Precision Agriculture and Wheel Track Direction

Controlled traffic has been broadly adopted across Australia to help manage the impact of compaction. Over two million hectares of Australia's cropping areas is now cropped under controlled traffic.

One of the objectives of controlled traffic is to facilitate more consistent crop production, and reduce business risk. The introduction of controlled traffic can reduce the area of the paddock covered by wheel traffic from 70% to 15% or less.

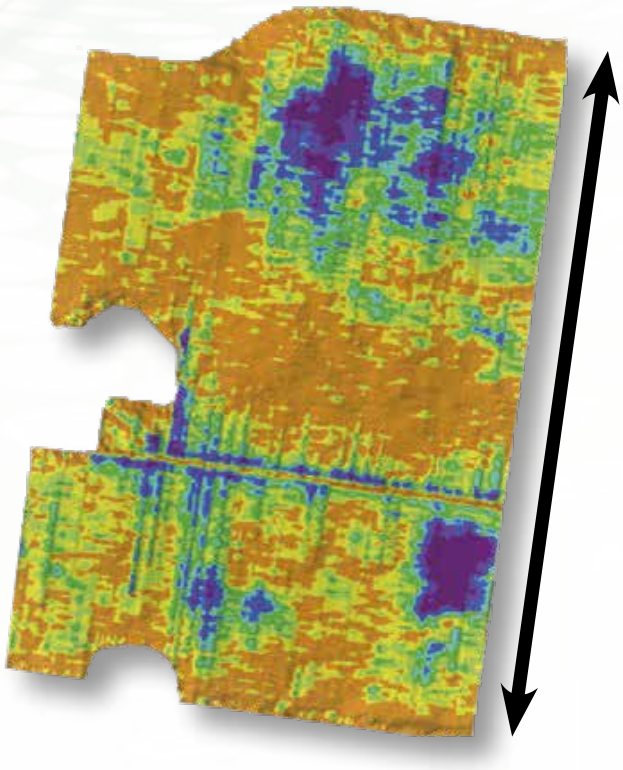
Compaction can have a significant impact on infiltration of rainfall, not only at the surface, but also down through the soil profile, which, combined with compaction, can reduce yield potential by as much as 10 to 30%. The first pass of a tractor can do enormous damage, especially when the soil is wet. The use of dual wheels is not necessarily the solution as they will spread the weight of the machinery, but compaction will then be spread over a greater area.

Many soils, especially the vertosols commonly found in northern NSW and southern Qld will eventually repair the damage caused by traffic and tillage. A series of wetting and drying cycles is an important aspect of this natural repair and can be rapid at the surface, but is much slower further down the profile. At a depth of 30cm, for instance repair can take years.

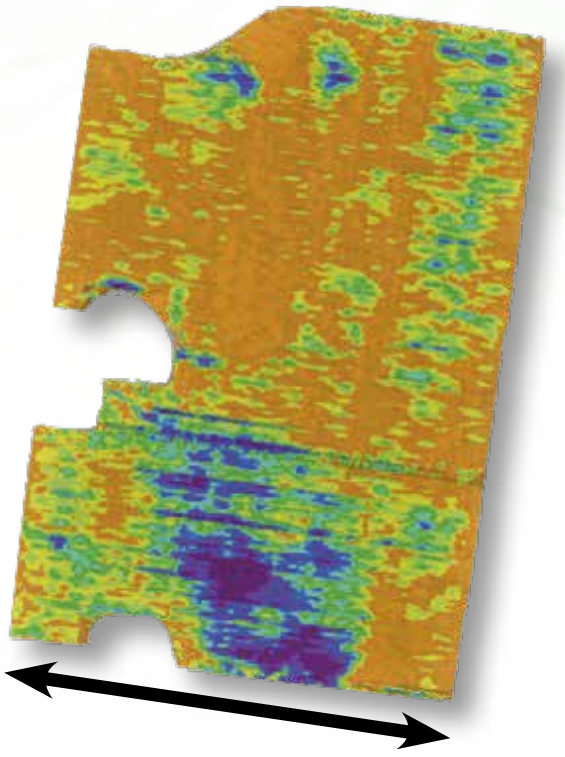
The aim of controlled traffic is to use the same wheel tracks for all machinery, planting, spraying and harvest.

One of the key considerations in setting up wheel tracks for controlled traffic is direction of run. The use of elevation data (gathered whilst auto-steering the tractor) is a simple way to get the wheel tracks in the right place. Growers will be able to improve efficiency of field operations and minimise erosion or potential water logging.

The images below shows the impact that wheel tracks can have on waterlogging, with the image on the left showing run direction north/south whilst the image on the right shows east/west. The purple areas are greater than 10cm water ponding, and the orange areas have no ponding at all.



waterlogging NS



waterloggingEW

Precision Agriculture and Wheel Track Direction (Continued)

This information has been gathered from a farmer's tractor, and the data run through a computer model to simulate where water will congregate. The steps to gathering this data are:

1. Make sure data logging is turned on in your machine. In many instances nowadays the elevation data is already being collected with your operations.
2. Export the data out to your data card or USB stick.
3. Import the data into a software program such as Trimble FarmWorks® or Agleader® SMS. Or provide this data to a specialist in this area.
4. Check for ponding and determine if the strategy is to
    a. change the run direction,
    b. level the paddock, or
    c. use farm through drains to remove surface water.

Besides using the wheel track run direction to minimise waterlogging, new GPS levelling technology has emerged in recent years; allowing dryland farmers to alleviate the problem with a lot less soil shifted. In most cases, land levelling on dryland farming can be as little at 50-100 cubic metres per hectare, making it cost effective.

It is important to note that wheel tracks and row direction can have a big impact on where water flows, especially on floodplains. It is really important to plan the run direction when moving into a controlled traffic system, and consider a catchment-wide approach. It's not a good approach just to pick the longest run. If in doubt, get some advice.

Growers must also remember some wheel tracks may need occasional maintenance, so that they don't get too deep. It is important to ensure that the wheel tracks don't become weedy and add to the challenges of managing potentially resistance weed species.

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For more Information:

www.precisionagriculture.com.au