



AN OVERVIEW OF THE AVOIDED AND REMOVED GREENHOUSE GASES IN ALBERTA'S ANNUAL CROPPING AGRICULTURE, BY POSTAL CODE, FROM 2002-2018: WHERE DID THIS HAPPEN?

Biological Carbon Canada

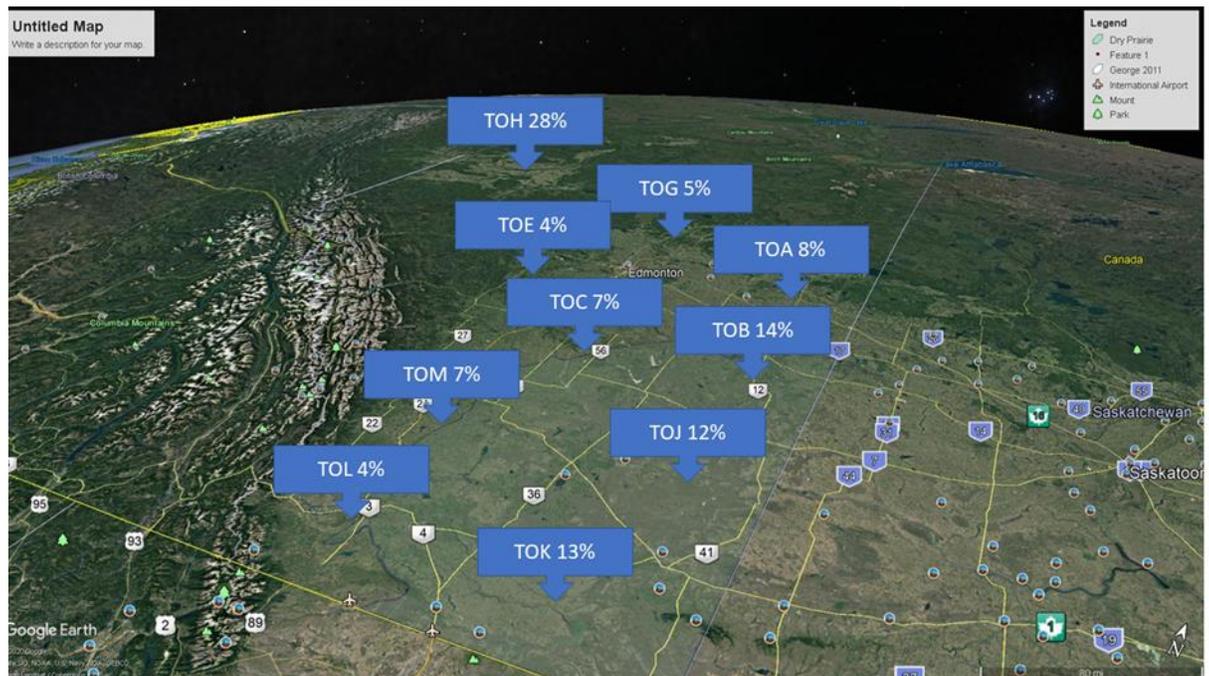
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Executive Summary

Between 2002 and 2018, approximately 15,712,760 tonnes of CO₂e reductions were serialized and transacted based on actions undertaken on Alberta farms using two land-based offset Protocols, under evolving standards for quantification and for assurance. These likely represent the majority of all direct GHG reduction activities undertaken on the Province's farms, but do not include on farm energy efficiency, renewables deployment, livestock methane abatement or other voluntary activities due to lack of available data.

Figure 1: Overview of where in Alberta carbon reductions occurred by percentage, grouped by Postal Code



Protocol History

In March 2009, the QUANTIFICATION PROTOCOL FOR TILLAGE SYSTEM MANAGEMENT Version 1.3 was issued under the *Specified Gas Emitters Regulation*.

In this protocol, it allowed for the creation of a greenhouse gas offset and allowed these offsets to be used for compliance under the regulations.

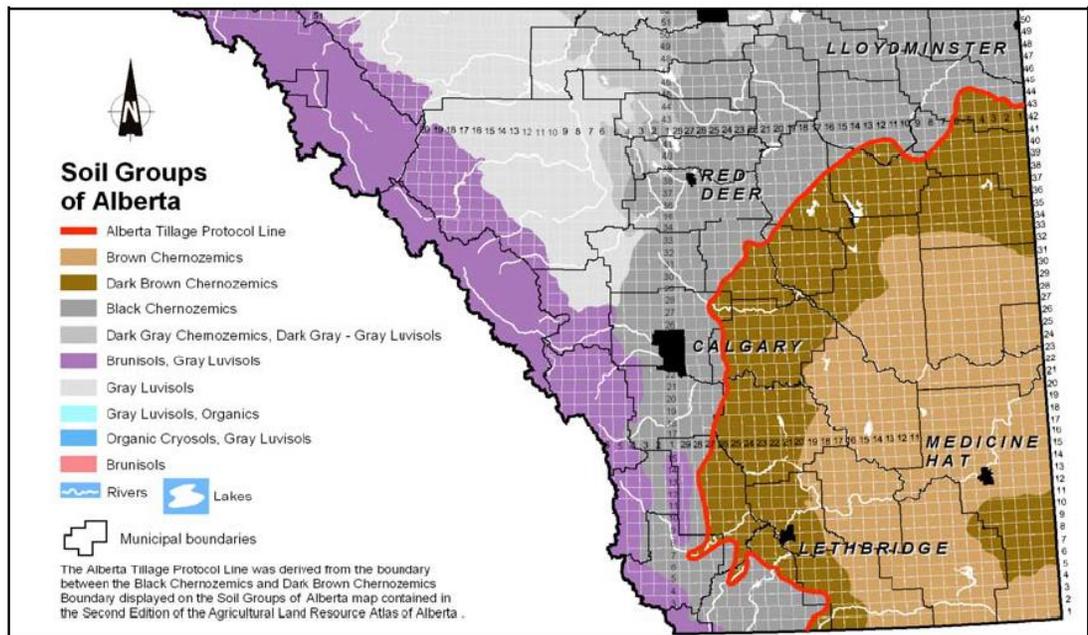
The Protocol, in summary, allowed a farmer to claim an offset through:

- Allowed for the creation of an offset back to 2002.
- Allowed for the creation on annual crops only.
- Allowed for the creation based on no-till and reduced till systems.
 - No-Till – Up to two passes with low-disturbance openers (up to 38%, the ratio between the widest part of the seed boot and distance between the seed boot shanks) or one pass with a slightly higher disturbance opener (up to 46%) to apply seed, fertilizer or manure, discretionary tillage of up to 10% (number of acres cultivated in a parcel making a claim); with no cultivation post-harvest.
 - Reduced Till - Soil disturbance to apply seed, fertilizer, or manure exceeds no till definition and/or one cultivation in fall or spring; with up to two cultivations post-harvest.
- Applies to a change in CO₂e (both avoidance and soil sink increases).
- Established a division in the province between the lighter soil zones in southern Alberta and the rest of the province.
- In Parkland, the farm was able to claim 0.454T/ha per vintage year under no-till and 0.015T/ha under reduced tillage. In 2012, this was amended to 0.316/T per vintage year.
- In Dryland, the farm was able to claim 0.235T/ha per vintage year under no-till and - 0.019T/ha under reduced tillage. In 2012, this was amended to 0.154/T per vintage year.

In April 2012, the QUANTIFICATION PROTOCOL FOR CONSERVATION CROPPING version 1 (ISBN 978-0-7785-9627-1/8) was issued under the *Specified Gas Emitters Regulation*.

This Protocol replaced the 2009 Protocol. At the same time, the standard of audit for verification was upgraded.

Figure 2: Dividing line between soil zones



Source: Alberta Land Resource Unit. 1995

Figure 3: Examples of how an aggregator company assure row spacing and boot widths comply with Protocol. In this example the disturbance is 36%. In addition to these, a picture of the serial number is also taken. All are GPS referenced.



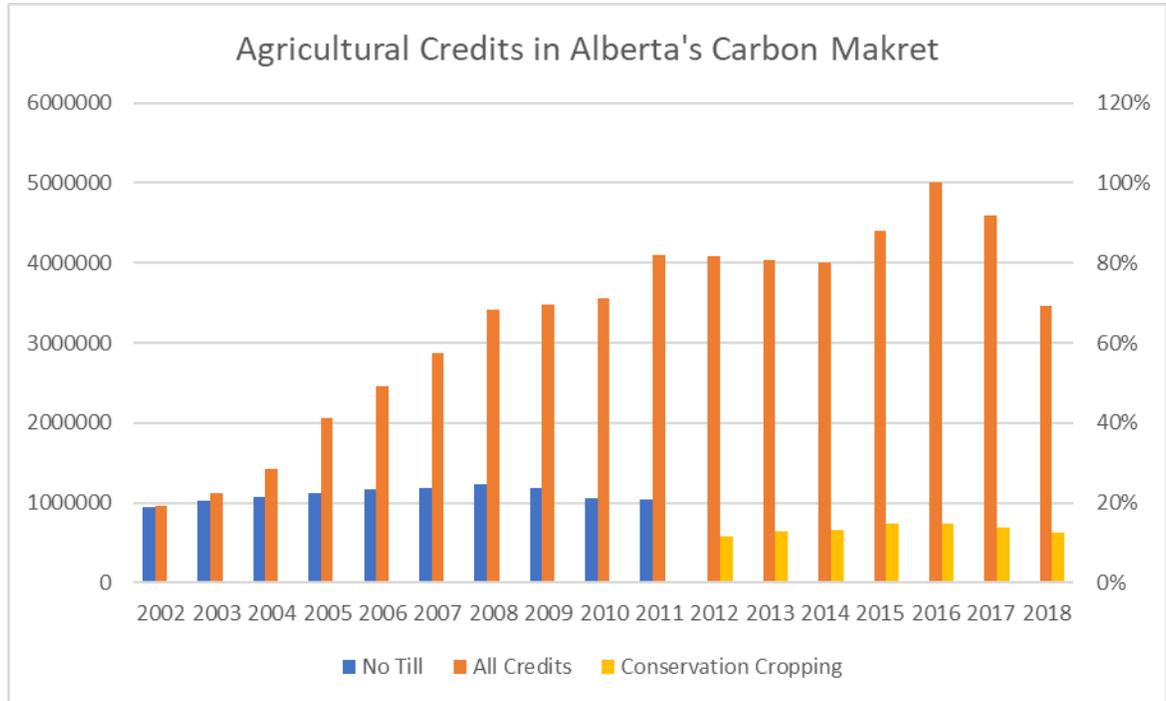
The Marketplace

The marketplace is bilateral. The farm, who uses the farming system as defined by the Protocol, makes the claim an offset was created. Through an aggregator, the offset is verified and serialized. The aggregator then negotiates the sale of an offset to a regulated emitter and then the emitter submits the offset for compliance.

The figure below shows the vintage year production of offsets.

Between 2002 and 2011, the 2009 Protocol allowed for the serialization of 11,038,581 tonnes of CO₂e reductions. When the 2012 Protocol was adopted, it allowed another 4,674,179 tonnes to be serialized. The marketplace now has traded agricultural offsets in total of 15,712,760 tonnes.

Figure 4: Total Tonnes Produced in Alberta by Protocol

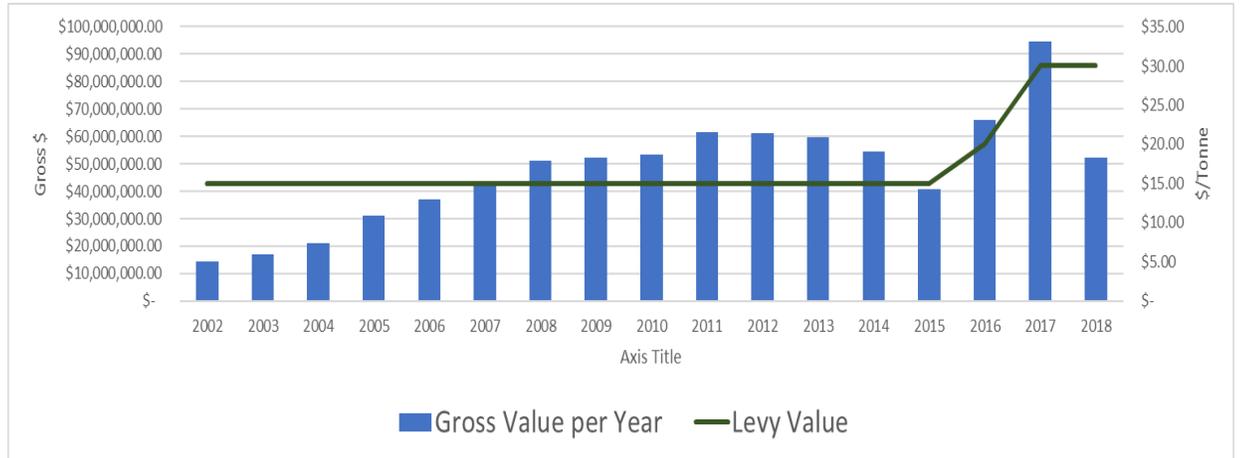


Gross Value to Alberta Famers

The graphic below represents the gross value to the farming community. The value is based on the levy charged final emitters. Because market data is not transparent, the discount the tonnes traded under the levy is not available.

The gross total value of the tonnes retired (sold) is approximately \$810.67 million dollars.

Figure 5: Annual Gross Value of Retired Tonnes from Farmers



Methodology

Data and other sources were used to estimate the relative percentage of offsets across the province. The total tonnes in the registry was then distributed across the province based on the relative geographic size of each postal code.

Example

TOK, in the southern part of the province, covered an estimated 29% of the Dry Prairie region and 11% of the Parkland areas. Based in an estimate that a total of 2,252,215 tonnes originated from the Dry Prairie region, and 7,070,742 tonnes originated in the Parkland, it was calculated 1,230,309 tonnes came from the Dry Prairie and 812,418 tonnes came from Parkland. This totaled 2,042,728 tonnes or 13% of the total tonnes estimated produced over the period.

Geo-referencing Emission Reductions

The project attempts to geo-locate where in Alberta the production of offsets occurred.

Figure 6: An Estimate of the Geo-location of Reductions from Alberta Farms by the first three letters of a postal code.

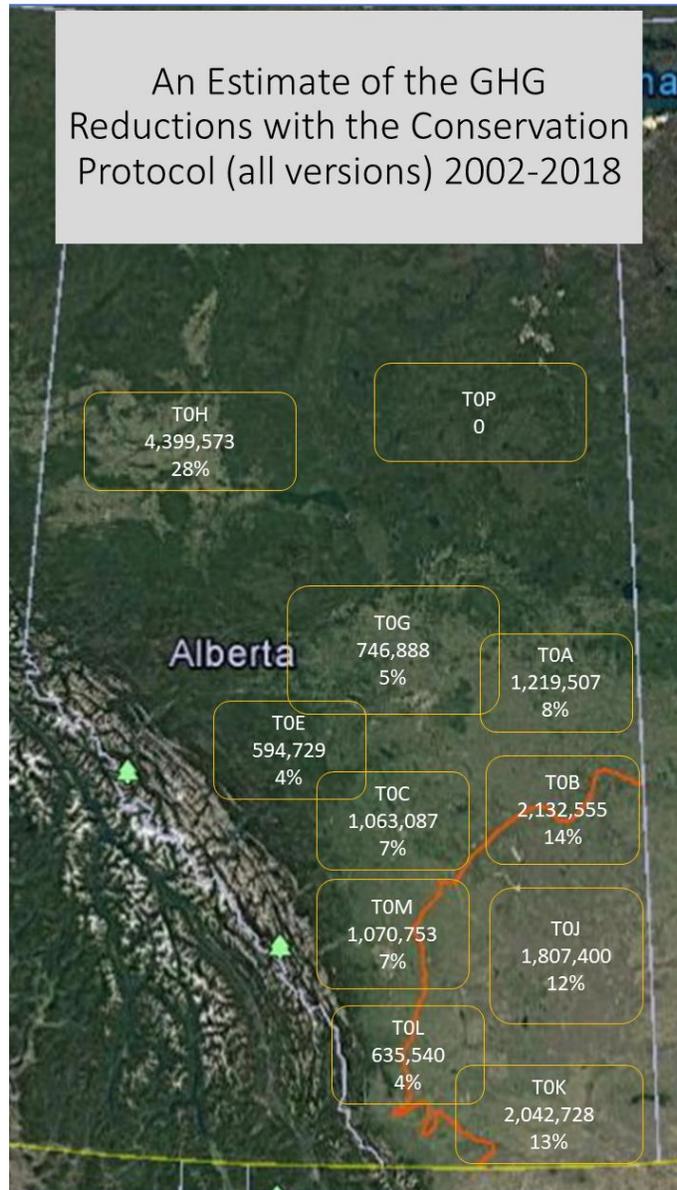


Table 1: Estimated breakdown of tonnes by postal code.

Postal Code	Estimated Tonnes	Percentage	Farmland Approximate Center GPS of Postal Code
T0H	4,399,573	28%	56.15N, 118W
T0P	0	0%	
T0G	746,888	5%	54.52N, 114.06W
T0A	1,219,507	8%	54.52N, 111.63W
T0E	594,729	4%	53.80N, 114.97W
T0B	2,132,555	14%	53.13N, 111.45W
T0C	1,063,087	7%	52.46N, 112.25W
T0M	1,070,753	7%	52.14N, 113.70W
T0J	1,807,400	12%	51.15N, 111.41W
T0L	635,540	4%	50.30N, 113.50W
T0K	2,042,728	13%	49.45N, 111.80W

Future Issues

The current protocol expires at the end of 2021.

For More Information

Biological Carbon Canada

<https://www.biologicalcarbon.ca/>

ACTia

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