

Supporting Cover Crop Adoption at Ausable Bayfield (2022)

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In our working landscape, the amount and duration of vegetative cover on agricultural lands helps to determine the health of soil and downstream water quality. Staff at Ausable Bayfield Conservation Authority (ABCA) have used an adaptive management approach to promote cover crop adoption since at least 2010. We build awareness, support community knowledge, find grant dollars to plant cover crops, and monitor the efficacy and the adoption of cover crops. Educating granting agencies that are concerned about water quality about the importance of land management, in particular cover crops is important. Staff at ABCA take every opportunity to provide this knowledge.

Programs – Cover Crop Funding for Landowners

Ausable Bayfield Conservation Authority staff work with several partners to administer cost-share programs to watershed landowners. These cost-share programs support and promote best management practices that landowners may implement on their properties, such as over-wintering cover crops, to protect and improve soil and water resources.

Huron Clean Water Project

The Huron Clean Water Project (HCWP) provides financial and technical assistance to Huron County residents to improve and protect water quality in Huron County. The County of Huron funds the program (\$500,000 in 2022). Staff at Ausable Bayfield and Maitland Valley conservation authorities administer the program.

Table 1: Cover Crop Incentive project applications approved through Huron Clean Water Project, across Ausable Bayfield and Maitland Valley watersheds

Cover Crop Season	Approved Applications	Total Acres
2021-2022	128	7970
2020-2021	73	4805
2019-2020	54	4651

Table 1 demonstrates that uptake in over-wintering cover crops remains high across Huron County, as the program is in its eighth year supporting cover crops and continues to see increasing uptake. The category remains available to Huron County cover crop producers to apply for in 2022.

Since the Cover Crop Incentive category was added in 2015, the requirements, incentive rate, and funding cap has been amended to keep the program relevant, and beneficial to producers, while maintaining the goal of protecting and improving water quality in Huron County. Administrators made recent amendments to the program, such as allowing a single species cover crop after corn or soybeans to reflect the challenges that Huron County producers expressed when trying to establish more over-winter cover following these main crops.

Landowners are able to apply for Cover Crop Incentive funding for \$15 per acre, up to a maximum of 150 acres per year. Project applications submitted through the HCWP must meet several requirements, including, but not limited to:

1. Landowners may apply every year. Each application to the HCWP must be for a different cover crop mixture.
2. There must be three or more species in the cover crop. A multi-species mix is not required for late season cover crops planted after corn and soy harvest. These fields will still need to meet the 50% residue requirement.
3. Crops may be tilled no sooner than the spring of the year following planting (may be chemically killed the previous fall).
4. A final residue measurement of at least 50% is required prior to planting the next crop in the following spring.
5. Cover crops are not to be used for forage or grazing.

Applicants are paid the incentive after HCWP program staff has confirmed the field(s) were managed according to the guidelines.

Ausable River Cover Crop Incentive

The Ausable River Cover Crop Incentive is for landowners living in the Ausable River watershed. The Government of Canada through the Canada Nature Fund funds the Ausable River Cover Crop Incentive program. Prior to 2020-2021, the Habitat Stewardship Program funded the Cover Crop Incentive for eligible landowners within the Ausable River watershed. Ausable Bayfield Conservation Authority staff administer the program.

Table 2: Cover Crop Incentive project applications approved within the Ausable River watershed

Cover Crop Season	Approved Applications	Total Acres
2021-2022	28	1742
2020-2021	23	1218
2019-2020	9	507

The Ausable River Cover Crop Incentive became available to eligible landowners in 2017. Table 2 demonstrates that uptake in over-wintering cover crops programs is increasing across the Ausable River watershed, as the program is in its sixth year supporting cover crops and continues to see increasing uptake. The category remains available to eligible landowners to apply for in 2022.

Landowners are able to apply for Cover Crop Incentive funding for \$15 per acre, up to a maximum of 100 acres per year. Project applications submitted through the Ausable River Cover Crop Incentive must meet several requirements, including but not limited to:

1. Landowners may apply every year. Each application to the program must be for a different cover crop mixture.
2. There must be three or more species in the cover crop.
3. Crops may be tilled no sooner than the spring of the year following planting (may be chemically killed the previous fall).

4. A final residue measurement of at least 50% is required prior to planting the next crop in the following spring.
5. Cover crops are not to be used for forage or grazing.

Ausable Bayfield staff confirm that field(s) were managed according to the guidelines and then applicants are paid the incentive.

Cover Crop Boost Program

The Cover Crop Boost Program is applicable to landowners that live in specific Ausable-Bayfield sub-watersheds, including the Bayfield River watershed and the shoreline tributaries that drain directly into Lake Huron. The Cover Crop Boost Program provides an opportunity for eligible landowners to apply for cover crop funding. The purpose of the Boost program is to monitor the agronomic (yields and soil health) and water quality with more land in over-winter cover. The Fred A. and Barbara M. Erb Family Foundation and the Ontario Ministry of Environment, Conservation and Parks (MECP) fund the Cover Crop Boost Program. Staff at Ausable Bayfield administer the program.

Table 3: Cover Crop Boost project applications approved within the Bayfield and Gully sub-watersheds

Cover Crop Season	Approved Applications	Total Acres
2021-2022	41	2882
2020-2021	18	1203

Landowners are able to apply for Cover Crop Boost funding for \$30 per acre, up to a maximum of 100 acres per year. Project applications submitted through the Cover Crop Boost Program must meet several requirements, including but not limited to:

1. Landowners may apply every year.
2. Crops may be tilled no sooner than the spring of the year following planting (may be chemically killed the previous fall).
3. A final residue measurement of at least 50% is required prior to planting the next crop in the following spring.
4. Cover crops are not to be used for forage or grazing.

Applicants are paid the incentive after Ausable Bayfield staff has confirmed the field(s) were managed according to the guidelines.

Communicating – Farmer Champions and Peer-to-Peer Learning

Based on our local findings about the significance of cover crops (see below) and recognizing the importance of peer-to-peer learning, we started hosting January producer meetings in 2010. We shifted our January producer meeting focus to Huron County Producer Cover Crop meetings in 2016. We also hosted summer “shop” talks starting in August 2011, with a cover crop focus. In the pandemic years, we have continued to host January Zoom Cover Crop Producer-led meetings and smaller tours of the cover crops with the Huron County Soil and Crop Improvement Association at the Huronview Demonstration Farm. A 60” corn demonstration and “We’ve got it covered” signs were other approaches used since 2020 for increasing awareness and supporting community knowledge.

Research – Field and Watershed Scale Monitoring of Cover Crops

Field Scale

One of the early findings from the Watershed Based Best Management (WBBE) program (2010- 2013) was the reminder that vegetative cover on cropped fields helps to reduce surface erosion. We measured water quality improvements at the field scale when a participating landowner rotated a crop-field into a hay field. Where we had measured surface erosion (sediment and phosphorus) on the edge of the cultivated field, we did not have any water (or sediment and nutrients) runoff in the vegetative-covered field.

We continue to monitor cover crop effectiveness at the field scale at our long-term edge of field site in Gully Creek. We use 10 years of data to demonstrate the probability of flow during precipitation events based on the vegetative cover (crop, cover crop or residue). Further, with advancements in mapping, we are working with the producer data to show profitability considerations through the crop rotations, at the field scale.

Watershed Scale – Watershed Model

Dr. Wanhong Yang is at the University of Guelph, Watershed Evaluation Group. Dr. Yang uses the long-term land management data and downstream water discharge data in Gully Creek to demonstrate that the water retention in the fields with cover crops has further benefits. Water retained in fields reduces downstream channel erosion, an important component of overall loading of sediment and phosphorus to downstream water bodies. The Great Lakes Agriculture Sustainability Initiative (GLASI) and ONFARM programs, led by Ontario Soil and Crop Improvement Association (OSCIA), have supported the research and the field and watershed scale.

Watershed Scale – Mapping

In the 2018 Ausable Bayfield Watershed report cards, we used 2015 aerial photography to classify agricultural lands as vegetated or not vegetated during the winter. The Modified Soil Adjusted Vegetative Index (MSAVI2) uses differences in light reflectance to classify the landscape. Fields with high vegetative cover will emit reflectance values that are higher than fields with bare soil.

An important consideration is that the MSAVI2 is limited to the detection of ‘living’ vegetative cover. Sprayed or “tilled under for green manure” cover crop fields are difficult to detect. The MSAVI2 is also dependent upon the quality of the aerial photography, in particular, the season in which the photography was flown. In southern Ontario, aerial photography is typically flown in early spring to capture the different forest systems (coniferous compared to deciduous). The progression of the growing season affects the MSAVI2. For instance, the spring of 2010 was warm and the wheat fields were obvious in the aerial photos from that year. In 2015, the cold, wet spring delayed the growth of wheat fields. Consequently, the MSAVI2 resulted in a lower percentage of overwinter vegetation cover on agriculture land in 2015 compared to 2010. The use of MSAVI2 would be fine for a spatial comparison but it has limited application in monitoring overwinter cover temporally.

Watershed Scale – Results

For a spatial comparison in the 2018 Report Cards, in the Ausable Bayfield area, overwinter cover (this includes wheat fields, hay/pasture, and cover crops) in 2015, ranged from six to twenty-six per cent. The South Gullies, Bannockburn, Bayfield North, Main Bayfield, and Bayfield Headwaters had the highest overwinter cover percentages. The Upper Parkhill, Lower Parkhill, Nairn Creek, Middle Ausable, and Lower Ausable had lower percentages. If fields were in a corn-soybean-wheat rotation, a minimum of 30 per cent of overwinter vegetative cover might be expected. The ABCA did not assign a grade to the percentage of overwinter vegetative cover on agricultural lands in 2018.

Other Watershed Mapping Options

Due to the limitations in the MSAVI2 technology, the Ausable Bayfield Conservation Authority has evaluated other tools to determine spatial and temporal trends in overwinter vegetative cover. With funding from OMAFRA and the Fred A. and Barbara M. Erb Family Foundation in 2021, the ABCA explored four methods to determine over winter cover on agricultural fields in the Gully Creek and the Main Bayfield watershed from 2012 to 2016. The four methods included:

- 1) landowner surveys,
- 2) drive-by windshield surveys,
- 3) Modified Soil Adjusted Vegetation Index² (MSAVI2) calculations on 4-band spring air photos (2015), and
- 4) Agriculture and Agri-Food Canada (AAFC) Annual Crop Inventory derived from satellite images.

As a part of WBBE, the Ausable Bayfield started windshield and land management surveys in some watersheds in 2009. Windshield surveys conducted in the autumn following corn harvest and before the snow accumulates help to provide information about vegetative cover over winter. Surveys conducted in the spring, help with understanding tillage and the main crops.

Landowner surveys and drive-by windshield surveys provided the most useful information to understand overwinter cover. These activities require landowner participation and staff time to conduct the surveys and input into the GIS database. MSAVI2 calculations on spring aerial photography has limited applications to determine overwinter cover, due to aforementioned issues. The MSAVI2 calculation may be effective on satellite images acquired at targeted times of the year. The AAFC crop inventories focus on the growing season crops and therefore, have limited overwinter crop information.

Summary

Communicating about the research with policy advisors and producers has led to enhanced knowledge about the environmental benefits of cover crops. As evidenced by the addition of cover crop funding in the HCWP in 2015, local research and demonstration works to enhance community support and uptake. Ongoing dialogue about the short and longer-term agronomic benefits/trade-offs needs to be supported.