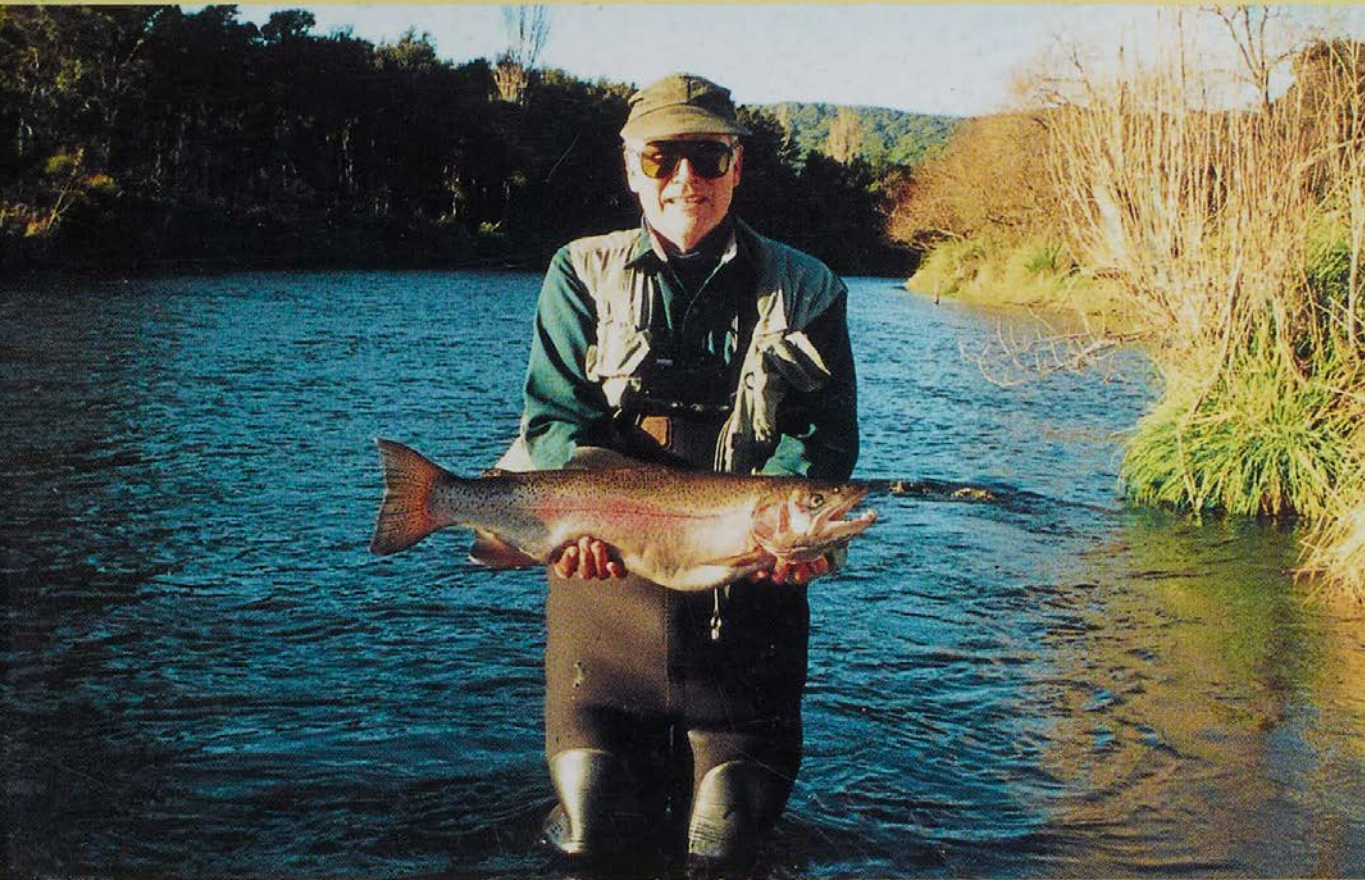


# TARGET TAUPO

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

JULY 1998, ISSUE 28



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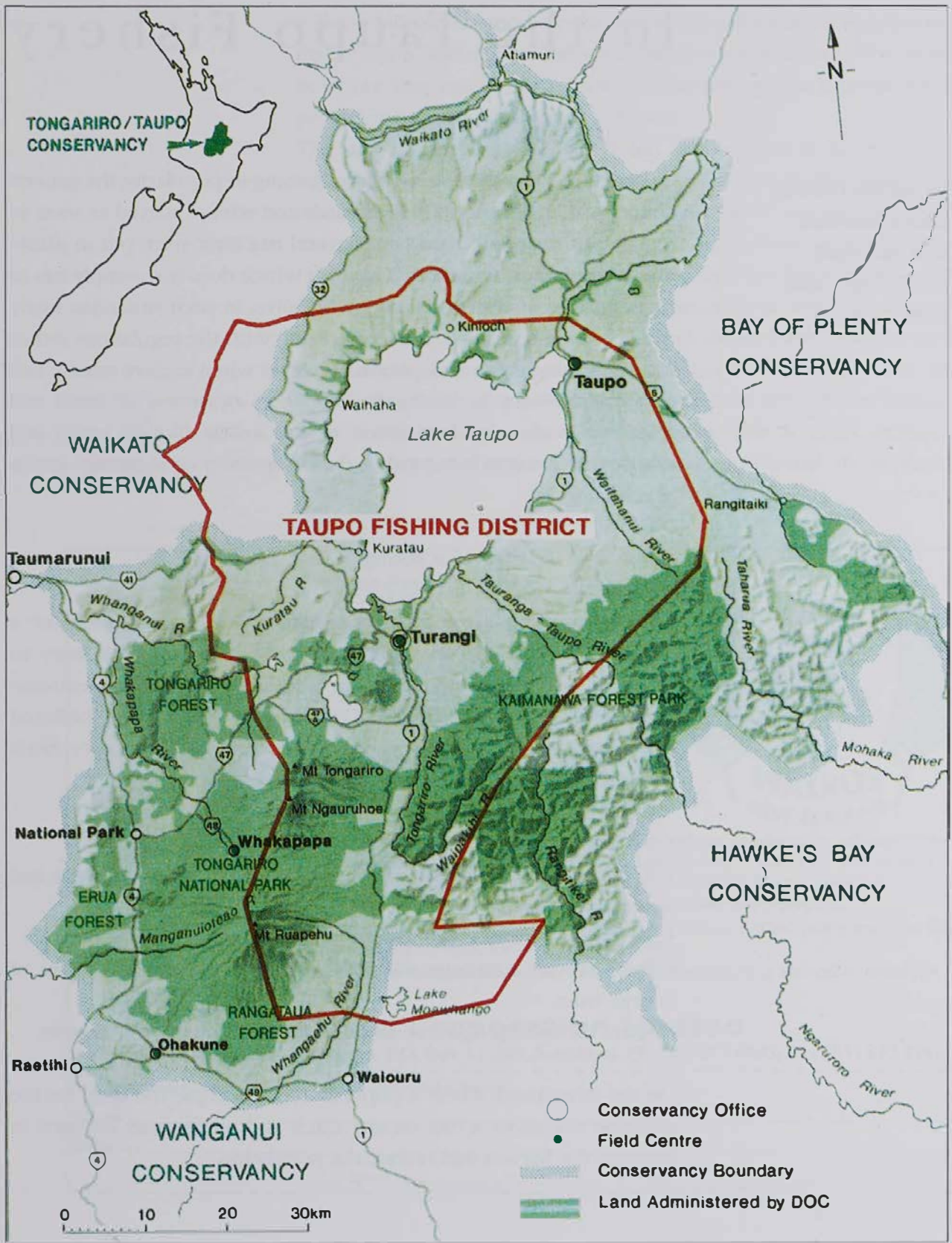
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# Catch and Release in the Taupo Fishery

*by Michel Dedual,  
Glenn Maclean,  
Rob Marshall,  
Errol Cudby and  
John Gibbs*

Although catch and release is a term gaining in popularity, the general concept is far from new. Indeed catch and release started as soon as regulations regarding legal fish size and bag limit were put in place. These regulations require that any fish which does not comply has to be unhooked and released, preferably alive. In such situations many anglers perceive that they are complying with the regulations rather than practising catch and release. However when anglers release fish that could otherwise be legally kept then awareness of catch and release increases. In the context of this article though, catch and release is defined as being either the compulsory or voluntary action of releasing fish.

## **Catch and Release as a Management Tool**

Fishery managers can use catch and release regulations as a management tool in two different ways. It may be compulsory to release all fish which do not meet a particular criterion (the extreme being total catch and release of all fish caught) or it may be prohibited to release any fish caught (no catch and release). Compulsory catch and release is generally used to curb the harvest to:

- Increase angler catch rate
- Reduce the need for stocking to maintain acceptable stream and lake fisheries
- Restore or enhance wild fish in mixed fisheries
- Increase the maximum size or the abundance and catch rate of large trout.
- Share the fishing resource amongst a greater number of anglers.

On the other hand, where a population has become too large for the available resources, a ban on any catch and release may be used to increase the harvest and reduce the population.

Catch and release regulations has been a dramatic success in some instances but has also been a complete failure in other cases. What is still not fully understood are the biological and social ingredients that make catch and release either a success or a failure. The belief, however, that catch and release regulations are the answer for all problems is unfortunately too common.

The success of catch and release has been shown to be dependent upon the susceptibility of the species targeted by the angler. For example cutthroat trout which is a favourite species in North America, is much more readily caught than rainbow or brown trout. Furthermore the cutthroat trout suffers only a low hooking mortality. These two characteristics mean cutthroat trout fisheries respond more favourably to catch and release and are probably why the most dramatic improvements reported in fisheries following catch and release regulations have been in places such as Yellowstone National Park. For brown trout, however, there are not as many examples where catch and release has been as successful in achieving



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management goals. Rainbow trout have been reported to respond more favourably than brown trout, but still not as successfully as cutthroat.

Another ingredient which influences the success of catch and release in terms of improving the fishery is the size-age structure of the trout population. If the population is characterised by a high recruitment and a short life cycle the impact of catch and release is much less than where the trout live longer and where the young fish do not compete too severely with older year classes for food. In this latest scenario an increase in catch rate as well as an increase in size may be expected following the implementation of compulsory catch and release.

In a river fishery catch and release regulations usually improve the population structure and permit the population to more nearly reflect the natural state expected in the absence of angling. This is especially important where fisheries are managed as an integral part of the ecosystem. In Yellowstone National Park the first priority for fishery use is to ensure natural reproduction with sufficient numbers to maintain genetic diversity and supply food for other wildlife. This management approach also provides robust fish populations and angling opportunities.

However, where the fishery productivity is high with an abundance of suitable habitat, combined with long growing seasons the quality of fishing may be maintained even under a liberal harvest. In this situation catch and release regulations may not be appropriate.

In Taupo, trout production is largely determined by the amount of rearing habitat that exists in the rivers for the young fish. The conditions that prevail in the rivers, such as the frequency of large floods, have been shown to affect the number of juveniles that the rivers can rear. Thus the production of juvenile trout will be variable from year to year. However, when these fish reach the lake and start to feed on smelt it appears that there is sufficient smelt to allow them and the older trout to grow without competition between them affecting the size and number of large fish. For example the monitoring of trout numbers in the lake indicates that the count for November 1997 was the second highest since surveys began in 1988. Yet the size and condition of trout in 1998 are far better, being the best recorded since the 1920s. This strongly suggests that food is not a limiting factor for trout growth otherwise we would have large trout only when their numbers are low, which is clearly not the case. Under these conditions the introduction of total catch and release on Lake



Taupo would be of no help to achieve better trout growth. In fact total catch and release may allow the trout population to reach such a large size that competition for food does become a factor limiting their size and condition, exactly as it did twice earlier in this century.

Similarly, total catch and release on Taupo rivers would not achieve much either. In Taupo legal size trout are present in the rivers only during the spawning period. Our monitoring of the spawning runs shows clearly that redd superimposition (new redds cut over existing redds) is common so having more adults spawning as a consequence of increased catch and release is unlikely to improve the overall output of juvenile trout. More than sufficient juveniles are generated now to occupy all the suitable habitat. Furthermore catch and release would not produce larger fish in the river because the fish do not grow during their spawning migration. It may increase the proportion of previous spawners in the run the following season, but generally previous spawners are no larger and not in as good condition as maiden (first time spawning) trout.

The situation is completely different in back-country river fisheries (and in Lake Otamangakau) where the trout densities are lower than in Taupo streams and where trout may live to a great age, growing slowly to large sizes. In such conditions catch and release should provide a better catch rate and an overall larger average size of fish.

The last, but not least characteristic of Taupo is that it is a wild fishery sustained solely by natural spawning making catch and release unnecessary in order to restore or protect the genetic diversity of the wild population. The situation is very different in Rotorua lakes where mixed populations of hatchery and wild trout exist side by side and where the wild component in order to be maintained cannot be subjected to the same levels of harvest as the hatchery-reared population.

So, as fishery managers, we believe that the trout population in Taupo can sustain the present harvest without collapsing. Indeed, harvest is desirable to ensure the population does not outgrow the smelt population. We are confident that if we succeed in preserving, or in some cases improving, the amount of habitat suitable for juvenile trout, in avoiding degradation of water quality in Lake Taupo, and setting levels of harvest that are sustainable, there is no need to use total catch and release regulations as a management tool. The use of total catch and release would only be warranted as a last resort in a situation where no harvest would be sustainable.

## Voluntary Catch and Release

In the absence of regulations requiring either total or conversely no catch and release, then individual anglers have to make their own choice in determining if they want to kill a takeable trout or to release it. This decision should ideally be based on a consideration of the pros and cons inherent in the practice of catch and release and an understanding of the biology of the trout fishery melded with the angler's own philosophy towards the treatment of a fish. Too often though, the angling literature mentions only the positive aspects of catch and release and overlooks some of the less glamorous points and in doing so cuts the angler's choice short.

The most obvious arguments in favour of voluntary catch and release are well understood by most anglers. They include:

- The angler can fish longer and catch more fish without exceeding the daily bag limit
- The angler has the opportunity to choose which fish to keep but does not have to kill fish if they don't want to
- If a fish is released and survives, it has the chance to grow larger and to be fished for again.

The negative aspects of voluntary catch and release are less obvious to the angler and relate primarily to the fish caught, including:

- Our studies of the effects of capture and recovery on rainbow trout in the Tongariro River and in Lake Taupo have confirmed that hooked trout respond to capture with not



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only extensive physical exercise but also another form of stress reflecting their fright and discomfort. Provided the fish is handled gently it will, within a few hours, recover reasonably well from the physical effort, but its fright will last longer before returning to pre-capture levels. This long-lasting stress has the potential to affect the fish in many aspects of its life by altering its basic physiological processes. The effects of stress on reproduction and on susceptibility to bacterial and fungal infections are well documented.

It is interesting to note that fish tolerate hooking better than the subsequent handling. Studies of snapper caught on long lines have shown that the fright and discomfort stress level is higher for snapper after one hour of being tethered on a hook than after 10 hours, indicating that fish get used to being hooked and become more relaxed as time goes by. However, as soon as the fish are landed and handled their stress levels rise dramatically. This strongly suggests that during the catch and release experience the most difficult moment for the fish to cope with is handling. Anglers need to bear this in mind, particularly when posing for photographs with their fish.

- If the fish has been poorly handled it may die a lingering death and be completely wasted.
- Voluntary catch and release may also restrict the fishing opportunities of other anglers by allowing a successful angler to remain in one spot even when other anglers are waiting with various degrees of patience for their turn.

Many anglers back up their support for catch and release by saying that it can't be a bad choice because they have caught the same fish more than once. This may be so, although once the fish recovers from the stress of being caught and handled, it has to continue feeding and so become available to be fooled again. However, it is certain that the fish will not enjoy the following captures any more than the first one. Depending on our personal views we may feel that any discomfort to the fish is preferable to it dying or we may take the view that it is inappropriate to cause avoidable stress to the fish simply for our enjoyment.

Further complicating the issue for anglers is the growing prominence

*Taking a photo of trout prior to its release adds to the stress already experienced by the fish*



of the animal rights movements. Overseas, these groups have been using the negative aspects of catch and release as ammunition to challenge sport fishing as a whole.

Ronald Spitler in volume 23, No1 (1998) of *Fisheries* explains how serious the problem is getting world-wide and concludes that it is up to the resource managers to know how to properly deal with the animal rights movement, and that no mistake can be afforded, the price of failure being too high. For example, in Germany, a total ban of catch and release has already been put in place.

Sports fishing is a legitimate and acceptable practise under New Zealand law. The government is currently considering new animal welfare legislation and no doubt the attitudes of anglers, hunters and society in general, will be taken into account in determining acceptable practices for the future.

Obviously catch and release is more complicated than many of us had previously thought. The purpose of this article is to present the facts, both the positive and negative, regarding the practice of catch and release so that you can make an informed decision as to what you are going to do. There is no absolute answer. For example, the authors of this article have widely differing approaches to the practice of voluntary catch and release, reflecting our own interpretations of the information available and personal philosophies.

There is, however, a wrong answer. If you kill every fish you catch simply to demonstrate your angling prowess with the knowledge that most will rot in the bottom of the freezer, or conversely release every fish simply to demonstrate some form of angling elitism, then you are wrong!

Should you decide to release or kill a trout, do so but don't try to judge others who choose to act differently.

# The Importance of Habitat

by Cam Speedy

*The following article was written for the annual Heli-Sika Hunting Contest at the Great Lake Centre, Taupo in June. The presentation is reproduced here for your interest and consideration.*

We have heard a lot lately about forest health problems as a consequence of sika deer impacts in the Kaweka Ranges. Indeed, as the Department of Conservation's "Deer Discussion Document" process has moved along, we have heard why many people in New Zealand regard feral deer as a major forest pest. This is a very complex issue which is confounded by the many different perspectives that exist in New Zealand society towards conservation, the environment and the many introduced animals that can impact on both.

What I would like to do today is to try and step back from the politics of this already complicated issue, and concentrate on a more fundamental issue that is important to everyone - the biological sustainability of the great New Zealand outdoors and the enjoyment it gives to so many. In particular, I would like to talk about the sustainability of our native forest ecosystems. Ecosystems that not only provide habitat for our unique flora and fauna, but to many of you as hunters are also the life force that sustains the animals you hunt. Without habitat that is productive, healthy and self sustaining, not only will our native plants and animals suffer in the long term, but your hunting within those same forest environments will have an uncertain future.

Habitat quality and sustainability in native forests must underpin our approach to management whether we are concerned about conservation or hunting. I have always said, and still firmly believe, that hunters and conservationists have much in common. To achieve their goals, they must both ultimately have healthy, sustainable habitat. Indeed, the single-most important aspect of ensuring the long-term welfare of any life within a forest ecosystem, whether it be native or introduced, is to ensure the welfare of the forest itself.

While many hunters are keen naturalists, most are not expert forest ecologists or botanists so to expect them to be able to determine

habitat health directly from observations of forest structure and floristic diversity is a hard ask. However, hunters do know about deer. In terms of deer, the health of the forest will be directly reflected in the quality of the animals present, their size, body condition (fat reserves at any given time) and their reproductive success (the proportion of hinds calving and the proportion of calves surviving their first winter).

When the forest provides all the nutritional and shelter needs required by deer, animal condition will be high with good body weights, large skeletal size, heavy fat reserves most of the year and, genetics aside, strong antler development. Almost all breeding hinds (3 to 10 years old) will give birth to a calf each spring and more importantly, calf growth over summer will be strong so that in the following winter, survival will be high. That is not to say, however, that if you have healthy deer they are not having an impact on the forest. The relationship between native forests and introduced animals is very complex and there will always be some impact (the significance of which is open to debate) regardless of how many or how few deer are present. To add to the problem, deer impact is incremental over time and the impact apparent now not only reflects present deer density, but the whole history of various animal species at a given site. More to the point though, our technical ability to eliminate animal impact completely is very limited, so we are left to find some acceptable middle ground. If the deer that live in a forest are fine healthy specimens, and that is certainly my choice as a hunter, I believe we are at least heading in the right direction.

As forest health declines - there are many reasons for this but let us focus on declines that are deer induced - the quality and abundance of life within that forest also decline. Using deer as an example, hunters are often under the impression that the more deer there are to breed, the more deer there will be to hunt but it is not that simple. Deer will increase, if not adequately harvested, to a point where a lack of resources, e.g. food, compromises reproductive success. Hunters can be misled into thinking the habitat is doing well when they shoot a well conditioned stag in autumn. Their logic, which appears sound on the surface, is that because the stag is fat the habitat must be good. The reality is that stags have only themselves to take care of over the growing season. There is almost always some food around in summer, no matter what the condition of the habitat. This is stored by the stag for the coming rut and winter. The breeding hinds, which collectively

make up the engine room of the herd, in contrast must put much of their spring and summer nutrition into providing for their calves. At the end of summer if there has not been ample food available or the quality of food is poor, they will be in their lowest condition of the year. If they have struggled through summer not only will their calves be small and vulnerable to the winter but the hinds may not cycle in autumn. The number of hinds cycling has a major bearing on the intensity of the rut so if the rut is poor in an area you hunt, this may be an indication that there are habitat problems, regardless of the condition of stags. Hinds that do not cycle do not go to the stag and consequently do not have a calves the following spring. Some may even die during winter if the season is harsh and they are severely run down. By failing to cycle a hind is often able to regain some condition the following summer, but if hinds are only breeding every two or three years in a particular area it is likely there is something drastically wrong with the habitat. Usually the deer population is too high and has been for some time. A good deer manager, if habitat enhancement is not an option, would recommend herd reduction in such a situation. I have hosted American deer biologists in the central North Island who have objectively recommended just that upon inspection of severely depleted habitat.

Any hunter concerned for the welfare of the bush, and indeed the longer-term welfare of the deer, should be looking at the condition of the breeding hinds in late summer and autumn to gain an impression of the state of the habitat, and hence the herd in their chosen hunting area. If the hinds are not generally well conditioned during this time, they will be struggling to reproduce and there will almost certainly be habitat sustainability problems that must eventually be addressed. In spring and summer when a hunter sees a breeding aged hind without a yearling or a calf at foot, he should be asking why and critically appraising the state of the forest in which that herd is living as one possible reason.

Another indicator of habitat problems may be the presence of dead deer. Are they calves? Are they mature deer? Why might they have died? How severe was the last winter? How much palatable regeneration is present in the forest?

If most of the hinds are skinny and there are few calves around, it is likely the forest will be struggling under an unsustainable deer herd. Forest understoreys will likely be eaten out or full of plant species not palatable to deer. This change in forest composition and the



subsequent effects it has over time on our native flora and fauna are the main concerns expressed about deer impacts by conservation interests and they are valid ones. There are places in New Zealand where this is very definitely the case. Parts of the Kaweka and Ahimanawa Ranges where many of you may have hunted as part of your involvement in this competition are examples. Not only are these situations undesirable from a conservation perspective, they also work against the aspirations of hunters in the longer term because the number of deer these areas are able to support ("carrying capacity") slowly but surely declines further and further over time when the habitat is exposed to such a regime. In this situation the hunter would be advised to shoot every hind they see to help reduce the population and to allow the habitat a chance to recover. If the population is reduced and held down to more appropriate densities (this may be a long-term objective in some areas where serious or ongoing habitat problems are evident), increases in herd health will eventually follow. As reproductive success increases with the improvement in the habitat and so long as density is maintained at

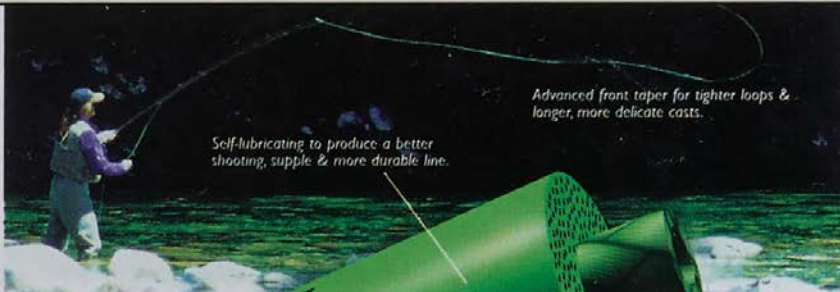
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some lower level (and we don't yet know what these densities are for most habitats) the herd, the hunting and most importantly the habitat, will be far better off for it. It sounds a bit backward but the reality is that hunters can actually enjoy a higher sustainable deer harvest from a lower overall deer population if, and only if, the habitat is in good condition and the harvest strategy is correct. The best and quickest way to achieve this in areas where deer impact has caused a decline in the habitat is to concentrate hunting effort on the productive sector of the herd, the breeding females.

Only where there are few deer with every hind breeding each year will passing up breeding hinds increase hunting opportunities. If hunting opportunities are indeed the objective, in such areas the harvest focus should be on the female calves, female yearlings and mature stags to contain the herd's expansion, maintain strong habitat health and therefore the general health and productivity of the herd. In between the two scenarios of low deer numbers well within the capacity of the habitat to support them and deer at levels too great for the habitat to sustain long term, is a continuum of situations. Different herds at any one point in time may be rising or falling and every hunter needs to read the signs and understand where their particular herd is at (good hunters do this instinctively). It is also important to realise that the deer-habitat relationship is an extremely dynamic one which is constantly changing. It is often influenced by the seasons, the severity of winter cold and the harshness of summer drought. The droughts of 1998 in parts of New Zealand are a classic example. Carrying capacity can fall dramatically under such climatic conditions and hunters must accept that if habitat quality is to be maintained for the sake of their future hunting, herd reductions will be required from time to time, just as farmers have had to down-size their flocks or herds over recent months.

Habitat problems can often be subtle and sometimes take a while to become obvious. Habitat decline can be serious for many natural ecosystems which require long sustained periods of very low game density to repair. In some situations it may even be irreparable. I guess the bottom line to what I am trying to say is that hunters should never be afraid of harvest. In nature, death is as important as life. Herd reductions create opportunities. Opportunities that can change a potentially undesirable situation to one which is more biologically sustainable. Sure, if the situation is serious and urgent this may take some time to achieve, but if the sustainability of the habitat depends

on it, it has to be done.

It is all about understanding the biology of deer and reading the signs on the hunting block. A hunter who understands and reads the signs will be in a better position to hunt with the wellbeing of the habitat in mind, contributing in an appropriate way to the bigger picture by carefully harvesting the deer to ensure sustainability of the habitat that supports the herd.

Similarly, from a conservation perspective this is not an unreasonable management approach because those same native forests also support some pretty unusual and internationally significant native wildlife. For me at least the other life in the forest is as big a part of the hunting experience as the deer!

I put it to you that any management regime that contributes to the long-term sustainability of native forest will have benefits to hunters in the long term because without healthy native forests, hunters will not have healthy productive deer herds.

Hunters need to focus on this issue above all else. Management regimes that put habitat sustainability first must be a priority. I suggest that many of the more thoughtful hunters realise this already. Forget the days of large deer herds in native forests - those days are gone. Not just because of helicopters or poison, but because the herds of the past also borrowed too much from the future during a time when deer managers had little ability to control numbers. Many of our native forests no longer have the capacity to support such scenes. The biological reality for these forests is that any future hunting regime must be built around reduced deer numbers in what is an already depleted habitat resource. When you are sailing close to the wind there is little room for error and habitat sustainability must underpin management. If you take nothing else from this presentation, I hope you will recognise the limitations biological reality imposes on future management options for deer in many native forests. Think a little less about where you are going to hunt next weekend, and instead, think a little more about what your hunting might be like in the next millennium if we don't get the habitat management formula right ..... today!

# Lake Taupo Catfish Monitoring 1996/97 and 1997/98

by Rob Marshall

## Introduction

The brown bullhead catfish (*Ameiurus nebulosus*) has been present in New Zealand since 1877. Native to North America, the species appears to have adapted well to New Zealand's aquatic environment, and is now distributed throughout the country. Catfish are most common in the Auckland and Waikato regions. Populations also exist in Taranaki, Wairarapa and even as far south as Hokitika. The spread of catfish in New Zealand has sparked widespread debate about the possible impacts on New Zealand's native and introduced freshwater fisheries.

Since the introduction (either deliberate or accidental) of catfish to the Taupo region approximately 16 to 20 years ago, concerns over the potential negative impacts that catfish might exert on the Lake Taupo trout fishery have been raised. As a result the Department of Conservation commissioned a masterate student from Waikato University to study the fish's general biology in the lake, and also established a long-term monitoring programme to identify trends and changes in the population size and structure. The initial study completed by Grant Barnes provided the Department with, amongst other valuable information, information as to the preferred habitat of catfish in Lake Taupo. This allowed the Department to select suitable sampling sites for the monitoring programme.

The Lake Taupo catfish monitoring programme commenced in 1996. Since then catfish have been netted from three different sites around Lake Taupo each month between December and March. A portion of each month's catch is processed to establish the length, weight and gender of each fish.

The following report presents the results of the Lake Taupo catfish monitoring programme to date, and identifies potential topics for further research.

## The Lake Taupo Catfish Population

### *Numbers and distribution*

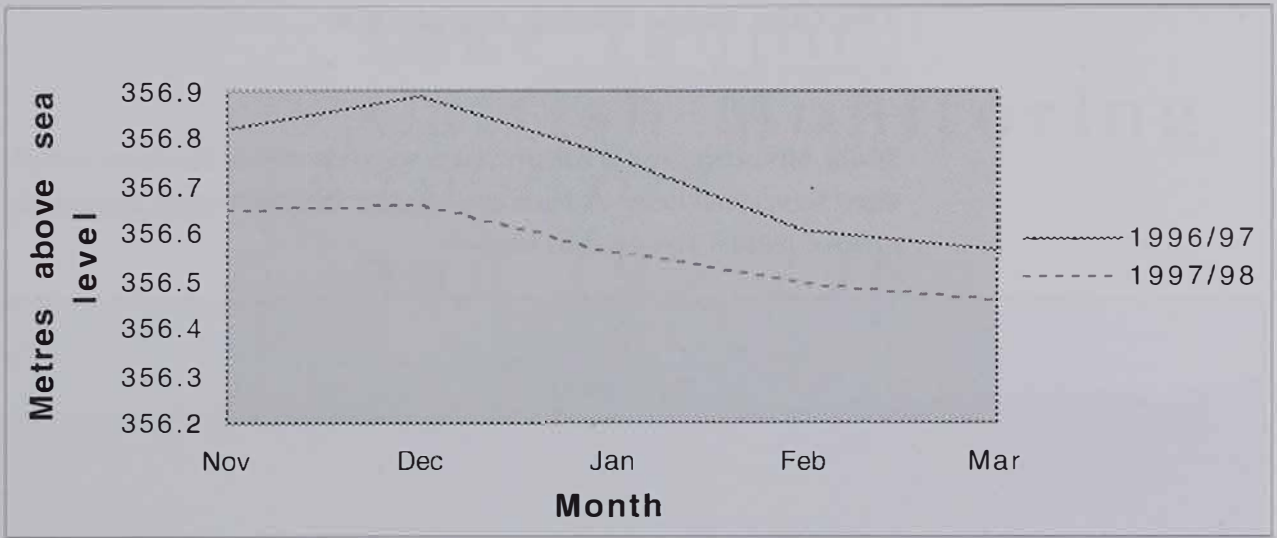
Waihi, Motuoapa and Whakaipo bays were chosen as the three sample sites. To varying degrees, each possesses a shallow weedy margin, the type of habitat favoured by catfish.



*Waihi Bay: Typical catfish habitat*

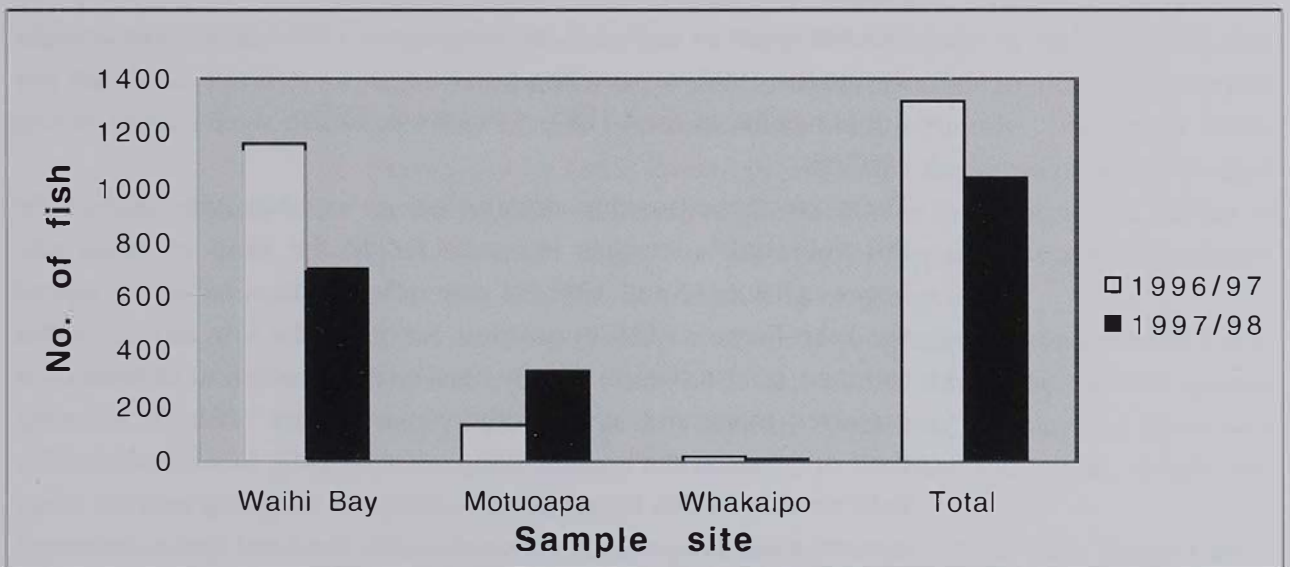
During the 1996/97 sampling period a total of 2401 catfish were caught from 24 nets set overnight. This equates to a catch rate of 100 fish per night in each net. In comparison 1114 catfish were caught during the 1997/98 sampling period, with a catch rate of 46 fish per net per night. In total 1287 (54%) fewer catfish were caught during 1997/98.

There are three possible explanations or combinations thereof for this substantial decrease in catch. Firstly, the drop in catch rate between 1996/97 and 1997/98 may reflect a decrease in the size of the Lake Taupo catfish population. Secondly, the low lake level this summer (refer to Graph 1) may have enabled catfish to expand their preferred range and inhabit other areas further offshore, reducing their densities at the present sample sites. Finally, this reduction may indicate that catfish have moved outside our sampling area for other reasons, such as increased competition for food and space, increased susceptibility to predation in very shallow water or purely for reproductive purposes.



Graph 1: Comparison of the monthly average Lake Taupo water level between the summer of 1996/97 and 1997/98 (Source: ECNZ)

The margins of Waihi Bay contain many large, sheltered weed beds which provide cover for catfish and their prey. In 1997/98 Waihi Bay produced 65.4% of the total catch. Motuoapa, which contains both weedy and sandy habitat, constituted 32.8% of the total catch while the northernmost site of Whakaipo Bay was responsible for only 1.8%. Catfish in 1996/97 were distributed slightly differently. The proportion of the catch from Waihi Bay was the highest of all sites and



Graph 2: Comparison of the total number of catfish caught in early summer between 1996/97 and 1997/98

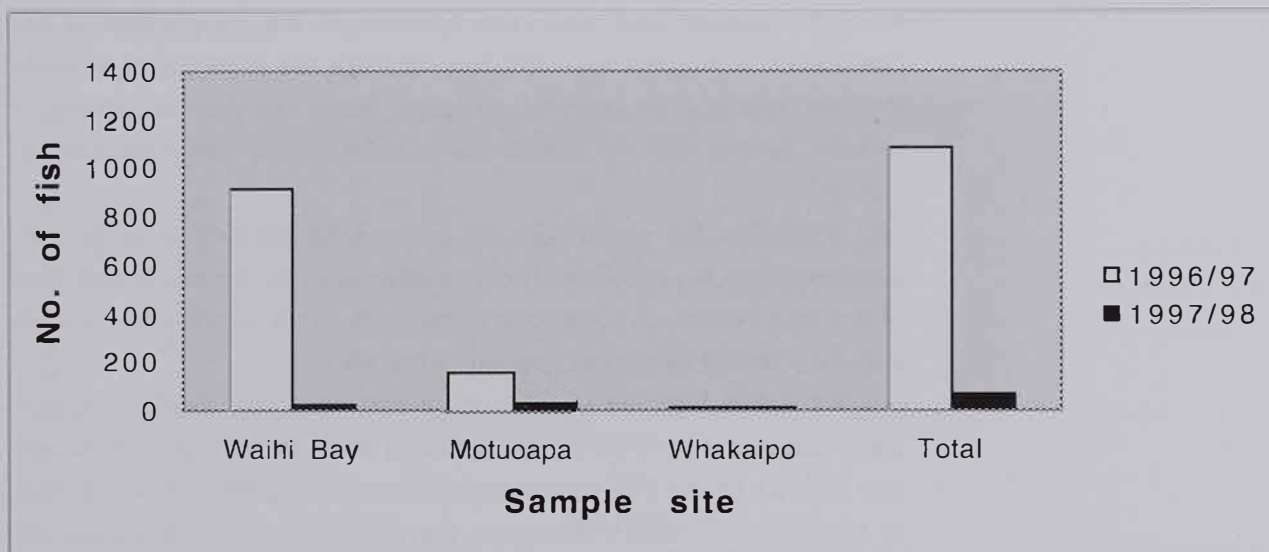
was 21% greater than this year. Conversely, the proportion of the catch from Motuoapa was 20% less. Perhaps the population in Waihi Bay has reached its carrying capacity based on the availability of suitable habitat and the Motuoapa population has just continued to expand.

The Whakaipo Bay site, while not as good catfish habitat as the two southern sites is one of the most suitable sites in the north and west of the lake. The much lower catch rates reflect the much lower catfish densities which occur over much of the lake.

Graphs 2 and 3 divide the fish from each site into those caught in early summer (December and January) and late summer (February and March). Fewer fish were caught in early summer of this year than in 1996/97. As Graph 3 illustrates, the difference in catch during late summer was substantially greater. For instance 97% fewer fish were caught during late summer this year at Waihi Bay. The effect of low rainfall throughout this summer led to the low lake level mentioned above. Graphs 2 and 3 provide evidence to support the theory that catfish may have expanded their preferred range owing to low lake levels, and therefore avoided our sampling nets.



*The product of one night's sampling at Waihi Bay*



Graph 3: Comparison of the total number of catfish caught in late summer between 1996/97 and 1997/98

#### *Length, weight and condition*

Table 1 shows the average size of the catfish sampled. The length and weight of female and immature fish have increased, although males show no difference. The weight of the female catfish is related to the size and amount of ova present when sampled. Observations of the gonads during dissection showed that many of the fish were in spawning condition with large gonads, although some had already spawned.

	Female		Male		Immature	
	1996/97	1997/98	1996/97	1997/98	1996/97	1997/98
Average length (mm)	174	209	190	190	119	131
Average weight (gm)	85	150	113	117	23	31

Table 1

A sub-sample of the mature population (fish between 240 and 300mm in length) was selected and used to establish the condition of the population using Fulton's index ( $K=W/L^3$ ). The 1996/97 condition factor was 0.012, while 1997/98 was slightly higher at 0.013. Both condition factors are comparatively low for catfish, which are known to grow to 500mm and have a condition factor of up to 0.024.

#### *Sex ratio*



Of the 374 catfish that were processed this season 51% (190) were male, 46% (172) were female and 3% (12) immature. In 1996/97 21% of the catch was identified as immature. This reduction in immature fish may be due to the apparent increase in size of the fish this year, which may have prompted early maturation. It is interesting to note that the average length of this season's immature fish is 22mm greater than last year, suggesting growth rates were faster this summer.

### *Diet*

Analysis of the gut samples removed from the catfish has yet to be completed, although observations of the stomach contents during dissection indicate that the main food source is freshwater snails. The range of food items taken appears to be relatively limited. Aside from snails, catfish feed mainly on other small invertebrates. Catfish predominantly scavenge for food, and in so doing consume a large amount of detritus (decaying organic material) and algae.

A common concern among iwi and angling groups is that catfish eat a large amount of koura. Our results to date show that this is not the case, though koura are more common in the diet of large catfish. Small fish also seem rare in the diet of catfish. Smelt were present in a small number of the fish sampled, mainly during the late summer months when smelt are known to "die back" after the rigours of spawning. The smelt



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present are therefore most likely to have been scavenged rather than actively caught. This is supported by the abundance of dead smelt washing onto the northern shores of the lake this year, and the fact that the only site where smelt were part of the catfish diet was Whakaipo Bay in the north.

### *Conclusion*

The number of catfish caught in this year's monitoring programme was substantially lower than last year. Three scenarios have been identified which may explain these results: a) the population of catfish in the lake has declined, b) catfish have dispersed owing to low lake levels, therefore reducing their density, c) catfish have redistributed themselves owing to increased competition.

The information available from the monitoring programme alone does not allow us to ascertain which scenario or combination of scenarios explains the observed results. However given other observations this summer of large numbers of catfish even over clean, sandy areas around the lake, it is likely scenarios (b) and/or (c) are most likely.

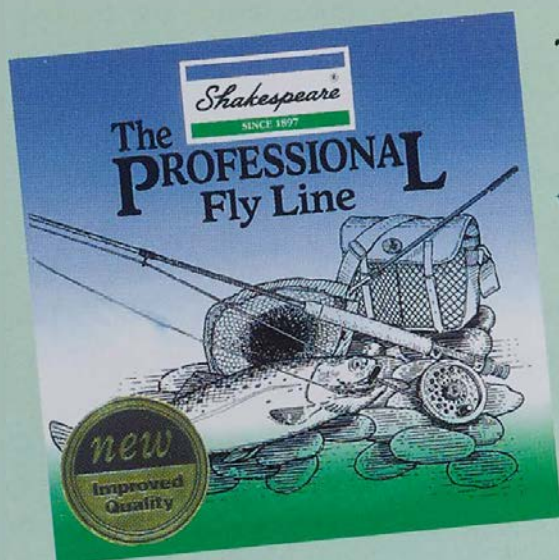
Nevertheless this year's catfish monitoring has been extremely informative. The monitoring programme is fulfilling its role of identifying trends and changes in the catfish population, and has provided an impetus for further research. For example, it will be interesting to see whether the apparent increase in growth rate is maintained next summer.

### **Follow-on Research**

- A research project involving ultrasonic tagging on a sample of catfish to track their movements will be undertaken next summer. This project should also provide further information about their spawning behaviour. (A feature article on this project will be published in a future issue of *Target Taupo*.)
- A tagging-recapture experiment, where two samples of 800 catfish are to be tagged at different times of the year has been established to estimate the total catfish population size in Waihi and Motuoapa Bays.

## Future Research

- Weighing the gonads of each fish processed as part of the regular monitoring programme, to allow a seasonal GSI (Gonadal Somatic Index) to be created. This will provide more accurate information on the reproductive biology of the fish in Lake Taupo, and the relationship between gonad size and fish weight.
- Further exploration into the low condition factor and small maximum size of adult catfish in Lake Taupo, which indicates that mature fish find it difficult to continue growing in the lake.



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# Goat Control - Waione/Canyon Block

*by Norm McDonald,  
Prohunt New Zealand*

Early this year Prohunt completed extensive goat control over 2500ha of virgin podocarp forest known as the Taurewa Ecological Area, which is located in the south-western corner of Tongariro Forest, south of Taumarunui (*Target Taupo, issue 27*). Subsequently the Ruapehu Area of the Department of Conservation contracted Prohunt to undertake four days of extensive hunting (involving three hunters with trained and certified goat dogs) to reduce goat numbers and to quantify the goat populations and their distribution in approximately 1300ha of cutover podocarp forest in the adjoining Waione Stream/Echo Canyon area.

The Waione Stream flows from Taurewa quarry north-east towards the Whanganui River approximately 9km downstream. Heavily logged and burned earlier this century, the Waione is now overgrown with dense toi toi, making hunting access difficult.

Working from “Nick’s” hut (off Kapoors Road) the hunting team divided the control area into 12 blocks that covered the most likely goat habitat. The control area was too large (1300ha) to cover intensively in the time available.

## **Goat Distribution**

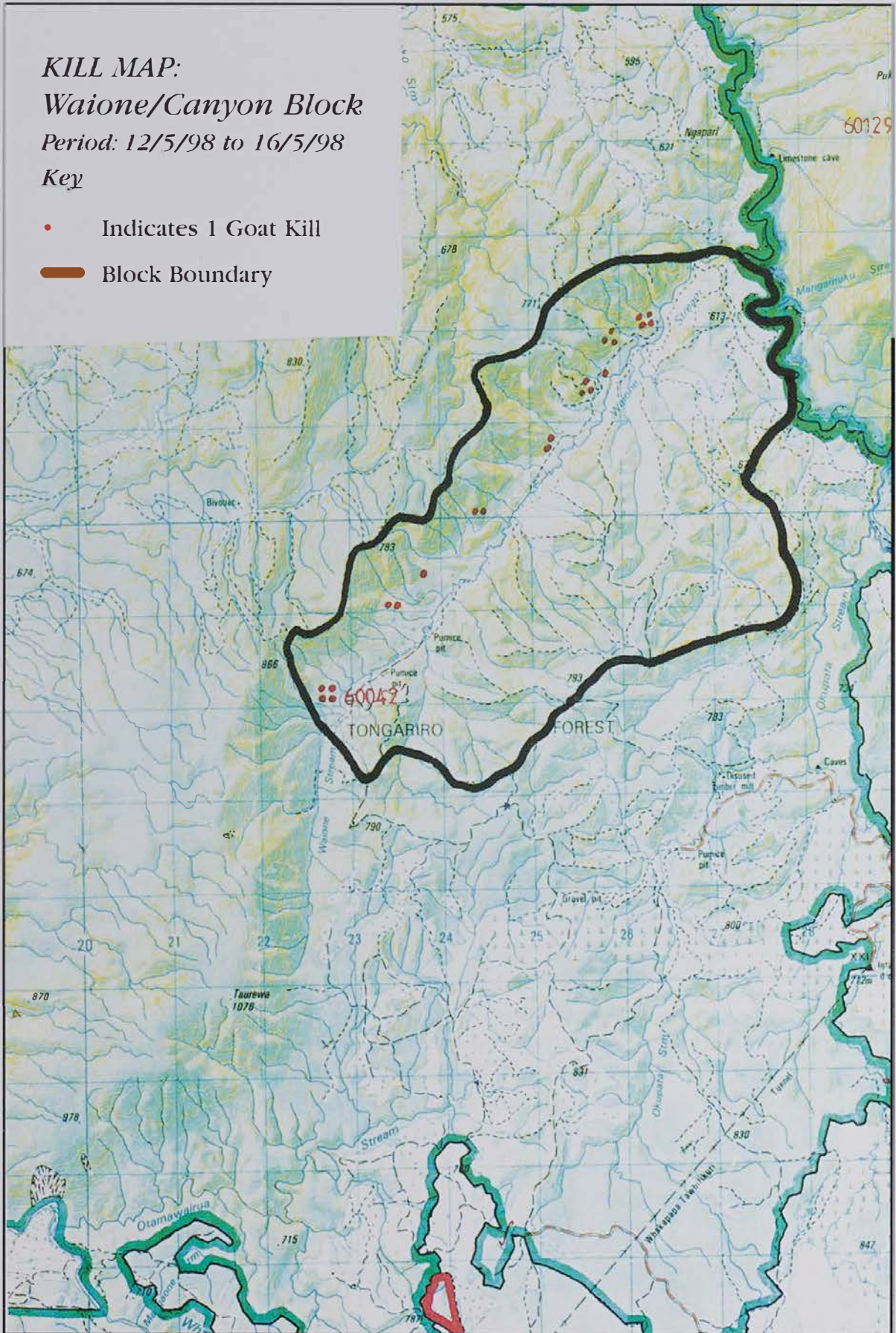
The area on the true left of the Waione Stream to the block boundary has a low to moderate goat population that is evenly distributed from the quarry to the Whanganui River.

The balance of the control area on the true right around Cut Off Creek/Echo Canyon historically held goats but comments from local hunters indicate goat numbers have diminished over the last 10 years or so. Prohunt found no goats or sign in this area in the limited time spent there.

Further south on this side of the river goat sign was evident in areas around the pumice pit, which was just outside the block boundary but which hunters had to walk through to access the control area on the other side. We feel that this is one area that should be looked into for future sorties.

**KILL MAP:**  
**Waione/Canyon Block**  
**Period: 12/5/98 to 16/5/98**  
**Key**

- Indicates 1 Goat Kill
- Block Boundary



## **Goat Kills**

During the 12 hunter days of effort put into the control area, 23 goats were killed (1.9 kills/effective hunter day). All of these kills occurred on the true left of the Waione.

## **Deer**

No deer were killed but hunter comments were that deer were probably in higher numbers than goats in the areas hunted.

## **Vegetation Condition**

Toi toi is the dominant species covering the river flats to half way up the ridge systems, and this tends to be quite intimidating to hunters. Deer and goats were in sufficient numbers to ensure that animal tracks gave reasonable access to most areas. Palatable species in the browse tier have suffered a lot from both deer and goats but little possum sign was noted.

## **Conclusion**

Previous effort in Taurewa has goat densities down to minimal levels and hunter effort in adjacent areas will reduce the amount of reinfestation dramatically.

However, it is unlikely that the hunting effort spread over such a large area in the Waione has reduced goat numbers to low enough levels here to have any lasting effect.

While it is apparent that goats are uniformly spread over the control area on the true left of the Waione in low to moderate densities, goat distribution on the true right and around the Echo Canyon area is presumed to be very low. This is supported by comments from recreational hunters.

With extra hunting effort in this area it is possible to reduce goat numbers to very low levels but there is unlikely to be any positive change in vegetation condition while deer numbers remain at present levels.

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# Something Fishy

## **Possum Control Near Popular Winter Angling Area**

The Tongariro Delta and southern Lake Taupo wetland will be the subject of an aerial 1080 carrot possum poisoning operation this winter. The operation will be undertaken in late August following the duck shooting season. It is targeted at Tb possums living in the wetland which have been subject to intensive ground control since 1992 but which continue to occur in numbers which allow Tb to persist in both the possum population and local cattle herds.

**Please note** - Anglers fishing the Waiotaka River from Hautu Village to the mouth, the lower Waimarino River (below State Highway 1) and the true right bank of the Tongariro River below Grace's Road will need to be especially careful about any canine companions in these areas following application of toxic bait.

The operational area will be well sign-posted. Please do not remove or tamper with warning signs along angler access tracks.

## **Monitoring Young Trout**

The sustainability of the Taupo trout population relies on, among other things, successful spawning and the survival of the young produced. Monitoring the change in abundance of these juvenile trout over time allows us to assess their survival and identify the effects of both natural and man-made processes, such as floods, changes in water quality that occur following volcanic activity or flow manipulations.

The Department's juvenile monitoring programme has been underway for two years. Samples are taken every month from three sites on the Tongariro River and two sites on the Whiti kau Stream.

Juvenile trout occupy two different habitat types. Larger fish live in and around woody debris and instream cover, and smaller juveniles live among the boulders and cobbles of shallow runs and riffles. To sample these habitats two different methods are used. Electric fishing machines (EFM), which transmit an electric current through the water and into the bed of the stream, are used to sample bouldery areas, whereas baited Gee minnow traps (similar to the plastic

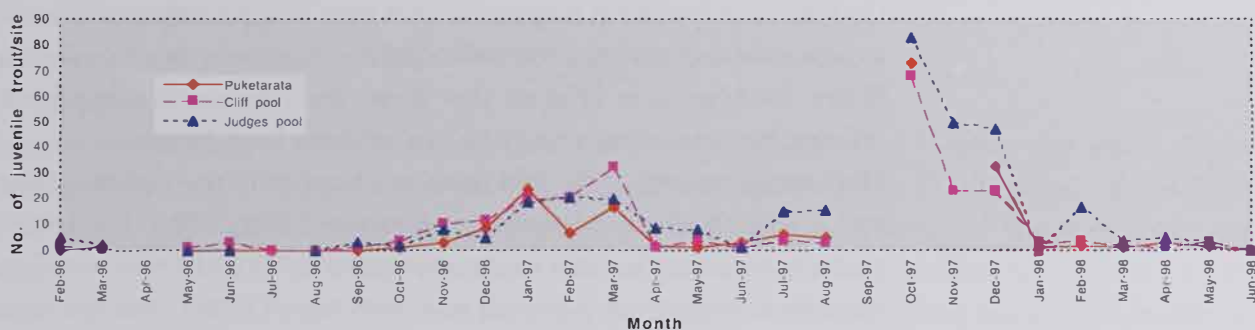


“baitcatchers”) are used in deeper areas and around cover.

The electric current produced by an EFM is sufficiently powerful to induce “forced swimming” in the fish, drawing them towards the operator who catches them with a hand net. Once caught, each fish is measured and its species identified before being returned to the water, none the worse for wear. Electricity and water are obviously a potentially dangerous combination, although when used properly by trained staff are the most effective way to sample fish populations in the rivers around Taupo. The minnow traps are baited with trout roe and set overnight. In the morning each trap is lifted and the fish caught are processed.

The results of the monitoring programme to date highlight the annual cycle of juvenile abundance that occurs in a wild fishery such as Taupo. Spawning takes place throughout the winter months, with the resulting fry hatching in spring or early summer. Graph 4 illustrates this fluctuation with the peak abundance occurring between November and March. The weather last spring was comparatively settled with few floods, enabling the freshly laid eggs and newly hatched fry to develop without any major disturbance. Graph 4 shows the large number of juveniles surviving this summer, which reflects these stable instream conditions. Also apparent is the rapid decline which occurs in each year class. The odds of an individual fry surviving to maturity are very low which is why each female trout lays in the order of 3000 eggs.

Graph 4: The juvenile trout abundance, measured by electric fishing the Tongararo River, fluctuates over time



Should nothing too adverse occur in the life of young trout over the next 18 months lake anglers should see the benefits in the summer of 1999 and the year 2000. River anglers will benefit during the year 2000's winter spawning run.

## Waipa and Te Whaiiau Traps

The Waipa trap, which captures the spawning run in a tributary of the Tongariro River, has been operational since early January and is functioning very well. Nearly all the finishing touches have been made to both the trap and the hut. This includes installation of a generator-driven light at the trap to allow safe operation during floods at night.

Since trapping began the number of fish running each month has steadily increased.

Table 2 shows the monthly runs up to the end of June 1998

Month	Number of rainbow trout trapped	Number of brown trout trapped
January	26	0
February	8	0
March	77	0
April	78	32
May	193	195
June	434	293
Totals	816	520

The February run is incomplete as the stream was in flood for several days and the trap over-topped.

The totals to date, in conjunction with the results from trapping the Whitikau stream in the mid-1990s highlight the number of brown trout that migrate from the lake into the upper Tongariro system to spawn. Given that many of these fish will have entered the lower river in December or January it is apparent that they take a number of months to negotiate the mainstem of the Tongariro. Anglers target them in the Hydro Pool but it is obvious that there must be many other pools offering the opportunity to catch one of these large browns.

The average weight of the 268 rainbows trapped to the middle of May was 2.48kg (5.5lb) and that for browns was 3.20kg (7lb). The largest rainbow through the trap to date weighed 4.75kg (10.5lb), whereas the largest overall was a brown male of 5.1kg (11.2lb). See the next issue of *Target Taupo* for a summary of the final run this winter.

The Te Whaiiau trap at Lake Tamangakau is operating for its fifth consecutive year. The feature of this year's run appears to be an increase in the number of smaller fish, which is encouraging as it suggests a strong year-class entering the spawning population. Also interesting is the number of trout passing the trap that are



*Norrie Ewing, looking slightly bedraggled from working through the wee hours of the morning, holds a typical Tongariro brown*

attempting to spawn for the fifth time, i.e. they are at least seven years old.

### **River Surveys**

The usual winter river survey programme is underway again. Some of you may have already talked with one of our team. If so, thank you for taking the time to answer the questions. The results of these surveys provide us with vital information about the season's catch rate and the size and quality of the fish being caught. It is also an opportunity for us to assess the degree of satisfaction among anglers.

Results to date indicate that the early season fishing throughout the rivers has been better than in recent years. As expected, based on the results of the summer angler survey and also the Waipa trap run, the highlight so far has been the exceptional size and quality of the fish

taken. Fishing in the Tongariro River has been difficult at times, but improved significantly once steady rains arrived in late May. The smaller rivers in the district have produced some equally fine fish, though on a more consistent basis. For example, the Tauranga-Taupo and Waimarino held good numbers of fish throughout most of April and May. Overall fishing for the remainder of this winter is shaping up well, and anglers making the effort should be rewarded with some exceptional Taupo trout.

### **No Closure of the Tongariro River**

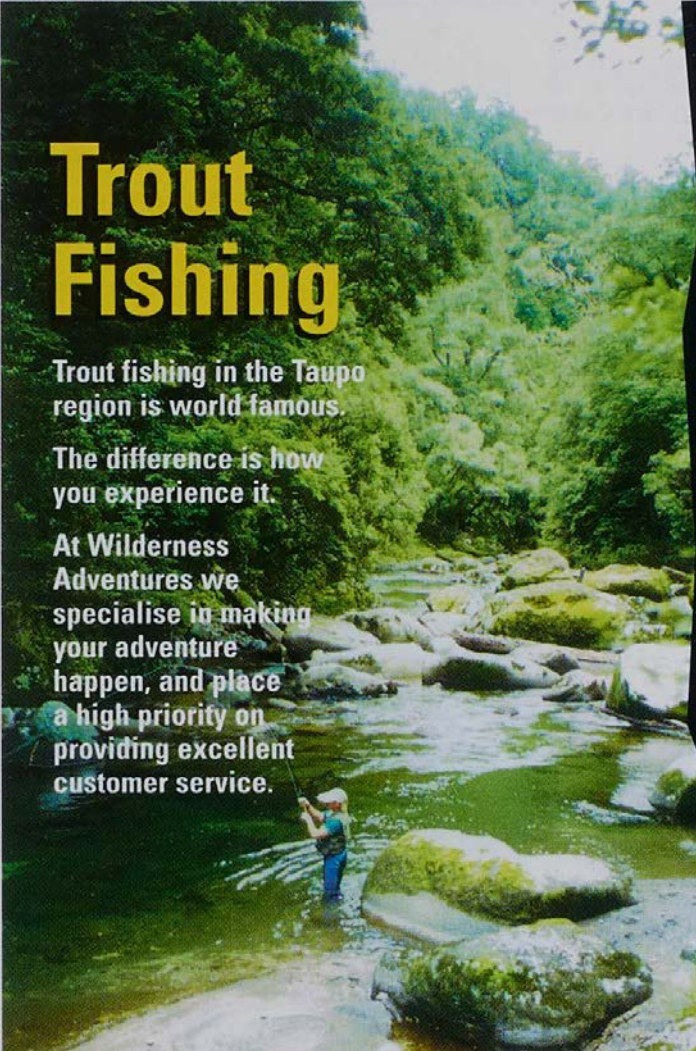
We are aware of a story circulating that the Tongariro River will be closed to fishing above the State Highway 1 bridge next year. Not surprisingly, this has caused consternation among Tongariro anglers. We have no idea how this story has arisen, although perhaps it has evolved from concerns over the possible impacts of the eruptions on the Tongariro spawning run. However, it is not an option we have ever seriously considered and, as it has turned out, the fishery is in excellent shape with no need to further restrict harvest. It just goes to show how easily stories can gain credibility. Now that it's been raised though, maybe .....???

### **Progress on National Trout Centre Development Plan**

As part of events to mark the centenary of the introduction of rainbow trout into Taupo waters, the Department of Conservation is developing a new concept plan for the National Trout Centre (NTC). These days the hatchery role of this facility is confined to rearing a few thousand fish for the children's fishing pond and for scientific research. However, in recognition of the huge importance of the fishery to the local area and the need to quickly re-establish the fishery should it be affected by a major catastrophe, the primary role of the NTC remains as its potential to operate as a hatchery to kick-start the fishery again. The need for this role met with some scepticism initially but following the eruptions of Mount Ruapehu in 1995 and 1996 and current concerns over a possible lahar from the crater lake it is now accepted as essential.

The NTC attracts over 50,000 visitors each year and within its role as a hatchery it also functions on a day-to-day basis as a shop window for

the Taupo fishery. The Department would like to develop this advocacy role further over the next few years and so is undertaking the development of a new concept plan working with the NTC Trust, Tuwharetoa Maori Trust Board and our neighbours at the site. The idea is to develop further displays based around the management and history of the fishery, trout and other freshwater species, while retaining the superb natural qualities of this unique site. A wide range of ideas is being canvassed and staff have visited Mount Bruce National Wildlife Centre and Kelly Tarlton's Underwater World amongst other places. Ideas suggested range from aquaria, working management structures such as fish ladders and traps, an auditorium, a replica of an early angling camp to employing a teacher on site, the use of electric carts in the grounds instead of vehicles and greater contact with Department staff. Not all the ideas will be adopted but,



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by canvassing a variety of options, it is hoped to come up with a mix of activities and displays which will make a visit to the NTC a memorable experience.

We intend to have the concept plan finalised by late July. The next step will be to plan each development in detail including costing. Many of the projects are unlikely to be particularly expensive and already several sponsors have indicated an interest in being involved. The intention is to undertake the various projects as resources allow, with the first completed before the end of this year to mark the trout centenary. Ideally, several developments will occur each year so that people visiting on an annual basis will see something new each time. The finalised concept plan will be published in the November issue of *Target Taupo*. However, if you have any suggestions or comments, or are interested in sponsorship opportunities please contact Glenn Maclean or Herwi Scheltus at the Turangi office (at the address inside the front cover).

### **Women in Conservation**

For the first time, women throughout the Department of Conservation are able to develop a project and see it through to its completion. The women within the Tongariro-Taupo conservancy are hoping to develop an area at the National Trout Centre, alongside the Waihukahuka stream, where the public will be able to enjoy the surroundings and see trout in their natural environment.

The plan will include landscaping an area beside the stream, planting shrubs and trees, creating walkways and having a restful spot where the public can sit and relax and enjoy the very tranquil surroundings. The project is being co-ordinated by Fishery staff Vicki McLean, with support from Shirley Oates.

We will keep you updated with this venture in future editions of *Target Taupo* and you will be able to see the contribution that women do make with conservation work in this area.

### **Maori Trout Fishing Rights**

The following media statement, reproduced in full, was released by Neil Billington, Senior Judicial Communications Adviser to the High

Court, on 14 May.

“There is no Maori fishing right in respect of trout, it was decided in the Wellington High Court today.

In a test case the Court reversed the decision of the Wanganui District Court last year, when the respondent, Kirk McRitchie, was acquitted of a charge of fishing for sports fish without a licence. The respondent, who is a Maori, claimed as a defence that he was exercising a fishing right under the Treaty of Waitangi.

The case was appealed by the Taranaki Fish and Game Council.

The High Court, in a joint decision by Justice Neazor and Justice Greig allowing the appeal, said the acquisition of any Maori fishing right in respect of trout is precluded by legislation existing at the time of the introduction of the species and since.

‘The issue in this case in the end came down to a narrow one because it

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is not disputed that Maori had Treaty-based rights to take freshwater fish.' The Court said the issue in respect of freshwater fisheries is not identical with that which arises in respect of sea fisheries. Sea fish were indigenous in the waters in 1840 and thereafter; freshwater fisheries involve fish indigenous to New Zealand but also those introduced at a known time later than 1840.

It said legislation has proceeded on the basis that there were existing Maori fishing rights in freshwater, and that any rights in respect of non-controlled fish existed alongside the complete control of fishing for introduced fish (as witness the consistent provision about throwing back an unintentionally taken 'controlled' fish). The Court said the legislation has since 1884 contemplated persons fishing in freshwater unintentionally taking a 'regulated' fish and returning it to the water.

'The particular factor that exists in respect of trout is that the history of the legislation makes it plain that the taking of salmon and trout was from their introduction controlled by law.'

The earliest legislation protecting salmon and trout was passed in 1867, before the fish were introduced. This legislation was repealed in 1908 but protection continued with the Fisheries Act and subordinate legislation.

'From 1983, what fish would be the subject of control was left to be determined by subordinate legislation. That is the present position. On the face of it, control could be applied to any freshwater fish.'

The Court said this case differs from others because controlling legislation predates the introduction of the fish and regulatory control in respect of trout has continued in some form to the present. There was never a time when trout or salmon were available without control to those who were otherwise free to or had rights to fish in fresh water.

The Court said it was not deciding that the content of a Maori fishing right was determined by the species available and caught in 1840, but that an intention to include the fish from any such right is to be properly spelt out by reference to legislation."

### **Summer Harvest Similar to Last Year**

Despite the increase in the minimum size limit this season, which was designed to reduce the angling harvest, the harvest was similar to that



of last summer. A comparison of the catch and harvest over the last three summers is shown in Table 3.

Every five years we undertake an intensive season-long survey to measure the harvest from Lake Taupo and the Tongariro River. To improve the statistical accuracy the year is divided into 12 day types and a sampling regime undertaken for each day type.

Table 3: Estimated catch and harvest by anglers trolling on Lake Taupo for the three day types surveyed, 1995/96 to 1997/98

Day type	Harvest		
	1995/96	1996/97	1997/98
Spring/summer weekends	8801	5754	4045
Christmas	12,608	8632	14,328
Late summer weekends	4407	3897	2068
Total harvest	25,816	18,283	20,441
Total catch (legal size)	30,243	22,123	26,206
% of legal size trout released	14.6	17.4	22

However, the year-long survey is expensive and demanding of staff resources and it is not possible to repeat it every year. An annual measure of the angling harvest though, is essential information for the management of the Taupo fishery and so a smaller survey is undertaken in the years between the full season-long surveys.

The last year-long survey was undertaken over the 1995/96 season and it was found that exactly one-third of the total harvest was accounted for by the three day types listed in Table 3. To measure the harvest over these three day types is a much smaller task and we can then extrapolate the results to get an estimate of the total harvest. This estimate for 1997/98 is presented in Table 4, along with estimates for previous seasons.

Table 4: Estimates of the total harvest taken by anglers trolling on Lake Taupo, 1990/91 and 1995/96 to 1997/98

Year	Total troll harvest
1990/91	63,760
1995/96	76,442
1996/97	55,403
1997/98	61,942

The 1990/91 estimate is derived from the first season-long survey which was repeated in 1995/96.

Looking at the results for this summer (Table 3) it is apparent that the harvest over spring was not as high as 1995/96 or 1996/97. Our

angling data shows high average catch rates for the anglers we interviewed but the low harvest is a direct reflection of the poor weekend weather which prevailed through spring and which discouraged anglers from venturing out.

The weather over the Christmas break was much more conducive to fishing and this was reflected in the number of anglers on the lake. Our instantaneous counts of anglers done several hours after daylight on the four survey days were 404, 546, 421 and 705. With this angling pressure combined with reasonable catch rates through the period, over 14,000 trout are estimated to have been killed in the 16 days which comprise this period. The settled weather prevailed through summer and autumn which encouraged a continuation of a very high fishing effort. However, at this time of the year and accentuated by such settled conditions, trout move deep out of reach of most angling methods and the catch rates fall. As a consequence the harvest was not very high. Those anglers who used wirelines or downriggers experienced some very good fishing this February but the vast proportion of anglers continued with harling or lead lines with more limited success.

The increased minimum size limit (45cm) was intended to reduce the harvest in the lake but it appears trout growth and size were such that the impact of the regulation on restricting the harvest was no greater than in previous years. However, in conjunction with the increase in average size, the trout population, as measured by a November acoustic survey (*Target Taupo 27*) was also larger than previously predicted and thus the larger than intended harvest is not a concern to fishery managers.

### **Lake Taupo International Fishing Competition Comes of Age**

The 21st ECNZ-sponsored Lake Taupo International Trout Fishing Competition was held once again on Anzac Weekend. To commemorate 100 years of rainbow trout in Taupo, and also that this was the 21st time the competition has been held, organisers applied to have a major prize for the capture of a tagged fish. Previously prizes for catching tagged fish were not permitted under the criteria for fishing competitions set by the Department of Conservation and the Taupo Fishery Advisory Committee (TFAC). This was because organisers could offer huge prizes by taking out insurance against the prize being won. Obviously the bigger the prize the more entrants would be attracted



*“Petra” before being tagged and released*

and the greater the numbers of fish caught. While only one fish could win the prize any licensed angler was still entitled to take three fish, and it was expected that the harvest would be increased significantly. This application, however, coincided with a review of the criteria against which we assess fishing competitions. The major concern we have about fishing competitions is that they should not cause a major increase in the angling harvest. With this in mind and in conjunction with the TFAC we have decided that the current level of harvest from competitions (2.5% to 3% of the total trout harvest) should not be exceeded. Within this limit the yearly harvest from non-commercial (social or club-based) competitions has remained constant at approximately 780 fish, largely because a similar number of permit applications is received each year. It was decided that unless the number of applications increased substantially no further constraints would be imposed on such competitions. However, a much larger harvest of trout occurs in commercial competitions (1400 to 1500 fish per year). Commercial competitions are those under which the organisers can charge a larger entry fee and in return pay a resource rental to the Department of Conservation. This rental may be either

### *The tags used*



based on a percentage of the negotiated prize value or indexed to the number of entrants, and represents the opportunity cost of making commercial gain out of what is a public resource. All money received from the resource rentals is applied to the management of the Taupo fishery. Working from the proviso that the overall harvest should not be increased and that the non-commercial harvest is likely to remain at recent levels, implied that the commercial competition harvest should also not exceed current quantities. An analysis of the data from recent competitions indicated that this would be achieved by restricting competitor numbers to 450 in each of the two current commercial competitions. This restriction of commercial competitions to two per year, each with a maximum of 450 entrants, has been endorsed by the TFAC with the two current competitions having first right of refusal. If a competition is to be held at another time of year the number of entrants will be adjusted to take into account the likely change in angling success. An advantage of restricting entrant numbers is that we can be confident of controlling the impact of a particular competition on the fishery. That in turn removes much of the concern over the offering of a tagged fish prize. There is, though, another aspect to be taken into account. Anglers have varying views on the worth of fishing competitions. Our view is that so long as the sustainability of the

fishery is not at risk and the entry fee is within the reach of any licensed angler then it is just another opportunity to make use of the fishery. It's not everyone's cup of tea, but similarly there are many anglers who thoroughly enjoy participating. That is the key and should the prizes on offer ever get so large that the fun is lost in the quest to win, or the entry fees get so high that only a select few can afford to enter, then approval will be declined.

In accordance with this new policy, and in discussion with the Department of Conservation, organisers of the 21st Lake Taupo International Trout Fishing Competition offered a Honda CRV car for the capture of a single tagged fish over the Anzac weekend competition.

Four days prior to the competition "Petra" was caught by Department of Conservation staff at Whakaipo Bay using a spotty gold cobra. She was then tagged with two unique numbered tags, and quickly transported to the centre of the lake where she was released. Four hundred anglers pursued "Petra" over the three day competition, weighing in 1056 trout, but not "Petra".

The size and quality of fish were exceptional and a further reflection of the excellent growth and condition of trout in the lake this summer. The competition has imposed a voluntary 45cm minimum length for any fish weighed in in previous years so the change to a 45cm minimum legal length this season does not affect the comparison of data between years. A comparison of the average length, weight and condition of rainbow trout caught trolling in Lake Taupo in 1997 and 1998 is presented in Table 5.

Table 5: Comparison of lake-caught rainbow trout weighed in in the 1997 and 1998 competitions

	Average length (mm)	Average weight (kg)	Average condition factor
1997	526	1.97	48.6
1998	542	2.20	49.7

The increase in average size this year is also reflected in the increase in average size of mature rainbows caught fly fishing in the river as shown in Table 6.

	Average length (mm)	Average weight (kg)	Average condition factor
1997	553	2.25	47.5
1998	577	2.58	48

Table 6: Comparison of river-caught rainbow trout weighed in in the 1997 and 1998 competitions

The average weight of river-caught rainbows of 2.58kg or 5.7lb is a good indication of what anglers can continue to look forward to catching this winter.

The largest fish caught in the competition was a rainbow female of 5.52kg, although the big prize of a trip to Tasmania went to Marcus Olsen of Tauranga for catching the trout nearest to the average weight of all the trout weighed in.

And "Petra" as far as we know, is still swimming around somewhere in Lake Taupo.

### Angling Tracks

Fishery staff maintain 17km of roads and 30km of tracks to provide anglers with access to fishing waters in the district.

The roads and car parks are maintained initially by contractors while staff carry out repairs and remedial work. Tracks are cleared and repaired prior to the period when they receive most use - in most cases this is winter, so the riverside tracks are cleared in late summer and autumn. This year, for various reasons, work fell behind schedule and it was necessary to employ three men temporarily to finish the tracks in time for the start of winter angling.

*Weed eaters Gordon McKenzie, Arthur Lambert and Kelly Palmer prepare for track clearing*



During summer there were a few grumbles about overgrown, impassable tracks, and it had to be explained that the tracks are for licensed anglers to reach fishing waters and they are kept open when most of the angling is done. In most cases this is during winter.

An exception is the Hinemaiaia above the State Highway 1 bridge. The river is closed to fishing from 1 June to 30 November so the tracks are cleared in early summer to give access to the river above the bridge during the ensuing summer to early winter period.

Recently a group of Kuratau people sought angling access along the banks of the Kuratau River from the mouth upstream. Provisions of the Maori Land Amendment and Maori Land Claims Adjustment Act 1926 make this legally feasible and now we need to see how practical it is (there is 4 to 5km of river) and what costs will be. If it is we then need to develop an implementation plan with landowners that will allow foot access for licensed anglers across their properties along the river bank. Then there will be a bit of scrub cutting to do.

## **Willows**

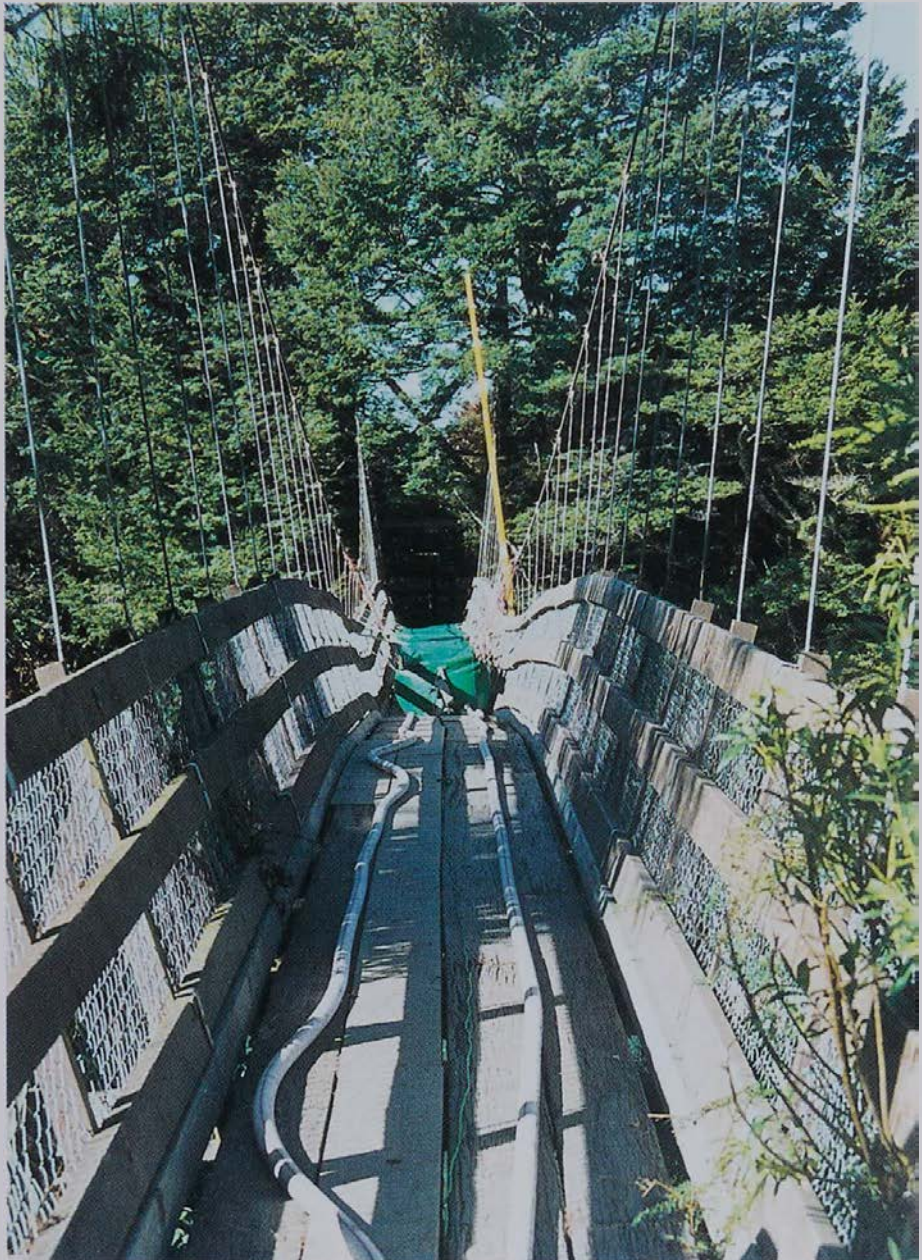
They're a bit of a pest in some places in the Taupo fishery, green in summer, gaunt in winter, with an ability to clog waterways and snag fishing gear. Not all willow species present the same problems but unfortunately all the willows in this district are either crack or pussy willow, and if not controlled, spread rampantly. In the case of pussy willow this is through the spread of seeds, but for crack willow it is by the shooting of twigs broken off from established trees. Thus a large tree growing high in the catchment can clone hundreds of new trees spread along the banks downstream.

To keep them under control we undertake a programme each summer along the rivers and on lakeshore reserves, spraying the young trees with herbicide. The herbicides are supposed to be absorbed into the tree and kill the whole plant but, as anyone knows, willows are tenacious, if not downright aggressive, and can re-grow from very small pieces which escape treatment. Our aim is therefore to control rather than eradicate willows.

This summer the Tongariro and Waiotaka rivers were attacked with both knapsack and tractor mounted units and lakeshore reserves around Taupo from Kawakawa Bay to Ohaumahanga Point and the Lake Otamangakau shoreline dealt to.

## Bridges

The Department now operates a system called quality conservation management (QCM) which influences all work with the aim of achieving the best practice, making sure what is done is right, complying with correct procedures, improving performance and risk management and safeguarding the health and safety of both staff and the public. In relation to structures the QCM system is designed to ensure that they are safe, meeting all legal and operating



*Major Jones bridge was load tested by filling a large rubber bladder with water.*





*The bridge under a three tonne load.*

requirements, and provide a range of recreational opportunities. There are 17 structures in the fishery area included in the QCM system. They range from bridges to boardwalks and retaining walls and QCM requires a baseline inspection of all, followed by regular re-inspection by external engineers.

Inspections usually involve some form of testing. The two largest structures, suspension foot bridges across the Tongariro River at the Red Hut and Major Jones pools, were tested recently by laying large butyl rubber bladders out on the decking, pumping water into them and measuring the movement of the suspension wires. Both bridges took more than 3000l (i.e. more than three tonnes) before the wires moved the predetermined 2 to 3mm, thus proving an adequate safety margin for their 10-person maximum rating and giving added confidence to Department staff.

Enquiries and occasional complaints about loose nails, nuts, boards and wires, etc., show us that some members of the public at least are still wary about Department of Conservation structures. The QCM system ensures that our bridges, landings, walkways, etc., are safe and, as people become more aware of it, will assure the public that there is no danger at the recommended loadings.



For the 1998/99 fishing season we have produced a commemorative licence celebrating the centenary of the introduction of rainbow trout to the Taupo fishery. This souvenir licence is likely to become a collector's item as it will only be available for this season. The licences will be available from all sales outlets from the last week of June, and licence prices remain the same as the current season. Please remember when purchasing your licence to print your name and full address (not your holiday home address).

### **Target Taupo Mailout**

There appears to be some confusion over the receipt of *Target Taupo* each year. It is only mailed to those anglers who have purchased an Adult Season licence in the previous season. This *Target Taupo*, issue 28, is sent to you at the address on your 1997/98 licence, and you will receive another two in November and March. The licence you purchase for 1998/99 will in turn cover your three issues which will be sent to you beginning in July 1999.

### **Children's Fishing - National Trout Centre**

Kids' weekend open fishing days at the National Trout Centre, organised by Bill Colston and run by Tongariro and Lake Taupo Angling Club (TALTAC) volunteers, have reached all-time lows in attendance figures this year. The May and June turnouts of 88 and 85 respectively are the lowest for full days since the first one in May 1983. Is trout fishing becoming less popular among today's youngsters? We think not; certainly not, judging by the reactions of those who came. A more likely explanation is that there has been less promotion and advertising of the occasions in response to a fall in numbers of volunteer helpers over the last two to three years. Bill has sought help through local newspapers and TALTAC newsletters but only a few new faces have joined the band. Recently Department of Conservation has rostered more staff to help out but we would be very sparse on the grass if attendance were to reach the 400 to 500 or more of earlier years.

If you want to help, telephone Errol Cudby on (07) 386 9269 at work (leave a message) or Bill Colston at home on (07) 386 7484.

Next open fishing days this year are 12 July, 16 August and 27 September.

Over the past few years schools visiting the National Trout Centre have sought to participate in a fishing experience and DOC staff, assisted by a small band of volunteers, have obliged. These fishing tours have proven very popular; one school wrote to say that their students had rated it the best of their week's activities in the area - ahead of visits to Whakapapa, the Tokaanu hot pools, kayaking and the Otorohanga kiwi house. Numbers have increased to rival the 1500 to 2000 who would have attended the five children's open days in past years. Now with fewer attending the open days, school children outnumber them by far.

This year the children's pond was emptied and re-stocked with trout in March instead of the previous December as occurred in past years. Seven schools totalling over 300 students took advantage of this during February and March and by the time this edition of *Target Taupo* is printed nearly 20 schools will have visited and received instruction in the noble art of fly fishing, fishery management and trout ecology.

The increasing popularity of the fishing tours and the recent departmental restructure have forced a few changes to the rules:

- only two fishing days per week
- 10.30 a.m.. or 1.30 p.m. starts
- no more than 60 children
- seven years and older.

Bookings should be made with Shirley Oates, telephone (07) 396 9243. We believe that this makes best use of our resources and also provides a worthwhile educational experience for visiting students in accordance with the management objectives for the National Trout Centre.

### **Honorary Warranted Officers**

Honorary Warranted Officers (HWOs) have been assisting with conservation projects for many years. In 1987 the New Zealand Forest Service, Wildlife Service and the Lands and Survey Department amalgamated to form one department, the Department of Conservation.

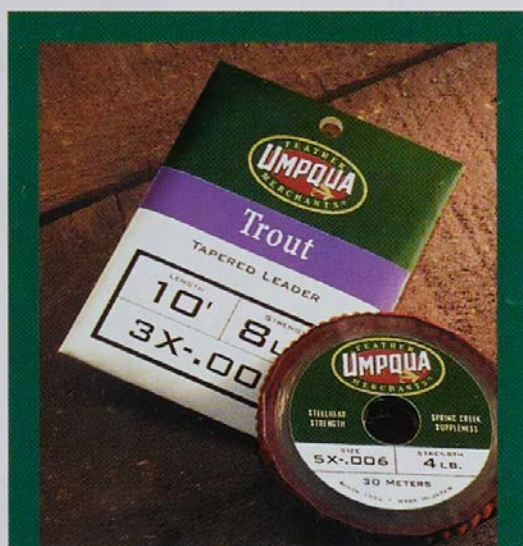
The honorary rangers from these former departments were automatically adopted by the Department of Conservation. Shortly

after, in 1990, a further change was made to the Department. The day-to-day management of the sports fisheries (except the Taupo Fishing District) and gamebirds in this area became the responsibility of fish and game councils. Once again the honorary management structure was changed. The decision whether to remain an honorary to work for the Department or fish and game councils, or in fact work for both, was left up to the individual. These choices, along with the changes to legislation, have prompted this conservancy to take a closer look at the management of the HWO system.

The changes also meant that past training was not adequate for the amount of expertise required for the job.

The conservancy's objective is to design and facilitate training for HWOs and to ensure that they meet the minimum required standards for compliance and law enforcement in the field. New applicants are now required to complete an application assessment and undertake a probationary period of 12 months, during which time they must complete basic field training. After completion of the probation period and field training the applicant will be assessed and if accepted, a warrant will be issued.

Once warranted, HWOs are required to attend regular training courses throughout each year and undertake a minimum amount of field activity.



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## Compliance and Law Enforcement Update

With the onset of winter, staff have been active interviewing river anglers, patrolling spawning areas and checking key locations at night to protect the fishery. After many hundreds of angler interviews conducted so far, it is pleasing to note that general compliance with the fishing regulations is excellent, with an offence detection rate of less than 1%. Following a

*Nets can do a lot of damage in a short space of time. Conservation Officer Roy Baker with the 21 trout and a gill net seized from five offenders who were successfully apprehended*



number of complaints from Waitahanui anglers, a planned operation was conducted in the vicinity of the State Highway 1 bridge at Waitahanui. This resulted in five individuals being apprehended, all for fishing with illegal lures. The quality of the fish this winter has already attracted the unwanted attentions of serious poachers. Staff have been monitoring traditional poaching locations both night and day on a regular basis. In this way evidence of illegal activity can be detected almost as soon as it starts occurring and appropriate action taken to apprehend the culprits. These people primarily use gill nets in the lake and rivers and these nets can do a lot of damage in a short space of time. Fisheries staff recently successfully apprehended three offenders netting in the lake and in a separate incident five offenders were caught with a net and 21 prime fish in a Taupo spawning stream. Our surveillance and enforcement effort will continue - watch this space!!

### Fishery Duty Officer

As part of the process of continuous improvement following the recent departmental restructuring, the Taupo Fishery Area has introduced a duty officer roster system to respond to urgent after-



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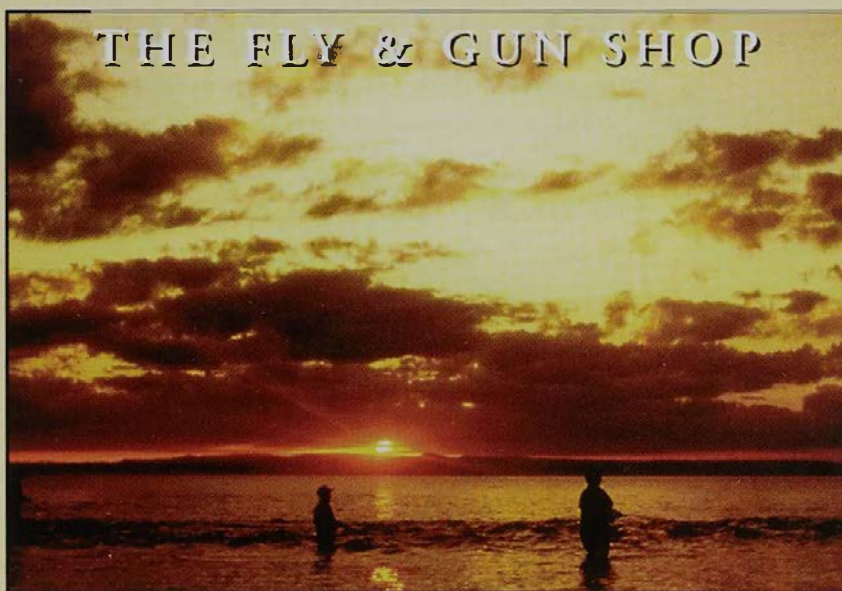
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hours enquiries. The Tongariro/Taupo conservancy already operates a duty officer system to deal with general conservation enquiries and emergencies such as fire reports, search and rescue and safety issues. Contact is made by ringing the Turangi office number (07-386 8607) any time. After hours the call is automatically transferred to the rostered duty officer. In future, urgent fishery calls, e.g. poaching reports, trout stranding, licensing issues, etc., can be made to the same number. The conservancy duty officer will pass on the information and the Fishery duty officer will take appropriate action. If using this service, please ensure you provide full information about the matter of concern including your contact phone number in case follow-up is necessary. It is especially important to report offences promptly to increase the ability to apprehend offenders. Vital information includes location, physical descriptions of offenders, vehicle or boat

## Hard at work in Taupo . . .



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descriptions and registration numbers or names. Confidentiality of any information supplied is guaranteed.

### **Commercial Fish Smoking and Freezing**

Anglers are reminded that there is a section in the Taupo Fishing Regulations 1984 governing the commercial smoking and freezing of trout. These regulations place specific requirements on managers of commercial smokehouses, and on anglers who deposit fish at these smokehouses for processing or in commercial freezers for storage.

In summary:

A register must be kept on the premises recording:

- (a) the date and time of deposit of the fish
- (b) the number of fish
- (c) the total weight of fish
- (d) the number and type of licence (if any) of the owner of the fish
- (e) the address (if any) to which the fish are to be forwarded.

Anglers must therefore be prepared to supply this information when they deposit their fish.

The fish and register must be able to be inspected at the smoking facility by warranted conservation officers at any reasonable time.

The fish are not allowed to be stored at a commercial smokehouse unless they bear the name and address of the owner and the date on which they were deposited at the facility.

People are not allowed to give, and smokehouse managers are not allowed to receive, any trout in exchange or as partial or full consideration for storing, preserving or treating trout.

No one individual can deposit and no smokehouse manager can receive from an individual, any trout if that individual already has an aggregate weight of 23kg stored on the premises.

No one person shall on any one day deposit at any commercial smokehouse any trout in excess of the daily bag limit which is currently three fish.

Full copies of the Taupo Fishing Regulations 1984 are available from the Taupo and Turangi offices of the Department at a price of \$2.50 each.

# Bitz 'n' Pieces

## Winter Possum Control

All areas where toxins will be present in the Tongariro/Taupo conservancy through winter 1998 are shown on the map on page 59. Details of these operations are as follows:

**1080 Poisoned baits** have been or will be laid to kill possums at several locations on conservation lands through the autumn and winter. These include:

- Along the northern boundary of Erua Forest in the upper Kaitieke Valley. This involved aurally distributed 1080 carrot baits in late June. The operation is part of Manawatu/Wanganui Regional Council operations on behalf of the Animal Health Board.
- The following Scenic Reserves were treated by Manawatu/Wanganui Regional Council staff with hand and/or bait station distributed 1080 baits around the reserve boundaries: Raurimu, Mangatepuhi, and Raurimu Spiral Scenic Reserves.
- The pine forest along the eastern boundary of the Tongariro National Park, Mount Pihanga Block. This involved 1080 carrot baits distributed by aircraft during late June and is part of Environment Waikato operations on behalf of the Animal Health Board.
- The Tongariro Delta/southern Lake Taupo wetland. This will involve aurally distributed 1080 carrots in late August. The operation is targeting Tb possums living in the wetland which have been subject to intensive ground control since 1992 but which continue to occur in numbers which allow Tb to persist in both the possum population and local cattle herds.

**Brodifacoum 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 occurred. This bait is laid in bait stations but pigs may get access to bait either directly out of bait stations or by consuming rat or possum carcasses that have died from eating bait. The Department of Conservation recommends that hunters do not eat any pork that may have been taken from the following areas:

- In the vicinity of the Whakapapa Village and Ohakune Mountain Road/ Raetihi Hill within Tongariro National Park
- Rangataua Forest around Rotokura and Dry Lake and on the lower lava flow east of the lakes
- The upper Waione Valley of Tongariro Forest
- Around extensive areas of Erua Forest south of Erua Road
- Opepe Scenic Reserve
- Tirohanga Scenic Reserve
- Pakuri Scenic Reserve
- Ohakune Lakes Scenic Reserve
- Ohinetonga Scenic Reserve
- Whakapapa Gorge Scenic Reserve and the adjoining north-western boundary of Tongariro Forest
- Kaiapo Bay Scenic Reserve on the northern lake shore;.

**All poisoned areas are well sign-posted - please do not remove signs.**

### **Lodgepole Pine (*Pinus contorta*)**

*by Kevin Loe,  
Environment Waikato*

People travelling across the Desert Road on their way to and from the Taupo region may have noticed the presence of small pine trees growing amongst the tussock. These seedlings are of *Pinus contorta*, an aggressive weed species that was brought to New Zealand around the turn of the century as part of the attempt to establish our exotic forest industry. What travellers probably don't notice is the ongoing battle by various agencies to prevent this species from getting a hold on our alpine landscape, and changing it forever.

*Pinus contorta* is native to western North America and exists from Baja California to the Yukon and from sea level to over 3500m in the Rocky Mountains. In New Zealand it has spread from plantings established in the Karioi Forest during the 1920s, and by the early 1970s *Pinus contorta* was becoming a serious concern within the Tongariro National Park. It took several years of lobbying to finally get the various government agencies to agree that *Pinus contorta* did pose a real threat to the National Park, the Army training ground and, in fact, all the alpine areas in this vicinity.

The battle to get *Pinus contorta* under control has seen it burned,

*A single tree in the middle of nowhere but if left for several years the start of a contorta forest.*



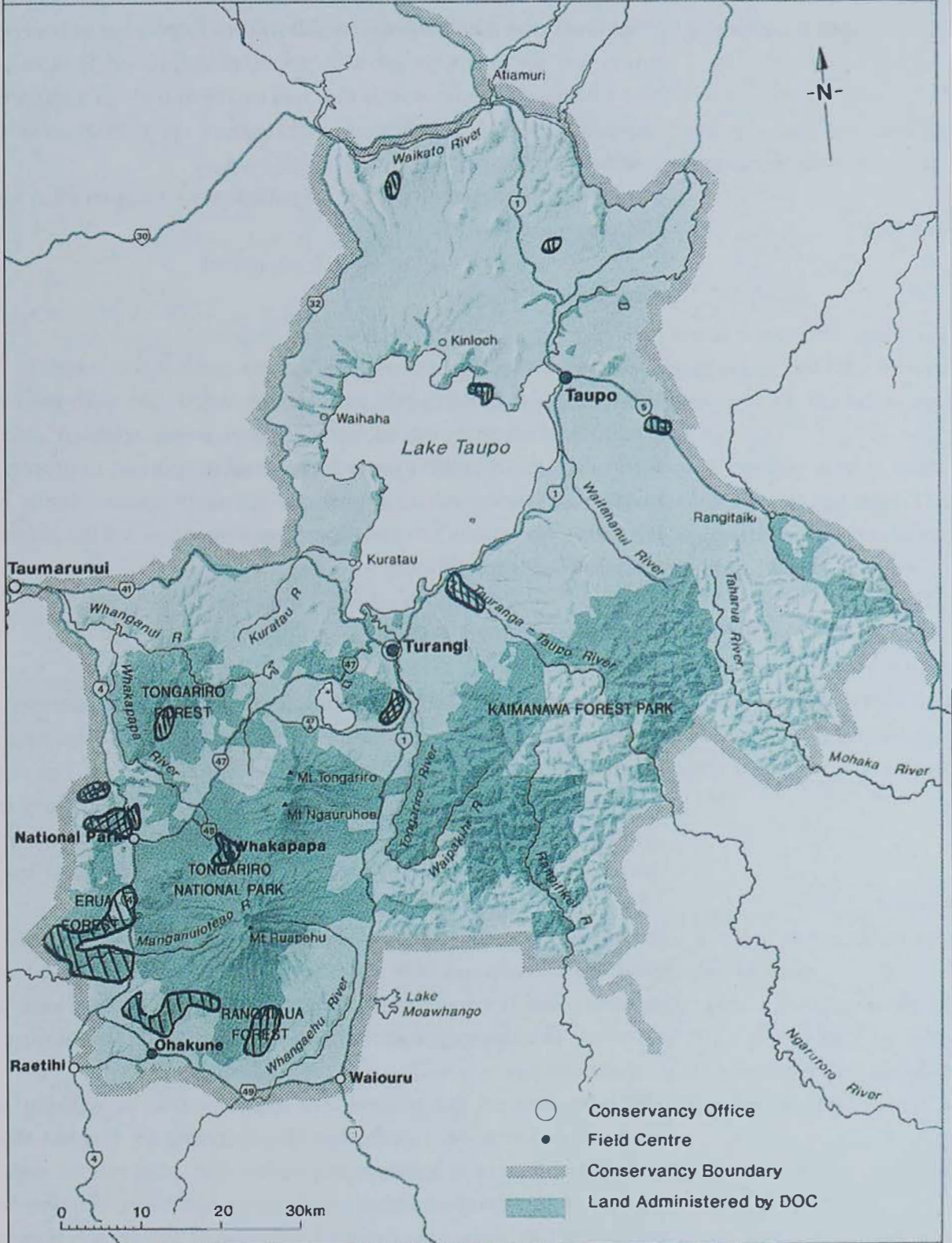
sprayed, crushed, poisoned, pulled out and cut down. Controlling *Pinus contorta* within public conservation land and some neighbouring alpine blocks consumes a big part of the Department's weed control budget each year. As most of this work is in steep terrain, it is undertaken by a group of up to 10 people ferried by helicopter. Crews using scrub bars are employed by the Ministry of Defence to control *Pinus contorta* adjacent to the Desert Road, while specialist abseilers are used to remove it from the gorges of the upper Moawhango River.



In order that the seed source is eliminated, each block of land which has *Pinus contorta* on it receives a working over every three to four years in an effort to remove any trees and ensure they don't reach a cone producing age (six to eight years).

Public using conservation land are encouraged to pull out any *Pinus contorta* they see! If the tree is too large to pull out, ring barking with a knife at ground level will kill it. The cut has to be deep and should be made through the orange-brown bark layer to the white wood. Alternatively, people noting *Pinus contorta* in the Kaimanawa and Kaweka ranges and the Tongariro National Park can inform the Turangi DOC office of their location.

The regional councils in this area have all declared the pine a total control plant pest in their relevant pest management strategies and are working with landowners and forest companies to prevent its

# Land Administered by Department of Conservation



 = Brodifacoum Poison } Winter  
 = 1080 poison } 1998

further spread. Environment Waikato has also funded control operations on a few sites in order to remove the seed source.

The threat posed by *Pinus contorta* to these alpine areas is very real when you see seedlings growing above the Turoa ski field car park and witness the dense stands that will establish if given a chance. On Mount Ruapehu it has the potential to grow up to 2200m, which is 800m above the tree line.

This is one living tree that the Department of Conservation would like to see cut down!!

### **Dog Policy Update**

There is nothing further to report on this issue at this stage.

Hunters in Tongariro Forest area are reminded that, with increasing numbers of captive reared juvenile kiwi being released into the forest, dog control will become increasingly important to protect this investment. Young released kiwi are regularly tracked (with radio telemetry equipment) to roosting sites sometimes within metres of roads and tracks within the forest.

### **Deer Discussion Paper**

On 18 December 1997 the Minister of Conservation released the public discussion paper "Issues and Options for Managing the Impacts of Deer on Native Forests and Other Ecosystems". The release followed a year of meetings and discussions by a working party made up of a number of groups and organisations with an interest in the deer issue, convened by the Department of Conservation in January 1997.

Submissions on the discussion paper closed on 2 March 1998. All submissions received have now been independently analysed and a summary has been prepared. In excess of 2000 submissions were received. The analysis document is currently with the Minister of Conservation.

The next stage of the process is a second round of working party meetings to formulate a draft plan. The timetable for this has slipped slightly and it is now anticipated that the draft plan will be with the Minister of Conservation for his consideration later this year before being released to the public for a further round of submissions. It is hoped the

final plan will be adopted by the Minister late this year or early next.

### **Umukarikari Tb Prevalence in Deer - Landcare Research Study**

The final report for this study has not yet been received but will be published in a further issue of *Target Taupo* as soon as it becomes available.

### **Deformed Red Stag Antlers**

In April this year, local Turangi hunter Don Boyes found the complete skeleton of a large red stag. The antlers of this stag, while not long or well developed, were incredibly exaggerated in terms of their thickness and extremely heavy as shown in the photo on page 62.

Investigations revealed it is a condition known as “peruke” which, while common in roe deer, white tail and mule deer, is rare in red deer. The condition is a result of abnormal changes in testosterone levels during velvet growth, often caused by testicle damage, which results in uncontrolled antler formation.

A branch fell across the antlers of this stag while it was still reasonably fresh. The decay process of the branch has eaten away the antler where the branch was lying before the remainder of the soft antler calcified and hardened. The stag was a large, mature (five to six years old) animal and the cause of death is unknown, but we are sure you will agree, it is a most unusual head!!

### **Heli-Sika Hunting Competition**

There were 51 entrants in this year’s sika deer hunting competition and 19 entrants in the red deer section, held on Sunday, 14 June.

The top sika head was shot by Lance Keightly with a Douglas score of 189.3 point, although a larger head measuring 191.7 points shot by John Kovacs was entered but was not eligible because the lower jaw was not supplied. Although John didn’t take the top prize he picked up a consolation prize.

Hopefully all the entrants next year will supply the bottom jaw as these are used for valuable data collection on the sika herd.

One lucky hunter from Denmark, Christian Justesan, shot the second best

*Conservation Officer Tom May holds the head displaying the condition “peruke”*



head as well as taking the prize for judges choice.

This year was the first year red deer were able to be entered in the competition, the top head being shot by Neil Stewart with a Douglas score of 297.5 points.

Despite the sponsors of the archery and black powder sections putting up valuable prizes, including three hunting bows, there were no entries in either section. Hopefully there will be some entries next year.

The new venue at the Great Lake Centre in Taupo proved to be very popular with both the trade exhibitors and the public alike.

There were around 1000 people at this year’s competition and trade show with a welcome increase in families attending. The continued

*Table 7*

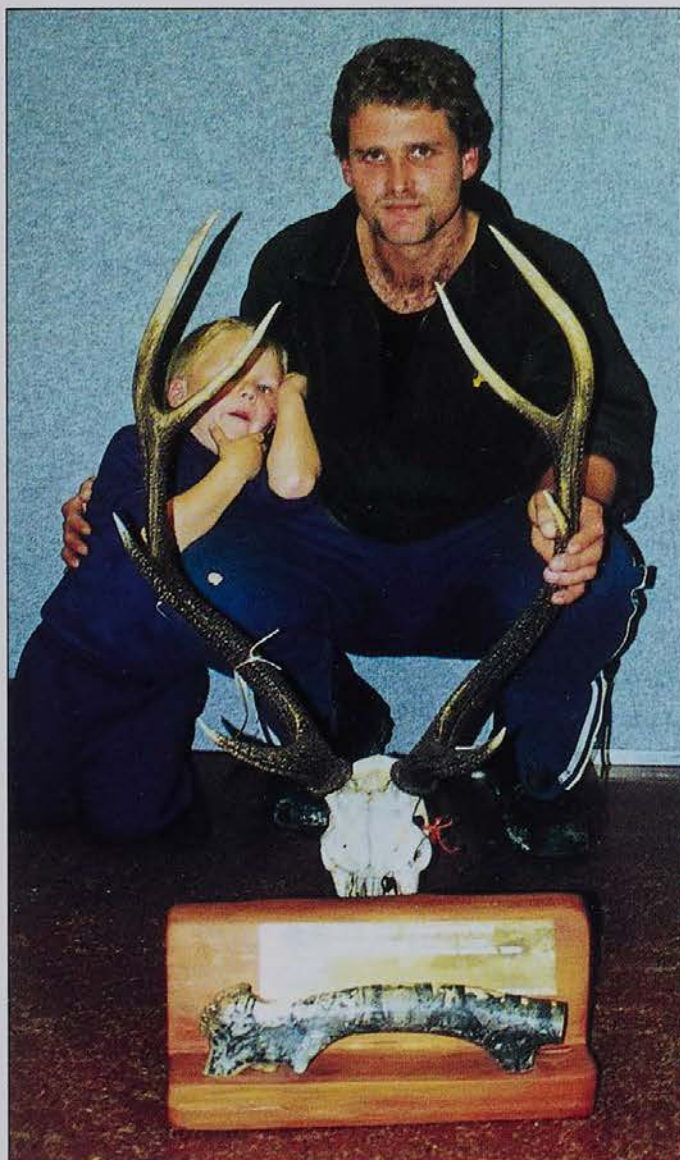
Sika Deer		Red Deer	
Name	Douglas score	Name	Douglas score
Lance Keightly	189.3	Neil Stewart	297.5
Christian Justesan	186.6	Philip Budd	293.1
Adrian Livesey	182.6	Greg Hallett	275.1
George McCreadie	177.7	Mark Poole	270.3
Paul Monteperto	168.7	Peter Proctor	264.7



support from hunters and sponsors involved in the competition will assure next year's event will be even bigger and better.

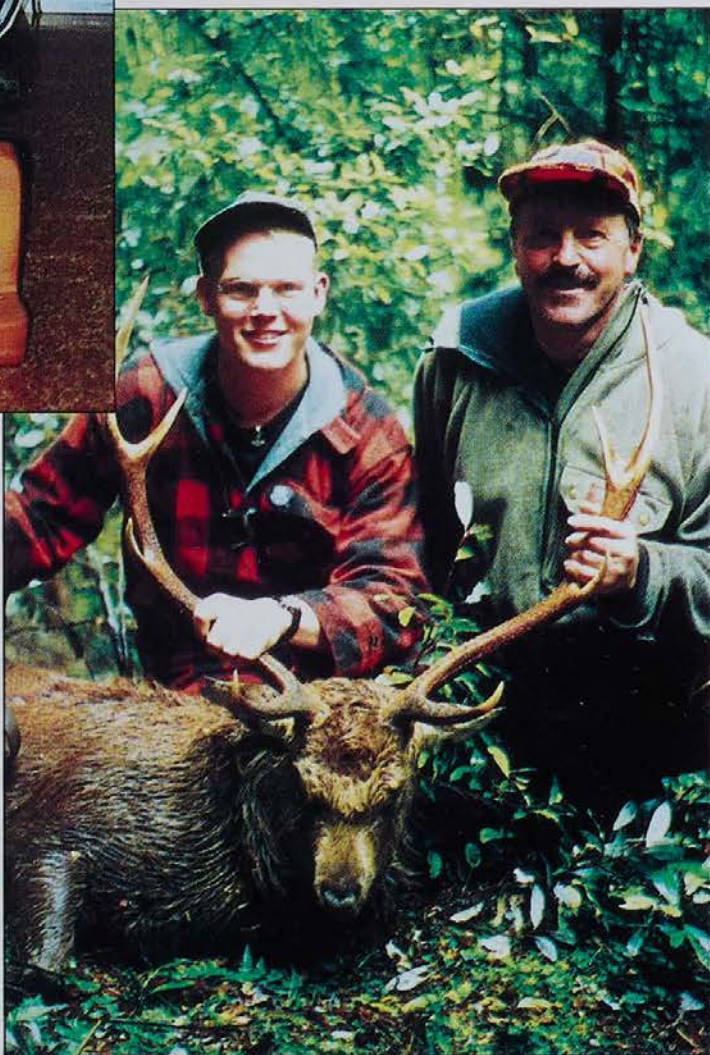
Entrants who supplied jaws for analysis will receive the information in due course.

A full report on this year's competition will be posted on the Hunters' and Habitats' website, [www.customcartridges.co.nz](http://www.customcartridges.co.nz), over the next couple of weeks.



*Lance Keightly with his winning sika head*

*With hunting guide Chris White, Christian Justesan (left) from Denmark, shows off the second best head in the competition.*



# Autumn Hunting Summary

*by Cam Speedy*

A long warm autumn, in fact the warmest average autumn temperatures for 60 years, was the result of the continuing El Nino weather pattern in the central North Island this year. The impact on hunting was to restrict the serious rutting activity, and therefore roaring activity, to days on which the hinds were actually cycling. Generally it was hard to pick the right day, the noise was often all over shortly after dawn, and most hunters left their hunting blocks wondering whether there was still something more to come. This held true for both the red deer and sika deer blocks this year, which is not to say there were not plenty of stags shot, they just didn't seem to make a lot of noise in most places.

Hunting activity was at its usual peak levels for this most popular and busy time of the year. Tongariro Forest had its fair share of pressure and a number of very good red deer heads were taken. Clements Road had 35 to 50 cars most weekends and the car parks of the air transport companies were full for the whole period.

Red deer numbers in the Kaimanawa Range continue to be at low levels and the red deer roar was generally very poor. The Otamateanui was probably the best of the Kaimanawa red deer blocks. In contrast the Ahimanawa red deer roar was better than average and some good success was enjoyed by Heli-Sika clients in their private blocks during early April.

Sika hunting activity (and success) seemed to peak between 22 and 26 April with the majority of autumn stag jaws received taken over this period. However, some good May hunting was enjoyed by those who delayed their 1998 trip and the characteristic rutting vocalisation was still a regular sound in the eastern ranges well into June. Rutting activity depended on where you went rather than when you went this year. Reports from hunters hunting the same weekend but in different areas were wildly contrasting, some reporting a great trip with others very disappointed. Habitat quality, deer density and deer condition, especially the condition of breeding hinds, all have an important influence on the rut (see article on The Importance of Habitat in this issue). Hunters need to consider all these issues, not just timing, when assessing the reasons for the rutting activity on the blocks they visited.

Fewer than 200 hunting diaries had been received by the time editorial was required for this issue of *Target Taupo* so no analysis of the data has taken place to date. Once a larger sample has been received the autumn data will be processed and reported in subsequent issues. If you have an old diary lying around, please send it in. It is also important for all Kaweka hunters to provide data to allow the new management regime put in place this year to be adequately assessed.

Data from the whole of 1997 is now available thanks to a big rush of diaries received during autumn as hunters renewed their permits for the roar. This data is presented in Table 8. The most telling figures from the table are the reduced kill rates for 1997 and the significant reduction in the number of successful hunters, down to 19.9% of permit holders, which is the lowest ever recorded. Deer kills per 1000 hunting days are down for both sika and red deer and reflect the herd reductions caused by recent possum control operations and the intense hunting pressure this in turn has caused at sites which have not been subject to possum control. While there are still higher kill rates being achieved in the back country, the front country where a larger proportion of the hunting effort occurs continues to be hard for all but hunters who have local knowledge. Goat kill rates by recreational hunters continue to fall, reflecting the impact Department of Conservation control operations have had on goat populations in the conservancy. Pig populations, however, fluctuate more as a result of environmental conditions than hunting pressure. Most pigs shot on conservation land within the conservancy are a by-kill of deer hunting rather than the result of targeted pig hunting.

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

- Ammo from the  
NZ Ammunition Co Ltd .....Bruce Annan, Waiuku
- Neil Philpott's new video .....B Cruickshank, Taupiri
- Helicopter transport from  
Lakeland Helicopters.....J Cocker, Port Ohope
- Air transport from  
Air Charter, Taupo .....R McDonald, Tokaanu
- "Stoney Creek" Hunting Gear .....J Davidson, New Plymouth
- Sports goods from the  
Fly & Gun Shop, Taupo .....Tim Catford, Warkworth \*

**Table 8: Recreational Hunting Statistics - Tongariro/Taupo Conservancy 1990-1997**

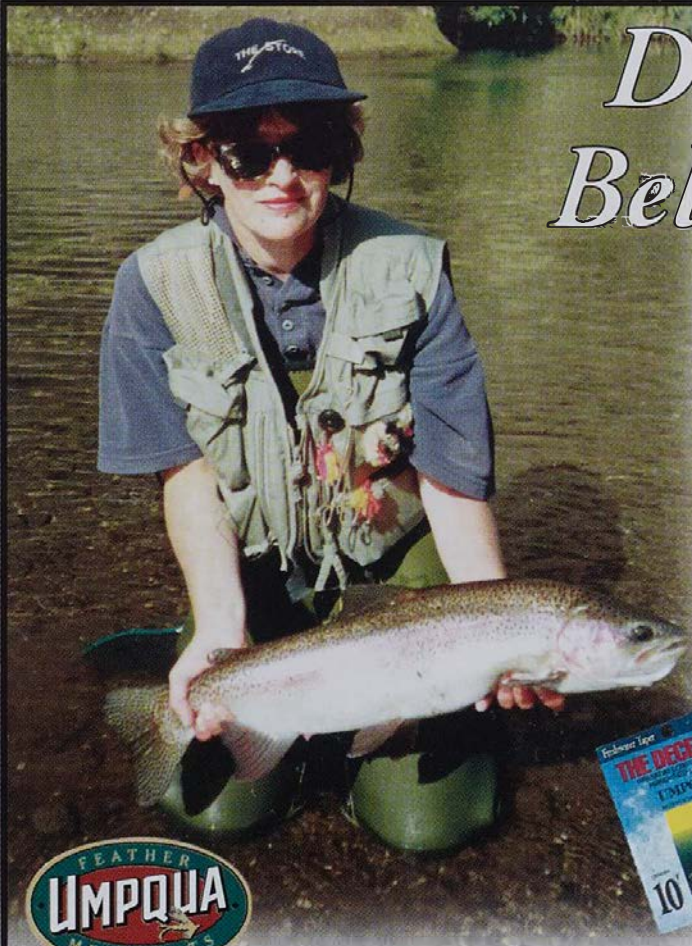
Area Hunted	Year	Days of Hunting Reported	Proportion of total Specified Hunting Effort	KILLS				CPUE*
				Sika Deer	Red Deer	Pig	Goat	
			%					Kills/Day
Kaimanawa RHA	1990	2376.5	34.3	388	23	3	-	0.17
	1991	2431.0	37.8	404	27	4	-	0.18
	1992	1923.5	35.0	318	27	10	-	0.18
	1993	1886.5	35.9	300	8	5	-	0.17
	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	
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	189	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	
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	
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	61	0.34
	1995	514.0	12.4	1	99	3	72	0.34
	1996	280.0	9.4	-	53	2	16	0.25
1997	251.5	7.0	-	51	3	16	0.28	
Erua Forest	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	-	37	0.53
	1995	97.5	2.3	2	42	-	47	0.93
	1996	65.5	2.2	-	25	4	33	0.95
1997	66.5	1.9	-	15	1	8	0.36	
Rangitaiki Forest	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	
Unspecified Returns	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	
TOTALS	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	
Conservancy Totals Corrected per 1000 days hunting effort	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	-	

\* CPUE = Catch per unit effort (that is, kills per day hunted)

	1990	1991	1992	1993	1994	1995	1996	1997
- No. of 4-month hunting permits issued	6,865	7,033	6,668	6,344	7,237	6,641	6,813	7,087
- Average return rate (% of issues)	31.6%	30.8%	29.0%	26.5%	23.1%	19.8%	15.6%	16.7%
- Proportion of successful hunters	38.4%	33.9%	33.9%	35.4%	31.8%	31.1%	36.4%	19.9%

(\* If anyone knows Tim, can they please get him to get in touch with us. He appears to have shifted since his last hunting permit.)



Winners of the autumn prize draw will be drawn and notified later this winter. Get out and enjoy the winter hunting and don't forget to get those diaries in!



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# Team Profile

*Luigi Zuccati*

Previous contract employment with the Department of Conservation taught Luigi many of the skills he required to begin his current position of working a fish trap.

Born and bred in Turangi, he has had the opportunity to enjoy a wide range of outdoor activities. Hunting and fishing are his main spare-time sports. Having travelled overseas and recently purchased and renovated a home in Turangi, Luigi's ambition is to have a secure career.

"Working with the fisheries management team is something I really enjoy and I am hoping to work with them again on a more permanent arrangement," Luigi says.

Luigi's first few weeks with the fishery team were a disappointment for him with little to do while he was operating the trap. However, regular rain over recent weeks has meant numerous long nights and the novelty of handling and processing a pen full of fish is wearing thin.



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