

Waituna Lagoon health scorecard, April to June 2024

Indicator		Target *	Most recent data (green = better than target, orange = worse than target)			5-year median	State and trend **
			Apr 2024	May 2024	June 2024		
Bacteria	<i>E. coli</i> (<i>Escherichia coli</i>)	<540 CFU/100ml	370 CFU/100ml	No data	<10 CFU/100ml	14 CFU/100ml	<p style="text-align: center;">5-year trend</p>
Nitrogen	Total Nitrogen	< 0.337 g/m ³	1.10 g/m ³	1.20 g/m ³	1.78 g/m ³	0.82 g/m ³	<p style="text-align: center;">10-year trend</p>
Phosphorus	Total Phosphorus	< 0.02 g/m ³	0.042 g/m ³	0.036 g/m ³	0.051 g/m ³	0.029 g/m ³	<p style="text-align: center;">10-year trend</p>
Clarity	Total Suspended Solids		7.00 g/m ³	5.80 g/m ³	6.1 g/m ³		
Algae	Chlorophyll a	< 0.005 mg/l	0.015 mg/l	0.014 mg/l	0.042 mg/l	0.0027 mg/l	<p style="text-align: center;">5-year trend</p>

Note: Environment Southland collects data from 4 lagoon sites each month. For the sake of simplicity, data from Waituna Lagoon at Lagoon Centre is shown here.

Indicator	Target *	Most recent data	Data from previous years (green = target achieved, orange = target not achieved) ***															
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Lagoon closure	Lagoon closed over spring-summer	Lagoon open over summer																
Aquatic plant cover	>30-60% average % cover	2%																
Aquatic plant biomass index	>1000 average biomass index	53																
Macroalgae cover	<10% cover of filamentous algae	<1																
Ruppia reproductive success	≥40% of Ruppia produced flowers	0																
Status of Ruppia megacarpa	≥20% of the sites record Ruppia megacarpa	0																

* Targets from Ecological Guidelines for Waituna Lagoon [Waituna lagoon Guidelines v6-final.pages](#)

** State and trend from LAWA: <https://www.lawa.org.nz/explore-data/southland-region/lakes/waituna-lagoon/waituna-lagoon-lagoon-centre>

***Source: [Vegetation Status in Waituna Lagoon: Summer 2024](#)

Indicator		Explanation
Bacteria	<i>E. coli</i> (<i>Escherichia coli</i>)	<i>E. coli</i> are bacteria commonly found in the gut of warm-blooded animals (including birds, livestock, dogs and humans). They are used as an 'indicator organism' to indicate faecal contamination including bacteria, viruses and protozoa. In water used for swimming and other recreation, low counts of <i>E. coli</i> are acceptable, but too much faecal contamination can cause gastroenteritis or infections of ears, eyes, nasal cavity, skin, and the upper respiratory tract.
Nitrogen	Total Nitrogen	Nitrogen is a naturally occurring element, essential for growth. However, excessive nitrogen creates problems in freshwater as it can cause excessive growth of plants and nuisance algae. Some forms of nitrogen can become toxic to aquatic life (fish and invertebrates) at high concentrations. Sources of nitrogen include wastewater, industrial and agricultural runoff. Total nitrogen is the sum of all nitrogen types found in a sample. High total nitrogen can lead to eutrophication and algal blooms.
Phosphorus	Total Phosphorus	Phosphorus is another naturally occurring element, essential for growth. High levels of phosphorus in freshwater can cause excessive growth of plants and nuisance algae. Sources of phosphorus include wastewater, household detergents and fertiliser. Total phosphorus includes all types of phosphorus found in a sample, including that bound to sediment. This is important in Waituna Lagoon as over time it can be released and become available for plant uptake. High total phosphorus can lead to eutrophication and algal blooms.
Clarity	Total Suspended Solids	Light penetration is important as it controls the amount of light in the water needed for aquatic plants to grow. Water clarity may be reduced when there is an increase in suspended sediment or algae in the water. As erosion occurs, tiny particles of clay, silt or small organic particles are washed into waterways. These tiny particles can be supported in the water current and are termed suspended sediment. The faster the water is moving the larger the amount and size of suspended sediment particles it can carry. Soil type in the catchment can affect the amount of suspended sediment.
Algae	Chlorophyll <i>a</i>	Large amounts of algae in lakes can decrease water clarity, change the colour of the water, reduce dissolved oxygen, alter the pH, impact other organisms, and can be a risk to the health of people and animals. Chlorophyll <i>a</i> is the green pigment in plants that is used for photosynthesis. Measuring how much chlorophyll <i>a</i> is in the water provides an indication of the total amount of algae present. Algae that are very small are also known as phytoplankton. Cyano bacterial blooms are a key indicator of severely eutrophic conditions.

Indicator	Target *	Explanation
Lagoon closure	Lagoon closed over spring-summer	Spring is the time when most <i>Ruppia</i> seeds germinate, and the summer months are when <i>Ruppia</i> plants grow, and produce flowers and seeds for the next season. For optimal <i>Ruppia</i> germination, growth and reproduction, the lagoon should be closed during spring and summer. When the lagoon is open, stressors to <i>Ruppia</i> growth and reproduction include: reduced habitat for <i>Ruppia</i> to grow, desiccation of plants in shallow areas, inhibited germination, wind and wave disturbance, competition from slime algae that cope better with saline conditions and smothering by marine sediment.
Aquatic plant cover	>30-60% average % cover	<i>Ruppia</i> is the dominate aquatic plant in Waituna Lagoon and plays a key role in regulating water quality and providing habitat for animals. <i>Ruppia</i> cover is used as an indicator because it typically forms extensive beds in healthy ICOLLS (intermittently closed and open lakes/lagoons) in New Zealand and Australia. We do not know precisely what a realistic minimum target is for aquatic plant cover in Waituna. This is due to variability in sediment and exposure characteristics within the lagoon, and also disturbance caused by the recommended winter lagoon openings that may limit the expansion and stability of aquatic vegetation. Given this uncertainty, the Ecological Guidelines suggest the minimum target should be between 30 and 60%. This is based on international research, and a recent review which suggested 50% coverage as a conservative level to ensure a clear water state.
Aquatic plant biomass index	>1000 average biomass index	Aquatic plant cover measures only one aspect of the health and resilience of the aquatic plant community. Biomass of aquatic plants provides another useful measure. During <i>Ruppia</i> monitoring, biomass is estimated by an index of plant cover x height.
Macroalgae cover	<10% cover of filamentous algae	Excessive growth of filamentous algae on the lake bed is an indicator of eutrophication. To remain in a mesotrophic state, the cover of filamentous algae should be less than 10%.
<i>Ruppia</i> reproductive success	≥40% of <i>Ruppia</i> produced flowers	<i>Ruppia</i> can reproduce both vegetatively and by seed. It produces flowers and fruit in summer and autumn and most seeds germinate in spring.
Status of <i>Ruppia megacarpa</i>	≥20% of the sites record <i>Ruppia megacarpa</i>	There are two species of <i>Ruppia</i> in Waituna Lagoon. <i>R. polycarpa</i> is small and delicate. It commonly grows in shallower water and is better adapted to withstanding desiccation when water levels are low. Its seeds have the ability to germinate after they are covered in water again. <i>R. megacarpa</i> is large and robust with long, branching stems. It grows in deeper water and is more sensitive to desiccation. Good light penetration is important for <i>R. megacarpa</i> .