

Waimakariri Irrigation Limited

Overseer Nutrient Budget Policy

Contents

| | |
|--|---|
| 1. Introduction | 2 |
| 2. Purpose | 2 |
| 3. Nutrient Budget Requirements..... | 2 |
| 3.1 Overseer for FEP Audits | 2 |
| 3.2 Change on Farm | 2 |
| 3.3 Farms where Change has not Occurred..... | 3 |
| 3.4 Monitoring of WIL PA Equivalent Farms (Schedule C)..... | 3 |
| 4. OverseerFM Protocol..... | 3 |
| 5. Review and Sign Off | 3 |
| 6. Appendices..... | 4 |
| Appendix 1: No Farm System Change Summary Report..... | 4 |
| Appendix 2: WIL Nutrient Budget Consistency Protocol (May 2024)..... | 6 |

1. Introduction

WIL holds a nutrient discharge consent, CRC184861, this consent will be replaced by renewal consent **CRCXXXXXX**. Both the existing nutrient discharge consent and proposed new discharge consent use OverseerFM as the basis for monitoring nitrogen loss by the scheme.

All Overseer modelling or farm information returns are required by 31 August annually.

2. Purpose

The purpose of this Policy is to ensure Shareholders and Waimakariri Irrigation Limited (WIL) meet their respective obligations under WIL's resource consents, by ensuring that all nutrient budgets are prepared on a consistent basis and in a timely manner.

3. Nutrient Budget Requirements

Overseer modelling is required in the following instances:

- Annually
- If there has been any change or any proposed change to the farm system that may impact nitrogen losses (section 3.2)

If the property is a WIL PA Equivalent Farm (Schedule C) a Farm Data Collection Form (Appendix 1) can be substituted for Overseer if the shareholder wishes.

On a Schedule A property, if there has been no change occur since the previous Overseer modelling was completed a copy of the file to the new Year End within OverseerFM is acceptable accompanied with a Farm Data Collection Form (Appendix 1).

All Schedule A properties OverseerFM account annual subscriptions need to be paid even if there has been no change to the farm system. This is to allow WIL to update the nitrogen baseload during September annually, and to report on cumulative scheme nitrogen losses compared to our limits.

3.1 Overseer for FEP Audits

All shareholders are required to have an up to date OverseerFM nutrient budget completed prior to the FEP audit, this OverseerFM nutrient budget must not be a copy. The WIL environmental team will be assessing this when FEP audits are being booked. The nutrient budget will be made available to the FEP auditor to allow them to assess compliance with the farms nitrogen load limits.

3.2 Change on Farm

It is expected that an updated Overseer model will be completed if there has been any change or if any change is proposed to the farm system that may impact nitrogen losses. In a lot of these scenarios, the change is likely to result in a Land Use Change application being required (refer to the Land Use Change Policy), please contact the WIL Environmental Manager to discuss. The definition of change within WIL is consistent to the definition of change detailed by ECan in the 'FEP Auditor Guidance Nutrient Objective 2' document. Change triggering the need for Overseer modelling includes;

- Increase in irrigation area
- Change in irrigation application rate or volume affecting more than 10ha

- Change in crop area (winter grazed crop as well as arable crops)
- Change in dairy cow numbers of 5%
- Change in all other cow numbers of 10%
- Change in animal species ratio for mixed livestock farms of 20%

3.3 Farms where Change has not Occurred

In situations where there has been the same farm system continued from one season to the next there is no need for a new Overseer model to be completed. If no change has occurred, WIL will require a simple ‘summary of the farm system’ return as per Appendix 1. Once this has been returned and assessed by WIL, the previous Overseer modelling will be copied to the new year end slot within OverseerFM.

3.4 Monitoring of WIL PA Equivalent Farms (Schedule C)

It is important WIL still monitor properties that fall within this category to ensure intensification is not occurring that could put the WIL nutrient discharge consent at risk. Farms within the category must not exceed 50 hectares of irrigation or 5 hectares of winter crop. There are two options for properties within this farm category:

- 1.) Complete annual Overseer modelling by 31 August as per the requirements discussed in this policy, or
- 2.) Complete an annual Farm Data Collection form (Appendix 1) to be submitted to WIL. Note this option is only available if the farm can adhere to the WIL PA Equivalent Farm area thresholds (50 hectares or less of irrigation or 5 hectares or less of winter grazing).

4. OverseerFM Protocol

The OverseerFM account must be set up with WIL having administration rights with the Shareholder as the account owner. All Nutrient Budgets must be completed with consistent modelling and in a format and to a standard that meets WIL requirements, as may be notified by WIL from time to time. Nutrient Budgets must be completed or reviewed by a consultant who has completed the Massey University “Advanced Nutrient Management” course, or equivalent. Overseer modelling inputs must follow the WIL Nutrient Budget Consistency Protocol (May 2024) as per Appendix 2. All Overseer modelling or farm information returns are required by WIL by the end of August every year.

5. Review and Sign Off

This policy will be reviewed every two years, unless changes are triggered through the annual review of the Environmental Management Strategy or Water User Agreement.

| Revision | Status | Date | Prepared by | Checked | Approved |
|----------|--------|------------|-----------------|------------------------|----------|
| v2 | Draft | 08-10-2024 | Ben Howden (EM) | WIL Board of Directors | |
| v3 | Draft | 20-11-2024 | Ben Howden (EM) | | |
| | | | | | |
| | | | | | |
| | | | | | |

6. Appendices

Appendix 1: No Farm System Change Summary Report

| | | Previous Modelling Inputs | Overseer | Most Season Inputs | Recent Farm |
|---|--|---------------------------|----------|--------------------|-------------|
| What season was the most recent Overseer modelling completed for: | | | | | |
| Fertiliser | Total kg N used | | | | |
| | Kg N/ha used on pasture | | | | |
| | Total kg P used | | | | |
| Irrigation | Total area | | | | |
| | Gun area | | | | |
| | Roto-rainer area | | | | |
| | Lateral Move / Pivot area | | | | |
| | K-line / sprinkler area | | | | |
| | Fixed grid area | | | | |
| Grazed Winter Crop | Total area of winter crop | | | | |
| | Brassica area and type | | | | |
| | | | | | |
| | Other winter grazed crop area and type | | | | |
| | | | | | |
| Cattle on Farm | Kg of milk solids | | | | |
| | Peak milking cow numbers | | | | |
| | Predominant cow breed and weight | | | | |
| | Winter grazed cows | | | | |
| | Winter grazed in calf heifers | | | | |
| | Winter grazed R1's | | | | |
| | Average monthly grazed cow numbers outside winter | | | | |
| | Average monthly grazed heifer numbers outside winter | | | | |
| Average monthly grazed calf numbers outside winter | | | | | |
| Cattle general comment | | | | | |
| Sheep on Farm | Number of ewes lambbed | | | | |
| | Number of rams on hand | | | | |
| | Lambing rate | | | | |
| | Replacement rate (grazed on) | | | | |

| | | | |
|------------------------------|---|--|--|
| | Lambs purchased | | |
| | Lambs sold | | |
| Sheep general comment | | | |
| Deer | MA Stags | | |
| | Replacement Stags | | |
| | MA Hinds | | |
| | Replacement Hinds | | |
| Deer general comment | | | |
| Farm Infrastructure | Feed pad use | | |
| | Effluent discharge method and area | | |
| Supplement Fed | Grass baleage / silage | | |
| | Oat baleage / silage | | |
| | Lucerne baleage / silage | | |
| | Straw | | |
| | Hay | | |
| | Grain | | |
| | PKE | | |
| Other | | | |

Appendix 2: WIL Nutrient Budget Consistency Protocol (May 2024)

| | | |
|-------|---|---|
| 1 | Table of Contents | |
| 2 | Background | 1 |
| 2.1 | Scope | 2 |
| 3 | General Requirements | 2 |
| 4 | Other Requirements | 2 |
| 4.1 | Reporting Year | 2 |
| 4.2 | Acceptable Area Variation | 2 |
| 4.3 | Nutrient Allocation Zones | 3 |
| 4.4 | Averaging Year-End Data | 3 |
| 4.4.1 | Irrigation Inputs | 4 |
| 4.5 | Years In Pasture | 4 |
| 4.6 | Soil Blocking | 4 |
| 4.6.1 | Consistency with Previous Nutrient Budgets | 4 |
| 4.6.2 | Within Farm Management Block (where FM mapping tool is not used) | 4 |
| 4.6.3 | Where Farm Management Block is less than 10% of Farm Area (where FM mapping tool is not used) | 4 |
| 4.7 | Fodder Crops | 5 |
| 4.8 | Plantain | 5 |
| 4.9 | Workarounds | 5 |
| 4.9.1 | Process if workaround is required: | 5 |
| 4.9.2 | Common Errors in Overseer Version 6.5.4 | 5 |

2 Background

WIL's discharge consent, CRC184861, requires the total loss of nitrogen (N) for all properties covered by the consent to be reported annually to Environment Canterbury to ensure the scheme is farming within required limits.

The reporting requirement is being done on an aggregated basis and no individual data is provided to Environment Canterbury.

WIL is currently in the process of renewing the discharge consent, as such, it is important all properties covered by the discharge consent supply Overseer nutrient budgets for the year ending 2024, with the end month consistent from year to year. These nutrient budgets will be used in the consenting process.

As Overseer is first and foremost a farm systems model, not a regulatory tool, many modelling inputs can be subjective and rely on the judgement of the modeller to apply the most applicable option. When used in a regulatory context, different approaches, while valid, can make it challenging to compare outputs from one nutrient budget to the next.

2.1 Scope

The nutrient budget conventions detailed in this document have identified common areas of nutrient budget modelling where subjective assessments may be required in OverseerFM version 6.5.4 and establish an agreed approach to ensure nutrient budgets prepared for WIL requirements are consistent and comparable. These protocols may be updated at any time to align with updates to the OverseerFM model.

3 General Requirements

- Any nutrient budget prepared for WIL requirements is to align with the most recent [OverseerFM User Guide](#).
- Nutrient budgets are to be prepared by suitably qualified personnel, such as a Certified Nutrient Management Advisor or equivalent.
- Where practicable, OverseerFM nutrient budgets are to be blocked using the mapping function, with default soils and climate details used.
- If “workarounds” are used, a copy of the original input file(s) is to be made and clearly labelled, changes made are to be documented in the “comments” section of the applicable nutrient budget.
- All farmed areas covered by the WIL discharge consent must be in an Overseer nutrient budget. Maps of the blocks have been provided to each shareholder and will be made available to you.
- Nutrient allocation zones are to be split to allow for analysis of each zone, see below and chapter 8 of the LWRP.
- Ensure WIL has admin access to each OverseerFM account.
- Nutrient budgets must be completed by no later than the end of August.
- In the Farm Identifier field please enter the WIL Farm ID, this information has been provided to the shareholders and is available upon request.
- Once completed, copy the model to the relevant Year End slot.
- Once in the Year End slot the Overseer model needs to be published to WIL, and email notification and/or reports are to be sent to compliance@wil.co.nz.
- When publishing please enter the WIL Farm ID (refer to the shareholder information that has been sent) in the Publishers Farm Identifier field.

4 Other Requirements

4.1 Reporting Year

When comparing nitrogen losses between nutrient budgets, the end month of the reporting year shall be consistent between the budgets.

4.2 Acceptable Area Variation

In general, minor variance in total area, effective area, winter grazing, effluent area and irrigation area by type is unlikely to significantly impact on the nitrogen loss calculation for a property.

Provided the areas are within 5% (up to 10 ha) of the GIS mapping supplied to each shareholder, then the nutrient budget is acceptable.

Exceptions: Key exceptions include:

1. Where the nutrient budget has been provided to assess the impact of a Land Use Change. For instance, if there is a proposal to increase irrigated area, the nutrient budgets must precisely reflect that change.
2. If the nutrient budget will be used for other regulatory requirements.

4.3 Nutrient Allocation Zones

There are five nitrate priority sub-areas and one zone that does not require reductions as per the LWRP (chapter 8) within the Waimakariri Catchment. As part of WIL’s discharge consent renewal it is important that these zones are clearly blocked and labelled in Overseer modelling to allow for sub-catchment scale analysis and compliance reporting.

| Nitrate Priority Sub-area (see Planning Maps) | Farming type | Cumulative percentage reductions in nitrogen loss and dates by which these are to be achieved | |
|---|--------------|---|-------------------|
| | | By 1 January 2030 | By 1 January 2040 |
| Sub-area A | Dairy | 20% | 30% |
| | All other | 5% | 10% |
| Sub-area B | Dairy | 20% | 30% |
| | All other | 5% | 10% |
| Sub-area C | Dairy | 20% | 30% |
| | All other | 5% | 10% |
| Sub-area D | Dairy | 20% | 30% |
| | All other | 5% | 10% |
| Sub-area E | Dairy | 20% | 30% |
| | All other | 5% | 10% |

4.4 Averaging Year-End Data

Overseer is a farm system modelling tool and assumes average climate and rainfall information for a farm. When preparing a Year-End nutrient budget or Farm Scenario, it is important inputs reflect the “average” farm system, not seasonal anomalies. Examples of where it is appropriate to average data are detailed in Table 1.

Table 1: Examples of when Averaging Farm Data is Applicable

| Averaging of Year-End Data | |
|---|---|
| <i>Note where averaging of data has been used, details should be included in the nutrient budget comments section and/or supporting email.</i> | |
| Examples of Averaged Data | Not Averaged |
| <ul style="list-style-type: none"> Irrigation – exclude any irrigation events which appear to be abnormalities, e.g. Irrigation events in shoulder months, where it was exceptionally dry, and water was available. Alternatively, include any irrigation events that could not occur for some reason (irrigation restrictions, wet conditions). Fertiliser – Exclude fertiliser inputs which are seasonal abnormalities (E.g. May/Aug) Crop Yields and Harvest Dates – use average yields and harvest dates where climatic conditions were unusual. Exceptional Circumstances – for instance if a property held onto or destocked for a season due to M.bovis, or lack of availability at the meat works, use data from the previous seasons to generate a representative N loss | <ul style="list-style-type: none"> Stock Numbers – refer to exceptional circumstances. Crop Rotations |

4.4.1 Irrigation Inputs

If the farm has soil moisture measurement hardware installed, this is to be selected as the tool (Soil Moisture sensors: probes/tapes) that irrigation decisions are made on.

4.4.1.1 Recommended Steps for Modelling Irrigation in Overseer

Step 1: Model what the farm does on average, based on information provided by the Shareholder and within the limitations of irrigation infrastructure.

Step 2: Sense Check Modelled Irrigation applications with either (in order):

1. Water use data (robust info is available from 2023)
2. IrriCalc. Average year and system capability
3. On Farm Average Irrigation Records
4. Allocated Volumes & Rates

Step 3: Adjust to within (+/-) 100mm, using decision rules within capability of irrigation system design.

4.4.1.2 IrriCalc:

- Check Climate information is the same.
- Choose Irrigation Type
- Use "Average Year"
- Adjust input/decision rules to reflect the average, provided they are within the capabilities of the irrigation system design.

Note: Differences between IrriCalc and OVERSEER – IrriCalc assumes an 80% efficiency while OVERSEER assumes a 100% efficiency.

4.5 Years In Pasture

Years in Pasture is to be averaged based on the proportion of restorative vs depletive crops in year 1. This is to be included in the supporting report or "Comments", including a note where "ryegrass seed" has been used as a proxy for other crops.

4.6 Soil Blocking

4.6.1 Consistency with Previous Nutrient Budgets

Where a nutrient budget has been prepared for setting nutrient limits, soils shall be blocked in a manner consistent to the previous budgets and any discrepancies to be noted in the comments or supporting information.

4.6.2 Within Farm Management Block (where FM mapping tool is not used)

Where multiple soil types exist within a farm management block, soil types less than 10% of the block are absorbed into the largest soil type within the same management block.

E.g. Pivot irrigated dairy platform farm management block = 100 ha, consisting of three soil types of; Temp_1a.1 (65 ha), Eyre_2a.1 (30 ha) and Lism_2a.1 (5 ha). Lism_2a.1 can be modelled with the largest soil type, Temp_1a.1.

4.6.3 Where Farm Management Block is less than 10% of Farm Area (where FM mapping tool is not used)

Where multiple soil types exist in Farm Management Blocks which make up less than 10% of the farm area, the block can be modelled using the highest risk soil type, e.g. lowest PAW.

E.g. 10 ha of dryland corners on a 150 ha farm has 6ha of a Temp_1a.1 soil and 4 ha of a Lism_2a.1 soil can be modelled as 10 ha of the Lism_2a.1.

4.7 Fodder Crops

Where a fodder crop is used as part of the pasture/re-grassing rotation (i.e. on a dairy platform) the fodder crop is to be modelled as a crop block in OverseerFM to allow for capture of the cultivation events post grazing and the same month end date as the overall model. It is useful to check how previous nutrient budgets have been prepared to maintain consistency.

4.8 Plantain

Where a farm has integrated Ecotain¹ into their pasture sward, "Plantain" may be selected as the pasture species for the applicable paddocks at the rate supported by proportion of seed sown (if within 2 years) or a recent plantain assessment using the [DairyNZ Plantain Assessment Tool](#).

Where used, the applicable evidence to support the proportion of plantain in the pasture sward should be provided.

4.9 Workarounds

"Workarounds" are inputs which are not what it appears. E.g. adjusting winter feed yields or grazing timing to overcome ME errors etc.

1. If errors arise, first re-check data and inputs (e.g. stock numbers and yields) are correct and reasonable.
2. If crops are not represented in Overseer v6.5.4 refer to the [Substitute Crops](#) help article and use the appropriate alternative. In the "Alternative Crop Name" field enter the actual crop.
3. Use the fertiliser, irrigation and yields from the actual seed crop.
4. Regenerative crops or straight chicory (e.g. multi-species animal feed):
 - When grazed like a mixed pasture, model as pasture
 - When break-fed, model as forage rape crop

4.9.1 Process if workaround is required:

Step 1: Enter model as told by Farmer.

Step 2: If error, review information provided for accuracy.

Step 3: If the error persists make a copy of the actual file and name it accordingly (Year End Original) and apply the workarounds.

Step 3: Try to make budget work within reason (balancing invoicing vs. achieving a representative file)

Step 4: Record changes and assumptions made

Where a crop proxy or workaround has been used, nutrient budget to include a supporting note in the nutrient budget "Comments" or in a supporting document to explain the variation between actual activity and modelled activity.

4.9.2 Common Errors in Overseer Version 6.5.4

Version 6.5.4 of Overseer included updates that has resulted in Feed Eaten errors. Fixes to these errors are detailed below.

¹ Note Ecotain is the only plantain cultivar approved for use as a "mitigation" by ECan.

4.9.2.1 Defoliation Events

Error commonly occurs in older arable nutrient budgets where selection of defoliation options was not available.

1. In Pasture/Crops, identify blocks with a defoliation error.
2. Go to "Edit Crops" on the blocks where error is identified.
3. Select "Crop Sown".
4. Add option in "Defoliation Management".
5. If Ryegrass, select "grazing" and assign applicable stock enterprise.
6. If unknown, confirm with the farmer.
7. Repeat for all blocks with a defoliation error.

4.9.2.2 ME Error

Error can occur in nutrient budgets with winter grazing crops.

1. Identify months where ME error has arisen in Animal Reports.
2. Adjust stock movement to earlier or later in the applicable month(s) (if possible) to match likely stock movements.
3. If ME error still not resolved, check yield estimates and align with industry averages for the winter crop.
4. Once ME error resolved, note changes made in "Comments" including original inputs which were updated.