

**IN THE ENVIRONMENT COURT OF NEW ZEALAND  
CHRISTCHURCH REGISTRY**

**I TE KŌTI TAIAO O AOTEAROA  
ŌTAUTAHI ROHE**

**ENV-2020-CHC-128**

**UNDER** the Resource Management Act 1991 (RMA)  
**IN THE MATTER** of the Omnibus Plan Change - Plan Change 8, being part  
of a proposal of national significance directed by the  
Minister for the Environment to be referred to the  
Environment Court under section 142(2)(b) of the RMA

**AND**

**IN THE MATTER** of an application under section 149T of the RMA

**OTAGO REGIONAL COUNCIL**

**Applicant**

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**STATEMENT OF EVIDENCE OF NICOLA MCGROUTHER ON BEHALF OF  
THE OTAGO REGIONAL COUNCIL  
17 September 2021**

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## Introduction

- 1 My full name is Nicola Olwyn McGrouther
- 2 I have a Masters Degree in Regional and Resource Planning, an Honours Degree in Geography and Economics and an Advanced Sustainable Nutrient Management Certificate (Overseer).
- 3 I am the owner and Director of Creekside Consulting. I have held that position for five and half years, prior to which I was:
  - (a) Manager of Community Liaison at the Otago Regional Council;
  - (b) Senior Community Liaison Officer and Land Resource Officer at the Otago Regional Council; and
  - (c) Land Management Officer at the Taranaki Regional Council.
- 4 In total I have 24 years' experience as a rural liaison environmental management specialist for farming systems in New Zealand.
- 5 I participated in the mediation sessions on proposed Plan Change 8 to the Regional Plan: Water (**PC8**), as a representative for New Zealand Deer Farmers Association and Beef + Lamb New Zealand, in relation to Part F (Sediment Traps) of PC8.
- 6 Given that matters agreed at mediation, I have been asked by the Otago Regional Council (**ORC** or **Council**) to prepare evidence for these proceedings in relation to sediment traps.
- 7 I have prepared this statement of evidence in my capacity as an expert and acknowledge that I have read and understand the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note dated 1 December 2014. I have complied with it when preparing my statement of evidence, and I agree to comply with it when I give any oral evidence. Other than where I state that I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

## Scope of evidence

- 8 I have been asked by the Council to provide technical evidence in relation to sediment traps.

- 9 My evidence addresses:
- (a) Why sediment traps are used on-farm;
  - (b) Use of sediment traps within Otago (how prevalent is the practice);
  - (c) The different types of sediment traps;
  - (d) Rationale for only providing for sediment traps outside of flowing water; and
  - (e) Exclusion of livestock and the reasons why it is not always appropriate to exclude livestock.
- 10 In preparing my evidence I have reviewed the following documents and evidence:
- (a) The notified version of PC8;
  - (b) PC8 (version as agreed at mediation);
  - (c) National Policy Statement for Freshwater Management 2020 (**NPS-FM 2020**);
  - (d) National Environmental Standards for Freshwater 2020 (**NES-F 2020**);
  - (e) Resource Management (Stock Exclusion) Regulations 2020 (**Stock exclusion regulations**); and
  - (f) Detention Bund: A Guideline for on-farm, pasture based, storm water run-off treatment, John H Paterson, Dyland T Clarke, Brian Levine (2019).

### **Executive Summary**

- 11 Sediment traps are used on farms as a mitigation measure to capture sediment and limit the amount of sediment run off from paddocks and tracks that would otherwise enter streams and other waterways in rain events.
- 12 Sediment traps are common on farms across Otago, traditionally being ponds in permanent and intermittently flowing waterways, but increasingly being positioned in critical source areas and swales to reduce sediment runoff before it gets to permanent waterways.

- 13 Sediment trap design in intermittently flowing waterways is diverse, examples include ponds, detention bunds across the stormflow pathway in a paddock that may temporarily hold water for a few days, and small tractor bucket scrapings to slow track runoff in rainfall events.
- 14 Sediment traps are very effective positioned outside flowing water. They protect the instream values of the permanently flowing waterways by trapping sediment before it gets to those waterways. These type of sediment traps also do not cause an environmental impact when cleaned out.
- 15 Fencing of sediment traps in intermittently flowing or ephemeral waterways is often not appropriate or needed. In extensive hill country with low stocking rates, stock access to sediment traps is unlikely to significantly impact on waterways and the cost of fencing is prohibitive.
- 16 In intensively grazed situations where sediment traps are located as bunds across pastoral paddocks or gullies in stormwater pathways, excluding stock does not provide any environmental benefit, and provides a strong disincentive to farmers from putting them in. Existing sediment traps in running waterways are already well protected through the stock exclusion protections through the Stock exclusion regulations.

#### **Sediment trap use on-farm**

- 17 Sediment traps are used on farms as useful mitigation measure to capture sediment and limit the amount of sediment off paddocks and tracks that would otherwise enter streams and other waterways in rain events.
- 18 Minimising soil loss is important to farmers for a number of reasons. Once soil is lost from a paddock it cannot be replaced and over time significant soil loss can negatively impact on production. Soil swept into waterways can also negatively impact on waterway ecosystem health, smothering cobbles, reducing instream fish and invertebrate habitat and clogging up waterways and culverts. This is not only a cost to the farmer to clean out creeks (and the associated consent costs), but increasingly farmers are proud to maintain healthy waterways in their waterways and catchments.

### **Sediment trap use within Otago**

- 19 Sediment traps are used across Otago farms and have been for many years. There is no specific record of the number or type of sediment traps in use. However, in the farms I have visited over my 21 years working in Otago, I have usually seen at least one sediment trap on most farms. These traditionally have been open ponds in permanent or intermittently flowing waterways.
- 20 Increasingly farmers are recognising the value of installing sediment traps in intermittently flowing waterways, critical source areas, gullies or swales to capture sediment loss before it reaches permanent waterways. Farmers are also installing cut-outs from farm roads and tracks into small bucket sized sediment traps to temporarily hold stormwater before it spills out into paddocks or heads along intermittently flowing pathways to more permanent waterways.
- 21 There is currently a national SLMACC (Sustainable Land Management and Climate Change Freshwater Mitigation Programme) funded project, 2020 to 2024, which is looking to trial detention bunds (a type of sediment trap) in Otago. These are usually placed in intensively farmed, high producing pasture paddocks and will hold water for up to 3 days to allow sediment to settle out into the paddock.

### **Types of sediment traps**

- 22 Sediment traps range in size and shape. They may be several hectares in size (lakes or ponds), or as small as a scoop of a tractor bucket.
- 23 Sediment traps can be situated in gullies and may have water in them, some, or all the time, or they can also be situated in the critical source area in a grazed paddock as a detention bund. These bunds hold stormwater flows for up to 3 days until the storm event passes and the sediment trap returns to pasture.
- 24 There may be a series of small sediment traps to capture runoff as it moves down through a swale, or one larger sediment trap towards the bottom of a slope.
- 25 The decision on the type and size of swale will depend on the amount of sediment runoff expected, whether the sediment trap will form other

functions (stock water, duck shooting, biodiversity enhancement) and the machinery the farmer has access to.

- 26 The range of sediment traps is best described in the photos that are attached to this evidence as **Appendix A**.

#### **Rationale for sediment traps outside of flowing water**

- 27 Sediment traps are one of the effective tools for mitigation sediment runoff from paddocks.
- 28 Placing sediment traps in intermittently flowing waterways such as gullies and critical source areas on paddocks to intercept stormwater flows before water gets into permanently flowing waterways, is a practical way to protect the instream values of those permanent waterways.
- 29 At the same time, gullies and critical source areas will often only flow in rainfall or stormwater events and therefore not have any instream values themselves, making them an environmentally safer location to capture sediment.
- 30 These sediment traps can be easily cleaned out without environmental damage to permanently flowing waterways.
- 31 Detention bunds (a form of sediment trap) situated in intermittently flowing pathways in pasture paddocks are proving to be very effective at reducing sediment losses to waterways. In Lake Rotorua catchment, research shows that detention dams in paddocks designed to hold water for no more than 3 days, have reduced sediment runoff by up to 51-59% for suspended sediments and 47-68% for Phosphorus.<sup>1</sup>
- 32 The proposed Rule 13.5.1.10 has a condition requiring that works do not occur in flowing water. There was a similar condition in the notified version of PC8, but the wording was clarified in mediation to ensure that sediment and nutrients from the sediment trap do not get carried by temporary water flow into nearby waterways. This is a practical solution to minimise any environmental impact.

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<sup>1</sup> Detention Bund: A Guideline for on-farm, pasture based, storm water run-off treatment, John H Paterson, Dyland T Clarke, Brian Levine (2019).

**Exclusion of livestock**

- 23 The notified version of Rule 13.5.1.10 of PC8 included a condition that the sediment trap cannot be access by livestock. As a result of mediation, the parties agreed that this condition should be deleted. The reasons for this are explained as follows.
- 33 Excluding livestock from sediment traps in intermittently flowing waterways is often not appropriate or needed.
- 24 In extensive hill country with low stocking rates, stock access to sediment traps is unlikely to significantly impact on waterways and the cost of fencing is prohibitive.
- 25 In intensively grazed situations where sediment traps are located as bunds across pastoral paddocks or gullies in stormwater pathways in intermittent waterways, excluding stock does not provide any environmental benefit as there are no instream habitat or ecological values to protect. In many instances these sediment traps will be simply pastoral grass species with some depression in the ground which will occasionally fill up during and following rain events.
- 34 Requiring stock exclusion from sediment traps in intermittently flowing waterways will not provide any environmental benefit and have the perverse outcome of creating a strong disincentive to farmers from putting them in.
- 35 It is particularly important as detention bunds become more common, that farmers are actively encouraged to install these. Such sediment traps have potential to become a key tool in mitigating sediment loss across catchments. Given that sediment loss to permanent waterways in Otago is a key issue, it will be important to support their construction. This can be achieved by not requiring stock be excluded from sediment traps in intermittently flowing waterways in the permitted activity rule.
- 36 It is also important to note for context that:
- (a) Rule 13.5.1.10 is only permitting the construction of sediment traps in the bed of any ephemeral or intermittently flowing river.

- (b) Existing sediment traps in permanently flowing waterways are already well protected through the Stock exclusion regulations, which will also apply to some intermittently flowing waterways too
- (c) It is useful to note that farmers will often voluntarily fence off sediment traps that do have water permanently in them in intermittently flowing waterways as sediment traps can be a stock hazard around intensively grazed stock.
- (d) When fencing of sediment traps is undertaken some stock access is required to control weed and grass growth. Deer fencing too close to the sediment trap makes it difficult excavate and maintain the traps, so any fencing needs to be set back to allow access for machinery, which in turn requires light stock access for weed control.

### **Conclusion**

- 37 The permitted activity Rule 13.5.1.10, agreed to at mediation, provides a good incentive for farmers to install sediment traps in intermittently flowing waterways. This rule is subject to a number of conditions to ensure the environmental effects of sediments trap installation and maintenance are appropriately avoided, remedied and mitigated.



**Nicola Olwyn McGrouther**

**17 September 2021**



**Appendix A - Sediment Trap Photos**

**Photo 1** - Sediment traps are best situated in the critical source area where water naturally flows. They can range in size from large ponds to small scoops out of the ground.



**Photo 2** - A sediment trap at the start of a critical source area/intermittent waterway.





**Photo 3** - A permanently filled pond in a intermittent waterway running down a dry gully. This pond permanently fenced as the farmer has decided that makes more sense for stock management purposes.



**Photo 4** - A sediment trap that occasionally fills with water. Fenced off from large mobs but some grazing will occasionally occur to control grass growth and weeds.





**Photo 5** - A permanently filled pond in a intermittent waterway. This pond is fenced to exclude intensive mobs but will be lightly grazed for weed control.



**Photo 6** - A hill country sediment trap in a intermittent waterway



**Photo 7** - Sediment trap: Detention bund in intermittent waterway pathway – will run in rainfall events.

Normally grazed with dairy cattle, this detention bund sediment trap normally fills with water 7-8 times a year. At these times the cattle are removed from the paddock.

Photo 8 and Photo 9 below show the detention bund capturing water and being grazed when dry.



**Photo 8** – Shows the detention bund in Photo 7 capturing water.





**Photo 9** – Shows the detention bund in Photo 7 being grazed when dry.



**Photo 10** – A Detainment Bund starting to fill during a run-off event. Lake Rotorua catchment.