Waterway Technote

Drains

Contents

Benefits of good drain practice

Drains include natural or artificial channels to lower the water table and/or reduce surface flood risk. They often make up the majority of lowland waterways, acting as highways for nutrients, sediment and bacteria lost on-farm.

Good management of drains benefit your farm by:

- Optimising soil moisture
- Improving pasture production
- Improving stock health and production by reducing waterborne illness and losses
- Enhancing water quality by reducing nutrient, sediment and bacterial concentrations
- Improving habitat for fish and insects by cooling water, enhancing flow and increased oxygenation.

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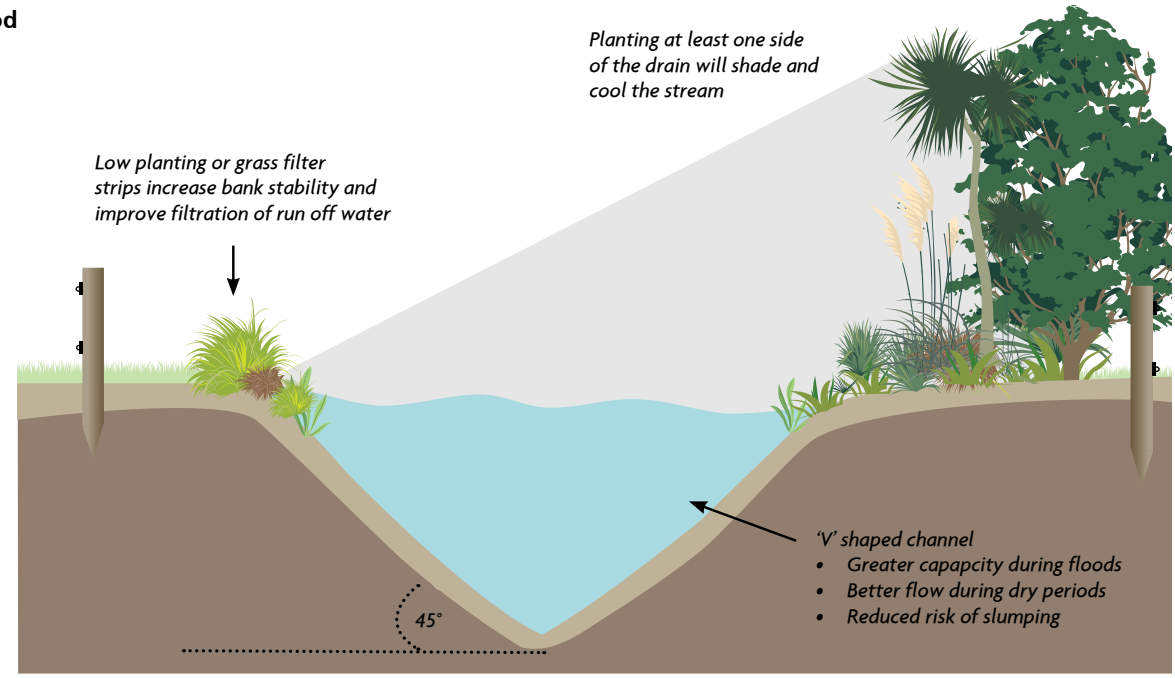
DairyNZ

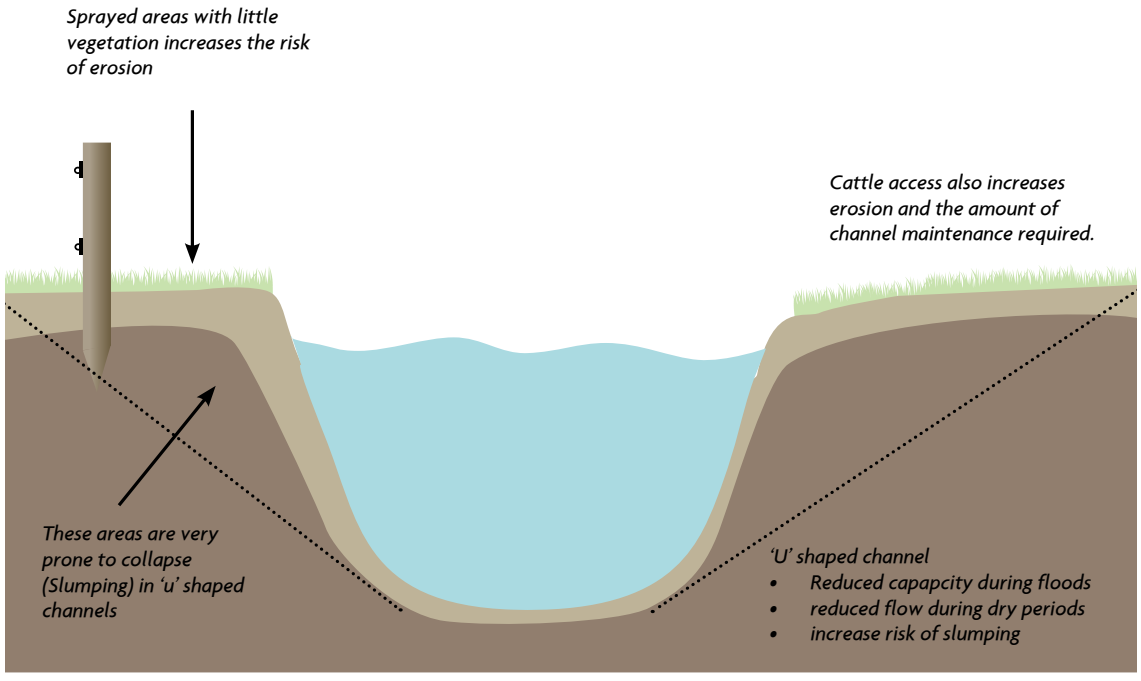
Are your drains healthy?

- ☐ Fenced
- ☐ Grassed or planted along banks
- ☐ Gently sloping (1:1 or 45°)
- ☐ No ponding or pugging
- ☐ Outlets run well after rain
- ☐ Have little build-up of sediment

Good



Not so good



Example of a poorly managed drain

Drain bank erosion caused by stock.

Source: Environment Waikato Best Practice Guidelines for Land Drainage

Example of a well-managed drain

A stable drain bank fenced from stock with a grassy margin.

Source: Environment Waikato Best Practice Guidelines for Land Drainage

The Sustainable Dairying Water Accord

The *Sustainable Dairying: Water Accord* affects your drains. All drains should be included in your farm riparian plan, whether natural, straightened-natural or artificial. Drains require fencing by May 31, 2017 – the only exceptions are drains less than a metre wide and a foot deep.

See the *Sustainable Dairying: Water Accord* at dairynz.co.nz/wateraccord.

Planning drain maintenance

Take the time to design your drain maintenance by reading through the rest of these topics.

- Contact your regional council to identify what conditions apply to farm drainage structures (culverts, weirs & bridges) and activities (clearing & spraying) in your region, or if you are in a land drainage area.
- With the exception of peatland, the goal is to lower the water table 30cm below the soil surface within 24 hours, or 50cm within 48 hours of rain halting (a one-year return period, 24 hour storm is the design event). Any more or less can reduce pasture health.

1. Peat soils are subject to stricter controls in your regional plan as they require a higher moisture content to prevent their loss to erosion or microbial action.
2. Optimal depths to the water table for pasture and forage crops range from 30-45cm on peat. (WRC, 2006)
3. Avoid deep or closely spaced drains. Do not dig through into underlying soil types when cleaning.
4. For more information read *For Peat's Sake* see waikatoregion.govt.nz.

Fencing and clearing

Excluding livestock helps protect banks from slumping and collapsing, while protecting pasture during floods and improving water quality.

- Permanently exclude livestock from any drains one metre or more wide and 30cm deep.
- Find out if you need consent.
- Ensure you have consent if required (call your regional council if in doubt).
- Walk drains with the digger operator beforehand to avoid clearing any shallow stony areas known as riffles – clearing these can require consent under the Conservation Act (1987).

- Clean diggers thoroughly to avoid spreading weeds.
- Use a weed rake or stream-cleaning bucket on diggers to minimise spoil and better protect banks from collapsing (also leave spoil near the drain so that fish can easily return to the water).
- Clear from upstream down – leave downstream drains undisturbed until last to help trap sediment released by the digger upstream.
- Clear sediment from a single bank – this limits damage to banks and enables planting on the northern bank to enhance water quality.
- Clean and break – aim to clear no more than a fifth of your drains per year, rotating between years.

Bank shaping (battering)

Avoid excavating drains in the shape of digger buckets – they can require more frequent clearing, encourage weed growth and offer less protection from flooding.

- Batter banks to a 1:1 slope (45°).
- Gentle slopes are easier to grass, offering more opportunity to strip sediment, nutrients and bacteria from runoff.
- Gentle slopes collapse less frequently, reducing the need to clear drains and improving drainage capacity.
- A V-shaped channel (as opposed to a U-shape) increases low-flow water speeds, suppressing weeds in summer.

Grass filters (pasture and native sedge)

Grass filters are cheap and effective at protecting banks and improving water quality

- Grass strips can filter up to 90 percent of suspended sediments, 28-80 percent of particulate phosphorus and 5-59 percent of dissolved phosphorus (if 3m or more wide). (WRC, 2006)
- By removing nutrients and sediment, grass strips improve water quality and suppress weed growth.
- Grasses, especially native sedges, improve bank stability through their roots and reduce the need to clear drains of slumped banks.

A stable drain bank fenced from stock with a grassy margin.

Source: Environment Waikato Best Practice Guidelines for Land Drainage

Planting drains

Maintaining digger access is crucial to drain management, but shading the channel in summer is also important to keep down aquatic weeds and cool the water for native wildlife.

- Where you can plant both sides of the drain. This will help stabilise the bank and shade the water.
- Planting up the northern bank ensures summer shade and access for clearing from the southern bank. (See *Waterway Technote: Planting*)

Planting shades water and helps prevent weed growth. Cleaning these is made easy for a long reach digger by only planting sedges (Carex spp).

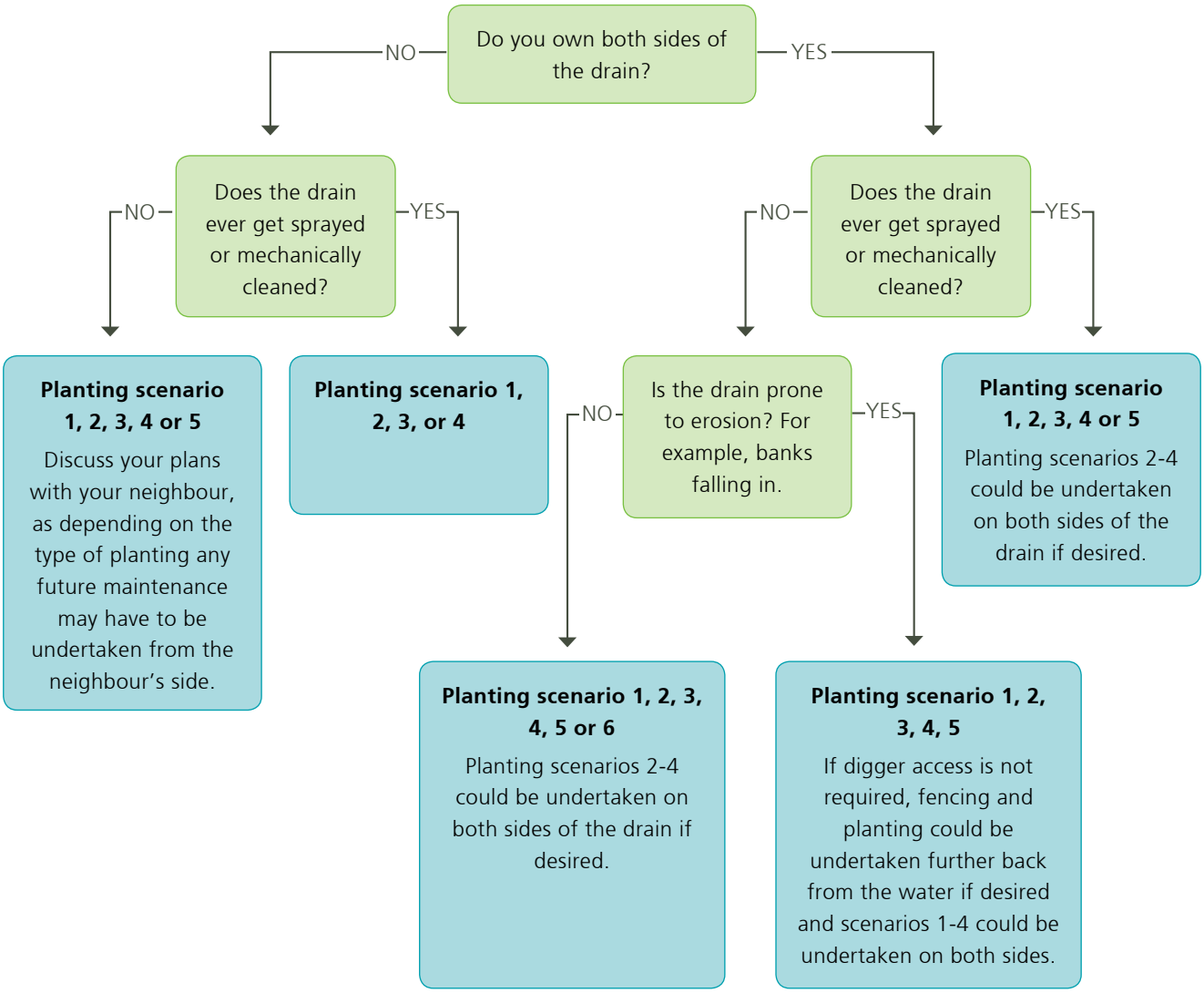
Source: Environment Canterbury: Living Streams Handbook – Part 1: Investigations and planning. Environment Canterbury. Christchurch

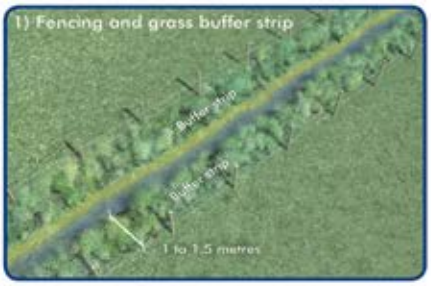
- Cutting out sunlight reduces weed growth and cools water. This helps drains remain well-oxygenated for fish and insects as well as able to carry more water.
- Use the decision tool to decide on whether to plant your drain.

When is it appropriate to plant drain banks

Most drains will benefit from planting, however check with your Regional Council if you are able to plant the drain if you are in a council maintaned drainage scheme area.

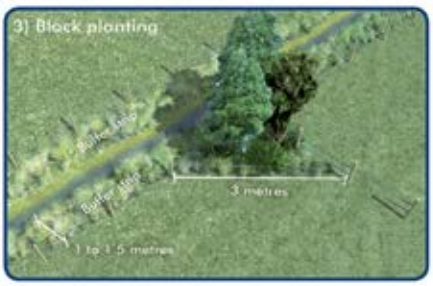
DO YOU WANT TO PLANT YOUR DRAIN?





- Fencing should be 1 to 1.5 metres back from the edge of the drain.

- Focus the planting on the northern side of drain to maximise shading.
- If the drain is mechanically cleared plants should be planted at least 15 metres apart to allow a digger space to swing and place drain cleanings. Extra digger manouvering may result in increased pasture damage.



- Focus the planting on the northern side of drain to maximise shading.
- Care will need to be taken if spraying herbicide.

- Focus the planting on the northern side of drain to maximise shading.
- Plant trees that won't grow too big and encroach on the drain – hebe, manuka and coprosma are suitable.
- Avoid large leaved plants such as flax as they may grow large and block the drain.
- In some cases stock may be able to reach over and graze plants – consider installing an electric outrigger on the fence.

- Boggy riparian areas are best left in ungrazed grass as they are excellent nutrient filters.
- Focus the planting on the northern side of the drain to maximise shading.
- Plant shrubs and large trees at least 3 metres back from the drain edge to avoid plants encroaching on the drain. Grasses are acceptable within 3 metres.
- Care will need to be taken when spraying herbicide.

- Boggy riparian areas are best left in ungrazed grass as they are excellent nutrient filters.
- This planting regime will restrict access for maintenance.
- Plant shrubs and large trees at least 3 metres back from the drain edge to avoid plants encroaching on the drain, reducing the capacity and dropping excess debries. Grasses are acceptable within 3 metres.

Spraying

A weed choked drain.

Source: A guide to managing your drains: Selwyn-Waihora

Bank erosion resulting from spraying the drain edge.

Source: Environment Waikato Best Practice Guidelines for Land Drainage

Drains are like any other waterway, they require ongoing weed maintenance.

- Always inform neighbours and check if resource consent is needed (call your regional council).
- Check your calendar – only spray drains from October to January, any later or earlier risks interrupting native fish breeding and migration.
- Only use glyphosate-based herbicides over water and avoid spraying within a foot of the bank edges.
- Spot-spray banks – never blanket spray for weeds, which can kill grass filter strips and/or any plantings.
- Follow manufacturer's guidelines for correct concentration and application (i.e avoid high winds, wet weather or excessive application rates).
- Willows (grey, crack) often become problematic if not regularly cut-back. Treatment varies by type and also distance infested so talk to your regional council about suitable options for foliar, trunk or stump poisoning. (See *Waterway Technote: Pests*)

If you need to clear weeds, spray only the centre of the drain.

Source: Environment Waikato Best Practice Guidelines for Land Drainage

Land drainage areas

Regional councils have responsibilities under the Resource Management Act (1991) to manage the effects and use of watercourses or bodies, and of drainage and stormwater runoff. Territorial or district authorities also have responsibilities to manage stormwater under the Local Government Act (2002). Any artificial, natural or straightened natural drains in drainage schemes are therefore subject to strict conditions of consent for clearance, fencing and planting (call your regional council and district authority if unaware whether you farm in a drainage area or of conditions).

Where to go for more information

DairyNZ's sustainability team member (0800 4 DairyNZ or 0800 4 324 7969) can answer your questions on drain maintenance, as can your regional council land or catchment management officer. Your milk supply company will be able to answer any questions on farm obligations to The Sustainable Dairying Water Accord.