Väderstad Compaction Tillage Project 2025-26

Premise

The adaption of conservation and zero-tillage practices in western Canada has resulted in a substantial improvement in both grain yields and soil health over the years. However, the reduction in tillage has, in some cases, resulted in an increase in soil compaction in areas where moisture has been limited.

Zero till systems rely on the freeze-thaw cycle that occurs naturally during the winter and spring to break up compaction resulting from field traffic over the course of the preceding year. If sufficient soil moisture is not present, this cycle does not take place and compaction remains into the following season. Soil compaction restricts root growth especially in the advanced stages of crop growth and, by extension, results in reduced yields. With the importance of soil moisture preservation and importance of compaction reduction being considered, it is therefore important to strike a balance where a compaction eliminating tillage operation is limited to the soil depth just below the level at which compaction exists.

Prescription mapping to apply variable rates of both fertilizer and seed has gained widespread acceptance amongst growers as a means of delivering as much product as required that will maximize yield potential for that specific area of the field. This same practice can be applied to tillage, specifically compaction tillage, in which the operation is conducted only to the maximum depth needed to eliminate the compaction layer. The purpose of this project is to use the Vaderstad Wil-Rich 357 Inline Ripper, in combination with prescription tillage technology, to understand the potential benefits of such an operation in terms of providing return on investment to growers.

Project Preparation

The Vaderstad Wil-Rich 357 Inline Ripper was selected for the project as its primary function is to carry out deep tillage operations in soil to a maximum depth of 18 inches. To suit different field conditions, two different sets of shanks and points were used: the low disturbance and minimal disturbance shanks as well as the 3" and 8" points respectively. A Vaderstad E-Services control system was installed on the ripper to provide automated depth control and prescription tillage capability.

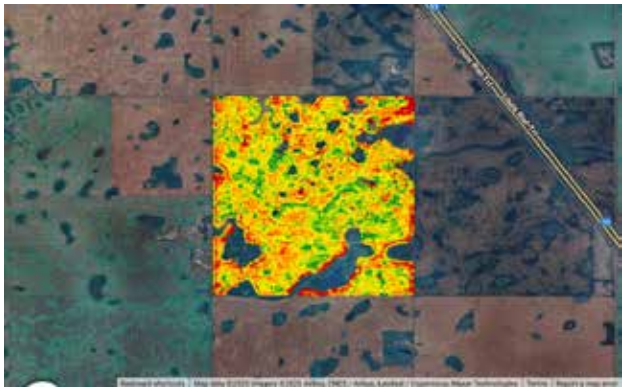
Low disturbance shanks and 3" points on left, minimal disturbance and 8" points on right.

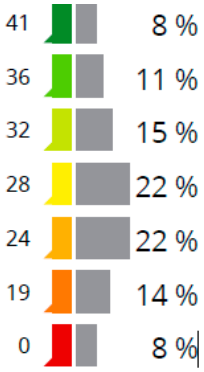
Field selection took place near Davidson SK with two different fields being used in the project. The North, located northwest of Davidson, features flat to slightly rolling topography and light lentil residue with clay loam soil. The South field, located southwest of Davidson, features mostly flat topography with some low laying areas and medium canola residue and sandy clay loam to sandy clay soil.

North field on left, South field on right.

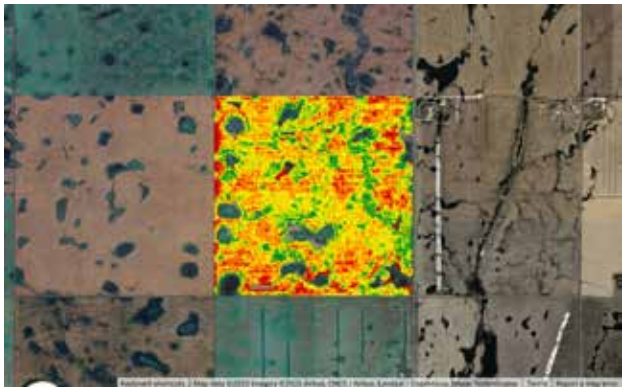
Fall 2025 Project Activities

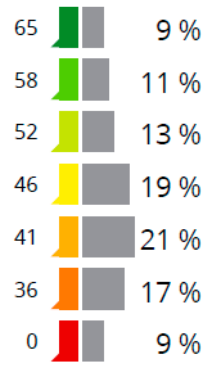
Prior to field analysis and tillage, harvest was completed on the North field on September 7th and on South field on September 22nd. The yield maps are shown below:





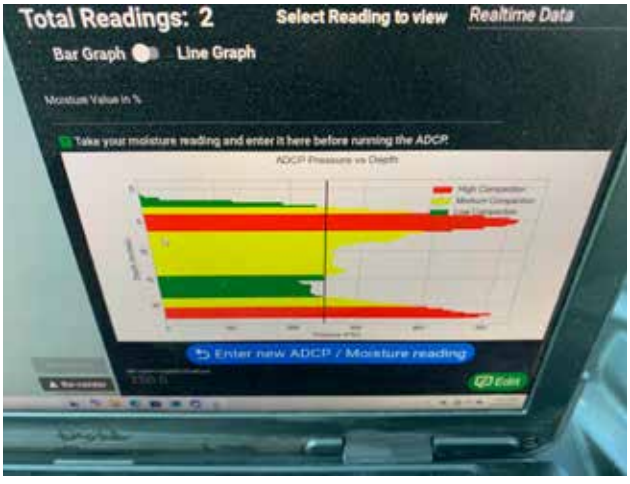
North field yield map and yield analysis.





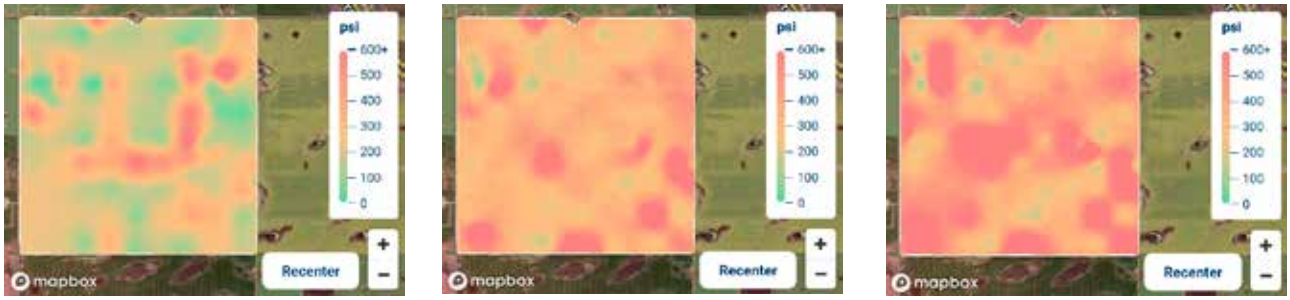
South field yield map and yield analysis.

Compaction testing and analysis on both fields was conducted using technology provided by EarthOptics based in Minneapolis, MN.

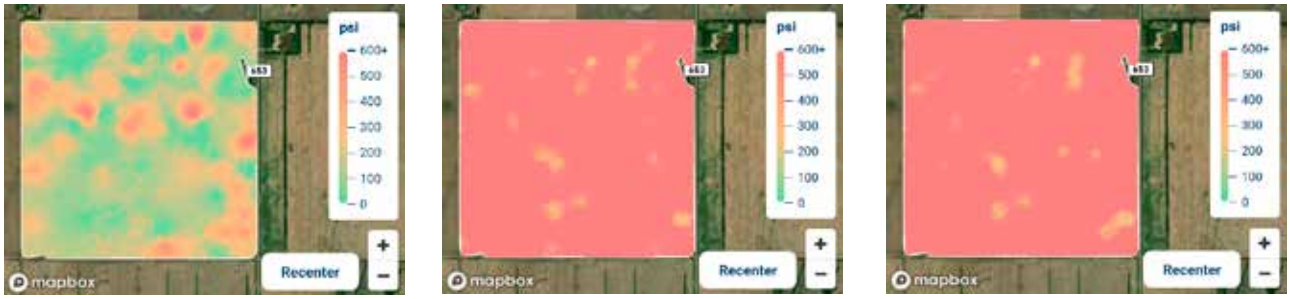


Compaction testing, September 29.

Using a probe mounted on the rear of a UTV, compaction was tested to a depth of 18" and, combined with soil conductivity data, stored into the EarthOptics database. Field maps were then created to illustrate the various levels of compaction at different depths.



North field compaction maps at 3", 12" and 18" depth respectively.

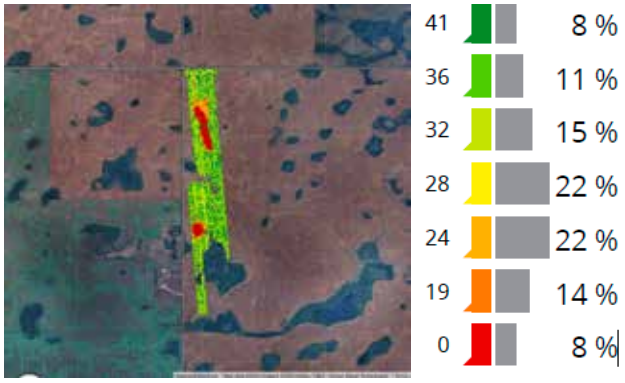


South field compaction maps at 3", 12" and 18" depth respectively.

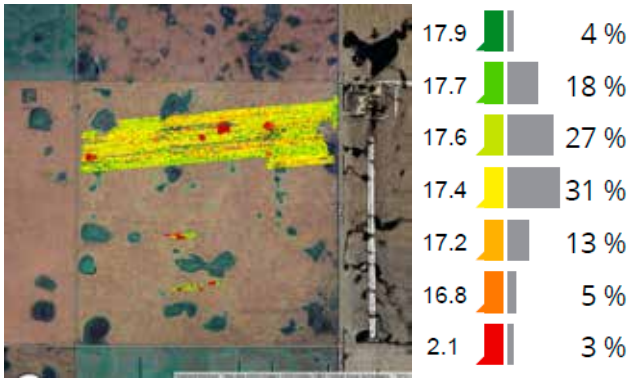
Using the compaction data, prescription maps were created for both fields. These maps were uploaded to the John Deere Operations Center, the control system for the tillage operation.

Initial tillage testing took place at both the North and South fields on October 23rd to ensure the automated tillage functions responded according to the prescription mapping. Main tillage operations took place on the South field on October 24th with the low disturbance shanks and 3" points. The minimal disturbance shanks and 8" points were installed on the machine on October 31st with tillage operations taking place again at the South field on November 1st and at the North field on November 2nd and 5th.

Initial tillage operations on North and South fields respectively, Oct 23.



North field compaction tillage map and analysis.



South field compaction tillage map and analysis.

The greater variability in terms of compaction at different depths seen in the North field resulted in a greater variance in tillage working depth compared to the South field. Due to variances in data transfer from field to software, the depth of actual tillage varies by approximately 2".

Post-tillage analysis on the two fields took place on November 4th to examine any differences in field finish between the two shank/point combinations. Field finish was compared using the Cr index where the length a chain laid out over the surface of the soil was compared to the Euclidian distance (the actual distance between the start and end point of the chain). The lower the number, the smoother the field finish.

Location	Shanks	Points	Cr Value
South Low Spot	Low Dist.	3"	0.11
South Low Spot	Min Dist.	8"	0.08
South Level Spot	Low Dist.	3"	0.12
South Level Spot	Min Dist.	8"	0.09
North Level Spot	Min Dist.	8"	0.11

The minimal disturbance shanks and wide points showed a smoother field finish compared to the low disturbance shanks and narrow points. Because only the minimal disturbance equipment was used in the North field, no comparison was performed in that area.

Future Project Activities

Prior to spring seeding in 2026, both fields will be analyzed for compaction using a penetrometer to examine the effect of the freeze-thaw cycle on compaction levels in the soil. Crops in both fields will be monitored throughout the course of the 2026 growing season with yield analysis taking place upon completion of harvest. Through collection and examination of the project data, the determination will be made as to the effect the compaction tillage operation from a standpoint of return on investment and agronomic stewardship.

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Year
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*Frame structure comes with 36 month or 25,000 acres warranty from Warranty Start Date.**

** Warranty valid period is whichever limit occurs first.*

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