

Process for inputting irrigation management into OVERSEER®

Data Entry

- a. Obtain an understanding of the irrigation system(s) in place on the property between 2009-13 (baseline).
- b. Block property with consideration of the irrigation systems during 2009-13 (i.e. decision tools in use, return interval, application depth, irrigator type). Each irrigation system is blocked separately in OVERSEER with appropriate areas.
- c. Enter irrigation system type as one of the following:
 - i. Linear and centre pivot.
 - ii. Travelling irrigator
 - iii. Spray lines
 - iv. Micro-irrigation (drip and sprinkler)
 - v. Solid set
 - vi. Controlled flood
 - vii. Border Dyke
- d. In the irrigation management section choose to schedule irrigation based on "visual assessment/dig a hole".
- e. Choose the months when irrigation might be applied – remember that the OVERSEER model utilises 30 years of averaged climate data, therefore the irrigation data must also use the long-term irrigation information relevant to an 'average year' as opposed to within year tactics based on a drier or wetter year. Typically, the farms will apply irrigation from October until March.
- f. Enter irrigation management by month – the farmer will provide information about how they made their decision to start and stop irrigating along with the irrigation depth applied and the return interval. Because of the way most travelling irrigator irrigation systems have been designed, it is more common for farmers to apply the same depth of irrigation (mm) throughout the season, and to alter the return interval than it is for farmers to vary the depth applied each month. The return interval must vary over the season and during the shoulders of the irrigation season (September-October and March-April). Also note the irrigation applications will be determined by the lightest soil in the irrigation run. This should be reflected in the nutrient budget.
- g. If farmer information is unavailable, then take time to understand the system in place on the farm and make assumptions based on the rate of take, length of irrigator runs and the capacity the irrigation system is designed to deliver. (i.e. many Canterbury irrigation systems are designed for between 3.5-5 mm/day).
- h. Because some properties did not have enough water allocated to them during the baseline seasons, the maximum consented volume of irrigation per hectare in the consent should not be exceeded in baseline file calculation. An exception to this is when a dairy farmer had obtained an effluent consent and a building consent during the baseline period. In these instances, it is possible to model the "operative farm system" assumed in the effluent consent, including the irrigation and cow numbers modelled as part of the application.

Key sensibility checks

- a. Consented take – convert to depth per hectare from litres per second or consented annual volume and compare with OVERSEER® block Other Values page
- b. Irrigation system specifications - instantaneous take rate, application depth and return interval.
- c. Model the depth and return interval for the most limiting factor (e.g. the water permit might limit volume available, or the irrigation system may have too long a return interval to utilise the annual volume)
- d. Check the modelled annual application depth is no greater than the IRRICALC average annual volume, plus or minus one system application depth. For example, for a rotorainer, if the IRRICALC annual volume was 600 mm/ pa, and the rotorainer application depth was 50 mm, then the annual application volume used shall not exceed a maximum of 650 mm/ pa. Similarly, for a centre pivot if the IRRICALC annual volume was 400 mm/ pa and the pivot application depth was 15 mm then the annual volume used shall not exceed a maximum of 415 mm/ pa.
- e. Check the distribution of the annual application depth approximates the IRRICALC monthly distribution. Also, for irrigation applications in September, October, March and April, check the modelled monthly application depth is no greater than the IRRICALC monthly application depth plus 25%. If the IRRICALC monthly application depth plus 25% is less than the minimum irrigation system application depth, then no irrigation application can be applied. For example, if the September IRRICALC monthly application depth plus 25% is 25 mm and the minimum application depth of a rotorainer is 50 mm then there must be no irrigation recorded in September.
- f. Irrigation events will mostly be dictated by the lightest soil in the irrigation run. Where there are two soil blocks irrigated at the same time the IRRICALC volume should be chosen for the lower WHC soil to reconcile with the other values calculated by OVERSEER. It should be noted that in practice irrigation systems with long return intervals cannot be easily altered to account for within paddock soil type variations.
- g. For crops, check that the irrigation inputs are sensible for the crop grown in the block to which irrigation water is applied (e.g. crops such as clover may require less water than pasture). Irrigation must also not be applied to bare land (unless it is required to manage soil structure/cultivation timing for which a narrative is included). Irrigation must also be removed from the month the crop is harvested - unless a narrative is included to demonstrate the reason why.
- h. Check the modelled annual irrigation depth applied does not exceed the annual consented volume.
- i. Alter application depths or return intervals accordingly until OVERSEER calculates a similar irrigation depth, with a comparable annual distribution, added to pasture (mm/yr) as supplied by IRRICALC (within one irrigation application depth)

Using IRRICALC to reconcile annual volumes and comparable annual distribution entered as a sensibility check against the OVERSEER® estimate based on the user inputs of irrigation management

- a. <http://irrimap.aqualinc.co.nz>¹
- b. Enter the GPS coordinates used in the relevant OVERSEER® block to choose the farm location
- c. Select the irrigation method
- d. Select soil water holding capacity for the lightest soil in an irrigation run and align with the PAW from S-Map (assume 600 mm depth)
- e. Select crop type as pasture
- f. Read the monthly and average annual irrigation water use in mm.
- g. Alter the depth or return interval in the OVERSEER® nutrient budget until the annual average irrigation depth reconciles with the IRRICALC annual average volume² and is consistent with points d. and e. under the 'key sensibility checks' section of this document.
- h. In the 'property description' box in OVERSEER®, enter in that IRRICALC was used, and also the relevant irrigation type, soil PAW and GPS coordinates. This ensures consent planners and FEP auditors can easily check the IRRICALC calculation, as the relevant report will often not be included with the OVERSEER® file.

Notes:

1. An OVERSEER® user will need a basic understanding of irrigation systems and the maths associated with checking these calculations and conversions.
2. A Certified Nutrient Management Advisor (CNMA) is recommended to have either completed the work or reviewed it.

¹ Do not use the Irricalc model version found at <http://mycatchment.info/> as this is outdated for Canterbury

² One of the key assumptions of Irricalc modelling is that soil is free draining. Note irrigation requirements may be less than reported in Irricalc if the soils are poorly drained or the water table is close to the soil surface.