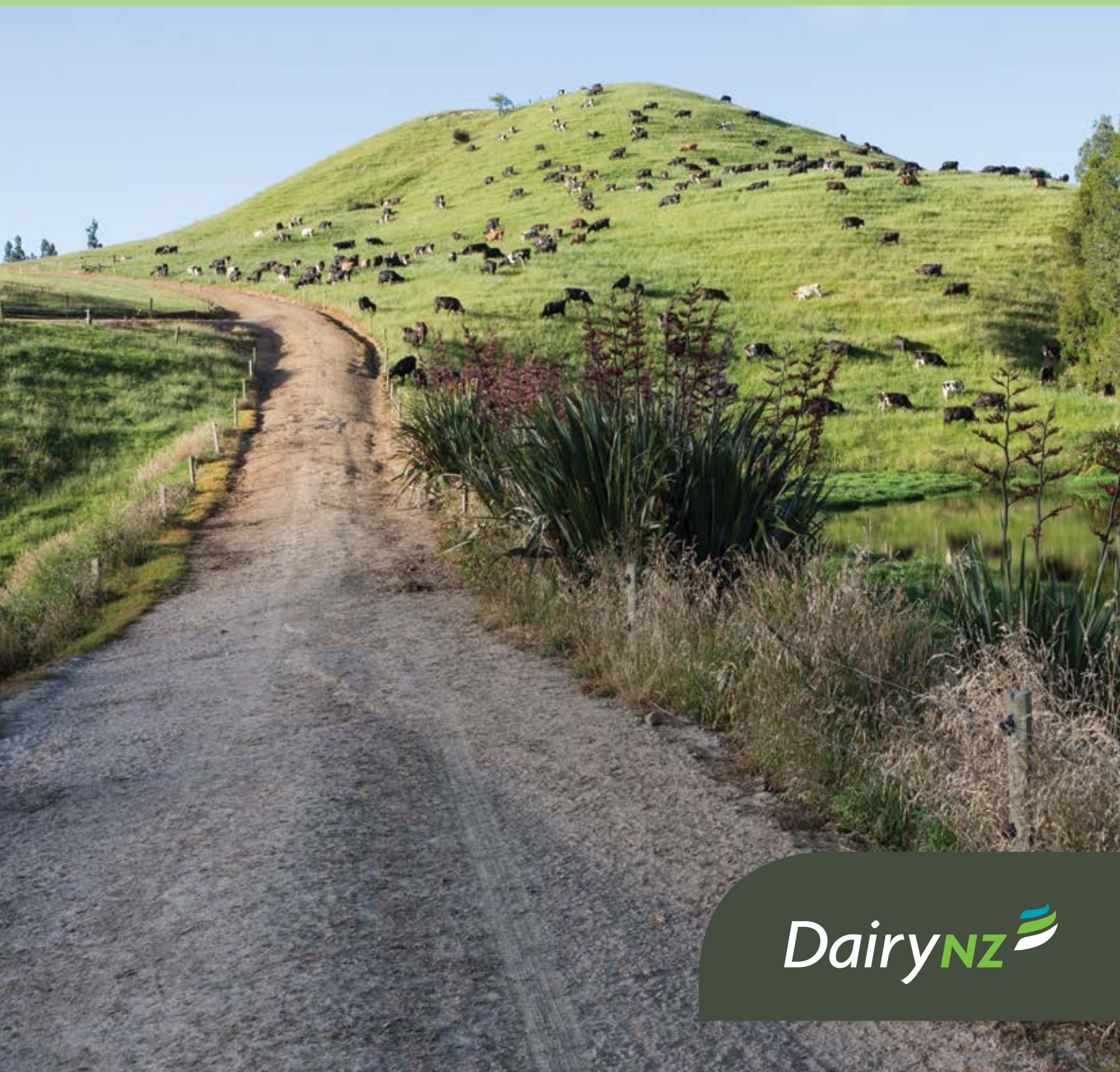


# *Good management practices*

*A guide to good environmental management on dairy farms*



**Dairy**NZ 



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# Why this guide is for you

Implementing good environmental management practices on-farm is not only efficient – it helps to minimise risk to your business and reduce your environmental impact. It is ‘the right thing to do’ and makes business sense.

This guide describes what good environmental management looks like on a dairy farm, so you can easily identify the practices you are doing well. It also gives you examples of the information you may need to keep to demonstrate it.

In some regions you may need to demonstrate how you are achieving good management practice on-farm to meet your regulatory requirements. This booklet guides you on how to achieve those standards.

It is important that you are aware of and meet your regional council regulations. There are a range of rules and consent conditions that may relate to your farm that you should be aware of – check your council requirements.

This guide links with the DairyNZ Sustainable Milk Plan (SMP). A DairyNZ Sustainable Milk Plan is a type of environmental plan and a risk assessment tool for dairy farms.

Working through this guide will help you with the development of your Sustainable Milk Plan by identifying areas you are currently performing well and highlighting areas for improvement. You may not meet all of the practices today but if you plan the steps and work on a realistic timeframe you will get there.

The information in this guide is based on the document *Industry-agreed Good Management Practices relating to water quality – Matrix of Good Management Project – 18 September 2015*. To read the full document, go to [dairynz.co.nz/canterbury](http://dairynz.co.nz/canterbury).



# *Frequently asked questions*

## *What are good management practices in this guide?*

These are practices which help manage your farm resources while minimising your environmental risk. The focus of the practices is on environmental water quality (notably nitrogen, phosphorus, sediment, and faecal contaminants). They do not cover good practice for other aspects of farm management or farm system design.

## *Why are consistent good management practices important?*

A defined list of good management practices helps provide guidance of what should be done on farm. It enables farmers to identify areas to focus on, standards to aim for and what management decisions to consider.

Implementing good management practices on your farm will reduce your environmental and business risk and result in a more sustainable farm and healthier environment. There are expectations from our consumers and our communities to farm in an environmentally responsible manner and being able to say and prove “I farm to good management practice standards” is important.

## *Who decided what the good management practices are?*

The good management practices (GMP) described here were prepared following workshops with groups of farmers, rural professionals and industry representatives from six primary sectors who were involved in the Matrix of Good Management project. The resulting lists of good management practices were compared across industries, and a single set of good management practices relevant to all industries was developed along with implementation guidance.

## *What is the Matrix of Good Management and why was it created?*

The Matrix of Good Management (MGM) project was set up to develop industry-agreed good management practices. By having a defined set of good management practices, farmers would be able to compare their current practices with these and assess their own performance and opportunities.

For Canterbury the MGM project is also developing examples of typical nitrogen and phosphorus losses that can be expected from a range of farming systems, soils and climates when farms operate at good management practice (GMP) level.

Read more at [ecan.govt.nz/mgm](http://ecan.govt.nz/mgm)

## *Who is involved in the Matrix of Good Management Project?*

The Matrix of Good Management is a joint initiative between Environment Canterbury, Crown Research Institutes (AgResearch, Plant & Food Research and Landcare Research), primary sector organisations (DairyNZ, Deer Industry New Zealand, NZ Pork, Beef + Lamb New Zealand, Horticulture NZ and the Foundation for Arable Research) and is supported by a number of regional councils and central government. The project is overseen by a cross-sector governance group.

## *What is the focus of the good management practices?*

Good management practices address issues that affect water quality - including nitrogen, phosphorus, sediment, water take and faecal contaminants. Good management practices help you to understand environmental risks, assess your farm, identify how to manage these and record your progress. They do not cover other areas of farm management such as animal welfare, greenhouse gas reduction, health and safety and biosecurity.

## *What do I do if the good management practice does not relate to my farm?*

Focus on all good management practices that apply to your farm. If, for example, you do not have irrigation or cropping, the specific practices that cover those areas are obviously not applicable.

## *What do I have to do?*

1. Understand each good management practice.
2. Assess what you are currently doing and how it compares to the good management practices.
3. Identify and plan what you need to do to achieve good management practice.
4. Determine what evidence you currently have for each good management practice.
5. Gather additional evidence you may need.

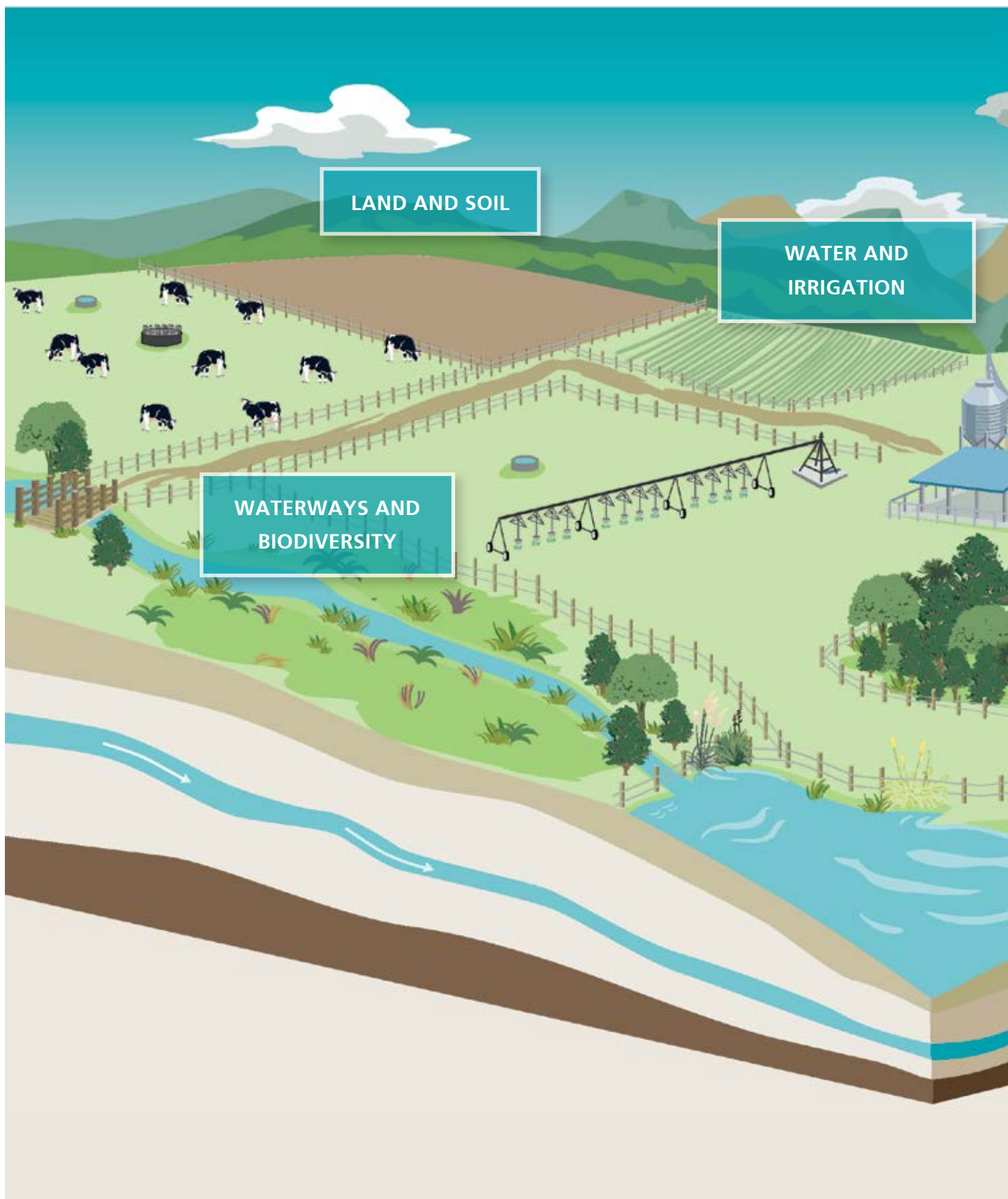
## *How do these good management practices fit with existing rules and requirements?*

It is important that you meet all your regional council rules and requirements, and also any specific conditions of supply from your milk company. The good management practices described in this booklet allow you to evaluate your current practices and assess your performance; they do not replace any regional council or milk company requirements.

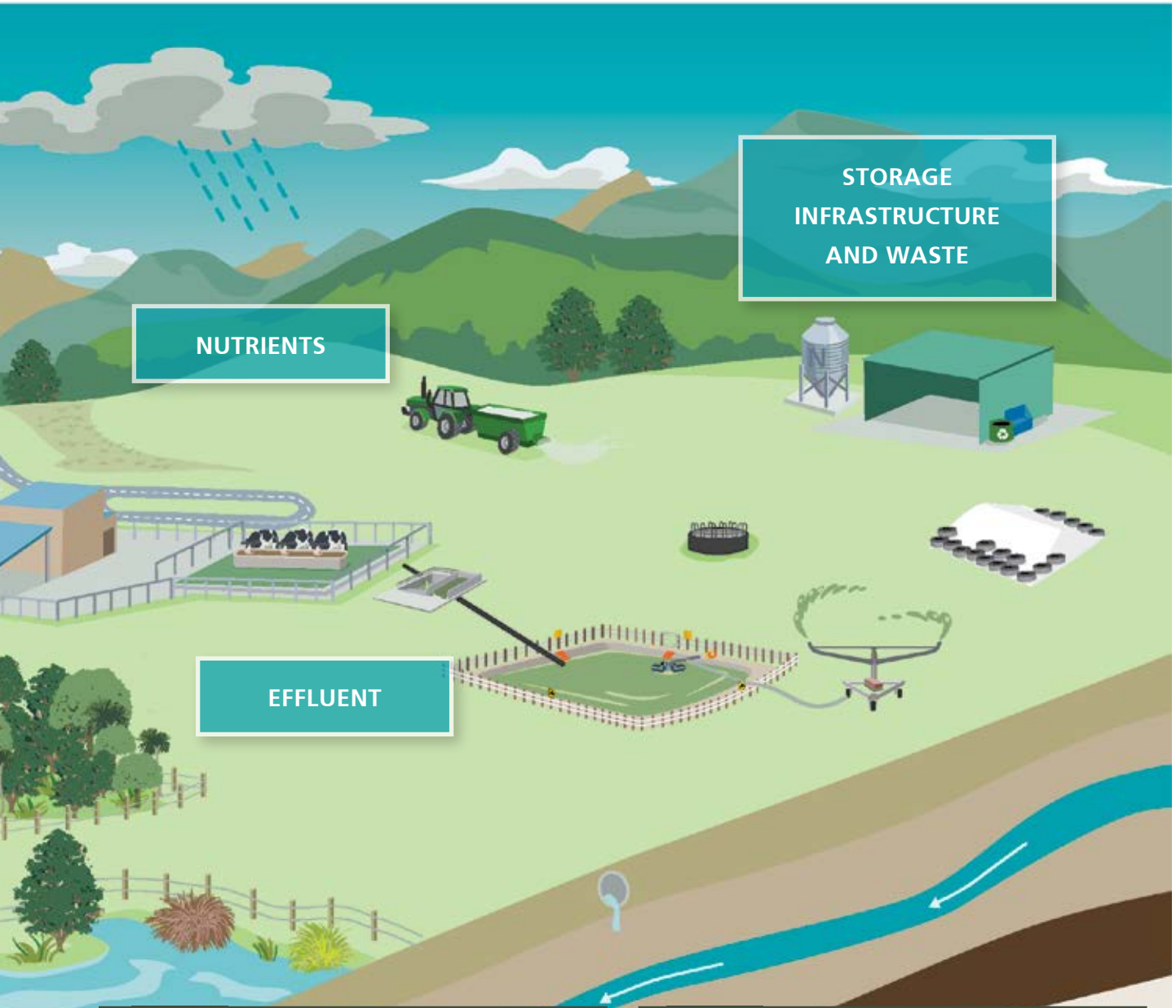


# How to use this guide

The guide is divided into six key management areas. These areas link directly to the DairyNZ Sustainable Milk Plan.







**STEP 1**

✓ *Practice*

Each management area has related good management practices (GMP). Each GMP has a list of practices to consider. Work through and identify what practices you are or are not currently doing.

Tick ✓  YES  NO

**STEP 2**

🔍 *Evidence*

For each GMP consider if you have any evidence of what you are doing. The evidence box by each GMP provides examples of what information may be considered as evidence that you have undertaken this practice.

**IMPORTANT: You do not need to have ALL of the examples listed to prove a practice.**

# Overview of good management practices

The good management practices in the MGM project booklet are divided into farm management areas: whole farm, land, plants, and animals. This is because they must relate to all farming sectors.

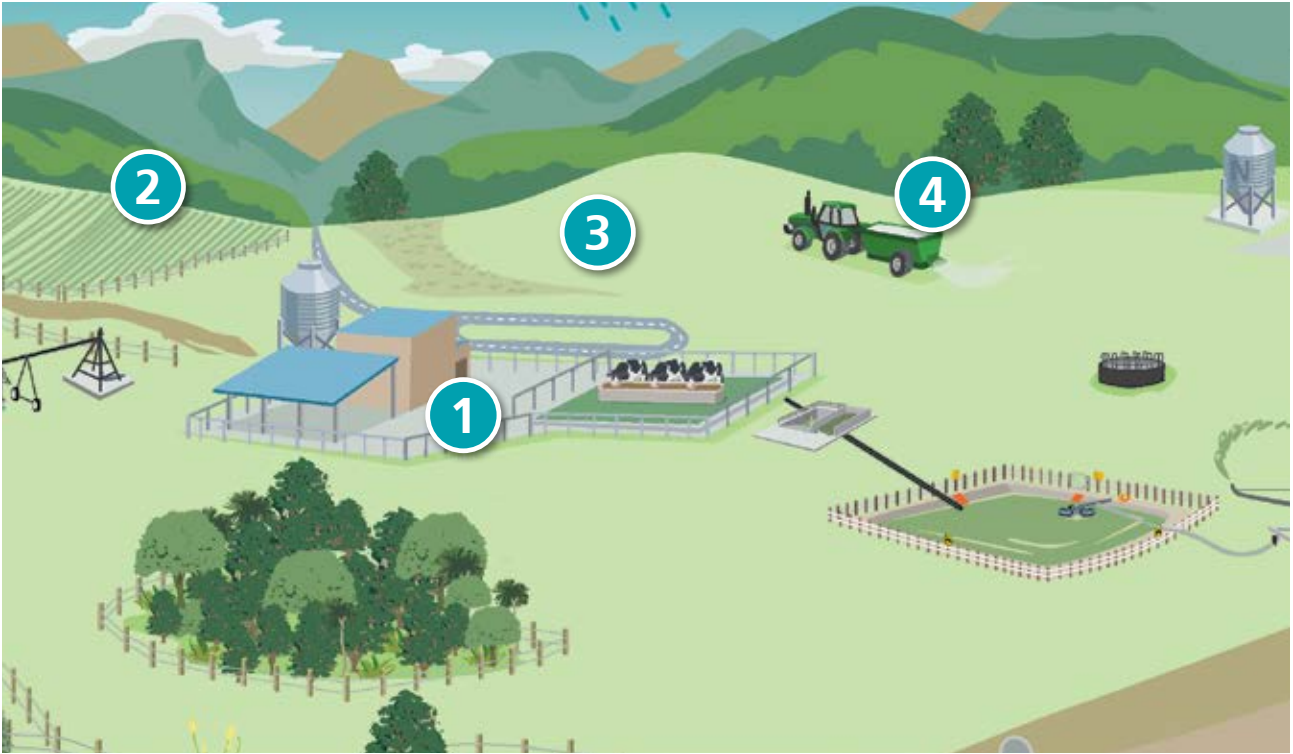
The list below describes the good management practices (GMP) as described by the MGM project and identifies which management area of the Sustainable Milk Plan it relates to.

MGM environmental topic		DairyNZ SMP management area
<b>WHOLE FARM</b>		
<b>FARM PLANNING AND RECORDING</b>	GMP 1	Identify the physical and biophysical characteristics of the farm system, assess the risk factors to water quality associated with the farm system, and manage appropriately.
	GMP 2	Maintain accurate and auditable records of annual farm inputs, outputs and management practices.
All management areas		
<b>LAND</b>		
<b>CULTIVATION AND SOIL STRUCTURE</b>	GMP 3	Manage farming operations to minimise direct and indirect losses of sediment and nutrients to water, and maintain or enhance soil structure, where agronomically appropriate.
<b>GROUND COVER</b>	GMP 4	Manage periods of exposed soil between crops/pasture to reduce risk of erosion, overland flow and leaching.
	GMP 5	Retire all land use capability (LUC) class 8 and either retire, or actively manage, all class 7e to ensure intensive soil conservation measures and practices are in place.
Land and soil <b>PAGE 26</b>		
<b>SEDIMENT, PHOSPHORUS AND FAECAL BACTERIA</b>	GMP 6	Identify risk of overland flow of sediment and faecal bacteria on the property and implement measures to minimise transport of these to water bodies.
	GMP 7	Locate and manage farm tracks, gateways, water troughs, self-feeding areas, stock camps, wallows and other sources of runoff to minimise risks to water quality.
	GMP 8	To the extent that is compatible with land form, stock class and intensity, exclude stock from waterways.
GMP 9	Monitor soil phosphorus levels and maintain them at or below the agronomic optimum for the farm system.	Waterways and biodiversity <b>PAGE 18</b>
Nutrients <b>PAGE 10</b>		

MGM environmental topic	DairyNZ SMP management area	
<b>PLANTS</b>		
<b>NUTRIENT MANAGEMENT</b>	GMP 10 Manage the amount and timing of fertiliser inputs, taking account of all sources of nutrients, to match plant requirements and minimise risk of losses.	Nutrients <b>PAGE 10</b>
	GMP 11 Store and load fertiliser to minimise risk of spillage, leaching and loss into water bodies.	Storage infrastructure and waste <b>PAGE 30</b>
	GMP 12 Ensure equipment for spreading fertilisers is well-maintained and calibrated.	Nutrients <b>PAGE 10</b>
<b>IRRIGATION AND WATER USE</b>	GMP 13 Manage the amount and timing of irrigation inputs to meet plant demands and minimise risk of leaching and runoff.	Water and irrigation <b>PAGE 22</b>
	GMP 14 Design, calibrate and operate irrigation systems to minimise the amount of water needed to meet production objectives.	
<b>ANIMALS</b>		
<b>FEED</b>	GMP 15 Store, transport and distribute feed to minimise wastage, leachate and soil damage.	Storage infrastructure and waste <b>PAGE 30</b>
<b>FARM EFFLUENT AND WASTE WATER MANAGEMENT</b>	GMP 16 Ensure the effluent system meets industry-specific Code of Practice or equivalent standard.	Effluent <b>PAGE 14</b>
	GMP 17 Have sufficient, suitable storage available to enable farm effluent and waste water to be stored when soil conditions are unsuitable for application.	
	GMP 18 Ensure equipment for spreading effluent and other organic manures is well-maintained and calibrated.	
	GMP 19 Apply effluent to pasture and crops at depths, rates and times to match plant requirements and minimise risk to water bodies.	
<b>INTENSIVE GRAZING</b>	GMP 20 Select appropriate paddocks for intensive grazing, recognising and mitigating possible nutrient and sediment loss from critical source areas.	Land and soil <b>PAGE 26</b>
	GMP 21 Manage grazing to minimise losses from critical source areas.	

# Nutrients

## Good management practices



### *Why is this important?*

Nutrients come from multiple sources on farm such as fertiliser, effluent, fixation, supplementary feed and irrigation water. Having a good understanding of where nutrients are coming from and going to on your farm means you will be able to make better decisions around purchasing and applying fertiliser. Applying the right amount of fertiliser in the right place, at the right time, will ensure that you get the best possible response and return on investment, and will minimise the risk of losses to water.

After investing significant time and money into managing your nutrients and making the best decisions about what to apply, when and where, it is important the equipment can deliver what you need. Over-application of nutrients will increase the risk of leaching or runoff, wasting money and in some cases breaching rules. Under-application of necessary nutrients will result in plants and animals with reduced performance.

Nitrogen and phosphorus losses to waterways can cause undesirable plant or algal growth. This can make the waterway unsuitable for aquatic life, recreational activities and requires additional maintenance.

## 1 General nutrient management

### ✓ PRACTICE

	YES	NO
Soil-test each year for each different management block	<input type="checkbox"/>	<input type="checkbox"/>
Soil-test well before crops are planted to identify nutrient levels	<input type="checkbox"/>	<input type="checkbox"/>
Use a nutrient budget to help fertiliser decision-making	<input type="checkbox"/>	<input type="checkbox"/>
Supply farm nutrient information to your milk company at the end of each season	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Soil test results
- Nutrient budget
- Milk company nitrogen report
- Nutrient management plan

## 2 Monitor and maintain P levels at the economic optimum | GMP 9

### ✓ PRACTICE

	YES	NO
Monitor Olsen P trends of successive years	<input type="checkbox"/>	<input type="checkbox"/>
Maintain Olsen P in optimum range	<input type="checkbox"/>	<input type="checkbox"/>
Tailor fertiliser applications for different management blocks	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Soil test results
- Fertiliser recommendations
- Fertiliser invoices

## 3 Fertiliser application matches plant requirements and minimises losses | GMP 10

### ✓ PRACTICE

	YES	NO
Record all fertiliser applications – product, rate, date, location (If using contractors get the information from them)	<input type="checkbox"/>	<input type="checkbox"/>
Assess soil temperature and moisture levels before applying fertiliser (i.e. avoid winter months)	<input type="checkbox"/>	<input type="checkbox"/>
Avoid fertiliser application:		
- When heavy rainfall is forecast and runoff is likely	<input type="checkbox"/>	<input type="checkbox"/>
- Close to waterways	<input type="checkbox"/>	<input type="checkbox"/>
Apply N – ‘little and often’ and when pasture is actively growing	<input type="checkbox"/>	<input type="checkbox"/>
Assess pasture or crop growth and feed requirements before applying N	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Fertiliser proof of placement records – product, rate, date, location
- Pasture walk data / Feed wedge

## 4 Fertiliser spreading equipment is well maintained and calibrated | GMP 12

### ✓ PRACTICE

	YES	NO
Calibrate farm spreading equipment regularly – check spreading width and volume	<input type="checkbox"/>	<input type="checkbox"/>
Clean and grease spreaders routinely	<input type="checkbox"/>	<input type="checkbox"/>
Check for ‘paddock stripes’ after spreading	<input type="checkbox"/>	<input type="checkbox"/>
If using contractors: Make sure they are Spreadmark accredited	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Calibration information
- Maintenance records
- Contractor invoice

## CASE STUDY

### *Regular testing and set management rules result in wise use of nutrients*

Nathan and Rose Stoddart farm 600 cows on 210ha in Waikato. OVERSEER nutrient budgets and advice from their fertiliser representative have been integral to their nutrient management planning.

Soil testing the farm blocks, regular pasture analysis to check on trace element status and occasional animal blood tests and liver biopsy allow them to tailor fertiliser applications to get nutrients into target soil test ranges. "The crux of the whole farming system is in nutrient management. Fertiliser is our second biggest farm expense, so only put on what you need when it's actually going to make a difference. Don't scrimp but use it wisely."

"We have set some management rules for applying nitrogen fertiliser to ensure we get the best response from what we apply". In spring, when soil temperature is 8°C, the Stoddarts start applying urea at 35kg N/ha after each grazing – after assessing their feed budget and soil saturation. This continues through summer. In autumn they stop applying at the end of April or when soil temperature drops below 10°C or the soil becomes saturated – whichever comes first. "We know nitrogen applied in winter has a poor response and a high risk of leaching."



## For more information on nutrients



Visit [dairynz.co.nz/nutrients](http://dairynz.co.nz/nutrients) or phone 0800 4 324 7969 to order a resource

### Nutrient management



DairyNZ – Nutrient management on your dairy farm

DairyNZ – Reducing nitrogen loss



DairyNZ Farmfact series

- Plant nutrition (7-1)
- Determining nutrient requirements (7-2)
- Soil testing (7-3)
- Pasture testing (7-4)
- Critical nutrient levels for pasture (7-5)
- Nitrogen fertiliser (7-10)
- Seasonal nitrogen use (7-11)
- Phosphorus fertiliser (7-12)
- Sulphur fertiliser (7-13)
- Potassium fertiliser (7-14)
- Lime and soil acidity (7-15)
- Nitrogen use going into summer (7-16)
- Nitrogen use after a dry summer (7-17)
- Nutrient budgeting (7-20)
- Nutrient management (7-21)
- Nutrient value of effluent (7-22)
- Standing cows off pasture – Strategy to reduce nitrogen leaching (7-25)

### Professional support

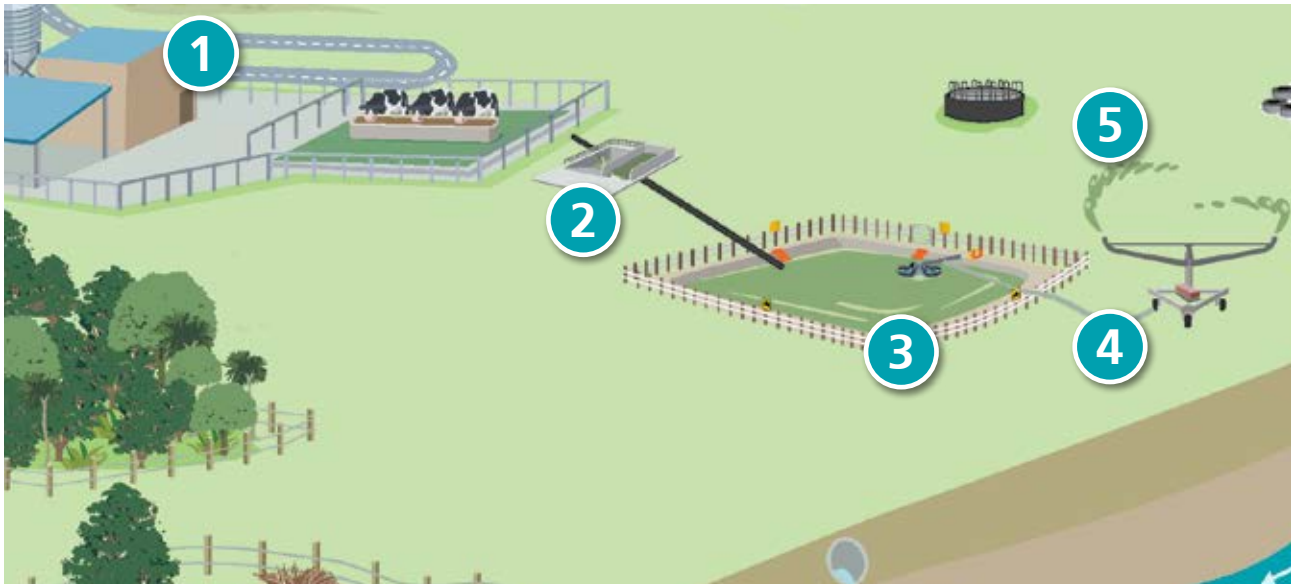


Certified nutrient management advisors

Spreadmark accredited contractors

# Effluent

## Good management practices



### Why is this important?

Effluent loss to waterways is a major risk to water quality because of the nutrients and faecal bacteria it contains. All milk companies require effluent systems to be fit for purpose and be able to achieve 365-day compliance with the rules.

Having a system that is designed to the 'Farm Dairy Effluent Design Standards and Code of Practice' provides this certainty and peace of mind.

Having sufficient effluent storage will allow you to store effluent when soil or weather conditions do not suit application and provide flexibility during summer months, allowing you to apply effluent at times that suit you.

Ensuring effluent is applied to pastures and crops, at the appropriate depth, rates and times, reduces the risk of nutrient loss through leaching and runoff and maximises the value of effluent in terms of nutrient uptake.

### 1 All effluent systems

#### ✓ PRACTICE

	YES	NO
Understand and comply with effluent consent conditions and regional rules	<input type="checkbox"/>	<input type="checkbox"/>
Have an effluent management plan	<input type="checkbox"/>	<input type="checkbox"/>
Record all effluent applications	<input type="checkbox"/>	<input type="checkbox"/>
Train staff on how to operate and maintain the effluent system	<input type="checkbox"/>	<input type="checkbox"/>

#### 🔍 EVIDENCE

- Regional council compliance record
- Effluent management plan
- Effluent application records
- Staff training records
- Operations manual

### Have you considered

Getting a Dairy Effluent Warrant of Fitness (WOF) is a simple way of checking if your system is up to scratch, and covers the above areas. For more information go to [effluentwof.co.nz](http://effluentwof.co.nz)





## 2 Effluent system meets code of practice | GMP 16

### ✓ PRACTICE

	YES	NO
Effluent is collected from all sources: dairy sheds, yards, feeds pads, underpasses	<input type="checkbox"/>	<input type="checkbox"/>
System design is appropriate for the soil type, topography, and climate	<input type="checkbox"/>	<input type="checkbox"/>
For new systems: use an accredited designer	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Effluent WOF assessment
- Effluent system design plans
- Commissioning report

## 3 Sufficient suitable storage available | GMP 17

### ✓ PRACTICE

	YES	NO
Use the Dairy Effluent Storage Calculator to work out storage needs	<input type="checkbox"/>	<input type="checkbox"/>
If building new storage, use an accredited effluent designer	<input type="checkbox"/>	<input type="checkbox"/>
Apply effluent whenever possible to keep storage low	<input type="checkbox"/>	<input type="checkbox"/>
Ensure storage facilities are sealed	<input type="checkbox"/>	<input type="checkbox"/>
Routinely remove effluent solids that accumulate	<input type="checkbox"/>	<input type="checkbox"/>
Have safety barriers, equipment and signage	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Dairy Effluent Storage Calculator report
- Storage design plans
- Pond or tank liner specifications and warranties
- Compaction/seepage test data
- Pond leakage test – approved method by your regional council

## 4 Spreading equipment is well maintained and calibrated | GMP 18

### ✓ PRACTICE

	YES	NO
Calibrate effluent irrigator/spreading equipment	<input type="checkbox"/>	<input type="checkbox"/>
Inspect and maintain effluent equipment regularly	<input type="checkbox"/>	<input type="checkbox"/>
Service effluent pumping equipment routinely	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Effluent calibration results – bucket test
- Maintenance schedule/records
- Servicing invoice

## 5 Effluent applied at correct depth, rate and time | GMP 19

### ✓ PRACTICE

	YES	NO
Adjust effluent application timing and rates based on soil moisture levels	<input type="checkbox"/>	<input type="checkbox"/>
Spread nutrient load evenly across the largest area practical	<input type="checkbox"/>	<input type="checkbox"/>
Test for high potassium (K) levels on effluent block to avoid animal health issues	<input type="checkbox"/>	<input type="checkbox"/>
Adjust fertiliser application to effluent areas based on soil tests	<input type="checkbox"/>	<input type="checkbox"/>
Identify and record risk areas for effluent application on map	<input type="checkbox"/>	<input type="checkbox"/>
Consider odour impact during application	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Soil test results
- Nutrient budget – effluent report
- Effluent application area risk map
- Rainfall/soil moisture records

## CASE STUDY

### *Investing time training your team in effluent management - well worth the effort*

Chris and Charlene Withy, 50:50 sharemilkers from Southland, say that investing time into training your farm team has benefits across the business.

Every new staff member goes through a specific training process when they arrive, part of which is how to manage the effluent system.

“We take everyone through it all, from the collection sump, storage pond and irrigator and make sure they know what it should look like and how to set it up.”

“One key thing during the effluent training is to ensure they know how to set up the irrigator properly. To make sure we are putting on the right amount of effluent, we go through the gearing on the irrigator and explain exactly which gear we have it in when things are wet and how to change it when soils are dry.”

To help in staff training the Withys have laminated their effluent management plan, effluent map and a photo of their irrigator setup and put it up on the office wall.

“Keeping the system simple seems to work well.”



## For more information on effluent



Visit [dairynz.co.nz/effluent](https://dairynz.co.nz/effluent) or phone 0800 4 324 7969 to order a resource

### All systems

 DairyNZ – Effluent compliance checklist – (Regionally specific)

 DairyNZ – Farmfact: effluent series

DairyNZ – Effluent management plan

DairyNZ – Irrigator run sheet


### Designing or upgrading systems

 DairyNZ – FDE systems – Planning the right system for your farm

DairyNZ – FDE design standards and code of practice


DairyNZ – Pocket guide to determine soil risk for FDE application

### Effluent storage

 Dairy effluent storage calculator


DairyNZ – Effluent technical note – Pond leakage measurement approaches


DairyNZ – Working volume calculator

 DairyNZ – A farmer's guide to building a new effluent storage pond

IPENZ Practice Note 21 – Farm dairy effluent pond design and construction


### Effluent system operation


 DairyNZ – Effluent depth testing calculator

 DairyNZ – A staff guide to operating your effluent irrigation system – Low rate system

DairyNZ – A staff guide to operating your effluent irrigation system – Travelling irrigator


DairyNZ – Farmers guide to managing FDE – A good practice guide for land application systems

 DairyNZ – Farm dairy effluent spreading calculator app

 Primary ITO – Effluent management planning (For farm managers/sharemilkers) [primaryito.ac.nz](https://primaryito.ac.nz)

Primary ITO – Dealing with dairy farm effluent (For the whole farm team) – [primaryito.ac.nz](https://primaryito.ac.nz)

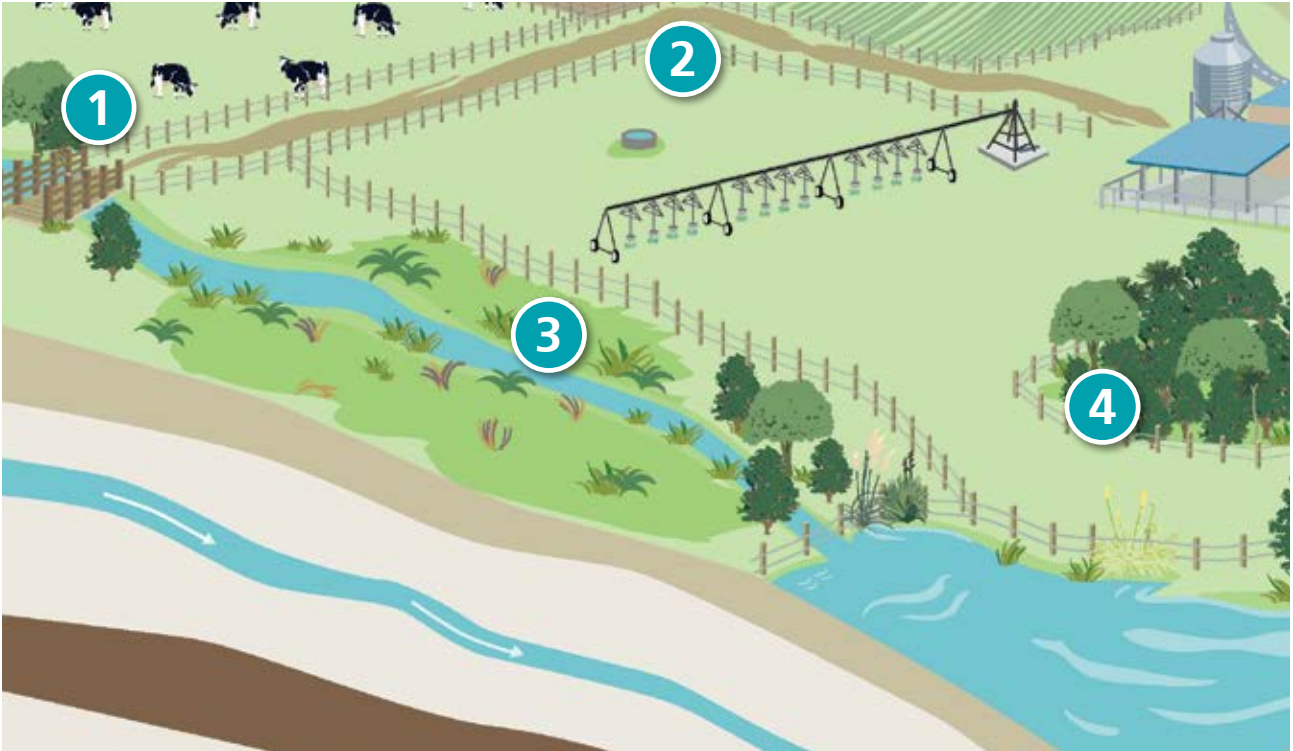
### Professional support

 Dairy effluent warrant of fitness assessment

Farm dairy effluent system accredited designer

# Waterways and biodiversity

## Good management practices



### *Why is this important?*

Keeping stock out of waterways ensures stock stay safe and waterways stay healthy. Stock in waterways deposit dung and urine which increase nutrient and bacteria levels in the water. It also causes erosion and disturbance of stream banks and beds. Stock exclusion is one of the best things you can do to improve water quality.

Sediment, faecal bacteria and phosphorus can also enter waterways by overland flow. The use of buffer strips and riparian planting not only reduces overland flow of nutrients and sediment, it also provides shade and habitat for aquatic life.

Wetlands and areas of native vegetation are important natural filters and habitat for plants and animals. Protecting these areas from stock access and weed growth can have significant benefits.

# 1

## Identify areas where runoff may occur and manage to avoid runoff entering waterways | GMP 6

### ✓ PRACTICE

	YES	NO
Identify risk areas where surface runoff may enter waterways	<input type="checkbox"/>	<input type="checkbox"/>
Leave a grass buffer strip or riparian plantings between waterway and fence	<input type="checkbox"/>	<input type="checkbox"/>
If cultivating paddocks leave an uncultivated buffer strip between cultivation and waterway (the steeper the land the wider the buffer strip needs to be)	<input type="checkbox"/>	<input type="checkbox"/>
Ensure bridges and culverts have raised sides or mounds to stop runoff entering waterway	<input type="checkbox"/>	<input type="checkbox"/>
If the track is beside a waterway, slope the track in the opposite direction to avoid effluent and sediment flowing into the waterway	<input type="checkbox"/>	<input type="checkbox"/>
Maintain track cut-outs to appropriately direct track runoff	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Risk areas identified on farm map
- Record any riparian fencing, planting or buffer strips on farm map
- Cropping / pasture renewal policies and procedures
- Culvert or bridge design plans
- Track maintenance records

# 2

## Tracks, feed areas, gateways and troughs are located away from waterways | GMP 7

### ✓ PRACTICE

	YES	NO
Locate tracks away from waterways if practical	<input type="checkbox"/>	<input type="checkbox"/>
Feed out supplement away from waterways	<input type="checkbox"/>	<input type="checkbox"/>
Locate water troughs away from waterways in a dry area of paddock	<input type="checkbox"/>	<input type="checkbox"/>
Ensure gateways are in a dry point and are wide enough for good cow flow to reduce pugging	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Farm map identifying tracks, feed areas, and troughs

# 3

## Stock are excluded from waterways | GMP 8

### ✓ PRACTICE

	YES	NO
Fence all permanently flowing waterways (including wetlands)	<input type="checkbox"/>	<input type="checkbox"/>
Bridge or culvert across regular stock crossings	<input type="checkbox"/>	<input type="checkbox"/>
Temporarily fence any temporary streams if grazing while water is flowing	<input type="checkbox"/>	<input type="checkbox"/>
Develop a riparian management plan (include any plantings)	<input type="checkbox"/>	<input type="checkbox"/>
Ensure drains are well managed	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Farm waterway map with fencing and crossings shown
- Riparian management plan

# 4

## Areas of native plants or significant biodiversity are protected

### ✓ PRACTICE

	YES	NO
Identify areas on farm map	<input type="checkbox"/>	<input type="checkbox"/>
Fence stock out of the area	<input type="checkbox"/>	<input type="checkbox"/>
Control weeds within the area	<input type="checkbox"/>	<input type="checkbox"/>
Trap or poison animal pests	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Farm map
- Weed and pest management records

## CASE STUDY

### *Riparian area now considered a valued part of the farm system*

Boggy Creek, a tributary of Te Waihora/Lake Ellesmere, flows through the entirety of Phil Garrett's 440 hectare farm in Leeston. Phil has driven the riparian fencing and planting on the farm and now considers it to be another part of the farm system.



Riparian management began on the farm when Environment Canterbury offered to plant along Boggy Creek once it was fenced. Seeing the benefits of fencing and planting, such as added stock shelter and a greater bee population, Phil continued to fence the rest of his drains.

Phil says Boggy Creek used to need fairly regular clearing as it suffered from a high sediment load due to stock access. Since planting, Phil has seen a significant improvement. "It no longer needs clearing and is back to its original shingle bottom".

Boggy creek is constantly flowing and often floods during high rain fall. Phil has planted carex secta beside the stream which is resilient to flooding – moving to accommodate the extra water and bouncing back when the water recedes. Flaxes and larger plants are placed further up the bank to avoid being ripped out when the water flow is higher and stronger.

Weed removal is a priority for Phil to ensure that plants are established successfully. Spot spraying is used a month before planting to minimise competition for the plants. Gorse and blackberry are the main weed concerns in the planted areas and crack willow is also a problem as it is plentiful at the source of the creek. Yearly maintenance spraying ensures these weeds are kept under control.

#### **TOP TIPS – Phil Garrett**

##### **"Be patient, plants look messy for the first year"**

Plants will be alive and thriving in the second year if you've planted correctly and kept up with maintenance, but in the first year, they can look a bit messy. We have plants that are eight years old and reaching maturity – they look really great.

##### **"Keep on top of maintenance after planting"**

Plant maintenance is a big task. There is a lot of labour involved, particularly in the first three to five years. You can get a contractor in or get your farm team to help out and it makes a difference to your success and plant survival rates.

##### **"Plant wet, unproductive areas as well"**

A triangle of land was created when our races were adjusted to suit the central pivot. This area was naturally wet and unproductive. We created a wetland area by planting flax and carex species. They filter runoff from the races and grow low enough to not hit the pivot.

## For more information on waterways



Visit [dairynz.co.nz/waterways](http://dairynz.co.nz/waterways) or phone 0800 4 324 7969 to order a resource



DairyNZ – Riparian planner (online April 2016)



DairyNZ – Getting riparian planting right in your region – Your step by step guide to successful riparian planting



DairyNZ – Waterway technical note series

- Planning
- Crossings
- Drains
- Fencing
- Managing erosion
- Pest animals
- Pest plants
- Planting
- Waterway management solution finder

DairyNZ – Farmfact series

- Road underpasses (8-7)
- Key benefits of managing waterways (5-1)
- Planning and getting started (5-2)
- Fencing (5-3)
- Full planting (5-5)
- Controlling weeds and pests (5-6)
- Protecting wetlands and seeps (5-7)
- Constructing and maintaining drains (5-8)

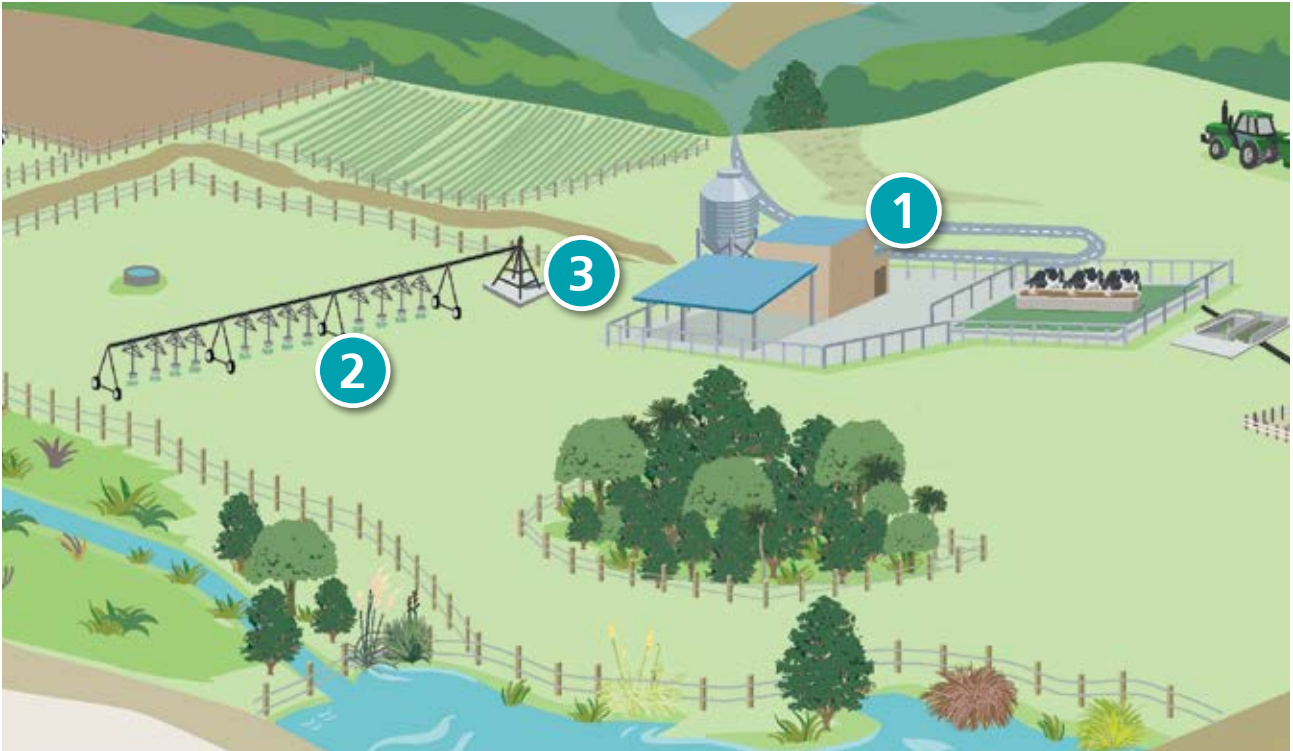


DairyNZ – IPENZ practice note 27 dairy farm infrastructure

The sustainable dairying: water accord

# Water and irrigation

## Good management practices



### *Why is this important?*

Water is arguably the most important resource on farm, even more so on irrigated farms. Often there is limited water available and costs associated with pumping it around the farm. Water taken for farming is removed from the natural cycle and may reduce stream flows or groundwater levels. Ensuring water is not wasted will save money and benefit the environment.

A well-designed irrigation system is easier to manage and more reliable. Managing well is still key to ensuring the system operates efficiently and that water is applied at the right depth across the farm. This will result in more even pasture growth and easier pasture management. An efficient irrigation system also allows you to better match water application to soil, plant and production requirements. This will maximise efficiency within the farm system in terms of production, electricity usage, and wear and tear on equipment. It also means that excess water is not draining the soil of nutrients or resulting in runoff that may contaminate groundwater and waterways.



# 1

## Water use for the dairy shed and stock water is efficient

### ✓ PRACTICE

	YES	NO
Measure all water use on farm (water meters)	<input type="checkbox"/>	<input type="checkbox"/>
Minimise water wastage from the dairy shed	<input type="checkbox"/>	<input type="checkbox"/>
Ensure all leaks are fixed as soon as possible	<input type="checkbox"/>	<input type="checkbox"/>
Check water troughs daily where animals are grazing	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Water meter and telemetry records
- Maintenance records

# 2

## Irrigation rates and timing match plant requirements | GMP 13

### ✓ PRACTICE

	YES	NO
Irrigate to replace soil moisture deficit only	<input type="checkbox"/>	<input type="checkbox"/>
Assess soil moisture levels and weather when scheduling irrigation by:		
- Estimate soil moisture levels with a soil water budget or	<input type="checkbox"/>	<input type="checkbox"/>
- Monitor soil moisture levels with real time soil moisture equipment		
Measure all water use on farm (water meters)	<input type="checkbox"/>	<input type="checkbox"/>
Monitor large water takes (telemetry)	<input type="checkbox"/>	<input type="checkbox"/>
Record irrigation events - when, where, amount	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Soil water budgets, moisture trace or data
- Irrigation scheduling – rainfall records, soil tapes/probes/sensors
- Water efficiency calculations
- Water meter and telemetry records
- Irrigation event and location records

# 3

## Design, calibrate and operate irrigation systems to use water efficiently | GMP 14

### ✓ PRACTICE

	YES	NO
Use an accredited design and installation company – “Blue tick” for new irrigation system or upgrades	<input type="checkbox"/>	<input type="checkbox"/>
Evaluate irrigation system annually to check application efficiency and performance (consider using a skilled professional to assess)	<input type="checkbox"/>	<input type="checkbox"/>
Carry out routine bucket tests to assess performance	<input type="checkbox"/>	<input type="checkbox"/>
Inspect and maintain regularly	<input type="checkbox"/>	<input type="checkbox"/>
Train all staff using the system (Consider Irrigation NZ’s operator and manager training)	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Irrigation system design plans
- Commissioning report
- Calibration results – bucket test
- Maintenance schedule/records
- Servicing invoice
- Training records

## CASE STUDY

### *More grass with half the water*

Scott Searle is using half as much water and growing more grass than ever.

Scott is a lower order sharemilker on a mid-Canterbury farm which is 80% irrigated in an area where water restrictions are common. He is dedicated to achieving maximum production while using minimum irrigation water.

Keeping tabs on water use is easy; every litre of water that is pumped up from the groundwater for irrigation is recorded by a water meter. The information is then automatically sent to Environment Canterbury so they can see at any point what is going on.

Scott had started to notice that after the irrigators had been through, there were areas on the farm where the water was ponding. So after much consideration and discussion with his consultant, Scott decided to run his Roto-rainer travelling irrigators at double speed.

“By running the Roto-rainers at twice the speed you put on half the water and only use half the power. This is great at the shoulders of the season when you really only need half the water anyway.”

Scott saw that to use his water more efficiently he needed to better understand the soil moisture levels, so invested in soil moisture tapes ‘Aquaflex’ across the irrigated areas of the farm.

He added an extra sensor below the root zone to check that water doesn't go through the soil profile. “Basically it is just using technology to see what's actually happening. It means that we are making decisions based on facts rather than just guessing.”

“Every farmer has been guessing for 50 years, when to stop and start irrigating. What the technology does is tell you exactly when to start irrigating and actually see what is going on down there.”

“The power and water we save benefits our bottom line too. There is no advantage in wasting water, we are paying huge amounts of money to pump it and the saving you can make from better understanding when to use it is massive.”



## For more information on irrigation



Visit [dairynz.co.nz/water-use](http://dairynz.co.nz/water-use) or phone 0800 4 324 7969 to order a resource

### General



[irrigationnz.co.nz](http://irrigationnz.co.nz)

[dairynz.co.nz/water-use](http://dairynz.co.nz/water-use)

### Operation and management



DairyNZ – Guide to good irrigation – Part 1 – Good irrigation practices on farm

DairyNZ – Guide to good irrigation – Part 2 – Good irrigation practices for farm owners and managers

DairyNZ – DIY irrigation evaluation



DairyNZ – Irrigation depth testing calculator

### Professional support



Irrigation NZ – Certified irrigation designer

Irrigation NZ – Qualified irrigation performance assessors

### Training



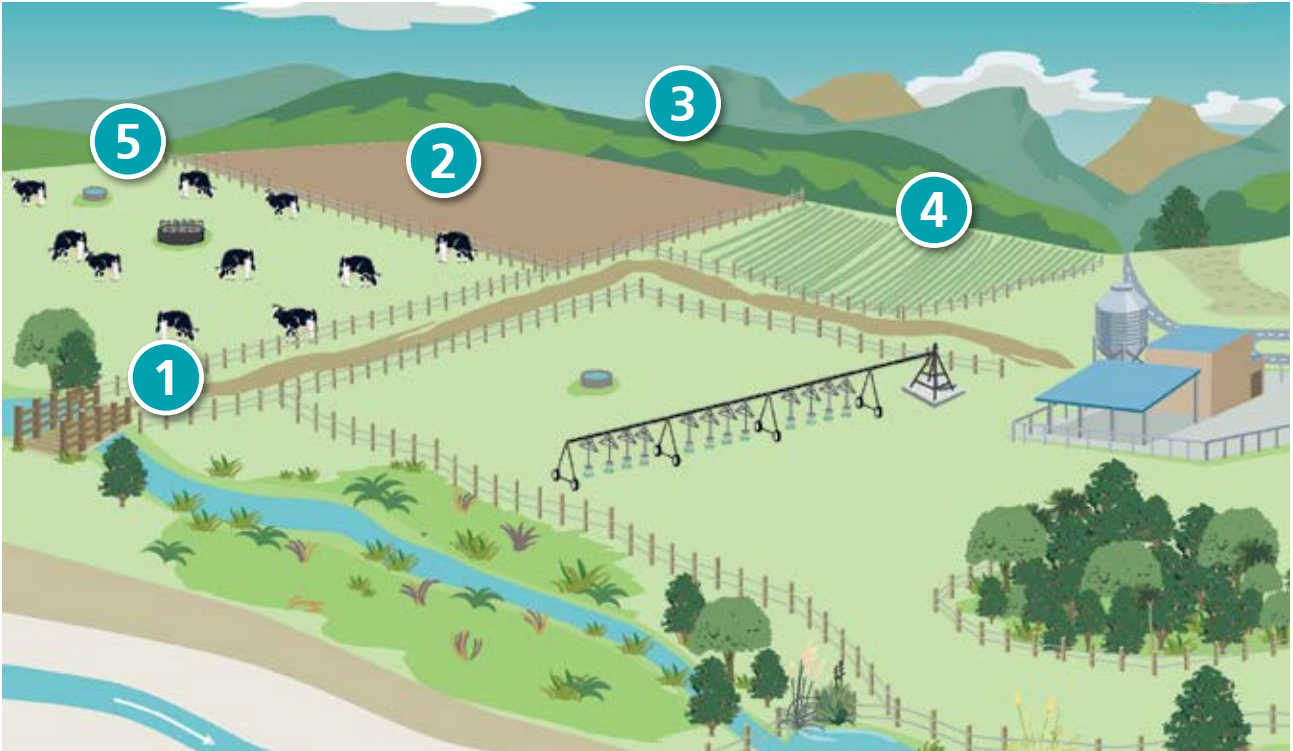
Irrigation NZ – Irrigation operator and manager training

Irrigation NZ – Irrigation system development (for farmers beginning irrigation development)



# Land and soil

## Good management practices



### Why is this important?

Land and more specifically the soils are the fundamentals of a productive dairy farm. Management practices which result in pugging, compaction, extended periods of bare soil and grazing unsuitable land will all result in top soil damage, erosion and loss of production.

Topsoil is nutrient rich and losing it into waterways is not only expensive to the farm in terms of replacement nutrient costs, it is also damaging to the waterway.

Sediment can be a limiting factor to water quality as it will discolour the water and silt up stream beds which damages aquatic habitat.

Nutrients, most notably phosphorus attached to the sediment, can cause undesirable plant and algal growth which harms aquatic life. Sediment accumulation also has downstream impacts on rivers, estuaries and harbours.

1

### Minimise losses of sediment and nutrient to water, and maintain soil structure | GMP 3

#### ✓ PRACTICE

	YES	NO
Avoid pugging and compaction of soils	<input type="checkbox"/>	<input type="checkbox"/>
Consider no tillage or low impact cultivation methods and timing	<input type="checkbox"/>	<input type="checkbox"/>
Locate supplement feed-out areas away from waterways	<input type="checkbox"/>	<input type="checkbox"/>
Leave riparian margins or buffer strips beside waterways and other areas where sediment and nutrients may flow such as gullies or swales.	<input type="checkbox"/>	<input type="checkbox"/>

#### 🔍 EVIDENCE

- Wet weather management policies
- Cropping / pasture renewal policies and procedures
- Record retired, fenced and erosion-planted areas on farm map

## 2 Reduce periods of bare soil between crops and pasture to reduce erosion and leaching | GMP 4

✓ PRACTICE	YES	NO
Re-sow bare paddocks as soon as practical	<input type="checkbox"/>	<input type="checkbox"/>
Rest and re-sow erosion damaged areas	<input type="checkbox"/>	<input type="checkbox"/>
Subsoil, rip or cultivate compacted soils	<input type="checkbox"/>	<input type="checkbox"/>
Use cover crops (e.g. oats, mustard) to reduce losses and increase soil organic matter	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Cropping / pasture renewal policies and procedures
- Sowing and grazing dates recorded in farm diary

## 3 Retire all LUC 8 land and retire LUC 7e land or ensure that it has soil conservation measures in place | GMP 5

✓ PRACTICE	YES	NO
Identify any LUC 8 and 7e land on the property	<input type="checkbox"/>	<input type="checkbox"/>
Permanently fence off LUC 8 and 7e land areas	<input type="checkbox"/>	<input type="checkbox"/>
Plant areas to protect from erosion if practical	<input type="checkbox"/>	<input type="checkbox"/>

*Note: LUC means land use capability*

### 🔍 EVIDENCE

- LUC map of farm
- Record retired, fenced and planted erosion-risk areas on farm map

## 4 Use appropriate paddocks for intensive grazing | GMP 20

### ✓ PRACTICE

Select low risk paddocks for intensive grazing that are ideally:	YES	NO
- Further away from waterways	<input type="checkbox"/>	<input type="checkbox"/>
- With soils least likely to pug and compact	<input type="checkbox"/>	<input type="checkbox"/>
- Flatter with as few gullies and swales as possible	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Winter crop paddock selection tool
- Map winter cropping areas

## 5 Manage grazing to minimise nutrient loss from risk areas | GMP 21

### ✓ PRACTICE

If paddocks near waterways have to be used during wet periods, fence off a buffer strip beside the waterway	YES	NO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Offer more feed in cold conditions when demand is high and utilization low	<input type="checkbox"/>	<input type="checkbox"/>
When break feeding:		
- Feed towards the waterway	<input type="checkbox"/>	<input type="checkbox"/>
- Move fences daily rather than offering a few days feed at a time	<input type="checkbox"/>	<input type="checkbox"/>
- Back-fence land that has already been grazed	<input type="checkbox"/>	<input type="checkbox"/>
Crops:		
- Offer long narrow breaks rather than wide breaks	<input type="checkbox"/>	<input type="checkbox"/>
- Sow crops across slopes not up and down where practical	<input type="checkbox"/>	<input type="checkbox"/>

### 🔍 EVIDENCE

- Winter management plan
- Wet weather management policies

## CASE STUDY

### *A phosphorus sensitive catchment drives new winter management plan*

Greg and Renee Rooney farm in a P-Sensitive catchment. Over the past five years they have followed a plan to reduce the amount of sediment and P lost from winter grazing.

For them, the grazing and pugging of paddocks during wet weather was increasing the risk of surface runoff causing loss of sediment and phosphorus to the creek.

Over the past couple of years Greg and Renee have started to use more on/off grazing to help minimise compaction and pugging soil during extremely wet times. Greg now always moves stock to higher ground away from the creek during times of high rainfall.

Greg is focusing on having contented cows during wet weather periods. “The secret to managing soils is to treat the cows well by keeping them fully fed, because the day you run out of feed is the day you are in trouble and the damage is caused.”

#### FARMER'S TIP

“We select lighter free-draining paddocks for wintering cows to limit pugging, but are aware this can increase nutrient leaching, so we reduced our stocking rate to match feed supply and limit environmental damage.”

*Dave Ashby, Cust*

#### FARMER'S TIP

“Farm maps are a great way to pull together a whole lot of ideas. We have a laminated map that we draw all over and show problem areas and describe what’s going on.”

*Nick Hunt, Manawatu*

For good wintering and land management practices- especially in Southland and South Otago – refer to this practical guide.



## For more information on land and soil



Visit [dairynz.co.nz/environment](http://dairynz.co.nz/environment) or phone 0800 4 324 7969 to order a resource

### General



[dairynz.co.nz/environment](http://dairynz.co.nz/environment)

### Land management



DairyNZ – Land management regional guides series



DairyNZ – Farmfact series – Limiting pugging and compaction damage (5-40)

### Wintering



DairyNZ – Wintering in Southland and South Otago

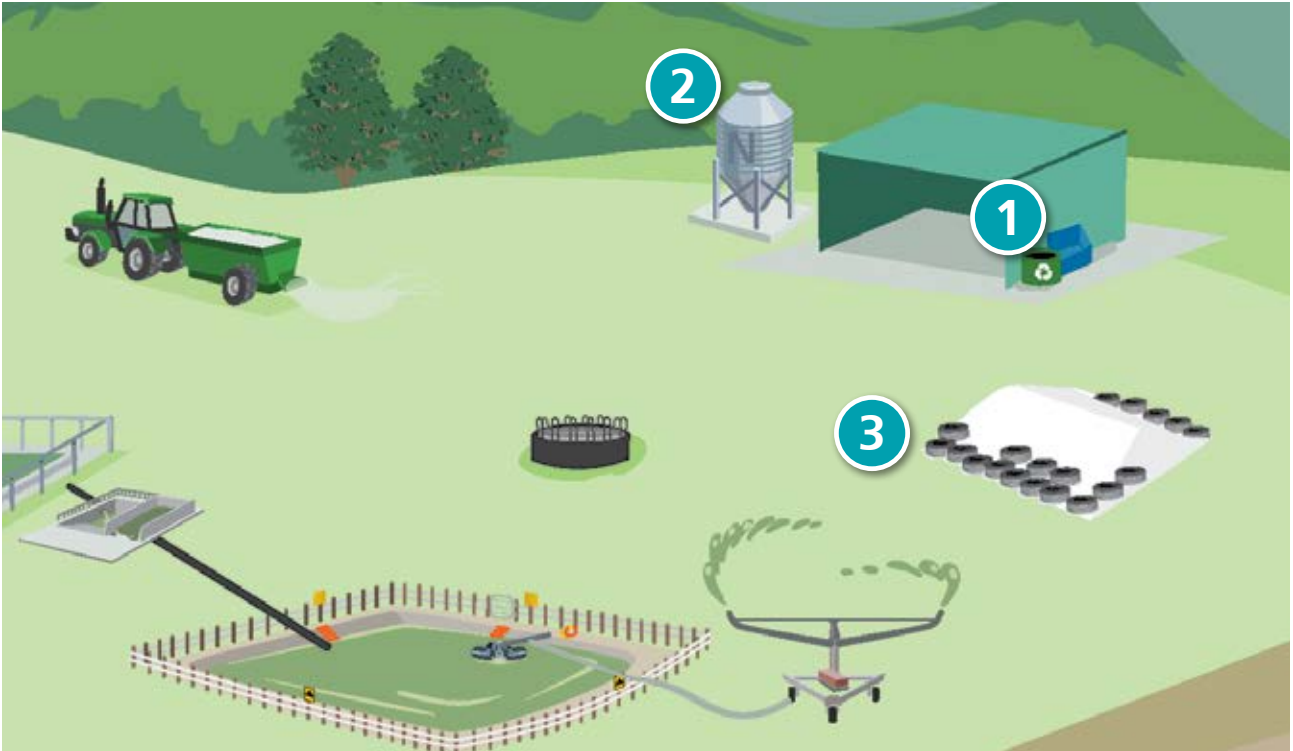
DairyNZ – Crop paddock selection tool

DairyNZ – Reviewing your wintering system



# Storage infrastructure and waste

## Good management practices



### *Why is this important?*

Feed and fertiliser are significant financial investments and a major source of nutrients into the farm system. Make sure you are getting maximum value from your investment by ensuring that storage and loading is carried out correctly to avoid wastage and reduce the chances of any nutrients entering and contaminating waterways.

Waste including farm waste, household waste and dead stock pose the risk of contamination of waterways, groundwater and land. Appropriate management reduces this risk.



# 1

## Farm waste is minimised and managed properly



### PRACTICE

	YES	NO
Recycle waste where possible	<input type="checkbox"/>	<input type="checkbox"/>
Contain and remove waste from farm where feasible	<input type="checkbox"/>	<input type="checkbox"/>
Send dead animals for processing or correctly dispose on-farm	<input type="checkbox"/>	<input type="checkbox"/>
Any on-farm waste pits are small, away from waterways, and above the water table	<input type="checkbox"/>	<input type="checkbox"/>
Control pests	<input type="checkbox"/>	<input type="checkbox"/>



### EVIDENCE

- Refuse transfer receipts/invoices
- Dead stock collection invoices

# 2

## Store and load fertiliser with minimal spillage and leaching | GMP 11



### PRACTICE

	YES	NO
Follow 'Fertiliser Industry - Code of Practice' for fertiliser handling, storage and use	<input type="checkbox"/>	<input type="checkbox"/>
Locate storage sites away from waterways	<input type="checkbox"/>	<input type="checkbox"/>
Ensure stored fertiliser is covered	<input type="checkbox"/>	<input type="checkbox"/>



### EVIDENCE

- Farm map with storage sites identified
- Fertiliser storage and handling policy

# 3

## Store, transport and distribute feed with minimal wastage, leachate and soil damage and leaching | GMP 15



### PRACTICE

	YES	NO
Locate feed storage areas away from waterways	<input type="checkbox"/>	<input type="checkbox"/>
Store silage and other feeds on hard-sealed areas and collect leachate	<input type="checkbox"/>	<input type="checkbox"/>
Divert overland flow and rain water away from feed storage area	<input type="checkbox"/>	<input type="checkbox"/>
Ensure silage has been sufficiently wilted before being put into stack	<input type="checkbox"/>	<input type="checkbox"/>
Ensure silage remains sealed while stored to prevent rotting	<input type="checkbox"/>	<input type="checkbox"/>
Permanent feed-out areas / facilities are sealed and effluent is collected	<input type="checkbox"/>	<input type="checkbox"/>



### EVIDENCE

- Farm map identifying feed storage and feed out areas
- Feed out area design plans

## For more information on storage infrastructure and waste



Visit [dairynz.co.nz/environment](http://dairynz.co.nz/environment) or phone 0800 4 324 7969) to order a resource

### Farm waste



DairyNZ – Farmfact series

- Farm dumps and offal pits (5-35)
- Disposal of agrichemicals, containers and drums (5-36)
- Composting dead stock (5 -37)



[agrecovery.co.nz](http://agrecovery.co.nz) (Rural recycling programme)

Local regional council website

### Storage infrastructure



[fertiliser.org.nz](http://fertiliser.org.nz) – Best management practices for fertiliser handling and storage

DairyNZ – FarmFact series

- Designing silage and feed storage areas (1-48)
- Grass silage – The preservation process (1-43)
- Losses when making pasture silage (1-44)



DairyNZ – IPENZ practice note 27 dairy farm infrastructure



*dairynz.co.nz*