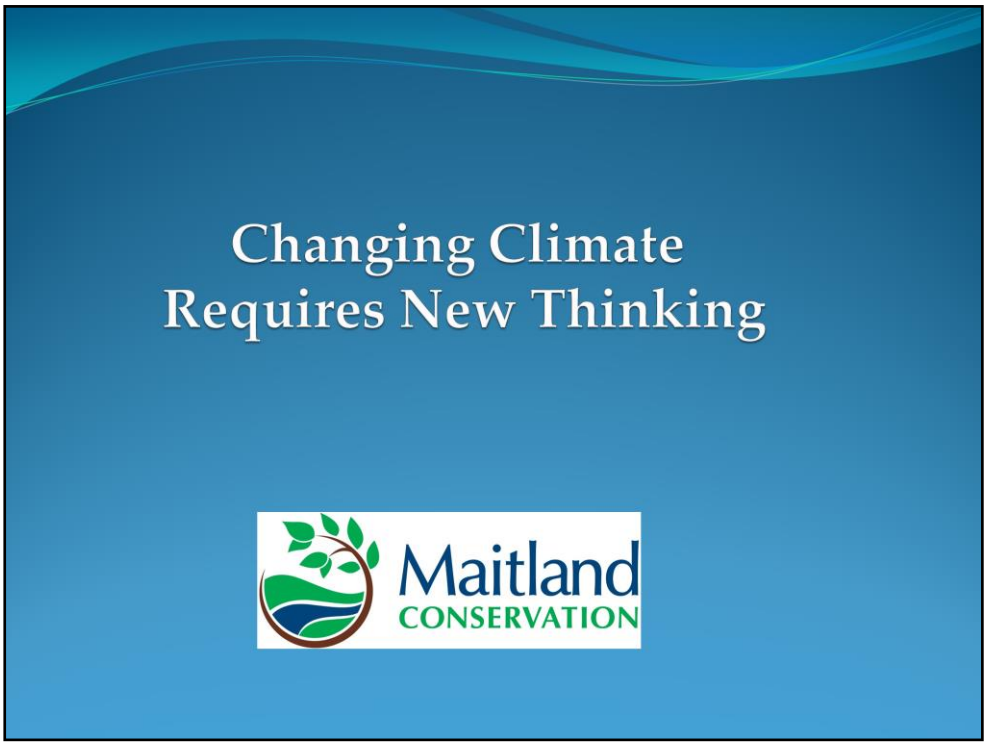


Thank you for the opportunity to tell you about the changes that we are making at MVCA to deal with the increasing impacts of global heating.

I will outline some of the trends and impacts that are taking place and how we are changing our approach to deal with these impacts. Business as usual is not an option, need to look at transformative change to the what we do and how we do it based upon the challenges we all face with respect to Global Heating

I will also outline what MVCA is doing to reduce our use of fossil fuels.

Then outline the changes we have and are making to our services

I will close with some thoughts on a way forward for you to consider.

Global heating is a having a major impact on the Maitland watershed. We are experiencing dramatic changes to precipitation, temperatures and with respect to severe weather.

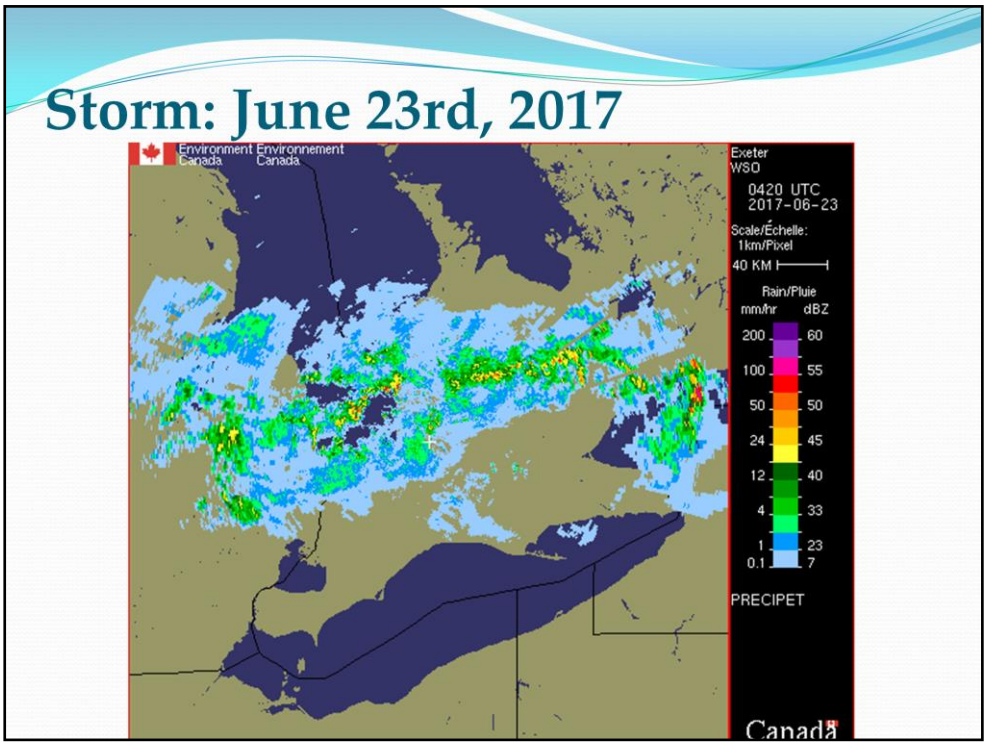
Warmer and wetter winters, with more precipitation falling as rain, as temperatures will get above freezing more often.

Three of our last flood events have occurred in the winter months, December 2008, January 2019, February, 2018.

Steve Jackson, MVCA's Flood and Erosion Safety Coordinator says that every season is flood season now.

Warmer winters means that we are more likely to experience ice storms than snow storms during the winter. Two ice storms in 2013. April and December. $250,000 damage/clean up costs for Municipality of North Perth. These are costs that come out of the municipalities budget and that are not budgeted for. Decreases the funding that they have available to invest in building resiliency.

We are experiencing hotter, drier summers. Picture of the Maitland River at Benmiller on September 6th, 2012. 2012 was the driest year in 35 years. It was followed by the wettest year in 40 years in 2013.
Higher risk of droughts, which puts a lot of stress on our river system.



Experiencing more high intensity short duration thunderstorms such as this one that dropped between 4-7 inches(120-176mm) of rain in 6-8 hours across North Maitland watershed, with highest amounts recorded upstream of Harriston. The amount of rainfall in these storms is difficult for meteorologists to predict. Only 50mm of rain was forecasted by Environment Canada. A warmer climate holds more water vapour in suspension. Increases the risk of high intensity rainfall events that can drop a lot of water in a very short time.

There is also an increasing risk of bluff collapse, gully erosion and shoreline erosion due to the impacts of global heating.

Increased precipitation across the Great Lakes Basin is resulting in higher lake levels in Lake Huron.

The projections for great lake levels are for higher highs and lower lows and shorter time periods between these changes.

There is still a lack of understanding and belief that the burning of fossil fuels is changing the climate and that we need to change our landuse practices.Still have people who want to clear and drain wooded swamps for agriculture

MVCA's first priority was to develop a carbon footprint reduction strategy.

We looked at where we are using fossil fuels in our operations and identified ways reduce their use over time

Our largest source of fossil fuel use is with our vehicles and equipment.

We replaced two gasoline powered vehicles with two all electric Chevy Bolts to replace two gasoline powered vehicles. We plan to continue to purchase all electric vehicles and equipment when they are available.

Over the past four years we have reduced our carbon footprint by 20% and saved money with respect to maintenance and operation of our fleet. 2016- 52.2tonnes to 41.64tonnes in 2019.

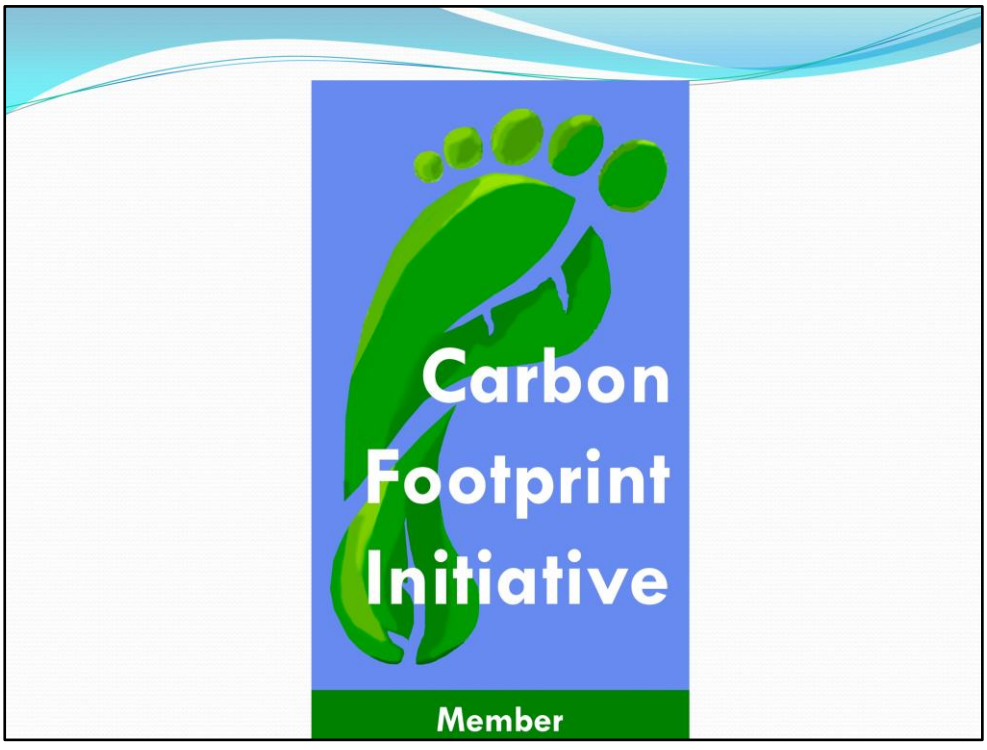
To help achieve these reductions has meant changes in scheduling and organization of time by staff. Staff are to take the most fuel efficient vehicle for the trip they are taking as well as organizing site inspections to maximize time on the road.

Next 20% is going to be a lot harder to achieve as there aren't electric trucks on the market at an affordable price as yet.

Energy Efficiency

In 2007 MVCA installed a ground source heat pump, white membrane roof, additional insulation, and energy efficient lighting. Electricity generation in Ontario has a small carbon footprint..

reducing our hydro costs by over 30% when we installed these energy efficiency measures.



In 2012 MVCA started the Carbon Footprint Initiative with 4 local companies, Ideal Supply Company; J.H.Keeso and Sons; Trillium Mutual Insurance, Molesworth Farm Supply and the Municipality of North Perth. When we started these companies knew little about climate change but the more they read and we discussed the issue, they came to the consensus that they had a moral responsibility to focus on eliminating their dependency upon fossil fuels for the good of future generations.

The focus of the CFI is to identify how to reduce our carbon footprint. The CFI has two focuses:

1. Reduce the use of fossil fuels
2. Sequester carbon through the planting of native trees, shrubs and plants

Each member develops their own strategy for reducing the use of fossil fuels and sequestering carbon and presents it to the others for input.

The CFI has expanded to include Corteva Agrisciences; Cowbell Brewing, County of Huron; Ward and Uptigrove and EFS Plastics.

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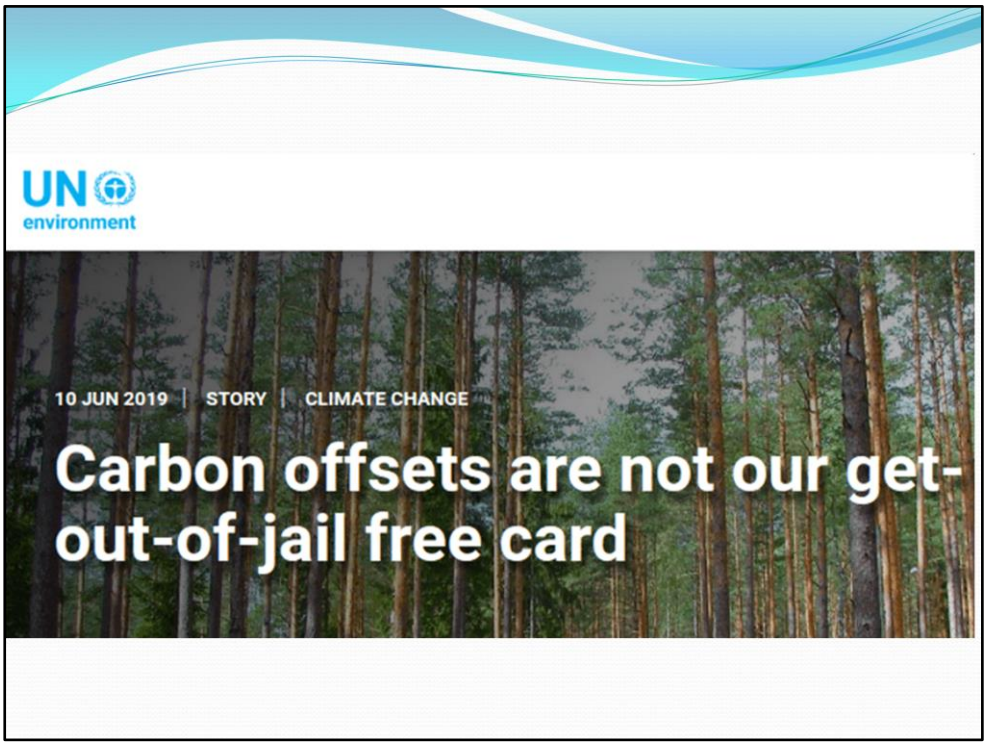
The CFI is interested in doing more outreach with other companies and municipalities in the watershed.

You can learn more about the CFI on MVCA's website.

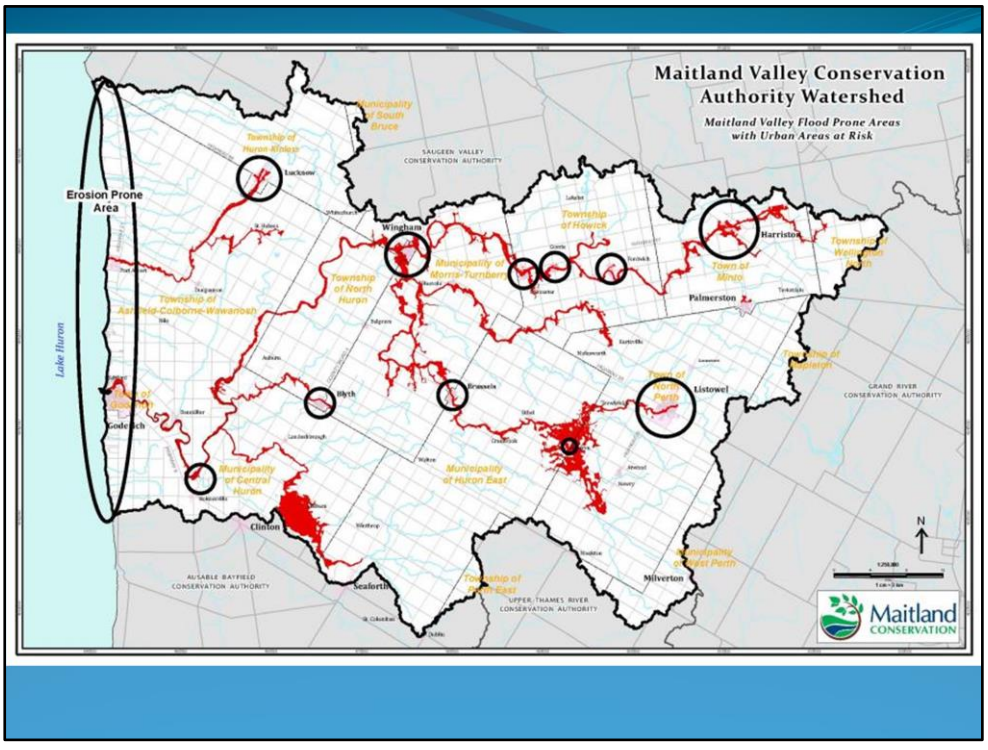


One of the topics the CFI discussed a few years ago was carbon offsetting through the planting of trees. The latest science on carbon offsetting doesn't support the continued burning of fossil fuels and planting trees to make up for the CO2 emitted.

We are taking the fossilized carbon that hasn't been part of the active carbon cycle for millions of years and then trying to offset it by planting trees which are part of the active carbon cycle. We are emitting more carbon than the land can absorb according to climate scientists.

Approx. 1/3 of the excess carbon in the atmosphere comes from deforestation and loss or organic matter, they other two thirds came from burning fossil fuels.

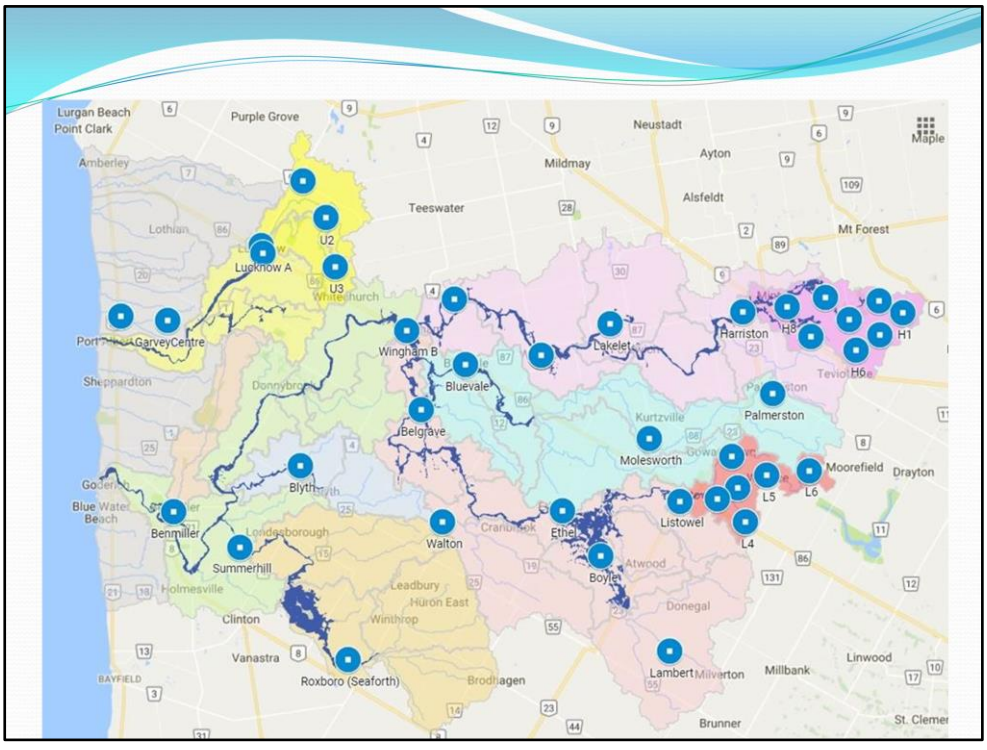
We have to do two things, convert to non carbon energy sources and to sequester carbon and restore biodiversity and ecosystem health by restoring our forests and rivers.



Flood/Erosion Damage Centres: There are 15 small towns built in flood prone areas and several thousand acres of agricultural land/roads that are subject to flooding. Probability/magnitude of flooding will increase as the climate continues to warm:

Along the 50km section of the Lake Huron shoreline that is located in MVCA's jurisdiction there are approx. 700 seasonal/permanent lakefront homes/cottages located on or near the top of the bluff that are in areas at risk of bluff collapse, shoreline erosion and gully erosion. Assessed value of $300 million land/development

Flood Damage Potential: $176 million in the 15 urban areas.



We have had to totally reinvent our flood forecasting and warning system across the watershed. There is a greater risk of floods coming from a localized rainfall event or rapid snowmelt event than the spring thaw.

We have had to add a lot more rain gauges across the watershed, especially in headwater areas where we have flood prone municipalities. Harriston, Lucknow and Listowel.

We need to be able to provide these municipalities with as much lead time as possible to warn and evacuate residents of flood prone areas. In the headwaters it is only a matter of hours before they would be affected by a flood event.

We have also had to increase the number of staff to act as duty officers as we need to monitor for flood events 24 hours a day, 7 days a week all year round. In the past our focus was mainly on monitoring the spring melt and ice jams in the river.

We are also lobbying for a Federal-Provincial Flood and erosion damage reduction program that will help rural flood/erosion prone municipalities. Currently there is no federal or provincial program that has funding directed at helping rural municipalities such as the Town of Minto. In the 70's and 80's the Provincial government had a flood damage reduction program that provided up to 85% grant for flood damage reduction projects to rural municipalities.

There were 150 homes flooded, $10 million in damages from the 2017 flood. Insurance companies have advised the residents with homes in the flood prone areas that they will have capped payouts or in some case no coverage against flood damages for the next flood.

We have had to play a larger role in helping Minto narrow down the options for reducing flooding.

Unfortunately our senior levels of government have not put the programs in place to help municipalities and conservation authorities deal with the increased risks of flooding and erosion.

We are also advocating that the Federal and Provincial Government recognize non riverine areas that are subject to flooding from intense rainfall and rapid snowmelt events as potential hazards for development.

Countries in Europe have already begun to develop standards for mapping non riverine flood prone areas.

We need to start identifying and developing planning policies for this new hazard as well in our land use planning documents.

Warmer winters means the clay bluffs don't stay frozen all winter and higher lake levels result in increased risk of shoreline erosion, bluff collapse and gully erosion.

We have no way of knowing exactly when a bluff will collapse but we do know what conditions will increase the risk of collapse.

We have started working with our shoreline municipalities to encourage them to develop emergency response plans for bluff collapse situations and to undertake exercises to practice the response so they are ready in the event of a real situation. We conducted an exercise with the fire departments in Bruce County last year as they would be called to deal with this type of emergency along the shoreline.

We have also been meeting with the planning department to talk about how the land use planning process can be speeded up for shoreline homeowners who need to move their cottages/homes back from the bluff. Time is off the essence unfortunately our processes are not designed to move quickly when dealing with emergencies such as development relocation.

Erosion and wave uprush standards need to be updated as well by the Provincial Government.

The majority of the shoreline development that is located along the Lake Huron shoreline went in prior to landuse planning controls and an understanding of the risks associated with developing along the bluffs. There were also no standards for storm water management or road construction when a lot of these lakeshore developments were built in the 50s, 60s and 70s.

We have been recommending to shoreline associations that they consider installing appropriate storm water management systems to reduce the risk of damages to roads and buildings . The risk of damages is only going to increase as the climate continues to heat up.

We can buffer some of the impacts that we can expect and restore our rivers and forests by putting more natural infrastructure back on the landscape to develop some resiliency from these changes and make it easier to recover when a severe weather event takes place. Building resiliency means that we are less likely to suffer major damage and the systems are more likely to recover from these events. It's about how to protect our natural assets across the watershed. Rivers/Lake Huron shoreline/forests are still the foundation of our economy and community well being!

80% of the Maitland watershed is used for agriculture. Agriculture is most vulnerable to the impacts of our rapidly changing climate. MVCA is focussing its stewardship efforts on three key system changes that will help reduce the impacts of global heating and help farmers keep soil and nutrients on the land and out of rivers and streams.

Over the past 50 years 31,400 acres of flood plain and river valley lands across the watershed have been converted to use for growing corn, wheat and soybeans. High susceptibility for soil and nutrients to be flushed into watercourses due to intense rainfall events and rapid snowmelt events. The river channels have been deepened and straightened. In order to reduce the loss of soil and nutrients and to restore the health of the river, these lands need to be restored either as natural areas or put into permanent hay and to have the river channel restored.

Estimated cost to restore these lands is $248 million dollars.

New new incorporate the principles of storm water management into the design of new municipal drains and to retrofit existing municipal drains in order to keep soil and nutrients on the land. These purpose of storm water management is to Slow it down/Spread it out/Soak it in: Scott Municipal Drain Rural Storm Water Management Project: provides for drainage for farmland, reduces potential for flooding downstream, reduces erosion resulting in improved water quality in the watercourse, maintain base flow under weather extremes, restores health of aquatic ecosystem and reduces need for maintenance of the drain.

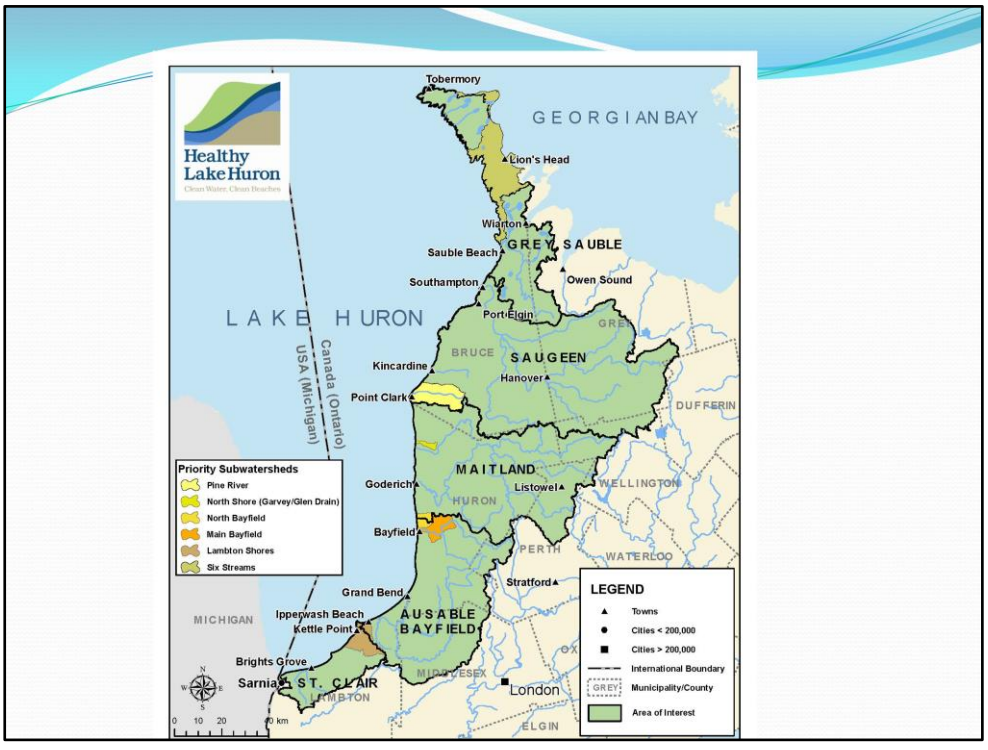
This approach needs to become the norm rather than the exception due to our changing climate.

The third major system change we are encouraging is the use of cover crops so that the land is kept covered throughout the winter months. With our warmer, wetter winters the potential for soil and nutrient loss is high if the soil is not kept covered. Cover crops also help to improve soil health and improve organic matter levels as well.

Ultimately we are going to need to totally rethink our food and agriculture system.Need to develop a more resilient food system: Key actions: eliminate dependency upon fossil fuels, restore degraded ecosystems/resilient/ provide nutritious food that people need to be healthy: Transformational change is needed not just incentives for better stewardship.

MVCA has been working with York University for over 20 years to identify how agriculture is being impacted by global heating and the changes that are needed to develop more resilient, productive systems that will be able to provide food in a warmer more unstable climate.

Healthy Lake Huron is a collaborative of partners who work in the watersheds that drain into Lake Huron on the Canadian side of the Lake Huron. It was established by the Ministry of Environment in 2010 at the request of the Lakefront Associations in Huron County to try and improve water quality along the Lake Huron shoreline.



It is co led by OMAFRA and MECP. Members include the Counties of Huron, Bruce and Lambton; Huron and Grey Bruce Health Units, LHC3; ABCA, SVCA, St. Clair, MVCA and Grey Sauble CA, Pine River Watershed Initiative, Bruce Power and the Bruce Biosphere Initiative.

Environment and Climate Change Canada; Parks Canada, MNRF and MMAH.

The steering committee for HLH has expanded its focus to include climate change adaption into its most recent five year work plan.

The work of HLH was put on hold in 2019 while the new Minister of Environment, Conservation and Parks was reviewing all programs. The Minister decided to keep HLH going and also reinstated the COA funding for HLH.

We need all levels of government, NGO's and the private sector all working together if we are going to effectively address the challenges of both mitigating and adapting to the impacts of global heating. Municipalities, conservation authorities and NGO's don't have the resources at the local level to address these challenges.

We have been advocating that government at all levels develop programs that have the following characteristics:

1. Watershed based
2. Community Led and designed
3. Have the technical and financial support, social, economic and environmental
4. Have the right incentives to help people and communities transition to new approaches
5. Are in place for at least 10 years or longer.

In summary, MVCA has determined that business as usual is not an option and that is why we are making the changes that I have outlined and why we are advocating for the changes to programs and working relationships. Individual and agency action are important but we need strong leadership, collaboration, policy and programs from all levels of government and sectors of society if we are going to not only mitigate global heating but also have healthy rivers and streams and strong resilient communities both now and in the future.