St. Clair Conservation
Healthy Watersheds Program


2014: Pre-plant


2016: Summer season


2018: Summer season

The Healthy Watersheds Program focuses on *retiring marginal and/or unprofitable farmland* into:

Nutrient retention infrastructure: wetlands, earthen berms, grassed waterways, riparian buffers, and windbreaks

Wildlife habitat: tree planting, tallgrass prairie planting

- The Program connects landowners with resources and financial incentives to help implement Best Management Practices and stewardship projects on their property.
- Landowners can meet with SCRCA staff on site and staff can offer advice, help with project design and implementation, and answer questions landowners may have pertaining to the project.
- Grant availability depends on the project location within the watershed, what funding sources are available, and the guidelines and deadlines outlined by the funding sources.
- A project review committee evaluates the environmental benefits of each project before a grant is provided.
- Typically, grants of 50% (to a maximum of $10,000) are provided to landowners for eligible projects. In some cases, up to 100% of the project sub-total may be approved for some types of projects.
- The Healthy Watersheds Program main stewardship goals are:
  - Improving water quality and quantity
  - Improving fish and wildlife habitat, with a focus on aquatic Species at Risk habitat

If you are interested in setting up a site visit (once COVID-19 restrictions are lifted), call 519-245-3710 or email:

Jessica Van Zwol, Healthy Watershed Specialist jvanzwol@scrca.on.ca (x241)
Steve Shaw, Manager of Conservation Services sshaw@scrca.on.ca (x213)
Jeff Sharp, Conservation Services Specialist, jsharp@scrca.on.ca (x217)

St. Clair Conservation

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Healthy Soil, Healthy Water

St. Clair Conservation
Spring 2020

It's spring, the frogs are calling from the wetlands, and everyone's eager to get outside to enjoy nature and get back onto the fields to start planting! Staff here at SCRCA are hoping you and your loved ones have a wonderful start to your spring, while staying safe during the pandemic.

While our need for social distancing and warmer weather may start the itch to get planting equipment on the field, did you know that **60-80% of soil compaction damage** occurs on the **first trip** across the field?

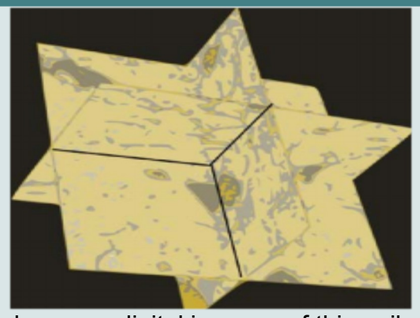
Soil compaction occurs when soil particles are pressed together by the passage of machinery (even your pickup truck!) or livestock. Wet clay soils, commonly found in Lambton County, are extremely prone to compaction. Not all hope is lost: there are methods to avoid compaction. Check out the information in this newsletter and some of the resources we provide to dig deeper (no pun intended!) on the topic and make a plan to evaluate and reduce soil compaction in your fields.

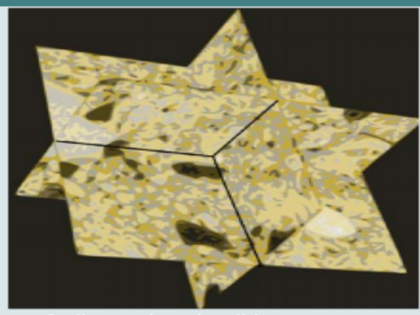
Yours in Conservation,

Jessica Van Zwol and The Healthy Watersheds Team at St. Clair Conservation

Ps. If your children are in need of things to do, check out our daily activities on Facebook and Twitter!

Soil Compaction - What does it look like?





Researchers use digital imagery of thin soil sections to create 3-dimensional soil images to see the spatial configuration of soil components. The non-compacted soil (left, beige) is evenly spaced with large, connected pores (grey). Clay soils naturally have more pore space. Compacted soils (right) have tightly packed aggregates and small pores. Pore space is important for water infiltration: small pores restrict water movement.

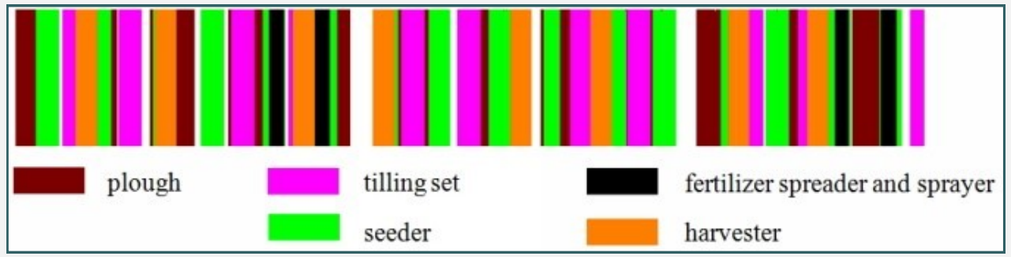
Soil Compaction - Is it really so bad?

- Reduced crop productivity
- Restricted root development
- Reduced soil aeration
- Decreased soil available water
- Reduced infiltration rate
- Increased sediment & nutrient loss by soil erosion
- Increased surface runoff
- Increased nutrient deficiency

Using Controlled Traffic to Reduce Soil Compaction

Controlled Traffic (CT) involves having machinery work on assigned field traffic lanes of the field each year, thus minimizing the area of compaction in the field. CT can reduce soil compaction to as little as 15% of a field compared to 40-97%, when using conventional tillage systems[1].

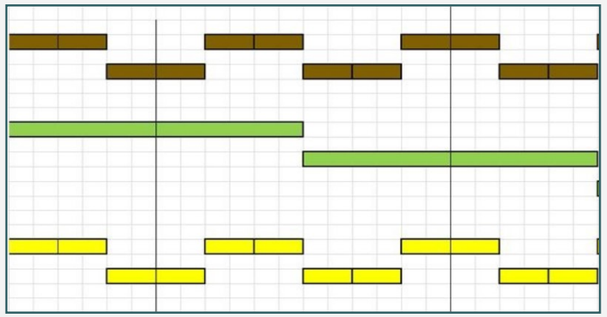
For the greatest results, where all equipment uses the same traffic lanes, you may need to make an investment in new equipment and modify your equipment. Any reduction or overlap in traffic patterns, however, can provide benefits: you don't need to replace all your equipment at once; just be strategic. The key is to match equipment operating widths and maintain the same wheel tracks[2].



(used with permission[1])

Figure 1: Typical traffic pattern using conventional farming practices of winter wheat cultivation[1]

Wheel track widths can vary and it can be tough to match larger headers, off-set fronts, or airseeders. Based on your equipment, select an operating width and match equipment in multiples. The combine is generally the most expensive piece, so you could base your system around that. A commonly used system is 3:1 ratio (e.g. 30' seeder, 90' sprayer). Before you begin modifying equipment, measure twice! Check the actual cutting width of the header to ensure you don't leave behind unharvested rows of crops.



(used with permission[2])

Figure 2: Traffic pattern in 3:1 Controlled Traffic system: 30' seeder (top brown), 90' sprayer (middle green), 30' header (bottom yellow)

In addition to reducing soil compaction, implementing controlled traffic farming can:

- Reduce fuel use by ~25-50% with designated lanes
- Increase (soybean) yields of 5-20%
- Increase fertilizer availability by reducing surface runoff
- Improve water infiltration rates by ~50%

References:

[1]Walczykova M., Zagórda M. 2017. The possibilities of reducing the compacted field area in selected crop rotation. EJPAU 20(4), #13.

[2]Belliard, S. 2019. https://fieldcropnews.com/2019/09/ontario-field-crop-report-week-of-september-9-2019/

Good resource: https://www.nacc.com.au/wp-content/uploads/2015/05/NACC_Controlled_Traffic_Farming_Technical_Manual.pdf

Determining the Nutrient Retention Capacity of Newly Restored Wetlands

Ducks Unlimited Canada recently completed a study on wetlands and nutrient retention. The goal was to understand how on-farm restored wetlands reduce phosphorus loads from entering the watershed.

The study involved:

- Eight newly-restored, edge-of-field wetlands were selected within the Lake Erie drainage basin (created within the last 2-6 years and ranged ~0.35-1.80 acres in size).
- SCRCA collected water samples at the inflow and outflow of each wetland.
- Samples were analyzed for total phosphorus (*TP*), total dissolved phosphorus (*TDP*), soluble reactive phosphorus (*SRP*, which is a form of *TDP*), and particulate phosphorus (*PP*). *PP* is attached to soil particles and commonly associated with soil erosion, while *TDP* and *SRP* are dissolved in solution. *TP* roughly equals *TDP* + *PP*.
- The researchers evaluated:

  Nutrient Retention Capacity: the ability of a wetland to keep or retain a nutrient, based on the addition of all daily input loads (surface inflow, tile inflow, and precipitation inputs).

  Nutrient Reduction Efficiency: measures how well a wetland retains nutrients by dividing the input nutrient mass by the outflow nutrient mass, divided by 100 to obtain a percentage.

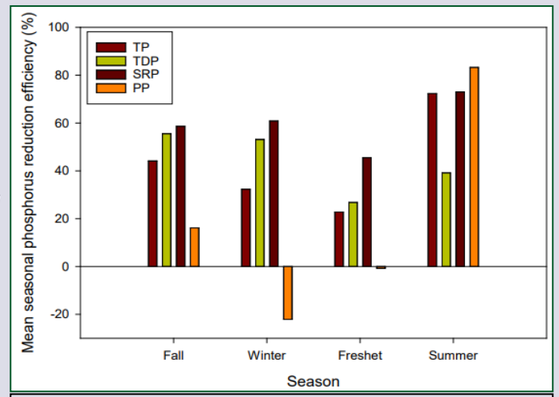


Figure 1: Average seasonal **phosphorus reduction efficiency** (%) of eight wetlands for total phosphorus (TP), total dissolved phosphorus (TDP), soluble reactive phosphorus (SRP), and particulate phosphorus (PP).

The study found:

- Phosphorus levels at the outflow of the wetlands were lower than at the inflow.
- Average *TP* retention capacity was **7.2 kg/ha/year**, with a reduction efficiency of **39%** (Fig. 1)
- Average *PP* retention capacity was **3.0 kg/ha/year**, with a reduction efficiency of **13%** (Fig. 1).
- One site was a nutrient source, not a sink. Phosphorus levels of the upland soils and wetland sediment of this outlier site were higher than all other sites. This may be why this site was a source.
- The *SRP* retention capacity for the other seven wetlands is **5.0 kg/ha/year** with an average *SRP* reduction efficiency of **71 %** (Fig. 1).

Water level recorders at one project site

These results suggest that newly restored on-farm wetlands not only provide wildlife habitat, but can serve as green infrastructure to reduce phosphorus from entering Lake Erie tributaries.

Ducks Unlimited Canada | *Institute for Wetland and Waterfowl Research*

Check out the full report for more information:
https://www.ducks.ca/assets/2020/02/Ontario-Small-Wetlands_FINAL-Report_Feb-7-2020.pdf