Te Awarua-o-Porirua Whaitua Committee – habitat requirements of tuna

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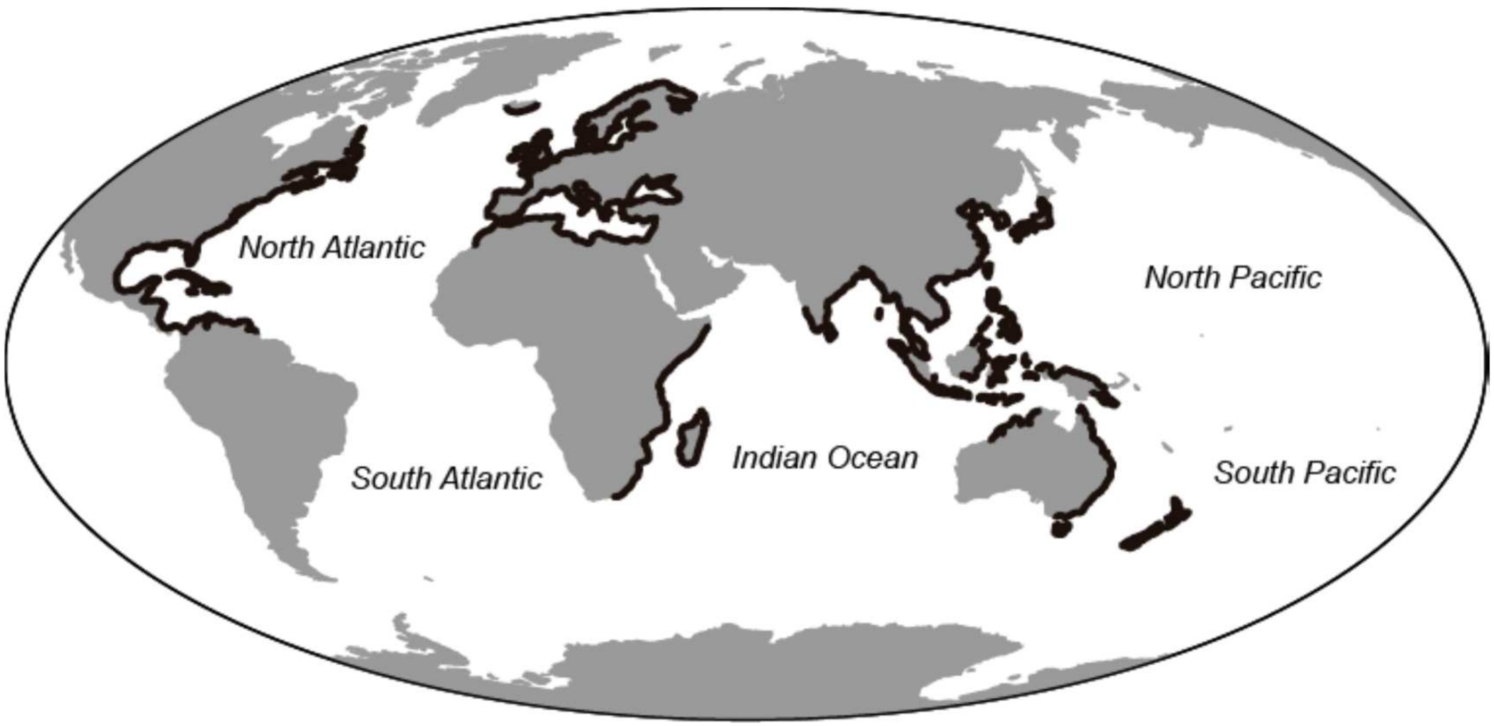
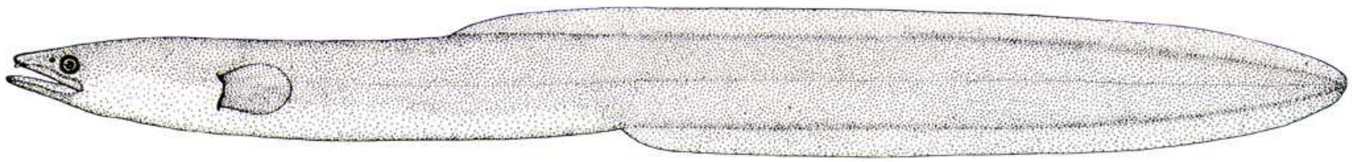
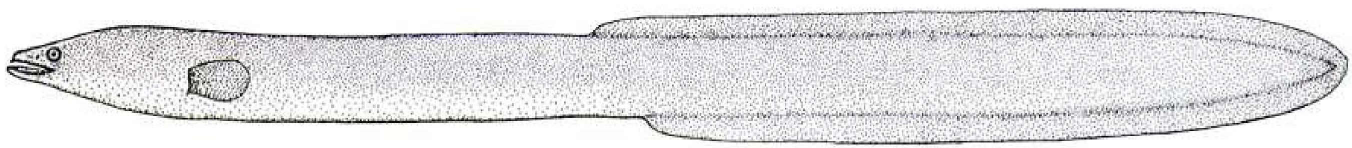
Worldwide distribution of freshwater eels (19 species/subspecies)



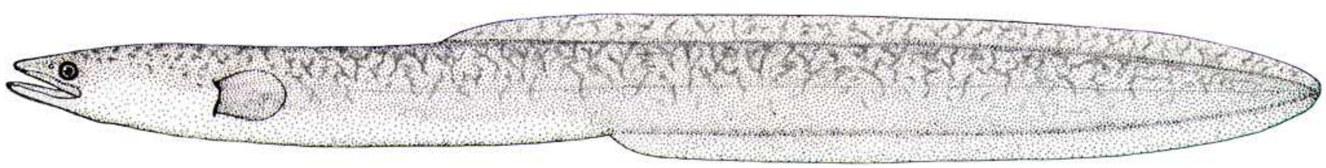
New Zealand eels



Longfin eel, *Anguilla dieffenbachii*, maximum size 2.0 m, 25 kg



Shortfin eel, *Anguilla australis*, maximum size 1.1 m, 3 kg

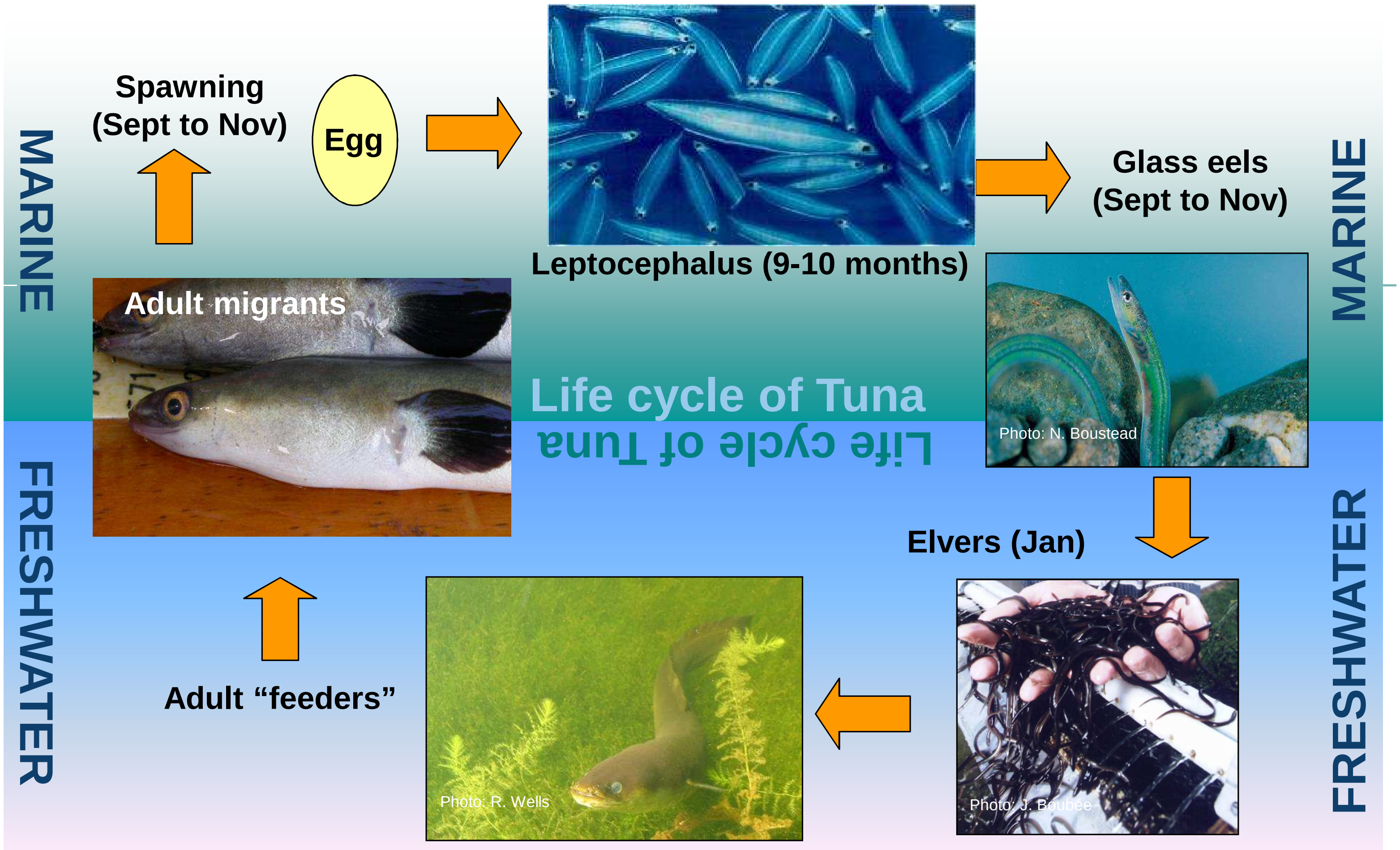


Australian longfin eel, *Anguilla reinhardtii*, maximum size 2.0 m, 21kg

Longfin eel, Lake Rotoiti, New Zealand. Estimated length 1.7 m, estimated weight 22 kg.

A 1.5 m (14 kg) longfin from a South Island river.

- these large females are now protected, but there are markets for them in Asia


MARINE
Spawning
(Sept to Nov)
Egg
Leptocephalus (9-10 months)
Glass eels
(Sept to Nov)
MARINE
Adult migrants
Life cycle of Tuna
Photo: N. Boustead
FRESHWATER
Elvers (Jan)
FRESHWATER
Adult “feeders”
Photo: R. Wells
Photo: J. Boubee

Essential habitat components for tuna

Flow-related

- Minimum flow
- Flow variability
- Water quality

Habitat-related

- Instream habitat
- Riparian habitat
- Instream passage
- (Toxins)

Flow-related habitat components

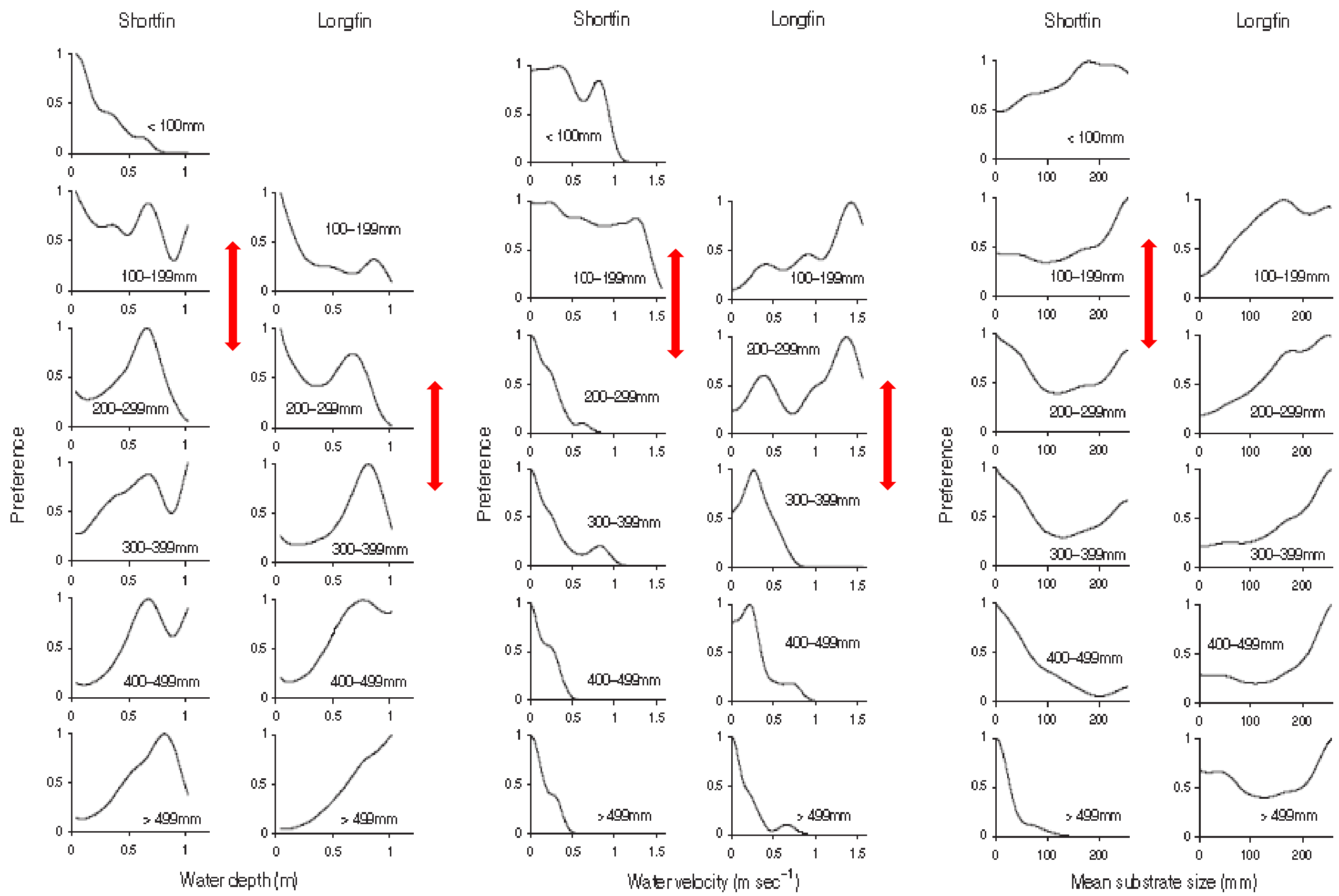
- Stream minimum flows and allocation limits; these affect both the quantity and quality of habitat (water temperatures)

- Flow variability – some variability is good but very flashy flows from largely impervious urban catchments can be bad for habitat erosion. Floods provide feeding opportunities and stimulate up- and downstream migrations

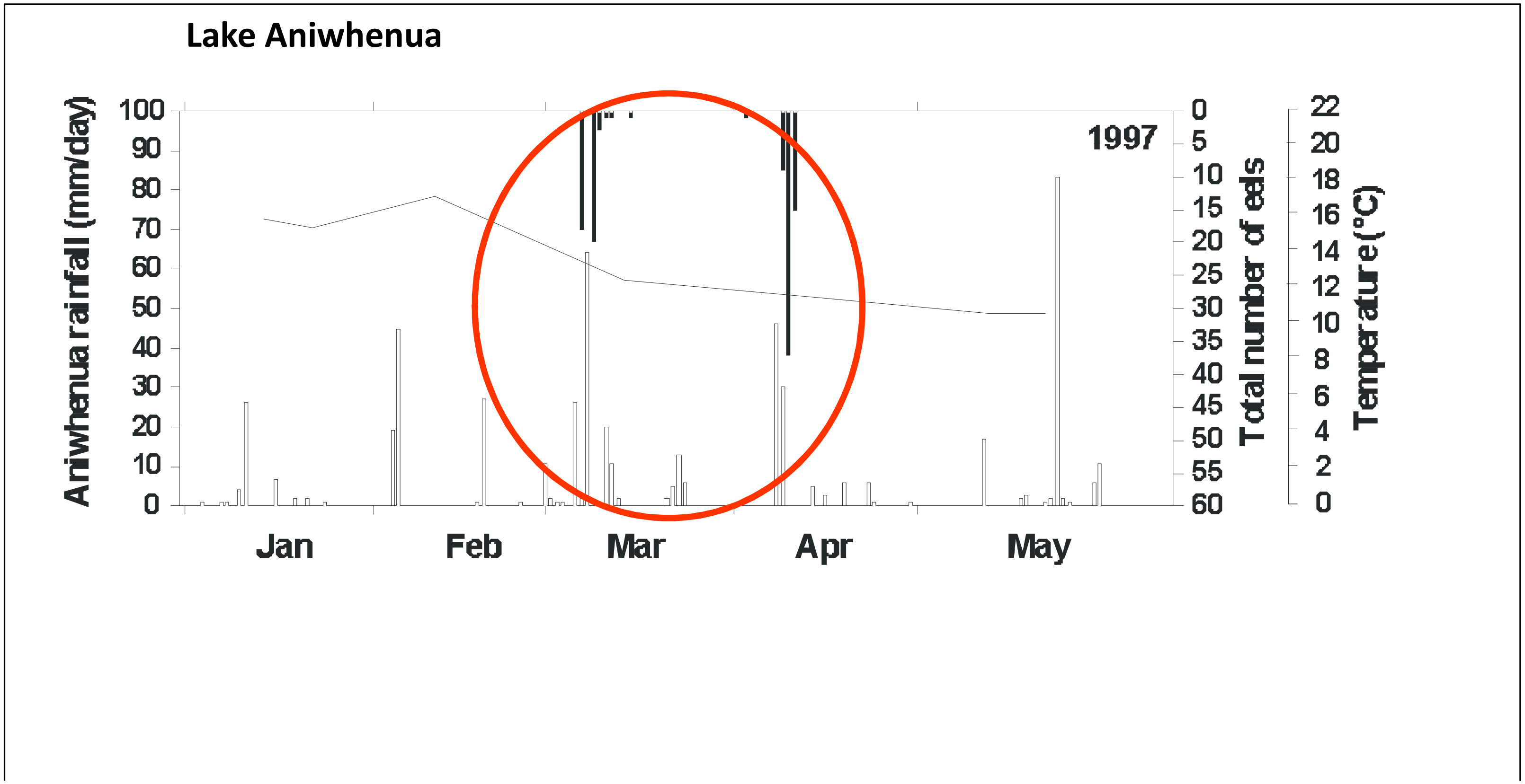
- Water quality; e.g., ***sediment***, metals, nutrient effects on periphyton and dissolved oxygen. Eels relatively resilient but sediment affects types and amount of invertebrate food

Changes in habitat use with size

Jellyman et al. 2003. Amer. Fish Soc Symposium 33: 63-78.



Rainfall (and increased flow) triggers downstream migration of silver eels (heke)



With best wishes
from
K. Radway Allen

NEW ZEALAND MARINE DEPARTMENT
FISHERIES BULLETIN No. 10

THE HOROKIWI STREAM

A STUDY OF A TROUT POPULATION

by

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Wellington, New Zealand
1951

Jellyman

Taihoro Nukurangi

The Horokiwi Stream 50 years on: a study of the loss of a productive trout fishery

D. J. Jellyman
G. J. Glova
M. L. Bonnett
A. I. McKerchar
K. R. Allen

NIWA Technical Report 83
ISSN 1174-2631
2000

Part of Abstract from Jellyman et al. 2000

There was no evidence that a single catastrophic event had impacted on fish stocks, but rather, the marked decline of the trout population appeared to be due to gradual habitat degradation. Most of this degradation occurred before the mid 1960s, when it was likely that extreme floods caused considerable instream erosion, leading to a substantial input of sediment into the stream. The effects of this were an accumulation of fine sediments, a shallower and wider stream channel, reduced depth of pools, reduction in both the size and quality of riffles, which in turn resulted in a substantial reduction in invertebrate production. Increased nutrient input promoted greater growth of aquatic weeds and algae, which also altered invertebrate composition. Although the trout population decreased markedly, the eel population appeared unaffected,

Suggested sequence of events and interactions that lead to demise of Horokiwi (Horokiri) trout stock.

The influence of sediment is shown in red

Habitat-related components

- Instream habitat not related to flow; e.g., instream cover, undercut banks, debris clusters etc (not uniform concrete beds or edges)

- Riparian habitat: e.g. shading to manage temperature and cover from predators, contribute to food

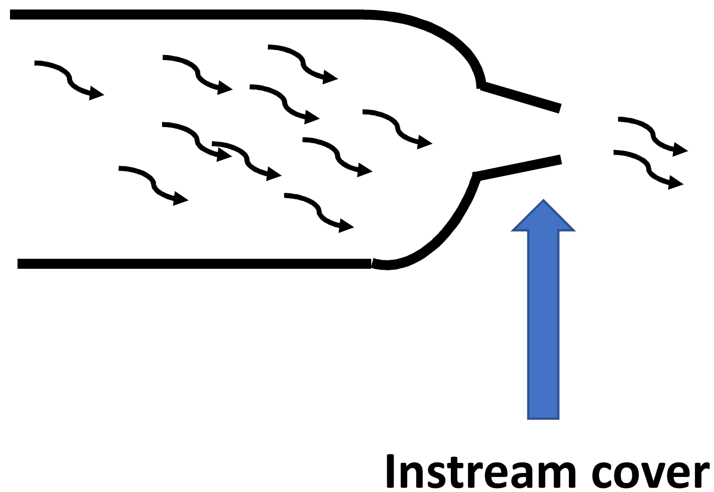
- Migration passage; e.g., avoiding restrictive structures like unnegotiable culverts and pipes

- Disturbance of historic toxins (DDT) in the soil in parts of the catchment (eels are bio-accumulators of toxins)

19 eels (to 82 cm) came from this debris cluster

31 eels were caught under the collapsed bank on right *vs* 7 small eels from left bank

The ‘bottleneck” hypothesis

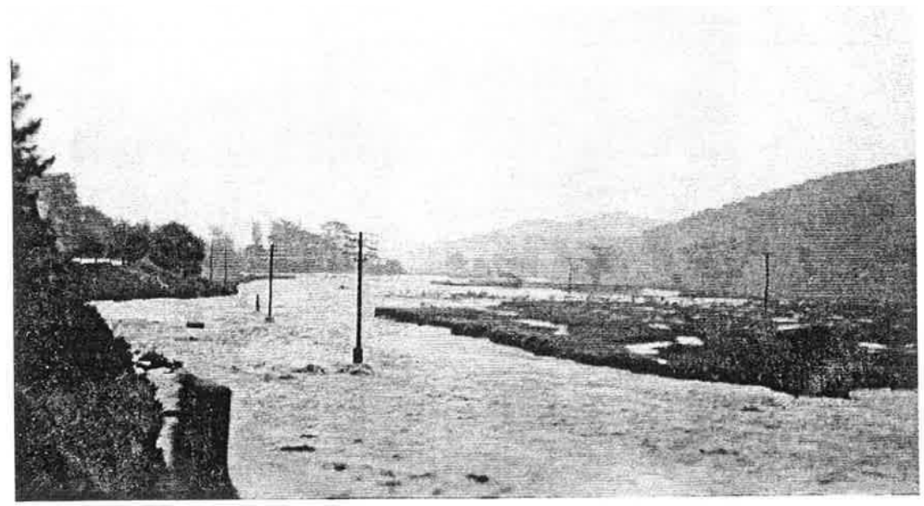


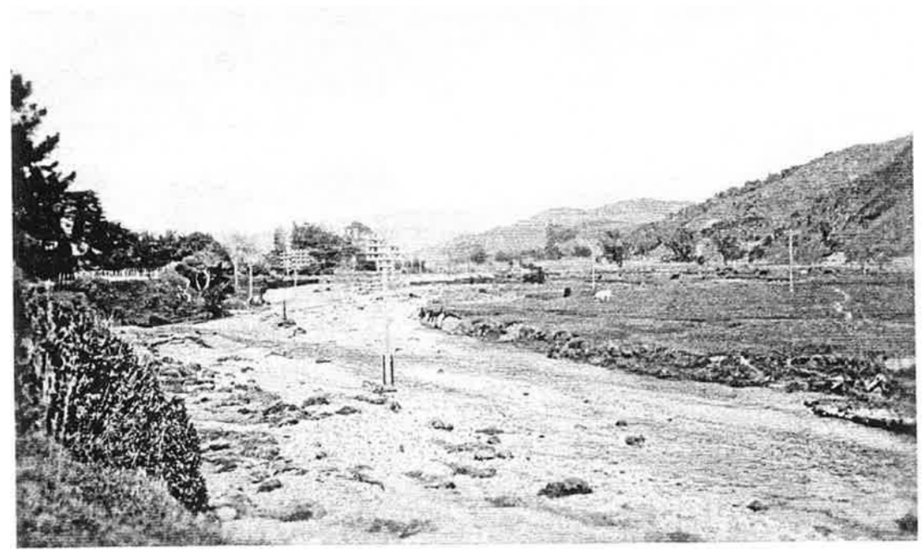
Instream passage – avoid perched culverts

Takehome messages

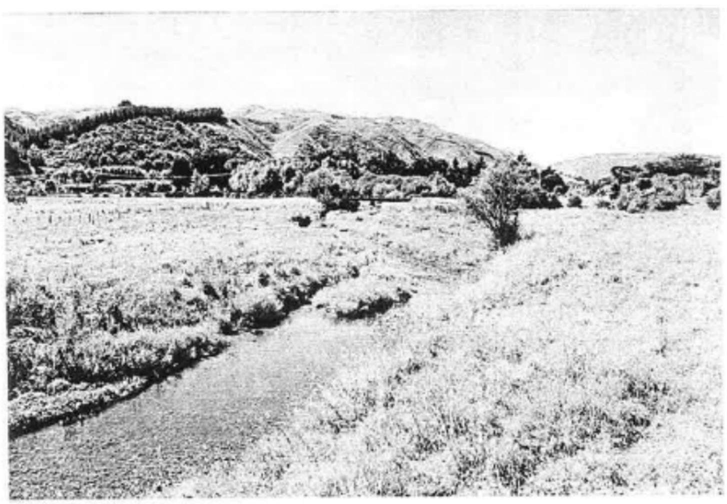
- Habitat preferences differ between the 2 species - Longfins prefer flowing water, stony substrates; shortfins prefer slow-flowing reaches, soft sediments
- Habitat preferences change with increasing size
- Eels are light-avoiding (active at night) so daytime concealment cover is essential
- Lack of suitable cover for “adult” eels in Horokiwi was found to be the primary factor limiting their abundance
- Excess sediment has major negative impacts

Large flood, October 1941 (from Allen 1951) – the trout population took 4 years to recover from this event

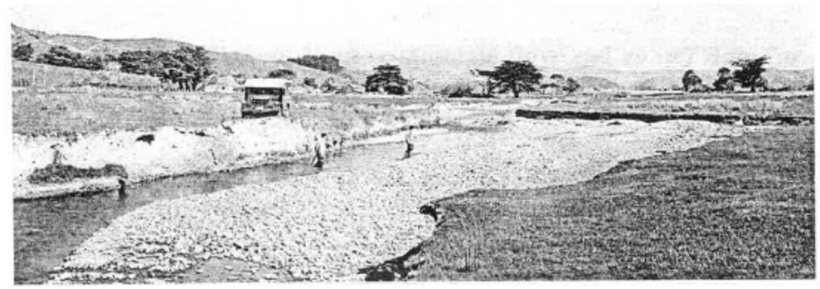




1940’s



1998



1950

1951

1999