Land management on Northland dairy farms

Managing land to reduce sediment and phosphorus loss

DairyNZ

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The land is one of dairy farmers' greatest assets and managing land productively and sustainably will add further value to the farm. It's part of future proofing New Zealand's unique farming landscape and waterways to ensure we continue to have productive land to farm and a beautiful environment to enjoy.

Northland dairy farmers have learnt to farm with a wide range of soil and land types. The addition of extreme weather events has meant Northland dairying has some of the most diverse landscapes in the country.

This guide covers six areas which have the greatest impact on the land in Northland, with advice on how to manage these areas for the best outcome for your land and the environment. These areas include:

Erosion | Pugging | Crops | Races | Waterways | Wetlands

Many actions to land improvement will have multiple on-farm benefits, indicated by the following icons.

On-farm benefits:

Environmental **Animal health** **Farm staff** **Farm profit**

The effect of soil loss

Soil loss can significantly decrease productivity and profitability on a dairy farm by decreasing the amount of available nutrient-rich topsoil for grass growth. Most erosion and land damage occurs during times of high rainfall, particularly in areas with already exposed or disturbed soil.

Runoff from a farm can contain phosphorus, nitrogen, bacteria and sediment which affects water quality. Streams, estuaries and harbours are particularly sensitive as contaminants don't flush through and accumulate in these water bodies. The cumulative effect of farmers reducing runoff will improve the health of waterways.

Trees such as poplar or hybrid/sterile willows can be planted to stabilise steep or unstable land.

Erosion control

Sloping land is more susceptible to erosion. Erosion can occur relatively unseen, but contributes hugely to the loss of valuable topsoil on all land types.

Actions to prevent and reduce erosion

- Rest the paddock as soon as open patches of soil appear to allow pasture to recover. Consider over-sowing when soil conditions suit. Maintain good grass cover of around 1500kg/DM with effective grazing management.
- Where erosion is occurring, plant trees such as willows and poplars which help stabilise soil.
- Where gully erosion has occurred, re-contouring can help to spread the flow of water more evenly, which would otherwise form channels in paddocks.
- Fence tomos/sinkholes to avoid stock and vehicle access and call Northland Regional Council for mitigation advice.
- Strip graze steep areas with young stock (lighter animals will have less impact on the land).
- Highly eroded areas may benefit from retirement to native forest or plantation forestry.

Benefits of reducing erosion

Water quality is improved by reducing the amount of sediments entering waterways.

Ensuring topsoil is kept in paddocks is beneficial for grass growth and milk production.

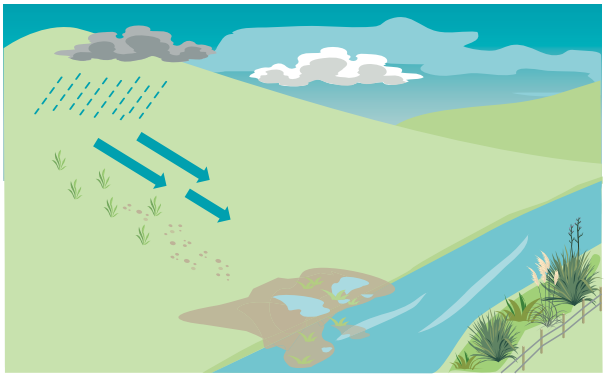
Erosion-control trees such as hybrid willows and poplars can also provide shade and shelter for stock. These can be purchased from Northland Regional Council.

TIP

Talk to Northland Regional Council for information on their envrionment fund and planting for erosion control phone 0800 002 004.

Main types of erosion in Northland

Sheet erosion



Gully erosion

Slip/slump erosion

Streambank erosion

Pugging prevention

Northland's clay-rich soils are prone to pugging in wet weather. The management of pasture has a big impact on how susceptible paddocks are to pugging. Pugging causes runoff of fine sediment; a major pollutant of Northland's waterways.

Actions to minimise pugging

- Select paddocks better suited to wet weather grazing, such as paddocks that dry out faster and use these during winter rounds.
- Minimise movement of animals around paddocks.
- Resting and re-grassing of paddocks that have been severely pugged or compacted will help reduce the impact on future pasture production.
- On-off grazing can be an effective tool to reduce pugging damage.

FARMER'S TIP

"During spring and summer, as soon as rain hits, the cows need to be shifted off the paddock. We have a zero-pugging policy in spring and summer."

Shayne O'Shea, Kokopu

Benefits of reducing pugging

Avoiding damage from pugging is beneficial to waterways, as pugged areas increase surface runoff.

An area of seriously pugged pasture in spring will produce about 40% less dry matter than undamaged pasture through the following season. Reducing pugging will also reduce the need for re-grassing

Stand-off pads can take pressure away from paddocks and can enhance cow wellbeing during wet periods. We recommend that a cost-benefit analysis is carried out before construction of off-paddock infrastructure. For more information visit dairynz.co.nz/standoff.

Sacrifice paddocks should be used as a last resort and should only occur when all other options have been exhausted.

Cropping area establishment

Cropping can cause soils to be exposed for long periods of time, during which rain and overland flow paths wash soil into waterways.

Actions for improving cropping areas

- Where possible use cultivation technology such as direct drilling and broadcasting, which will decrease soil disturbance.
- Grazing routine in cropped paddocks should start furtherest away from waterways and graze back towards them, leaving a buffer strip available to filter and trap sediment.
- Where health and safety allows, it is good practice to cultivate across slopes rather than up and down slopes which can speed up the movement of soils. (Figure 1)
- Leave grass strips across slopes of cultivated paddocks to act as filters to trap sediments running off cultivated areas. (Figure 2)
- Have an understanding of where water flows or moves in a paddock during wet periods. Avoid cultivation in areas of intermittent water-flows such as seeps and dry streambeds to minimise soil loss.
- Time your cultivation for when soil moisture is low. This will reduce compaction of the soil.

Figure 1. *Cultivate across slopes where possible to reduce soil loss by redirecting water flows.*

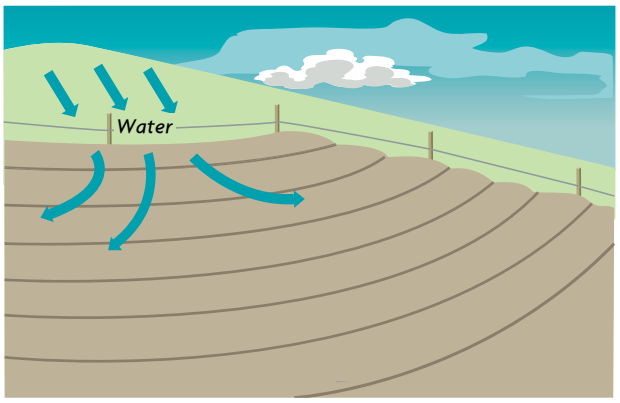
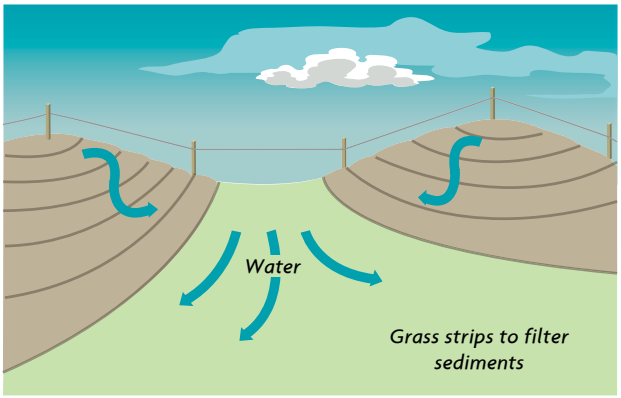


Figure 2. *Leaving grass strips undisturbed in gully areas helps to trap sediments.*



Benefits of improving cropping areas

Reducing soil disturbance and minimising runoff will mean less sediment and nutrients entering waterways.

Reducing erosion of cropping areas will reduce the risk of seed or crop loss at establishment and help retain the quality of valuable topsoil.

Race construction

Races can create channels that transport sediment, bacteria and nutrients into waterways.

Actions to improve races

- A 'speed bump' can be used to direct water off the track on a steep slope.
- Minimise shaded areas to ensure races dry quicker.
- A gradual incline between 3-8% will allow cows to use the entire width of the race. If the incline is too steep the cows will walk on flatter areas in the centre or edges of the race.
- If you have a race next to a waterway, ensure it slopes away from the water towards a paddock or sediment trap.

Benefits of improving races

Well-constructed races with cut-off 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 reduce lameness issues within the herd.

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

- A speed bump forces water off/away from the race surface and prevents the loss of race material.
- Reducing very shady areas allows the race to dry out.

- A gradual incline of 3-8% will ensure cows use the entire width of the race and allows water to drain.

- Avoid large shady areas which prevent races from drying out.
- Avoid completely flat races which cause water to sit/pool on the surface.

- Large wet patches along race edges indicate a lack of ability to drain water.
- Cows walking single file may indicate the race needs maintenance or is not suitable for stock.

Waterway management

Stream bank erosion

The erosion of stream and river banks is an ongoing issue in Northland due to the mixture of heavy and light soils and causes large amounts of sediment and phosphorus to enter waterways.

Actions to reduce bank erosion

- Drain banks should be gradually sloped, with a shallow 'V' formation rather than a more unstable 'U' shaped bank.
- Eroding streambanks can be planted to help stabilise them.
- Size culverts to cope with high flows as well as allowing for fish passage.
- Nib walls and diversion channels prior to crossings help to avoid the movement of run-off into waterways.
- Locate bridges and culverts where there are regular stock crossing points to prevent stock accessing water and maximise cow-flow.
- Exclude stock from wetlands to avoid them getting stuck or eating poisonous swamp plants such as sweet reed grass.

Benefits of stopping stream bank erosion

Stable stream banks means less sediment and soil enters waterways, creating a better habitat for wildlife.

Preventing stream bank erosion can help protect productive farming land from being washed away during high-flows

TIP

Before removing willows within waterways, contact the Northland Regional Council on 0800 002 004.

Crossings

Well-constructed crossings will reduce bank erosion and the amount of faecal matter that enters waterways. The type of crossing and the location is important so that it can adequately cope with high volumes of water during floods.

Benefits of having well designed and constructed crossings

Well-constructed crossings minimise direct effluent and sediment entering waterways and improve the habitat for fish and other in-stream species.

Keeping stock out of waterways will ensure they aren't used as a drinking source, minimising the risk of water borne diseases such as Liver Fluke. It also ensures cows can receive minerals added to stock water.

Culverts and bridges will help speed up safe crossing and allow for movement of stock and vehicles during higher river flows.

PLANTING IN NORTHLAND

For information about suitable planting types, download or order *"Getting riparian planting right in Northland"* from dairynz.co.nz/waterways.

Protecting wetlands

New Zealand has lost 90 percent of its wetland areas due to drainage. It is important to maintain wetlands as they protect land from flood damage due to their ability to slow or hold surface water and release this slowly over time. They also reduce the amount of sediment entering waterways and provide a valuable habitat for native wildlife.

Benefits of protecting wetlands

Wetlands retain and filter nutrients before they enter waterways, are a valuable habitat for native species and reduce flood flows.

Fencing wetlands will reduce the likelihood of stock getting stuck. Reducing the amount of muddy areas you have is important for maintaining teat health and reducing the incidence of mastitis.

Wetlands can protect land from flood damage due to their ability to slow or even hold surface water and release it slowly over time.

Wetlands include anything from small on-farm seeps to large, regionally recognised wetland areas. All wetlands, regardless of size, hold significant importance for native flora and fauna and will help filter contaminants leaving the farm in runoff.

Help on hand from Northland Regional Council

Northland Regional Council offers free no-obligation advice and funding towards land management, including:

- farm water quality improvement plans
- soil conservation/erosion management
- riparian management
- wetland and lake management

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