Fragmentation and Conversion: Frequently Asked Questions

What is fragmentation of agricultural land?
Fragmentation occurs when large agricultural areas become divided into separate parcels isolated from each other by non-agricultural land uses such as houses. Fragmentation can also happen within agricultural parcels due to access roads, oil and gas developments and/or pipelines, power lines, or other types of linear infrastructure.

How is fragmentation calculated?
Agriculture and Forestry measures fragmentation by comparing the number of small parcels (10-80 acres) to the number of large parcels (80+ acres) within a given municipality. The more small parcels there are, the more fragmented the land base is. The level of fragmentation is expressed as the percentage of agricultural parcels between 10 and 80 acres among the total number of agricultural parcels in a municipality.

What is conversion of agricultural land?
Conversion is an actual, observable land-use change from an agricultural use to a non-agricultural use (or vice versa), such as houses. Conversion can be temporary (such as oil and gas well development) or permanent (such as acreages (rural residential development)). Conversion may be a gain (positive) or loss (negative) within any given year.

How is conversion calculated?
Agriculture and Forestry sorts parcels by size, with parcels between 10 and 240 acres generally found to be agricultural. Agricultural dispositions (e.g., grazing) on public land are also included. Conversion is then calculated by adding up the total agricultural area for a given year and subtracting the previous year's total from it, which provides the difference in the amount of agricultural land from the previous year (conversion).

What is the Land Suitability Rating System (LSRS)?
Developed in 1995, the LSRS is a comprehensive approach to integrating and modeling soil, landscape and climate factors. Agriculture and Forestry uses the LSRS for spring seeded small grains, meaning that land is assessed based on its productive capacity for those crops. Universally, LSRS 1, 2 and 3 lands are considered suitable (prime) for crop production, while LSRS 4 lands are considered marginal for crop production. Alberta does not have any LSRS 1 lands, largely due to climate factors.

How does prime agricultural land under the Land Suitability Rating System compare to prime agricultural land under the Canada Land Inventory?
The amount of prime land under both systems is relatively similar. Under the Land Suitability Rating System (for spring seeded small grains), Alberta has approximately 29.2 million acres of Class 2 and 3 lands (combined). Under the Canada Land Inventory, Alberta has approximately 28 million acres of Class 1, 2 and 3 lands (combined). However, beyond Class 4 ratings for both systems, the differences become larger due to the different methods used in classifying agricultural land.

How did Agriculture and Forestry decide on the land use classes?
The Urban land use class includes any land within the boundaries of an urban municipality – this area is defined by the data Agriculture and Forestry uses. To create the other classes, Agriculture and Forestry conducted an analysis of parcel sizes of titled land throughout Alberta. The analysis showed that the most common parcel sizes are around 5 and 160 acres – 5 acre parcels are likely rural residential, and 160 acre parcels are likely agricultural. This led Agriculture and Forestry to create a rural residential land use class of 0-10 acres, setting the lower limit of the agricultural class to 10 acres. The upper limit was set to 240 acres as the result of further in-depth analysis and looking at large parcels and what they are used for.

What are the land use classes that Agriculture and Forestry uses?
The land use classes are:

- Urban (defined by the data we use)
- Rural Residential (0-10 acres)
- Agricultural (10-240 acres plus agricultural dispositions on public land)
- Non-agricultural (anything not in the three classes noted above)

What is Agriculture and Forestry's data source?
The calculations use land titles data provided by Alberta Municipal Affairs; agricultural dispositions on public land are identified in data provided by Alberta Environment and Parks.

Have any other groups done work on fragmentation and conversion?
Agriculture and Forestry is aware of two other groups that have worked on calculating conversion of agricultural land in Alberta. Agriculture and Agri-Food Canada and the University of Alberta have both undertaken calculations to determine the amount of agricultural land converted to non-agricultural uses, however they use different methodologies and their calculations cover different time periods.
Agriculture and Agri-Food Canada has calculated the amount of agricultural land conversion through the Census of Agriculture. Comparing two instances of the Total Farm Area reported through the Census of Agriculture allows for the calculation of how much agricultural land was lost (or gained) over the corresponding time period (2006 to 2011, for example).
The University of Alberta has calculated the amount of agricultural land conversion between 2000 and 2012 using remote sensing technology (satellite imagery sorted into land use classes). The University of Alberta's calculations used Agriculture and Agri-Food Canada's Annual Crop Inventory to compare the amount of agricultural land in 2000 to the amount in 2012. The University of Alberta's analysis focused on examining the conversion of agricultural land in the Edmonton-Calgary (Highway 2) corridor, however they did calculate conversion of agricultural land for all of Alberta.

How accurate is the Agriculture and Forestry methodology? What problems does it have?

The methodology calculates that Alberta has approximately 21 million hectares of agricultural land, which generally aligns with historical Census of Agriculture data. There are potential sources of error in the calculations, however, including:

- Issues with the Green Area boundary (has not been updated since 1999);
- Misclassification of public land that is sold to a private owner;
- Exclusion of any agricultural land within the boundaries of an urban municipality;
- The potential inclusion of wetlands, forests/woodlots, golf courses, and other land uses in the Agricultural land use class;
- The misclassification of large agricultural parcels (over 240 acres) into the Other category;
- The existence of “sliver” polygons that occur due to the overlaying of layers in the Geographic Information Systems (GIS) program; and
- Assigning LSRS classes to parcels based on the dominant (50% or greater) class of that parcel.

Why is there such a large increase in agricultural land in the Lower Peace Region?

Since 2011, the Government of Alberta has released 136,000 acres of public land in Mackenzie County to be sold by public auction to private individuals. Much of this land has been cleared and is now used as cultivated agricultural land, which shows as an addition to the agricultural land use class. This land, however, is of a lower Land Suitability Rating System quality than that located throughout much of southern Alberta.

Why did it take so long to produce the latest report?

In order to ensure that the calculations best represented the actual level of fragmentation and conversion of agricultural land in Alberta, several different methods were analyzed for accuracy and applicability. This analysis took some time to make sure that the method used to calculate fragmentation and conversion was accurate, repeatable, and transparent. The process was started in 2011, and Agriculture and Forestry is now confident in the methodology used for this report. Agriculture and Forestry will continue to assess the reliability of the data provided in order to report the best information possible on the fragmentation and conversion of agricultural land.

How often will reports be released?

Fragmentation and conversion data will be reported annually (by Land-use Framework region, municipality, and LSRS class). A full report that will include trend analysis and discussion will be provided every five years. The first full report, covering 2011-2015, is expected in late 2016.

Will Agriculture and Forestry provide a discussion/analysis of current trends?

Trend analysis will appear in the full report every five years – the first of these will be released in late 2016.

Why didn't Agriculture and Forestry use remote sensing or the Census of Agriculture?
After looking at and trying to use both the Census of Agriculture data and remote sensing data for calculating the fragmentation and conversion of agricultural land, Agriculture and Forestry determined that both datasets contained inconsistencies that made them difficult to use for annual reporting on a regional scale. They may be more suitable for comparing distant periods in time.

What is the purpose of this reporting?
Within regional plans under the Land-use Framework, Agriculture and Forestry has committed to reporting on the fragmentation and conversion of agricultural land. The reports are intended to assist municipal decision-makers in their land-use planning decisions by providing reliable information on the agricultural land base in each municipality and Land-use Framework region. The reporting also will provide a stream of data that Agriculture and Forestry will monitor over time to support future policy development.

Does Agriculture and Forestry have any information for 1996-2010?
Agriculture and Forestry and Municipal Affairs examined data availability for the 1996-2009 time period (no data was available for 2010), however there were some inconsistencies with the reliability of the data. This information was used to assist in ensuring the current methodology generally aligns with historical trends. Agriculture and Forestry is assessing whether some of this data can also be published.

Which classes of farmland are we losing the most of?
According to our calculations, much of the agricultural land lost to conversion is Land Suitability Rating Class 2 and 3, which is the most productive farmland in the province (prime land). A substantial portion of the agricultural land gained within the province was of lesser quality (Land Suitability Rating Classes 4, 5 and 6).

Where are we losing the most high quality farmland?
Most of the high quality (Land Suitability Rating Class 2 and 3) is being lost in the Edmonton-Calgary corridor along Highway 2.

What is the government doing about the fragmentation and conversion of agricultural land?

While land use decisions are made by individual municipalities, the Government of Alberta guides and supports them in their decision-making. This is done through the Provincial Land Use Policies, regional plans under the Land-use Framework, as well as the Efficient Use of Land Strategy and its associated compendium of tools.

The *Provincial Land Use Policies* encourage municipalities to identify their agricultural areas and reduce the fragmentation and conversion of agricultural land by directing non-agricultural development to other areas. As these policies are updated and incorporated into regional plans under the Land-use Framework, municipalities are now expected to follow this direction (rather than being encouraged to follow it).

The *Efficient Use of Land Strategy* provides municipalities with direction on reducing the footprint of their built environment, and the collection of tools shows them a variety of methods they could use to do that.

Are there incentives to keep agricultural land in production instead of converting it to other uses?

Agriculture and Forestry and the Government of Alberta are focused on the voluntary avoidance of fragmentation and conversion, however local municipalities can provide incentives to avoid converting agricultural land to other uses – the Efficient Use of Land tools compendium provides some guidance on ways that this can be done.

Where can I find additional information on the methods and results?

An in-depth explanation of the methodology, the results tables for each Land-use Framework region, and historical conversion reports can be found at www.agriculture.alberta.ca/landuse.