

## Te Arawa Rotorua Lakes Trophic Level Index Results – 2015

### What is The Trophic Level index?

The Trophic Level Index is a number used to indicate the health of lakes in New Zealand. As a general rule of thumb the higher the number, the worse the water quality in the lake.

### How is TLI calculated?

The TLI number is calculated using four separate water quality measurements – total nitrogen, total phosphorous, water clarity, and chlorophyll-a.

Total nitrogen and total phosphorous are nutrients that plants thrive on. Large amounts of these nutrients in the lakes encourage the growth of algae which can lead to poor water quality.

Water clarity is a measurement of how clear the water in the lake is. In general, the clearer the water, the better the water quality.

Chlorophyll-a is the green colour in plants. Knowing how much chlorophyll there is in a lake gives us a good idea of how much algae the lake has. It's okay to have algae in a lake, just not too much. The more algae present, the poorer the water quality.

The Trophic Level Index combines these four measurements into one number

### What do the TLI numbers mean?

The Trophic Level Index gives an indication of lake water quality. The Bay of Plenty Regional Water and Land Plan has TLI objectives for each of the Te Arawa Rotorua lakes. Each range of numbers translates into a scientific description as explained below:

Trophic Level Index	Lake Type	Explanation
Less than 2	Very good water quality (microtrophic)	The lake is clear and blue with very low levels of nutrients and algae.
2 – 3	Good water quality (oligotrophic)	The lake is clear and blue, with very low levels of nutrients and algae.
3 – 4	Average water quality (mesotrophic)	The lake has moderate levels of nutrients and algae.
4 – 5	Poor water quality (eutrophic)	The lake is green and murky, with higher amounts of nutrients and algae
Greater than 5	Very poor water quality (supertrophic)	The lake is fertile and saturated in phosphorus and nitrogen, often associated with poor water clarity.

The Regional Council has calculated a Trophic Level Index for each of the lakes in the Rotorua area to assess the overall health of each lake. The Trophic Level Index for each lake is compared over time to see if water quality is getting better or worse.

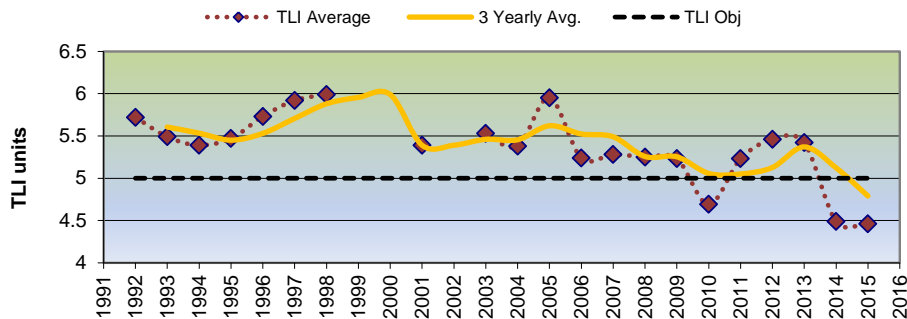
## Trophic Level Index Results

### Lake Ōkaro

**Improving**

Catchment remediation and in-lake treatments have reduced productivity over the past two years.

**TLI 2015**



TLI Objective  
5.0

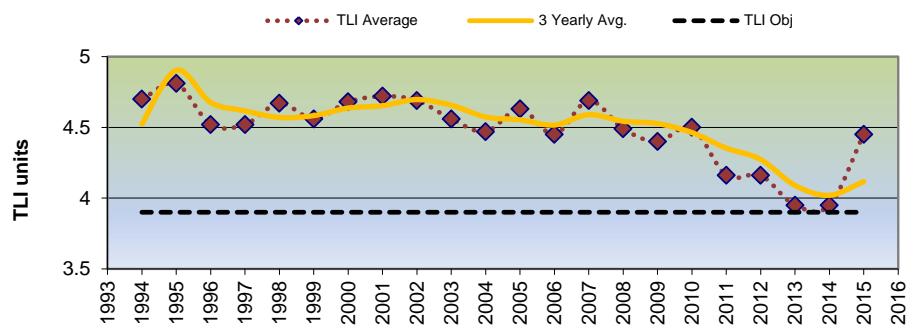


### Lake Rotoehu

**Stable**

Improving water quality over recent years but vulnerability to climatic conditions as seen in the previous summer with a decline in water quality in response to long period of stratification.

TLI Objective  
3.9

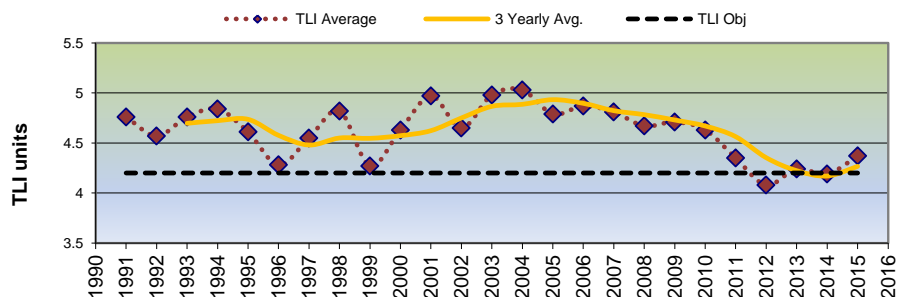


### Lake Rotorua

**Stable**

After a period of improvement, prolonged stratification last summer has seen the trophic status of this lake decline this last year.

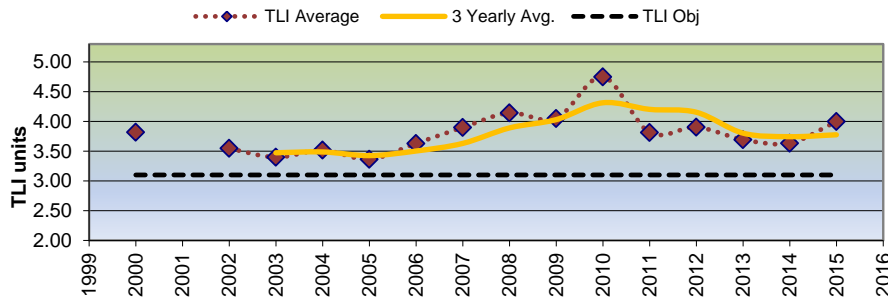
TLI Objective  
4.2



**Lake Rotokakahi**

**Investigation needed**

Deteriorating water quality which appears to be a consistent long-term trend.



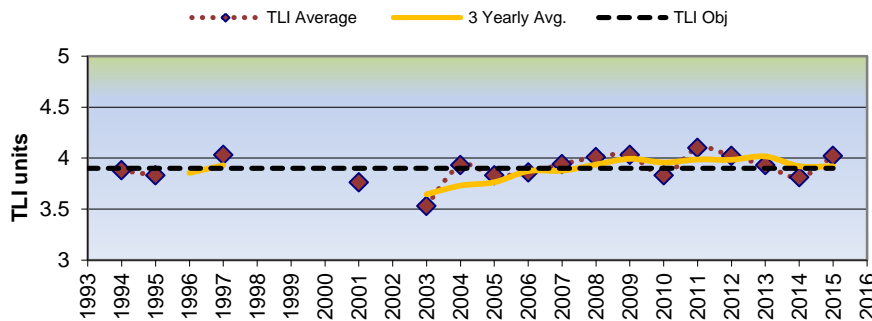
TLI Objective  
3.6



**Lake Rotomahana**

**Investigation needed**

Increasing phosphorus concentrations in the lake are observed.



TLI 2015

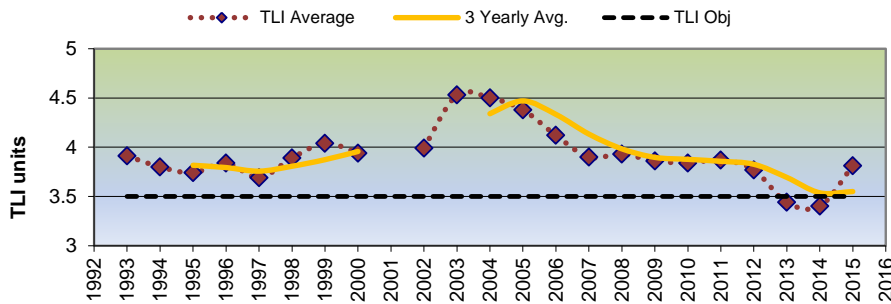
TLI Objective  
3.9



**Lake Rotoiti**

**Investigation needed**

Long-term improving trend since the installation of the Ōhau Channel diversion wall, however in 2014/15 trophic status declined.



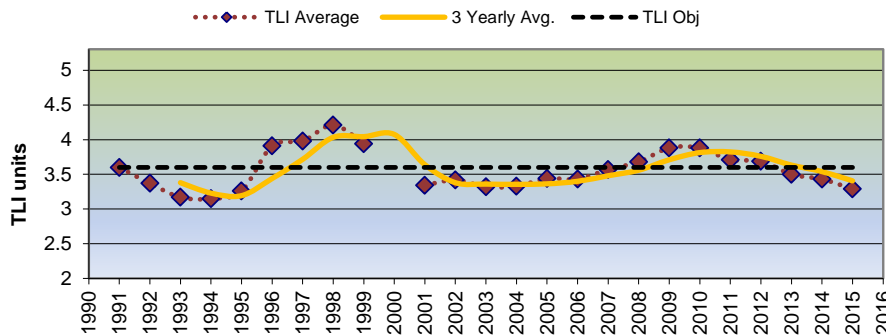
TLI Objective  
3.5



### Lake Rerewhakaaitu

### Improving

Trophic indicators continue to improve over the past six years. Water clarity and nitrogen levels are the main drivers for an improving trophic state.



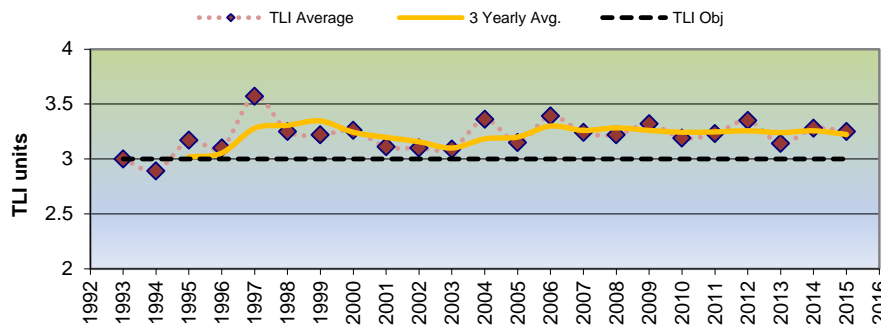
TLI Objective  
3.6



### Lake Okareka

### Stable

Water clarity was poor over the last summer, but this was offset by lower than average nutrient and chlorophyll-a concentrations.



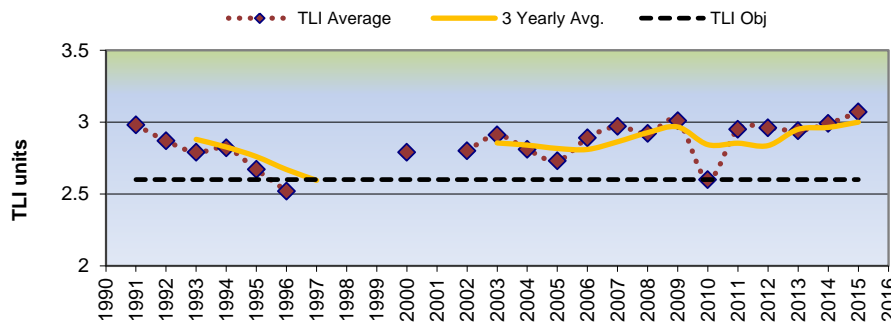
TLI Objective  
3.0



### Lake Tarawera

### Declining

Lake Tarawera experienced cyanobacteria blooms and health warnings were issued in the summer of 2014/15. Phosphorous concentrations are increasing.



TLI 2015

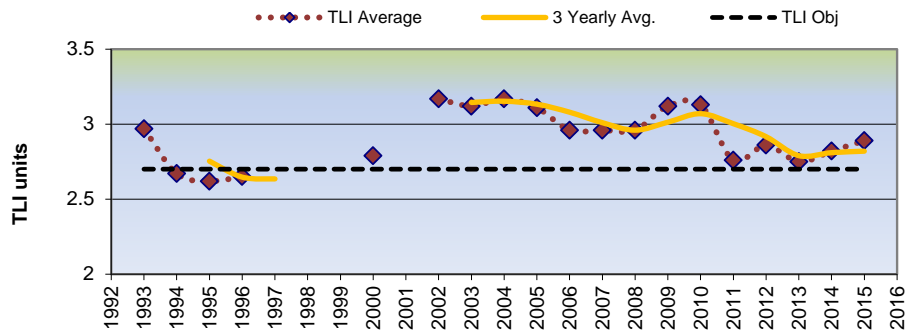
TLI Objective  
2.6



### Lake Tikitapu

Stable

An improved trophic status is observed since 2010 and remains stable.



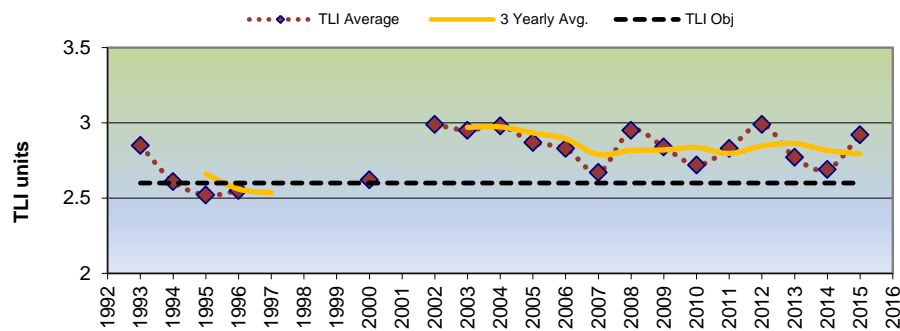
TLI Objective  
2.7



### Lake Okataina

Stable

Changing phosphorus concentrations is the main cause of fluctuations in the TLI, but overall the trophic state is stable.



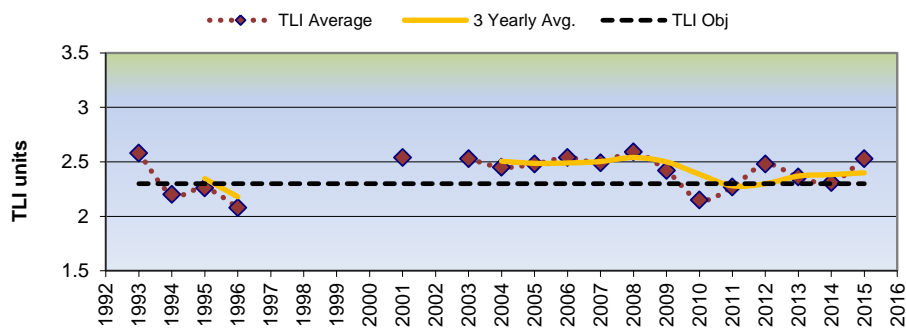
TLI Objective  
2.6



### Lake Rotoma

Stable

Increasing phosphorus and declining oxygen levels in this lake could be concerning indicators of a declining state.



TLI Objective  
2.3



Lake	TLI Obj.	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Trophic status
Okaro	5.0	5.5	5.4	6.0	5.2	5.3	5.3	5.2	4.7	5.2	5.5	5.4	4.5	4.5		Eutrophic
Rotorua	4.2	4.7	5.0	5.0	4.8	4.9	4.8	4.7	4.7	4.6	4.4	4.1	4.2	4.2	4.4	
Rotoehu	3.9	4.7	4.6	4.5	4.6	4.5	4.7	4.5	4.4	4.5	4.2	4.2	4.0	4.0	4.5	
Rotokakahi	3.6	3.5	3.4	3.5	3.4	3.6	3.9	4.1	4.0	4.7	3.8	3.9	3.7	3.6	4.0	Mesotrophic
Rotomahana	3.9		3.5	3.9	3.8	3.9	3.9	4.0	4.0	3.8	4.1	4.0	3.9	3.8	4.0	
Rotoiti	3.5	4.0	4.5	4.5	4.4	4.1	3.9	3.9	3.9	3.8	3.9	3.8	3.4	3.4	3.8	
Rerewhakaaitu	3.6	3.4	3.3	3.3	3.4	3.4	3.6	3.7	3.9	3.9	3.7	3.7	3.5	3.4	3.3	Oligotrophic
Okareka	3.0			3.4	3.2	3.4	3.2	3.2	3.3	3.2	3.2	3.4	3.1	3.3	3.3	
Tarawera	2.6	2.8	2.9	2.8	2.7	2.9	3.0	2.9	3.0	2.6	3.0	3.0	2.9	3.0	3.1	
Tikitapu	2.7	3.2	3.1	3.2	3.1	3.0	3.0	3.0	3.1	3.1	2.8	2.9	2.8	2.8	2.9	
Okataina	2.6	3.0	3.0	3.0	2.9	2.8	2.7	3.0	2.8	2.7	2.8	3.0	2.8	2.7	2.9	Oligotrophic
Rotoma	2.3	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.4	2.2	2.3	2.5	2.4	2.3	2.5	