Baseline study of the potential impact of increased trout numbers in the Kaituna River on whitebait (migrant galaxiids)

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Prepared for

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Contents

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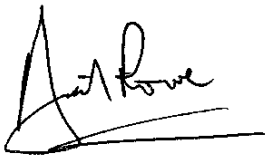

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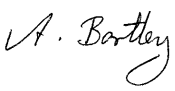

1. Introduction

The proposed 'Ohau Channel Wall' in Lake Rotoiti may divert juvenile trout from Lakes Rotorua and Rotoiti down the Kaituna River. This could potentially increase the trout population in the lower river, particularly in the mid to lower reaches, because much of the upper river is turbulent and unsuitable habitat for trout. As trout feed on upstream migrant whitebait in New Zealand rivers during spring months (McDowall 1990), an increase in the trout population in the mid to lower reaches of the Kaituna River may reduce populations of inanga and other galaxiids. Before the wall is constructed, a record of trout catch per unit of effort (CPUE) in the lower river is required to provide a basis for monitoring future changes in trout abundance. This survey was designed to establish a 'pre-diversion wall' baseline. The extent of trout predation on inanga and other galaxiids was also investigated, as an increase in trout alone will not produce an impact unless the majority are feeding on whitebait and other galaxiids

2. Methods

Five panel gill nets (3 x 10 m panels of 60, 80 and 110 mm mesh) were set in the lower Kaituna River in late afternoon on 20 October 2005 and left overnight. The five netting sites were located from just above the Mangorewa River confluence down to the lower river (Figure 1). Nets were set at tributary mouths and along river margins in quiet waters. The nets were lifted early the next morning and fish length, weight, species and condition recorded, including by-catch species other than trout. The catch per unit effort (CPUE) was recorded for each net.

To determine the extent of predation by trout on inanga and other galaxiid species, gut content analysis was undertaken on all trout captured. The entire stomach was removed, placed in fixative, and taken back to the lab for contents analysis. Any whitebait found in the gut were weighed in relation to the rest of the stomach contents. A number of kahawai also had their gut contents assessed.

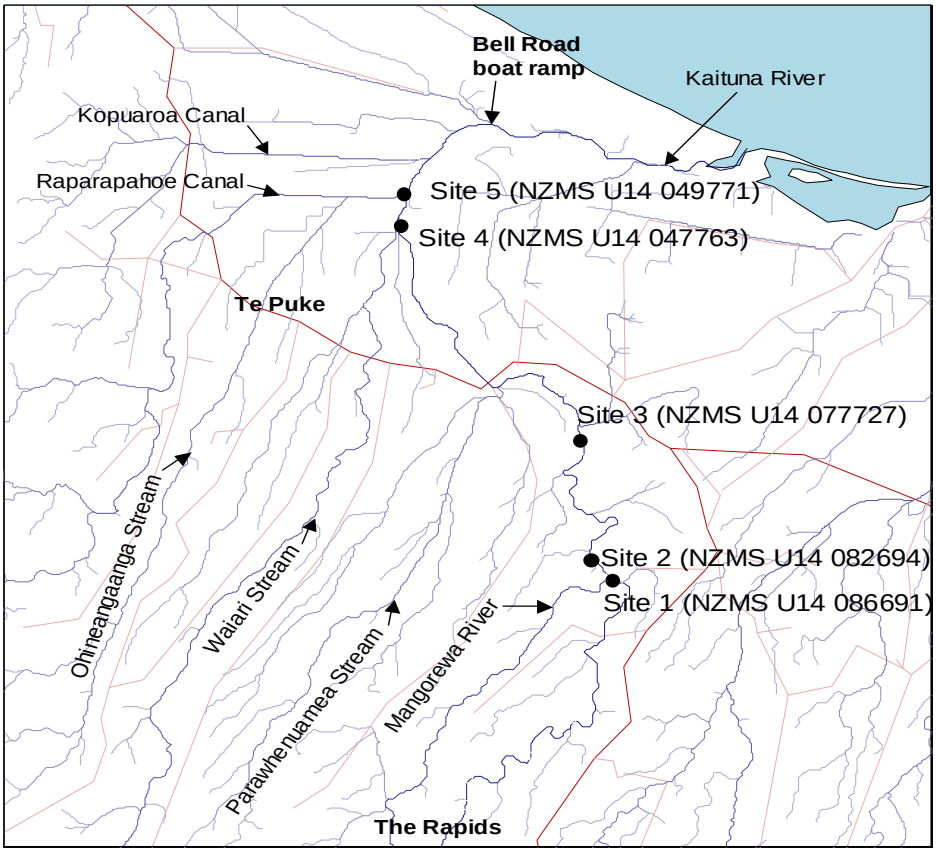

Figure 1: Location of panel net sites on the Kaituna River, October 2005.

3. Results

Only two trout were captured, both small adult rainbow trout (350 mm and 290 mm total length). The larger of the two was caught at Site 3 (Table 1), and the smaller fish at Site 5. Both trout were females (Table 2) with Stage 2 (developing) gonads. The two nets in the lower end of the river (Sites 4 and 5) caught a number of grey mullet and kahawai. A large giant kokopu was also captured at Site 1 at the Mangorewa River confluence.

Table 1: Catch per unit effort (CPUE) for each panel net set, fish size (mm) given in brackets.

Site	Location	No. fish caught by species (length range mm)			
	NZMS260 U14	Mullet	Kahawai	Rainbow trout	Giant kokopu
1	086691	-	-	-	1 (330)
2	082694	-	-	-	-
3	077727	-	-	1 (350)	-
4	047763	12 (280-320)	4 (260-280)	-	-
5	049771	2 (285-305)	1 (285)	1 (290)	-

Table 2: Rainbow trout sex, length, weight, condition factor $(W/(L/10)^3)\times100$) and gut content weight.

Trout	Site	Sex	Length (mm)	Weight (g)	Condition Factor	Gut contents weight (g)	Gonad stage
1	3	F	350	542	1.26	2.55	2
2	5	F	290	346	1.42	0.70	2

A gut analysis was carried out for both fish, with the larger fish having a full stomach compared with a half full gut for the smaller fish. No juvenile galaxiids were found in either of the two trout. Both trout had one large unidentifiable fish in each of their guts and a large adult inanga or smelt was also found in the larger trout. Most of the kahawai had been feeding on glass eels (Table 3), but four juvenile galaxiids were also found.

Table 3: Gut analysis results for 5 kahawai from the Kaituna River, October 2005.

Kahawai	Site	Species found in the gut					
		Glass eel	Whitebait	Inanga	Smelt	Common bully	Paratya shrimp
1	4	5	-	-	-	-	17
2	4	1	-	-	-	-	-
3	4	3	2	-	-	-	8
4	4	-	-	-	-	-	-
5	5	11	2	1	1	2	-

4. Discussion

The low catch rate (0.4 trout/net/night) suggests that trout numbers are low within the mid to lower reaches of the Kaituna River. A previous survey conducted in April 2004 produced a similar result, with only five rainbow trout caught from five panel gill nets set in the mid to lower reaches of the Kaituna River (Phillips et. al 2005). These fish ranged from 280 mm to 480 mm in size. Mullet were also caught in the April 2004 survey, but in larger numbers (i.e., 60 compared with 14 mullet in the latest survey). However, more mullet are expected in the river during summer months. The kahawai catch was similar over both surveys.

Existing information extracted from the New Zealand Freshwater Fish Database (NZFFD) for the Kaituna River (N=73 records) indicated that rainbow trout occurred at 11% of sites and brown trout at 4.1% (Phillips et. al. 2005). Trout abundance may be seasonal and related to temperature, with the trout tending to congregate at the stream mouths or moving into the cooler spring-fed tributaries such as the Waiari Stream and the Mangorewa River during summer months. In cooler winter and spring months, trout distribution within the river may be more widespread making them harder to catch. The NZFFD records will also include wadeable sites with juvenile fish.

Some trout are thought to move into the lower regions of New Zealand rivers during spring to feed on migrating fish such as whitebait and glass eels (McDowall 1984). However, as the trout population in the lower Kaituna appears to be low, predation from trout on migrating galaxiid species appears to be minimal in this river. No migrating galaxiid species were found in the stomachs of the two trout caught. However, of the five kahawai caught, four had a number of glass eels in their gut and two also had whitebait, indicating that predation from kahawai on migrating galaxiid species may be more significant than that of rainbow trout.

5. Conclusions

The trout population in the mid to lower reaches of the Kaituna river appears to be low and any current predatory impact on migrating galaxiid species is likely to be minimal. This and the April 2004 surveys provide a limited baseline on which future monitoring of trout abundance can be based.

6. References

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Phillips, N.; Baker, C.; Boubée, J.; Chiaroni, L.; Green, M.; Hawes, I.; Hicks, M.; Jowett, I.; Ray, D.; Smith, B.; Walsh, J.; Wells, R. (2005). Kaituna River hydro development: technical report on river studies – final report. NIWA Client Report HAM2005-008.

NIWA
Taihoro Nukurangi

FRESHWATER FISH DATABASE FORM 1

Date	**21/10/2005**	River/Lake system **Kaituna River**			Catchment number **146.000**
Time	**0800**	Sampling locality **Kaituna River**			
Observer	**jps**	Access			Altitude (m) **5**
Organisation	**niwa**	NZMS 260 Map no. **u14**	Coord. **2805700 6378800**		Distance inland (km) **15**
Fishing method	**gin**	Area fished (m2) or no. nets used **5**	Number of electric fishing passes **0**		Tidal water **y**

HABITAT DATA

Water	Colour			Clarity		Temp.	pH
	Average width (m)	Average depth (m)		Maximum depth (m)		Conductivity	
Habitat type (%)	Still	Back-water	Pool	Run	Riffle	Rapid	Casc.
Substrate type (%)	Mud	Sand	Fine gravel	Coarse gravel	Cobble	Boulder	Bed-rock
Fish cover (y/n)	Macrophyte	Instream debris	Undercut bank	Bank veg.			
Catchment vegetation(%)	Native forest	Exotic forest	Farm	Urban zone	Scrub	Swamp land	Other
Riparian vegetation(%)	Native forest	Exotic forest	Grass tussock	Exposed bed	Scrub willow	Raupo flax	Other

Type of river/stream/lake

Water level	Downstream barrier		Pollution
Large invertebrate fauna	Koura	Paratya	Freshwater mussel
Bottom fauna abundance	Predominant species group		Permanent water

FISH DATA

Species		Abundance		Length	Habitat/Comments
Oncorhynchus mykiss	**Rainbow trout**	**2**	**(o)**	**290-350**	**gen**
Mugil cephalus	**Grey mullet**	**14**	**(c)**	**280-320**	**gen**
-	**Marine species**	**5**	**(c)**	**260-285**	**gen kahawai**

Comments