

Agricultural Preservation – Analysis and Modeling Assumptions

Introduction and Purpose

The *GO TO 2040* plan, due to be complete in 2010, will make recommendations for policies, strategies, and investments needed for northeastern Illinois to reach its potential. For the plan to be viable, it is critical that the *benefits* and *costs* of these recommendations be understood. This document is part of a series that begins to analyze potential plan recommendations in this context by developing “sample programs” for the implementation of potential plan recommendations.

In this case, two “sample programs” for agricultural preservation were developed to present potential future land use opportunities for farming in the region. The first program (p. 3) is a purchase of development rights program which would compensate farmers or land owners for the rights of development on their land in order to keep the land in agricultural use. The second program (p. 11) is described in less detail and promotes local food systems with emphasis on a regional program that would develop food distribution channels and urban agriculture. This would support the local farming economy and support existing healthy living programs. While these are presented as separate programs in this paper for simplicity, they are not incompatible and could be combined. Other considerations in agricultural preservation are noted at the end of the report. The remainder of this document, and the accompanying presentation, describe how these “programs” were developed.

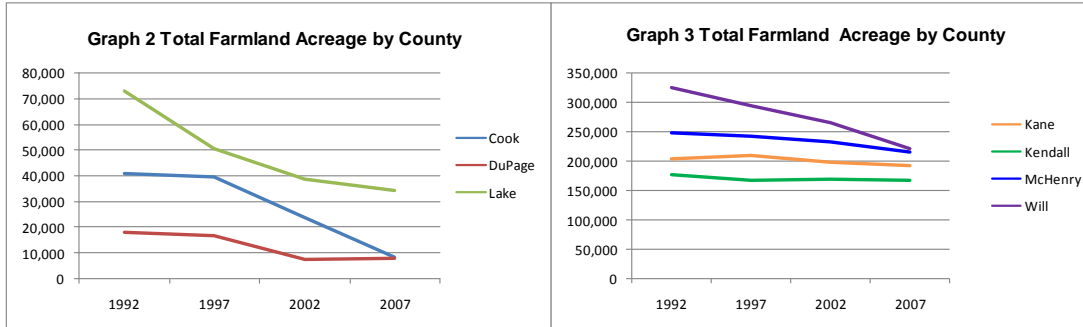
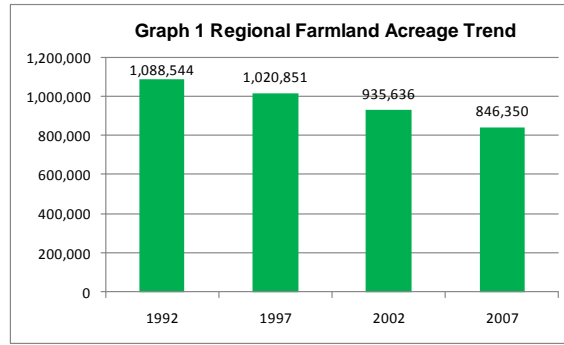
Before reviewing the remainder of this document, please read the following notes, which explain its purpose and limitations.

- **Implementation:** This document does not address the responsibility for implementing the “sample program” described here. This is a very important consideration and will be addressed as a next step.
- **Scenario context:** Agricultural preservation will not be pursued in the absence of other strategies. CMAP recognizes that the benefits of the strategy are magnified when linked with open space preservation, stormwater management, and ecosystem restoration. As a later step, agricultural preservation will be analyzed along with these other strategies; but for this series of documents, CMAP is attempting to isolate and examine the benefits of individual strategies.
- **Site specificity:** The results of this analysis are not accurate at the parcel level, and further geographic detail beyond what is shown in this document cannot be given.
- **Assumptions:** To perform the analysis of the “sample program” described here, assumptions were made for appropriate locations, unit costs, and others. The purpose of this document is to allow these assumptions to be discussed and questioned, but please note that *some* assumptions must be made for any analysis to be possible.

The purpose of the analysis and modeling exercise is to determine, on a regional scale, the benefits and cost of the “sample programs” described above.

Farmland in the Region

Although Illinois is one of the leading states in producing corn, wheat, and soybean crops, farmland acreage has continuously declined. Since the northeastern region is the most populated in Illinois, its farmland has been at highest risk of loss, especially to residential and commercial development. Graph 1 shows that 242,194 acres have been removed from agricultural use in the total region during the last fifteen years, which is approximately 16,000 acres annually. However, examining loss by county gives more insight into regional differences, which is important when considering a regional preservation program. The majority of the region’s farmland, 94%, exists in Kane, Kendall, McHenry, and Will counties. Graph 2 and 3 show losses in farmland among the seven counties.



As these graphs show if current trends persist, the region will continue to lose significant amounts of its agricultural land between now and 2040.

Treatment of Agriculture in Regional Land Use Plans

Despite the continual loss of farmland in the region, farmland is viewed as an asset. Table 1 below provides statements from county land use plans about the future of farmland; collectively farmland preservation can be seen as a regional priority. The preservation of agriculture is also identified as a goal in CMAP’s Regional Vision.

County	Land Use Plan	Farmland Preservation Policies
Kane	2030 Land Resource Management	To maintain the goal of keeping 50% of area agricultural in 2030, the plan calls for 50% of new growth to take place in the existing urban corridor. The western third of the county is currently agricultural landl.
Kendall	Land Resource Management	Maintain the most productive agricultural lands for agricultural purposes, allowing only less productive land to be used for urbanization. The plan calls for the south western third of the county to remain agricultural.
Lake	Regional Framework 2020	Goal is to protect select farmland; policies support specialty farming, working farms inclusive of heritage, protect agricultural land in conjunction with open space.
McHenry	2030 Land Use Plan (Draft)	Adopting a “land first” approach to planning to discourage the premature development of agricultural lands; utilize LESA system, encourage agri-tourism and specialty crops. Connect agricultural land and open space.
Will	Land Resource Management	The viability of large-scale agriculture in Will County will be extended as long as is feasible through sound land use planning and through making tools available that provide farmers an alternative to conversion to non-agricultural uses. The County will explore tools that allow farmers who so desire to make it possible to permanently preserve farmland

* Kane is the only county with a purchase of development rights program, assisted by private funding.

Regional Purchase of Development Rights (PDR) Program

One common method of farmland preservation involves Purchase of Development Rights, or PDR. Under such a program, a public agency (usually) purchases easements on farmland that restrict development potential. The farmland can continue to be used for farming purposes, but cannot be developed. Within the region, Kane County currently has a successful PDR program, and other counties are considering similar approaches.

There are other approaches to conserving farmland, such as instituting agricultural zoning. However, PDR is one of the more effective long-term approaches, because once the rights of development are purchased by a public agency they are held in perpetuity.

As with any regional analysis and modeling process, the definition of the PDR program involved making generalities and assumptions. These assumptions were based on available literature and/or interviews with regional and national experts. Assumptions were part of five stages in this analysis:

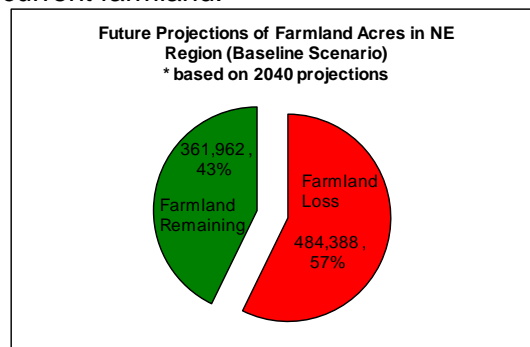
- Set a target for the number of acres that could be preserved through the PDR program.
- Determine the soil productivity in the region distinguishing between most productive soil and least productive soil.
- Determine economic farmland values across the region.
- Determine other important criteria to be considered when developing a “sample program” for farmland preservation.
- Determine the approximate cost of acquiring the development rights of farmland within a regional PDR program.

PDR programs are voluntary, relying on willing sellers to be effective. CMAP has not attempted to forecast the willingness of agricultural landowners to participate in the program. For this initial report, it has been assumed that willing sellers of development rights can be found. In Kane County, the program has been popular among farmers, and currently has a waiting list for participation.

The assumptions within each stage of analysis will be fleshed out in greater detail below.

1. Set a target for acres that could be preserved through the PDR program.

The calculation used to project farmland loss is based on the historical loss of acreage from 1992 to 2007; loss totaled 242,194 acres. This timeframe corresponds with recent population growth and increased development on farmland. Without any action, an annual loss of 16,146 acres could continue over the next 30 years; this could lead to an additional loss of 484,388 acres in the region by 2040, 57% of current farmland.



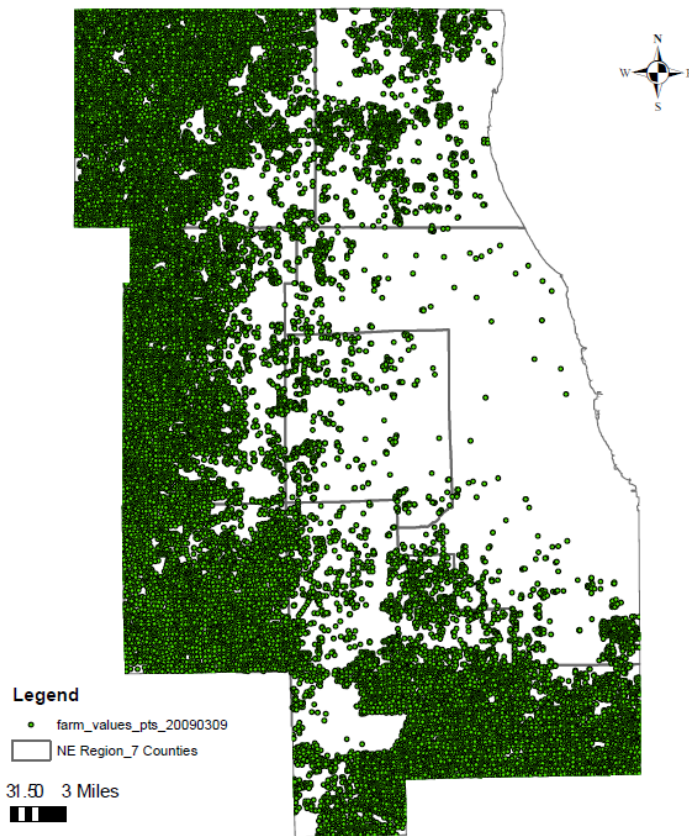
It is certain that some farmland will be converted to non-agricultural use to support regional growth. A regional PDR program would seek to reduce the amount of farmland lost, and also preserve the most

valuable land. For purposes of initial discussion, this paper sets a target of preserving 75% of the region's farmland, which would mean having 630,000 acres across the region be used for agriculture in 2040. This would require reducing the amount of farmland lost from 484,000 to 210,000 acres; in other words, 273,000 acres would need to be actively preserved.

This paper examines the capability of a regional PDR program to accomplish this goal. In reality, other means such as increasing densities in currently developed areas would also have a significant effect on reducing farmland loss. Additionally, it is recognized that the development that would have occurred on this farmland must be accommodated elsewhere in the region, and unless it is directed to appropriate areas, it may simply consume other, unprotected farmland or natural areas.

Map 1 below represents existing regional farmland parcels, an approximate total of 29,000 parcels representing 3,700 farms (many farms contain multiple parcels).

Map 1: Regional Farmland Parcels

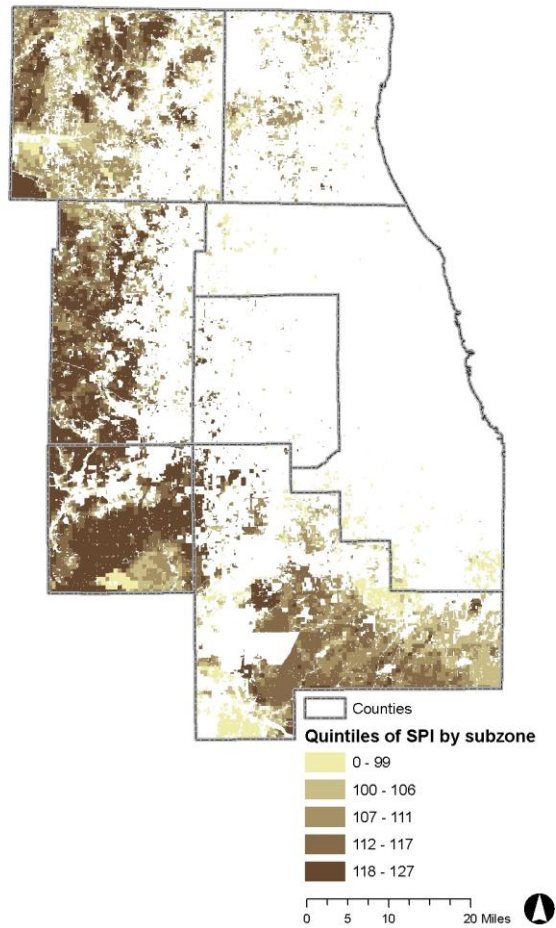


2. Determine the soil productivity in the region by distinguishing between most productive soil and least productive soil.

The soils contained in the region are a combination of four main soil types, which are unique to this region compared to the rest of the state. The basic soils in the region include Southern Wisconsin and Northern Illinois Drift Plain, Northern Illinois and Indiana Heavy Till Plain, Illinois and Iowa Deep Loess and Drift, and Southern Michigan and Northern Indiana Drift Plain.

Generally, soil is analyzed and evaluated by scientists and researchers and soil data is used to determine soil characteristics and soil productivity. For the purpose of determining soil productivity in the region, the data sources used were 1) SSURGO database per county and 2) UIUC farm soil productivity index. One factor, the soil slope, was not included in this analysis. We deemed the most important factors of identifying soil productivity were the soil type and soil index. The highest score of the soil productivity index in the region is 130 vs. 147 in Illinois. The most productive soils around the region, as shown in Map 2, are in Kane, Kendall, McHenry and Will counties.

Map 2: Soil Productivity in the Region by Subzone



3. Determine the economic farmland values across the region

The economic value of farmland is derived from production and sales of farmland crops which contribute to the local and regional economy. In 2007, the region's farmland market value of production sales totaled \$645.9 million. Corn and soybeans contributed to the majority of market value; however, forage and wheat were also other key products.

Around the region, farmland parcels are assessed for tax purposes based on the Illinois property tax laws. Differential assessment, a preferential farmland tax policy, uses specific evaluation

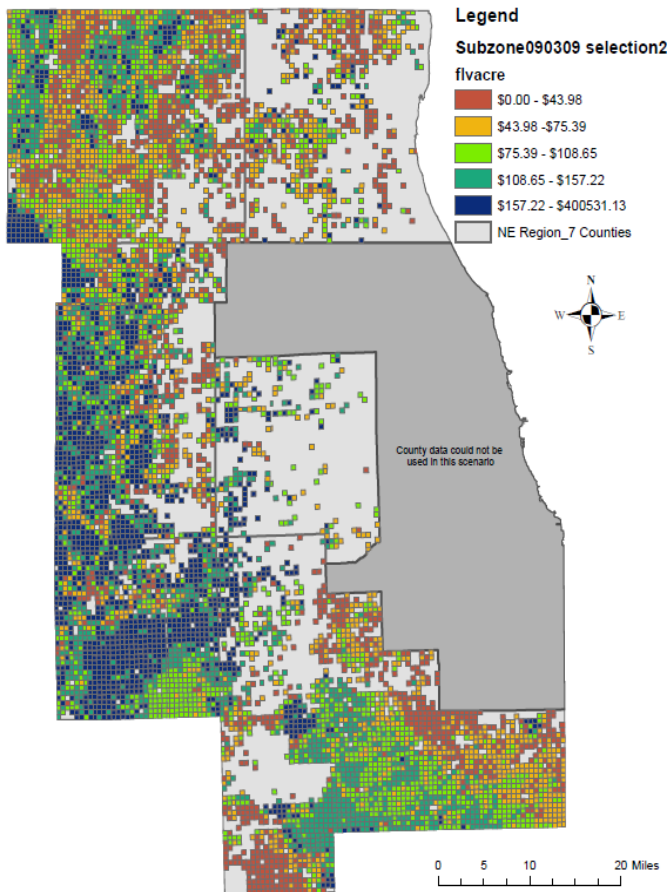
methods to determine farmland economic values and taxation; these are quite different from the assessment practices for residential, commercial, or other uses.

The assessment process for valuing farmland is inclusive of statewide studies of land use, soil productivity, and the net income of farms. Farmland buildings are part of the total value of farmland, assuming that these buildings and/or improvements contribute to farmland production.

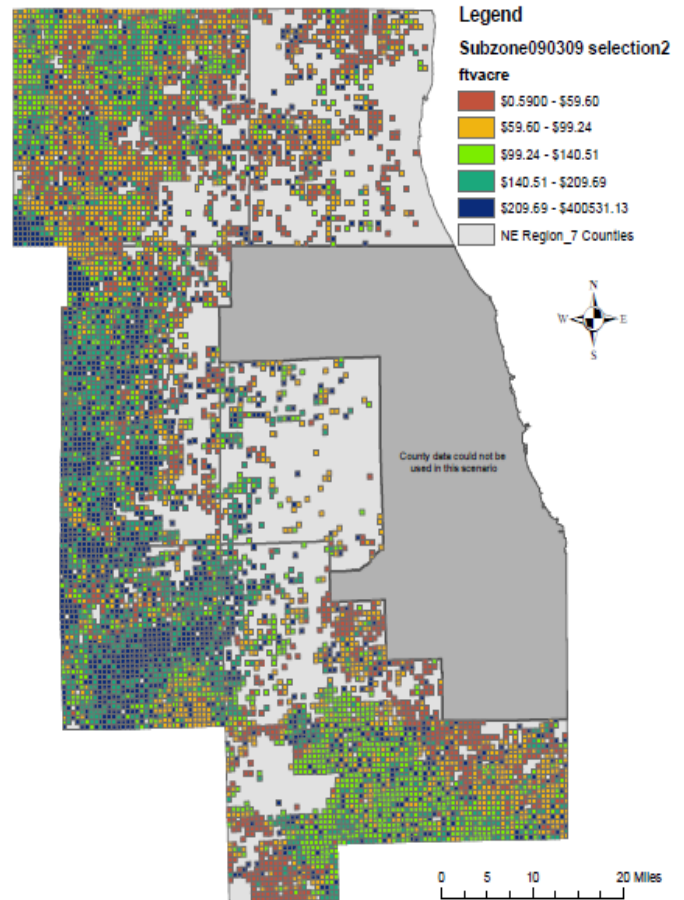
- Farm acreage is assessed based on its ability to produce income
- A farm building is assessed at 1/3rd of value that it contributes to the farm's productivity
- Farm home sites and farm dwellings are assessed at 1/3rd of market value (similar to assessment practices for other land uses)
- Each County must have a Farmland Assessment Review Committee
- Assessor may make some subtractions for things like slope, drainage, ponding, flooding, and field shape and size

Map 3 shows economic farmland value based only on land value. Map 4 shows economic farmland value based on both land value and farm buildings/farmland improvements which equals total farmland value.

Map 3: Farmland Value per Acre by Subzone



Map 4: Total Farmland Value per Acre by Subzone



Please note that Cook County farmland data could not be used in this scenario due to apparent differences in agricultural assessment practices between Cook and the rest of the region.

4. Determine other important criteria to be used for the “sample program”

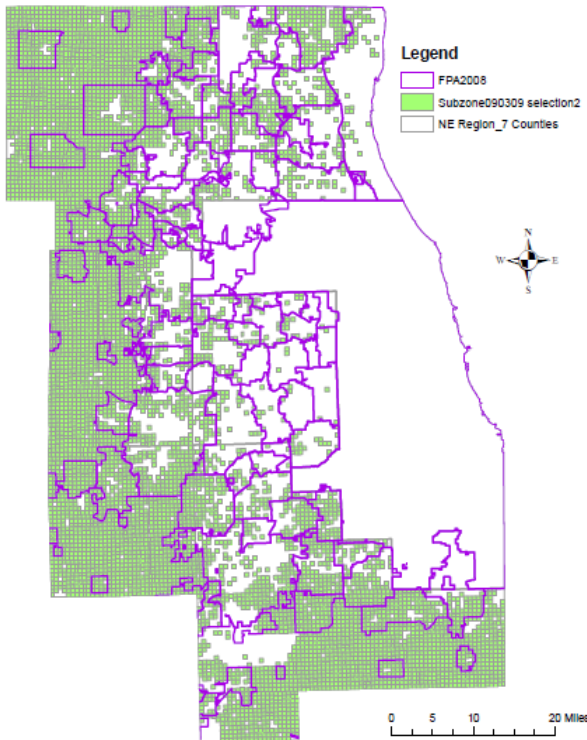
Assessed value and soil productivity are highly correlated, and are the principal means used to develop the PDR “sample program.” Beyond this, farmland that also met the criteria described below was given priority, such as farmland under direct growth pressure or in environmentally sensitive areas. An additional screening was done to remove subzones with under 10 acres of farmland, as PDR programs are typically used on larger areas.

Farmland with at least two of the following five characteristics was eligible for inclusion within the “sample program.” (Please note that the vast majority of farmland did have at least two of these characteristics.)

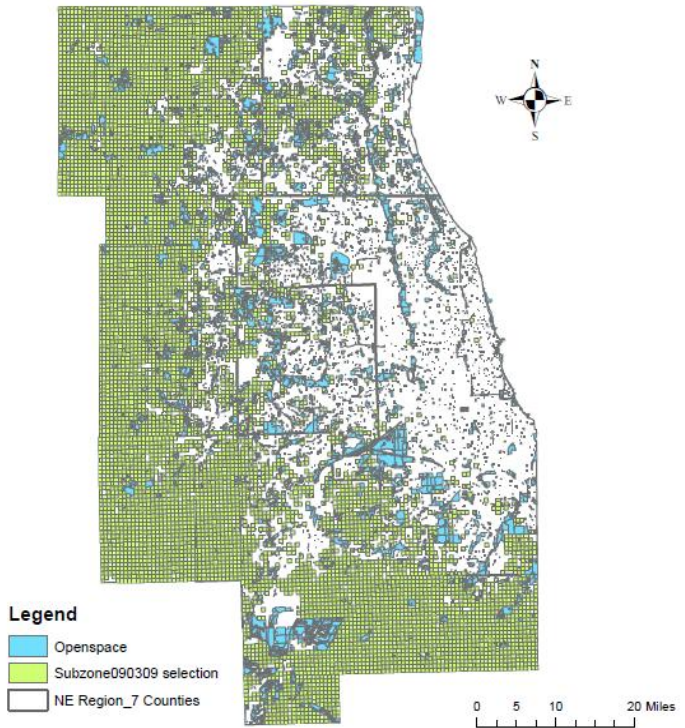
- i. Farmland intersecting with a Facilities Planning Area (FPA)
- ii. Farmland within a quarter mile buffer of open space
- iii. Farmland 1.5 miles of either an arterial roadway or interstate roadway
- iv. Farmland within the Green Infrastructure Vision
- v. Farmland within 500 feet of a NHD stream flow

The following maps, Map 5-Map 9, show the farmland in the region with these characteristics.

Map 5: Regional Farmland in FPAs

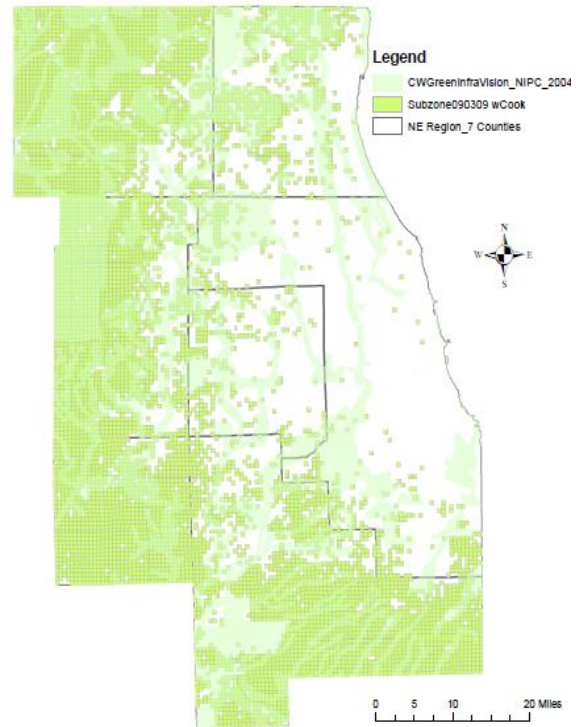
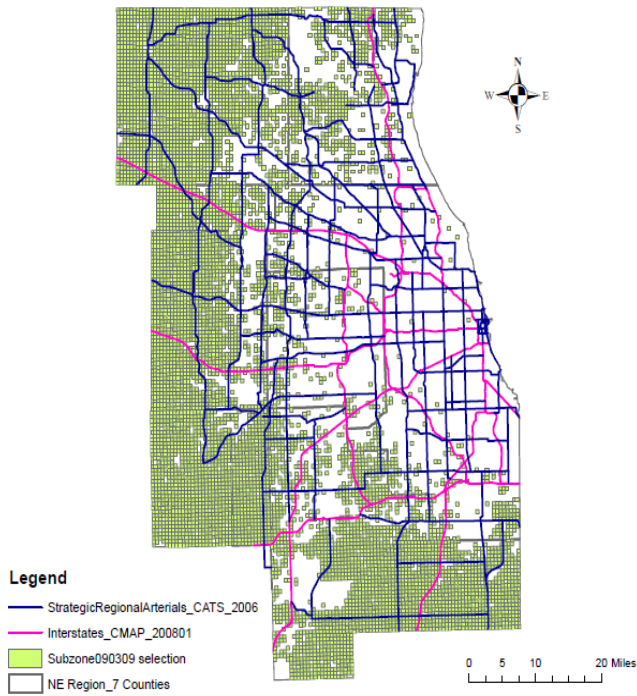


Map 6: Regional Farmland near Open Space Areas

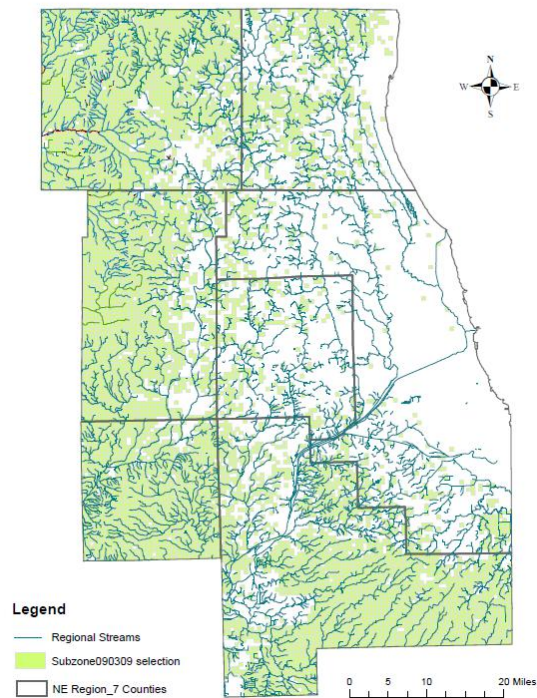


Map 7: Regional Roadways intersecting with Farmland

Map 8: Farmland with Green Infrastructure Vision

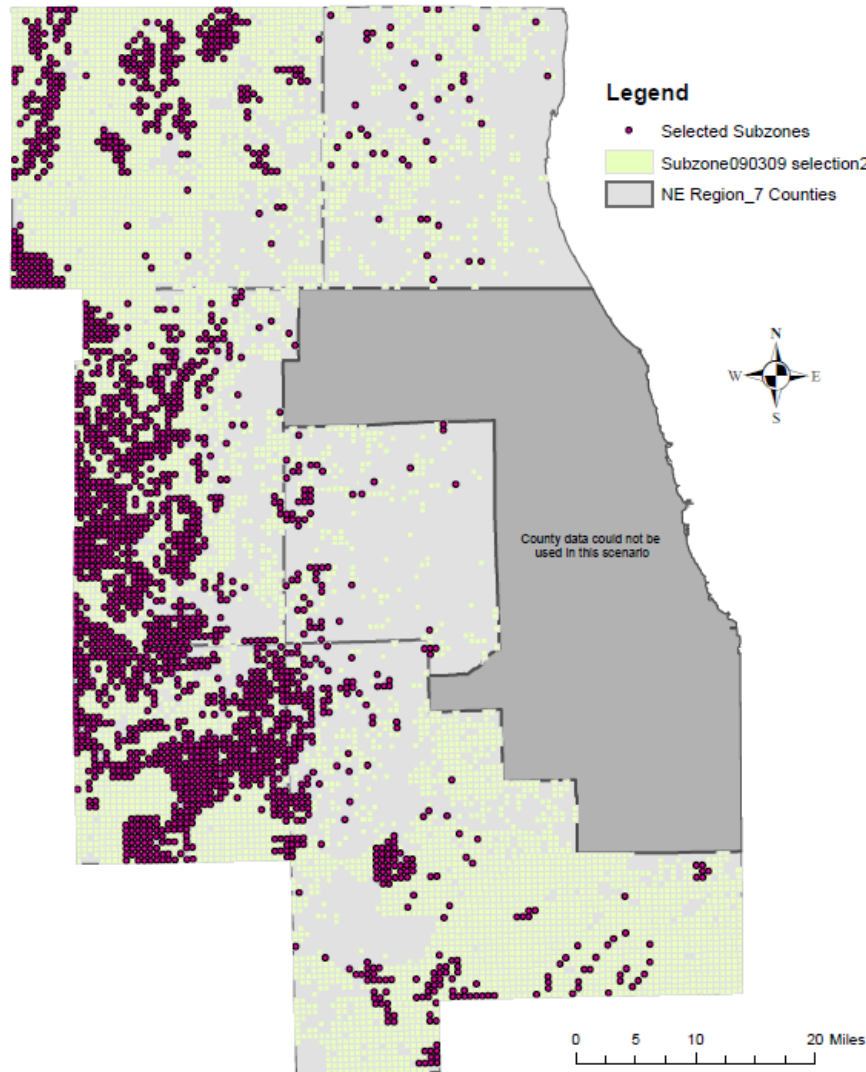


Map 9: Farmland around Regional Stream Network



After these criteria were applied, remaining eligible subzones were ranked according to the average assessed value of their farmland. The subzones containing the most valuable 273,000 acres were targeted for inclusion in the regional PDR program. These are shown in Map 10. As a comparison with Maps 3 and 4 will show, this is very consistent with the location of the region's most valuable farmland.

Map 10: Selected Farmland for Sample PDR Program



5. Determination of costs for protecting 273,000 acres of farmland in the region

Although the cost of purchasing development rights is less than an outright purchase of the land as a fee-simple acquisition, the cost increases in tandem with land values. The cost of a PDR in many cases is the difference between the overall market value and agricultural land value. The average price paid for development rights in Kane County has increased over the years and a recent cost range was estimated between \$6,100 and \$9,000 (Kane County Planning Department). However, for the purpose of the PDR sample program, a regional average is used; this regional cost scale was based on extrapolating up from Kane County's experience. The regional costs are assumed to range from \$6,500 to \$10,000 per acre. The cost of \$6,500 per acre is based on a regional average of farmland market value. The cost of \$10,000 per acre allows for slightly more than a ten percent premium on purchase of development rights

vs. Kane County, considering higher land values around the region. Since the farmland included in the PDR program is among the region's more valuable farmland, the higher figure of \$10,000 per acre was used to develop cost estimates. This would lead to a total program cost of \$2.73 billion, or approximately \$91 million per year for 30 years. If the lower end of the scale were used, these figures would be lower (\$1.77 billion, or \$59 million per year).

Next Steps

As described above, the "sample" PDR program will cost between \$1.77 billion and \$2.73 billion and would target preserving approximately 273,000 acres of the region's most valuable, threatened, or environmentally important farmland. This analysis is not complete, and several more steps are planned:

- The consistency between the areas identified for inclusion in the regional PDR program need to be compared to the land use plans of the affected counties.
- This analysis has not yet considered implementation, including the funding sources and implementation responsibility for these efforts. These are very important considerations and will be addressed as a next step.
- Several indicators need to be modeled and measured, such as how the sample program would impact the distribution of population and jobs, the natural environment, and economic and fiscal health.

Local Food Systems

A report on food systems is being prepared for CMAP by the Chicago Food Advisory Council, the Greater Chicago Food Depository and the City of Chicago Department of Planning and Zoning, with support from The Chicago Community Trust. A draft of this report is expected to be complete by the end of spring 2009. The information contained in this section is designed to identify some of the highlights of this work, but it is not a complete summary of work conducted to date.

A food system begins with the sourcing of genetic material (e.g. seed, stock), and follows through the production, processing, distribution, sales, purchasing, preparation, consumption, and waste disposal pathways of food. The food system is managed by a diverse set of actors and sectors including farmers, the agriculture industry, food processing industry, cartage companies, retailers, restaurateurs and government. Determining how to define the appropriate geographic scope for any food system including the CMAP Regional Food System, is a key dimension of any assessment.

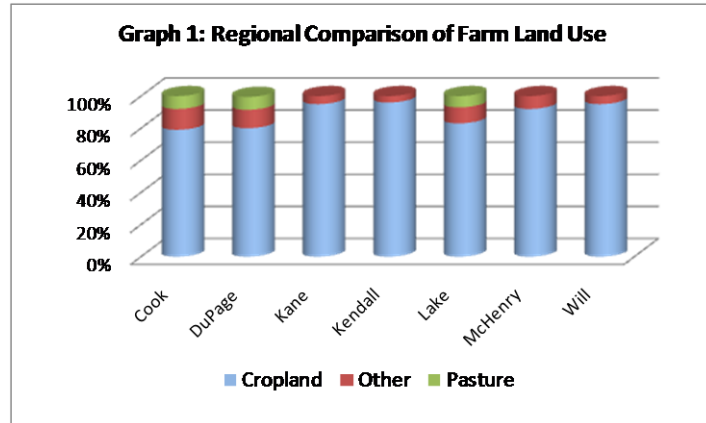
In 2007 the Illinois Farm, Food, and Jobs Act was signed. The main goal of this act is to promote local food systems throughout the state which also has a positive impact on the economy. A task force was formed to identify opportunities and recommend policies to increase locally grown food and local organic food production.

Among the issues that will be covered in the food systems report are the following:

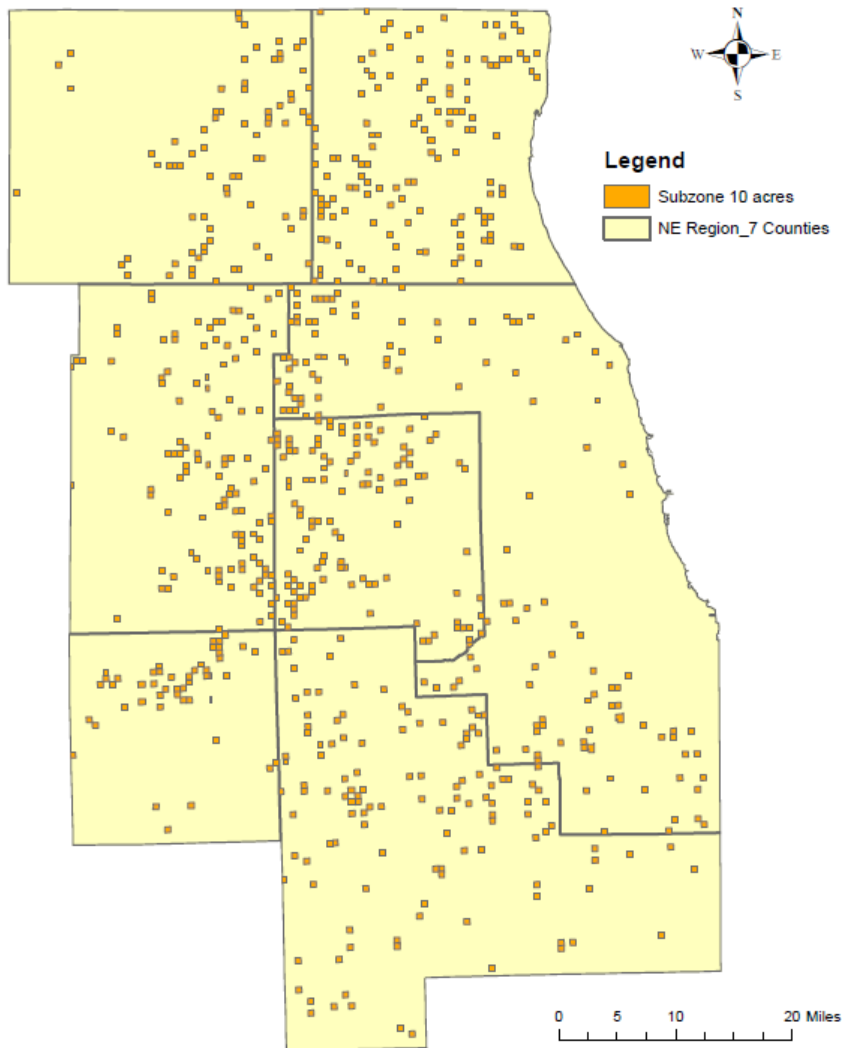
- The role of small-scale agriculture, including community gardens and urban farms, in meeting local food system needs.
- “Food deserts” or areas of the region where access to fresh, healthy food is limited.
- The role of land use and transportation planning in supporting local food systems.
- Educational programs to increase awareness about healthy foods and improve food access as well as community food security.
- The potential of increasing organic farming in the region to meet local demand.
- Links between local food systems and the food processing industry, which has long been a major employer and economic contributor in the region.

CMAP has done some limited analysis of small-scale agriculture in the region, with a number of interesting findings. Overall, the number of farms increased in the region between 2002 and 2007 by more than 10%; 390 farms were added to the region, despite a total decline in farm acreage. Also, the total number of full owners and operators increased, showing more people employed in farming. This aligned with a 47% spike in the number of farmers who stated that they had another primary occupation, making farming a secondary occupation.

Graph 1 shows that Cook, DuPage, and Lake counties have a higher percentage of their farmland in specialty crops and pasture than the region’s other counties (2007 Agricultural Census, USDA), and the size of farms in these counties is also generally smaller. However, smaller farms are a growing trend all over the region. Small farms such as these can be very effective participants in local food system programs. Map 11 shows areas across the region where subzones are less than 10 acres.



Map 10: Farmland Subzones less than 10 Acres



Other Considerations in Agricultural Preservation

A number of other considerations in agricultural preservation have not yet been explored, but research on them is underway. These are described below.

The use of agricultural land for biofuel production is an emerging topic. Illinois consistently ranks in the top five states for corn production which supports biodiesel fuel and ethanol production. The biofuel market utilizes incentives provided by federal and state governments in the form of tax incentives, subsidies, guaranteed loans, and grants. It is possible that federal support for biofuels will increase even more in the near future. The production of biofuels is controversial, and CMAP has not taken a position on its desirability within the region, but it is an emerging issue that must be recognized.

Another consideration is the use of farmland for clean energy production beyond biofuels. Specifically, wind energy production on agricultural land has been identified as a potential future direction. The viability of this within the region has not yet been researched.

The linkage between agriculture production and the region's freight system is an often overlooked but important consideration in the economic viability of agriculture. Most of the region's agricultural production is exported, and strong linkages to the freight system are needed to sustain this. This topic has been introduced with CMAP's Freight Committee but its full implications have not yet been explored.