Nutrient transport, water quality and modelling: Joining the dots

Rt Hon Simon Upton

Parliamentary Commissioner for the Environment

2 August 2018

Parliamentary Commissioner for the Environment
Te Kaitiaki Taiao a Te Whare Pāremata

Excess nutrients

Source: Waikato Regional Council

Excess nutrients

Source: Brian High

Excess nutrients

Source: Horizons Regional Council

Variety of datasets

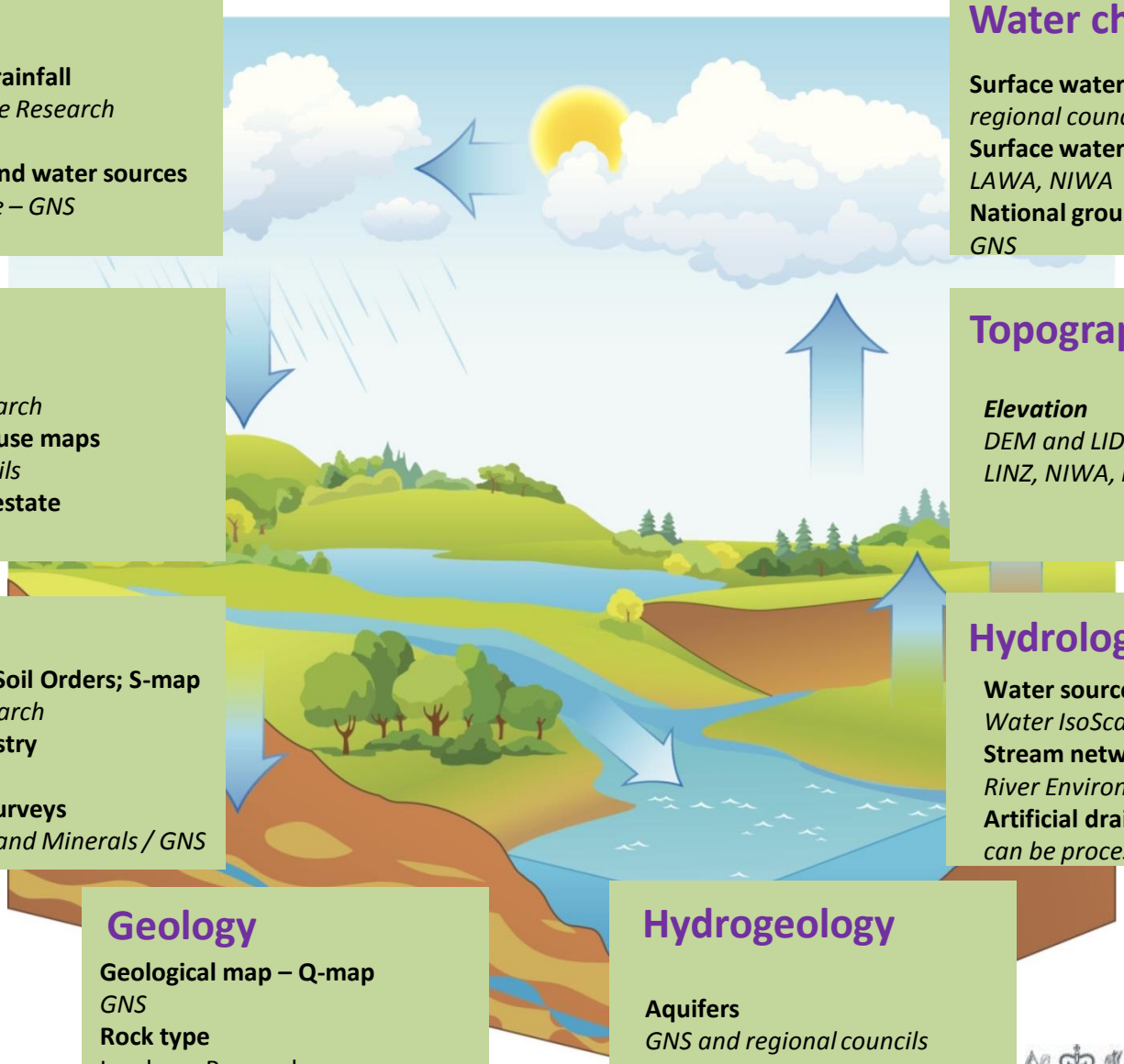
Climate

Temperature, rainfall
NIWA, Landcare Research

Precipitation and water sources
Water IsoScape – GNS

Water chemistry

Surface water and groundwater
regional councils' SOE data
Surface water quality
LAWA, NIWA
National groundwater quality
GNS



Land use

Land cover
Landcare Research
Regional land use maps
regional councils
Conservation estate
DOC/ LINZ

Topography

Elevation
DEM and LIDAR –
LINZ, NIWA, regional councils

Soils

Fundamental Soil Orders; S-map
Landcare Research
Soil geochemistry
GNS
Radiometric surveys
NZ Petroleum and Minerals / GNS

Hydrology

Water sources
Water IsoScape – GNS
Stream network
River Environment – NIWA
Artificial drainage
can be processed from LiDAR

Geology

Geological map – Q-map
GNS
Rock type
Landcare Research
Database of minerals – Petlab
GNS

Hydrogeology

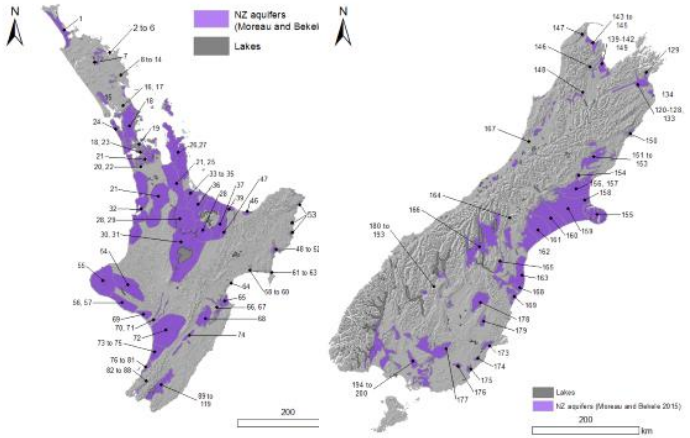
Aquifers
GNS and regional councils

Hydrogeological information

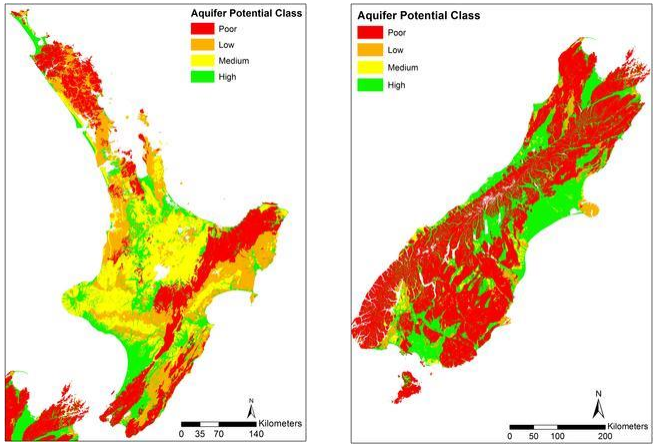
New Zealand aquifers

- No nationally consistent map and classification of NZ aquifers yet
- A couple of attempts undertaken by GNS

NZ Aquifer Map (GNS, 2015)



NZ Aquifer Potential Map (GNS, 2017)



Source: GNS

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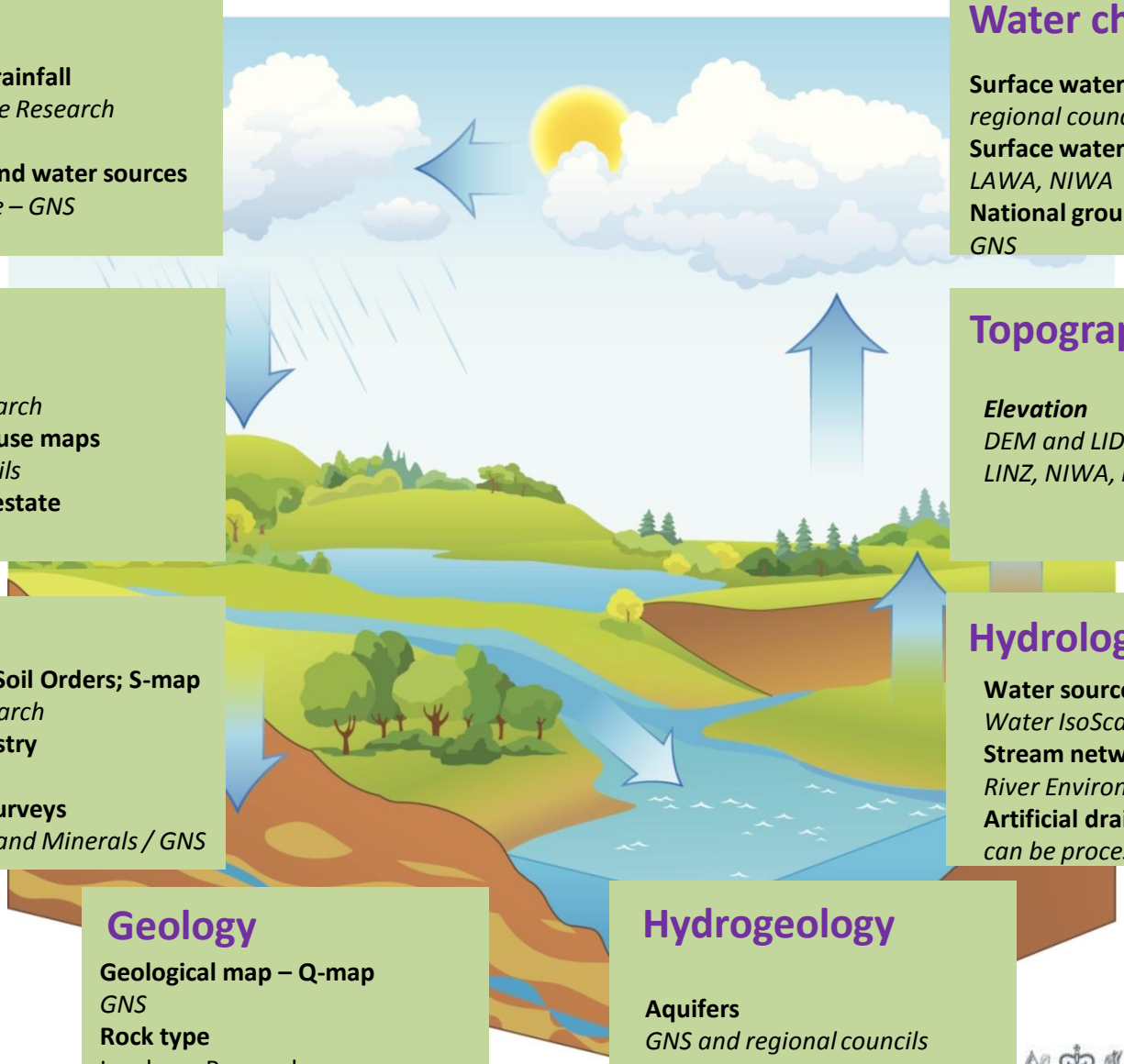

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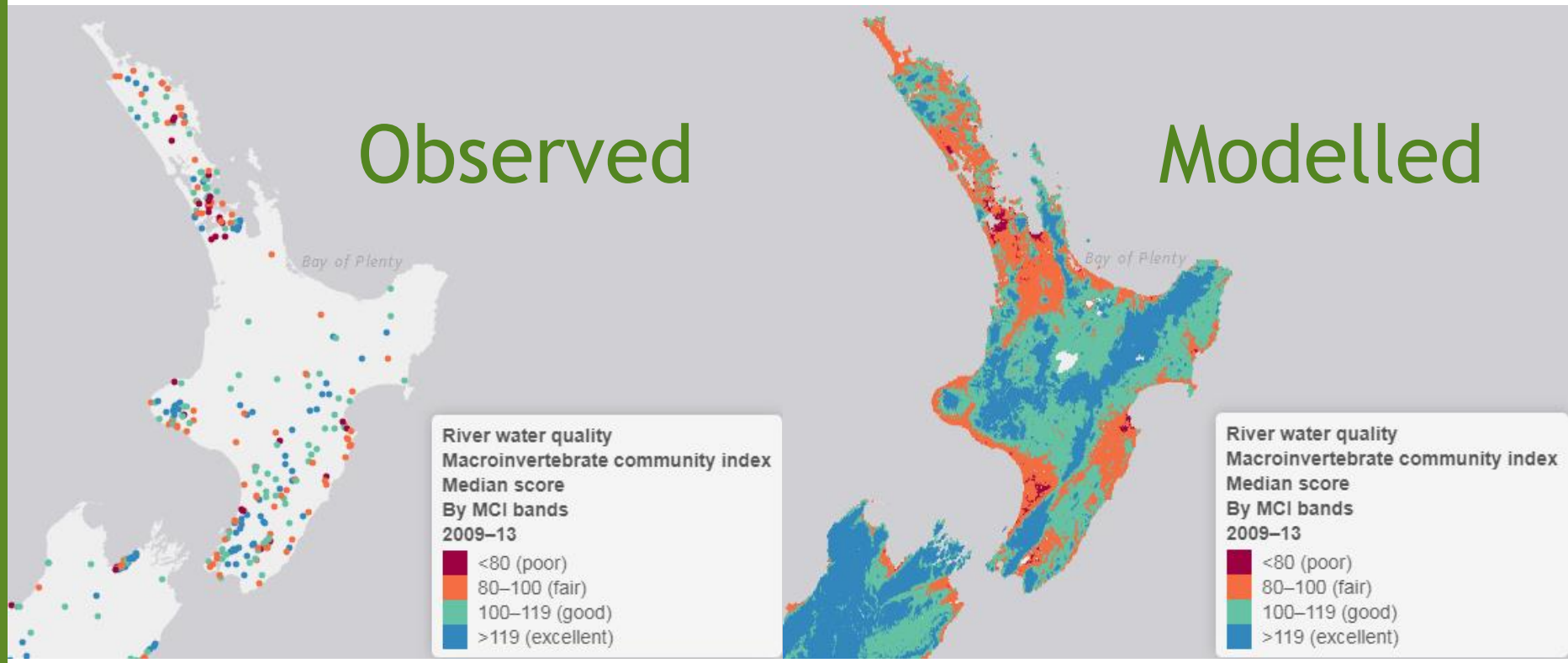
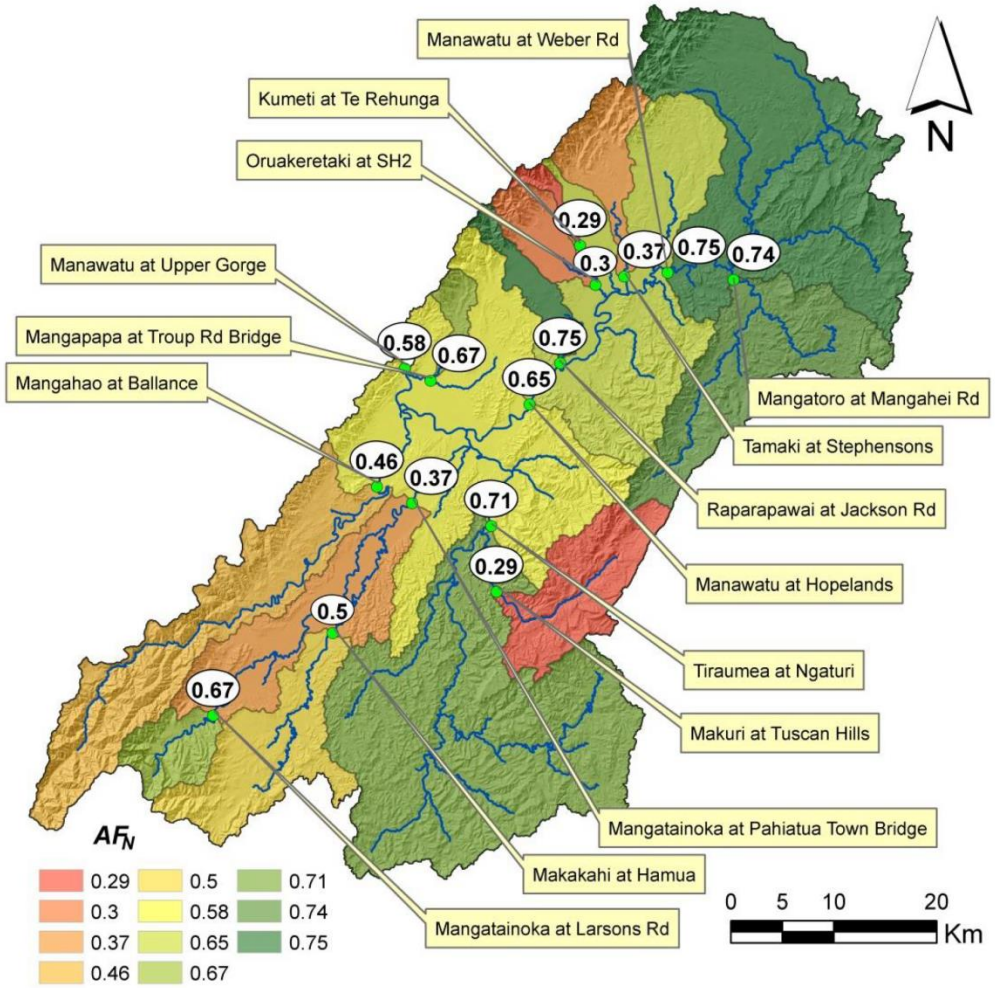
Macroinvertebrate community index (MCI)



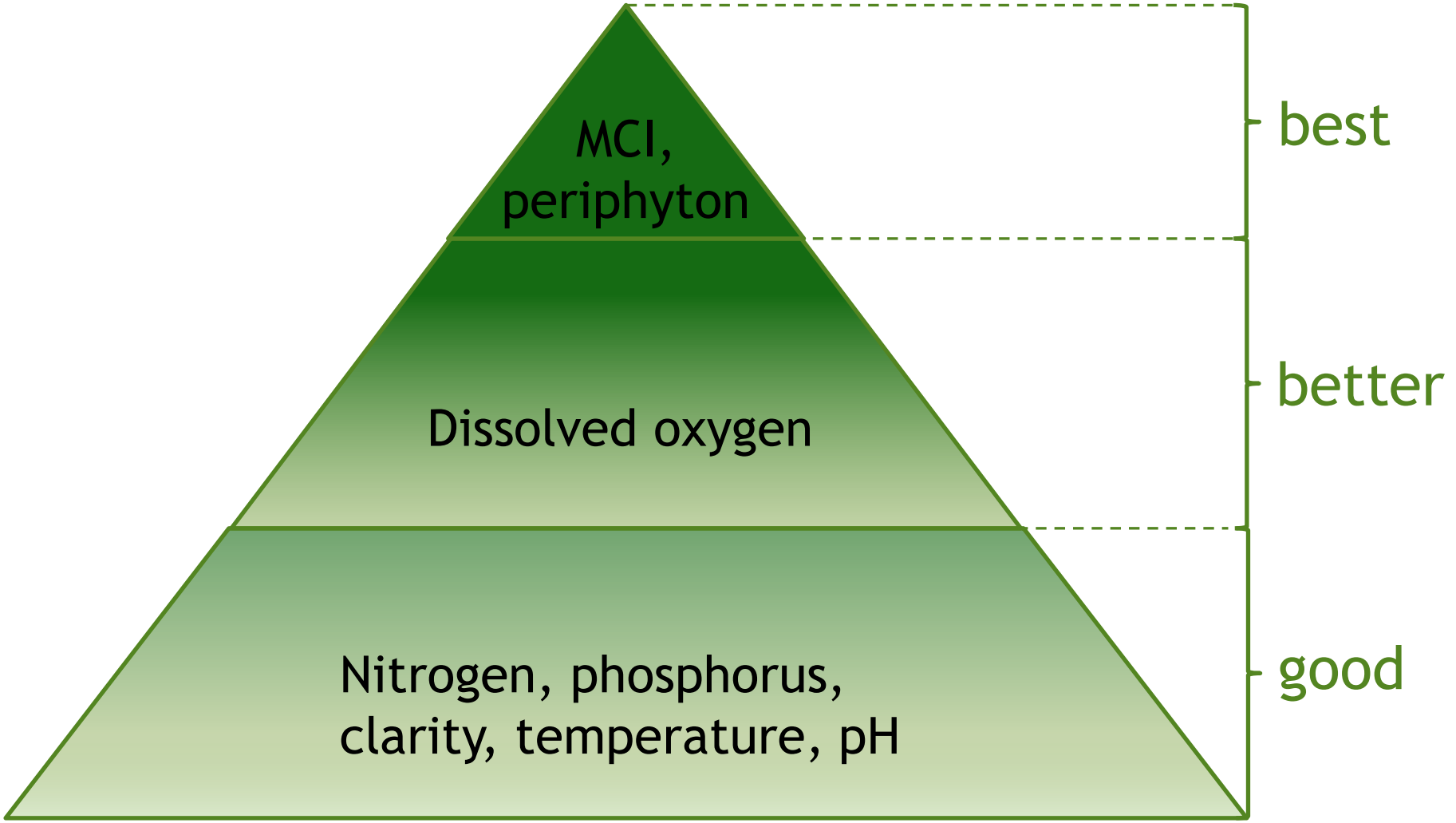
Source: Stats NZ, Environmental Indicators

Spatial variability: Nitrogen attenuation



Source: Elwan et al, 2015

Indicators: good, better, best



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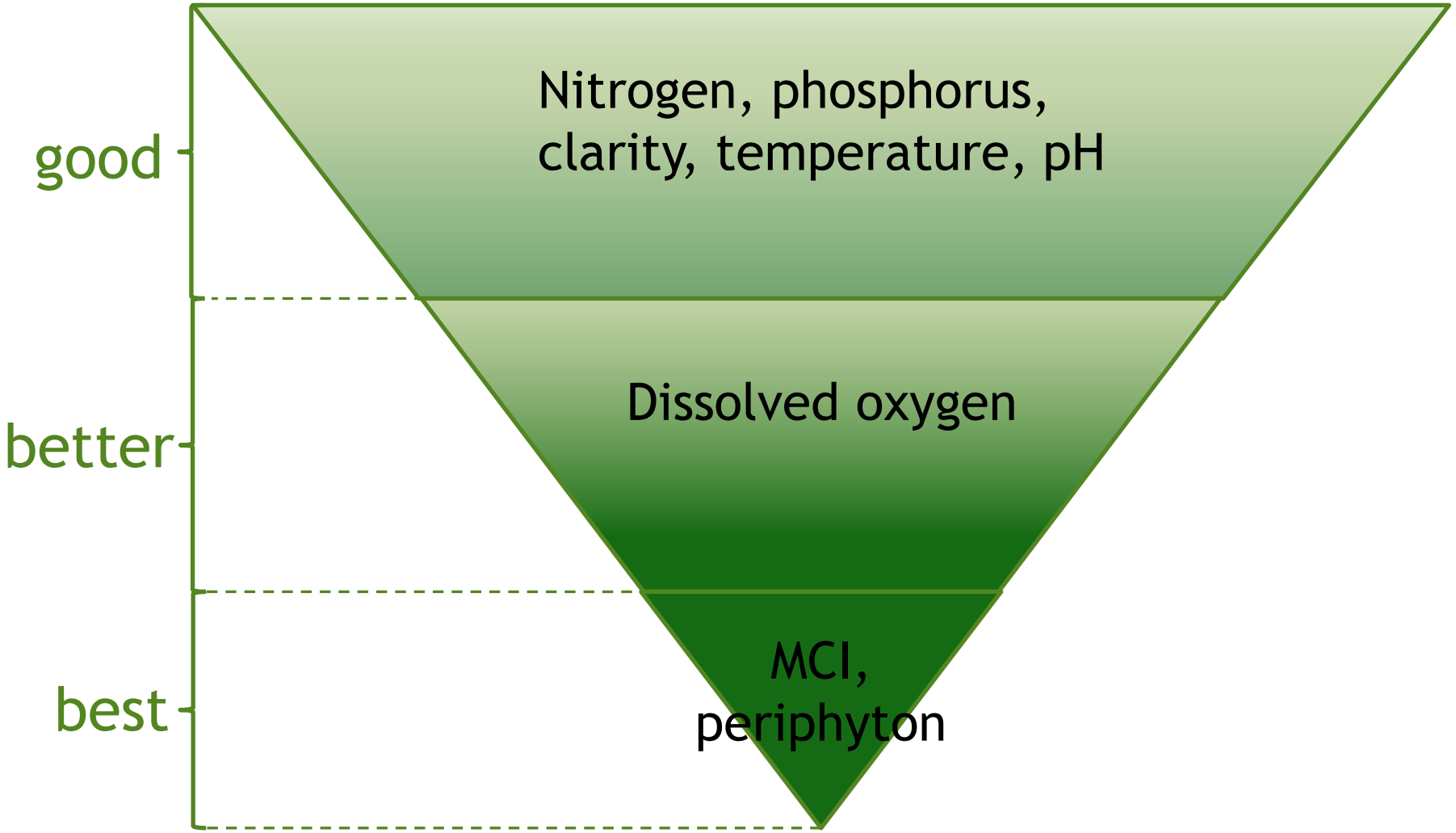
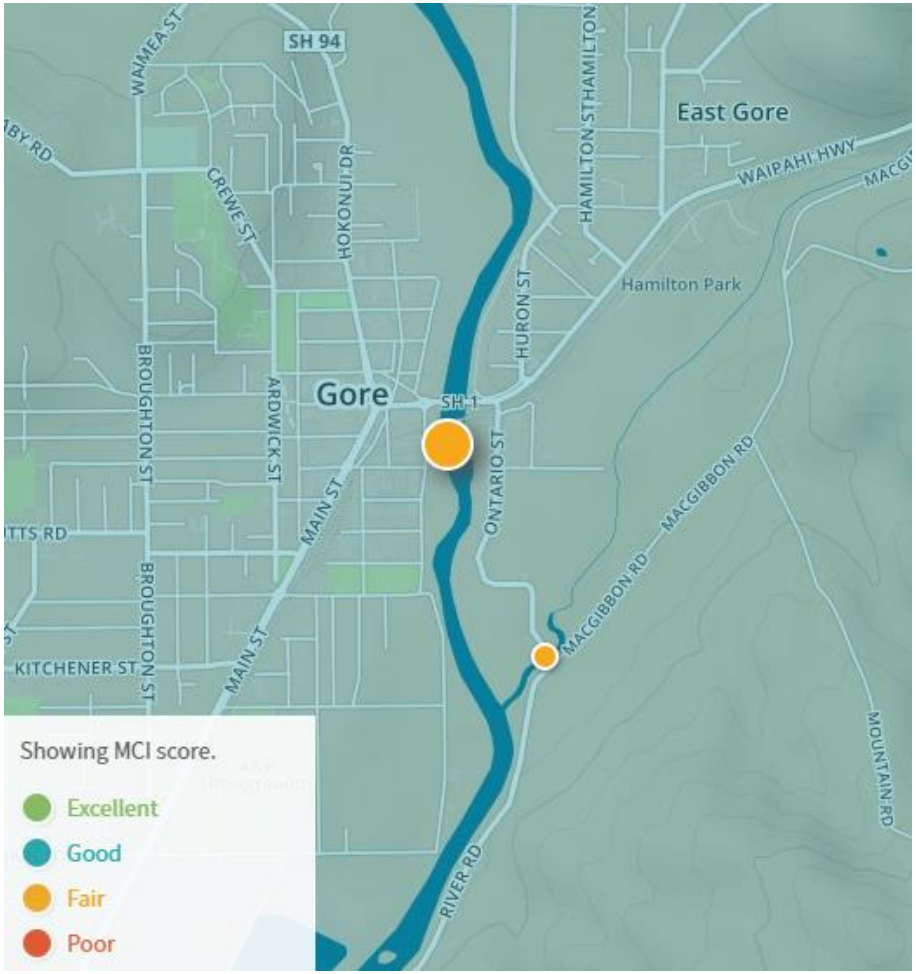
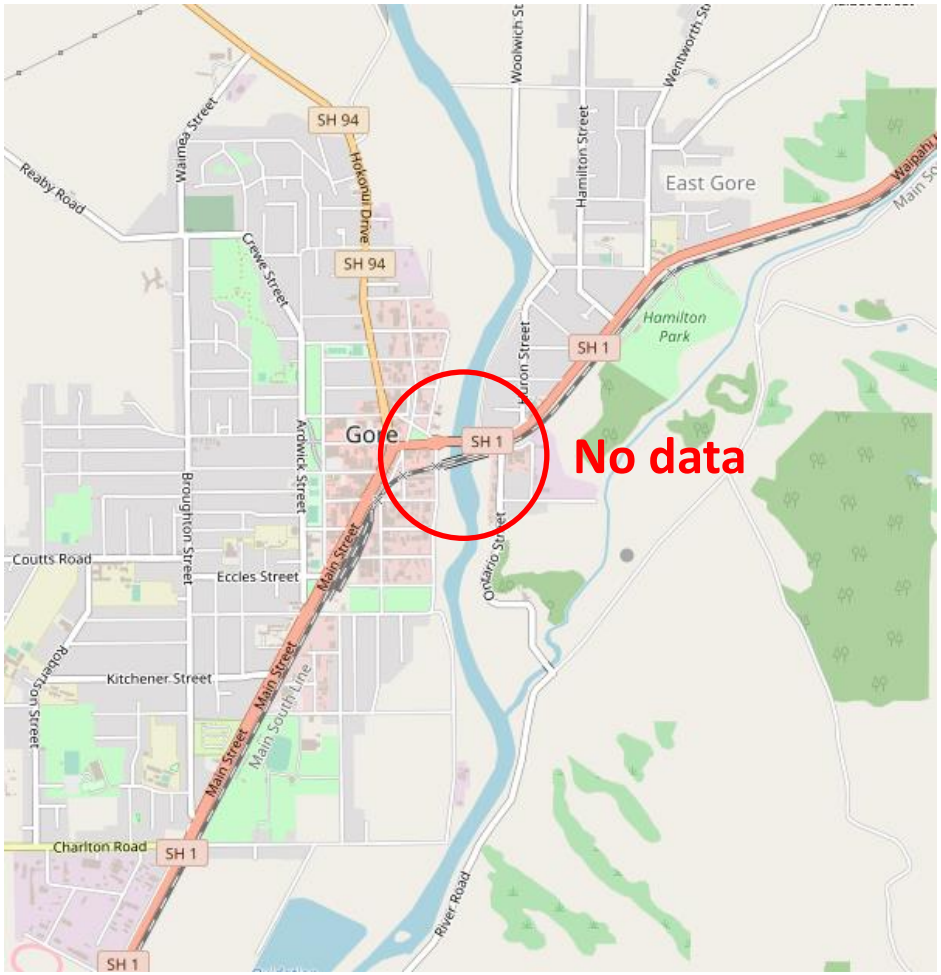


Macroinvertebrate community index according to LAWA



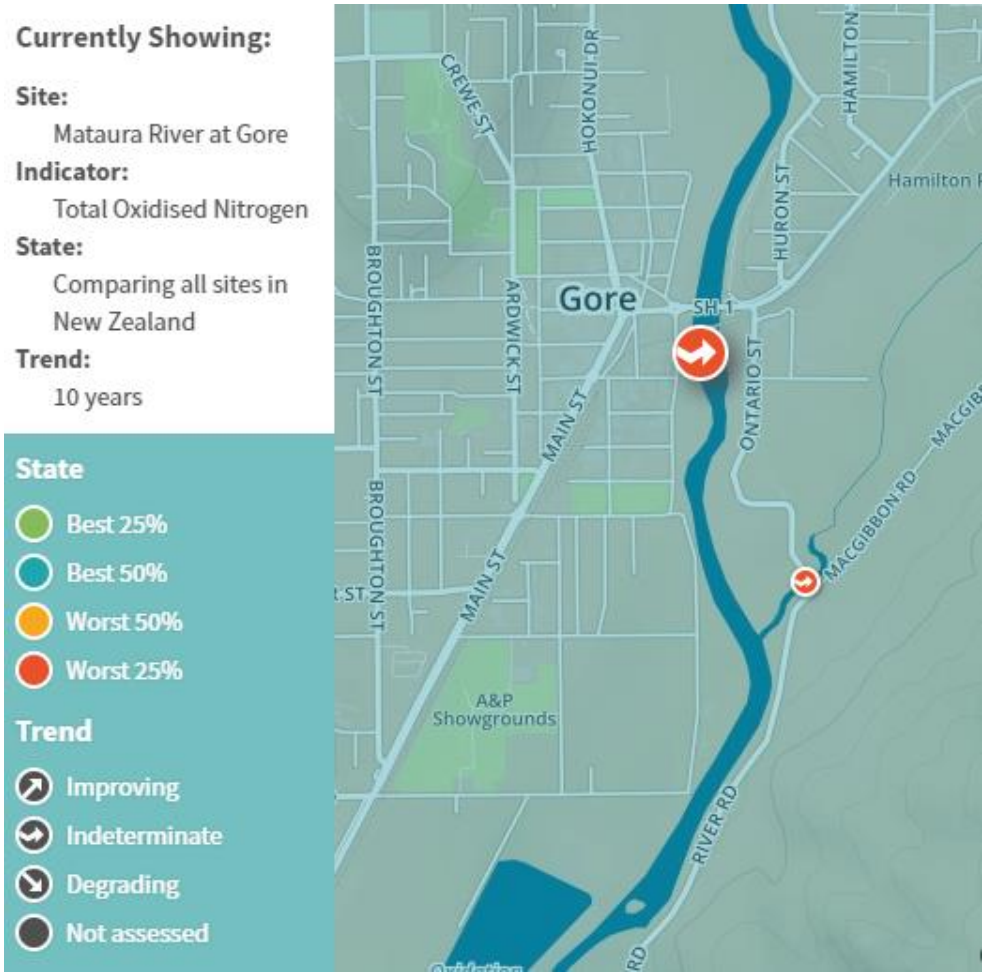
Source: lawa.org.nz

Macroinvertebrate community index according to MfE & Stats NZ



Source: Stats NZ, Environmental Indicators

River water quality: nitrate-nitrogen according to LAWA



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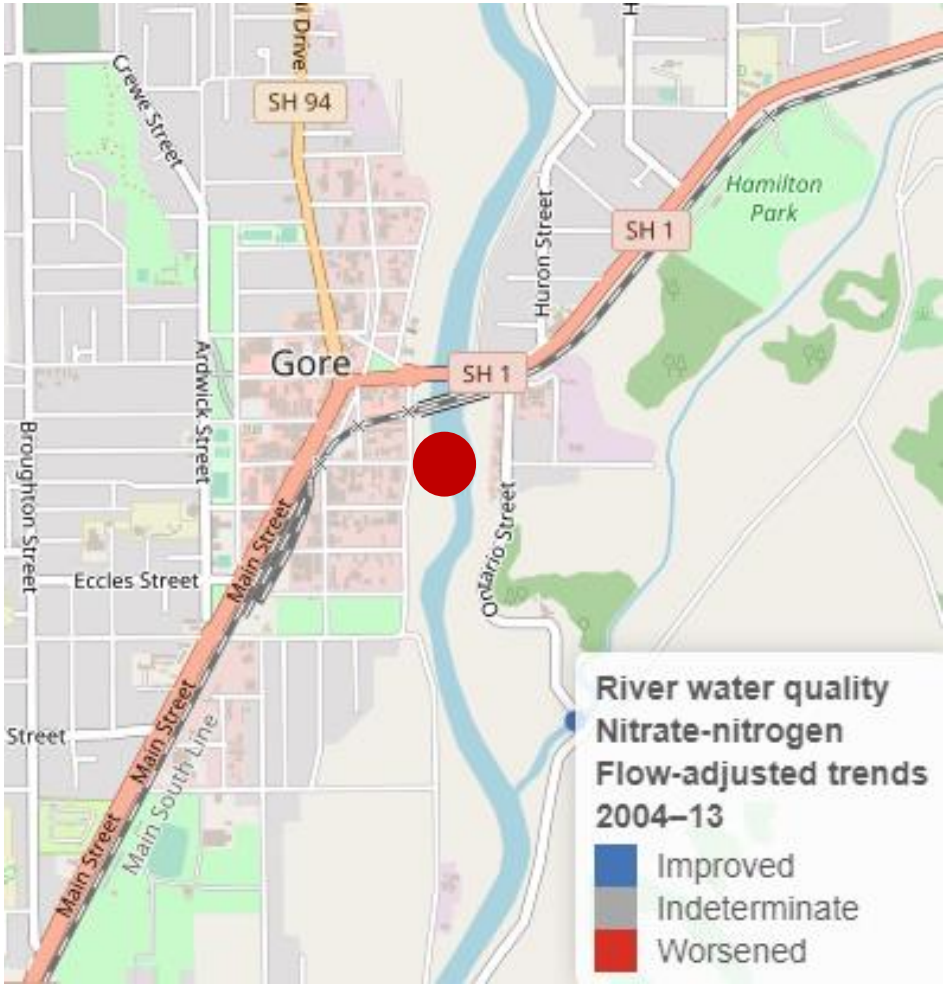

Source: Stats NZ, Environmental Indicators

In summary:

- Better understanding of nutrient transport across catchments
- Better understanding of what models can and can't do
- Better communication of what is happening to water quality