

CASE STUDY



Russell Drummond Aparima River Catchment

The Drummond property is an extensive sheep and beef operation located at Avondale within the Upper Aparima River Catchment. The topography of the property is rolling to steep with some areas of river flat.

On advice from Environment Southland, Russell has constructed four sediment traps on his property, each focusing on separate smaller catchment areas.

The first sediment trap is located in an area where cultivation and winter grazing have occurred, in order to capture sediment resulting from these activities. The second site, containing a series of 2 traps, is located within a low use and highly modified existing critical source area to capture material originating from some steeper hill country areas. The final 3rd site is located next to a farm track to capture material flowing off the track during high flow rainfall events.

SITE 1

This sediment trap has been constructed by creating a bund in an existing gully system. The catchment area above this site consists of developed pasture with periodic winter grazing. This sediment trap aims to slow overland flow to allow sediment and phosphorus to drop from suspension during rainfall events.



Image 1: A bund has been placed to slow water flow allowing sediment to settle. The outlet is located to the side of the structure to ensure flow is disrupted and minimise the risk of blow out.

SITE TWO

Site two is located in a vegetated critical source area. A series of two traps of about 10 x 1 x 1 meters have been created. Scrub and pasture species surround the area assisting with the filtration/capture of sediment during rainfall.

Table 1: Key calculations of Site 2 sediment trap. Note in this illustrative example the fenced off area is included as a wetland treatment area within the catchment and the actual physical sediment traps are a small treatment that complement the vegetated areas. Reductions are based on the NIWA constructed wetland guidelines which rely on treatment relative to catchment size.

<https://niwa.co.nz/freshwater-and-estuaries/management-tools/restoration-tools/constructed-wetlandguidelines>

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|---------------------------------------|--------------------------------------|
| Catchment area | 9ha (19,000 m ²) |
| Fenced off area | 0.672ha (6720 m ²) |
| Sediment traps size | (x4) 10 x 1 x 1m (40m ²) |
| Effective wetland area % of catchment | 3.5% (6720/19000) |
| % of N reduced | 35% |
| % of P stored | 45% |
| % of sediment collected | 80 % |



Image 2: The second sediment trap area in a series of two. Water movement through this sediment trap is slow. Discharge from the outflow flows over a heavily vegetated area before reaching an adjacent stream.

SITE THREE

Site three is located next to an existing access track to intercept sediment moving down the access track into a waterway. The trap has been constructed to a size approximately 10 meters long, x 2 meters wide and x 1 meter deep.

In time the sediment trap will be permanently fenced to exclude stock and planted with native grasses to aid in the capture of further sediment and nutrients from both the sediment trap and a critical source area located adjacent to the sediment trap.

The catchment area of this portion of track is about 0.252ha (2520m² or a 50m*50m square). Environment Southland have calculated that over a year, it is likely to be transporting over 2.2 million liters of water containing track sediments that will contain bacteria and nutrients. (2520m² * 900mm annual rainfall)

Due to the catchment area being a track with little to no vegetation cover this trap will require regular emptying to remain effective.



Image 3: The recently constructed sediment trap located next to a main access track. Track runoff flows into the top of the trap allowing the velocity to slow and sediment to drop out before flowing out via a tile drain. This image was taken after recent rain with evidence of finer sediments still suspended in the water.

COSTS

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| <p>Number of digger hours to construct using 13 ton digger</p> | <p>It took a total of 5.5 digger hours to construct all four sediment traps.</p> <p>Breakdown for each site is as follows:</p> <ul style="list-style-type: none"> » Site 1: Sediment trap in existing gully system – 3.5 hours. » Site 2: 2x sediment traps next to cattle yards – 1 hour » Site 3: Sediment trap next to track – 1 hour |
| <p>Any ongoing costs</p> | <p>The others will just be cleaned when required which will largely depend in the farming activities occurring within their catchments.</p> |