



Morven Glenavy Ikawai Irrigation Company Limited

Including

Waihao Downs Irrigation

ENVIRONMENTAL MANAGEMENT STRATEGY

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Environmental Management Strategy

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1 Introduction

This Environmental Management Strategy outlines the commitment that Morven Glenavy Ikawai Irrigation Company Ltd (MGI) and Waihao Downs Irrigation Ltd (WDI) have made to a pro-active approach to environmental management in all aspects of the development, operation and maintenance of the schemes.

It describes how MGI and WDI (“the schemes”) and their water users will jointly manage environmental issues, including the use of Farm Environment Plans (FEPs), independent audits, and robust compliance and enforcement.

The schemes recognise that they are operating under a wider sustainable management framework, in particular the Canterbury Water Management Strategy (CWMS), the Land and Water Regional Plan and the Lower Waitaki South Coastal Canterbury Zone Implementation Programme (ZIP).

This Environmental Management Strategy has been developed in accordance with the conditions of resource consents CRC091997 and CRC184153 (MGI), CRC180558 and CRC164369 (WDI), but it is applicable to all MGI resource consents and activities

MGI adopted an initial Environmental Management Strategy (EMS) for the Morven Glenavy Ikawai Irrigation scheme in October 2010. The EMS now includes the matters required under CRC184153 (MGI pending), CRC180558 and CRC164369 (WDI) for a ‘Scheme Management Plan’.

The consented command areas for MGI and WDI are shown in Appendix 1.

2 Governance and Management

Morven Glenavy Ikawai Irrigation Company Ltd is a co-operative company with seven directors. Waihao Downs Irrigation Ltd is a wholly owned and operated subsidiary of MGI.

The two schemes have separate resource consents for scheme operation, although WDI shares the MGI intake structure at Stonewall. The WDI scheme began providing water in the 2016-17 irrigation season.

The two schemes are managed together using the same staff and many of the same contractors. There is some overlap in the consented command areas for the two schemes.

A single GIS-based data management system is used for scheme asset management and for individual farm information, including shareholders, land parcels, irrigated areas, water metering and Farm Environment Plans.

3 Sustainability Policy and Principles

The schemes are committed to ensuring that they are viable and contribute lasting benefits to society. Through consideration of social, cultural, environmental, ethical and economic aspects in all that they do, they will seek a balance between agricultural productivity and environmental protection, both of which are essential for the long-term productivity and sustainability of the area.

Sustainability Policy

MGI and WDI aim to be leaders in sustainable irrigation performance in New Zealand, and will develop, implement and maintain systems for sustainable management to drive continual improvement in performance and will strive to:

- Meet or, where less stringent than our own standards, exceed applicable legal requirements, including our resource consent conditions;
- Promote continual improvement in responsible and efficient use of water and other natural resources;
- Ensure that our shareholders understand their environmental responsibilities and support them in reaching the required standards, particularly through the Farm Environment Plan and audit processes;
- Understand, uphold and respect cultural heritage, in particular respecting the Ngai Tahu values in relation to water, the natural environment and other taonga¹;
- Actively enhance biodiversity values, wherever possible, within our operation;
- Engage regularly, openly and honestly with people affected by the scheme operations and have processes in place to act on concerns associated with irrigation activities;
- Develop and maintain positive relationships with industry partners and local communities;
- Track and regularly review our environmental performance and report to shareholders, Canterbury Regional Council and others.

¹ Sacred treasure, valuables

4 Environmental Objectives and Targets

The strategic outcomes that this Environmental Management Strategy seeks to achieve are:

- Promote and enhance sustainable irrigation management
- Manage nitrogen and phosphorus loads in streams and rivers within acceptable levels
- Protection of ecologically important wetlands and their habitats
- Effective and efficient irrigation without over-allocation
- Farming activities that meet Good Management Practice (GMP) requirements
- Maintenance and enhancement of economically sustainable farming
- Understanding and respect for Ngai Tahu values in relation to freshwater

In order to achieve these outcomes, the schemes have identified key management areas and an objective and one or more targets for each. These objectives and targets include those required by the Canterbury Land and Water Regional Plan (LWRP).

Table 1 (below) sets out the objective and targets for each management area.

Table 1: Objectives and Targets

OUTCOME AREA	OBJECTIVE	TARGETS
Irrigation Management	<p>a) The amount and timing of irrigation is managed to meet plant demands, minimise risk of leaching and run-off and ensure efficient water use</p> <p>b) To ensure that all new irrigation systems and significant upgrades meet MGI/WDI resource consent conditions and industry best practice standards</p>	<ul style="list-style-type: none"> • The performance of irrigation systems is assessed annually (including bucket testing), and irrigation systems are maintained and operated to apply water at their optimal efficiency • Minimum irrigation efficiency is 80% • The timing and depth of irrigation water applied takes account of crop requirements and is justified through soil moisture monitoring or soil water budgets and climatic information • All staff involved in the operation and maintenance of the irrigation system are suitably trained • Irrigation systems are designed and installed to: <ul style="list-style-type: none"> ○ meet the current Irrigation NZ Design and Installation codes of practice and standards ○ minimise and, wherever possible, avoid the application of irrigation water onto non-productive land, such as impermeable surfaces (including roads) and river or stream margins
Nutrient Management	<p>a) To use nutrients efficiency while minimising nutrient losses to water</p> <p>b) Nutrient losses do not exceed consented nitrogen loss limits</p>	<ul style="list-style-type: none"> • Nitrogen losses from farming activities are at or below the: <ul style="list-style-type: none"> a. Baseline GMP Loss Rate or Good Management Practice Loss Rate (whichever is the lesser) or b. consented nitrogen loss limits • Available nitrogen loss mitigation measures (excluding those associated with irrigation, fertiliser or effluent management) are implemented • Phosphorus and sediment losses from farming activities are minimised • Manage the amount, timing and application of fertiliser inputs to match the predicted plant requirements and minimise nutrient losses

OUTCOME AREA	OBJECTIVE	TARGETS
		<ul style="list-style-type: none"> • Store and load fertiliser to minimise the risk of spillage, leaching and loss into water bodies
Cultivation & Soils Management	The physical and biological condition of soils is maintained or improved in order to minimise the movement of sediment, phosphorus and other contaminants to waterway	<ul style="list-style-type: none"> • Farming activities are managed so as to not exacerbate erosion • Farming practices are implemented that optimise infiltration of water into the soil profile and minimise run-off water, sediment loss and erosion • Scheme race easements are grazed with 1 healthy cow per 1,000 m² or light weight stock such as sheep to minimise the risk of over-grazing, pugging and sediment loss
Animal Effluent & Collected Solid Animal Waste	<p>To manage the risks associated with the operation of effluent systems to ensure effluent systems are compliant 365 days of the year.</p> <p>Animal effluent and solid animal waste is managed to minimise nutrient leaching and run-off</p>	<ul style="list-style-type: none"> • Effluent systems meet industry Codes of Practice or an equivalent standard • The timing and rate of application of effluent and solid animal waste to land is managed so as to minimise the risk of contamination of groundwater or surface water bodies • Sufficient and suitable storage is available to enable animal effluent and wash-down water to be stored when soil conditions are unsuitable for application • Staff are trained in the operation, maintenance and use of effluent storage and application systems
Waterbodies (wetlands, riparian areas, drains, rivers, lakes) & In-stream Biodiversity Values	<p>Wetlands, riparian areas and the margins of surface waterbodies are managed to avoid damage to the bed and margins of the water body, and to avoid the direct input of nutrients, sediment and microbial pathogens.</p> <p>To protect and enhance in-stream biodiversity values</p>	<ul style="list-style-type: none"> • Stock are excluded from waterbodies in accordance with regional council rules or any granted resource consent • Vegetated riparian margins of sufficient width are maintained to minimise nutrient, sediment and microbial pathogen losses to waterbodies, • Farm tracks, gateways, water troughs, self-feeding areas, stock camps, wallow and other farming activities that are potential sources of sediment, nutrient and microbial loss are located so as to minimise the risk to surface water quality

OUTCOME AREA	OBJECTIVE	TARGETS
		<ul style="list-style-type: none"> • Prioritise the achievement of the targets for the Management Area: Waterbody for any spread heads, wetlands and spring-fed streams so as to protect and enhance the instream biodiversity values
Point Sources (offal pits, farm rubbish pits, silage pits)	The number and location of pits are managed to minimise risks to health and water quality	<ul style="list-style-type: none"> • All on-farm silage, offal pit and rubbish dump discharges are managed to avoid direct discharges of contaminants to groundwater or surface water • All on-farm offal and silage pits comply with regional council rules
Water-use (excluding irrigation water)	To use water efficiently ensuring that actual use of water is monitored and efficient	<ul style="list-style-type: none"> • Actual water usage is efficient and appropriate for the end use • Water meters are installed and verified according to manufacturer's specifications and operate within +/- 5% accuracy
Mahinga kai	To protect mahinga kai values	<ul style="list-style-type: none"> • Mahinga kai values of surface waterbodies on the property are recognised by achieving other objectives and targets in the Farm Environment Plan, and in addition by: <ul style="list-style-type: none"> a) maintaining existing indigenous vegetation in accordance with relevant regional council and district council vegetation clearance rules or any granted resource consent; b) identifying opportunities to undertake additional plantings of indigenous vegetation, and carrying out and managing any additional plantings in accordance with regional council guidelines for riparian planting; c) undertaking farming activities in a manner that minimises adverse effects on existing indigenous vegetation and on any additional plantings of indigenous riparian vegetation; and d) managing pest plants in accordance with regional council rules
Ngai Tahu Values	Understand and respect Ngai Tahu values in relation to freshwater	<ul style="list-style-type: none"> • Actively support Wainono Lagoon restoration • Relationship with Waihao Runanga • Annual scheme meeting with Waihao Runanga

OUTCOME AREA	OBJECTIVE	TARGETS
		<ul style="list-style-type: none"> On-farm good management practices take into account Ngai Tahu values

4.1 MANAGEMENT ACTIONS FOR ACHIEVING THE OBJECTIVES AND TARGETS

4.1.1 Respecting Ngai Tahu Values in Relation to Freshwater

The schemes acknowledge that freshwater is a significant cultural resource for Ngai Tahu and understand that the health of the waterways and groundwater in the scheme areas is important for cultural values and interests, especially for the Waihao Runanga.

Some existing scheme activities that are improving management of both water quality and quantity will assist meet some of the Ngai Tahu objectives for freshwater. On farm requirements regarding Ngai Tahu values are incorporated into the relevant management areas in the scheme Farm Environment Plan template. The schemes also aim to improve overall understanding of Ngai Tahu customary rights and responsibilities and support tangata whenua to safeguard and enhance water for its taonga values for future generations.

Current activities that contribute to achieving Ngai Tahu objectives for fresh water include:

- Waihao River augmentation
- Wainono Lagoon restoration
- Avoiding over-allocation through setting limits for on-farm takes
- Supporting farmers to have farming activities at or above 'Good Management Practice'
- Requiring wetlands and riparian zones to be protected from inappropriate activities including stock access and cultivation
- Promoting on-farm practices that recognise the connection between land, groundwater, surface water and coastal waters
- Annual meeting with local Runanga

4.1.2 Irrigation Management

The schemes recognise that using water resources for irrigated farming is only one of many options for that water and, therefore, all water taken into the scheme must be used as effectively and efficiently as possible.

Scheme infrastructure and water distribution

The schemes will minimise losses in the off-farm distribution network through:

- A high standard of maintenance of the supply canals and secondary distribution system
- Use of scheme control and management systems, including buffer ponds, to supply water on demand and avoid operational by-wash. This includes receiving timely notification from farmers of their water requirements and use of all water requested.
- Regular monitoring and review of the volumes of water taken and distributed by the scheme to identify any water accounting issues, including flow gauging on MGI races.
- Continued investment in improvements to scheme infrastructure to improve supply efficiency.
- Piping the distribution network of the entire WDI scheme which minimises both losses and by-wash.
- The fish screen will be operated and maintained in accordance with the Fish Screen Management Plan (Appendix 8)².

Design and Installation Approvals

In order to ensure compliance with scheme infrastructure requirements and consent conditions including CRC091997 (5), CRC180558 (18) and CRC164369 (14), new systems must:

² CRC180558 (10)

- be designed and installed to meet the current Irrigation NZ Design and Installation codes of practice and standards
- take into account the specific requirements of any fragi-pallic soils on the property
- minimise and, wherever possible, avoid the application of irrigation water onto non-productive land, such as impermeable surfaces and river or stream margins
- meet scheme allocation and efficiency rules.

To ensure that new systems meet these requirements:

- Irrigation design information³ must be submitted to MGI for review and a 'design approval'⁴ received prior to the start of construction;
- Commissioning checks⁵ must be carried out and results reported to MGI for review and approval.
- If the designer or installer is not certified by Irrigation NZ, then the schemes may arrange for a full independent check of the design or commissioning report at the irrigator's expense.
- For new areas of irrigation, no scheme water will be supplied until the design approval has been granted.

Water Supply

- For new irrigation (MGI and WDI) water is allocated at a maximum of 0.45 l/s/ha⁶.
- On-farm irrigation efficiency⁷ for new developments must be at least 80%.
- For all new MGI irrigation, the seasonal limit is up to 700 mm/year. In order to demonstrate irrigation is 80% efficient, users must be implementing soil moisture monitoring and applying this information to irrigation decision-making; and using no more than 600 mm in an average year and up to 700 mm only in a dry year.
- For WDI the seasonal limit, per property, is 627 mm/ha/year⁸ of irrigated land.

Water measurement

- All spray irrigators are required to have water meters and telemetry, as specified⁹.
- All borderdyke irrigators are required to return their hours, using either the database or phone app, at the completion of each watering.
- Users will have real-time access to their data and receive reports that benchmark water efficiency performance across the scheme (e.g. for different soil types, irrigation systems and land uses). If poor efficiencies are noted these will be reviewed.
- Water meters used for irrigation shall be maintained by the farmer and verified for accuracy within ±5%. The frequency of verification will be determined by manufacturer's recommendation.

³ See 'Getting Started' brochure and Irrigation Design Checklist (on www.mgiirrigation.co.nz)

⁴ The relevant scheme will meet the cost of this design check, which is to ensure that the system meets all scheme requirements, including allocation limits and consent conditions, particularly for efficient water use.

⁵ See www.mgiirrigation.co.nz for minimum requirements

⁶ The maximum consented rate is 0.58 l/s/ha for MGI. No on-farm rate specified for WDI.

⁷ On-farm irrigation efficiency means the volume of water delivered and retained in the root zone after irrigation excluding soil moisture in excess of field capacity that rapidly drains away, divided by the volume of irrigation water delivered to the farm. On-farm irrigation efficiency includes losses from application non-uniformity and excessive application depths, surface run-off, surface redistribution and macro-pore flow, evaporation, and on-farm distribution. Surface run-off means irrigation water that flows over the surface to outside the area of irrigation.

⁸ CRC180558 23

⁹ See 'Getting Started' brochure and Irrigation Design Checklist (on www.mgiirrigation.co.nz)

Water Application

- All Water Users are required to use water as evenly and efficiently as possible by applying water at depths and frequencies to meet the needs of their crops while minimising runoff, ponding, and/or drainage to waterways or other properties, and losses to groundwater.
- Spray irrigators must demonstrate how they ensure that only the amount of water required is applied, including:
 - Daily soil moisture and soil temperature measurements, and
 - regular checks on irrigator operation (e.g. 'bucket test')
- Water Users are required to take all practicable steps to operate at good management practice and:
 - ensure that the volume of water used does not exceed that required for the soil to reach field capacity;
 - avoid leakage from pipes and structures;
 - minimise and, wherever possible, avoid applying water onto non-productive land, including tracks, impermeable surfaces (including roads) and river/stream margins
- Water Users are responsible for any irrigation water (and any associated contaminants) that leave their property boundary and for all costs incurred to remedy damages or prevent ongoing problems to downstream properties.
- Water Users who have either repeated or significant poor performance¹⁰ in application or management of irrigation water will be required to complete formal training in irrigation operation.

Foothills catchments

If any proposed irrigation using MGI water is in any of the foothills catchments that are identified in CRC091997 condition 12 (MGI) as 'flowing water bodies'¹¹ (see Appendix 2), the water user must consult with MGI over the ecological surveys that are required **before and after** irrigation development.

Where condition 12 applies, the Water User must agree to carry out the relevant surveys, and must agree that if the ecological values are found to decrease as a result of irrigation, then:

- the Farm Environment Plan must be updated, within 3 months, to describe corrective actions to mitigate the decrease in ecological values and
- the actions must be implemented in the timeframe specified

Significant Wetlands

New areas of irrigation in the vicinity of any significant natural wetland¹² (as identified in the MGI database) must ensure that there is no reduction in area, no loss of significant areas of indigenous vegetation or significant habitats of indigenous fauna. Stock must be excluded.

Mudfish Sites (WDI)

Any potential mudfish sites on properties receiving water from WDI must be managed¹³ so that cattle, deer and pigs are excluded, or an alternative habitat is provided, and mudfish relocated to that alternative habitat. Prior to commissioning, potential mudfish habitat within the command area was investigated, and 9 possible sites were surveyed in November 2015¹⁴. None

¹⁰ For example, C or D grade audit results with required actions for irrigation or nutrient management

¹¹ Defined in CRC091997 condition 12

¹² Identified by MGI under CRC091997 condition 11. Contact MGI for further information.

¹³ CRC180558 18 (f)

¹⁴ Ryder Consulting Ltd: "Waihao Downs Irrigation Ltd. Pre-Commissioning Monitoring: Interim Report 2", July 2016 p32,

of these sites were considered ideal mudfish habitat, however they were sampled as they were the best of the available habitat in the area. No mudfish were found.

Before approving the FEP for any new areas of irrigation in WDI, the Environmental Manager will check for any additional potential sites for mudfish¹⁵. If any likely sites are identified, then a survey will be required. If mudfish are found, then protection will be required. No water can be supplied by the Scheme until this has been completed.

4.1.3 Nutrient Management

The objective and targets for nutrient management are based on regulations and industry good practice, which both require nutrient budgeting and management planning to understand and track Nitrogen and Phosphorus inputs and minimise losses.

Consent CRC164369, issued in August 2016, covers the discharge of nutrients to land for properties receiving water from Waihao Downs Irrigation scheme. The consent sets a total Nitrogen (N) load for WDI and the method for calculating this load.

Each property will have a 'Maximum Cap' for Nitrogen, which is the maximum Nitrogen loss rate for the farm based on soil type and area. Where there is more than one soil type, the Cap is calculated using the proportions of the different soil types. The consent¹⁶ sets out the Maximum Caps at the time the consent was granted, and the method for calculating updated values when the *OVERSEER* model revised.

A new consent (CRC184153) for the discharge of nutrients to land that covers the MGI scheme area has been lodged in March 2018 and still has to be granted by Environment Canterbury but is expected to include similar methodology as for CRC164369 at Waihao Downs for the South Coastal Canterbury (PC3) nutrient allocation zone. The Maximum Caps do not apply to the Lower Waitaki (PC5) area of CRC184153 and so these farms are required to operate at or below the GMP Baseline Loss Rate.

All Water Users (MGI and WDI) are required to prepare and make available to MGI an annual year-end *OVERSEER* Nutrient budget¹⁷ for each of the identified land management units and the overall farm, for the purposes of farm environment plan audits and consent compliance reporting to the regional council. The nutrient budget must be completed by a Certified Nutrient Management Advisor. Scheme water will not be provided unless the Nutrient Budget has been provided. Annual nutrient losses are reported to Canterbury Regional Council.

All Water Users are expected to:

- Carry out regular soil tests, appropriate to their land use
- Keep records of fertiliser applications and other inputs
- Apply fertiliser to Spreadmark¹⁸ Code of Practice, either by a certified operator or with self-calibrated equipment
- Establish and maintain an Overseer FM account
- Provide MGI Irrigation with Administrator Access to their Overseer FM account

Fertiliser applications are expected to follow the relevant good management practices identified in the Code of Practice for Nutrient Management¹⁹.

¹⁵ CRC180558 condition 13g and CRC164369 condition 10e

¹⁶ Schedule 2

¹⁷ Or an alternative nutrient budget that is approved by Canterbury Regional Council

¹⁸ <http://fertqual.co.nz>

¹⁹ Code of Practice for Nutrient Management (with emphasis on fertiliser use) NZFRMA 2007

Farms that exceed the allowable nutrient losses when assessed under Good Management Practice (GMP) criteria will be required to prepare a Remedial Action Plan to reduce the loss rates. A Remedial Action Plan at the FEP level will be required in circumstances where the exceedance is demonstrated to adversely affect groundwater or surface water quality targets in the area.

When a nutrient 'hot-spot' is identified (through Overseer) this will be addressed through the farm environment plan and a Nutrient Management Plan will be prepared and implemented on the property.

Phosphorus and Sediment Losses: Critical Source Areas²⁰

During the preparation or updating of the FEPs, the Environmental Manager/Advisor will identify areas that have a high risk for losses of Phosphorus (P) or sediment to waterways and record these as critical source areas (CSA). Suitable management practices are required as part of the FEP so that risks are reduced, and losses are minimised as far as is practicable.

A new programme to assist in the identification and management of CSAs has been set up through the Waihao Wainono Project which is a joint project between Morven Glenavy Irrigation Scheme and Environment Canterbury. A Memorandum of Understanding is in place to facilitate the on-farm and catchment scale work within the scope of this project.

Keeping Records

Under CRC180558 and CRC164369, WDI irrigators are required to supply the following records:

- Fertiliser use
- Stock numbers
- Land use

This information is included in the inputs for the *OVERSEER* nutrient budget model, so all water users are required to keep and maintain these records and provide annual updates, if requested.

4.1.4 Cultivation and Soil Structure

The schemes recognise the importance of good practice soil management on irrigated land to minimise losses to groundwater and surface water, particularly phosphorus, sediment, and faecal contamination.

The pallic type soils (e.g. Claremont and Ngapara) commonly found in the scheme command area are particularly susceptible to degradation of soil structure. Farm Environment Plans must identify appropriate management strategies for grazing and/or cropping that will be used to avoid, minimise or mitigate degradation of soil structure integrity, including:

- Preparation and implementation of a Winter Grazing Management Plan
- Comply with all regional council rules on winter grazing
- Winter grazing arrangements that avoid soil treading and compaction damage by stock on wet soils (e.g. feed pads, stand-off pads, on-off grazing, back fencing)
- Irrigation management (e.g. soil moisture monitoring, depth and timing of effluent irrigation) to ensure that drainage and overland flow are minimised
- Appropriate cultivation and other cropping practices to minimise soil loss and maintain healthy soils
- Appropriate planning and stock management when grazing scheme races

²⁰ CRC180558 (13p) and CRC164369 (10l)

4.1.5 Animal Effluent and Solid Animal Waste

Although individual properties are responsible for resource consents and other requirements for collected effluent, the schemes recognise that contamination of surface and ground water will occur with poor effluent management practices. Failure to comply with effluent requirements will be dealt with through the enforcement processes i.e. non-compliance with Farm Environment Plan and ECAN effluent requirements would put irrigation water at risk.

Water users will be required to demonstrate that they manage irrigation in effluent application areas carefully in order to minimise problems. This may include additional soil moisture monitoring in effluent blocks, and particular attention to effluent irrigation when designing new systems.

All farms that have an effluent discharge consent are required to complete an Effluent Warrant of Fitness every three years. This is undertaken by an independent certified Effluent Warrant of Fitness Assessor. Recommended actions from the assessment are included as part of the Farm Environment Plan required actions.

The schemes do not endorse flushing of effluent ponds with irrigation company water.

4.1.6 Scheme wide Ecological and Mahinga Kai Values

The schemes will actively seek opportunities to incorporate enhancement of ecological values in managing the open channels and other scheme infrastructure, in ways that do not conflict with scheme operation. The Environmental Management Fund (section 5.5) will assist in scheme-wide environmental management projects.

When the main distribution races are flowing, cattle, deer and pigs must be excluded. During periods when races are dry, they may be grazed at low stocking rates, sufficient to ensure that there is no visible damage to the races (pugging).

The schemes recognise that biodiversity is a critical aspect of environmental management. The schemes note that a priority outcome for the Canterbury Water Management Strategy (CWMS) is 'biodiversity protection' and the Zone Implementation Programme (ZIP)²¹ outcomes include "*Coastal Streams have ... biodiversity suitable for waterway*". The schemes will raise awareness of biodiversity issues and encourage on-farm actions and opportunities by linking and collaborating with agencies, organisations and networks with skills and experience to provide advice and support on-farm and across the scheme.

The schemes take a particular interest in two biodiversity projects within or adjacent to the scheme area which are identified in the ZIP:

- **Wainono Lagoon**, which is a wetland of national importance, and has been a significant mahinga kai resource for Tangata Whenua. The schemes recognise the importance of Wainono Lagoon and support its protection, enhancement and restoration.
- Mudfish habitat in the upper catchment of **Dog Kennel Stream**, one of the few remaining unaltered and natural streams with mudfish population in South Canterbury. The schemes support the ZIP aim to maintain mudfish populations by excluding stock and minimising the effect of nutrient runoff from the waterway, improving water quality and enhancing the natural riparian zone.

²¹ ZIP ref ZIP Addendum South Coastal Canterbury 7/8/2014 version

On-farm

Before water is supplied to new areas of irrigation, the Environmental Manager/Advisor will ensure that suitable stock exclusion provisions are in place²².

The schemes note that in order to design new irrigation systems that are highly efficient in terms of water and energy use it may be necessary to remove existing trees and shrubs. However, where shelter belts and other plantings are removed for irrigation development, MGI **encourages** replacement of these with suitable native vegetation plantings particularly in locations that assist to develop a network of native vegetation patches and corridors from the mountains to the sea.

'Sustainable Dairying: Water Accord'²³ will set a minimum standard for all dairy farms.

4.1.7 Targets for Continuous Environmental Improvement

The Company's policy and strategic priorities are to strive for continuous environmental improvement. This means that even if every farmer in the schemes was achieving an A grade in their FEP audit, the Company may choose to set and require higher objectives and targets to be achieved internally.

To ensure a consistent and top-down approach, the Board of Directors shall determine an annual environmental target or objective each August. This continuous improvement target shall be introduced and implemented through annual FEP reviews on a progressive basis; and it is expected that farms shall meet or exceed these targets within the specified timeframe.

²² CRC180558 Condition 13g and CRC164369 Condition10e

²³ "Sustainable Dairying: Water Accord A Commitment to New Zealand by the Dairy Sector" 2013 <http://www.dairynz.co.nz/publications/dairy-industry/sustainable-dairying-water-accord/>

5 Key Environmental Management Activities

5.1 FARM ENVIRONMENT PLANS AND AUDITS

Farm Environment Plans and the associated audits drive the process of continual environmental improvement for all properties receiving scheme water. The requirements for the Farm Environment Plan are part of the contractual arrangements between MGI/WDI and the user for supply of water (water use agreement). This agreement may also cover other environmental management obligations.

The diagram below shows the relationship between the Environmental Management Strategy, water use agreement and Farm Environment Plan, and the ongoing, inter-connected process of adaptive management through monitoring, review and revision.



All current water users have an approved Farm Environment Plan. For new scheme areas, a Farm Environment Plan must be completed and approved before water is supplied, including any land receiving water under a transfer arrangement, even if the transfer is temporary.

The schemes have a template for their FEPs (Appendix 3) that includes the matters required by their resource consent conditions, and also meets the ECAN LWRP schedule 7 requirements. The Environmental Manager/Advisor provides support and assistance in preparing the initial FEP and in reviewing and revising, as required. All MGI properties receiving water are required to have an FEP using the updated template prior to their next audit.

The MGI/WDI Operating Procedures for Farm Environment Plans set out details of the preparation, audit and updating processes.

Tangible and Measurable Targets

The Farm Environment Plan will establish, for each of its management areas:

- Measurable targets that clearly set a pathway and timeframe to achieve the objective;
- A description of good management practices and actions necessary to achieve the objective and targets;
- The records needed to demonstrate performance towards the targets.

5.2 FARM ENVIRONMENT PLAN APPROVAL AND AUDIT PROCESSES

Farm Environment Plans must be submitted to MGI for approval and signoff. When there are changes in ownership, management or farm system (e.g. conversion to dairy) the Farm Environment Plan must be reviewed in consultation with the Environmental Manager/Advisor, revised if necessary, then resubmitted for approval and audited in next audit round.

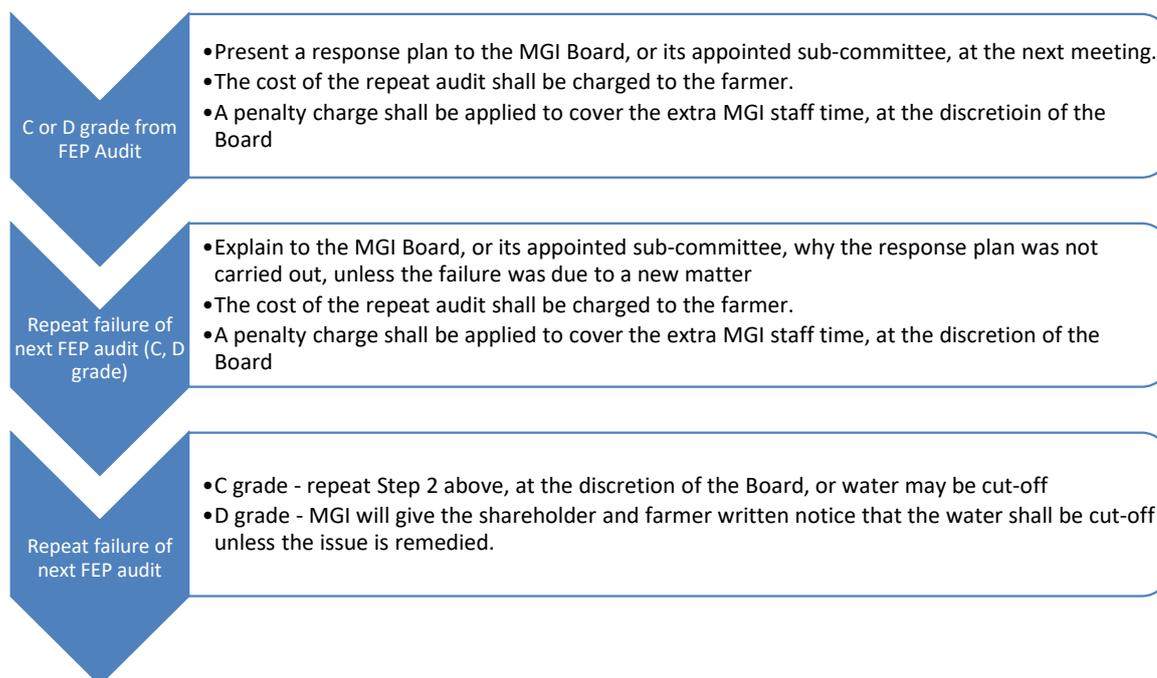
All Plans will be audited by an independent accredited auditor. For the first three years of receiving scheme water each Farm Environment Plan will be audited annually. Following each audit, the water user will receive an audit report that will include an overall grade (A - D) for the audit. The water users will be required to remedy any problems and complete actions required for improvement within the time frame specified. Failure to do this will invoke the enforcement procedures.

Following three years of full compliance for any property (all A or B grades), audits of that property may be reduced in frequency to at least once every three years. C and D grades will require re-audit as shown in Appendix 4.

Charges for additional audits

Policy 3.2.2 of the Company Policies document:

Farmers are expected to carry out or demonstrate progress towards, improvement actions identified in the FEP, through an EWOFF or arising from an FEP audit. If a farm fails an FEP audit then a response plan is required; and if the farm fails the repeat audit penalties shall apply. The costs of repeated audit failures shall not be borne by other shareholders. The following procedure shall apply:



Consultation on Results of FEP Audits

Following completion of the annual audits a summary of the results of all the audits and any general issues arising from the audits will be sent to all Water Users.

The Environmental Manager will offer to meet at least annually with the Waihao Wainono Community Catchment Group, which includes a range of community members with an interest in the area. The Environmental Manager will present the results of the WDI audits and other monitoring; and consult²⁴ with the parties.

The Environmental Manager will offer to meet with Te Rūnanga o Waihao at least annually to present the results of the FEP audits and other scheme monitoring; and to consult with Te Rūnanga o Waihao.

Farm Environment Plan Reporting

As required by the relevant consents each scheme will report annually to Canterbury Regional Council on FEP performance, including a summary of the results of the FEP audits for the preceding season, together with other environmental reporting (see section 7).

Review and Update of Farm Environment Plan Requirements and Template

The specific environmental management requirements for the Farm Environment Plans will be reviewed at least every five years, or if the conditions relating to the relevant RMA consents for the Scheme are changed by the Canterbury Regional Council.

Feedback from irrigators and others will be incorporated into any review of the FEP template. The initial draft of the FEP template was trialled with several scheme farmers, as case studies and changes made in response to farmer feedback. It is intended that the FEP Template meets all the scheme consent requirements, and is also approved by ECAN under LWRP Schedule 7, to meet the requirements for any individual farm consent. The current template which is in Appendix 3 has been approved by ECAN as meeting these requirements.

5.3 TRAINING AND INFORMATION PROVIDER

The schemes will continue to actively promote and facilitate an ongoing training and information programme to assist water users to improve farm performance, maximise environmental benefits and minimise adverse effects. The schemes are proactive in providing growers with information on recent research results and new technologies for best practice irrigated farming and support relevant research projects within the scheme area, where there are potential benefits to water users from the results.

The Irrigation New Manager training course shall be offered at least once per year and is mandatory for all new managers that have not previously attended a New Manager Training course, within the previous five years. This course will also be compulsory for managers on farms that have been identified through the audit process as not achieving irrigation management objectives and targets. The requirement to attend New Manager or any other training will also be at the discretion of the Environmental Manager.

Other training workshops will be provided as required where a specific requirement has been identified either through the FEP audit process or as part of the scheme's continuous improvement targets.

The schemes will use a mix of methods, including electronic and hard copy to communicate with water users. The web site will be regularly updated with the objective that it becomes recognised as the first point of call for scheme information.

²⁴ CRC180558 13f, 13k and CRC164369 10d, 10h

Where relevant, any ongoing education, training and information opportunities provided by the schemes will be extended to all properties within the command areas, and other properties in the Lower Waitaki catchment. This may include partnering with sector organisations (e.g. DairyNZ, FAR, Beef and Lamb), or promotion through irrigation and other networks (e.g. Lower Waitaki Collective, Irrigation NZ).

5.4 WAIHAO RIVER AUGMENTATION

The scheme provides water that augments flows in the lower Waihao River. This contributes significantly to supporting:

- Ecological sustainability in both the lower river and the Wainono Lagoon;
- Recreational opportunities in the lower river; and
- Groundwater recharge.

The schemes will continue to be actively involved in collaborative programmes for improved environmental management of the Wainono Lagoon.

6 Scheme Management Plan

6.1 FEP TEMPLATE

The Farm Environment Plan (FEP) template is provided in Appendix 3 of this document. The operational rules, FEP audit grades and compliance procedures are set out in the following sections.

The FEP Management checklist (Section 6.2) is designed for farmers so they can plan and track their key activities through the audit cycle.

6.2 FEP MANAGEMENT CHECKLIST

Timeframe	Task	Farmer Checklist
By December for MGI By September for WDI	Prepare an Overseer budget (actual) for previous 12-months ²⁵	
9-months before audit	Review previous FEP and ensure that all actions have been completed MGI will conduct a review and update of the FEP	
6-months before audit	EWOFF for dairy farms with effluent management Address any EWOFF actions arising ²⁶	
Prior to FEP audit	Prepare for the FEP audit visit Check that records are available to show auditor ²⁷	
FEP Audit	<ol style="list-style-type: none"> 1) Address any FEP audit actions or recommendations arising. 2) For C or D grades, prepare a response plan for presentation to the MGI Board (Section 5.2) 	
<i>Repeat checklist cycle</i>		

²⁵ Ensure that MGI administration has access rights to Overseer FM

²⁶ In some cases it may be sufficient to demonstrate progress on an action, such as an engineering design or contract, for actions that may require significant capital upgrade and investment

²⁷ Water usage and climate data can be downloaded from the MGI Database Property Page. Farms with soil moisture monitoring can obtain full dataset from the Loncel or Water Metrics cloud portals, or other service providers (if applicable).

6.3 WATER SHARING AND ALLOCATION AT LOW FLOWS

Consent CRC180558 (6) requires that the WDI EMS sets out
How water takes during periods of low flow in the Lower Waitaki River will be shared among consented abstractors using a water sharing roster
How any reduced take from the Waitaki River at times of low flow will be shared among scheme water users.

Details for the flow sharing regime are still being developed with the Waitaki Irrigators Collective (WIC) but all shareholders will be afforded equal priority to a reduced quantity of water. The arrangements for low flow situations are outlined in Section 6.2 of this EMS.

6.1 FISH DEFLECTION BARRIER

The fish deflection barrier screen²⁸ is an engineered rock structure placed at an angle to the direction of flow that ensures that the entrance velocity of the water is sufficiently low to avoid fish entrainment and to promote fish migration away from the structure.

As the fish barrier is a passive rock structure, operational and maintenance requirements are minimal. Visual checks are carried out by the scheme operators every 1-2 days in accordance with the Fish Screen Management Plan (See Appendix 8), and maintenance scheduled when necessary.

Condition 10(i) requires inspection following high flows (> 600 m³/s). These checks will be carried out as necessary, with due regard for health and safety risks while the river is at high flow.

6.2 OTHER WDI OPERATIONAL RULES AND REQUIREMENTS

WDI commenced operation in the 2016-17 season. Following a review of the first season's operation, the EMS has been updated to include other operational rules and requirements for the take of water, water management and water distribution. Any future updates to the operational rules and requirements will be included as required and/or when the EMS is reviewed.

6.3 ENVIRONMENTAL MANAGEMENT FUND

The Environmental Management Fund meets the requirements of CRC180558 and CRC164369 (WDI). Appendix 5 sets out the structure and operation of the Fund. This includes the priorities for the use of the fund²⁹. The Application Form and Guidelines are available on the scheme web site.

Applications close on May 31st each year. The provisions for the management of this fund will be regularly reviewed and updated as part of the annual review of this EMS.

Funded projects must be maintained in perpetuity by the landowner responsible, and WDI/MGI will protect this through a condition of the FEP.

²⁸ CRC180558 10 and 12m

²⁹ CRC180558 (14) CRC164369 (10k)

6.4 PERFORMANCE INCENTIVES

MGI will offer awards and recognition to farmers that achieve high standards in their farm and environmental management. The purpose of the performance incentives is to encourage other farmers to strive for improved outcomes; and continuous environmental improvement.

Recognition may include financial incentives as well as non-financial acknowledgement such as signage and awards.

7 Compliance and Enforcement

7.1 PROCEDURES

The schemes will ensure that Water Users comply with the scheme requirements for take and use of water, including the Farm Environment Plan processes. Individual users who do not adhere to the requirements can put the consents for the whole scheme at risk. Established procedures will be used to deal with issues of possible non-compliance. Concerns about compliance can be raised at any time (e.g. by public, neighbour, scheme personnel), or as a result of the audit process.

The schemes will take an integrated approach to compliance and enforcement by:

- Promoting water user compliance

Using educational programmes, technical assistance, reduction in audit requirements for good performance and other methods to promote, support and encourage compliance by Water Users with sustainable irrigated land use requirements

- Implementing procedures to receive, record and respond to public complaints

The Environmental Complaints Procedure (Appendix 6) sets out the process to follow to record, follow up and respond to all public queries and complaints. Once a query is received it must be recorded on the appropriate form and reported to the General Manager and Environmental Manager within one business day. Contact numbers and emails are available on the web site, including a 24-hour duty operator contact that can be used for urgent reporting or emergencies. The web site Enquiry Form can also be used to report a complaint.

- Monitoring Water User compliance, including
 - Inspections and audits, both internal and independent;
 - Responding to complaints of non-compliance
- Responding to Water User non-compliance, including
 - Providing routine notice about a breach or alleged breach (e.g. phone call, warning letters, notice of violation, inspections) and a request to achieve compliance (for minor non-compliance with no or minor actual adverse environmental effect)
 - Entering discussions and providing advice to those who have significant non-compliance in order to develop a programme to achieve compliance
 - Action, where necessary (e.g. ongoing significant non-compliance or repeated minor non-compliance with moderate actual or potential adverse environmental effect):
 - To compel compliance;
 - To impose consequences for breaches (e.g. fines/charges, water restricted/cut off);
 - To correct damages
 - For major and/or persistent non-compliance, with serious or persistent actual adverse environmental effects, immediate request for compliance, advising that water supply will be ceased if problems are not remedied within 10 days.
- Imposing penalties that take into account:
 - Seriousness of the non-compliance;

- Degree of co-operation;
 - History of non-compliance
- Compliance committee

The schemes will set up a compliance committee to deal with breaches that cannot be resolved through discussion and advice, or that may have incurred costs to the schemes or to others. This committee would have the power to:

- Impose a penalty charge upon a water user for breach of their agreement with MGI for supply of water;
- Convene a hearing so that disputes or issues can be presented;
- Restrict or cut off water

The committee would be appointed by the combined Boards of MGI and WDI and have a membership of at least three, including an independent Chairperson, to ensure that the committee has a balanced representation that includes both farming and environmental management expertise.

The following actions will be taken where non-compliance with the FEP requirements is identified on a property receiving water from MGI or WDI³⁰:

- For minor non-compliance with no or minor short-term actual adverse environmental effect, there will be routine personal contact with the water user, with follow-up written notification identifying the actions that must be taken and the timeframe to achieve compliance.
- For significant non-compliance, or repeated minor non-compliance, with moderate actual or potential adverse environmental effect, the Scheme will immediately contact the Water User and identify the actions that the water user must comply with immediately to meet the FEP requirements. The Water User will also be notified that water supply will be restricted if non-compliance is not remedied within 10 days.
- For major and/or persistent non-compliance with serious or persistent actual or potential adverse environmental effects, the Scheme will immediately contact the Water User and identify the actions that the Water User must comply with immediately to meet the FEP requirements. The water user will also be notified that water supply will cease if non-compliance is not remedied within 10 days.

The Guidelines for Achieving Environmental Compliance (Appendix 7) give examples of minor, significant and major non-compliance, as well as persistent or repeated non-compliance.

7.2 FLOW RESTRICTION PROCEDURE

Pursuant to the Schemes resource consents, once critical low flow conditions are reached in the Waitaki River at Kurow the rate of abstraction must be ramped down until the minimum flow is reached and then the total abstraction must be suspended. Agreement has been reached with the other Waitaki River irrigators and Meridian Energy to exercise flow sharing during these critical times.

Details for the flow sharing regime are still being developed with the Waitaki Irrigators Collective (WIC) but all shareholders will be afforded equal priority to a reduced quantity of water. Under the flow sharing agreement, the first step involves the convening of a Committee that includes representation from all the WIC members. The Committee considers the actual

³⁰ CRC180558 Condition 13g and CRC164369 Condition10e

needs of each irrigating scheme or individual so that a fair flow sharing, and ramp-down allocation is identified on a case-by-case basis.

7.3 REMEDIAL ACTION PLAN

A remedial action plan (RAP) is a requirement of CRC184153, the MGI scheme nutrient discharge permit.

If a farmer exceeds their consent load³¹, which has been determined for each FEP in Schedule 1 of CRC184153 or privately held Farming Land Use consents in some instances, then a RAP is required. The remedial action plan (RAP) shall set out the methods and timeframes for altering and/or adapting farm land use practices, including irrigation management practices, to ensure that the exceedance of the limit in Schedule 1 is returned as soon as practicable to the specified level for the relevant monitoring site.

The farmer shall prepare the Remedial Action Plan and identify the measures that they will implement to reduce the nutrient loss rate to within acceptable limits within an 12-month period of receiving the actual Overseer budget that identified the exceedance of the consent load. The timeframe for this RAP process is as follows:

- Prepare a RAP and submit to MGI within 2-months of the Overseer budget;
- The actions from the RAP shall be included with the FEP;
- The actions must be completed within 12-months of the exceedance and compliance confirmed by a new Overseer budget.

Failure to prepare a RAP or to address the actions arising shall be treated by MGI using the same procedure as an FEP Audit failure (C, D grade) at Step 2 (refer to Section 5.2).

³¹ The "consent load" has been calculated for each FEP in Schedule One of the nutrient discharge permit. It is the Baseline GMP Loss Rate in PC5 areas and no greater than the Maximum Caps in the PC3 areas.

8 Monitoring and Reporting

8.1 SCHEME MONITORING PLANS

The Scheme Monitoring Plan for the MGI CRC184153 consent area is awaiting approval by the Regional Council. The Plan involves routine periodic water quality sampling of particular streams and wells for the purposes of checking compliance with receiving water limits and any trends in nutrient parameters.

The Scheme Monitoring Plan required under CRC180558 and CRC164369 (See Appendix 7) for the WDI area has been operating since the scheme completed commissioning in 2016.

The results from the Scheme Monitoring Plans are reported annually. The Environmental Manager is responsible for ensuring that the necessary monitoring, analysis, evaluation and reporting is undertaken by suitably qualified people.

8.2 WATER TAKE MONITORING

The schemes have NIWA hydrological flow recorders and loggers operating on the intake gates to continuously monitor the volume and rate of water abstracted from the river. This data is telemetered in real-time to the scheme operators via the NIWA Sentinel control system.

The water takes from the Waitaki River are automatically recorded and continuously analysed to check that takes do not exceed the maximum permitted. In the event that any exceedance occurs, this will trigger an automatic alert to ensure that any problems are immediately rectified. WDI shares the MGI intake at Stonewall. The WDI share of the water is measured at several downstream flow recorders and from the levels in Baylyn Pond. Actual farm water use is also measured but there is a delay between farm use and the rate of abstraction due to water storage in Baylyn and Harrisons Pond.

For measured flows in the Waitaki River, the record from the Canterbury Regional Council's gauge at Kurow will be used.

8.3 ANNUAL REPORTING TO CANTERBURY REGIONAL COUNCIL

MGI

As required by consent CRC091977 and CRC184153, MGI will report annually to Canterbury Regional Council, including:

- Properties receiving irrigation water under this consent
- A summary of on-farm water supply for each year (July-June)
- A summary of the results of the Farm Management Plan audits for the preceding season, including:
 - Any issues of non-compliance with the Plans, the Strategy or the conditions of consent CRC091977;
 - Actions taken by MGI to remedy any non-compliance matters.

MGI also has other reporting requirements under other consents, including:

- Water takes
- Water quality associated with Waihao River augmentation

WDI Annual Environmental Report

As required by resource consents CRC180558 (29) and CRC164369 WDI will report annually to Canterbury Regional Council on environmental performance, including

- Water takes, use and associated river flows
- Summary of the annual audit results for the FEPs
- Results of monitoring undertaken under the Scheme Monitoring Plan
- Analysis of differences in results from the previous report
- Proposed monitoring and off-farm environmental mitigation for next 12 months
- Analysis of, and response to, any unexpected adverse environmental effect from the exercise of CRC180558 in the last year
- Changes in those holding water supply agreements with WDI
- Provide any updates to Nutrient Discharge Allowance or Maximum Cap (e.g. if model changes)
- Provide schedule of properties, irrigated areas, soil types (by area), maximum cap
- Annual Nitrogen and Phosphorus losses for each property (from Overseer) for the current year (1 July to 30 June)
- Results of FEP audits, any significant non-compliance found, and actions taken by scheme and/or water user to remedy or mitigate the non-compliance.
- Results of the monitoring carried out under the WDI Environmental Monitoring Plan

8.4 EMS REVIEWS AND UPDATES

This EMS will be reviewed annually for 5 years, following the commissioning of WDI scheme, then at least once every 3 years. The schemes will consult Canterbury Regional Council during the review process and will take into account the information gathered from any environmental monitoring carried out.

The revised EMS will be provided to Canterbury Regional Council as required under resource consents CRC091997, CRC180558 and CRC164369.

Once the reviews mandated by the resource consent have elapsed, MGI shall continue to review and where necessary update the EMS on an annual basis. The Board shall review and approve any updates by the July meeting each year.

Appendix 1 MGI and WDI Scheme Command Areas

Legend

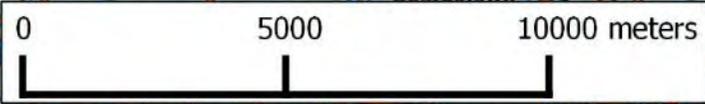
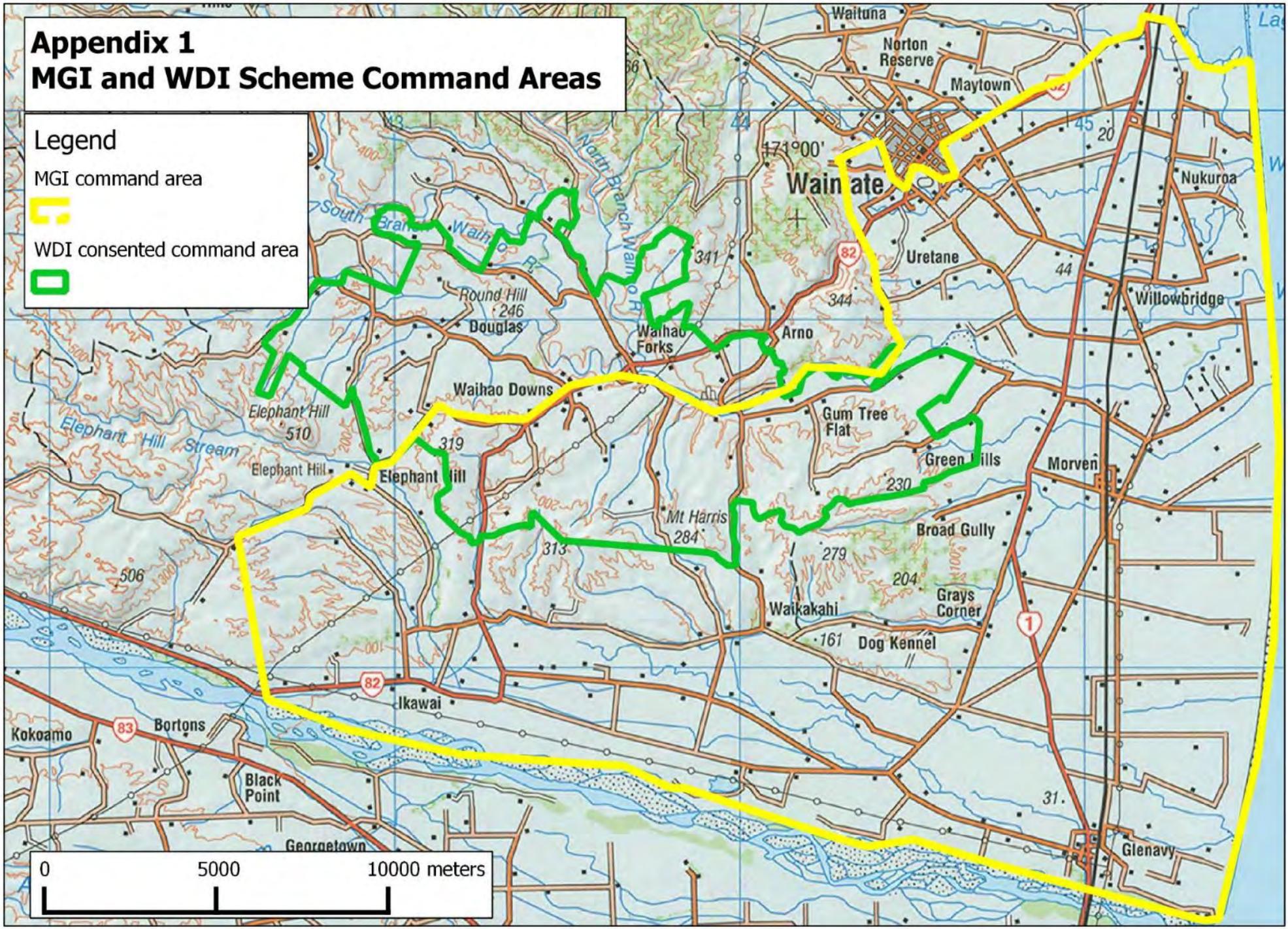
- MGI command area
- WDI consented command area



MGI command area



WDI consented command area



Appendix 2 Foot-hill Catchments described in CRC091997

Legend

Foothill catchments in Condition 12

 'Flowing Water Bodies'

 Not 'Flowing Water Bodies'

MGI command area

