

# Freshwater ecology monitoring programme: state and trend report card

Kicknet sampling – how we collect macroinvertebrates.

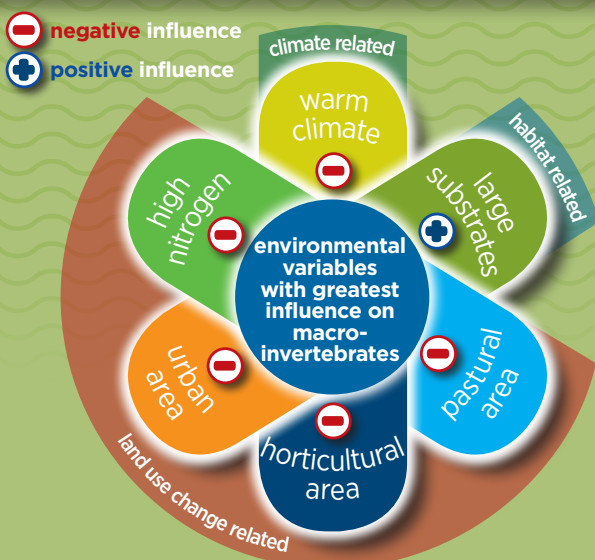
Findings from all annual macroinvertebrate monitoring at **120 sites**, some since **1992**

**135** = TOTAL different macroinvertebrate types identified

DOMINANT macroinvertebrate types found at **90%** of monitoring sites



## Environmental variables that influence stream health the most



Stream health is also affected by these non-environmental factors...



### watertakes

There are currently over 1,300 consents to take water from streams/ rivers/lakes/groundwater in BOP. High levels of water abstraction can have environmental impacts – possibly reducing the reliability of supply for all. Removing groundwater can also have negative impacts on stream flows, especially in aquifers that are closely linked to surface waters.

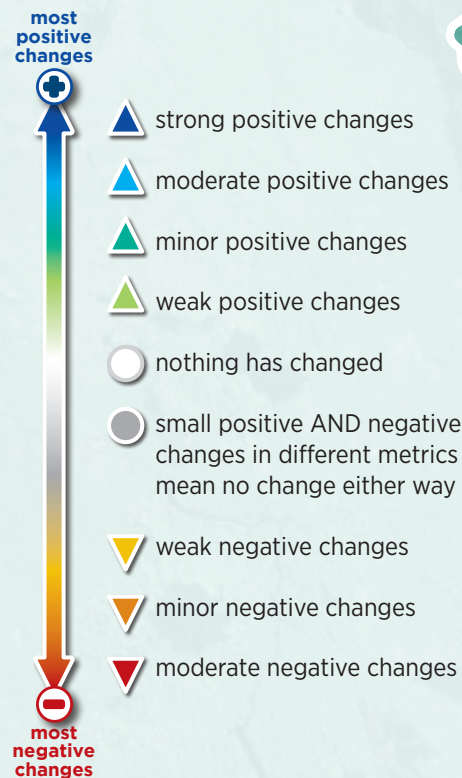


### discharges

Currently there are nearly 430 consents for discharges of contaminants into waterways from a range of agricultural/industrial activities, as well as from stormwater/wastewater treatment plants.

# Trends in freshwater ecology health

as indicated by macroinvertebrate site monitoring



Detailed results & programme information can be found in *State and trends in River Health (1992-2014) in the Bay of Plenty* available at [www.boprc.govt.nz](http://www.boprc.govt.nz).



Changes in freshwater ecology health are assessed by counting how many of the seven macroinvertebrate data metrics change at each site over time. If only one of the seven metrics change it suggests the macroinvertebrate community at that site is basically stable. If four or more of the seven metrics change it suggests that the macroinvertebrate community at that site has changed a lot.

## native vegetation

Motu River



## agriculture

Tahawai Catchment



## urban

Wainui-te-whara

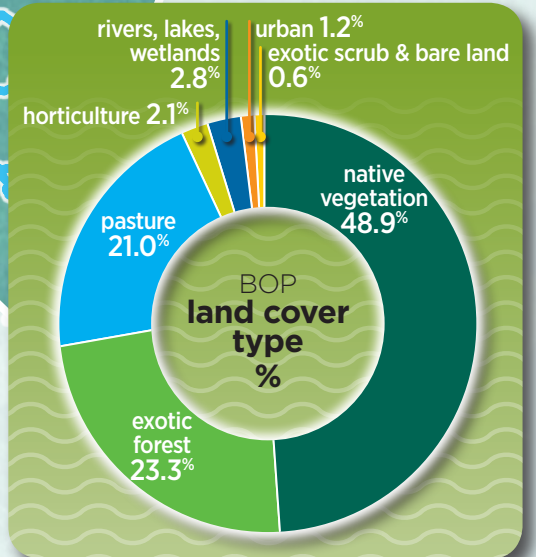
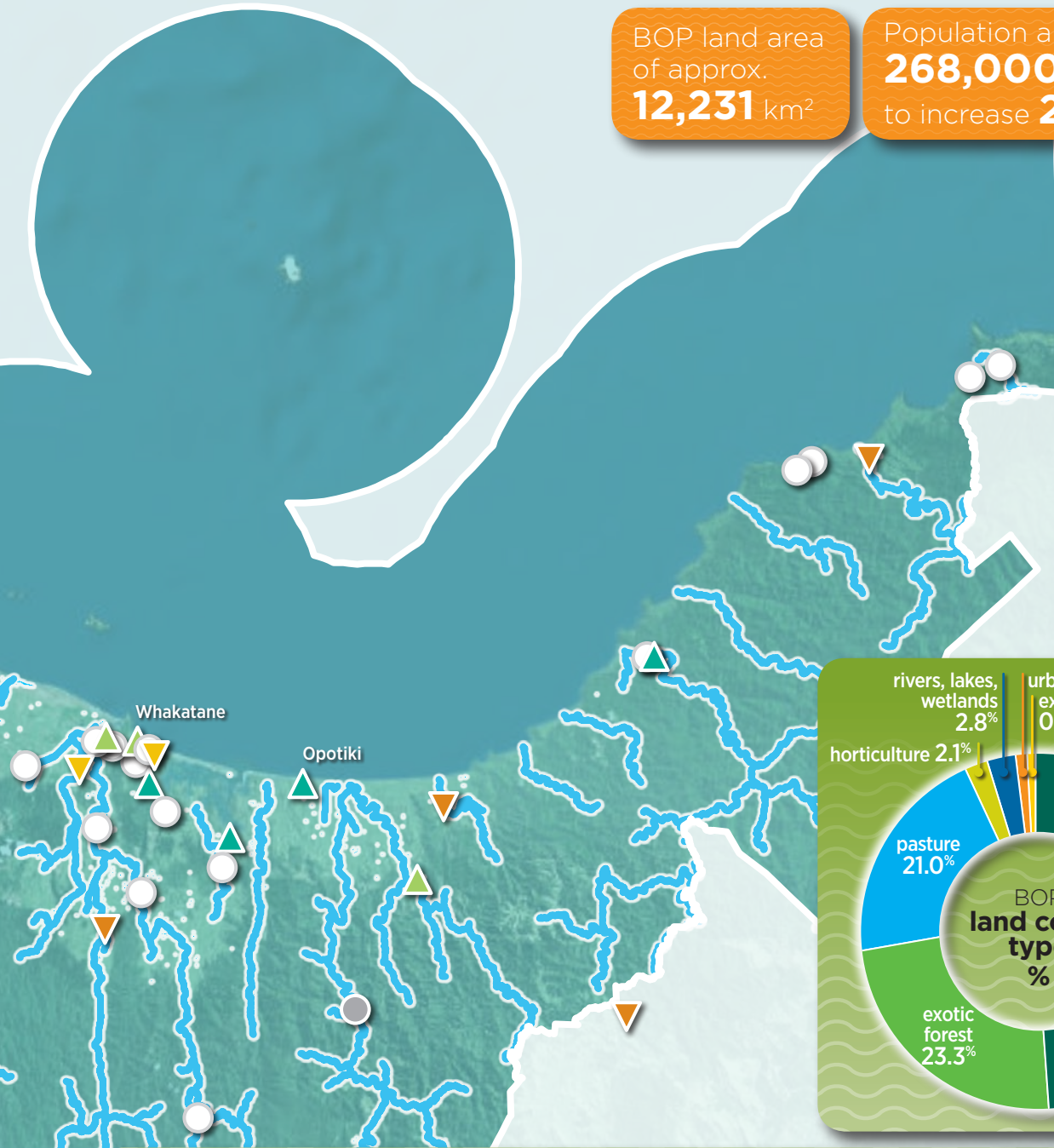


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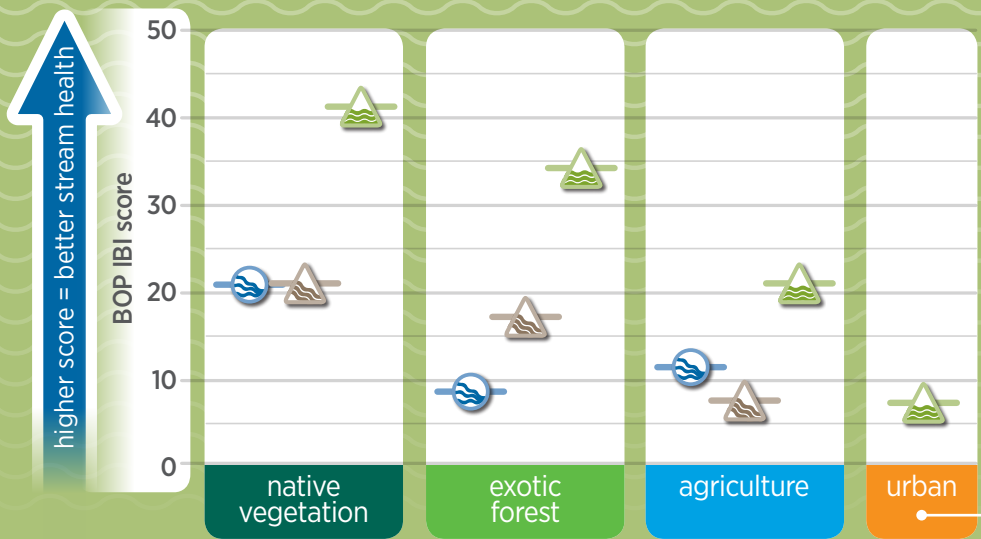
BOP land area of approx. **12,231** km<sup>2</sup>

Population approx. **268,000**\* & expected to increase **26%** by 2021

\*2013 Census



### Median BOP IBI scores by land use & stream type



You can find explanations about BOP IBI & stream types in our *Freshwater ecology monitoring programme: measuring stream health information sheet*.

**stream type key**

- NON-VOLCANIC any gradient
- VOLCANIC on STEEP gradient
- VOLCANIC on GENTLE gradient

All the urban monitoring sites are only on volcanic, gentle gradient streams.

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## Overall findings:

### LAND USE HAS A CLEAR INFLUENCE ON STREAM HEALTH

The condition of macro-invertebrate communities reflect disturbances associated with land use change that occurred many decades ago.

Our macroinvertebrate metrics clearly show the following general pattern on stream health...



#### BEST STREAM HEALTH

Streams draining catchments dominated by **native bush & exotic plantation forests**.



#### AVERAGE STREAM HEALTH

Streams draining **agricultural areas** were average, as some are in very good condition, but some are very poor.



#### WORST STREAM HEALTH

All streams draining **urban catchments** were generally in the worst health.



#### MINIMAL SIGNIFICANT TRENDS OVER TIME

Of 798 individual trend analyses done, significant trends were found on only 56 occasions (7%). Most of those 56 were weak changes, with only 1 or 2 of the seven metrics changing.



#### MACROINVERTEBRATE COMMUNITIES ARE STABLE

Despite evidence of declining water quality in the region, no strong evidence of changes in stream macroinvertebrate communities was detected.



#### RIPARIAN PROTECTION CURRENTLY NOT TIPPING THE BALANCE

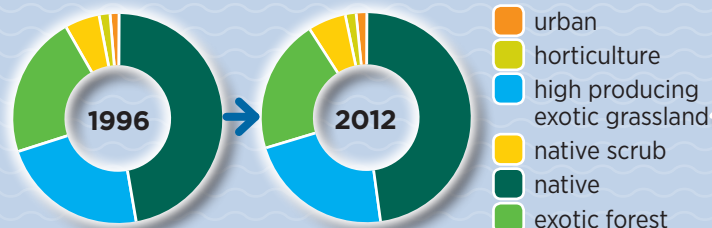
Current levels of riparian protection work are not yet tipping the balance towards more positive health of the macroinvertebrate communities in our waterways.

See our *Freshwater ecology monitoring programme: riparian protection effectiveness information sheet* for more details.

### CHANGE IN FARMING PRACTICES & INTENSIFICATION MAY INFLUENCE STREAM HEALTH

Land cover has barely changed since 1996, but there has been changes in agricultural stock numbers. Data shows the number of beef cattle and sheep in the BOP has declined between 1995 and 2015, while the number of dairy cattle has increased during this period. This may reflect changes in regional farming practices e.g., dairy farming intensification - which may affect stream health. This is why we have a monitoring programme.

#### changes in land cover type 1996 → 2012



Can include a wide mix of sheep/beef/dairy farming, and different aspects of dairy farming e.g., use of pasture for wintering-off dairy herds.

#### changes in stock numbers 1995 → 2015

