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NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORT NO. 25

EVIDENCE PRESENTED TO A HEARING IN RESPECT OF A NATIONAL WATER CONSERVATION ORDER FOR THE MOHAKA RIVER

by

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Presented on behalf of Electricity Corporation of New Zealand Ltd

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Servicing freshwater fisheries and aquaculture

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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.

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MOHAKA RIVER CONSERVATION ORDER

SUMMARY OF EVIDENCE - Rowan Strickland

My evidence to the tribunal was largely based on the report I wrote on fish distribution and habitats in the Mohaka river (Fisheries Environmental Report No. 55, 1985), but also on subsequent drift diving and recreational visits.

Eleven fish species were recorded by MAFFish. Eight of these fish have life history stages which require access to and from the sea. A steep gradient through the Maungataniwha gorge appears to contribute in a major way to the observed distribution, diversity, and density of migratory fish in the Mohaka river, consequently the diversity of fish habitat in the upper reaches is not utilised by a corresponding diversity of fish species.

The three most abundant fish species in the Mohaka river, particularly upstream of the Maungataniwha gorge, were longfinned eels, brown trout, and rainbow trout. Of the native fish present, eels were the most abundant and widely distributed. Eels and koaro are the only species whose distribution does not appear to be affected by the Maungataniwha gorge.

There are no rare or endangered species among the native fish found in the Mohaka and none form a fishery of national importance. In a regional context, eeling may be important and it is no doubt locally important, as are the native fish caught in the vicinity of the mouth.

Hydro development is unlikely to have a significant effect on any existing fishery based on native fish, though this aspect would require more investigation once a specific development proposal is available.

Brown trout are the most abundant fish species in the Mohaka and together with rainbow trout are well distributed throughout the catchment. Natural recruitment of both trout species is successful and widespread. The numbers of large trout found above the Glenfalls area support a fishery of outstanding value but there is a lack of evidence to suggest a fishery of national importance persists below this point.

The Mohaka fishery could be enhanced by formation of a lake in the Te Hoe area or downstream of this point. With careful management, hydro electric lakes in the lower Mohaka, have the potential to create a greater range of fishing opportunity.

POST TRIBUNAL COMMENT

After hearing Mrs Haliburton's evidence on the nature of the section of Mohaka river now referred to generally as the Maungataniwha gorge,

it would appear that this area has not always necessarily been a barrier to fish moving upstream. Her evidence described the gorge as featuring calm water before the 1931 earthquake and that the earthquake and uplift produced the present steep gradient features. This could explain the presence of several species found above the gorge during the 1983 survey but which are usually considered weak migratory species and are rarely found above such obstacles as the Maungataniwha gorge.

IN THE MATTER of the Water and Soil Conservation Act 1967

AND

IN THE MATTER of an Application for a Water Conservation Order for the Mohaka River system

EVIDENCE OF ROWAN STRICKLAND

INTRODUCTION

1. My name is Rowan Strickland and I am employed as a Technical Officer at the MAFFish Fisheries Centre in Rotorua. My primary work area is environmental studies relating to fish and fisheries, and I have had twelve years experience in this field, four years of which were with the Auckland Acclimatisation Society. In 1983 I was responsible for a study of fish distribution and habitats in the Mohaka River and am author of Fisheries Environmental Report No.55 which details the results of that survey. I am familiar with most of the Mohaka from my involvement with subsequent fisheries studies in this system, as well as recreational pursuits within the catchment which include rafting, hunting, and fishing.

2. I appear at this hearing on behalf of Electricity Corporation of New Zealand Limited. My evidence relates to

the fish species found in the Mohaka river and the likely impact on these fish if hydro electric dams were constructed in the Mohaka.

1983 FISHERIES SURVEY OF THE MOHAKA RIVER

3. This survey was carried out for the Ministry of Works and Development Power Division by MAFFish in association with Department of Scientific and Industrial Research Ecology Division, Hawke's Bay Catchment Board, Hawke's Bay Acclimatisation Society, Wildlife Service of the Department of Internal Affairs, and Ministry of Works and Development.

4. The survey was aimed at providing a database on fish in the Mohaka from which studies to assess hydro-electric development proposals in the river could be readily identified. 73 sites were sampled by electro-fishing throughout the Mohaka system and sites were chosen to cover the range of geological, vegetation, land use and altitudinal zones represented in the catchment.

5. The most significant factor in native fish distribution appears to be the gradient increase in the Maungataniwha Gorge, which has a thinning out effect on both species diversity and numbers. Up to this point, the river

meanders through a steeply entrenched siltstone valley which offers a limited range of poor quality habitat for fish compared with the diversity of habitats found in the catchment beyond the Te Hoe confluence.

ADDITIONAL MAFFISH SURVEYS IN THE MOHAKA RIVER

6. In conjunction with other studies, further work was conducted by MAFFish in the Mohaka at different times since 1983. This work involved trout census studies in which data was collected by drift diving in the Mohaka's main stem in the vicinity of Glenfalls and at various sections above the Mangatainoka confluence. Table 1 summarises rivers nearby which were also drift dived. These surveys have shown that the Mohaka's headwaters, in comparison to its middle reaches, and headwaters of several other popular trout fishing rivers within Hawkes Bay and Central North Island districts, has a higher number of catchable sized fish.

IMPACT OF HYDRO ELECTRIC DEVELOPMENT ON THE MOHAKA RIVER FISHERY

7. The following comments regarding impacts of hydro-electric schemes, as outlined in Mr Cox's evidence, on fish found in the Mohaka river are based on data from the above surveys.

These comments are also made on the presumption that little or no fish passage will be allowed for. However, my colleague Charles Mitchell will address the question of fish passage, and outline some ideas for enhancing some of the fish stocks in conjunction with development proposals.

8. Table 2 lists the fish species MAFFish have found in the river, and some species which the Hawke's Bay Acclimatisation Society have reported from the estuary area. Also attached to this list are marine species reported to have been caught in the lower river and at the mouth. All eleven fish species recorded by MAFFish are either present in the impact area or at some stage of their life cycle move through it. Eight of the species have marine life history stages. In addition to the following, life history data for each of these species is outlined in Table 3. I have coloured slides of the species I have referred to if the Tribunal would like to see these. If there are any particular species the Tribunal would like a coloured print of I can let you have them at a later date.

LONGFINNED EELS

9. The largest density of longfins is found above the Te Hoe confluence. This fish utilises nearly every stream of the

catchment and will be the most affected if movement beyond the dams is stopped. Longfinned eels were found up to 160 kilometres inland. Their choice of habitat differs from the shortfinned eel, in that they seek running streams rather than sluggish water. Longfinned eels provide a fishery throughout the catchment and good catches are known to be taken from as far upstream as Poronui. Without continued access for elvers (juveniles) any eel fishery would be adversely affected by dam construction, although their long lifespan implies that it would be some time before this impact became obvious.

SHORTFINNED EELS

10. Density of shortfinned eels is high in the lower reaches but thins out above the Te Hoe confluence, with a few penetrating up to 100 kilometres inland. Our data suggest that this fish will be affected by any of the development schemes unless lake populations can be established in the formed lakes. Limited numbers of elvers may climb the spillway into the first lake, but a growth period within the first lake may limit their chances of further upstream migration because ability to climb decreases with increase in size. Both eel species must migrate from the sea as elvers and later return to the sea as breeding adults.

11. Both migrations must be considered if the impact of development is to be minimised for these species.

KOARO

12. Koaro are found in suitable habitat from above the Te Hoe confluence up to 127 kilometres inland. These fish usually form a small portion of the whitebait catch when their juveniles enter freshwater, but in unmodified rivers like the Motu they can form up to 78 percent of the whitebait catch. A similar survey to the 1983 survey of the Mohaka was carried out in the Motu in 1980, and adult koaro comprised 17 percent of the catch from 45 sites throughout the catchment. In the Mohaka adult koaro comprised only 2 percent of the catch from 73 sites. While the whitebait catch composition of the Mohaka has not been analysed, it can be assumed that it is likely to contain a low composition of koaro.

13. Koaro are likely to form a landlocked population if a dam is placed below the Te Hoe confluence. Such populations already occur, for example, Mangatawhiri and Mahinarangi dams, and landlocked populations are present in many New Zealand lakes. Establishing lake populations of koaro in the Mohaka may make a minor contribution to the whitebait fishery at the Mohaka's mouth.

BLUEGILLED BULLY

14. This fish is probably present in the Mohaka below Willowflat as there are similar habitats to that in which we found them in the Te Hoe, 60 kilometres inland. Because of the marine requirement in their life cycle, their distribution will be confined to the first 15 kilometres of the Mohaka if hydro development proceeds. The bluegilled bully is not part of any known fishery and is common in coastal rivers around the Bay of Plenty and east coast.

COMMON BULLY

15. This fish will readily form landlocked populations in lakes. Seagoing stocks will also persist in the Mohaka below the Raupunga dam. While there is no known fishery based on the common bully, it is no doubt a forage fish for larger species in the lower river. The common bully is likely to flourish in dam reservoirs on the Mohaka and continue to provide food for larger fish.

CRAN'S BULLY

16. Like the other bullies, Cran's does not form part of any known fishery though it may have some value as food for other fish. Cran's bully would probably persist in the

areas they are already found as they do not require a marine phase in their life cycle.

TORRENTFISH

17. Torrentfish have been found 40 kilometres upstream from the sea in the Mohaka at Willowflat, and seem to be limited to the lower river by the gradient increase through the Maungataniwha Gorge. Because torrentfish require a marine phase in their life cycle, distribution will be limited to the lower 15 kilometres of river after hydro development. This may be of concern if a fishery is based on this fish, but none has been reported from this river. Torrentfish are found throughout New Zealand and are abundant in most east coast rivers.

SMELT

18. Smelt are likely to have a similar distribution to inanga in the Mohaka, though they can be found upstream as far as Willowflat, approximately 40 kilometres from the sea. Juvenile smelt are no doubt taken at the same time as, and form part, of the whitebait fishery. This should remain unchanged, except there may be some depletion in numbers due to a more confined distribution of adults. This could only be assessed by further sampling of the river to

pinpoint the areas of river supporting the greatest density of adults. However, smelt can be established as a landlocked species and this is often encouraged to provide food for trout. Smelt could be established in both hydro lakes and may contribute to smelt runs and the smelt fishery at the Mohaka's mouth.

INANGA

19. The inanga is most likely to be the main species caught in the Mohaka whitebait fishery, though this has not been confirmed. Unlike the koaro, the inanga is a fish of the lower river system and in the Mohaka was recorded only 2 kilometres inland from the sea. Unless there is to be a dramatic flow reduction or flow fluctuations below Raupunga, none of the schemes should affect this fish since it is unlikely that inanga are as far upstream as Willowflat. The largest densities are likely to be confined to the first 10 kilometres of river.

SALMONIDS

20. Both brown and rainbow trout are well established throughout the Mohaka River, and in the 1983 survey were the most prevalent fish species found. Almost the entire trout sample during this survey consisted of juvenile trout

of both species, which coupled with their abundance and wide occurrence, suggest that natural recruitment of trout is both successful and widespread throughout the Mohaka catchment above the Te Hoe confluence. Claims about the upper and middle reaches value as a trout fishery are more than backed up by these results and by the high numbers of large trout counted in these reaches during drift dive surveys. However, within the limits of the data collected, it appears that numbers of large trout peak and decline somewhere between the Taharua and Glenfalls area. Although further drift dives would be required to confirm this trend I suspect that this downstream decline in numbers of large trout probably continues the rest of the way down the Mohaka, particularly below the Waipunga where the combined effect of upstream catchment modification and the downstream increase of silt from the papa country have a visible effect on the quality of trout habitat. I base these comments on visual observations I have made of the river before and since the 1985 Easter flood and my last observation was just two days ago.

21. Estuarine and sea run trout are known to occur in other New Zealand rivers and have been speculated as occurring in the Mohaka. Whether this is fact and to what extent it occurs

in the Mohaka has never been properly researched. Therefore, unless significant runs of trout occur between the estuary and headwaters, the proposed dams will have no detrimental effect on trout numbers.

22. The one salmonid requiring an uninhibited run of the river from the sea to the middle and upper reaches is the quinnat salmon. However attempts during the late 1800s and 1960s by the Hawke's Bay Acclimatisation Society to establish salmon in the Mohaka River were all unsuccessful and in MAF's view there is no likelihood of a sustained run ever developing in this system.

HYDRO LAKE FISHERY

23. Although upstream salmonid movement would be impeded by dams, the downstream recruitment of juveniles to a second hydro lake or the lower reaches would be largely unaffected. If anything, the reaches of the river which might be formed into lakes by hydro development could increase the potential and quality of habitat for trout. This will enhance the fishing potential in these areas and provide for a greater diversity or angling use. The Hawke's Bay Acclimatisation Society have demonstrated a strong interest in static water fishing over the years by

the management effort expended on Lake Tutira. A carefully managed hydro electric reservoir on the Mohaka would cater for this interest. I understand from Mrs Halliburton senior that the lake formed in the Te Hoe as a result of the Hawke's Bay earthquake in ~~1938~~ 1931, created a good trout fishery and she has already described this to the Tribunal. In my opinion this is the only indication of what type of trout fishery will occur if a lake environment is created.

SUMMARY

24. The database of fish distribution in the Mohaka was gained almost entirely from one comprehensive survey of the river in 1983 on behalf of NZED. Since I prepared my report No. 55 in 1983, I have rafted, fishedand drift-dived the river on a number of occasions and those field trips have confirmed my initial views and my evidence. Of the native fish present, eels are the most abundant and widely distributed. Eels and koaro are the only species whose distribution does not appear to be affected by the Maungataniwha gorge. There are no rare or endangered species among the native fish found in the Mohaka and none form a fishery of national importance. In a regional context, eeling may be important and it is no doubt locally

important, as are the native fish caught in the vicinity of the mouth. Hydro development, as outlined, is unlikely to have a significant effect on any existing fishery based on native fish, though this aspect would require more investigation once a specific development proposal is available. Such an investigation could answer most aspects of likely impacts on the native fishery within 12 months.

25. Brown trout are the most abundant fish species in the Mohaka and together with rainbow trout are well distributed throughout the catchment. Natural recruitment of both trout species is successful and widespread. The numbers of large trout found above the Glenfalls area support a fishery of outstanding value but there is a lack of evidence to suggest a fishery of national importance persists below this point. Though there would be a change in the type of fishing if a lake was to be created in the Te Hoe area, I believe that with careful management it would actually enhance the Mohaka fishery and create a greater range of fishing opportunity. The same applies to any of the lakes which could be created below this point.

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TABLE 1

A COMPARISON OF TROUT NUMBERS PER KILOMETRE FROM FOUR RIVERS IN THE KAIMANAWA AND KAWEKA RANGES, DERIVED FROM DRIFT DIVING SURVEYS.

		Brown Trout			Rainbow Trout		
		Lge	Med	Small	Lge	Med	Small
Mohaka at Poronui	15/2/89	48.0	2.0	4.0	4.0	0.0	0.0
" " "	27/4/89	66.0	6.0	0.0	0.0	0.0	0.0
" at Taharua	15/2/89	48.0	2.0	4.0	4.0	0.0	0.0
" below Otupua	2/4/85	76.8	35.5	52.4	1.0	1.0	6.6
" at Glenfalls	26/3/86	9.0	4.8	4.8	1.8	2.4	0.0
"	1/2/88	11.5	21.2	23.0	9.6	10.9	22.4
Taruarau headwaters		3.0	2.0	1.0	21.0	9.0	17.0
"		7.0	0.0	2.0	11.0	2.0	5.0
Rangitikei headwaters		4.0	0.0	0.0	2.0	1.0	1.0
"		0.0	0.0	0.0	14.0	3.0	1.0
"		5.0	0.0	1.0	21.0	0.0	1.0
"		3.0	0.0	0.0	15.0	8.0	0.0
Ngaruroro headwaters		6.0	1.0	0.0	14.0	5.0	5.0
" Kuripapango		2.0	3.0	1.0	2.0	7.0	14.0

Trout numbers per kilometre
in The Manganui a te Ao River

Manganui a te Ao at different	15	0	0	7	1	0
sites from lower headwaters	5	0	0	9	2	1
through to the lower middle	16	2	0	4	3	1
reaches	14	4	2	6	8	3
	22	8	1	4	2	4
	7	7	0	13	15	0
	12	7	2	4	4	5

TABLE 2

CHECKLIST OF FISH AND CRUSTACEA IN THE MOHAKA RIVER

Common name	Scientific name
Species caught during the electric fishing survey, February 1983.	
Long-finned eel*°	Anguilla dieffenbachii
Short-finned eel*°	Anguilla australis
Common smelt*	Retropinna retropinna
Koaro*o	Galaxias brevipinnis
Inanga*	Galaxias maculatus
Rainbow trout#°	Salmo gairdnerii
Brown trout*#o	Salmo trutta
Torrentfish*	Chiemarrichthys fosteri
Blue-gilled bully*°	Gobiomorphus hubbsi
Common bully*°	Gobiomorphus cotidianus
Cran's bully	Gobiomorphus basalis
Crustacea	
Koura	Paranephrops planifrons
Shrimp*	Paratya curvirostris
Species reported by Hawke's Bay Acclimatisation Society as caught in the estuary area.	
Lamprey*	Geotria australis
Kahawai#	Arripis trutta

Yelloweyed mullet#	Aldrichetta forsteri
Grey mullet+	Mugil cephalus
Black flounder*	Rhombosolea retiaria
Yellowbelly flounder+	Rhombosolea leporina

* Migratory species

\# Introduced species

\+ Estuarine species

° Fish found above M55

Additional fish species reported being caught at the mouth of the Mohaka and occasionally in the estuary.

Gurnard	Chelidonichthys kumu
Red cod	Pseudophycis bachus
Spotted dogfish	Mustelus lenticulatus
Spiny dogfish	Squalus blainvillei
Black back ray	Dasyatis spp
Eagle ray	Myliobatis tenuicaudatus
Blue moki	Latridopsis ciliaris
Stargazer	Leptoscopus macropygus
Trevally	Caranx georgianus
Barracouta	Thyrsites atun
Small piper	Hyporhamphus ili
Sole	Peltorhamphus novaezeelandiae

Mako shark	Isurus oxyrinchus
John dory	Zeus faber
Spotty	Psuedolabrus celidotus

TABLE 3

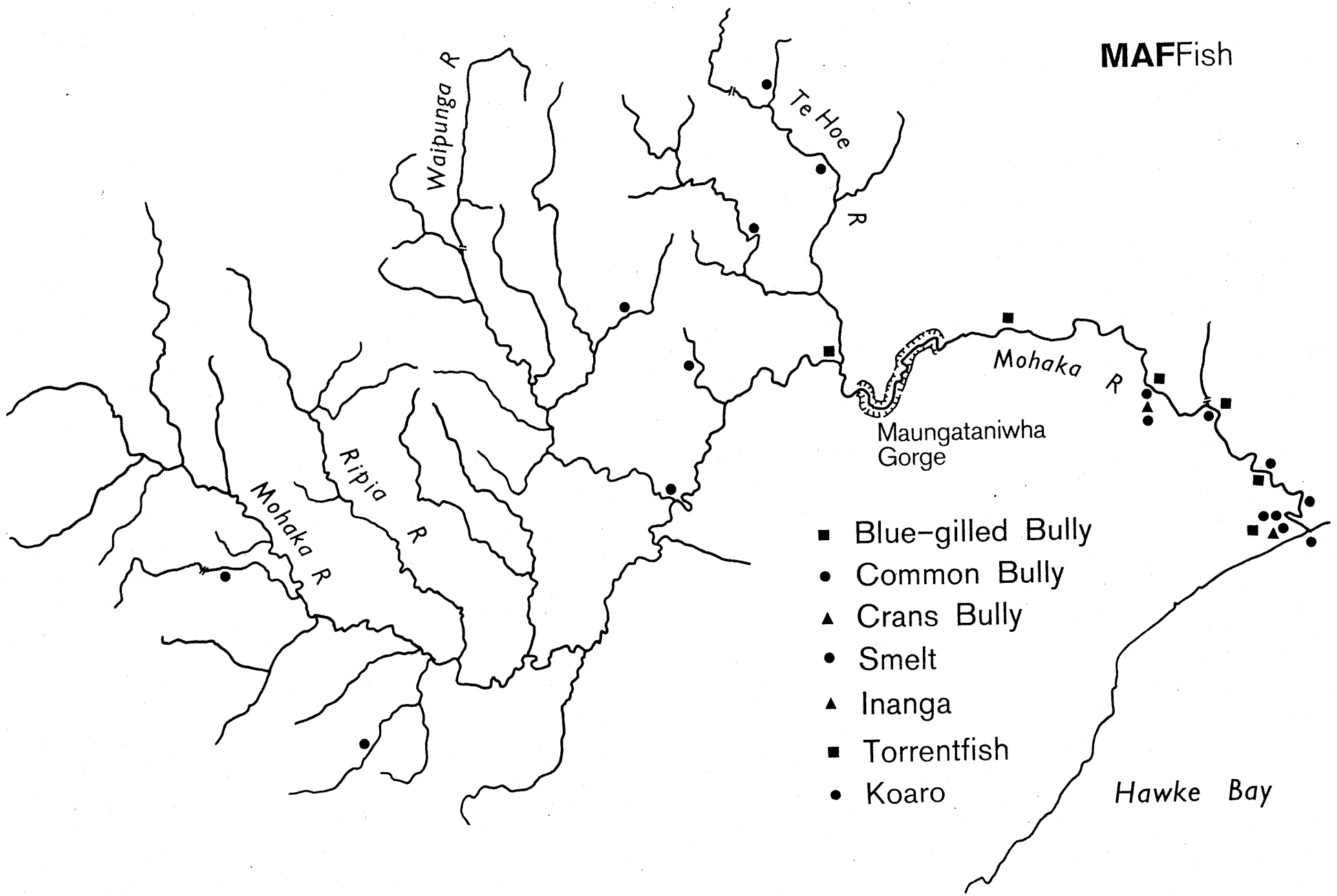
LIFE HISTORIES OF FISH FOUND IN THE MOHAKA RIVER

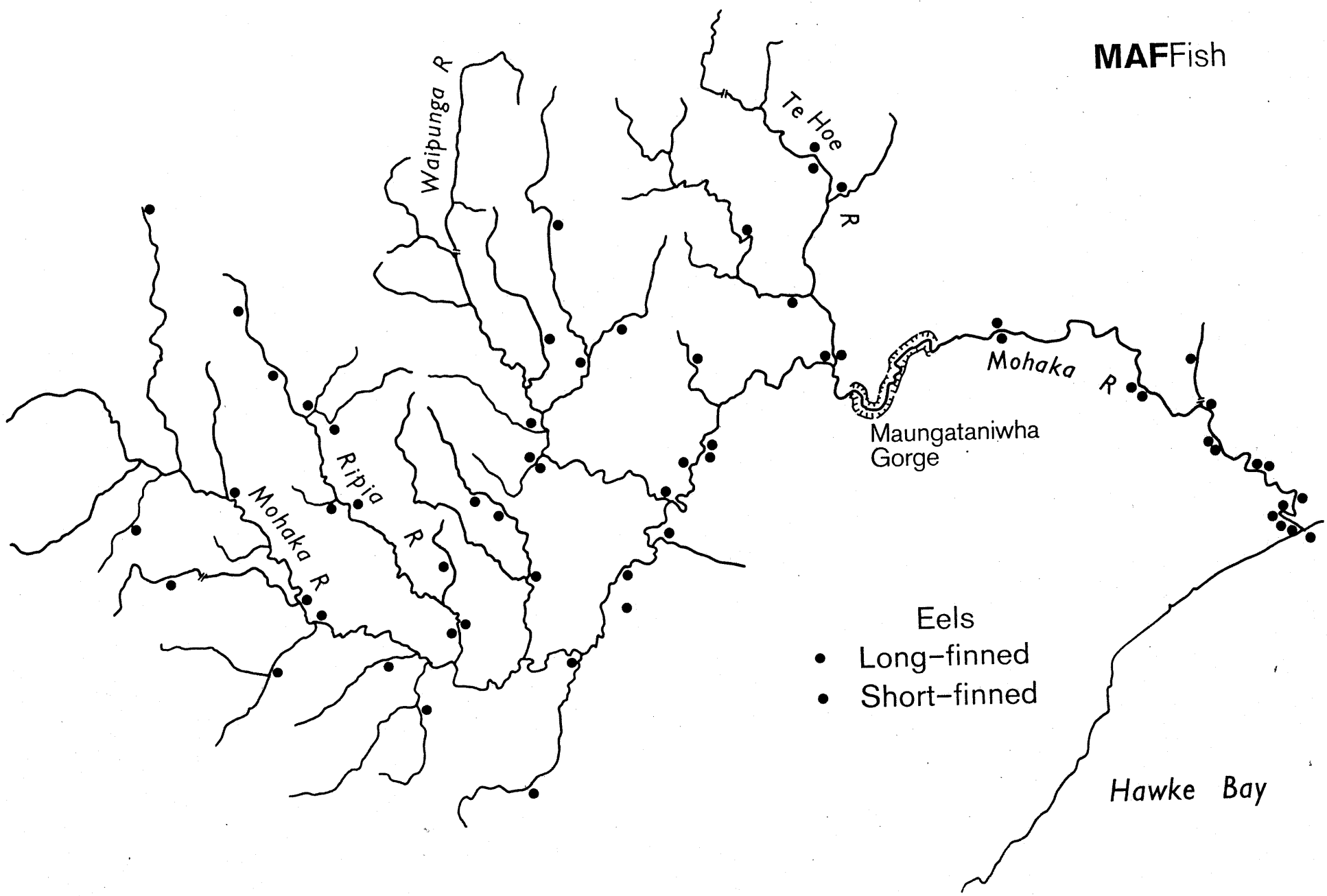
A. Native Species

Common name	Distribution and adult habitat	Adult migrations and reproduction	Juvenile habitats and migration
Shortfinned eel and Longfinned eel	NZ wide in all types of water	In late summer and autumn eels migrate to the sea where they breed	Glass eels enter freshwater in late winter and spring. Elvers migrate upstream in summer
Koaro	NZ wide in small rapidly flowing, usually forested streams	Adults do not migrate. Spawn in autumn and early winter	Larvae migrate downstream in autumn and winter. Juveniles return upstream as whitebait in spring
Black flounder	NZ wide mainly in coastal rivers and lakes	Little is known. Adults migrato sea to spawn in winter	Juveniles enter freshwater in spring
Bluegilled bully	NZ wide, inhabiting rapids in rock and gravelly coastal streams	Adults are not known to migrate Spawn from spring to autumn	Juveniles may migrate upstream in late winter and spring.
Common bully	NZ wide. In all types of lowland rivers, streams and lakes. Also occurs in inland lakes	Adults do not migrate. Spawn occurs out in spring and early summer, eggs being attached to rocks, logs and other objects.	Newly hatched larvae are washed to sea or remain in lakes. Juveniles return and migrate upstream from late spring through summer
Cran's bully	N.I. in moderately flowing rocky streams	Adults do not migrate. Breed habits unknown; probably similar to common bully	Larvae and juveniles probably live in same habitat as adults

Torrentfish	NZ wide mainly in large unstable coastal rivers, but penetrates far inland	Adults seem to segregate by sex, so that females must migrate downstream to spawn in summer. Mass migrations not known to occur	Eggs or larvae washed to sea. Juveniles re-enter freshwater and migrate upstream in spring and autumn
Common smelt	NZ wide in the sea, lower reaches of some rivers and in some lakes	In spring and summer smelt migrate up streams to spawn on sandy and silty areas	Freshly hatched larvae migrate downstream to lakes or the sea returning next spring
Inanga	NZ wide. Abundant in slow flowing lowland streams, swamps lagoons	In late summer and autumn, ripe fish migrate downstream into estuaries and spawn at spring tides amongst terrestrial plants	Eggs hatch during spring tides and larvae are washed out to sea. Juveniles enter rivers as whitebait in spring
Brown trout	Present in virtually all rivers and streams south of Auckland	Some populations resident. In others, adults migrate from the sea, lakes and rivers upstream into tributary streams where they spawn in gravel beds from April to July	Some populations resident. In others, fish may migrate downstream as fry or 1+ fish in September to December or as fingerlings in late summer and autumn

Rainbow Trout	NZ wide. Most abundant in Hawkes Bay, Rotorua and Auckland rivers	A few populations resident. Generally adults migrate upstream from lakes and rivers into tributary stream to spawn in gravel beds. Extended spawning period.	Most fish migrate downstream to lakes as fry in spring and early summer
Quinnat salmon	Adults marine. East and west coasts of S.I. Also found in some S.I. lakes	Adults enter fresh water from the sea during November to June; migrate upstream to spawn in gravel beds of stable tributary streams. Peak spawning is mid-April.	Fish migrate downstream for most of the year. Peak of the fry migration is September and October but juveniles remain in the river for up to a year.


MAFFish
Waipunga R
Te Hoe R
Mohaka R
Maungataniwha Gorge
Ripia R
Mohaka R
Blue-gilled Bully
Common Bully
Crans Bully
Smelt
Inanga
Torrentfish
Koaro
Hawke Bay


MAFFish
Waipunga R
Te Hoe R
Mohaka R
Maungataniwha Gorge
Ripia R
Mohaka R
Eels
Long-finned
Short-finned
Hawke Bay