DairyNZ

# Good farming practices for environmental management

## Dairy Farm Systems

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DairyNZ Corner Ruakura and
Morrinsville Roads Private Bag 3221
Hamilton 3240

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# Introduction

Implementing good farming practices on-farm is not only efficient – it helps to minimise business risk and reduce 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 and focuses on ten key areas for environmental management:

- Nutrients
- Critical Source Areas
- Waterways
- Land and Soil
- Effluent
- Water Use and Irrigation
- Hazardous Substances
- Waste Minimisation
- Biodiversity and Mahinga Kai
- Greenhouse Gases

Each area contains dairy specific Good Farming Practices (GFPs) and detailed explanations of how they can be achieved. It also provides examples of the information that can be used to demonstrate their achievement.

The GFPs are environmental management practices for sustainable dairy farming in New Zealand; and their development has been supported by the dairy companies.

In addition to GFPs, Leading Practices have also been included as suggested future goals for dairy farmers to aim towards.

This Dairy GFP guide is based on the Good Farming Practice Principles initially developed for the Good Farming Practice Action Plan for Water Quality[1]. The Action Plan is a voluntary commitment by the wider primary sector to accelerate the uptake of GFPs for water quality (primarily) and quantity outcomes, to measure and demonstrate this uptake, and to communicate progress.

The Dairy GFPs have been developed to provide a more detailed understanding of what is needed on farm to meet good farming practice on dairy farms. They form the foundation of, and underpin farm environment plans, and provide a framework to support reporting of sector progress.

While the Dairy GFP set minimum criteria for dairy farming, in some areas individual dairy farmers may need to go further. This could be where national regulations, or regional council requirements or consent conditions require farmers to meet additional practice standards, in catchments where there are freshwater and/or ecosystem health challenges.

[1]The Good Farming Practice Action Plan for Water Quality can be found at **dairynz.co.nz/media/5vjnydw4/good_farming_practice_for_water_action_plan_2018_v7.pdf**

# How to use this guide?

This guide is divided into 10 key environmental management areas: Nutrients, Critical Source Areas, Waterways, Land and Soil, Effluent, Water Use and Irrigation, Hazardous Substances, Waste Minimisation, Biodiversity and Mahinga Kai, and Greenhouse Gases. An overarching Farm Information, Assessment and Reporting section provides guidance on good data, monitoring and reporting approaches.

Each management area is further divided into practices. For each an explanation of what is required to meet good practice is given, plus links to other relevant information. Leading Practice explanations are also given to highlight ways to go beyond good practice.

**Step 1**

## Practice

For each GFP,  identify the practices that are relevant to your farm. For those that are, work out which ones you are already meeting, and which ones you are still working towards.

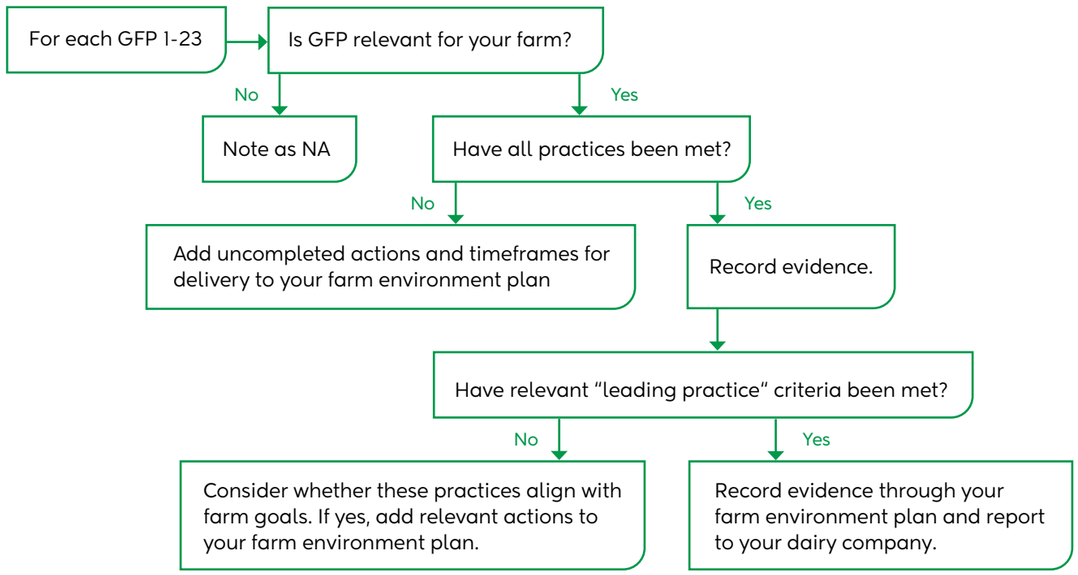
Uncompleted actions and timeframes for completion are added to the farm environment plan.

**Step 2**

## Evidence

For each GFP, if requested, provide evidence for completion of the practice to your dairy company. Examples of types of evidence are given. For actions that have not yet been achieved, capture and prioritise them through your farm environment plan.

Note that dairy companies may use this information to highlight sector progress and scientifically assess the environmental improvements achieved by farmer action. Data will only ever be used in an anonymised way; individual farm actions will not be reported.




# Contents

# Farm Information, Assessment & Reporting

## The characteristics of the farm and the farm system are identified[2]

| | |
|---|---|
| The property and farm enterprise details[3] are recorded, including: | Physical address |
| | Owner(s), manager and name and contact details of the primary contact person |
| | Farm name(s), legal description(s) of the land, and any relevant farm identifiers |
| | Size of the operation (hectares) |
| | A description of the farming activities |
| A map(s)[4] or aerial photograph of the farm is produced at a scale that clearly shows: | Boundaries of the property or land areas being farmed |
| | Boundaries of the main land management units and land uses on the property |
| | Location of infrastructure including boundary fences, entranceways, tracks, buildings, stockyards, washdown sites, agrichemical and fuel storage sites, offal pits, rubbish dumps, effluent ponds, underpasses, feed-pads, wintering or stand-off pads, housing, silage pits and irrigation |
| | Location of permanent and intermittently flowing waterways (rivers, streams, lakes, drains, ponds, dams and wetlands) |
| | Location of riparian vegetation and fences (permanent and temporary) adjacent to waterways |
| | Locations where stock access or stock crossing of waterways occurs |
| | Location of any Criticial Source Areas, i.e., features in the landscape where water flows naturally or accumulates, and there is a connection to waterways (gullies, swales) |
| | Location of any contaminant hotspots, i.e., point sources (stock camps, stream crossings, yards and stock holding areas, stand-off pads and silage pits) |
| | Location of flood protection or erosion control assets, including flood protection vegetation |
| | Location of public access routes or access routes used to maintain waterways |
| | Māori and European archaeological sites |
| | Location of any significant indigenous areas or Mahinga kai sites |
| | Resource consents held by the property or farm enterprise |

| | |
|---|---|
| **Evidence** | Farm description and map |

**Further Information**

**Regulatory requirements**

Freshwater Farm Plan Regulations; Regional Plan Rules; Consent Conditions

[2]Good Farming Practice (GFP) Principles (2018) alignment: 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

[3]The property and farm enterprise details will be updated once the FW FP regulatory requirements are known

[4]The mapping information requirements will be updated once the FW FP requirements are known

# A risk assessment of the farms inherent and management activity risks is undertaken[5]

| | |
|---|---|
| A risk assessment[6] is undertaken that includes: | Risk Identification – List the relevant rules and regulations that must be met, the farm management activities being undertaken, and the farms inherent risks; from these identify the relevant Dairy GFP for the farm system |
| | Risk Analysis – Assess each Dairy GFP (including any associated rules and regulations) to determine if it is being achieved |
| | Risk Treatment – List actions to be taken to achieve each Dairy GFP, and rules and regulations, including:<br>• What actions are already in place<br>• What actions need to be put in place<br>• Timeframes for these actions to occur |

| | |
|---|---|
| **Evidence** | Risk assessment |

**Further Information**

**Regulatory requirements**

Freshwater Farm Plan Regulations; Regional Plan Rules; Consent Conditions

[5]Good Farming Practice (GFP) Principles (2018) alignment: 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

[6]The risk assessment process will be updated once the FW-FP regulatory requirements are known



# Accurate and auditable records are kept of annual farm inputs, outputs and management practices[7]

| | |
|---|---|
| Accurate and auditable records are kept that: | Support the farms risk assessment process |
| | Provide evidence of farm inputs, management practices and outputs that support the actions being undertaken to achieve the Dairy GFP and reduce any additional risks identified through the risk assessment |

| | |
|---|---|
| **Leading Practice** | Farm management software is used to track and record all farm inputs, outputs, and management activities |

| | |
|---|---|
| **Evidence** | Records of farm inputs, outputs and management practices |

**Further Information**

**Regulatory requirements**

Freshwater Farm Plan Regulations; Regional Plan Rules; Consent Conditions

[7]Good Farming Practice (GFP) Principles (2018) alignment: 2. Maintain accurate and auditable records of annual farm inputs, outputs and management practices

# Nutrients

## Soil phosphorus levels are monitored and maintained below or within the target ranges for the soil-type and crop[8]

| Soil Tests | |
|---|---|
| For each land management unit Olsen-P (or an equivalent recognised soil test) levels are monitored: | Annually for capital applications |
| | Biennially for maintenance applications |

| | |
|---|---|
| **Leading Practice** | Olsen-P (or an equivalent recognised phosphate soil test) is monitored at the paddock scale |
| **Evidence** | • Olsen-P (or equivalent) soil test monitoring results<br>• Nutrient budget prepared by a suitably qualified person |

**Further Information**

**Fertiliser Association**
fertiliser.org.nz/Site/resources/booklets.aspx

fertiliser.org.nz/includes/download.ashx?ID=147241

**Regulatory requirements**

Freshwater Farm Plan Regulations; Freshwater NES (190-N Cap); Regional Plan Rules; Consent Conditions

[8]Good Farming Practice (GFP) Principles (2018) alignment: 4. Monitor soil phosphorus levels and maintain them at or below the agronomic optimum for the farm system

# The amount and timing of fertiliser inputs, takes account of all sources of nitrogen and phosphorus, matches plant requirements and minimises losses to waterways and groundwater[9]

| Soil Tests | |
|---|---|
| For each land management unit at a minimum: | Prior to any capital fertiliser applications |
| | Biennially for maintenance fertiliser applications |
| | Soil tests, including soil mineral N-testing, are taken for every paddock where long-term pasture is going into forage or other crops |
| | Soil tests are taken at least 6 weeks prior to the fertiliser application[10] |

| Nutrient Budget | |
|---|---|
| A nutrient budget is prepared annually by a suitably qualified person<br>The nutrient budget accounts for: | Different soil types |
| | Different slope classes |
| | All sources of nutrient:<br>• Soil nutrient status (including soil pH)<br>• Organic fertilisers including manure and liquid effluent<br>• Imported feed<br>• Previous land use (grazings and crops) |
| | The nutrient budget is used to set the farms annual fertiliser applications for each land management unit[11] |

| Fertiliser Application Records | |
|---|---|
| All fertiliser applications are recorded, including: | Product |
| | Rate |
| | Date |
| | Location |

| Fertiliser Application |
|---|
| Feed budgets and feed wedges are used in combination with nutrient budgets to match fertiliser applications to crop/pasture demand |
| Fertiliser is not applied to permanently flowing or intermittent waterways |
| Fertiliser is not applied to ephemeral watercourses or Critical Source Areas during high-risk periods |
| Fertiliser is not applied when the soil is saturated, or run-off could occur from sloping land and/or when tile drains are running |
| Fertiliser is not applied when rainfall is forecast that would result in the soil becoming saturated or there is a risk of run-off from sloping land |
| Fertiliser is not applied during periods where there is insufficient soil moisture, for the crop or pasture cover to achieve an agronomic response. |
| Fertiliser applied during the higher risk months of May, June, and July, must be supported by the following evidence:<br>Expected response rate and production that would be achieved from the fertiliser application<br>Record of round length demonstrating adequate time for fertiliser uptake by the crop/ pasture<br>Soil moisture status demonstrating the soil was not saturated or forecast to become saturated<br>Soil temperature status demonstrating that the crop/ pasture was actively growing; at a minimum the soil temperature is >6°C and increasing |

[9]Good Farming Practice (GFP) Principles (2018) alignment: 5. Manage the amount and timing of fertiliser inputs, taking account of all sources of nutrients, to match plant requirements and minimise risk of losses

[10]To allow time for laboratory processing of results

[11]Actual fertiliser application may differ from the nutrient budget due to factors such as seasonal climatic variations and feed supply; any changes must be justified and documentedany changes must be justified and documented

## Nitrogen Fertiliser Applications

| |
|---|
| Feed budgets, feed wedges and nitrogen plans are used to minimise the use of synthetic N-fertiliser |
| Pasture is at least 25mm high (approximately 1,000 kg/DM/ha) before N-fertiliser is applied |
| The amount of synthetic nitrogen fertiliser applied is less than the Synthetic Nitrogen Fertiliser Cap regulation limits |
| The soil temperature is assessed prior to applying N-fertiliser to ensure the crop/ pasture is actively growing; at a minimum the soil temperature is >6°C and increasing |
| For individual N-fertiliser applications to pasture >30 kg/N/ha, the following evidence must be recorded: |
| A feed budget demonstrating the feed deficit to be filled |
| Expected response rate and production that would be achieved from the N-fertiliser application |
| Record of round length demonstrating adequate time for N-fertiliser uptake |

## Purchased Nitrogen Surplus

| |
|---|
| The input and output data required to calculate Purchased Nitrogen Surplus[12] is recorded |
| Purchased Nitrogen Surplus is at or below the target for the farm[13] |

[12]Purchased Nitrogen Surplus is the sum of the nitrogen inputs used for production on the farm (e.g., fertiliser, imported feed) minus the total nitrogen that is removed from the farm as products (e.g., meat, milk, crops, exported effluent, supplements sold)
[13]The Purchased Nitrogen Surplus target(s) for your farm can be found on the Dairy tomorrow website **dairytomorrow.co.nz**



| | |
|---|---|
| **Leading Practice** | A nutrient management plan is prepared that describes how N, P, K, S, and any other relevant nutrients will be managed to minimise environmental risk and is revisited when any change in ownership or management occurs.<br><br>fertiliser.org.nz/Site/code-of-practice/appendices/appendix_4_nutrient_management_plan_template.aspx |
| | All fertiliser applications are recorded using a geospatial mapping system<br><br>Urease inhibitor coated N-fertiliser products are used to minimise the risk of N-losses to the environment |
| | Precision fertiliser application systems and technologies are used, including but not limited to, paddock scale soil testing, precision placement systems, and variable rate applications |
| **Evidence** | • Nutrient budget prepared by a suitably qualified person<br>• Soil test monitoring results<br>• Fertiliser application records<br>• Climate data<br>• SOP's for fertiliser applications |

### Further Information

**Nutrient Management Guide**

**Fertiliser Association**
fertiliser.org.nz/Site/code-of-practice

fertiliser.org.nz/includes/download.ashx?ID=147241

### Regulatory requirements

Freshwater Farm Plan Regulations; Freshwater NES (190-N Cap); Regional Plan Rules; Consent Conditions

# Fertiliser is stored and loaded to minimise the risk of spillage and losses to waterways and groundwater[14]

| Fertiliser storages: |
|---|
| Located at least 50 meters away from permanently flowing or intermittent waterways, ephemeral flow paths, critical source areas, and areas prone to flooding or run-off |
| Can contain all stored fertiliser, have an impervious floor and are protected from rain |
| Collect and divert any rain or water away from the storage area |
| Well ventilated with adequate lighting |
| Appropriately signed |
| Able to contain a spillage and provide secondary containment where appropriate |

| | |
|---|---|
| **Evidence** | Pictures or field observations of fertiliser storage areas |

**Further Information**

**Fertiliser Association**
fertiliser.org.nz/Site/code-of-practice/best-management-practices-considerations/fertiliser-handling/best_management_practices_fertiliser_handling_stor.aspx

**Regulatory requirements**

Hazardous Substances and New Organisms Act and Regulations; Agricultural Compounds and Veterinary Medicines Act; Health and Safety at Work Act and Regulations; Regional Plan Rules; Consent Conditions

[14]Good Farming Practice (GFP) Principles (2018) alignment: 6. Store and load fertiliser to minimise risk of spillage, leaching and loss into waterbodies



# Fertiliser spreading equipment is maintained and calibrated[15]

| |
|---|
| Fertiliser spreading equipment is maintained in accordance with the manufacturer's instructions |
| Fertiliser spreading equipment is calibrated according to the manufacturer's design specifications and the product being spread |

| | |
|---|---|
| **Leading Practice** | All contractors used for fertiliser spreading are Spreadmark accredited |
| | fertqual.co.nz/understanding-the-marks/spreadmark |

| | |
|---|---|
| **Evidence** | Spreading equipment maintenance and calibration records |

**Further Information**

**Land wise**
fertiliser.org.nz/Site/code-of-practice

**Regulatory requirements**

[15]Good Farming Practice (GFP) Principles (2018) alignment: 7. Ensure equipment for spreading fertilisers is well maintained and calibrated

# Feed is stored, transported and fed to minimise wastage, leachate and soil damage[16]

| Storage | |
|---|---|
| Feed that has the potential to create leachate is stored: | at least 50 metres away from permanently flowing and intermittent waterways |
| | away from community drinking-water protection zones |
| | away from ephemeral flow paths or critical source areas |
| | on hard-sealed or compacted areas |
| Rainfall run-off is diverted to land away from feed storage areas | |

| Feeding out |
|---|
| Permanent feed-out areas are sealed, and all run-off is collected and applied to land via the effluent system |
| Feed-out areas are located away from permanently flowing or intermittent waterways, ephemeral flow paths, and critical source areas |
| Soil damage from feeding-out is minimised |

| | |
|---|---|
| **Leading Practice** | Leachate from stored feed is captured and applied to land via the effluent system |
| **Evidence** | Pictures or field observations of feed storage areas |

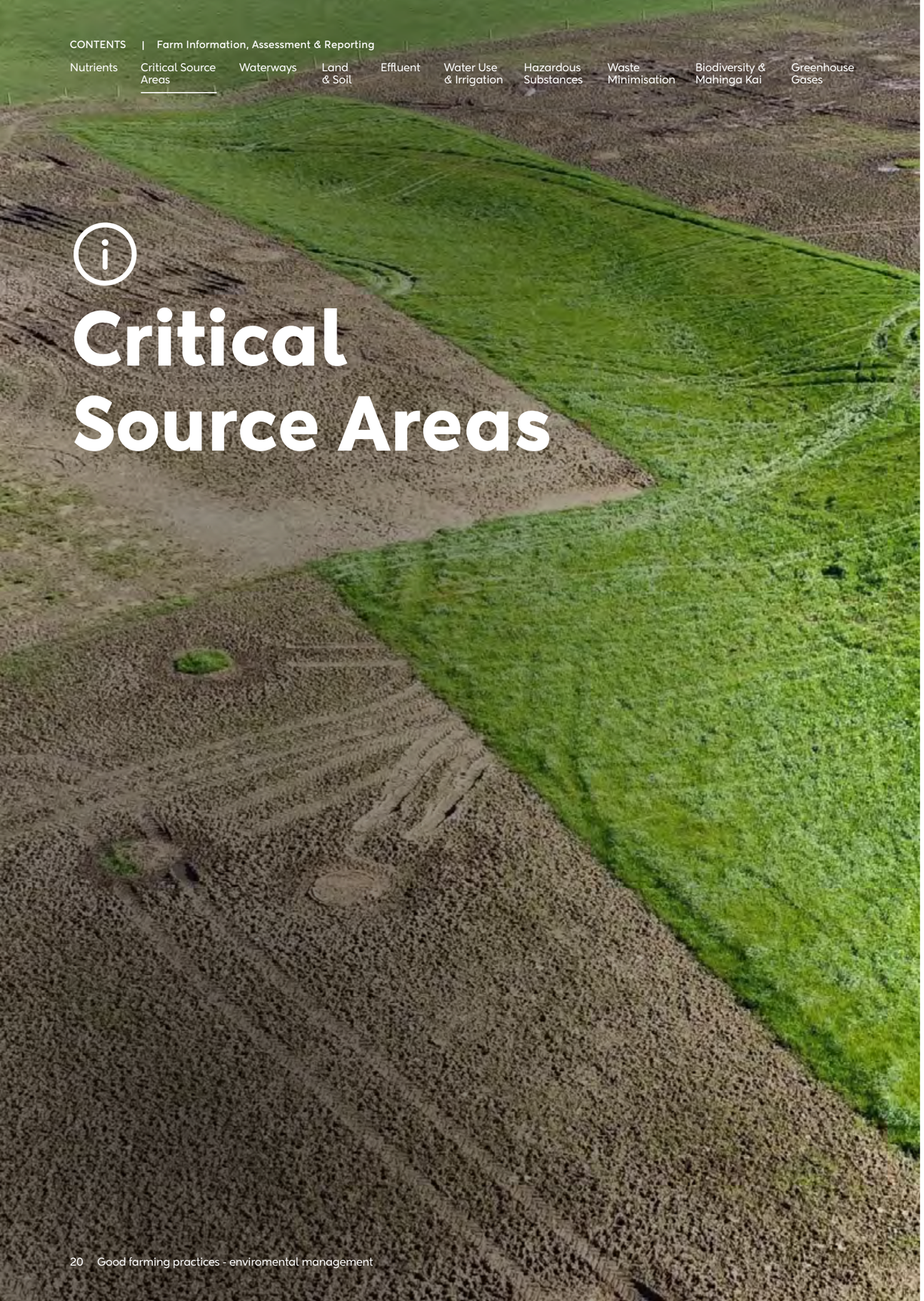
**Further Information**

**Regulatory requirements**

Regional Plan Rules

[16]Good Farming Practice (GFP) Principles (2018) alignment: 8. Store, transport and distribute feed to minimise wastage, leachate and soil damage

NOTES



# Critical Source Areas

## Critical Source Areas and farm Hot Spots are identified and managed to minimise contaminant losses to waterways[17]

Critical Source Areas (CSA) are features in the landscape where water flows or accumulates, and there is a connection to waterways
Contaminant Hotspots are areas where there is potential for point source contamination to waterways

### Identification and Management

CSA are identified including the time of year the risk occurs, and actions put in place to reduce or mitigate contaminant loss

CSA are not cultivated during times of high-risk

- when the crop or pasture to be sown would not germinate, i.e., at a minimum the soil temperature is >6oC at 9am and increasing
- when rainfall is forecast that would result in sediment run-off to the waterway

Stock are excluded from CSA during times of high-risk

- when the soil is saturated or when rainfall is forecast that would result in the soil becoming saturated
- when rainfall is forecast that would result in run-off to the waterway

### Drainage Systems

Run-off from new sub-surface drainage systems is filtered through a wetland or grass buffers, prior to it entering a permanently flowing or intermittent

### Tracks and Gateways

Where possible tracks and gateways are located away from all permanently flowing or intermittent waterways and low points in the landscape

If the track or gateway is beside a permanently flowing or intermittent waterway, the ground is sloped in the opposite direction to avoid run-off

Tracks and gateways minimise water ponding, excessive effluent build-up, and erosion

Run-off from tracks and gateways is filtered by a vegetated strip or sediment traps

Run-off from tracks and gateways is filtered by a vegetated strip or sediment traps

[17]Good Farming Practice (GFP) Principles (2018) alignment: 9. Identify risk of overland flow of sediment and faecal bacteria on the property and implement measures to minimise transport of these to waterbodies AND 10. Locate and manage farm tracks, gateways, water troughs, self-feeding areas, stock camps, wallows and other sources of run-off to minimise risks to water quality

## Troughs

Troughs are located away from waterways, low points in the landscape or wet areas

The area surrounding troughs is maintained to prevent ponding

## Stock Crossings

Stock crossings are present on all permanently flowing or intermittent waterways >1 m that stock cross more than once per month

Stock crossing have raised sides or mounds (bunded) to prevent run-off into waterways

Stock crossings (particularly culverts) allow for fish passage

## Temporary Feed-out Areas

Temporary feed-out areas (including in-paddock bale placement) are located away from waterways, low points in the landscape, or where run-off to waterways could occur

## Infrastructure Management

The condition of drainage systems, tracks and gateways, troughs, and stock crossings are assessed annually, and maintenance carried out accordingly

| | |
|---|---|
| **Leading Practice** | Stock are permanently excluded from all CSA |
| | Appropriate vegetative buffers are established to filter any run-off to permanently flowing or intermittent waterways |
| | Run-off from all sub-surface drainage systems is filtered through a wetland or suitable vegetative buffers prior to it entering a permanently flowing or intermittent waterway |
| | Bunded stock crossings are present on all the farms permanently flowing or intermittent waterways |

| | |
|---|---|
| **Evidence** | • Pictures or field observations of critical source areas management<br>• Farm management systems |

### Further Information

**Critical Source Areass**

**Waikato Regional Council - CSA**
waikatoregion.govt.nz/assets/WRC/WRC-2019/6374-HRWO-critical-source-areas.pdf

**Efficient Tracks**

**Stream crossings**

### Regulatory requirements

Regional Plan Rules

# Waterways



## Stock are excluded from lakes and waterways[18]

| | |
|---|---|
| Exclude stock from waterbodies to the extent that is compatible with land form, stock class and stock intensity. Where exclusion is not possible, mitigate impacts on waterways | Stock are excluded from lakes and permanently flowing or intermittent waterways > 1 metre |
| | The setback from the waterway or lake is a minimum of 3m unless a permanent fence was in place prior to August 2020 |
| | A permanent fence means a 2-wire electric fence, a post and batten fence or a deer fence |
| | The setback (riparian area) is managed, including the control of plant and animal pests |
| | Stock are excluded from ephemeral flow paths if grazing occurs while water is flowing |
| | Wet areas within paddocks are managed to avoid contamination from stock or fertiliser |
| | Drain cleaning minimises sediment and fish losses |
| | The length of the farms permanently flowing or intermittent waterways < 1 metre is recorded |
| **Leading Practice** | Stock are excluded from permanently flowing or intermittent waterways < 1 metre, ephemeral flow paths, and permanently wet areas |
| | The livestock exclusion setback is site specific, i.e., is related to the slope run-off potential, and is inclusive of any critical source areas |
| | A riparian planting plan is in place and being actively implemented |
| **Evidence** | • A stock exclusion plan is being actively implemented.<br>• Field observations of stock exclusion, riparian management and drain management<br>• Evidence of the use of temporary fencing such as time stamped photographs<br>• Drain management procedures |

**Further Information**

**Waterbodies and wetlands**

**Drains**

**Regulatory requirements**

Stock Exclusion Regulations; Regional Plan Rules

[18]Good Farming Practice (GFP) Principles (2018) alignment: 10. Exclude stock from waterbodies to the extent that is compatible with land form, stock class and stock intensity. Where exclusion is not possible, mitigate impacts on waterways

# Land & Soil



# Cultivation is managed to reduce the risk of sediment loss and maintain soil structure[19]

| Paddock Selection | |
|---|---|
| The suitability of each paddock for cultivation is assessed, and high-risk cultivation activities avoided. Considerations include: | Topography and soil type |
| | Proximity to waterways |
| | Erosion susceptibility |
| | Crop sowing and harvest dates |
| | Cultivation methods |
| | Previous cropping history |

| General Management |
|---|
| Crop rotations are planned to enable timely re-sowing and to minimise the time in bare cover during the high-risk winter period |
| The use of catch/cover crops should be considered to reduce contaminant losses to water and improve soil quality |
| Permanent vegetation cover is retained in gullies, on steep slopes or beside waterways |

| Soil Management |
|---|
| Soil structure is assessed every 3-years using Visual Soil Assessment or equivalent method |
| Compacted soils are alleviated through deep ripping or aeration |
| Cultivation is avoided when soil moisture is at or beyond field capacity |
| No or minimum tillage cultivation techniques are predominantly used such as, direct drillling, strip-tillage, or non-inversion tillage. |

| Evidence | |
|---|---|
| | • Crop rotation and cultivation plans<br>• Environmental considerations incorporated within the farm businesses crop rotation<br>• Environmental consideration incorporated at an operational level regarding the cultivation, sowing and harvest methods used<br>• Evidence of management actions such as crop or livestock diaries or time stamped photographs |

| Further Information | Requirements |
|---|---|
| | Regional Plan Rules |

[19]Good Farming Practice (GFP) Principles (2018) alignment: 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 AND 12. Manage periods of exposed soil between crops / pasture to reduce risk of erosion, overland flow and leaching

# Erosion-prone land is managed or retired to minimise soil losses[20]

All erosion susceptible areas are mapped and have a soil erosion control programme actively being undertaken

Retire all Class 8 and 7e land (when mapped at the farm scale) from grazing

**Leading Practice**

Develop and implement an erosion control plan for all erosion susceptible areas, including consideration of:

- Indigenous forest
- Exotic forest
- Space planting
- Streambank planting
- Shelterbelts
- Erosion control structures

**Evidence**

- Erosion susceptibility map
- Pictures and field observations of erosion control actions being implemented

**Further Information**

**Association of Resource Management**
nzarm.org.nz/soil-conservation-technical-handbook

**Erosion control**

**Regulatory requirements**

Regional Plan Rules

[20]Good Farming Practice (GFP) Principles (2018) alignment: 13. Manage or retire erosion-prone land to minimise soil losses through appropriate measures and practices



# Grazing of pastures and crops is managed to minimise sediment and contaminant loss[21]

| Grazing Management | |
|---|---|
| A farm grazing policy is developed that considers and manages: | Erosion susceptibility |
| | Soil pugging and compaction |
| | Overgrazing |
| | Adverse climatic events |
| | Stock type, class and intensity |
| | Grazing rounds/rotation lengths |

**Leading Practice**

Feed or stand-off pads are used during periods of wet weather

**Evidence**

- Grazing policy
- Evidence of management actions such as crop or livestock diaries or time stamped photographs

**Further Information**

**Regulatory requirements**

Regional Plan Rules

[21]Good Farming Practice (GFP) Principles (2018) alignment: 15. Manage grazing to minimise losses from critical source areas

# Paddocks selected for Intensive Winter Grazing (including intensive baleage wintering) are low risk and managed to minimise the risk of erosion, run-off to waterways and leaching to groundwater[22]

| Paddock Selection | |
|---|---|
| Undertake a risk assessment and select low risk paddocks that: | Are away from waterways |
| | Livestock must be kept at least 5m away from the bed of any river, lake, wetland or drain, regardless of whether there is any water in it at the time |
| | Are 10° or less maximum slope |
| | Determined by measuring the slope over any 20m distance |
| | Are not vulnerable to pugging |
| | Are not susceptible to erosion |
| | If low risk paddocks are not available adapt the farming system to avoid intensive winter grazing |

| Waterways | |
|---|---|
| When selecting areas for intensive winter grazing the following land areas are not cultivated (and vegetation cover is maintained) between 1 May to 30 September: | Ephemeral flow paths or natural drainage channels that run during times of high rainfall |
| | Critical source areas such as gullies or swales |
| When intensive winter grazing occurs between 1 May and 30 September permanent or temporary fencing that excludes stock from grazing, is placed around: | Ephemeral flow paths or natural drainage channels that run during times of high rainfall |
| | Critical source areas such as gullies or swales |

| Supplementary Feed |
|---|
| Where supplementary feed such as baleage is used, it is strategically placed in the crop prior to the start of winter |
| Supplementary feeding areas (temporary feed-out area) are located away from permanently flowing or intermittent waterways, ephemeral flow paths, and critical source areas |
| Supplementary feed is used tactically, for example offer more feed during cold conditions when demand increases and crop utilisation declines |

| Grazing Management |
|---|
| Take all reasonably practicable steps to minimise pugging |
| Breaks are actively managed as appropriate for the winter grazing management system |
| Grazing occurs towards the waterway |
| Land that has already been grazed is back-fenced; this does not prevent its use to help manage through adverse weather events |
| Portable water troughs are used for stock drinking water and placed away from ephemeral flow paths and critical source areas, close to the feed face and moved as appropriate for the winter grazing management system |

[22]Good Farming Practice (GFP) Principles (2018) alignment: 14. Select appropriate paddocks for intensive grazing, recognising and mitigating possible nutrient and sediment loss from critical source areas AND 15. Manage grazing to minimise losses from critical source areas

## Vegetation Re-establishment

Resow land as soon as practicable after grazing

## Adverse Events

An adverse event management plan is in place that considers animal welfare implications alongside environmental risk management including minimising the risk from pugging

| | |
|---|---|
| **Leading Practice** | Stand-off pads or paddocks are used during periods of very wet weather |
| | Sediment traps or actively managed constructed wetlands are used minimise sediment loss |

| | |
|---|---|
| **Evidence** | • Resource consent<br>• Winter grazing plan including:<br>  • Mitigations required for each paddock<br>  • Grazing management procedures<br>  • Managing grazing  through extreme rainfall events<br>• Evidence of farm specific operating procedures and their implementation<br>• Evidence of farm specific adverse event plans<br>• Pictures and field observations of grazing and cropping management actions such as time stamped photographs |

### Further Information

**Wintering on crops**

**Improving your wintering systems**

### Regulatory requirements

Freshwater NES

Regional Plan Rules

Consent Conditions

NOTES

# Effluent



## Effluent and manure is applied at depths, rates and amounts that match plant requirements and minimise the loss of nutrients or microbial pathogens to waterways and groundwater[23]

| Effluent Management Plan | |
|---|---|
| An effluent management plan is in place that includes: | Regional rules and consent conditions |
| | A farm effluent map that highlights:<br>• Waterways<br>• Buffer and exclusion zones<br>• High and low risk soils<br>• Effluent system layout (hydrants and runs) |
| | System maintenance checks |
| | System operating procedures |
| | Health and safety |
| | Emergency procedures and contacts |

| Nutrients |
|---|
| Soil tests are taken biennially in the effluent application area, and fertiliser applications adjusted accordingly |
| The nutrient loading rules or consent conditions are not exceeded |

[23]Good Farming Practice (GFP) Principles (2018) alignment: 19. Apply effluent to pasture and crops at depths, rates and times to match plant requirements and minimise risk to waterbodies

| Application | |
|---|---|
| All effluent applications are recorded including: | Date |
| | Location |
| | Depth applied |
| Effluent is not applied when soils are at or above field capacity | |
| Effluent is not applied when rainfall that would result in the soil becoming saturated is forecast | |
| The application meets the Distribution Uniformity upper quartile ($DU_{uq}$) standard of <1.25 | |
| Average application rates do not exceed the soils infiltration rate | |
| The odour impact upon neighbouring properties is considered, including any consent conditions | |
| Failsafe mechanisms are in place: | Low pressure pump cut-off, or |
| | Irrigator movement pump cut-off, and |
| | Pond level sensor |

| Effluent and Manure Storage |
|---|
| The effluent storage level is actively managed to remain as low as possible for the prevailing climatic conditions |
| Manure levels are actively managed to remain within the storage bunker |

| Training |
|---|
| Staff are trained in the effluent systems operation and maintenance |

| | |
|---|---|
| **Leading Practice** | Effluent area soil moisture is monitored using a soil moisture sensor or soil water budget |
| | An effluent operation and maintenance manual is in place and actively used |
| | Telemetered proof of placement of effluent applications |
| | Changes in the nutrient composition of the effluent or manure applied are understood across the milking season, by testing effluent samples throughout the season; fertiliser applications to the effluent area are adjusted according to nutrient composition |
| | Soil tests are taken annually in the effluent application area |

| | |
|---|---|
| **Evidence** | • Annual soil tests<br>• Nutrient budget<br>• Soil moisture monitoring for effluent application decision-making<br>• Rainfall records<br>• Effluent and manure application records including amount, depth, date, and location<br>• Evidence of staff training programme |

**Further Information**

**Effluent management Plan Poster**

**Effluent**

**Regulatory requirements**

Regional Plan Rules

Consent Conditions

# The effluent system is designed, operated and regularly checked to minimise the risk of nutrient and microbial pathogen loss to waterways and groundwater, and to prevent microbial contamination[24]

| | |
|---|---|
| New effluent systems include all new developments, and existing system expansions or redevelopments | |
| Effluent is collected from all sources: | Dairy sheds |
| | Yards |
| | Barns, feed-pads, and stand-off pads |
| | Underpasses |
| | Feed storage areas (if applicable) |

| Storage | |
|---|---|
| The effluent storage volume is sized to meet either the: | Consent conditions; or |
| | Plan requirements; or |
| | The 90th percentile storage volume as calculated by the Dairy Effluent Storage Calculator (DESC) |
| The storage meets local Building Act requirements | |
| The storage is sealed to prevent leakage to groundwater | |

[24]Good Farming Practice (GFP) Principles (2018) alignment: 16. Ensure the effluent system meets industry-specific Code of Practice or equivalent standard AND 17. Have sufficient suitable storage available for farm effluent and wastewater AND 18. Ensure equipment for spreading effluent and other organic manures is well maintained and calibrated

| Assessment |
|---|
| Effluent system checks are undertaken at least annually, including testing of effluent depth and rate |
| Maintenance is undertaken as and when required to ensure there is no decline in effluent system performance |

| | |
|---|---|
| **Leading Practice** | The volume of farm effluent storage meets the 90th percentile volume as calculated by the Dairy Effluent Storage Calculator (DESC) |
| | The design of the farm effluent storage is consistent with IPENZ Practice Note 21: Farm Dairy Effluent Ponds |
| | An effluent Warrant of Fitness (WOF) is undertaken every 3-years or when there is a major change to the infrastructure |

| | |
|---|---|
| **Evidence** | • Evidence provided that the effluent designer is design certified and/or the Effluent Design company is accredited.<br>• Effluent WOF or commissioning test report/re-test report.<br>• DESC report<br>• Storage drop test report<br>• Evidence provided of checks and maintenance<br>*Note: The industry checklist provides a minimum standard for this.* |

**Further Information**

**Irrigation NZ**
irrigationnz.co.nz/PracticalResources/SpecialistEquipment/Fertigation

**FDE designs standards and code of practice 2015**

**Effluent Systems**

**Regulatory requirements**

Regional Plan Rules

Consent Conditions

# Water Use & Irrigation

Image supplied by Agri Magic

## Dairy shed and stock water use is efficient and prevents source contamination[25]

| |
|---|
| National regulations, permitted activity or resource consent conditions are met |
| All well heads are sealed, and stock permanently excluded from them |
| A backflow prevention system is installed (where required) |
| Water takes are monitored (stock and dairy shed) and leaks identified and repaired as required |
| Dairy shed water use is efficient, i.e., water use is appropriate for the washdown system |

| | |
|---|---|
| **Leading Practice** | All water takes are telemetered |

| | |
|---|---|
| **Evidence** | • Reports, pictures, or field observations of well heads and backflow prevention systems<br>• Water monitoring records and farm water supply maintenance logs |

### Further Information

**Bore responsibility - Hawkes Bay Regional Council**
hbrc.govt.nz/services/water-management/bore-security

**Irrigation NZ**
irrigationnz.co.nz/PracticalResources/COP/Fertigation

**Water use on farm**

### Regulatory requirements

Water Measurement and Reporting Regulations 2020

Regional Plan Rules

Consent Conditions

[25]Good Farming Practice (GFP) Principles (2018) alignment: New, not in the 2018 GFP Principles

# The depth, rate and timing of irrigation is managed to meet plant demand and minimise the risk of leaching and run-off

| Scheduling | | |
|---|---|---|
| Irrigation decision-making is informed by a soil water budget or soil moisture sensor | | |
| For both methods, the soils full-point and irrigation trigger point are correctly set and monitored | | |
| Irrigation decision-making also includes monitoring of: | Depth of irrigation applied | |
| | Rainfall | |
| | Weather forecasts | |

| Training | |
|---|---|
| Staff are trained in irrigation system operation and maintenance | |

| Leading Practice | |
|---|---|
| | Irrigation management zones are set based on irrigation system operation, soil type and crop type |
| | Irrigation decision-making is informed by a soil water budget or soil moisture sensor for every irrigation management zone |
| | An irrigation operation and maintenance manual is in place and used to train staff |

| Evidence | |
|---|---|
| | • Sensor trace or data<br>• Water budget model or calculation<br>• Evidence of staff training or certificate of attendance for an irrigation workshop |

**Further Information**

**Irrigation NZ - Scheduling**
irrigationnz.co.nz/PracticalResources/GMP/Scheduling

**Regulatory requirements**

Regional Plan Rules

Consent Conditions

# The irrigation system is designed, operated and regularly checked to minimise the amount of water applied to meet plant demand, and prevent microbial contamination[26]

| Design & Installation |
|---|
| National regulations, permitted activity or resource consent conditions are met |
| All well heads are sealed, and stock permanently excluded from them |
| A backflow prevention system is installed (where required) |
| All irrigation water takes are telemetered |
| All new irrigation systems are designed and installed in accordance with industry codes of practice and standards |
| New water and irrigation systems include all new developments, and existing system expansions or redevelopments. |
| An Irrigation Design accredited company and/or a certified irrigation designer is used. |
| A 'wet' commissioning test is undertaken that includes pressure, flow, depth, and uniformity |
| The design meets a low quartile distribution uniformity ($DU_{lq}$) of >0.80. |

| Assessment | |
|---|---|
| Pre-season checks, including a visual inspection of the irrigator when it is running, are undertaken for each irrigation system annually | |
| A performance assessment is undertaken for each irrigation system every 5-years or: | when a major system change occurs |
| | there is significant non-compliance |

**Further Information**

**Bore Security – Hawkes Bay Regional council**
hbrc.govt.nz/services/water-management/bore-security

**MfE - measuring and reporting water intakes**
environment.govt.nz/publications/measuring-and-reporting-water-takes-brochure

**Irrigation NZ**
irrigationnz.co.nz/practicalresources/irrigationdevelopment/startup
irrigationnz.co.nz/practicalresources/irrigationdevelopment/commissioning
irrigationnz.co.nz/practicalresources/cop/fertigation
irrigationnz.co.nz/practicalresources/cop/design
irrigationnz.co.nz/practicalresources/cop/performanceassessment

**Regulatory requirements**

Water Measurement and Reporting Regulations 2020

Regional Plan Rules

[26]Good Farming Practice (GFP) Principles (2018) alignment: 21. Design, check and operate irrigation systems to minimise the amount of water needed to meet production objectives


# Hazardous Substances

## Hazardous substances (agrichemicals and fuel) are stored, handled, used and disposed of to avoid contamination of waterways and groundwater[27]

| |
|---|
| An inventory of all hazardous substances stored on-farm is kept, including Safety Data Sheets (SDS) |
| All environmental risks are identified, and staff made aware of these and how they are to be managed |
| Hazardous substance information and training is provided |
| A Certified Handler certificate is held if class 6.1A or 6.1 B are stored or used on site by farm staff |
| Procedures are in place for managing emergencies |

| Storage | |
|---|---|
| Agrichemicals and fuels are stored separately | |
| Storages are: | Located away from waterways or areas prone to flooding |
| | Appropriately signed |
| | Able to contain a spillage and provide secondary containment where appropriate |

| Application |
|---|
| Applications follow the SDS conditions |
| Application equipment is calibrated at least annually |
| Before spraying sensitive areas are identified including waterways, or significant indigenous vegetation and/or species |
| When spraying monitor wind speed and direction to avoid spray drift into waterways or significant indigenous vegetation and/or species |

[27]Good Farming Practice (GFP) Principles (2018) alignment: New, not in the 2018 GFP Principles

| Leading Practice | Storage |
|---|---|
| | All fertiliser and fuel storages are covered |
| | All agrichemical and fuel storages provide secondary containment |
| | **Application** |
| | Farm applicators hold the GROWSAFE standard (or equivalent) certificate |
| | Agrichemical contractors hold a GROWSAFE Registered Chemical Applicator (or equivalent) certificate |

**Evidence**

- Pictures or field observations of storage areas
- SOPs for hazardous substance handling including emergency procedures
- Inventory of hazardous substances on site and associated SDS.
- Emergency response kit including spill kit; fire extinguisher; emergency response card; first aid kit
- Appropriate signage (as per SDS requirements)
- Well-maintained PPE (as per SDS requirements)
- Spray records and climate data

**Further Information**

**NZS 8409:2021 (Growsafe)**
growsafe.co.nz/StandardManual/Introduction.aspx

**Worksafe**
worksafe.govt.nz/topic-and-industry/agriculture/chemicals-and-fuels-on-farms

**Regulatory requirements**

Hazardous Substances and New Organisms Act and Regulations

Agricultural Compounds and Veterinary Medicines Act

Health and Safety at Work Act and Regulations

Regional Plan Rules

**NOTES**

# Waste Minimisation

## Farm waste is minimised[28]

| |
|---|
| A waste minimisation system is in place which prioritises waste reduction, and where this is not possible focuses on reuse and recycling |
| Where available, recycling schemes are used for farm waste, e.g., scrap metal, baleage wrap, agrichemical containers, tyres, paint, oil, batteries, and other hazardous substances |
| Farm dumps and offal pits are located at least 50m away from waterways and above the water table |
| Hazardous substances are not disposed of in the farm dump |
| There is no burning of farm dump contents |

| | |
|---|---|
| **Leading Practice** | All farm waste is sent off farm for disposal in a registered waste facility |

| | |
|---|---|
| **Evidence** | • Waste reduction plan<br>• Evidence of recycling (receipts/ bins)<br>• Evidence of reuse (timestamped photos) |

**Further Information**

**Waste management**

**Regulatory requirements**

Regional Plan Rules

[28]Good Farming Practice (GFP) Principles (2018) alignment: New, not in the 2018 GFP Principles

# Biodiversity & Mahinga kai

## Farm indigenous biodiversity and Mahinga Kai values are identified and protected[29]

| | |
|---|---|
| Indigenous biodiversity and Mahinga kai values are protected: | Existing areas are mapped |
| | Existing areas are managed to maintain their current integrity and values |
| | Existing access arrangements to Mahinga kai sites are maintained |

| | |
|---|---|
| **Leading Practice** | Indigenous biodiversity and Mahinga Kai values are actively restored and enhanced including: |
| | Stock exclusion |
| | Planting or regeneration of existing areas |
| | Plant and animal pest control |
| | Identifiation of less productive land for restoration projects |
| | New plantings |
| | Engagment with local hapu/iwi to improve access to Mahinga kai sites |

| | |
|---|---|
| **Evidence** | • Farm indigenous biodiversity and Mahinga Kai map<br>• Evidence of plant and animal pest management |

**Further Information**

**Biodiversity**

**Regulatory requirements**

[29]Good Farming Practice (GFP) Principles (2018) alignment: New, not in the 2018 GFP Principles

# Greenhouse Gases

## Farm greenhouse gas emissions are known and a plan is in place to reduce or off-set them, that also considers adaptation to climate change[30]

| | | |
|---|---|---|
| Agricultural greenhouse gas emissions are known by gas, including: | Methane from: | |
| | | • Livestock |
| | | • Effluent |
| | Nitrous oxide from: | |
| | | • Livestock |
| | | • Fertiliser |
| A plan is in place to minimise or off-set emissions over time, including: | Improving the efficiency of pasture and crop production | |
| | Reducing the total amount of feed eaten | |
| | Matching feed demand with pasture growth and utilisation | |
| | Improving the management of livestock effluent | |

| | | |
|---|---|---|
| **Leading Practice** | **Total greenhouse gas emissions are known by gas, to also include:** | |
| | Carbon Dioxide | • Fossil fuels |
| | | • Energy use |
| | | • Sequestration |
| | **The plan to minimise or off-set emissions over time, also considers:** | |
| | Adoption of energy efficient vehicles, machinery, technology, and practices | |
| | Generation of renewable energy | |
| | **Future climate risks and opportunities are known:** | |
| | Temperature and rainfall changes | |
| | Extreme events | |
| | **Options to increase farm resilience are assessed and implemented** | |

[30]Good Farming Practice (GFP) Principles (2018) alignment: New Greenhouse gases: Farm Planning Guidance

| | |
|---|---|
| **Evidence** | • Farm greenhouse gas numbers can be provided<br>• Evidence of a plan to reduce or off-set emissions<br>• Region-specific climate change challenges and opportunities can be relayed |



# Glossary of terms

| | |
|---|---|
| **Agronomic response** | Means beneficial crop or pasture growth is observed from the farm management activity |
| **Artificial waterway** | Means a waterway that is man-made including a stock water or irrigation race and a farm drain (an artificial channel designed to lower the water table and/ or reduce surface flood risk).<br><br>They do not include a modified waterway (where the flow path of a permanent or intermittent waterway has been altered) |
| **Auditable records** | Means the data, information and documents kept to provide an auditor with evidence that an activity has been undertaken |
| **Backflow prevention system** | Means a system that protects a ground or surface water supply from potential contamination. It may include a physical air gap or a specific device such as a reduced pressure zone or double-check valve |
| **Capital fertiliser application** | Means an application of nutrients that aims to raise soil nutrient status beyond maintenance requirements as measured by soil testing |
| **Catch or Cover crops** | Means a fast-growing crop that is grown between the main crop to take up excess soil nitrogen and provide vegetative cover to reduce the risk of nitrogen leaching and/or sediment run-off |
| **Compaction (soil)** | Means the damage caused to soil quality by machinery movements or livestock treading |
| **Contaminant hotspots** | Means the areas of the farm where there is a high-risk of contaminants being lost to the environment |
| **Critical Source Areas** | Means the same as defined in the National Environmental Standard for Freshwater (NES-F):<br><br>A landscape feature such as a gully, swale, or depression where run-off accumulates from adjacent land and delivers or has the potential to deliver contaminants to waterways, lakes and wetlands or their beds |
| **Crop rotation** | Means the practice of growing crops in succession on the same land |
| **Cultivation** | Means any process that involves turning over or tilling the soil, it includes pasture renewal and cropping |
| **Dairy Good Farming Practices (GFP)** | Means the farming activities that can be reasonably expected of a dairy farmer to help meet environmental objectives |
| **Ephemeral flow paths** | Means a waterway that temporarily conveys water immediately following a rain event |
| **Erosion susceptible areas** | Means the areas on farm that are eroding or have the potential to erode, including (but not limited to) surface, gully, slip and streambank erosion. |

| | |
|---|---|
| **Failsafe mechanism (effluent)** | Means a monitoring device or control system that minimises the risks from a breakdown or poor management of the effluent system |
| **Farm** | Means the dairy milking platform, unless otherwise stated in the Dairy GFP document |
| **Farm dump** | Means a location on-farm used to dispose of general farm waste |
| **Feed budget** | Means a predictive analysis of the seasonal pasture supply in relation to livestock demand, including an estimate of any deficit or surplus |
| **Feed storage area** | Means an area where supplementary feed is stored on-farm, including pits, bunkers, and sheds |
| **Feed wedge** | Means a paddock-scale feed analysis at any given point in time. Measured pasture covers of each paddock are arranged in order of longest to shortest, and a line placed over these starting at the target pre grazing cover and fishing at post grazing cover. From this it can be determined whether the farm has a surplus of deficit of feed. |
| **Grazing round/ rotation** | Means the length of time before livestock return to graze the same paddock |
| **Imported feed** | Means feed that is bought on to the farm |
| **Inherent risks** | Means the risks posed to the environment from the biophysical characteristics of the land |
| **Intensive winter grazing** | Means the same as the NES-F interpretation:<br>**The grazing of livestock on an annual forage crop at any time in the period that begins on 1 May and ends on the 30 September of the same year** |
| **Intermittent waterway** | Means a waterway that only flows at certain times of the year, but does not include an artificial waterway unless they convey stormwater to an intermittent waterway |
| **Land management unit** | Means a homogenous block of land that responds in a similar way under similar management |
| **Leading Practices** | Means the on-farm activities that dairy farmers could undertake to go beyond Good Management Practices |
| **Maintenance fertiliser application** | Means an application of nutrients that aims to maintain the balance between nutrient inputs and outputs as measured by the soil nutrient status from a soil test |
| **Minimum tillage** | Means the process of establishing pasture or a crop using the minimum amount of soil disturbance |
| **New effluent system** | Means a new or upgraded effluent system installed on or after 1 January 2023 |
| **New irrigation system** | Means a new or upgraded irrigation system installed on or after 1 January 2023 |



| | |
|---|---|
| **Nutrient Budget** | Means a modelled calculation of the farm's annual nutrient flows (inputs and outputs) |
| **Offal pit** | Means a covered hole excavated on-farm for the purpose of disposing of offal and dead livestock |
| **Overgrazing** | Means the grazing of pasture to the point where cover is depleted leaving bare unprotected patches of soil |
| **Permanent feed-out area** | Means a purpose-built area with an impervious surface that is regularly used for supplementary feeding or loafing of dairy cattle, i.e., feed pad, winter pad, standoff pad, or loafing pad, but not a sacrifice paddock |
| **Permanent vegetation** | Means an area where the vegetative ground cover is maintained |
| **Permanent waterway** | Means a waterway that flows year-round, but does not include artificial waterways unless they convey stormwater to a permanent waterway |
| **Pugging (soil)** | Means the damage caused to soil structure by stock trampling of saturated soils |
| **Purchased N-surplus** | Means the sum of the nitrogen inputs used for production on the farm (fertiliser (including fertigation) and imported feed minus the total nitrogen that is removed from the farm as products (meat, milk, crops, exported effluent, supplements sold) |
| **Response rate** | Means the amount of pasture or crop grown (kg/DM) in relation to the amount of nutrient applied (kg/ha) |
| **Soil erosion control programme** | Means a plan of works and farm practices to manage the erosion susceptible areas on farm |
| **Soil temperature** | Means the temperature of the soil at 9am each day |
| **Stock composting area** | Means a location on-farm used to dispose of dead livestock through the process of composting |
| **Stock crossing** | Means infrastructure that is used for stock to cross over a river or stream to prevent damage to the bed and avoid contaminants directly entering the waterway, they include bridges and culverts |
| **Sub-surface drainage** | Means the process of removing excess water from the soil and includes mole drains, tile drains and slotted pipes |
| **Supplementary feed** | Means the additional homegrown or bought in feed used to fill feed deficits |
| **Synthetic N-fertiliser** | Means inorganic chemically manufactured nitrogenous fertilisers |
| **Temporary feed-out area** | Means temporary areas of pasture where supplementary feed is fed to cattle |
| **Well head** | Means the component of a groundwater bore used for water abstraction that is above the surface |
| **Wet areas** | Means areas of pasture where the soil is predominantly saturated year-round |