Draft

Internal Rep to D.O.C Ham.

DRAFT

KOPUKU — MEREMERE CAUSEWAY

FISH DISTRIBUTION STUDY

9-10 March 1988

J. A. T. Boubee

A. G. Stancliff

P. W. Empson

ISSN 1170-2001

NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORT NO. 2

KOPUKU - MEREMERE CAUSEWAY FISH DISTRIBUTION STUDY 9-10 MARCH 1988

by

J.A.T. Boubee

A. G. Stancliff

P. W. Empson

Internal report to Department of Conservation, Hamilton

MAF Fisheries

PO Box 6016

ROTORUA

Servicing freshwater fisheries and aquaculture

FEBRUARY
1989

NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORTS

This report is one of a series initiated in January 1989, and issued by the Freshwater Fisheries Centre, MAF Fisheries. The series was established to ensure that reports prepared for clients, tribunal hearings, internal use, etc., are collected together and available to future users. They are for limited circulation, and some may be confidential.

ISBN 0-477-08391-9

MAF Fisheries is the fisheries business group of the New Zealand Ministry of Agriculture and Fisheries. The name MAF Fisheries was formalised on 1 November 1989 and replaces MAFFish, which was established on 1 April 1987. It combines the functions of the former Fisheries Research and Fisheries Management Divisions, and the fisheries functions of the former Economics Division of MAF.

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

Introduction

This survey was undertaken to determine the fish species present in the Whangamarino Swamp adjacent to the Kopuku-Meremere causeway and to obtain data on their distribution.

Methods

Fyke, gill and trap nets were set at 7 sites along the causeway and in Kopuku Stream (Fig. 1) for 24 hours between 9 and 10 March 1988.

Results and Discussion

A total of 8 fish species were caught (Table 1). This is 2 less than that found in a survey of the lower Whangamarino River by Boubee et al. (1986) (Table 2), and 10 less than Strickland (1980) reported from the swamp and its catchment (Table 3).

Longfinned eels and smelt were notable omissions from our survey. Strickland (1980) stated that longfins were found mostly in streams draining into the swamp, with few residing in the swamp itself. Smelt are abundant in the lower Waikato River and were expected to inhabit the main waterways of the swamp. Rudd, tench and grass carp are present only in low numbers and occur mainly in the Whangamarino River. Koi carp are becoming more abundant, especially in the Whangamarino and Maramarua Rivers (S. Pullan, MAFFish, pers. comm.).

Shortfinned eels were common in all the areas sampled. Shortfins caught at site 4, which was affected by effluent from the Kopuku coalmine, weighed less on average than those taken from an area of unaffected habitat at site 1 (76.6 g compared to 91.4 g). Shortfinned eels appear to have declined significantly in size since Strickland's 1980 survey, as he recorded average weights of 255-420 g for shortfins from similar habitats. This suggests that there has

Introduction

This survey was undertaken to determine the fish species present in the Whangamarino Swamp adjacent to the Kopuku-Meremere causeway and to obtain data on their distribution.

Methods

Fyke, gill and trap nets were set at 7 sites along the causeway and in Kopuku Stream (Fig. 1) for 24 hours between 9 and 10 March 1988.

Results and Discussion

A total of 8 fish species were caught (Table 1). This is 2 less than that found in a survey of the lower Whangamarino River by Boubee et al. (1986) (Table 2), and 10 less than Strickland (1980) reported from the swamp and its catchment (Table 3).

Longfinned eels and smelt were notable omissions from our survey. Strickland (1980) stated that longfins were found mostly in streams draining into the swamp, with few residing in the swamp itself. Smelt are abundant in the lower Waikato River and were expected to inhabit the main waterways of the swamp. Rudd, tench and grass carp are present only in low numbers and occur mainly in the Whangamarino River. Koi carp are becoming more abundant, especially in the Whangamarino and Maramarua Rivers (S. Pullan, MAFFish, pers. comm.).

Shortfinned eels were common in all the areas sampled. Shortfins caught at site 4, which was affected by effluent from the Kopuku coalmine, weighed less on average than those taken from an area of unaffected habitat at site 1 (76.6 g compared to 91.4 g). Shortfinned eels appear to have declined significantly in size since Strickland's 1980 survey, as he recorded average weights of 255-420 g for shortfins from similar habitats. This suggests that there has

been heavy commercial exploitation in recent years, although the apparent change may have resulted from the different sampling methods used in the 2 surveys. Only a few male breeding migrants were present at most sites, but they comprised most of the catch at site 7 (40 of the 42 eels caught were migrants). The movement of fish to and from this site is probably restricted by the causeway to periods of high water.

Catfish distribution was patchy (Table 1), yet they appear to be widely distributed in the Whangamarino Swamp.

Of the 9 black mudfish caught, 8 were taken at site 1 in the Kopuku Stream. Strickland (1980) described their occurrence as sparse although widely distributed. Our observations and those of McLea (1986), suggest that they may be abundant in some locations. Black mudfish averaged 74 mm total length (range 52.5 - 132 mm). The two adults examined had developing gonads. Analysis of the gut contents of 4 specimens showed that they had been feeding on adult insects and amphipods. McLea (1986) did not find adult insects in the stomachs of black mudfish from the Lake Rotokawau wetland. A recent rise in water level in the Whangamarino may have accounted for the large terrestrial component in their diet.

Inanga were caught at 3 of the 7 sites sampled (Table 1). A trap set in the Maramarua River at site 6 accounted for 338 of the 340 inanga caught. Most were adults (mean total length 75.3 mm, range 47 - 122 mm) with developing gonads. Gut content analysis showed that larval and adult insects, shrimp and amphipods were important foods for inanga in the Whangamarino. Inanga are a migratory species that require free passage to and from the Waikato River.

been heavy commercial exploitation in recent years, although the apparent change may have resulted from the different sampling methods used in the 2 surveys. Only a few male breeding migrants were present at most sites, but they comprised most of the catch at site 7 (40 of the 42 eels caught were migrants). The movement of fish to and from this site is probably restricted by the causeway to periods of high water.

Catfish distribution was patchy (Table 1), yet they appear to be widely distributed in the Whangamarino Swamp.

Of the 9 black mudfish caught, 8 were taken at site 1 in the Kopuku Stream. Strickland (1980) described their occurrence as sparse although widely distributed. Our observations and those of McLea (1986), suggest that they may be abundant in some locations. Black mudfish averaged 74 mm total length (range 52.5 - 132 mm). The two adults examined had developing gonads. Analysis of the gut contents of 4 specimens showed that they had been feeding on adult insects and amphipods. McLea (1986) did not find adult insects in the stomachs of black mudfish from the Lake Rotokawau wetland. A recent rise in water level in the Whangamarino may have accounted for the large terrestrial component in their diet.

Inanga were caught at 3 of the 7 sites sampled (Table 1). A trap set in the Maramarua River at site 6 accounted for 338 of the 340 inanga caught. Most were adults (mean total length 75.3 mm, range 47 - 122 mm) with developing gonads. Gut content analysis showed that larval and adult insects, shrimp and amphipods were important foods for inanga in the Whangamarino. Inanga are a migratory species that require free passage to and from the Waikato River.

Further Studies

The lower average weight of eels resident in the area affected by the Kopuku coalmine requires further investigation. The lower weight could be due to the eels being in poor condition as a result of a decreased food supply or some other factor.

Inanga are an important species (for recreational, traditional and commercial reasons) that inhabits an ever decreasing area of habitat. A more intensive study of their distribution in the Whangamarino Swamp is required to ensure that important habitats are not cut off by point sources of pollutants or by the construction of culverts or weirs.

References

Boubee, J. A. T., Stancliff, A. G., and Mitchell, C. P. (1986). Fish and fish communities in the lower Waikato River. Part 1: Impacts of thermal power station development on migrant and resident fish. Internal report to Electricorp. 77p.

McLea, M. C. (1986). Ohinewai regional resource study - biology and water quality. Waikato Valley Authority Technical Publication No. 37. 199p.

Strickland, R. R. (1980). Fisheries aspects of the Whangamarino Swamp. N. Z. MAF, Fisheries Environmental Report No. 7. 37p.

Further Studies

The lower average weight of eels resident in the area affected by the Kopuku coalmine requires further investigation. The lower weight could be due to the eels being in poor condition as a result of a decreased food supply or some other factor.

Inanga are an important species (for recreational, traditional and commercial reasons) that inhabits an ever decreasing area of habitat. A more intensive study of their distribution in the Whangamarino Swamp is required to ensure that important habitats are not cut off by point sources of pollutants or by the construction of culverts or weirs.

References

Boubee, J. A. T., Stancliff, A. G., and Mitchell, C. P. (1986). Fish and fish communities in the lower Waikato River. Part 1: Impacts of thermal power station development on migrant and resident fish. Internal report to Electricorp. 77p.

McLea, M. C. (1986). Ohinewai regional resource study - biology and water quality. Waikato Valley Authority Technical Publication No. 37. 199p.

Strickland, R. R. (1980). Fisheries aspects of the Whangamarino Swamp. N. Z. MAF, Fisheries Environmental Report No. 7. 37p.

TABLE 1: Catch from the Whangamarino Swamp in the vicinity of the Meremere Causeway, 9-10 March 1988. Site locations are shown in Fig. 1.

Site	Net	Black Mudfish	Inanga	SF Eel	Cat-fish	Gold-fish	Common Bully	Koi Carp	Gamb-usia	Shrimp	Kou
1	B	2	1	132	---	---	---	--	--	--	--
	T	6	---	13	---	---	2	--	30	--	--
2	D	---	---	1	27	---	---	--	--	--	--
	A	---	---	64	83	1	---	--	--	--	--
	C	---	1	114	130	---	---	--	--	--	--
	D	---	---	64	2	---	---	--	--	--	--
	A	---	---	34	27	---	---	--	--	--	--
	A	---	---	---	4	---	---	--	--	--	--
3	B	1	---	20	---	---	---	--	--	--	--
4	A	---	---	12	22	2	---	--	--	--	--
	B	---	---	14	10	1	---	--	--	--	--
	D	---	---	17	27	10	---	1	--	--	--
5	G	---	---	---	---	---	---	--	--	--	--
	A	---	---	8	---	---	---	--	--	--	--
	A	---	---	38	---	---	---	--	--	--	--
6	T	---	338	54	---	---	100	--	18	164	--
	D	---	---	12	96	---	---	3	--	--	1
	A	---	---	1	27	---	---	--	--	--	--
7	B	---	---	38	---	---	---	--	--	--	--
	B	---	---	4	---	---	---	--	--	--	--

- = no catch
\ = single-winged fyke of 25 mm mesh
} = single-winged fyke of 2 mm mesh
: = 2 x single-winged fykes (2 mm mesh) joined by a common leader
= double-winged fyke of 25 mm mesh
= trap of 2 mm mesh
= 10 m gillnet of 89 mm mesh

TABLE 1: Catch from the Whangamarino Swamp in the vicinity of the Meremere Causeway, 9-10 March 1988. Site locations are shown in Fig. 1.

Site	Net	Black Mudfish	Inanga	SF Eel	Cat-fish	Gold-fish	Common Bully	Koi Carp	Gamb-usia	Shrimp	Kour
1	B	2	1	132	---	---	---	--	--	--	--
	T	6	---	13	---	---	2	--	30	--	--
2	D	---	---	1	27	---	---	--	--	--	--
	A	---	---	64	83	1	---	--	--	--	--
	C	---	1	114	130	---	---	--	--	--	--
	D	---	---	64	2	---	---	--	--	--	--
	A	---	---	34	27	---	---	--	--	--	--
	A	---	---	---	4	---	---	--	--	--	--
3	B	1	---	20	---	---	---	--	--	--	--
4	A	---	---	12	22	2	---	--	--	--	--
	B	---	---	14	10	1	---	--	--	--	--
	D	---	---	17	27	10	---	1	--	--	--
5	G	---	---	---	---	---	---	--	--	--	--
	A	---	---	8	---	---	---	--	--	--	--
	A	---	---	38	---	---	---	--	--	--	--
6	T	---	338	54	---	---	100	--	18	164	--
	D	---	---	12	96	---	---	3	--	--	1
	A	---	---	1	27	---	---	--	--	--	--
7	B	---	---	38	---	---	---	--	--	--	--
	B	---	---	4	---	---	---	--	--	--	--

\- = no catch
A = single-winged fyke of 25 mm mesh
B = single-winged fyke of 2 mm mesh
C = 2 x single-winged fykes (2 mm mesh) joined by a common leader
D = double-winged fyke of 25 mm mesh
T = trap of 2 mm mesh
G = 10 m gillnet of 89 mm mesh

TABLE 2: Catch from the Whangamarino River at a site 100 m upstream of the Waikato River confluence, February 1984 to March 1985. Modified from Boubee *et al*. (1986).

Net	No. of 24 hr. Sets	Mean Number per 24 hours										
		Inanga	Smelt	SF Eel	LF Eel	Cat-fish	Gold-fish	Common Bully	Koi Carp	Rudd	Grass Carp	Shrim
G	14	---	---	--	--	1.0	0.9	0.1	0.1	--	0.1	---
A	15	---	---	4.5	1.7	47.9	0.9	0.2	0.2	0.1	--	---
D	4	---	---	21.0	7.8	142.8	0.3	--	--	--	--	---
T	3	23.3	11.7	2.3	7.0	--	--	5.3	--	--	--	42.

- = no catch
G = 30 m gillnet with 3 x 10m panels of 25, 62, and 89 mm mesh
A = single-winged fyke of 25 mm mesh
D = double-winged fyke of 25 mm mesh
T = trap of 2 mm mesh

TABLE 2: Catch from the Whangamarino River at a site 100 m upstream of the Waikato River confluence, February 1984 to March 1985. Modified from Boubee et al. (1986).

Net	No. of 24 hr. Sets	Mean Number per 24 hours										
		Inanga	Smelt	SF Eel	LF Eel	Cat-fish	Gold-fish	Common Bully	Koi Carp	Rudd	Grass Carp	Shri
G	14	---	---	--	--	1.0	0.9	0.1	0.1	--	0.1	---
A	15	---	---	4.5	1.7	47.9	0.9	0.2	0.2	0.1	--	---
D	4	---	---	21.0	7.8	142.8	0.3	--	--	--	--	---
T	3	23.3	11.7	2.3	7.0	--	--	5.3	--	--	--	42.

- = no catch
G = 30 m gillnet with 3 x 10m panels of 25, 62, and 89 mm mesh
A = single-winged fyke of 25 mm mesh
D = double-winged fyke of 25 mm mesh
T = trap of 2 mm mesh

TABLE 3: Checklist of fish species recorded in the Whangamarino Swamp and its catchment. Modified from Strickland (1980).

Common Name		Scientific Name
Lamprey	+	*Geotria australis*
Longfinned Eel	*	*Anguilla dieffenbachii*
Shortfinned Eel	*	*Anguilla australis*
Common Smelt	*	*Retropinna retropinna*
Giant Kokopu	+	*Galaxias argenteus*
Banded Kokopu	*	*Galaxias fasciatus*
Inanga	# +	*Galaxias maculatus*
Black Mudfish	*	*Neochanna diversus*
Rainbow Trout	+	*Salmo gairdnerii*
Brown Trout	+	*Salmo trutta*
Catfish	*	*Ictalurus nebulosus*
Goldfish	*	*Carassius auratus*
Tench	#	*Tinca tinca*
Rudd	+ #	*Scardinius erythrophthalmus*
Mosquitofish	*	*Gambusia affinis*
Grey Mullet	*	*Mugil cephalus*
Torrentfish	*	*Cheimarrichthys fosteri*
Common Bully	*	*Gobiomorphus cotidianus*
Koura	*	*Paranephrops planifrons*
True Shrimp	*	*Paratya curvirostris*
Mysid Shrimp	*	*Tenagomysis chiltoni*
Freshwater Crab	*	*Halicarcinus lacustris*

* Recorded during the October 1980 survey

\# Identified by Acclimatisation Society staff

\+ Reported by eel fishermen.

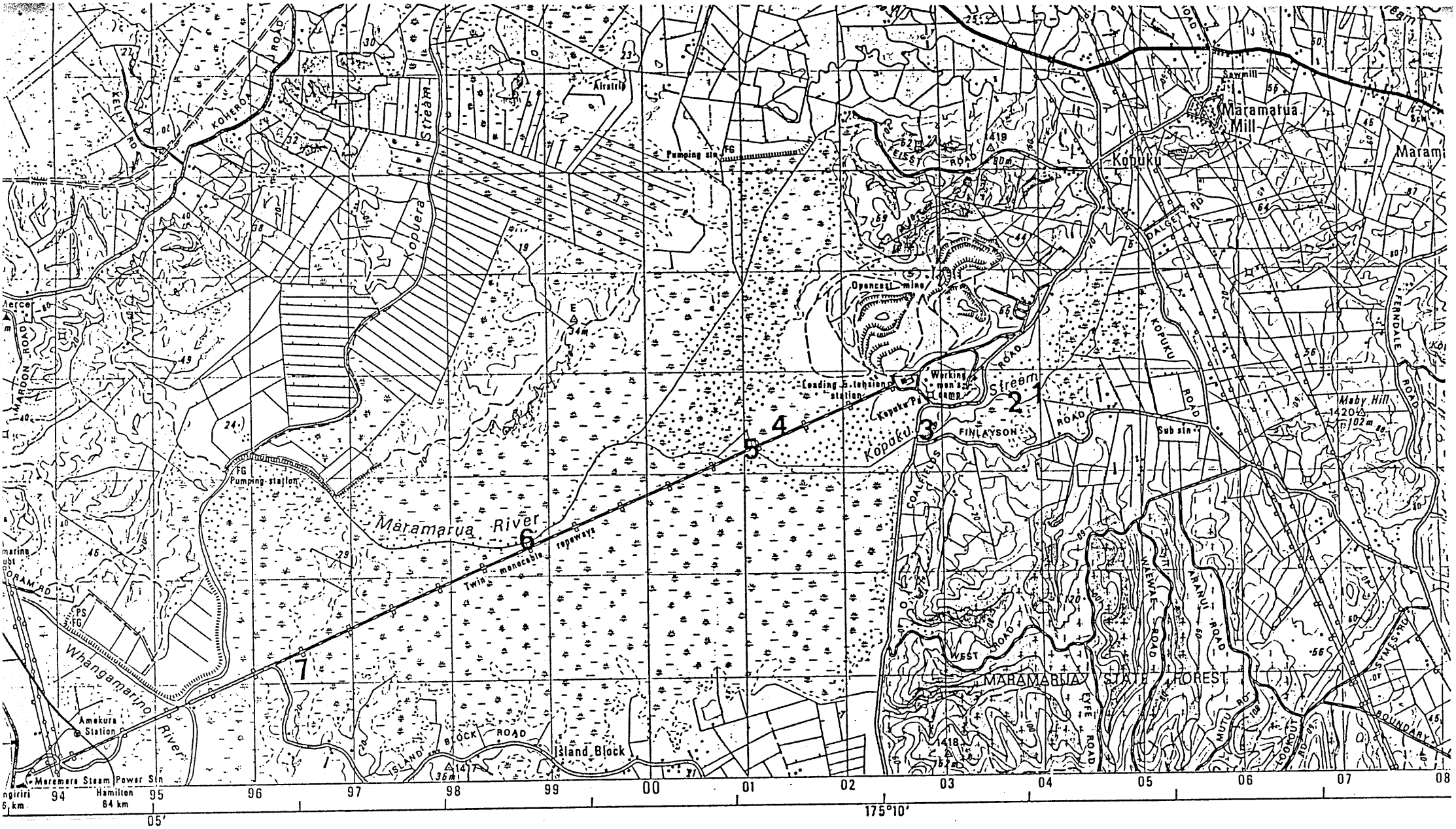

FIGURE 1: Location of sampling sites along the Kopuku-Meremere causeway and in Kopuku Stream, 9-10 March 1988.