Safeguarding *Ruppia* in Waituna Lagoon

Arawai Kākāriki
Wetland restoration programme

Objective 2: Water – Maintain and enhance water regime and water quality to support wetland values

Waituna Lagoon. *Photo: DOC*

Ruppia plant communities play a vital role in preserving the ecological health of Waituna Lagoon, but monitoring has shown _Ruppia_ populations are well below ecological targets.

Lagoon opening

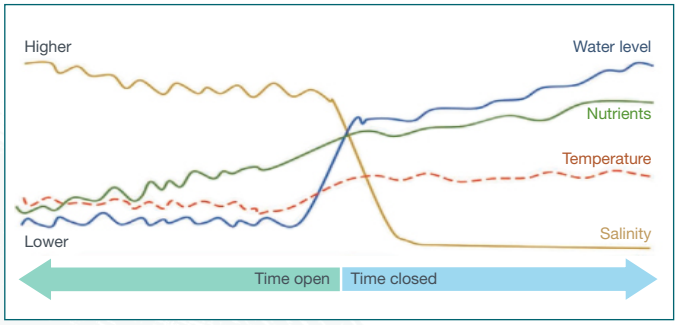
Waituna Lagoon in Murihiku (Southland) is home to an abundance of birds, fish and plant life, but land use changes in the surrounding catchment and frequent opening of the lagoon have caused the internationally significant ecosystem to enter an unstable state.

Without human intervention, the lagoon would be closed for periods of several years before naturally breaching to the sea. However, the lagoon has been regularly opened since the 1900s to prevent flooding on surrounding farmland. These openings occur when the water depth reaches the trigger level specified in the resource consent. While improvements to the opening regime were made in 2017 in an effort to reduce opening events during spring/summer and flush algae, regular openings remain a concern.

Ruppia, algae and salinity

Ruppia polycarpa and *R. megacarpa* play a crucial role in keeping Waituna Lagoon healthy. When these plants grow densely, they protect the water quality, dampen wave action and prevent the lagoon bed from being stirred up. If plant communities collapse, the lagoon is at risk of becoming degraded, with poor water quality and algal blooms.

When the lagoon is closed, levels of nutrients from the surrounding catchment rise, feeding algae that can smother *Ruppia*. Opening the lagoon can be a short-term solution to flush nutrients and disrupt algal growth, but low water and high salinity levels affect *Ruppia* growth, particularly in the critical spring–summer growth period.



Changes in the waters of Waituna Lagoon with time after opening or closing to the sea. *Source: NIWA*

Ecological targets

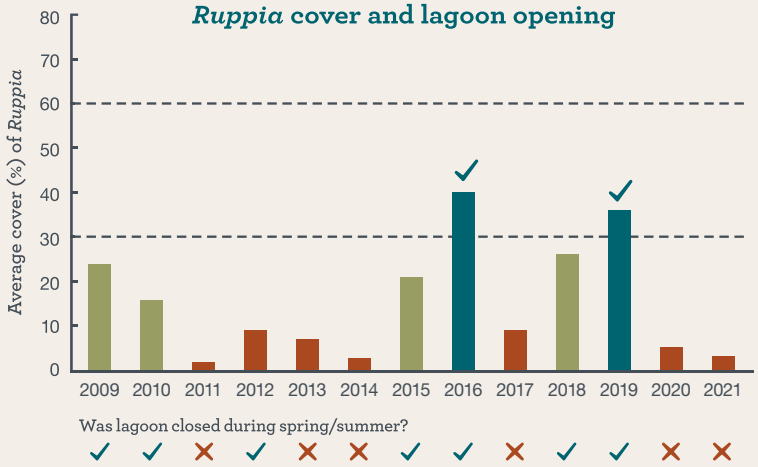
The Lagoon Technical Group has identified six ecological targets for *Ruppia* in Waituna Lagoon.[1] Annual monitoring is carried out in late summer to assess whether these targets are met.

- **Lagoon closure** – The lagoon is closed during the *Ruppia* growing season (spring and summer, 3 months before monitoring).
- ***Ruppia* cover** – The average % cover of *Ruppia* (and other native macrophytes) is 30–60%.
- ***Ruppia* biomass index** – The average *Ruppia* 'biomass index' (% cover × cm height) is > 1000.
- ***Ruppia* reproductive success** – ≥ 40% of *Ruppia* samples are in a flowering or post-flowering life stage.
- ***Ruppia megacarpa* status** – *R. megacarpa* is present at ≥ 20% of the sites.
- **Macroalgae cover** – Macroalgae on the lagoon bed, on plants and in floating mats have < 10% cover.

Results and implications for lagoon health

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Lagoon closure target met	✓	✓	✗	✓	✗	✗	✓	✓	✗	✓	✓	✗	✗
Total number of ecological targets met	2	3	1	3	–	1	3	4	–	5	5	1	–

Ruppia cover and lagoon opening



- In 2021, **zero** ecological targets were achieved, making this the third monitoring year that failed to meet any targets.[2]
- Years when **one or no targets were met** were also years when the target for lagoon closure (ie > 3 months before survey) was not met.
- Current evidence indicates that keeping the lagoon closed for at least two consecutive growing seasons is important.
- The opening regime and water quality need to be improved to prevent algal domination and to protect the overall ecological health of Waituna Lagoon.

For more details, check out **NIWA's 2021 report**[2]

Progress since 2015

In 2015, we reported on the status of Waituna Lagoon and identified four key actions. Since then, we have worked with our partners to implement these actions and help conserve *Ruppia*.

2015 action	Our progress
Advocate to reduce the nutrient and sediment load from the Waituna catchment.	We share our annual monitoring results to raise awareness of the ongoing risks to the lagoon from poor water quality.
Work with stakeholders to develop a sustainable approach to lagoon opening.	We are supporting a multi-agency initiative to improve the management of opening events, as part of **Whakamana te Waituna**.
Monitor changes in water quality, aquatic plants (*Ruppia*) and other key features of the lagoon.	We continue to work alongside Environment Southland to monitor the ecological health and water quality of Waituna Lagoon.
Research to improve understanding of how much agricultural land is impacted by high water levels.	We worked with NIWA, Environment Southland and Living Water to map the extent of land impacted by high water levels.

References

1 Lagoon Technical Group 2013: Ecological guidelines for Waituna Lagoon. Report prepared for Environment Southland.

2 De Winton, M.; Elcock, S. 2021: Technical report on vegetation status in Waituna Lagoon: 2009–2021. Prepared for the Department of Conservation by the National Institute of Water & Atmospheric Research Ltd, Hamilton.

Next steps

The long-term health of the *Ruppia* populations in the lagoon and the ecosystem they support remains uncertain. We will work together with hapū and iwi, community, and agency partners over the next 5 years to carry out the following key actions.

- Implement an **opening regime** that improves ecological health in partnership with the community.
- Continue to **monitor changes** in water quality, aquatic plants (*Ruppia*) and fish populations.
- **Support** on-ground catchment actions to improve water quality.
- **Share information** on the joint efforts of stakeholders to safeguard Waituna Lagoon.

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