

Water quality and ecology

of the Rangitāiki Water Management Area



Rangitāiki River Estuary

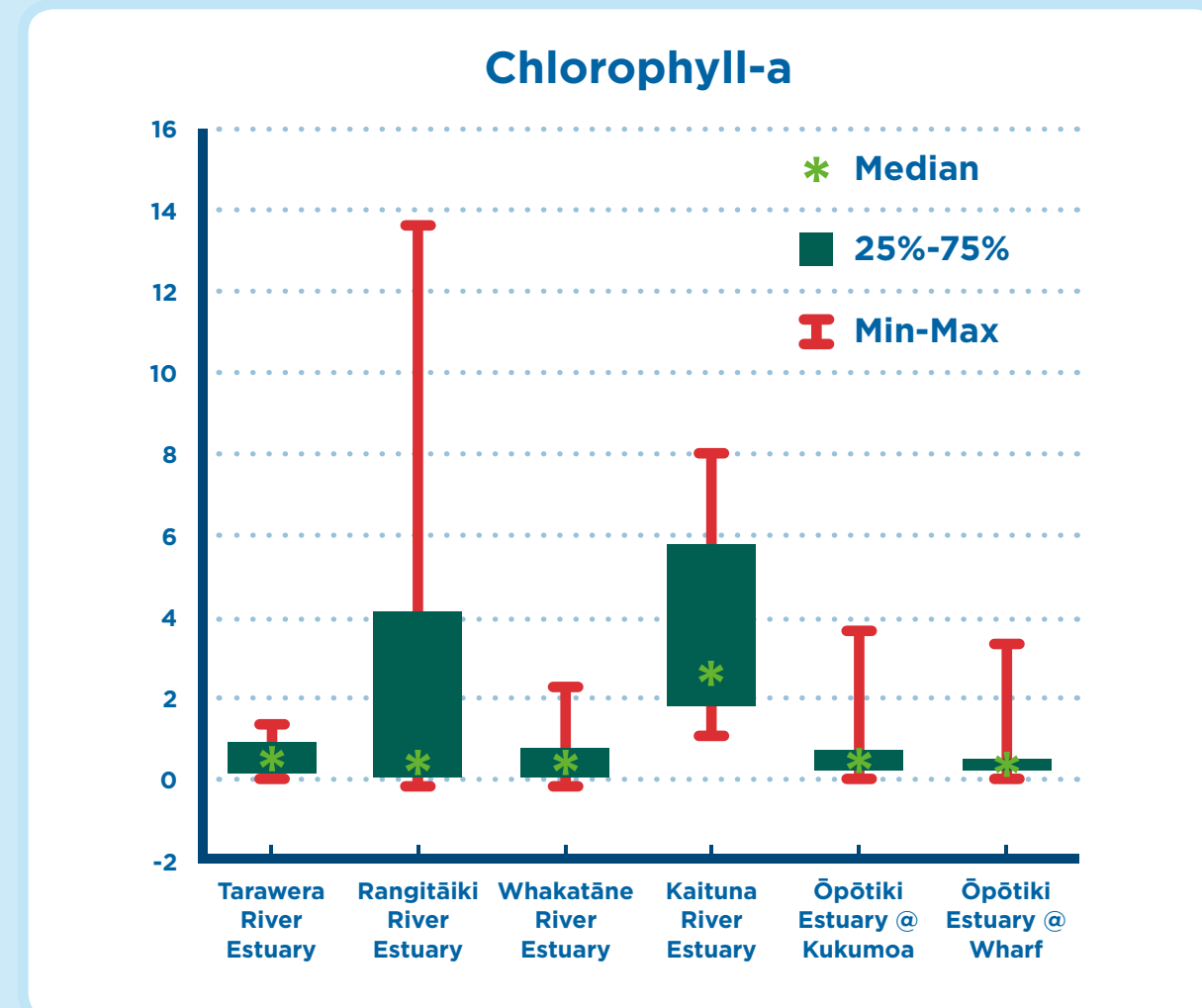
Issues:

- Increasing nutrients
- Nuisance biological growths
- Whitebait habitat

River estuaries are dynamic environments with large changes in tidal and river flows. About 63 percent of native freshwater fish species use estuaries to swim between fresh and salt water. Like many river estuaries, the Rangitāiki has little aquatic vegetation or macro-algae.

Freshwater usually dominates the water quality of river estuaries. Flood flows and the delivery of sediment and nutrients into estuaries can make it hard for plants and animals to live and grow there. Phosphorus and nitrogen are increasing in the estuary. Nitrogen is also increasing in the whole catchment, while phosphorus is only increasing in the lower catchment. Point sources and land use influence phosphorus in the lower catchment.

Nutrients can promote excess plant and algae growth. We measure plant and algae growth by measuring the concentrations of chlorophyll-a, the pigment in plants that is used for photosynthesis. The Rangitāiki estuary has the highest maximum chlorophyll-a concentrations and the second highest median of the Bay of Plenty river estuaries.



Lakes Aniwhenua and Matahina

Issues:

- Choking exotic lake weed growth
- Excess nutrients impacting algae, weed growth and ecology
- Impacts of weed growth on recreational and aesthetics



We described the health of lakes using the trophic level index (TLI), calculated using total nitrogen, total phosphorus, water clarity and chlorophyll-a.

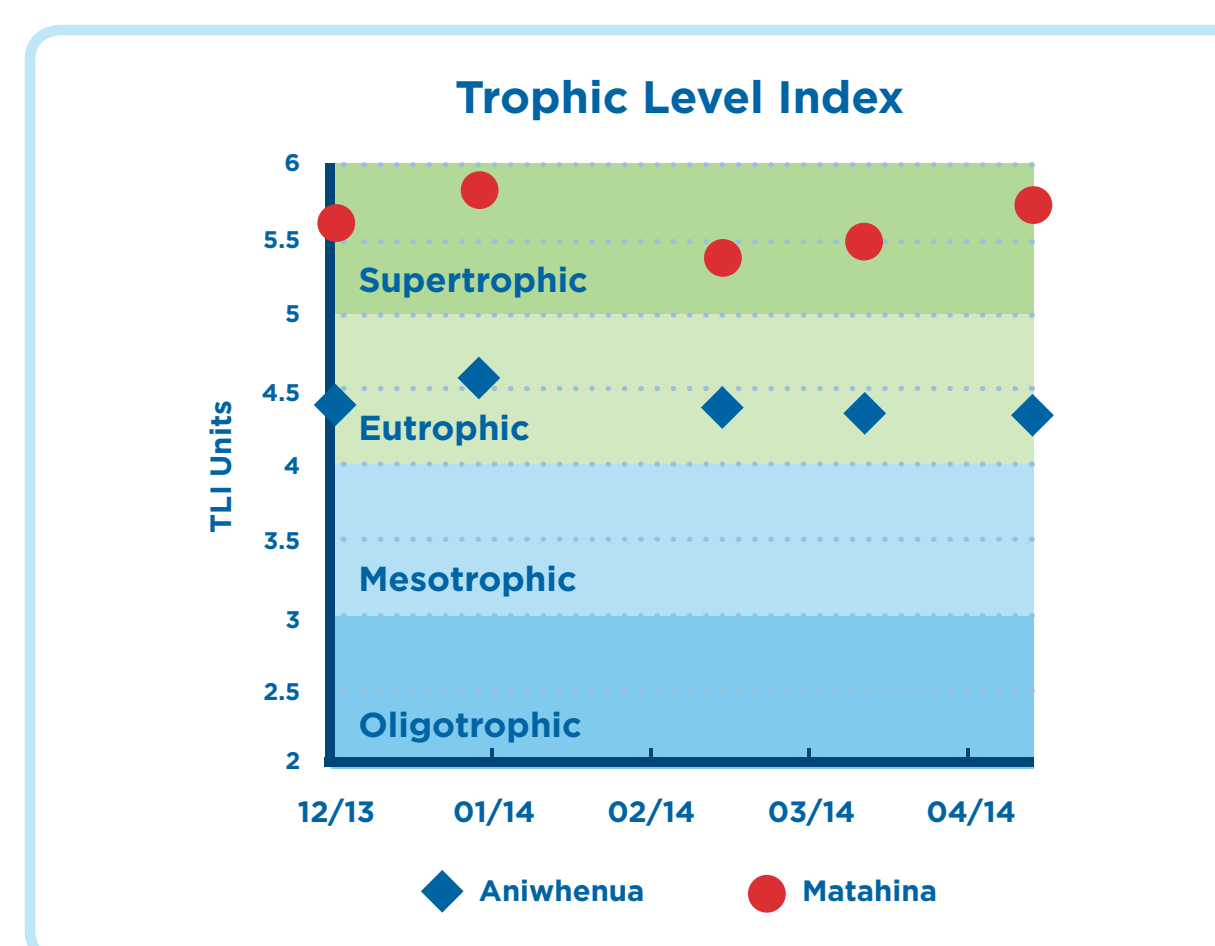
TLI results show both lakes are nutrient-enriched, and that Lake Aniwhenua is classed as eutrophic (poor water quality) and Matahina is classed as supertrophic (very poor quality).

Lake macrophytes and aquatic plants are important habitats for fish and invertebrates and play an key role in nutrient cycling. Macrophytes are monitored and used to generate Lake Submerged Plant Indicators (LakeSPI) to classify the ecological condition of the lakes.

Introduced macrophytes or aquatic weed have largely out-competed native species in these two lakes. See what their LakeSPI state is in the graph (right).

How should these lakes be managed?

Lake	LakeSPI Condition %	Native Condition %	Invasive Impact %
Lake Aniwhenua	12%	8%	85%
Lake Matahina	10%	3%	96%



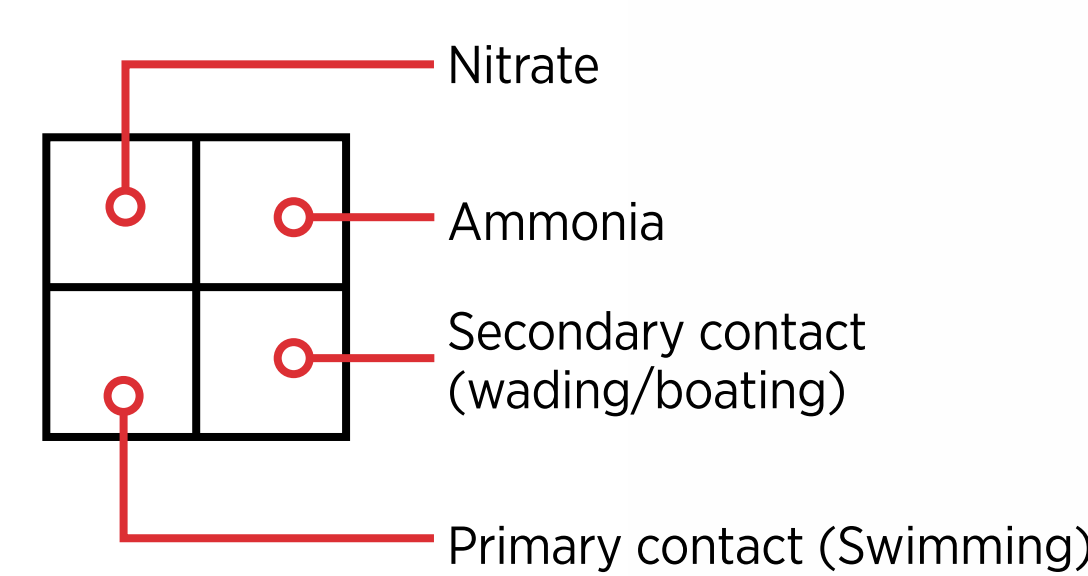
National Objectives Framework (NOF)

The National Policy Statement includes a National Objectives Framework (NOF), which sets compulsory national values for freshwater to protect 'human health for recreation' and 'ecosystem health'.

The NOF has a series of 'bands' ranging from A to D, and National Bottom Lines for the following attributes in rivers:

- To protect ecosystem health: Nitrate, Ammonia
- To protect human health for recreation: E.coli, Cyanobacteria

NOF Banding



Good

- A
- B
- C - MAS

Poor

- D

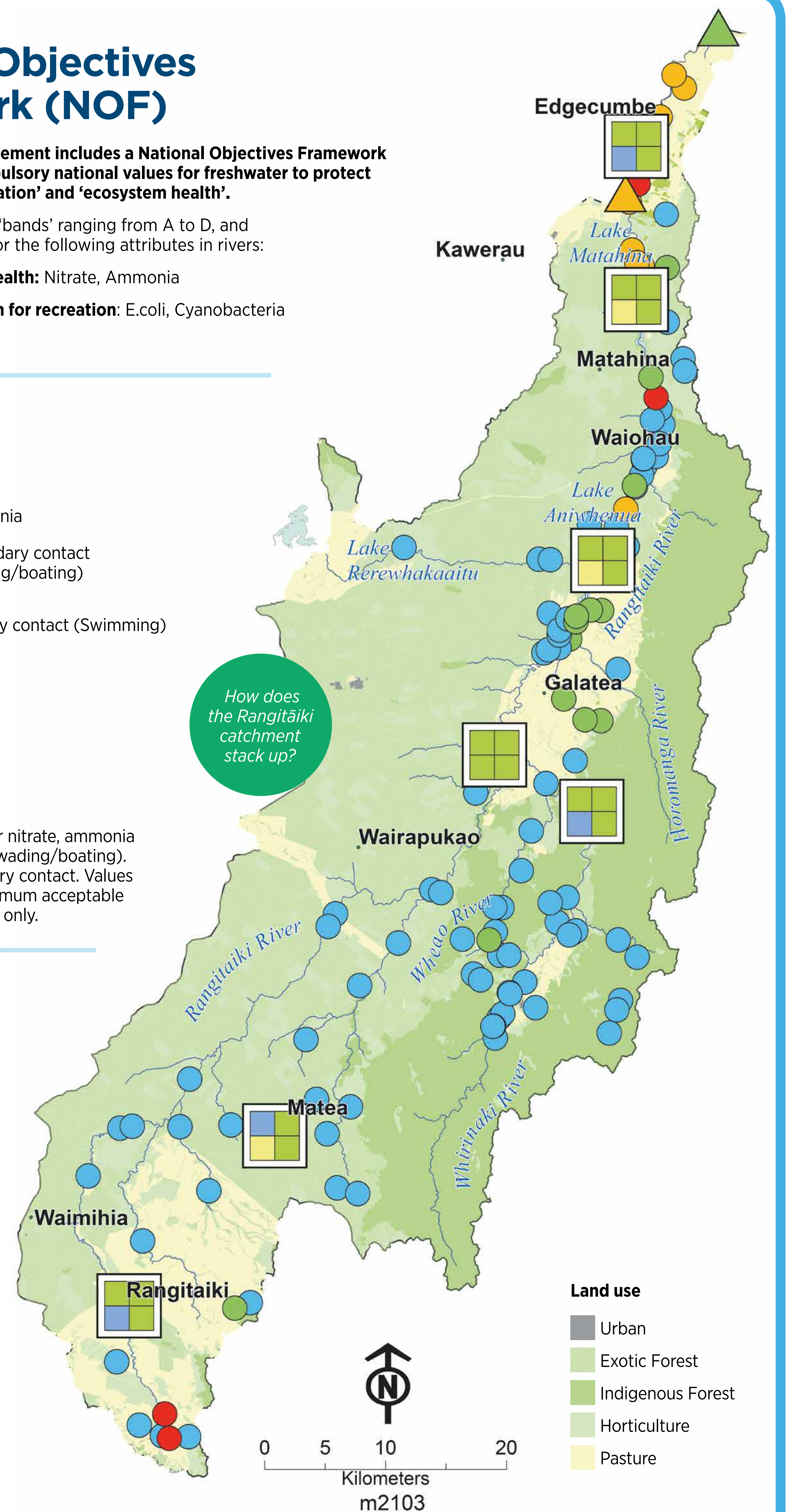
Annual Median (2014) for nitrate, ammonia and secondary contact (wading/boating). 95th Percentile for primary contact. Values are greater than the minimum acceptable state for primary contact only.

MCI Class

- Excellent
- Good
- Fair
- Poor

Suitability for Recreation Grade

- Good
- Fair



How does the Rangitāiki catchment stack up?

Coastal and freshwater recreation monitoring

When contaminated by human or animal faeces, water can contain disease-causing bacteria, viruses, and protozoa (such as salmonella, campylobacter or giardia).

These organisms can pose a health risk in waters used for recreational activities such as swimming.

Where would you choose to swim?



Macro-invertebrates

We use invertebrates to assess stream health as they integrate a wide range of environmental factors over relatively long periods of time.

Streams mostly support invertebrate communities typical of streams in good or excellent health. Streams draining from native bush and exotic forest had the highest health, while the health in streams draining from pasture was the lowest. Stream health was especially low in the Rangitāiki River's main stem, on the plains. Other sites, particularly in the lower Rangitāiki, had invertebrate communities indicative of fair or poor health.

What Macroinvertebrate Community Index (MCI) class is most abundant in the Rangitāiki catchment?

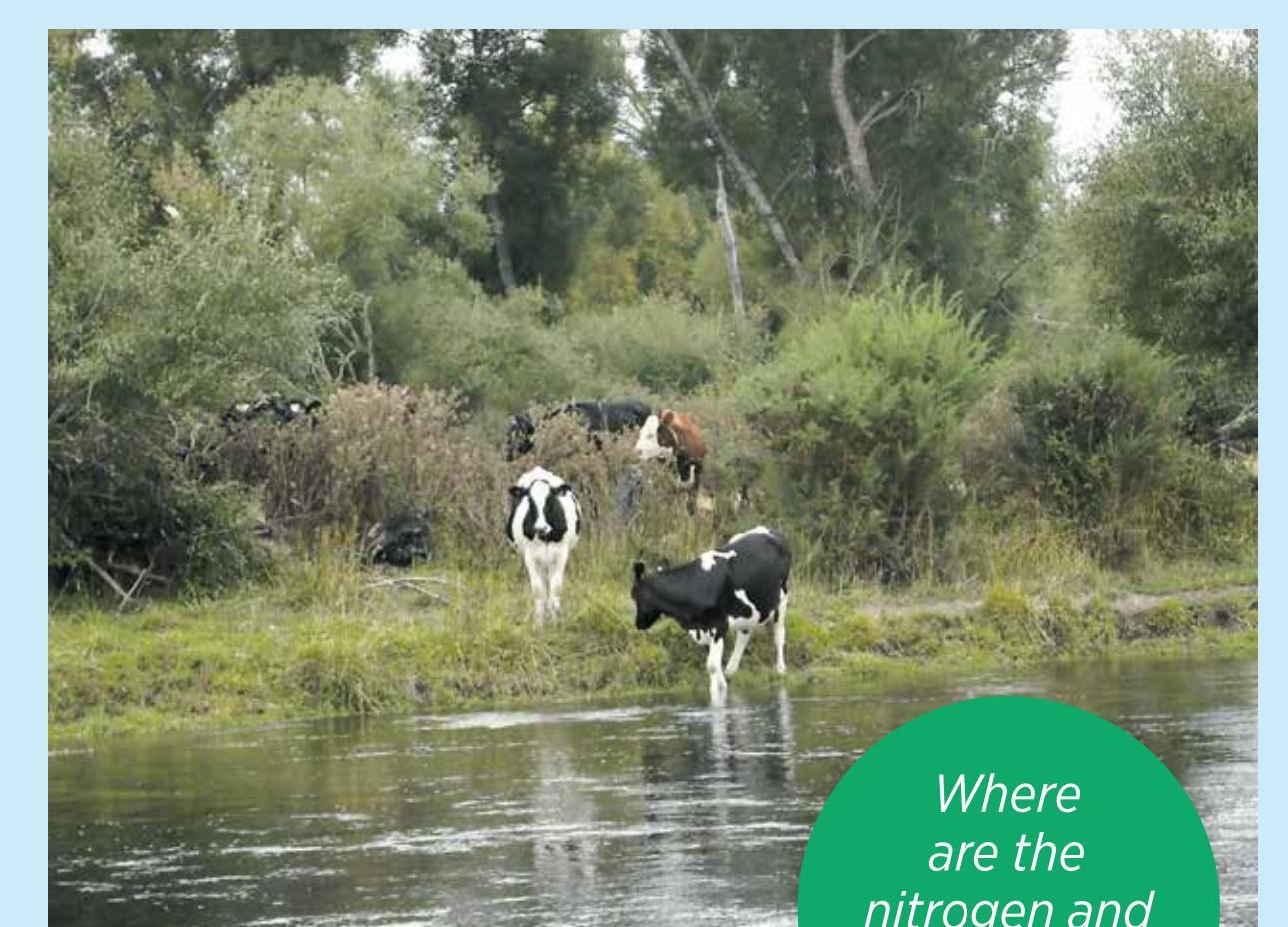


Invertebrates were collected from the stream by disturbing the substrate immediately above a triangular net, which captured all dislodged material (both invertebrates and organic matter).

Nutrients

Excess nutrients can cause increased growth of aquatic plants and algae. Excessive growth of these organisms can clog water intakes, use up dissolved oxygen as they decompose and block light to deeper waters.

Lake and reservoir eutrophication can occur, which produces unsightly scums of algae on the water surface and leads to decreased animal and plant diversity and affects recreational water use.



Where are the nitrogen and phosphorus hot spots?

