

IN THE MATTER OF of the Resource Management Act 1991 (**'the Act'** or **'RMA'**)

AND

IN THE MATTER OF of Appeals under Clause 14 of the First Schedule of the Act in relation to the Proposed Southland Regional Water and Land Plan Decisions.

BETWEEN ALLIANCE GROUP LIMITED
Appellant

AND SOUTHLAND REGIONAL COUNCIL
Respondent

STATEMENT OF EVIDENCE BY JOHN KYLE

TOPIC A

15 February 2019

1. INTRODUCTION

1.1 My name is John Clifford Kyle. I hold an honours degree in Regional Planning from Massey University, obtained in 1987. I am the Managing Director of the firm Mitchell Daysh Limited, which practices as a planning and environmental consultancy throughout New Zealand.

1.2 I have been engaged in resource and environmental management for 30 years. My experience includes a mix of local authority and consultancy resource management work. Since 1994, I have been involved with providing consultancy advice with respect to Regional and District Plans, designations, resource consents, environmental management and environmental effects assessments. This work includes extensive experience with large-scale consenting projects involving inputs from a multidisciplinary team.

1.3 An outline of projects in which I have been called upon to provide resource management advice in recent times is included as **Appendix A**. Notably, I have provided Alliance Group Limited (**Alliance**) with resource management planning advice for a number of years. This involvement has included providing advice on various policy statements and plans around New Zealand and with managing resource consenting projects at Pukeuri, Lorneville and Maitāwhiri. From this experience I understand the processing plants operated by Alliance, the environmental issues the company deals with, and why and how the company has an interest in the promulgation of policy statements and plans which might influence their operations.

1.4 In preparing this evidence I have read and agree to comply with the Environment Court's Code of Conduct for Expert Witnesses contained in the Practice Note 2014. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express here.

1.5 My firm has been engaged by Alliance to provide resource management planning advice with respect to the Proposed Southland Water and Land Plan (**the Proposed Plan**). My firm was involved in the preparation of submissions, further submissions and evidence relating to the Proposed Plan. In preparing this evidence I have reviewed the submissions, further submissions, hearing evidence, the Southland Regional Council's decision, appeal and section 274

notices, as well as the evidence in chief that has been filed on behalf of the Southland Regional Council. In particular I refer to the planning evidence prepared by Mr McCallum-Clark.

1.6 In this statement of evidence, I will:

1.6.1 Address Alliance's submissions and appeal points on the following provisions which are relevant to Topic A including:

1.6.1.1 Objective 13B;

1.6.1.2 Objective 18; and

1.6.1.3 Physiographic Zone Policies 4 – 12

1.7 I note Alliance also has a primary appeal point on Objective 11. However, I understand Alliance's legal counsel will be formally withdrawing this appeal point and I have not been asked to address it in this evidence.

2. EXECUTIVE SUMMARY

Objective 13B

2.1 Alliance is concerned that Objective 13B seeks a 'no cumulative effects on human health' outcome when managing water quality. This would seem to be a very difficult, and probably an implausible outcome to achieve in Southland, without imposing prohibitive costs on the activities which directly or indirectly discharge to land or water. There appears to be no acknowledgment in the s32 analysis of the significant costs associated with taking this approach. However, in my assessment, this is what the current drafting of Objective 13B seeks, and I concur with Alliance's concern on this matter. I have suggested some amended wording for Objective 13B so it better reflects a suitable resource management outcome.

'Good Management Practice'

2.2 Alliance opposes the use of the term 'good management practice' where it would apply to industrial and trade processes in Objective 18 and Policies 4 – 12 of the Proposed Plan.

- 2.3 In my observation, ‘good management practice’ has currency in a farming context, and good management practice guidance documents are increasingly an accepted means of managing the effects of farming activities on water quality. However, in my view it would be problematic to apply the ‘good management practice’ directive to industrial and trade processes as I understand the term has no accepted meaning when applied to these activities. It is also unnecessary to introduce this new test, as the Proposed Plan already contains specific policy¹ requiring the adoption of the best practicable option to manage the treatment and discharge of contaminants derived from industrial and trade processes.
- 2.4 I have suggested an amendment to the definition of ‘good management practice’ to address this concern.

3. OBJECTIVE 13B

- 3.1 The Alliance appeal seeks Objective 13B be deleted.
- 3.2 Mr McCullum Clark has described how Objective 13B is the result of the Hearing Commissioner’s splitting the notified version of Objective 13 into three separate objectives (13, 13A and 13B) as follows:²

Notified Provision

Objective 13

Enable the use and development of land and soils, provided:

- a) *the quantity, quality and structure of soil resources are not irreversibly degraded through land use activities and discharges to land;*
- b) *the discharge of contaminants to land or water that have significant or cumulative effects on human health are avoided;*
and
- c) *adverse effects on ecosystems (including diversity and integrity of habitats), amenity values, cultural values and historic heritage values are avoided, remedied or mitigated to ensure these values are maintained or enhanced.*

Decisions Version

Objective 13

Enable the use and development of land and soils to support the economic, social, and cultural wellbeing of the region.

¹ Policy 16A.

² Statement of Evidence of Matthew McCallum-Clark on Behalf of the Southland Regional Council - 14 December 2018, Paragraph 146 – 151.

Objective 13A

The quantity, quality and structure of soil resources are not irreversibly degraded through land use activities or discharges to land.

Objective 13B

The discharges of contaminants to land or water that have significant or cumulative adverse effects on human health are avoided.

- 3.3 The Alliance appeal expressed concern that by splitting Objective 13B from the introductory text in the notified version of Objective 13, it represents a significant broadening in planning direction relative to that contained in its parent provision (Objective 13(b)). I agree with that observation. I would interpret Objective 13 to be an objective focussed on enabling land use development and farming in Southland's catchments within limits. I also consider that the notified version of Objective 13(b) was not particularly relevant when considering a point source discharge from an industrial site. In contrast, Objective 13B in the decisions version of the Proposed Plan is clearly relevant to this type of activity.
- 3.4 With respect to the substance of Objective 13B, the Alliance appeal is primarily concerned with that part of the provision which seeks all discharges of contaminants to land or water be 'avoided' if they will have cumulative effects on human health, notwithstanding the significance of those cumulative effects. Alliance is concerned the objective seeks to differentiate between cumulative effects on human health (a no cumulative adverse effect outcome) and all other effects (where significant adverse effects are to be avoided). There is no general opposition in Alliance's appeal to Objective 13B seeking that discharges which have significant adverse effects on human health should be avoided.
- 3.5 This distinction does not appear to have been picked up by Mr McCallum-Clark in his analysis of Alliance's appeal point and he does not address Alliance's concern with the cumulative effects matter specifically.
- 3.6 Avoiding all discharges which have any cumulative adverse effect on human health would seem to be a very difficult, and probably implausible outcome to achieve in Southland, without imposing prohibitive costs on the activities which directly or indirectly discharge to land or water. From my assessment of the relevant documents, the approach does not appear to be supported by an

analysis of the significant costs associated with taking this approach, which is a necessary discipline which derives from s32 of the Act.

- 3.7 However, in my assessment this is what the current drafting of Objective 13B seeks, and I concur with Alliance's concern on this matter.
- 3.8 For the above reasons, and without further information from Council, I suspect that the disagreement between Alliance and the Council on Objective 13B relates to its drafting, rather than its intent. Assuming this is the case - in my view this issue could be readily addressed by amending the provision along the following lines, noting that 'cumulative effects' are a subset of the term 'effect' as defined in section 3 of the Act, and in my view need not be afforded specific mention in the provision:

Objective 13B

The discharges of contaminants to land or water that have significant ~~or cumulative~~ adverse effects on human health are avoided.

4. OBJECTIVE 18 AND POLICIES 4 - 12

- 4.1 Alliance has submitted in opposition to the term 'good management practice' applying to industrial and trade processes in Objective 18 and Policies 4 – 12 of the Proposed Plan. The Alliance appeal seeks that this directive only apply to farming activities, and that discharges from industrial and trade processes be subject to the best practicable option ('BPO') test, which is the approach taken within policies specific to managing the effects of industrial and trade processes.
- 4.2 In my observation, 'good management practice' has currency in a farming context, and good management practice guidance documents are becoming an increasingly common means of managing the effects of farming activities on water quality. This is acknowledged in Mr McCullum-Clark's evidence.³ Moreover, I note that the Regional Council's own good management practice factsheets all currently focus on farming activities, rather than managing the effects of discharges from industrial or trade processes. A review of other regional council planning documents also shows a 'good management practice' approach (or similar) is relatively commonly used as a means of

³ Statement of Evidence of Matthew McCullum-Clark on behalf of the Southland Regional Council - 14 December 2018, Paragraph 227.

managing farming activities in other regions.⁴ A particularly notable example of this is the Canterbury Land and Water Regional Plan which includes a near identical objective⁵ to that being considered here, but which makes it clear to users that the objective is only focused on farming systems. This is achieved via its definition of ‘good management practices’⁶ which references the *Industry-agreed Good Management Practices* document I have included in **Appendix B** of my evidence.

4.3 However, I am not aware of any generally accepted notion of what ‘good management practice’ means in the context of an industrial or trade process, nor any examples of where the term has been used elsewhere in RMA planning documents for this purpose. And unfortunately, neither the definition of ‘good management practice’ in the Proposed Plan, the analysis in the s32 Report, or any discussion in Mr McCullum-Clark’s evidence assists me to understand what the term is intended to mean when applied in that manner in the context of the Proposed Plan.

4.4 I am also not reassured by Mr McCullum-Clark’s observation that the original intent of Objective 18 was to recognise “*an overall aim of the [Proposed Plan] to encourage good practice by all water and land users in the region*”⁷, and that the Reporting Officers were of the view the provision is a “*high-level statement of intent – an aspirational outcome for the region*”⁸. Nor does Mr McCullum-Clark’s view that the provision “*outlines an expectation of behaviour, rather than compliance with specific standards or processes*”⁹ assist me in understanding how Objective 18 in its current wording is intended

⁴ See for example: Objective 3.24 of the Canterbury Land and Water Plan referred to in the body of my evidence; Policy 5-8 and Policy 14-6 of the Horizons One Plan which refer to the use of good management practices for managing loss of nutrients, faecal coliforms and sediment from intensive farming; Method 3.9.4.1 of the Waikato Regional Plan which refers to the use of ‘good practices’ to address effects of non-point discharges and in Implementation Methods in Chapter 5.2.4 relating to discharges to land; and various policies in Chapter H19 of the Auckland Unitary Plan which provide for intensive farming in the rural zones where carried out in accordance with good industry practice; Appendix VII of the Regional Freshwater Plan for Taranaki which sets out Good management practices for discharge of agricultural effluent; and Outcome 12 of the Operative Regional Water Plan for Southland which seeks the establishment of new dairy farms in accordance with good management practices.

⁵ The relevant objective states:

Objective 3.24

All activities operate at good environmental practice or better to optimise efficient resource use and protect the region’s fresh water resources from quality and quantity degradation

⁶ **Good Management Practice** - means the practices described in the document entitled “Industry-agreed Good Management Practices relating to water quality” - dated 18 September 2015

⁷ Statement of Evidence of Matthew McCallum-Clark on Behalf of the Southland Regional Council - 14 December 2018, Paragraph 183.

⁸ Statement of Evidence of Matthew McCallum-Clark on Behalf of the Southland Regional Council - 14 December 2018, Paragraph 184.

⁹ Statement of Evidence of Matthew McCallum-Clark on Behalf of the Southland Regional Council - 14 December 2018, Paragraph 195

to apply to industrial and trade processes. There is nothing in the drafting of Objective 18 or the physiographic policies which says to me they are aspirational, or that a measured application of them is appropriate. The importance of wording is now well acknowledged in planning circles, and in my view the language used in Objective 18 and the physiographic policies when referring to ‘good management practices’ reinforces, rather than alleviates the need for certainty in what the term means in the context of those provisions. Objective 18 is unequivocal in seeking all activities “*operate in accordance with good management practice or better*”. Similarly, the physiographic policies ‘*...require implementation of good management practices to manage adverse effects on water quality ...*’.

4.5 I also observe that the Proposed Plan effectively ties what is meant by ‘good management practice’ to the various Good Management Practice factsheets available on the Southland Regional Council’s webpage. Arguably this constitutes ‘incorporation by reference’ in terms of Part 3 of Schedule 1 of the RMA, although it is not treated as such in the s32 Report. The Proposed Plan does not refer to any specific factsheet by reference, so also appears to contemplate that reference will be made to the current factsheets that are listed on the Council’s webpage at the time that consent is applied for. Ordinarily an amendment to, or replacement of, material incorporated by reference in a plan only takes legal effect as part of that plan following a plan change process. However, there is no comment in the s32 Report or Mr McCallum-Clark’s evidence on whether that would be the case for the factsheets.

4.6 In addition to being uncertain, in my view plan provisions requiring industrial and trade activities to operate in accordance with ‘good management practice’ are also unnecessary. The Proposed Plan already has the necessary (and commonly used) tools to manage the effects of an industrial or trade process on water. These include provisions requiring the adoption of the best practicable option to manage the treatment and discharge of contaminants derived from industrial and trade processes.¹⁰ In my experience, applying the best practicable option requirements to sites like Alliance’s processing plants, alongside the various plan provisions, which address the various environmental imperatives, has worked well to achieve sustainable

¹⁰ As required by Policy 16A.

management outcomes. I am unaware that any circumstances have been identified by the Council which suggest a need to re-invent the wheel here by introducing reference to new “good management practice’ requirements which at the moment would appear to relate more to the management of farming practices.

- 4.7 For the above reasons, I have formed the opinion that it is both problematic and unnecessary in a planning sense to expand the use of the term ‘good management practice’ from its common farming-related usage to also include industrial and trade processes. However, I disagree with the Alliance appeal point that Objective 18 needs to specify that industrial and trade processes are to be managed in accordance with the best practicable option test, as this is already required by Policy 16A. In my view, an appropriate means of addressing this matter would be to amend the definition of ‘good management practices’ along the following lines:

Good management practices

Are practices to manage the adverse effects of farm systems on water quality from contaminants transported via drainage and overland flow. They include, but are not limited to, the practices set out in the various Good Management Practices factsheets available on the Southland Regional Council’s webpage.

5. CONCLUSION

- 5.1 Overall, it is my view that Objective 13B, Objective 18 and the physiographic policies require some revision and refinement in order to better achieve the requirements of s32 of the Act and the purpose of achieving sustainable management of natural and physical resources.

John C Kyle

15 February 2019

Appendix A – Selected Project Experience

- Alliance Group Limited – Lead consultant – renewal of all discharge and land use consents Lorneville Meat Processing Works, Lorneville - Southland Region.
- Alliance Group Limited – Air Discharge Consents – Pukeuri Meat Processing Works, Pukeuri - Otago Region.
- Alliance Group – advisor regarding various regional and district plans – nationwide.
- Queenstown Lakes District Council – preparation of a Plan Change to expand Queenstown town centre, including to accommodate a convention centre.
- Wellington International Airport Limited – Lead consultant - strategic and resource management advice with respect to the proposed runway extension – Wellington City.
- Environmental Protection Authority – advisor to the Minister appointed Board of Inquiry regarding a Plan Change by Tainui Group Holdings and Chedworth Properties for the Ruakura Inland Port Development, Hamilton.
- Environmental Protection Authority – advisor to the Minister appointed Board of Inquiry regarding a Notice of Requirement and resource consent applications by the New Zealand Transport Agency with respect to the Expressway between Peka and North Otaki on the Kapiti Coast.
- Environmental Protection Authority – advisor to the Minister appointed Board of Inquiry regarding a Notice of Requirement and resource consent applications by the New Zealand Transport Agency with respect to the Expressway between MacKays Crossing and Peka Peka on the Kapiti Coast.
- Environmental Protection Authority – advisor to the Minister appointed Board of Inquiry regarding resource consent applications and designations by the New Zealand Transport Agency with respect to the proposed Transmission Gully Project – Wellington Region.
- Queenstown Lakes District Council – member of the review team commissioned to undertake a review of Council consenting and resource management policy operations.
- Environmental Protection Authority – advisor to the Minister appointed Board of Inquiry regarding a plan change application to the Wellington Regional Water plan to assist with the proposed Transmission Gully Project – Wellington Region.
- Queenstown Airport Corporation – lead consultant - Notice of Requirement for land adjacent to QAC in order provide for the future expansion of airport operations, Queenstown Lakes District.
- Genesis Power Limited – due diligence Slopedown Wind Farm, Southland District and Southland Region.
- TrustPower Limited – Planning witness - proposed Kaiwera Downs Wind Farm, Gore District and Southland Region.
- TrustPower Limited – Planning witness - proposed alteration to the Rakaia Water Conservation Order – Lake Coleridge Hydro Electric Power Scheme – Canterbury Region.

- Meridian Energy Limited – Planning witness -Proposed Mokihinui Hydro Electric Power Scheme, damming, water and land use related consents, Buller District and West Coast Region.
- TrustPower Limited – Planning witness - Wairau Hydro Electric Power Scheme, water and land use related consents, Marlborough District.
- Southern Health – Plan Change Invercargill Hospital Development - Invercargill City.
- Sanford Limited, various marine farm proposals Marlborough Sounds, Marlborough District.
- Port Marlborough Limited – Lead consultant - Plan Change proposal to alter the marina zone within the Marlborough Sounds Resource Management Plan to provide for consolidation of marina development in Waikawa Bay, Marlborough District.
- Port Marlborough Limited – Resource consent application for occupation of coastal space – Shakespeare Bay port facilities – Marlborough District.
- Meridian Energy Limited – Planning witness - proposed Wind Farm, Lammermoor Range, Central Otago District and Otago Region.
- Queenstown Airport Corporation – Lead consultant - Runway End Safety Area, designation and construction related consents, Queenstown Lakes District and Otago Region.
- Riverstone Holdings Limited – Lead consultant - Proposed Monorail Link – Lake Wakatipu to Fiordland, Department of Conservation Concession Application – Southland Conservancy.
- Ryman Healthcare Limited – Proposed rest homes – land use and regional consents – nationwide.
- Otago Regional Council – Planning witness - Consents required for controlling the Shotover River to mitigate flood risk – Queenstown Lakes District and Otago Region.
- Queenstown Airport Corporation – Lead consultant - aircraft noise controls and flight fan controls – Plan Change and Designations, Queenstown Lakes District.
- Todd Property Pegasus Town Limited – Pegasus Town, North Canterbury – Waimakariri District, Canterbury Region.
- Willowridge Developments – Lead consultant - 3 Parks Plan Change to create new commercial, large format retail, service, tourist and residential land use zones, Wanaka, Queenstown Lakes District.
- Gibbston Valley Station – Lead consultant - Land use and regional consents, Viticulture and Golf Resort, Gibbston – Queenstown Lakes District and Otago Region.
- Marlborough District Council – Business Park Plan Change, Blenheim - Marlborough District.
- Ravensdown Fertiliser Limited – Lead consultant - Coastal and Air Discharge Consent Renewal, Dunedin – Otago Region.
- Irmo Properties Limited – Resource consent application for retail complex, Green Island – Dunedin City.
- Infinity Investment Group and JIT Investments – Lead consultant - Hillend Station Farm Park development, Wanaka – Queenstown Lakes District.

- Infinity Investment Group – Lead consultant - Peninsula Bay Plan Change, Wanaka – Queenstown Lakes District.
- Genesis Power Limited – Planning witness - Tongariro Power Development, Water Related Consents, Central North Island – Environment Waikato and Horizons MW.
- Genesis Power Limited – Planning witness - Waikato District Plan review and provision for the Huntly Power Station, Waikato District.
- Matukituki Trust – Planning witness - Residential Development, Roy’s Peninsula, Wanaka – Queenstown lakes District.
- Department of Corrections – Planning witness - New Corrections Facility, Milton - Clutha District and Otago Region.
- Department of Child Youth and Family – Lead consultant -Youth Justice Facility, Rolleston – Selwyn District and Canterbury region.
- Telecom New Zealand Limited – Mobile Phone and Landline Infrastructure Developments, South Island, all Districts.
- Kuku Mara Partnerships – Planning witness - Large Scale Marine Farms, Marlborough Sounds – Marlborough District.
- Marine Farming Industry – Plan Appeals, Tasman Aquaculture Inquiry, Tasman and Golden Bays – Tasman District.
- Various clients – advice with respect to the promulgation of Resource Management Plans and Changes to those Plans – various Districts and Regions – predominantly South Island.

**Appendix B – Industry Agreed Good Management Practices Document
Referenced in the Canterbury Land and Water Regional Plan**

Industry-agreed Good Management Practices relating to water quality

18 September 2015



These industry-agreed good management practices relating to water quality were developed from the Canterbury Matrix of Good Management project and were first published in April 2015. While intended for use in Canterbury, they were developed to be applicable across all regions in New Zealand.

Foreword

The Matrix of Good Management (MGM) project aims to estimate the ‘footprint’ of nitrogen and phosphorus loss for the range of farm systems in Canterbury today, assuming that they are operating at good management practice (GMP). This means we need to be clear about what constitutes good management on farms.

Our approach to this been to ask the industry partners in the project - DairyNZ, Deer Industry New Zealand, NZPork, Beef + Lamb New Zealand, Horticulture NZ and the Foundation for Arable Research – to consult widely within their sectors to define GMP. Over the past 18 months, a great deal of hard work by a large number of farmers and growers has culminated in the definitions of GMP set out here.

It would not have been possible to achieve this milestone of industry-agreed, pan-sector GMP descriptions without the thoughtful contributions, willingness to listen, and sheer determination of many people from both the Canterbury and national farming community.

This sort of hands-on participation by all the project partners, and many of the farmers that they represent, typifies the ‘co-production’ of this important project.

As chair of the MGM project Governance Group, and on behalf of the Environment Canterbury Commissioners, I would like to thank all those involved in producing this milestone document.



Tom Lambie

Chair, MGM Governance Group

Version 2, 18 September 2015

Previous version: Version 1, 9 April 2015

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BACKGROUND

The Matrix of Good Management (MGM) project is a collaborative initiative between Environment Canterbury, Crown Research Institutes (AgResearch, Plant & Food Research and Landcare Research), primary sector organisations (DairyNZ, Deer Industry New Zealand, NZPork, Beef + Lamb New Zealand, Horticulture NZ and the Foundation for Arable Research) and is overseen by a cross-sectoral governance stakeholder group. The project aims to quantify the typical nutrient losses that are expected to occur from the range of farming systems, soils and climates across Canterbury when managed to good management practice (GMP). This information is important for two key reasons: to provide more reliable nutrient loss estimates that can be used for catchment modelling, and for regulatory purposes to indicate that all farmers are operating at GMP.

Although there is widespread support for the implementation of good management practices across primary industries, until now there have been no commonly agreed definitions of GMP, nor a good understanding of the nutrient losses that occur on farms operating at GMP. For any particular GMP there will be a range of estimated nutrient losses and these losses will vary with differing land uses and different soil types and climate zones.

The GMPs described here have been prepared following workshops with groups of farmers, rural professionals and industry representatives covering the six sectors involved in the MGM project. The resulting lists of GMPs were compared across industries, and a single set of cross-sector GMPs has been developed along with implementation guidance for these GMPs. Most of the guidance is also cross-sector but some is specific to particular industries.

These GMPs will be applicable to all farms in Canterbury by June 2017. They do not overrule any requirements of council consents, regional plans or land management agreements. As knowledge and technology advance over time, updates to these GMPs, and the associated implementation guidance, is likely to be necessary.

Further information

There are many useful, generic and sector-specific publications that expand on the GMP implementation guidance. Use of these documents is recommended. These include:

Generic

- The Fertiliser Association of New Zealand's Code of Practice for Nutrient Management
- Irrigation New Zealand's Irrigation Design and Installation Codes of Practice and Standards
- Irrigation New Zealand's Performance Test Guidelines

Dairy

- Sustainable Dairying: Water Accord
- DairyNZ FDE Guide to managing FDE and Guides to operating effluent irrigation system
- FDE Design Code of Practice

Sheep and Beef

- Beef + Lamb New Zealand website
- Land and Environment Plan (LEP)

Deer

- The New Zealand Deer Farmers Landcare Manual 2012
- 1999 Deer Industry Guidelines for the Winter Enclosure of Deer
- Deer Industry New Zealand endorses the use of Beef + Lamb New Zealand's Land and Environment Plan (LEP)

Horticulture

- Nutrient Management Code of Practice
- Erosion and Sediment Control Guidelines

Arable

- FAR Focus 6 (2012): Nutrient Management Plans

Outdoor Pigs

- EnviroPork (2005) Pork Industry Guide to Managing Environmental Effects

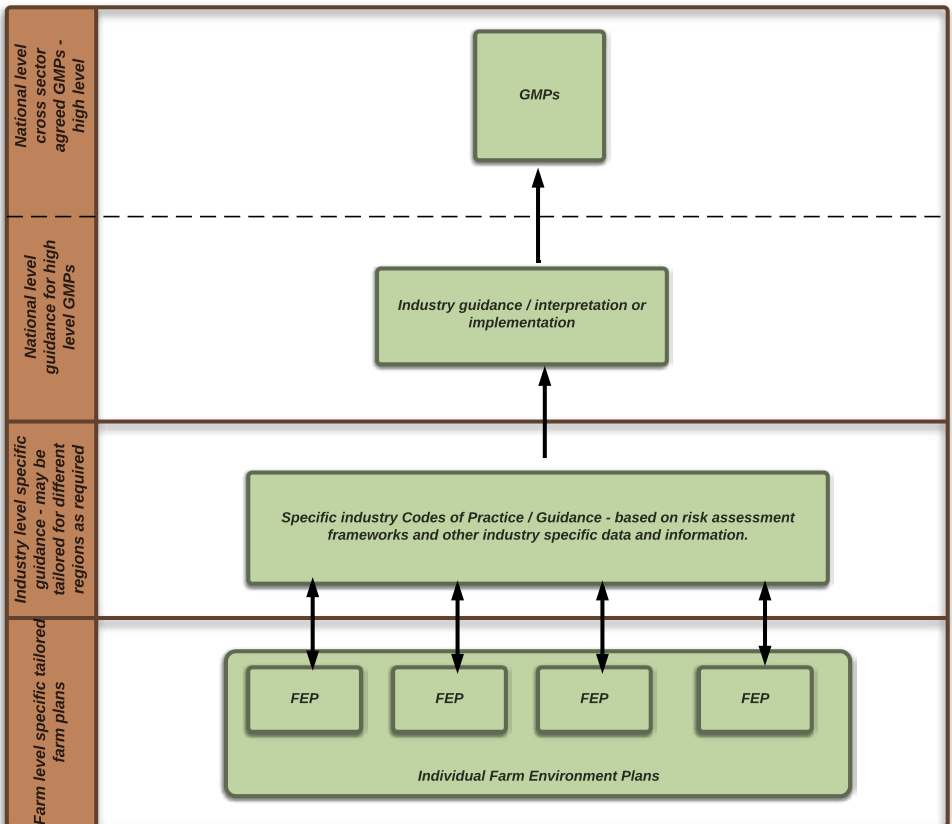
Underpinning concepts

- Understand the nutrient loss pathways on your property;
- Assess risks to water quality;
- Manage appropriately;
- Record actions;
- Review regularly.

Caveats

- This document includes some background information to provide context for the GMPs but it is not intended as a comprehensive report on the steps taken to develop these GMPs. Neither is it intended as a guide for farmers and growers.
- The Implementation Guidance set out here is not a requirement of GMPs, recognising that practices and actions relevant to a particular farm will be determined by risk assessment and intervention with the most appropriate action.
- These GMPs focus on water quality (notably nitrogen, phosphorus, sediment, and faecal contaminants) and may not fully take into account GMPs for other aspects of farm management (e.g. greenhouse gas reduction, health and safety, biosecurity, biodiversity and conservation of natural and cultural heritage).

The context of the Good Management Practices



Glossary of terms

These may be subject to further refinement as the Environment Canterbury Land and Water Regional Plan develops.

<i>Buffer strips</i>	Vegetated buffer strips are land strips adjoining waterways of critical source areas that are managed to maintain their vegetated state permanently; they are not cultivated and are grazed only to manage the vegetation. Width may vary according to level of mitigation required and topography.
<i>Critical Source Area</i>	Areas of enriched contaminant sources and hydrological activity that occur in small parts of a catchment or farm such as a gully, swale or depression, but that contribute a disproportionately large amount of contaminants to the environment.
<i>Cultivation</i>	The preparation of land for growing pasture or a crop and the planting, tending and harvesting of that pasture or crop, but excludes: <ul style="list-style-type: none">• Direct drilling of seed;• No-tillage practices;• Re-contouring of land;• Forestry.
<i>Intensive grazing</i>	Intensive grazing is the grazing of stock on fodder crops or pasture, to the extent that the grazing results in significant de-vegetation. This is usually associated with break feeding behind temporary electric fencing.
<i>Waterways, significant waterways, wetlands and significant wetlands</i>	As defined by the relevant Regional Council or Unitary Authority.

SUMMARY LIST OF GOOD MANAGEMENT PRACTICES

WHOLE FARM

Farm planning and records

- GMP: Identify the physical and biophysical characteristics of the farm system, assess the risk factors to water quality associated with the farm system, and manage appropriately.
- GMP: Maintain accurate and auditable records of annual farm inputs, outputs and management practices.

LAND

Cultivation and Soil Structure

- GMP: Manage farming operations to minimise direct and indirect losses of sediment and nutrients to water, and maintain or enhance soil structure, where agronomically appropriate.

Ground cover

- GMP: Manage periods of exposed soil between crops/pasture to reduce risk of erosion, overland flow and leaching.
- GMP: Retire all Land Use Capability Class 8 and either retire, or actively manage, all Class 7e to ensure intensive soil conservation measures and practices are in place.

Sediment, phosphorus and faecal bacteria

- GMP: Identify risk of overland flow of sediment and faecal bacteria on the property and implement measures to minimise transport of these to water bodies.
- GMP: Locate and manage farm tracks, gateways, water troughs, self-feeding areas, stock camps, wallows and other sources of run-off to minimise risks to water quality.
- GMP: To the extent that is compatible with land form, stock class and intensity, exclude stock from waterways.
- GMP: Monitor soil phosphorus levels and maintain them at or below the agronomic optimum for the farm system.

PLANTS

Nutrient management

- GMP: Manage the amount and timing of fertiliser inputs, taking account of all sources of nutrients, to match plant requirements and minimise risk of losses.
- GMP: Store and load fertiliser to minimise risk of spillage, leaching and loss into water bodies.
- GMP: Ensure equipment for spreading fertilisers is well maintained and calibrated.

Irrigation and water use

- GMP: Manage the amount and timing of irrigation inputs to meet plant demands and minimise risk of leaching and runoff.
- GMP: Design, calibrate and operate irrigation systems to minimise the amount of water needed to meet production objectives.

ANIMALS

Feed

- GMP: Store, transport and distribute feed to minimise wastage, leachate and soil damage.

Farm effluent and wastewater management

- GMP: Ensure the effluent system meets industry specific Code of Practice or equivalent standard.
- GMP: Have sufficient, suitable storage available to enable farm effluent and wastewater to be stored when soil conditions are unsuitable for application.
- GMP: Ensure equipment for spreading effluent and other organic manures is well maintained and calibrated.
- GMP: Apply effluent to pasture and crops at depths, rates and times to match plant requirements and minimise risk to water bodies.

Intensive grazing

- GMP: Select appropriate paddocks for intensive grazing, recognising and mitigating possible nutrient and sediment loss from critical source areas.
- GMP: Manage grazing to minimise losses from critical source areas.

GOOD MANAGEMENT PRACTICES AND INDUSTRY IMPLEMENTATION GUIDANCE

WHOLE FARM

Farm planning and records

Our intent: Ensure that significant environmental risks to water quality have been assessed, addressed and documented to demonstrate adherence to GMP.

GMP: Identify the physical and biophysical characteristics of the farm system, assess the risk factors to water quality associated with the farm system, and manage appropriately.

Implementation guidance:

Consider:

- Biophysical characteristics such as soil types, topography, and climate.
- Physical characteristics such as waterways, artificial drainage networks, irrigation.
- Risk factors such as soil loss, nutrient loss and damage to soil structure.
- Management or practices that are required by third parties to be recorded e.g. offal pits, feed storage, effluent storage and application area and irrigation area.
- **Outdoor pigs:** Farm in low rainfall area and on flat land to minimise runoff.

GMP: Maintain accurate and auditable records of annual farm inputs, outputs and management practices.

Implementation guidance:

Maintain accurate and auditable records that:

- set out objectives to be met;
- identify all relevant farming activities and practices, including those that demonstrate that relevant GMPs are being applied;
- demonstrate the assessment of all risks to water quality;
- identify how and when actions to mitigate risks will be undertaken;
- allow the generation of an annual actual OVERSEER® nutrient budget.

Utilise industry templates for recording key information – such as water use, fertiliser inputs, and spray diaries, planting dates, paddock rotation, feed inputs and composition, stock numbers and production outputs or yield.

Review the planned actions annually (e.g. carry out a self-audit).

- Farm Environment Plans (FEPs) may be used to assist with this GMP; FEPs include the industries' specific planning tools such as NZ Pork Farm Environment Plan, Sustainable Milk Plans, NZ GAP or Global GAP, Land and Environment Plans, ProductionWise.
- Some regional councils may have approved consistent templates to assist in preparing FEPs.
- Mixed systems may need to combine or adapt existing FEPs.

LAND

Cultivation and soil structure

Our intent: To minimise direct and indirect losses of sediment and nutrients to water without being prescriptive about cultivation or soil management techniques used, as there are many agronomic considerations to take into account on a paddock-by-paddock and season-by-season basis.

GMP: Manage farming operations to minimise direct and indirect losses of sediment and nutrients to water, and maintain or enhance soil structure, where agronomically appropriate.

Implementation guidance:

Consider:

- Distance from surface waterways, effectiveness of buffers
- Slope of land (degree and length) in relation to waterway
- Soil type and texture, quality (e.g. pugging, or compaction susceptibility)
- Climatic and weather conditions to determine timing of cultivation
- Cultivation methods (pre-, during, and post-cultivation; contour, no- or low-tillage)
- Measures to prevent sediment and nutrients entering waterways (e.g. sediment traps or interception drains, headlands or diversion bunds, grazing techniques)
- Measures to prevent soil loss through erosion, overland flow and wind blow (e.g. space planted trees, windbreaks, cover crops)
- Measures to prevent or remedy soil damage
- Previous use of land, and future use of land
- Using sub-soiling or ripping to remedy compaction of soils

Leave grassed areas around rocks, gullies and riparian margins. If spraying out pasture, first identify areas that won't be worked or re-sown e.g. gullies, runners, riparian margins and rocky areas.

In heavy soils, cultivate soil when conditions are dry enough to reduce compaction and pugging and improve drainage and soil structure.

Ground cover

Our intent: Reduce risk of erosion, overland flow and leaching associated with exposed soil.

GMP: Manage periods of exposed soil between crops/pasture to reduce risk of erosion, overland flow and leaching.

Implementation guidance:

- Consider soil conditions and crop rotation.
- Areas that are harvested, grazed or stock damaged (resulting in bare soil) are re-sown as soon as practical to minimise periods of exposed soil.
- Rest and re-sow erosion damaged areas.
- Use cover crops (green feed, oats, mustard, other biological activates) to reduce losses and nutrient use; this also increases organic matter.
- When developing paddocks, retain native vegetation such as tussock and shrub habitat in gullies, steep and higher country as this will regulate run off of water, help retain water quality, reduce soil movement and provide filter areas prior to water entering streams (a significant co-benefit is that it also provides cover for newborn stock).
- **Outdoor pigs:** Maintain groundcover in accordance with the following.
 - For dedicated outdoor units or those in a pastoral rotation the minimum ground cover is:
 - For dry sows: at least 40% cover on 75% of the land (less than 40% cover permissible on 25% of the land);
 - Each paddock to have on average more than 10% cover;
 - For lactating sows: at least 70% cover.
 - For outdoor units as part of an arable operation the minimum ground cover is:
 - For dry sows: 25% cover (100-0% over 2 years);
 - For lactating sows: at least 70%;
 - Reduce fallow during and immediately after the pig phase of the rotation e.g. by planting a catch crop.

GMP: Retire all Land Use Capability Class 8 and either retire, or actively manage, all Class 7e to ensure intensive soil conservation measures and practices are in place.

Sediment, phosphorus and faecal bacteria

Our intent: Minimise transport of sediment, phosphorous and faecal bacteria to water bodies.

GMP: Identify risk of overland flow of sediment and faecal bacteria on the property and implement measures to minimise transport of these to waterbodies.

Implementation guidance:

- Identify, record and manage risk to and from critical source areas such as wallows, bank erosion, pugging, trampling or slips on steep hillsides to minimise or eliminate sediment entering waterways.
- Where appropriate use methods to minimise or eliminate sediment entering waterways such as:
 - vegetated buffer strips/riparian planting adjusted in width for slope, hydrology, bank stability, land use and proximity to critical source areas;
 - sediment traps;
 - paddock contouring;
 - earth bunds;
 - raised headlands.
- **Deer** - Fence pacing considerations:
 - Maintain appropriate feeding levels to reduce stress and fence pacing.
 - Identify the best stock class to fit the soil types to minimise the risk of soil erosion, as identified in the Deer Farmers Landcare Manual.
 - Maintain pasture length in winter or wet periods, to prevent soil being washed off in heavy rain. In particularly vulnerable areas retain tussock cover or native vegetation to regulate water runoff and to reduce risk of soil loss particularly in gullies or along riparian margins.
 - If fence pacing is bad, fill in area and re-sow or plant with trees and if damage is extreme, re-fence to remove the problem area. If fence pacing continues, review fence placement as this can be a contributing factor.

GMP: Locate and manage farm tracks, gateways, water troughs, self-feeding areas, stock camps, wallows and other sources of run-off to minimise risks to water quality.

Implementation guidance:

- Locate and design laneways so that run-off is filtered by a vegetated strip. Design and manage laneways to minimise water ponding, excessive effluent build-up and erosion.
- In areas exposed to wind erosion, establish shelter belts with trees that will filter the wind and provide added shade and shelter.
- On tracks, allow for cut-offs and slumps that will take the run off away from streams.
- **Deer** - wallow considerations:
 - Identify natural springs and wallows prior to cultivating paddocks and pipe or drain into retired areas;
 - Provide a suitable area away from waterways for safe wallowing.

GMP: To the extent that is compatible with land form, stock class and intensity, exclude stock from waterways.

Implementation guidance:

- Plan and prioritise waterway areas (including wetlands) to fence, based on the vulnerability of the land, significance of the waterway and potential to impact on water quality off-farm.
- Exclusion of extensively farmed stock from waterways in hill and high country areas may not be practical but rather a mix of mitigations and practices can be used to minimise sediment and faecal bacteria losses from farms.
- Actively manage stock, stock density and stock classes adjacent to waterways to reduce risks to water where fencing is not practical.
- Exclude stock from significant waterways, drains and significant wetlands.
- Locate and manage crossing of waterways so it will not result in degradation of those waterways.
- Provide alternative stock-water sources away from waterways where possible.
- Provide shade and shelter away from waterways where appropriate.
- Place salt blocks and supplementary feed away from riparian margins.
- Leave an appropriate buffer depending on slope, to filter runoff, even if only temporarily during vulnerable periods.
- During high risk periods for erosion e.g. winter grazing, fawn weaning, actively manage stock to prevent slumping, pugging or erosion.

GMP: Monitor soil phosphorus levels and maintain them at or below the agronomic optimum for the farm system.

Implementation guidance:

- To determine the level of phosphorus fertiliser needed, conduct regular, on-going soil testing (Olsen P or an equivalent, recognised soil test) at the block scale to monitor trends, patterns and the impacts of nutrient management decisions.
- Leave an unfertilised strip as a buffer zone beside creeks, drains and storm water flood zones. Allow more distance as slopes become steeper.

PLANTS

Nutrient management

Our intent: Balancing the application of nutrients to match plant requirements and minimise risk of losses.

GMP: Manage the amount and timing of fertiliser inputs, taking account of all sources of nutrients, to match plant requirements and minimise risk of losses.

Implementation guidance:

- Manage nutrients supplied from all sources including the soil, brought in feed, previous grazing and crops and any organic sources applied.
- Regularly soil test to identify nutrient needs, particularly paddocks that are going into crop.
- Expert guidelines, for example using crop calculators, expert agronomic advice or codes of practice should be used where appropriate.
- Nitrogen and phosphorus fertiliser is applied strategically to meet agronomic requirements, and to avoid adverse environmental impacts (e.g. strategic use around Critical Source Areas). Detailed guidelines are provided in The Fertiliser Association of New Zealand's Code of Practice for Nutrient Management (with emphasis on fertiliser use).
- Nutrient budgets as a tool to manage nutrient loss can be helpful.
- Practices such as use of side dressings and split applications may be helpful to reduce the risk of leaching and ensure greater utilisation of nutrients by plants.
- **Dairy:** All farmers have and use a predictive nutrient budget (OVERSEER®) as the basis for managing nutrients on their farm (milking platform, and any support land). Predictive nutrient budgets and nutrient management plans are developed by Certified Nutrient Management Advisors, and updated when the farm system changes. The OVERSEER® data input standards are used to create OVERSEER® nutrient budgets.

The Dairy Industry's Audited Nitrogen Management System contains recording and reporting requirements for N fertiliser on dairy farms (including milking platform, and any contiguous support land).

- **Outdoor pigs:** No NPK fertilisers are to be applied to the outdoor pig unit.

GMP: Store and load fertiliser to minimise risk of spillage, leaching and loss into waterbodies.

Implementation guidance:

- Follow fertiliser industry code of practice for fertiliser handling, storage and use.
- Locate storage sites away from waterways.

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

Implementation guidance:

- Any contractors used for fertiliser spreading should be accredited. The current industry standard is Spreadmark.
- Ensure your spreading equipment is calibrated according to its design specifications specific to the product being spread.
- Information on fertiliser applications is kept (or sought from contractors), including product, rate, date, location.

Irrigation and water use

Our intent: To apply irrigation water efficiently to meet plant demands and minimise risk of leaching and runoff.

GMP: Manage the amount and timing of irrigation inputs to meet plant demands and minimise risk of leaching and runoff.

Implementation guidance:

There is a demonstrable reason why irrigation is to be applied, for example:

- to replace soil moisture deficit
- for the purpose of herbicide activation
- to prepare soil for cultivation
- frost protection
- for fertigation

GMP: Design, calibrate and operate irrigation systems to minimise the amount of water needed to meet production objectives.

Implementation guidance:

- Any new development, upgrade or redevelopment is consistent with irrigation industry codes of practice.
- The irrigation system is evaluated annually to demonstrate optimal performance using irrigation industry guidance.
- **Dairy:** Actual irrigation water take is measured with a water meter. Soil moisture levels are tracked throughout the season to justify irrigation events, e.g. using soil moisture balance calculations or soil moisture probes or tapes.
- **Dairy:** Actual annual irrigation use is evaluated for consistency with estimated agronomic needs for the season based on climatic data and pasture/crop requirements.
- **Dairy:** Dairy sheds will use no more water for dairy shed washdown and milk cooling than is necessary to produce hygienic and safe milk (Sustainable Dairying: Water Accord). Actual water use in the dairy shed is measured with a water meter.
- **Horticulture and Arable:** Water is applied to maintain soil between stress point and field capacity - knowledge of evapotranspiration, field capacity and use of soil probes can assist in achieving this.
- **Horticulture and Arable:** Volumes applied are informed by all relevant factors e.g. crop type, plant growth stage, soil type and field capacity.

ANIMALS

Feed

Our intent: Minimise risk of contamination of waterbodies from stored feed.

GMP: Store, transport and distribute feed to minimise wastage, leachate and soil damage.

Implementation guidance:

- Design feed storage facilities to minimise wastage and soil damage, i.e. sealed or compacted surface.
- Minimise leachate generation (e.g. make silage at optimum moisture content) and prevent leachate from entering surface waterbodies, groundwater or stockwater.
- Site silage stacks so that overland flow of water from heavy rain cannot enter the stack.
- Site feed areas away from waterways.
- Distribute feed so as to minimise soil damage (from farm equipment and animals) and potential surface run-off to waterways, i.e. avoid Critical Source Areas.
- **Deer:** Make sure silage is made at the optimum moisture content to reduce possible leaching, recommended at 30% dry matter or more.
- **Outdoor pigs:** Feed diets and feed levels appropriate for the physiologic state of the animal i.e. separate gestating and lactating sow diet.

Farm effluent and wastewater management

Our intent: Minimise risk of contamination of waterbodies from stored and applied effluent.

GMP: Ensure the effluent system meets industry specific Code of Practice or equivalent standard.

Implementation guidance:

- **Dairy:** All new effluent systems are designed to Farm Dairy Effluent (FDE) Design Code of Practice. The main objectives of the system are: to capture all FDE; to spread the FDE at a time that allows uptake by plants; to uniformly spread the FDE to the desired depth, and at the desired intensity; to control FDE application to within the boundaries of the application area; to ensure that FDE systems can be operated safely; and to comply with all regulatory requirements, including consent conditions.

GMP: Have sufficient, suitable storage available to enable farm effluent and wastewater to be stored when soil conditions are unsuitable for application.

Implementation guidance:

- **Dairy:** Suitable storage is calculated using the Dairy Effluent Storage Calculator. This enables FDE to be stored when soil and management conditions are unsuitable for FDE land application. All areas that FDE is collected from are sealed (this includes feed pads). All new effluent systems are designed to FDE Design Code of Practice standard. Storage facilities are sealed and maintained to ensure containment of effluent. Storage is actively managed to ensure storage is available when required.
- **Deer:** Enclosure systems should be located and managed to minimise environmental impact of effluent. In particular:
 - Store effluent for later dispersal to land where appropriate;
 - Effluent and run-off water should not enter natural waterways untreated;
 - Solid waste should be kept away from waterways;
 - Faecal/urine surface material should be cleared annually;
 - Paddock enclosure systems should not result in significant or irreparable soil loss or erosion.

GMP: Ensure equipment for spreading effluent and other organic manures is well maintained and calibrated.

Implementation guidance:

- **Dairy:** Spreading equipment is calibrated according to its design specifications specific to the product being spread. The effluent system can apply effluent efficiently. Information on effluent applications is kept (or sought from contractors), including product, rate, date, location. The effluent system is self-evaluated annually to demonstrate optimal performance, e.g. through an application efficiency test (bucket test); see DairyNZ FDE Guide to managing FDE and Guides to operating effluent irrigation system.

GMP: Apply effluent to pasture and crops at depths, rates and times to match plant requirements and minimise risk to waterbodies.

Implementation guidance:

- **Dairy:** FDE is applied to pasture and crops at depth, rates and times to best prevent loss and to increase utilisation; area complies with consent (use OVERSEER® to calculate). Take account of nutrients supplied by effluent or manure when calculating

fertiliser requirements, e.g. use the DairyNZ FDE calculator app to determine the amount of nutrients applied. See FDE Design Code of Practice.

- **Outdoor pigs:** No effluent to be spread on the outdoor unit.

Intensive grazing

Our intent: Minimise risk of contaminant loss to waterbodies, and maintain soil structure and quality.

GMP: Select appropriate paddocks for intensive grazing, recognising and mitigating possible nutrient and sediment loss from critical source areas.

Implementation guidance:

- Where possible, select paddocks for winter grazing that are not vulnerable to pugging and compaction, do not have significant artificial drainage such as mole and tile drains, waterways, temporary streams or natural drainage channels (running in times of high rain). Choose wintering paddocks away from waterways if possible.

GMP: Manage grazing to minimise losses from critical source areas.

Implementation guidance:

- Sow crops for grazing across slopes if possible rather than up and down hills, to reduce runoff.
- Graze lower lying areas and areas closest to waterways last.
- **Deer:** Where possible, shift deer to dry, sheltered areas before wet weather arrives.
- **Deer:** Monitor animals regularly on self-feed silage pits to make sure all animals retain the required body condition score.





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