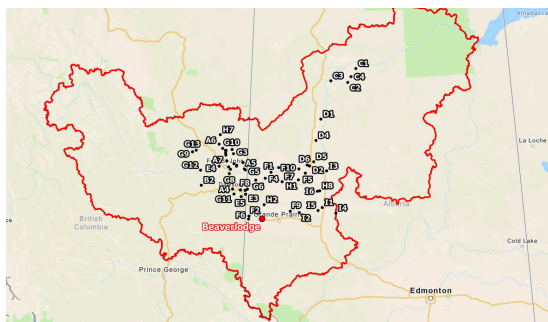


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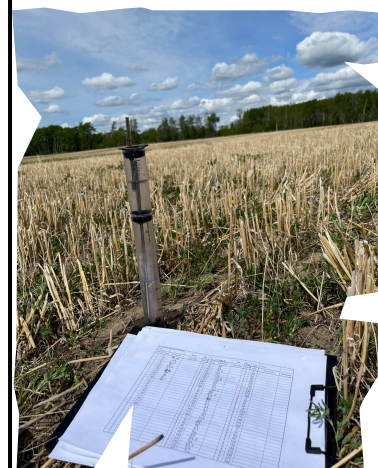
Co-Benefits

The Peace Region Living Lab project is a region-wide collaboration led by the Peace Region Forage Seed Association (PRFSA). Seven other producer groups in Alberta and BC have joined the PRSFA to bring together a project that will serve agricultural producers and land stewards of the region. Enhancing agroecosystem services in the Peace River Region is the focus of the Peace Region Living Lab (PRL), with the goal of adoption of practices that improve productivity, profitability and environmental resiliency.



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Site ID	Management Type	Crop Type
D1 Hawk Hills	BMP Conventional (Check)	Annual silage crop mix Barley (grain)
D2 Warrensville	BMP Conventional (Check)	Annual and perennial cover crops Perennial silage
D4 North Star	BMP Conventional (Check)	Canola on swath-grazed field Yellow peas
D5 Chinook Valley	BMP Conventional (Check)	Alfalfa (hay), humic acid applied Alfalfa (hay)
D6 Warrensville	BMP Conventional (Check)	Canola, humic acid applied Barley



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Co-Benefits



The Peace Region Living Lab partners with Agriculture and Agri-food Canada (AAFC) to promote the use of best management practices in agriculture in various agricultural field zones across the country. The idea is to create a data compilation of parameters observed in growers field and use this data to compare and assess the impact of sustainable versus conventional agricultural practices.



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Soil parameters are measured in fields that are conventionally managed and fields following beneficial management practices such as cover cropping, intercropping, livestock integration, or biological nutrient cycling. These parameters are measured in each field before seeding (1) **Infiltration**: The rate of water flowing through the soil column is measured by using (a) a **mini-disk infiltrometer**, where a small transparent column, with a semipermeable end is placed on top of the soil and allowed to discharge its water content (60 ml) onto the soil ground. Volume of water discharged is recorded every 30 seconds. A maximum of five minutes (10 water volumes) is recorded should there still be water inside the column after that time period; and (b) a **single ring system**, where a 15 cm wide ring is hammered into the ground to a depth of 5 cm. The ring is covered with a plastic film and 0.5 L of water is poured into the film inside the ring. The film is removed and the time the water takes to percolate through the soil inside this ring is recorded. (2) **Compaction** which is measured through a penetrometer. In this way, pressure in pounds per squared inch are taken at depths of 10, 20, and 30 cm in a single place. (3) **Temperature and soil moisture**, taken using a soil thermometer and a soil moisture metre and (4) a **visual soil assessment** where a shovel of soil is dug out and observed for physical features.



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Forage and crop residue are collected as well. Forage is collected before a scheduled cutting by the grower to assess forage yield and its nutrient content. Crop residue and grain samples are also collected in fields where a cash crop was grown to assess grain yield and observe potential signs of pests or pathology in leftover stubble.

Additional data collection in both conventional and BMP fields:

2023: Insect monitoring - which is taken by digging a small hole in the soil and set a plastic pit trap in it, collecting them a week after. Sweep nets are also used. The operator walks 50 steps along a transect at the edge of the field and into the field and waves the sweep net inwards along the transect. Insects are stored away in alcohol and shipped to the AAFC Beaverlodge research station for identification purposes.

Disease monitoring - ten random plants are collected at each inflection point of a zig zag pattern. Each plant is assessed for signs of pathology (plant diseases) or arthropod herbivory (insect feeding). Plants are collected, pressed for preservation, and sent to Dawson Creek in British Columbia for identification.

2024: Soil nematode and microbiology analyses - soil samples were collected from every field in the spring and sent to AAFC labs in BC for testing.

Continuation of Socio-Economics will be collected during this time as well in the form of farm information and peripheral surveys.



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Co-Benefits: Best Management Practices and Soil Compaction (Preliminary Results)



This field trial aims to explore the role of different Best Management Practices (BMPs) in the Peace Region area over soil compaction at 4, 8 and 12 inches soil depths. The BMPs studied in this trial mainly focused on:

- **Diversified Cropping Systems**
- **Soil Amendments**
- **Cover Cropping Strategies**

The overall objective of this trial is to determine how these combined approaches can reduce soil compaction and improve water infiltration in the region's soils.

Site	BMP details
D1	Increasing diversity with companion cropping (feed barley and pea intercrop), biostimulants (i.e. fulvic acid), and urease inhibitors
D2	Companion cropping, cover crop mix
D4	Swath grazing an 8-way annual cover crop mix blend, intercropping
D5	Perennial forage stand
D6	Use of humics in annual crop rotation



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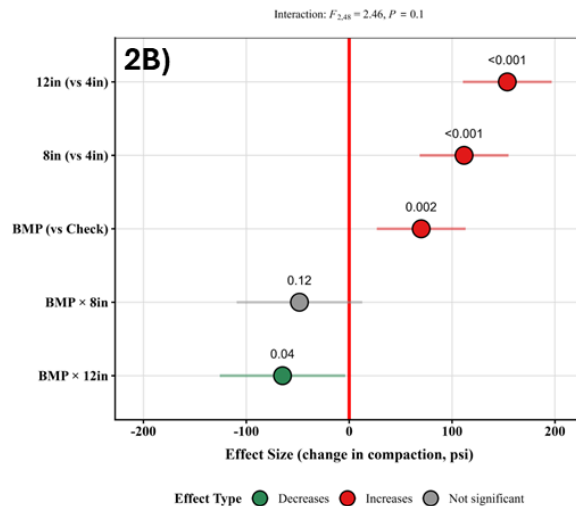
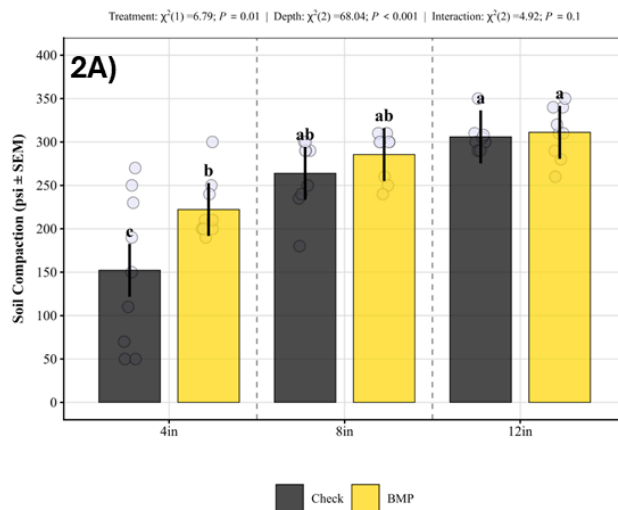
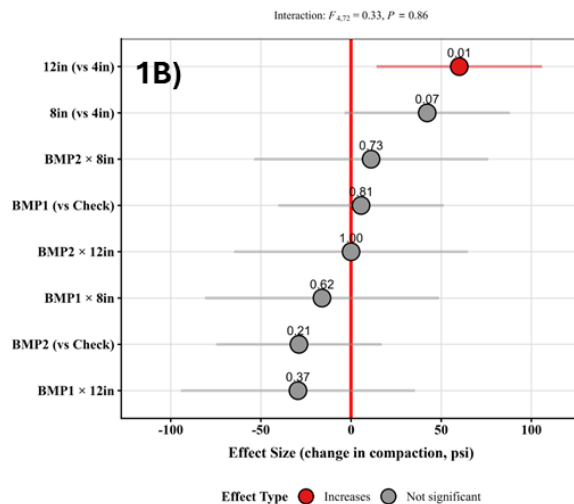
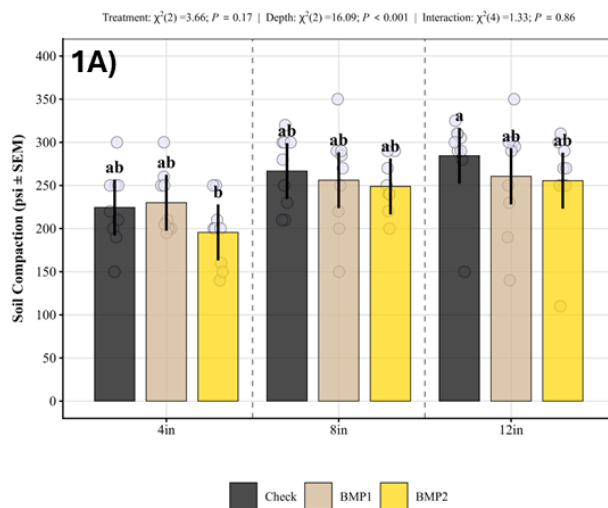


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Co-Benefits: Best Management Practices and Soil Compaction (Preliminary Results)

(1A) Site D1: mean soil compaction (1B) effect size of compaction

(2A) Site D2: mean soil compaction (2B) effect size of compaction



Key Points:

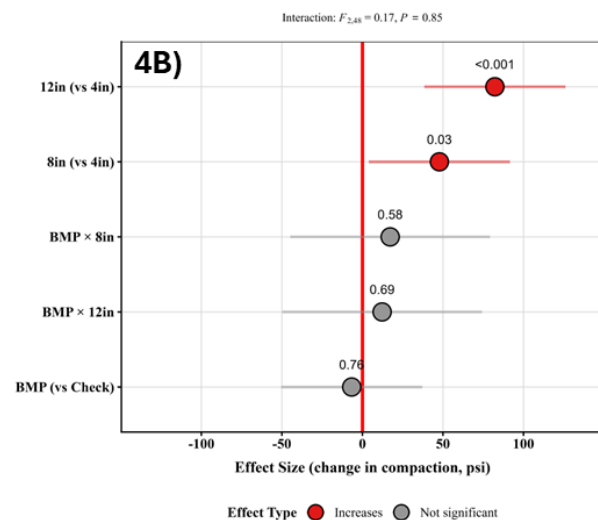
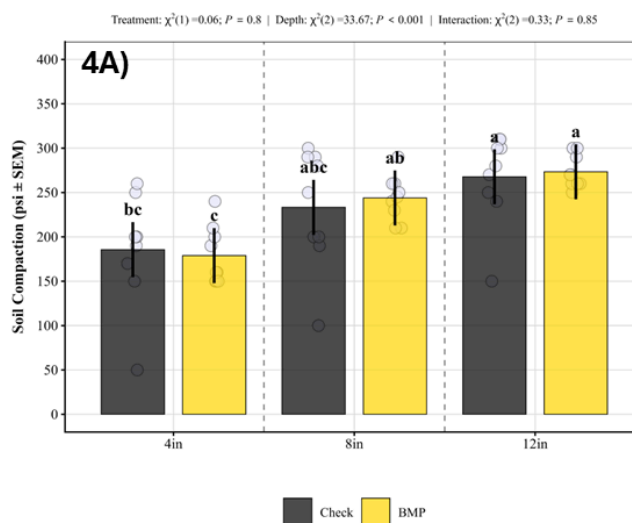
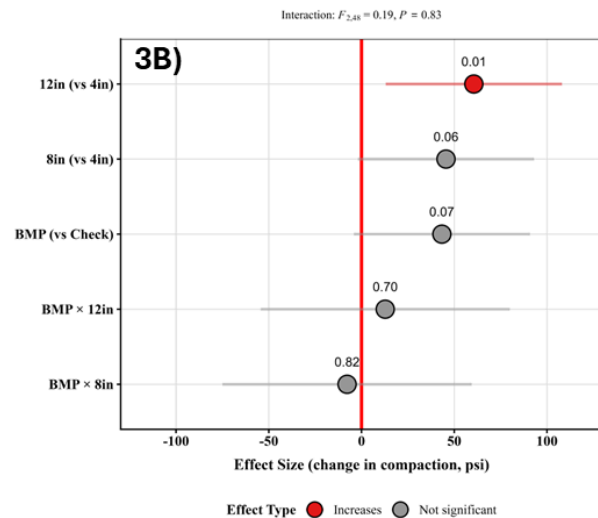
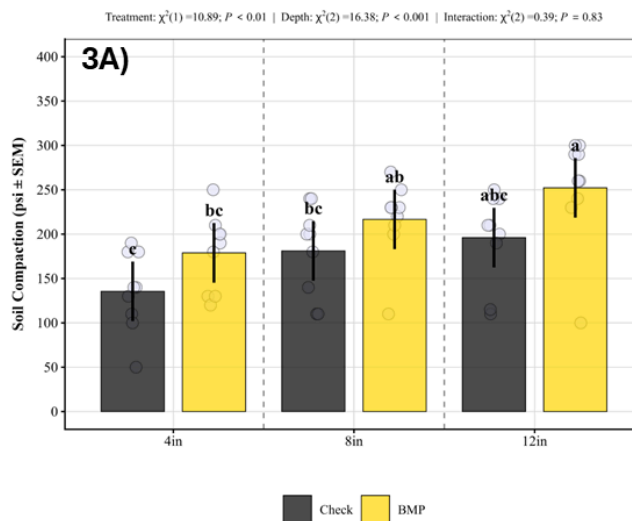
- Soil compaction increased with depth on sites D1 and D2
- BMP Companion cropping, cover crop mix was associated with higher soil compaction on site D2 compared to control
- Companion cropping, cover crop mix was effective in decreasing soil compaction at 12 inches depth at site D2 (Fig. 2B).

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Co-Benefits: Best Management Practices and Soil Compaction (Preliminary Results)

(3A) Site D4: mean soil compaction (3B) effect size of compaction

(4A) Site D5: mean soil compaction (4B) effect size of compaction



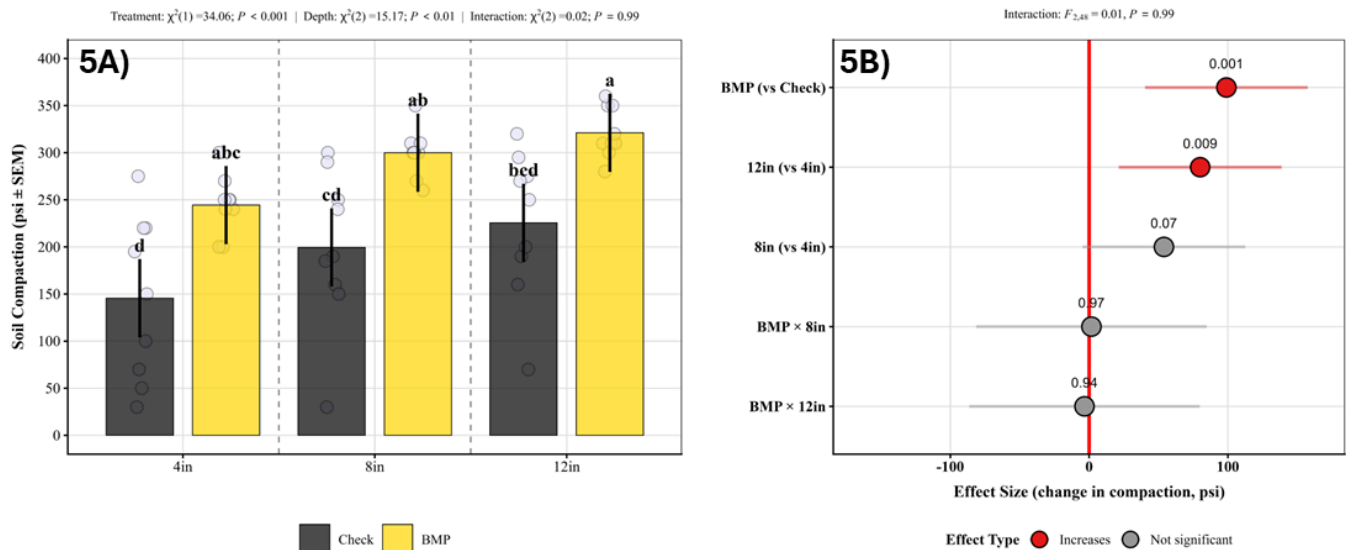
Key Points:

- Like sites D1 and D2 that used different BMPs, soil compaction had a trend to increase with soil depth on sites D4 and D5 as well.
- No differences in soil compaction were seen between control/check and the fields with BMPs (Fig. 4B).

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Co-Benefits: Best Management Practices and Soil Compaction (Preliminary Results)

(5A) Site D6: mean soil compaction (5B) effect size of compaction



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Key Points:

- Soil compaction had a trend to increase with soil depth on sites D5 and D6, like most other sites.
- No differences in soil compaction were seen between check and the fields with BMPs (Fig. 5B).

Our results show that using various Best Management Practices do not always reduce soil compaction across a vast region. A clear positive trend in soil compaction was instead observed with an increase in soil depth. However, at one specific site, a significant interaction was observed where the BMP (companion cropping, cover crop mix) lowered compaction at the 12 inch depth, suggesting that localized factors may have influenced BMP effectiveness under certain conditions. Regardless of this isolated finding, the general findings imply that soil compaction remains a challenge in deeper soil layers regardless of the BMP applied. Additional research into soil management is needed to further identify the mechanisms behind these site-specific responses and developing tactics that can improve subsoil compaction more consistently across the region.

Disclaimer: These results are preliminary and based exclusively on 2025 data. Conclusions may be premature, as comparisons with past years are needed to establish trends and meaningful differences.



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