

# LAKE TŪTIRA WATER QUALITY

Lake Tūtira, 40km north of Napier, has been affected by poor water quality for decades - the first algal bloom was recorded in 1957. This is not an overnight problem, and there is no single cause. Many attempts have been made since the 1970s to improve the lake, and research continues today to find a sustainable, long-term solution.

## WHAT'S THE MATTER WITH LAKE TŪTIRA?

Over time, too much nutrient-carrying sediment has entered the lake. Because there is only one narrow outlet at the north end, most of this sediment stays in the lake water. In 1988, Cyclone Bola caused an estimated 773,000 m<sup>3</sup> of sediment to enter lakes Tūtira and Waikōpiro.

A store of 'legacy' phosphorus has also built up in the lake bed since aerial topdressing began in the 1950s. Native bush clearance to turn the land into fernland and then pasture has not helped.

## WHAT CAUSES ALGAL BLOOMS?



Algae are microscopic organisms which occur naturally in fresh water lakes and rivers. We can only see algal populations when they quickly expand or 'bloom', causing the water to change colour.

Long, warm Hawke's Bay summers heat the top layers of Lake Tūtira, where there are plenty of nutrients, creating perfect conditions for algal populations to bloom.

Ceratium algae turns the water brown, but is not toxic. Cyanobacteria algae turns the water green or blue-green, with foamy scum at the edge and an unpleasant smell. It can turn toxic - always treat it as so.

The top layer of warm water also prevents oxygen reaching deeper water and contributes to increased water alkalinity - a sometimes fatal combination for trout and tuna (eels).

## THERE IS NO SINGLE CAUSE BUT MANY CONTRIBUTING FACTORS



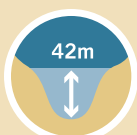
Topdressing  
since 1950s



Deforestation  
since 1600s



A high erosion  
catchment area



Lake topography  
(deep, steep with  
a narrow outlet)



Extended  
high summer  
temperatures



Ongoing  
sediment and  
nutrient loading



'Legacy'  
nutrient in the  
lake bed

## HOW THE LAKE REACTS IN WARM SUMMERS



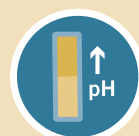
Higher water  
temperatures  
near the surface



Stratification and  
less oxygen  
in deeper water

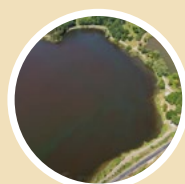


Algal blooms  
in nutrient rich  
top layer



Increased  
alkalinity

## WHAT WE SEE



Cloudy and  
discoloured water



Dead trout  
and tuna (eels)



Unsightly algae  
and scum



# LOOKING TO THE FUTURE

Although the problems are most clearly visible in the lake itself, the solution will involve the wider catchment and community, including the Maungaharuru-Tangitū Trust who own most of the lake bed and represent the tāngata whenua.

## WHAT HAS BEEN DONE SO FAR

- 1970s** Aerators were used to try to oxygenate and mix the lake water.
- 1980s** Papakiri Stream (Sandy Creek) was diverted away from the lake as this was the main supply of sediment and nutrients from the northern catchment during storms.
- 1992** HBRC planted pine forestry in the regional park to absorb nutrients.
- 2006** Tūtira Regional Park reserved for soil conservation; hillsides planted in native and exotic trees; a wetland established at the mouth of a stream to soak up more nutrients.
- 2009** Monitoring buoy installed in the lake.
- 2010** Tūtira Forum established to bring discussion about the lake and park into the community.
- 2011-13** Mānuka trial blocks established.
- 2012** Waikato University contracted to develop a computer model to help understand how the lake works, using data collected by HBRC on lake inputs and land use.
- 2014** Ownership of most of the lake bed was returned to tāngata whenua represented by the Maungaharuru-Tangitū Trust.

## WHAT IS BEING DONE?

Many landowners in the catchment are planting to reduce the amount of sediment flowing off their land into the lake. HBRC is investigating long-term options for improving the lake water, including aerating it with modern technology.

Maungaharuru-Tangitū Trust is using different knowledge systems including Mātauranga Māori, local environmental knowledge, science, policy and planning to undertake short-term actions and long-term planning. Key to this project is working together with partner agencies, landowners and community engagement. Some objectives include reconnecting the clean low flows of Papakiri Stream (Sandy Creek) to the lake, plus riparian planting and fencing.

## LAKE FACTS

Mean annual rainfall **1438mm**  
Catchment area **32.08km<sup>2</sup>**  
Lake area **1.79km<sup>2</sup>**  
Maximum depth **42m**  
Maximum breadth **1.2km**  
Water volume **36.1m<sup>3</sup>**  
Water residence time **7 years**



## OUR VISION:

Algal blooms will be stopped and water quality and habitat improved.

Trout fishery will be enhanced and tuna (eel) population replenished.

The mauri (life force), quality and integrity of Tūtira will be restored and maintained for present and future generations.