

# TARGET TAUPO

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

Department of Conservation  
Tongariro Area Office  
Taupo Conservancy

MARCH 2004, ISSUE 45



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# TARGET TAUPO

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

MARCH 2004, ISSUE 45

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*Photo: Rob Kirkwood.*

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# RADIO TRACKING trout in the Tongariro River

WHAT DID WE LEARN?

by Mark Venman and Dr  
Michel Medual  
Mark is our Technical  
Support Officer and  
Michel is the Fishery Area  
Scientist

In issues 43 & 44 of Target Tempo we described the radio tagging experiment that we were undertaking over the winter months of 2003. A total of 108 rainbow trout were captured and surgically implanted with radio transmitters before being released to allow us to follow their spawning journeys up the Tongariro River. A similar experiment was conducted during 1995 which showed the movements and habitats of rainbow trout during that particular year.

In general, studies are carried out on a single occasion to answer questions. However, fish behaviour in the river can be controlled by a range of factors that may change over time. In the seven years that followed our first experiment, the river changed substantially as a consequence of the 1995 and 1996 eruptions of Mount Ruapehu and the July 1998 floods. It is interesting to compare the data from 1995 with that from 2003 to see whether these changes have affected trout, particularly in terms of their preferred spawning sites.

We were able to follow 92 of our tagged trout as they journeyed through the Tongariro River before tracking ceased on the 17th of November 2003. Another 10 fish were found elsewhere in the fishery while six were never located at all. Sixteen of the fish were caught by anglers who returned the transmitters. All of these fish were caught in the Tongariro River, unlike 1995 when some tagged fish were caught in the lake after successfully completing their spawning runs.

During the seven month study period, we were able to determine more than 800 fish

locations (Fig 1). In this article we will attempt to compare the results from both years to see if any differences or similarities are evident. These results help increase our understanding of the spawning migrations of rainbow trout and should also assist anglers improve their success on the rivers this coming winter.

## Where in the river do trout spawn?

For the purposes of this experiment and to allow comparisons to be made with 1995, the Tongariro was split into four different reaches:

- Top - Pounj intake to the Fence Pool (10.5km)
- Upper - Fence Pool to the Breakaway Pool (2.25km)
- Middle - Breakaway Pool to the Highway Bridge (7.75km)
- Lower - Highway Bridge to Delatours Pool (6.45km)

When trout remained in one location for more than three weeks we assumed that they were spawning. Overall, the spawning locations of 34 rainbow trout were determined between May and November and the preferred spawning areas of radio tagged trout are shown in Table 1 along with data from 1995. These figures indicate that spawning occurred throughout the whole river from Delatours Pool to well above the winter fishing limit as was the case in 1995. However, it is interesting to note that there were differences in the zones favoured by spawning fish. For example, there was a decrease in the popularity of both the top and upper sections for spawning fish

Table 1: Spawning areas of radio tagged trout throughout the Tongariro River identified between May and November 2003 and June to November 1995

River section	Percentage (and number) of spawning fish	
	2003	1995
Top	20% (6)	28% (11)
Upper	13% (4)	25% (10)
Middle	43% (13)	20% (8)
Lower	23% (7)	28% (11)

combined with a slight decrease in the lower section during 2003. However, the middle section of river more than doubled in popularity since 1995 and was clearly the preferred section of river for spawning rainbow trout in 2003. By contrast in 1995, the middle section of the river was the least preferred section of

river for spawning fish. While the top section of the Tongariro River was not particularly favoured during 2003 many trout utilised tributaries such as the Whiti kau and the Waipa Streams which

flow into this section of the river. A total of nine fish were caught passing through the Waipa trap (21% of all fish tagged at the Fence Pool) emphasising the importance of this spawning tributary for fish that make it as far upstream as this.

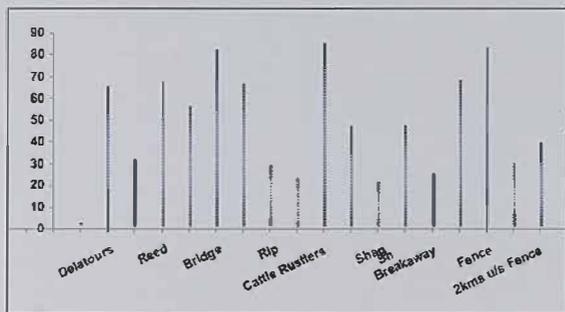
It is now accepted in scientific literature that the choice of habitat by fish for spawning is mainly dictated by the current

*However, the middle section of river more than doubled in popularity since 1995 and was clearly the preferred section of river for spawning rainbow trout in 2003*

observed during 1995 when small floods were efficient at encouraging fish to move early in the run. Only one fish tagged at the Tongariro Delta made it to the Waipa trap and this fish took

just 16 days to travel the approximately 24 kilometres, an average rate of 1.5 kilometres per day. However, this was exceptionally fast as the average time for fish to travel from the Tongariro Delta to the Fence Pool (18 kilometres upstream) was 67 days, or 270 metres per day. This is a slower average speed than the 41 days calculated during 1995, and could possibly be due to changes in the river or the low rainfall and therefore more stable flows during 2003. Overall, 2003 lacked many of the freshes (small floods) that stimulated fish movement during 1995, especially at the beginning of the study period. The average time for fish to travel from the Fence Pool to the Waipa trap (distance of approximately 6 kilometres) was 41 days with an average rate of movement of just 150 metres per day. However, the daily movements of these trout were highly variable. Some fish might not move much over a couple of days before moving a reasonable distance in just one day.

Figure 1: Distribution of fish locations along the Tongariro River by fishing pool



that flows up or down through the gravel where the eggs incubate. Clearly the big ash inputs from the Mōmū Ruapehu eruptions and subsequent big floods during 1998 and 2000 altered the distribution and characteristics of the gravel through the river and perhaps this explains the altered spawning preferences.

On a smaller scale it is interesting to note how some pools were much more favoured by our tagged fish than others. Figure 1 highlights that the Bridge, Cattle Rustlers and Fence pools regularly held tagged fish.

### How quickly do trout move through the river?

Fish tagged at the Delta at the end of April

### Spawning behaviour

The experiment conducted during 1995 showed that rainbow trout follow a hierarchical system with some fish being dominant and others submissive. This has consequences in terms of who gets the best partners and spawning sites. This pecking order was also observed during 2003 with dominant fish fighting off other males while mating with suitable females. The fish shown in Figure 2 was a male rainbow trout, 555mm in length of unknown maturity. This fish moved quite quickly upstream after being tagged and took just 9 days to travel the 10 kilometres from the Delta to the Rain Pool where he remained for 2 weeks. Over the

next 7 days he then moved to the Breakaway Pool (9 kilometres upstream) where he remained for 42 days while he spawned. This fish then rapidly headed back downstream only to then stop at the Reed Pool for another 47 days where we assume he spawned for a second time with a different group of females before finally dropping back to recover in the lake. The slight movement upstream around the 15th of October coincided with receding water levels after a fresh, although this male dropped back again to the Reed Pool shortly afterwards.

This type of behaviour is consistent with a dominant male as he was capable of fighting off other males at two separate locations for a period of more than one month at each site while presumably mating with suitable females. It is likely that after initially spawning at the Breakaway Pool this male was heading downstream towards the lake before being stimulated to spawn again by encountering another group of fresh females in the lower river at the Reed Pool. The condition of this fish after spawning twice and defending his territories for almost three months would be poor, to say the least. It is interesting to note that this fish had a

*It is interesting to note that this fish had a look at the lower river for approximately two weeks before deciding to move further upstream and spawn at the Breakaway Pool*

spawned there), there were more dominant males in that area when he first arrived or fewer females. Due to the fact that this male stayed for two weeks it is likely that he was ousted from this spot by a more dominant male and forced to move further upstream. During 1995, it was found that every fresh that occurred in the river induced an increase in average daily movement rates and that movement tended to occur both as the river was rising and receding. This pattern also occurred during 2003 and is

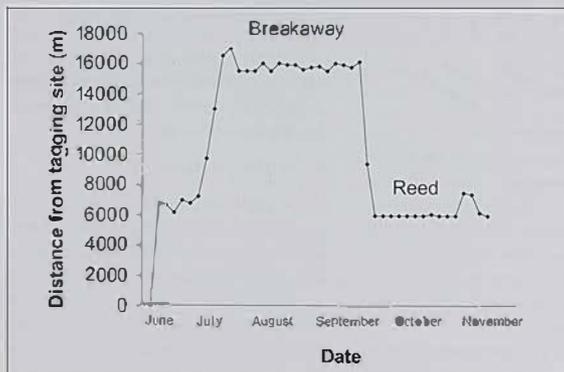
well illustrated in Figures 3 & 4. These show the migration patterns of seven fish which passed through the Waipa trap along with daily mean flows for the Tongariro River over the same period. It is interesting to note that six of these fish were hanging around the Fence Pool during the settled conditions which preceded 15th September. Regular heavy rain over the following month then stimulated these fish to move to their desired spawning sites in the Waipa Stream.

#### When do fish move?

Tracking fish movements manually by walking the banks of the Tongariro River several times a week allows us to see where, and by how much, a fish moves between successive tracking days, but we cannot tell what time of day the fish moves. However using data from the automatic logger located near the mouth of the Waipa Stream helps us to determine this, as this logger records the time that a tagged fish was detected for the first time.

These times were plotted for 16 different fish over three months and are shown in Figure 5. No fish arrived at the logger between midnight and 4am with most of the morning movement occurring between 4am and 8am. Overall only 25% of the fish recorded arrived at the logger between midnight and midday. The remaining 75% arrived between midday and midnight with the majority (37.5%) arriving at the logger between 4pm and 8pm. This same data was also used to see whether movement varied with the amount of daylight hours. For example, do fish change when they move in relation to day length? We used the data from ten tagged fish to try and answer this

Figure 2: Spawning migration of a rainbow trout (555mm) in the Tongariro River during 2003



look at the lower river for approximately two weeks before deciding to move further upstream and spawn at the Breakaway Pool, and then returning once again to the lower river to also spawn there. Perhaps while spawning conditions were good in the lower river (at least seven radio tagged fish

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question and discovered that when daylight hours are low (10hrs 30mins during August) fish would begin arriving late in the morning at 11.50am and continue arriving until 90 minutes after sunset. However, when daylight hours were longer (13hrs 6mins during October) fish tended to arrive at the logger much earlier with movement occurring from 5.30am until 70 minutes after sunset. This suggests that trout prefer to move during the day. They adjust their movement in relation to day length by waiting until daylight increases during shorter days, and conversely moving earlier when days are longer.

### Catching trout

As discussed earlier, one important change since 1995 is the increase in popularity of the middle section of the river for spawning trout. Almost three quarters of all tagged fish captured by anglers were caught in this section of the Tongariro. The remainder of those captured by anglers were caught in the

lower section of the river between the Bain Pool and the Bridge Pool.

From the 16 tagged fish caught by anglers, the migration patterns of 13 were examined. Although only three females were caught, two of these had been stationary for an average of 23 days and so likely were at their spawning sites when caught. However, in 1995 females were generally caught as they were moving upstream or resting on their way to their spawning sites. The apparent difference this year may be due to the low rainfall and stable river flows which prevailed throughout much of the winter. It is possible that under these conditions, the upstream movement of the fish was hindered and that even though these two fish spent a long time in one pool they were yet to reach their spawning grounds.

Four males were caught after they had remained in the one location for an extended period of time. This is similar to 1995 and consistent with the fact that males are known to take lures as part of an aggressive

Figure 3: Spawning migration patterns of seven fish tagged at the Fence Pool that successfully reached the Waita Pool

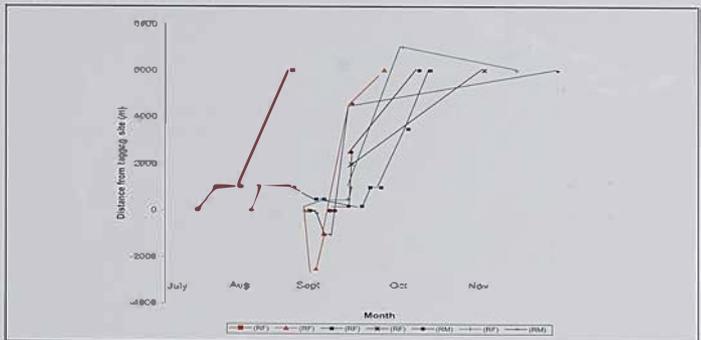
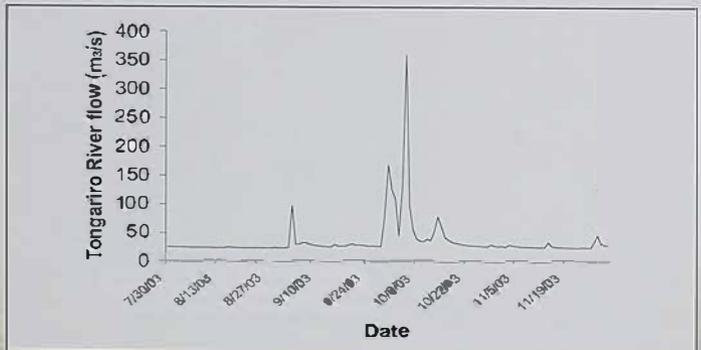
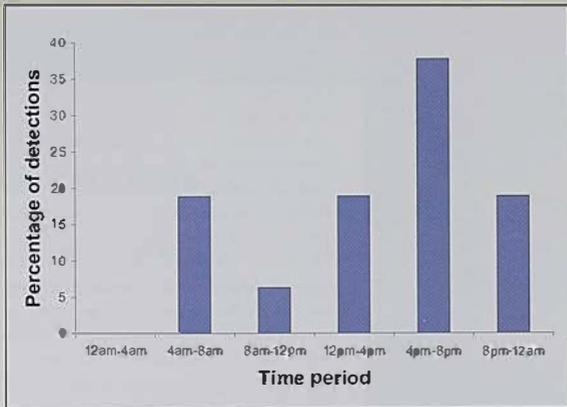


Figure 4: Daily mean flow ( $m^3/sec$ ) for the Tongariro River at Turangi between July and December 2003 (Genesis Power)





*Figure 5: First detection time of tagged trout at the automatic logger situated above the top section of the Tongariro River*

*The lower Tongariro River January 2004. Approximately one quarter of the rainbow trout run spawns in this part of the river. Photo: Rob Kirkwood*

response to defend their territory. Five additional males were caught when they had been upstream of Delatours Pool for a period ranging from just one to 16 days (average of 8.6 days). Because this is a relatively short period it is not possible to know if these fish were on their spawning grounds or still in the process of travelling to their desired spawning locations. Overall, three quarters of tagged fish caught were males and many of them were probably caught while on their actual spawning grounds. The number of radio tagged fish caught (14% of the fish tagged) during 2003 was very slightly up on the 12% caught during 1995. This could

be just luck or perhaps reflect the extended periods of low rainfall which meant that many fish remained in certain pools for longer in 2003 than 1995 thereby increasing their chances of being caught. Surprisingly, fish that were tagged during April were on average caught more quickly than fish tagged during June and the trend continued with fish tagged during July evading capture even longer. It is recognised in literature that when there are fewer fish present the chances of an individual fish being caught increase. This may well explain why our first tagged fish, which were early in the run, were apparently more vulnerable.

### **What is the pattern of movement into the tributary streams?**

We observed that several fish apparently missed the mouth of the Waipa Stream and continued further upstream before dropping back downstream and entering the Waipa Stream. As discussed earlier, many of these fish may have moved past the stream mouth and were waiting for higher flows and water levels before moving into the Waipa Stream. Alternatively, they may simply have missed the stream mouth, perhaps it had changed in some way and wasn't as obvious to them as it should be. Nevertheless, two thirds of all fish that passed through the Waipa trap were recorded on the logger situated in the main stem of the Tongariro well above the mouth





Our radio tracking results indicate most fish spend at least two months in the river during spawning. Photo: Rob Kirkwood

Pools like the Cliff and the Breakaway have changed dramatically from these photos in the early 1990s (since recent flooding the Breakaway Pool no longer exists). Photos: Len Birch



## Estimating the size of the Tongariro River run

One of the main objectives of this study was to estimate the total run in the Tongariro River by using the run data from the Waipa trap combined with knowledge of the proportion of fish that made it to the Fence Pool and then the Waipa Stream. We estimate the size of the rainbow trout run through the Tongariro River between April and November 2003 was 80,000 fish. This includes fish destined for tributary streams such as the Waipa and Whitikau. With an average of over 6,000 fish using the Waipa Stream and approximately 15,000 using the Whitikau Stream this leaves around 60,000 fish in the main stem of the Tongariro and tributaries such as the Manganawhitivhiti, Waihukahuka and Poutu. This estimate is slightly higher than the 1995 estimate of 60,000 trout in total derived from the Whitikau trap run. Almost 15% of all fish tagged were caught and so in terms of the total run, this would equate to a harvest of approximately 13,500 rainbow trout during 2003. By comparison the 2000/01 harvest calculated from a specific study was approximately 13000 trout.

*As discussed earlier, one important change since 1995 is the increase in popularity of the middle section of the river for spawning trout*

of the Waipa Stream. So there must be a good reason why this occurred so regularly. Interestingly, a similar pattern was observed with fish spawning in the Whitikau Stream further down the Tongariro. A third of the fish we tagged at the Fence Pool, which is 100 metres above the Whitikau Stream confluence, were content to remain there for several weeks before moving downstream and running up the Whitikau Stream. Scientific studies suggest that fish returning to spawn use the scent of the river where they were born to return there. It is possible that the scent difference between the Waipa, Whitikau and Tongariro is not great enough to produce an immediate cue. This is nevertheless fascinating because it means that trout may be reacting to the presence as well as the absence of a smell to find the right place to go.

## Conclusions and prospects for winter fishing on the Tongariro River during 2004

As occurred during 1995, the majority of the Tongariro River was utilised for spawning. However few tagged fish spawned in the top part of the main river. This is where the tributaries become more important. Trout continue to take a considerable amount of time to move through the river system even

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9'6"	#8	114gr	3	B



Handle type A



Handle type B

during varying flow conditions and spawning fish are in the river system for at least two months. Once again, daily movement rates increased in response to small floods and good angling opportunities should exist when fish are moving, especially in the lower section of the Tongariro.

One of the most interesting findings was the increase in use of the middle section of river between the highway bridge and the Breakaway Pool by spawning fish during 2003, in comparison to 1995. The lower and upper sections of the river also provided reasonable densities of spawning trout although lower overall than 1995. At the time this article was written, it

would have been worth fishing at Delatours, Bridge, Cattle Rustiers, Poutu and Fence Pools this winter. However, due to the major recent flooding, many of these pools may have changed significantly. The sites we identified vary quite widely from the popular spawning sites identified during 1995 which included the Reed, Swirl, Bridge, Hydro, Red Hut and Blue Pools.

*From our results it would appear that fish move more between midday and midnight than between midnight and midday*

We commonly hear complaints from anglers during our creel surveys on the rivers that the pools that they have been fishing for many years are no longer what they used to be. The change in locations favoured by the fish may partly explain this and also provides a clear message: you need to move around until you find another suitable pool which is favoured by fish today in order to remain successful.

From our results it would appear that fish move more between midday and midnight than between midnight and midday, with the majority of fish movement between 4pm and 8pm. Of course this doesn't resolve the debate as to whether the best fishing occurs when the fish are actually moving or as soon as they stop to rest. Nevertheless this is good news if you are not an early bird as you can wait until after lunch to catch the worm!

We also observed that rainbow trout moved later in the day when daylight hours were shorter and moved earlier when the day length was longer.

Also, trying your luck fishing above the confluence of a spawning stream may lead to some interesting fishing. Our results show that it was reasonably common for fish to pass their spawning stream and rest just upstream in the main river, before dropping back to enter the stream after a few weeks.

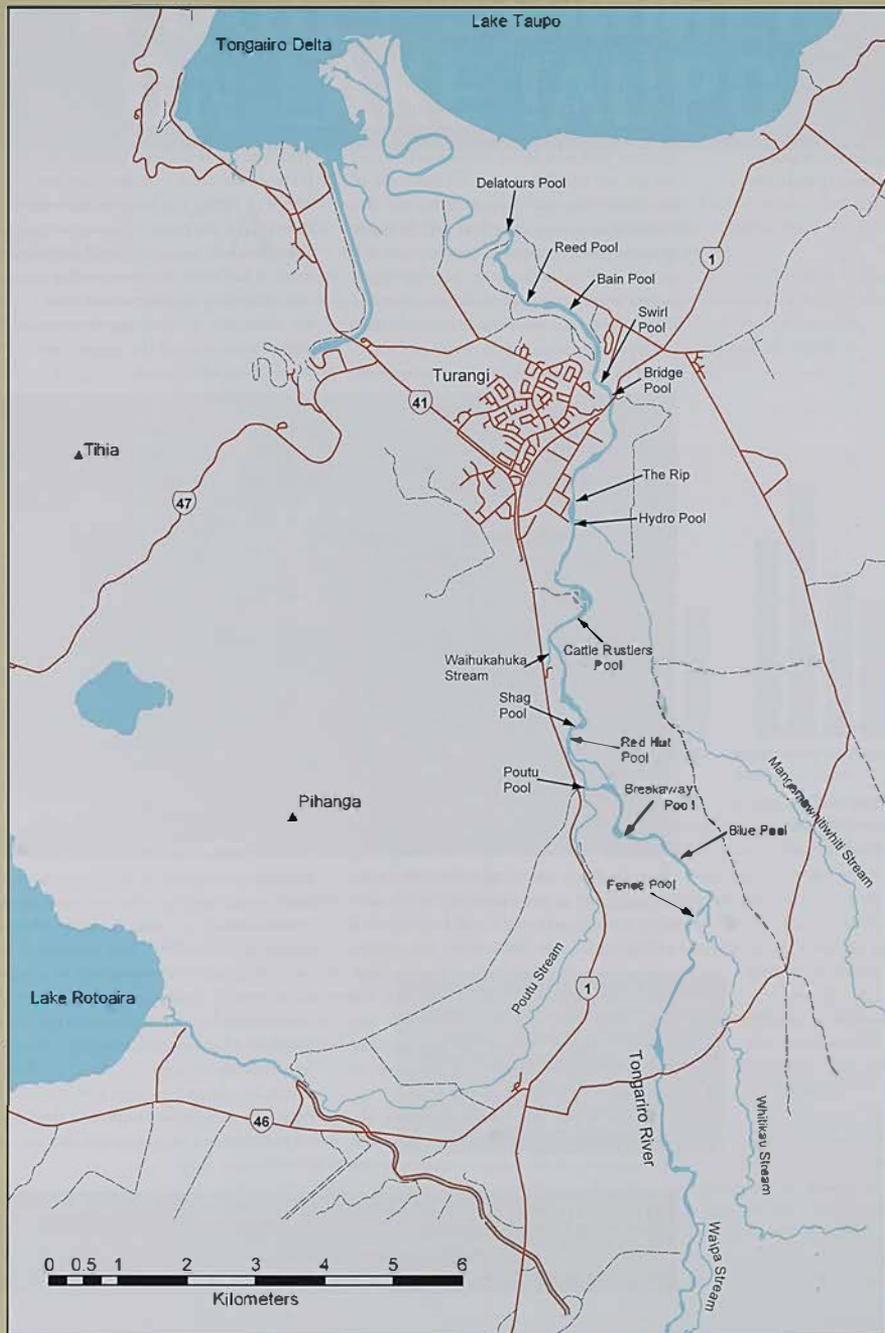
In conclusion, it is evident that many changes have occurred in the river since the first tracking project was conducted during 1995. These changes are apparent in terms of differences in fish behaviour and preferred spawning locations over the seven year period. This highlights that in order to gain reliable information it is essential to repeat these experiments after major events which change the make-up of the river to see how both the river and fish behaviour may have changed.

*The eruptions of Mount Ruapehu in 1995 and 1996 had a major impact on the Tongariro River and the fishery.*  
Photo: Glenn Maclean



# THE TONGARIRO RIVER

*The Tongariro River as it was in 2003, showing the pools referred to in the article*



# Sad find for Taupo fishery rangers

by Dave Hart & Patricia Francis.  
Dave is our Fishery Area Ranger based in Taupo and Patricia is Programme Manager, Community Relations

Early on Waitangi Day, two rangers from the Fishery Area team received a report from the public about a net discovered at Omori, on the western bays of Lake Taupo. On arriving at the scene, Mark Venman and Rob Hood immediately found the gill net, which had been set just south of the Omori Stream. Tangled in it were five trophy-size brown trout and four rainbow trout in prime condition. All of these fish would have made a catch that any angler would have been proud of, and in fact at least two of the brown trout would no doubt have been proudly displayed on someone's wall! All of the fish were dead. Gill nets are indis-

criminate killers and cause fish to be so badly damaged and tangled that they are usually dead when found or are not in a condition to be able to survive if released. One brown trout was actually a fish that had been through one of our monitoring traps in 2000. It is a tragic waste that a reasonably old and wily character such as this had survived all of the threats to its existence over the years only to end its days tangled in a poacher's net. Compliance and law enforcement work is a large part of the work of the fishery area team. Our objective, on receiving information on set



The net discovered at Omori contained several trophy-sized fish. Mark Venman untangles a large brown as he retrieves the net.

public about suspected illegal fishing activity, and urges anyone noticing what they think is suspicious behaviour to contact our duty officer by mobile on: (025) 290 7758. Information is of most use if based on immediately acting on these reports quickly will often mean the offenders can be caught in the act of poaching. Although heart-breaking to see the slaughter of prime trout such as those at Omori, instances such as these only serve to make us even more determined to protect the fishery by maintaining a vigilant compliance and law enforcement focus.

## IMPORTANT

IF YOU SUSPECT ILLEGAL FISHING ACTIVITY, PLEASE CONTACT US IMMEDIATELY.  
TAUPO FISHERY AREA 24 HR DUTY OFFICER MOBILE: 025 290 7758

# A QUIET SUMMER ON LAKE TAUPO

by Mark Venman and  
Gleim Maclean.

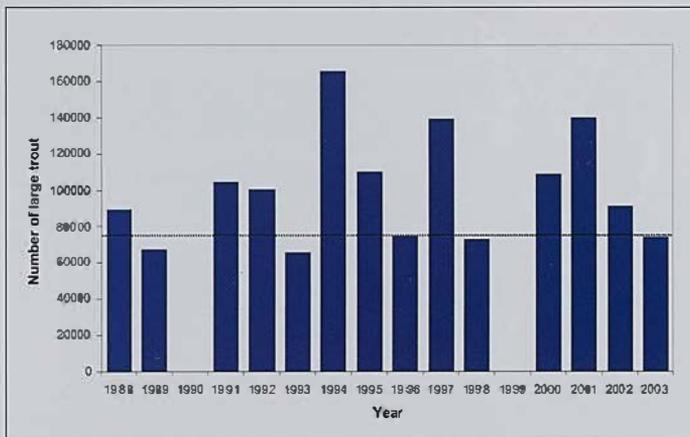
Mark is our Technical  
Support Officer and  
Gleim is the Programme  
Manager for Research  
and Monitoring

A combination of relatively low fish numbers and, with the exception of January, some very ordinary weather, has so far made for a less than memorable summer fishing season in Lake Taupo. However it's not all gloom and doom for the coming winter.

rivers over the last few winters. This suggests major mortality occurred when the juvenile trout entered the lake.

We know that the period just after the young trout enter the lake and switch to feeding on smelt is critical, and that each year many fish are unable to successfully make the transi-

Graph 1: November acoustic estimate of the number of trout longer than 35cm in Lake Taupo



The first indication that the fishery was not particularly strong came with our annual acoustic survey of trout numbers in the lake in November 2003. This survey estimated that there were 75,000 trout longer than 35cm in length, which compares to an average of 100,000 over the last 16 years. The annual estimates from 1988 to 2003 are presented in graph 1.

It is important to remember that this estimate is only a snapshot in time and is continually changing as new, young fish grow to legal size and older fish get caught or die. However we did not expect such a low count given the excellent spawning and rearing conditions which have prevailed in the

*It is important to remember that this estimate is only a snapshot in time and is continually changing as new, young fish grow to legal size and older fish get caught or die.*

lake. It would appear that the settled winters of recent years may further reduce the chances of young fish surviving entry into the lake. There are several ways that this could potentially occur. For example, the high inflows which would normally occur with the frequent rain over winter may be important to boosting lake productivity and therefore the smelt populations.

Similarly, the settled winters have had a noticeable impact on the timing of the spawning run causing this to be several months later than normal. It is possible that the fish are therefore slightly smaller than usual when they enter the lake in late



*Prospects are encouraging for anglers this winter*  
**Photo: Rob Hood**

autumn as one year old fish. Trout's ability to successfully feed on smelt is very much linked to their size, so a smaller average size could significantly hinder their survival. Certainly the average size of young fish which did survive last winter was smaller than normal. Whereas typically we would expect the great proportion of the new year class to be longer than 35cm by November, it is noticeable this year that many fish were not. These fish were in excellent condition indicating that they

*Add to this the greater proportion of young fish still under the 35cm length threshold at the time of the survey and it is apparent that the fishery is stronger than we would initially think*

were making good growth. This in turn suggests their smaller size was the result of being slightly younger than usual. Better understanding how these factors influence juvenile

survival in the lake is our next big research programme.

While the fishery is clearly at the low end, the November estimate is somewhat deceiving as a consequence of the lack of regular rain over the preceding months. As in the past couple of years the spawning run



was much later than normal and fish which would normally have returned to the lake after spawning and been counted were still up the rivers. For example, 706 rainbows were recorded in November through the Waipa trap and a further 324 before the trap was removed on 18 December. This equates

similar high catch rates on the lake during early 2004 but these have not occurred to the same extent yet. However it was noticeable that many of the fish anglers were catching in January at the southern end of the lake were recovering fish which likely returned to the lake with the small fresh

Table 1: Average catch rate (per angler) for anglers interviewed on Lake Taupo between November 2003 and February 2004

Month	2002/2003 catch rate (fish per hour)	2003/2004 catch rate (fish per hour)
November	0.34	0.54
December	0.42	0.32
January	0.28	0.23
February	0.37	0.18
Average	0.35	0.28

to a sixth of the total run for the year. Similarly, nearly 70% of the run occurred after 1 September.

Add to this the greater proportion of young fish still under the 35cm length threshold at the time of the survey and it is apparent that the fishery is stronger than we would initially think, based on the acoustic count alone.

Angling data for the lake between November and February follows the normal pattern with catch rates

between Christmas and New Year. On occasion anglers were expressing concern at the condition of these fish but they were just typical of spent fish newly arrived in the lake. It is likely the frequent freshes over February have washed many more kelt back to the lake but the rough lake conditions have not been conducive to angling over this month.

In terms of angling methods, jigging, once again, produced the highest catch rate out on the lake this summer (Table 2).

Table 2: Average estimated catch rate by method and hours of effort for anglers interviewed on Lake Taupo November to February 2004

Method	Catch rate (fish per hour) 2002/2003	Hours of effort 2002/2003	Catch rate (fish per hour) 2003/2004	Hours of effort 2003/2004
Shallow trolling	0.37	328	0.30	420
Leadlines	0.48	545	0.17	516
Wirelines	0.31	73	0.38	86
Downriggers	0.39	147	0.17	197
Jigging	0.74	215	0.51	222

decreasing after Christmas (Table 1). This decrease after the New Year is what we expect as the fish move deeper beyond the reach of harling and lead line trolling methods.

However during the summer of 2002/2003, the catch rates remained high after Christmas. This was due to the late influx of kelts that returned to the lake around Christmas and which were relatively easy to catch as they fed hard around the lake edge to regain condition. Due to the extremely late spawning runs last year, we expected

Anglers jigging accounted for 18.3% of all anglers which is an increase on the 14.7% interviewed using this method last summer. This figure is probably an over estimate of the total proportion of anglers jigging because jigging is particularly popular at the southern end of the lake where weather conditions have dictated we obtain many of our surveys. Generally it is still not that widely practised and traditional methods such as shallow trolling and leadlines still make up the majority of angling effort on the lake. Similarly downriggers were only

used by 11.7% of anglers interviewed despite their proven effectiveness when used correctly.

Over the summer period we weighed a total of 235 rainbow trout and these fish averaged 504mm in length and 1.37kg (3lb). Fish caught during November and December were on average shorter than those caught during January and February which is expected as the small maiden fish are growing at around 1mm per day feeding predominantly on smelt. This rapid increase in length is also reflected in the reduction in the proportion of undersized fish in the catch from 43% in November to 28% in January. Typically we expect 20 to 25% of the catch to be less than the legal minimum length in November which highlights the smaller average size of the fish this spring.

Those anglers interviewed over the summer months rated the size and condition of fish that they were catching at 3.4

out of 5, their angling success at 3.1 out of 5 and their enjoyment at 4.6 out of 5 (where 1 = terrible and 5 = excellent). These ratings are similar to last year. Over 83% of anglers said that nothing detracted from their angling enjoyment while others mentioned detractions including bad boating manners and jet skiers.

While the fishing over summer has not been exceptional, prospects for fishing next winter are nevertheless much brighter. In general the angling harvest this summer has been reduced compared to recent

years due to a combination of long periods of poor weather limiting angling opportunities, the high incidence of undersized fish which anglers have had to release, and the fact that many of the kelts did not return to the lake until much later than normal. As a consequence a greater proportion of the population will survive to reach maturity and enter the rivers this

winter, and we expect strong spawning runs. Given the relatively young age of many of these fish it is likely that the runs will again occur later in the year, especially if conditions during the early part of winter are fairly settled. Considering the current unseasonable weather, that would seem unlikely, but time will tell!

*While the fishing over summer has not been exceptional, prospects for fishing next winter are nevertheless much brighter*

## FINICKY FISH CHOOSE

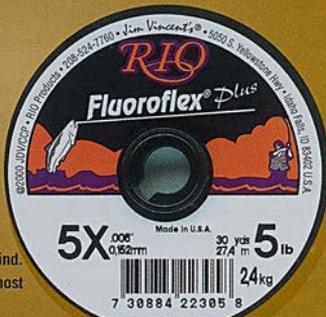


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# Fishery staff present findings at river flow conference

by Dr Michel Dedual

**W**ith the increasing demand for water, the pressure on our rivers is building. How much water can we safely take out of a river? And how should we take it to minimise any ecological impacts?

Different techniques are used in an attempt to answer these questions. Commonly used is the Instream Flow Incremental Methodology (IFIM) and one of its key components, Physical Habitat Simulation Modelling (PHABSIM). IFIM is a process for solving water resource allocation problems and PHABSIM is a series of computer models that have been used for the last 30 years to describe and measure the physical habitat that fish, invertebrates, or even blue ducks prefer and predict how it changes with flow.

One of the features of PHABSIM is that it invariably predicts that there is too much water in the rivers in their natural state. It is not easy to believe that good can come by reducing a river's flow and some clear proof that these models are accurate is required to convince fishery management. Despite PHABSIM and related models being widely used around the world for more than 30 years, their predictions have never really been validated.

Such proof is difficult to establish, mainly because of a lack of long time series data and particularly a lack of data on "before versus after" conditions. Perhaps not unexpectedly, the critics of the methodology are growing in numbers and scientific opinion is clearly split between those saying that the method-

ology should be abandoned unless it can be proven right, and those who support its continued use.

PHABSIM has been heavily criticised because there is no proof that the number of fish present is related to the quantity of physical habitat in the river. This is a fair criticism because if there is no relationship between physical habitat and fish numbers, how can we trust that the predictions from PHABSIM will protect the fishery the river sustains? And more importantly, why should we use this methodology?

This debate prompted Fish & Game New Zealand in collaboration with DOC and the Cawthron Institute, to organise a workshop in Nelson to put all the arguments on the table. Experts in the fields of statistics, invertebrates, algae, native fish and trout explained their experience with and thoughts about PHABSIM. The main aim of this workshop was to produce a road map to progress the way decisions are made on the future of New Zealand rivers.

Glenn Maclean and Michel Dedual examined the use of PHABSIM as it was applied to the Tongariro River. Unlike other situations in New Zealand and most overseas, a lot of data has been collected on the Tongariro

River over a long period. This provided us with a great opportunity to check if the theory behind PHABSIM stacked up in reality. We presented the results of our research showing that most assumptions necessary to use PHABSIM could not be supported for the

*Despite PHABSIM and related models being widely used around the world for more than 30 years, their predictions have never really been validated*

Tongariro River. This led us to believe it is not appropriate to use this technique on the Tongariro and that any results derived from applying the technique are meaningless.

Our studies show that it is the quantity and quality of the food available, not the amount of preferred habitat, as assumed by PHABSIM, that will limit the total number of fish reared in the Tongariro. However, there is no doubt that the flow regime in the river does control both the quantity and quality of food produced. The food quantity is determined by the total area of rapids that the river contains, because the rapids produce much more food than the runs or pools. The quality of the food is controlled by the density of algae (periphyton) that grow on the bottom. When the rocks are covered by a thick layer of slippery periphyton, the invertebrates are dominated by small organisms like midges and minuscule worms which make poor food for juvenile trout. When the periphyton is sparser, then mayflies, caddis, and stone flies dominate. These large prey are much more valuable as food, speeding up

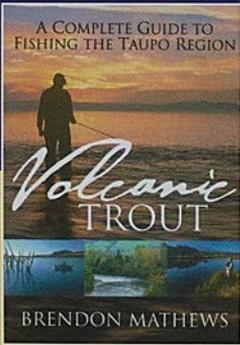
the growth of young trout and thus boosting their chances of survival when they enter Lake Taupo. Periphyton is to a large degree controlled by available nutrients and the frequency of small floods. Frequent freshes in the river which scour the periphyton off the rocks prevent it building up and limiting trout food production.

We are therefore confident that the best flow to protect the Tongariro River is one that provides a sufficient area of rapids and a flushing regime that cleans the bottom to produce large valuable prey for trout. This is why we reached agreement with Genesis Power Ltd for a flow regime in the Tongariro River that is in accordance with our research and observation, rather than recommended from PHABSIM studies. We hope that the arguments we presented at the workshop will assist the debate over the use of PHABSIM in the future. Clearly there are a number of concerns raised by various experts which need to be addressed if we are to have confidence in this technique as a suitable tool to set flows for New Zealand rivers.

## Volcanic Brilliance

Reviewed by Bob South, Editor Fish & Game New Zealand

*The Essential Anglers Companion*



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TROUT

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Published by Longacre Press  
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WINNER of the CD-Rods Downunder series fly rod competition.  
R. Wallis, Wellington.

Many New Zealand fishing books are fairly easy to fault. Every once in a while, though, that mould is broken, as it has been recently by first time author Brendon Mathews and his book *Volcanic Trout*, a complete guide to fishing the Taupo region (Longacre Press, \$44.95). It has been 20 years since any definitive guide has been compiled on what arguably is the finest trout fishery in the world. Mathews' 224 page, 200 full colour photograph book should become the bible of many of the 60,000 anglers who visit Taupo annually. Splendidly laid out, with tasteful use of maps, charts, and illustrations, *Volcanic Trout* is a who's who, but much more. It provides information on the ecology of the Taupo fishery, how to read conditions, some history, advice on protecting the resource, as well as pertinent visitor information. The book reads well and 'feels good'.

# Kids love fishing too!



by *Peirina Francis*

*The Jensen family enjoying a day fishing at Motuoaipa*

*Photo: Rob Hood*

It's great to see every year a large number of children and young people out on Lake Taupo enjoying the freshwater and summer sunshine.

Surprisingly though, not many children who come to Taupo over the summer period actually go fishing. Data from our angling surveys on the lake last summer show that only 8.7% of all anglers interviewed were children. We know that some children have a special interest in fishing, perhaps because they have parents that enjoy the sport, but it is a shame that a large proportion of kids are missing out on the chance to have fun catching a Taupo trout. You may know of a young person that hasn't had this opportunity, and might be keen to learn. But where do you start?

Sometimes the thought of teaching someone young to fish can be daunting. After all, it takes years of knowledge and experience to learn the intricacies of fishing for trout. If they don't know very much about trout, then why not start by taking them for a visit to the Tongariro National Trout Centre? Inside The River Walk building a display on the life cycle of trout will help them to understand how trout grow, where they are

more likely to live and what they will be eating, and how to identify male and female trout, rainbow and brown trout. Within the grounds are fish of varying ages and size. Children can see wild trout underwater in the viewing chamber window, observing them as they sit in the current or rise to take an insect from the surface. This may fuel their desire to go out on the lake and try to catch a fish of their own!

A lot of the art and technicalities of fishing will unfortunately initially be lost on children, because their desire first and foremost will be to catch a fish. They want plenty of action! So a good suggestion might be to take them out boat fishing to begin with.

Perhaps the biggest issue with children is keeping their interest as they tend to have short attention spans. So if you are going to go out, keep the trip short. Target the times of the day when you are most likely to be successful and go out then. Heading early in the morning or late in the evening over the summer period can bring some really good fast results, and it is catching the fish that will keep the youngster interested. As we



Allow time for discovery and point out other things on the trip to keep their interest – the sun rising, smelt in the water, native birds in the trees, trout in the shallows, aquatic insects on the surface of the water; fish rising to the surface. Often it is the whole experience that will be remembered in the future, and the fact that they went fishing just melts into the memory of the complete experience they had of being out on Lake Taupo or camping by the lake over the holidays. Don't lose sight of the fact that they are kids, and irrespective of how much they seem to be enjoying themselves, often an hour will be plenty long enough for young children.

To make the experience a happy one, check weather reports and be flexible. Pack a camera to record that first ever fish and remember to wear hats and lifejackets, take the sunscreen and lots of cool drinks in the summer. The whole idea is lost if a child spends a couple of hours catching trout only to remember in future years the terrible sunburn they got while out in the boat!

Jigging for trout can be very exciting over the summer period when fish tend to be deeper. A rig set up for jigging can be easily handled by young children and the action of moving the lure up and down will keep the them interested, for a little while anyway. Playing a fish on light gear also means an exciting experience. Rods suitable for jigging or trolling are relatively inexpensive to buy. Take your child to a sporting shop and get them to choose the lure they would like

*Above: San Yarratt of Palmerston North gets ready to put his trolling rig back into the water  
Below: Rob Kirkwood, Ranger, interviews a family who are well prepared for a big day out on the lake.  
Photos: Rob Hood*

develop into more experienced anglers, we are fussier about the fish we catch and their size and condition. However, children are generally thrilled to catch anything, even a kelt in poor condition will have them excited! Have realistic expectations of what you will achieve and give them praise for their accomplishments





*Above: Richard Pemey (10 yrs) of Palmerston North holds a rod while fishing the Western Bays with his friend Sam Currie*

*Photo: Petrina Francis*

*Below right: Five-year-old Emily Bol of Auckland holds her trophy rainbow hen in the Whareroa fishing competition held New Years Day 2004*

*Photo: Petrina Francis*

to use - the colours are bright and attractive, and it will give them a thrill when they do catch a fish on a lure that they chose!

Don't forget, when they do bring home their catch, to show them how to cook it successfully. Some children may be interested in seeing what the fish has been eating when you gut it, this will help to explain the feeding habits of trout and why certain lures or flies work better than others. And if everyone enjoys eating the fish once it is cooked, then the youngster will really feel good. If they catch an undersize fish, don't forget to congratulate them on their effort, and explain that it must be put back so that it can grow bigger. Show them how to release it carefully, so that they gain an understanding of the importance of these small juvenile fish to the ongoing sustainability of the fishery.

Over winter each year, the Tongariro National Trout Centre hosts children's fishing days. Held one day a month from April through to October, these days are an opportunity for budding young anglers to learn to cast a fly line, under the tuition of volunteers of the Tongariro National Trout Centre Society, and catch a fish from the kids fishing pond. On these public fishing days, excited young children bring their fish in to the volunteers to be weighed and a certificate issued. Although the fish are still relatively small in comparison to those generally

caught on the lake, the children think they are fantastic and this is reflected in the huge smiles they have on their faces. In fact, some children will come back year after year to catch a fish from the pond. Unfortunately, due to the major flooding that occurred on the 29th of February in the Tarangi area which impacted greatly on the trout centre site, there will be no kids fishing days this year. However, our team are working hard to repair damage to the pond so that it can be re-opened and we can hold the fishing days once again over the winter period 2005.



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One of the Society volunteers helps a youngster catch a fish from the pond during a public kids fishing day held at the trout centre

Photo: Brendon Matthews



Quite possibly the start of a lifetime interest in trout fishing judging from how much Campbell Macleod talks about his first trout.

Photo: Glenn Macleod

Another suggestion is to enrol your child in one of the fishing competitions held around the lake. These are fun family days, generally organised by local resident associations or angling clubs, and most have children's prize categories. Fishing to catch a trout worthy of a prize in the competition is great fun, and kids always love to win something!

The prices of children's licences (whole season and day) have consciously been held low so as to make them affordable for most families. It is important that children understand why they need a licence and that the

fee contributes to the protection of the fishery and their future enjoyment.

Some parents have found that catching catfish is a fun way of introducing children to fishing. In the shallow, weedy areas of the lake, such as Tokaanu and Motuopa, catfish can be caught quite easily on a line with a small hook and bait such as cheese, luncheon sausage or bread. As catfish are considered a pest fish, there are no specific regulations on how they can be caught. If however, the child inadvertently catches a trout while fishing for catfish, the trout must be released back into the water. There are many adults throughout New Zealand who will remember the excitement of their first fishing experience as they dangled a line in the water and caught sprats from a wharf!

When you are lucky enough to live, work or holiday in a place like Taupo, you are reminded each day how important it is to get the message out to young people on how fortunate we are to have such an amazing wild freshwater sports fishery. So why not introduce a young person to fishing, teach them to respect the fishery and treasure all of the opportunities that we enjoy? You will have influenced one of the Taupo anglers of the future!

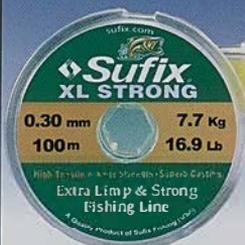
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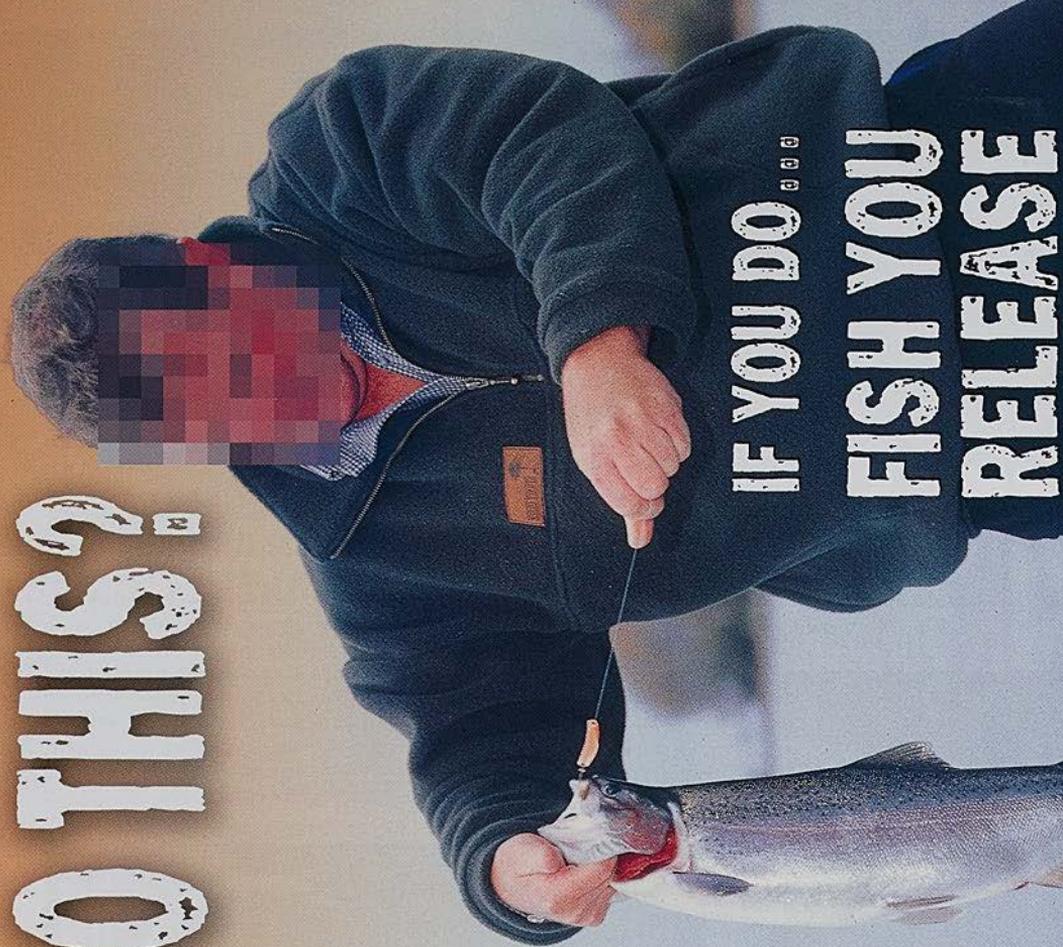
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DO YOU DO THIS?





### **Every year many Taupo trout die unnecessarily, victims of poor release techniques and rough handling.**

Due to regulations such as the minimum size limit, anglers must release some fish they



# WILL DIE

catch. Anglers may also choose to release a fish, if it is not of sufficient quality to eat. Often these fish are kelts recovering from the rigours of spawning. Kelts are very important to the fishery for two reasons. If they are

handled carefully they have a good chance of surviving and regaining condition to make a worthwhile catch for another angler. If they survive to spawn again, they are preserving the future of the wild fishery!

## **So what can you do to ensure the survival of fish that you release?**

### **If possible: Leave the fish in the water and unhook it without touching it.**

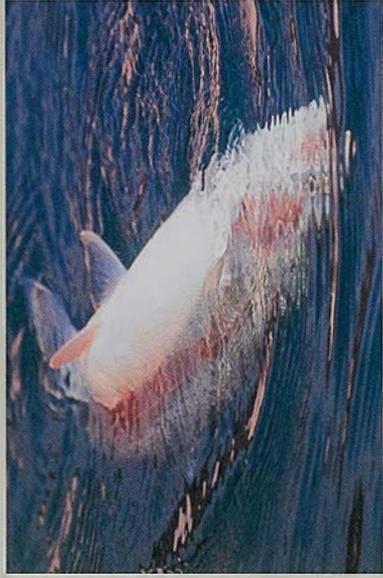
#### **When boat fishing:**

- Lean over the side of the boat and use long nosed pliers to twist the hook free, while the fish is still in the water
- If this isn't possible, use a knotless net and carefully lift the fish into the boat
- Leave the fish in the net and without touching it remove the hook using long nosed pliers or forceps
- If necessary, gently support the fish upright in the water until it swims away

#### **When fly-fishing:**

- Bring the fish carefully to the edge and unhook it while it remains in the water
- If necessary, use a knotless net to control the fish and remove the hook using long nosed pliers or forceps
- Use barbless hooks

**Never put your fingers in the gills or squeeze the fish.**



*A sad sight – this splendid rainbow on the surface of the water will not survive*

# Boat speeds on Lake Otamangakau

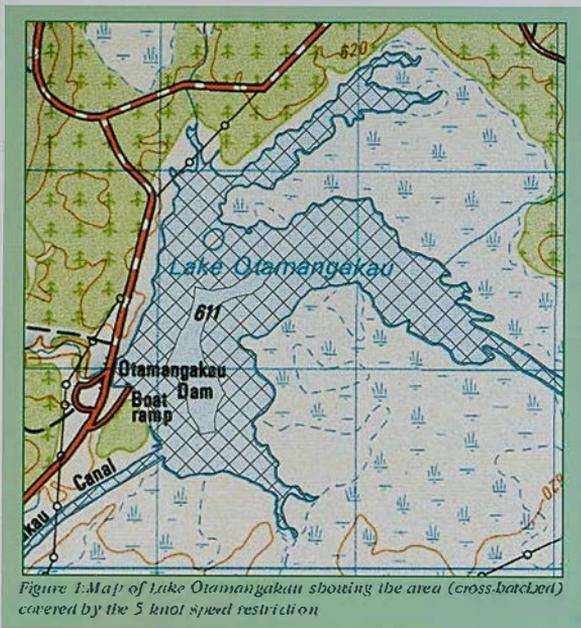


Figure 1: Map of Lake Otamangakau showing the area (cross-hatched) covered by the 5 knot speed restriction

Anglers are reminded of the speed restrictions which apply when boating on Lake Otamangakau. At this stage Horizons Regional Council has no bylaws in place for this lake and so the Water Recreation Regulations continue to apply. These regulations require that boats do not exceed 5 knots within 200 metres of the shore. As Figure 1 highlights there is very little of the lake which is not covered by this speed restriction.

While this speed restriction is in place for safety reasons it is also very useful in ensuring boat traffic does not unreasonably impact on anglers fishing the lake. Lake Otamangakau is a very shallow lake and the trout are easily disturbed. Similarly anglers wading in the shallows find the wake of boats upsets trout cruising close to shore and makes their fishing difficult. At the end of the day it is only a small lake and travelling at high speed from one area to another is simply not necessary.

## NEW REGULATIONS FOR THE NEXT FISHING SEASON

*By Rob McLeay  
Rob is our  
Programme  
Manager for  
Field Operations.*

**T**aupo anglers will recall the review of the current fishing regulations undertaken by the Department in 2002. A draft set of new regulations was prepared following wide consultation with anglers and interest groups. This draft was then sent to the legal division of the Department which has the responsibility for carrying out formal consultation with other government departments and shepherding the next proposals through the required parliamentary process, so that they ultimately become law. It was during this consultation phase that the Ministry of Fisheries challenged aspects of the Department's role in making regulations for the Taupo trout fishing district. This prevented completion of the process in time to implement new regulations for the current 2003/2004 fishing season.

We are pleased to be able to announce that the inter-departmental difference has been resolved and it seems likely that the new regulations will be operative in time for the start of the 2004/2005 season, which commences on 1st July.

As a consequence, the fishing licence will be revamped to include among other things, a summary of the new regulations.

Harry Hamilton and Roy Baker clear debris to prevent the barrier from washing out after recent flooding.

Photo: Rob Hood



## THE WAIPA TRAP

by Rob Kirkwood

Rob is a fishery Ranger and part of the team who carry out much of our field work

Below left: Rob Kirkwood installing the Waipa trap in early January

Photo: Rob Hood

Below right: This picture of the trap was taken on the 1st of March just after the Tongariro River burst its banks causing severe flood damage in Turangi

Photo: Rob Kirkwood

A significant part of the monitoring work undertaken by the fishery team is the operation of a fish trap on the Waipa Stream. The Waipa Stream is one of five main tributaries of the Tongariro River used by adult trout for spawning.

In January 2004 the trap was reinstated after a three week outage over the Christmas period. It marked the start of the seventh year of trapping at this site.

Fishery rangers Rob Kirkwood and Rob Hood spent a pleasant afternoon getting the trap operational again. Spawning trout were still visible upstream of the trap and both rangers reported having fresh fish swimming past them while working on the trap.

Over the summer months the fish through the trap are predominately kelts returning to the lake after spawning, however this winter will again see the return of large numbers of spawning trout.

The unseasonable weather in February of this year has seen the trap flooded twice since its installation. Spare a thought over the winter period for our rangers who work the trap in all types of weather, often clearing fish several times during the night when the spawning run is at its height. Most of the fishery team are trap operators and take turns to ensure the Waipa trap is monitored 24 hours a day, 7 days a week.



# WAIPA TRAP

## S U M M A R Y

by Mark Venman

**D**uring 2003, we completed our sixth consecutive season trapping the Waipa Stream, a tributary of the Tongariro River near the boundary of Kaimanawa Forest Park. Over these six years staff have weighed, measured and marked a total of 2,956 brown trout and 25,722 rainbow trout

At the beginning of each year, we review the previous year's trapping results and make comparisons with earlier years. For example, we compare the size and timing of the runs as well as average fish size to see if there are any significant differences. By simply knowing the actual run in the Waipa and the condition of the fish, we can tell how good that year was and this normally provides an indication of the conditions throughout the whole fishery. Results for 2003 indicate that both the rainbow and brown trout runs were slightly less than the six yearly average and that once

again the bulk of the rainbow trout run occurred very late in the year.

### Size of the run

Figure 1 shows the numbers of trout running the Waipa Stream each year, adjusted to take into account any fish that bypassed the trap when the stream was in flood.

The largest brown trout run occurred during 1998. Last year's run was the second lowest since trapping began and a little lower than the yearly average.

Rainbow trout numbers reached a peak during 2001. The run in 2003 was slightly below the yearly average but significantly higher than in 2002.

### Size and condition of fish

In 2003 rainbow trout averaged 520mm in length and 1.6 kg (3.5lb) and brown trout 400 mm and 2.7kg (6lb). Tables 1 and 2 show

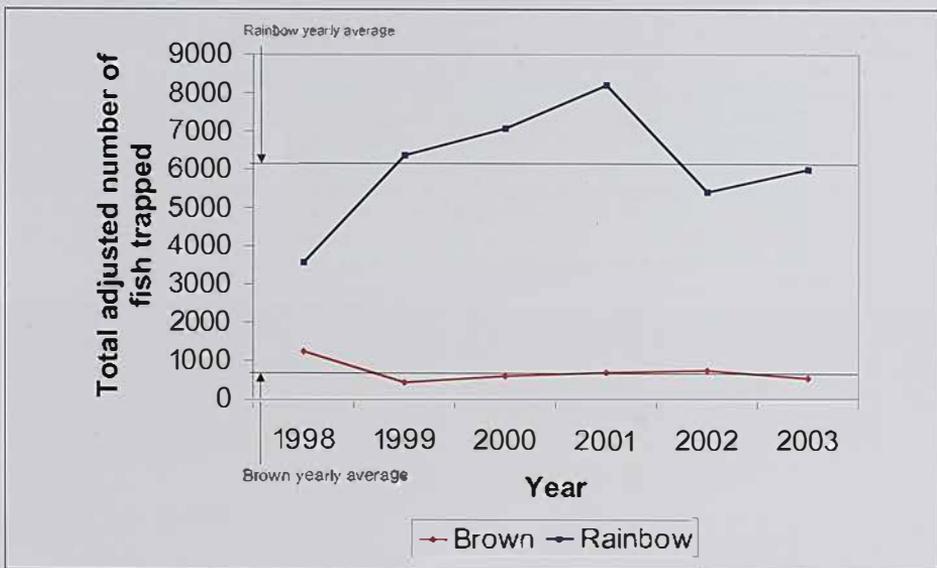


Figure 1: The adjusted number of rainbow and brown trout running the Waipa Stream since 1998

Table 1. Average length (mm) of trout trapped in the Waipā Stream since 1998

Species / sex	1998	1999	2000	2001	2002	2003
Rainbow female	585	536	543	541	523	520
Rainbow male	582	536	541	537	518	521
<b>Rainbow total</b>	<b>581</b>	<b>526</b>	<b>542</b>	<b>540</b>	<b>521</b>	<b>520</b>
Brown female	630	559	579	600	586	585
Brown male	661	569	602	627	587	619
<b>Brown total</b>	<b>635</b>	<b>588</b>	<b>603</b>	<b>612</b>	<b>595</b>	<b>601</b>

Table 2. Average weight (kg) of trout trapped in the Waipā Stream during 2003

Species / sex	1998	1999	2000	2001	2002	2003
Rainbow female	2.5	1.9	2	1.9	1.7	1.7
Rainbow male	2.3	1.7	1.8	1.8	1.5	1.6
<b>Rainbow total</b>	<b>2.4</b>	<b>1.7</b>	<b>1.9</b>	<b>1.9</b>	<b>1.6</b>	<b>1.6</b>
Brown female	3.4	2.4	2.6	2.9	2.5	2.5
Brown male	3.6	2.2	2.6	3.1	2.4	2.9
<b>Brown total</b>	<b>3.3</b>	<b>2.6</b>	<b>2.8</b>	<b>3.0</b>	<b>2.6</b>	<b>2.7</b>

how these length and weight averages compare to past years.

We examined the length data to see if the differences we were observing between years were significant. In all cases, the average sizes calculated for 1998 were significantly larger ( $p < 0.05$ ) to all other years, probably the result of temporary changes within the lake caused by the eruption of Mount Ruapehu during 1995/96. In 2003 the rainbow females measured were significantly smaller than previous years and rainbow

males were smaller than those measured between 1998 and 2001.

In terms of trophy sized trout, only one brown male was trapped during 2003 which exceeded 10lbs (4.54kg) in weight. Similarly only one rainbow exceeded 8lbs or 3.65kg. The percentage of brown trout greater than 8lbs trapped during 2003 is almost identical to that of 2002 for the species as a whole.

#### Timing of the runs

The brown trout run tends to be much less

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Fisbery: Ranger Rob Kirkwood measures a rainbow trout in the Waipua trap. Photo: Petrina Francis

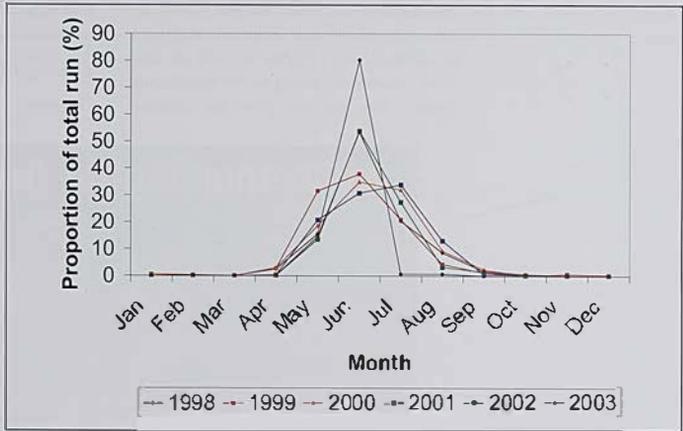


Figure 2: Timing of the brown trout run in the Waipua Stream between 1998 and 2003

variable than the rainbow trout run and normally occurs between the months of April and September, peaking in June when on average almost 40% of the run occurs (Figure 2).

The rainbow trout run is spread throughout the whole year. June normally sees the first major run

of fish although this can occur as early as April if river conditions are favourable (Figure 3). The main peak typically occurs during September though has clearly been influenced in recent winters by the prevailing weather patterns. The settled conditions and lack of rain characteristic

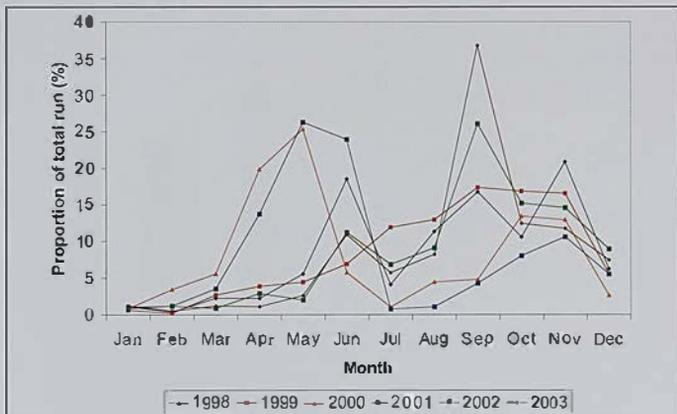


Figure 3: Timing of the rainbow trout run in the Waipā Stream between 1998 and 2003

of the last three winters is reflected by the increased proportion of the total run passing through the trap after 1 September. This percentage of the run that occurs between September and December has slowly increased between 1998 and 2003 from 54% to 63%.

During our creel surveys on the rivers each winter, we hear comments from anglers complaining that they have been fishing the Tongariro River at the same time for many years and that there

are not as many fish as there used to be. Well these anglers are probably right, there are not as many fish early in the season because as this data shows, the bulk of the run now occurs after most anglers have given away their winter river fishing. We encourage anglers to plan their fishing trips for later on in the year this coming winter, especially if the weather conditions are settled early in the season.

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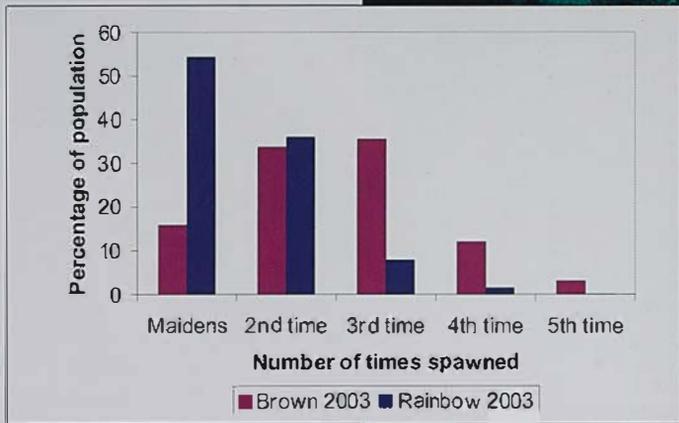
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Figure 4. Age structure of the Waipā Stream trout population based on fin clip data from 2003.



### Age structure of the population

The age structure of the population can be established by examining the amount of repeat spawning. If we assume that trout in the Taupo fishery mature when they are three years old and subsequently spawn every year, then we can estimate their age by using the number of times the fish has been trapped previously as determined from fin clips.

From the fin clip data it is evident that the majority of the rainbows were maidens (3 year old fish spawning for the first time) which is what we would expect. The graph highlights that at Taupo only a very small proportion of rainbows survive to spawn a third time or more. Nevertheless repeat spawners make up approximately 40% of the run in the Waipā which could mean anything between 1500 and 3500 fish. This highlights the importance of these older trout to the fishery and the need for anglers to handle kelts with care. When these fish first return to the lake after spawning they often don't look very good but many will recover condition quickly and be difficult to distinguish from a maiden when fully recovered. Losing this number of fish would significantly reduce the spawning run through the Waipā as well as reducing angling opportunities throughout the whole of the longaro River.

The brown trout run consists of an even greater proportion of repeat spawners and a greater proportion of relatively old fish. For example, more than 10% of fish in the Waipā



trap are spawning for their 4th time, likely as 6 or 7 year olds. It is characteristic of the Taupo fishery that brown trout live longer and spawn more times than rainbows, probably reflecting differences in the way the two species live.

### Conclusions

The overall number and condition of fish last year was reasonable, although size tended to be on the small side. Whether the



*Fun in the rain for trap operator Norrie Ewing on the 2nd of September 2003. Trout were jumping the front barrier to get upstream every few seconds as this photo was taken.  
Photo: Glenn Maclean*

smaller average size reflects that growth was not as good as previous years or simply that the fish were slightly younger as a consequence of the much later spawning since 2000. is not known. Significant differences in sizes and condition were found to occur between years and some years definitely appeared more favourable than others. It is typical for a wild fishery to fluctuate through extremes but when good conditions exist, the fishing can be exceptional.

One of the most interesting findings has been confirmation of the increase in the proportion of the rainbow trout run that is occurring between September and December. Catch rates also remained high for those anglers who last year persevered through September and October. Anglers should plan their fishing trips for later in the year as this pattern of late runs would appear to now be well established.



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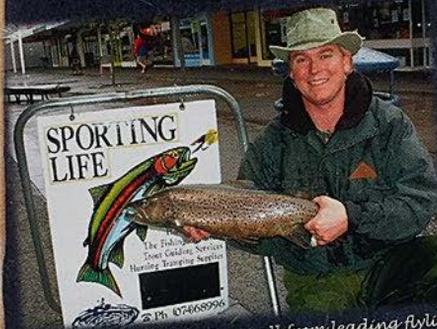
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# Steel downrigger weights

by John Gibbs

John is the Taupo Fishery Area Manager

Steel (left) and lead (right) 10lb (4.5kg) downrigger weights recovered from the bed of Lake Taupo at Rangatira Point

Photo: John Gibbs



In earlier issues of *Target Taupo*, particularly Numbers 26 (November 1997), 30 (March 1999) and 32 (November 1999), we wrote about the perceptions and risks of lost lead fishing tackle in lake Taupo and its rivers. This mostly takes the form of lead weighted lures, lead cored trolling line and lead downrigger weights.

Our conclusion then was that while lead can be an environmental toxin, the degree of contamination depends on the form and availability of the lead and the chemistry of the water surrounding it. Generally, we expect leaching of lead from large static objects such as downrigger weights to be minimal and slow due to the neutral water of the lake.

Nevertheless, we also recommend a precautionary approach to minimise or avoid the loss of lead to the lake environment. One of the best ways to achieve this is to use non-toxic, degradable materials for downrigger weights. The most obvious are concrete, iron and steel. A few years ago we tested the efficiency of steel downrigger weights against the conventional lead balls. Using sonar, divers and underwater video we found that, weight-for-weight, 4.5kg cylindrical steel weights were just as effective as spherical lead ones and sold for the same price.

Recently, while setting out data loggers on the lake bed for the acoustic trout tagging experiment, DOC Fishery divers Glenn Maclean and Dave Hart recovered lost steel and lead downrigger weights from 12.5 metres of water at Rangatira Point. While we don't know how long each had been in the water, it is clear from the photo that the steel weight was corroding away substantially while the lead one was essentially inert.

This suggests that our expectations are correct and that lead weights are likely to remain intact on the lake bed for a long time. Steel, on the other hand, corrodes readily and harmlessly and probably disappears quite quickly.

So we reiterate our earlier advice to use steel downrigger weights in preference to lead. There has been a problem in sourcing steel weights and a ring around 11 local fishing and boating outlets revealed only one with stocks available. This is Taupo Rock and Tackle in Tongariro Street and they advise that their supplier is still unsure if there is sufficient demand to continue production. Other retailers expressed interest in selling steel weights if a manufacturer could be found. So roll up to your favourite fishing store, create that demand and do your bit for the lake Taupo environment.

# WOMEN'S ANGLING SEMINAR

**When:** Saturday, June 5th, 2004

**Time:** 10:00 am - 12:00 noon

**Venue:** Inside the auditorium at The River Walk building,  
Tongariro National Trout Centre, State Highway 1, Turangi

We are holding a seminar for all those women out there who would like to learn more about fishing at Taupo. The seminar will cover:

- An introduction to the Taupo fishery
- A peek into the world of trout
- Tips on lake fishing
- Fly fishing – basic techniques, casting, and gear.

With a practical demonstration from professional fly fishing guide Carol Harwood.

Bronwyn Wilson, a leading New Zealand fly tier will also be giving fly tying demonstrations, and Sporting Life in Turangi will have a display of women's fishing gear and other items of interest. A seminar pack will be provided to all attending with information to take home and morning tea will be provided.

**Spaces are strictly limited to thirty. Please book early by contacting:**

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# Circle hook trial: the results so far

by Dr Mitch Deddall

Circle hooks are not new. They have been around for thousands of years, as evidenced by ancient artefacts made of primitive materials like stone and bones, shaped into a circle hook. For example, the Native Americans used material that was already naturally a hook shape, such as claws or beaks from the osprey eagle.

It is particularly interesting to see that like the net knot, the concept of the circle hook is identical in virtually every civilisation around the world and appears at around the same time in history. Thinking "outside of the square" about this concept was clearly a worldwide phenomenon.

As the name implies, circle hooks are round and shaped like hoops. The tip of the hook turns in toward the shank.

The principle behind the circle hook is simple and is based around a fish swimming in, taking the hook and then swimming away. As the fish moves off, the angle of the line is against the jaw and as the line tightens the hook is pulled out of the mouth. Due to the shape of the point, the hook does not catch on anything until it encounters the edge of the mouth, where it rotates and hooks the lip or the jaw hinge. Therefore circle hooks are particularly effective at catching fast swimming fish that attack the lure and keep going at speed. Once hooked, the fish cannot escape. The circle hook is therefore very effective in situations where there is no angle to "set" the hook, which is why commercial long line fisheries have used them for decades.

Not only do circle hooks catch most fish in the mouth and avoid throat or gullet hooking, but the nature of the design also means that it is not necessary to have a barb on the hook.

Until recently circle hooks were used mainly by commercial and recreational anglers in the sea. The use of circle hooks is even compulsory in some states along the Atlantic Coast of North America. However overall opinion amongst freshwater anglers suggests

that because of the way the hook works, circle hooks are not particularly suited for lures and flyfishing where there is a typical adrenaline loaded "strike" by the angler.

There is not a lot of scientific information about the efficiency of circle hooks for trout fishing, but we suspect that with some adjustment to fishing technique, there is no reason why they wouldn't work. This is especially the case with stillfished lures such as "hoochie" but also with streamers, nymphs and dry flies.

Because of this, we decided to assess the performance of circle hooks in Taupo as explained in issue 13 of *Taupo Taupo*.

## How did we assess this?

Most trout were caught flyfishing using a shooting head line with a slow retrieve along the drop-off at several locations around the lake, but mainly at the Tauranga-Taupo River mouth. So far we have trialled four hook categories including barbed and barbless circle hooks, and standard

hooks in sizes 8 and 10 (Figure 5). Most fish were caught by the same angler.

Each strike was recorded and the hook-up percentage was defined as the number of fish hooked divided by the number of strikes. The landing performance was expressed as the number

of fish landed divided by the number of hook-ups. The location of the hook in the fish landed was also recorded. Hook location categories were: (1) corner of the jaw or jaw hinge; (2) upper or lower jaw; and (3) deep hooked, including tongue, gills, and oesophagus. Any bleeding was recorded if present when landed or after the hook was removed. In each case the hook was removed using a pair of long nose surgical tweezers. The bleeding incidence was calculated by dividing the number of fish that were bleeding by the total number of fish landed. It is important to estimate the incidence of bleeding because if a fish bleeds when released, it is likely to die immediately or later. Any fish released that died immediately were counted as death after hook removal.

*the nature of the design also means that it is not necessary to have a barb on the hook*

The interim results obtained so far are presented in the table below.

### Preliminary verdict

As we described earlier, the use of circle hooks requires an adjustment in fishing technique, in particular refraining from striking but instead just tightening up on the fish. Our limited experience with using circle hooks may explain at least partly the lower hook-up and landing rate when using circle hooks. We anticipate that as the trial unfolds and we get more used to fishing with these hooks that our hook up rates will improve and this difference will be less obvious in the final results.

Another observation is that there are days when fish loss following a hookup is virtually nil and other days when this is substantial. This may relate to the differences in fish feeding activity. Sometimes fish take the lure in a very "casual" way and at other times they take it frantically. Fishing at the Tauranga-Taupo river mouth is particularly good when the flow of the river is receding following a fresh, but still has some colour. In these conditions trout often "whack" the fly, grabbing the hook quickly and then running. Documentation on circle hooks suggests that this is when these hooks are most efficient.

Even though the data sample is small, some clear patterns are already appearing. The most obvious is the hook location with circle hooks having a much higher rate of jaw hook-up than normal hooks. Consequently the bleeding and death of fish following

removal of circle hooks is far less common than with normal hooks.

Circle hooks, especially when barbless, are very easy to remove. We are confident that circle hooks will help anglers to release fish so that they have a higher chance of survival. However the degree to which circle hooks gain popularity in Taupo, will be directly related to the commitment of anglers to ensure the survival of any fish they release.

Most major hook manufacturers now carry a large range of circle hooks. The design has been dramatically expanded to suit any possible type of prey and fishing technique. For anglers who have a large stock of barbed "J" hooks but who are keen to try circle hooks, an easy and cheap option is to modify these hooks. The first step is to crush the barb by squeezing and twisting it using long nose pliers. Then the final 1-2 mm of the point is bent toward the shank of the hook (see picture). You have then created an effective circle hook.

In order to have a robust accumulation of data on the performance of circle hooks in Taupo, we anticipate conducting this trial for an entire year. This way we are able to sample sufficient fish at every stage of maturation and through a whole range of conditions. After completion of this trial, we will produce a full report in *Target Taupo*.

In the meantime we would really appreciate feedback from anglers who have tried circle hooks with nymphs or dry flies.

*Table 1: Interim results of booking trials to compare circle and J type hooks flyfishing for rainbow trout on Lake Taupo*

		CIRCLE HOOKS		"J" HOOKS	
		number	%	number	%
Fishing success	Strikes	32		50	
	Hook-up	29	91	50	100
	landings	20	69	45	90
Hook location	Corner jaw	15	75	20	44
	Upper/lower jaw	1	5	2	5
	Deep hooked	4	20	23	51
Bleeding		0	0	6	13
Death after hook removal		0	0	3	7
Ease of hook removal	Easy	20	100	33	73
	Medium	0	0	5	11
	Difficult	0	0	7	16



Figure 1: left: Large bone fish hooks used to catch cod. right: Small bone fish hooks probably used to catch flounder 1500 years ago. Photo Credit: Robert Lewis, Maine State Museum [www.seaweb.org/Science/july27/historical.html](http://www.seaweb.org/Science/july27/historical.html)



Figure 2: Bone hook found in Norway considered to be 4,000 years old. Photo: [http://www.martinlegero.no/web.net/prc\\_historia\\_engl.htm](http://www.martinlegero.no/web.net/prc_historia_engl.htm)



Figure 3: Japanese hook made of reindeer horn and about 1500 years old



Figure 4: Hook from Easter Island, probably made from human bone

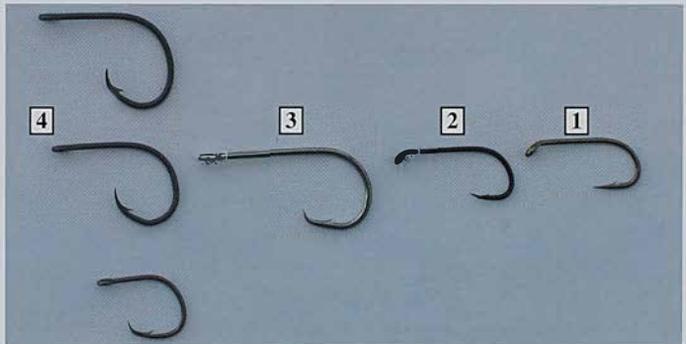
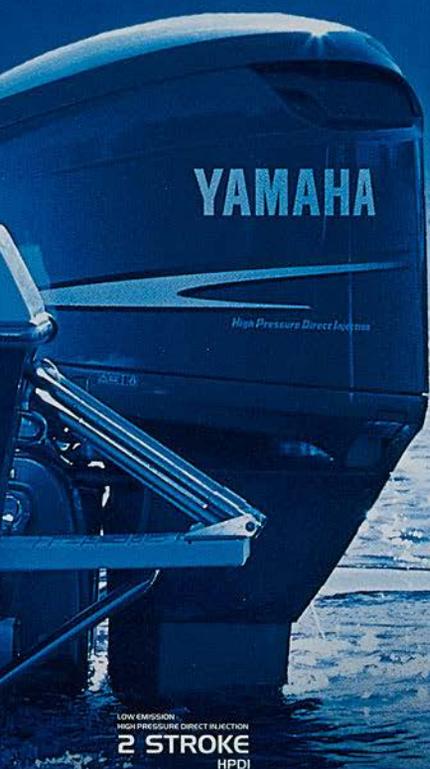


Figure 5: Hooks used in our trial. From the right: four circle hook types – 1, a conventional barbed hook 2, “T-Tinator” (author’s creation made from Gamakatsu F-111 as described in the text) 3, Mustad C71SSS 4, Three sizes of Eagle Claw 1702G. Note that the “T-Tinator” is barbless.



Figure 6: Maori hook, Ahuriri Museum courtesy of Napier City Council [www.ahuriri.co.nz/history/baude.htm](http://www.ahuriri.co.nz/history/baude.htm)

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The Tongariro River has changed significantly as can be seen in this aerial photo. The river has cut a new channel causing the Breakaway Pool to dry up. Photo: John Gibbs.

# CLEAN UP

## AT TONGARIRO NATIONAL TROUT CENTRE BEGINS

by Petrina Francis

The unseasonal weather experienced around New Zealand has taken a big toll on the country. The flooding of the Tongariro River on the 29th February, after 133mm of rain fell in 24 hours, caused major damage to homes in Turangi and to the Tongariro National Trout Centre.

The trout centre has been flooded in the past, however the force and volume this time has only been seen once before, in the "100 year flood" of 1958 when the flow peaked at 1490 cubic metres a second. This time the river rose from its normal Turangi flow of 25 cumecs to a maximum of 1430 cumecs.

The pictures on these pages tell a story of



Above: The fishery team and DOC staff from Ruapehu clear thick mud from the kids fishing pond. Photo: Rob Kirkwood. Harry Hamilton Ranger uses the DOC fire truck to clear mud from the rearing ponds at the centre. Photo: Rob Kirkwood.



Left: An aerial view of the rearing ponds at the trout centre. Photo: John Gibbs. Far Left: Dave Hart rescues a nice brown whio that had been stranded in very shallow water. Photo: Mark Venman.



*The Major Jones bridge across the Tongariro River is now closed.*

*Photo: John Gibbs*

*Below from left to right: The viewing chamber was completely filled with water.*

*Photo: John Gibbs*

*Pia Te Rangiata and Harry Hamilton removing mud from the viewing chamber after the water was pumped out.*

*Photo: Petrina Francis*

*Severe damage was done to the pathway at the centre that runs alongside the Tongariro River.*

*Photo: John Gibbs*

severe flood damage and the large clean-up operation needed to restore the trout centre grounds back to a condition suitable for visitors. With the help of Tongariro National Trout Centre Society members, volunteers, and DOC staff from Ruapehu Area, the Fishery Area team have made good progress in tidying up the site. Unfortunately all of the fish destined for the kids fishing days at the centre this year were lost, so there will be disappointed children all over the North Island who will not be able to catch a fish from the pond this year. However, we are hoping to have the programme up and running again in 2005. Due to the generosity of Eastern Fish & Game in offering a quantity of yearling trout to us.

There is still a lot of hard work ahead for everyone, and the goal of the fishery team is to restore the trout centre back to a condition that will allow us to open it once again to the public.

The flooding has made some significant changes to the channel of the Tongariro



*The River Walk building at the trout centre was hit hard by the flooding also. Carpet and flooring has had to be removed and dried. Photo: Petrina Francis*

River. The Major Jones bridge is closed for substantial repairs, and some 2km of anglers access tracks have been lost. Anglers can expect that their favourite fishing pools will have changed and there will be new pools, which could make for some interesting winter fishing and lots of exploring!



# TAUPO TROUT CATCH INCREASES

by Glenn Maclean

Results of the 2000/01 harvest survey indicate that the total catch and harvest (fish killed) of trout from the Taupo fishery has increased significantly over earlier estimates for the 1990/91 and 1995/96 seasons. This increased catch is largely due to a much greater angling effort on the lake spread across the whole year, rather than reflecting greater numbers of anglers at peak periods.

This survey was first conducted over the 1990/91 angling season coinciding with a major low point in the fishery. Results of the survey indicated that in years of low trout numbers such as at the start of the 1990s, angling harvest was large enough to have a major impact on the quality of the fishery. The small number of fish surviving to reach maturity was felt most by winter river anglers targeting them as they made their spawning migrations. As a consequence, in late 1990, we reduced the harvest by cutting the daily bag limit from 8 to 3 fish.

While these angling surveys provide information vital to the management of the fishery the financial and staff resources to undertake them is such that we can only run them every 5 years. The survey was repeated over the 1995/96 season and again over 2000/01.

In 2000/01, we estimated the catch and harvest from Lake Taupo and the Tongariro River as in past surveys. However this time we extended the survey to also estimate the catch from the Taumanga-Taupo River and

from the other river mouths and lake shore. The survey involved selecting a number of days across the season using a stratified random sampling design. On each of the selected days the number of anglers fishing the area in question was counted at intervals through the day by an observer in a light plane. At the same time staff on the ground interviewed anglers returning to the boat ramp or while still fishing to obtain details of their angling success. In total 235 flights were made and 6,678 interviews completed. In simple terms the daily catch and harvest was obtained by multiplying the daily angling effort calculated from the aerial counts by the average catch and harvest rate recorded from the interviews. The daily estimates were then combined to give estimates of the catch and harvest over the whole season.

The following is a brief summary of the results:

## Lake Taupo

### Trotling

- Non guided anglers caught an estimated 132,925 legal sized trout of which they kept 99,732 (75% of the catch)
- To catch these fish they spent an estimated 430,000 hours fishing
- The average trip length was 2.5 hours so this effort represents 172,000 angler visits
- One angler in 5 lived in Taupo
- On average anglers released one fish in four because it was undersize and of the legal sized fish also released one fish in four

If you fished the lake in 2000/01 it is most likely you used a leadline. However, as Graph 1 highlights, other methods and especially downriggers were relatively more successful.

Of note, given the concern by some anglers over the perceived impacts of jigging, is that this method only contributed three percent of the total catch.

### In addition

- Guided anglers caught an estimated 30,050 legal sized fish, keeping 22,070 trout or 73.4% of their catch

Graph 1: Breakdown of angling effort and catch for non guided anglers trotling on Lake Taupo by method, 2000/01 season



- They fished for an estimated 54,548 hours or 22,265 visits
- Guided anglers made up 11.3% of all anglers but accounted for 18.8% of the total catch and 18.1% of the harvest. This reflects that the average catch rate of guided anglers over the whole season was estimated at 0.5 trout per hour compared to 0.31 trout per hour for non-guided anglers
- Taupo fishing guides used downriggers almost exclusively (80% of the time)

*Lake shore and river mouths*

This incorporates anglers fishing the lake shore and river mouths including from anchored boats at the Tongariro Delta and

Tauranga-Taupo mouth. Estimates of the number of anglers fishing at night were determined from counts made by staff driving a circuit around the lake and visiting favoured localities.

- Anglers made 29800 visits fishing for an estimated 109,000 hours
- They caught an estimated 24,725 large trout keeping 13,635 fish
- Night fishing accounted for one quarter of the lake shore effort but a third of the total catch
- Overall fishing from the lake shore attracts 13% of anglers visiting the lake

**Tongariro River**

If you fished the Tongariro River between 1 July to 23 October 2000 and 7 April to 30 June 2001 (note the survey did not cover the summer):

- Your catch would be part of the estimated 28050 legal sized trout caught. Of these anglers kept an estimated 12950 trout or 45% of the catch
- Your visit/s were among 21,758 visits by anglers over the 199 days. This is an average of 109 visits per day
- You spent on average 4.1 hours on the river each day
- On average you could expect to have shared the river with between 35 and 40 anglers at any time
- If you fished upstream with a floating line then you were among two thirds of the anglers. As a group you had an average catch rate of one fish every four hours and caught three quarters of all the fish. By contrast wet line anglers on average caught one fish every five hours
- On average you released more than half your catch (55%)
- Less than 4% of your fellow anglers were guided
- One angler in four was from Auckland

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Anglers trolling on Lake Taupo caught 160,000 legal size trout over the 2000/01 fishing season

### Tauranga-Taupo River

This river attracted one third of the estimated angling effort for the Tongariro. On average at any moment there were likely to be 12 anglers on the river. These anglers caught an estimated 10,450 trout and kept 3,450. Ninety five percent of anglers favoured fishing upstream with a nymph for an average catch rate of one fish just over every three hours. In contrast to the Tongariro River, 17% of anglers interviewed on the Tauranga-Taupo were guided.

As part of counting anglers on the Tongariro and Tauranga-Taupo rivers we also counted anglers on the other eastern streams though didn't undertake interviews there. This allows us to compare the relative effort (Graph 2) but not to calculate the catch or

harvest from these smaller tributaries

Graph 2 indicates that more than half of the winter river angling effort occurs on the Tongariro and that the Tongariro and Tauranga-Taupo account for nearly three quarters of all the effort.

### Total use, catch and harvest

Table 1 summarises the total use, catch and harvest for the Taupo Fishery in a more detailed way.

- Overall anglers made an estimated quarter of a million visits to Lake Taupo and surrounding rivers over the 2000/01 season spending an estimated three quarters of a million hours fishing
- Those of you who troll on Lake Taupo account for two thirds of the total angling effort in the fishery. However because your trips on the lake tend to be shorter than anglers fishing the rivers, then trollers on Lake Taupo comprise nearly three quarters of all anglers
- Excluding the catch from the Waiahanui, Hinemaiaia, Waimarino and Waiotaka streams, anglers caught an estimated 225,000 legal sized trout of which they harvested 150,000 fish (two thirds of the catch)

Graph 2: Relative angling use of the eastern Taupo tributaries 2000/01 season

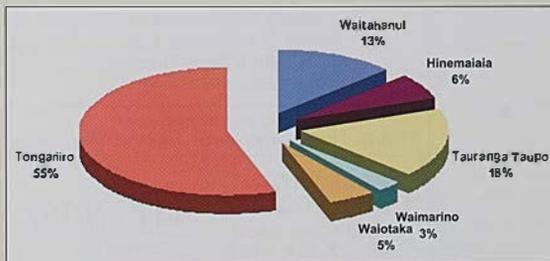


Table 1: Estimated effort, angler visits, relative use, catch and harvest for the Taupo Fishery 2000/01 season

Area	Effort (hrs)	Angler visits	Relative use (%)	Catch	Harvest
Tongariro River	89,210	21,758	11.8	28,047	12954
Tauranga Taupo River	28,496	6950	3.8	10,450	5,446
Waikanae River	21,254	5,184	2.8		
Hinemaitia River	10,100	2,463	1.3		
Waikaremoana River	4,254	1,037	0.6		
Waioata River	8,577	2,092	1.1		
Lake (trotting-unguided)	430,000	172,000	56.9	132,925	99,732
Lake (trotting - guided)	5,4548	22,264	7.2	30,050	22,069
lake edge (day)	82,971	22,670	11.0	16,878	8,978
lake edge (night)	26,051	7,118	3.7	7,817	4,655
TOTAL	755,458	263,537		226,197	151,834
Standard Error	37,130			14,325	9,670

\* relative use is the amount of effort as a proportion of the total effort

- If we assume the catch from the other tributaries was relative to the effort expended on them then the total catch can be estimated at 240,000 trout and harvest at 160,000 fish or 270 tonnes
- On average every angler caught five trout over the season

#### How does this compare?

Graph 3 shows the changes in catch and harvest for the Tongariro River and Lake Taupo over the past decade.

Of note:

- Angling effort on the Tongariro has remained unchanged, the increase in catch reflecting improved catch rates
- The practice of catch and release on the Tongariro has increased so the harvest has remained unchanged
- Angling effort on the lake has increased 60% though licence sales were very similar between 1990/91 and 2000/01 seasons
- The catch on the lake has increased 120% reflecting the increased effort and that the average catch rate has increased from one fish every four hours to one fish every three hours

- The lake harvest is 1.9 times that of 1990/91

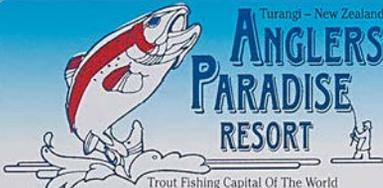
#### What does this mean?

There are a number of important management issues highlighted by these latest results.

#### Lake Taupo

1. The lake harvest has increased significantly despite the reduction in the daily bag limit from 8 fish to 3 fish in December 1990 and

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*On an average day, you can expect to share the Tongariro River with between 35 and 40 other anglers.*

*Photo: Rob Hood*

the increased minimum size limit in July 1998

2. In part this simply reflects that the fishery is stronger than it was in the early 1990's
3. However a significant cause is the increase in angling effort on the lake which is not reflected in licence sales. The increased effort is spread across the whole season rather than reflecting increased numbers at peak periods
4. Over 50,000 undersized trout and 40,000 legal size trout were released by lake anglers. Potentially there is a huge additional harvest if these fish are not released correctly and die.
5. The harvest taken tolling accounts for three quarters of the total harvest in the fishery
6. 2000 was a major peak in the Taupo Fishery. In less productive years the average catch rates will decline. Nevertheless at this level of angling effort the harvest will impact significantly on the quality of the fishery unless carefully managed
7. As much as river anglers will not like to hear this, the lake fishery is now clearly the

major component of the Taupo Fishery attracting 75% of angler visits

8. The lake edge and river mouth fishery is of similar magnitude to the Tongariro and Tauranga-Taupo river fisheries combined

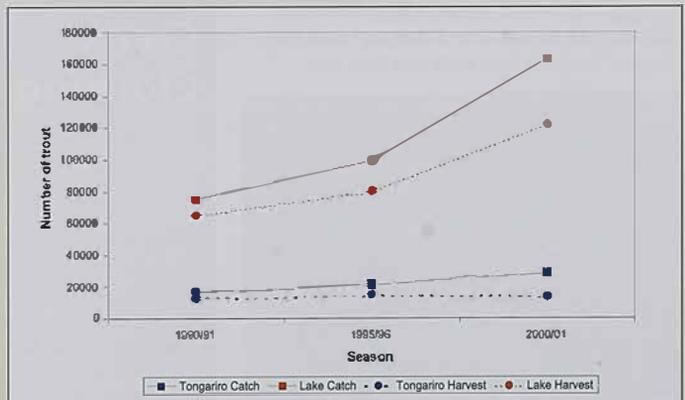
*Tongariro River*

9. The effort has remained constant suggesting that angler numbers are essentially determined by the amount of space available
10. The Tongariro attracts over half of the total winter river angling effort
11. Harvest has remained constant reflecting an increase in catch and release which offsets the increased average catch rates in recent years

*Overall*

12. The survey reinforces the importance of the Taupo fishery. Anglers made over a quarter of a million trips over the 2000/01 season fishing for over three quarters of a million hours
13. Anglers caught nearly a quarter of a million legal sized trout of which they harvested an estimated 160,000 fish or 270 tonnes of trout.

*Graph 3: Catch and harvest estimates for the Tongariro River and Lake Taupo toll fishery (including guided anglers) 1990/91, 1995/96 and 2000/01 seasons*



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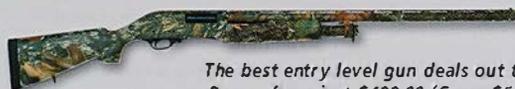
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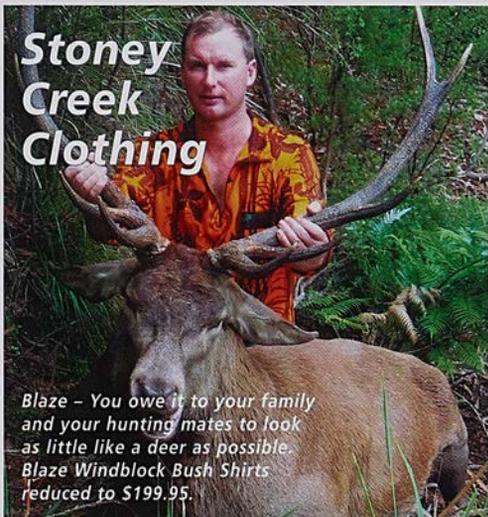
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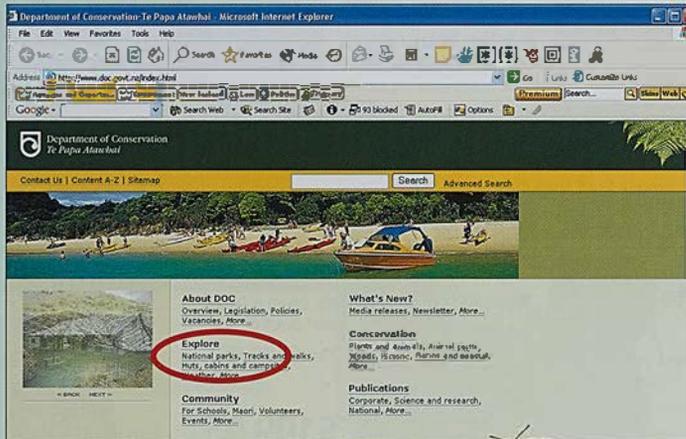
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# Surfing the DOC site

by Petrina Francis



## www.doc.govt.nz

Have you looked at the Department of Conservation website lately?

This huge site is constantly being updated and revised. With a fresh new front page this year, the site is developing into a fantastic source of quick information to those who understand how to navigate it. And in case you didn't realise, the Taupo angler has their own special section.

On entering the site, click on the "explore" category and then on the "hunting and fishing" section listed along the top of the screen. From there, look to the left and you will see a series of links including one that says "Taupo fishery".

Here you can find a list of agents that sell licences, a fact sheet all about the Taupo fishery, information on the Tongariro National Trout Centre, catch up on key Target Taupo articles from the past and read a monitoring report which is updated monthly by the technical team keeping website surfers up to date with trout trends.

Also within the larger DOC site can be found other helpful web stuff such as:

Daily updated weather information by region at:

<http://www.doc.govt.nz/Explore/Weather/Weather.aspx>

You can't read all the newspapers at once! So check out recent news media releases including Taupo fishing releases at:

<http://www.doc.govt.nz/Whats-New/MediaReleases.asp>

Lots about tracks and walks at:

<http://www.doc.govt.nz/Explore/002-Tracks-and-Walks/index.asp>

Send your own electronic Christmas cards this year under the "what's new" section at:

<http://www.doc.govt.nz/Whats-New/Xmas-Cards/index.asp>

Subscribe to the DOC-NZ-UPDATE - a regular newsletter to find out What's Up DOC! On the front page of the site, and read all about current issues and research.

[www.doc.govt.nz](http://www.doc.govt.nz) - check it out!



# Society continues to look ahead

by Petrino Francis

Planning for further development of the Tongariro National Trout Centre is one of the exciting challenges facing the Tongariro National Trout Centre Society.

The society meets regularly to discuss progress at the centre, review operating costs and expenditure and plan future projects at the site. Towards the end of December 2003 the committee met to review the strategy and objectives of the society and refocus on a timetable for development of the site. What evolved was a priority list of projects the society will work on over the next few years which include: relining and landscaping of the children's fishing pond, additional toilet facilities, improved donation boxes and signage, interpretation of the fish trap display and site directional signs. None of this is possible however without sponsorship and donations, and a major challenge for the society will be to actively seek funding for these projects.

Overarching these projects is the theme of education - developing the site as an educational facility. In partnership with the Department of Conservation and a major sponsor, plans are afoot for a teacher to be employed to provide school groups that visit the centre with a learning programme which will incorporate use of a classroom, the River Walk building displays and auditorium, the hatchery and the great natural aspects of the centre which include the Waihukahuka Stream and Tongariro River. Children will be able to learn about the life cycle of living things, what lives in freshwater, trout ecology, freshwater conservation, the sport of angling, why people value resources such as water and trout, threats to the existence of trout, sharing natural resources and the importance of laws and regulations to manage the fishery and environment. It is hoped that through this programme, we can influence young minds and teach them to respect the Taupo trout fishery and the opportunity it provides for the local community and economy. We hope that children will leave the centre excited about the outdoors and see fishing as a healthy recreational pursuit that they want to be involved in.

So there is plenty for the society to be excited about! All of this will help them achieve their mission statement:

*"To develop, promote and expand the Tongariro National Trout Centre, in partnership with the Department of Conservation; to enlighten and inform children and educate all visitors about trout, the Taupo fishery, New Zealand freshwater fisheries and freshwater ecology; to see and enjoy trout in their natural habitat, and to encourage participation in recreational fishing as a healthy and pleasurable activity"*

John Wilcox, Society volunteer looks after a happy visitor  
Photo: Rob Kirkwood

If you would like to be part of this enthusiastic society, they are always keen for new members. At present The River Walk building, the latest jewel in the crown of the society and a fantastic new interpretive building within the trout centre grounds, is manned daily by a group of friendly helpers. If you would like to assist with this volunteer work, the society would love to hear from you.

For more information on the society or to become a volunteer, please contact: Brian Wills on Ph: (07) 386 7339 or write to: Tongariro National Trout Centre Society, PO Box 73, Turangi.



# EXCITING NEW ACOUSTIC TRACKING PROJECT BEGINS

by Dr Michel Medual &  
Rob Kirkwood

In rivers trout are relatively easy to observe and research can be readily carried out. As a consequence the biology of rainbow trout in rivers around Taupo is reasonably well understood. However, our knowledge of trout behaviour in Lake Taupo is fragmented and most of the information is anecdotal. Do trout exhibit schooling behaviour? Are there any parts of the lake that trout prefer? How extensive are trout movements both vertically and horizontally in the lake? What depth and water temperature do they prefer during the day and night, summer and winter? Do they tend to follow the shoreline as they travel or do they swim across the lake?

All these fascinating questions are being explored and hopefully answered through our acoustic tracking project on Lake Taupo, using a new generation of transmitters specially customised in Canada to suit our research requirements.

By now most of you are will be familiar with the radio tracking technology that was used in the Tongariro River by our team, and in Lake Otamangakau. For the first time, three years ago, we used acoustic telemetry (using sound waves rather than radio waves to convey the information) to explore the behav-



An acoustic transmitter.  
Photo: John Gibbs

our of catfish in Motuoaapa Bay. This time we are using new cutting edge technology to follow rainbow trout in Lake Taupo.

The acoustic tracking project involved catching 34 adult trout in different areas around the lake by angling. An acoustic transmitter was surgically implanted into each fish which sends a coded sound signal every minute and a half for 514 days, recording the depth and the temperature of the water where the fish is swimming. A series of 16 automatic listening stations are deployed at strategic locations around the lake including all the main river mouths, prominent points on the shore, Horonotangi

The listening station, or data logger. Sixteen of these are placed in strategic locations around the lake.  
Photo: John Gibbs





Dave Hart and Glenn Maclean prepare to place a data logger on the lake bed.  
 Photo: John Gibbs

Reef, and Motutaiko Island. The automatic logging station records every signal within a radius of about 1 km. After 514 days, the logging stations will be recovered by divers, downloaded and the data analysed.

The transmitters are especially designed to meet animal ethics guidelines for surgical implants. Their weight (30 g) ensures they don't exceed less than 2% of the host fish body weight. They are made of an inert epoxy resin and careful trials show that the incisions heal quickly and cleanly and normal feeding behaviour is resumed in just a few days.

A substantial amount of work was required to set up this project. Firstly, the automatic data loggers, which look similar to a large grey firecracker, had to be installed. The loggers were attached to a warratah and positioned by divers between 10 and 17 m deep on the bed of the lake. The sites were recorded with a GPS.

We then concentrated on the fish tagging operation. This was one of the better parts of the job! Fish had to first be caught and to achieve this, fishery staff used three boats. Two were used to catch all the fish required and the third to transport the caught fish

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*Rob Kirkwood and Dave Hart collect the floating bags containing the tagged fish just prior to releasing the fish back into the water*  
 Photo: John Gibbs

back to floating holding bags anchored at the tagging site.

A variety of fishing methods were used during the project. Harling proved successful in the early hours of daylight and as the day progressed, deeper methods such as down-riggers and jigging were used. As you can imagine, a fair bit of healthy competition was involved between the crews of the fishing boats! Fish were tagged in various locations around the lake including Whakaipo Bay, Waihaha Bay, White Cliffs - Horomatangi Reef, Stump Bay, Motukapa Bay, and the Tauranga-Taupo River Mouth.

After anaesthetising and surgically implanting the acoustic tags into each fish, they were released back into the lake, in the same loca-

tion where they were caught. Each fish was also marked with a coloured, numbered "spaghetti" tag on its back.

If you do happen to catch a rainbow trout with a plastic spaghetti tag sticking out of its back, please record the number of the tag if you release the fish, and let us know this along with when and where you caught it. If you have kept the fish please send us the same information along with the transmitter which will be sitting inside the body cavity under the stomach. To date two fish have been caught, including one at Waihaha a month after it was released at White Cliffs. When we download the loggers it will be interesting to see if this fish was detected swimming around the lake shore or whether it swam straight across the middle of the lake.

*Michel Dedual releases tagged trout from the holding bags*  
 Photo: Glenn Maclean



As you read this, somewhere in the lake, a data logger or listening station is recording the movement of these fish as they swim around the lake. Over the next 18 months, valuable information will accumulate that will help us understand more about the behaviour of rainbow trout in Lake Taupo. The information obtained through this project will also be useful to anglers who are keen to understand Taupo trout better. We will be sure to keep you up to date with the project's progress in future issues of *Target Taupo*.

# SOCIETY RECEIVES CONSERVATION AWARD

by *Petrina Francis & Dave Wakeelin*.  
*Dave is the Community Relations Officer for the Tongariro Taupo Conservancy*



*Pictured right, six happy conservation award recipients (from left to right) Gary Vartiainen - Waiakei Primary School, Albie Shaw - Pukawa Wildlife Management Group, Chris Hutton - NZ Forest Managers, Elizabeth Macey, John Minter - Tongariro National Trout Centre Society, Tracey Hickman - Genesis Power Ltd*  
*Photo credit: Taupo Times, Paula Coulter*

In December 2003 John Minter, on behalf of the Tongariro National Trout Centre Society, stepped up to receive one of six Tongariro Taupo Conservation Awards from the Department of Conservation.

The award was in recognition of the effort the Society has put into fundraising and development of a new interpretation centre and auditorium, opened by the Prime Minister in August 2003 and situated within the Tongariro National Trout Centre grounds. "As a trust this group was instrumental in providing funding and support for several projects at the site over the years, including upgrading of the underwater viewing chamber, construction of a public carpark, BBQ facilities, and organising the immensely popular children's fishing days" said John Gibbs, Taupo Fishery Area Manager, as he presented the award. "The Society's long term strategy is to continue to develop the centre site, and to facilitate research, study, advancement and understanding of trout and other freshwater fisheries in New Zealand".

The awards, now in their eleventh year, acknowledge the conservation efforts of a range of individuals and organisations. The Pukawa Wildlife Management Group received an award for their initiative to take on pest control in their community at the southern end of Lake Taupo. NZ Forest Managers Ltd were

recognised for working together with the Department of Conservation for the protection of the endangered tree species *Pittosporum tumerit* near Lake Otunangakau and control of grey willow within the Lake Rotoaira basin. Genesis Power Ltd received an award for their willingness to consult, listen and help the department reach solutions in the application of the East Rapaehui Lahar early warning system as well as funding a trust to assist research into the endangered blue duck.

Waiakei Primary School was honoured for their commitment to conservation projects in their school community. "The school enthusiastically embraced the Conservancy's Native Trees in Schools project and continued it, doubling the original area planted with school children actively seeking sponsorship and planting advice," said Dave Wakeelin, Community Relations Officer.

The final award was received by Elizabeth Macey on behalf of her late husband John Macey, former Chief Ranger of Tongariro National Park, for his work in the training of rangers, improving resources in the park and helping start the Diploma in Parks and Recreation Administration at Lincoln College.

All of the awards were certainly well deserved, and will take pride of place on walls around the country!

## The Tongariro National Trout Centre Society

The role of the Society is to promote and foster public interest in, and understanding of, the Taupo fishery, other freshwater fisheries and freshwater ecology through development of the trout centre and wider promotion and education programmes. To join the Society, fill out this form and send \$25.

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
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Post to: Tongariro National Trout Centre Society, P.O. Box 73, Turangi

# BLUE FOX



by **Rapala**



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# HINEMAIAIA RIVER WINTER FISHING LIMITS

by John Gibbs

One of the key outcomes sought by the Department of Conservation in our submissions on the Trustpower resource consents for the Hinemaiaia HB dam, was an improvement in the fishery sufficient to allow more angling opportunity on the river.

In evidence prepared for the hearing we showed that there was some 7-8km of water available year-round to anglers prior to the construction of the dam. After construction in 1966, it was necessary to protect the reduced spawning habitat for trout by closing the upper 1.5km of water permanently and closing the 5.5km above the highway bridge for the 6 months of June to November. This left only 1.5km of river available for fishing year-round, or a 50% loss of angling opportunity. To this can be added the loss of fishing opportunity in Lake Taupo itself as a result of fewer trout being produced by the Hinemaiaia system.

It is hardly surprising then that anglers are keen to see the restoration of some of that lost opportunity. This was reflected in a petition we received in October last year, signed by 297 people.

The petition read:

**Petition to Paul Green, Conservator DOC, Turangi**  
**Increased fishing opportunities on the Hinemaiaia River**

We the under signed would like you to consider the following request for increasing the fishing opportunities on the Hinemaiaia River.

**Proposal to increase winter fishing limit by a further 1 km of river above the main road bridge.**

Name	Address	Signature
------	---------	-----------

We provided copies of our evidence from the consent hearings to Colin Philpott, the petition organiser and undertook to discuss the request with the Taupo Fishery Advisory Committee and publish our response in *Target Taupo* so petitioners could see the outcome. The TFAC endorsed the department's recommendations which are set out in the following letter.

Distributed by Douglas Johnson & Co  
Member of IGFA

31 October 2003

Colin Philpott

TAUPO

Dear Colin

## HINEMAIA RIVER FISHING LIMIT PETITION

Thank you for presenting your petition seeking extension of the winter fishing limit on the Hinemaia River to one kilometre above the state highway bridge.

The lack of angling opportunity on the river is of major concern to us as managers of the fishery. Currently opportunity on the Hinemaia is much more restricted than on similar Taupo rivers and this formed the basis of our position with regard to the renewal of operating consents for the Hinemaia Power Scheme. Dr Michel Dedual has forwarded you a copy of the evidence that we presented at the hearing for these consents but I will briefly summarise it below:

- Prior to the construction of the HB (lower) dam in 1966, trout had spawning access much further upstream including to the Pitikohuru and Kakapo tributaries.
- Concerns over the impact of loss of access to the upstream spawning areas caused fishery managers to set the winter limit at the highway bridge to protect fish using the remaining spawning areas.
- In hindsight this also proved a prudent move because the fluctuating flows associated with power generation had a very negative impact on spawning success and juvenile trout survival and rearing.
- In the hearing we sought a requirement that TrustPower provide upstream and downstream fish passage past HB dam and operate a much more natural flow regime in the lower river, which we believe would significantly improve the fishery.
- The justification for our position was that these improvements would in turn allow us to increase angling opportunity by relaxing some of the regulations. Shifting the winter limit is obviously one option but changes could also include such things as the timing of the closed season in the upper river.
- We were successful in our case but the hearing decision was subsequently appealed to the Environment Court by several parties including TrustPower. However before the case went to court TrustPower agreed to our proposed consent conditions.
- TrustPower agreed to trial several approaches to facilitate fish passage past HB dam with the requirement that they must provide long term passage by July 2008. They also accepted the flow regime recommended by the hearing committee.
- TrustPower has now also reached agreement with the other parties who appealed the decision and it is expected the resource consents will be granted in the next few weeks.

We are very pleased with this outcome and confident that it will be reflected by a significant improvement in the Hinemaia fishery over the next few years. Once an improvement is evident then we will actively pursue changes to increase fishing opportunity consistent with the intent of your petition. However we are not prepared to implement changes until the fishery improves. To do so would be inconsistent with our position that the new consent conditions, which come at considerable cost to TrustPower, were necessary in the first place.

In the short term a management plan has been developed between the Harepe Residents Association, the local hapu DOC, TrustPower and Environment Waikato for that area of the river below the highway bridge. The plan stems from concerns about the state of the river and banks and provides for ongoing work to address such aspects as small scale erosion, removal of snags restricting angling, removing leaning trees before they fall in and weed control. Within the plan is the opportunity for different groups to be involved as appropriate. The first work begins in mid November and involves repairing and extending a groyne just upstream from the river mouth. At the same time we will use the machinery to remove a number of snags from the river to create more angling water. This will become an annual activity (though not involving heavy machinery each year) and will significantly improve fishing opportunity in this stretch. We also believe that the more natural flow regime now in place is likely to reduce the amount of erosion and therefore debris in the river.

In the medium term if this project is a success we hope to extend it above the bridge but it is the groups view at this stage that it is better to concentrate on doing a good job in the downstream reach.

I am sorry therefore, that for the protection and on-going sustainability of the fishery we cannot agree with the request in your petition in the immediate future. However we are supportive of the intent and all going to plan, hope to increase the angling opportunities on this special river within a few years. We will publish this letter in the next issue of Target Taupo (March 2004) so that the many anglers who signed your petition are aware of the response.

Yours sincerely

John Gibbs

Taupo Fishery Area Manager

# A study of the mortality of juvenile rainbow trout at Kuratau hydro-electric dam

by Dr Michel Dedual

**P**icturesque Lake Kuratau, on the western side of Lake Taupo was formed when a natural fall in the Kuratau River was dammed with an earth dam in 1962. As the operational head pond for the Kuratau Power Station, the lake provides enough volume to ensure an adequate supply of water to the station.

There are self sustaining populations of rainbow trout upstream of the dam and of interest to our team is the fact that not all of these fish stay in Lake Kuratau. Some trout manage to pass down into the Kuratau River to eventually reach Lake Taupo. Evidence of this can be seen by the concentration of adult fish observed each winter just metres downstream of the tail race and in the big pool just below the fall in the bypass. These are mature fish which are attempting to return upstream of the lake to spawn but which are thwarted by the power station and waterfall. While little angling for these fish occurs in the Kuratau River they are nevertheless a valuable addition to the fishery in Lake Taupo and at the Kuratau River mouth, and help offset the impact of the power station on the production of trout in the lower river.

Therefore safe downstream passage for juvenile rainbow trout through the Kuratau power station is a key factor. Juvenile fish can pass downstream in two different ways, either by passing over the spillway when the lake is overfull, or passing through the

turbines at the power station. What is unknown is which pathway is the most important for passing juvenile trout downstream. With the renewal of the resource consents to operate the scheme this became a key question. If passage over the spillway is the crux then provision for this could be made in the consents by requiring King Country Energy (KCE), who operate the station, to allow the lake to overflow for prescribed periods over autumn which is the time of peak juvenile trout migration. However there is clearly a significant cost to KCE in spilling this water and not something they would want to do unless it is necessary. Therefore we agreed that the first step was to establish whether juveniles passing through the turbines as part of their regular operation survived this passage. If significant numbers of fish did survive what intuitively we would think was a very hazardous trip, then the spilling provisions would be unnecessary.

*What is unknown is which pathway is the most important for passing juvenile trout downstream*

As a consequence the new consents make provision for establishment of spilling flows if necessary, but first require that KCE investigate survival through the turbines with the condition that if more than 50% of trout survive, spilling flows will be unnecessary. We have agreed to undertake the trial in collaboration with KCE and fishery scientist Dr Michel Dedual has put in place a plan to assess this survival rate. Juvenile rainbow trout will

*Gordon McKenzie and Rob Hood assess the suitability of this oversized fyke net for the trial*

*Photo: Michel Dedual*



Kerry Mackie (King Country Energy Ltd) and Michel Dednat discuss plans for the trial by the turbine outlet at the Kuratou Power Station

Photo: Rob Hood



be released into the penstocks above the turbines passing through the system to be recaptured in a large net fitted at the outlet of the turbines. All fish will be counted and assessed by the team, and live fish will be kept in captivity for a further period of 24 hours in order to determine the overall survival rate and if there is any delayed mortality.

The initial trials were planned for early

February but the regular rain and unseasonable weather throughout the month has meant the trial has had to be postponed on three occasions

However, it is hoped that a break in the weather will mean the project can be undertaken by the time you read this. We hope to be able to bring you the results of this trial in the July issue of *Target Tackle*.



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# Summer lake angling seminars

Photos: John Gibbs

This summer's lake angling seminars were strongly affected by the fickle Christmas holiday period weather we experienced at Taupo, which saw one seminar cancelled and the other held in perfect conditions the very next day.

The seminar scheduled at Whareora reserve on the 30th of December was reluctantly cancelled when heavy rain and unseasonable cold winds over the previous night persisted through the day.

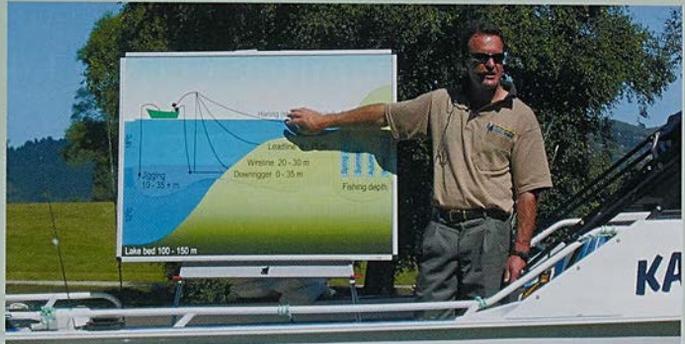
Fortunately the skies cleared as forecast that evening and the 85 keen anglers who turned up for the seminar at the 3 Mile Bay boat ramp reserve on the following morning were treated to a perfect Taupo day!

As in previous years the seminar was aimed at providing novice boat anglers and those new to fishing at Taupo with information and tips designed to improve their chances of catching a trout. Topics covered in the seminar included the life cycle of Taupo trout, their distribution in the lake depending on the season and time of day, tips on technique and tackle for various angling methods, effective use of echo-sounders, how to release fish correctly, and some general information on fishery regulations and boat angling etiquette. This year we were pleased to deliver the seminar with the aid of some excellent new resources including large charts with magnetic overlays illustrating various angling methods in relation to lake topography, and a series of flip-charts detailing how echo sounders work and the best use of them to enhance

Dave Hart explains how to set up a downrigger



Glenn Maclean uses the magnetic chart to explain what methods should be fished at different times of the year



The public enjoyed fine weather at the seminar at 3 Mile Bay



angling success. Past problems with trying to speak to a large group over background noise were also overcome with the use of a cordless microphone and speaker system, despite the best efforts of the occasional helicopter!

The lake angling seminars have become a firm component of the Department of Conservation summer program and will be sure to be held next year. Dates and venues will be published in the November 2004 issue of *Target Taupo*, or for more information give Petra Jane Francis a ring on (07) 386 9259 nearer the time.



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# The Taupo Fishery Advisory Committee (TFAC) takes a look at angling behaviour

by Graham Wbyman  
and Strato Cotsilitis,  
Taupo Fishery Advisory  
Committee

The Taupo Fishery Advisory Committee (TFAC) was set up as an 'advisory user group' following the establishment of the Department of Conservation in 1987. The functions of the committee, as defined by the Taupo Fishing Regulations are to:

- Advocate Taupo sport fishing interests
- Facilitate communication between the Department and anglers, and to keep anglers informed on matters affecting their interests
- Foster ethical standards of angling behaviour
- Consider and advise the Department of Conservation on freshwater and sport fishing matters within the Taupo fishing district
- Make representations, as it sees fit, to the Minister of Conservation or to the Department itself or any other government agency or other organisation, on matters affecting the Taupo fishery including national and regional policy statements, management strategies and management plans
- Liaise with Fish and Game New Zealand on matters of mutual interest relating to sports fish.

## Who are the committee?

### The committee consists of the following members:

Six members appointed by the Minister of Conservation from persons nominated by the following organisations:

New Zealand Professional Fishing Guides Association

*Current representative is Ken Dimcan*

Taupo Commercial Launchmen's Association

*Current representative is Chris Jolly*

Taupo Fishing Club

*Current representative is Richard Shrimpton*

Tongariro and Lake Taupo Anglers' Club (TAFAC)

*Current representative is Graham Wbyman*

Turangi Trout Unlimited

*This position vacant as the branch is in recess*

Waitahanui Angling Improvement Association

*Current representative is Wayne Pattinson*

### One member each is also appointed by the minister to represent:

Tuwharetoa Maori Trust Board (on advice from the board)

National angling interests - *currently represented by Strato Cotsilitis*

Fish and Game New Zealand (on advice from Fish & Game) - *currently represented by Bryce Johnson*

Tongariro/Laupo Conservator of the Department of Conservation - *currently represented by John Gibbs, Taupo Fishery Area Manager*

## The committee needs input from anglers

The committee meets every two months and deals with a wide variety of matters. One of the main functions of the TFAC is to facilitate communication between the angling community and

the fishery managers and so the committee welcomes feedback and comments from anglers. This is your fishery and we urge you to get involved. For this reason, the committee needs your input so please contact the committee with any comments which you feel will assist in maintaining the Taupo fishery as one of the best in the world.

### How to contact the TFAC committee

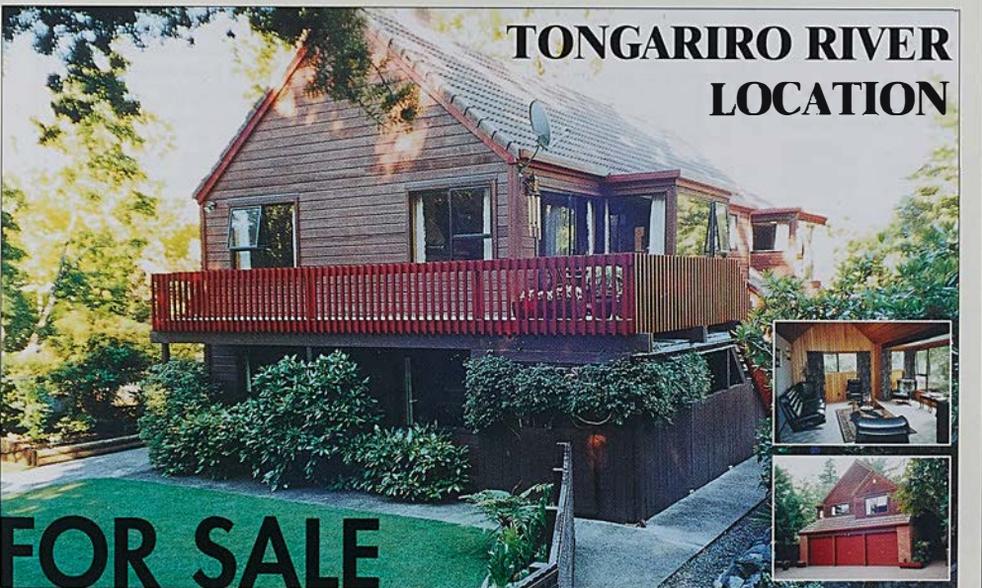
Please contact Graham Whyman directly on (07) 386 8996 or email [sport.life@xtra.co.nz](mailto:sport.life@xtra.co.nz)

Or write to:  
Taupo Fishery Advisory Committee  
PO Box 327  
Turangi

### Angling behaviour

The TFAC are concerned at the lack of etiquette displayed by anglers when fishing the lake and rivers. In an effort to "foster ethical angling behaviour" the TFAC committee would like to draw anglers' attention to an excerpt taken from *Volcanic Trout - A complete guide to fishing the Taupo region*, by Brendon Mathews, published by Long Acre Press Ltd, 2003. The TFAC feel that this quotation sums up very well how anglers in the Taupo District are expected to behave.

The following is printed with the kind permission of author Brendon Mathews and LongAcre Press Ltd.



# TONGARIRO RIVER LOCATION

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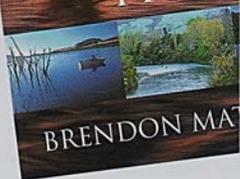
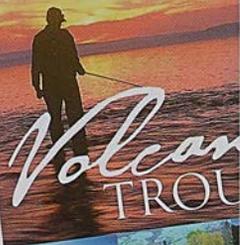
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## A COMPLETE GUIDE TO FISHING THE TAUPO REGION



### Anglers' Lore

Anglers' lore (also called angling etiquette) is a simple set of guidelines for generally agreed good behaviour when fishing. It is not strictly applied, but when you have to share water with others, deviation from it can and will upset other anglers. When the fishing is hot and anglers are in abundance there are times when some people forget their manners. In my experience this is usually an oversight bought on by eagerness or anticipation rather than a blatant disregard for others. It pays to alert the 'unaware' angler to your presence and if possible ask their intentions.

Calm, respectful dialogue often eases any ill-feeling between the parties and is the preferred option if a enjoyable fishing experience is what you were looking forward to.

### In the tributaries

1. Always enter a pool behind any angler already fishing. Should you be joined in a pool by another angler it is your duty to keep moving and give everyone a fair go at the fish. A good rule of thumb is to take a step for every one to five casts, depending on the method and the number of anglers in line. Once at the end of the pool simply move to the back of the line and start again.

2. Hogging a position is the fastest way to upset other anglers

3. Shodhorning yourself into an already congested pool is a sure way to discourage other anglers from taking their step, which means you may not get a turn at the best water

4. If the pool is full of anglers, wait on the bank or move on to another less crowded location

5. When an angler hooks a fish leave them plenty of room to play and land it. Don't rush in and take their place in the line while they are away landing the fish!

6. It is common to share a pool with anglers using a technique different from yours and at some stage you will cross paths in the pool, so exercise patience and talk with the other angler about who will do what when the time comes

### At the mouths

1. The start of the line is usually at the 'rip', which is where the river or stream water meets the lake. Depending on the conditions there could be two lines of anglers coming from the centre of the rip, one either side. Unless there is a large gap between people in the line, your starting point is behind the person furthest from the rip. If in doubt, ask the angler either side of the position you intend to take if it is OK with them.

2. When an angler near you indicates they have a fish on, immediately wind in your line to avoid a tangle.

3. At night, don't shine lights or torches towards the lake because light on the water can alert the trout to your presence. Turn your back to the lake before switching on.

4. It is not common to move your position as you do in the tributaries because the fish are normally on a beat and there is a reasonable chance that you will have as much opportunity as the next angler to get into them. However, people do leave, so if a gap appears, and it suits, close up the ranks.

### On the lake

1. When harling or trolling, cutting in from of another boat usually results in tangled lines. In particular beware of boats using lead or wae lines, which could be 100 metres or more behind the boat.

2. Don't force the other boat on a head-on bearing to turn in to the shallow water and snag the anglers' lines. Instead make a turn out into the lake and return to the fishing zone when the other vessel is clear.

3. Ensure you stay well clear of the 300m fishing-only radius that is in place around most river and stream mouths. A white marker pole coloured with black and yellow rings usually indicates these. Make yourself familiar with the exceptions on your licence.

4. Remember the regulations regarding proper navigation lighting of your vessel. It is an offence to be on the lake before sunrise or after sunset without the correct navigation lights being shown. The fines are instant and can be very heavy, not to mention the obvious danger you place yourselves and others in.

5. When travelling at speed, keep well clear of other boat users. Nobody enjoys rolling through someone else's wake, especially when it is completely avoidable on such a large lake.

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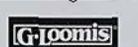
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Colour: Chartreuse

Sizes: WF 3 to WF 10, DT 3 to DT 10, Level 6, 7 & 8

■ 160 Sink-Tip Lines - Premium Line / Sinking Tip

Colour: Green Belly / Grey Tip

90 foot length, Sink Rate: 1.75 - 4.0 IPS. Sizes: WF 4 to WF 10

■ 130 Intermediate Sinking - Premium Sinking Line

Colour: Dark Brown

90 foot length, Sink Rate: 1.75 - 4.0 IPS. Sizes: WF 4 to WF 10

■ 160 Sinking Lines - Premium Fast Sinking Line

Colour: Dark Green

90 foot length, Sink Rate: 2.0 - 4.0 IPS. Sizes: WF 4 to WF 10

For more information check out [www.nzblue.com/aquanova](http://www.nzblue.com/aquanova) or call 09 630 9677



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## THE SF535

Stunning performance from a boat that New Zealanders love the most. The Haines Hunter SF535 has a proud history as arguably the best handling blue water boat of its size. Nifty performance in the wet, easy to tow and handle on and off the trailer the Haines Hunter SF535 also fishes extremely well. The combination of great looks, comfort and room make it easier to enjoy the rewards of being out on the water with family or friends. The handling characteristics of this boat are the envy of many, providing

seamless performance with a sporting flare of a true thoroughbred. It all adds up to less strenuous day on the water. Test drive the Haines Hunter SF535 and find out why more New Zealanders have made this model the most preferred boat on the market today.



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## the art of performance



Made from a soft, quiet Gore-Tex® fabric, our Matuka Jacket features an ergonomically designed, detachable hood. The insulated collar fights off even the most ferocious Tongariro zephyr. Super comfort cuffs sport a non-snap stretch finish, while sleeves are anatomically shaped to allow the most amazing amount of freedom when casting.

Pockets (self-draining of course) are strategically placed, with handwarmers underneath.

Generous while not cumbersome, the versatile inner pocket under your stormflap has ample room for keys, licences and those brag photos you always like to carry around.



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