

NIWA

Taihoru Nukurangi

FISH PASSAGE OVER THE WHANGAMARINO WEIR

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Location: NZMS

Introduction

Concern has been expressed that the Whangamarino Weir may hinder upstream fish migration during periods of low summer flows. As part of the monitoring programme for the weir, NIWA undertook a trapping and catch release experiment with assistance from DoC. This study was undertaken in early December 1994 when river levels downstream of the weir were approximately 0.5 m below the weir crest. Timing of the study was chosen to coincide with a period of high upstream movement of whitebait species notably inanga.

Methods

Fish distribution and migration

To determine if there were any differences in species composition and relative density caused by the weir, boat seine hauls were made above and below the weir on 6 December. Fish movement downstream of the weir was monitored by setting two small, 2mm mesh, fish traps on the true left and right banks, downstream of the weir, on 6-7 December. Concurrently, fish movement across the weir was determined by setting a large fish trap across part of the weir notch (Fig. 1). All traps were fitted with 10mm mesh to exclude large eels. A length of 3mm mesh netting was attached to the outer edge of the large trap as a wing to channel fish into the trap (Plate 1). The netting was removed at night as a precaution against loss or damage. Small gaps were present beneath the mouth of the trap and the trap extended over only half the width of the weir, hence, it is likely that some fish avoided capture. Catch data therefore are only qualitative and in no way represent total numbers of fish moving over the weir.

Catch release experiments

Inanga collected from the Waikato Estuary in the morning of 6 December were stained with bismark brown dye at the weir. The size composition of these fish was representative of the inanga known to migrate in the area (Stancliff et al. 1988, NZFFR No. 96). The inanga were released from the river bank immediately downstream of the weir in two batches. The first batch consisting of 250 inanga was released at 15.30 hrs, the other of 60 inanga and 5 smelt was made 20 minutes later. Fish were recaptured in the trap set across part of the weir crest.

Results and Discussion

Five species of fish were captured in the seines. Catches of mosquito fish and common bully were higher upstream of the weir than downstream. No smelt or goldfish were caught in the seine upstream (Table 1). Seven smelt were however captured overnight in the trap set at the weir cress indicating that smelt are able to negotiate the weir. It thus appears that at the time of sampling fish composition in the Whangamarino River above and below the weir was similar and that fish were not accumulating downstream of the weir.

A small number of stained inanga were recaptured at the weir crest within 30 minutes of each release (Table 1). Stained inanga were also observed at the mouth of the trap within 10 minutes of release. Unfortunately, because of the brown colour of the Whangamarino River (humic stained), fish that were dyed in Bismark Brown were difficult to recognise one day after release. It was not therefore possible to determine the percentage of stained inanga that negotiated the weir. However, given that catch of inanga in all 3 traps was very low on 6 December (Table 1.),

previous to the release of stained fish, it is likely that most of the inanga captured on the 7th at the weir crest were fish that had been released the previous day. (Use of a different stain (eg neutral red) and/or the use of clear water when sorting the fish should be considered should further trials be considered necessary.) On the basis of the catch obtained we judge that the majority of inanga released were able to negotiate the weir without difficulties.

The capture of a juvenile mudfish in the large trap supports anecdotal evidence from coarse fishermen who have reported that small numbers of mudfish are present in the Whangamarino River.

Conclusions

At water levels encountered on 6-7 December 1994, smelt and inanga and elvers were able to negotiate the Whangamarino Weir. Further monitoring may be necessary if higher water level differentials are encountered during the main upstream migration period of inanga and smelt (September to December). If such experiments are contemplated, release of large numbers of inanga and smelt stained with neutral red rather than bismark brown should be made. Determining whether the weir impacts on the migration and distribution of mullet should also be contemplated. To do this an extensive netting survey of the Whangamarino River in summer would be needed.

Table 1. Fish species captured in seines and traps set around the Whangamarino Weir 6-7 December 1994. Refer to Fig. 1 for location of nets.

Time	Fish species	Lower seine	Upper seine	Small trap L	Small trap R	Large trap
1200 6/12/94	Goldfish	4	0	-	-	-
	Smelt	5	0	-	-	-
	Mosq. fish	3	12	-	-	-
	Shrimps	20	20	-	-	-
	C.bully	13	46	-	-	-
	Elvers	0	2	-	-	-
1430 6/12/94	Goldfish	-	-	6	3	0
	Mosq. fish	-	-	20	15	5
	Shrimps	-	-	12	0	0
	Inanga	-	-	1	0	2
	C.bully	-	-	72	10	43
1550 6/12/94	C.bully	-	-	-	-	40
	Inanga	-	-	-	-	2
	Inanga(S)	-	-	-	-	4
1620 6/12/94	C.bully	-	-	-	-	30
	Inanga	-	-	-	-	2
	Inanga(S)	-	-	-	-	3
1000 7/12/94	C.bully	-	-	6	14	606
	Mudfish	-	-	0	0	1
	Elvers	-	-	10	2	86
	Eels	-	-	1	0	0
	Mosq. fish	-	-	50	40	35
	Smelt(*)	-	-	0	0	7
	Shrimps	-	-	300	90	18
	Goldfish	-	-	30	20	1
	Inanga(*)	-	-	0	0	59

Recaptured stained fish shown as (S)

* some of these fish appeared to be stained but marks were difficult to discern.

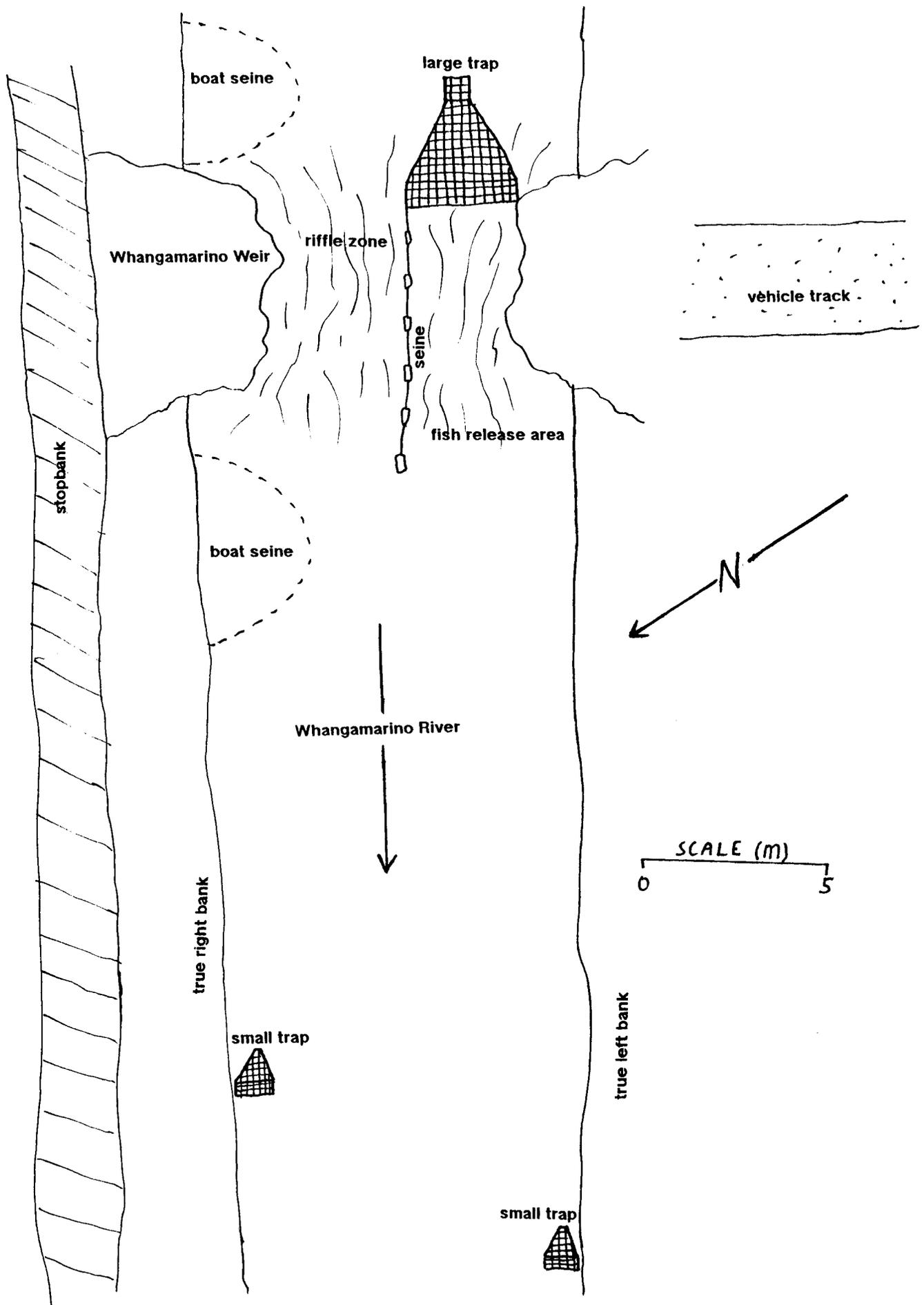


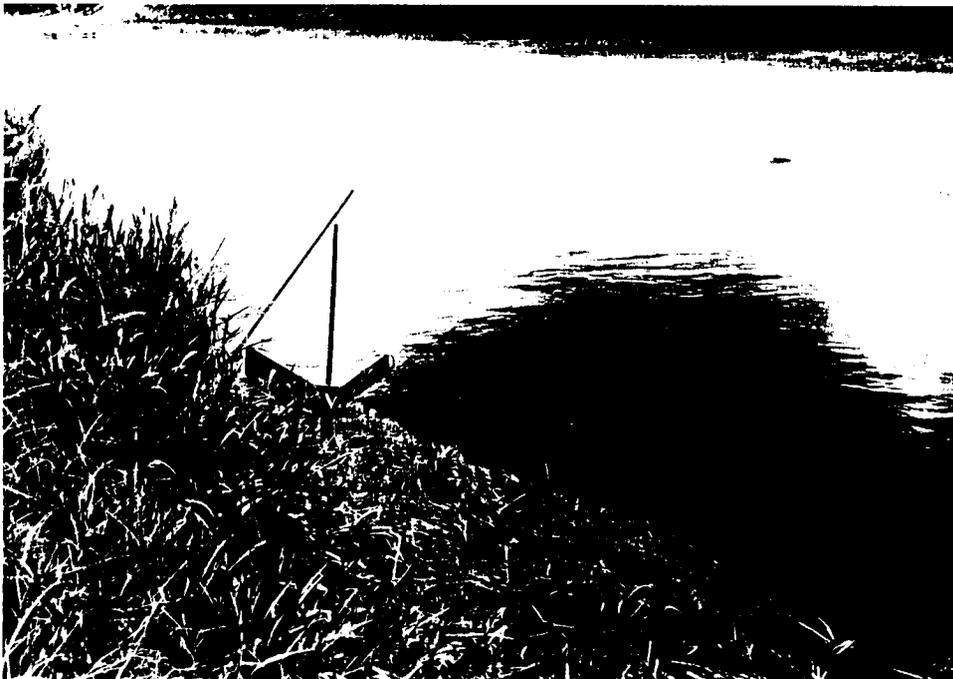
Figure 1. Whangamarino weir sampling localities, 6-7 December 1994.



Plate 1.
Whangamarino Weir,
6-7 December 1994



Large trap set at
weir crest



Small trap on left bank
downstream of weir