



Release Notes – Overseer version 6.5.4

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1. Introduction

The OverseerFM model release 6.5.4 introduces several important updates intended to improve accuracy and reliability. These include changes to the calculations of net energy requirements for walking while grazing and an improved alignment with National Inventory modelling. These improvements also resolve known issues and improve model performance.

Key Updates:

- **Improved net energy modelling:** OverseerFM model now incorporates a more refined representation of net energy requirements for walking while grazing. This improvement better considers factors such as relative stocking rate and block slope, leading to a better representation of energy needs during grazing activities.
- **National Inventory alignment:** Some animal coefficients have been updated to align with those used in the National Inventory GHG modelling. This alignment ensures relativity with the national data.
- **Breeding bull breeds:** A more comprehensive list of breeds is available to be modelled for breeding bulls in a dairy enterprise.

2. Overall Impact on the OverseerFM Model

The cumulative effect of these updates is a significant improvement in overall model performance providing a more representative and reliable tool.

Figure 1 compares modelled N-leaching values with measured results in grazing system trials run across New Zealand. Comparing the results from versions 6.5.2 and 6.5.4 it can be seen that the distribution of results is more tightly aligned in the 6.5.4 results. Using the statistical analysis detailed in Moriasi et al. (2007) performance ranges from “satisfactory” to “good” or “very good” for all indicators. This improvement is clearly visible with a significant reduction in dispersion around the 1:1 line for the version 6.5.4. The methodology used to obtain these graphs is detailed in Tavernet (2023).

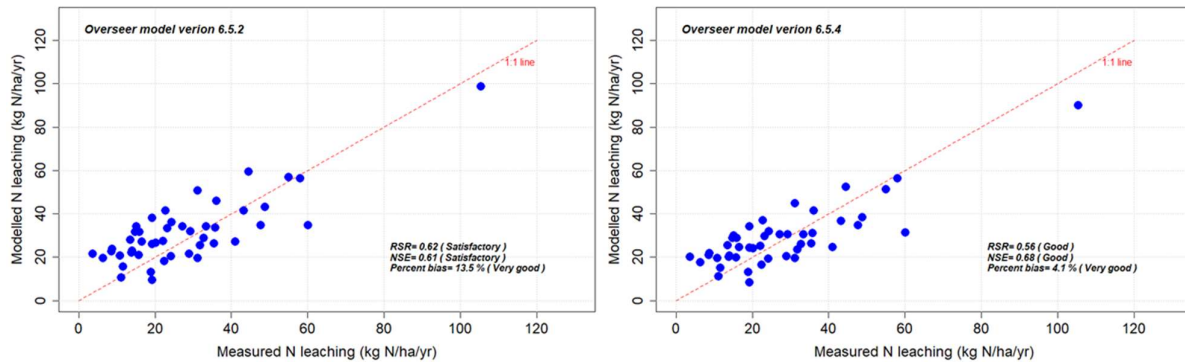


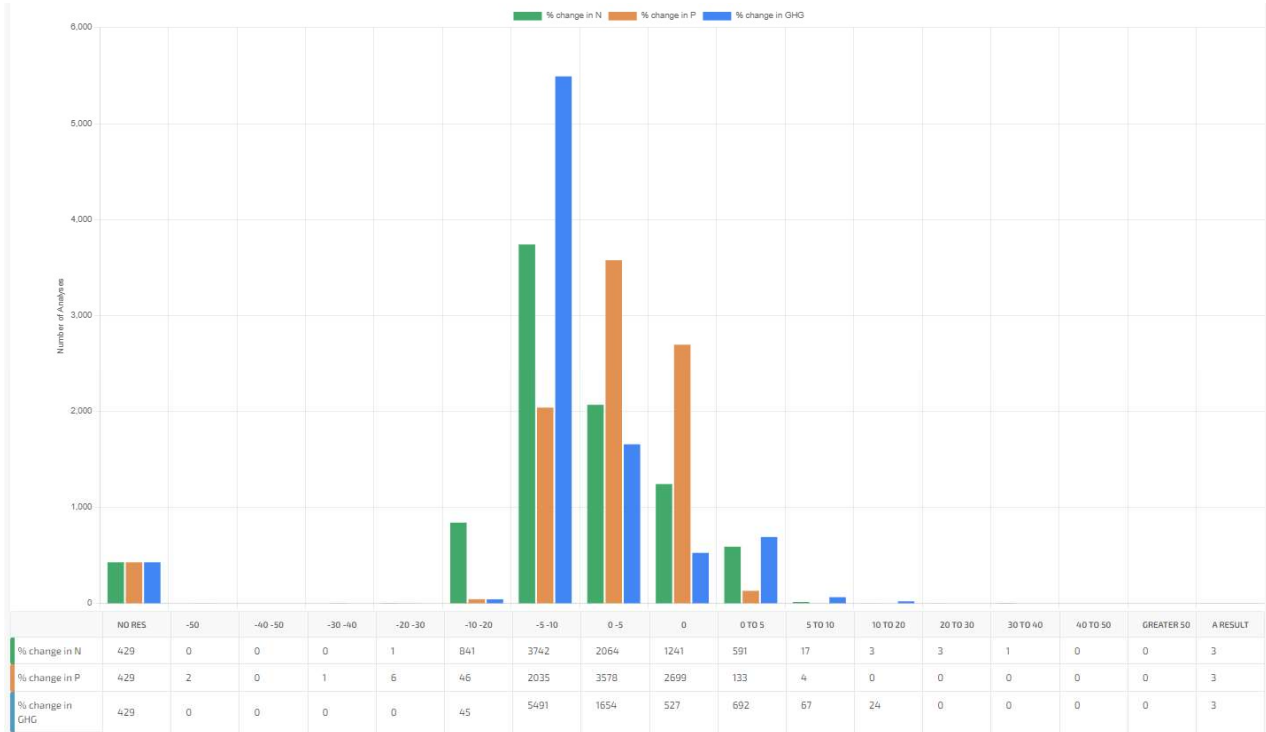
Figure 1- Comparison of experimental and modelled annual nitrogen leaching loss (kg N/ha/year) based on measured data from New Zealand paddock-scale grazing system studies and modelled using the Overseer model.

3. Impact of Change

Overall, the impact on OverseerFM results is moderate from the changes made to the model in version 6.5.4.

The impact of changes have been tested using the complete database of c.140,000 analyses, and also a smaller subset of the latest year analyses for all farms modelled in the Overseer database (c.10,300 analyses).

The following graph shows the impact of model release 6.5.4 on N, P and GHG results for the latest year-end analyses.



It should be noted that 4% of the analyses which previously had a result, now produce no result.

99.7% of these created errors are due to an overfeeding of animals. Assistance for how to resolve these errors is outlined in the 'Metabolic requirements net energy associated with walking calculation' section below.

Note: The "NO RES" column indicates the number of analyses that had a model result prior to the model upgrade but now get a model error because of the release. The "A RESULT" column indicates the number of analyses that prior to the model upgrade did not have a valid result due to a model error but now have a valid result following this release.

4. Individual changes

4a. Update gestation period to bring in line with the National Inventory

OverseerFM's metabolizable energy (ME) model has been updated to become more aligned with the Government's National Inventory modelling. To ensure relativity with the National Inventory, targeted modifications have been made, such as reducing the pregnancy gestation period for dairy, beef, and sheep Enterprises, while increasing it for deer Enterprises. These adjustments result in generally minor impacts on the required ME during pregnancy.

Impact of change: For sheep no impact on N, P and GHG results. For beef some minor (0-5%) differences in N, P and GHG results. For dairy minor differences (0-5%) in P results only.

4b. Metabolic requirements net energy associated with walking calculation

To improve the model, the approach to calculating animal energy requirements has been revised. The equation which determines animals' net energy requirements associated with walking during grazing has been updated to reflect current scientific knowledge.

This has resulted in a reduction in animals metabolic energy requirements and therefore in the required energy intakes. As a result, some animals may receive excessive feed, which can lead to overfeeding errors in the model.

Impact of change: All results are impacted with an overall decrease of 5%, 3% and 5% for the total N loss, P loss and GHG emissions respectively.

This reduction in results was expected, with the reduction in feed intake leading to a reduction in nutrient intake.

4% of analyses now produce no results. For 93% of the analyses impacted by this change the error is due to overfeeding of animals.

To resolve this issue, it is recommended to:

- Decrease the number of supplements distributed on pastoral blocks or distribute them differently over the months depending on the needs of animals as identified in the 'Animal Reports' tab within an OverseerFM analysis.
- Decrease the yield of crops destined to feed animals (fodder and forage) and to increase field loss in proportion.

To achieve the decrease, yield and field loss must be modified in the definition of crops. As an example, Figure 2 shows a 15% reduction.

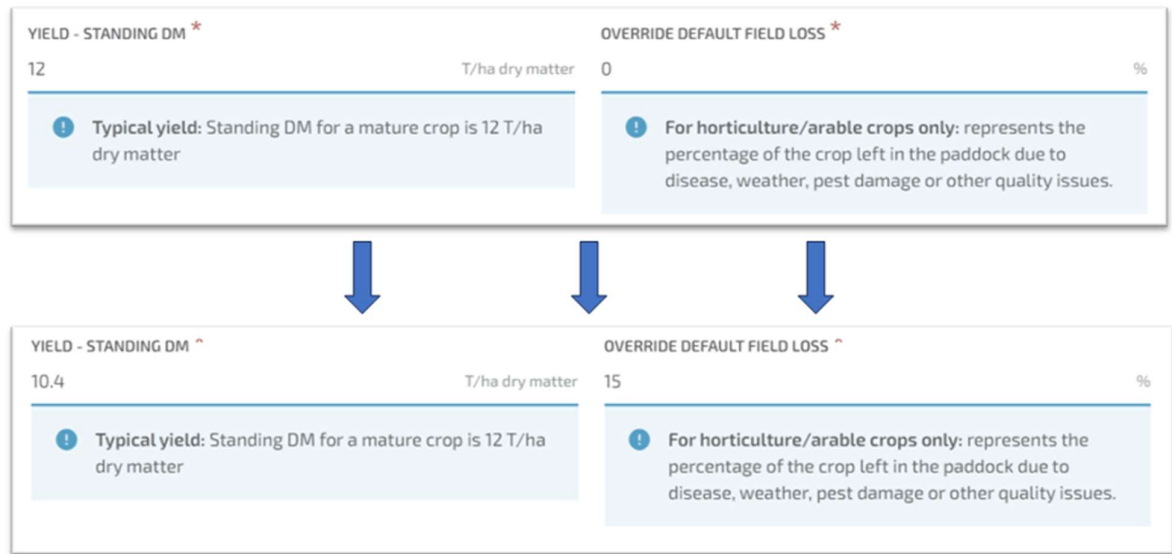


Figure 2- Example showing a 15% decrease in yield in the crop definition followed by an increase in field loss by the same value.

4c. Standard reference weight coefficient for male dairy animals

We have updated the standard reference weight (SRW) coefficients specifically for male dairy stock classes.

This refinement ensures a better representation of metabolic energy requirements.

Impact of change: N, P and GHG results remain unchanged for 99% of the analyses.

In the remaining 1%, generally when the proportion of males in the herd becomes significant (relative to females), a >5% decrease in results is observed.

4d. Expanded breed selection for dairy breeding bulls

Responding to user requests, the complete list of beef breed types have been added to the Breeding Bulls stock classes for Dairy enterprises. The full list of breeding bull breeds is now:

- Angus
- Beef Type
- Charolais
- Dairy Cross
- Friesian Jersey Cross
- Jersey
- Maine Anjou
- South Devon
- Ayrshire
- Blonde
- Chianina
- Friesian
- Hereford
- Limousin
- Simmental

Impact of change: No impact on N, P and GHG results.



References

Moriasi, D.N., Arnold, J.G., Liew, M., Bingner, R.L., Harmel, R.D., & Veith, T.L. (2007). Model Evaluation Guidelines for Systematic Quantification of Accuracy in Watershed Simulations. Transactions of the ASABE, 50, 885-900.

Tavernet, J.P. (2023). Assessment of Overseer model performance with experimental data from grazed pastures. Overseer report for MPI and can be found [here](#).