Farm Environmental Management Plan: Grampians Station (A N Hope)

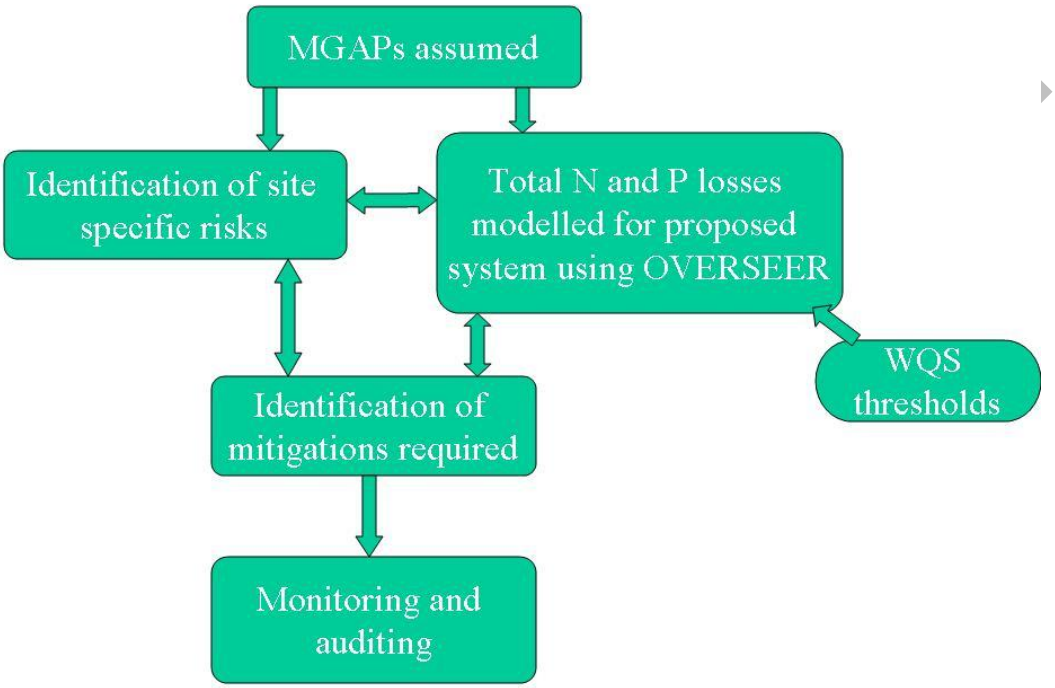
1. Introduction

The Water Quality Study ('WQS') funded by Mackenzie Water Research Limited ('MWRL'), found that the additional irrigation proposed in the catchment could take place without significant adverse effects on the environment providing that nutrient reduction occurred on the farms.

The process that was advocated for ensuring this on-farm nutrient reduction was through Farm Environmental Management Planing. A clear process for building a Farm Environmental Management Plan (FEMP) was laid out in the Water Quality Study and has been followed here. An overview schematic of the process of building a FEMP is shown in Figure 1.

The responsibility of the implementation, monitoring and auditing of the plan lies with the **farmer**.

Figure 1: Overview schematic of the process to build a Farm Environmental Management Plan

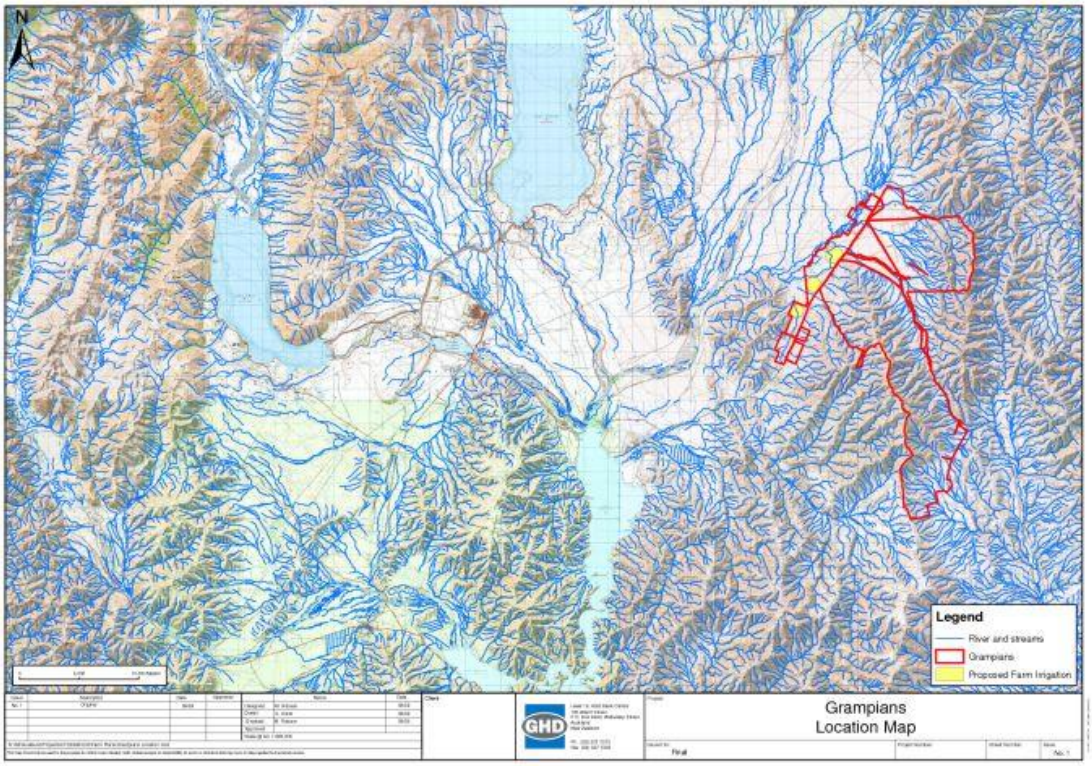


MGAP – Mandatory good agricultural practices

2. Farm Description

2.1 General farm description

Grampians is a 20,000 stock unit high country run. It is alongside the Haldon and Haka Pass Roads, and rises from 500m above sea level to 1,800m above sea level on the Grampians range. The rainfall is low at about 350mm annually. About 90% of the stocking is on the extensive flats and low fans of the Grampians Range. Most of the freehold flats are developed to dryland pasture and lucerne and this provides most of the carrying capacity. The flats also grow about 150 hectares of oats for stock feed annually. The property is run as a breeding stock unit as the low summer rainfall prevents stock finishing. Low autumn rainfall means that long periods of winter feeding of stock are required. Winter feed consists of “home grown” lucerne hay and oat grain, and this is a costly but necessary system.



Location Plan

Table 1. Cover utilisation by season and stock class for current system

	Cover utilisation by season and stock class - CURRENT			
Class of stock	**Spring**	**Summer**	**Autumn**	**Winter**
Ewes	Developed flats & oversown hill	Oversown hill	Flats & Native	Winter fed on flats & 0versown hill
Hoggets	Developed flats	Developed flats	Developed flats	Winter fed on flats & oversown

				hill
Breeding cows	Grass flats	Grass flats	Native	Native
Wethers	Grampians range	Grampians range	Grampians range	Grampians range

2.2 Proposed farming system

The proposed changes to the farming system are as follows:

To develop 385 hectares to irrigated pasture and winter feed by the use of 3 centre pivots which take water from Snowy Stream and Grays River. The aim is to complement the farm programme in that the store stock can all be finished, winter feed cropping can be reduced, and likely loss of the Grampians Range through tenure review can be offset to maintain the current total carrying capacity.

Table 2. Cover utilisation by season and stock class for proposed system

	Cover utilisation by season and stock class - PROPOSED			
Class of stock	**Spring**	**Summer**	**Autumn**	**Winter**
Ewes	Developed dry flats & oversown hill	Oversown hill	Flats & Native	Winter fed on flats and oversown hill
Hoggets	Irrigated flats	Irrigated flats	Irrigated Flats	Winter fed on dry flats and irrigated blocks
Breeding cows	Dryland flats	Dryland flats	Native	Native
R1 Steers & Heifers	Irrigated flats	Irrigated flats	Irrigated flats	Irrigated flats
Wethers	Grampians range all year			

The irrigated area will be in pasture, but with a pasture renewal rotation through winter feed (turnips, kale, ryecorn). At any one time there may be 85% in pasture and 15% in winter feed crops.

2.3 Soils

All of the soils on the property are light, except the swampy area alongside the Grays River. The flats and fans are comprised of sedimentary and alluvial soils of low fertility, with soil tests generally showing moderate pH, medium phosphate, high potassium, and very low sulphur.

On the proposed irrigation area, the soils are relatively recent alluvial fan soils with soil tests as above showing moderate pH, medium phosphate, high potassium, and very low sulphur in their native state. The proposed irrigation area has been developed to dryland pasture and lucerne, so there is now a balanced pH, phosphate etc. Experience with these soils under irrigation shows that very low rates of

fertiliser are required to obtain good irrigated pastures – 2 tonnes lime/ha, 250-300kg/ha sulphur super, and moderate rates of urea only in the first and second years.

The soil types are as follows:

Pivot A
Simons+Grampians+Curraghmore 110mm
Streamlands+Glenrock 90mm

Pivot B
Glenrock 50mm
Streamlands+Glenrock 70mm

Pivot C
Mackenzie 55mm

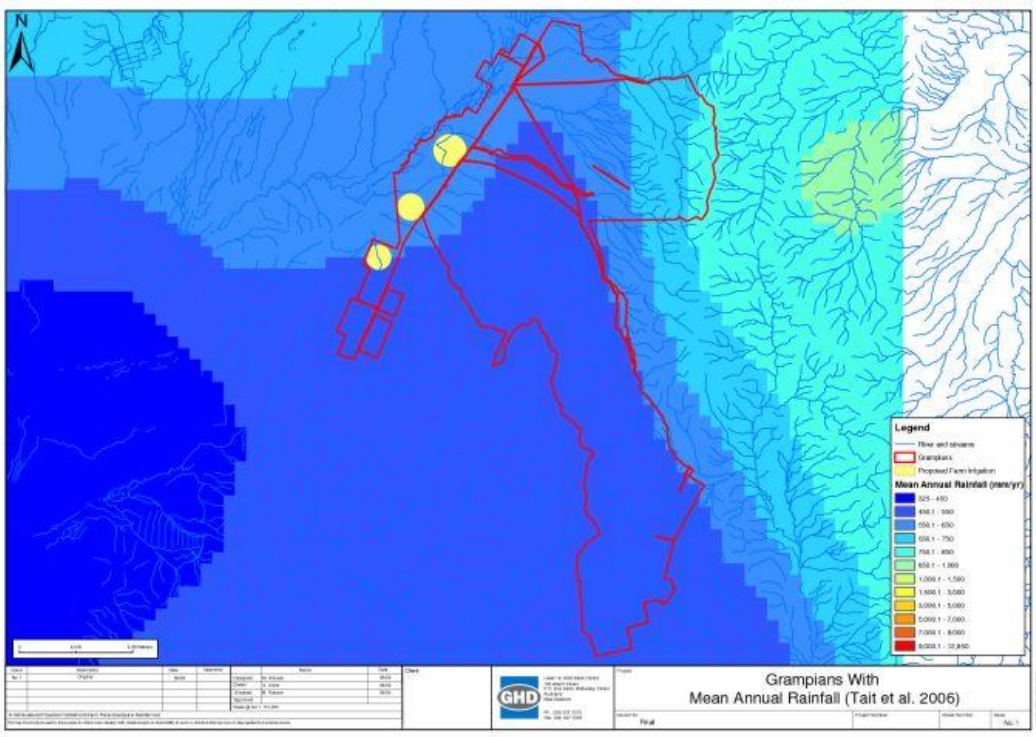
Larbreck 40mm

2.4 Topography

The property includes the Grampians Range and a part of the Dalgety Range, but the majority is flats and easy fans and this is where most of the stock is carried.

2.5 Climate

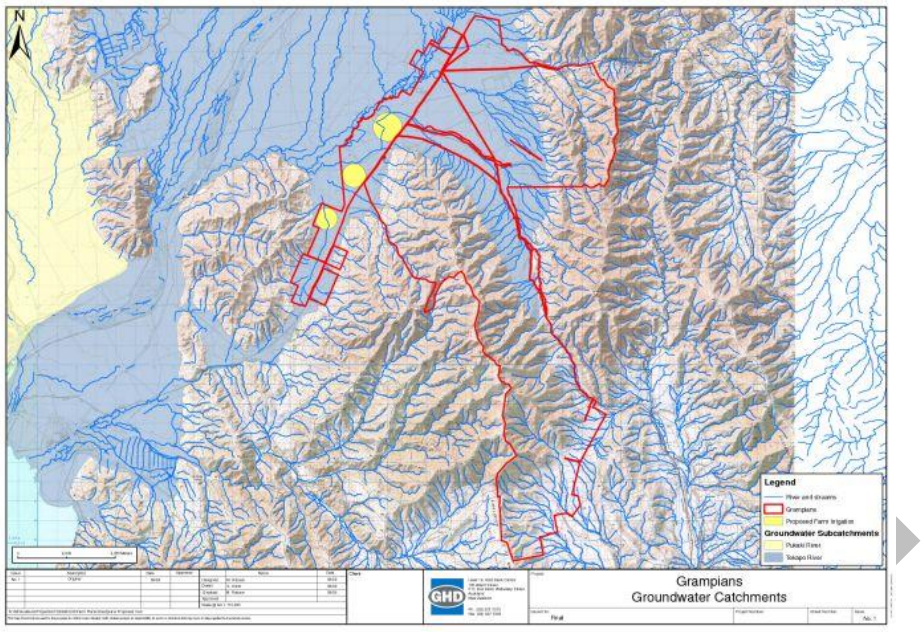
Temperatures range from -20 degrees in winter to 40 degrees in summer. Winter is 130 days, with frosts at any time of year. The rainfall is very low at about 350mm/year. Snow falls each winter, up to 1 metre in depth. The overall effect is hard winters, short spring growth peaks, and dry summer and autumn.



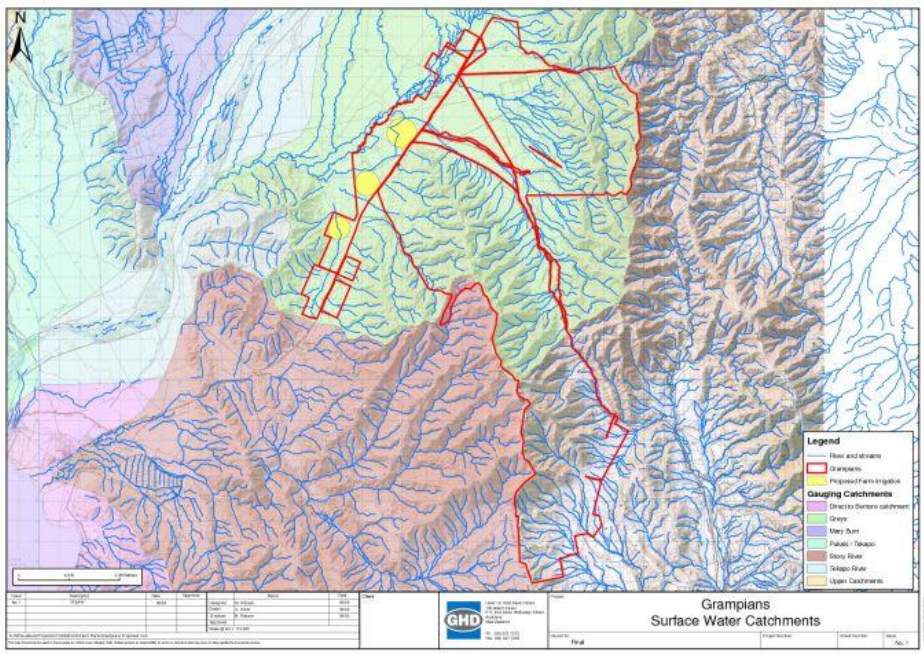
Rainfall Map

3. Environmental Context

The environmental context of the farm is a reference both to local and wider receiving environments.



Groundwater Catchment



Surface Water Catchment

3.1 Water Quality Study receiving environments and mitigation requirements

Grampians, according to the WQS, lies in the Tekapo groundwater catchment and the Grays River, Tekapo River and Northern Arm Lake surface water catchments.

The following shows the calculated nutrient mitigation requirement of the receiving environments determined in the WQS and the resulting thresholds for N and P for Grampians Station. Please note that no mitigation is required for Tekapo Groundwater or the Northern Arm.

Grays River Mitigation required kg/ha irrigated land	Tekapo River Mitigation required kg/ha irrigated land
N 1.00 P -0.10	N 0.40 P 0.40

For this farm, the Grays River mitigation requirements are the most stringent. These mitigation requirements cap Grampians Station's nutrient discharges at 58,120 kg N per annum and 1,240 kg P per annum.

3.2 Local receiving environments

The Grays River is located on the eastern fringe of the Tekapo Basin and drains the western slopes of the Grampians, Dalgety, Rollesby and Two Thumb ranges. The river discharges into the Tekapo River approximately 19.5km upstream of Lake Benmore.

Snow stream drains the western slopes of the Grampians Range and flows into the Grays River. The river has a channel length of approximately 18.6km and a catchment area of 77km^2. The lower 5km to 6km are normally dry, and only in flood conditions does the river experience run-off. The abstraction from the Snow River is from the subsurface flow (i.e. in the dry reach of the river), using a gallery.

Given this, the Snow River below the Hakataramea Pass Road has little or no fishery or habitat values.

Grays River

Wetland that recieves discharge

4. Farm Environmental Management Plan development

4.1 Stage 1 – Mandatory good agricultural practices

The table below shows the mandatory good agricultural practices that will be adopted. These include the base assumptions of OVERSEER and therefore help validate the use of the model on the farm.

Table 3. Mandatory good agricultural practices

Mandatory good agricultural practices	What these practices mean on farm
Fertilisers applied according to code of practice for fertiliser use	The fertiliser users' code of practice aims to ensure that where fertilisers are used that they are used safely, responsibly and effectively and in a way that avoids, remedies or mitigates any adverse environmental effects. The code of practice includes guidance on fertiliser use, application, storage, transport, handling and disposal.
Use a fertiliser recommendation system (nutrient budget) and account for all sources of nutrients including applied effluents and soil reservoirs accounted for	Planning fertiliser applications to all crops, determining crop requirement and accounting for soil nutrients and organic nutrient supplies, all reduce the risks of applying excessive fertiliser above the crop requirement. This maximises the economic return from the use of fertilisers and reduces the risk of causing nutrient pollution of the environment Accounting for all sources of nutrients including imported sources and soil reservoirs is an important management measure in all farming systems and become especially important on farms where manure is produced and applied to the land. The re-application of organic manures to land is often thought of as a disposal of a waste product, and the available nutrients within the organic manures are not accounted for. The use of an integrated nutrient budgeting tool such as OVERSEER automatically accounts for nutrients supplied in organic manures.
Fertiliser application applied evenly	The even application of fertiliser is an assumption of the OVERSEER model as included in the fertiliser code of practice. Fertiliser spreaders should be tested and calibrated in-house at least annually and every 5 years by an independent auditor.
Irrigation and effluent applied evenly	The even application of water and or effluent is an assumption of the OVERSEER model. Irrigators should be tested and calibrated in-house at least annually and then every 5 years in accordance with the code of practice for irrigation evaluation by a qualified irrigation auditor.
Crop, cultivation, nutrient inputs and yield records kept per farm management unit	Maintaining good crop input records is important for: • The calculation of cumulative annual organic fertiliser applications and also their contribution to long term nutrient supply; • The prediction of realistic crop yields that are used to determine crop requirements; • Providing accurate inputs to the OVERSEER nutrient budgeting model that is being used here as a proxy for measuring diffuse nutrient losses.

Good design of irrigation systems	Design will match soil properties and low application amounts on shallower soil to prevent summer drainage.
Robust irrigation scheduling	Good irrigation scheduling to prevent summer drainage.
Supplement and feeding out management	To be addressed in the Farm Environmental Risk Assessment.
Winter grazing management	To be addressed in the Farm Environmental Risk Assessment.

4.2 Stage 2 – OVERSEER and meeting WQS mitigation requirements

The WQS thresholds set for Grampians Station, using the most stringent nutrient mitigation requirement, are 58,120 kg N/year and 1,240 kg P/year. Table 4 below illustrates that the proposed farm system losses as modelled by OVERSEER are within the thresholds set out by the WQS. Management or mitigation strategies that have been used to meet this threshold are detailed in Section 5.

Table 4. Total N and P losses modelled by OVERSEER for the proposed farming system on Grampians Station and WQS thresholds

	Nitrogen Threshold (kg/farm)	Phosphorous Threshold (kg/farm)
MWRL Water Quality Study Property Thresholds	58,120	1,240
OVERSEER® outputs	49,936	199

4.3 Stage 3 – Identification and mitigation of site specific environmental risks

4.3 Farm Environmental Risk Assessment (FERA)

4.3.1 All regularly used tracks (twice daily) that are culverted or bridged.

4.3.2 No chance of immediate runoff from any tracks entering a waterway.

4.3.3 There are stock tracks that enter/cross through waterways. These tracks are not used all that often and are not used by huge numbers of stock.

4.3.4 No evidence of past runoff or soil wash around the property.

4.3.5 No silage pits are used. All bailage and hay, these are also located away from any waterways, so the chance of runoff is minimal.

4.3.6 The waterways on the farm are not fenced off allowing for free stock access. The Grays River and swamp are of most concern, and the applicant realises this and is willing to fence off these areas.

4.3.7 Over the winter months the cattle are moved up onto higher country (up the Haka pass), and it is the sheep that are kept in one area on the lower land. The sheep are fed bailage and hay over the winter, coming out of the winter (spring) the paddock or paddocks used for holding stock over the winter are re-drilled, taking up nutrients.

4.3.8 In the areas where the sheep are held over the winter there is not immediate runoff into nearby streams as the streams are located a long distance from these areas.

4.3.9 The cattle over the spring come down and calve on the lowland block, with close proximity to the swamp and stream. Although the cattle calve in this area the stock numbers are very minimal, with an average of around 30 cattle calving per 25 hectares.

4.3.10 The sheep and cattle yards are located a long distance from any waterways, and if dip is being used it is contained in the yards and evaporates.

4.3.11 Contractors are brought in and used if anything is being sprayed off.

4.3.12 There is evidence of bankside erosion along the Grays River. The majority of this is not stock induced, but is the result of high water level flows during the winter and early spring.

4.3.13 The small wetland that receives the excess runoff water from the diverted source is not very large, and it is planned, if need be to do more planting around this area. The wetland does not get stocked and will be fenced. This runoff is then allowed to return to the Grays River.

4.3.14 There are other small streams that are culverted, but not fenced. Where stock have access to these streams there is a small amount of stock induced erosion (as seen in photo; Grampians- evidence of culverted track, but stock have easy access to the stream).

4.3.15 Inversion tillage (ploughing) is used rarely at times to break in new ground for planting, this will only happen once, otherwise direct drilling is the preferred method.

4.3.16 Soils are not left bare over the winter, and with the proposed pivots there is a hope for a grass winter.

4.3.17 There is no evidence for compacted soils even where (approximately 2000) sheep are held over the winter, these areas are re-drilled after the winter as well, minimising the risk further.

4.3.18 Current pest control measures taken on the property are; broom and gorse spraying, poisoning for rabbits using Pindone, 1080 can be used if rabbit numbers get bad, this is avoided as much as possible, night shooting constantly, and trapping for rabbits and ferrets, with around 1000 traps over the property. There is also a plan in to do wilding pines.

4.3.19 Fertilisers used are; sulphur super 30 with 150 kilograms used over majority of farmable land. This is split into blocks, with the blocks receiving the fertiliser in alternating years (every second year).

4.3.20 The Lucerne gets fertilised every year with a Lucerne mix. Over the oats and any Rye corn crop 20 is used.

4.3.21 The fertiliser is spread on a defined area, and the amount of runoff that may be experienced is minimal.

4.4 General issues on extensive high country farming systems

In extensive high country farming systems there are a number of issues that on more intensive farming systems would be assessed as being a risk to water quality but on extensive high country farming systems they have not been defined as a risk due to the extensive nature of the farming systems and the lower stocking rate per hectare. Some of these general issues have been identified below:

1. There will be areas within the farming system where tracks will cross waterways; these are tracks that are used irregularly, in extensive areas of the farm.

2. There are also areas within a high country farming system where stock will have unrestricted access to streams for crossings and stock water. This is an essential access for stock movement and stock water. On most farms there are a number of small creeks/streams that flow within the hill country and it would be logistically impossible to place stock crossings on all of these. There is also the need for stock to move across streams/creeks within a block (paddock) for grazing access. A reticulated water system would be unsustainable in the hill country as troughs would freeze solid in the winter months, preventing access to fresh drinking water.

3. Swamps/heavy grounds are an integral area in a high country farming system; they provide a water source and good grazing for stock in dry years. In undertaking the FERA it has been identified that all swamps/heavy ground need to be monitored to ensure that bank erosion, compaction and pugging does not occur.

4. Wind erosion is a significant issue in the upper Waitaki Catchment. The sparse vegetation on large areas of land in the Mackenzie Basin gives little protection to the shallow, friable soils which continue to be eroded by frost heave and westerly winds. A mean soil loss of 0.22 mm/year or 2.2 tonnes of soil lost per hectare across a number of sites within the Mackenzie Basin has been reported. While it cannot be assumed from this information that erosion rates will continue at this level in the future, the results do confirm a strong relationship between the percentage of vegetation cover and erosion risk.

The problem of bare ground and exposure to wind erosion has been compounded since the early 1990s by the rapid spread of hieracium particularly on the poorest soils. One of the most significant impacts of further irrigation in this area would be a reduction in the amount of bare ground and corresponding reduction in wind erosion risk. (*Environmental, Economic and social impacts of irrigation in the Mackenzie Basin. Ministry for the Environment, February 2005.)*

5. Monitoring and identification of any problems arising for the above three issues has been included in Table 8.

5. Farm Environmental Management Plan for Grampians Station

5.1 Mitigation measures and management options adopted on Grampians Station

The table below shows the all the mitigation and management tools that are proposed to be undertaken on Grampians. Measures indicated as **FEMP stage 1 are those identified as Mandatory Good Agricultural Practice**, **measures identified as FEMP stage 2 are those changes that have been modelled in OVERSEER to meet the WQS mitigation requirement (if required)**, and those indicated as **FEMP stage 3 are mitigation measures chosen to ameliorate site specific environmental risks on the farm**..

Table 5 indicates in brief how the measures are to be monitored and audited.

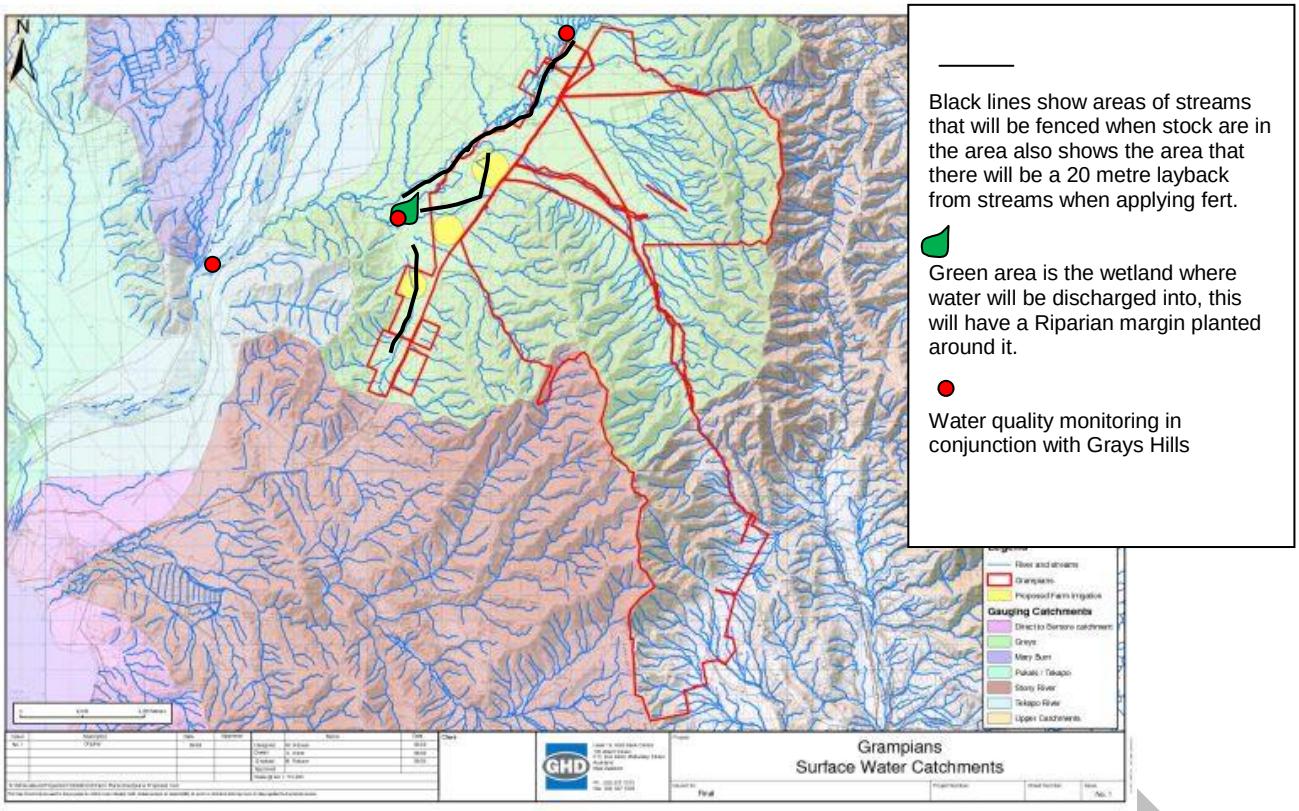
Table 5. Table of mitigation options, monitoring and auditing for Grampians Station

FEMP stage	Measure	Monitoring	Auditing
1	Fertilisers applied according to code of practice for fertiliser use		Self certification
1	Accounting for all sources of nutrients including applied effluents and soil reservoirs	Soil and effluent testing and cumulative effluent inputs per management unit	Reconciliation of fertiliser, effluent and soil records with nutrient budget for example blocks. Submission of examples soil and effluent tests
1	Even fertiliser application	Calibrate and optimise fertiliser spreaders annually and every 5 years by an external auditor	Submission of testing and calibration
1	Even irrigation and effluent application	Calibrate and optimise irrigators annually in house and every 5 years by an external auditor	Submission of testing and calibration
1	Record crop, cultivation, nutrient inputs and yields per farm management unit	Upkeep of records	Submission of example block records
1	Good design of irrigation systems	Design of irrigation system by a certified professional	Irrigation system audited by a certified auditor every 5 years
1	Robust irrigation scheduling	Calculation of annual % effective water use	Submission of annual % effective water use
2	No winter application of fertiliser	Field records	Signed field records
2	N fertiliser applications split to under 50 kg N/application	Field records	Signed field records
2	No P fertiliser within three weeks of irrigation	Field records	Signed field records
2	Olsen P of below 30 maintained	Regular soil testing (every 3 years)	Submission of soil tests
2	Movable water troughs to prevent fertility transfer	Manager	
3	Fence off any streams that may run through any green feed areas, if stock are not in these paddocks for large periods of the year then a temporary fence will be	Photo and staff	Annual auditing visits and report

FEMP stage	Measure	Monitoring	Auditing
	adequate		
3	Fence off the Grays River as much as possible to restrict stock access to the river	Photos and annual survey of the erosion and compaction	Annual auditing visit until the fencing is complete
3	Maintain a 20 metre layback from waterways when applying land based fertilisers	Field Records	Annual auditing report
3	Maintain a 5-11 metre irrigation buffer from any water ways (Grays River)	Photos	Annual auditing visits
3	Plant a riparian margin within the wetland as detailed in the map below	Water quality monitoring continued quarterly, and photos in the audit report	Annual audit report and visit
3	Monitor and manage stock access, stock type and stock number from all permanently flowing waterways within non irrigated intensively farmed areas	Photos and location plan of waterways	Photos

Evidence of a culvert through a stream but notice stock induced erosion

Another culvert where stock have access to water and have caused some erosion



5.2 Monitoring and Auditing

5.2.1 Baseline monitoring

Baseline monitoring is already underway on Grampians Station.

Table 6. Baseline monitoring on Grampians Station

		Location	Frequency	Measured parameters to include
Soil	Soil nutrient testing	All intensive blocks in rotation	1 in 3 years	Standard suite of soil nutrients
Soil	Soil depth build up under irrigation	Irrigated area v. dryland adjacent	Annual measurements	
Pasture	Ground cover and species	All blocks	All blocks	% Ground cover, species

5.2.2 On-going monitoring

On going monitoring and auditing of FEMP are as important as the plan itself.

Table 6 above shows the current monitoring undertaken on Grampians and Table 7 below shows proposed monitoring plan, frequency, location for the monitoring and parameters for the monitoring along with the triggers and contingency plans if the triggers are exceeded.

Table 7. Example monitoring plan for Grampians Station showing location, frequency and parameters for monitoring

		Location	Frequency	Measured parameters to include	Triggers	Contingency plan if triggers are exceeded
Soil	To include: Soil nutrient testing	All irrigation paddocks and intensive areas in rotation	1 in 3 years for soil nutrient status	Standard suite of soil nutrients	Olsen P >30	Reduce or stop the application of P fertiliser to the area and monitor
Soil	Soil compaction testing	All blocks in rotation	Annually for soil compaction testing.	Soil compaction	Compaction, surface capping	Remove compaction with the appropriate tool
Runoff	Wet weather survey	All blocks	Annually	Runoff	Runoff occurring	Introduce runoff removal infrastructure where appropriate.
Water	Surface water quality	Entry and exit of Grays River on property boundaries.	Quarterly	Total Nitrogen, nitrate, ammonia, total Kjeldahl nitrogen, total phosphorus, dissolved reactive phosphorus, E Coli and suspended solids.	No significant decrease in water quality	If comparative surface water analysis indicates a decrease in surface water quality then the particular contaminant should be identified while a full root cause analysis is undertaken
Water	Surface water quality	Proposed wetland where irrigation water will be discharged	Quarterly	Total Nitrogen, nitrate, ammonia, total Kjeldahl nitrogen, total phosphorus, dissolved reactive phosphorus, E Coli and suspended solids.	No significant decrease in water quality	If comparative surface water analysis indicates a decrease in surface water quality then the particular contaminant should be identified while a full root cause analysis is undertaken
Water	Irrigation application		Annually in house and 1 in 5 years by an independent	Application uniformity	>80 %	Optimisation of the irrigator performance will be performed at the time of testing
Fertiliser	Fertiliser application		Annually in house and 1 in 5 years by an independent	Application uniformity	>80 %	Optimisation of the spreader performance will be performed at the time of testing
Weed and pest pressures	Weed and pest populations	Relevant blocks	Annually	% or magnitude of infestation	ECAN monitor and communicate if their triggers have been exceeded	Legislative compliance with notice of direction issued by ECAN

Where triggers are exceeded, the immediate contingency plans in Table 9 should be implemented while a 'root cause' analysis is carried out. Any further mitigation measures to be adopted as a result of monitoring should be added to Tables 7, 9 and 10.

1) Is the current mitigation option implemented correctly?

No – Implement and monitor

Yes – to 2)

2) Has anything changed in the farm system?

Yes – remodel and monitor

No – to 3)

3) Have there been abnormal conditions at the time of trigger breach?

Yes – continue monitoring to see if trigger breach continues

No – Seek advice if suitably qualified person to investigate root cause and suggest appropriate mitigation.

If emergency conditions occur that risk a pollution event, such as a catastrophic failure of the irrigation system that is resulting in overland flow to a watercourse, seek immediate guidance from you regional council:

Environment Canterbury 0800 76 55 88

5.2.3 Auditing

The auditing process allows both the farm operator to illustrate, and other interested parties to have confidence that the management practices and mitigations planned for the farm are being implemented. In addition, the audit shows that there is a mechanism for the adaptive management of the property should the chosen mitigation or management not perform to expectations.

An annual audit is proposed, and requires both external and in-house input. The annual audit should be completed and submitted to ECan by end of July each year.

Table 8 below shows an example of an annual audit report for Grampians Station.

Table 8. Table showing proposed contents of an annual audit report for Grampians Station

Mitigation Measure	Audit Measures	Action in case of non compliance
	Annual audit of OVERSEER nutrient budget and report based on previous 3 years. Submission of compliance with thresholds	Should the OVERSEER report show losses exceeding the threshold, further mitigations should be adopted to effect a reduction in nutrient loss to below thresholds.
	Submission and brief interpretation of water quality analysis	Where triggers have been exceeded, immediate contingency plans should have been carried out and a root cause analysis conducted. The results of which should be presented here.
	Submission and brief of annual wet weather survey	Any remedial actions proposed after the annual survey should be undertaken.
	Submission and brief of annual tracks that cross waterways survey	Any remedial actions proposed after the annual survey should be undertaken
	Submission and brief of annual compaction survey of the irrigation area	Any remedial actions proposed after the annual survey should be undertaken
	Annual pest and weed survey undertaken by Ecan should be submitted	Legislative compliance
Even irrigation application	Calibrate and optimise irrigators annually in house and every 5 years by an external auditor	Submission of testing and calibration

Record crop, cultivation, nutrient inputs and yields per farm management unit	Verification of records	If records have not been produced then this should be rectified for next audit
Good design of irrigation systems by a certified professional and audited every 5 years	Irrigation system audited by a certified auditor every 5 years and any changes recommended should be implemented	If changes recommended not implemented then this should be rectified by next audit
Robust irrigation scheduling	Verification of records	If records not received then this should be rectified by next audit
No June/July application of fertiliser on the irrigated area	Field records	If records not received this should be rectified for next audit.
N fertiliser applications split to under 50 kg N/application	Field records	If records not received this should be rectified for next audit
No P fertiliser within three weeks of irrigation	Field records	If records not received this should be rectified for next audit
Olsen P of below 30 maintained	Submission and brief interpretation of soil test results	Where triggers have been exceeded, immediate contingency plans should have been carried out and a root cause analysis conducted. The results of which should be presented here.
Fence off any streams that may run through any green feed areas, if stock are not in these paddocks for large periods of the year then a temporary fence will be adequate	Check fenced areas are present and where they have indicated they will be. Photos	Areas of fencing damage should be repaired.
Fence off the Grays River as much as possible to restrict stock access to the river	Check fenced areas are present and where they have indicated they will be. Photos	Areas of fencing damage should be repaired.
Maintain a 20 metre layback from waterways when applying fertilisers by land based application	Field records and maps	If maps not received with annual audit this should be rectified by the next audit.
Maintain a 5-11 metre irrigation setback from any water ways (Grays River)	Check setback area is present. Photos	Areas of less than 5m setback should be extended to ensure the minimum is 5m.
Plant a riparian margin within the wetland as detailed in section 5.1	Water quality monitoring continued quarterly, and photos in the audit report	Areas of riparian vegetation failure or damage should be replaced prior to the next audit. Settling ponds should be constructed and in use before next audit

6. Summary

This FEMP has been written to serve two purposes; to ensure the existing farm system can meet the nutrient mitigation requirements set out by the MWRL Water Quality Study, and to set out the process for identification of farm specific environmental risks that arise from the inherent characteristics of the farm and from the existing farm system and its management.

The WQS thresholds and modelled outputs from OVERSEER detailed in Section 4.2 illustrate that this proposed system meets the WQS thresholds identified.

A full on-farm risk assessment was completed in December 2009 with a commitment to address the risks identified. Section 4.3 sets out the risks identified for this property and those issues common to all high country farming systems, along with existing mitigation measures.

The mitigation and management measures detailed in Table 5 set out the measures that have been adopted to mitigate and manage the risks that were identified in the risk assessment along with mandatory good agricultural practices and those measures that have been modelled in OVERSEER.

Baseline monitoring and any additional monitoring proposed for this property are identified and set out in Section 5.2, Tables 6 and 7 allows the performance of the measures chosen to be monitored and where they are performing sub-optimally, these can be addressed through the root cause analysis process.

The auditing of this plan, addressed in Section 5.2.3, Table 8 ensures that the relevant mitigation measures outlined in Table 5 are audited annually either internally or externally and communicated to ECAN by the end of July each year.