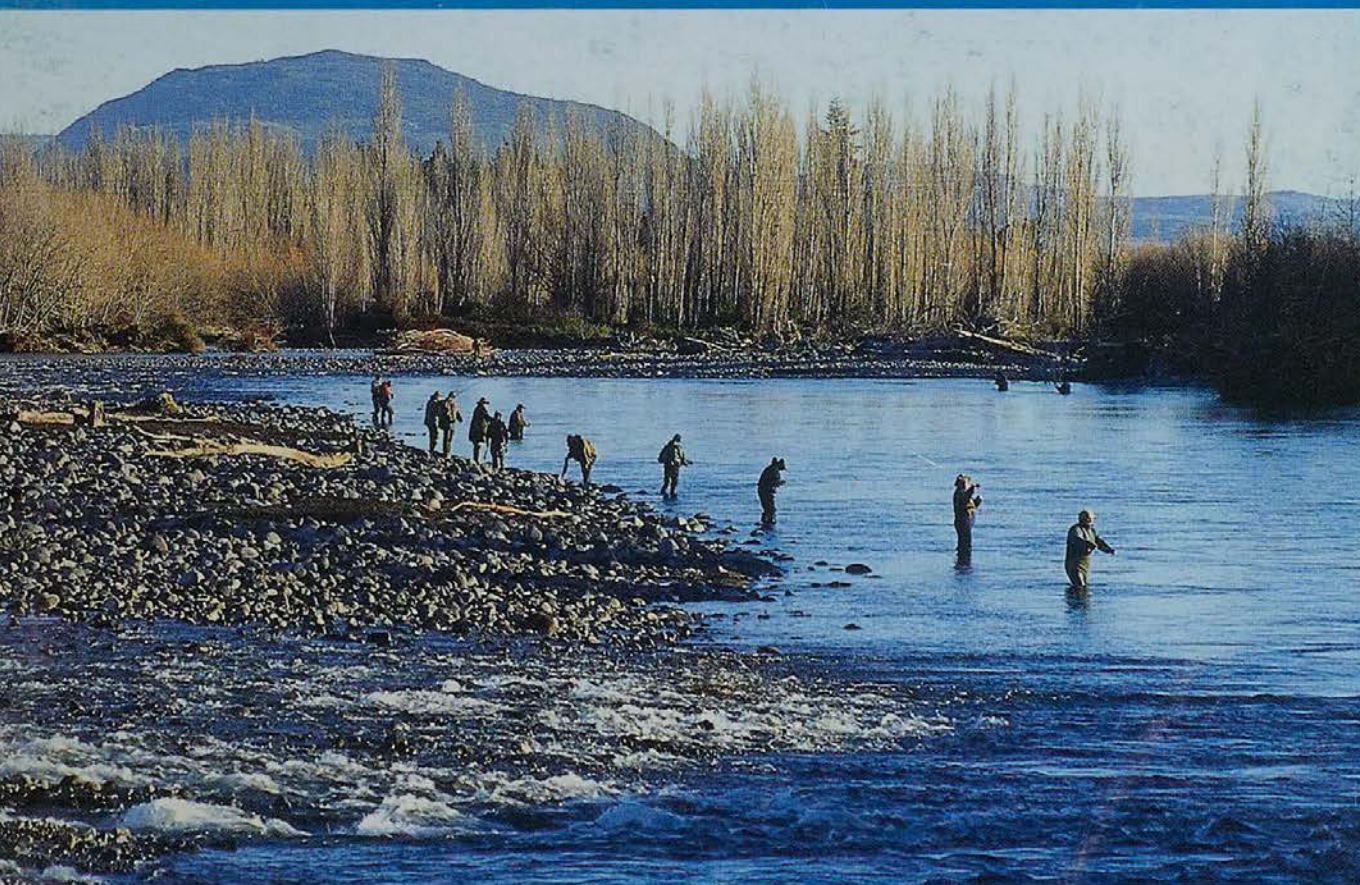


# TARGET TAUPO

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

JULY 1999, ISSUE 31



Department of Conservation  
*Te Papa Atawhai*

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

JULY 1999, ISSUE 31

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The views expressed  
in *Target Taupo* are  
those of the  
contributors and do  
not necessarily reflect  
Department of  
Conservation policy

Cover photo:  
Anglers line the  
Tongariro River  
below the  
SH 1 bridge.

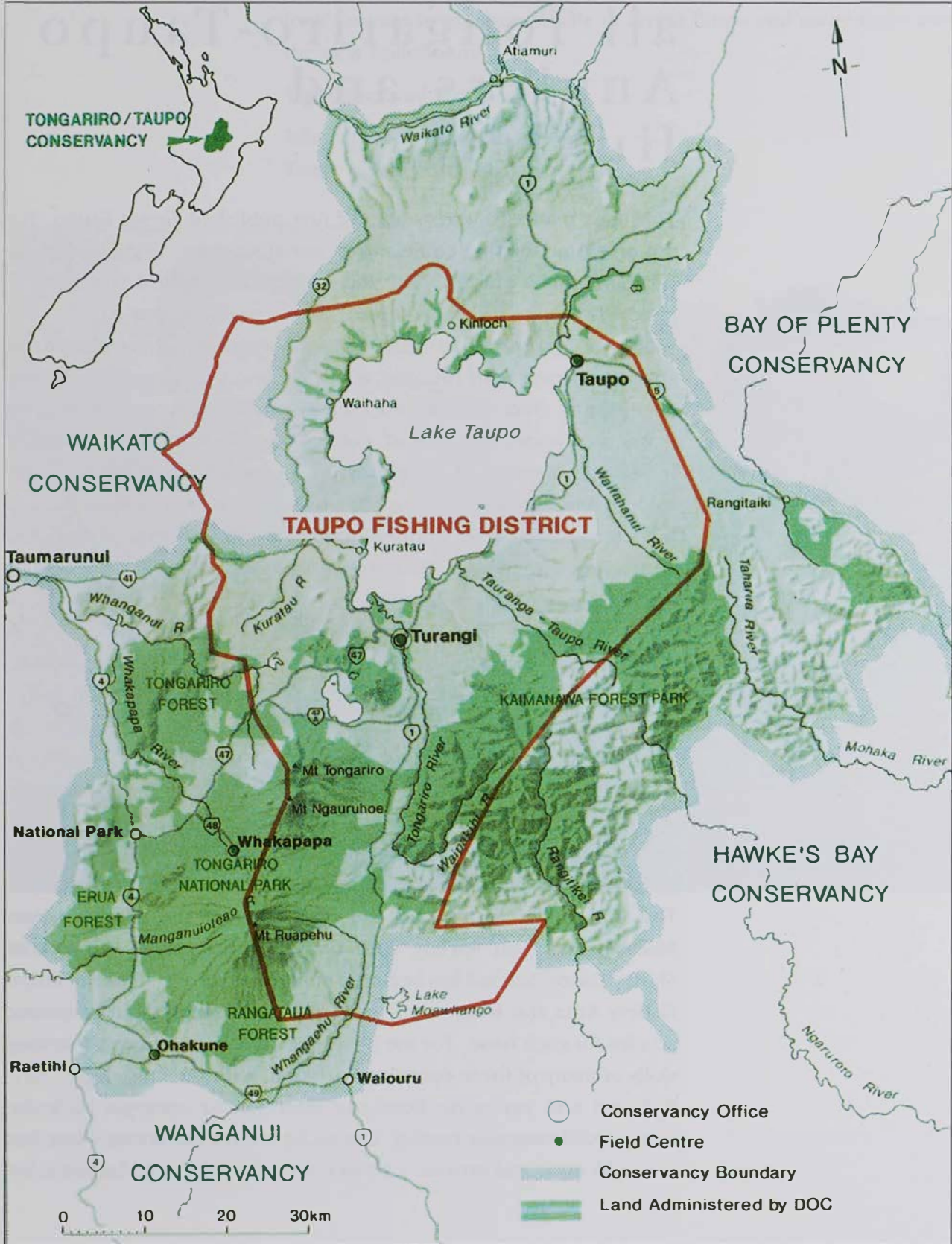
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# Tongariro/Taupo Conservancy



# A Warm Welcome to all Tongariro-Taupo Anglers and Hunters

This issue marks 10 years since we first published *Target Taupo*. It's not only time that has come a long way since then. Lying beside me is issue number 1 of July 1989 and a slim little volume it is, a mere 27 pages. This editorial will complete the 68 pages of issue 31.

When we first started out there was no colour, no cover photos, no advertisements (apart from the inside covers), no bylines and no free distribution. Over the years the magazine has grown to as many as 80 pages per issue, has lots of colour photos, full-colour covers, a reasonable amount of useful advertising relevant to hunters and anglers and is sent free to all Taupo whole season fishing licence holders and holders of hunting permits from the previous year. You now know who have written the feature articles as well. Printing and distribution are done professionally.

Some important things haven't changed. Target Taupo is still published by the Department of Conservation, albeit in its newest guise of the Tongariro-Taupo conservancy rather than the old Taupo District. Its prime purpose is still to provide information on opportunities for fishing and wild animal hunting in the area, to increase interest in and awareness of these resources, to stimulate debate and encourage feedback from anglers and hunters.

Over the last 10 years there have been two particular constants which have been crucial to the development and success of the magazine. The first is the enthusiasm and dedication of the editors, Glenn Maclean and Cam Speedy, with the staunch logistical support of Shirley Oates. Second has been the contributions of staff of the Taupo Fishery Area and from other parts of the conservancy in providing articles for each issue. For me it has been a delight to see the writing skills of many of these contributors bloom with the challenge.

It is not and has never been our intention to compete with the commercial magazine market. Our niche is not a commercial one, but is to add value and provide a service for our anglers and hunters. We

try to do this as professionally as we can and are continually looking for ways to improve this service. We hope you like it. Personally, I look forward to another decade of Target Taupo and many more into the new millennium.

Tight lines and hot barrels

John Gibbs

Taupo Fishery Area Manager



*Editors Glenn Maclean (left) and Cam Speedy surrounded by 10 years of Target Taupo. The magazine has come a long way since the first issue, held by Cam.*

# Improving the Table Quality of Your Catch

*by Michel Dedual  
and David Moate*

Fish are nutritious, low in cholesterol and high in protein and most anglers enjoy eating some of what they catch. Taupo trout are renowned for their eating qualities and sharing a fish with dinner guests is one of the pleasures Taupo anglers enjoy from their sport. However, the quality of the meal is dependent upon a series of events starting long before the trout is put on the table. If you care for your catch by following some basic rules, you'll bring home fish with a firm consistency, sweet smell, and delicate flavour but if you don't, even the cat may turn dinner down. It is estimated by the United Nations that every year a staggering 25 million tonnes of fish worldwide is wasted through discards at sea and losses owing to deterioration.

In this article we will explain the natural processes involved before and when a fish is hooked, what happens when it's caught and then killed, and after it's dead. We will see how understanding these processes can help us to adjust our handling techniques to get the best eating quality out of a Taupo trout.

## **Selecting a Fish to Eat**

There is an old saying that you can't make a silk purse out of a sow's ear and this is equally applicable to creating a gourmet meal of trout. The way in which the fish has lived prior to its capture, especially its diet and the quality of the water it has lived in, will affect the taste and appearance of the flesh. In Taupo, trout make most of their growth in the lake and so the conditions here will determine to a large extent the flesh quality. The quality of the lake environment in Lake Taupo is very high by any standards and provides the best start for having excellent eating fish. Taupo trout, in contrast to fish from many other origins, do not have any of the taint often described as muddy or earthy. Interestingly, this flavour is mainly caused by two compounds (geosmin and 2-methylisoborneol) which are also part of the chemical profile of "corked" wine. The muddy taste is produced by



bacteria and may be detected by our palate when the concentration of the compounds is as low as 0.00000001g per litre or roughly a pinch in an Olympic size swimming pool!

Trout in Lake Taupo rely mainly on smelt for food, which in turn rely on zooplankton. This plankton is similar to microscopic koura (freshwater crayfish) and like koura they have a pigment in their body called astaxanthin that gives the appetising and sought after bright orange red colour of most Taupo trout flesh. Some species of plankton contain astaxanthin in such great concentration that when consumed by smelt and processed by digestion the intestine of the smelt turns red. This red intestine is imitated in certain smelt fly patterns. Furthermore, koura, even though they are consumed by trout and will give a red colour to the trout flesh, represent only a tiny fraction of the total diet of trout in Lake Taupo. So contrary to the popular wisdom that when you catch a trout with bright orange flesh it is a "koura muncher" it is most likely a "smelt muncher". In salmon aquaculture astaxanthin is included in the feed as an additive, as the colour of the flesh is one of the most important quality criteria for farmed salmon. The function of this pigment has not been clearly established, but it has been proposed that it may help the fish to fight disease. Furthermore, the accumulation in the muscle may function as a store for pigment needed at the time of spawning when the male develops a strong red colour in the skin and the female produces coloured eggs. It is clearly seen that the muscle colour in trout fades at the time of spawning so that by the time the fish is spent, the flesh has invariably become white. So if you want to eat a fish with red flesh you will have to catch it before it starts spawning. It is, however, worthwhile to mention that as long as the fish is in good condition the colour of its flesh does not affect its nutritional quality.

Taupo trout are wild and have spawned and grown in what is a very demanding environment. Only a very small fraction of the fry emerging from the gravel survives to reach maturity several years later. Not surprisingly these survivors tend to be prime specimens, with any weak or unhealthy fish weeded out along the way. This vitality is reflected in their appearance much like any other animal in good health. While their colour is not very bold they have a shiny, bright appearance, the skin is unmarked by any blemishes and the fins complete and unscarred. The head is small in relation to the rest of the body which is deep and well rounded.

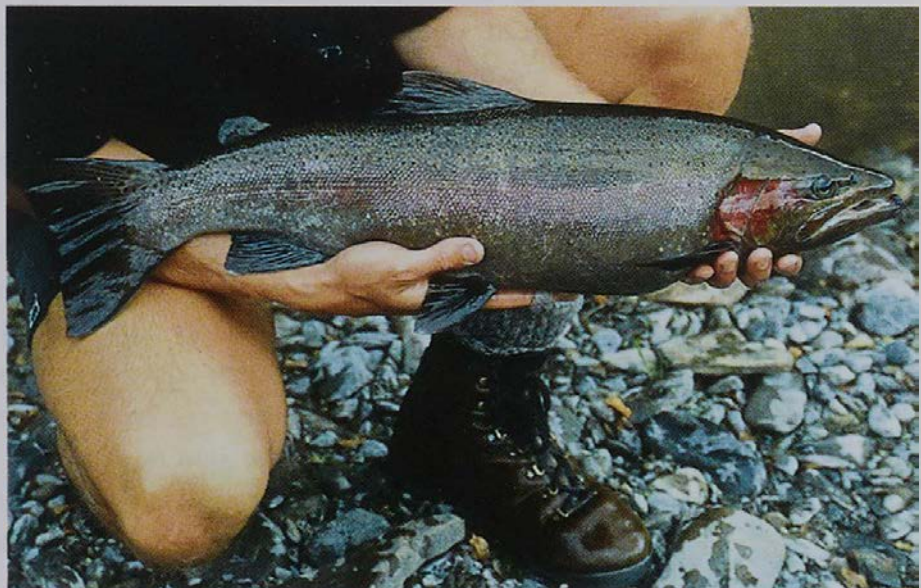
*A prime maiden fish with the characteristic silver sheen, deep well rounded body, clear fins and small head*



As spawning approaches trout undergo a series of physiological changes, some of which are reflected in their appearance. For example, their colours become much more bold and the head changes in shape, including the development in male fish of a pronounced kype or hook of their lower jaw. At Taupo, trout spend a number of months in the spawning streams during which they feed very little. During this time they may have had to travel 10 to 20 kilometres up the river, battle with other fish for prime spawning sites, cut spawning redds, and withstand floods. Thus it is easy to understand that spawning is a very demanding process on the fish to the point that the majority of them will be unable to recover and will die in the months following.

The toughest that do survive arrive back in the lake in a sorry state.

*A male rainbow close to spawning. Note its much darker colour; bright red spawning slash particularly on the gills and the characteristic kype (hook of the lower jaw) which has developed. As yet the fish is in good condition but by the time it returns to the lake it will have lost all its body depth and its fins will be tattered and torn from fighting with other male fish*



They can't shrink in length but have lost so much condition that there is no longer any depth to the body. The overriding impression is of a long fish with a big head that is somewhat skinny. The fish lacks any sheen, the fins are tattered and the skin is often pock-marked by infections.

Once back in the lake these trout prey on smelt which coincidentally move into the shallows to spawn. When the densities of smelt are high the fish quickly regain condition and by late summer many are almost impossible to distinguish by eye from those fish yet to spawn once.

So, in the lake there is a whole continuum of fish quality ranging from prime maiden fish and well-recovered previous spawners through to some fish which will never regain condition and which will die at some stage through the summer.

If a fish is sought for eating it is desirable to select a fish in good condition so as to maximise its eating qualities. For inexperienced anglers it can be very difficult to distinguish between good and poor fish, but try to look for some of the features mentioned. Almost certainly you will have to go through some trial and error, but remembering a well-conditioned fish tends to have orange-red flesh, you will soon start to correlate the external appearance of the fish with the flesh quality inside.

There is always a group of recovering fish that even experienced anglers sometimes misjudge. At the time of capture they appear to be well recovered but an hour or two after death it is obvious they are not in as good a condition as hoped for.

So part of the equation for a delicious tasting trout is the underlying quality of the fish itself. The other equally important aspect is how it is handled from the moment it is hooked.

### **When Hooked**

When the trout is hooked it will try to free itself by fighting against the pull of the line. The anatomy of fish muscle is different from the anatomy of terrestrial mammals in that the fish lacks the tendinous system connecting muscle bundles to the skeleton of the animal. Instead, fish have muscle cells running in parallel and connected to sheaths of connective tissue, which are anchored to the skeleton and the skin. The trout muscle runs on both sides of the body from head

to tail and forms the fillets. Basically, the muscle is composed of a multitude of filaments of two types: thick ones and thin ones. When the thick filaments are “grabbing and swivelling” their way along the thin filaments in a telescopic fashion, the muscle contracts. The reverse process relaxes the muscle. Both the processes of contraction and relaxation require energy that can be produced by the burning of two types of fuel. The first fuel used is “burnt” in the presence of oxygen and is “clean” producing only water and carbon dioxide (CO<sub>2</sub>) as by-products. When the fish runs out of this fuel it will switch to a second type of fuel that “burns” without oxygen. The combustion of this fuel produces lactic acid, which accumulates in the muscle and affects the taste of the flesh. After the exercise the fish will replenish its “clean” fuel and “recycle” the lactic acid by transporting it via the bloodstream into the liver.

However, if the fish is dead it won't be able to do this and the muscle will not be able to contract or relax anymore and will, therefore, remain stiff. The whole body becomes inflexible and the fish is in “rigor mortis”.

In trout, rigor mortis usually lasts for a day or more and then the rigor relaxes. The muscle relaxes when the bonds between the thick and thin muscular filaments start to loosen up, which is also the first sign of self-digestion (decomposition). From a quality point of view retarding the onset of rigor mortis as well as its resolution will prolong the freshness of a fish. Small muscles are affected first so in trout the first visible part of the body to turn rigid will be the cheek. Temperature, handling, size and physical condition of the fish affect the rate of onset and resolution of rigor. High metabolic activity in the time just before death, for example when fighting against the line, leads to higher levels of lactic acid, and shorter time for the rigor mortis to develop. The experiments that we carried out on live trout in Taupo have shown that lactic acid concentration rises rapidly after exercise, peaks two to four hours later and returns to normal by about 12 to 24 hours. The same experiments also showed that the fish that were played for longer times had higher levels of lactic acid. This means that the acidity and therefore quality of the flesh will be dependent on the amount of time that the fish has been struggling against the line and how quickly the fish is killed after it is landed. If the fish continues to thrash around in the fish bin then the level of lactic acid will continue to rise even though the fight is over. Ideally

the fish destined for the table should be landed as soon as possible after it has been hooked and then killed quickly. Higher environmental temperature also leads to a shorter reaction time and has other effects discussed later.

Japanese consumers use the state of rigor mortis as a criterion to estimate fish quality. Pre-rigor fish are considered to be of high quality and fetch high prices. While fish still in rigor are desirable, post-rigor fish are not. So there is a growing interest in producing premium quality chilled fish for specialised overseas markets. Of particular importance for these markets are techniques that extend the period of high quality shelf life or enhance the qualities normally attributed to very fresh fish. Both these aims can be achieved by delaying the onset of rigor mortis and its subsequent resolution. The onset of rigor mortis can be substantially delayed by the technique



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used to kill the fish. Many anglers kill their trout by bashing them hard on the head with a rock or a pickaxe or severing a gill so they bleed to death. While these are convenient ways to kill a fish they are not the most desirable in order to improve the eating quality of the fish. To improve this, trials have been carried out using the Japanese iki jime (live killing) harvesting method. Iki jime harvesting involves the insertion of a spike quickly and directly into the brain thereby causing immediate brain death. In particular the posterior part of the brain should be destroyed so that the fish can no longer react neutrally to its sensory environment, and motor struggling is inhibited.

The gill is then cut and the fish placed in water to bleed. As the heart of the fish remains pumping for a short time bleeding occurs effectively. Getting the blood out of the fish immediately is important because blood spoils faster than the flesh. It is also known that bleeding of fish significantly reduces the post mortem production of lactic acid and hence the acidity of the flesh and onset of rigor. Furthermore, when you fillet a fish that hasn't been bled, the blood will flow into the flesh, increasing the chance of spoilage and detracting from the appearance. Significant improvements were observed in a series of trials between salmon harvested utilising the iki jime method and the current methods employed. The quality of salmon gutted and packed prior to the onset of rigor mortis is known to be significantly better in terms of overall shelf life and texture than those processed during rigor mortis. When the standard harvesting method is used, rigor may commence within three to four hours, thus minimising the time available for processing prior to the onset of rigor. With the iki jime method there is sufficient time for the fish to be gutted and packed prior to the onset of rigor, thereby minimising the potential for physical damage (e.g. gaping) caused by handling fish in rigor. Similar results have been reported for snapper and kahawai. You can't stop rigor from occurring and you don't want to. In fact, experts believe that you can't properly smoke a fish that was filleted prior to or during rigor mortis. They insist that the fish has to be allowed the full process of rigor or it won't properly absorb the salt brine solution used to cure fish prior to smoking.

Damage from rigor mortis comes in two very avoidable ways. If a fish is kept warm, the process of rigor is accelerated, which damages the flesh. Also, if a fish is bent in rigor mortis and you forcibly straighten

*The far two fish held by Michel Dedual are in rigor mortis and stiff, while the near fish killed at the same time using iki jime, is still supple*



it, you will damage the flesh. The damage will be evident when you fillet your catch. The connective tissue between the muscles in a fish is fairly weak. A fish that goes through accelerated rigor mortis or is forcibly straightened will have unsightly separations in the flesh. Essentially these separations occur at the same places that you would expect the fish to flake when you cook it. However, if you ice your fish immediately and lay it in such a manner that it isn't bent or twisted, it will go through rigor mortis and relax out of it at the right pace and without harm to the flesh. If your catch is bent and stiff, let it relax on its own before attempting to fillet it.

The moment a fish dies, the immune system collapses and bacteria are allowed to proliferate freely. On the skin surface, the bacteria to a large extent colonise on the scales. During storage, they invade the flesh by moving between the muscle fibres. Few foods are more perishable than fish. The odour that many people associate with our finny friends, that “fishy” smell, indicates spoilage. Fresh fish that have been properly killed, bled, gutted, and iced have hardly any smell at all. Having killed a fish, the sooner you remove the source of bacteria and slow the rate of bacterial reproduction the better. Also, digestive enzymes begin eating through the stomach wall of your catch as soon as it dies. These juices will eventually eat through to the flesh. If you want a good fish dinner, you have to get the bacterial and enzyme spoilage processes slowed to a minimum. One way to achieve this is to cool down the fish as quickly as possible. Bacteria and enzymes will multiply and work harder in a warm environment.

The ideal would be to bleed the fish in an ice slurry, putting them in ice immediately. Obviously carrying ice is not practical when you are river fishing in a remote location. However there is reasonable access to most pools along rivers and at river mouths in the Taupo region where the car won't be too far away, and a chilly bin full of ice in the boot of the car is a practical option. If, for some reason, ice is not used immediately after catching the trout, it is worthwhile keeping the fish moist but not submerged in water. Evaporative cooling usually reduces the surface temperature of fish below the optimum growth temperature of pathogenic bacteria, although it does not prevent spoiling. Submerging the fish in water is not such a good idea unless it is in cold running water. Stagnant water in a bucket acts as a very efficient environment for bacteria growth and will accelerate spoilage as the water gets warmer. When fishing from a boat a chilly bin full of ice should be a standard procedure. For ice to work properly, you want it to have as much contact with the fish as possible. Flake ice makes more contact with the skin than cube or block ice. However, cubed ice is dramatically better than no ice at all. Plastic bottles full of water stored in the freezer and placed in the chilly bin will also do a good job. If the fish is kept cool you can delay removing the guts and gills for a few hours without any serious decrease in quality. The burying of the fish on the beach although protecting the trout from the birds is not the best thing to do either. Indeed, the sand will be a rich source of bacteria that will accelerate the decomposition of your fish, especially if you bury your trout in a hole used previously.



*What more could any chef ask for? A Taupo limit of prime eating trout which have been killed by iki jme, bled immediately and laid on ice flat*



Another process called “livor mortis” also occurs following death, which will affect the appearance of the fish rather than its quality. Livor mortis is a reddish-purple to purplish discoloration of the body. It is caused by the accumulation of blood due to gravity. Compressed areas will show up pale and are clearly visible on the side of the trout in contact with the bottom of the bin or the ground. Forensic pathologists look at livor mortis to determine the position of the body at death. The process begins within half an hour to two hours of death, and the peak effect is reached after 8 to 12 hours at which time it becomes fixed. Until then livor will shift if body position is changed. Thus it is a good idea to turn the fish in the bin from time to time to avoid the unappetising look of a trout in livor mortis.


When you arrive home, as soon as possible wrap the fish you intend eating in several layers of newspaper and leave in the fridge for 24 hours. The popular adage that fish are best eaten fresh is right providing the fish is eaten before the onset of rigor mortis. Otherwise the flesh is actually best eaten after the rigor mortis has resolved which means about 24 hours after it was killed, or later if it was killed using the “iki jime” method. If you are going to freeze the trout then remove the gut contents and place the trout into a vacuum-sealed plastic bag which will avoid the fish drying out. Dry fish flesh has an unappealing stringy appearance. Remove the fish from the fridge just prior to cooking. Normally any attempts to fillet a fish in the kitchen are rudely terminated and are banned forever but with this method of preparation you will be spared this fate as the flesh now contains

little blood and the skin is not slimy. In fact preparing a trout has never been as clean, easy or safe.

In summary we have seen that the eating quality of the trout depends upon numerous factors. The angler cannot significantly change some of these, like the quality of the water where the fish is living or its diet. However from the moment the trout is hooked the angler will largely determine if the fish will be a prime table example or simply cat food. We believe that Taupo trout deserve as much care as is practically feasible in the way they are handled prior to being enjoyed around a table. If anglers are willing to honour their catch as much as they can then they will seek to keep those fish which are not too close to spawning or which have fully recovered from spawning and so will have the best chance of having a fish with the appetising bright red-orange flesh colour. The same angler will also play the fish quickly and land it with care, preferably using a net. The fish will then be killed using the iki jime method and bled by cutting or tearing the gill arch. Ideally the fish will then be stored in ice until further processing back at home. If the fish is destined to be eaten fresh it should be eaten within two to three hours after it has been caught or alternatively wait until rigor mortis has disappeared before cutting it, since the processing of the fish still in rigor will damage the flesh. This approach means that you would eat your fish the day after you caught it. If your fish is to be consumed later you will have to store it in the freezer. A good tip is not to wash the fish just prior to storage because the freezing process will expand any water droplets within the flesh and damage it. The process suggested is clean if the fish has been bled, because the gutting will be a clean operation.

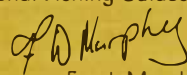
Of course, the ultimate touch that can affect the eating quality of the fish will not be the result of scientific knowledge, but will reflect the protocol followed by the alchemist in the kitchen. Nevertheless it will be easier for an average chef to prepare a delicious fish that has been taken care of, than for an award-winning chef to cook a poorly handled, poor quality fish. The final surprise that a Taupo trout can provide will depend upon the imagination of the person-in-charge of the kitchen ... but that is another story.

Bon appétit.



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# Changes to the Wild Animal Recovery Industry

## **Background**

The Department of Conservation has been administering a licence system under the Wild Animal Control Act (1977) for the commercial aerial hunting of wild animals such as deer since 1987. Prior to 1987 the system was administered by the New Zealand Forest Service. Helicopter operators who have a Wild Animal Recovery Service (WARS) licence are able to hunt and recover wild animals. Most aerial hunting activity involves deer recovery and/or culling goats and thar. In addition, WARS licence holders require a hunting permit from the Department of Conservation to hunt on land administered by the Department. Where the hunting is to occur on private land, the permission of the landowner is required. There are currently 56 licensed WARS operators.

The Wild Animal Control Amendment Act 1997 will come into effect on 1 October 1999. This legislation repeals the licensing provisions for aerial recovery under Part II of the Wild Animal Control Act 1977. This means the current licensing system will be abolished from 1 October 1999.

## **A New Concessions Based System**

From 1 October 1999 helicopter operators wanting to carry out a wild animal recovery operation will need to:

- Either obtain landowner permission to hunt on private land;
- or obtain a concession to hunt on land administered by the Department of Conservation;
- and comply with Civil Aviation Authority, New Zealand Police and other legal requirements.

A concession is an official authorisation to undertake business activity in an area managed by the Department of Conservation. For wild animal recovery operations concessions will be granted in the

form of a licence or a permit. The matters that must be considered when deciding to grant a concession are set out in the legislation. They include, but are not limited to:

- whether the proposal complies with, or is consistent with, the Management Plan or the Conservation Management Strategy for the area;
- the nature and effect of the activity;
- the purposes of the Wild Animal Control Act 1977;
- the role of recreational hunters in achieving wild animal control.

An application may be declined if any adverse effects of the activity can not be avoided, remedied or mitigated. Conditions may be attached to a concession to control how, when and where the activity is to be undertaken.

While anyone may apply for a concession at any time the Department's intention is to invite and consider applications for wild animal recovery concessions from existing WARS licence holders, and other interested parties, in a bulk application and consideration

To some it's a pastime.  
To others it's a passion.  
To Cortland it's a way of life.



## CORTLAND

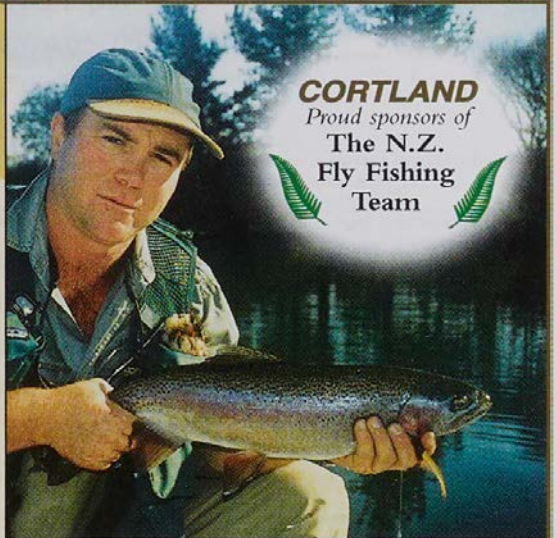
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Mike Stent - Fly & Gun, Taupo



Mike Stent - Fly & Gun, Taupo.

- Member of the New Zealand Fly fishing Team.

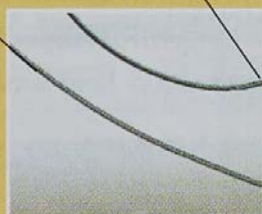


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process, prior to 1 October 1999. To enable this process to occur the Department is currently assessing the land it administers under the National Parks, Reserves and Conservation Acts to determine the areas over which it intends to invite applications for concessions and any restrictions that may be required. Restrictions on the use of an area for aerial recovery may be imposed if the considerations set out in the legislation require them.

Other key changes to the management of aerial recovery are:

- Generally there will be no restrictions on the number of operators granted concessions, unless restrictions are necessary after the matters specified in the legislation have been taken into account.
- A concession can be granted to a company, individual or partnership and can include the use of more than one helicopter.
- The Department will no longer require a helicopter to be marked as was required with the WARS licence, although any Civil Aviation requirements will still need to be met.
- Operators will only be required to collect data where this is required for specific research or management purposes.

The Department will no longer have any responsibility for regulating wild animal recovery operations on private land. Aerial recovery operators will need to obtain permission from the landowner, meet Civil Aviation requirements, meet New Zealand Police requirements and other legal requirements. There has been a significant increase in the provisions relating to illegal wild animal recovery with fines of up to \$10,000 for individuals and up to \$80,000 for companies.

### **Local Implications**

The Tongariro/Taupo conservancy has considered the new system in light of the legislative requirements and the requirements of various conservation management plans for the land areas it administers. The new concession regime requires that all areas of conservation land are to be made available on an unrestricted basis to wild animal recovery operations unless there are legal reasons, based on legislation or local Conservation Management Strategy or Conservation Management Plans (CMPs), to close or restrict activity in specific areas.

The Tongariro/Taupo Conservancy proposes to close or restrict the conservation land areas listed in the attached table to wild animal

recovery operations. (Note: By default, all other conservation lands not listed will be open to wild animal recovery concessions but there are no significant wild animal populations in these other areas so interest from operators is not likely to be high.)

Name of Area	Restrictions on Wild Animal Recreation Operations (WARO) concession activity	Reason for restriction (based on PTIII B Conservation Act and Section 23 Wild Animal Control Act (WAC Act))
Tongariro National Park	i) WARO activity will be limited to the period 1 May to Labour Weekend each year;	This recognises the role of persons engaged in recreational hunting (S.23 WAC Act) - peak times are Dec/Jan and Mar/Apr; and the impact low flying aircraft will have on the experience of very high numbers of summer visitors – peak times are Labour weekend to Easter. Restrictions are consistent with CMP where aircraft use is restricted to essential management purposes;
	ii) WARO activity will be restricted to that area of Tongariro National Park known as the Hauhangatahi Wilderness Area and that area north of the Whakapapanui and Waihohonu Rivers;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum on the southern side of Mount Ruapehu and in the Whakapapaiti catchment exclude these areas from commercial recovery of deer;
	iii) WARO concessionaires will be required to log activity and provide prior notification of all activity;	Required of all aerial operators within the park;
	iv) Hunting effort/flying hours and deer harvest data required;	a. Hunting effort/deer harvest/vegetation condition monitoring regime in place; b. Required to assess impact on visitor experience;
Kaimanawa Forest Park	i) WARO activity will be limited to the period 1 June to 30 November each year;	This recognises the role of persons engaged in recreational hunting (S.23 WAC Act) - peak times are Dec/Jan and March to May;
	ii) WARO activity will not be permitted in the gazetted Recreational Hunting Area (RHA) over 24,000 ha in the north east of Kaimanawa Forest Park;	This recognises the role of persons engaged in recreational hunting (S.23 WAC Act) - area has highest recreational hunter use in NZ with up to 1000 hrs/sq km p.a. Restriction is consistent with the Kaimanawa Forest Park CMP;
	iii) Harvest/hunting effort data required;	Deer harvest/vegetation condition monitoring regime in place to monitor impact of various management options in Kaimanawa/Kaweka Ranges (S&R funded PhD);
Rangataiki Conservation Area	WARO activity will be limited to the period 1 June to 30 November each year;	This recognises the role of persons engaged in recreational hunting (S.23 WAC Act) - peak times are Dec/Jan and March to May;
Tongariro Forest Conservation Area	WARO activity will not be permitted in Tongariro Forest;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Rangataua Forest Conservation Area	WARO activity will not be permitted in Rangataua Forest;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Erua Forest Conservation Area	WARO activity will not be permitted in Erua Forest;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Waituhi/Kuratau SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Kaiapo Bay SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Opepe SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Ohakune Lakes SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Pakuri SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Raurimu SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Mangatepuhi SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Hukupapa SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Ohinetonga SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Whakapapa River SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Whakapapa Island SR	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Waimarino Scientific Reserve	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum;
Whakapapa Marginal Strip	WARO activity will not be permitted;	Presence of significant numbers of permanent possum bait stations pulse fed monthly with Brodifacoum.

As this change-over process will result in changes to the current level of wild animal recovery in the conservancy, the conservancy will consult with affected parties before concessions are issued.

# Something Fishy

## **The Impacts of Trout Poaching - A Practical Perspective**

*In response to a request from the Tuwharetoa Maori Trust Board the Department provided a practical description of the impact that the poaching of trout has. While it was for use by members of the board in their discussions it was agreed that it should also be reprinted here.*

A female trout produces approximately 3000 eggs. She lays these eggs in gravel depressions in the streambed called redds and using her tail covers the eggs with more stones.

Spawning trout are the most important trout in the fishery for they have survived floods, being eaten by shags, disease or being caught by anglers to return to lay the next generation of fish. Without these fish and their eggs there will be no more trout.

A typical haul of poached trout often includes at least 10 female trout. In one go 30,000 eggs have been killed. But that is not all. To catch these fish people have walked up and down the stream often dragging heavy nets. Any eggs under each footstep have been crunched and squashed by the stones moving around them. Typically poachers work over several hundred metres of stream, which may contain 50 or more redds. That's another 150,000 potential trout, which don't even get a chance of survival.

So these poachers haven't killed a few fish, they have killed close to 200,000. Sure most would have died before they were fully grown but this way they don't even get a chance.

Just imagine how many are killed when the larger poaching operations occur. The 72 fish taken from Pitchfork Creek over three hours in 1992 probably killed nearly a million eggs.

When the fishing gets hard it's easy to blame the other anglers or floods or the weather. But what would it be like if another million eggs had hatched two years before?

## **Steel Downrigger Weights**

In recent years we have discussed the issue of the use of lead-based fishing tackle - lines, weighted lures and downrigger weights - in the





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Taupo fishery (*Target Taupo* issues 26, 27 and 30). It is pleasing to see that an enterprising local has taken up the challenge and is commercially producing a non-lead downrigger weight. These are made of solid steel with stabilising fins and weigh 4.5kg (10lbs). They are competitively priced compared with the lead alternative and can be obtained from Waioranga Sports in Taupo.

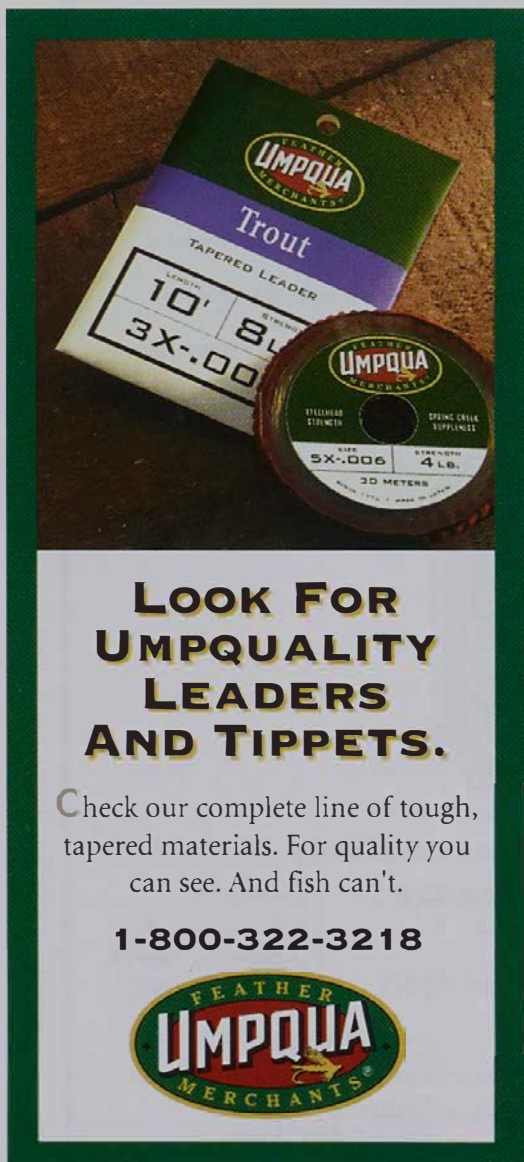
### Changes at the Tongariro National Trout Centre

In recent issues of *Target Taupo* we have discussed the development of a plan to guide the future direction of the Tongariro National Trout

Centre. This plan (*Target Taupo* issue 30) focuses on developing the advocacy role of the centre to promote trout, trout fishing and freshwater ecology in general. The plan is now complete and a number of the developments identified are in the process of being implemented.

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

Local builder Gordon Hydes undertook the work with assistance from fisheries staff. The building was carefully dismantled, the materials shifted to the new site by hand and then reconstructed. The large bay




The advertisement features a photograph of fishing gear. On the left is a green and white box for 'Trout TAPERED LEADER' with a length of '10' 8L' and a price of '3X-.00'. To the right is a spool of 'UMPOUA' tippet, labeled 'FEATHER', 'UMPOUA', 'MERCHANTS', 'STEELHEAD STRENGTH', 'SPRING CRICK SUPPLIANCE', 'SIZE 5X-.006', 'SPIN 4LB.', and '30 METERS'. Below the photo is a white box with a green border containing the text: 'LOOK FOR UMPQUALITY LEADERS AND TIPPETS. Check our complete line of tough, tapered materials. For quality you can see. And fish can't. 1-800-322-3218' and the Umpqua Merchants logo.

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*Peter Masters of Taupo Helicopter Services lifts the main structural beam for the new kiosk into place*

windows were retained and the only major change was the installation of French doors, which open out onto a large deck overlooking the pond. The new kiosk blends in well amongst the trees and we are very pleased with the result.

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

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

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

lighting identified in the plan.

Following on from the new track built by Department of Corrections inmates to the mouth of the Waihukahuka (hatchery) stream this summer, staff have cleared the area of blackberry and broom and sprayed the regrowth. The Women in Conservation group in the conservancy then planted over 400 native shrubs and grasses, which they will tend until the plants become established.

The next major project, which is getting underway, is the conversion of the old workshop building into an interpretation centre, which will include an auditorium. This is a joint project between the Department



*The new kiosk overlooks the children's fishing pond*

and the National Trout Centre Trust. A concept plan for the new building has been discussed and detailed plans will shortly be drawn up. It is intended to have the building, though not necessarily the displays, completed by this time next year so that we are in a position to apply for funding for a full-time teaching position to be based here starting in January 2001.

*Fishery Area staff Shirley Oates (left) and Nadine Gibbs planting trees as part of the revegetation project at the National Trout Centre*



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

*The open hours for the Tongariro National Trout Centre are now 10 a.m. to 3 p.m. At present outside of this time the main entrance gates will usually be closed*



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

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

*The new booking system which allows for 30 children per hour means volunteers can spend more time with each child without excessive queues forming*



*Children at the fishing days receive individual tuition from volunteer anglers*

deep, rather than construct a bridge.

The other major change that has occurred has been in the way we operate the children's fishing days. As discussed in *Target Taupo* issue 30 these days had become so popular that it was no longer possible to provide each child with the full angling experience. As a consequence, this year we have introduced a limit of 30 children per hour or a total of 180 children per day. This means that the volunteer anglers can spend approximately 10 minutes with each child but does require that children book prior to the day to ensure they can be fitted in.

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

So next time you visit some big changes will be evident - call in and check them out.

## Second Step of the Catfish Study in Lake Taupo

In addition to the six catfish previously fitted with acoustic transmitters (*Target Taupo* issue 30), in May we implanted another six catfish with the same type of transmitter. The location and movement of these fish will be recorded during the next six months and will help us to determine what catfish do in winter in Lake Taupo. We are especially keen to see if catfish return to the shallow habitat that they were using in spring but that they have deserted since last December. We will keep you updated as soon as new data is available.

In the meantime if you catch catfish carrying a yellow or orange plastic tag please report the catch and details of the tag, to the fishery managers, as these fish also provide us with valuable data.

*Acoustic transmitters were surgically implanted into anaesthetised adult catfish*



*Fishery Area staff Michel Dedual and Rob Marshall at the operating table in the Motuapa Marina*





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## Speak Up!

Most of the fishing opportunities in the Taupo region are well known and patronised. Fishing in close proximity to other anglers is quite normal; in fact it is a great feature of the Taupo fishing experience and testimony to the quality of the resource and the popularity of angling. Not surprisingly with such an intensity of use and wide range of views amongst anglers, at times a few issues arise, especially on the rivers during winter. Angling etiquette is a much discussed subject and one that fisheries staff are often faced with. Some anglers become frustrated because other anglers do not adhere to their own personal or what they believe is the commonly practised etiquette. However, often both anglers genuinely believe they are doing the right thing. For example, perceptions of what is unacceptable crowding of another angler may be quite different between an angler used to fishing wilderness streams and someone used to rubbing shoulders in the hustle and bustle of lower Queen Street. Another issue which regularly arises is when an angler arrives at a popular pool which is already full. Some anglers stick dogmatically to the old etiquette that they should get a turn and slot into the queue, however long it may be. When those in the water stop moving because the last thing they want to do is reach the end of the pool and then have to wait on the bank for an hour or more, those already waiting get upset. That's quite understandable but so too is the reluctance of the anglers already fishing - after all they made the effort to get to the pool early so why should they then make way for someone who has wandered down at a more leisurely hour. The answer in this case is that, of course, the anglers should keep moving through the pool but equally when the pool is full with perhaps one or two more waiting on the bank then it's full - anyone arriving after this and expecting to fish is out of luck and should move on somewhere else.

When staff ask the aggrieved angler what they did about a particular situation most say that they did nothing but expected the other party involved to change their behaviour or fisheries rangers to deal with it. The bottom line is that it is up to all anglers to work together. If each angler takes a considerate approach and where there is an issue, talks it through with the other angler, then usually it can be resolved very amicably. Fisheries managers can assist by encouraging fair and accepted angling etiquette but on the water it's up to each individual angler. It's you, the angler, who not only uses the resources, funds and

shapes their management but ultimately develops the sport. Angling etiquette is an important aspect of our sport, the continual development of which is something we are all part of.

So where there is an issue on the water “speak up”. Politely talk to the other anglers present. Not only will you find out how the fishing is, but also everyone can agree on how best to share the water.

### **Angling Etiquette**

The following points are a synopsis of the currently accepted etiquette on the Tongariro River:

1. You should always enter the pool behind any angler already moving through the pool.



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*When an angler hooks a fish leave that person room to play it and return to the same spot in the pool. On the other hand, do not be a “fish hog” taking fish after fish without moving whilst everyone else in the pool stands still*

2. If the pool is full, wait on the bank until someone leaves or move on yourself to another spot.
3. Slotting into an already crowded pool often causes those fishing to simply stop moving, as they are no keener than you to wait on the bank once they reach the end of the pool. Similarly, if you are sharing a pool keep moving through it steadily.
4. Occasionally an angler moving upstream nymph fishing will encounter a downstream angler wet fly fishing. With a little patience and consideration these two anglers can pass each other quite happily.

#### **45 Centimetre Size Limit**

The minimum size limit for trout in the Taupo fishery was increased from 35cm to 45cm in July 1997. This was instigated after concerns that Mt Ruapehu’s activities had destroyed the majority of the fry and juvenile trout in the Tongariro River in 1995 and 1996. The increased size limit means a higher percentage of trout survive harvest from the lake resulting in greater numbers of trout to satisfy winter fishing and spawning requirements. For the first time lake anglers have to

release a significant percentage of their catch particularly in spring. While the majority of anglers are supportive of the new size limit some are being a little complacent with their measuring. An example of this was during a recent Lake Taupo fishing competition where fisheries staff measuring contestants' trout had to disallow several trout that were undersized. Many more were undersized if measured from the tip of the nose to the fork of the tail which is the commonly accepted method used to measure fish. This is the method we use for all our monitoring and competition organisers to record the data. Fortunately for the anglers involved, the regulations define the legal length as being to the tip of the tail which is usually 5 to 10mm longer. The reality is that most anglers are not aware of the legal definition and it was good luck rather than good management that the



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fish were not, in fact, undersize. Similarly, during our routine licence checks and creel surveys on the lake this summer the taking of undersized fish has been one of the most common offences detected. The only way to be 100% sure is to measure the trout carefully by laying them on top of a board with the measurements marked on it. A headboard to rest the trout's nose against prevents it from slipping off the mark or falling if it struggles. Another advantage is that the trout can even be kept in the landing net while being measured. This minimises handling and is quick, thereby improving the chances of survival of any trout released. Do not use a measuring tape held over the trout, as the curved shape of the body will add to the length measured possibly resulting in an undersized fish being taken. River anglers rarely have a problem as most mature spawning trout are well over the 45cm length but if in doubt place a marker on your rod.

*The chlorine spill into the Waipahiti Stream was very obvious but did not impact on the lake*



Remember to measure the trout from the tip of the nose to the tail, keeping the trout in a relaxed straight position. We strongly recommend anglers continue to measure to the fork of the tail rather than to the tip. That way if you make a slight mistake in your measuring it shouldn't prove critical. Don't guess and assume it will be all right - excuses like "we thought it was long enough" or "I measured it with my hand" do not demonstrate sufficient care.

Next time you measure a trout caught from Lake Taupo which is less than 45cm and have to release it, don't be disappointed by this, instead consider it a positive move to your future angling success and the sustainability of the fishery.

### **Chlorine Discharge**

At 11 am on 12 May 1999 a chlorine delivery pipe burst at De Bretts Thermal Resort resulting in the spilling of 300 litres of chlorine, 200 litres of which entered the Waipahiti Thermal Stream. Taupo Fire

Service, Police, Taupo District Council, Environment Waikato, Civil Defence and Department of Conservation Fishery Area all responded to the spill. Fortunately the spill was quickly diluted in the stream and by the time it entered Lake Taupo chlorine levels were measured at similar concentrations to that of a private swimming pool. Due to the hot thermal water in the stream and lake inlet area there was little risk to aquatic life. Lake dilution then further reduced any effects the discharge may have had. De Bretts Thermal Resort is presently involved in a resource consent application and fishery managers will be insisting that systems and facilities be improved to prevent any more spills.

## Tracks Update

Angling access tracks have finally been cleared for the winter season after a rather protracted process of letting and re-letting contracts and resolving several issues with landowners. In the past we undertook the track maintenance ourselves but in a change this year we trialed getting the work done by contractors.

The call for tenders for the track clearing in February generated a heartening amount of interest from contractors and in March one was selected from the six who submitted prices. Despite having completed mowing contracts satisfactorily in the past for us, this contractor did less than one day's work and cleared only 1.3km of a total of over 45km of track by the end of April when the contract ended.

This was obviously not a satisfactory situation and anglers



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arriving to fish the rivers for the first time this winter were understandably upset about the condition of some tracks.

To remedy the problem we approached the top-listed contractors from the original tender process plus a couple of others who had subsequently expressed interest, and finally split the work between two. Both Truebridge Agricultural Contractors and Plateau Sawmilling responded to the urgency of the situation and in a short time did excellent jobs on the tracks.

So, initially, while the trial was not successful, the final outcome was much more satisfactory.

### **In-stream Cover, Obstructions, Hazards or Snags?**

What you call them depends on your perspective, whether you are an angler or a kayaker or a fishery manager or an engineer or a scientist. Mostly they are trees or other vegetation which have fallen into a river from eroding banks.

Sometimes from the bank you can see trout sheltering behind them and if you get in and have a quiet look through a dive mask you will be sure to see samples of most life in the river hiding amongst the branches, roots, fronds, etc. When young trout are about, that's where you will find many of them too.

So, while they may annoy river users and inspire calls for their removal, snags are not always bad. In fact, by its very nature, a river is a dynamic entity, moving around its bed, bashing at the banks, forming and re-forming rapids, runs, pools, eddies and shifting materials in almost every direction. If you have much to do with rivers you come to admire this dynamism and you adapt to it and live with it.

Our policy with snags is to leave them except where the benefits to angling strongly outweigh their value as juvenile habitat or where snags are blocking fish passage to spawning areas upstream. For example we might remove a large snag washed into the middle of a popular angling pool if this is a practical option. However, for the most part, fishing around the snags is part of fishing, indeed the snags are often the reason why fish are lying in these particular areas.

Occasionally we are asked by other river users to remove snags for them. While in some instances we support the proposed work, e.g. the removal of snags trapped on the piles of a bridge, it is not for us to spend licence revenue on such unrelated activities.

## Juvenile Trout Monitoring

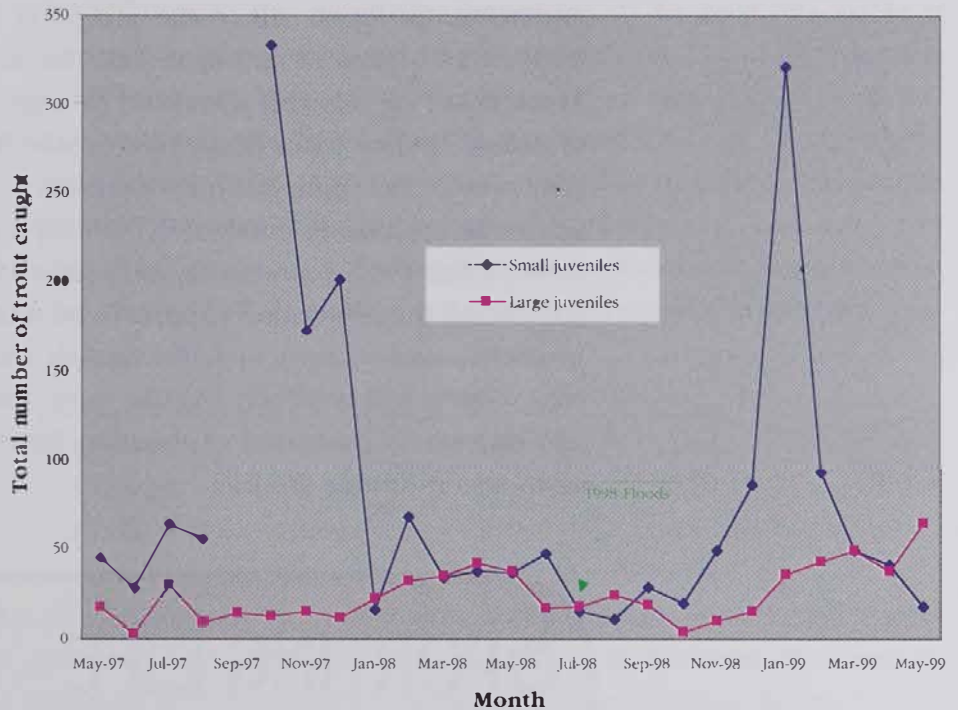
Monitoring of the Tongariro River and Whiti kau Stream juvenile trout populations is undertaken once a month throughout the year. The results of this project are an important component of the management of the Taupo fishery as fishery sustainability is dependent, to a large degree, on successful spawning and juvenile rearing. As with many of the monitoring programmes undertaken the aim is to identify trends and assess the impacts of natural and manmade events on the population.

Most Taupo anglers will remember the rain in July 1998 that was responsible for two large floods in the Tongariro River. The floods were the third and fourth largest since recording began in 1957, peaking at 814 and 838 cumecs (cubic metres of water per second) respectively. The physical damage caused by the floods was immediately evident and is still visible today, with anglers returning to fish for the first time since having to re-learn the river. The impact on the trout population was understandably perceived to be great by many anglers. How could trout eggs laid in fine gravel survive when boulders as big as cars were being rolled down the river? There is no question that whatever spawning had taken place up to six weeks prior to the floods would have been lost, but what happened to the juvenile trout that had already emerged from the gravel.

Although many fish enter the rivers in late autumn, the majority of spawning doesn't occur until September and October. Therefore the key issue was how much successful spawning took place after the floods, and what effect did the loss of any early spawning have on the entire year's recruitment. The size of the Tongariro River spawning run in three years time will provide the ultimate answer, but a lot can be taken from the results of our juvenile monitoring programme. Graph 1 shows the number of small juveniles (fry) caught by electric fishing and the number of large juveniles (fingerlings) caught in minnow traps every month between 1997 and 1999 at selected sites on the Tongariro and Whiti kau Rivers. The number of fry caught in the months immediately following the floods dropped, as opposed to the previous year when there was a steady increase in fry numbers each month to a peak abundance in October. In 1998 the fry population remained low until December but then in January 1999 peaked at a similar peak abundance to that of 1997, although



*Graph 1:  
The number of  
juvenile trout caught  
from the Tongariro  
River and Whiti kau  
Stream between  
1997 to 1999*



approximately three months later than in 1997. The data supports the evidence that the floods did have an impact on juveniles yet to hatch and on fry which had recently emerged. It also shows the positive effects of the flood, which cleaned the spawning gravels and likely improved the success of subsequent spawning, illustrated by the abundance of fry from December to February 1999. So although some fry were lost, the improved success of post flood spawning helped to make up any shortfall in recruitment. Fingerlings that were larger and more likely to survive high flows appear to have been less affected by the floods than the fry. The number caught remained relatively constant following the floods and has followed a similar pattern to that measured in 1997.

From the available information it appears that the impacts of the July 1998 floods on the Tongariro trout population were far less dramatic than they were on the Tongariro angling population. We will keep you informed of the results of the juvenile monitoring programme in future issues of *Target Taupo*.

### **Lake Taupo Catfish Monitoring**

Monitoring of catfish in Lake Taupo commenced in 1996 with the objective of identifying changes in the population in Waihi, Motuoapa

and Whakaipo bays. Since the inception of the programme, the public's awareness of catfish in Lake Taupo has steadily increased. Fishery staff are regularly contacted by anglers having seen "schools" of catfish on the surface of the lake, or who have caught a catfish at a river mouth. Inevitably the question is asked "Do these catfish reflect an overall increase in numbers?". As Graph 2 shows, the number of catfish caught at the monitoring sites since 1996 has actually reduced and overall the population appears to be relatively stable. A research project started recently, in which catfish were tagged with acoustic transmitters, will hopefully explain more about the fish's behaviour, and provide an ecological explanation for the catfish sighted in the open waters around the lake.

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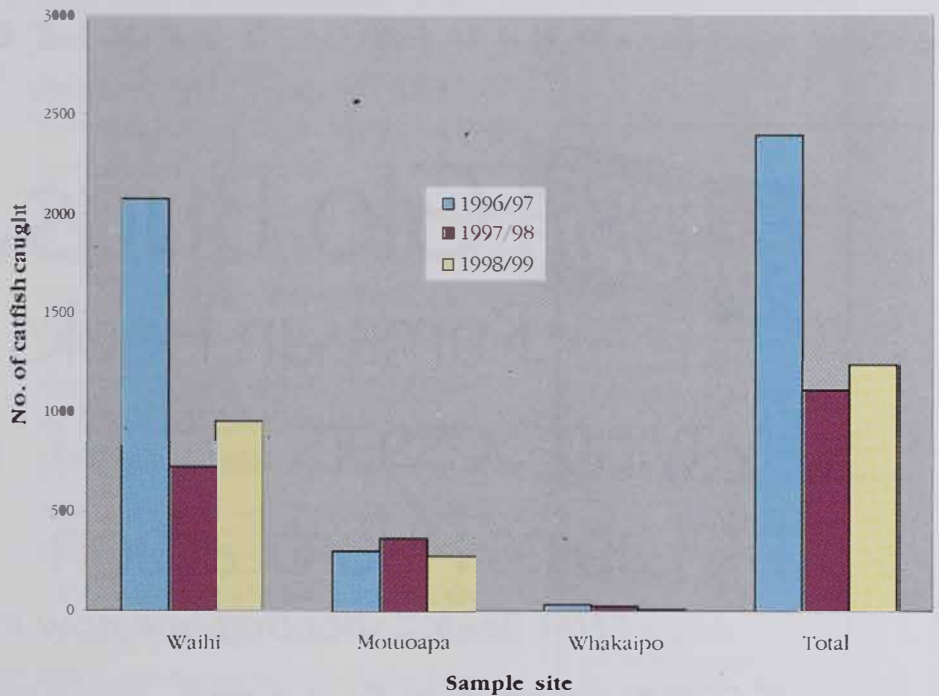
In addition to the population appearing to be relatively stable it appears that the average size of the catfish (Table 1) and the fish's diet preference are also stable. All are positive signs in terms of any potential negative impact catfish may have on trout. Over recent seasons the trout population has thrived in the lake, but should marked increases in the population size and structure, and changes in diet of catfish, become evident it would be reasonable to assume that the potential effect on the trout population could also increase.

*Table 1: The average length (mm) of catfish caught from sampling sites in Lake Taupo between 1996 and 1999*

	Male	Female	Immature
1996/97	190	174	119
1997/98	190	209	131
1998/99	203	179	144

Monitoring will continue to ensure any changes are detected. Future monitoring results and the results of the catfish research currently underway will feature in a subsequent issue of *Target Taupo*.

*Graph 2: Total number of catfish caught from Lake Taupo since 1996*



### **The Life and Times of Tagged Trout in Lake Taupo**

The tagging of trout has been used as a management tool in New Zealand and around the world for many years. A lot can be learnt

about the behaviour and growth of fish simply by marking them with numbered tags, recapturing them at a later date and assessing the details of their movement, age and growth. Studies of this type are often used to learn more about trout behaviour in the Taupo fishery. Each study is designed with its own specific objectives and aims. For example, in 1995 large numbers of trout were caught and tagged in a fish trap on the lower Tongariro River. By recapturing a portion of these tagged fish in the Whiti kau Stream trap approximately 18.5km upstream, the proportion of the total Tongariro spawning run using the Whiti kau Stream could be calculated. As we knew the total number of fish running the Whiti kau Stream from the operation of the fish trap we could then estimate the size of the total Tongariro River trout run. The results of the study were published in issue 24 of *Target Taupo*. All of the fish tagged in this and other studies remain

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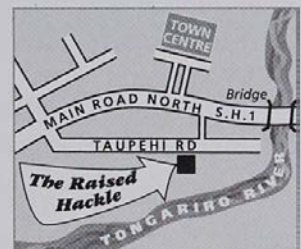
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afterward in the population to carry on a normal life, and so are available to anglers until such time as they are caught and killed or die of natural causes. Aside from the specific information collected for the study a lot can be learnt from the subsequent recapture of tagged fish by anglers. Obviously the collection of this information is completely reliant on anglers returning the details of any tagged fish they catch. Important details include the tag number and colour, the species, sex, weight and length of the fish and the date and location of capture. With this information we are able to enhance our understanding of the behaviour of trout in Taupo. Indeed many of these recaptures provide very interesting stories.

A good example is that of the rainbow trout tagged as a prize in the 1998 Lake Taupo International Fishing Competition. The fish named "Petra" by Department staff, was caught on 19 April in Whakaipo Bay, tagged, transported and released in the middle of the lake. Four months later she was caught in the Stones Pool on the Tongariro River, highlighting the fact that trout use all of the lake during their life. Many other examples of this behaviour exist. A rainbow trout that was tagged during July 1995 in the lower Tongariro River was subsequently caught by an angler, seven months later, at Rangitira Point in the north of the lake. In this time the fish ran the rest of the Tongariro River, spawned, migrated back down the river and had swum to the opposite end of Lake Taupo. The degree of variation in the behaviour of individual trout is also highlighted by some of the tag returns. For instance fish tagged in the Whitikau Stream in January 1994 and in June 1994 were caught on the same day in October 1994 in Kawakawa Bay at the north-western end of the lake. River mouth anglers also benefit from the vast movement of Tongariro River trout. Fish tagged in the Tongariro River have been caught at the mouth of the Tauranga-Taupo,

*"Value...It's unwise to pay too much,  
but it's unwise to pay too little.  
When you pay too much you lose a little  
money, that is all.*

*When you pay too little,  
you sometimes lose everything,  
because the thing you bought  
was incapable of doing  
the thing you bought it to do.*

*The common law of business balance  
prohibits paying a little and getting a lot.  
It can't be done.  
If you deal with the lowest bidder,  
it's well to add something  
to the risk you run.*

*And if you do that,  
you will have enough  
to pay for something better."*

*John Ruskin (1819 - 1900)*



Kuratau and Waihora River mouths up to 12 months after being tagged. It is likely that these fish are attracted to the mouths for feeding and are not necessarily accumulating prior to running the particular river to spawn.

Needless to say trout migration patterns are impressive, both in the speed and distance of movement and the variation shown by individual fish, in some cases subjected to similar environmental conditions. The data also highlights the importance of successful Tongariro River recruitment on the welfare of the entire fishery. In other words, Tongariro River trout not only sustain angling in the south but provide angling opportunities everywhere in Lake Taupo. Historic records from the operation of fish traps on the Waihukahuka (Hatchery) Stream on the Tongariro River and Tokaanu Stream, established that the majority of Lake Taupo trout only spawn once. In any given year, between 0 and 5% of the population return to spawn for the third time and even less return for a fourth effort. However, an interesting tag return was received recently where a rainbow trout tagged in the Whitikau Stream in May 1995 was caught at the Delta in October 1998 after having spawned for the fifth time. Assuming that trout are three years old when they spawn for the first time this fish would have been approximately eight years old when it was caught. Taupo trout do not grow much once they have spawned for the first time. A good example of this is a trout that was tagged in 1995 attempting to spawn for the first time and which was 520mm long. When eventually caught by an angler three years later it had only grown 10mm in length.

This April a new tagging programme was started in which 60 fish per month are tagged in an attempt to establish how long they spend upstream of the Waipa fish trap. This will allow us to adjust the total trap run to take into account fish missed when the trap is overtopped during floods. A total of 420 fish will be tagged for the study, many of whom will eventually make their way down the Tongariro River into Lake Taupo. Over the next few years we hope to receive the details of many of these fish as anglers catch them. Should you be lucky enough to catch a tagged trout, please take a few minutes to send the details to us. If you don't wish to kill the fish then the tag number, sex and species, date and location of capture are sufficient. If you do kill it, then an accurate weight and length of the fish in addition to the above details would be very useful.

*Fish trap operator Bevan Clinch tags a rainbow trout in the Waipa trap as part of an experiment to determine how long each fish spends in the stream*



*Below: Each plastic floy tag carries an individual number and is inserted just under the dorsal fin using a tagging gun*

### **State of the Fishery**



Comparisons are often made about the quality of each year's fishing by anglers and fishery managers. For anglers, discussing the difference between the number of fish caught and theorising as to why is an important and very enjoyable part of angling. For fishery managers it allows the health and quality of the fishery to be assessed over time. The usefulness of the comparisons made by fishery managers increases with the number of years and the amount of data available. For this reason monitoring programmes involving large amounts of data collected over many years - have become a very important part of managing the Taupo trout fishery.

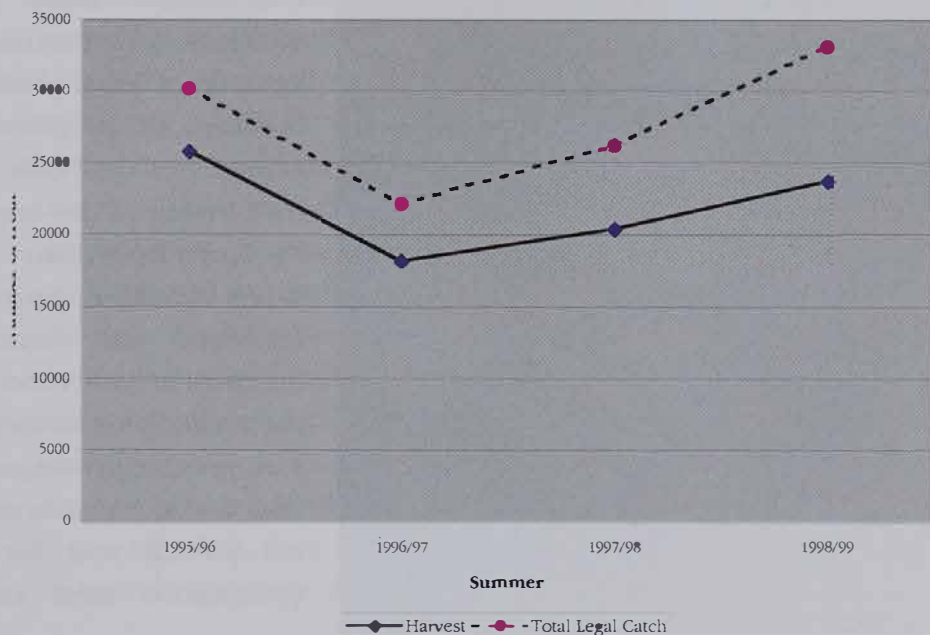
When making comparisons it is important to remember the context under which the information was collected. This is especially important at the moment as anglers and fishery managers begin comparing the fishing this year with last. Last year, as most people know, was an exceptional year for catching large, well-conditioned trout and the results of our

monitoring projects reflected this. The fish were some of the largest and best-conditioned fish seen since the 1930s. However catch rates, particularly in the Tongariro were poor.

This year the Taupo trout fishery is in a healthy state. The fishing so far has been quite different to last year, but information available to date shows that another good winter fishing season can be expected. Towards the end of summer fishing in the lake did slow down as is typical of this time of year, with an average catch rate of 0.23 fish per hour (one fish for four hours of fishing) in March and 0.14 fish per hour in April, compared to catch rates of around 0.35 fish per hour (one fish every three hours) and 0.28 fish per hour in November and December 1998 respectively. However in contrast, fly fishing at the Tauranga-Taupo and Tongariro River mouths was exceptional through autumn as fish began to congregate prior to making their spawning runs. Overall the catch rates are relatively high and this angling success is reflected in our estimates of the harvest for the spring/summer period. Graph 3 compares the estimated lake harvest for each summer since 1995/96.

This graph indicates the harvest was higher than the last two years despite the fact that the angling effort was only 86% of that last year. While the overall effort estimate was lower, the maximum instantaneous count of 880 anglers on 3 January 1999 was the highest since aerial counts began in 1990. The graph also indicated the total catch of legal sized trout (including those returned by anglers) was as

*Graph 3: Total legal catch and harvest estimated from Lake Taupo for the summers 1995/96 to 1998/99*





large as any of the years compared, despite the increase in the minimum legal size in July 1997.

Data obtained from the 22nd annual “Mighty River Power” International Trout Fishing Competition provided interesting information on the size of fish caught on the lake. Table 2 shows the drop in average size and condition of the fish this year. Over the last two years, as previously mentioned, the size and condition of trout were exceptional, and the size of fish in 1999, while smaller, still compares very favourably to the size of fish typically produced by the Taupo fishery over the years.

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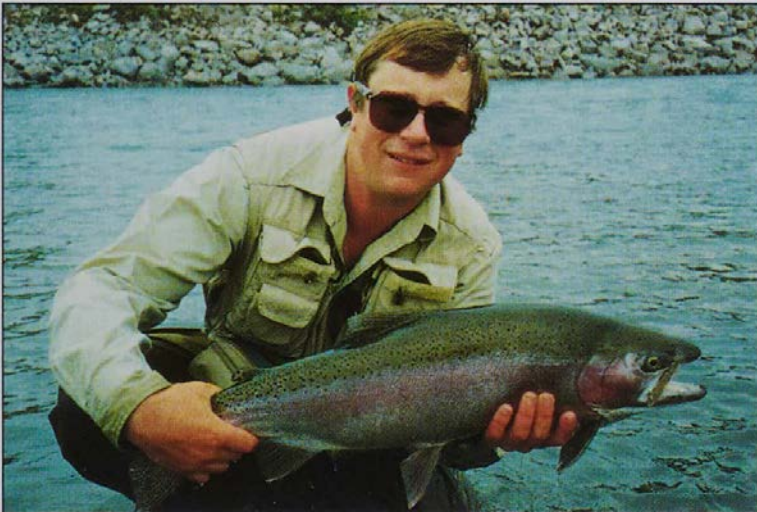
**Flash-A-Bugger, Black & Olive**

Hook: TMC 300  
 Thread: Black, 3/0  
 Tail: Black marabou with olive Flashabou  
 Rib: Fine copper wire  
 Body: Dark olive chenille with olive Flashabou  
 Hackle: Black



**Zonker, Black (Dan Byford)**

Hook: TMC 300  
 Thread: Black, 3/0  
 Underbody: Lead wire, bent to shape  
 Body: Black mylar piping  
 Wing: Black rabbit strip; Pliobond to body  
 Overwing: Pearl Accent Flash  
 Throat: Red rabbit  
 Eyes: Yellow and black, painted



My favourite Umpqua patterns are the Flash-A-Bugger and the Zonker. Using a teeny T300 line and Deceiver tippet material provide an effective combination for this style of fishing.”



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*Fishing at the Tauranga-Taupo River mouth over autumn was exceptional. Changes to the mouth again favour boat-based anglers as was the case for many years up until the mid-1990s*



*Table 2: Comparison of the lake-caught rainbow trout weighed in over the last three competitions*

	Average length (mm)	Average weight (kg)	Average condition factor
1997	526	1.97	48.60
1998	542	2.20	49.70
1999	513	1.64	44.12

A total of 1100 trout were weighed in at the competition, 42 more than in 1998. The largest fish caught was a rainbow male that weighed in at 4.57kg (10.1lb).

Not surprisingly in light of the data from the lake over summer, angling survey results for the Tongariro River so far this winter also show a drop in the average size of fish caught compared to last year. The average weight so far this winter is 1.86kg (4.1lb) and the average length 545mm, whereas the average size last year was 2.63kg (5.8lb) and 589mm. An average weight of nearly 6lb for fish caught last winter highlights just what an exceptional year 1998 was for trout size and condition. This winter the fish in the river much more closely resemble typical Taupo trout. That is, fresh, silver, well-conditioned fish of 1.8 to 2 kg. Much more typical also is the average catch rate which has increased from 0.12 fish caught per hour in 1998 (one fish every 8 hours) to 0.27 fish per hour (one fish every four hours). Since monitoring began on the Tongariro River in 1985, the average catch rate has only exceeded this on three occasions (1986, 1987 and 1993).

Given that the number of fish trapped in the Waipa Stream (a tributary of the Tongariro River) fish trap so far this year is lower than last year there are likely to be a lot of fish yet to enter the Tongariro. Fish have also taken longer to enter some of the other rivers in the district, with the average catch rate on the Waitahanui and Hinemaiaia Rivers low, at 0.11 fish per hour and 0.12 fish per hour respectively. Runs in the Waitahanui in particular tend to be triggered by stiff south-westerly winds which have been conspicuous by their absence this autumn and it is likely most fish are yet to run these rivers. The Tauranga-Taupo River on the other hand has been fishing consistently well, and has an average catch rate so far of 0.24 fish per hour. Our counts of spawning fish in the upper stretches of the eastern tributaries have all been very typical for this time of year with the exception of the Waiotaka River which has clearly experienced some very big runs already. Overall the prospects for the winter are good and a little more rain should see lots of fish running all of the Taupo tributaries. Staff will continue to monitor the fishing over the remainder of the winter, interviewing anglers and collecting data to enable us to assess the “state of the fishery”. If you are approached please spare a little time to answer a few questions. A full analysis of the information collected over the winter season will appear in the next issue of *Target Taupo*.

# Tongariro Forest Goat Control

*The following operational reports were received from Prohunt Ltd following contract goat control operations in Tongariro Forest over the summer/autumn period. The first report relates to operations in the Waione Stream during January/February, while the second report details goat control activity in the Whakapapa River in May. The reports are reproduced in an abridged form for your information.*

## **Waione Stream**

At the end of 1996, Prohunt carried out the first sweep of the Taurewa Ecological Area for goats. The second sweep in January/February 1997 showed at 83% reduction in kills and a very low remnant goat population. This year's operation was aimed at building on the success of the Taurewa operation and increasing the size of the control area to the north, reducing goat numbers and the possibility of reinfestation.

The headwaters of the Waione originate from the north faces of Taurewa, winding its way north-east through dense toitoi covered flats and cutover podocarp forest for approximately 11km until it meets the headwaters of the Whanganui River.

The toitoi reclaimed areas that had been logged and burnt now form an intimidating barrier that extends from the stream to half way up the ridge system. On the steep faces above the toitoi is mature podocarp forest that has been heavily browsed by both deer and goats.

A 1998 inspection covered a period of four days (12 effective hunter days) for 23 goat kills. The results indicated that at that stage, goats were restricted to the true left of the Waione River.

All individual hunters miss goats. For example, on Raoul Island an average of 19% of all goats encountered escaped - and learnt to avoid hunters. A team hunting method has been developed by Prohunt for the control of goats in New Zealand forest habitats that minimises the chances for goats to escape. In low goat densities this method has proven to remove 90% of goats with one sweep of the control area.

After dividing the control area into 13 smaller management units, Prohunt hunters, utilising this method, systematically dogged the control area, covering each management unit two or more times.

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The programme started at the Taurewa end of the control area and worked north. Prohunt put in 20 effective hunter days in this area for 12 goat kills. It wasn't until Prohunt reached the areas that had previously been logged that they started to get onto any significant goat population. The team shifted camp further down the Waione after the first week to access the northern blocks. The team hunted from this camp for the next two weeks for another 61 goat kills (50 effective hunter days). The further north the team moved towards the confluence of the Waione and Whanganui the steeper the topography and tighter the understorey which coincided with a gradual reduction of goat numbers. For the last week they shifted up to "Ten Bunk" hut which is accessed from a network of old logging roads from the Owhango side of the forest, and hunted the remaining blocks. The hunters put in 20 effective hunter days of effort removing 22 goats. Goats didn't seem to like this habitat and only started occurring in higher densities further north. In summary, the goats in this area favoured the north-facing slip country, which was typical of the faces in the middle of the catchment. Overall there was only a low to moderate population of feral goats but they did occur in some reasonable sized mobs (9 or 10 animals were common). They generally had fairly small home ranges, with the majority of the animals living in optimum goat habitat. The hunters found no goat sign in the flat/rolling country. Because of the hot weather during January 1999, most of the goats were in the relatively cool areas, low down in the creeks. These hot, still days were also hard on the dogs, so the hunters tended to work from daylight to utilise the coolest part of the day. It seems apparent that goats are working their way into the catchment from side creeks that flow into the Whanganui River and crossing into the catchment via the saddles. There is also a healthy population of deer in this area, with the hunting team observing approximately 25 to 30 animals between them during this period. There seemed to be a lot of sign low in the toitoi and high in the rolling country at the top of the main range. This year it seems the constant deer aversion training paid off, with very little time lost to dogs chasing deer. The biggest problem the hunters had, was that of access. Even though there are many old logging tracks throughout this area, to get to most blocks required a walk up the creek and then working through the belt of toitoi. This at times was a slow process.

Weather throughout the programme was excellent, if a bit hot. Some hunter time was lost due to shifting camps three times, but overall there was minimal down time. In total 95 hunter days produced 95 goat kills.

### **Whakapapa River**

In late 1996 the Department of Conservation started an intensive goat control programme in the Taurewa Ecological Area. This programme was later extended to include the Waione Catchment immediately to the north and now to the south-east in the Whakapapa River. This report covers the hunting effort in the Whakapapa by Prohunt NZ Ltd between 24 and 28 May 1999.

Based at the Department of Conservation accommodation at National Park, Prohunt hunters put in 28 effective hunter days in the two control areas (490ha and 110ha) for a total of 66 goat kills.

Block 1 - 110 hectares of DOC estate situated on the Raurimu Land Corp Farm on the true left of the Whakapapa. Five effective hunter days of effort resulted in 12 goat kills. Apart from one lone nanny, all the other goats were caught in a very small area on the northern boundary of the block. This is likely to have accounted for all the goats in this area.

Block 2 - This block extended approximately five kilometres on both sides of the Whakapapa River upstream from the Otamawairua Stream. Prohunt put in another 23 effective hunter days covering this area for 54 goat kills.

Most of the animals caught were on the steep faces of the true left of the Whakapapa at the northern end of the block. This was ideal goat country and they had been living in this area for some time. The true right of the block was appreciably steeper, colder and wetter and not as good habitat for goats (this area was only slightly larger than the control area on the true left, but because of the topography it took almost twice as long to cover). There was some goat sign scattered through the block, but goat numbers were significantly lower on this side.

The majority of deer (in low/moderate numbers) were restricted to the area north of the Mangaone Stream on the true right of the Whakapapa. There was only the occasional deer throughout the rest of the control area and almost none on the true left bank.

The block as a whole was difficult to hunt as the river was quite deep and swift, and there were quite a few faces that extended from the

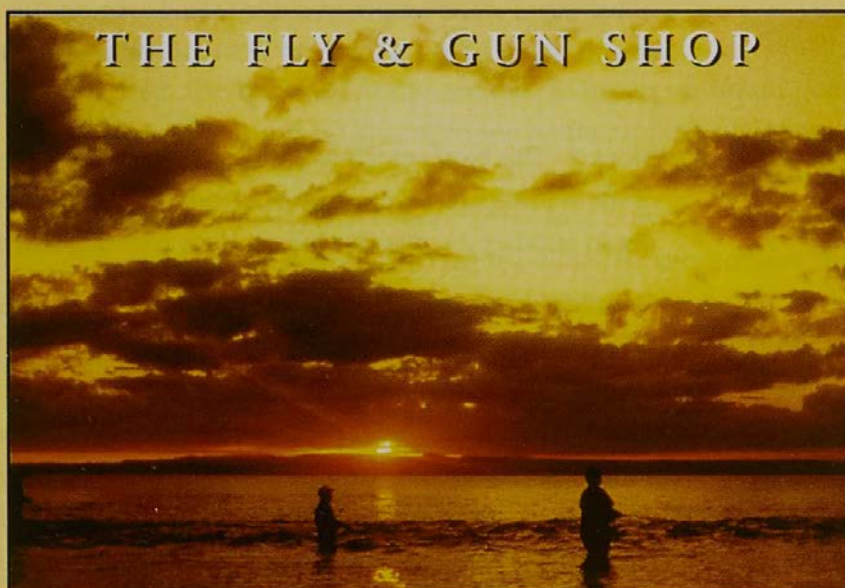
river to almost the farm edge on both sides of the catchment. This made for a lot of climbing to get up and around the bluffs and then drop back down to the river on the other side.

The weather deteriorated and it rained constantly on the last couple of days, which caused the river to rise, making it impossible to cross. This slowed down progress through the block but still allowed one complete sweep and enough time to “hotspot” the areas where goats had been found.

Generally the goats caught were very healthy and some of the largest goats Prohunt have seen. A high percentage of the goats autopsied were pregnant with twins, obviously responding well to the abundant supply of palatables and grass throughout the block.

There is a chance of reinfestation of goats from the neighbours on the northern boundary on the true left of the Whakapapa, as goats were observed coming off the farmland and back into the block.

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# 1999 Sika Competition

by Cam Speedy

On Sunday 27 June at the Great Lake Centre at Taupo the seventh annual sika competition measure-up and prize-giving organised by Taupo's Hunters & Habitats Club was held. Forty sika heads and 24 red deer heads from various central North Island hunting locations were presented for measuring by the New Zealand Deerstalkers' Association. The quality of the red deer heads was a feature this year. The top three heads all came from areas where large-scale possum control using 1080 poison has occurred in the last few years, suggesting that the improvement in habitat that has resulted is not only benefiting native animals. The heads which made the record book from this year's competition are listed in the table below:

Hunter:	No. Points:	Douglas Score:	Location Taken:
<b>Sika Deer:</b>		(Record Book > 170)	
Glen McRae	8	193.7	Sparrowhawk Range Te Tiringa Sream
Arthur Scott	8	182.7	
Brett Boniface	8	182.4	Waiotaka River
Monroe Reweti	8	177.1	
Neil Philpott	8	177	
Andrew Philpott	8	171.6	
Mathew Clow	8	171.1	
Jamie Fairburn	8	170.5	
Chris Short (Bow)	14	170.1	
<b>Red Deer:</b>		(Record Book > 300)	
Dean Collins	14	350	Kaitieke
Sandy Muir	12	303.5	Rotoaira Forest

The data sets collected this year from both stags and hinds, combined with the data sets collected from the Hawkes Bay "Super Hunt" on 13 June have significantly boosted the growing sika deer database being compiled by Hunters & Habitats.

Bruce Banwell officially launched his new book "*The Sika*" and, together with a number of trade displays, the day was a great success.

*Glen McRae of Reporoa with his winning Sparrowhawk Range sika head. Glen won the competition in 1997 with an even bigger head from the same area*



*Arthur Scott of Turangi with an exceptional sika stag taken in the northern Kaimanawa Range. Arthur's stag earned him second place and the prize for "Judges Choice" at this year's competition*



*Chris Short of Taupo won the bow hunting section this year with an unusual 14 point sika stag taken in the Poronui area. Chris also shot a nice 8 point stag.*



# Bitz 'n' Pieces - News Items from Around the Conservancy

## **Rangitikei Remote Experience Zone - Spring Hunting Access**

Three sites in the Rangitikei Remote Experience Zone within Kaimanawa Forest Park will be open to helicopter access for hunting from Labour Weekend (Saturday 23 October 1999) to the weekend before Christmas (Sunday 19 December 1999). One party at a time can book each site through the Turangi Office. Bookings will be taken from 8 am on Friday 1 October 1999 but not before. Bookings are for exclusive helicopter access only (foot hunters may still walk to the sites although this is unlikely) and can be made for periods of up to 10 days. Helicopter access is not permitted to the area at any other time of the year in recognition of the wilderness character of the catchment and to protect the Rangitikei headwater trout fishery. The open period was chosen because of the preference many hunters have for shooting stags at other times of the year, and because breeding female deer are most vulnerable to harvest just prior to calving in spring. The exercise is primarily an animal control action and is therefore designed to focus hunting pressure on reducing the breeding females which are the productive sector of the herd.

Following is a brief description of each of the three sites:

- 1 **Ecology Stream Enclosure Plot Site** (Grid Reference U19 714208)  
- Valley habitat with extensive mountain beech terraces, slips, small river clearings and steeper, often broken, bush clad faces. One hour walk to tops - no track. Mostly sika deer around camp with red deer nearer the bush line. No fishing.
- 2 **Whakamarumaruru Tops Site** (Grid Reference U20 722172) - Tops habitat, with dense high altitude mountain beech below bushline. Camp in bush saddle. Mostly red deer with a few sika (stags mostly) later in spring. No fishing.
- 3 **Otamateanui Tops Site** (Grid Reference T20 610143) - Tops habitat, with very steep, often dense, high altitude mountain beech below bushline. Exposed camp on the tops. You will need to go prepared! Mostly red deer hunting in open country. Binoculars essential. No fishing.

*Note:* Owing to perceived conflicts with the Rangitikei trout fishery and the fact that harvest rates have been so poor over the past two years, the Ecology Stream/Rangitikei Junction site has been closed this year. Special conditions will still apply to the use of the three sites that remain open.

### Aerial Access in Kaimanawa Forest Park

The Department of Conservation has recently proposed changes to aircraft access within Kaimanawa Forest Park. A rethink of access to the Rangitikei headwaters in the vicinity of Mangamaire has been undertaken as a consequence of a number of tensions surrounding access by anglers and rafters. These include the impact on the world famous Rangitikei headwater fishery and the use of private land by the general public as they access down the Rangitikei River. The Department also proposed changes to the Tongariro River helipad, which has not been used for access for some time as rafting now makes the Tongariro quite accessible, and the provision of a



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helipad on the Waiotaka River.

The Department received 11 submissions from a range of parties including New Zealand Defence, landowners with interests adjacent to the Rangitikei River, aircraft operators and fishing guides.

The two key issues to arise from the process were:

1. Ensuring that public access to the Rangitikei River was maintained while not infringing on private landowners' rights;
2. Developing a fishery management regime for the Rangitikei which protected its significant values.

This second issue is obviously one for Wellington Fish and Game Council as the management agency rather than the Department.

The normal process for amendments to the Kaimanawa Forest Park Management Plan would be a series of formal hearings with recommendations to the Conservation Board. In this case it is far more appropriate to get the interested parties together around the table with a view to developing a number of long-term protocols and understandings about the way in which the Rangitikei will be managed and used by the public.

The Department will run a workshop on 3 August 1999 with those parties who made a submission being invited to participate. Along with the resolution of the Kaimanawa Forest Park access issues New Zealand Fish and Game will take the opportunity to discuss issues in relation to the Rangitikei headwater fishery.

For more information please call Greg Carlyon, Conservancy Planner, Tongariro/Taupo Conservancy - Telephone (07) 386 9245

## **Possum Control Operations**

**1080 Poison** will be laid at two locations that may affect hunters using conservation lands within the conservancy through the winter period.

1. 1080 carrot baits were distributed by helicopter on an area of new plantings in Rotoaira Forest between the Poutu Stream and Mount Pihanga, Tongariro National Park in June. The operation was conducted by EPRO Ltd on behalf of New Zealand Forest Managers to kill hares, possums and rabbits. A similar operation occurred on Justice Department lands in the Lower Waiotaka/Whitikau Stream area at the same time. This is unlikely to affect hunters using DOC administered land.
2. 1080 carrot baits will be distributed by helicopter over that area of the Waituhi/Kuratau Scenic Reserve west of the Waituhi Lookout and north of State Highway 41. This operation is part of a retreatment of

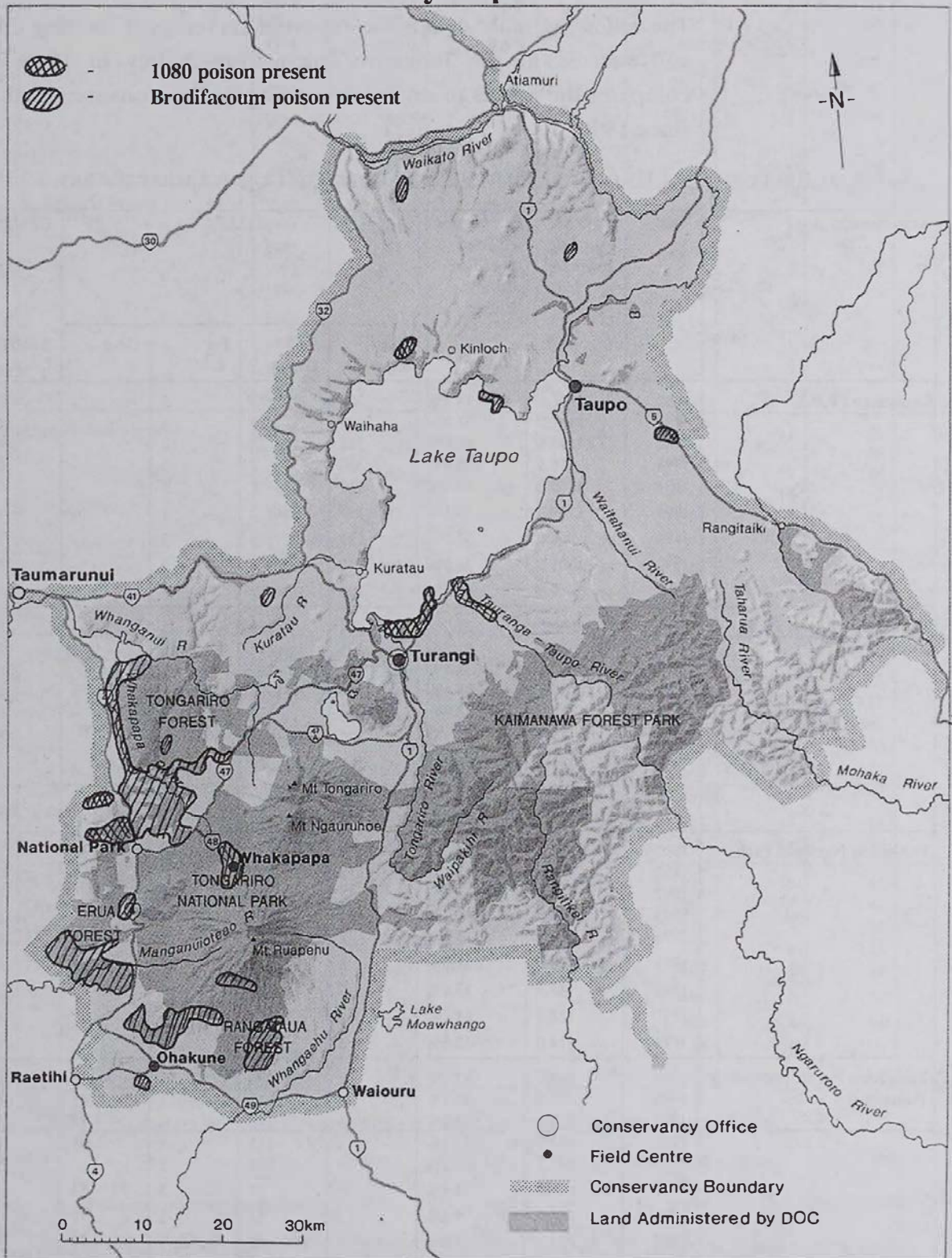
the Hauhaungaroa stage 2 TB control operation conducted in 1994. **Brodifacoum Poison** in the form of “Talon” or “Pest-Off” baits has been laid at numerous sites around the conservancy as a means of maintaining low pest densities where successful knockdown operations have previously occurred. This bait is laid in bait stations but pigs may get access to bait either directly out of bait stations or by consuming rodent or possum carcasses that have died from eating bait. **It is recommended that hunters do not eat game meat, especially liver, that has been taken from the following areas:**

- The vicinity of the Whakapapa Village within Tongariro National Park ;
- The vicinity of Ohakune Mountain Road within Tongariro National Park;
- Rangataua Forest around Rotokura and Dry Lakes and on the lower lava flow east of the lakes;
- Ohakune Lakes Scenic Reserve;
- The Kapoors Road Frost Flats in Tongariro Forest ;
- Whakapapa Gorge Scenic Reserve and the adjoining north-western boundary of Tongariro Forest;
- Ohinetonga Scenic Reserve;
- The farm boundaries of the Taurewa and Raurimu Landcorp farm blocks in southern Tongariro Forest;
- Waituhi/Kuratau Scenic Reserve -100 acre Bush Block;
- Erua Forest south of Erua Road and north of National Park Township;
- Taupo Scenic Reserves (Opepe SR, Tirohanga SR, Pakuri SR);
- Kaiapo Bay Scenic Reserve between Kinloch and Taupo on the northern lake shore.

**See attached map for details - all poisoned areas are well sign-posted. Please do not remove signs.**

**If dogs get access to carcasses in these areas an antidote in the form of a “Vitamin K” injection can be obtained from your local vet.**

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## Hunting Statistics for 1998

The following table details the reported recreational hunting effort and success in the Tongariro/Taupo Conservancy in 1998 and compares the results to similar data collected in a consistent manner since 1990.

**Table 3: Recreational Hunting Statistics - Tongariro/Taupo Conservancy 1990-**

Area Hunted	Year	Days of Hunting Reported	Proportion of Total Specified Hunting Effort %	KILLS				CPUE*
				Sika Deer	Red Deer	Pig	Goat	Kills/Day
Kaimanawa RHA	1990	2376.5	34.3%	388	23	3	-	0.17
	1991	2431.0	37.8%	404	27	4	-	0.18
	1992	1923.5	35.0%	318	27	10	-	0.18
	1993	1886.5	35.9%	300	8	5	-	0.17
	1994	1580.0	31.0%	210	18	5	-	0.15
	1995	1209.0	29.1%	197	2	1	-	0.17
	1996	968.0	32.5%	155	5	2	-	0.17
	1997	1301.0	36.0%	159	4	8	-	0.13
	1998	1260.5	40.1%	188	2	1	-	0.15
Kaimanawa Forest Park (excluding RHA)	1990	2212.0	31.9%	304	250	21	-	0.26
	1991	1999.5	31.1%	306	211	15	-	0.27
	1992	1860.0	33.9%	300	210	5	-	0.28
	1993	2016.5	38.4%	350	200	11	-	0.28
	1994	1679.5	32.9%	169	126	2	-	0.18
	1995	1378.0	33.1%	202	123	1	-	0.24
	1996	1141.0	38.4%	158	84	2	-	0.21
	1997	1380.0	38.2%	197	105	-	-	0.22
	1998	952.5	30.3%	133	76	3	-	0.22
Tongariro National Park	1990	1251.0	18.0%	16	313	6	16	0.28
	1991	980.0	15.2%	18	275	6	8	0.31
	1992	731.0	13.3%	14	192	5	1	0.29
	1993	741.0	14.1%	12	244	4	-	0.35
	1994	643.5	12.6%	7	194	5	-	0.31
	1995	458.0	11.0%	6	133	4	-	0.31
	1996	447.5	15.0%	10	188	1	-	0.44
	1997	528.0	14.7%	4	138	-	-	0.27
	1998	394.0	12.5%	6	98	-	-	0.26
Tongariro Forest (including Pukepoto)	1990	764.0	11.0%	3	190	31	245	0.61
	1991	702.0	10.9%	-	145	11	153	0.44
	1992	718.5	13.1%	-	146	4	88	0.33
	1993	663.0	12.6%	-	143	5	95	0.36
	1994	515.5	10.2%	-	115	2	-	0.34
	1995	514.0	12.4%	1	99	3	61 72	0.34
	1996	280.0	9.4%	-	53	2	16	0.25
	1997	251.5	7.0%	-	51	3	16	0.28
	1998	390.5	12.4%	-	47	-	-	0.16

Table continued on opposite page



<b>Erua Forest</b>	1990	166.5	2.4%	-	48	4	172	1.35
	1991	167.5	2.2%	-	38	2	76	0.71
	1992	147.0	2.7%	-	35	-	65	0.68
	1993	185.0	3.5%	-	42	1	73	0.63
	1994	135.0	2.7%	-	35	-	-	0.53
	1995	97.5	2.35	2	42	-	37 47	0.93
	1996	65.5	2.2%	-	25	4	33	0.95
	1997	66.5	1.9%	-	15	1	8	0.36
	1998	48.5	1.4%	-	16	-	16	0.51
<b>Rangitaiki Forest</b>	1990	166.5	2.4%	25	9	-	-	0.21
	1991	141.0	2.0%	31	9	3	-	0.31
	1992	84.5	1.5%	17	4	-	-	0.25
	1993	120.0	2.3%	19	7	1	-	0.23
	1994	130.5	2.6%	24	3	-	-	0.21
	1995	90.5	2.2%	16	2	-	-	0.20
	1996	69.5	2.3%	7	1	1	-	0.13
	1997	66.0	1.8%	10	2	-	-	0.18
	1998	87.0	2.8%	16	2	-	-	0.21
<b>Unspecified Returns</b>	1990	1107.0	-	85	135	11	85	0.29
	1991	747.0	-	53	102	7	95	0.34
	1992	640.5	-	21	91	19	35	0.26
	1993	446.0	-	25	65	15	7	0.25
	1994	377.0	-	17	64	3	28	0.29
	1995	367.0	-	20	33	-	4	0.16
	1996	537.5	-	25	61	-	-	0.16
	1997	556.0	-	16	53	3	-	0.13
	1998	343.5	-	30	24	-	5	0.19
<b>TOTALS</b>	1990	8042.5	-	821	968	76	518	0.26
	1991	7180.0	-	812	811	48	325	0.34
	1992	6131.5	-	672	710	43	189	0.26
	1993	5698.0	-	682	679	43	162	0.28
	1994	5099.0	-	439	556	17	143	0.23
	1995	4160.0	-	450	436	9	123	0.25
	1996	3533.5	-	358	417	12	50	0.24
	1997	4160.0	-	386	368	17	24	0.19
	1998	3487.0	-	374	263	5	30	0.19
<b>Conservancy Totals Corrected per 1000 days hunting effort</b>	1990	1000	-	102	121	10	65	-
	1991	1000	-	113	113	7	46	-
	1992	1000	-	110	116	7	31	-
	1993	1000	-	120	120	8	28	-
	1994	1000	-	87	109	4	28	-
	1995	1000	-	109	105	3	30	-
	1996	1000	-	101	108	4	14	-
	1997	1000	-	93	87	5	6	-
	1998	1000	-	107	76	2	9	-

\* CPUE = Catch per unit effort (that is, kills per day hunted. On average a day's hunting is 6.6 hours)

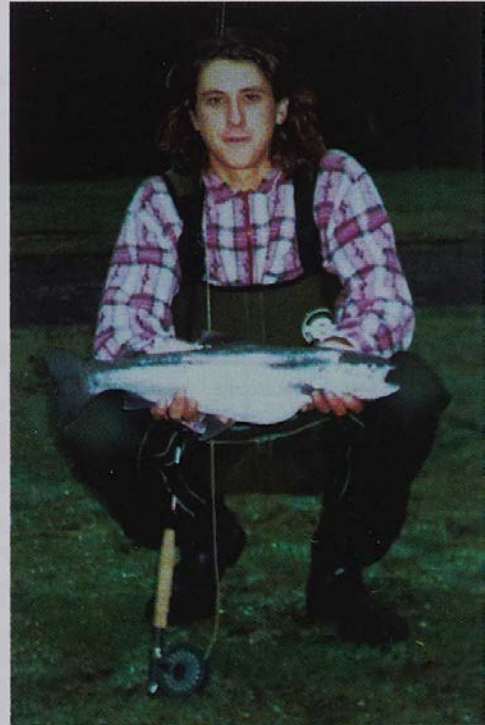
	1990	1991	1992	1993	1994	1995	1996	1997	1998
- No. of 4-month hunting permits issued	6865	7033	6668	6344	7237	6641	6813	7087	6586
- Annual return rate (% of issues)	31.6%	30.8%	29.0%	26.5%	23.1%	19.8%	15.6%	16.7%	16.1%
- Proportion of successful hunters	38.4%	33.9%	33.9%	35.4%	31.8%	31.1%	36.4%	19.9%	30.3%

# Staff Profile

## Olin Pilcher

Hailing from the rural town of Morrinsville, Olin is working with the Fishery Area team over the busy winter months, fulfilling part of his university degree requirements at the same time.

Being very keen on the outdoors, Olin can now confidently list “fly fishing” alongside saltwater fishing, diving and surfing as keen areas of interest. Although the surf isn't red hot in Turangi the fishing is, but while Olin has christened his new rod with some fine specimens he still has a bit of work to do on his technique.



“Handling world-class trout on an almost daily basis and maintaining fish traps during floods has been challenging but also rewarding. I am really enjoying working with a great team in an area of such importance as Taupo, and cannot wait to do further battle with some more pumice snakes over the coming months!” says Olin.

*Editor's note: “Pumice snakes” are the almost continuous trails of pumice which float down Taupo streams when they are in flood. At its worst this pumice can block a fish trap within minutes, significantly increasing the risk of the trap scouring and blowing out. Under such circumstances the trap operator may have to work throughout the night clearing the pumice to maintain the trap - fortunately for permanent staff there are keen young people like Olin ready to take up the challenge.*

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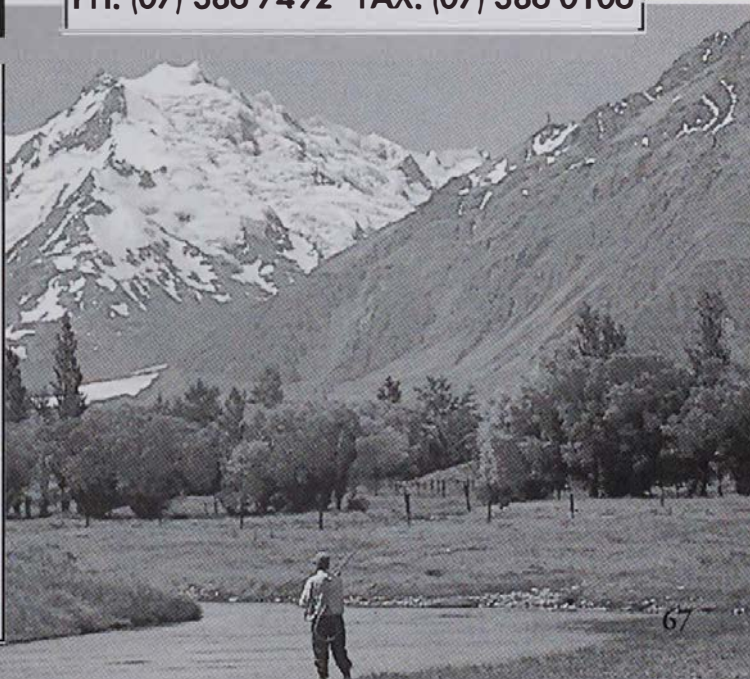
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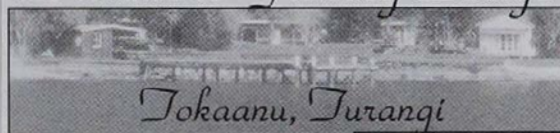
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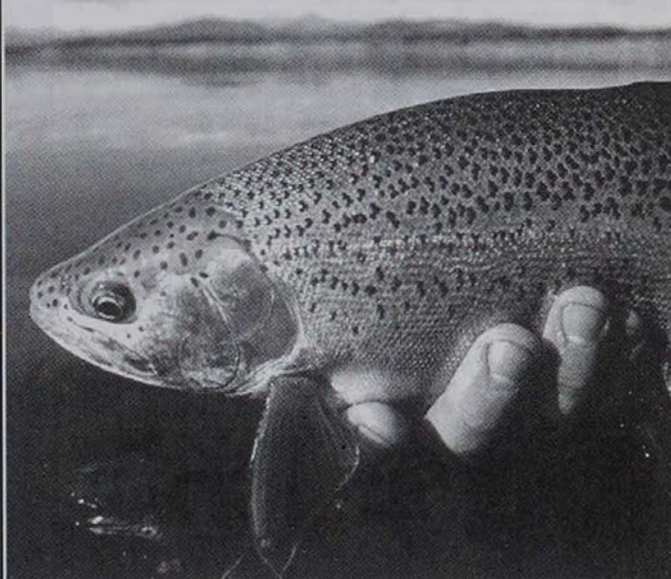
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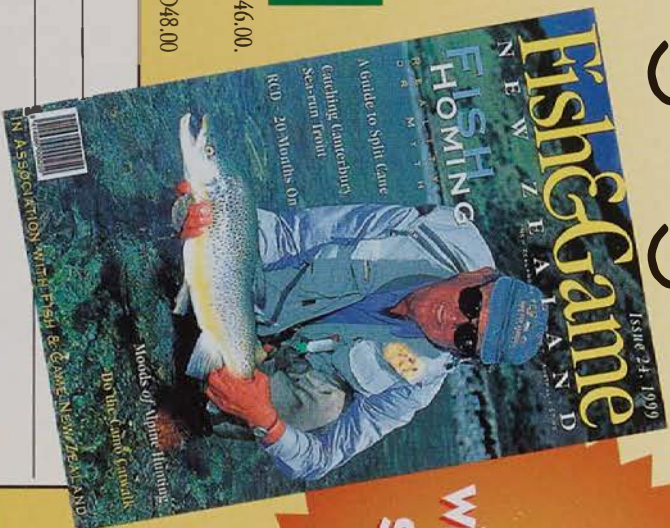
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