

10.3. Catchment Monitoring Programmes 2017-18

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PURPOSE

- [1] This report is intended to provide an overview of water quality monitoring by catchment groups (in five irrigated catchments) between July 2017 and April 2019.

EXECUTIVE SUMMARY

- [2] Plan Change 6A (PC6A) of the Regional Plan Water (RPW) was made operative on 1 May 2014. Under PC6A the Otago Regional Council (ORC) set rural water quality limits and targets for achieving good water quality (Schedule 15) and permitted activity discharge thresholds (Schedule 16) for contaminants discharged from rural land to water.
- [3] The 2017-2019 annual plans included a rural water quality implementation target focusing on water quality in five irrigated catchments.
- Upper Taieri (upstream of Waipiata)
 - Bannock Burn/Shepherds Creek
 - Thomsons Creek (Manuherikia)
 - Waiareka (Kakanui)
 - Awamoko
- [4] The 'Good Water in Otago' project commenced in 2017/18. The overall objective of the monitoring programme was to provide a more detailed study of water quality in a catchment when compared to a single point sample defined by ORC's State of the Environment (SOE) network.
- [5] The intent of the programme was to get landholders to understand how land use activity impacts water quality, with a view that they could review (or change) land use activities in order to meet RPW Schedule 15 (S15) limits and targets. The programme was also intended to encourage land users to form catchment groups, devise their own sampling programmes and undertake their own sampling.
- [6] Key to the success of the programme was ORC's leadership and regular communication in the first year of the programme. The right person on the ground during this period is critical in building relationships and trust with the community, this is the most important learning for future work of this nature.

- [7] Positive and encouraging behaviour change during the programme was evident. The most obvious being communities taking responsibility for water quality in their catchment and linking water quality results with farm management practices.
- [8] An improvement to the programme would be to monitor freshwater ecosystem condition alongside water quality. This would provide the opportunity for even greater community engagement. Tools to undertake this monitoring are readily available, i.e. NIWA's macroinvertebrate SHMAK kit or the Irish Small Streams Risk Score (SSRS) rapid macroinvertebrate assessment.

RECOMMENDATION

That the Council:

- 1) **Receives** this report.
- 2) **Notes** the progress with the Catchment Monitoring Programme.

BACKGROUND

ORC led monitoring programme 2017-2018

- [9] During the 2017/2018, water quality in the Upper Taieri, Bannock Burn/Shepherds Creek, Awamoko and Thomsons Creek catchments were monitored by ORC and results reported back to community leaders.
- [10] In the Upper Taieri, the Maniototo Irrigation Company (MIC) had already begun a community led water quality monitoring programme. This programme was transferred to ORC to lead, manage and expand.
- [11] In the Waiareka (Kakanui catchment) ORC ran a joint programme with the North Otago Sustainable Land Management Group (NOSLaM). The North Otago Irrigation Company (NOIC) were already working closely with NOSLaM and had set up a sampling programme in the catchment, ORC expanded this programme.
- [12] The catchment programmes were originally planned to run for one year with fortnightly water quality sampling.
- [13] During the first year of the monitoring programme, ORC was approached by one landholder in the Upper Taieri requesting additional sampling on the Sow Burn. This landholder offered to take the samples in conjunction with the ORC programme. This trial proved successful and paved the way for full community sampling in the second year of the programme.

Community led programme

- [14] As a result of the Sow Burn experience, ORC, through community meetings, gauged interest in catchment groups taking ownership of water quality sampling. Funding continued into 2018/19 to allow the community led sampling programme to be implemented in all catchments other than Waiareka Creek and Awamoko. In the Waiareka Creek and Awamoko these catchments the ORC/NOIC monitoring programme continued with NOSLaM oversight.

- [15] The idea of the community led programme was for landholders to take ownership of problems and to coordinate their own testing as a group. The programme was designed to be flexible in terms of sites sampled and parameters monitored.
- [16] To ensure robustness of results, all community samplers were trained (in the field) by ORC. They were supplied with a document detailing: monitoring site names; locations (grid references and photographs); S15 and Schedule 16 (S16) limits; laboratory expectations; tips for taking samples, and courier drop off details and cut off times (see example in Appendix 2).
- [17] Catchment communities set up sampling programmes in various formats which ranged from a landholder sampling in the immediate vicinity of their land (Totara/Linn Burn and Riverslea) to a nominated person sampling throughout a catchment (Gimmer Burn, Ewe Burn and Bannock Burn/Shepherds Creek) or nominated person sampling more than one catchment (Pig Burn/Eden Creek and Sow Burn/Shepherds Creek).
- [18] In Thomsons Creek, the community set up their own monitoring programme, and requested ORC also continue monitoring to provide community support.
- [19] The joint water quality monitoring programme continued in the Waiareka and Awamoko and ORC set up a new catchment monitoring programme in the Kye Burn.

Site Selection

- [20] The monitoring sites were selected in consultation with the community (Table 1 and Appendix A). The second year of sampling allowed communities the flexibility to modify and enhance ORC’s original monitoring programme; to allow sites to be retired or added, depending on the nature of the results returned and the condition of the water bodies sampled. It allowed hot spots to be targeted (a focus was the water quality of water races supplying irrigation water to properties, along with races that diverted water back in to rivers).

Table 1: Monitoring Programme sites 2017/18 & 2018/19

Catchment	SOE	Active*	Retired	Not sampled**	Total sites
Upper Taieri	5	43	12	4	64
Bannock Burn/Shepherds Creek	1	31	4	0	36
Thomsons Creek	1	22	5	0	28
Kye Burn	1	16	0	0	17
Waiareka	1	13	0	0	14
Awamoko	1	2	1	0	4
TOTAL					163

**A mix of ORC & community sites **Not sampled as no water or stagnant through the year but initially identified as an area of interest ^Catchment added in year two.*

- [21] Sites were tested for S15 parameters (nitrate-nitrite nitrogen, dissolved reactive phosphorus, ammoniacal N, *E. coli* and turbidity). All the catchments monitored were in

the RPW Schedule 15 receiving water group 2 and results were compared against the limits and targets in Table 2 below¹.

Table 2. Receiving Water Group 2 numerical limits for achieving good water quality.

NNN	DRP	Ammoniacal N	<i>E. coli</i>	Turbidity
0.075 mg/L	0.01 mg/L	0.1 mg/L	260 cfu/100mL	5 NTU

- [22] Where drains or direct runoff from land were tested as part of the programme (i.e. irrigation run-off), the results were compared against the limits and targets specified in S16 (discharge threshold area 2) in Table 3 below.

Table 3. Discharge Threshold Area 2, permitted activity discharge thresholds

NNN	DRP	Ammoniacal N	<i>E. coli</i>
1.0 mg/L	0.035 mg/L	0.2 mg/L	550 cfu/100mL

- [23] ORC recommended landholders only sample *E. coli* to allow a short turn-around time at the laboratory, which in turn meant landholders could remember land use practice at the time of sampling and investigate any results returned with high *E. coli* concentrations. ORC also facilitated faecal source tracking to clarify the source of elevated *E. coli* at sites in Shepherds Creek (Bannock Burn) and Thomsons Creek. The primary objective was to see if wildfowl, septic tanks or farm animals were responsible for elevated *E. coli* concentrations.
- [24] Community led discussion resulted in a continuous turbidity meter being installed in Eden Creek (Upper Taieri) in November 2018. The site is telemetered, and the data is available on the ORC website, allowing the community to link elevated turbidity with rainfall and/or irrigation practice (elevated turbidity will generally mean elevated *E. coli*/nutrients). This is particularly important in the Upper Taieri, where an ORC contact recreation site (Taieri at Waipiata) is located downstream of the irrigated landscape.

¹https://www.orc.govt.nz/media/5795/regional-plan_-water-for-otago-updated-to-1-july-2018-schedules.pdf

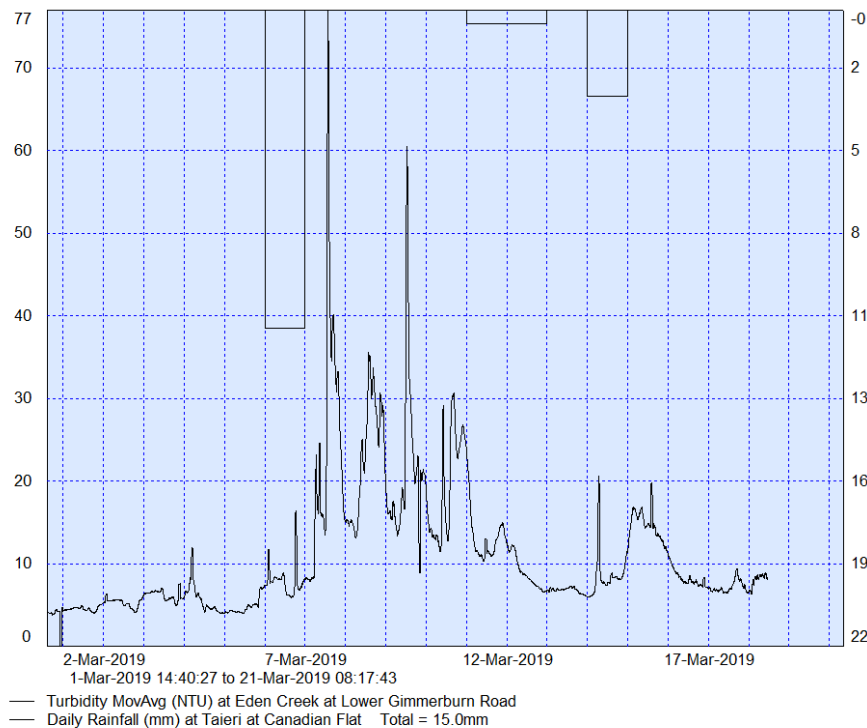


Figure 3 Continuous turbidity, Eden Creek and daily rainfall (Canadian Flat)

Community Engagement

- [25] Water testing results were reported back to the communities to enable them to make informed decisions on whether changes to land use practices were required. To do this effectively each catchment group had a nominated representative to liaise with ORC. The representative assisted ORC with putting context around results (i.e. irrigation rosters, localised rainfall, etc.).
- [26] Table 4 lists the number of community catchment meetings staff have held (or attended) over the last two years. The meetings have included education of the objectives of the monitoring programme, an analysis of results to date, an overview of the S15 and S16 targets and limits and planning to enable the community to lead sampling during the second year. Meetings in the Waiareka and Awamoko catchments have been facilitated by the NOSLaM. This group is farmer-led and provides practical resources and support to farmers.

Table 4. Community Meetings & Training Sessions 2017-2019

Catchment	Community meetings	Training / one on one sessions
Upper Taieri	3	8
Bannock Burn/Shepherds Creek	1	3
Thomsons Creek	2	1
Kye Burn	1	1
Waiareka/Awamoko	21	0
Total	28	12

- [27] There has been positive media coverage. For example, the Otago Daily Times (ODT) reporting on the Thomson Creek monitoring programme on 12 November 2017².



ORC environmental officer Melanie Heather (left), ORC environmental resource scientist Rachel Ozanne, Limerick Downs station owner Hamish Stratford (second from right) and Matakau Station owner Andrew Paterson attended the meeting on water quality last week. PHOTO: REBECCA NADGE

Figure 2 ODT Article Photograph

DISCUSSION

- [28] The first year of ORC led monitoring was a success building trust and community interest in the programme. Catchment leaders distributed water quality results to interested parties in the catchments. To enable better engagement ORC stepped back from sampling and facilitated landholders to take ownership of the monitoring programme. The community sampling programmes were flexible (sites and analytes) and the community became more familiar with the S15 and S16 targets and limits, as well as identifying and addressing problem areas in their catchments.
- [29] The catchments monitored were irrigated, and the community became increasingly aware of how irrigation can affect water quality (particularly in the Eden Creek and Wedder Burn/Gimmer Burn catchments). This resulted in ORC installing an in-situ continuous turbidimeter to assist the community to differentiate between elevated turbidity relating to rainfall, and elevated turbidity relating to irrigation.
- [30] It was also noted that water quality in races was degraded at the beginning of the season, when it is likely that water flushing the irrigation races (after a winter of animals accessing the dry races) caused a significant deterioration in water quality.
- [31] To improve the programme for the 2019/21 years, the selection of catchments requires early finalisation to enable meetings to be held in the catchments prior to the start of sampling. At the initial meeting, timelines should be made clear to ensure that the community knows the cut-off date for ORC involvement in any catchment programme and the expectation of community led monitoring in the second year.
- [32] 'Show the science, show the problem' is an effective way of communicating water quality problems and there are other tools to use to engage the community as well as water quality monitoring. These could include using the NIWA macroinvertebrate

² <https://www.odt.co.nz/regions/central-otago/joint-efforts-water-quality>

SHMAK kit or the Irish Small Streams Risk Score (SSRS) rapid macroinvertebrate assessment. In addition, ORC's rural liaison specialists could facilitate community river assessments and stream walks to heighten community engagement.

- [33] It has proven valuable to the community to have the continuous turbidity meter in Eden Creek. An expansion of continuous monitoring at key locations (turbidity/dissolved oxygen/temperature) will increase community understanding of water quality.
- [34] During the first year, when ORC sampled water quality at specified sites, the results were made available on-line for the five catchments (Figure 3). The system was not able to incorporate community results (frequent change of sites, change of parameters) and these results have not been put on line. On line reporting would have been a better way of communicating monitoring programme results to stakeholders and the community involved, rather than laboratory PDF files.

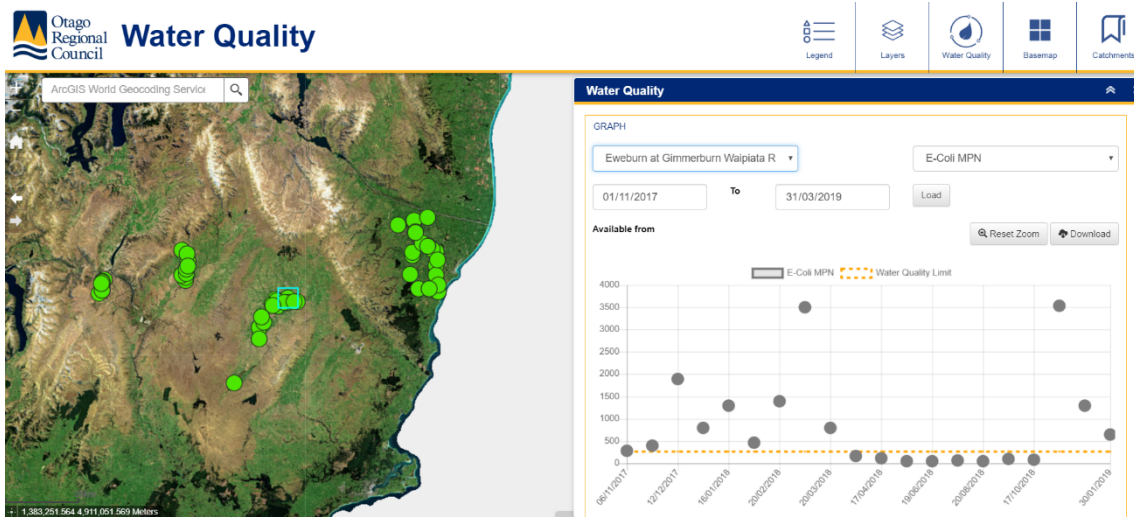


Figure 3 ORC community water quality website

- [35] The catchment programme has been successful in setting up eight community led sampling programmes, six of these in the Upper Taieri, one in Thomsons Creek and one in the Bannock Burn/Shepherds Creek catchment. ORC has also supported NOSLaM in the Waiareka and Awamoko catchments. Three 'pods' (catchment groups) have been formed in this area (Awamoko, Waiareka and Friston Stream) regularly meeting to discuss water quality issues and methods to improve it. One initiative, stemming from high dissolved reactive phosphorus concentrations found in the Waiareka catchment, has been for NOSLaM to engage the University of Otago to investigate the source of high phosphorus.
- [36] ORC should be proud of the engagement this project has fostered and commend those communities that have taken part and thus taken ownership of water quality in their catchment.

CONSIDERATIONS

Policy Considerations

- [37] The Good Water in Otago project will focus on five new catchments in July 2019. It is proposed to focus on the Upper Clutha lakes catchments covering Wanaka, Hawea and

Wakatipu. This programme will focus on supporting established catchment groups (Upper Clutha Lakes Trust, Wanaka Water Project etc) with focused water quality monitoring as well as providing water quality information for both the Urban Water Quality strategy and the hydrodynamic model for Lake Wanaka.

Financial Considerations

[38] The budget for the monitoring programmes is in the Science Management Group. As at 20 March 2019, the Science Management Group YTD budget was 28% underspent.

ATTACHMENTS

Nil