TARGET TAUPO

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

NOVEMBER 1997, ISSUE 26

Department of Conservation
Te Papa Atawhai

We're giving you our word on the environment.

At ECNZ, we believe the environment shouldn't suffer when we generate power. That's why we're always careful to use and manage resources responsibly. And why we're committed to consulting with interested parties on all important issues. We've also developed a set of Environmental Performance Indicators for the company. You can read about them in the ECNZ Environmental Report, released in conjunction with our 1996/97 Annual Report. To get copies, phone us on 0800 4 ENERGY (0800 436 3749) and just say the word.

ECNZ

Internet: http://www.ecnz.co.nz

HKM ECNZ

TARGET TAUPO

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

NOVEMBER 1997, ISSUE 26

Published by
Department of Conservation
Tongariro/Taupo Conservancy
Private Bag, Turangi, New Zealand

ISSN 0114-5185

Telephone (07) 386 8607
Facsimile (07) 386 7086

Production and advertising by Fish & Game New Zealand
Telephone (09) 579 3000
Facsimile (09) 579 3993

The Use of Lead in Taupo Waters

by Michel Dedual and Glenn Maclean

Lead is widely recognised as an environmental poison and as managers of the Taupo fishery we undertook an assessment of the possible effects that the lead used in fishing equipment might have on the local eco-system. This involved compiling information from studies carried out both in New Zealand and elsewhere about lead, including its toxicity, its abundance in Taupo waters, likely levels of inputs from lost fishing gear and possible alternatives which could be used. Note that in this article we have omitted many of the more complex aspects of the chemistry of lead so as not to unnecessarily complicate the issue for readers.

Although lead is a natural constituent of soil and water, in recent decades the worldwide production and use of lead have expanded dramatically, as has the associated problem of lead pollution in aquatic environments.

Present-day levels of lead in industrialised countries have been estimated to be two to three orders of magnitude higher than levels in the pre-industrial age. The estimated annual global emissions of toxic metals (in 1980) showed that lead constituted by far the largest emission of such metals. Lead releases originating from human activity were estimated to be approximately 2,000,000 tonnes compared to natural releases of approximately 6000 tonnes each year.

Fishing and hunting sports contribute to this increase in the amount of lead released into the environment. Between 1988 and 1993, the total deposition of lead shot and sinkers into the Canadian environment by hunters, clay target shooters and sport anglers averaged approximately 2500 tonnes per year. About 70% to 80% of this deposition was lead from shooting sports. Data from Canada, USA, Great Britain and elsewhere though, indicates that the lead intoxication of loons, swans and other water birds from the ingestion of fishing sinkers as well as lead shot is a problem. The problem occurs when lead pellets or sinkers are lost in shallow areas (or dropped on the bank) where they are sieved up by feeding waterfowl and accumulate in the gizzard. As a consequence of widespread

mortality amongst swans, the sale of lead fishing sinkers weighing less than 28g (1oz) has been banned in Great Britain since 1987. In USA the use of lead sinkers in Yellowstone National Park and Red Rock Lakes National Wildlife Refuge has been banned, and the USEPA (United States Environmental Protection Agency) has proposed to prohibit nationwide the manufacture, processing and commercial distribution of lead sinkers of a size range known to be ingested by water birds.

New Zealand is not immune from lead poisoning of waterfowl. Poisoning has been shown to occur in this country amongst waterfowl ingesting lead shot and it is estimated that throughout New Zealand, as much as 14% of waterfowl could be dying annually from lead poisoning.

While a substantial number of studies have concentrated on direct effects and the incidence of lead shot in waterfowl, much less is known about the effects lead shot has on aquatic systems.

A study in Otago showed that Kaikora lagoon had a mean density of 387,500 shotgun pellets per hectare in front of maimais used for duck shooting. The lead shot was found to have no significant effect on sediment lead levels in the lagoon. It was concluded that the lead shot released no significant amount of lead into the sediments. The author concluded that lead from exhaust gases, tip leachates, road runoff and industrial waste may pose a much higher relative threat to aquatic communities. However, evidence suggested pellets may have to be over 20 years in age and as much as 100 years old before they turn "soft" and break up.

Solid lead has a narrow band of acidity conditions in which it will become soluble and it is highly insoluble in neutral water. Only in very soft waters (waters of acidic nature) can it occur in significant concentrations within the water.

Sub-lethal effects on aquatic life can include the darkening of the tail of salmonid fish, which can be used to diagnose low levels of lead in the water. For example, some evidence of this effect has been found in the fish from rivers receiving discharges from old lead mines in mid-Wales. An American study showed that trout feeding on invertebrates originating in lead-contaminated rivers displayed some pancreatic and hepatic effects. Both brown and rainbow trout deposited fecal material in long ribbons in comparison to the shorter and narrower diameter fecal material from fish fed with a normal diet. Brown trout

also had a swollen stomach and large intestine owing to excess feed material which was not passed through the gut.

Constipation as a result of lead exposure has not previously been reported for fish but this effect is well known in mammals. Heavy metals can be absorbed through the gut and are ultimately distributed to other organs such as liver, kidney and muscle. It has been demonstrated that ionic metals are not absorbed as efficiently and may not be as toxic as metals bound to proteins.

Severe poisoning of humans by drinking lead-contaminated water is rare because a large dose is required. The primary health concern posed by lead is either indirect poisoning, particularly through formation of organic metal complexes in foodstuffs, or long-term chronic effects.

Lead is particularly toxic to children, posing hazards that include kidney damage, metabolic interference, central and peripheral nervous system toxicity and depressed biosynthesis of protein, nerve and red blood cell formation. Health requirements indicate that concentrations of lead in water should not exceed 5µg L^{-1} in soft waters (alkalinities of 20mg L^{-1}) and 25µg L^{-1} in more neutral water.

The water of most Taupo streams is soft with average alkalinities (12 measurements) in the Waitahanui and Tauranga-Taupo rivers over the 1993/94 period of 26.6mg L^{-1} and 20.5mg L^{-1} respectively. In Taupo waters, therefore, the lead will constitute a health risk at lower concentrations than elsewhere.

In the Taupo area lead has two origins: natural through the weathering of andesite material in the catchment particularly around Lake Rotoaira; and human via leaching from garbage, exhaust gases, road runoff, shotgun pellets and lost fishing material. Lead concentration in the water of Lake Rotoaira between 1972 and 1974 was 3µg/L. In Lake Taupo at the same period it was measured at 1.4µg/L and not detectable in Waihi Bay and Two Mile Bay respectively. In plankton, lead levels were 60, 46 and 34µg/g in Rotoaira, Waihi Bay and Two Mile Bay and in the sediments it was undetectable for the three sites. It appears that diverted water from Rotoaira to Taupo does affect the lead concentration which decreases as the water passes downstream. The lead concentration in Rotoaira plankton at 60µg/L is regarded as high. Measurements made in October 1994 and April 1995 showed slightly lower concentrations of lead in Lake Taupo. These concentrations ranged from 0.22µg L^{-1} at

the surface, to 1.4µg L^{-1} at the bottom. At the surface of the sediment lead concentration was 10.5µg kg^{-1}. However, it is not known if the measurements made in the 1970s were reliable enough to use them as a comparison to detect any trend in lead concentrations in Lake Taupo. There is therefore a need to continue to monitor lead levels, especially around areas which are heavily contaminated by lead debris from fishing gear.

To put these concentrations in perspective, the lead concentrations in the water of Lakes Taupo and Rotoaira are much lower than the average lead concentration in Canadian tap water which was 7.6µg/L in 1976. The New Zealand Ministry of Health and the Australian New Zealand Environmental Conservation Council (ANZECC) have set lead concentration thresholds as follows: 1-5µg/L in water for protection of aquatic life (1992) and 10µg/L in drinking water (1995). The ANZECC guidelines are currently undergoing a review but the new guidelines have not yet been released.

The amount of lead in Lake Taupo originating from shotgun pellets is likely to be insignificant in comparison to that from lost fishing

equipment. Sources of lead in fishing equipment include lead balls from downriggers, lead trolling line and bug eyes, beads and body wrapping used in weighted nymphs.

As part of this assessment we surveyed local retail outlets in the Taupo area as well as several major city stores to assess the amount of lead which was sold during the last 12 months for use in Lake Taupo. The results show that the total amount of lead sold was in the order of 4000kg. This amount does not include home made sources such as lead recovered by melting down old batteries, wheel weights or the caps of fancy bottles of wine. The majority of this lead material will not be lost in the lake or rivers, but this gives some scale of the maximum input possible from lost fishing equipment. If all this lead immediately dissolved into the water in the lake (rather than the fraction which actually occurs) it would raise the lead concentration in the water by approximately 0.07µg/L. The amount of lead present in nymphs used in Taupo rivers may seem small in comparison to a length of lead line or a downrigger ball but the erosion of the lead by sand in the stream sediment will release particles of lead into the water flow faster than will occur through degradation in the lake sediments.

Almost all studies that have investigated the concentrations of lead in soils, sediments, water or biota have taken place on or around clay target shooting sites. In order to have similar data from Lake Taupo a study has been initiated to compare areas where large amounts of lost lead line and the occasional downrigger ball lie in the sediments with other areas free of debris. The study will assess the amount of material lost in some of the more popular trolling spots and compare the sediment lead concentration between the different areas. Results of this study will be published in the next issue of *Target Taupo*.

As previously discussed, the main reason for banning lead shot and sinkers has been the death of water birds following ingestion of lead and the death of predators after eating lead-poisoned birds. This is not a problem in Taupo as virtually all fishing equipment containing lead is used in water of sufficient depth that it is well out of reach of waterfowl seiving through the sediments. To our knowledge there is no example where the reason for banning lead products was related to wider environmental issues such as possible lead accumulation in the sediment and its subsequent increased concentration in the water. It is debatable whether we actually have legal authority under the Acts

we work under to ban lead simply on a premise of looking after the wider good of the environment when the use of lead-based fishing equipment is having no demonstrated effect on the fishery. Lead inputs into Lake Taupo from some natural waters are relatively high but even so lead is undetectable within the lake sediments. We are currently undertaking an assessment of lead levels within the sediment at Rangatira Point, which is probably the area of the greatest amount of lead-based fishing debris. The analysis will measure total lead and include those forms of lead not available for biological uptake, but even so we do not expect any detectable increase in lead levels compared to those in sediments from uncontaminated areas in the lake.

However, rather than dismiss concerns, we recognise that lead is a serious environmental toxin and even if it is having no measurable effect, if we can avoid using it then the only responsible action is to do this. Attempts to solve problems of lead shot or lead sinker use though, by advocating a voluntary switch to non-toxic substitutes, have, in general, been ineffective. Substitutes for lead shot are not as ballistically effective and in general substitute materials tend to be more expensive, less malleable and less readily available. However, we believe that these problems can at least, in part, be overcome in the Taupo fishery.

Downrigger weights can quite easily be made of other material such as concrete or iron shaped into an aerodynamic form. These are unlikely to cost any more than lead weights and a number of users have already indicated to us that they would be prepared to change to such weights if they were readily available. At present no one is manufacturing non-lead weights but the opportunity is there and we are confident they will soon be available. It is not difficult to make your own weights in the backyard by pouring concrete into a mould, after all they don't need to be pretty. The other option is to encase the lead downrigger weight with a coating so that the lead is sealed from the surrounding water. The coating though needs to be very robust so that it is not fractured or torn if the weight is dragged along the bottom.

There are a number of available substitute materials which can be used in place of lead when tying weighted nymphs, for example tungsten beadheads which are 50% heavier than lead and only slightly more expensive. Lead-cored trolling line is very convenient to wrap around the hook but there certainly is no problem to tie effective weighted flies using non-lead products.

The difficult problem to overcome is finding a suitable substitute for lead lines used in deep trolling. Downriggers (with non-toxic weights) are expensive and wirelines, while very effective, are much more difficult to use and the angling experience less enjoyable. At this stage we are not aware of a ready alternative which combines the sinking characteristics with the suppleness and ease of use of a lead line.

The use of lead products is not threatening the Taupo fishery but where ready alternatives exist which do not diminish anglers' enjoyment, we should use them. Much of the attraction of Lake Taupo is its clean, natural appearance and it is up to all of us to take responsibility for maintaining this and be proud of it. In general we are not very good at this - one only has to look at the amount of litter on the banks of all the popular fishing pools - but things have to change. For too long we have rested on our laurels because New Zealand has a much cleaner, greener image than most other countries. The reality is we treat the environment poorly, we just haven't been in this country long enough to wreak the damage that has occurred through much of Europe and elsewhere. However, unlike many other places it's not too late to change, but it's up to each one of us to start taking responsibility for our own impacts on the environment.

If you have any ideas of alternative options, particularly for lead lines, let us know. We will shortly put together an article detailing just what alternatives are available and some practical notes on how to obtain and use them. It is not imperative that changes occur immediately but it is our goal to minimise the use of lead-based materials within the next few years.

Effect of Possum Control on Tb Prevalence in Wild Deer

Understanding the livestock disease, bovine Tb, in wild deer populations is a major issue, not just for farmers, veterinarians and Government officials, but also for deer hunters. The following article by Graham Nugent, Landcare Research Manaaki Whenua New Zealand Ltd, outlines proposed work on this topic, based in the Waimarino, Waiotaka and Whitikau catchments of north western Kaimanawa Forest Park where the disease has been present in wild deer for 25 years or more.

Background

Wild deer are strongly implicated as a potential maintenance host and reservoir of bovine Tb by three lines of evidence showing (i) high prevalance (>30%) in some wild deer populations; (ii) that deer-to-deer transmission occurs on farms; and (iii) that the disease can pass from farmed deer to other wildlife (e.g. possums). The key question is whether the disease is self-sustaining in wild deer populations, and if they are able to act as a source of infection in the absence of reinfection from other species. If so, then deer control will be essential in any attempt to eradicate the disease.

However, it remains possible that the high prevalences seen in some wild deer populations are simply the product of possum-to-deer transmission, which has been conclusively demonstrated to occur with young farm deer. This project aims at determining the role of deer in maintaining Tb in wildlife by monitoring changes in Tb prevalence in wild deer following possum control in the Umukarikari Range east of Turangi. Aerial 1080 poisoning in winter 1994 reduced possum densities

by more than 90% and deer densities by a substantial but unquantified level. In 1996 the first of three annual surveys monitoring changes in Tb prevalence was initiated. It showed that none of the sample of 21 deer born after the poisoning in 1994 had become infected with Tb. Similarly, two post-poison disease surveys (in 1995/96 and 1996/97) in the Hauhungaroa Range showed that only a few of the young deer sampled had become infected since possum numbers had been reduced. All the infected deer came from areas close to an unpoisoned possum population. This suggests the possibility that so long as possum numbers do not rebuild the reservoir of disease contained within the wild deer population may gradually disappear as older animals die out, even if no further management action (i.e. no deer control) is undertaken. This finding, if true, has important management implications in that good initial and maintenance possum control may be all that is necessary to eliminate Tb from wild deer (unless deer are also being infected from other sources).

Objective of the 1997/98 proposal

To determine the effect of aerial 1080 poisoning operations for possums on Tb prevalence in wild deer, in order to help decide whether additional deer-specific control measures are required to eliminate Tb from wildlife populations, by determining Tb prevalence in wild deer in the Umukarikari Range east of Turangi in 1997/98.

An interim report will be prepared in June 1998.

Methods

Study area and broad experimental design: The proposal is to repeat the 1996/97 disease survey undertaken over 10,000ha of native forest east of Turangi (the north-western face of the Umukarikari Range), using helicopter-based hunting. Sampling will focus on the area within 8km of the native forest margin, as this is the area in which most infected animals were found in 1993/94 (24%) and 1996/97 (7%) compared with 0% in animals taken from more than 8km back.

The experiment is a straightforward comparison of age and sex-specific Tb prevalences within samples for the year immediately before poisoning and two to four years afterward. No non-treatment control areas are available, as all of the area surveyed in 1993/94 was poisoned. The experiment therefore will not be able to objectively rule out the possibility that any decline in prevalence is possibly just part of a natural cycle. Subjectively, that possibility appears unlikely in light of the long-standing (>25 year) presence of the disease in pigs and deer at Turangi.

Deer sampling and necropsy: Approximately 30 deer will be obtained by shooting, using contracted helicopter-based hunters. Hunting will take place in the last week of November and first two to three weeks of December when deer are most visible in this area.

Deer will be carried out whole to an inspection site, where an identification number will be assigned, and the date, species, sex, kill location, pregnancy status and apparent age class recorded. The paunch and intestines will be removed - the paunch will be discarded but the intestines will be placed in a labelled plastic bag. The carcass and intestines will be stored in a chiller at Turangi for up to four days or until a worthwhile load of deer has been accumulated, before

transportation by road to a venison processing plant. All carcasses and intestines will be inspected for Tb lesions by an experienced MAF inspector.

All lymph nodes will be inspected and sliced, and the body cavity and internal organs closely examined. All suspect lesions up to a maximum of two per animal will be cultured separately, as will material from each of the pooled retropharyngeal lymph nodes and pooled tonsils of all animals. The lower jaw bone will be removed after necropsy for age determination.

Statistical analyses and data to be reported

For the deer Tb data, the key statistical analysis required is simple and straightforward. Tb prevalences will be determined for each age-sex class, and results compared between years and age classes. Secondary analyses will look at differences between the sexes and species (sika and red).

Additional analyses will compare the distribution of infection within the body between different age classes and through time, to identify whether there are any major changes in the proportion of animals with head versus visceral infection since possum numbers have been reduced. This will provide information on the most likely source of any new infections.

Editor's Note: Results will be published in the July 1998 issue of *Target Taupo.*

Trout Movement in Lake Otamangakau

by Michel Dedual

Four years of trapping rainbow and brown trout during their spawning migration from Lake Otamangakau to Te Whaiau, Wanganui, and Papakai streams have helped us to understand this phase of their life. However, we don't know as much about their life in the lake which is, of course, the period when anglers can target them. Fishing in Lake Otamangakau requires skill and patience and many anglers interviewed during their quest ask questions such as, "what part of the lake do the fish use?", "is there any difference in the areas used by the brown and rainbow trout?", "do they remain there all the time?", "do they move during the day?" and "what makes them change their location?".

As part of the Tongariro Power Development consents process we undertook a study to:

1 Describe the distribution and movements of adult rainbow and brown trout in Lake Otamangakau from early spring through to late summer.

2 Assess if fish locations and movement patterns were related to manageable parameters like lake level and current in the lake.

Current in the lake is largely determined by the difference between the amount of water diverted from the Whakapapa and Whanganui Rivers which enters the lake through Otamangakau Canal and the amount of water leaving the lake through Wairehu Canal. This is controlled by Electricity Corporation of New Zealand (ECNZ). Furthermore, any difference between the amount of water entering the lake and the amount of water leaving creates changes in lake level.

Methods - The brown and rainbow trout used in this study were captured in July and August 1996 in the Te Whaiau trap as they returned from spawning upstream. Additionally in October 1996 four brown trout were captured from around the margins of Lake Otamangakau by angling. Radio transmitters were implanted in the body cavity of the fish using the same technique as for the experiment carried out in the Tongariro River (*Target Taupo*, issue 19, July 1995).

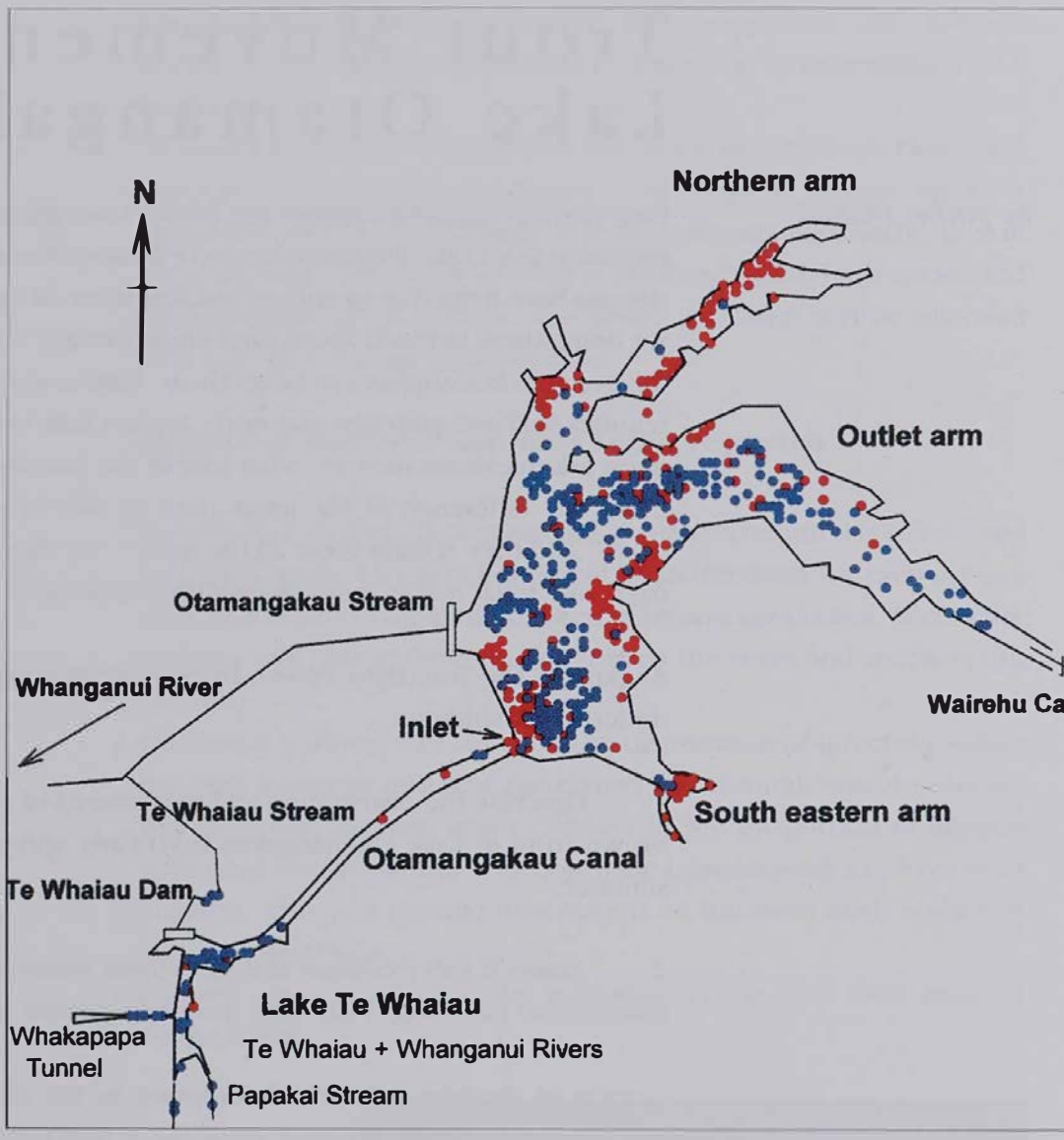


Figure 1 - Study site and radio-tagged trout location in Lake Otamangakau, August 1996 to April 1997. The red and blue dots represent brown and rainbow trout respectively.

To be able to track the fish through spring and summer the radio transmitters were equipped with a battery which would last eight months. After tagging, the fish were released close to the trap or, in the case of the lake-caught fish, close to the tagging site.

Fish locations were determined weekly from a boat on the lake and by foot along the canals. The same route was followed on each tracking day starting at the main boat ramp of Lake Otamangakau and then following the main channel through the lake. In January 1997 fish were also tracked over a 24-hour period at three-hour intervals to

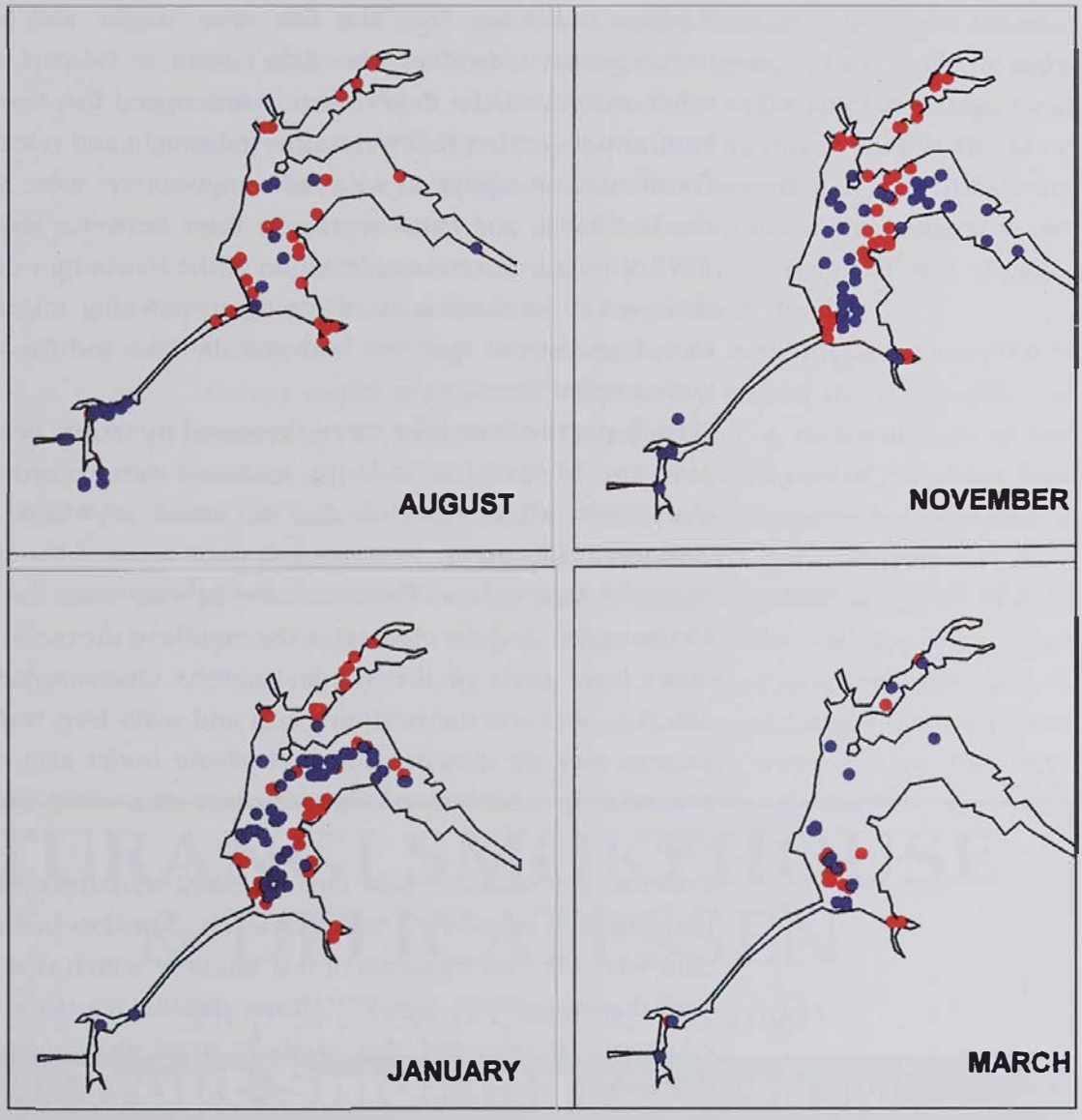


Figure 2 - Monthly distribution of rainbow and brown in Lake Otamangakau watershed. Red and blue dots represent brown and rainbow trout respectively.

determine what trout do at night in Lake Otamangakau.

Between early spring and late summer the water temperature and oxygen content of the water column at five sites in the lake were measured concurrently to the tracking. Lake levels and inflow-outflow data were kindly provided by ECNZ.

Results and discussion - A total of 36 fish (15 brown and 21 rainbow) were implanted with a radio transmitter. Three radio-tagged fish (all rainbow) were found dead during the first month of tracking. One transmitter was recovered along the Wairehu Canal among

fishguts indicating that the fish was caught and killed by an unscrupulous individual who didn't want to be part, unlike many other anglers, of the experiment. One tagged fish was caught and kept, and two other fish were reported caught and released.

Fourteen trout equipped with radio transmitters were recaptured in the Te Whaiau and Papakai streams traps between May and August 1997, showing that the implantation of the transmitter did not impair their sexual maturation or affect their spawning migration. Other radio-tagged trout spawned between the lake and the trap so were not recorded through the trap.

Which parts of the lake were favoured by trout - Between 17 July 1996 and 14 April 1997, 823 fish locations were recorded (Figure 1). Our results show that fish can be found anywhere in the Lake Otamangakau system. Nevertheless some areas of the system attract more fish than others. The most used habitats were the inlet in Lake Otamangakau and the channel in the middle of the outlet arm. On the other hand parts of the system such as Otamangakau Canal, the junction between the northern arm and main lake body, the south-eastern arm, the downstream part of the outlet arm, and the area immediately upstream of Otamangakau dam were not intensively used.

Dots located outside of Lake Otamangakau were brown trout tracked in the swamp area during high lake levels. The dots behind Te Whaiau dam were the two locations of one rainbow which was lost over the dam during spilling. Figure 1 shows that brown trout favoured the edges of the lake and that rainbow trout were mainly using the deeper part of the lake.

Although most parts of the lake were used by trout of both species over the tracking period, some seasonal patterns can be identified (see figure 2).

In August most rainbow trout were still found in the upstream part of the system especially in Lake Te Whaiau. Rainbow trout are known not to travel great distances from their spawning stream during the first month following spawning, which is why spent rainbow trout are often caught in the Taupo rivers through into spring and early summer. Many brown trout on the other hand were already back in Lake Otamangakau, using the area around the inlet and the edges of the lake. By September the rainbow trout started to move downstream toward Lake Otamangakau, mainly using the areas around the inlet and the outlet arms. Brown trout tended to establish

territories and the same fish could be tracked in the same location over many weeks. Very revealing were several of the angler- caught brown trout which were transported across the lake to be tagged and then released. Within a few days these fish were back at the same spot where they had been caught. It is interesting to note that during this period the dredging of Otamangakau Canal was underway and fish were commonly tracked just downstream of the dredge, suggesting that the dredging did not disturb the fish.

During October and November fish of both species concentrated around the inlet of Lake Otamangakau and in the outlet arm. In December the inlet was still popular but a concentration of fish became apparent in January in the upstream part of the outlet arm. As the summer continued, rainbow trout progressively established in the deepest part of the lake but brown trout remained in their previous areas. During the peak of summer (February), fish of both species used the deepest parts of the lake and the inlet more intensively, with some brown trout still favouring the areas close to the edges of the lake. Our tagging-tracking technique did not permit us to accurately assess how deep in the water column fish were

located, nor to detect any vertical partitioning of the rainbow and brown trout. However, it is unlikely that fish were located just above the bottom of the lake. We know from other studies that rainbow trout spend most of their time in the top three metres of water interspersed with brief deeper dives.

By March, fish of both species concentrated around the inlet with some fish moving upstream and using Lake Te Whaiau, probably on their way to spawn.

The use of the inlet area by rainbow trout early in the season may indicate that at this time this part of the watershed provides the best food supply. However, as the season evolves (November to January) the weedbed in the lake grows, which then provides the most productive habitat. Nevertheless the inlet remains attractive but not to the same extent as earlier.

Between November and January the outlet arm is the most intensively used part of the lake. The temperature and oxygen concentrations measured in this part of the lake highlight some interesting features. The water temperature in this area is not much different from the other arms of the lake and the oxygen concentrations were the lowest measured during our monitoring. The popular wisdom would suggest that such an area should be avoided rather than favoured by trout. The results of another study carried out by Cawthron Institute of Nelson and DOC sheds some light on this matter. This study found that the middle part of the outlet arm is the area which produces the largest amount of food in the lake. This strongly suggests that trout, especially the rainbows, concentrate where the food is the most abundant, not taking too much notice of the temperature and oxygen as long as they are adequate.

Fish movements - Individual daily movements were variable in both species with some fish travelling large distances and other remaining fairly stationary. Brown trout were on average less mobile than the rainbows. Female brown trout were the most stationary, and male rainbows were the most active.

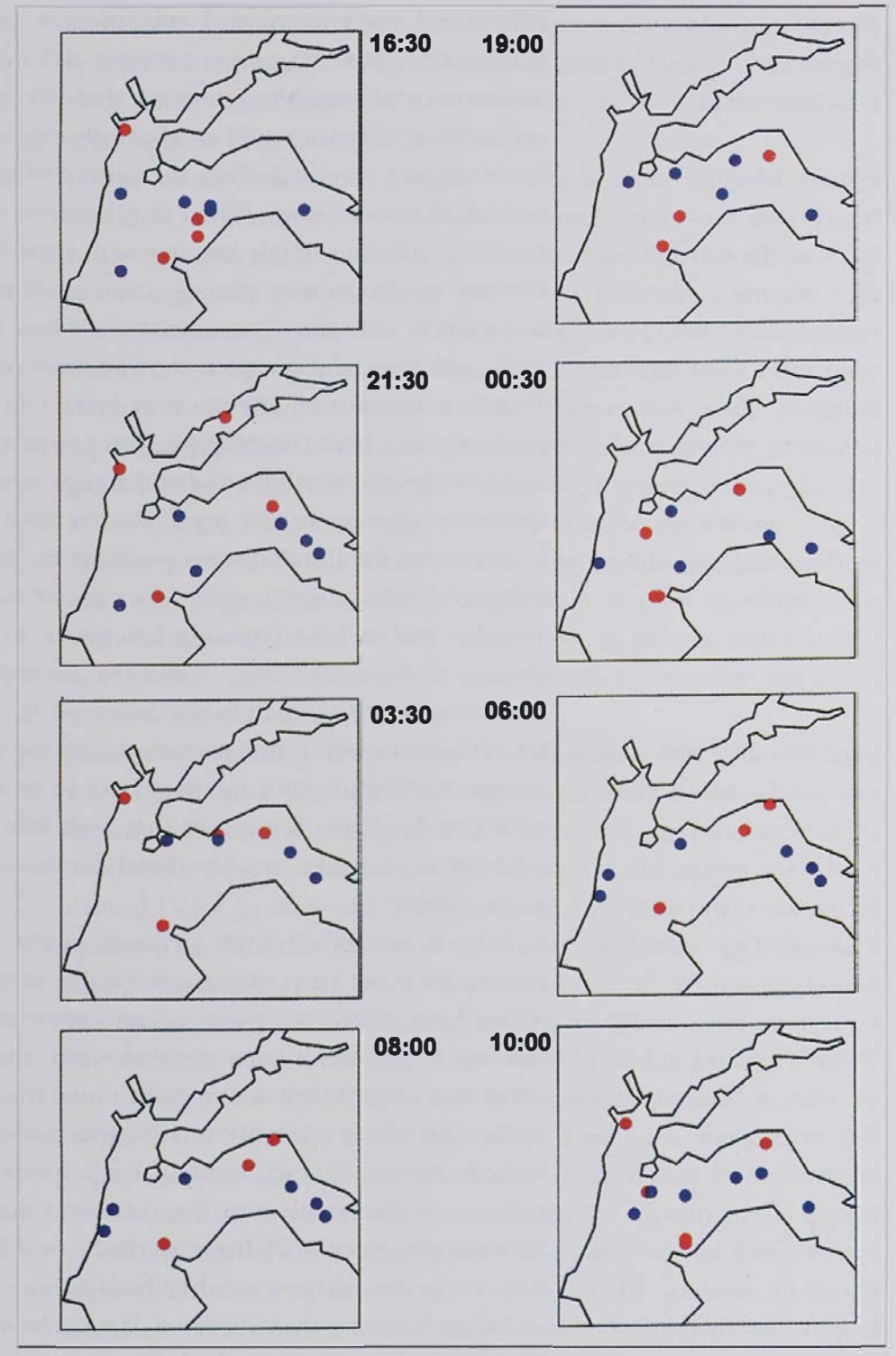


Figure 3 - Locations of radio-tagged brown (red dots) and rainbow trout (blue dots) at different times of the day, Lake Otamangakau 21-22 January 1997.

Effects of environmental parameters on fish movement - Investigation of relationships between fish movement and recorded environmental variables showed that for all tracking dates no environmental factor could satisfactorily explain fish movement.

However, lake level did affect the variety of movement exhibited by individual brown trout. When the lake level was high brown trout moved in a more variable manner with some fish moving to explore the swamp. In contrast rainbow trout movement was influenced by the current in Lake Otamangakau. When the flow in the lake increased, then rainbow trout showed more uniform movement.

This is a significant difference in behaviour between brown and rainbow trout. Lake Otamangakau has a large area on the eastern side and between the northern and outlet arms which floods readily with only small changes in lake level. Brown trout take advantage of this by exploring the flooded areas, probably for feeding. Rainbow trout, although they can live in quiet water prefer some current where it is available and in Lake Otamangakau prefer to use the inlet and the channel in the outlet arm. When the current is high the rainbows don't have to travel much to get their food, they just take it as it drifts by. However when the current drops the trout cannot afford to remain in the same spot and they have to move more widely to find sufficient food. So it appears that high lake levels and significant currents in the lake are beneficial for brown and rainbow trout respectively.

A lack of any relationship between water temperature and fish movement is not surprising since suitable temperatures are available somewhere within the water column anywhere across the lake. In another study brown trout avoided water above 19°C when cooler water was available but in our study brown trout were tracked in parts of the lake where water above 19°C was present close to the surface. Indeed, during summer, trout of both species feed actively at the surface when desirable prey like cicadas or damselfly are available.

Movements over a 24-hour period - (see figure 3) Up until 4.30 p.m. on the first afternoon fish of both species used the same habitats as during the other tracking dates. The rainbow trout were principally found in the main channel of the outlet arm and judging by the strength of the radio signal they were down deep. Brown trout cruised in their habitual shallow habitat along the margins of the lake. Later in the afternoon though, rainbow trout came closer to the edges of the lake and the increasing strength of the signal indicated that they

were moving closer to the surface. Throughout the night trout of both species used the edges of the lake or the surface waters over deeper areas until around 8 a.m. the next morning. By 10 a.m. the rainbows were back in their usual daytime haunts.

Whilst occupying similar habitats rainbow trout showed greater amounts of movement throughout the night than did the brown trout. This may not be indicative of increased feeding though, as it has been suggested that increased activity in fish can coincide with restricted feeding behaviour. Certainly anglers in Lake Otamangakau report good fishing in the morning when fish shift back from their nocturnal to daytime habitats. We believe that early morning represents the time when fish start to feed again, therefore providing good fishing prospects. Rainbow trout feed mainly during the day and at night are just swimming passively close to the surface.

The vertical shift in the water column that we observed in rainbow trout may be associated with a similar shift in prey distribution, or with reduced ability to visually detect prey in deeper water at low light levels. Salmonids have also been shown to move up and down in the water column to help digestion.

Effects of spilling from Lake Te Whaiau - Our radio-tracking experiment also provided us with some indications about the negative effects that spilling over Te Whaiau dam can produce. On 12 September 1996, as a consequence of unusual circumstances which caused ECNZ to close the Wairehu Canal, Te Whaiau dam started to spill at 1.8m^3/sec, the flow peaking at 17m^3/sec before spilling ended on 22 September 1996. On 13 September, fish No. 26 was tracked at the confluence of Whakapapa intake and Te Whaiau stream and on the same day eight other tagged fish were located in Lake Te Whaiau. On 20 September 1996 only four fish could be tracked in Lake Te Whaiau and fish No. 26 could not be found. A week later (27 September) the signal of fish No. 26 was received loud and clear from Te Whaiau dam. A visit to the dam revealed the severity of the effects of the spilling. Twelve adult trout, eight rainbow and four brown, were found dead on the concrete apron of the spillway, all facing upstream. Two of the dead fish had their left pelvic fin clipped indicating that they spawned in Te Whaiau stream in winter 1996. Fish No. 26 was not amongst the dead fish and its signal was received from further downstream. A survey of Otamangakau stream revealed fish No. 26 in a pool about 1km downstream accompanied by three other large rainbow trout and one large brown trout all probably

originating from Lake Otamangakau. On 4 October 1996 we electro-fished the loose rock terraces below Te Whaiau dam and the first 50 metres of Otamangakau stream. We caught about 200 fry, (mainly rainbow), a dozen juvenile (50-120mm) trout of both species and three longfin eels. Although we don't know exactly when the fish were washed down, we suspect that it was during the night when the fish swim closer to the surface and closer to the edges.

During a drift dive in the Wanganui River below Lake Otamangakau in June 1997 another brown trout with a right pectoral trap clip was observed. This anecdotal observation further supports the suggestion that substantial numbers of fish can be washed down the Otamangakau stream when Lake Te Whaiau dam is spilling.

But that was not the end of Fish No. 26. On 12 December 1996 it was caught and released by a local guide in the Wanganui River just above the confluence with the Waione stream (about 10km downstream of Te Whaiau dam). This capture indicates that some fish survive the wash-down experience and that those fish lost from Lake Otamangakau watershed provide opportunities for anglers using the Wanganui River. However, the fate of the fry washed down is less clear. On 29 April 1997 we electro-fished the Otamangakau stream again and found only five juvenile brown trout but no juvenile rainbow. The juveniles may have moved further downstream or have perished.

Nevertheless, the lake level can have some important negative effects on the fishery as a whole. During spilling over Te Whaiau dam substantial numbers of both adult fish and fry are lost to the system. Adult fish who survive will improve angling opportunities in the Wanganui River but they cannot return to their spawning ground. The fate of surviving fry after washing-down remains unknown.

Conclusions - Rainbow and brown trout can be caught almost anywhere in the Lake Otamangakau system. Brown trout were found in any type of habitat but with a marked preference for the littoral zone (edge). Rainbow trout were more mobile and used the "pelagic" (open water) parts of the lake more intensively. Fish locations show that the best angling prospects in spring are likely to be found around the inlet of Te Whaiau Canal into Lake Otamangakau. As summer progresses try the middle part of the outlet arm. By the end of summer it may pay to fish the deepest parts of the lake as the fish concentrate there before starting their spawning migration. By the end of the season (April to June) the most productive areas are likely to be found

again around the inlet and in Te Whaiau Lake and its adjacent canals. The 24-hour pattern of fish movement identified in this study indicates that the best time for fishing may occur early morning when fish start to feed heavily. As the day progresses best angling prospects for rainbow trout are likely to be found in the main channels. If you target brown trout cruising along the edges of the lake then it does not really matter at what time of the day you fish. If you want to fish at night then a floating line is the way to go as the fish are cruising closer to the surface. It was interesting to note that during our experiment the movement of experienced anglers fairly well matched the movement of fish during the day and over the course of the season.

Our results suggest that as long as the level and current in Lake Otamangakau are managed similar to that during the summer of 1996/97 then good fishing prospects will be available. However, we recomend that Te Whaiau dam spills should be avoided, especially at night in spring, when fry entering Lake Te Whaiau from the Te Whaiau stream are especially vulnerable.

Applying some of the information in this article may help reduce the frustration which can arise when fishing Lake Otamangakau.

Favoured brown trout habitat.

Something Fishy

A Good Angler or Not?

Fishing downstream I had the Stones Pool to myself. Adjacent to the bottom of the rock gabion a nice rainbow jack took the fly and a few minutes later I hooked a second. As I fought this fish an angler strode determinedly across the gravel beach and waded into the water immediately downstream of me, casting into the very spot I had just been fishing.

I backed out holding the fish much harder than I should, lest it reach the legs of this angler. He certainly wasn't making things easy for me! As I landed the fish a second angler approached and in the manner customary of the great majority of anglers who fish the Tongariro River, we chatted about the morning's fishing. As we talked, we watched the first angler standing steadfast in the centre of the pool working his nymph again and again through the lie. It became obvious he wasn't going to move. A little while later I moved to sit in the sun while the other angler also rigged to fish a nymph moved in below him. I sat watching the first angler fish and still he didn't move. He certainly cast a good line and fished the drift well. Ultimately the indicator hesitated and he struck, fighting the fish with finesse as he pulled it to the shore. Down on his knees he pulled out his forceps and with exaggerated care unhooked the fish and gently let it swim away. He looked up, gave me a satisfied wink, and waded back in to reclaim his spot.

He might have been somewhat disappointed if he had realised that I wasn't actually that impressed by his angling demonstration. There is an awful lot more to being a good angler than simply mastering the fundamentals of casting and catching fish, perhaps not least the ability to share.

Forestry Activities Cause Comment

We have been approached by several people concerned that various forestry activities in the district may have an effect on the water quality of the rivers and lake.

To undertake any activity such as logging or land clearance the owners or forest managers must first obtain a resource consent from

the regional council, in this case Environment Waikato. The consent allows them to undertake the work subject to them meeting any conditions of the consent. For example they might be permitted to log a particular block so long as they do not fell across the stream, and remove all logging slash from the waterway.

A consent application may be either publicly notified, a formal process in which any interested party can make a submission, or non-notified if the impact of the proposed activity is minor and the applicant has the approval of any affected parties. Where an activity may have an effect on the rivers and streams DOC is usually deemed to be an affected party. This provides an opportunity for us to raise any concerns about potential impacts on the fishery from the proposed development. In most cases there are straightforward solutions which protect fishery interests while allowing the work to be undertaken and the parties readily reach agreement. Ultimately it is the regional council that is responsible for setting any conditions, issuing the consent and enforcing the conditions.

Generally in the Taupo catchment, the streams and their margins are well protected. This is as a consequence of two forward-thinking developments, the Lake Taupo Catchment Control Scheme, begun in 1976, and the establishment of Lake Taupo Forest, as well as the protection afforded by the large areas within Tongariro National Park and Kaimanawa Forest Park. Under the Catchment Control Scheme areas, particularly on the western side of the lake, which were adjacent to streams or prone to erosion have been retired from grazing and fenced out. In some instances these were re-planted with native or timber species but usually were just left to revegetate naturally, forming a buffer along the stream margins.

It is not well understood that the primary reason for planting Lake Taupo Forest was to protect water quality and that revenue generation was only a secondary consideration. For example, all the streams and rivers within the forest are protected by extensive corridors of native vegetation, areas not normally left when planting forests in the past.

Large areas of this forest are now ready to be milled and already in the last two years the landscape has changed dramatically. Both sides of the Waimarino stream have been clear-felled but a combination of sensible logging practice and the protection afforded by the streamside vegetation has to this point prevented any discernible impact on water quality. The forest managers are now in the process

of seeking a 10-year consent to log a further 10,000ha. Normally we would be very reluctant to agree to such a wide-ranging consent because it is very difficult to identify, let alone resolve, the specific issues. However, in recognition of the underlying objectives of the forest owners, Ngati Tuwharetoa, we are comfortable to support this consent so long as we can discuss issues as they arise with a more formal process to resolve the isolated occasions when we don't reach agreement.

The other obvious change on the eastern lake shore has been the recent clearance and planting of Te Rangiita Station. A variety of views has been expressed about this development, which was done within the conditions of the resource consent issued by Environment Waikato. Anglers are often concerned that pine forests have a very detrimental impact on their trout fisheries and when poorly planned and managed this can certainly be the case. However, when done carefully as is the case of Lake Taupo Forest, they provide a level of protection much greater than most other land uses. While from a fishery management point of view the ideal is for each catchment to remain undeveloped, we recognise that individual landowners have every right to seek a return from their land. The challenge for us is to ensure that this occurs in such a way as to not affect the fishery.

45cm Size Limit Adopted

On 1 July 1997 the minimum length of trout which can be legally kept from Lake Taupo and the surrounding tributaries was raised from 35cm to 45cm. This change is designed to reduce the harvest of young trout, the numbers of which have already been affected by large floods and the Ruapehu eruption in late 1995. These fish will be vulnerable to boat anglers over the next 18 months and at current levels of angling pressure most will be caught. If they are caught and killed then they are never going to get to make their spawning run up one of the tributaries and so be available to the river angler. Without an

Resting your hand over the fish's eye will cause it to lie quietly while you check its length. Quite clearly this fish is well over the line marking 45cm.

increase in the size restriction we believe the harvest of trout from the lake this season would result in low numbers surviving to spawn and very poor river angling in 1998 and 1999.

So as to more fairly share the resource between lake and river anglers we have sought to reduce the lake harvest by protecting these young fish through the busy summer period. Most juvenile trout enter the lake in late summer or autumn and from then on grow very rapidly, reaching 35cm (the old size limit) in the following spring. They continue growing at between 0.5mm and 1mm a day so that by autumn, a year after entering the lake, they have reached the new legal size of 45cm. A s the bulk of lake angling occurs over the spring and summer months these fish are now largely protected from anglers during their first year in the lake. By their second summer they have grown to be well over the legal limit.

Using the data collected from measuring hundreds of fish kept by lake anglers over the last two years, increasing the size limit to 45cm will reduce the harvest by approximately 25%, or one fish in four. These trout which anglers previously kept will now have to be released because they will be undersize.

Since the new limit was introduced in July there has been comment that anglers have often had to release much more than 25% of their catch. A vast proportion of the fish returned have been between 40cm and 45cm and it has been suggested that the limit is set too high.

However, this does not take into account that over winter the largest

fish are all up the rivers spawning, or how fast the remaining fish are growing. A 40cm fish in early July will be of legal length by October, well before most anglers begin their season's fishing on the lake.

The main impact of the increased minimum size is on the following year class; those trout which would have been legal in November or December but which will now not be legal until next autumn. That there are very few fish under 35cm in the catches at present reflects the underlying problem, that this year class is weak.

One thing we have noticed is that some anglers are very casual about how they are measuring their fish. Near enough is not close enough! The simplest option is to mark 45cm on a length of dowel or the net handle and lay the fish against this. A nother option is a flat piece of board with a second piece nailed across one end and a line ruled across the board 45cm from this end. It is then just a case of lying the fish on the board, sliding it along until the fish's head hits the end piece of timber and checking that the tail is over the line on the board. (See photo on page 29).

Legally length is defined as from the tip of the snout to the tip of the tail, so if you measure to the "V" of the tail as is more usual, then you will have a 5mm or so margin in case you are slightly out.

1997/98 – A season of big trout?

Indications are that anglers will find a measuring board unnecessary on many occasions this summer. A s discussed on page 40 the average size of spawning fish last winter was significantly larger than in previous years and this trend appears to be continuing in the lake this spring. A nglers are reporting regular catches of 2.5kg to 3kg maiden fish in superb condition. These fish can be expected to continue growing steadily through the summer and we are predicting some very large fish are likely. Therefore while the total number of trout is likely to be down this summer, those that are caught should be well worth the effort.

Rainbow Trout Centenary

Next year sees the centenary of the most significant event in the history of the Taupo trout fishery. On 24 February 1898 Frank Lowe, the assistant secretary of the Wellington Acclimatisation Society, and Malcolm and Forrestina Ross of Wellington released some 5000

YOU SAW HIM TWICE LAST SEASON...

In a quiet rarely fished backwater...
He's big -very big...
You've worked out the drift...
You've tied the fly that will trigger his feeding instinct...
This season all you need to nail him is the right gear so he doesn't smash you up again!

You could spend $1000 on a quality imported fly rod...
Then again you could choose an internationally acclaimed Kilwell Presentation Series Fly rod and have the $500 plus you've saved to spend on a Systems 2 fly reel, a Scientific Anglers fly line, some leaders and flies and enough petrol to get you to that backwater trophy and home again...

Your choice... We just think you should know what your options are.

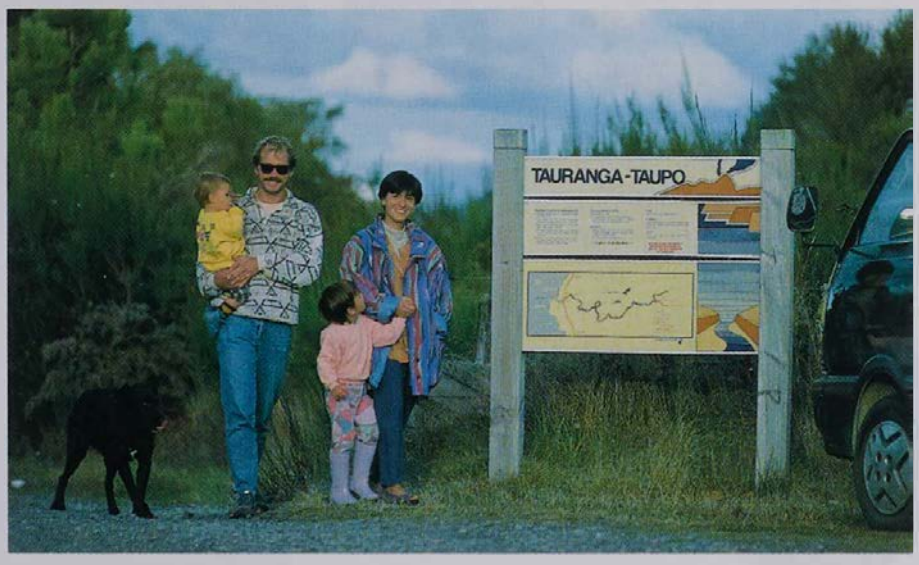
Presentation Fly Rods
Designed and crafted by New Zealanders who fish the same waters you do!

KILWELL
ROD CRAFT

rainbow trout fry in the upper tributaries of the Tongariro River.
While brown trout had been established for some years, this was the first attempt to stock rainbows in the Taupo fishery. This first release was followed by several years of intensive stocking of the lake and many of its tributaries, culminating in the development of the world-class rainbow trout fishery we have today.
DOC has worked with Destination Lake Taupo to commemorate 1998 as the Year of the Trout. This will become the district's marketing theme for the year and a special logo has been designed to go on all promotional literature. Several events are being planned and all groups with an interest in the fishery and the district's visitor industry are invited to contribute.

New River Information Signs Planned

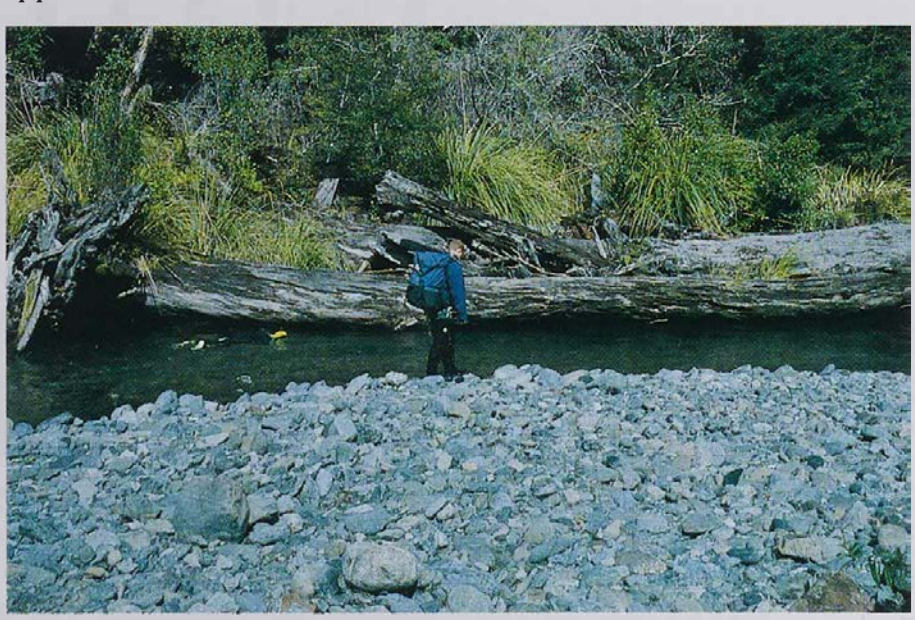
We are currently designing new angling information signs to go on all the Taupo rivers, which will replace existing signs erected in 1990. Despite the best efforts of some people these signs have lasted very well, but we are now starting to run out of replacement panels, and in other cases, the information is becoming dated. The new signs will be similar to those at Lake Otamangakau involving computer-generated graphics printed on to a film, but in this case the film will be glued directly on to a metal backing board. By taking this approach the film work, which is not particularly expensive, can be readily replaced if it is damaged or the information needs to be changed.
The new signs should be in place by next April in time for the winter fishing season.



The current signs which have been in place since 1990 have proven very successful.

Results of this Winter's Spawning Counts

Each month over winter we count selected stretches of the Hinemaiaia, Waimarino, Waiotaka, Tauranga-Taupo and Whitikau Rivers. Both the counting techniques and the stretches selected have been refined over recent years and we are now very confident in the accuracy of these counts. Some rivers are counted using a team of drift divers but in the smaller rivers we have found that using one drift diver to check the deep holes and an observer on foot is the best approach.



Counting a typical stretch of the Whitikau Stream. Glenn Maclean looks under the log while Bevan Clinch counts any trout that skirt upstream between himself and Glenn.

The peak counts this winter on each river are listed in Table 1.

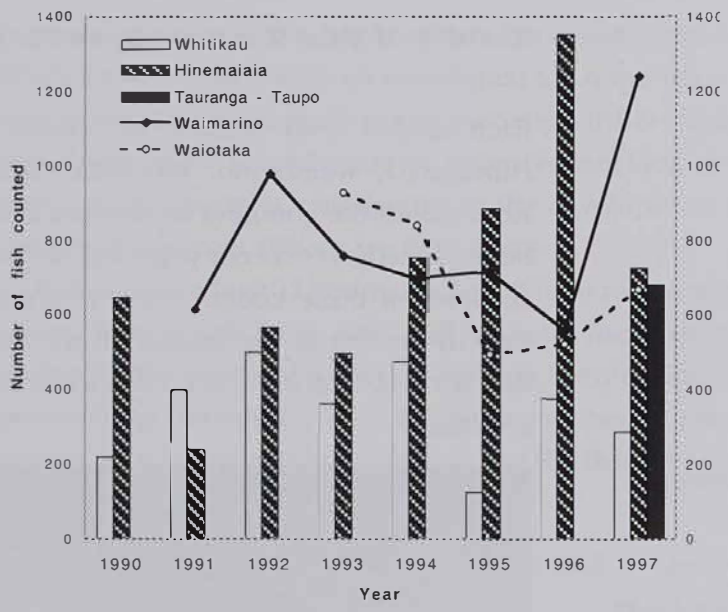
Table 1: Peak counts on rivers this winter

River	Length counted (km)	Peak count	Number of trout/km
Hinemaiaia	1.3	724	557
Tauranga-Taupo	1.7	681	401
Waimarino	20	1239	620
Waiotaka	1	667	667
Whitikau	3.9	289	74

The peak counts for each river are compared to counts for previous years in graph 1.

There is only a single count shown for the Tauranga-Taupo as, while this was the second season we have surveyed this river, last year was a trial using different methodologies and the counts are not

Graph 1 : Comparison of peak spawning counts for five Taupo rivers 1990 to 1997.



comparable. The count finishes just above the Rangers Pool, although on one occasion this year after we finished a couple of us swam through the pool which was empty of anglers. At a conservative estimate the pool held 150 trout.

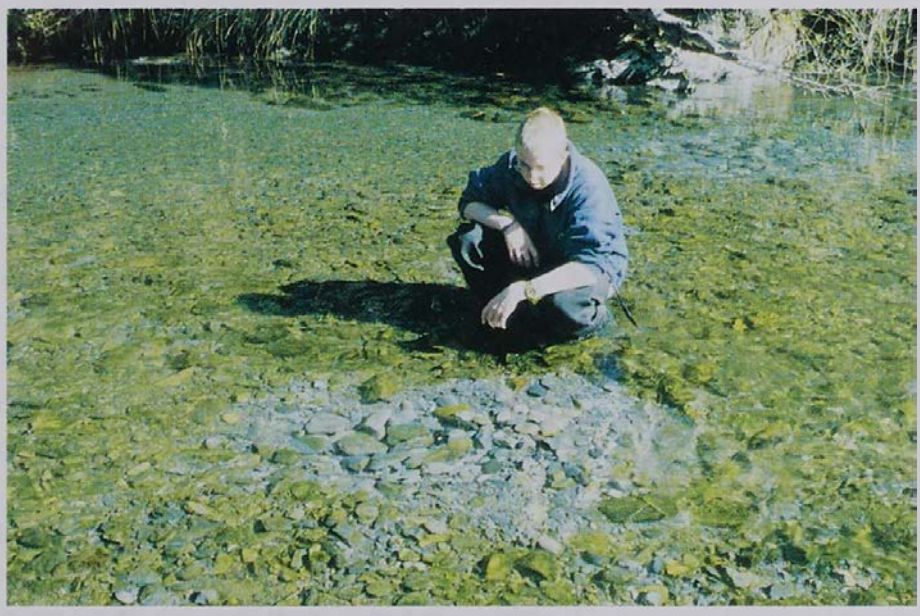
It is apparent from the graph that the Hinemaiaia, Waimarino and Waiotaka counts are all high when compared to previous years, in fact the Waimarino count is the highest recorded since counts began in 1992. The Hinemaiaia count is well down on the peak last year but is still one of the highest counts for this river. It was noticeable however, that the fish arrived in the survey section just below the bottom dam several months later than usual. The Whitikau count in 1997 is misleading. The peak count was recorded in July and is a large count for this month, reflecting that the early spawning run in the Tongariro was perhaps larger than in recent years. On the August and September counts though, it was apparent that there were no freshly run fish in this stretch which occurs above the Grotto. The Grotto is a narrow, deeply incised chasm which cuts through the ignimbrite belt extending right down the eastern lake shore.

On some rivers like the Waimarino, Tauranga-Taupo and Tongariro (prior to the construction of Poutu Dam) the falls created by the river flowing off the hard ignimbrite rock shelf prevent trout migrating any further. However, on other rivers like the Whitikau and the Waiotaka, the river has cut a narrow path through the rock and trout can negotiate past, albeit with some difficulty. The Grotto is a sequence of falls and chutes over half a kilometre in length and occasionally it becomes blocked with logs and debris. This time though we couldn't

find any obstruction until we abseiled into a narrow chute. Below a fall of only 1.5m were hundreds of trout, stacked up waiting. However, the fall was completely clear of debris which suggests it must be impassable under low flows.The gorge in this part is only 2m wide and presumably it does not take much of an increase in flow to change the flow patterns which then allow the fish to get past. The fall must have always been a barrier under low flows but in every other year high flows occur regularly enough that it does not create a problem. However, this winter the river has been as low as we have ever seen it at any time of year and the extensive periphyton growths still present on the bottom in spring testified to the lack of any significant floods.

In late October following small freshes during the previous month we repeated the Whitikau survey, this time counting 461 trout including a large number of fresh- run fish.This confirms high flows are necessary in order for trout to reach the more than 10km of prime spawning

Heavy growths of brown periphyton which remained on the rocks this winter highlighted spawning redds in the Whitikau. Bevan Clinch wonders at the size of some of the rocks spawning trout have moved in this redd.



water above the Grotto. Of note in the Waiotaka count, which occurs high up in the prison property, was 53 brown trout. Brown trout are very rarely caught by anglers fishing in this stream.

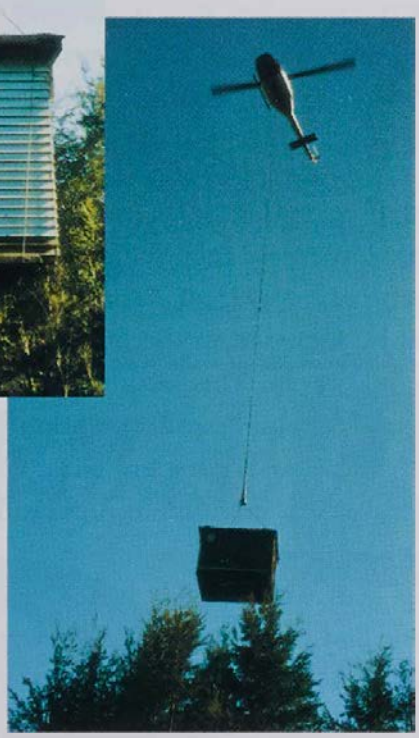
These counts highlight a trend that we have become aware of over recent years that the size of the spawning runs in the different rivers is not totally synchronised. In any one year one river inevitably stands out and in recent seasons both the Tauranga-Taupo and the Hinemaiaia have had very big runs. This year it was the turn of the Waimarino.

Overall very good numbers of fish have reached the spawning areas and so far this winter and spring conditions have been very favourable for both spawning and fry survival. The streams are chock full of fry and fingerlings and as long as nothing untoward occurs the fishery should rebound quickly from the low expected this season.

Waipa Fish Trap

Over recent months the Waipa fish trap has been designed, constructed in the workshop, pulled to pieces, flown in by helicopter and re-assembled on site. Utilising recycled Tokaanu trap steelwork and with two 200kg bedlogs for the front and back barriers, staff found out when having to carry all the materials along the 200m winding bush track from the drop site, just how substantial the structure was to be.

Derek Lowe, the helicopter pilot, was also put to the test. The trap, accommodation hut and extension materials were flown in by



Derek Lowe approaches with the hut, using the tops of the manuka to stop the hut swinging before placing it on the site bearers.

Iroquois on 29 August. Three short flights were made, two from the back of prison farm property and one from the old Whitikau trap site. The near maximum (1600+kg) loads were reflected in Derek's slowness to clear the fence, but were flown in without a hitch. To see a 4m x 3m hut dangling on a 30m chain and spinning like a top, being deftly stopped using the top of an adjacent tree and then placed on to the site bearers, left no doubt about the pilot's ability.

On excavating the trap site three large boulders were uncovered which had to be blown out of the way, much to the delight of some staff members. The bedlogs were then dug in and wired down and the trap put together. It took less than a week to install the trap which has worked faultlessly in subsequent trials, a testimony to the design and construction skills of Gordon McKenzie and Roy Baker.

Work has now switched to building an extension on the trap hut to

Norrie Ewing puts the first fish through the Waipa trap while Gordon McKenzie and Roy Baker check he does it correctly.

include a fireplace and altering the interior to make it more comfortable. Norrie Ewing's ability to locate and acquire second-hand materials from all round the place at little or no cost has resulted in a hut which should be very pleasant to stay in, even through the worst days of winter. Work is nearly completed and the trap will begin operation as planned in early January, the first year of what we hope will be many.

Boat Safety

Fisheries staff operating boats on Lake Taupo and other local waters are meeting new safety requirements.

From 1 February 1998, all departmental power boats over 3.5m length, will be included in the Maritime Safety Authority's Safe Ship Management system. This requires the Department to have an approved safety, training and operating plan for its boats and staff under the Maritime Transport Act. This will specify minimum standards for safety equipment, operating, operators' qualifications and regular inspections.

All fisheries staff who operate boats have or will complete a formal qualification and we have also developed a boat handling course which consists of a series of modules emphasising practical skills to ensure safety and efficiency.

Licence Sales

Total licence sales for the 1996/97 season are shown below, with the previous year's sales in brackets:

Adult Season	11,848	(11,552)
Child Season	6045	(5728)
Adult Month	912	(892)
Adult Week	9621	(9621)
Adult Day	33,380	(33,559)
Child Day	6479	(5967)
Total	**68,285**	**(66,844)**

An overall increase in sales for the 1996/97 season of 1441 or 2%.

However, at the end of October of this season (1997/98) sales are

down by 1344 on the same period last year.
The excellent fishing in the area over winter has apparently not been reflected in the sale of licences.

NTC Children's Fishing

The July, August and September children's fishing days continued the pattern set in May and June (see *Target Taupo*, issue 25) - a low to average turnout (233, 154 and 206 children respectively) giving a total for the year of 942. This is the lowest in the 15 years the open days have been running and only the second time the total has been below 1000 (the long-term average is 1269).
The main reason for the decline was a decision not to publicise the open days in the week prior as had been the practice in previous

years. Tongariro and Lake Taupo Angling Club (TALTAC) organiser, Bill Colston, found that he had fewer volunteers at the start of the year and so it was decided not to send the customary news releases to the media. It seemed to work. Comparing the May to August period in 1997 with 1996, numbers were down 25% while the visitor count at the Turangi Information Centre was up 12% for the same period.

The most noticeable result was that no children had to be turned away and the queues were never more than 30-40 minutes long whereas people had complained of having to wait 1 1/2 to 2 hours on busy days in other years.

Pressure on the helpers seemed no different, but that could be one person's viewpoint. There were certainly occasional gaps in the line - chances to wet the whistle and grab a sausage.

The trout generally behaved as they have been trained to. The smallest was 80g, the largest 1800g and the average weight went from 286g in May to 457g in September; sure proof that fishing doesn't stunt your growth.

Winter Angling Summary

The fishing this winter did not follow the typical pattern but ultimately it was a season many anglers will remember. For most because of the exceptional size and condition of the fish they caught and for others because of the fishing they experienced in the Tongariro following the first significant flood of the winter in mid-August.

In Table 2 the mean length, weight and condition factor of angler-caught fish in the Tongariro in 1996 and 1997 is listed as well as the average length of fish from the 1980s.

Table 2 : Comparison of the mean length (and weight) of angler-caught fish from the Tongariro River, 1985-1997

	1985	1986	1987	1988	1989	1996	1997
Length (mm)	541	530	539	540	544	542	569
Weight (kg)						1.94	2.36
Condition factor						44	46

Anglers perceptions of an increase in the size of the fish are clearly supported by this data, the fish this year averaging another 25mm to 30mm in length (approximately 1 inch) and 0.4kg to 0.5kg in weight (approximately 1lb). These fish were in splendid condition as indicated by the high average condition factor of 46. Fish of 3kg to 4kg were routine throughout the season and many more of this size

were lost owing to the difficulties of landing such fish in the Tongariro. Regularly we saw limit bags where all the fish were of this size and as a group the fish this season were the best rainbow trout staff have seen from the Taupo fishery. Likewise fish in the other Taupo tributaries were of a similar size, for example averaging 2.4kg and 577mm in length from the Tauranga-Taupo River. Perhaps not surprisingly not one of the 450 anglers interviewed since the minimum length was increased to 45cm on 1 July raised this as a concern.

The fishing early season was perhaps better than in recent years but through July and early August, normally the peak fishing period, it was best described as patchy. Skilled anglers with a lot of experience on a particular river had good success but the majority of anglers found it hard. Fortunately the quality of the fish anglers did catch compensated in part. However when finally significant rain fell in the middle of August, the Tongariro in particular when it cleared on 22 August fished very well. This

Graph 2 : Monthly catch rate (number of fish caught per hour) on the Tongariro River, March to October 1997

continued for over a month and occurred again in early October and represents the best period of fishing this river has produced for a number of years. The fluctuation in fishing success is shown in graph 2 which plots the average catch rate (fish caught per hour) of anglers interviewed on the Tongariro River during our routine checks each month.

Many places around New Zealand had a much wetter winter than usual perhaps receiving the rain which would normally have fallen in the central North Island. By early August streams in this area were as low as we have ever seen them at any time of the year, the bottom covered in rafts of brown periphyton which would normally be removed by the first flood of the winter. It was noticeable anglers struggled under these conditions. There were not a lot of fish present as they waited for more favourable conditions to make their spawning run and those that were in the river were feeling very vulnerable in the low clear flows. Many anglers persisted with standard Taupo techniques without a lot of success but those anglers, often with small stream experience, who applied more finesse to their approach did much better. This period highlighted a characteristic of the Taupo fishery that we have become aware of in recent years. When the fishing is hard skilled anglers with a lot of local knowledge still do well and notice little change in their success. However the greater majority of anglers are affected and for many the challenge is just to catch a single fish during these periods.

Table 3 : A comparison of the average catch rate between 1990 and 1997

	1990	1991	1992	1993	1994	1995	1996	1997
Tongariro	0.19	0.27	0.27	0.30	0.21	0.24	0.24	0.24
Tauranga-Taupo			0.23	0.41	0.31	0.27	0.13	0.17

The table suggests that overall this season on the Tongariro River was on a par with previous seasons. Data in the early 1990s though was only collected from June to early August during the peak fishing period when catch rates are typically at their highest. The greatest number of anglers are on the river in this period and the data for 1997, while collected over a much wider spell (March to October), is still biased towards this period simply because this is when the bulk of interviews were obtained. Unlike other years though, the peak fishing did not occur until after this. A nglers who did not fish the Tongariro after mid-August will likely rate the season as mediocre in terms of their angling success but for those who did, the month following certainly was something special.

Of all the rivers the Tauranga-Taupo highlighted the difficulties anglers had catching trout under the low clear conditions. Over recent seasons large numbers of anglers have chosen to fish this river and the pressure means the fish are continually being disturbed. When the river is low it is not a very big river and it should be no surprise that when a heavily weighted nymph crashes in past the trout's head or a bright fluorescent indicator drifts a few centimetres overhead the trout keeps its mouth closed. The Tauranga-Taupo is a very easy river to fish when the fish are lying out in the open, as often occurs when the river is discoloured. However, once the fish get pushed back under the banks and into the obstructions it changes character to become a very challenging river. Not only is it necessary to cast very close to the bank and the fly-eating blackberry but near the bank are usually very subtle problems of drag that must be overcome by the upstream nymph angler. Under these conditions lengthen your leader, use smaller lightly weighted or unweighted flies and use the smallest indicator you can, preferably none at all.

At least when the river is low the fish are obvious and most anglers interviewed on the river commented that there were lots of fish, they just couldn't catch them. A s a consequence while the overall catch rate of 0.17 fish per hour (approximately one fish for every five and a half hours of fishing) would often represent a poor fishing experience, anglers were generally happy because they recognised

the problem was not a lack of fish but their ability to catch them under the conditions. When asked how they rated their angling success the average response on a scale from 1 (terrible) to 5 (excellent) was 3.3 or acceptable. When asked though to rate how much they enjoyed their angling experience the average score was 4.9 (excellent).

Table 4 : A comparison of the average responses for the Tauranga-Taupo and Tongariro Rivers since 1992

		1992	1993	1994	1995	1996	1997
How satisfied are you with your angling success?	Tongariro	3.5	3.7	3.6	3.4	3.3	3.5
	Tauranga-Taupo	3.6	3.9	3.9	3.6	3.2	3.3
How much have you enjoyed your angling experience?	Tongariro	4.3	4.8	4.6	4.6	4.5	4.8
	Tauranga-Taupo	4.8	4.8	4.8	4.7	4.5	4.9

As our escapement (spawning) counts show on page 34 the run in the Waimarino River was very large and in general this river was greatly underutilised by anglers. Of the other rivers good runs entered the Waitahanui early in the season in response to the frequent westerly blows during this time. In contrast the spawning runs in the Hinemaiaia were, like the Tongariro, delayed indicating the importance of floods to stimulate the run up these rivers.

One interesting statistic from our creel surveys was the proportion of fish released by anglers. On the Tongariro River 47% of legal size fish were returned, up from 39% in 1996 and 23% in 1990, a continuation of the trend towards catch and release.

During the winter, confrontations between anglers on the Tongariro twice made the national news. To be totally accurate one extreme incident made the national news on two separate occasions six weeks apart. This incident did involve a physical attack but comment about widespread "rod rage" was a huge exaggeration. However the issue of crowding, on the Tongariro in particular, was of concern to anglers not so much because angler numbers were any greater than in a number of other years but because the behaviour of a small minority was very poor. To put the issue in perspective over-crowding or poor manners by fellow anglers was raised by a third of anglers asked what if anything detracted from their angling experience. In other words two-thirds of anglers were comfortable with the current situation although of course those who dislike the situation enough

simply don't visit and so don't get asked. The issue of crowding was complicated this year by the fact that it was not consistent over the whole river. As an extreme example, one of our staff fished the Boulder Pool one morning in late July and did not see another angler until 8.30 a.m. The fishing was red hot, yet at the same time 40 or more anglers were spread between the Bridge and Hydro pools, not that he was complaining.

The great proportion of anglers this year were no different from their predecessors; they came to enjoy their fishing, catch a few fish and have a chat with each other on the bank, all in a genuine spirit of goodwill. There will always be a lot of anglers on the Tongariro, indeed for many anglers the contact with fellow anglers is one of the major attractions. So long as anglers adopt this sort of relaxed, friendly attitude any situations are readily resolved and the experience enjoyed. The large numbers of new anglers on the river each year who do not necessarily know the established protocols is frequently raised as the cause of conflicts but in reality more experienced anglers readily help them out and most new anglers are only too keen to receive advice.

Some problems occur simply because people have different interpretations about whether a pool is crowded or not. For example someone used to fishing on their own may get frustrated at having to share the pool with a handful of other anglers but someone who spends their working life amidst the bustle of Queen Street maybe totally relaxed standing shoulder to shoulder. People are not deliberately being obstructive, they simply have a different understanding of what is acceptable practice. In some cases they have got the wrong end of the stick but in other situations there is no clearcut right or wrong behaviour. Perhaps the most common example is the traditional practice of moving steadily through the pool so that other anglers get an opportunity to also fish the best spots. Having reached the end of the pool the angler walks back along the bank to the start of the pool and enters the water again. It works fine but these days some people make a substantial effort to be at the pool first, arriving perhaps as early as 3 or 4 a.m. Some might question whether this is really necessary but once an angler has made the effort should that angler then have to move out of the pool and wait for an hour or more on the bank simply because another group of anglers has risen at a much more comfortable hour and then expect to fish a pool that is already full. The initial angler can rightly argue

Two typical rainbows from the Tongariro River this season.

that the pool is full and the later arrivals should go elsewhere but in turn these anglers can argue that the first angler has had an opportunity to fish the pool and it is now their turn. If both parties stick stubbornly to their "right", ill-feeling soon occurs.

The key is to treat other anglers how you would like to be treated yourself. If you had made the effort to get to the pool early you wouldn't like to be pushed out by late arrivals and similarly if you have had a good session why not take the opportunity to have some breakfast and give someone else a crack. Rarely is the river so busy that it is necessary for late-arriving anglers to queue up for an already full pool. A ll this does is encourage those already in the pool to stop moving because they don't want to have to wait on the bank either. Instead move on and look for a less busy pool. Equally if there is no queue on the bank there is no excuse for an angler not to keep moving through the pool so that everyone has a fair go.

A lot of unnecessary niggle is a consequence of the widespread attitude amongst anglers that the success of the trip can only be measured by the number of trout caught. For sure these anglers say other things are just as important but the reality is they do not relax until they have caught a good number of fish and that tension is reflected in their behaviour and attitude towards other anglers. They are in competition with everyone whether it is, for example, to be first through the pool or to crowd in on another angler in a hot spot or to stay stationary in the same spot themselves.

The other cause of conflict is a very small group of deliberately selfish

anglers who don't care about anyone else. These are the anglers who refuse to move through a hot spot or who just barge in to get to the best spot and are not adverse to asserting themselves over other anglers who might question what they are doing. Very few anglers are like this but just one can affect the angling enjoyment of many people. This attitude is not necessary and if you are one of these people don't be surprised if in future our staff remind you of the accepted standards of behaviour. This also applies to the lower Waitahanui or anywhere else. Just relax and enjoy being on the river, it's got to be better than being at work.

Desert Road De-icing

Recently, Transit New Zealand was granted a consent under the Resource Management Act to trial the application of chemicals on sections of the Desert Road (State Highway 1) to minimise ice build-up in the winter. Earlier proposals to use common salt as is the practice in some other countries were rejected because of environmental concerns associated with the use of this compound.
The chemical chosen for the trial is calcium magnesium acetate which, in the amounts and concentrations being proposed, has been assessed to have no impact on the environment.
Notwithstanding the above, the consent is for a five-year trial period with stringent conditions that potential effects be monitored throughout the trial and results reported back to all interested parties.

Fishery Advisory Committee

The Taupo Fishery Advisory Committee is appointed by the Minister of Conservation to provide comment and advice on issues and policy

:Technical Support Supervisor Glenn Maclean explains planned research at the new Waipa fish trap to Advisory Committee members Nick Wall (Taupo), Graham Whyman (TALTAC), Graham Pyatt (Trout Unlimited), Ron Burgin (New Zealand Professional Fishing Guides' Association) and Strato Cotsilinis (National Angling Interests) during a recent field inspection of significant issues.

matters associated with the fishery. The committee comprises representatives of Taupo Angling Club, Taupo Commercial Launchmen's Association, Waitahanui Angling Association, Tongariro and Lake Taupo Angling Club, New Zealand Professional Fishing Guides' Association, Trout Unlimited, National Angling Interests, Tuwharetoa Maori Trust

Board and New Zealand Fish and Game Council. The committee provides an essential communication link between fishery managers and the anglers and associated groups as represented by the members.

Taupo District Fishing Licence Review

During the current year, the Department will undertake a review of Taupo District fishing licence categories, the influences on licence sales, fee relativities between classes of licences, the licence format and mechanisms for distribution of the review. The review goal will be to ensure that Taupo fishing licences and their administration meet the needs of anglers, fishery management and stakeholders in the most efficient, effective and cost beneficial way.

The Department is currently discussing this project with the Dean of the School of Management, Waikato University, with the intention of obtaining the services of a suitably qualified student to undertake the work this summer.

Use of More Than Two Nymphs

This winter there has been comment regarding anglers using more than two nymphs, often in conjunction with split shot as barrel weights.
Most anglers using this setup still fish in the conventional manner but others use this rig to foul-hook or jig for trout.
When one of our officers approaches, the end nymph or two is quickly broken off and discarded leaving the angler with a legal rig. While in terms of our routine licence checks the angler avoids prosecution they are easily caught if we get more serious. While we would like to concentrate on perhaps more damaging activity, such as exceeding the bag limit, it is necessary to stamp out this unwanted practice and this will be a priority next winter.

Court News

Recent court prosecutions have resulted in fines totalling over $4000 for fishing offences. Fishing without a licence was the most prevalent offence, but one offender was fined $1000 for the illegal use of a net in Lake Taupo.
This year we have twice successfully apprehended offenders using nets in Lake Taupo following calls from anglers who discovered nets set in the lake. On each occasion the angler left the net alone and immediately contacted us. As these two examples indicate, the chances of successfully apprehending the offenders are very high under such circumstances. Remember, a contact telephone number is printed on your licence.
From 1 December fishing is permitted above the winter fishing limits on all Taupo rivers, these limits imposed to protect spawning fish over the winter.

Lake Otamangakau Spawning Run

This winter was the fourth winter we have trapped the spawning run from Lake Otamangakau. Fish are trapped as they migrate up the Te

Whaiau and Papakai streams and at the outfall of the Whanganui stream diversion.

In total, 1747 trout were trapped compared to 1159 in 1996. The increase is in part owing to the lack of floods this year which enabled us to trap a greater proportion of the total run. During large floods the stream overtops the barrier and fish migrating upstream are able to bypass the trap. However, by collecting a sample of the spent fish as they return to the lake after spawning we can work out the proportion of the run missed from the proportion of kelts lacking a trap clip.

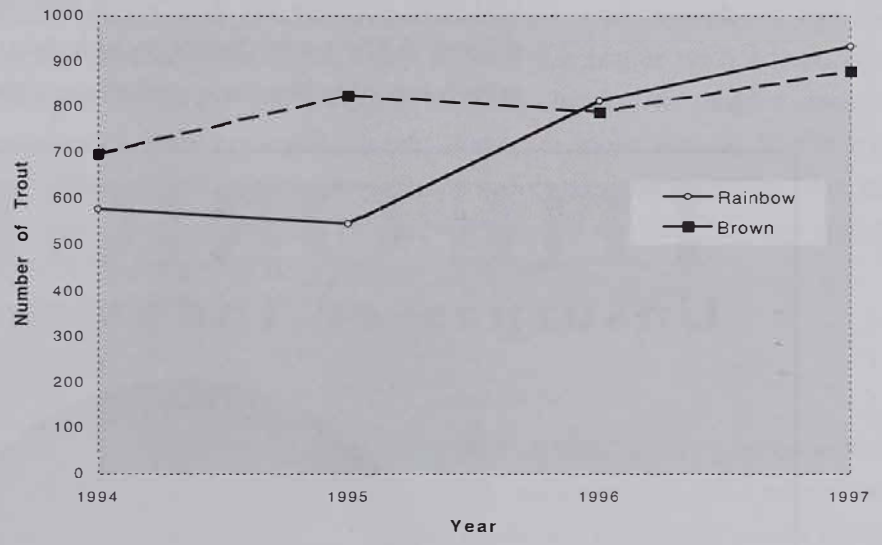
Annual totals for each species, broken down by sex and adjusted to take into account the number of fish missed during floods are given in Table 5. The totals do not include fish trapped in the Papakai Stream which has only been trapped since 1996.

Table 5 : Adjusted annual total of rainbow and brown trout, broken down by sex 1994 to 1997

	1994	1995	1996	1997
Rainbow female	427	361	582	600
Rainbow male	151	183	232	332
Rainbow Total	**578**	**544**	**814**	**932**
Brown female	497	591	575	578
Brown male	201	235	215	300
Brown Total	**698**	**826**	**790**	**878**

The total number of rainbow trout in 1997 (932) is 14.5% up on 1996 and the brown trout run has increased by 10%. The trend in numbers of each species is shown in graph 3.

Graph 3. : The total number of rainbow and brown trout in the spawning run, 1994 to 1997



Seven rainbow trout were trapped in the Papakai stream or 0.7% of the total run. In contrast 193 brown trout or 18% of the run used this stream. It was also noticeable this year that significant spawning occurred in the Te Whaiau stream below the trap. In previous years this area was unsuitable for spawning but recent changes in the character of the stream have created ideal spawning conditions and fish using this area are not included in any calculations.

The percent of previous spawners (fish which have spawned at least once previously) in the run, is shown for 1996 and 1997 in Table 6.

Table 6 : Percent of trout in the run which had already spawned at least once, 1996 to 1997

	% of Previous spawners in the run	
	1996	1997
Rainbow female	32.7	28.6
Rainbow male	27.7	22.6
Brown female	56.5	50
Brown male	37.9	38.2

Ron Burgin's client caught and released this 7.2kg (77.5cm) rainbow male in February this year. Catching a trophy fish in Lake Otamangakau is usually the result of much effort and local knowledge.

Each year when the fish pass through the traps a different fin is clipped. By examining the fins for trap scars we can establish when each fish first passed through the trap and so how many times it has spawned. The percentage of fish in the 1997 run divided according to how many times they have spawned, is shown in Table 7.

Table 7 : Breakdown of the spawning history of trout in the 1997 run

	% of fish in each group			
	1st time spawners	2nd time spawners	3rd time spawners	4th or more*
Rainbow female	71.4	15.2	7.3	6.1
Rainbow male	77.4	11.1	8.2	3.2
Brown female	50	17.3	8.1	24.6
Brown male	61.8	12.4	12.4	13.3

* Some of these fish may have spawned more than four times but because the trap has only been in place for four years it is not possible to break this down further.

This information reveals that a quarter of all brown females have spawned at least four times which means they have to be at least seven years old. Despite the relative longevity of these fish the brown

trout population has not increased. A s the results of our monitoring of the trout harvest indicate that angling is unlikely to be a major limitation, this suggests either recruitment into the lake or the survival of juveniles once in the lake is very low. More than 70% of the legal catch is returned and these results emphasise how vulnerable this population would be to over-harvest if anglers were to kill more of the fish they caught.

Lake Otamangakau trout continue to grow after each spawning and trophy-sized fish are usually quite old. The decline in the percentage of repeat spawners amongst the rainbow population may be indicative of either a stronger year class of first- time spawners or reduced survival of older fish. Evidence suggests that both have occurred. In Table 8 the number of fish (proportion) 4.45kg (10lb) or larger trapped 1994 to 1997 is compared.

Table 8 : Number and percent of trout 4.45kg or larger in the run, 1994 to 1997

	1994	1995	1996	1997
Rainbow	15 (3.8%)	36 (8.6%)	42 (9.2%)	8 (1%)
Brown	2 (0.4%)	9 (1.5%)	8 (1.4%)	2 (0.2%)

From Table 8 there is a very obvious decline in the number of trophy-sized fish in the run. There were many fewer fish over 725mm this year and those that were, were invariably in poor condition.

However, fish which were slightly smaller were in excellent condition, for example a rainbow female of 720mm and 5.5kg (condition factor 53) and a rainbow male of 680mm and 4.5kg (condition factor 52). This suggests that the conditions for growth in the lake remain very favourable and that the longest fish were the remnants of a strong year class now past its prime.

The age class is succumbing to old age and those that have survived have lost a lot of condition in the struggle. A lack of fish over 700mm in good condition indicates the following year class is much smaller in size. More promising though, is the increase in the size of the rainbow run in 1996 and 1997 (up 70% on 1995) which reflects the entry of much stronger year classes into the spawning population in the last two years. So long as conditions for growth remain favourable, these year classes should contribute increased numbers of trophy fish within the next couple of years.

The lack of very large fish and increased numbers of young, smaller fish are reflected in the decrease in the average length and weight of fish trapped in 1997.

Table 9 : Comparison of the average length and weight of rainbow and brown trout broken down by sex, 1994 to 1997

	Length				Weight			
	1994	1995	1996	1997	1994	1995	1996	1997
Rainbow female	600	615	600	586	2.82	3.18	3.01	2.60
Rainbow male	593	616	623	606	2.63	3.05	3.18	2.65
Brown female	572	599	597	570	2.34	2.85	2.87	2.33
Brown male	599	627	622	611	2.62	3.08	3.04	2.76

The results suggest that this summer anglers can expect an increase in their catch rates but hooking that trophy-sized fish will be an uncommon occurrence.

Trout Farming

Approaches by at least two organisations and individuals have recently been made to the Government to have trout farming legalised in New Zealand. One proposal appears to focus on sea cage rearing of rainbow trout, while the other appears to be solely related to public fish-out ponds. It is understood that a private member's bill to permit these activities may be promoted.

Trout farming is prohibited in New Zealand under Section 26ZI(4) of the Conservation Act. This prohibition has been retained by successive Governments through a number of reviews of the topic in the last 30 years. Present Government policy, as expressed by the Prime Minister in November 1996 and by the Minister of Conservation in July 1997, is that trout farming is not supported and that its prohibition will continue. Lobbying by the most recent proponents has failed so far to change the Government's position on this.

Downriggers

In September, the Cabinet Committee for Industry and Environment confirmed the ongoing use of downriggers in the Taupo fishery. This followed a three-year monitoring programme by the Department which concluded that downriggers do not create any additional pressure on the fishery but do provide an alternative and, for many anglers, more enjoyable angling experience. The recommendation to continue with the use of downriggers was detailed fully in the previous (July) issue of *Target Taupo*.

Concerns over lead pollution from lost downrigger balls were raised by

several anglers and is discussed in the article on lead on page 4. While this is not a problem at present the Department acknowledges that Lake Taupo is a very special, still relatively pristine environment, and in keeping with these qualities, the use of lead (and many other compounds) should be avoided if possible as a matter of policy. To this end we are initiating an ongoing programme to encourage anglers to use weights made from other materials (see *The Use of Lead in Taupo Waters* article for ideas and options, and future issues of *Target Taupo*).

Health of the Smelt in Lake Taupo

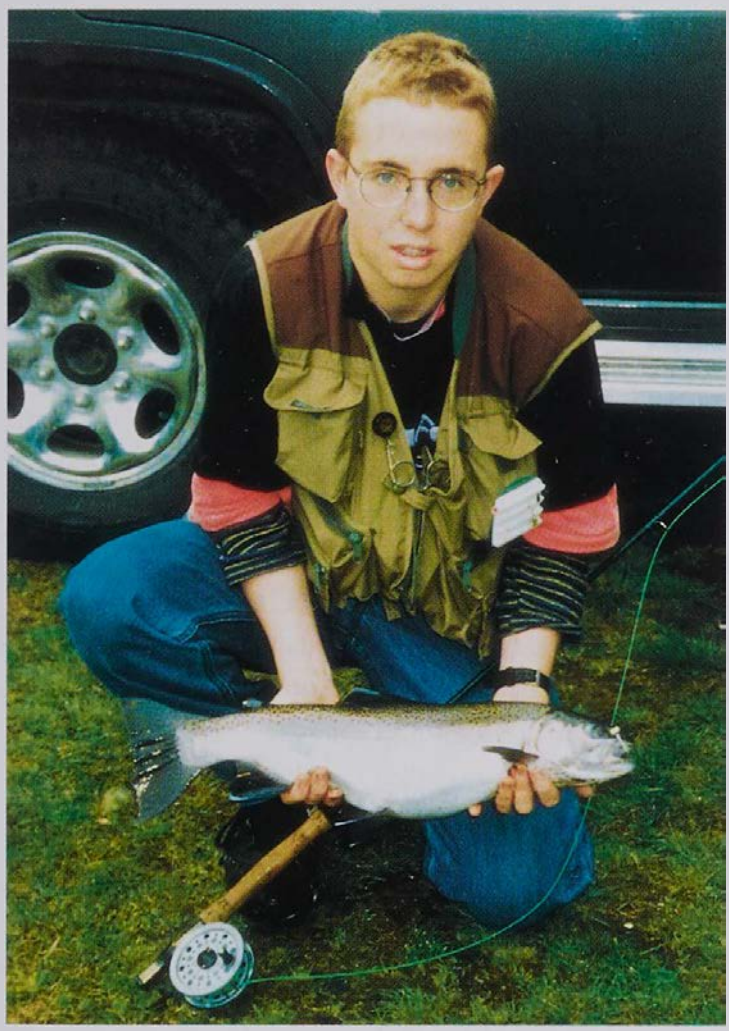
There is little doubt that the 1995/96 eruptions of Mount Ruapehu had an impact on Lake Taupo. A part from the ash transported into the lake by the Tongariro River, a direct fall of ash occurred into the lake. The input of this ash could potentially affect the ecology of the lake especially the smelt, which in turn could affect trout growth and condition.

However the results of our smelt monitoring last summer do not suggest a major impact. Samples collected along the eastern shore of the lake show that since 1995 the average length of smelt has decreased, with the smelt being on average 1mm shorter in 1997 than they were in 1994. However, it is unclear if this reduction in length is due to the direct effect of the volcanic eruptions or if it represents the effect of the general improvement in the water quality of the lake as monitored by Environment Waikato, or if it is a combination of these effects.

The estimation of the abundance of smelt present in the main body of the lake, which has been monitored intermittently since 1988, did not show any reduction in number. In fact the abundance of smelt has shown some large variations from 1988 to 1997. During this period the abundance of smelt was greatest in 1994 and least in 1992, with 1997 well above average. This strongly suggests that if the eruptions have had some effects on smelt, these were short lived or too small to be detected.

Ultimately, the stunning condition of the trout caught in 1997 highlights that any impacts on their food (smelt) were not significant for the trout fishery.

Perhaps as a consequence of rough handling when this fish has been released previously, its tongue protrudes outside the jaw, the excellent condition of the fish suggesting this did not affect its well being.



Bevan with "his" trout.

Bevan Clinch Moves On

This winter we had the pleasure of employing Bevan, a very keen young man who operated our fish trap at Lake Otamangakau. Bevan was also a very enthusiastic angler and many anglers visiting the trap ended up in lengthy discussions over the merits of different flies and how to fish them. He had a charmed stay, striking only a handful of floods through the whole winter, so much so that working the trap through a flood remained a novelty for him. Unfortunately we could only offer Bevan a contract for the trapping period but we wish him all the best in the future.

Bevan caught his share of fish and many more during the winter and on his last day decided he needed a photograph of himself with a typical Tongariro trout. We won't tell anyone though that when it mattered he was unsuccessful and had to rely on his "old dad" Norrie Ewing to come up with a fish.

Bitz 'n' Pieces -

News Items From Around the Conservancy

Winter Possum Control

A number of 1080-based possum poisoning operations took place this winter which may affect your chosen hunting area within the Tongariro/Taupo Conservancy over the early spring/summer period. Details of these are as follows (refer to map on page 65):

1. In May 1997 the Raurimu and Mangatepuhi Scenic Reserves were aerially poisoned by the Manawatu/Wanganui Regional Council with 1080 carrot baits.

2. In August the Whakapapa Island Scenic Reserve was aerially poisoned by the Manawatu/Wanganui Regional Council with 1080 carrot baits.

3. In the period June to September 1997 an area of some 9150 hectares was aerially poisoned involving Moerangi Station, Rotoaira Forest, northern Tongariro Forest, Pukepoto and Waituhi/Kuratau areas. This programme was supported by the Animal Health Board, New Zealand Forest Managers and DOC and conducted by Environment Waikato using 1080 carrot baits distributed by helicopter.

4. In July to November 1997 period 3000ha of eastern Rangataua Forest conservation area was treated with a combination of 1080/talon bait stations, ground trapping and aerial 1080 pellet poisoning as part of the Karioi Sanctuary Project. Possum control and research staff will continue to be in the forest daily throughout spring and summer undertaking a variety of work. Hunters are asked to take extra care when hunting in this area.

5. In the period July to November 1997 parts of Tongariro National Park and adjoining private land between the lower Ohakune Mountain Road and Horopito were treated with a combination of bait stations, trapping, night shooting and aerial 1080 pellet poisoning as part of a combined Manawatu/Wanganui Regional Council, Animal Health Board, local farmer and DOC initiative.

There are also significant areas under maintenance possum control by

both Regional Council and DOC staff using bait stations or hand-laid traps and toxins (cyanide, talon, 1080). Areas around the Western Bays of Lake Taupo, along the Whakapapa River and various other reserves in the conservancy may be affected by ground-based maintenance possum control programmes from time to time. Hunters should pay close attention to poison signs encountered in any hunting areas. Please, do not tamper with or remove poison signs! The life of someone's dog may depend on it.

Poison Declaration Forms for Wild Game Sales

If you shoot a deer or pig and want to sell it, you must now obtain a poison declaration from the landowner upon whose land you shot the animal. Forms are available from the meat processing plants at which you sell your carcasses. In signing the form, the landowner declares that no toxins have been laid upon the land over a set period of time. This is to help the industry provide an assurance to its overseas clients that the meat is pesticide free.

In the case of DOC administered land in the central North Island, we complete a declaration form every two months for the various processing plants and update all our field offices with copies to provide to hunters.

If you shoot and wish to sell an animal from DOC-administered land (other than the Kaimanawa Recreational Hunting Area from which the sale of animals is not permitted) you will need to bring your poison declaration form from your processing plant along to a DOC office, discuss where you shot that animal, have the form signed and the DOC declaration form attached to it, and take it with your carcass to the processing plant.

The Department recognises the valuable contribution that hunters play in helping protect conservation values from wild animals and is only too happy to help with the necessary documentation required for you to sell your carcasses. The temptation for some, however, may be to say that their animal came from a location where no toxins have been used, regardless of where the animal actually came from.

If pesticide residues are detected in one of your carcasses (MAF does random samples at regular intervals), you will be banned by the processing plant and will not be able to sell future carcasses. Worse, you could put the whole feral animal processing trade at risk. Worth thinking about.

You can help make the system work by working in with your local DOC office and game processing plant. It is in nobody's interest to try and cheat the system.

Dog Policy Update

As discussed in the last issue, the DOC Dog Policy process as outlined in the new Dog Control Act and various amendments to the Conservation and National Parks Acts continues, albeit slowly as a result of the disruption caused by restructuring of the Department. The Department is currently preparing guidelines and training packages to help staff involved in the issue and public discussion documents should start to filter out for public comment in 1998. Watch this space.

In the meantime, understanding that your dog has the potential to be a major threat to wildlife such as kiwi and blue duck will help you ensure while you are out in the hills that your dog doesn't add to the growing statistics of dog-related species deaths. If your dog does kill or injure a bird, don't waste it or worse, secure its fate by ignoring it, hand it in as quickly as possible to give us a chance to have the bird used in some productive way, or better, to save its life.

National Deer Plan

A working party was formed by the DOC earlier this year to look into the issue of preparing a deer discussion document. The working party involves representatives from a wide range of groups and organisations with an interest in deer and/or deer impacts. These include DOC, Forest and Bird, Federated Mountain Clubs, New Zealand Deerstalkers' Association, New Zealand Deer Farmers' Associaiton, New Zealand Forest Owners' Association, ECO, Federated Farmers, Conservation Authority, Safari Club International, Federated Hunters of New Zealand, Local Government New Zealand, Animal Health Board and the Wild Animal Recovery Service (WARS) Association. The working party has now had five meetings, and a draft discussion document entitled "Managing the Impacts of Deer on Native Forests: Issues and Options" was released in November for public comment.

If you have an interest in the deer issue, we encourage you to get hold of a copy of the discussion document and to make a submission. Copies are available from most conservancy offices or by writing to:

The Manager, Wild Animal Policy Division, Department of Conservation, Private Bag 10420, Wellington. Submissions will form the basis of a draft National Deer Plan early next year, which will also go out for public comment before the final plan is adopted by the Minister of Conservation. This is your chance to have a say. If you do not take this opportunity to put your views forward, you will be in no position to comment about the final outcome. Up to you!!

Tongariro Forest 4WD Policy

Many users of Tongariro Forest this winter will have noticed new signs up at road ends asking drivers of heavy 4WD vehicles not to use the roads beyond certain points in the forest. Instead, DOC is trying to encourage the use of lower impact vehicles such as motorbikes, quads, mountain bikes or horses.

This is simply because the old logging roads are not coping with the damage being done by heavy 4WD vehicles, the drivers of which seem more and more determined as time goes on and the tracks decay, to bounce and winch themselves into far flung corners of the forest.

The damage and erosion being caused by such activity in the forest are no longer acceptable and this has formed the basis of this latest policy decision.

DOC accepts that this is an about turn from the policies which have operated in the forest over the first 10 years of DOC management, when such activities were encouraged as a means of taking the pressure off the adjoining National Park. However as our understanding of the ecological importance of Tongariro Forest has grown, so too has the need to ensure public enjoyment of it is undertaken in a more sensitive manner. The Department accepts that time will be required for users to change what is a traditional pattern of use based on numerous generations of people with an association with the forest, but the time has come for that process to start. Your support for the new, more protective policies for this very special area would be appreciated.

Hunting Diary Returns

So far in 1997, over 700 hunters have returned hunting diaries for the Tongariro-Taupo Conservancy. This represents about 20% of the total number of hunters obtaining permits for DOC-administered land in

the central North Island. A total of 2731 days of hunting has been recorded from these hunting diaries. While this data does not identify anywhere near the total hunting effort or harvest, it does provide an indication of effort and harvest and more importantly, trends in the various hunting blocks over time.

Table 10 on page 64 summarises the information collected so far this year and compares it to similar data from previous years. The data clearly shows that over the past six years since data has been collected in the present format, hunters are finding it harder to be successful within the conservancy.

This is related to a number of factors:

1 Firstly, following the generally low deer densities which resulted from the wild animal recovery period of the late 1970s and early 1980s, habitat improvements occurred which allowed deer numbers to increase through the late 1980s. This period of herd expansion resulted in a further decline in habitat quality, with a subsequent reduction in deer quality and reproductive success (remember the deer die-offs that occurred in the harsh winters of the early 1990s?). Deer densities are still influenced by the decline resulting from this period. Much of the forest damage evident where this was the case is now 5 to 10 years old.

2 Secondly, aerial poisoning of possums with 1080 baits over much of the central North Island has reduced deer density in many areas.

3 Thirdly, a redistribution of hunting effort has occurred as a result of poisoning. Hunting effort has moved away from poisoned areas putting greater pressure on those areas where possum control has not occurred.

4. Finally, the central North Island sika herd continues to be one of the most sought-after game resources in the country and hunting pressure is increasing throughout their range.

Many hunters will have negative feelings towards reductions in deer density over large areas of the central North Island. However, it is important for all hunters to appreciate that habitat health is the single most important factor for all wildlife in the region. The lower deer densities and indeed, the effective possum control that have occurred over some 60,000ha of conservation land within the conservancy are already starting to show benefits for all sorts of wildlife. Deer are one of these. The number of sika stags with trophy-quality antlers has

increased dramatically over the past five to six years. While this is related to habitat changes brought about by cyclones and possibly ash deposits from Ruapehu, a general reduction in deer density is also a factor in many areas. Hunter acceptance of the general benefits to wildlife of lower deer densities and effective, sustainable reductions in possum impact will only help enhance this scenario in the longer term. To those hunters who continue to support our endeavours to try and understand the dynamics of forest-deer-hunter relationships by providing hunting diaries and deer jaws - thank you. Your reward is not only knowing that you are contributing to management knowledge, but you get a free copy of this magazine each time you provide feedback and you go into the draw for the $3500 worth of prizes we give away each year. Winners of the autumn and winter diary prize draws are as follows:

Helicopter Transport from Lakeland Helicopters:
B Phillips, Waitotara; A Krippner, Cambridge

Air Transport from Air Charter Taupo:
Peter Evans, Hamilton; Dylan Rhynd, Auckland

Sports Goods from the "Fly & Gun Shop", Taupo:
Ian McNabb, Waitetoko: Greg Kelly, Auckland

A copy of the "Sika Safari" Video from Neil Philpot:
Hamish Kibblewhite, Auckland; Selwyn Richards, Levin

"Stoney Creek" Clothing:
Richard Smithers, Picton; John Hamilton, Whangarei

Ammunition from "The New Zealand Ammo Co":
H Brown, Hamilton; David Mathieson, Auckland

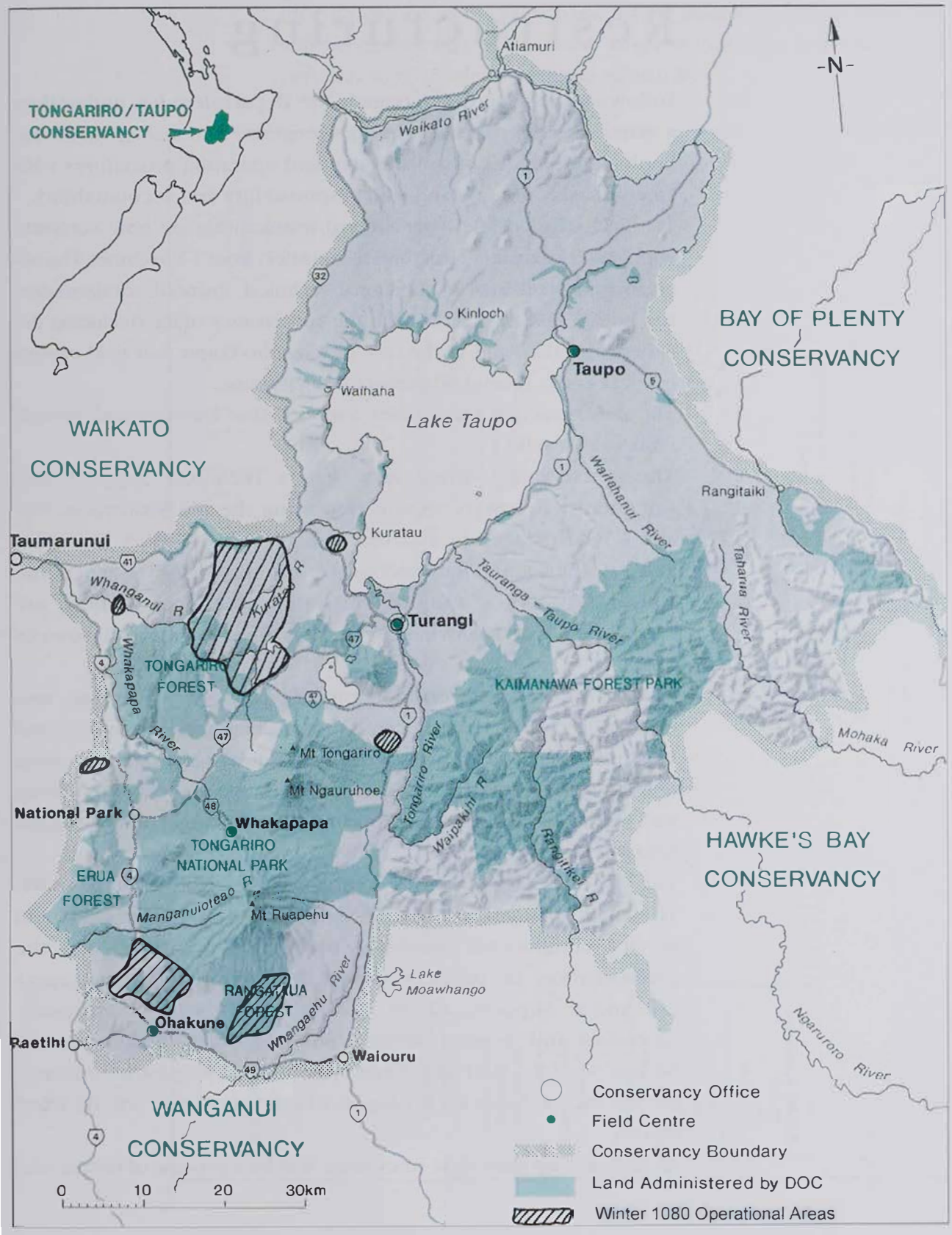
We trust your hunting this season is enjoyable, if not successful, and we look forward to hearing of your observations at the end of January .... safe hunting!

Table 10: Tongariro-Taupo Conservancy Hunting Diary Data - January to September 1997 (1996 in brackets)

Block	Days hunting	Kills				CPUE *
		Sika	Red	Pig	Goat	(Kills/days hunted)
Kaimanawa RHA	915 (844)	104 (133)	1 (5)	6 (1)	- (-)	0.121 (0.164)
Kaimanawa Forest Park (excluding RHA)	783 (771)	110 (123)	43 (42)	- (2)	- (-)	0.208 (0.217)
Tongariro National Park	373 (308)	4 (7)	81 (155)	- (1)	- (-)	0.228 (0.420)
Tongariro Forest	156 (208)	- (7)	33 (41)	1 (1)	7 (14)	0.218 (0.202)
Erua Forest	51 (58)	- (-)	11 (20)	- (4)	8 (31)	0.216 (0.414)
Rangitaiki Forest	48 (62)	8 (7)	1 (1)	- (1)	- (-)	0.188 (0.145)
Unspecified Returns	400 (452)	9 (21)	40 (30)	3 (-)	- (-)	0.130 (0.113)
TOTALS (January to September)						
1997	2731	236	210	10	15	0.167
1996	2796	293	294	10	46	0.214
1995	3097	329	276	6	111	0.197
1994	3749	320	334	17	132	0.179
1993	4291	555	447	36	129	0.242
1992	4648	613	504	35	91	0.241

* Does not include goat kills

Tongariro/Taupo Conservancy



Conservancy Restructuring

Following the Cave Creek tragedy the Department has undertaken a major internal restructuring to strengthen line management and implement quality control and standard operating procedures with an emphasis on safety and staff responsibility and accountability.

The final stages of the organisational restructuring are now complete with new conservancy structures taking effect from 1 November. The old organisation consisted of functional, technical, financial, administrative and human resources sections in the conservancy office (including the Fisheries section) and, in the case of Tongariro-Taupo, four field centres based at Taupo, Turangi, Whakapapa and Ohakune.

The new structure emphasises Support, Line Delivery and Service units at all levels.

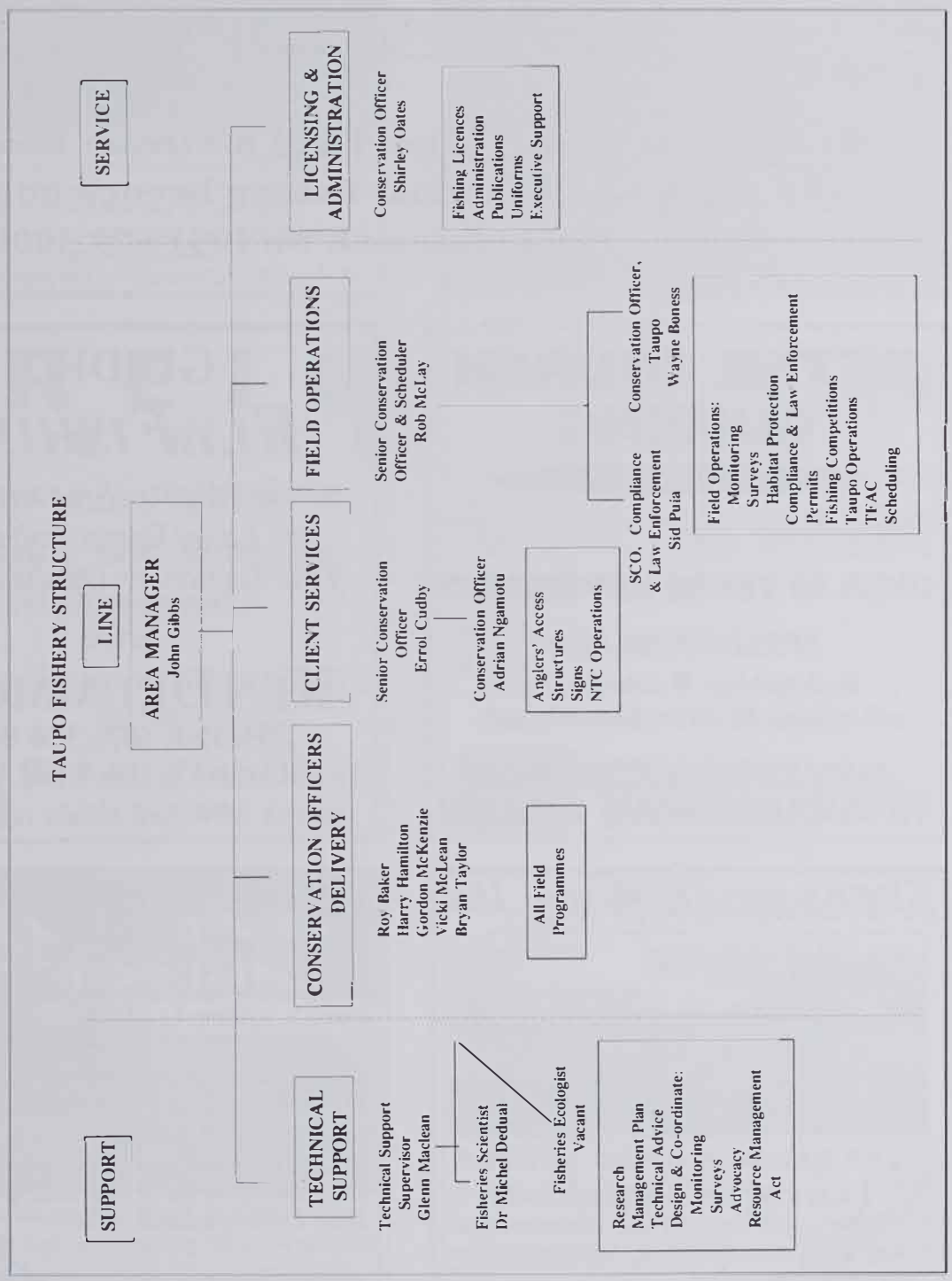
The conservancy office now has a Technical Support and Community Relations section (replacing the old Protection, Use and Advocacy section and the Conservancy Advisory Scientist) and a Business Services section (replacing the old Finance and Human Resources and Administration sections). There are separate Kaupapa Atawhai (iwi relations) and Human Resources Advisors.

Field delivery of conservation outputs takes place through two geographically based Areas, centred on Turangi and Whakapapa, and one functional-based Area, Fisheries, with the Area Managers reporting directly to the Conservator. The present Taupo and Ohakune based staff remain as Field Centres reporting to the Turangi and Whakapapa Area Managers respectively.

The Fisheries Area structure is shown in the diagram on page 68. The main changes are the division into support, delivery and service components mirroring the overall structure, and the amalgamation of projects under three programme managers (Technical Support, Client Services and Field Operations). Licensing and general administration are undertaken in the Service section. Staff have been appointed to all positions except for the vacant Fisheries Ecologist, which it is hoped will be filled shortly.

As staff take up their new roles, there will be a process of testing and

refining the various work programmes to ensure we have the most appropriate and effective mix. Anglers in the field are likely to notice little difference, as the same basic fishery management functions will still be carried out, but in some cases by different individuals, and certainly to more clearly defined standards.



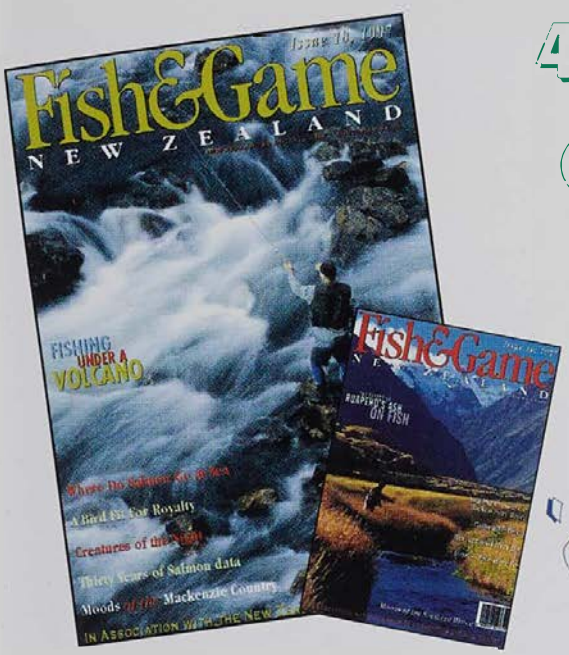
Taupo Field & Stream Directory

To advertise in the Taupo Field & Stream Directory and reach 12,000 annual fishing licence holders, contact Peter McIntosh on (09) 579 3000

SUBSCRIBE NOW

Call Toll-Free 0800 113 441

Winner Qantas Media Awards BEST NEWSTAND MAGAZINE



4 Issues for only $25 and get one back issue FREE!!

Fish&Game makes a great christmas gift at only $20 - a saving of $5.00 (see coupon below).

We will send your December gift issue of Fish & Game a few days before Christmas.

($20 applies only to New Zealand gift subscriptions).

Order your Back Issues Now
only $6.95
Some issues are low so order today!

GREAT FISHING GIFT!

4 Issues for $25. Each additional gift $20. Gift cards will be sent to you for announcing your gifts.

From: Name_____

Address_____

_____ Phone _____

To: Name_____

Address_____

_____ Phone _____

To: Name_____

Address_____

_____ Phone _____

Mail to: Fish & Game New Zealand, P.O. Box 12 965, Penrose, Auckland

or FREEPHONE 0800 113 441

NEW ZEALAND $25.00. AIRMAIL: Australia/South Pacific (NZ)$59.00. North America/Asia & U.K. (NZ)$81.00. Europe (NZ)$87.00
SURFACE: Australia/South Pacific (NZ)$49.00. Other Countries (NZ)$75.00

Name _____

Address _____

Town _____ Phone _____

Subscriptions Total $_____ (see prices above)

Back Issues Required (issue no's) _____ @ $6.95 ea $_____

Make cheque payable to Independent News Auckland Ltd, or alternatively, enter your visa/bankcard details below:

Card Number [ ][ ][ ][ ] [ ][ ][ ][ ] [ ][ ][ ][ ] [ ][ ][ ][ ]

Expiry Date _____ Total Amount $_____

Signature _____ Fish&Game NEW ZEALAND

Authorised Central North Island Haines Hunter Dealer. Enquire about our packages now.

CALL THE BOATMEN

Trev Terry Marine Ltd

Supporting the Boating Industries Association

NUKUHAU STREET, P.O. BOX 1038, TAUPO
FAX & PHONE (07) 378 7779. A/H: (07) 378 8753

Johnson OUTBOARDS

YAMAHA Outboards