ONE NUTRIENT BUDGET TO RULE THEM ALL
– THE OVERSEER® BEST PRACTICE DATA INPUT STANDARDS

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Abstract
User selection of the OVERSEER® Nutrient Budget *(Overseer)* inputs can have a major effect on the estimates of nutrient cycling for the described farm systems and hence the reported estimates for many outputs, including nitrogen (N) and phosphorus (P) loss to water. The purpose of providing *Overseer* Best Practice Data Input Standards (the Standards) is to reduce inconsistencies between different users when operating *Overseer* to model individual farm systems. This is particularly important for the 'descriptive' inputs, but applies to those that can be quantified also. The Standards were not developed to teach users how to use *Overseer.* For any one farm, the aim is to have one base nutrient budget which best describes the way nutrients cycle into, around and out of the farm.

The Standards were developed, at the request of the *Overseer* Owners, by a Technical Advisory Group (TAG) - a group of nine technical expert users, who drew on their personal knowledge and experience plus the DairyNZ Input Protocol for their Audited Nutrient Management programme, the AgResearch Expert User Group Guidelines and the Waikato Regional Council Protocol for Variation 5 (West Taupo catchment). The Standards are the consensus view of the nine technical expert users. A wider Stakeholder Advisory Group (SAG), consisting of agricultural industry (dairy, sheep and beef, arable) representatives, regional councils, the Ministry for Primary Industries, the Ministry for the Environment and Irrigation New Zealand critiqued and endorsed the Standards.

This paper outlines the process and criteria used to develop the standards, summarise how to navigate the standards, provides examples of a few key inputs and discusses future development of the standards.

Introduction
An OVERSEER® Nutrient Budget *(Overseer)* is an agricultural nutrient management tool which models the cycling of nutrients within a farming operation; it estimates the inputs, outputs and nutrient flows of various farm management scenarios to assist users to optimise production and environmental outcomes. It estimates N and P loss and greenhouse gas emissions allowing these estimates and farm management options to be considered. The Standards are a set of guidelines to assist expert users to define data inputs that consistently achieve the most accurate nutrient budget of a farm for nutrient management purposes. The Standards have not been developed to teach users how to operate *Overseer,* but they can help educate users on what various inputs mean and their role within the model.

User selection of the inputs can have a major effect on the estimates of nutrient cycling for the described farm systems and hence the budget reports. In one case study, N loss estimates for the Lincoln University Dairy Farm varied from a baseline 35 kg N/ha using relevant

production data and *Overseer* default values from 19 to 69 kg N/ha using farm specific data including rainfall and irrigation volume and timing (Pellow *et al*. 2013).

The purpose of providing a 'best practice' Standard is to reduce inconsistencies between different users when operating *Overseer* to model individual farm systems.

The Process

In 2013, the *Overseer* owners (Ministry for Primary industry (MPI), Fertiliser Association of New Zealand (FANZ) and AgResearch) brought together a Stakeholders Advisory Group (SAG) to scope out the need for, and requirements of an input user guide. The SAG consisted of several Regional Councils (Waikato, Bay of Plenty, Hawkes Bay, Manawatu/Wanganui, Canterbury, Otago and Southland), industry bodies (DairyNZ, Beef and Lamb, Federated Farmers, Irrigation NZ, Foundation for Arable Research, Horticulture NZ), Massey and Lincoln Universities, AgResearch, Landcare Research, Ravensdown, Ballance, central government agencies (Ministry of Primary industries, Ministry for the Environment) and Fish and Game.

At an initial meeting of the SAG, the need for a set of user input guidelines was confirmed. It was established that the guidelines must:

    a. Meet the requirements of multiple users

    b. Assist the effective management of nutrients

    c. Give consistent outputs for comparable situations (and comparable results for different situations) recognising that there may be variations between farm types and regions (i.e., be fit for purpose)

    d. Be able to be continually developed to be as good as they need to be to do the required job

    e. Indicate the quality of the data as well as the predicted outcome (a rating system)

    f. Include all nutrients and emissions modelled in *Overseer* notably N, P, K, Mg, Ca and S

    g. Cover all potential land uses that can be modelled in *Overseer*

    h. Be consistent with the principles of the model including its assumptions and limitations.

To produce this guideline document, a Technical Advisory Group (TAG) was proposed by the SAG. The TAG was a group of expert users of *Overseer* lead by Ants Roberts (Ravensdown) with David Wheeler and Natalie Watkins (AgResearch), Roger Williams (FAR), Ian Power (Ballance), Derek Ryan (Horizons Regional Council), Jon Palmer (Waikato Regional Council), Richard Allen (Fonterra) and Theresa Wilson (Dairy NZ). Linda Lilburne and Trevor Webb (Landcare) were co-opted during the process to provide invaluable advice to the TAG on the soil information pages within *Overseer*. The TAG discussed and then agreed to the document title 'The *Overseer* Best Practice Data Input Standards' (Standards).

The terms of reference for the TAG were as follows:

- o To review all current protocols or protocol-type guidelines either used or in development by sectors in agriculture, local and central government

- o To define the audiences of protocols and identify their requirements from protocols

- o To design the look and feel of a Standards document and build a communication process around its promotion

- o To prepare the content of the Standards

- o To ensure that the Standards are consistent with the *Overseer* model

- o To establish principles of design so that the basis on which the Standards were developed is obvious

- o To undertake sector consultation as required to complete the task

- o To report the completion of their work to a second meeting of the SAG

- o To prepare an operational document for the use of the Standards, not a policy document.

The TAG drew on their personal knowledge plus that contained in the Dairy NZ Audited Nutrient Management Scheme (Dairy NZ, 2012), the AgResearch Expert User Group Guidelines (Unpublished) and the Waikato Regional Council's Protocol (Palmer 2013) for Variation 5 (West Taupo catchment). The Standards are a consensus of the views of the technical expert users.

Once the draft Standards document was produced by the TAG, it was circulated to all members of the SAG for commentand suggestions to improve the document. Substantial feedback was provided from individual members of the SAG, who all endorsed the use of these Standards once suggested amendments had been incorporated. The Standards were finalised in late August 2013 and were published via a number of websites in December 2013 (Overseer Management Services, 2013).

Navigating the Standards

The contents of the Standards and the order of the inputs correspond to the data entry pages in *Overseer*, to allow users to quickly find the section they require in the Standards while using *Overseer*. Where there is more than one input option, the preferred option is listed as 1, the second as 2 and so on. Figure 1 shows the hierarchical order for soil identification.

Figure 1: The hierarchical order for selecting soil type, order or group.

Most sections contain impact statements, and some sections contain additional information such as notes, guidance, warnings or justification, especially where the input choice may affect the nutrient budget in subtle ways (Figure 2).

Figure 2: Guidance on how to select Location and the significance of this to a nutrient budget

When working through the standards, some input recommendations are self-evident; where the recommendation is simply to select the best option to reflect the farm you are trying to model (Figure 3).

Figure 3: The Standards advice on entering farm structures

Furthermore, some input recommendations clarify how to choose the most appropriate inputs for those input choices which are outside the user's area of expertise. In particular, some of the more 'qualitative' inputs describing soil properties and qualities (Figure 4).

Figure 4: Describing aspects of the lower profile of soils which may be on farm

An appendix is also included with the Standards, which provides a lot of helpful and useful information about certain sections of the model i.e cropping and soils.

Changes to the Standards

The General Manager of *Overseer* encourages anyone using the Standards to provide constructive criticism of the applicability and usability of the document. As updated versions of *Overseer* are produced the owners have committed to changing the Standards to be relevant for the latest version.

References

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