

Advanced Mitigation – Farmer Guide

Introduction

Advanced Mitigation (AM) describes a set of on-farm practices for Irrigation and Nutrient Management areas. The practices can be implemented by ALIL shareholders to improve water use efficiency and reduce N surplus beyond the standards expected by the industry agreed Good Management Practice (2015), while remaining cost-neutral or beneficial to a typical farm.

The outcomes were developed in consultation with MHV Water Ltd and Barrhill Chertsey Irrigation Ltd, industry experts and farmers.

Key Principles of Advanced Mitigation:

- A property is an “A” audit grade (Good Management Practice).
- Cost-neutral or beneficial to a typical Mid-Canterbury farm.
- Developed to improve environmental footprint of typical Mid-Canterbury farms.

Why Advanced Mitigation?

Some farms or parts of farms, have a higher risk of nitrogen loss compared to others and Advanced Mitigation expects more to be done to address those risks.

Where a property’s overall grade is audited as ‘Advanced Mitigation,’ the scheme can report a lower nitrogen loss for the property and therefore a lower nitrogen loss for the scheme, which contributes to target reductions.

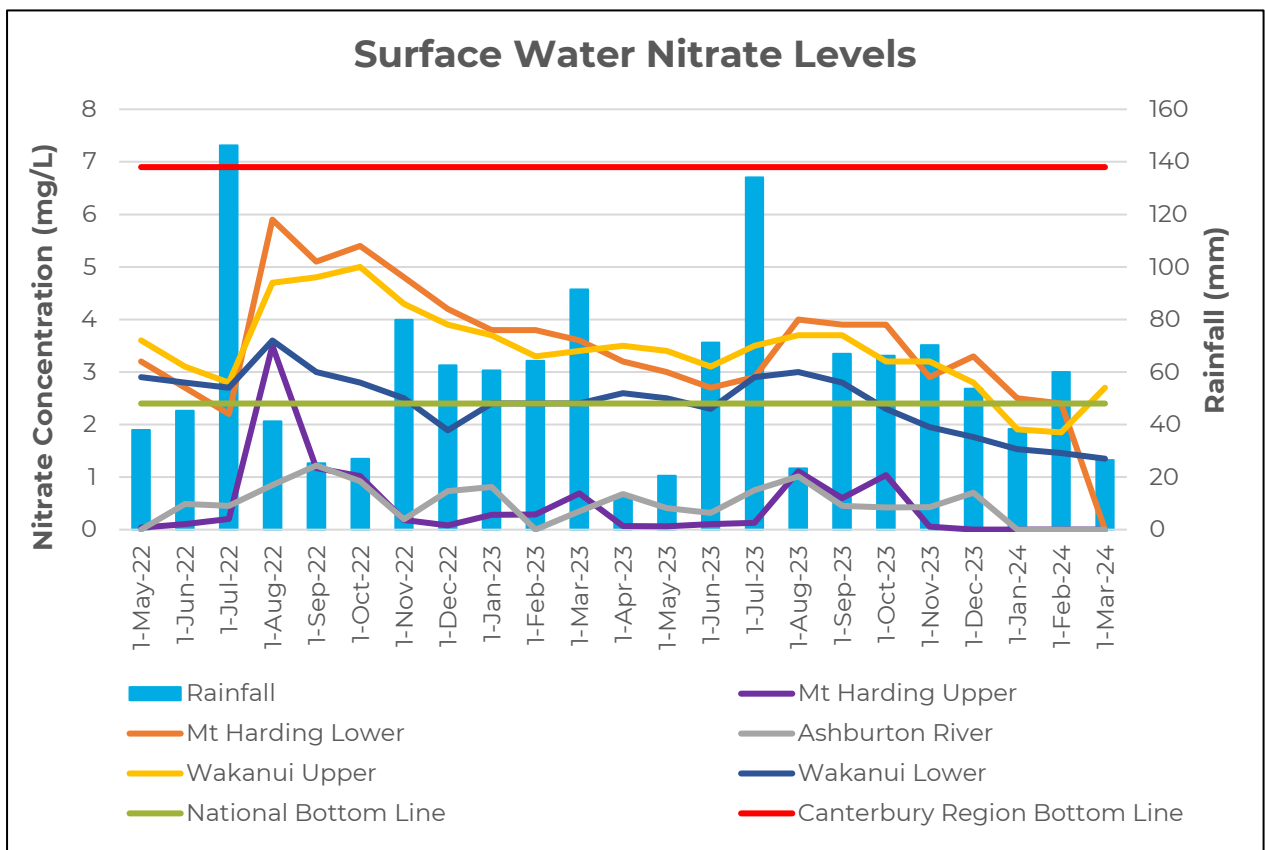
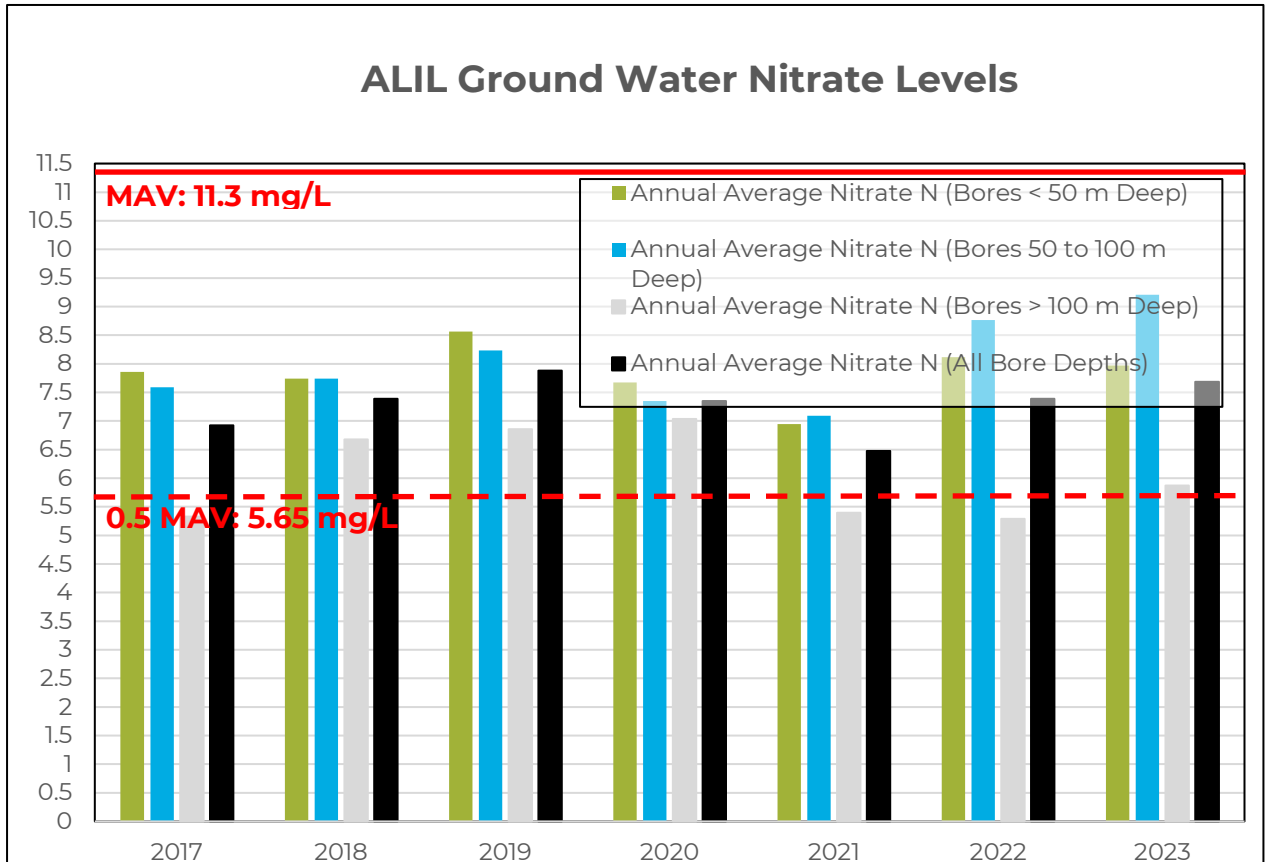
ALIL Reduction Targets

- **10%** reduction from 2020 nutrient load
- **20%** reduction from 2020 nutrient load

Water Quality Update

The water monitoring completed by ALIL is a key component to the operation of the scheme. ALIL have five years to determine a baseline from this data. Water quality needs to show improvement from the baseline, otherwise a response and remediation plan is required. ALIL are currently in the second year of water sampling and shareholders need to be continuing to implement practices to improve water quality.

The below graphs show the nitrate levels measured within the groundwater and surface water monitoring area.



Advanced Mitigation Irrigation Management

Drainage from irrigation or rainfall moves nitrogen available to plants in their root zone to our groundwater system. Refining your irrigation system and management practices reduces your water costs, wear and tear on your irrigation system and replacement costs of nutrients.

Irrigation Target 1 – Irrigation Scheduling

Outcome: *To minimise water use and drainage during times of high nitrogen loss risk, irrigation water is applied so that the timing and depth targets crop requirements and optimises capture of rainfall to minimise drainage.*

- **Efficient System**

95% of the irrigated area utilises a system which:

- Has a bucket test or full performance test demonstrating 80% distribution uniformity or better;
- The minimum return period is frequent enough to ensure field capacity is not exceeded.

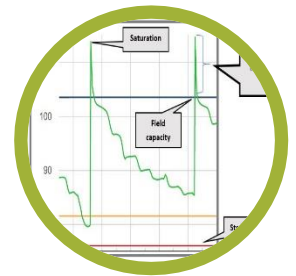


- **Differential Irrigation**

Irrigation system able to vary application by irrigation management zone on 95% of irrigated area on the property.

- **Strategic Irrigation Scheduling**

Optimise rainfall, predominantly through strategic management of irrigation-by-irrigation management zone and demonstrate an understanding of the soil moisture and weather forecast.



- **Accuracy of Tools**

Irrigation system and scheduling tools are maintained to optimise accuracy in application.

Irrigation Target 2 – Irrigation Training

Outcome: *The irrigation manager(s) understands the relationship between the irrigation system, soil, and climate in order to achieve the irrigation management requirement.*

- **Training**

All irrigation manager(s) are trained to understand the property's irrigation system and its limitations in line with the ALIL training template.



- **Understanding**

All irrigation manager(s) can articulate reasons for steps taken to minimise risk of drainage by irrigation management zone.

Advanced Mitigation Nutrient Management

A build-up of nitrogen in your soil profile runs a risk of being lost to groundwater the next time it rains. Every farm is different and understanding why nutrient fertility varies on your property means you can target your fertiliser plan and applications accurately, cutting back or adding more where it matters most to improve your farm's profitability.

Nutrient Target 1 – Fertiliser Management

Outcome: *To lower soil nitrogen surplus from higher risk and land use activities and to reduce leaching of nitrogen, fertiliser is applied based on the variability of soils and crop health throughout the season both within paddocks and between paddocks.*

- **Base Soil Fertility**
Soils have sufficient base fertility to optimise plant yield and existing nitrogen remaining in the soil is accounted for when making fertiliser application decisions.
- **Identification of variability**
Property has assessed and identified sources of variability on their land.
- **Targeted Application**
Fertiliser applications are targeted to meet the need of a plant, and account for variability both within and between paddocks.
- **Adaptive Management**
Plant growth and performance is monitored throughout the season, with fertiliser plans adapted in response to realised growth.



Questions to consider for achieving Advanced Mitigation:

- *What drives variability in soil fertility or production on my property?*
- *What information do I use to plan for the coming season's fertiliser requirements?*
- *How do I know if the information shows if there are changes in fertility within and between paddocks?*
- *How do I account for variable soil fertility in my fertiliser plan? OR, Can I manage things differently to reduce variability?*
- *How do I know if my pasture or crop is performing as I planned?*
- *What actions do I take if the season pans out differently to what I expected?*
- *How do I know my fertiliser management has achieved results (or desired results)?*
- *What could be done differently next season?*
- *What information do I have to show there is no variability across my farm?*

Advanced Mitigation Nutrient Management

Reducing nitrogen surplus on your property reduces the chance of excess nitrogen you have paid for, getting lost to groundwater when it gets wet.

Nutrient Target 2 – Nitrogen Surplus Reduction

Outcome: *To improve nitrogen fertiliser utilisation, reduce soil nitrogen surplus and lower the risk of nitrogen leaching and increase nitrogen uptake from the soil by optimising pasture and crop growth.*

- **Risk Assessment**
Property has completed a risk assessment to understand and quantify nitrogen brought into and removed from the system, how it is stored in the soil and when and how it is likely to be lost to the environment.
- **Pasture or Crop N Uptake Optimised**
Pasture and crop is managed to optimise uptake of N from the soil.
- **Applicable Nitrogen Loss Mitigations**
Tools and techniques to minimise nitrogen surplus are implemented.

Example Mitigations:

- Early culling where possible
- Mixed pasture swards (e.g. plantain)
- Catch crops utilised after winter crops
- Low nitrogen feeds in Autumn
- Effluent accounted for with fertiliser applications
- Available nitrogen in soil tested
- Less nitrogen fertiliser used in less productive areas of paddock
- Base soil fertility sufficient not to limit plant growth



Tamlaght Farm Ltd is a dairy farm owned by Colin & Paula Glass, contract milked by Ronald and Jane Kidayan with their farm team, Reque and Sam. Below is an outline of the key parameters of the property.

Tamlaght Farm Overview	
Area	Total: 219 hectares Effective: 210 hectares Dairy Platform: 185 hectares
Farm System	Dairy farm peak milking 670 cows through a 40 aside herringbone. Part of the herd is wintered on farm on fodder beet with the remainder of the herd wintered off farm.
Irrigation	180 hectares irrigated by pivots and sprinklers
Soils	Mayfield moderately deep, well drained silty loams Eyre shallow, well drained, silty loams

Tamlaght Farm Ltd was graded Advanced Mitigation for their audit in January 2024. Auditor comments included the thorough identification and consideration of the on-farm environmental risk from farming activities that has enabled development and implementation of appropriate management strategies. The management strategies were supported by sound documentation and records which allowed a high level of confidence that on-farm environmental risks are minimised. Examples of practices used to achieve Advanced Mitigation are described below.

Irrigation Target 1 & 2 – Irrigation Scheduling & Training

- Efficiency calculation for Mayfield soils = 50mm and Eyre soils = 46mm (Irrigation efficiency = Soil Profile Available Water x 0.5/0.8). K-lines apply 26mm per 24 hours and operate on an 8–10 day rotation. Therefore, current irrigation applications are less than this, reducing risk of drainage events.
- Irrigation infrastructure is set up to allow changes in irrigation rates per crop requirement. This is done by manually stopping and starting irrigation systems if required (i.e. crops grown under pivots). This management practice is used when fodder beet is in early growth stages.
- Tools used to help schedule irrigation include a combination of soil moisture probe data, visual assessments and weather forecasts.
- Irrigation operator can clearly articulate how irrigation decisions are made and the relationship between soil moisture, crop requirements, soils and weather forecasts are clearly understood and shown in record keeping. The farm owner and manager regularly discuss irrigation decisions together, particularly in the shoulders of the season.

Nutrient Target 1 – Fertiliser Management

- Clear long-term nutrient data available. A block is soil tested annually with the whole property tested every five years.

- Variability both between and within paddocks has been identified as caused by variations in soil types. It has been identified that with this variability, there is minimal difference in production/grass growth.
- Pasture walks occur weekly in the spring and fortnightly in the peak of the season. The Spring Rotation Planner is used by the contract milker for grazing management. The farm consultant walks the farm during visits and discusses grass growth/production with the contract milker.
- The farm's dryland area received the same amount of nitrogen fertiliser due to the heavier soil and the area has a strong grass growth production. However, during dry/drought conditions, less nitrogen is applied.
- Effluent applications are also included as part of the fertiliser management on farm.
- Farm owner makes fertiliser decisions and follows a Nutrient Management Policy.

Nutrient Target 2 – Nitrogen Surplus Reduction

- Nitrogen loss risks are higher in the autumn and winter. The risk is managed by increasing the grazing rotation and reducing the requirement for supplementary feed.
- Grazing rotations are changed throughout the season, a high pasture cover is required in the winter due to a quick calving time frame (targeting 2400-2500kgDM/ha at the start of calving – currently 2170 kg DM/ha). Extending the grazing rotation improves nitrogen efficiency. An Autumn Grazing Management Plan is followed. It is noted that the pasture mix on farm is only diploids, the reason behind this is that tetraploids have less resistance to pugging and diploids have a higher growth rate which is crucial in the spring.
- Cows are progressively drying off from the start of March and are all dried off by 25th May. In addition to this the milkings are changed to 3 in 2 milkings by mid March.
- Cull cows are sent off farm from late summer onwards (e.g. 40 in February, 40 in March and the last 40 in April). Destocking occurs aggressively through autumn to reduce the feed demand and reduce stocking rate at the high risk months of leaching. This also decreases the supplementary feed requirement during autumn (no purchased supplement is used in the autumn). The supplementary feed imported for the 2022/23 season was 225t DM (0.3t DM/cow) (including wintering supplement).
- Tight calving in spring. Six-week in calf rate this year was 71% (some years this has been as high as 80%). Calving starts at the end of July (including both heifers and cows). Majority of milk production is done before Christmas.