

## EARNING CARBON OFFSETS THROUGH TILLAGE MANAGEMENT

**Agricultural producers can use this protocol to broaden the benefits they receive from reduced tillage practices, by qualifying for carbon offsets under the Alberta Offset System**

Alberta has introduced first-of-its-kind legislation in North America that gives agricultural producers new ways to benefit from helping to reduce greenhouse gas emissions. The result is the Alberta Offset System, which includes a number of protocols producers can follow in order to earn carbon offsets from documented improvements to practice changes. These may be sold in the growing carbon offset market.

Alberta Agriculture and Rural Development (ARD) has developed a series of Protocol Summary documents to provide producers with a brief introduction to each of the protocols related to agriculture. Producers interested in improving management practices through projects that meet the requirements of this protocol can get more information through the website links and contact information provided at the end of this document.



**Record keeping is critical.** To qualify for offsets, producers need to provide documentation of the practices that remove and reduce GHG emissions. This is critical not only to earn offsets, but to protect producers from liability if there is any challenge to the carbon offset credits they are claiming.

### THE OPPORTUNITY FOR PRODUCERS

The Quantification Protocol for Tillage System Management offers a combination of benefits for producers. Farmers can increase soil carbon levels and reduce greenhouse gas emissions from fuel use, while earning carbon offsets in the process.

The focus of this protocol is for producers to reduce their amount of tillage. This can mean shifting portions of their land from a full-tillage system to a reduced-tillage or no-tillage system, or from a reduced-tillage system to a no-tillage system. The more land in a lower tillage system, the greater the number of carbon offsets a producer can earn under the Alberta Offset System.

**“FARMERS CAN INCREASE SOIL CARBON LEVELS AND REDUCE GREENHOUSE GAS EMISSIONS FROM FUEL USE, WHILE EARNING CARBON OFFSETS IN THE PROCESS.”**

Offsets represent some additional income for producers in the short-term. Documenting and verifying practice change by meeting protocol requirements can also open the door to greater opportunities in the future. Best practices and market potential for environmental goods and services in this area are expected to continue to improve and expand.

### KEY DETAILS

The key details of this protocol fall into several categories.

#### Main requirements

- For most protocols, earning carbon offsets is based on showing ‘before’ and ‘after’ practice change that results in lowering of greenhouse gas emissions. In this tillage protocol, coefficients were adjusted to allow early adopters to participate in the offset market so only proof of the reduced tillage practice is required.

Tillage Change	Total	
1) Parkland	(T CO <sub>2</sub> e / ac yr)	(T CO <sub>2</sub> e / ha yr)
NT	0.16	0.40
RT	0.01	0.02
2) Dry Prairie		
NT	0.09	0.22
RT	-0.01	-0.02

A more complete table including assurance factors is available in the full protocol.

*Note: After January 1, 2012, updated coefficients will reduce credit potential due to increases in adoption levels of reduced tillage.*

- To be eligible, farmers need to produce annual crops and have farm records that show where and what type of reduced tillage has occurred during the protocol application period (e.g. field records, air photos, field investigations, farm implement measures, machinery receipts).
- Farmers also need to provide records that show ownership and contractual relationships related to the land being used as claimed.

### Calculating offsets

- The protocol provides calculations to determine the number of offsets the producers are eligible to earn, based on the type of tillage management they have adopted and the land area it is used on.
- These calculations result from a scientific assessment of GHG removals and reductions of reduced tillage or no tillage compared to full tillage in two soil regions of Alberta: the Parkland (Black and Gray soil zones) and Dry Prairie (Brown and Dark Brown soil zones.)
- The calculations apply these factors to different tillage management systems. When these factors are multiplied by the area under that system, this calculation provides a value for the carbon offsets a producer can earn. (See Chart on page 1).
- As a result, producers only need to provide information on the practice they have adopted and then use the calculations provided, and do not need to “measure” their emissions.
- This greatly reduces the cost of entering the Alberta Offset System for farmers, and provides certainty for buyers and sellers in the marketplace.
- Another factor that provides certainty is the “credit duration period” or the period of time for which the factors used in calculations remain stable. The credit duration period for this protocol is 20 years.

**“THE MORE LAND THAT IS SHIFTED TO A LOWER TILLAGE SYSTEM, THE GREATER THE NUMBER OF CARBON OFFSETS A PRODUCER CAN EARN UNDER THE ALBERTA OFFSET SYSTEM.”**

**Capturing Credits Back to 2002.** Producers may claim carbon offsets based on eligible practices adopted at any time between 2002 and the current year, as long as requirements such as having necessary records are met. However, this option will not be available after January 1, 2012 due to increased verification requirements.

### Benefits of lower tillage

- There are many agronomic benefits from using minimal and no tillage in addition to those acknowledged in the protocols.
  - **Keeps more carbon in the soil.** Reduced tillage or no tillage means less soil disturbance and reduced losses of soil organic carbon.
  - **Keeps more crop residue.** It also means higher retention of crop residues to protect the soil surface from erosion, which also increases soil moisture levels.
  - **Increases yields.** Crop yields improve over time, through improved water and nutrient cycling.
  - **Saves fuel.** Fuel savings in reduced tillage systems also result in less carbon dioxide emissions from combustion of diesel.

### Specific management scenarios

Here’s a snapshot of some key additional guidelines producers should be aware of. More information on guidelines for these scenarios and others is available in guidance material.

- Credits are calculated based on a calendar year, not a crop year
- Fall fertilization and fall seeding are allowed if low disturbance openers are used
- First year of seeding perennials with reduced or no till is acceptable
- Irrigated Dry Prairie is considered to be in the Parkland
- Most sweeps do not qualify as no till
- Manure application is not considered in this protocol
- Inter-row tillage is considered the same as full tillage

### Definitions

- The protocol uses specific definitions of different tillage systems, based on what is allowed during the cropped land period and fallow period (where applicable).
  - **Cropped land period.** This applies to the management cycle that ends at harvest, (e.g. harvest to harvest). This includes land prepared for seeding which may occur in the previous fall.
  - **Fallow period.** This extends from harvest for one full year to the next fall.
- The three different tillage systems are defined as follows:
  - **No-till.** A no-till system allows up to two passes with low-disturbance openers (up to 38 percent) or one pass with a slightly higher disturbance opener (up to 46 percent) to apply seed, fertilizer or manure. It allows discretionary tillage of up to 10 percent of the surface area of an agricultural field, and does not allow any cultivation. During the fallow period, no cultivation is allowed.

- Percent values associated with openers are based on maximum opener width divided by the shank spacing of the implement.
- Discretionary tillage means that up to 10 percent of the surface area of a single agricultural field may be cultivated to address specific management issues. These areas are determined on an annual basis, and may change from year to year.
- Additional operations with harrows, packers, or similar non-soil disturbing implements are accepted.
- **Reduced-till.** During the cropped land period, a reduced-till system allows soil disturbance to apply seed, fertilizer, or manure that exceeds the no-till definition, and/or one cultivation in fall or spring. During the fallow period, one or two cultivations are allowed.
- **Full-till.** A full-till system has more than one cultivation between harvest and subsequent seeding if there is no fallow period, or, more than three cultivations between harvest and subsequent seeding if there is a fallow period.

### Aggregators can help

Most farmers will not earn enough carbon offsets to enter the marketplace individually, as buyers are typically seeking offsets that represent carbon dioxide emission equivalents in the thousands of tonnes. That's where "aggregators" come in.

- These service providers pull together offsets from many different farmers, to produce a much larger package of offsets that is easier to manage (reducing verification costs and reporting requirements) and easier to sell.
- They also handle many of the requirements of dealing in the Alberta Offset System, such as registering the specific acres for which offsets will be calculated.
- There are a growing number of aggregators in Alberta and a list available on the Carbon Offset Solutions website, at [www.carbonoffsetsolutions.ca/eot/resources/marketservice.html](http://www.carbonoffsetsolutions.ca/eot/resources/marketservice.html).
- Producers may negotiate single or multiple years of offset sales when negotiating and signing a contract with an aggregator within the Alberta Offset System.

## LEARN MORE

Producers who are interested in pursuing projects that meet the requirements of the Tillage System Management protocol can access more information through the following website links:

**Alberta Agriculture and Rural Development – Climate Change:**  
[www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/cl11618](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/cl11618)

**Alberta Environment – Climate Change:**  
[www.environment.alberta.ca/0923.html](http://www.environment.alberta.ca/0923.html)

**Climate Change Central – Carbon Offset Solutions:**  
[www.carbonoffsetsolutions.ca](http://www.carbonoffsetsolutions.ca)

These resources include background information, available Interpretive Guides on the protocol, as well as access to the complete Protocol Documents. Producers can also contact ARD directly at (780) 310-FARM (3276) or Toll Free at 1 (866) 882-7677.

***This document last updated: January, 2011***

*Disclaimer: The information provided in this document is intended as general guidance only, as a first step for agricultural producers considering projects for the Alberta Offset System protocols. Please consult the full Government of Alberta approved protocols and available Interpretive Guides for more complete information before making a decision to pursue practice change aimed at earning carbon offsets.*

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