

# Whakapapa River: 2017 Drift Dive Survey & Angler Use Update

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Author: Adam Daniel  
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Auckland/Waikato Fish and Game  
Hamilton New Zealand

## Contents

SUMMARY .....	2
1.0 Introduction .....	3
2.0 Study Area.....	3
3.0 Methods .....	4
4.0 results .....	5
5.0 Discussion .....	6
6.0 Looking forward .....	8
7.0 references .....	8

### SUMMARY

*Due to high and turbid water at Owhango only the foot bridge drift dive (traditional reach) was completed in 2017. Water clarity at the foot bridge site was over 7 m in 2017 and provided excellent visibility. Rainbow trout numbers remained stable and high in 2016/17 at just over 11 fish over 40 cm per kilometer of river. However, brown trout that are normally counted in a single hole were largely absent. The findings are not that alarming and could be from abnormally low water temperatures caused by frequent rain during the summer of 2016/17.*

*During the rather wet 2016/17 fishing season natural flows were up allowing for ample water extraction and the Whakapapa River was fishable (<5 m<sup>3</sup>/s) for 62% of the season for a total of 165 fishable days. This is a significant increase over previous years and may have resulted in heavy fishing pressure after drift dives were conducted.*

*A preliminary study of longitudinal water clarity was conducted during 2016/2017 with the goal of identifying sub-catchments that contributing high sediment loads to the river. However access was found to be very challenging due to the 18 h float time from Lake Otamangakau to Kakah and alternative take out locations will be trialed in 2017/18.*

## 1.0 INTRODUCTION

Fish & Game's management objective for the upper Whakapapa River is to maintain a trophy trout fishery. Fish & Game would also like to increase access to the ample but isolated public lands along the upper Whakapapa River. The Angler Use Study completed in 2016 has confirmed that limited access in the upper Whakapapa catchment has led to low angler use. The overall angler use (>0.5 km from parking areas) was only 2 anglers per month on average in 2014 and 2015 (Daniel, 2017).

Since 2011 trophy trout numbers have leveled off at what may be the carrying capacity for the Whakapapa River under the current flow regime. The 2015 national angler use survey (Unwin & Rouse, 2016) indicate that there has been an increase in angler usage (Figure 1). This increase in angler use has been exacerbated by increased use by guides primarily from the Taupo fishery.

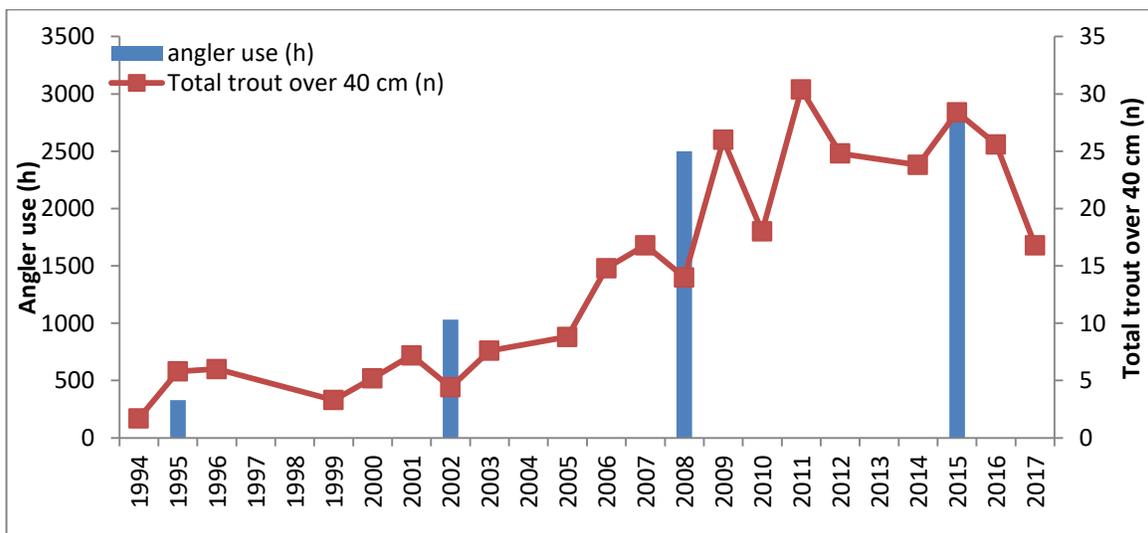


Figure 1. Angler use from 1995, 2002, 2008 and 2015 (blue bars) behind total (rainbow trout + brown trout over 40cm) per kilometer of the Whakapapa River at the foot bridge (red squares) 1994-2017.

## 2.0 STUDY AREA

The Whakapapa River is formed by the joining of the Whakapapa-nui and Whakapapa-iti Streams. Both streams drain small glaciers and snowfields on the western slopes of Mt. Ruapehu and are cold, swift and clear. The only major nutrient or sediment inputs in the upper Whakapapa River are the runoff and wastewater discharge from the Whakapapa Village that is up for consent review in 2017. DoC has proposed upgrades to the system that should increase consistency of the discharge and reduce the overall impact to the Whakapapa River. Fish & Game have commented on the proposed plan and suggested set targets to hold the agency to an adaptive management approach. In addition there is also seasonal disturbance from the Whakapapa Ski fields and corresponding access roads.

The Whakapapa Intake of the Tongariro Power Scheme is located about two kilometers downstream from the confluence of the Whakapapanui and Whakapapaiti streams. Below the intake the Whakapapa is a turbulent river alternating between steep rapids and short deep pools. Here the river is quite narrow, generally about 10 to 20 m wide.

Access to the intake is via a private road running through the Taurewa Station operated by Landcorp. Downstream from the intake, access is restricted for the first 5 km by steep banks which support native forest and scrub.

The Owhango bridge site is located 20 km from the intake and is the first publicly accessible section of the river. The Owhango Bridge site is easily accessible and heavily fished. However, this reach has high numbers of rainbow trout likely due to predominantly catch and release fishing documented in the Angler Use Monitoring Study where less than 1% of anglers were recorded with dead fish (Daniel, 2017). Although this section has been known for illegal fishing activities in the past only one angler was documented fishing out of season in 2015.

### 3.0 METHODS

Only one reach of the Whakapapa River was surveyed in 2017 as the Owhango bridge drift dive survey was not conducted due to poor water clarity and high flows. The traditional gauging station dive reach covers 2.5 km of river downstream from the gauging bridge (Figure 2). Only pools were dived due to rapids between pools presenting a safety risk to divers, as a result very little habitat suitable for small fish was investigated. In total fifteen pools were dived below the gauging station. The drift dive involved three divers floating downstream using snorkelling equipment and counting trout as they became visible. Divers only counted fish as they passed under to avoid over counting.



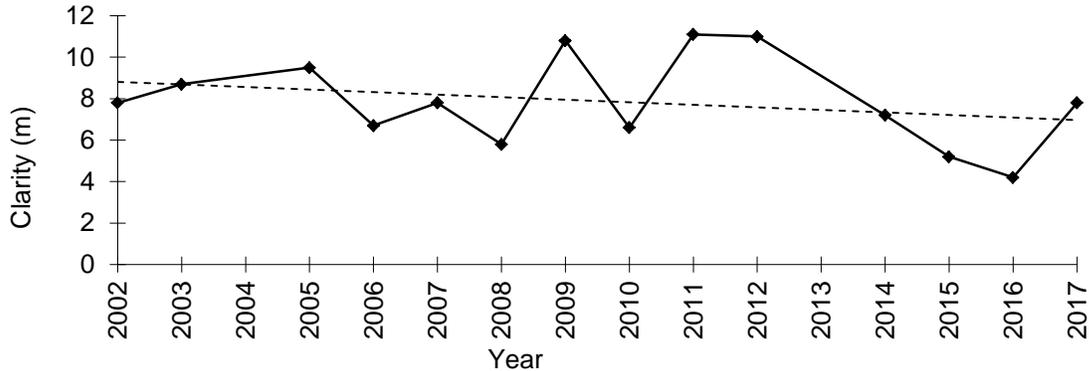
**Figure 2.** Drift dive monitoring area downstream from the upper Whakapapa River gauging bridge.

Water clarity was measured using a black disk, which was placed in the water and then viewed underwater in a horizontal direction using a periscope. The maximum distance that the outline of the black disk could be viewed underwater provided an estimate of water clarity. River flow at the time of the dive was obtained from the Genesis Energy

website.

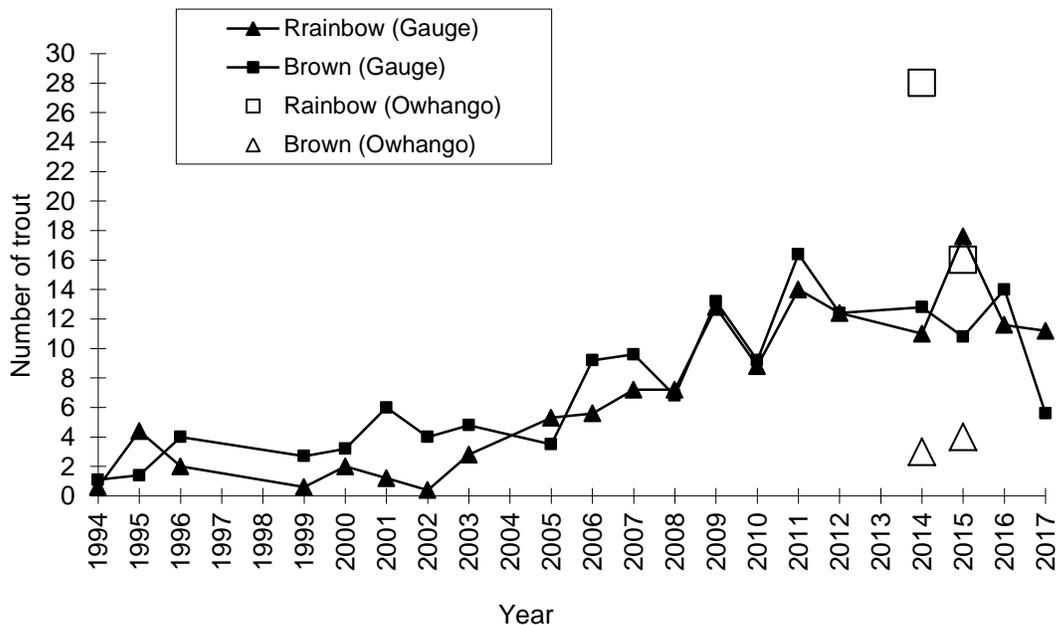
#### 4.0 RESULTS

The gauging station dive was started at 2:00 p.m. on the 4th of March 2017. Water clarity was 7.8 m (Figure 3) but the water was cold at 11.5°C. The Whakapapa River had a median flow of 5.6 m<sup>3</sup>/s during the month prior to the survey and was flowing at approximately 8.0 m<sup>3</sup>/s for the drift dive. Summer flows were extremely high and temperatures cool due to persistent rain.



**Figure 3.** Water clarity in the upper Whakapapa River as observed on 14 drift dive surveys conducted from 2002-2017. Dotted line indicates overall trend in water clarity during dives conducted science 2002.

The gauging station reach had very similar densities of oversize (40+ cm) rainbow trout observed in 2017 compared to the 2016 survey with 11.2 rainbow trout per km (Figure 4). However, there was a dramatic decline in brown trout counted in 2017 resulting in a decrease in the total count of oversized trout from 25.6 in 2016 to 16.8 per km in 2017 (Figure 1 & Figure 4).



**Figure 4.** Number of large ( $\geq 40$  cm) trout per kilometer of the upper Whakapapa River at the gauging station bridge (gauge) and above the Owhango access (Owhango) 1994-2017.

The majority of the brown trout counted in during previous drift dives at the Whakapapa Intake have been consistently counted in a single hole. Because the count at this reach is reliant on a single hole it is not surprising to have a large variation in a single count. Trout were observed in nearly every pool with trout numbers varying from 1 to 10 fish per pool. In total 45 trout were observed during the gauging station drift dive with several large fish spotted in the 3.0-3.5 kg range near the upper end of the reach.

## 5.0 DISCUSSION

Water clarity at the gauging station was good in 2017 at the gauging station but the Owhango site has proven to be far more variable likely due to the influence of the Piopotea catchment. Frequent rain and cool weather during the summer of 2017 may have altered the behavior of brown trout resulting in a lower count. The 19°C water temperature limit for trout that normally forces fish to migrate into the headwaters of streams like the Whakapapa for thermal refuge when lowland streams become too warm during the summer months was not reached in many parts of the region. The 2017 drift dive was also later than the normal January date due to poor weather potentially altering the results of the 2017 counts.

Overall the Whakapapa fishery has high numbers of oversized (40+ cm) rainbow trout but the brown trout population will need to be carefully monitored in 2018. The reduction in trout counted highlights the need to make the Owhango drift dive a priority in 2018. With six years of reasonably stable rainbow trout numbers it is likely that the upper Whakapapa has reached carrying capacity based on currently operational conditions.

Flows in the upper river are substantially modified by the intake weir operated by Genesis Energy which maintains a minimum flow of 3 m<sup>3</sup>/s and can divert up to 40 m<sup>3</sup>/s. The intake weir reduces the magnitude of floods such that moderate rainfall usually has negligible effect on flows resulting in dramatic increases and decreases in flows rather than rain induced spikes, followed by a gradual reduction in flow. Although such a dramatic hydrograph could cause mass stranding of fish the steep channelized morphology of the Whakapapa River bed does not allow for lateral flooding that would likely strand fish. But the sudden spikes likely washes most of the small fish downstream leading to the very large population of mostly 40+ cm fish.

The outflow of the intake structure has also caused scouring that has resulted in limited access upstream of the intake structure. The reach above the structure was monitored during the Angler Use Study in (2014-2016) and was one of the lowest use sites that was publicly accessible from a car park (1.2 anglers per month) and had less than half the anglers recorded on the downstream site (Daniel, 2017). Staff have noted that flooding in 2015 channelized the flow coming out of the intake structure. This scoured channel has created a hazardous crossing at flows above 3 or 4 m<sup>3</sup>/s. Finding an alternative access point from the powerhouse or improving the traditional crossing should be a priority.

Genesis Energy is required to maintain a flow of at least 29 m<sup>3</sup>/s downstream in the Whanganui River below Taumarunui at Te Maire. Consequently, during periods of low rainfall Genesis Energy has to stop diverting water to maintain the Te Maire flow requirement returning the Whakapapa River to natural base flows. The natural base flow

of about 8 m<sup>3</sup>/s is well above the preferred “fishable flow” of about 5 m<sup>3</sup>/s that allows anglers to wade the upper Whakapapa safely. Fishing pressure on the upper Whakapapa is likely to be increased during wet summers, due to hydropower takes reducing flows on the Whakapapa and increased natural flows in other local rivers. During the rather wet 2017 fishing season natural flow were up and the Whakapapa River was fishable (<5 m<sup>3</sup>/s) for 62% of the season (figure 5; 165 fishable days). From the 2007/08 to 2011/12 fishing season there were a mean of only 36 fishable days (range 13-49 fishable days).

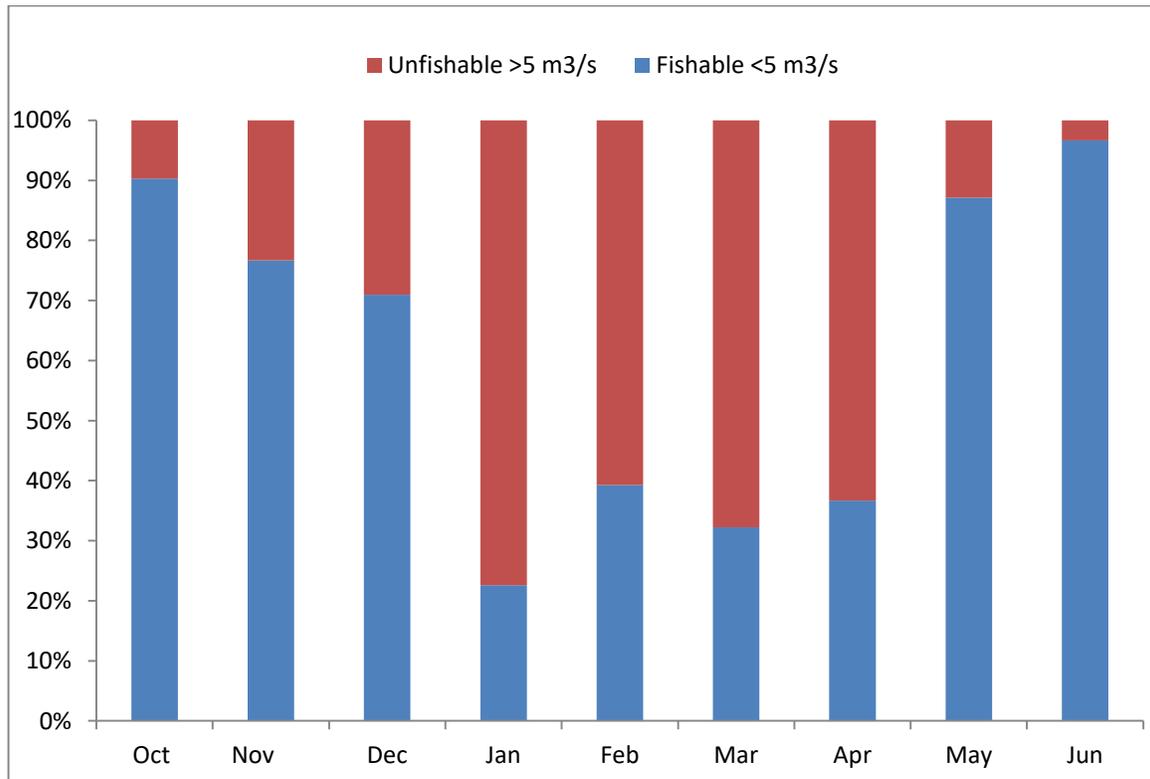


Figure 5. Percentage of each month of the 2016/17 fishing season the Whakapapa River was fishable (<5 m<sup>3</sup>/s) or unfishable (>5 m<sup>3</sup>/s). Data provided by Genesis Energy.

The current state of the Tongariro River fishery is also a major factor regulating pressure on the upper Whakapapa with poor fishing on the Tongariro resulting in increased pressure on the upper Whakapapa. Photographic evidence (Daniel, 2017) from the angler use study and observations from field staff have documented several guides from the Tongariro River with clients on the Whakapapa likely due to poor fishing or heavy pressure on the Tongariro River.

Overall, the rainbow trout population on the Whakapapa is healthy with ample large rainbow trout. Although brown trout will be carefully monitored during 2017/18 season it is likely the low numbers recorded in 2016/2017 were not reflective of the true population size. In terms of long term management the Whakapapa and Whanganui Rivers will be a key focus area for Auckland Waikato Fish & Game due to the high quality of the fisheries. Although angling pressure is currently low to moderate overall improving fish quality on the Whanganui will ultimately take pressure off the Whakapapa. Increasing water clarity in the upper Whanganui is likely the most effective

way to improve fish size on the upper Whanganui and will be explored in the 2017/2018 field season.

## **6.0 LOOKING FORWARD**

During the 2017/2018 field season staff will be monitoring water quality in the upper Whanganui River and its tributaries to try to determine the source of the heavy sediment load coming from the upper river. It is likely that the bulk of the sediment is the result of poor forestry practices. If the most impacted sub-catchments can be identified restoration measures can be better targeted. This work was initiated in early 2017 but access was difficult to make a safe two day float. An attempt to find a suitable study reach will be made during the 2017/18 field season.

## **7.0 REFERENCES**

- Daniel, A. A. (2017). *Whakapapa & Whanganui River Angler Use Monitoring Study*. Hamilton, New Zealand.
- Unwin, M., & Rouse, H. (2016). *Angler usage of New Zealand lake and river fisheries Results from the 2014/15 National Angling Survey*. Christchurch NZ.