



WAITUNA

Partners' News

Mana oranga; Mana tangata; Mana ki uta; Mana ki tai; Mana Waituna

Ensuring the wellbeing of the people, the land, the waters, the ecosystems, and the life-force of the Waituna catchment and lagoon, now and for future generations through a partnership approach.

Welcome to this issue of the Waituna Partners' News.

This is the third annual newsletter and provides updates from each of the Partners as well as details on several of the key projects completed or underway in the catchment.

The Waituna Partners' Group provides strategic direction and has responsibility for achieving the vision of the Waituna Project. The Partners include the Department of Conservation, Environment

Southland, the Southland District Council, Te Rūnanga o Ngāi Tahu and Te Rūnanga o Awarua. Each of these agencies have statutory roles in the care and management of the Waituna catchment and lagoon.

By coming together in this way, the Partners are able to achieve greater improvements and avoid duplication of effort than if they all worked separately.

Annual Report summary

This year a combined Annual Report was presented to the Partners', providing a summary of the progress made during the 2015-2016 financial year on some of the actions outlined in the Strategy and Action Plan for Waituna.

Action 1: Values

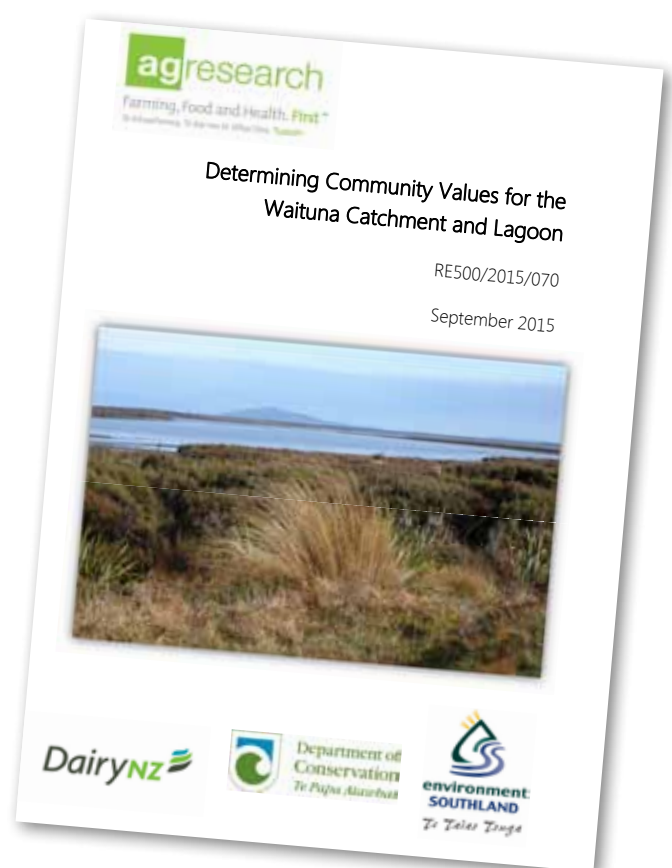
Two values workshops were held with interested community members, led by Liz Wedderburn from AgResearch and funded by Environment Southland, DairyNZ and DOC. Liz has since produced a report titled *Determining Community Values for the Waituna Catchment and Lagoon*.

From this, the Waituna Working Group summarised the next steps into four key actions:

1. Collation of documents/timeline on a webpage.
2. Checking the Strategy and Action Plan aligns with the values.
3. Development of SMART indicators/report cards to assess progress on the values against the Strategy and Action Plan.
4. Socialising values/community science update and sharing progress with the community.

A website for Waituna is currently being developed for collating the documents (read more about this later in this newsletter). The values alignment has been

completed and the Waituna Science Advisory Group will assist with the development of the SMART indicators in the upcoming financial year. Sharing progress with the community will be done in a variety of ways, including this newsletter, the website and community meetings.



Action 2: Cultural Opportunities Mapping Assessment and Response (COMAR)

The COMAR project will provide a Ngai Tahu whanui assessment on Waituna catchment and lagoon and is being undertaken by Te Rūnanga o Ngāi Tahu over the next few years.

A cultural values report has been drafted this year. Interviews were undertaken with whānau associated with the catchment, to help inform this report. This work has also involved building capacity by educating new staff and passing on information, understanding and knowledge to whānau.

Field work, data collection and analysis are underway and the completed report is expected by April 2017.

Action 3: Understanding nutrient losses

We're working to increase knowledge about nutrient losses by investigating new technologies/techniques for minimising nitrogen, phosphorus, and sediment losses and the cost/benefit relationships of these.

Nitrogen and phosphorus passive filters

These filters are now up and running and we can expect preliminary results very soon. These are jointly funded by DairyNZ and the Living Water Partnership, with support from Environment Southland and landowners.

Nitrate sensor

We investigated installing a continuous nitrate sensor to comprehensively determine the amount of nitrogen being contributed through the Waituna Creek, and to help determine the effectiveness of different initiatives to reduce nutrients entering the lagoon.

Funding applications for this work were unsuccessful so the project has not been progressed at this time.

Actions 4–6

While there is no detailed update on the following actions, they are being progressed.

Action 4: *Work with landowners to scope and investigate the potential locations and benefits arising from retirement of land both within the catchment and/or a buffer area around the lagoon.*

Action 5: *Minimise environmental risk of effluent storage/disposal at a farm and catchment level.*

Action 6: *Take practical steps to reduce nutrient loads coming into the lagoon from the Waituna catchment.*

Action 7: Bank reconstruction

Environment Southland has begun a Waituna Creek Riparian Planting Initiative – looking to plant 14km of reconstructed banks along the Waituna Creek.

This initiative has been split into three stages to align with planting seasons and facilitate funding applications.

Funding is currently being sought; the Living Water Partnership has confirmed funding of \$80,000 for planting on private land.



Before work started on bank reconstruction along the Waituna Creek.



After the completion of reconstruction work.



Opening Waituna Lagoon to the sea.

Action 8: Lagoon opening and closing

The lagoon was opened on 10 September 2015 (closed 10 October 2015) and reopened on 3 June 2016 (and remains open).

In the future the open/closed status of the lagoon will be easy to see on the Waituna website (read more about this later in this newsletter). We often get enquiries around the start of the duck shooting and fishing seasons about this.

Action 9: Identifying and protecting wetlands

The DOC Arawai Kakariki wetland restoration programme developed and submitted a successful Nature Heritage Fund application for the purchase of a private wetland at Fantail Rise.

Also as part of this programme,

- 16,000 ha of weed control and surveillance (aerial and ground) was completed. Major control work has been completed on Spanish heath, gorse, broom and spartina, which is now at extremely low levels at Waituna, Awarua Bay and New River Estuary. The predator trapping programme has been expanded and is now operating over the entire Tiwai Peninsula;
- an Awarua-Waituna Pest Animal Strategy has been developed;
- pest animal control across the whole wetland complex has been planned in conjunction with the Living Water Partnership; and
- weed control and planting at the Craws Creek restoration site has been undertaken.

In addition, a draft report on the location and extent of wetlands in the catchment has been completed by Living Water.

Action 10

While there is no detailed update on Action 10 (*Raise awareness of the importance of mahinga kai in the catchment, how it can be accessed and understand the implications for the Scientific Reserve status of the lagoon*), it is being progressed.

Action 11: Monitor ruppia

The DOC Arawai Kakariki Wetland Restoration Programme undertook ruppia monitoring in November/December and June to look at seasonal dynamics, as well as annual monitor in January/February.

This monitoring showed that ruppia cover has been successfully managed through the lagoon openings and keeping the lagoon closed during the growing season.

However, there was still a high abundance of algae in the lagoon. Managing both the lagoon opening regime and nutrient loads entering the lagoon from the creeks and streams will help to manage ruppia and algal growth.



Ruppia.

Lagarosiphon update

Earlier this year we were informed South African oxygen weed (*Lagarosiphon major*) had been found in Waituna Lagoon. While the weed won't survive in the lagoon, it's a real concern that it was found in the Waituna area.

South African oxygen weed can cause problems in our waterways, choking and blocking our lakes and rivers. It is not widely established in Southland and we want to keep it that way.

It looks similar to Canadian oxygen weed (*Elodea Canadensis*) which is more common, and is also found in the Waituna area. Both oxygen weeds spread easily through small fragments, so make sure you check your equipment and remove all traces of weed before moving between waterways.

We need your help to keep our lakes and rivers free from this invasive pest. If you see South African oxygen weed in the Waituna area, please contact our biosecurity team on 0800 76 88 45. We'd like you to take a photo, note the location and send the information to service@es.govt.nz.



Canadian oxygen weed
(*Elodea Canadensis*)



South African oxygen weed
(*Lagarosiphon major*)

Lagoon opening consent

The consent to open Waituna Lagoon to the sea was to expire on 21 May 2014. A new consent application was lodged prior to this to ensure the consent could still be exercised while the terms and conditions of a new consent were discussed. This application was put on hold while the matter of managing the openings was explored in more detail.

Towards the end of 2015, meetings were held again with affected parties to continue to progress the consent, and

finalise terms and conditions. After some give and take from all parties, agreement was finally reached in October.

At the time of print, all affected parties except one recreational individual had signed off their approval.

Eleocharis transplanted

Early in October Environment Southland staff were out working in Waituna to transplant some established eleocharis from a local farmer's pond to the constructed wetland trial further up the catchment.

The digger was amazingly gentle, managing to put the large clumps of these aquatic plants into the wetland intact. They'll be great for taking up excess nutrients in the water. Here's hoping the pukeko will leave these ones alone.



Eleocharis is transplanted to a constructed wetland trial area.

Waituna website

The Partners' agreed to fund a website for Waituna which will be a one-stop-shop for people who want to find out anything and everything Waituna. This also fits nicely with some of the recommendations that people had from the values workshop.

It will include all documents regarding Waituna, maps, historical information, as well as information on various projects happening in the catchment.

This website will be a sub-site of the Environment Southland website which will enable information to be easily updated. It is currently in the development phase but is expected to go live in the New Year. We will let you know as soon as it is available.

Catchment water quality review report

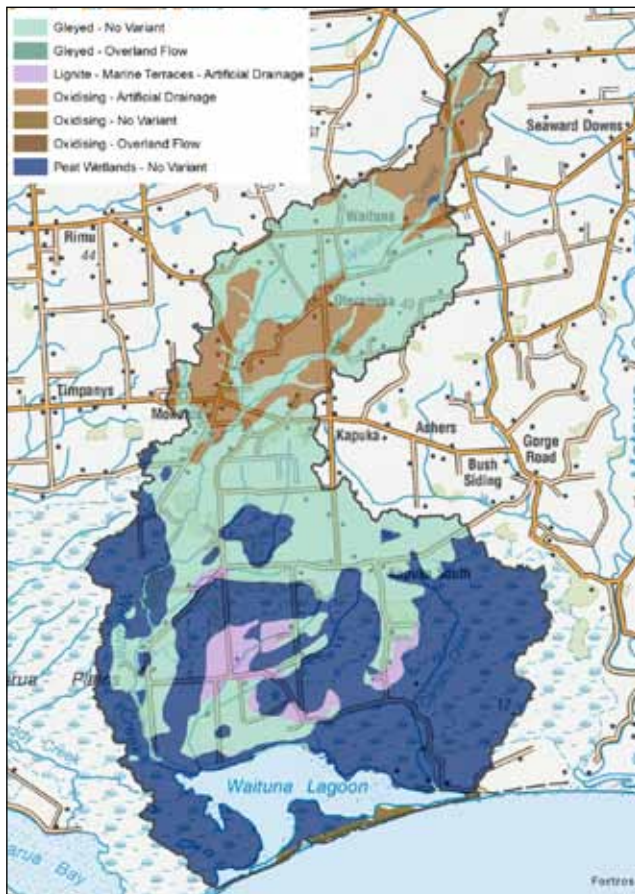
Using the physiographic zones research, a report has been completed collating information around topography, climate, land use, soils, hydrology and geology. The *Waituna Catchment Water Quality Review* report provides a better understanding of hydrological pathways and nutrient movement in the catchment.

Key findings

Areas of oxidised soils are seasonally contributing nitrate to shallow groundwater.

- Brown oxidising soils in the north of the catchment are associated with infiltration of significant loads of nitrate to shallow aquifers, which contributes to Waituna Creek.
- Nitrogen accumulates in the soil profile and shallow aquifer over the drier, warmer months when evapotranspiration is high, and soil drainage is low.
- Up to 90% of annual nitrate loads are flushed to Waituna Creek during late autumn – early winter.

The gleyed zone contributes nitrate via overland flow/tile drains in the lower catchment.



Physiographic zones in the Waituna catchment.

The actual contributing areas of different sub-catchments are difficult to clearly define.

- Changes in drain base slopes can produce an artificial drainage pattern different to the drainage patterns implied by land surface slope;
- Catchment flow divides are quite unclear where they cross peat wetlands, such as the Waituna catchment adjoining the Awarua Wetland complex;
- Shallow groundwater in the north of the upper Waituna Creek has a flow gradient that may flow beneath the surface water divide with the Waihopai catchment. This may contribute nitrate nitrogen to the Waituna Creek base-flow. A similar, but potentially less significant contribution to the nitrogen load in the Carran Creek headwaters may also occur.

Lagoon water quality

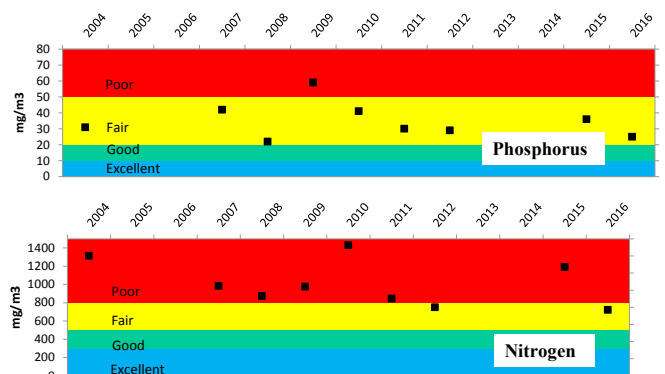
There are national water quality standards for lakes which can arguably be used to assess Waituna when it is closed. This is the time at which the lagoon is most at risk from nutrient input as the lagoon water sticks around much longer than when it is open.

The two charts below show the water quality in the Waituna Lagoon with each dot representing the **median** (the middle number for all the samples) nutrient concentration for closed periods (varying from 5 to 30 months) for phosphorus and nitrogen.

Lakes need certain amounts of the nutrients to support a healthy ecosystem. However, if there is too much, opportunistic algae can grow and cause a shift from clear water to a murky green, algae dominated system.

The colourful bars represent the different conditions as outlined by the national standards. Excellent represents a healthy and resilient system that is similar to natural reference conditions, and poor represents a degraded state at high risk of shifting to an algae dominated system.

Combined, these figures illustrate that during closed periods Waituna Lagoon experiences high stress levels, well above natural reference conditions.



Ruppia

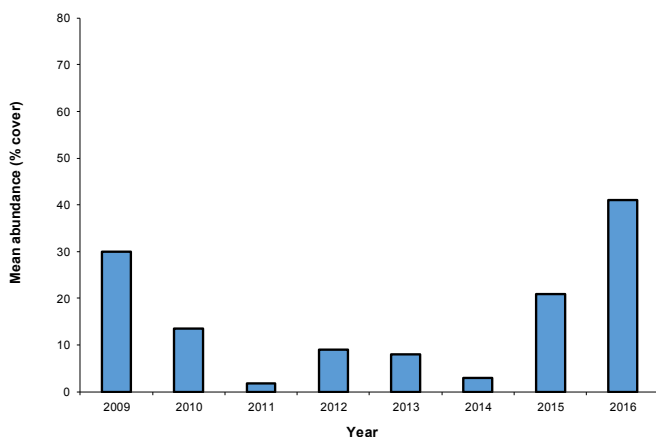
The lagoon technical guidelines developed in 2013 recommended a target of >30 to 60% cover for the aquatic plant ruppia and other native aquatic plants (macrophytes) across the lagoon.

Ruppia is important because it takes up nutrients from the water column, and slows down the flow enough to enable sediment to stop floating and drop to the bed of the lagoon. Its roots also prevent sediment from becoming stirred up again during periods of high wind.

Elevated nutrient concentrations provide conditions suitable for algae growth, which can shade out plants like ruppia. If this happens, the lagoon can shift from a clear water system dominated by rooted plants, to an algal dominated system, which has on-going implications for aesthetics and the ecology of the lagoon.

Ruppia struggles living in a saltwater environment. It can survive when the lagoon is open to the sea, but maximum seed germination and growth occurs when the lagoon is shut, especially over summer.

When the lagoon is open, nutrients and sediments can be flushed out. It is a fine balance between closed periods that have elevated nutrient concentrations and open periods with increased saltwater that affect the lifecycle of ruppia. For example, an opening in 2013/2014 lasted for 380 days and negatively impacted on the ruppia cover. When the lagoon was only open for two periods of 15 and 30 days over winter and spring in 2015, ruppia cover rebounded to healthier levels.



Average cover for ruppia (*R. megacarpa* and *R. polycarpa* combined) across Waituna Lagoon (all sampling sites).

Overall these results suggest that even with all the great work everyone has been doing, Waituna Lagoon still has the potential to experience a rapid decline in ecological health, unless nutrient availability (including both nutrients already within the lagoon and entering it) is reduced. This emphasises the importance of carefully managing opening events.

It also means that the lagoon is more likely to exhibit signs of stress in response to abnormal environmental conditions. For example the lack of wind, warmer temperatures and the localised delivery of nutrients by Waituna Creek is thought to have caused the algal bloom at the eastern end of the lagoon that occurred at the end of October this year. This particular algae is one that grows on other plants/algae and can shade them out.



At the end of October/ beginning of November an extensive green algal bloom was seen at the eastern end of Waituna Lagoon. (Photo Chris Owen)

Catchment water quality

Regional councils across the country are working with communities to establish the values we all want for our waterways.

There are currently some national standards and guidelines for freshwater quality that we must work toward. They are for activities fishing, wading, boating where your head is unlikely to go under water, nitrate toxicity for fish, and slime algae (periphyton) in streams.

Other values, or more stringent values, may be set regionally or locally depending on the values of the community.

Human health – *E.coli*

In water *E. coli* is used as an indicator of the risk of getting sick from contact with it. High levels of *E. coli* can make people and animals sick.

Here, *E. coli* from five years of monitoring is compared to the national standard for wading (note this is not swimability), which is 1000 *E. coli* per 100ml. This matches the standard set in the Regional Water Plan for Southland for *E. coli*.

Results show there is an increased health risk on Waituna Creek.

Ecosystem health – nitrate toxicity to fish

Nitrate is essential for all life, although in high amounts it can cause undesirable growths of algae and become toxic to fish.

Here, nitrate from five years of monitoring is compared to the national standard for toxicity to fish.

The yellow results indicate nitrate levels on Waituna and Carran Creeks can have an impact on the 5% most sensitive species.

Ecosystem health – slime algae

Slime algae is sometimes called periphyton. It grows naturally in all water; however its growth is enhanced by high nutrient levels. Very thick mats of slime algae can be toxic to humans, can reduce the amount and type of food available for fish and remove oxygen from water.

Currently we don't have enough data on slime algae for Waituna to make an assessment, so this quadrant is grey.

Ecosystem health – stream insects (macroinvertebrates)

Stream insects (otherwise known as macroinvertebrates) include the mayflies, caddis flies, worms and snails that live in rivers. They are an important food source for fish and birds, and are sensitive to the combination of nutrients, sediment and habitat. Because of this sensitivity, they are considered to be a good representation of overall water quality and ecosystem health.

The different macroinvertebrates present can be identified and then converted to a score called the Macroinvertebrate Community Index (MCI).

The median MCI scores over 2010–2014 are compared to national guidelines for sites with more than three observations. Monitoring locations with red in the bottom left quarter do not meet the national guidelines for macroinvertebrates (note: macroinvertebrates are not monitored on Carran Creek, hence the grey quadrant).

