Sediment trap field day

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Site 1: Constructed bund system

Location:

- Vegetated CSA/ gully system
- Flat part of the CSA
- Dries up in summer (i.e., not a waterway – a resource consent would be needed otherwise)
- Near base of hills (*Where natural or engineered flow pathways can be intercepted),*
- Near a fenced area, which was already wet (low productivity value),
- Easily accessible by a digger

Figure 1 – location of sediment trap (red arrows indicate direction of slope)

The catchment was *large* as defined by NIWA – 87 ha

Wetlands need to be between 1-5% of their contributing catchment (i.e., 100-500 m2 of wetland/ha) to significantly reduce catchment loads. <u>However, the size can be reduced by:</u>

- The amount of vegetation in the flow path
    - I.e., the CSA/gully was well vegetated so slows the flow of water naturally.
- Having multiple wetlands/ sediment ponds along the gully.
- *For further reductions,* fencing off the gully would allow for the vegetation to grow faster/ better due to reduced stock camping.

Construction:

Table 1: Sedimentation pond sizing.

Regional rainstorm intensity (Region)	Sedimentation pond size (m^2 per ha of catchment)
Low intensity (Otago, Southland, Manawatu-Wanganui, Canterbury, Wellington)	40
Medium intensity (Waikato, Marlborough, Taranaki, Auckland, Hawkes Bay)	60
High Intensity (Nelson, Northland, Tasman, Bay of Plenty, Gisborne, West Coast)	80-100

General principles for construction of a sedimentation pond are based on the coarse sediment trap guidelines (Hudson, 2002).

The wetland/ sediment trap was:

- Longer than it was wide (rectangle shape is recommended, or shaped into curved to mimic nature)
    - Need to take into account the reach of the digger (typically around 6m)
- Compact and flatten the bottom of the pond
    - Reduce chance of pond 'getting wiped away in rain events'
    - No 'preferential flow paths' of water, i.e., during high rainfall events, the water uses the outlet, rather than running over the constructed portion and impacting the integrity of the structure.
- Battered sides i.e., the sides are angled to reduce the impact of high-water flows eroding the bank
- Don't make the pond too deep, as you want the water to 'swirl' before going out the outlet
- Outlet should be to the side of the pond
    - If the outlet was in the middle of the constructed portion, during high rainfall events, the water would erode the outlet on both sides, reducing the structural integrity of the pond.
    - Pond should be 1.5 m below the outlet level

Site 2: Sub-surface drain – constructed wetland

Reason for sediment pond:

- Tile drain from catchment, running into creek with very limited vegetation to filter sediment.
- Lane was losing a lot of sediment

Location:

- Within the paddock, as this made more practical sense
- In flow path of CSA through paddock

Construction:

The lane had recently been re-battered, meaning there was limited vegetation to capture sediment	
	
Small catchment, so required small pond (10 m^2) However, Russell chose to make the pond larger (20 m^2)	
Clearly see the sediment running into the pond	

6-inch nova flow pipe carries water from the constructed pond, under the lane and into the creek. The water will only be carried, once the water level reaches the pipe, allowing the sediment to settle out.	

Plantings:

8.4 Plant selection: Key species for wet margins and embankments

These species are suitable for planting in wet margins and on dry embankment slopes to reduce bank erosion and weed ingression, and enhance plant and habitat diversity. For identification of these species, see 'Wetland Plants in New Zealand' (Johnson and Brooke, 1989).

Table 3: Key native plant species for wet margins and embankments.

Plant species	Common name	Natural range	Description	Planting position	Comments	Photo
Bolboschoenus fluviatillis and *B. medianus*	purua grass, kukuraho, ririwaka, river bulrush, marsh clubrush	Northland to Westland and Canterbury	1–1.8 m tall. Leafy sedges with stems, (triangular in cross-section), emerging from woody, bulbous tubers.	Shallow water to 0.3 m depth.	Common in coastal areas. Fast-growing in spring and early summer, dies back over winter. Provides seasonal diversity.	
Carex secta	purei, makura	Throughout New Zealand	1–1.5 m tall. Drooping harsh tussocks forming trunk-like base when mature. Green year-round.	Moist lower embankments and shallow water to 0.2 m depth.	Establish initially in moist conditions or shallow water, can grow in deeper water if gradually acclimatised. Classic New Zealand plant of wetland and stream margins.	
Other *Carex* spp.; especially *C. germinata, C. lessoniana* and *C. virgata*	rautahi, carex	Throughout New Zealand	0.5–1.5 m tall. Harsh leafy sedges. Green year-round.	Moist lower embankments and shallow water to 0.2 m depth.	Taller-growing species mentioned are likely to be the most robust and able to compete with weeds. Valuable for wildlife.	

Plant species	Common name	Natural range	Description	Planting position	Comments	Photo
Austroderia richardii, C. fulvida, C. toetoe	toetoe (New Zealand native species only, not to be confused with introduced pampas grasses)	Different species common in different regions	1.5–3 m tall. Coarse green tussocks, with tall feathery flower heads borne on cylindrical stems.	Upper & lower embankments to water edge and surrounds.	Useful, hardy plant suitable for bank stabilisation and screening. Ensure invasive introduced pampas species are avoided.	
Cordyline australis	ti kouka, cabbage tree	Throughout New Zealand	Tall-growing soft-stemmed tree bearing tufts of fibrous leaves.	Upper embankments and surrounding areas.	Classic New Zealand tree common in wet soils.	
Cyperus ustulatus	toetoe upokotangata, giant umbrella sedge	Northland to Canterbury and Fjordland; mainly coastal and lowland	0.5–1 m tall. Harsh pale-green leaves in clumps, with emergent seed-bearing leafy umbells.	Moist lower embankments and shallow water to 0.2 m depth.	Tolerates dry periods. Suitable for wetland margins and embankments, and shallow water.	
Phormium tenax	harakeke, New Zealand flax	Throughout New Zealand	1–3 m tall. Robust clumps of tough robust leaves. Tall dark brown to black flower heads.	Upper & lower embankments to water edge and surrounds.	Does not generally establish well in continuously flooded conditions. An important traditional plant for Māori and important habitat for wildlife.	

Figure 2 – NIWA wetland planting sguidelines