Land management on Waikato dairy farms

Managing land to reduce sediment and phosphorus loss

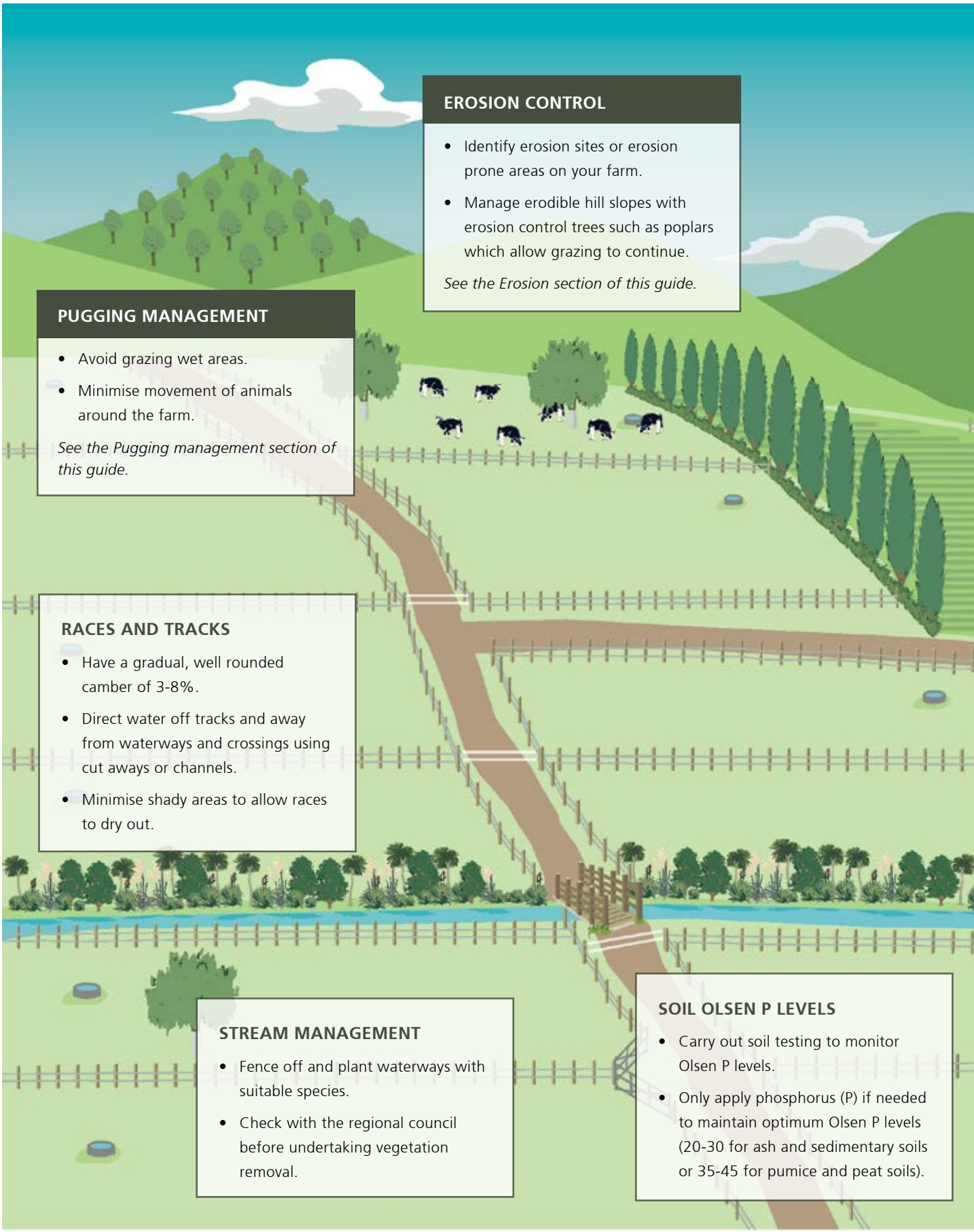
The land is one of dairy farmers' greatest assets. Managing land productively and sustainably will future proof New Zealand's unique farming landscape and waterways to ensure we continue to have productive land to farm and a beautiful environment to enjoy.

This guide covers five areas of land management which have the greatest impact in the Waikato, with advice on how to manage these areas for the best outcome. These areas include:

Erosion | Cropping | Pugging | Races | Critical source areas | Wetlands

DairyNZ

Key solutions for managing land on Waikato dairy farms



EROSION CONTROL

- Identify erosion sites or erosion prone areas on your farm.
- Manage erodible hill slopes with erosion control trees such as poplars which allow grazing to continue.

See the Erosion section of this guide.

PUGGING MANAGEMENT

- Avoid grazing wet areas.
- Minimise movement of animals around the farm.

See the Pugging management section of this guide.

RACES AND TRACKS

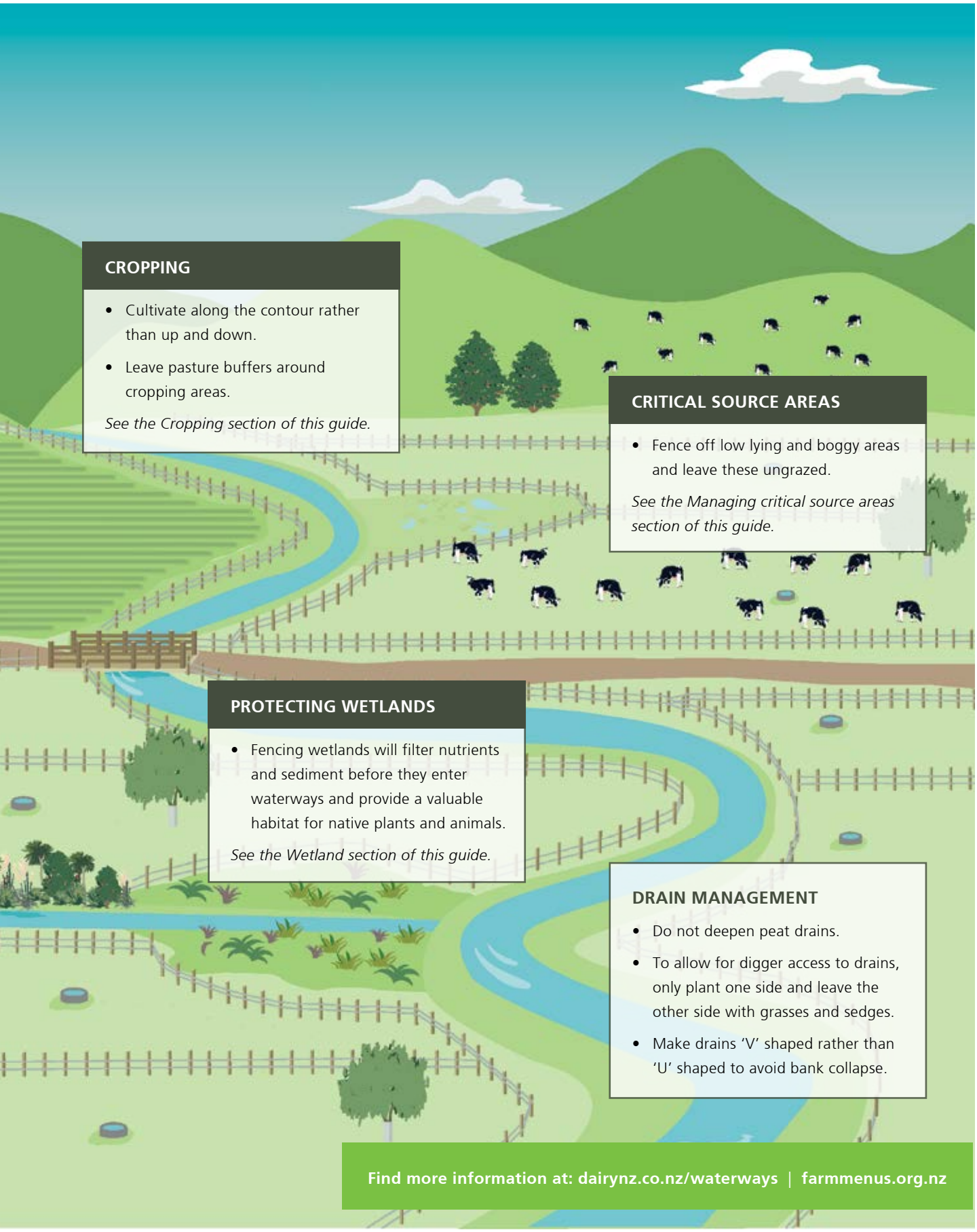
- Have a gradual, well rounded camber of 3-8%.
- Direct water off tracks and away from waterways and crossings using cut aways or channels.
- Minimise shady areas to allow races to dry out.

STREAM MANAGEMENT

- Fence off and plant waterways with suitable species.
- Check with the regional council before undertaking vegetation removal.

SOIL OLSEN P LEVELS

- Carry out soil testing to monitor Olsen P levels.
- Only apply phosphorus (P) if needed to maintain optimum Olsen P levels (20-30 for ash and sedimentary soils or 35-45 for pumice and peat soils).



CROPPING

- Cultivate along the contour rather than up and down.
- Leave pasture buffers around cropping areas.

See the Cropping section of this guide.

CRITICAL SOURCE AREAS

- Fence off low lying and boggy areas and leave these ungrazed.

See the Managing critical source areas section of this guide.

PROTECTING WETLANDS

- Fencing wetlands will filter nutrients and sediment before they enter waterways and provide a valuable habitat for native plants and animals.

See the Wetland section of this guide.

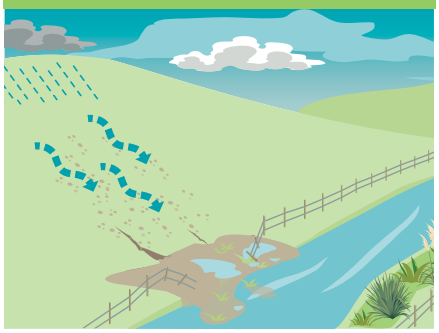
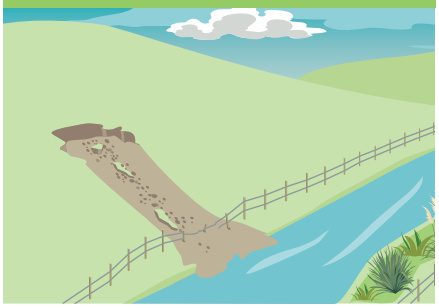
DRAIN MANAGEMENT

- Do not deepen peat drains.
- To allow for digger access to drains, only plant one side and leave the other side with grasses and sedges.
- Make drains 'V' shaped rather than 'U' shaped to avoid bank collapse.

Find more information at: dairynz.co.nz/waterways | farmmenus.org.nz

Erosion control

Taking action to reduce erosion will prevent sediment and nutrients from entering waterways and protect valuable topsoil.

EROSION TYPE	WHERE	ACTIONS TO AVOID OR MINIMISE EROSION
Sheet, rill and gully erosion (movement of soil overland in sheets or channels). 	Any sloping surface where the soil is exposed. Sheet erosion will often remain relatively unseen. Gully erosion is usually very active and visible but can also start as tunnels under the surface.	• Exclude stock from erosion prone areas. • Use cut-offs on races to direct water into paddocks. • Avoid overgrazing. • Select cropping paddocks carefully, limiting cropping on steep slopes and critical source areas. • Plant erosion control species. • Maintaining good pasture cover over winter will help reduce erosion.
Streambank erosion 	Streambanks – particularly in flood plains, on the outside of bends or in areas prone to high flows or floods.	• Exclude stock and set fences well back from stream banks. • Plant erosion control trees (hybrid willow and poplar). See dairynz.co.nz/waterways. • For severe active erosion, investigate options for erosion control structures with the Waikato Regional Council – call 0800 800 401.
Mass movement (earthflow, slips and slumps) 	Usually on steep land, but can also occur in moderate to gently sloping areas.	• Plant erosion control trees such as hybrid willow species or poplars. • Use lighter stock classes or lower stocking rates to reduce pressure on steep land. • In severe cases, retire land from grazing and change land use to plantation forestry or native forest. • Surface water controls may be required to divert water from critical areas. Call Waikato Regional Council for more information.

Benefits of reducing erosion

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

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

Erosion-control trees such as hybrid willows and poplars provide shade and shelter for stock.

Cropping area establishment

Cropping exposes soil for long periods of time, during which rain and water flowing overland can wash soil and nutrients into waterways.

Actions for improving cropping areas

- Where possible, use sowing techniques such as direct drilling to minimise soil disturbance.
- Grazing in cropped paddocks should start furtherest away from waterways and graze back towards them, leaving a grass buffer strip available to filter and trap sediment.
- Where health and safety allows, it is good practice to cultivate across slopes. Cultivation up and down concentrates water and increases erosion (Figure 1).
- Leave grass strips across slopes of cultivated paddocks to act as filters to trap sediment running off cultivated areas. (Figure 1.)
- Have an understanding of where water flows or moves in a paddock during wet periods. Avoid cultivation in areas of intermittent water-flow such as seeps and dry streambeds.
- Time your cultivation for when soil moisture is low to reduce compaction of the soil.

Benefits of improving cropping areas

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

Reducing soil disturbance reduces wind erosion and runoff so less sediment and nutrients enter waterways.

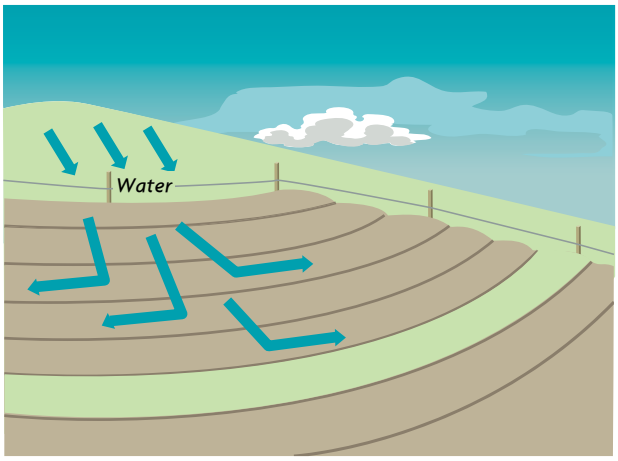


Figure 1. *Cultivate across slopes where possible to reduce soil loss by redirecting water flows. Leaving grass strips will provide a filter and slow water movement.*

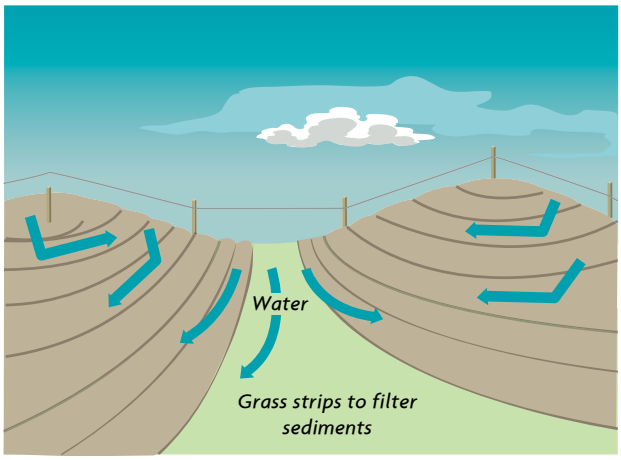


Figure 2. *Leaving grass strips undisturbed in gully/swale areas helps to trap sediments.*

A critical source area (CSA) in a maize paddock which has been left as a grass buffer strip.

Pugging management

Most Waikato soils are prone to pugging in wet weather. The management of pasture has a big impact on how susceptible paddocks are to pugging. By reducing pugging, the runoff of fine sediment into waterways is reduced.

Actions to minimise pugging

- Have a wet weather management plan to minimise soil damage. e.g.
  - avoid grazing at-risk paddocks when wet to prevent pugging
  - rest and re-grass paddocks that have been pugged to reduce the impact on future pasture growth
  - use on-off grazing to reduce pugging damage.
- Well-fed animals that have shelter in the paddock will move around the paddock less, reducing pugging.

TIP

Carry out a cost-benefit analysis before committing to off-paddock infrastructure at dairynz.co.nz/standoff.

Benefits of reducing pugging

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

Less surface runoff into waterways.

Improved foot and teat health and reduced environmental mastitis.

Sacrifice paddocks should be used as a last resort and should only occur when all other options have been exhausted. If a sacrifice paddock has to be used, there are management considerations that will reduce environmental and animal health risk. For further advice visit dairynz.co.nz/wintermanagement.

Managing critical source areas

Critical source areas (CSAs) are small, low-lying parts of farms such as gullies and swales where runoff accumulates in high concentration. The runoff carries sediment and nutrientst to waterways. Managing these areas well is one of the best ways to reduce sediment and nutrient loss from your farm.

Actions for 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 across a buffer zone, the wider the buffer zone should be to provide time for effective filtering.
- When constructing new tile drains, direct them into areas where runoff can be filtered, such as wetlands or grass buffers, before entering waterways.

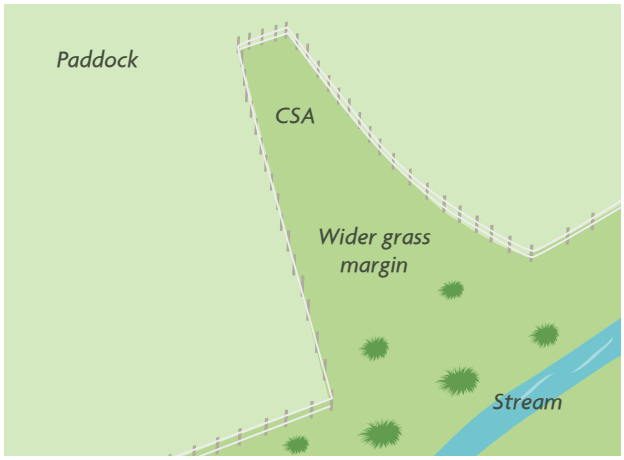
A CSA in a cultivated paddock.

Benefits of managing critical source areas

Loss of valuable topsoil is reduced.

Nutrient and sediment loss to waterways is reduced.

Keeping animals out of CSAs can improve hoof health and reduce the incidence of mastitis.



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

Critical source areas can occur in all parts of the farm even if relatively flat. Where tile drains occur under CSAs this allows for a direct pathway to waterways.

Protecting wetlands

New Zealand has lost 90 percent of its wetlands. Wetlands protect land from flood damage, due to their ability to slow or hold surface water and release it slowly over time. They also reduce the amount of sediment entering waterways and provide a valuable habitat for native wildlife.

Actions for protecting wetlands

- Identify wet areas on your farm (including ponds, bogs and seeps) and fence for stock exclusion.
- Undertake weed control if needed and plant with riparian and wetland species (see dairynz.co.nz/waterays).
- Excess sediment can reduce the life span of your wetland. Consider installing an easily accessible sediment trap just upstream of your wetland. This sediment is usually rich in nutrients, so spreading it on to paddocks is beneficial.

Benefits of protecting wetlands

Protect land from flood damage by slowing and holding excess surface water and releasing it slowly over time.

Retain and filter nutrients and sediments before they enter waterways. Provide a valuable habitat for native plants and animals.

Fencing wetlands will reduce the likelihood of stock getting stuck in wet areas, improve teat and hoof health and reduce the incidence of environmental mastitis.

We can help

Waikato Regional Council offers practical advice and may also provide funding towards work on your property that will protect water quality and reduce erosion.

Catchment Management Programme funded work includes:

- Waterway fencing
- Weed control
- Native planting
- Troughs
- Pest control
- Erosion control

To find out more, contact your local Catchment Management Officer:

P 0800 800 401 E info@waikatoregion.govt.nz W waikatoregion.govt.nz

Waikato REGIONAL COUNCIL Te Kaunihera ā Rohe o Waikato

DNZ40-024 March 2016