Federated Farmers Newsletter October 2014
Nitrogen Allocation South Canterbury Coastal Streams
By Colin Hurst

I recently hosted a presentation for the Hurunui-Waikari zone committee on our response to the regional council’s proposed nitrogen allocation for South Canterbury Coastal Streams.

Our hosts in North Canterbury made us very welcome —over 300 people attended—and there was lots of interest in what we were doing down our neck of the woods.

As many of you will be aware the council’s proposals which, first surfaced back in February, have caused much confusion and concern as to how farmers could meet proposed nutrient allocations and the consequences for them and their businesses if they failed to.

In response farmers protest at the Lower Waitaki South Coastal Canterbury Zone meeting. Ecan set up NARG: Nitrogen Allocation Reference Group, as a means towards understanding what was exactly required and to find suitable solutions moving forward.

NARG was open to the public and our pledge is “To work with Ecan to assess and describe the consequences of different options for allocating N load in the South Canterbury Coastal Streams (SCCS) area”.

Our aim essentially was to find a suitable nitrogen allocation method. This requires amongst other things community involvement and commitment to meet deadlines.

There has been numerous meetings throughout the last few months involving low and high emitting land users and we’ve had input and support from the regional council, Federated Farmers and DairyNZ as well as technical support.

I have to say the process has been unique and ultimately successful insofar it has brought farmers together on the common goal of meeting the regional council’s N allocation limits.

Environment Canterbury deserves praise too for throwing a great deal of time and resources into finding a compromise for all parties. Ecan was committed in deliberations from the outset and obviously wanted results.

The outcome established an agreement that the high emitting farmers have little room to manoeuvre and therefore are entitled to have their investment protected. With the introduction of maximum caps and are expressed as maximum losses for different soil types (e.g. 35kgN/ha/yr for very light and light soils; 20kgN/ha/yr for poorly drained soils). This would be achievable through reductions over time.

Low emitting farmers, shall meanwhile have the option to intensify their operation if they decide to. This will allow low leaching land uses to change land use and increase nutrient loss up to the flexibility cap. The proposed flexibility cap for Southern Streams moves from 10kgN/ha/yr through to 17kgN/ha/yr over time as long as water quality outcomes agreed by the community are be met.

In short, the consensus was, our method was fit for purpose as it reflected the variability of all the soils we farm on throughout our district.

The next hurdle is getting approval from the regional council and a hearing committee. For me, this process is a fine example of “bottom up governance” - where civic engagement leads the authorities for once and obtains -fingers crossed- a solution which everyone in the community is genuinely satisfied with.
There are many people to thank for getting us to this point and they include Ned Norton whose specialist scientist knowledge was invaluable. I also must mention Dr William Rolleston the Federated Farmers' president for his time and expertise and Lionel Hume our Federated Farmers Policy Adviser.
Above all, thanks to all the farmers who were involved-without your will and understanding this would not be possible.

Colin Hurst
0276895898
Hearing Statement of Colin Hurst on behalf of the Nitrogen Allocation Reference Group (NARG)

Hearing of Submissions on Plan Change 3 to the Canterbury Land and Water Regional Plan

My full name is Colin Thomas Hurst.

I am chairman of the Nitrogen Allocation Reference Group.

I am also on the steering group of various catchment Groups including the Waihao Wainono Water Users Group and the Hook Catchment Group, and I chaired the initial meeting of the Otaio Makikihi Catchment Group.

I am also the Chairman of Waimate Federated Farmers and vice chairman of The Arable Industry Group of New Zealand Federated Farmers. (copy of Federated Farmers newsletter article written by myself attached).

I will also be giving a Hearing Statement on behalf of South Canterbury Federated Farmers on the 16th November, going into detail about Hurst’s farm and implications PC3 has, note Hurst’s farm is farm A in expert evidence provided by Dr Samuel Dennis on behalf of Beef and Lamb.

From August 2014 through to May 2015, I also was on an Environment Canterbury committee called the MGM Policy Working Group whose purpose was to develop policy options and a work plan for implementing the results of the MGM project.

Today I will present an overview of the Nitrogen Allocation Reference Group (NARG) process, this is a presentation I have given to numerous groups including two Zone Committees, farming groups and catchment groups (copy of PowerPoint presentation attached).

I consider that the NARG process was very successful. I continue to agree with the NARG intent, but some of the numerical thresholds are now unworkable because some of the information the NARG consensus was based on has proved to be incorrect.
The ‘lookup’ tables (relating N discharge to land use) that the NARG consensus position was based on, did not attribute N leaching values consistent with Overseer estimates (to be used to assess compliance), for poorly drained soils.

I appreciate the recommendation on page 300 of the section 42A report, to increase the maximum cap for poorly drained soils, but I consider the NARG as a whole may have issues with the size of the re-worked maximum cap. It is important to get this right because there are significant areas of poorly drained soil in the catchment.

Phosphate/sediment is also the other important water quality parameter, Farm Environmental plans like what have be developed in the Hook catchment have a significant part to play as well as the Wainono restoration project, see additional information on what Hurst’s farm has been involved with. (copy attached).

Therefore, my request is to:

- Re-form the NARG and enable it to re-work the numbers using the latest information;
- Use the numbers from the MGM project to inform the hearing of the most up to date N loss numbers; or
- Introduce a narrative approach like what the MGM Policy Working Group came up with, which is likely to be incorporated into Plan Change 5 - permitted activity based on areas of intensive winter grazing and areas of irrigation.
Farm Environment Plan

Guide 2015

Tabled at hearing on 3rd November 2015
Farm Environment Plan Guide

Use this guide to assist you with filling in your Farm Environment Template

Background

What is a Farm Environment Plan?
A Farm Environment Plan is a plan for managing the soil, water and nutrient resources on your farm in a sustainable way.

The plan is specific to your farm and is developed by you or your farm consultant to reflect the environmental risks associated with your farm and farm business and how these will be managed.

It is valuable to your business because it enables you to identify and manage soil, water and nutrient losses which cost you money.

The key aims of a Farm Environment Plans are:
- To maintain the productive capacity of the soils on the farm
- To support the responsible use of soil, water and nutrients
- To minimise the loss of nitrate-nitrogen to soil drainage water
- To minimise any loss of sediment, phosphorus or nitrogen to surface waters
- To minimize the spread of weeds, diseases and insect pests between properties

The plan will include an assessment of the risks and management practices associated with:
- The soils on your farm
- Nutrient and sediment losses from point and non-point sources
- Irrigation
- Grazing
- Biosecurity

The plan also includes supporting documentation for audit purposes.

Depending on your farm system, a comprehensive Farm Environment Plan may also include other plans for activities relating to the environmental management of your land. Examples include: an agrichemical plan, an effluent management plan, a biodiversity plan, and stock and grazing management plans.

The development of a Farm Environment Plan leads you through the process of:
1. Risk assessment - locating the likely farm sites or management practices that have environmental issues or risks.
2. Implementing change – responding to the identified risks with a management change.
3. Developing the action plan – ranking priorities, identifying cost and developing a time frame.
4. Collation of documents to support your plan and provide evidence that you are delivering on your planned objectives.

Why do I need a Farm Environment Plan?
New Zealand’s wealth is in its climate, land and water resources and our economy and environment depend on the success of our land-based industries. The role of Regional Councils is to manage these resources through the implementation of the Resource Management Act and the National Policy Statement for Fresh Water.

To achieve this, there is a legal requirement in many regional plans for farmers to develop and use farm environment plans to show that they are aware of and are managing the environmental impacts of their farm systems.

There is no option, farmers must have an active Farm Environment Plan.

Your plan is a way of demonstrating that your management practices are having a positive impact on the environment.
Who will see this plan?
The Farm Environment Plan is an auditable document which provides evidence that you are managing your farm resources efficiently in a way that minimises the environmental impact of your farm business.

Auditors will visit from time to time to assess the effectiveness of your farm plan. You will be given prior notice of an auditor’s visit and will need to supply a copy of your plan and nutrient budgets to the auditor before the visit. Your plan will demonstrate that you have assessed the environmental risks on your farm and have developed an action plan for continual improvement.

During the audit there will be:
- An assessment of performance against the objectives, targets, good practices and timeframes in the plan.
- An assessment of the robustness of the nutrient budgets.
- An assessment of the efficiency of water use (if irrigated).

The auditor will be an accredited FEP auditor, who is independent of the farm and has not been involved in the preparation of the plan.

A farm environment plan is often required as part of a consent application, if this is the case, then your plan will be seen by a regional council staff members.

When do I use this template?
Use this template if your farm is mainly an arable cropping enterprise. This template enables you to assess the environmental risk of all the activities that are occurring on the farm, including crop harvesting, vegetable, grain and seed production, stock finishing and dairy grazing.

But...
If your farm is primarily a pastoral enterprise; either sheep/beef or dairy, use a Farm Environment Plan template developed for that pastoral system. The cropping component of your farm will be included in the pastoral template.

And...
If you are a member of an irrigation scheme, your scheme is likely to have a template that you may choose to use.

How do I develop a Farm Environment Plan?
This template will enable you to tailor a personalised farm environment plan for your property.

This template has nine sections; each focused on a different part of your farm environment plan. The sections are;

- Property details
- Soil management
- Irrigation management
- Nutrient management
- Effluent management
- Livestock management
- Point sources from sources such as offal pits, rubbish dumps, sludge stacks and compost heaps Biosecurity management
- Documentation

Each section has an easy to use plan template and instructions on how to fill it out. The technical notes to support the template are in this guide.
Your completed plan consists of the sections that are relevant to your farm. The information in some of these sections will not change very often but you will need to revisit the plan, at least annually, to review and revise your objectives.

The template is designed to be filled in electronically. Before you begin to fill in the template, save it to your computer hard drive. Remember to keep saving as you work your way through it. If you are not comfortable doing this you may print-off the information sheets and fill them in by hand.

Whichever way you choose it is a good idea to file all your plan documents in the one place. A ring-binder folder with partitions for each plan section is a good idea. This makes the job easier when it is time to update your plan and for when an auditor calls.

**Supporting evidence for your plan**

You will need to provide supporting evidence that your plan and management practices are effective.

Evidence of effectiveness can be demonstrated with an Overseer nutrient budget. In many regional council plans this is a requirement.

Other documentation you should collate and keep are:

- Copies of any consents relating to your farm.
- Fertiliser recommendations, purchases and application records
- Audit and maintenance records for your irrigators
- Irrigation application dates and rates.
- Crop records: Plant and harvest dates, yields and residue management.
- Stock records: Purchase and sale dates. Breeding records.

It is a good idea to file all this information in one place along with your farm environment plan.
Property Details and Farm Maps

Refer to pages 5-7 in the Template.

Property Details

GPS co-ordinates for the farm location can be found on Google maps. Find the farm location using the search function and the farm address. Hover the mouse over the entrance to the farm, right click the mouse and select the “what’s here” function. The co-ordinates will appear in a box adjacent to the marker. These co-ordinates are also used in your Overseer budget to access the weather information for the farm.

Include a brief summary of the main enterprises on the farm. For example: Irrigated grain and seed production. Lamb finishing.

Maps

A farm environment plan has a number of maps. Use the maps to draw areas where there are known risks for environmental losses and areas where you are planning specific management practices.

You may have an existing farm map or you can make a new one with Google Earth or a similar tool e.g. ProductionWise. Copy it several times, so that you can add specific information relating to different parts of your plan.

Leased land

If you are farming blocks of land under short term leases the best option is to prepare individual plans for each block. Follow the same planning process.

Farm maps are an important component of your farm plan.

Map 1 An overview of your farm

The map or aerial photograph must be at a scale to show:
- The boundaries of the property or the land areas comprising the farm enterprise.
- The location of permanent or intermittent rivers, streams, lakes, drains, ponds or wetlands.
- The location of riparian vegetation adjacent to water bodies.
- The location of waterways where stock access or crossing occurs.
- The location of any areas within or adjoining the property that are identified as "significant indigenous biodiversity".

Mark in these farm features and add the map scale and orientation to north.

Some regional councils are using a land use capability (LUC) approach for classifying land and setting nutrient limits. If you are in one of these regions you will need a LUC map for your farm. LUC maps provide a useful insight into the productive capability of your soils.

LUC maps are available on the regional council websites.

Map 2 Farm buildings, tracks, management blocks, irrigators and offal pits

A map that shows where the management blocks are on the farm is a useful reference for you and the auditors that will be visiting your farm.

The environmental risks on your farm may only be on part of the farm and some management blocks. It is important that you can identify where these areas are and you will need to refer to specific management blocks throughout the plan.

Management blocks might be as small as a single paddock or the aggregation of a number of paddocks that are managed in the same way.
Blocks are defined by differences in soil type, irrigation and dry land management. Blocks with differing crop rotations, stock management and nutrient losses can be set up.

ProductionWise and a number of other mapping programmes provide the facility to draw in your management blocks.

ProductionWise is freely available to all FAR levy payers.
http://www.productionwise.co.nz/

**Map 3 Critical Source Areas “Nutrient and Sediment Loss Hot-Spots”**

Use a map marked with paddocks, suitable for drawing on.

On the map, and with reference to the soils on your farm and the risk of N, P and sediment losses, mark the locations where there is a potential risk for environmental losses. (Refer to the Guidance notes to assess potential risk).

Identify any Point Sources or “Hot-spots” for nutrient losses, such as efflu pits, silage stacks and areas where intensive grazing is carried out.
Management Area Soils

Refers to pages 8-9 in the Template.

Objective: To maintain or improve the physical and biological condition of soils on the farm in order to minimize the movement of sediment, phosphorus and other contaminants to waterways.

Notes
The soil management plan provides an overview of the soils on your farm and their associated environmental risks.

Details relating to relationship between your soils and irrigation and nutrient management are covered in the irrigation, phosphorus and sediment and nitrogen modules of the plan.

Background
Well managed soils are a key factor in profitability for cropping farms.

It is important to have a good understanding of the strengths and weaknesses of the soils on your farm as this is where good environmental performance starts.

Soil texture and structure are important. Soil texture affects soil structure and erodibility. Soil structure affects the soil’s water-holding capacity and its resilience to drought, drainage and risk of ponding, runoff and erosion.

Soil erosion is a big issue for the environment and your back pocket, as soils that blow or wash away are lost from your farm for good. If soils and sediments end up in rivers, lakes and coastal estuaries they cause environmental damage that has serious impacts on invertebrate and vertebrate eco-systems and impacts on the public’s perception of farming.

A consideration of the soil types on you farm can:
• Optimise the yields and quality of crops and pasture.
• Help to reduce the risk of compaction and erosion.
• Reduce the risk of environmental damage.

Environmental Risk Assessment for Soils
Consider the following characteristics of your land and its soils when assessing the environmental risks on your farm.

1. Topography
Soil erosion by run-off is a risk on any cultivated land that is sloping. Management practices that slow the rate of run-off down the slopes or collect silt before it leaves the farm are important.

2. Stream Bank Erosion
Soil erosion may be a problem on stream banks which don’t have any vegetative protection, particularly if they are accessible to stock.

3. Soil texture
The texture of a soil affects its structure and the way it responds to cultivation and irrigation.

• Most soils are of mixtures of sand, silt and clays and the proportion of each component changes the characteristic of the soil and the way that it behaves. The triangle diagram below illustrates the proportions of each texture component in the soil mix. For example a silt loam soil is: 70-80% silt and 20-50% sand. (A loam is a rich, friable soil containing a relatively equal mixture of sand and silt and a somewhat smaller proportion of clay).
Sandy soils have poor structure and poor water holding capacity. They tend to dry out quickly and are highly susceptible to wind erosion.

Silty soils are fertile and easy to work but of all the soil types, silts, silt loams and loams have the highest risk of loss through water erosion especially on long or steep slopes.

Peat soils are fragile and the peat may be lost easily. They require drainage and care with cultivation and pH management to develop their productivity.

Clay soils are highly productive but they have characteristics that can cause environmental risks. These include:
- Soil surface crusting or sealing. This is a risk in soils that are over-worked and limits infiltration and increases runoff.
- Wind erosion under dry conditions, especially if they have been worked to a fine tilth.
- Compaction by machinery or animals especially under wet conditions. The compaction layer slows the rate of infiltration, increasing the risk of ponding and surface runoff.

4. Soil Profile
A soil profile describes the various layers within the soil. It is important to know how deep your soils are and what the characteristics of the secondary layers in the soil profile are.

The depth and nature of the secondary layers in the soil affect the water holding capacity and may affect rooting depth, especially if there are hard soil pans. A pan is a well-defined layer forming in the soil. There are two common types; a 'plough pan' which builds up in-field just below plough depth, and an 'iron pan' which forms naturally by iron oxide accumulations deposited in acid gley soils.

Shallow, stony soils drain quickly and nutrients can be easily leached.

5. Water holding capacity and drainage
Water holding capacity is a characteristic of the soil texture and is the total amount of water a soil can hold at field capacity.

Soil drainage refers to how much, and how quickly, water is removed from the soil. It is important because it affects the soil environment, both temperature and oxygen supply, which in turn affect microbial and plant root activity.

Drainage depends on three major factors:
- Water flowing into the soil; rainfall, irrigation, seepage and runoff.
- Flow rate through the soil (permeability).
- Outlet from the soil via field and natural drains into waterways.

These characteristics affect irrigation efficiency and nutrient movements through the soil profile. The higher the available water-holding capacity, the more suitable the soil for any type of irrigation.

6. Organic matter levels
Organic matter stabilises soil structure and increases the volume and size of soil pores which improves water infiltration and water retention. Organic matter also enriches the soil by supporting soil microbial activity. This impacts on nutrient cycles and nutrient management.

7. Management characteristics
Compaction: Compacted soils have increased bulk densities, poor aeration and reduced porosities because soil aggregates have been squashed together by management practices. Compaction can be caused by cultivation when the soil is wet, or by animal treading, and farm vehicles.
Excessive soil compaction restricts soil aeration, reduces plant growth and productivity, impedes drainage, reduces infiltration, and increases runoff generated during intense rains, leading to greater soil erosion losses.

**Soil aeration:** Soil aeration reflects the ability of soil to allow exchange of air (particularly oxygen and carbon dioxide gases) between the atmosphere and plant roots. Soils with poor aeration have a risk of becoming water logged and productivity drops and environmental risks increase.

### Good management practices for soils

**Regular Assessments**
Develop an assessment process for tracking the quality factors of your soils. Visual soil assessment (VSA) is one method of doing this.

- It is a simple tool to assess and monitor soil quality.
- It has an easy to follow guide which is self-explanatory.
- It doesn't require special training or technical skills.

For information about VSA, see [http://www.landcareresearch.co.nz/publications/books/visual-soil-assessment-field-guide](http://www.landcareresearch.co.nz/publications/books/visual-soil-assessment-field-guide)

Remember to file your assessment sheets with your soil management plan.

**To minimise the risk of soil erosion by wind**
- Select a low risk cultivation technique such as direct drilling or minimum tillage if possible.
- Plan the rotation to enable timely sowing to maximise ground cover during the high risk period.
- Include pasture in the rotation to help restore soil structure.
- Minimise periods of fallow or explore inter-cropping techniques to reduce the area of bare ground as crops establish.
- Establish shelter belts in exposed areas.

**To minimise the risk of soil erosion by water**
- Assess where risk of run-off is highest.
- Mitigate run-off risk in these areas e.g. through cultivation techniques such as contour ploughing or furrow dyking.
- Protect stream banks with riparian strips.
- Exclude stock from water ways.

**To reduce the risk of compaction**
- Wait for the soil surface to dry out before driving on the soil.
- Restrict the number of cultivation passes across the paddock.
- Restrict heavy vehicles to the edge of the paddock.
- Fit dual wheels to reduce contact pressure and the risk of wheel slip.
- Decrease tyre pressures to reduce contact pressure.
- Reduce tillage intensity.
- Consider your grazing management; limit the number of hours animals graze on wet paddocks.

### Information Resources for Soils

**Traditional soil maps**
Many of you will have soil maps for your farm based on soil surveys that were done in the past. These don't go out of date but soil names may have changed as soil classification systems have been updated. These maps are still are valuable guide for the soils on your farm, especially when they are backed-up with your personal experience.

Personal knowledge can be confirmed by digging soil pits. Document what you find with good photographs and measurements and descriptions of the soil profiles. File these with your soil plan.

If you have little or no information about the soils on your farm, **S-maps** is a useful and free tool to use to find out more. S-maps [http://smap.landcareresearch.co.nz/home](http://smap.landcareresearch.co.nz/home)
What is S-map?
S-map is the new national soils database. It is a free on-line tool that provides detailed information about the soils on your farm.

S-map integrates existing reports and digital information and updates soil maps where existing data are of low quality. It is being updated regularly and it integrates existing soil reports and digital information. Note there are some regions that have not been updated. Information in these regions is minimal.

It allows you to:
• Explore interactive soil maps
• Learn about the soil on your farm
• View detailed information about a soil class or attribute.
• Create custom PDF maps for printing
• Download soil fact sheets for specific locations.
• Develop your soil plan

Definitions for terms in S-map factsheets
Bypass flow is related to the speed that water flows through the soil. Water flows downwards through the soil by two routes; slowly via micropores and quickly through macropores. By-pass flow is the rapid flow through the macropores, the spaces between the soil aggregates. It is an important soil characteristic because it relates to nutrient leaching. High-bypass-flow soils are strongly structured soils, or have extremely stony horizons close to the soil surface.

Nitrogen leaching vulnerability is related soil depth and the soil's capacity to store water. Soils vary from low to very high leaching vulnerability according to soil depth and texture: deep leamy soils have a low vulnerability grade to very stony-sandy soils with very high vulnerability. N leaching is reduced in poorly drained soils. These soils have the capacity to store water and nitrate is reduced to nitrogen gases by denitrification processes in the anaerobic conditions.

Phosphorus leaching vulnerability is related to the combination of phosphorus retention and effective thickness of fine soil material in the whole soil profile. Soils with high vulnerability to phosphorus leaching are recent soils, stony or very stony Pallic soils, sand dunes, and shallow soils overlying rock.

Vulnerability to runoff relates to a combination of slope class, soil drainage, depth to an impermeable or a slowly permeable horizon, and permeability of soil above the impermeable or slowly permeable horizon. Land with high vulnerability to runoff occurs mainly on rolling land containing poorly drained soils with subsoil pans.
Management Area
Nutrient Management (N and P)

Refers to pages 10-12 in the Template.

Objective: To maximize nutrient use efficiency while minimizing nutrient losses to water

In long-term cropping rotations, even those with pastoral phases, nitrogen supply and crop demand are well balanced and losses are low. This is supported by FAR's benchmarking work with Overseer nutrient budgets which showed that 75% of arable farms had nitrogen losses to water of less than 20 kg N/ha/yr.

Most arable farmers are aware of the risks associated with nitrogen supply to the crop and are managing them appropriately.

The focus in your nitrogen management plan is only on the circumstances where there is a known high risk of nitrate leaching.

Background

The nitrogen cycle drives the supply of nitrogen to the crop. It is a dynamic process, dependent on soil conditions and microbial activity to breakdown complex forms of nitrogen into simple mineral forms (nitrate and ammonium) that are available to the crop.

The soil supply of nitrogen is one source for the crop, the other is from organic and inorganic inputs to the soil, from animals, crop residues and applications of inorganic and organic fertilisers.

Nitrogen losses from the soil are from leaching and denitrification.

- Leaching is the main process for nitrogen losses to ground water. It occurs when drainage water moves nitrates beyond the root-zone out of reach of the crop. Nitrate leaching is most likely to occur in winter, when crops are slow growing and rainfall is higher.
- De-nitrification is a microbial process where microorganisms convert nitrate, to nitrous oxide and nitrogen gas. These gases are lost to the atmosphere.

Risk Situations for Nitrate Leaching in Arable Rotations

What Leaching Loss is a Risk?
The best approach for assessing the risk of nitrogen losses to the environment is to work to the nitrogen leaching loss limit or cap set by your regional council. Information about these limits can be found on the regional council websites.

If nitrogen limits or caps have not been set, you must be able to demonstrate that your nitrogen management is following industry good practice.

Risk Situations for Nitrogen Losses

1. Cultivation after long term pasture (more than 5 years)
Mineralisation of the organic matter from the breakdown of the grass roots following cultivation releases nitrogen into the soil. The rate that the organic matter is broken down to plant available forms depends on the climatic conditions following the cultivation. Often there is more nutrient available than the crop can use, even if no additional fertiliser is added, so it is wise to recheck soil levels before the second crop in the rotation is planted.

2. Intensive winter grazing
How do we define intensive winter grazing? Environment Southland uses this definition: “Intensive winter grazing is defined as the grazing of stock between May and September inclusive, on fodder crops or pasture to the extent that the grazing results in significant devestation”.

Significant devegitation is defined as removal of, or damage to, vegetation caused by stock access or grazing that results in the exposure of large areas of bare ground and/or pugging of the soil”.

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The risk of nitrogen leaching after intensive grazing comes from the nitrogen load deposited onto the soil from the stock urine and dung. Urine from the stock is broken down in the soil to ammonium and nitrate. Some is lost to the atmosphere through volatilisation, but there is a large supply available and the opportunity to capture it for the next crop.

The following ideas provide options for managing intensive grazing.

**Strategies for mitigating negative impacts on soil and the environment**

**Paddock awareness**
Some paddocks may need to be avoided completely. If parts of the paddock are known to be high risk to nutrient loss, compaction and pugging, or sediment loss, manage grazing so that these areas are only grazed in dry conditions. This may mean that at-risk areas are grazed early in the season and more resilient soils are grazed later when wet weather is likely. On sloping land, beginning grazing at the top of the slope and working downhill can result in less sediment loss from overland flow of nutrients. When near waterways, a buffer zone of at least 3 meters is required.

**Shift the animals more than once per day**
Poor weather results in higher demand for feed but lower utilisation. Offering smaller breaks twice a day increases utilisation efficiency and reduces the amount of feed trampling. When the soil gets wet, offer a new break before water begins pugging.

**Increase amount of supplement fed**
When utilisation is low and crop is being trampled as stressed and underfed animals search for feed, increasing the availability of supplemental feed may be a good option. Supplemental feeding also enables the manager to contain the area of soil compaction by reducing walking traffic.

**Back fencing and portable water troughs**
If practical, use a back fence and transportable water troughs to ensure cows are contained and constantly moving onto fresh crop. This method reduces soil damage and compaction by eliminating the need to repeatedly walk back through previously grazed areas to access water.

**Split the mob**
Splitting the mob into two or more groups reduces grazing pressure and potential soil compaction. Lower cow numbers reduces the amount of hoof traffic in the grazing area and traffic to and from the water trough. This also allows the mobs to be managed separately if needed to achieve target body condition.

**Lift root vegetables**
Manually lifting or loosening root vegetables such as fodder beet and swedes before feeding can reduce the amount of energy and standing/compacting time spent by the cows in order to consume the feed.

**Stand off paddock or stand off pad**
In very wet conditions when pugging and animal health are at high risk, animals can be moved off the crop paddock and fed silage and supplemental feeds. Moving cows onto a sacrifice paddock of grass, a paddock with dense stubble, or even a feed pad takes pressure off of the bare soil in the winter crop and allows water to infiltrate the soil rather than pugging on the surface.

**Manage the N load**
After the cows have gone home there is a considerable supply of nitrogen in soil profile. Before planting the next crop, test the soil profile down to 60cm for AMN and/or mineral N tests. Supply the balance of the crop requirement as fertiliser.
3. An excess of fertiliser is applied
Fertiliser is supplied in excess of the crop demand and soil supply. Crop demand depends on two factors; final yield and how fast the crop is growing. Demand decreases during slow growth periods. Individual crops have different nutrient demands, this is well known by your fertiliser consultants.

4. Cropping and irrigation on shallow stony soils
Fertiliser is supplied in excess of the crop demand and soil supply. Crop demand depends on two factors; final yield and how fast the crop is growing. Demand decreases during slow growth periods. Individual crops have different nutrient demands, this is well known by your fertiliser consultants.

This risk relates to the frequency of drainage events on these soils. The soil water holding capacity on these soils may be poor in the upper topsoil layer but is often poor in the lower stony layers. Drainage events are common and nutrients quickly move through the soil profile beyond the root zone. Irrigation management and more frequent applications of smaller doses of nutrient are the keys to reducing the risk of nutrient losses from these soils.

5. Management after crops that fail to achieve their planned yields
Crops under-perform for a number of reasons; including:
- Poor soil environment, e.g. soils that are compacted and poorly drained.
- Pest and disease pressure.
- Weather impacts.

When estimating how much nutrient might have been removed by the crop consider:
- How much the crop had grown before the damage occurred. A crop that was damaged just before harvest will have used most of the available nitrogen in the soil.
- How much residue is being returned to the soil; this will contribute to the soil’s nutrient supply in the future.

6. Fallow periods
No crop, no nutrient uptake

7. Legumes
The nitrogen fixing ability of legumes must be considered when planning their nutrient requirements. A healthy legume plant will have healthy, active nodules that fix sufficient nitrogen for the plant’s needs. No nitrogenous fertilisers are required and soils with high levels of mineralisable N, may leach because the plant demand is lower than that of a non-legume.

Phosphorus and Sediment

Background
Phosphorus (P) is an important plant macronutrient and crops are unable to perform if the supply from the soil is limited.

In some soils the supply of phosphorus is limited, either because it has been depleted after many years of cropping or it is unavailable to the plant roots because it is bound strongly to soil minerals and clay particles. This is part of the normal soil chemistry process.

If cropping soils erode, through movement of wind or water, soil particles and sediments will carry the phosphorus off the farm at a cost to the farm and the environment. Sediments and phosphorus in our waterways cause problems by reducing light and stimulating algal (green-slime) growth. This in turn, depletes the dissolved oxygen in the water, degrading aquatic environments and spoiling the recreational value of the water.

Management practices to reduce sediment and phosphorus losses
The most effective way of managing sediment and phosphorus loss from the farm is to identify areas where there is a high risk of losses occurring and then to develop management strategies to reduce the losses.

Areas on the farm with a high risk for loss are called critical source areas. A specific focus on these areas is the most cost effective approach to managing sediment and phosphorus losses from the farm.
The following practices can help to minimise soil and P losses from the farm.
- Reduce the level of soil disturbance when you cultivate by adopting minimum tillage practices. This is particularly important if your soils are light and easily eroded by the wind.
- If you are cultivating sloping ground, work across the slope face rather than up and down the slope.
- Reduce run-off from soils by improving infiltration, e.g. remediate soil compaction and surface crusting.
- Manage irrigation to avoid ponding and over-application or run off.
- Consider furrow-tying along crop rows and installing silt traps to capture sediments in run-off water.
- Keep stock out of waterways.
- Measure and record Olsen P levels regularly. Reduce phosphorus fertiliser applications if levels are above the target levels for your soil-type and crop.
- Consider the type of phosphorus fertiliser being applied. Losses are more likely from products with readily soluble forms of P. Examples of the more common forms of soluble phosphorus fertilisers include; superphosphate, triple superphosphate, sulphur super, MAP, DAP and compound fertiliser formulations.

**Nutrient Management Plan Purpose**

The purposes of the nutrient management plan for cropping is to:
1. Supply optimal levels of nutrients for plant growth and product quality.
2. Minimise the pollution of surface and ground water resources from nutrient losses from agricultural land.
3. Maintain or improve the physical, chemical and biological condition of soil.

**Plan Development**

Assess the risk for nutrient losses from the crop and grazing rotations on your farm. You will need to consider each paddock and its crop, but many will have a low risk for nutrient losses requiring no specific management change.

Critical Source Areas for sediment and phosphorus losses may include:
- Soil types: light easily erodible soils
- Farm features such as: tracks, natural waterways, drains, irrigators, shelterbelts, wetlands, feed troughs, silage stacks, stock camps, wallows, trees, bush and scrub.
- Cropping ground where there is any risk of soil movement (wind erodible soils, sloping ground).
- Areas where ponding and run-off occur during rain or irrigation.
- Cropping ground close to waterways such as streams, wetlands or drains.
- Soils with Olsen P levels higher than the optimal ranges for the farm’s cropping enterprises.
- Waterways accessible to stock

Develop and document a management strategy for each identified risk on the farm.

Your management strategy must include:
- Details about the planned change in management.
- The time-frame and cost (if any) for the management activity.
- How the success of the management change will be assessed.
- Evidence of your management change

The plan requires you to indicate the nutrient management practices you are currently using.

**Farm Records:**
- Soil test results from recent soil tests for your cropping paddocks.
- Fertiliser recommendations for your crops.
- Records of your crops and their yields.
- Records of your fertiliser applications.
Management Area
Irrigation Management

Refers to pages 13-14 in the Template.

Objective: To operate irrigation systems efficiently, ensuring that the water is supplied where and when it is needed.

The irrigation management plan provides an overview of the irrigators and irrigated areas on your farm and their associated environmental risks.

Regional councils will expect your farm environment plan to demonstrate that:
1. Your irrigation system is operating efficiently.
2. Your water use is monitored and is efficient for the soil and the crop demand.

The Irrigation NZ website houses many resources for irrigators and notice of events being run to improve your ability to manage your irrigation efficiently.

You may choose to use the Irrigation NZ template for irrigated farms which you can also find on their website.

http://irrigationnz.co.nz/

Note: If you are a member of an irrigation scheme, you may prefer to use the Farm Environment Plan template developed for the scheme.

Irrigation management
For the most effective use of your water you should:

Apply the right amount of water at the right time to get maximum growth from your crops
If you apply too much water, more than the soil can hold, drainage occurs, this is a waste of water and the nutrients that may also be leached. If your irrigation is too late the crop will be short of water and its growth rate and final yield will be reduced.

Maintain and manage the irrigation system to minimise wastage and leaks
It is wasteful of both money and water to pump water and then let it go to waste because of leaks in the system and/or applications to tracks and other non-productive areas.

Leaks can reduce the operating pressure so the system doesn’t apply water evenly, leading to uneven crops.

Plan ahead for possible restrictions to water
In seasons when the demand for water is high, water restrictions are a possibility. If you depend on irrigation, decide on irrigation priorities by understanding which of your crops is the most sensitive to a water deficit. Prioritise crops that are of the highest value or are at a growth stage that is vulnerable to a shortage of water.

Develop a plan to best minimise the impacts of water restrictions.

The FAR Focus on Irrigation Management for Cropping is an excellent resource for irrigators.
Management Area
Collected Effluent Management

Refer to pages 15-16 in the Template.

Objective: To minimise risk of contamination of water bodies from stored and applied effluent.

This section needs to be completed if you collect and store from a stock enterprise and spread it back onto your pasture and/or cropping ground.

If you bring in effluent and manures from somewhere else to use as a nutrient source for your farm, you should follow the good management practices associated with testing and spreading to reduce the risk of any nutrient losses.

Management Area
Livestock Management

Refer to page 17 in the Template and pages 13-14 in this guide for information about nutrient and sediment losses associated with grazing.

Objective: To manage wetlands and water bodies so that stock are excluded as far as practicable.
To avoid damage to the beds and margins of water bodies. To avoid the direct input of nutrients, sediment and microbial pathogens to water bodies.

Assess the risk of sediment and nutrient losses associated with animal grazing on your farm and identify possible management changes to reduce these risks.

Management Area
Point Sources for Nutrient Losses

Refer to pages 18-19 in the Template.

Objective: To manage the number and location of offal pits, rubbish pits, silage bunkers, compost heaps etc to minimize the risk to health and water quality.

Point source pollution is defined as the ‘discharge of pollutants from a single fixed point’. On the farm these critical areas may include offal pits, rubbish dumps, compost heaps and silage stacks.

Dead stock is an unfortunate fact of life in farming. Disposal of carcasses and offal requires good management to reduce the possible impacts on human and stock health and the environment. The options available to dispose of dead stock are varied and often depend on local services. Regional councils have permitted activity rules, relating to the disposal of dead animals and offal. Familiarise yourself with, and follow, your local rules.

General farm rubbish can damage the environment or poison animals, plants and people if it is not disposed of safely. It may break down into chemical compounds which can pollute groundwater and waterways. Separate general rubbish into waste types and recycle or reuse on-farm if possible.

Well placed supplementary feed storage areas can save money through reduced spoilage, fuel use and travelling time. Design feed storage close to where it will be used, taking into account the food safety minimum distances. The storage area must be designed to capture leachate and run-off and should exclude rodents, rain and surface water.
Management Area
Farm Biosecurity

Refers to pages 20-21 in the Template.

Biosecurity is the collective responsibility for you, your farm employees and of every person visiting or working on the property.

What is Farm Biosecurity Plan?
Your farm biosecurity plan is a set of measures designed to protect your property from the entry and spread of pests and diseases. As most arable systems involve both cropping and animal production, it is important to consider the biosecurity risks relating to crop production and stock movement.

You and your employees are likely to be the people that first notice disease symptoms or new weeds and insect pests. If you see something that you don’t recognise get help with identification as soon as possible. It is better to be proven wrong than to lose the opportunity to contain and control a new weed or pest species on your farm.

For biosecurity measures relating to farm stock, Beef + Lamb NZ and Deer NZ’s document, Drystock Biosecurity Guidelines – Seven Intervention Points for On-farm Biosecurity, is a useful reference.


Assessing Biosecurity Risk on your Property
Pests have no boundaries and almost anything coming on to your property can be a potential source of new pests and diseases for livestock and plants. There is little you can do to prevent the risk of pests arriving on your property by air, water or the movement of wild animals and birds. However you can develop protocols to reduce the risk of pests hitching a ride on people’s clothing, animal feeds and manures, seeds and plant propagation material, and vehicles, machinery and equipment.

Report unfamiliar weeds, insect pests and diseases as soon as possible. FAR is a good starting place.

Signage
Use signs like the one below to tell people that farm biosecurity is a priority.

If people understand your concerns they are more likely to respect your wishes.

Place the signs at the gate and near the house or sheds so they are easily seen.

If you don’t want to use signs, ensure visitors report to management before they go onto the farm. Inform them about where they can and can’t go.

Movement of Vehicles and Machinery
Vehicles and equipment can carry soil and plant debris onto your farm. All contractors should be requested to have clean equipment before entering your property. Cast your eye over it before they set to work.

Use designated parking areas

Wash-down facilities
A designated area for washing down clothing, boots, vehicles and equipment enables weed seeds to be contained in a small area. The washdown area should:
- Be well away from the cropping paddocks,
- Have a sealed or gravel surface,
- Not drain onto cropping land or waterways,
- Have a sump or collection area for easy inspection.
Cleaning equipment and machinery
All plant material and soil needs to be removed from the machine. Use the wash-down area. Clean from the top down to avoid recontamination of the bit you have just cleaned.

People movement
People moving between farms can transport pests on clothing and footwear. Brief all employees, contractors, and visitors about your farm biosecurity measures.

Overseas visitors
Check that family members, employees and visitors returning from overseas have washed their clothing and footwear. This is particularly important for clothing items that don't normally go near a washing machine.

Contractors and utility workers
Inform people entering your farm to work about your biosecurity policy and make sure their vehicles and clothing are clean. It is also your responsibility to let them know if you have weeds, pests and diseases on your farm that could be a risk for their next clients.

Stock feed and new stock purchases
Purchased animal feeds should be inspected for weed seeds, insects and signs of disease. Feed-out in the same parts of the paddock so that it is easy to do a weed inspection after feeding out has finished.

Newly purchased stock should be held in a holding paddock for at least seven days to allow weed seeds to pass through the digestive system. Inspect for newly germinated weeds regularly.

Purchase seed and plant material from a reputable source
Always try and use certified material and keep a record of the certification report.
Documentation Section

Use this section to hold
1. A list of all the resource consents you hold for your farm operation
2. Soil tests, nutrient budgets, invoices and all other paperwork relating to your management plans.
3. Overseer Nutrient Budget

Note: An Overseer nutrient budget is required by a number of regional councils as part of your farm environment plan.

Farm information you need to keep which can be used to prepare an Overseer nutrient budget includes:

1. The location of the farm; latitude and longitude data to at least 3 decimal places. This enables identification of climate and soils for the farm.
2. Annual yield of arable and horticultural crops and a description of 24 months of the rotation. Start with the crop that is in the ground in April.
3. A description of the management practices used, including:
   i. Ground cover - pasture, fodder crops, crops and the crop rotation, non-grazed areas (forestry, riparian, and tree areas).
   ii. Stock management – lambing/calving/fawning dates and percentages, any purchases and sales and associated dates, types and age of stock.
   iii. Fertiliser application - types and quantities/ha for each identified block for all crops in the rotation.
   iv. Cultivation practice and crop residue management.
   v. Quantities of introduced or exported feed.
4. Irrigation areas: rates, monthly volumes and system type.
5. Monthly stocking rates for all the animal classes on your farm.
6. Farm animal effluent, pig farm effluent, stand-off pad and feed-pad effluent management including:
   i. Area of land used for effluent application.
   ii. Annual nitrogen loading rate and nitrogen load rate/application.
   iii. Instantaneous application rate.

Disclaimer
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Foundation for Arable Research
PO Box 23133
Templeton
Christchurch 8445

Tel: 03 345 5783
Fax: 03 341 7061
Email: far@far.org.nz
Web: www.far.org.nz
The Planning Process is:

1. Identify environmental risks: Please note: If your operation exceeded your planning levels, you may need to adjust your farm management plan.
2. Respond to these risks: Developing a response plan with specific actions and objectives.
3. Document your farm: Keep the information related to your response and planning.
4. Record your current management practices:

The expression guidelines you through the process. Use the guiding notes to help fill in the sections that are relevant to your farm business.

- Nutrient budgets oversee your management plans.
- Soil quality, nutrient budgets, and all other paperwork.
- A list of all resource concerns you held for your farm operation.

The documentation section is for copies of:

Other sections referring to environmental management may be added at a later stage:

- Documentation
- Residual management
- Slag storage and compost storage
- Point sources from sources such as hotel plus office buildings, dumps.
- Leashock management
- Effluent management
- Tiltle management
- Soil management
- Property deeds

After you begin to fill in the template, save it to your computer and hand it in.
For a regional council EFP, so you can choose to leave it blank.

The decision on agricultural management information is not part of the requirements.

If there is a management section which has no relevance to your farm, leave it

might like to see

auditor to fill in. There are suggestions for the sort of evidence an auditor

Change to reduce environmental risks "section of the template.

Consider what you might do differently and fill in the "management

if your management level is not listed. Write it in, using the additional blank

Indicate your current management practices by clicking the tick box

Otherwise, follow good management practice recommendations.

The second question point is your local regional council

The first question point is your current conditions.

as a general rule

that you are familiar with your current conditions and local rules.

Note: In some instances, the field management recommendations may differ

do use.

ack of environmental loss. Use the tick-box to mark the practices you

2. The template lists the management practices you could use to reduce the

management practices on your farm.

1. You will need to identify the environmental risks associated with that

Fill in the template for each of the management areas.
Map 3 Critical Source Areas: Nutrient and Sediment Loss Hot-Spots

- Draw in the farm buildings and management tracks.
- Draw in the position of the irrigators.
- Draw in dykes and irrigated areas.
- Draw the management block boundaries.
- This map will be a useful reference point.

The blocks will align with the blocks set up in the Overstore nutrient budget. Nutrient losses can be set up.

Management blocks with different crop rotations, stock management and nutrient management will be defined. The blocks are defined by differences in soil type, irrigation and dyked areas.

Management blocks might be as small as a single paddock, or the aggregate uptake of a number of paddocks that are managed in the same way.

Map 2 Farm buildings and tracks.

- Identify any point sources or 'hot-spots' for nutrient losses.
- Environmental losses refer to the drainage losses to assess potential risk.
- P and sediment losses refer to the locations where there is a potential risk for P and sediment losses. Mark the locations where there is a potential risk for P and sediment losses.

On the map, and with reference to the soils on your farm, and the risk of N, use a map marked with paddocks suitable for drawing on.

Information about soils

Fill in the HIGHLIGHTED parts of the template.
<table>
<thead>
<tr>
<th>Nutrient Management Indicators</th>
<th>Consent Number</th>
<th>Resource consent held</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus released: kgP/hay/yr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen released: kgN/hay/yr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition date for oversioe nutrient budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overseer version</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N Baseline (2009-13): kgN/ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface water take</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground water take</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground water take</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Image of Farm Details](https://www.gov.bc.ca/survey-titles/land-own-into-property-owners)

Legal description of the land:

Property size:

Consent Details:

Manager:

Contract Details:

Owner:

Address:

Property name:

Property Details and Farm Maps
<table>
<thead>
<tr>
<th>Evidence</th>
<th>Auditor Note</th>
<th>Level</th>
<th>Good Management Practices Currently Employed to Address Environmental Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td>Applied fertilizer by adopting strip tillage or direct drilling. Minimize the number of passes over the paddock.</td>
</tr>
<tr>
<td>NA</td>
<td></td>
<td></td>
<td>Phosphorus and other contaminants to waterways.</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td>Management Objective</td>
</tr>
</tbody>
</table>

**Management Area: Soils**

For details, refer to pages 7-10 in the tandem file guide.
<table>
<thead>
<tr>
<th>Evidence of completion</th>
<th>When</th>
<th>Key Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NA</td>
<td>Management\nchanges other than those listed above. The paddock is grazed besides the waterway first. Break-feed towards waterways at the paddock edge for allowing nutrient and sediment movement within waterways close to waterways. Where possible choose paddocks away from waterways to plan water courses. Where vegetation is managed to reduce the risk of flooding and sediment run-off.</td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>Ensure the buffer is reduced as stock is moved from stock and comply with the water grazing rules. Stock are kept out of waterways and away from stream edges.</td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>Buffer zones and/or riparian strips are used between culverted soils and waterways.</td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>Soil strips and/or soil conservation systems are used to prevent soil and sediments reaching waterways. To collect rainfall, they control the speed of initial water when the catchment gradient is used.</td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>Curve lines and wetlands are used to slow water flow across paddocks and between crop rows. Cultivation methods are used to slow water flow across paddocks and between crop rows.</td>
</tr>
<tr>
<td>Decision Tool</td>
<td>Action</td>
<td>Evidence</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td>Budget</td>
<td>Prepare a post-season nutrient budget to show how well your risk assessment and management practices are performing.</td>
<td>yes</td>
</tr>
<tr>
<td>Nutrient Needs</td>
<td>Test the soil before preparing a crop nutrient budget for early-season planting. The ideal nutrient levels depend on specific crop conditions. The current amount of N (N肥) is determined by the nutrient requirement, which is calculated based on soil test results and the sample collection is responsibility of the crop field.</td>
<td>yes</td>
</tr>
<tr>
<td>Soil Test</td>
<td>Develop a soil testing strategy to ensure all paddocks have regular soil tests and the sample collection is representative of the cropped area.</td>
<td>yes</td>
</tr>
<tr>
<td>Management Practices</td>
<td>To maximize nutrient use efficiency while minimizing nutrient losses to water.</td>
<td>yes</td>
</tr>
</tbody>
</table>

Management Area Nutrient Management

Identified Risks

Management Objective

To maximize nutrient use efficiency while minimizing nutrient losses to water.

References to pages 11-14 in the Technical Guide.
Consider the type of phosphorus fertilizer being applied. Losses are more likely from products with readily
soluble forms of P.

<table>
<thead>
<tr>
<th>Management practices other than those listed above.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
</tr>
</tbody>
</table>

You fillter consultant will advise on the crop requirements for P.

<table>
<thead>
<tr>
<th>Soil test</th>
<th>NA</th>
<th>No Sometimes</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measur and record Olsen P levels regularly. Reduce phosphorus fertilizer applications if levels are above the

immediately soluble to the crop, whereas the organic forms are released slowly through microbial activity.

the release of N from organic sources can be difficult to predict. Usually the minimal forms of N are

Graded

contrasts after long-term pastures or soils that have had regular manure applications or have been heavily

Peterson fertilizers

left a nitrogen content of 0.1% in the upper 1.5 ft. on bare land and 0.4% on unfertilized

Avoid applying animal manure or waterways.

<table>
<thead>
<tr>
<th>Application</th>
<th>NA</th>
<th>No Sometimes</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use a certified (spreader) fertilizer spreader or calibrate your own spreader before use to deliver the

Soil conditions include stony soils; soils that are poorly drained or composed of sands and solis

<table>
<thead>
<tr>
<th>Soil conditions and other limiting factors are taken into consideration when determining fertilizer need.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Evidence of</td>
</tr>
<tr>
<td>-------------</td>
</tr>
</tbody>
</table>

Management changes to reduce environmental risks relating to nutrient management.
### Key Points

- **Application Area:** Irrigation Management

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Yes</th>
<th>Sometimes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring and testing of irrigation systems</td>
<td>Yes</td>
<td>Sometimes</td>
<td>No</td>
</tr>
<tr>
<td>Maintenance and repair of irrigation systems</td>
<td>Yes</td>
<td>Sometimes</td>
<td>No</td>
</tr>
<tr>
<td>Training of staff in irrigation management</td>
<td>Yes</td>
<td>Sometimes</td>
<td>No</td>
</tr>
<tr>
<td>Design of irrigation systems</td>
<td>Yes</td>
<td>Sometimes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Evidence Level:**
- Good management practices currently employed to address environmental risks.

**Auditor Note:**
- To operate irrigation systems efficiently, ensuring that the water is supplied where and when it is needed.

**Management Objective:**
- To improve water efficiency and reduce environmental impacts.
<table>
<thead>
<tr>
<th>Evidence of completion</th>
<th>When by</th>
<th>Key actions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Management practices other than those listed above:

- Some crop residue is left in the soil
- Heavy machinery restricted to specified pathways
- Soil compaction is minimized
- Soils are well-managed to optimize infiltration and minimize runoff

Crop growth and development is monitored.

Soil moisture levels are assessed and used to track soil deficits.
<table>
<thead>
<tr>
<th>Management Practices other than those listed above.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In addition to the measures listed above, it is recommended that:</td>
</tr>
<tr>
<td>- Minimise the irrigation water source.</td>
</tr>
<tr>
<td>- Apply efficient to pipelines and storage tanks to minimise risk to water bodies.</td>
</tr>
<tr>
<td>- Ensure equipment for spreading efficient and other measures is well-maintained and properly calibrated.</td>
</tr>
<tr>
<td>- Ensure that the equipment for spreading efficient and other measures is well-maintained and properly calibrated.</td>
</tr>
<tr>
<td>- Have suitable storage facilities to enable the efficient and waste water to be stored when soil conditions are unsuitable for application.</td>
</tr>
<tr>
<td>- Design efficient storage to meet the industry specific Code of Practice or Equivalent Standards.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evidence Supplied</th>
<th>Author Note</th>
<th>Level</th>
<th>Good Management Practices Currently employed to address Environmental Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence Supplied</td>
<td>Author Note</td>
<td>Level</td>
<td>Good Management Practices Currently employed to address Environmental Risks</td>
</tr>
<tr>
<td>Evidence Supplied</td>
<td>Author Note</td>
<td>Level</td>
<td>Good Management Practices Currently employed to address Environmental Risks</td>
</tr>
<tr>
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<td>Author Note</td>
<td>Level</td>
<td>Good Management Practices Currently employed to address Environmental Risks</td>
</tr>
<tr>
<td>Evidence Supplied</td>
<td>Author Note</td>
<td>Level</td>
<td>Good Management Practices Currently employed to address Environmental Risks</td>
</tr>
</tbody>
</table>

Forms to page 16 in the template guide.
<table>
<thead>
<tr>
<th>Evidence of completion</th>
<th>When</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management changes to reduce the environmental risks associated with different management.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence of completion</td>
<td>When by</td>
<td>Key Actions</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>Yes</td>
<td>NA</td>
<td>Manage grazing to minimise loss from critical source areas (CSA).</td>
</tr>
<tr>
<td>Yes</td>
<td>Sometimes</td>
<td>Maintain grazing breakdowns.</td>
</tr>
<tr>
<td>Yes</td>
<td>NA</td>
<td>Manage areas where animal waste is concentrated to reduce nutrient and microbial runoff.</td>
</tr>
<tr>
<td>Yes</td>
<td>Sometimes</td>
<td>Use vegetation buffer strips or riparian plantings to reduce to litter sediment and microbial runoff.</td>
</tr>
<tr>
<td>Yes</td>
<td>NA</td>
<td>When possible. Recommend stock be excluded from waterways and other stock be excluded from waterways.</td>
</tr>
</tbody>
</table>

**Management Area: Livestock Management**

Good management practices currently employed to address environmental risks:

- To manage wetlands and water bodies so that stock are excluded as far as practicable. To avoid damage to the beds and margins of water bodies.
- To reduce the direct input of nutrients, sediments and microbial pathogens to water bodies.
<table>
<thead>
<tr>
<th>Level</th>
<th>Good Management Practices Currently Employed to Address Environmental Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Evidence Supplied</td>
</tr>
<tr>
<td>No</td>
<td>Evidence Supplied</td>
</tr>
<tr>
<td>N/A</td>
<td>Evidence Supplied</td>
</tr>
</tbody>
</table>

**Management Area: Point Sources for Nutrient Losses**

- **Identified Risks**
  - Water Quality
  - Management of Pits

- **Hearing to page 16 in the Technical Guide**
<table>
<thead>
<tr>
<th>Evidence of completion</th>
<th>When</th>
<th>Key actions</th>
</tr>
</thead>
</table>

Management changes to reduce environmental risks associated with all point sources.
<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>All machinery and equipment entering the farm is inspected for soil and plant material and is cleaned down before arriving paddocks.</td>
<td></td>
</tr>
<tr>
<td>Contracts are informed of the area of weeds, pests and diseases on the farm which may be a risk for their next clients.</td>
<td></td>
</tr>
<tr>
<td>Farm employees know where to report unwanted or exotic pests, weeds, and diseases if they spot them.</td>
<td></td>
</tr>
<tr>
<td>Farm employees are aware of weeds, pests and diseases that are not wanted on the farm.</td>
<td></td>
</tr>
<tr>
<td>Farm contractors are aware of the farm biosecurity protocols.</td>
<td></td>
</tr>
<tr>
<td>Farm contractors are consulted and regular visitors are aware of the farm biosecurity protocols.</td>
<td></td>
</tr>
<tr>
<td>The area around the wash down area is inspected every 4 months for unwanted pests.</td>
<td></td>
</tr>
<tr>
<td>The wash-down area has a sump to collect weed seeds and prevent run-off into waterways.</td>
<td></td>
</tr>
<tr>
<td>There is a designated wash-down area for farm machinery and equipment.</td>
<td></td>
</tr>
<tr>
<td>There is a designated parking area for visitors' vehicles.</td>
<td></td>
</tr>
<tr>
<td>There is a contact number on the biosecurity sign.</td>
<td></td>
</tr>
<tr>
<td>The biosecurity sign requests visitors to report to the management.</td>
<td></td>
</tr>
<tr>
<td>There is a biosecurity sign to inform visitors and contractors that the farm has biosecurity protocols.</td>
<td></td>
</tr>
</tbody>
</table>

**Recommended Practices**

<table>
<thead>
<tr>
<th>Identified Risks</th>
<th>Management Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm machinery and soil should not be brought onto the farm. The area is maintained in a manner that will help to control weeds, pests, and diseases.</td>
<td>Use this table to record the biosecurity management practices you are using on the farm. This part of your EFP is not applicable by the Regional Council due to biosecurity risks.</td>
</tr>
</tbody>
</table>

*Refer to pages 17-18 in the template guide*
<table>
<thead>
<tr>
<th>Key Actions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>You work collaboratively with neighbours and pest control groups to control the spread of weeds and pests.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>All farm personnel and visitors returning from overseas have open clothing and footwear before going onto the farm.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Plant propagating material is carefuly inspected before it is planted out.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Bins of seed and grain are covered during transport.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>All new seed is certified or has a seed purity certificate. These records are kept.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>There is a containment/demarcation plan for unwanted weeds and pests.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Crop inspections daily are recorded in a crop diary or recording sheet.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Production Wise has this option.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Crop inspection details are recorded in a crop diary or recording sheet.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Production Wise has this option.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>New plant stock is isolated in a holding paddock for seven days. This paddock is regularly checked for unwanted weeds.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>All livestock movements on and off the farm are recorded with a stock diary.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Purchased animal feed is fed out in the same area. This area is regularly inspected for new weeds.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>All grain and fodder bought for animal feed is certified as being disease free and free of weed seeds.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vehicle movements are confined to farm tracks where paddockable.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Machinery is cleaned down before it leaves the property.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Document</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Crop diseases (production reports)</td>
<td>Fertilizer, field essentials, cultivation records</td>
<td></td>
</tr>
<tr>
<td>Irrigation records</td>
<td>Soil moisture monitoring records</td>
<td></td>
</tr>
<tr>
<td>Irrigation records</td>
<td>Fertilizer production maps</td>
<td></td>
</tr>
<tr>
<td>Crop nutrient budgets - fertilizer recommendations based on soil test results</td>
<td>N baseline calculations</td>
<td></td>
</tr>
<tr>
<td>Soil test results</td>
<td>Oversee nutrient budget</td>
<td></td>
</tr>
<tr>
<td>Regional Council Conferences - Water, land use, and discharge consents</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Your list may contain some of these listed above:
Environment Canterbury Regional Council

Wainono Restoration Project
Grant Agreement

Dated this\(^1\) day of 2015

Parties: Council
Grant Recipient

Definitions:
Agreement means this legally binding arrangement mutually agreed between the Parties.
Before and After Photographs means at least three photographs of the Site(s) taken prior to work commencing and at least three photographs taken from the same points of the Site(s) on completion of any work in respect of which a Grant payment is to apply.
Council means Canterbury Regional Council.
Covenant means a promise or undertaking to carry out or refrain from doing some activity that affects adjoining land and able to be registered on a title.
Date means the date of this Agreement.
Grant means the funds administered by the Council to the Grant Recipient.
Grant Recipient means the person with appropriate legal entity to sign the agreement (may be the Landowner).
Implementation Plan includes the tasks, funds and milestones required to complete the project.
Landowner means the owner as it appears on the Legal Description of the address of the Property.
Parties mean the signatories to the Agreement.
Programme means the Biodiversity and Ecosystem Health Programme.
Project describes the actions to be carried out as described in the Implementation Plan in Schedule Three at the Property.
Property means the legal address of the project Site(s).
Region means the Canterbury region.
Site(s) means the Project locations shown on the maps in Schedule Two.

\(^1\) Date to be inserted by the last signatory of the Agreement

Initials here: [Signature]
Background:

a) The Council has established the Programme to assist in protecting and restoring indigenous biodiversity in the Region. As part of the Programme, funds are made available as grants to implement 'on the ground' actions to protect and restore biodiversity in the Region. These grants are made available through:
   - the Canterbury Water Management Strategy Immediate Steps fund;
   - the Canterbury Biodiversity Strategy fund; and
   - the Wanono Lagoon Restoration project (co-funded by the Ministry for the Environment Fresh Start for Freshwater fund).

b) The Council has consulted with the Grant Recipient and the Landowner(s) about the voluntary protection of certain sites identified on the Landowner(s) Property and about practical options for protection and restoration work for these sites.

c) The Council has agreed to provide advice on biodiversity protection and restoration and financial assistance to support protection and restoration work undertaken by the Grant Recipient.

d) The Grant Recipient has agreed to participate in the Programme and to undertake the protection and restoration work on the Site(s) shown on the maps in Schedule Two and described in the Implementation Plan in Schedule Three.

Purpose:

e) The Parties wish to set out:
   - the terms and conditions of the Council’s support including financial assistance by way of a grant to the Grant Recipient for the completion of a programme of protection and restoration work, including ongoing monitoring and maintenance of identified Site(s) on the Landowner(s) Property, and
   - the obligations of the other Parties

f) The terms and conditions are set out in this Agreement.
Programme Support
1. In consideration of the Grant Recipient undertaking the Programme of protection and enhancement work on the Site(s) identified on the project maps in Schedule Two and the work described in the Implementation Plan in Schedule Three, the Council will pay a grant up to the value identified as the Environment Canterbury contribution in Schedule Four, to the Grant Recipient on the terms and conditions set out in this Agreement.

Term of Agreement
2. This Agreement commences on the Date of this Agreement and expires within the term specified in Schedule Two, unless terminated earlier in accordance with the provisions of this Agreement.

Project Details
3. The Grant Recipient shall carry out the Project in accordance with the Implementation Plan in Schedule Three using best practice standards to ensure the Project is successful in meeting its intended biodiversity protection and/or restoration purpose.
4. The Grant Recipient shall as far as possible implement the Project in a manner that is consistent with and furthers the principles, objectives and purpose of the Council’s Canterbury Biodiversity Strategy and any other guiding documents referred to in the Schedules.
5. The Grant Recipient shall give the Project appropriate priority over other activities to ensure that it is undertaken without undue delay and in accordance with Clause 17.
6. The Grant Recipient shall report to the Council as set out in Clauses 18 and 19.
7. The Grant Recipient and/or the Landowner shall throughout the duration of the Agreement undertake any ongoing maintenance of any part of the Project including maintenance of any protection fencing around the Site(s) to a stock proof standard and/or maintenance of any plantings specified in the Implementation Plan in Schedule Three as and when necessary. For the purposes of this clause “maintenance of any plantings” includes the replacement of any plants that die within two years of planting above a ten percent attrition rate.
Legal Protection of Works

8. Where the Grant Recipient and/or the Landowner enters an agreement to sell any land containing Project Site(s) while this Agreement is current, the Grant Recipient and/or the Landowner will notify the Council in writing as soon as practicable after the contract for sale and purchase has been signed, and no less than 8 weeks before the sale settlement date.

9. The Landowner(s) shall not during the term of this Agreement transfer, assign or otherwise dispose of any interest in the land or any of the sites identified in Schedule Two without first ensuring that the Purchaser, Assignee, Lessee or other person acquiring an interest enters into an agreement with the Council on similar terms to this Agreement and in the form required by the Council, whereby that other person agrees to carry out Landowner(s) obligations for the unexpired term of this Agreement.

10. If the Grant Recipient and/or the Landowner(s) fails to faithfully observe, perform and fulfill the requirements of Clauses 8 and 9 or any of the conditions of this Agreement, then the Grant Recipient shall upon demand repay to the Council, in full, the amount of the Grant or such lesser amount as the Council may determine having regard to the nature and effect of the breach. In the event that the Grant Recipient fails to make such payment as shall be required the Council may take such action to recover the amount as it shall consider necessary.

Access to the Project Site

11. The Grant Recipient and/or the Landowner shall allow the Council (or its agents) to enter the Property at all reasonable times to observe the Site(s). Where practicable the Council will arrange with the Grant Recipient and/or the Landowner an appropriate time and day for the Site(s) observation prior to the inspection taking place.

Financial Accountability and Auditing

12. The Council shall pay the Grant as set out in the Payment Details in Schedule Four and following the provision of an Invoice(s) to the Council by the Grant Recipient quoting the Council’s purchase order number. Payment shall be made to the Grant Recipient or upon written request of the Grant Recipient directly to any contractor undertaking the works.

13. Where the approval of the Grant was made conditional on a Covenant to protect the Project Site(s) being entered into and registered on the certificate of title for the land as detailed in Schedule Two, payment of the Grant or any part thereof shall not be made until proof of registration of such Covenant has been provided to the Council.
14. The Grant Recipient shall use the Grant for payment of the costs of the physical work of the Project as detailed in Schedule Four only and shall not use any Grant monies for payment of costs of any administrative work, travel, meals, accommodation, meeting fees, venue hire costs, lease of land, advertising or resource consent application process associated with the project or for any other purpose whatsoever.

15. The Grant Recipient acknowledges that the Grant is for a proportion only of the cost of the project as shown in Schedule Four of the Agreement and the Grant Recipient is responsible for funding the balance cost of the project from other sources.

16. The Grant Recipient shall retain all receipts and other records as proof of purchase of expenditure on all items used for the Project in support of the invoice required by Clause 12 and shall make such receipts and records available for inspection by the Council on request.

Timing of Project

17. The Grant Recipient shall commence the project as identified in Schedule Two, shall meet all the Project milestones as set out in the Implementation Plan in Schedule Three, and complete the project as identified in Schedule Two, unless the Parties agree in writing otherwise.

Reporting on Project Objectives

18. Where identified as required in Schedule Two, the Grant Recipient shall prepare a Final Report on the Project and shall provide this to the Council as soon as reasonably practicable after the completion of the Project. The Final Report shall include the following Information:

a. Title of Project;

b. Name of Grant Recipient;

c. Date;

d. Name of author;

e. Details on outcomes achieved and a summary of the works that were carried out;

f. Details of all costs of the Project – including a record of hours for in-kind contributions and receipts for all works invoiced for the Project;

g. Before and After Photographs that have been taken from a location and at a scale, that enables the Council to confirm the completion of the Project and the effectiveness of work conducted; and

h. Maintenance and monitoring undertaken to date.
19. In addition to the report required by Clause 18 the Grant Recipient shall provide the Council with interim progress reports if requested to do so.

Resource Consents
20. The Grant Recipient and council shall be jointly responsible for ensuring that the Project complies with the laws of New Zealand, including any regional plans, resource consents or any other applicable legislation.
21. The council will meet costs associated with, and shall ensure that all resource consents or other consents required from any local authority or other authority are obtained prior to the commencement of the project. The council and grant recipient shall adhere to all conditions of such consent and the Grant Recipient acknowledges that the Council's approval of the Grant or entering into this Agreement in no way implies the Council's approval of any resource consent or other application required of it in its capacity as a consent authority.

Accidental Discovery
22. If during the course of carrying out work under this Agreement a site of archaeological interest to Rūnanga or Historic Places Trust is uncovered all work shall cease and the Council shall be advised. The Council shall take responsibility for determining and notifying when work can recommence.

Variations to the Agreement
23. This Agreement, including any variation to the scope of the Project or the Implementation Plan set out in Schedule Three, may be varied only by written agreement of all Parties.

Refund of Grant
24. The Grant Recipient accepts that eligibility for payment of the Grant or any portion thereof will be lost if Invoices and related information required by Clauses 12 and 16 are not provided to the Council by due dates.
25. The Grant Recipient shall upon demand refund to the Council any payment of the Grant or part thereof that cannot be substantiated by receipts or records to the satisfaction of the Council.
26. If the Grant Recipient fails to faithfully observe, perform and fulfil any covenant or condition of this Agreement, then the Grant Recipient shall upon demand repay to the Council in full the amount of the grant or such lesser amount as the Council may determine having regard to the nature and effect of the breach. In the event that the Grant Recipient fails to
make such payment as shall be required the Council may take such action to recover the amount as it shall consider necessary.

Disclaimer

27. Any advice provided on the Project by the Council is for the purposes of biodiversity protection and enhancement and the Grant Recipient shall be solely responsible for ensuring the suitability of the project for all other purposes including the avoidance or mitigation of adverse effects.

Acknowledgements

28. The Council's Programme is to be acknowledged as the source of funding in any publicity resulting from the performance of the Project.

Disputes

29. The Parties agree to act in good faith and attempt to resolve any dispute by meeting within 10 working days of one giving the other written notice of a dispute. If the dispute is not resolved within 5 working days by the nominated representatives of the Parties it will be immediately referred to more senior representatives of the Parties. If those representatives do not resolve the dispute within 10 working days, it will be submitted to arbitration in accordance with the Arbitration Act 1996. The arbitration will take place in Christchurch if requested by the Council.

Media and Publicity

30. The Grant Recipient agrees that the Council may use Project information for its own promotional purposes. The Council will consult with the Grant Recipient on the accuracy of the Project information used for that purpose where possible.

31. The Grant Recipient grants to the Council a non-exclusive, perpetual, royalty-free right to copy, store, distribute and make available images specified in clause 18 for the use of the Council including electronic broadcast on the Internet or other electronic media.
Local Government and Official Information and Meeting Act 1987

32. The Grant Recipient acknowledges that all Project information will be official information and may be made available under the Local Government Official Information and Meeting Act 1987.

Counterparts

33. This Agreement may be executed in counterparts (which may be scanned and emailed copies) and all of which, when taken together constitute one document.

Signed on behalf of the Grant Recipient:  

[Signature]

Name: Colin Hurst

Date: 11/3/2015

Witness: [Signature]

Witness Name: Kerri Long

Signed on behalf of the Council:

[Signature]

Name: Kim Drummond

Date: 12/3/2015

Witness: [Signature]

Witness Name: Karen Richardson  

12/3/15
Schedule 1 – Contact Details

<table>
<thead>
<tr>
<th>Grant Recipient</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Colin Hurst</td>
</tr>
<tr>
<td>Postal address</td>
<td>1520 Waimate Highway RD 1 Timaru</td>
</tr>
<tr>
<td>Phone number</td>
<td>038885898, 0278895899</td>
</tr>
<tr>
<td>Email address</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Landowner (if different from Grant Recipient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Postal address</td>
</tr>
<tr>
<td>Phone number</td>
</tr>
<tr>
<td>Email address</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E Can operational contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Postal address</td>
</tr>
<tr>
<td>Phone number</td>
</tr>
<tr>
<td>Email address</td>
</tr>
</tbody>
</table>

Schedule 2 – Project Overview

<table>
<thead>
<tr>
<th>Zone:</th>
<th>Lower Waiatei</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal description:</td>
<td>LOT 30 DP 387 BLK VIII WAIMATE SD</td>
</tr>
<tr>
<td></td>
<td>PT LOT 1 DP 2178 BLK VIII WAIMATE SD</td>
</tr>
<tr>
<td>Legal protection:</td>
<td>Not required</td>
</tr>
<tr>
<td>Location description:</td>
<td></td>
</tr>
<tr>
<td>Site coordinates:</td>
<td>Easting: 1462532.91</td>
</tr>
<tr>
<td></td>
<td>Northing: 5054414.79</td>
</tr>
</tbody>
</table>

Project outcomes
- Water quality in Wainono Lagoon and its tributaries is improved. The diversity of habitats within the Wainono Lagoon and its tributaries, and the species they support are maintained.

Project actions/outputs
- To undertake measures that will reduce sediment and nutrient input into the tributaries of Wainono Lagoon. This may include but is not limited to: sediment management, erosion control, stock crossings, fencing and riparian planting.

Term of Agreement
- This Agreement expires eleven years from the date of completion of the implementation actions (excluding actions identified for ongoing maintenance)

Project timing
- Commencement: Within one month of the Date of the Agreement
- Completion: Within one year of the Date of the Agreement
- Reporting on Project: Not required
Map 1: Project location
Map 2: Site works locations

Legend
- ARMORING OR GRADE CONTROL
- FENCING
- STREAM BATTERING/GRADE CONTROL
- BED PROFILING
- PLANTING

Initials here: CM

[Sketch of a site with marked areas for various works]
Map 3: Site works locations
Map 4: Site works locations

Legend

- ARMORING OR GRADE CONTROL
- FENCING
- STREAM BATTENING/GRADE CONTROL
- BED PROFILING
- PLANTING

Divert flow to existing swale (in blue)

Fill drain

Sediment trap

Boulder weir

Widen and bench

Initiate here: [Signatures]
## Schedule Three – Implementation

### Fence Specification

<table>
<thead>
<tr>
<th>Posts</th>
<th>Verts between pots</th>
<th>Wire type 1</th>
<th>Wire type 2</th>
<th>Wire type 3</th>
<th>Length</th>
<th>Map ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>Spacing (m)</td>
<td>Type</td>
<td>Number</td>
<td>Type</td>
<td>Number</td>
<td>Type</td>
</tr>
<tr>
<td>1800x100</td>
<td>5</td>
<td>None</td>
<td></td>
<td>2.5mm electrified</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Requirements:**

n/a

### Implementation Plan

<table>
<thead>
<tr>
<th>Milestone Tasks</th>
<th>Responsibility</th>
<th>Month</th>
<th>Year</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erect fence on agreed line to specification</td>
<td>Grant recipient</td>
<td>May</td>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>Undertake inspection and repair of fence to maintain fence in stock proof condition</td>
<td>Landowner</td>
<td>As required</td>
<td>Ongoing</td>
<td></td>
</tr>
</tbody>
</table>

1. Placement and materials for all other fencing elements including, but not limited to, strainers, stays, tie-backs, tie-downs, insulators, gates, flood gates, are to be fit for purpose with a design life of 30 years and consistent with accepted good practice.

2. Indicative month identified as the appropriate time to do the task, subject to seasonal variation or operational constraints. Variations greater than one month must be discussed with the Biodiversity Officer.

### Weed Control Specification

<table>
<thead>
<tr>
<th>Method</th>
<th>Target Species</th>
<th>Number</th>
<th>Units</th>
<th>Distribution</th>
<th>Chemical</th>
<th>Rate</th>
<th>Map ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felling</td>
<td>Crack willow</td>
<td>10-20</td>
<td>Individuals</td>
<td>Local patches</td>
<td>Glyphosate 360</td>
<td>Label rate</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Implementation Plan

<table>
<thead>
<tr>
<th>Milestone Tasks</th>
<th>Responsibility</th>
<th>Month</th>
<th>Year</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engage contractor to undertake control as specified</td>
<td>Environment Canterbury</td>
<td>March</td>
<td>2015</td>
<td>Felling contractor to be on site with excavator operator</td>
</tr>
</tbody>
</table>


2. Indicative month identified as the appropriate time to do the task, subject to seasonal variation or operational constraints. Variations greater than one month must be discussed with the Biodiversity Officer.

Initials here: [Signatures]
## Planting Specification

<table>
<thead>
<tr>
<th>Planting purpose or site description</th>
<th>Species¹</th>
<th>Size</th>
<th>Spacing (m)</th>
<th>Number</th>
<th>Coverage (m²)</th>
<th>Map ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank stabilisation, overland filtering</td>
<td>Phormium tenax</td>
<td>90mm</td>
<td>2</td>
<td>500</td>
<td>7600</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Carex secta</td>
<td>70mm</td>
<td>1.5</td>
<td>500</td>
<td>1200</td>
<td>n/a</td>
</tr>
<tr>
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<td>Carex secta</td>
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</table>

¹All plants must be eco-sourced. Species list is indicative and subject to availability, changes can be made with the prior agreement of the Biodiversity Officer.

### Implementation Plan

<table>
<thead>
<tr>
<th>Milestone Tasks</th>
<th>Person responsible</th>
<th>Month¹</th>
<th>Year</th>
<th>Comment</th>
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<tbody>
<tr>
<td>Pre-plant spraying</td>
<td>Environment Canterbury via contractor</td>
<td>March</td>
<td>2015</td>
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<tr>
<td>Planting</td>
<td>Environment Canterbury via contractor</td>
<td>April</td>
<td>2015</td>
<td></td>
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<td>First release spray</td>
<td>Environment Canterbury via contractor</td>
<td>May</td>
<td>2015</td>
<td></td>
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<tr>
<td>Second release spray</td>
<td>Grant recipient via contractor</td>
<td>October</td>
<td>2015</td>
<td></td>
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</tbody>
</table>

¹Indicative month identified as the appropriate time to do the task, subject to seasonal variation or operational constraints. Variations greater than one month must be discussed with the Biodiversity Officer.
The Wainono Project - restoring a national taonga

What is the Wainono Project?

Wainono Lagoon is a coastal lagoon and taonga (treasure) of tangata whenua.

The 480 hectare coastal lagoon and wetland is of national and International importance for its birdlife and native fish. It is also highly valued for its recreational values.

Work to protect and restore animals and plants in and around the lagoon is supported by local landowners and Rūnanga, the Wainono Water Users Group, the Department of Conservation, Q&A Trust, Fish & Game, Waimate District Council, Environment Canterbury, and the local zone committee.

Thanks to $800,000 from the Government’s Fresh Start for Freshwater Fund, plus $275,000 from the Canterbury Water Regional Committee and the Lower Waitaki Zone Committee, the project has a solid foundation for continuing its good work.

Some of this work includes sediment and erosion control, fencing streams, native plantings, protecting wetlands, weed control, and assisting fish passage.

New population of mudfish discovered

A population monitoring programme for the nationally critical Canterbury mudfish was undertaken to provide an indication of productivity and general habitat suitability as well as to investigate how changes in hydrology and water quality affect their populations.

The monitoring programme also discovered a significant new population of Canterbury mudfish in the Upper Hook area. Work is now being done with a local landowner to install fencing to protect their habitat.

As the site is in the upper reaches of a stable tributary it has the potential to seed new populations down stream or replenish existing ones.

What has been done so far?

- 21km of fencing to exclude stock
- 21km of stream banks reshaped and battered to prevent head wall erosion, undercutting and bank slumping
- 23 in-stream sediment traps including a large Hook delta wetland trap
- 109 sites where rock armouring has been installed to stabilise stream banks
- 40 detention bunds
- 3000 plants planted
- More than 50% of the catchment is covered by Farm Environment Plans that specifically address sediment management

How can you get involved?

There are two main ways you can get involved in the Restoration Project:

- Register your interest by joining the Friends of Wainono contacts list. Email lannisley.lange@ecan.govt.nz and we will send you updates and events information.
- If you are a land manager, enquire about funding assistance to protect biodiversity or for reducing the input of sediment and nutrient into waterways. Contact Kennedy Lange at kennedy.lange@ecan.govt.nz or 03 687 7800.

Farm Environment Plans help identify on farm environmental risks

The zone committee has been working Environment Canterbury and local farmers to develop Farm Environment Plans (FEP) to help farmers identify and manage environmental risks on their farm.

FEPs are unique to each property and reflect the local climate and soils, that type of farming operation, and the goals and aspirations of the land user.

The templates being developed for the Hook catchment have been specifically designed to include things like sediment management measures that will directly help water quality for Wainono tributaries.

The FEP templates being used in the catchment will continue to evolve and be refined as Environment Canterbury and project staff continue to work on these plans with individual farmers.

The Hook catchment steering group is specifically looking at how the template can be made easier to understand and use.

Main earthworks in the Hook catchment are approaching completion

Work started on properties in the south branch of the Hook River in August 2014 to help reduce the amount of sediment going in to the lake.

Fencing, stream batters, sediment traps and rock armouring are almost all done and the observed settling rate of disturbed sediment during the work has been very quick. This, and the low stream flows have meant the negative impacts on the environment have been minimal.

The dry conditions have also meant the seed strike for the grass that has been sown has been slow but the native plantings are establishing well.

Landowners have been very helpful and accommodating and are happy with how things are turning out.

Wainono - sharing its story

Signage and interpretation panels are being developed by Environment Canterbury, Rūnanga, Waimate District Council and the Department of Conservation.

A landscape architect has been engaged to design the structures that will present the Information and these will be built with recycled hardwood timbers from the old Waiaha box and Bradshaw’s bridge.

Using these materials will visually mark the sites as part of the restoration project and provide a useful heritage link with the history of water management around the lagoon.
Nitrogen Allocation Reference Group
(NARG)

South Coastal Canterbury Streams
(SCCS)

Colin Hurst
Outline

- SCCS background
- Tension and protest
- Forming a "NARG" group
- Key features of the NARG process
- Where did we get to?
- Proposed SCCS N-Allocation framework
- Concluding thoughts
- Questions & discussion?
SCCS background

- We have red, orange and green catchments under LWRP

- Consented new schemes (WD & HDI) would add 27,000 ha new irrigation
Tension and protest

- Feb 19th – Draft ZIP Addendum (N-allo based on Selwyn-Waihora framework)
- Land owners confused? Uncertainty of what all this means!
- Protest at Zone committee meeting
- Equity concerns
Forming a “NARG” group

- Formation of Nitrogen Allocation Reference Group (NARG)
- 20 members – open to public

NARG Purpose:
“To work with ECan to assess and describe the consequences of different options for allocating N load in the South Canterbury Coastal Streams (SCCS) area”
Key features of NARG process

- NARG to operate within guidelines and total N allocation already agreed
- Come up with allocation method
- Working to a tight deadline!
- Ten meetings, at times meeting weekly
- Technical support
Key features of NARG process

• Negotiation between high and low emitting land users
• Support of Federated Farmers
• Informal meetings behind the scene
• Invaluable support of regional council staff and the technical lead
• Trust and Respect
• Land and Water Partnership

Considered a range of (7+) options... see next
Range of N-Allocation Options

Grand-parenting
Protects investment of existing high emitting land uses but does not provide others with opportunity to develop.

Solution Space!!!
(as also described by Land & Water Partnership on Tuesday 13 May)

Simple averaging
Allows low emitting land users some flexibility to develop, but does not recognize existing investment.

Change from current situation
Range of N-Allocation Options

At NARG's request we shortlisted three options...

1. GMP at Current land use
   + flex cap
   + max

2. Modified Equal Allocation

3. GMP based on soil, rainfall (single land use)

4. Simple Averaging

5. Land Use Capability (Natural Capital)
Where did we get to? – key principles

- Protecting property owners equity
- Enabling low emitters to intensify up to flex cap
- Protecting high emitters investment by making reductions over time
- Recognise water quality outcomes must be met
Proposed SCCS N-Allo framework

- Everyone starts at their 2009-13 N “baseline” as per LWRP
- Everyone to be at least at GMP for their baseline landuse – as per MGM project numbers.
- High emitters reduce through time – “Max Caps”
- Low emitters can intensify up to “Flexibility Cap”
- Flexibility cap increases through time as mitigation occurs (flow augmentation) and gains are realised from the Max Caps
Maximum Caps

*High emitters must reduce through time... (better than GMP for high emitters on light soils)*

<table>
<thead>
<tr>
<th>Maximum Cap for Waihao Wainono and Northern Streams (kg/ha/yr)</th>
<th>Soils</th>
<th>New Users (HDI + WD + any other new converters)</th>
<th>Existing Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>XL, VL, L</td>
<td>Achieve immediately on conversion</td>
<td>Must prepare a plan by 2020 showing how to achieve</td>
</tr>
<tr>
<td>25</td>
<td>M, H, D</td>
<td></td>
<td>Achieve by 2025</td>
</tr>
<tr>
<td>20</td>
<td>Pd, Pdl</td>
<td></td>
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</table>
Flexibility caps for low emitters

*Increase* through time...
- Start at 10 kg/ha/yr for Wainono (red zone)
- Increase to 15 kg once flow augmentation
- Increase to 17 kg once Max Caps achieved, provided WQ outcomes being met

*Note* “steep hill” areas get 5 kg/ha/yr
(can’t transfer load from steep hills to “average out” high losses on flat)
# Implications of Max & Flex Caps?

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<tr>
<th>Land Use</th>
<th>NL</th>
<th>NP</th>
<th>P</th>
<th>D</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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</tbody>
</table>

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**Red land uses**
- Must reduce to meet Max Caps (35, 25, 20)

**Orange land uses**
- Carry on at GMP but can't increase

**Green land uses**
- May increase to Flex Cap of 15 (but still at GMP)
Soils: S-Map + local hill estimates

Note narrow "ribbons" of XL, VL and L soils along river courses
Total = 1121 t/yr
Flexibility, bucket = 214 t/yr
HDI & WDP = 227 t/yr
Existing use = 680 t/yr

Waiano Waiono

Makiki = 145 t/yr
Horseshoe = 51 t/yr
Kohika = 96 t/yr
Orito = 169 t/yr

Northern Streams

Sincires = 61 t/yr
Morrow = 307 t/yr
Morrow & Sincires
Concluding thoughts

- Phosphate/Sediment controlled by FEP and GMP
- Soils are the key
- Power of a consensus decision
Canterbury Matrix of Good Management Practices

Agriculture - Agreed

Relating to Water Quality

Good Management Practices

6 April 2016
Further Information

There are many useful general and sector-specific publications that explain the GMP. More information and guidance are likely to be necessary.

These groups will be applicable to all farms in Canterbury by June 2017. They do not cover the environmental guidelines. Read the guidelines for specific information.

The MGP is a collaborative initiative between industry bodies, researchers, and land managers.

The MGP is a collaborative initiative between industry bodies, researchers, and land managers.

The MGP is a collaborative initiative between industry bodies, researchers, and land managers. The benefits of the MGP are derived from working together to improve the sustainability of dairy farming in Canterbury.
The context of the Good Management Practices (GMPs) focuses on ensuring biodiversity and conservation of natural and cultural heritage. Other aspects of farm management (e.g., greenhouse gas reduction, health and safety) and economic performance (e.g., profitability) are also important, and must be taken into account. GMPs for the MEE project focus on water quality (including nitrogen, phosphorus, etc.) and the potential for improved nutrient management.

Regional Plan Develops

Buffer strips and other spatial strategies are key to protecting wetlands and waterways. Significant wetlands, waterways, and other areas are managed to maintain their ecological value. Critical Source Areas

Relevant Plan Develops

These may be subject to further refinement as the environment continues to evolve and new information becomes available. GMPs are intended to provide a guide for farmers and growers.
Industry-agreed Good Management Practices relating to water quality

**ANIMALS**

- **GMP:** Manage groundwater to minimise losses from critical source areas.
- **GMP:** Improve nutrient and sediment losses from critical source areas.
- **GMP:** Select and apply management practices for intensive grazing, eg fertilisers and mulching
- **GMP:** Reduce grazing and minimise risk to water bodies.
- **GMP:** Develop nutrient management plans, and improve the accuracy of nutrient inputs, taking account of all sources of

**PLANTS**

- **GMP:** Stock from waterways.
- **GMP:** Stock from flooding, and other sources of nutrients to water quality.
- **GMP:** Locate and manage farm tanks, drainage, and water requirements, self-draining areas, stock
- **GMP:** Identify risk of overland flow of sediment and eroded bacteria on the property and

**GROUND COVER**

- **GMP:** Manage periods of exposed soil between crops/pasture to reduce risk of erosion.
- **GMP:** Manage ground cover.

**HUMUS**

- **GMP:** Manage livestock operations to minimise direct and indirect loss of sediment and

**LAND**

- **GMP:** Manage eroded operations to minimise direct and indirect loss of sediment and

**FARM FARM Whole Farm**

**SUMMARY LIST OF GOOD MANAGEMENT PRACTICES**
and rocky areas

These clayey areas, that won’t be worked or row-corn & fallows, buffer, protect margins
leave lans graded around rocks, gullies and margining, if spaing or pastures
using patch-tilling of rippling to remedy compaction of soils
prevent loss, use of land, and water use of land

Materials to prevent or remedy soil damage

General steps, waterproof cover crops

Means to prevent soil loss through erosion

Means to prevent soil erosion through management of

Means to prevent soil erosion through management of

Climatic and weather conditions to determine timing of application

Collected data and records (e.g. planting or harvesting records)

Soil type and texture quality (e.g. planting or harvesting records)

Shape of field (deeper and higher) in relation to waterbody

Distance form surface waterways, effectiveness of buffers

Consider:

Implementation guidance:

Implementation guidance:

Management practices.

GNF: Maintain accurate and up-to-date records of annual farm inputs, outputs and

Suitable applications.

GNF: Maintain accurate and up-to-date records of annual farm inputs, outputs and

Suitable applications.

Assess the risk factors to water quality associated with the farm system, and

Farm planning and records

Whole Farm good management practices and

Good management practices and
Class 7 to ensure intense soil conservation measures and practices are in place.

**GMP:** Prepare all land use capability class B and other fields of actual/managed all land use capability class C. Planning a catch crop. Reduce runoff during and immediately after the phase of the rotation: 9 by:
- Reduce erosion at the least 70%.
- For dry soils: 20% cover (100% or 2 years).
- For cropland until part of an earlier operation the minimum 8% cover is:
- For cropland at least 50% cover.
- Each paddock to have an average more than 10% cover.
- For dry soils: at least 40% cover on 75% of the land (less than 4% cover). For depleted cropland until part of a pasture rotation the minimum 8% cover.

**Outdoor pads:** Pads are damaged. In accordance with the ordinance, stainless steel and fiber cables are still mangled out of water, help maintain cleanliness. When developing paddocks maintain clean irrigation system as grasses and turf better when developed paddocks maintain clean irrigation system as grasses and turf better.

- Cover crop (Garden type, Ears, B FORB, Agri, other decorative varieties) to reduce:
  - Rest and low erosion damage areas.
  - As soon as practical to minimize periods of exposed soil.
  - Rest are more available, reduce or stock damaged (resulting in bare soil) are re-sown.
  - Consider soil conditions and crop rotation.

**Implementation guidelines:**
- Cash grain loans, secure, farmers, other ideas of interest to reduce:
  - Poor and low erosion damage areas.

**Crop rotation, water and crop diet:**
- GMP: Manage periods of exposed soil between crop/parity to reduce risk of:
  - Ground cover.
  - Fertility, cultivation, soil when conditions are enough to reduce compaction and

**Implementation guidelines:**
- Water and crop diet: Poisons, transport of sediment, phosphorous and fecal bacteria to water.

**Waterways:**
- When applicable use methods to minimize or eliminate sediments entrainment.
- Where applicable, use methods to minimize or eliminate sediments entrainment.
- Manage erosion and protect crop of soil to reduce sediments to water.
- Identify, record and manage risk to and from critical source areas such as waterways.
- Implementation guidelines:

**In-pasture waterway:**
- Identifying risk of overland flow of sediment and fecal baceteria in the property.

**Paddocks:**
- Use irrigation transport of sediment, phosphorous and fecal bacteria to water.

**Planning:**
- Reduce runoff during and immediately after the phase of the rotation: 9 by:
- Reduce erosion at the least 70%.
- For dry soils: 20% cover (100% or 2 years).
- For cropland until part of an earlier operation the minimum 8% cover is:
- For cropland at least 50% cover.
- Each paddock to have an average more than 10% cover.
- For dry soils: at least 40% cover on 75% of the land (less than 4% cover). For depleted cropland until part of a pasture rotation the minimum 8% cover.
Plant management is crucial for water quality and preservation. Implementing specific strategies can help reduce nutrient losses and improve overall water quality.

**Examples of strategies include:**

- **Buffer strips:** Creating buffer strips along streams and rivers can help reduce nutrient losses by trapping sediments and nutrients.
- **Nutrient management programs:** Implementing best management practices (BMPs) can help limit nutrient inputs to water bodies.
- **Fertilizer use:** Reducing fertilizer use and improving application techniques can minimize nutrient runoff.
- **Dumping:** Properly disposing of waste and avoiding water bodies can reduce nutrient inputs.

**Implementation guidance:**

- **Buffer strips:** Locate buffer strips along streams and rivers to trap sediments and nutrients.
- **Nutrient management programs:** Implement BMPs to reduce nutrient inputs.
- **Fertilizer use:** Reduce fertilizer use and improve application techniques.
- **Dumping:** Properly dispose of waste to avoid water bodies.
crop yield, plan growth stage, soil type and field capacity.

horticultural and arable: volumes applied are informed by all relevant factors e.g. rainfall, temperature, etc.

can maintain effective irrigation.

horticultural and arable: water is applied to maintain soil between stress points and

account, actual water used in the day is measured with a water meter.

then is necessary to produce irrigations and sales (statistical data). Irrigation: water

dairy: dairy sheds will use no more water for dairy shed services and milk cooling

requirements.

and Irrigation and water use

information on root zone applications is kept (or should be maintained), including

specific to the product being spread.

enough for product distribution is calculated according to its design specifications

any contributions used for fertiliser spreading should be accredited. The current

Implementation guidance:

GMP: Ensure equipment for spreading fertilisers is well maintained and calibrated.

GMP: Stock and load fertiliser to minimise risk of spillages, teething and loss into

outdoor pigs. No spillage is to be applied to the outdoor pig unit.

any contributions on dairy farms (including milking parlors) and

GMP: Smooth and load fertiliser to minimise risk of spillages, teething and loss into

water needs to meet production objectives.

GMP: Design, calibrate and operate irrigation systems to minimise the amount of

There is a demonstrable reason why irrigation is to be applied. For example:

Implementation guidance:

GMP: Manage the amount and timing of irrigation inputs to meet plant demands and

to reduce soil moisture deficit.

GMP: To prepare soil for cultivation.

GMP: To prepare soil for cultivation.
Industry-specific management practices to reduce water quality

- **GMP** - Good Management Practices
  - **Implementation Guidance:**
    - All new equipment systems are designed to from energy- and water-efficient use.
    - Apply efficient policies to prevent emissions from vessels and equipment.
    - Ensure effective management of stormwater systems to reduce pollution.

- **ANIMALS**
  - **Implementation Guidance:**
    - Manage and maintain animal effluent systems to minimize environmental damage.
    - Store wastewater in suitable storage available to enable farm efficient and feed.
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