

NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORT NO. 3

KOPIKU - MEREMERE CAUSEWAY
FISH DISTRIBUTION STUDY
18-18 JANUARY 1989

by

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Internal report to Department of Conservation, Hamilton

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1. INTRODUCTION

This is the second survey undertaken to determine the distribution of fish in the Whangamarino Swamp in the vicinity of the Kopuku-Meremere causeway.

2. METHODS

Fyke, gill and trap nets were set at 8 sites along the causeway and in the Kopuku Stream (Fig. 1) for 24 hours between 17 and 18 January 1989.

3. RESULTS AND DISCUSSION

Eight fish species were caught (Table 1). Two of these (long-finned eels and rudd), were not recorded in the March 1988 survey. Black mudfish and Koi carp, which were found previously, were not captured this time.

Eels

Eels in the Whangamarino Swamp are small (Table 2), and a major decline in size has occurred since Strickland's 1980 survey. This suggests that there has been heavy commercial exploitation of the resource. It may be necessary to impose some quota/seasonal restriction on this fishery to ensure it's continued viability. Short-finned eels were common in all the areas sampled (Table 3).

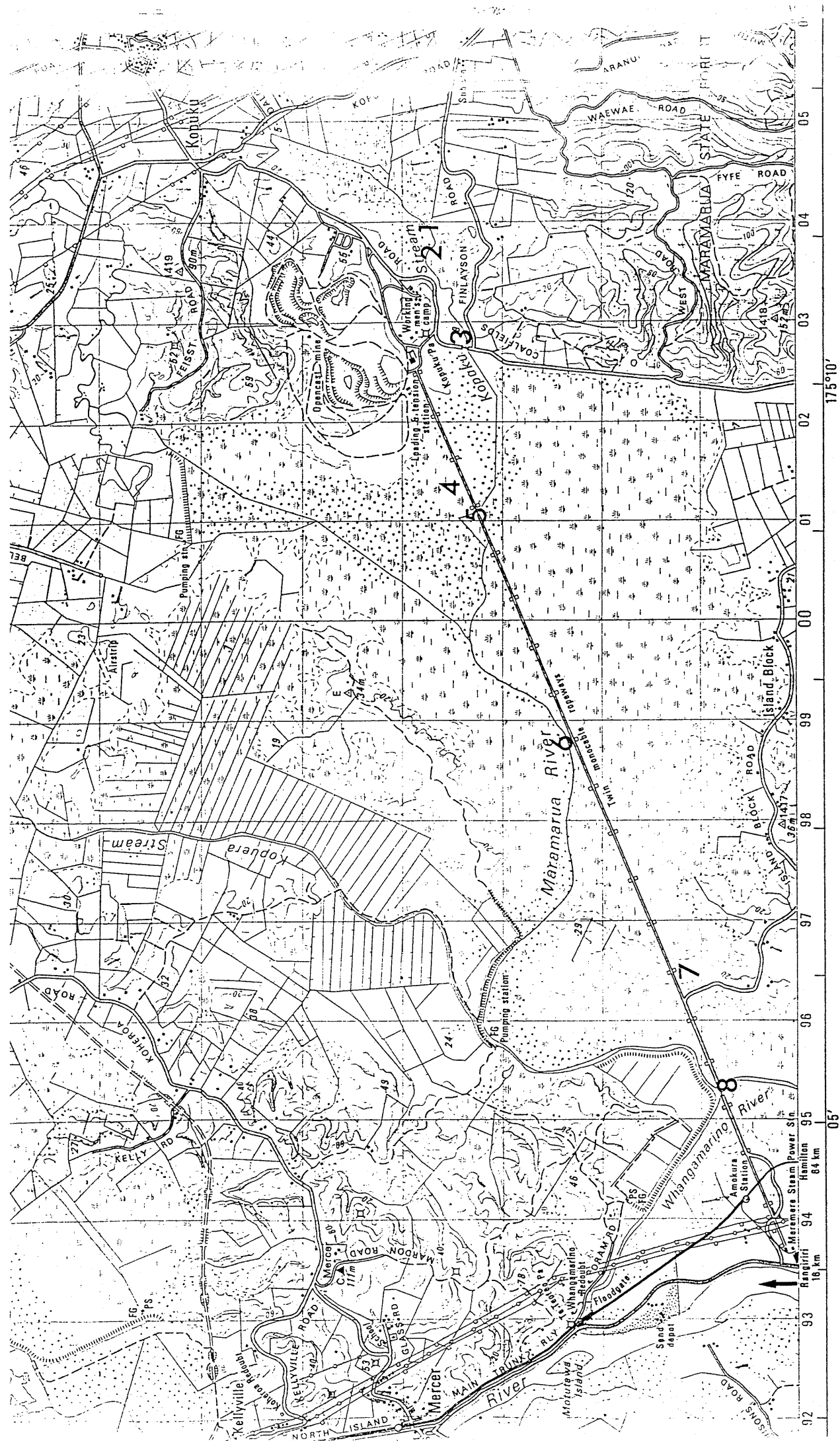


FIGURE 1. Location of sampling sites along the Kopuku-Meremere causeway and in Kopuku Stream, 17-18 January 1989.

TABLE 1. Fish species recorded in the Whangamarino Swamp.

Common Name	Survey 1 9-10 Mar 88	Survey 2 17-18 Jan 89
Black mudfish	adults	---
Catfish	juveniles/adults	juveniles/adults
Common bully	juveniles/adults	adults
Smelt	---	---
Goldfish	juveniles/adults	juveniles
Inanga	adults	adult
Koi carp	juveniles	---
Longfinned eel	---	adults
Shortfinned eel	adults	adults
Mosquitofish	adults	adults
Rudd	---	juveniles/adults

--- = none caught

TABLE 2. Length, weight and condition of short-finned eels from the Whangamarino Swamp, 17-18 January 1989.

Site	Total length			Weight			Condition		
	n	\bar{x}	SD	n	\bar{x}	SD	n	\bar{x}	SD
2	18	36.4	12.7	18	134.5	205.6	18	0.190	0.013
4	33	35.7	5.5	33	88.5	50.1	33	0.177	0.023
all sites	--	--	--	268	158.7	169.3	--	--	--

-- = not calculated

Ten long-finned eels were caught in streams draining the swamp. This species distribution is similar to that found by Strickland (1980) who noted that the majority of long-finned eels occupied the streams of the swamp and few lived in the swamp itself. Shortfins caught at Site 4, which receives effluent from the Kopuku coal mine, weighed less on average than those taken from an area of unaffected habitat at Site 2 (88.5 g compared to 134.5 g). This trend was also noted in March 1988. The condition of eels at Site 4 was also significantly lower ($P < 0.05$).

Analysis of gut contents of 48 shortfinned eels showed that they had been feeding mainly on Gambusia affinis, phyza sp. and oligocheates, with lesser amounts of Sigora arguta, insect larvae and detritus. Shortfins with empty stomachs comprised 58% of all eels analysed. Three longfinned eels analysed for gut content were full of gambusia and unidentified fish remains.

Black mudfish

No black mudfish were caught in this survey. This was not surprising as mudfish are known to aestivate in summer (Mcphail pers. comm.).

Numerous dead mudfish¹ were found in the swamp near the old Island Block School several days after the fire which destroyed about 2,000 ha of the wetland on 13 - 15 January 1989. The fire according to fire fighters burned rapidly and it was not thought to have been hot enough to have killed the fish immediately (T. Roxborough, DoC Hamilton pers. comm.). The death of these fish nevertheless emphasises the vulnerability of this rare species.

Black mudfish mainly inhabit areas where no other fish species are present (Mcphail pers. obs.). Our results and those of McLea (1986) suggest that the black mudfish may be abundant only in very limited locations. Therefore, their population densities and distribution throughout the Whangamarino Swamp requires investigation to determine the species habitat requirements and to ascertain the effects of predation and competition from other fish species, especially eels and catfish.

Other fish species

Catfish distribution was patchy (Table 3). The gut contents of four catfish showed that they had been feeding on oligochaetes, snails and plant remains. Two of the catfish examined were maturing females.

¹ Unfortunately the specimens collected were badly decomposed and only 31 fish could be measured with any accuracy (mean length = 90.6 mm, max. = 108.0 mm, min. = 64.0 mm). The otoliths of these fish were extracted for age determination.

TABLE 3. Catch from the Whangamarino Swamp in the vicinity of the Kopuku-Meremere causeway, 17-18 January 1989. Site locations are shown in Fig. 1.

Site	Net No.	SF eel	LF eel	Cat-fish	Gold-fish	Rudd	Common bully	Gambusia	Other
1	1 T	--	--	--	2	--	--	40	--
	1 G	--	--	--	--	--	--	--	--
	1 M	6	--	--	--	--	--	--	--
2	1 M	--	--	--	--	--	--	--	--
	2 O	19	--	82	--	--	--	--	--
	1 F	25	--	--	--	--	--	--	--
3	2 M	--	--	--	--	--	--	2	--
	1 F	103	--	--	--	--	--	--	--
4	1 M	1	--	--	--	--	--	--	--
	1 G	--	--	1	--	--	--	--	--
	1 D	13	2	3	--	--	--	--	--
	1 F	20	1	1	1	--	--	--	--
5	2 M	3	--	--	--	--	--	--	--
	1 O	9	1	--	--	--	--	--	--
	1 F	14	--	--	--	--	--	--	--
6	3 M	--	--	--	--	--	--	--	--
	1 T	4	--	--	--	21	5	--	727S
	1 G	--	--	--	--	--	--	--	--
	1 O	125	4	9	4	3	--	--	--
7	4 M	--	--	--	--	--	--	--	--
	1 O	2	--	--	--	--	--	--	--
	1 F	3	--	--	--	--	--	--	--
8	2 M	1	--	--	2	--	1	--	1I/909S
	1 O	19	2	26	--	--	--	--	--

SF = shortfinned LF = longfinned
 -- = no catch I = Inanga S = Shrimp
 G = 30 m gillnet with 3 x 10 m panels of 25, 62 and 89 mm mesh
 T = trap of 2 mm mesh
 M = gee-minnow trap of 6 mm mesh
 O = single-winged fyke of 2 mm mesh
 D = double-winged fyke of 25 mm mesh
 F = single-winged fyke of 25 mm mesh

Rudd were caught only in the Maramarua River. Both adults and juveniles were present there. Goldfish were at most sites but only in low numbers. The number of bullies caught was surprisingly low. Mosquito fish were seen throughout the area but few were caught. Koi carp, although not caught in this survey were seen in the Whangamarino River.

Only one adult inanga was caught in this survey, whereas in March 1988 a total of 340 inanga were captured at 3 sites. Their current absence may be due to the higher water temperature and lower oxygen level noted in this survey.

Shrimps were caught in large numbers (Table 3) in the Maramarua and Whangamarino Rivers (Sites 6 and 8, respectively).

4. CONCLUSION AND RECOMMENDATIONS

The population of eels in the Whangamarino Swamp is large, however the eel size is small and requires further examination. The constant commercial harvesting of large eels is thought to be the cause of the imbalance in population structure².

The apparent absence of the native black mudfish in this survey emphasises the need to carry out an extensive study of this

² In a balanced system the large eels consume small eels, thus reducing the population of small eels. With fewer small eels there is less competition for food, allowing faster growth rates.

species. Information on population size, distribution and habitat preference is needed to ensure protection of this rare and secretive species.

It is not known what proportion of the mudfish population was killed by the fire which recently destroyed a large area of their habitat. It is strongly recommended that a monitoring program be established to determine the distribution of the species in and around the burned area and to identify the habitat requirements of this species.

The almost total absence of inanga from the area also requires further study as their habitat is rapidly diminishing and catches of whitebait, which constitute at least 52% of inanga juveniles, have been declining at alarming rates.

5. REFERENCES

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TECHNICAL REPORT 1989/2

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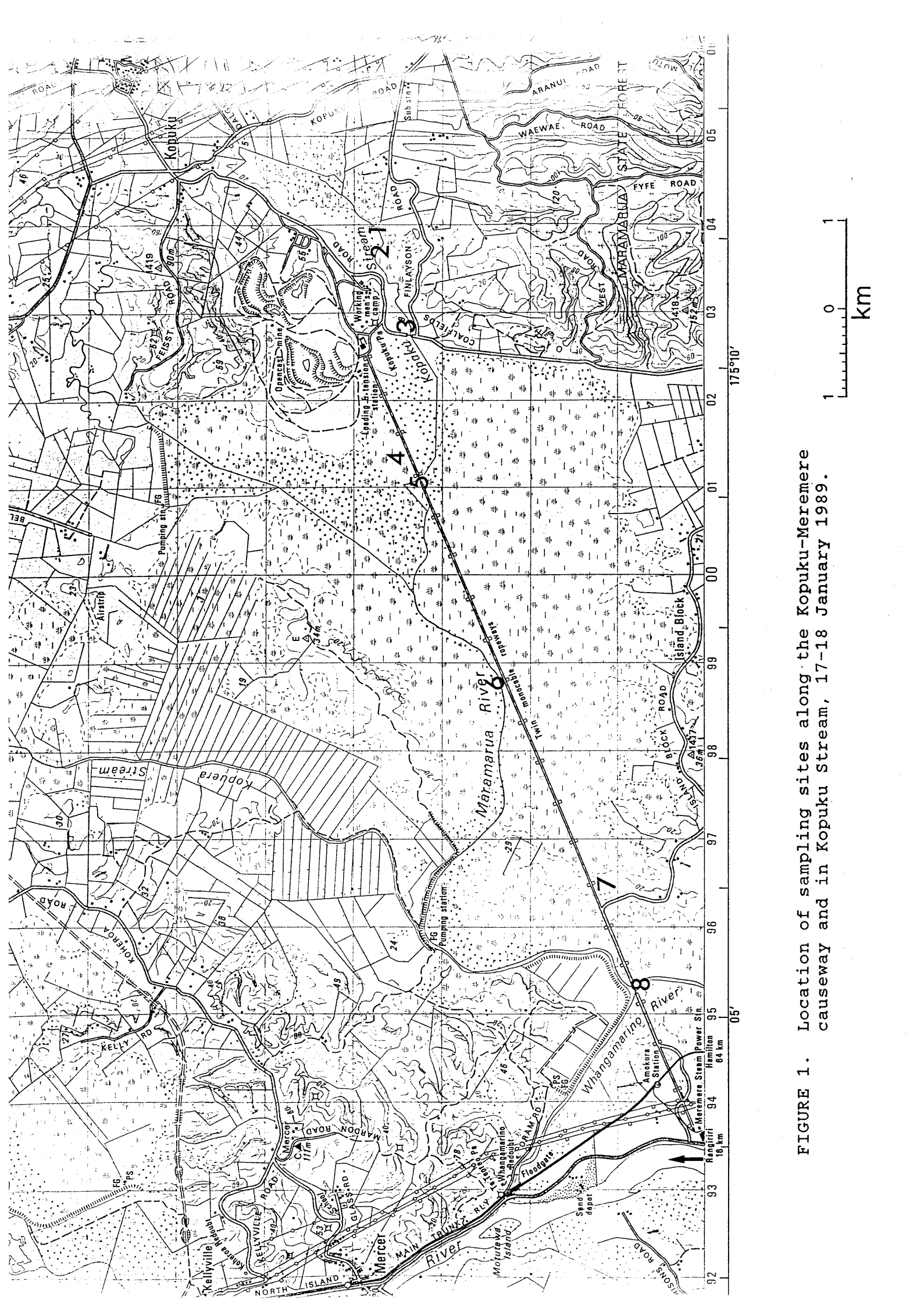


FIGURE 1. Location of sampling sites along the Kopuku-Meremere causeway and in Kopuku Stream, 17-18 January 1989.