Performance Assessment of OverseerFM Version 6.5.13

2026-05-14

Introduction

OverseerFM version 6.5.13 includes a series of internal model corrections and implementation updates. To verify that these modifications did not alter the predictive behaviour of the nitrate (N) leaching model, a comparative validation assessment was conducted using established validation datasets previously employed in OverseerFM performance evaluations.

The objective of this assessment was to confirm that version 6.5.13 maintains equivalent predictive performance relative to version 6.5.12 under identical simulation conditions.

Validation Methodology

Validation datasets

Model performance was evaluated using two independent validation datasets:

- a pastoral farmlet dataset derived from experimental grazed pasture systems and previously used in OverseerFM validation studies;
- the Lincoln crop rotation dataset representing arable and mixed cropping systems.

Together, these datasets encompass a broad range of environmental conditions, management practices, and N leaching responses relevant to OverseerFM applications.

Additional information on the validation datasets and the associated performance assessment methodology is provided in Tavernet (2023).

Model comparison

Simulations were performed using:

- OverseerFM version 6.5.12 (reference version);
- OverseerFM version 6.5.13 (updated version).

All simulations used identical farm inputs, climate data, soil information, management configurations, and simulation settings. This ensured that any observed differences could only result from changes introduced in version 6.5.13.

Statistical evaluation

Model performance was assessed using statistical comparisons between measured and modelled N leaching values.

The following performance statistics were evaluated:

- Relative Standard Error Ratio (RSR);
- Nash–Sutcliffe Efficiency (NSE);
- Percent Bias (PBIAS).

Measured versus modelled relationships were evaluated using 1:1 comparison plots, where perfect agreement lies along the 1:1 reference line.

Farmlet Dataset Validation

The two figures below illustrate the relationship between measured and modelled N leaching for OverseerFM versions 6.5.12 and 6.5.13 using the pastoral farmlet validation dataset.

The statistical indicators remained unchanged between versions:

- RSR = 0.44 (Very good)
- NSE = 0.80 (Very good)
- PBIAS = 1.5% (Very good)

Performance classifications were interpreted according to Moriasi et al. (2007).

These results demonstrate that the updates implemented in version 6.5.13 did not alter the predictive performance of the N leaching model for pastotal systems.

Figure 1.

Comparison between measured and modelled N leaching for OverseerFM version 6.5.12 using the pastoral farmlet validation dataset. The dashed red line represents the 1:1 relationship between measured and simulated values.

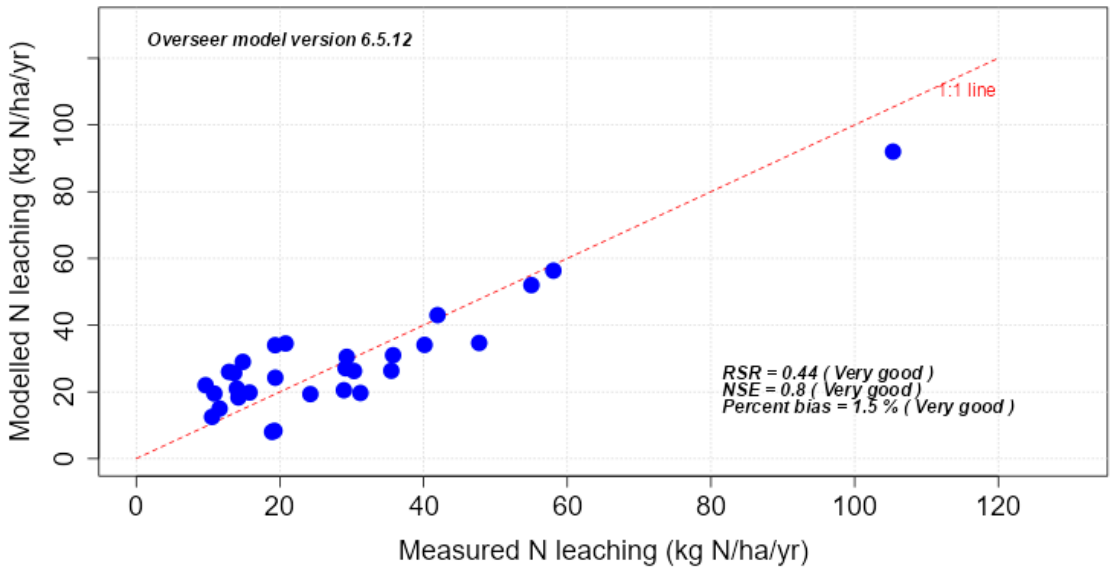

Figure 1: *Comparison of measured and modelled N leaching on pastoral system for OverseerFM version 6.5.12.*

Figure 2.

Comparison between measured and modelled N leaching for OverseerFM version 6.5.13 using the pastoral farmlet validation dataset. The dashed red line represents the 1:1 relationship between measured and simulated values.

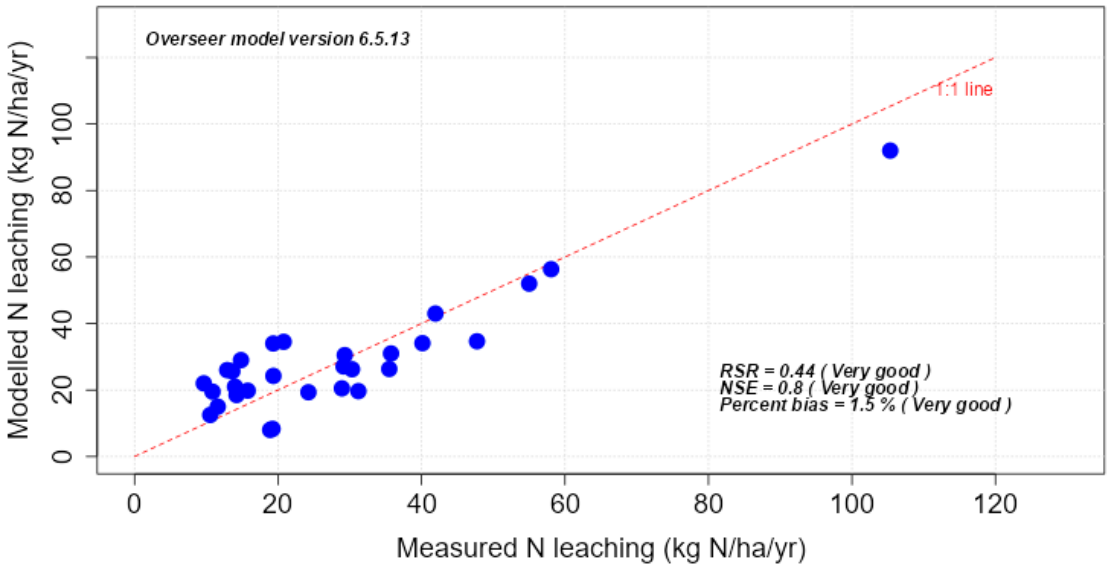

Figure 2. *Comparison of measured and modelled N leaching on pastoral system for OverseerFM version 6.5.13.*

Lincoln Dataset Comparison

A direct comparison using the Lincoln crop rotation dataset showed no differences between outputs generated by versions 6.5.12 and 6.5.13.

This confirms that the model updates introduced in version 6.5.13 did not affect N leaching performance for cropping systems.

Figure 3.

Comparison between measured and modelled N leaching for OverseerFM version 6.5.12 and 6.5.13 using the Lincoln crop rotation dataset. The dashed red line represents the 1:1 relationship between measured and simulated values.

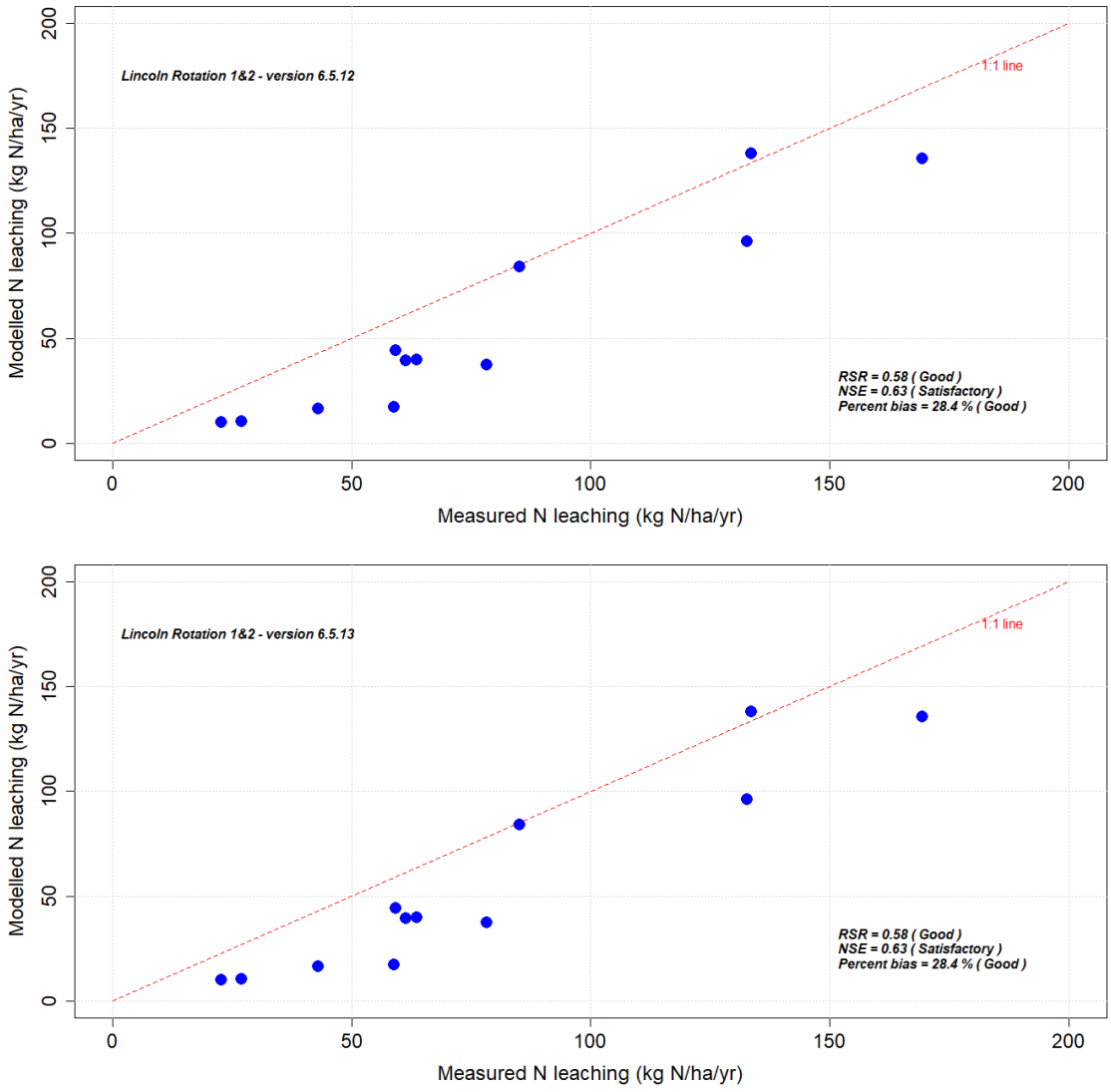

Figure 3. *Comparison of measured and modelled N leaching on crop system for OverseerFM versions 6.5.12 and 6.5.13.*

Discussion

The validation assessment demonstrates that OverseerFM version 6.5.13 preserves the predictive behaviour of previous model versions for N leaching estimation across both pastoral and crop rotation systems.

The absence of any change in statistical performance metrics indicates that the implemented corrections affect internal model processes without altering system-scale predictive performance.

The unchanged performance statistics confirm that no systematic bias was introduced by the model updates.

Maintaining consistency in predictive performance is important for ensuring continuity in:

- regulatory applications;
- benchmarking exercises;
- and scientific interpretation of OverseerFM outputs.

Conclusions

Validation against the pastoral farmlet and Lincoln datasets confirms that OverseerFM version 6.5.13 maintains equivalent predictive capability for N leaching relative to version 6.5.12.

Key findings include:

- no change in model performance statistics between versions;
- identical RSR, NSE, and PBIAS values across releases;
- no detectable systematic effect from the implemented corrections;
- no changes in Lincoln crop rotation outputs;
- preservation of scientific and regulatory continuity.

Overall, the results confirm that the modifications implemented in OverseerFM version 6.5.13 do not affect the operational performance of the N leaching model.

References

Moriasi, D.N., Arnold, J.G., Van Liew, M.W., 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(3), 885–900. https://doi.org/10.13031/2013.23153

Tavernet, J.-P. (2023). *Assessment of Overseer model performance with experimental data from grazed pastures*. Overseer Ltd. https://support.overseer.org.nz/hc/en-us/article_attachments/49053437510809