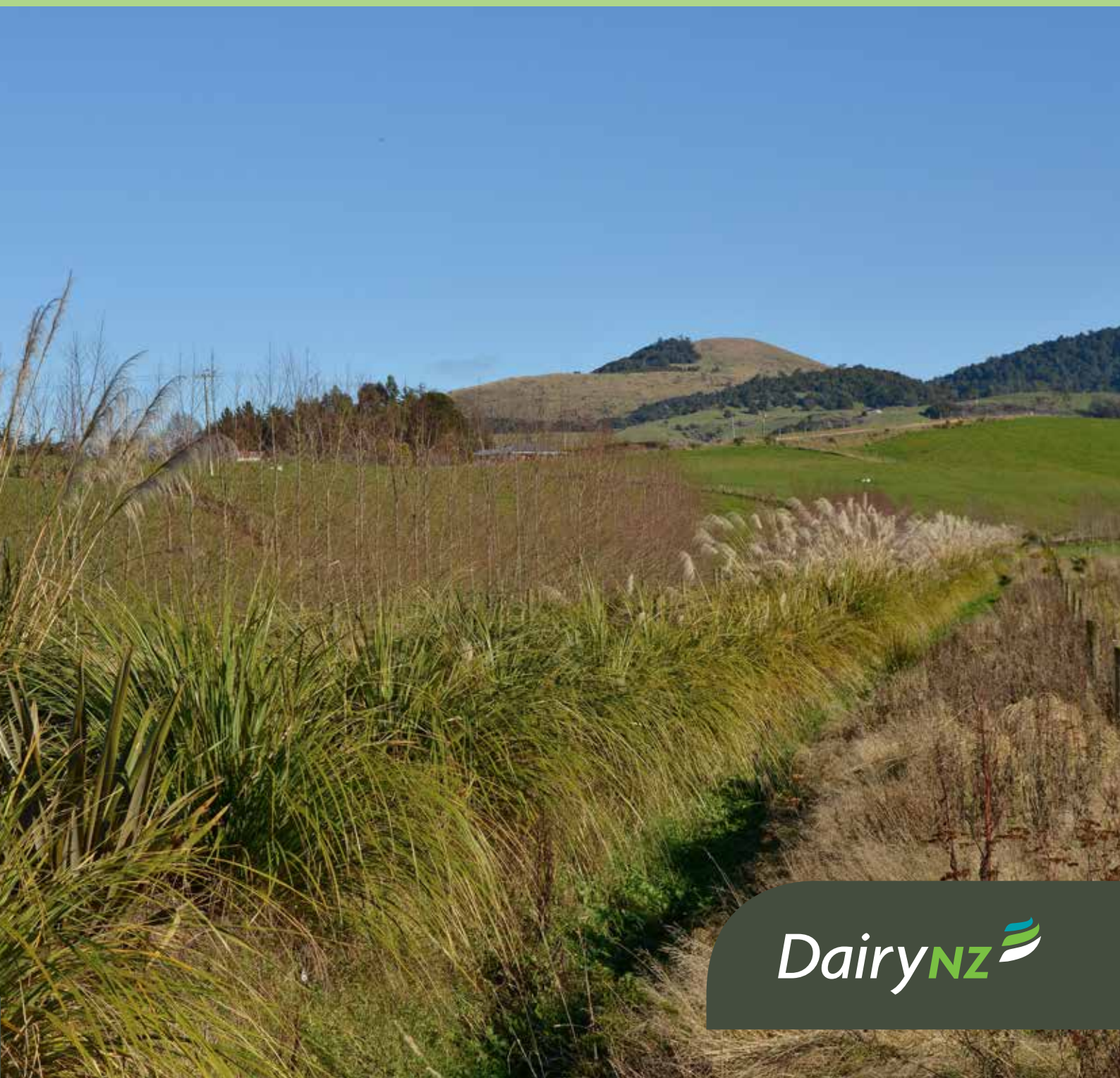


Land management on Otago dairy farms

Tips to minimise sediment and nutrient loss



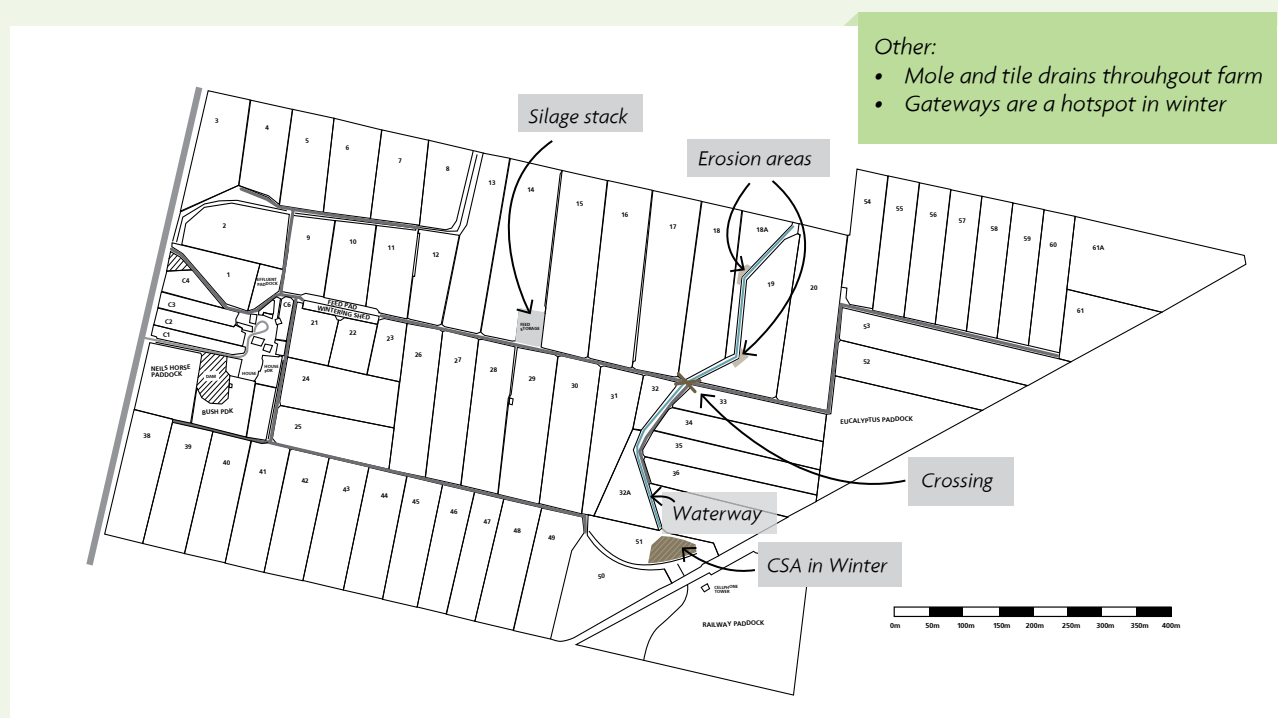
Land management on Otago dairy farms

Most loss of soil and contaminants occurs from relatively small areas of your farm. These areas are referred to as hotspots. Loss is typically from critical source areas in paddocks and other risk areas such as water crossings and races.

Managing these areas well is an effective way to reduce contaminant loss to waterways. This guide helps identify risk areas, provides management tips and suggests actions to help you keep soil, nutrients and dollars on farm.

Map the risks

To help prioritise areas requiring greater attention, mark risk areas on farm map and keep it on the wall at the shed to train staff and contractors.



Example farm map.

Highlight on the map:

- Sections of tracks and races prone to rilling and overland flow
- Crossings and culverts
- Silage stacks
- Critical source areas
- Waterways with eroding banks

You can also highlight wetlands, mole and tile drains and other areas on your farm that may require attention.

TIP

You can get a farm map from google earth but you may also be able to get a map from your milk supply company or the regional council.

This guide provides information on how to manage some of these areas. For more information, refer to dairynz.co.nz/environment.

Managing races

Rainwater can create channels on races that transport effluent and sediment to waterways. Well designed, constructed and maintained races will result in fewer incidents of lameness, save you time and money and will minimise contaminant loss.



Track with good surface and appropriate camber.

Possible actions for managing races

Surface

- Fill and compact potholes as they occur. Potholes trap water, turning the surface layer into slurry and the base layer into a bog.
- Grade race surfaces on a regular basis – at least annually.
- Drive at an appropriate speed on races.

Drainage

- Prune or remove trees near races to minimise shaded areas so races dry rapidly.
- Remove grass and manure from race edges where practical. Alternatively, if you wish to leave it to help support the race structure, cut lateral drains to allow water to flow away.
- Create 'speed bumps' to divert water off steep races.
- Maintain a camber of between 3-5%, steeper cambers result in water scouring the race.
- If you have a race next to a waterway ensure that it slopes away from the waterway to a paddock or sediment trap.

Benefits of improving races



Well-constructed races with cut-away drains that shed water to paddocks and a suitable camber will be less likely to send sediment into waterways.



Correctly designed and constructed races will help to improve cow flow and reduce lameness.



A well maintained race can reduce lameness in the herd and increase milk production with improved cow health and cow flow.

TIP

When it's raining, watch where water is running on your races. Take a shovel out to create cut aways and get water draining off the races and into paddocks or sediment traps instead.

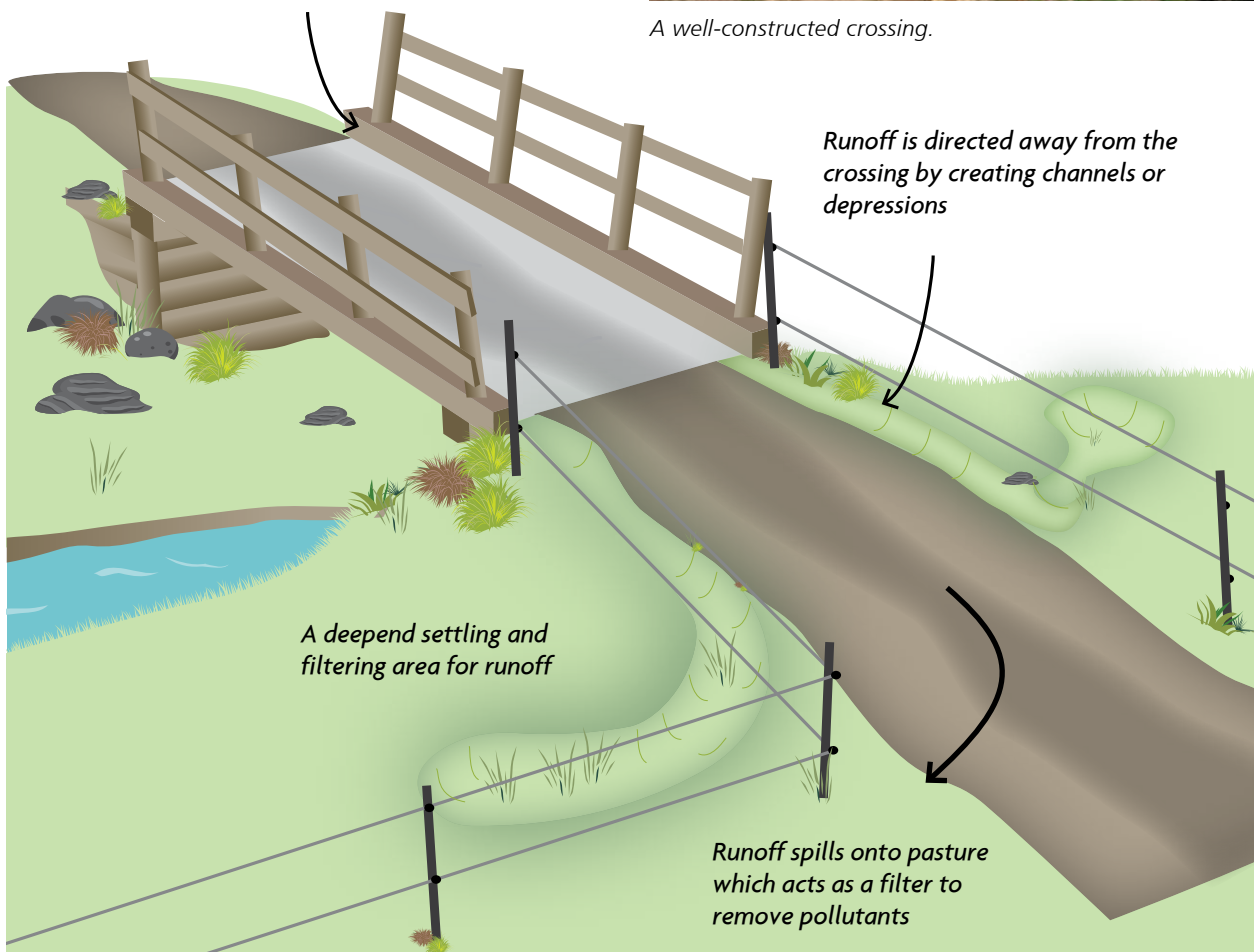
Crossings and culverts

Well planned and constructed crossings prevent damage to the stream bed and reduce the risk of effluent and sediment reaching waterways. They may also improve stock health and production by reducing stress, lameness and the potential of liver fluke.



A well-constructed crossing.

Raised edges on crossing divert runoff away from the stream



Maintenance of bridges and culverts

- Inspect bridges and culverts regularly, particularly after large rain events. Remove any debris or blockages.
- Ensure regular upkeep of bridges and culverts. Keep an eye on areas where runoff accumulates to prevent this washing into waterways during rain events.
- When installing or replacing a culvert, ensure the culvert is sized correctly and is flush with the stream bed to maintain fish passage.

Silage stacks

Silage stacks can be a risk area for nutrient loss and silage leachate is highly toxic to aquatic life. Well-managed silage stacks ensure that all silage and leachate is contained and will help to reduce spoilage.

Actions for managing silage stacks

- Site away from waterways and tile drains. Avoid areas prone to flooding or that have a high water table.
- Direct overland flow and rainwater away from silage stacks.
- Ensure groundwater does not seep into the silage stack.
- Store silage on hardsealed surfaces to capture and direct leachate into effluent system or sealed sump.

TIP

Otago Regional Council has regulations about the location and management of silage stacks. For more information, refer to ORC Factsheet 4 – Silage and compost.

TIP

A shallow trench around the stack will help prevent water run-off from the paddock entering the stack.



Critical source areas

Critical source areas (CSAs) are, low-lying parts of farms such as gullies and swales where overland flow accumulates in high concentration. Managing these areas well is a proven way to reduce contaminant loss from your farm.

TIP

For more information on strategic grazing around CSAs head to dairynz.co.nz/feed-tools

What do CSAs look like?

- Low-lying areas which tend to be boggy and may cause problems during wet weather.
- Areas where the tractor or stock are likely to get stuck.
- Unproductive areas which become damaged during winter or when heavy machinery is used on them.



A well managed CSA.



An example of a CSA. It collects a lot of overland flow from the surrounding paddocks and is boggy and unproductive. The CSA should be fenced off and left with rank grass to slow and filter overland flow coming off the paddock.

Managing critical source areas

- Identify where CSAs are on your farm.
- Fence off CSAs to create a grass buffer zone to filter contaminants and prevent stock access. The faster the water is flowing through a buffer zone, the wider the buffer zone should be to provide time for effective filtering.
- Use strategic grazing and graze CSAs last if you do not want to permanently fence them off.
- When constructing new tile drains, direct the discharge into areas where it can be filtered, such as wetlands or grass buffers, before entering waterways.

Filtering overland flow

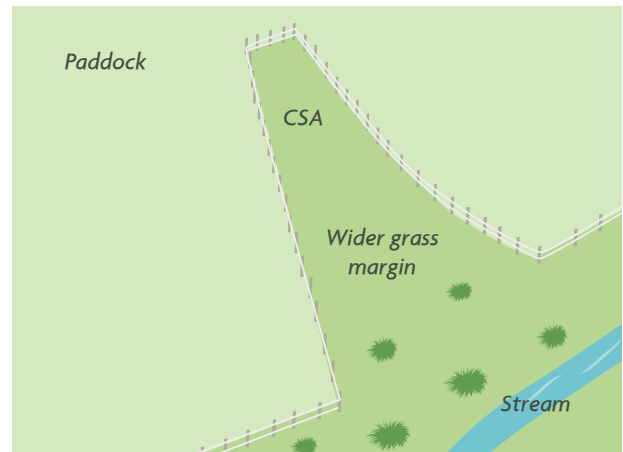
Grass or vegetative strips create buffer zones next to waterways or CSAs. They act as filters by slowing overland flow to trap suspended contaminants.

The buffer zone should be left uncultivated and ungrazed to operate effectively. The faster the water is flowing, the steeper the slope or the larger the catchment area the wider the buffer zone will need to be to provide time for effective filtering.

Filtering overland flow during cultivation

Possible actions when cultivating

- When it is safe to do so, it is good practice to cultivate across slopes rather than up and down, which can speed up overland flow.
- Leave grass strips across slopes of cultivated paddocks to act as filters to trap sediment running off cultivated areas.
- Understand where water flows in a paddock during wet periods. Avoid cultivation in CSAs such as seeps, gullies and runoff channels to minimise soil loss.



Fencing CSAs creates a grass buffer zone to filter out nutrients before they enter waterways.

TIP

Seek advice from a specialist at your regional council regarding consent requirements, location and design of sediment traps. Obtain all the necessary consents prior to any physical work.

Sediment traps

- Sediment traps are an option to filter overland flow before it reaches waterways and reduce the build-up of silt, sand and gravel downstream. Sediment traps work by slowing flows, reducing energy, filtering sediment and allowing grass growth.
- The trap has to be cleared out periodically, but it will reduce the need for more extensive waterway clearing. The sediment you remove from the trap can be reapplied to the paddock to replace lost topsoil.



An area of overland flow in paddock.

Managing streambank erosion

Managing streambank erosion

Streambank erosion can be a major source of sediment within a dairy farm system. Managing erosion will reduce the loss of productive land, reduce flooding effects downstream, reduce the effect of sediment on water quality and decrease loss of fences to floods.

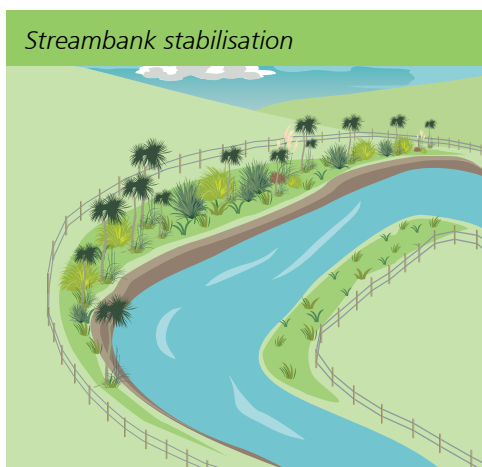
Stream erosion is a natural process but will be accelerated by:

- the removal of stabilising vegetation from stream banks and catchments
- a channel blockage upstream that is redirecting water flow
- increased erosive power of water due to river straightening
- steep banks collapsing due to undercutting.



Streambank erosion

An unprotected stream bank with erosion.



Streambank stabilisation

Planting of stream banks, particularly on the outside of bends, will help to anchor them and prevent erosion.

Preventing and managing streambank erosion

- Plant the outside of bends to help anchor them against erosion.
- Have rivers and streams fenced back far enough to allow for movement of the stream. Consider how far the stream moves during large storm events and how many events occur yearly. Plants will take a while to establish so allow for 3 years of erosion.
- Tree species with deep and extensive roots will be most effective at stabilising banks e.g. ribbonwood, cabbage tree and lemonwood.
- Fast growing species can help with erosion that is occurring quickly or is large. Matsudana willow, shrub willow and poplar are good options for this. Native species can then be planted throughout the exotics.
- For higher eroding banks or more severe erosion, erosion control structures may be required, it is best to seek advice from your regional council for this.

For more information, visit dairynz.co.nz/waterways.

TIP

Otago Regional Council requires consent for many activities in a waterway. Please contact the council for advice before proceeding.