

WATER QUALITY WORD FIND

Find the following words about water quality in this Word Find puzzle.

P H O S P H O R O U S X K N G
 E M K D S A M X P Z B A T E N
 B N A Q T I X I T B Q L W G I
 A P V K E S W N N C G I Q Y R
 C M R I T D I S A N O U D X U
 T O A N R N I T R O G E N O S
 E T T E D O C R N E W B G S A
 R L E I R H N U R E T A M C E
 I A M W M T Q M K Z I S T F M
 A K S E H U S E E B I C I E I
 B E N D A A Y N J N V R S E R
 K T S L P H N T A R T W M O N
 S Y I E U G P G C I T A U Q A
 C T A G M N R B A P L A N T S
 Y T S J H O S T N E I R T U N



AQUATIC	BACTERIA	CATCHMENTS
ENVIRONMENT	INSTRUMENT	LAKE
MEASURING	NITROGEN	NUTRIENTS
ORGANISMS	OXYGEN	PEAT
PHOSPHOROUS	PLANTS	QUALITY
SCIENTIST	STREAM	TE WHANGA

WHAT IS GOOD QUALITY WATER?

How good the water quality is will depend on the natural geology of the catchment, the land use (eg bush and scrub or intensive farming or urban) and the weather before sampling. Good water quality is normally seen as low in nutrients, clear, with neutral pH, having a high dissolved oxygen level and very few bacteria and other microbes derived from animals.

How good is the water quality on Chatham Island?

Many streams and lakes on Chatham Island are naturally dark coloured and slightly acidic because of the peat soils within their catchments. This makes them difficult to compare directly with other parts of New Zealand for clarity and pH but because it is natural we don't consider this as "bad water quality". Overall water quality on Chatham Island is good but with bacteria in some not quite so good places.

Streams, lakes and Te Whanga Lagoon on Chatham Island are generally well oxygenated with the exception of Washout Creek and Whangamoe Inlet Stream, which often experience decreased dissolved oxygen concentrations, probably from river mouth closures. Te Whanga Lagoon at Blind Jims Creek has shown a significant improvement over the past 10 years.

Nutrients are critical for the growth of plants and the main measures are nitrogen and phosphorus. The presence of too many nutrients can hurt aquatic organisms by causing lots

of algae to grow in the water. Nutrient concentrations on Chatham Island are generally low reflecting good water quality probably as a result of fairly low intensity agriculture.

Nitrogen

Nitrogen concentrations are greatest for Mangape Creek and Lake Huro and Lake Te Wapu. Long-term nitrogen trends vary among the island. Awamata Stream and Te Awainanga River are decreasing (i.e. improving), while Awatotara Creek and Waimahana Creek are increasing. Te Whanga Lagoon at Blind Jims Creek and Lake Rangitai are improving for nitrogen.

Phosphorus

Phosphorus concentrations are elevated for Blind Jims, Waimahana, Waitamaki and Mangape Creeks, potentially due to increased run-off and soil erosion, or bankside disturbance. However, phosphorus has significantly decreased for Mangape Creek.

Generally bacterial levels are low except for the lower Nairn River and Mangape Creek although many streams have had occasional high readings. Water quality at both sites are likely to be influenced by overland run-off and unrestricted stock access in grazed pasture catchments.



Issue 25 January 2015

Uniquely Chatham is a quarterly newsletter about the environment for the Chatham Islands community.

Water quality on the Chatham Islands

Keeping an eye on the water quality of the Chatham Islands' natural waterways is one of the roles of the Chatham Islands Council and is monitored by a team of scientists from Environment Canterbury. We need to know what quality the water is so that we:

- Know we have safe drinking water
- Can be sure that swimming and fishing spots are safe for contact recreation
- Can be sure fish and other aquatic organisms can live happily in a stream or lake
- Can plan for further economic development by understanding the current state and how any further development may affect that
- Comply with New Zealand legislation that requires an understanding of water quality and quantity (e.g. Resource Management Act 1992; National Policy Statement for Freshwater Management 2014).



Scientists from Environment Canterbury regularly monitor Chatham Island's waterways on behalf of the Chatham Islands Council.

Water quality monitoring is regularly carried out at 14 streams and eight lake or lagoon sites on Chatham Island to assess their current state and detect short and long term trends.



chatham islands council

9 Tuku Road, Waitangi, PO Box 24,
 Chatham Islands 8942
 Phone: (03) 3050-033 or 3050-034
 Email: info@cic.govt.nz
 www.cic.govt.nz

A sustainable future for our
 people and our islands.

How do we measure the quality of our waters?

Doctors use instruments like thermometers and stethoscopes and do blood tests to check on your health. Scientists use instruments like Secchi (sek'-ee) disks, and conductivity meters and get a laboratory to measure the concentration of different things in the water to determine how healthy the water is. They take measurements of the physical and chemical condition of the water and the health of what lives in it.

Scientists collect water in lots of different ways. They use boats to go out in the middle of lakes, they wade into streams wearing rubber boots that go up to their chests or drop buckets over the sides of bridges.

The quality of Chatham Island's waterways is assessed by measuring a number of things within the water such as dissolved oxygen, bacteria, water temperature, pH, the amount of nutrients and the clarity of the water. Because the Chatham Islands Council has been measuring quality for 10 years we are able to look at whether changes have occurred in that period.



What about Te Whanga?

In lakes the water quality is often combined into a single score - the trophic level index. This score is then put into categories of "eutrophic state".

The categories range (see table below) from ultra microtrophic (eg Lake Pukaki in the South Island) through to hypertrophic (eg Lakes Te Wapu and Huro in the past). The more eutrophic a lake is the more nutrients and algae are in a lake and generally the less desirable it is to be around.

Many Chatham Island lakes and the northern arm of Te Whanga Lagoon in particular have shown an improvement over recent years reflecting the significant decline of phosphorus.



Routine water quality monitoring sites for streams and lakes or lagoons on Chatham Island.

Table 1: Annual Trophic State for Lake and Lagoon sites of Chatham Island

Site Name	2010-11	2011-12	2012-13	2013-14
Tennants Lake	Eutrophic	Mesotrophic	Mesotrophic	Mesotrophic
Lake Huro	Hypertrophic	Supertrophic	Supertrophic	Eutrophic
Lake Marakapia	Mesotrophic	Mesotrophic	Mesotrophic	Mesotrophic
Lake Rangitai	Eutrophic	Mesotrophic	Mesotrophic	Oligotrophic
Lake Te Wapu	Hypertrophic	Supertrophic	Supertrophic	Supertrophic
Te Whanga Lagoon - Blind Jims Creek	Supertrophic	Supertrophic	Eutrophic	Mesotrophic
Te Whanga Lagoon - Southern Basin	Eutrophic	Eutrophic	Mesotrophic	Mesotrophic
Te Whanga Lagoon - Waitamaki Creek	Eutrophic	Eutrophic	Mesotrophic	Mesotrophic

Table 2: Description of Trophic States

TLI	Trophic state	General Description
<1	Ultra-microtrophic	practically pure, very clean, often have glacial sources
1-2	Microtrophic	very clean, often have glacial sources, very low nutrient enrichment
2-3	Oligotrophic	clear and blue, with low levels of nutrients and algae
3-4	Mesotrophic	moderate levels of nutrients and algae
4-5	Eutrophic	green and murky, with higher amounts of nutrients and algae
5-6	Supertrophic	very high nutrient enrichment and high algae growth
>6	Hypertrophic	saturated in nutrients, highly fertile, excessive algae growth



The Chatham Islands: A community that protects, sustains, enriches and values our environment, our cultural heritage and our uniqueness.