

An aerial photograph of a braided river system, likely the Rangitata River in Canterbury, New Zealand. The river consists of numerous interconnected channels of blue water flowing over a wide, light-colored gravel and sand bed. The channels are separated by low, vegetated islands and bars. The surrounding landscape is a mix of green fields and forested areas, with distant mountains visible under a clear blue sky.

Braided River Aquatic Ecology Trends — Past, Present, Future

Rangitata River, Canterbury

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1 SUMMARY of talk

Important but difficult to answer this challenge?

1. We understand the important wet features of braided rivers, but
2. Absence of regular quantitative monitoring of braided rivers
3. Evidence we do have is:
 1. Qualitative (macroinvertebrate surveys – MCI etc.)
 2. One-off surveys
 3. Snapshot surveys 40 years apart (**past and present**)
 4. Indications of fishery declines
 5. University thesis snapshots
 6. Narrative, anecdotal descriptions of structured surveys
4. None of these are definitive, but – “compelling balance of evidence of degradation”
5. How to influence the **future**? – Monitoring or action or both?

Long Term Monitoring

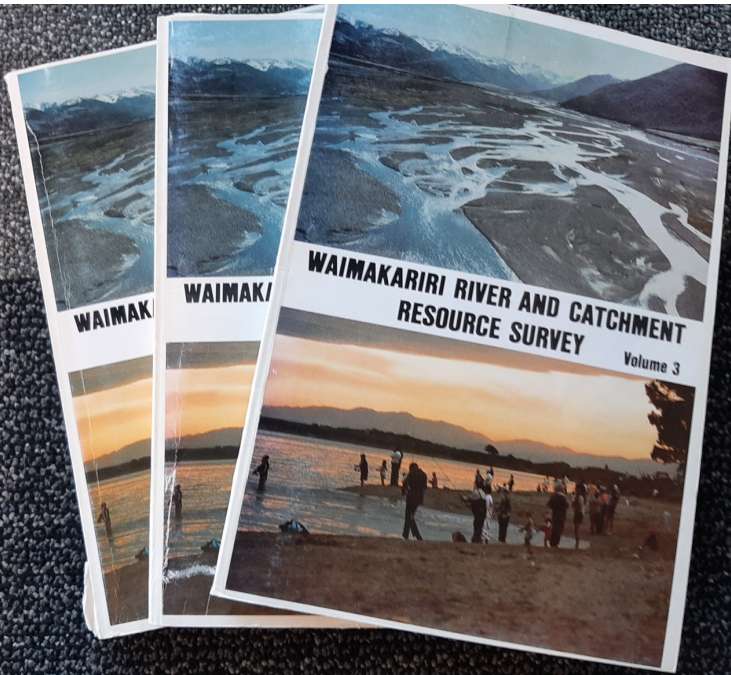
- No long-term fish monitoring. Many councils considering or trialing. But methods generally in smaller wadeable rivers. Ecan still scoping – not started yet but braided rivers unlikely
- Macroinvertebrates – generally qualitative (descriptive) rather than Quantitative (production) – wadeable methods so very little in braided rivers
 - NIWA NRWQN (1989 – 2020) – Waitaki, Opihi, Waimakariri, Hurunui
 - MCI/QMCI?? Plecoptera stone fly losses???
 - Ecan AEH (2000 – present) – wadeable rivers
- Periphyton – more recent and wadeable methods
- Habitat Assessment – recent and wadeable methods
- What else??

One-off surveys

- Catchment Board Resource Surveys – 1980s
- Marine Dept or NZFFR Reports – 1980s

These represent our best assessment of the **PAST**. Generally 40 years ago, and often still the most comprehensive surveys.

Often pre-date pressures and recent developments



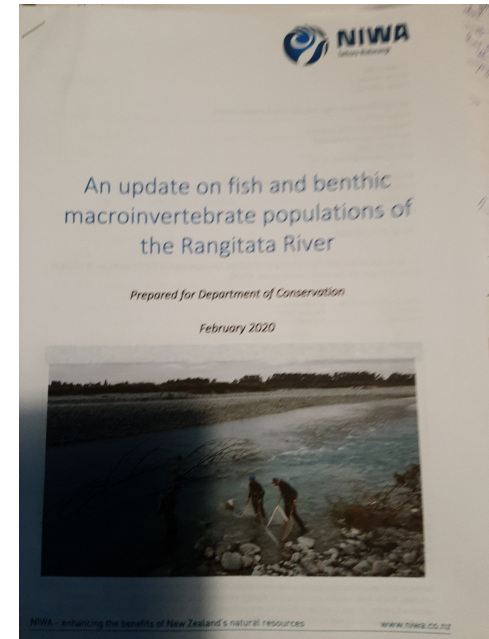
Snapshots – 35-40 years apart

1. Rangitata River

M. Bonnett (1983-84) Fish and benthic invertebrate populations of the Rangitata River.

Sinton and Jellyman (2018-19) An update on Rangitata River. (for Dept Conservation)

- Reduced number and abundance of estuarine species (giant bully, common smelt, stokells smelt, inanga, black flounder)
 - Lack of diadromous galaxiids
 - Reduced numbers of non-diadromous galaxiids
 - Large reduction in longfin eels
 - reduction in salmon and rainbow trout
 - Abundant Torrentfish, BG bully and common bully
- Generally, degradation in most fish communities.



Snapshots – 30-40 years apart

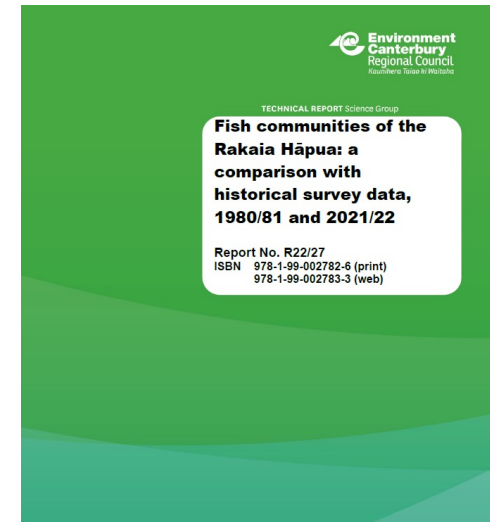
2. Rakaia River

Eldon and Greager (1983) Fishes of the Rakaia Lagoon

Arthur and Gray (2022) Fish Communities of the Rakaia hapua.

Arthur (2023) Fish community surveys of Canterbury hapua.

- Much fewer Stokell's smelt
- Fewer inanga and salmonids
- Smelt numbers substantially decreased
- Substantial decrease in black flounder and LF eels
- More yellow eyed mullet
- More common bully



Fishery declines

- Substantial decrease in recruitment of elvers – particularly Longfin eels
 - Low abundance of adult LF eels – no significant quota
 - Smelt fishery lost (tonnes at the Ashburton hapua)
 - Black flounder fishery greatly decreased
 - Salmon and sea-run trout fishery greatly decreased
 - Kanakana (Lamprey) very rare
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- Whitebait fishery maintained?
 - Mullet and kahawai increasing at river mouths?

Many University Theses on river communities

- Too many to list, but
- Gary Scrimgeour (1980s) – Torrentfish and Bluegilled bully in Ashley/Rakiura River
 - Key study on the biology, breeding and feeding of these species
 - Their abundance at the Rangiora study sites is now very low? Why?

May be much information in re-examining thesis studies on braided rivers

Narratives and community surveys

- Jellyman and Mayall-Nahi (2022) Perceptions of change: Recording observations over decades for Canterbury hapua. (for Ecan)
 - Fishery issues identified included:
 - Reduced abundance of smelt
 - Reduced abundance of sea-run brown trout and salmon
 - Decline in Stokells smelt.
 - Whitebait maintaining abundance
 - Emotional impacts of loss of fisheries and less emphasis on fishing
- Loss of Mahinga kai species abundance at many rivers – particularly marae, kainga and nohanga sites
 - Often descriptions of inability to provide much more than “a taste”.

Evidence of degradation or decline?

No one source of evidence is definitive alone,

But, together all of these examples give a consistent degradation message

Compelling “balance of evidence” of degradation and decline over the past 40 years in many braided rivers (particularly in the lower reaches/hapua)

This is the “**Past to Present**” story.

What will the story be for the next 40 years? The **Future?**

How do we set up to manage and report the future? – 30-40 years time?

Do we simply need to address/ resource the current absence of monitoring to be able to report state and trends in the future?

Very resource intensive and difficult in large braided rivers

Snapshots rather than regular (annual monitoring)

If you monitor things enough – do they get better?

Given the strong signal of degradation, we need actions to reverse and improve the values.

Causes of Braided River Fishery declines

- Abstraction – flow and allocation
- Water Quality
- River geomorphology- sedimentation
- Channelisation and gravel abstraction
- Loss of river margin habitats – “making room for rivers”
- Valuing the river edge habitats, wetlands, etc.
- Fish passage and poor fish screening at intakes
- Hapua and river mouth habitats
- Mouth closure
- Invasive species, nuisance species
- Climate change – temperature, droughts, floods
- Land use
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How do we set up to manage and report the future?

Need to identify and prioritise the pressures or causes and identify actions to reverse the degradation and improve the state of fisheries and mahinga kai.

Draw from OLWSC tools and approaches and design monitoring programmes to monitor and detect key improvements due to mitigations

Habitats like hapua and key species

The screenshot shows a website header with a teal navigation bar. On the left, it says 'OUR LAND AND WATER' and 'Toitū te Whenua, Toiora te Wai'. In the center is the 'National Science Challenges' logo. On the right is a home icon and the text 'ABOUT US' and 'Mā mātou'. Below the header is a light blue main content area. A dark green button labeled 'FUTURE LANDSCAPES' is at the top right of this area. Below it, the text 'Designing Freshwater Monitoring Programmes to Detect Early Improvement' is displayed in a large, dark blue font. At the bottom right of the page is a green footer with the 'Environment Canterbury Regional Council' logo and the Māori name 'Kaunihera Taiao ki Waitaha'.

OUR LAND AND WATER

Toitū te Whenua,
Toiora te Wai

National
Science
Challenges

ABOUT US
Mā mātou

FUTURE LANDSCAPES

Designing
Freshwater
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 **Environment
Canterbury**
Regional Council
Kaunihera Taiao ki Waitaha



What's our future, Canterbury?

We need to talk about our future

We want your feedback and thoughts on air, water, land, the coast, the built environment, and climate change. Do we have the balance right? Are we doing too much or not enough?

Share your visions for freshwater and outcomes for our environment and community wellbeing now.

Go to **ecan.govt.nz/ourfuture** for more information

- Fill out online feedback form
- Join a webinar or
- Visit us at a drop-in

Consultation closes 27 August 2023.