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NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORT NO. 84

TROUT SPAWNING AND ABUNDANCE OF SMALL FISH IN THE UPPER OHAU RIVER 1990/91

by

G.D. James

Report to: Electricorp

Freshwater Fisheries Centre

MAF Fisheries

PO Box 8324

CHRISTCHURCH

Servicing freshwater fisheries and aquaculture

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Enquiries to: The Librarian
Freshwater Fisheries Centre
PO Box 8324
Riccarton, Christchurch
New Zealand

1. BACKGROUND

Fisheries studies were undertaken for Electricorp in 1989/90 in the upper Ohau River, to assess the likely effects of enhanced flows on fish populations (James *et al.* 1990). This report described how the very limited areas of spawning gravels in the river, had been washed downstream into Lake Ruataniwha by the high spill flows during the 1989/90 summer. The report recommended that monitoring of the following spawning season be undertaken to determine the impact of this gravel loss. Thus the aim of this study was to assess the impact of reduced areas of spawning gravels in the upper Ohau River, on the success of trout spawning in the river in 1990.

It was agreed that two indicators of spawning success should be monitored: numbers of redds constructed by spawning trout during the 1990 winter, and abundance of juvenile trout as measured by electric-fishing over the following spring and summer. The results could be compared with data collected at the same sites the previous year, before the high spill flows.

2. SPAWNING

Since very few spawning gravels were left in the lower Ohau River, it was decided that one spawning survey in the lower section where most spawning occurred in 1989, and during the peak of the brown trout spawning run, should be sufficient to establish the extent of spawning in 1990.

As anticipated, when the survey was completed in mid July, very few redds were found. Section E (Fig. 1) was surveyed completely, with four redds seen on the north side above the power lines (in vicinity of dot 13 in James *et al.* 1990, Fig. 14). Two scratchings were seen below the power lines, but these were not proper redds and would not have been counted in the previous year. There is virtually no spawning gravel in this section now.

A check was made also in section D around and above electric-fishing site 3 (= area covered by dots 13, 10, and 11 in Fig. 14, 1990 report). Five separate redds were counted, plus another area about 5 m x 1 m, which was one continuous excavation and obviously represented several redds. There were also several scratchings in amongst the large cobbles which were not counted.

This brief survey confirmed that spawning areas and the number of redds counted in the upper Ohau River were much less than last year. In section E only four redds were observed, compared with 107 redds at the same time last year.

Because numbers of redds were much reduced in the upper Ohau River, it seemed useful to have a look also at possible spawning sites in the only other stream running into Lake Ruataniwha - the Wairepo Stream.

The lower section of the stream was walked, from its mouth upstream for about 0.5 km. It is unlikely spawning trout would move much above the culvert under the road, as a

short distance above here the stream flows for some distance through a shallow bed with no cover.

The stream was also checked at the first bridge on the Lake Ohau road. Below this bridge the stream divides into a number of small channels through a swampy area, and looks to be impassable to adult trout.

Further upstream where the power pylons cross, the stream is larger with more flow and looks to be reasonable trout habitat. Three redds were seen, and one medium sized trout. Fish present here, some 12 km above the lake, are almost certainly resident fish, because of the difficulties of access downstream. Such fish may contribute juveniles to Lake Ruataniwha, although the numbers would probably be small.

It appears this stream has little value for spawning trout in Lake Ruataniwha, although there may be some juvenile recruitment from resident fish in the stream into the lake.

3. JUVENILE TROUT AND NATIVE FISH ABUNDANCE

One of the best measures of trout spawning success is juvenile abundance. The original plan was to undertake monthly electric-fishing surveys over the 1990/91 spring/summer and compare the results with data from the previous year. Unfortunately high spill flows in mid to late December forced the cancellation of the December survey. Further surveys were considered of doubtful value given the numbers of fish captured in October and November, although another survey was undertaken in March as part of some other work.

Estimated densities of juvenile trout and native fish species are given in Table 1, for sites surveyed in the upper Ohau River in 1990/91. Numbers of juvenile trout were markedly higher at site 3 than at sites 4 and 5, and none were found at the top two sites (1 and 2) during the single survey of these sites in November. Densities of brown and rainbow juveniles and native fish in 1990/91 are compared with those in 1989/90 in Figs. 2 and 3. It is immediately apparent that numbers of juvenile brown and rainbow trout dropped dramatically in the lower two sections from which gravel was washed out, although in most cases numbers changed little at site 3 further upstream, where small pockets of spawning gravel still remain.

Numbers of common bully and koaro increased considerably, probably because of the increased cover provided by the larger substrate which remained after the gravel was washed out. This increase in substrate size should also have provided more cover for juvenile trout, and one might have expected a similar increase in abundance. The fact that there was a major decline instead, only serves to emphasise that successful trout spawning must have been much reduced in these lower sections of the river.

4. CONCLUSIONS

Juvenile trout numbers in lower sections of the upper Ohau River last summer were much less than were found there the previous season, before high spill flows washed out much of the spawning gravels. Numbers at the middle and upper sites where there had always

been few or no spawning gravels, were generally similar to those found the previous season.

As the lower sections of the river supported about 68% of trout spawning in 1989, present and future juvenile trout recruitment into Lake Ruataniwha and the enhanced upper Ohau River could be reduced by up to two-thirds of its previous level. Even though much fewer numbers of trout fry are likely to be produced, it does not automatically follow that the number of juveniles surviving will be markedly less. Many fry die under natural conditions, and the number surviving will depend in considerable part on the amount of habitat available for juvenile trout in the river and lake. It may still be that current lower levels of recruitment from the upper Ohau River, together with some recruitment from Lake Ohau will be sufficient to support the Lake Ruataniwha/Ohau River fishery at acceptable levels. As noted in James *et al.* 1990, the large numbers of trout in the Ohau canal and the presence of some juveniles in the upper reaches of the Ohau River after high spill flows, suggests that there will be some recruitment from Lake Ohau into the Ohau River/Lake Ruataniwha system following flow augmentation.

It will be important over the next few years, to monitor changes in trout abundance which may result from the reduced spawning success noted here, and the flow augmentation likely in 1992. Monitoring could be undertaken by gill net surveys in Lake Ruataniwha, and by organising some anglers who regularly fish the area to keep diaries. If monitoring indicates that the trout resource does not increase as expected over the next few years following flow augmentation, then consideration will need to be given to enhancing trout stocks so that full use is made of the augmented flow in the Ohau River. This could include the construction of a spawning channel below the Lake Ohau outlet weir, and provision for this should be made when designing the weir.

It is suggested that monitoring could be shared, with the South Canterbury Fish and Game Council collecting angler catch information, and MAF Fisheries undertaking gill net sampling in Lake Ruataniwha (with financial support from Electricorp). The latter programme would involve 2 staff in a weeks survey once a year, with a likely annual cost around $8,500 to undertake the work and produce a report. Such surveys would be in addition to the planned post-augmentation fisheries studies on the upper Ohau River, to be undertaken by MAF and Electricorp.

5. ACKNOWLEDGEMENTS

This study was funded by Electricorp, with assistance from the South Canterbury Fish and Game Council. Thanks to Simon Bloomberg, Graeme Hughes and Mark Webb for field support.

6. LITERATURE CITED

James, G.D., Jowett, I.G., Bloomberg, S., Davis, S. F., and Sagar, P.M. 1990. Studies on fisheries and residual flows in the upper Ohau River. *N.Z. Freshwater Fisheries Miscellaneous Report No. 33.* 55 p.

TABLE 1. Estimated densities (numbers/100 m^2) of juvenile trout and native fish caught during electric-fishing surveys in the upper Ohau River.

Date	Site	BT0	BT1	RT0	RT1	CB	UB	KO	LF
18.10.90	3	77	0	2	1	7	16	12	1
	4	1	1	0	0	39	2	59	0
	5	6	0	4	0	49	1	26	0
22.11.90	1	0	0	0	0	0	51	0	0
	2	0	0	0	0	0	38	2	0
	3	39	0	85	0	6	4	7	0
	4	7	0	10	0	26	4	53	0
	5	5	0	6	0	32	3	25	0
13.03.91	3	3	0	1	0	2	13	29	0
	4	10	0	2	0	36	1	41	0
	5	8	0	2	0	16	1	13	0

BT0 = brown trout aged 0+ years.
BT1 = brown trout aged 1+ years.
RT0 = rainbow trout aged 0+ years.
RT1 = rainbow trout aged 1+ yrs.
CB = common bully.
UB = upland bully.
KO = koaro
LF = longfinned eel.

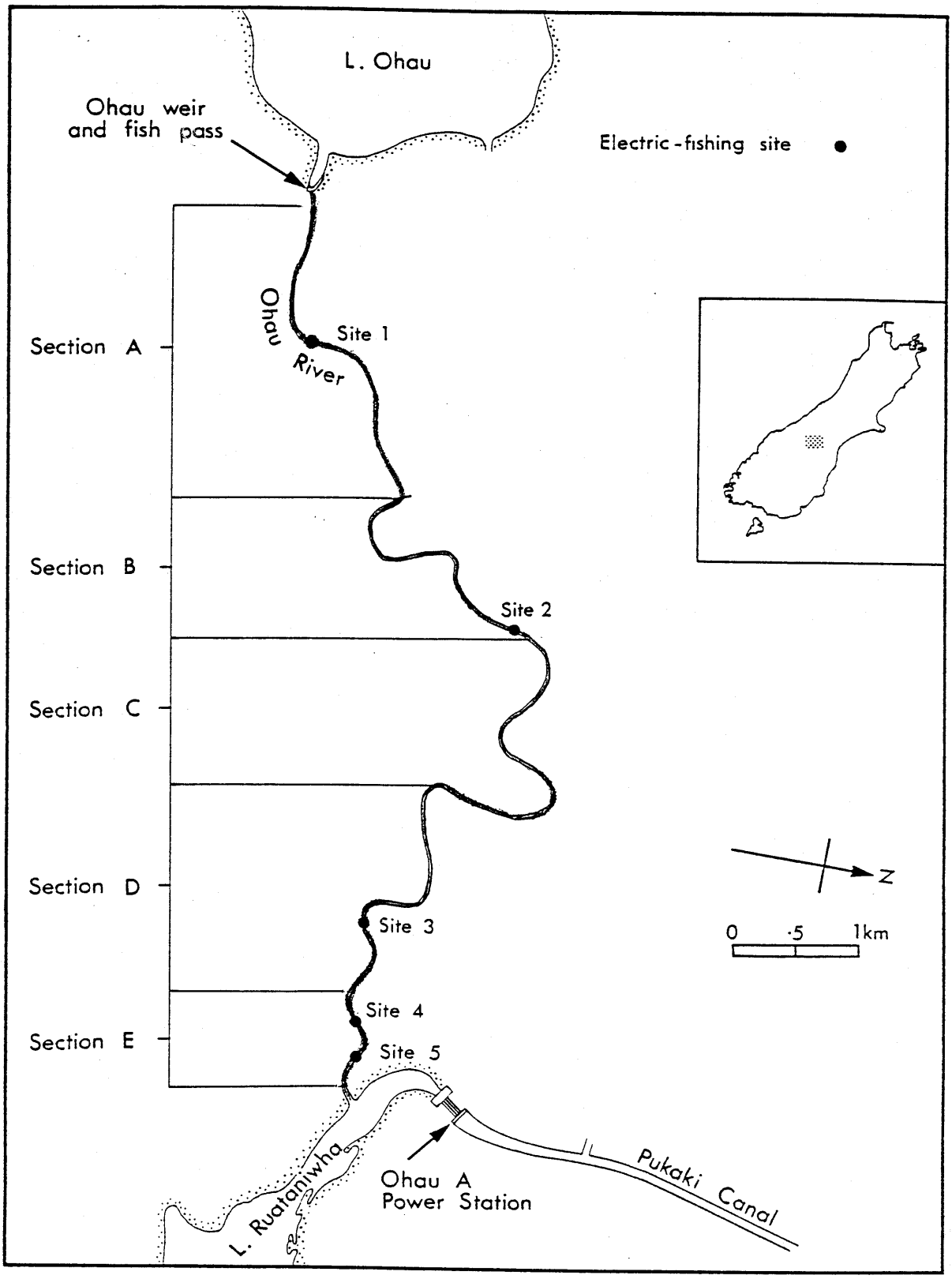

FIGURE 1. The upper Ohau River, showing localities and sampling sites mentioned in the text.

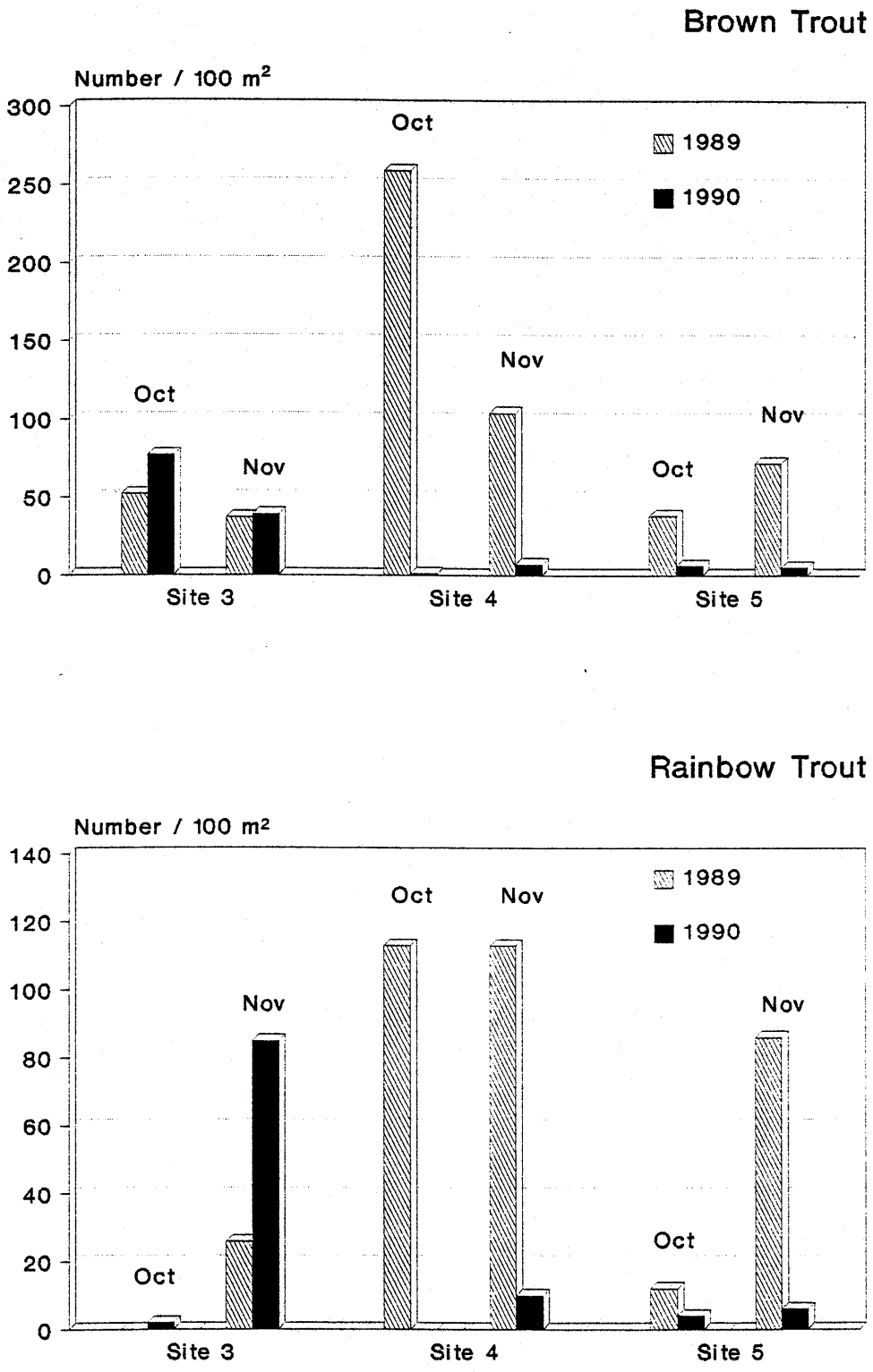

FIGURE 2. Estimated abundance (no. per 100 m²) of brown and rainbow trout fry in the upper Ohau River in 1990 (compared with data from 1989), by site and sampling date.

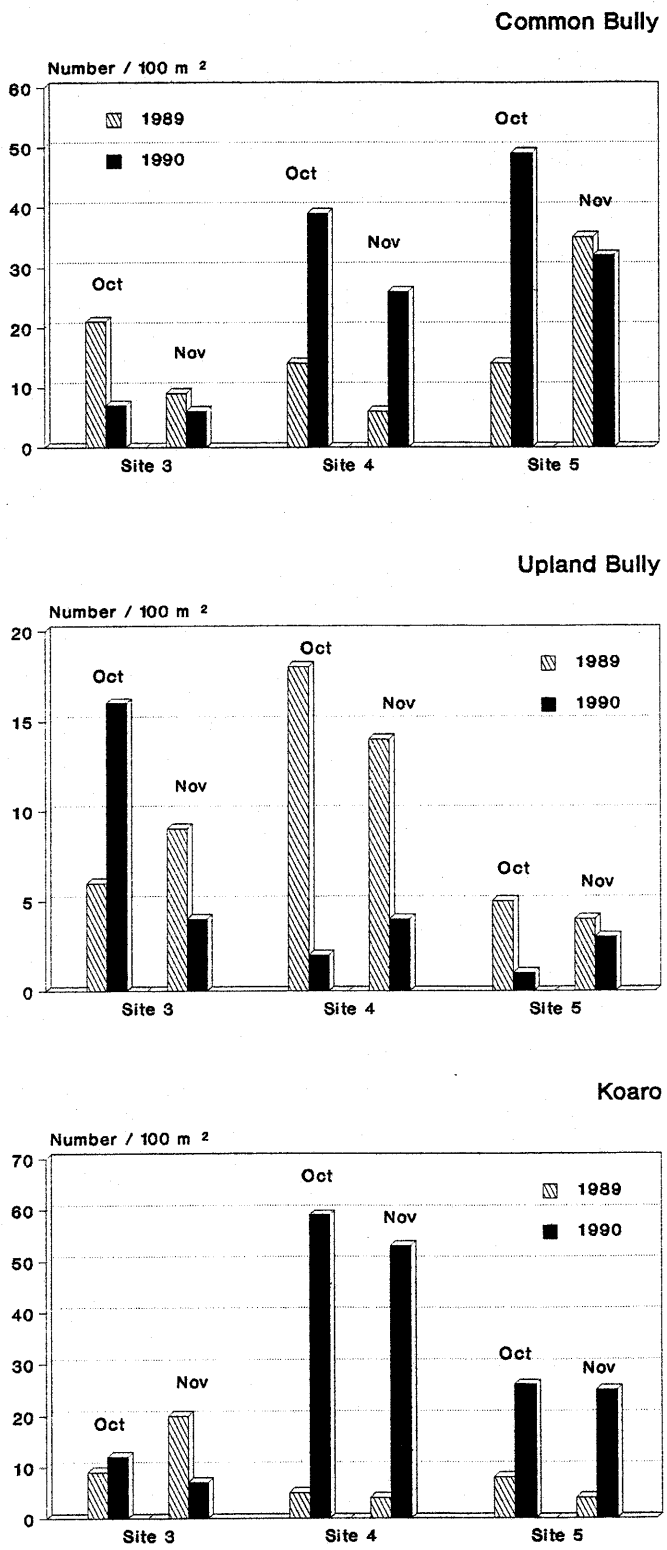

FIGURE 3. Estimated abundance (no. per 100 m²) of native fish in the upper Ohau River in 1990 (compared with data from 1989), by site and sampling date.