild Dogs

Reports from hunters in the Tauranga-Taupo waterfall area, within northern Kaimanawa Forest Park, suggests a small population of wild dogs may still exist in that part of the park. A small black bitch which had clearly given birth to pups recently, and a bull terrier cross-looking dog, were seen above the waterfall feeding on the remains of a deer carcass just prior to Christmas. The source of these dogs is likely to be lost pig dogs from the adjoining pine forest (Lake Taupo Forest) in the Kiko Road area.

If an opportunity presents itself, hunters are encouraged to shoot these dogs. From the description it appears the bitch, although timid, is approachable but the male is extremely wary of humans. There are likely to be other dogs present also since the bitch was obviously in milk over summer.

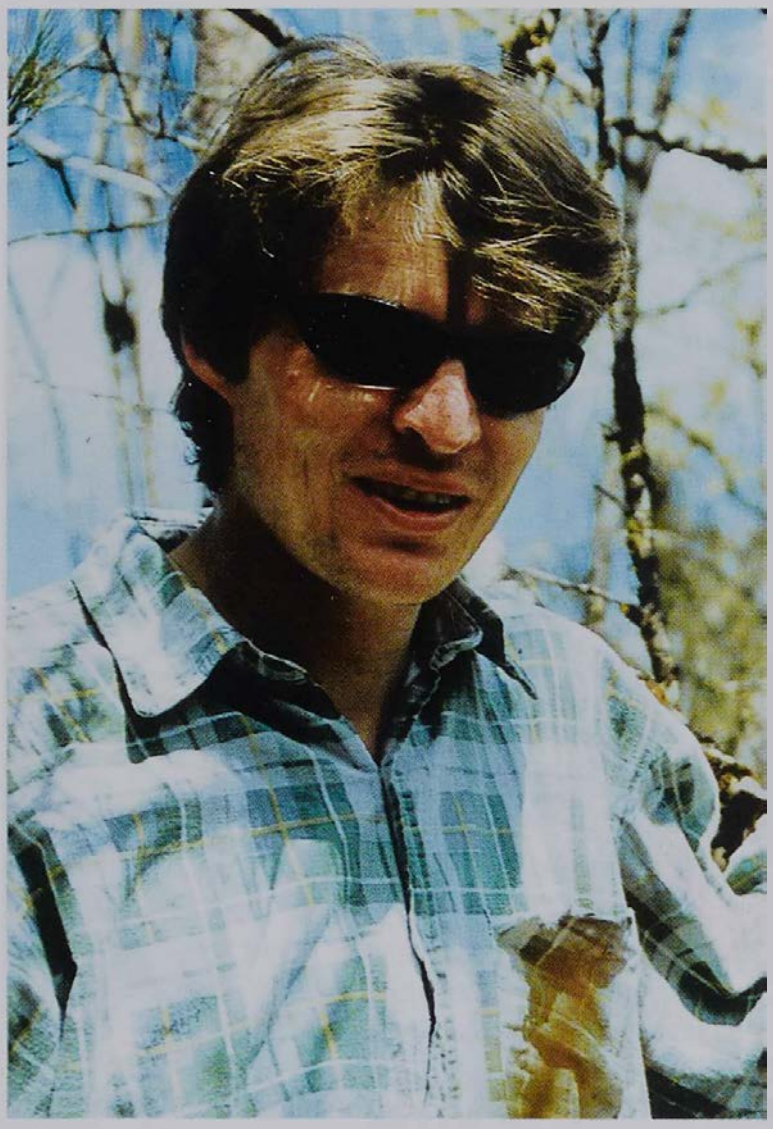
Although not confirmed, there have been reports of wild dogs in the Tree Trunk Gorge/Rangipo South area along the upper Tongariro River. No details are available on numbers or types of dogs but dogs have been heard at night and unaccompanied dog marks have been found around road ends and camp sites.

Wild dogs pose a significant threat to a range of wildlife in these areas.

Staff Profiles

Sean Husheer

Sean has worked for DOC in the Hawkes Bay, Nelson/Marlborough, Auckland and Wellington conservancies in a variety of roles including hut and track maintenance, wild animal and weed control, and vegetation monitoring. In between Sean obtained a Masters degree in ecology from Lincoln University. He has worked in his current position of Technical Support Officer for the past three years and is responsible for the Tongariro/Taupo Conservancy's forest monitoring. In summer this entails undertaking data collection field trips with the help of paid and voluntary staff. In winter Sean uses the excuse of data analysis and report writing to keep out of the cold. As part of his work he is commencing a four-year PhD programme looking at the effects of deer in Kaimanawa and Kaweka Forest Parks. In his spare time, between learning to fly and restoring his house in Turangi, Sean telemark skis and trains his dog to find kiwis and people buried in avalanches.



Nick Singers

Nick describes himself as having a severe addiction to the general study of New Zealand's native plants and natural history, as well as New Zealand's introduced species. He has been part of the Turangi office for over a year now, where he has an advisory role to the Department's threatened plant management and weed control work. Before coming to Turangi Nick worked as a contractor for DOC and several other organisations undertaking Protected Natural Area surveys, weed surveys and other ecological work around the North Island. Prior to that he studied at Massey University where he received BSc and MSc degrees, and has also worked as a gardener full- and part-time on a number of occasions.

In his spare time Nick enjoys exploring the outdoors and is also an avid home gardener.

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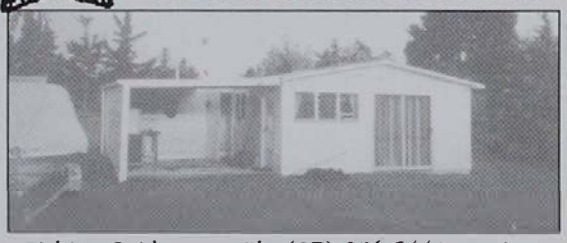

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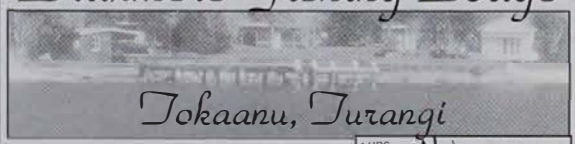
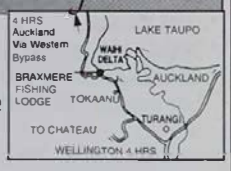


Tokaanu, Turangi



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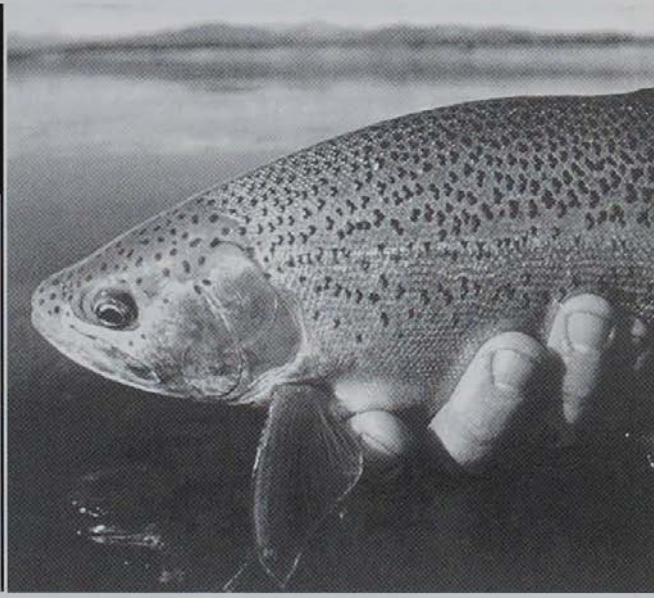

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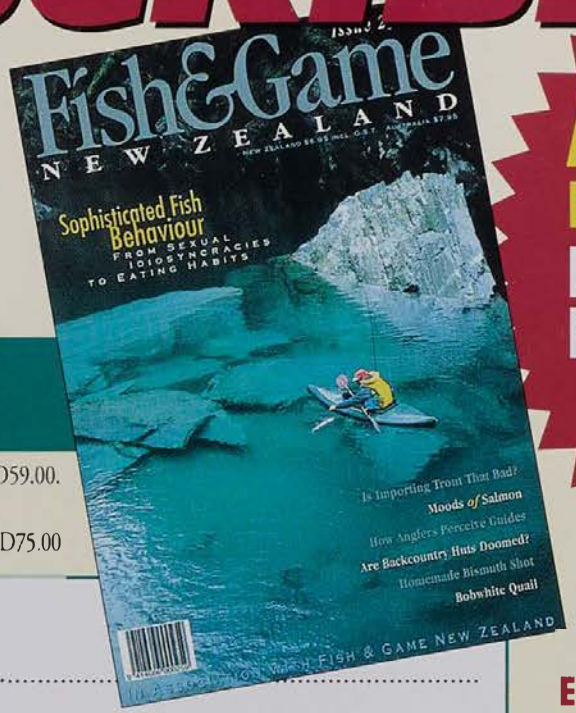

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