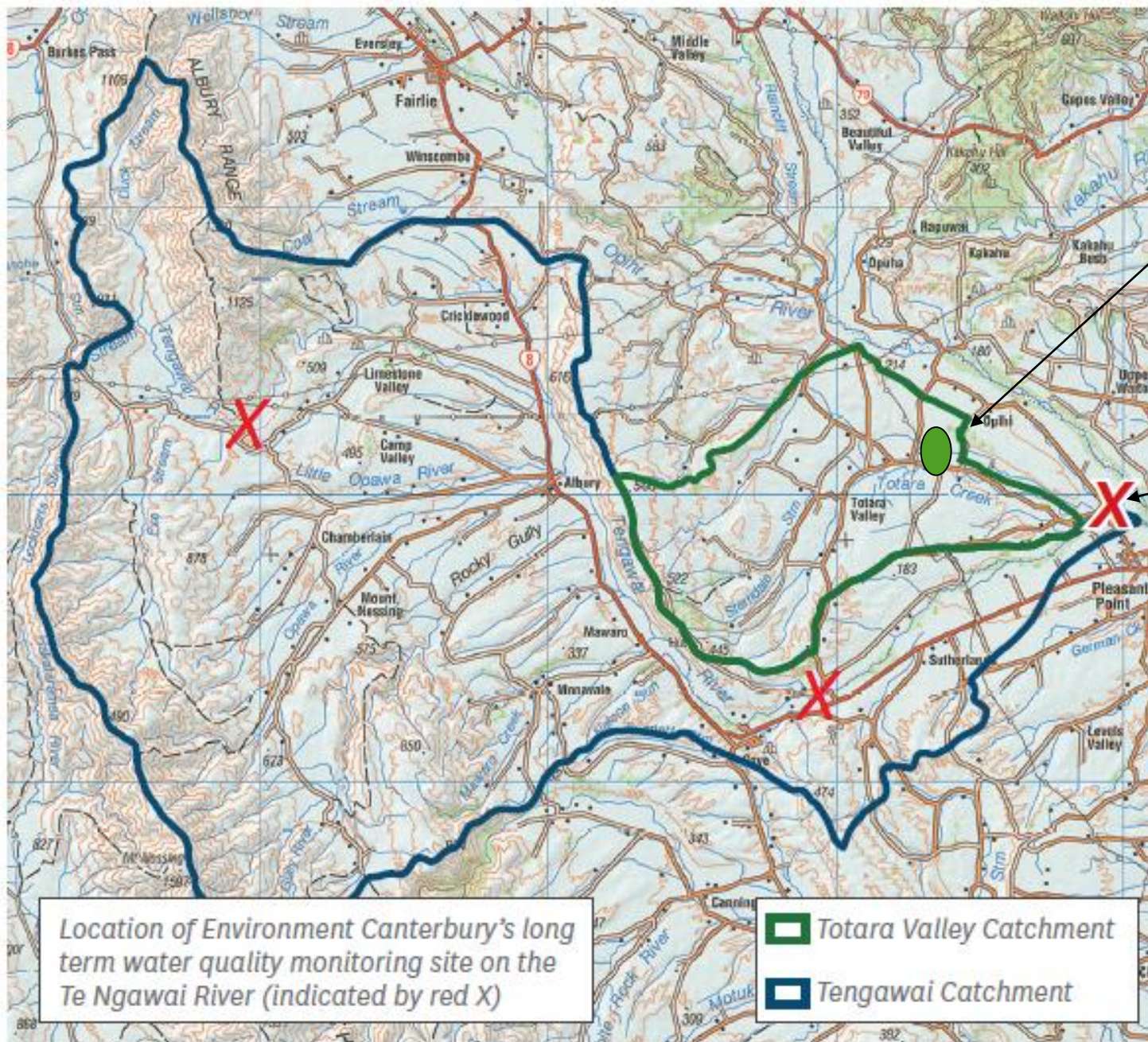


Water quality in the Te Ngawai River

Shirley Hayward
7 September 2016

Topics

- Monitoring
- Indicators
- State and trends



TVIS
race

Long-term
monitoring
sites – water
quality and
invertebrates

Monitoring

- Chemical and microbial parameters at Te Ngawai Bridge since 1995
- Invertebrate health at Te Ngawai Bridge since 1999
- Investigation of periphyton at Clelands Bridge Jul 2011 - 2014
- One year monitoring at Manahune Site, and TVIS race near bottom pond (2015/16)

Indicators

- Nitrogen and Phosphorus – nutrients encourage algae growth
- Nuisance periphyton and cyanobacteria
- E. coli -affect suitability for swimming, wading, drinking (including livestock).
- Total suspended solids – sedimentation
- QMCI – index of invertebrate community health

Nutrients

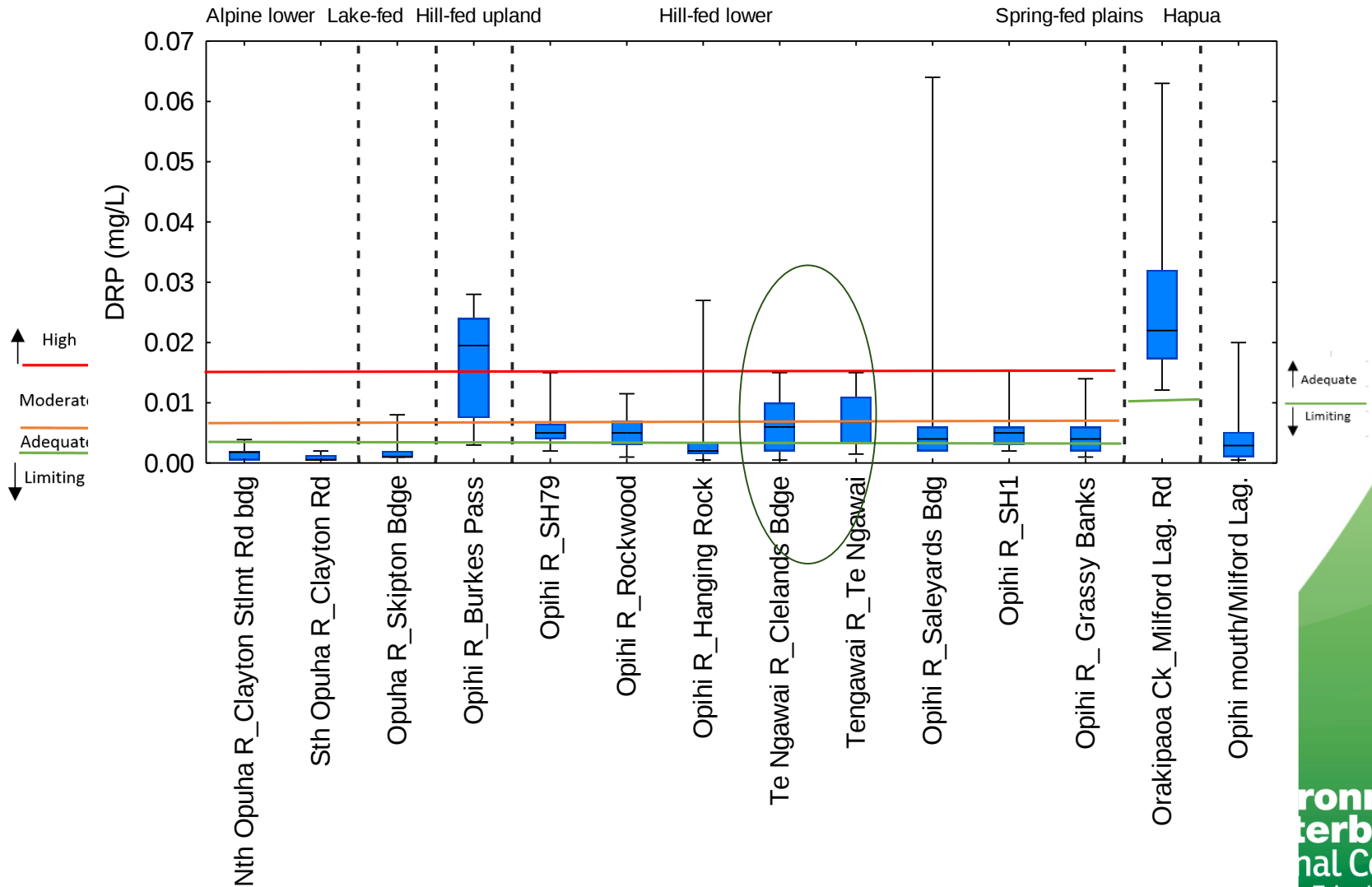
Can promote
nuisance
growths



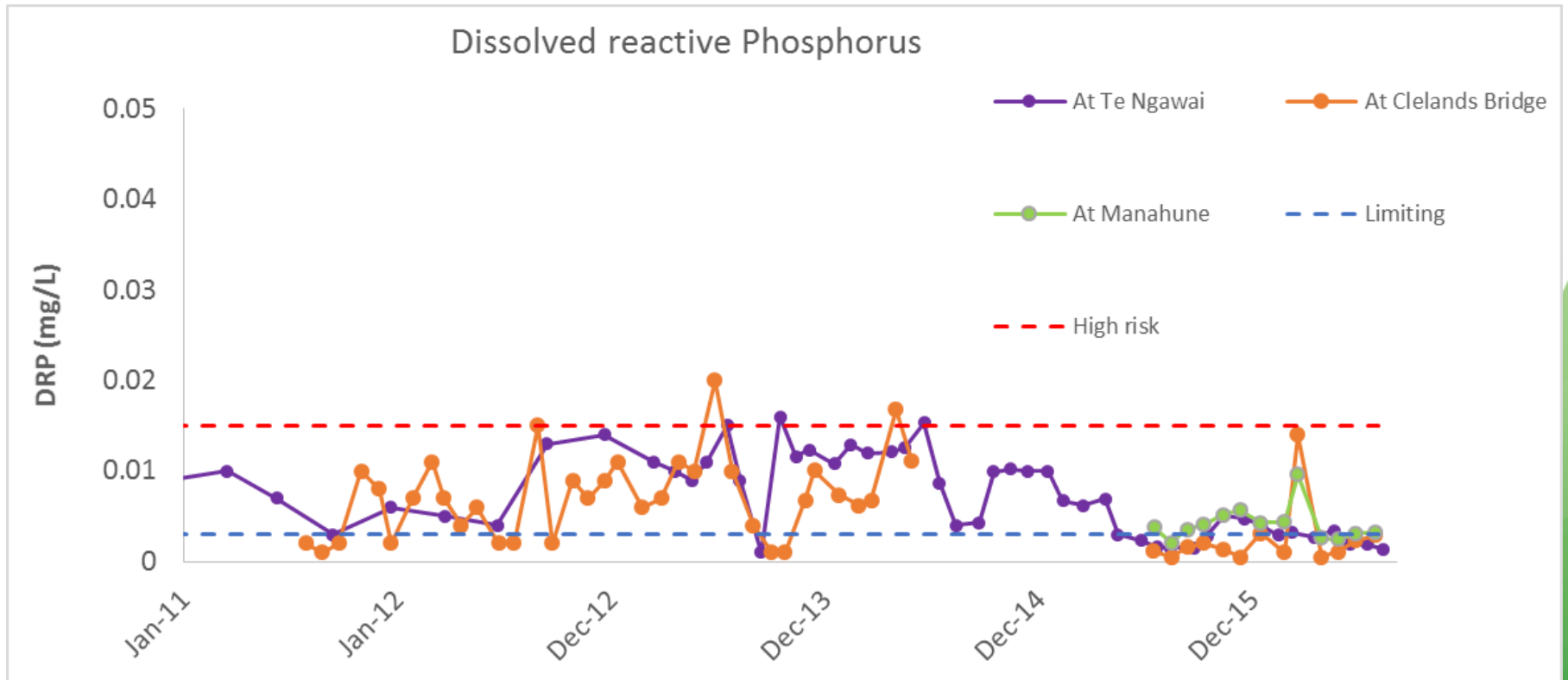
Phormidium –
potentially toxic

Ammonia and nitrate can be toxic to
aquatic life at high levels

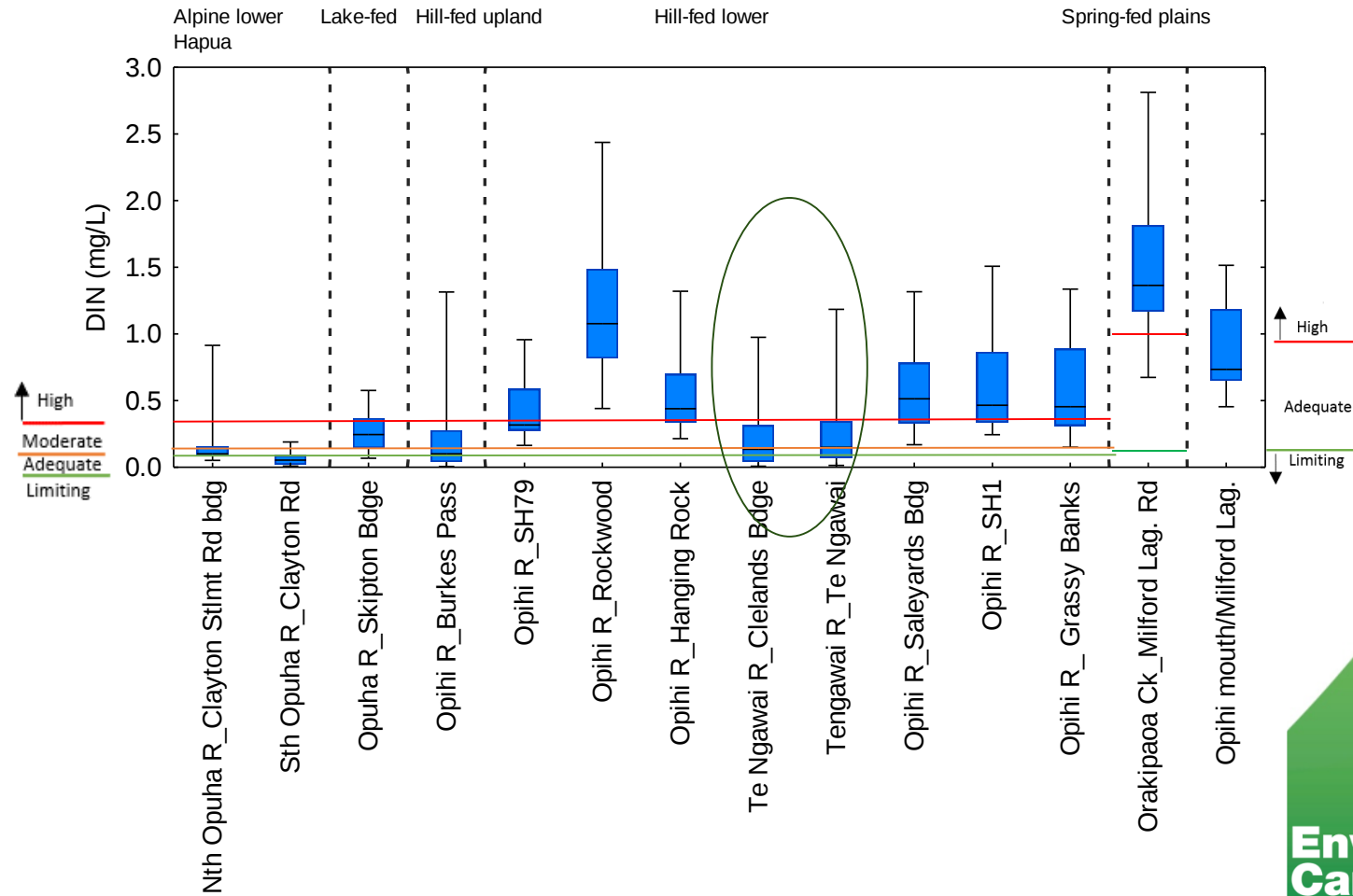
Opihi - phosphorus



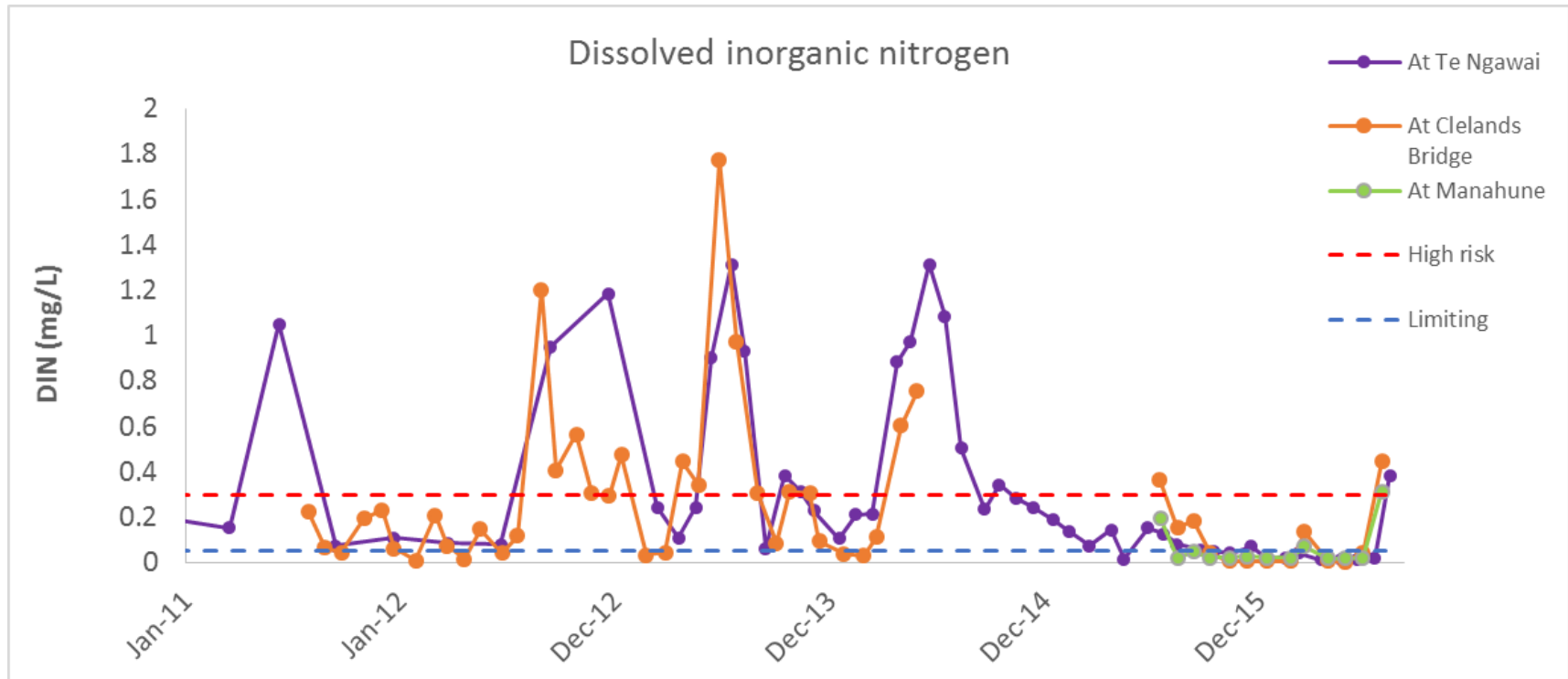
Te Ngawai - Phosphorus



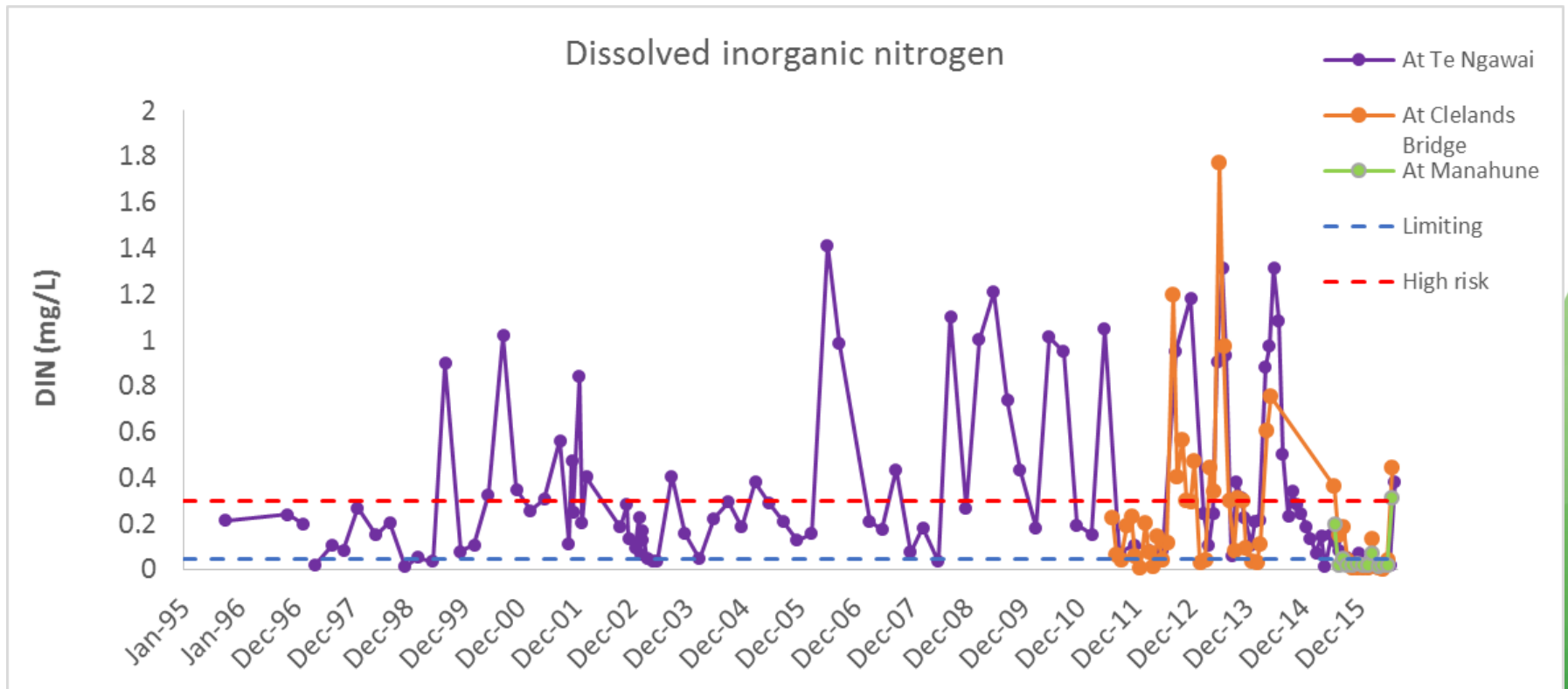
Opihi – nitrogen – 5 yr data

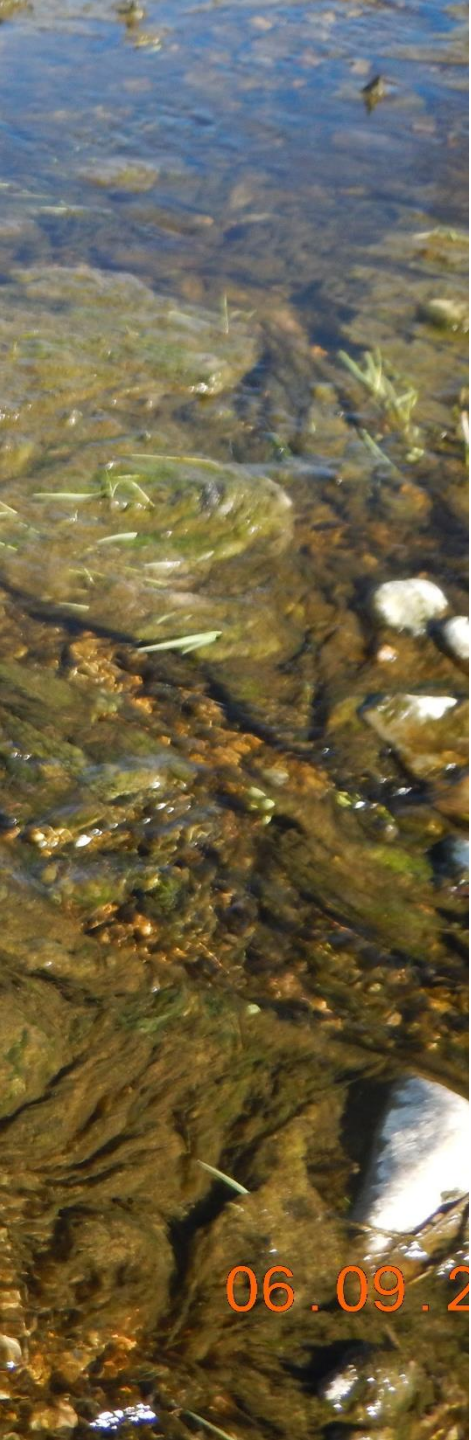


Te Ngawai - Nitrogen



Longer term trends - nitrogen





Periphyton – river slime!

High biomass - Nuisance growths

- Degrade habitat for invertebrates and fish
- Poor quality food for invertebrates
- Creates fluctuations in pH and amount of dissolved oxygen
- Unsightly, unsafe for swimming or wading
- Cyanobacteria – form of periphyton that is potentially toxic

➤ Needs combination of nutrients, stable flows, sunlight penetration, warm temperatures, coarse substrate

06.09.2

Periphyton biomass – measured as chlorophyll a

Te Ngawai River Clelands Bridge	Average Chlorophyll a (periphyton) mg/m ²	Maximum Chlorophyll a (periphyton) mg/m ²
2011/12	45.9	252.0
2012/13	15.5	60.1
2013/14	16.3	76.6

Dry year

Cyanobacteria - mostly phormidium

Percentage cover of cyanobacteria
observed at Te Ngawai Bridge

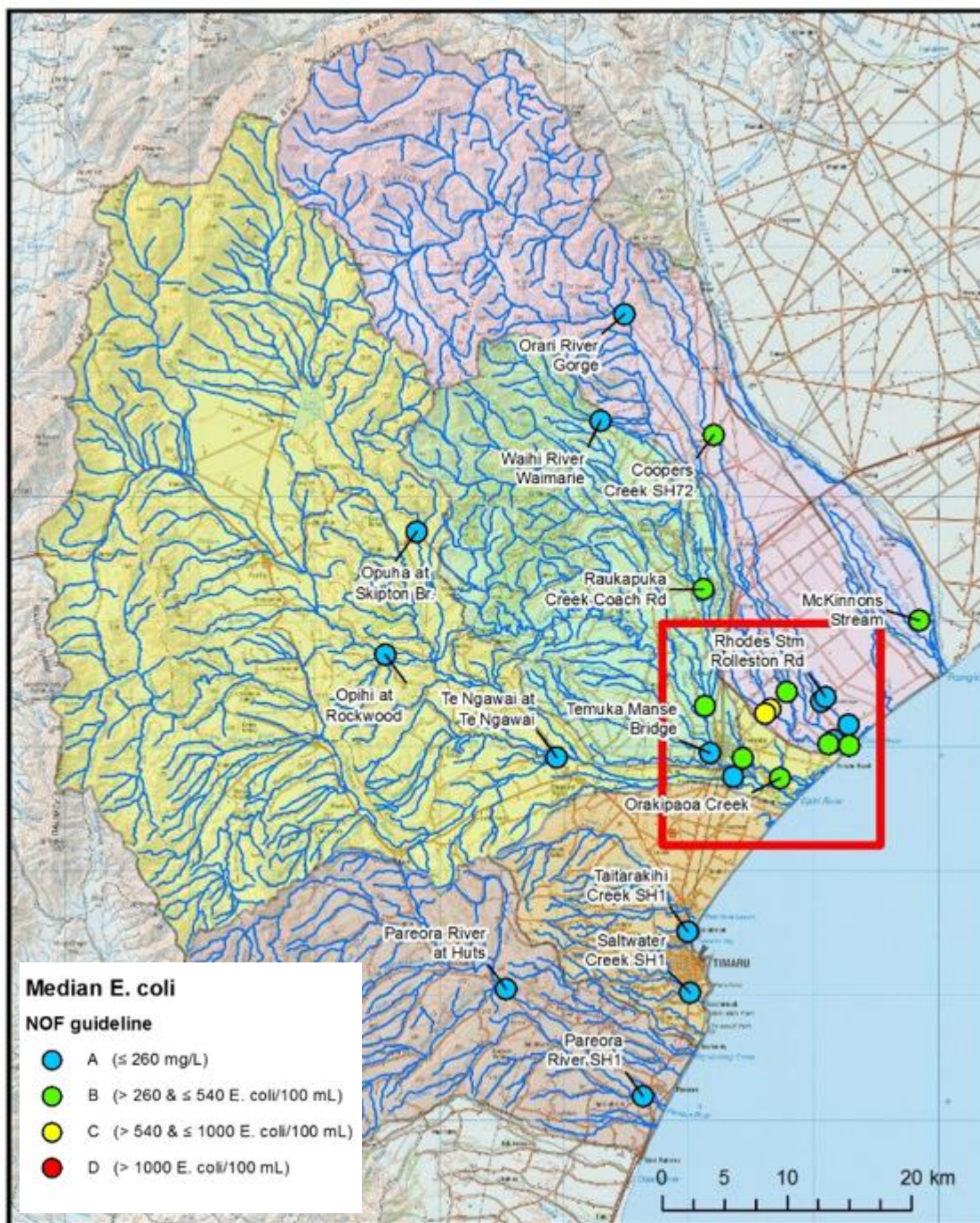
Year	Max cover of cyanobacteria (%)
2012/13	0
2013/14	0
2014/15	2
2015/16	40

Public health warning issued

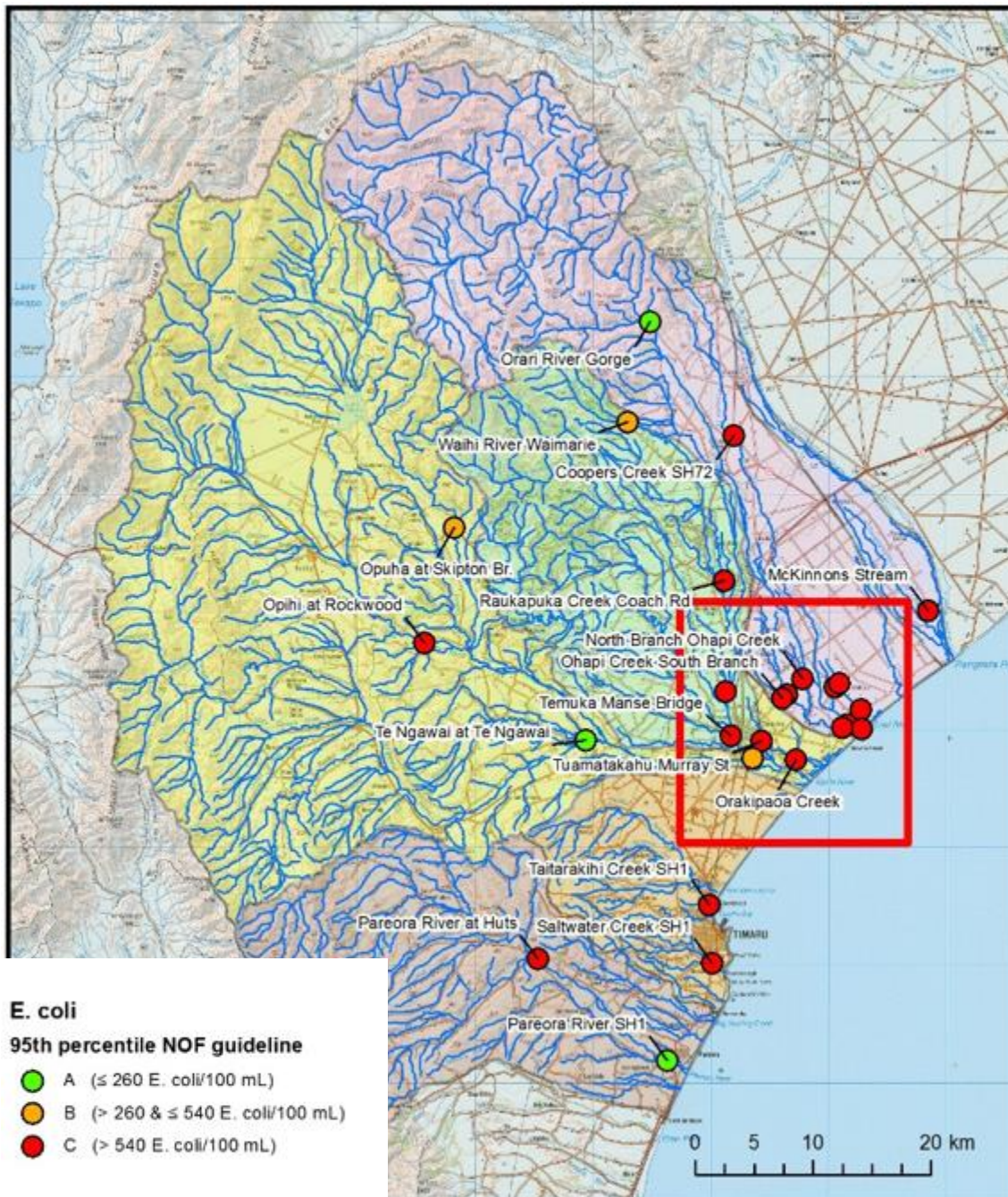
Swimmability / wadability

- Based on E. coli concentrations.
- E. coli indicates the risk of contamination of waterways with faecal material

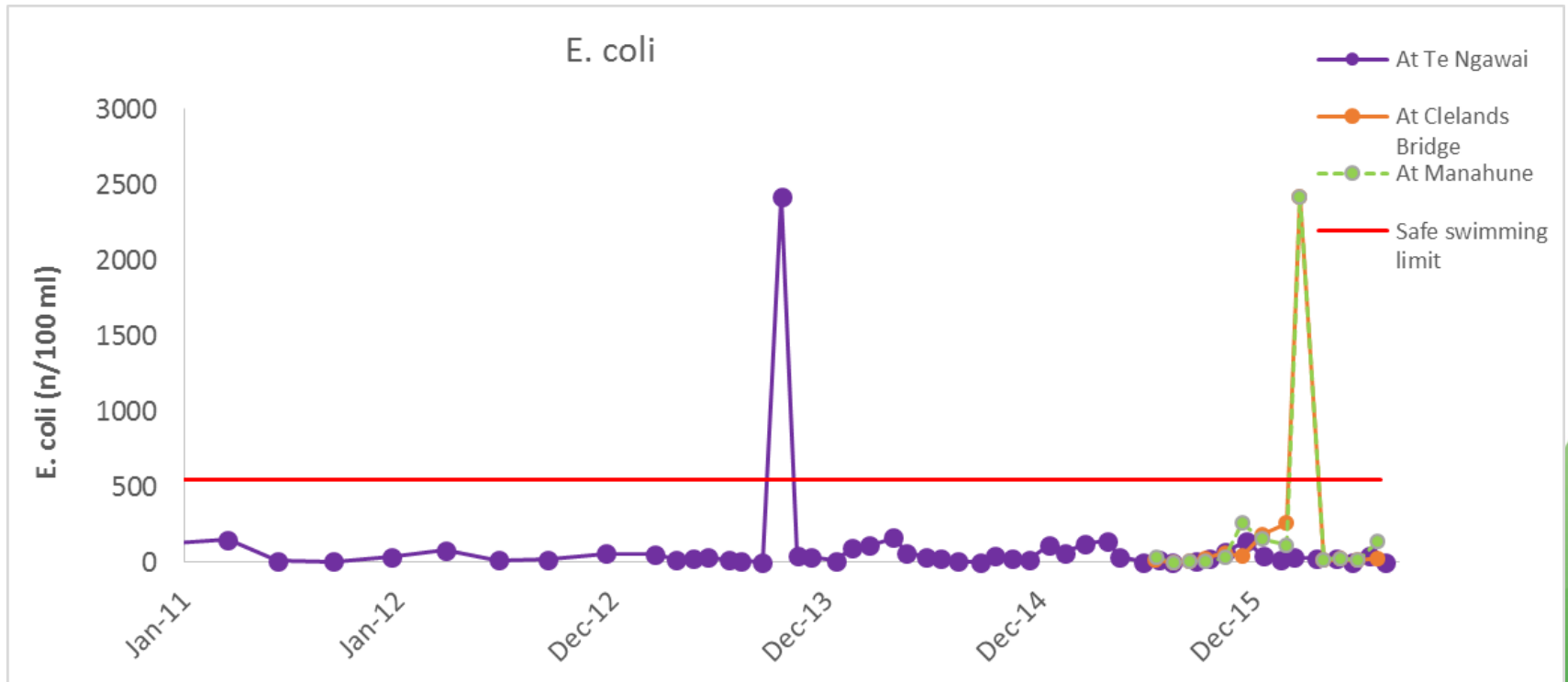
Assessment against NPS criteria for wadability (partial immersion)



Assessment against NPS criteria for swimming



Te Ngawai – E. coli



Invertebrates - QMCI



Mayflies
Deleatidium sp.
9 score



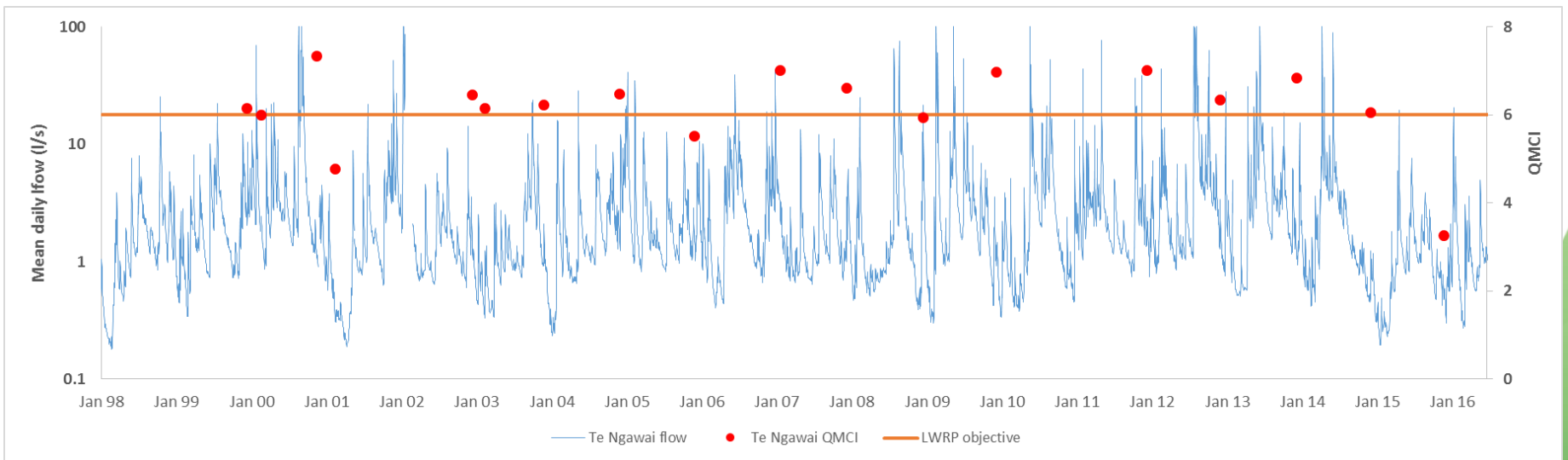
Potamopyrgus sp.
Snails
4 score



Midges
Chironomids
2 score

Increasing sensitivity to poor
water quality or habitat quality

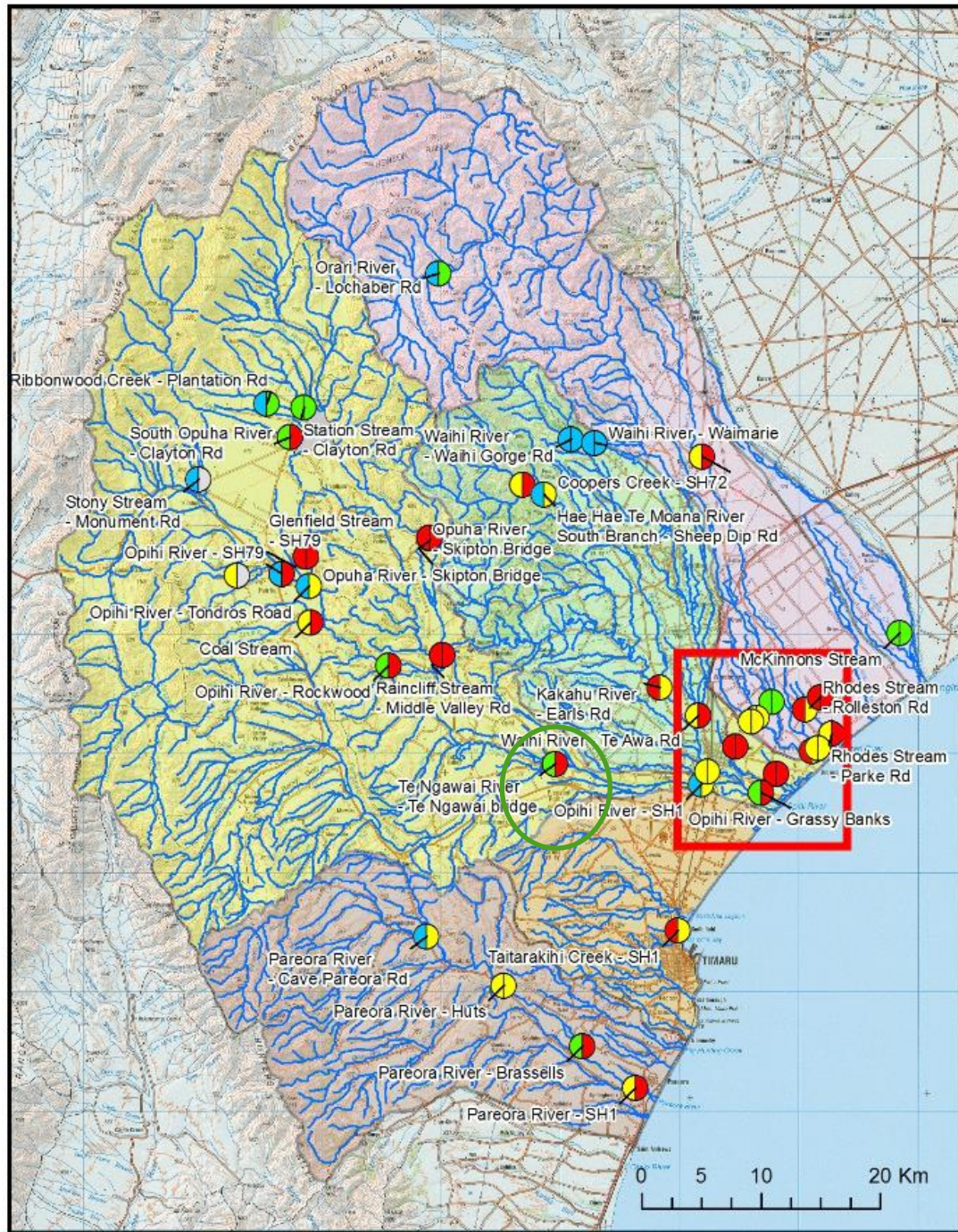
QMCI – invertebrate health Te Ngawai bridge



Invertebrate health indicative of ‘good’ to ‘excellent’ water quality most of the time.....

Invertebrates

QMCI - '5y average' | '2015/16'



TVIS

- Water taken from Opihi River – near Raincliff
- **Historically** discharged into Te Ngawai River above Te Ngawai Bridge monitoring site
 - Previous studies indicated that the historical discharge contributed to lower Te Ngawai River over summertime period
 - approx.
 - 75% of E. coli load
 - 90% of nitrogen load
 - 40% of phosphorus load

This discharge no longer occurs!

Summary

- Low to moderate N concentrations, higher in winter
- Moderate P concentrations
- E. coli concentrations low
- Invertebrate community healthy good to excellent – except last year!