

ON TO 2050 Lands in Transition Strategy Paper

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Introduction

As development on “lands in transition” -- agricultural lands, natural areas, and other open lands at the fringe of our region -- continues, northeastern Illinois communities will continue to experience the costs and benefits of this development pattern. A central message of GO TO 2040 was to encourage infill and redevelopment within existing communities, which remains an important strategy for a variety of regional and local goals, from supporting efficient use of our existing transportation systems to helping to promote walkability. Infill and redevelopment are also a central way to accommodate population growth while also achieving the Plan’s vision of a wide network of protected conservation open spaces, healthy water resources, and a growing local food economy. Plus, it is an inherently relevant message given that most communities in the region have neighborhoods or corridors that could benefit from reinvestment.

There are other parts of our region where agricultural and natural resources are subject to development pressure, yet these areas play a critical role in our agricultural economy and natural ecosystem functions. Important decisions about future homes and neighborhoods are being made with regard to the location and the form of new development in these areas. At the same time, decision-makers are working to support the agricultural economy and maintain natural ecosystem functions through a variety of tools, including land acquisition, conservation easements, and land use planning. Combined, land development and protection decisions have impacts on the market viability of area farms, habitat connectivity of our natural areas, and the costs associated with constructing and maintaining new infrastructure and services. In turn, these have ramifications not only on the new residents and businesses in growing areas but their existing neighbors, nearby municipalities, and the region as a whole.

This strategy paper reviews recent development and land protection trends and explores policy recommendations and strategies for ON TO 2050 that could better protect our existing agricultural and natural areas and coordinate new development in a way that supports long term community livability. The policy directions in this paper build on the GO TO 2040 plan and aim to refine the broad nature of those recommendations by providing additional specificity both on the recommendations themselves and how they can be implemented. This paper integrates the lessons learned from regional stakeholder engagement, review of the GO TO 2040 plan and implementation achievements, and national best practices research. In addition, CMAP staff analyzed land development and protection trends and conducted a series of interviews with stakeholders involved with development and land protection decisions in communities that either experienced a large amount of development, protection, or both.

A resource group, composed of individuals involved in land development and land preservation decisions, provided guidance throughout the process. In addition, CMAP's Environment and Natural Resources and Land Use Working Committees provided key input into the scope, direction, and content of this strategy paper.

Table 1. Lands in Transition Strategy Paper Resource Group.

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Land development and protection trends in Northeastern Illinois

Development or protection of agricultural and natural land impacts the region in a variety of ways and comes with both local and regional tradeoffs. In order to better understand land development and land protection trends, CMAP reviewed where new development or land protection of agricultural and natural lands occurred between 2001 and 2015.¹ This analysis does not draw distinction between the type of agricultural production or the type and quality of natural resource lands.²

CMAP supplemented this regional scale data analysis by interviewing local stakeholders involved with both land development and protection in eight communities and three counties that experienced high levels of development and/or land protection during this time period. This section provides an overview of the findings from the analysis of land development and protection trends.

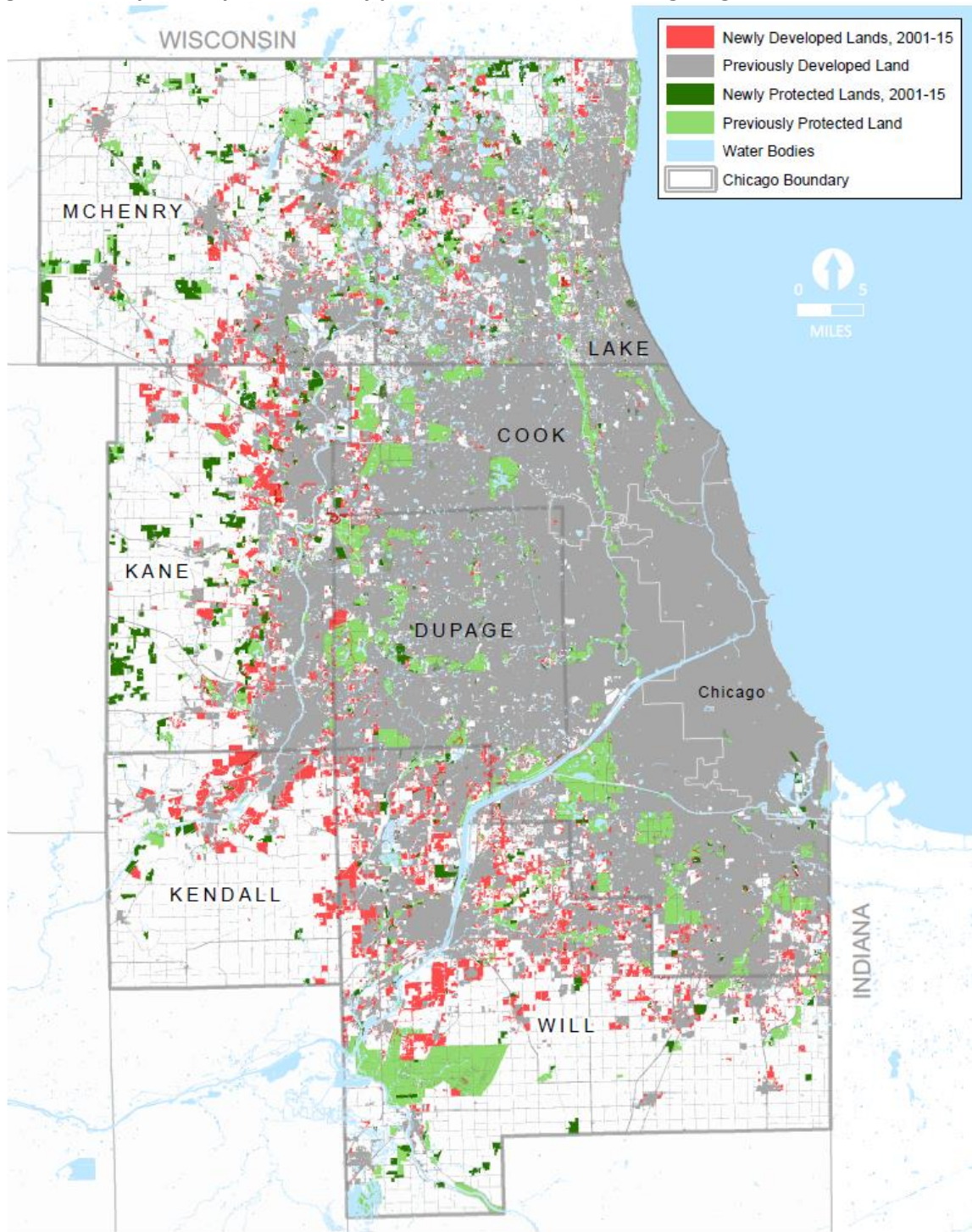
Land development

From 2001 to 2015, nearly 140,000 acres of agricultural and natural lands were developed while 61,500 acres of land were permanently protected (Figure 1). This additional development represents 10 percent of the total developed area of the region in 2015 and is roughly comparable to the land area of the City of Chicago. Most of the development on agricultural and natural lands took place in Will County, with Kane County a distant second (Figure 2).

¹ CMAP used data from the National Land Cover Dataset (NLCD), the CMAP Land Use Inventory, the Northeastern Illinois Development Database, the National Conservation Easement Database: A Ducks Unlimited/Trust for Public Lands project of all conservation easements in the state, the Trust for Public Land's Conservation Almanac, and I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands to identify agricultural and natural lands in 2001 that were either developed or permanently protected by 2015. For I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands, see www.prairiestateconservation.org/pscc/iview.

² CMAP defined agricultural land cover based on the cultivated crops and pasture/hay land cover types within NLCD. Similarly, CMAP defined natural land cover based on the deciduous forest, emergent herbaceous wetlands, evergreen forest, grassland/herbaceous, mixed forest, shrub/scrub, and woody wetlands land cover types within NLCD. All data in this section are focused on the 2015 status of lands that the NLCD defined as agricultural or natural lands in 2001. It does not include information on lands that were recognized as already developed in 2001. For more information on those development trends, see the Infill and TOD snapshot.

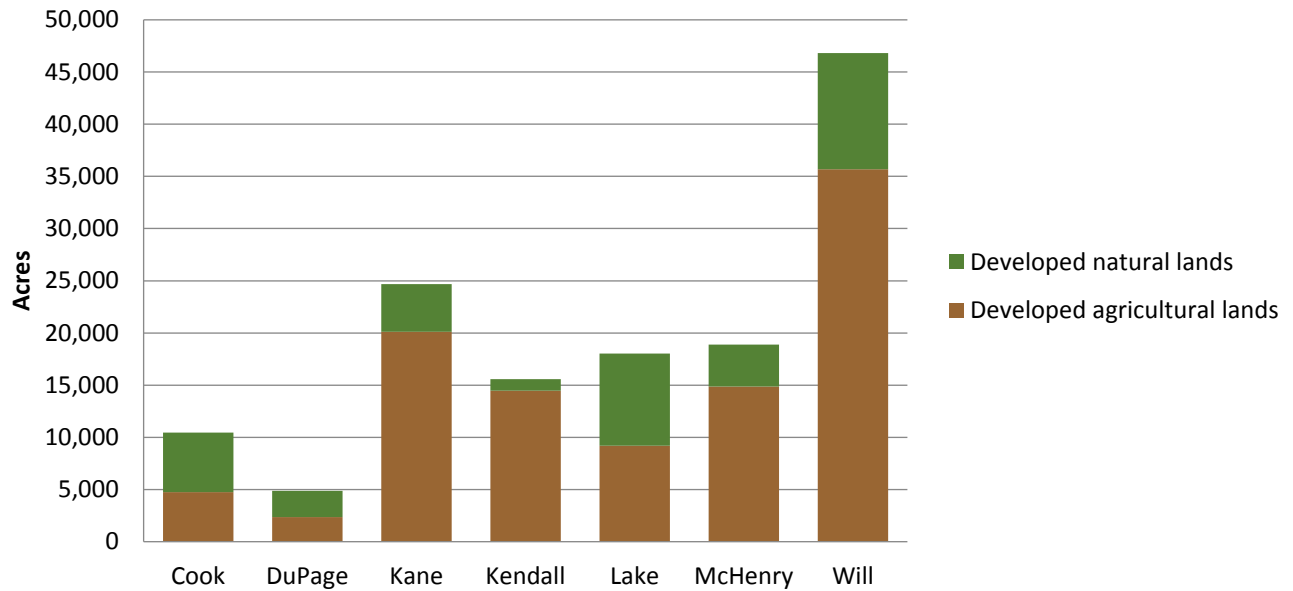
Figure 1. Newly developed and newly protected lands in the Chicago region, 2001-2015.



Sources: 2001-2011 National Land Cover Dataset, 2015 Northeastern Illinois Development Database, 2001/2005/2013 CMAP Land Use Inventory, 2012-2015 National Conservation Easement Database, 2014 Kendall County Forest Preserve District Master Plan, 2016 Trust for Public Land Conservation Almanac, and 2016 I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands.

Source: 2001-2011 National Land Cover Dataset, 2015 Northeastern Illinois Development Database, 2001/2005/2013 CMAP Land Use Inventory, 2012-2015 National Conservation Easement Database, 2014 Kendall County Forest Preserve District Master Plan, 2016 Trust for Public Land Conservation Almanac, and 2016 I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands.

Figure 2. Development on agricultural and natural lands by County, 2001-2015



Source: 2001-2011 National Land Cover Dataset and 2015 Northeastern Illinois Development Database.

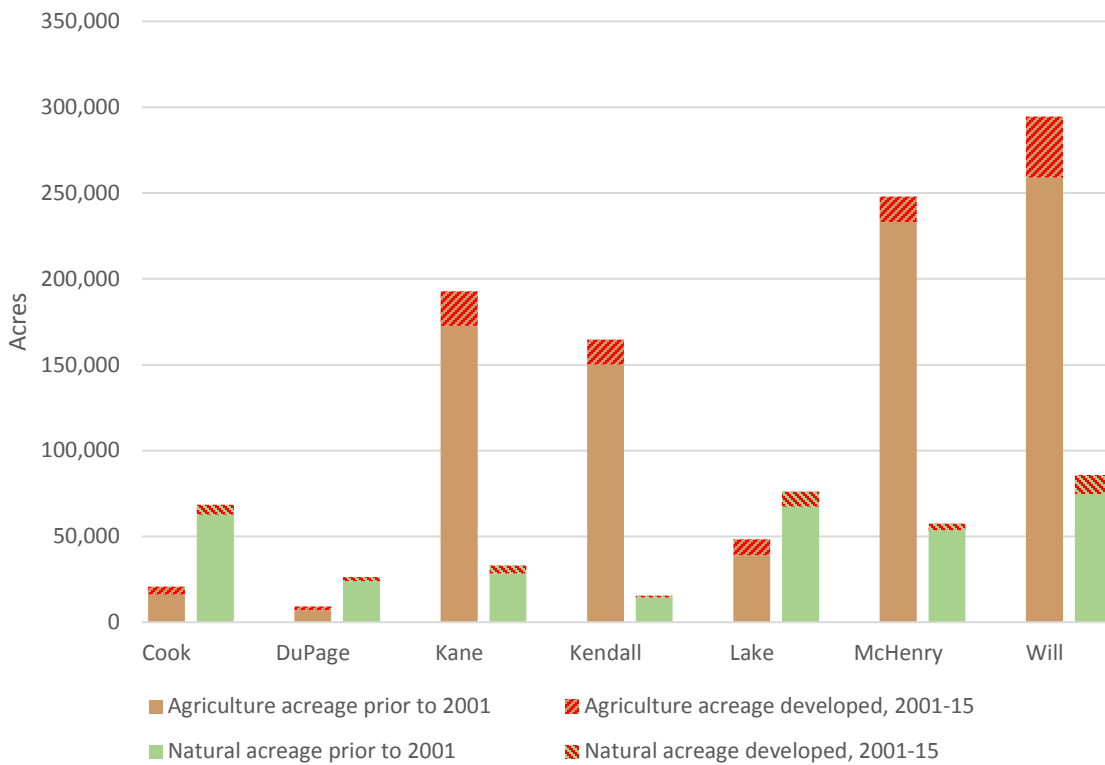
Most development occurred on agricultural lands

Since 2001, three-quarters of greenfield development occurred on agricultural lands, leading to a reduction of over 100,000 acres of land involved with agricultural production. The rate of development seen on agricultural or natural lands varies across the different counties (Figure 3). While the majority of remaining undeveloped lands in Cook, DuPage, and Lake Counties had natural land cover, these Counties experienced development on agricultural and natural lands in roughly equal proportions. Kane, Kendall, McHenry, and Will Counties, however, all had higher proportions of agricultural lands remaining and saw more development in these areas. The differences across Counties may not only reflect the different spatial distribution of these resources, but also different policies, regulations, and market pressures and preferences.

CMAP reviewed the local land use plans and development ordinances of 14 municipalities and three counties with the most development or land protection during this time period, defined by either acreage or percentage of their total land area.³ Few municipal future land use plans included agricultural land use categories or corresponding strategies to maintain these areas for agricultural production, while the County land use plans included these categories and strategies to varying degrees. In addition, agricultural resources were typically not included in the site review process within municipal subdivision ordinances. In conversations with local decision-makers, many reflected that development proposals on agricultural lands were often approved. If issues were raised, typical concerns focused on utility expansion and the corresponding costs of maintaining infrastructure and services.

³ The 14 communities were Antioch, Aurora, Big Rock, Bolingbrook, Campton Hills, Cary, Elgin, Homer Glen, Huntley, Joliet, Oswego, Plainfield, Round Lake, and Yorkville. The three counties were Kane, McHenry, and Will Counties. Case study interviews with local decision-makers were conducted in Antioch, Aurora, Campton Hills, Homer Glen, Huntley, Plainfield, Round Lake, Yorkville, Kane County, McHenry County, and Will County.

Figure 3. Total acreage of agricultural and natural lands prior to 2001 and development on those lands by County from 2001-15



Source: 2001-2011 National Land Cover Dataset and 2015 Northeastern Illinois Development Database.

Illinois and the Chicago region are known for abundant prime farmland soils, which are soil types that have the best combination of physical and chemical characteristics for producing food, feed, and other crops. The majority of new development on agricultural lands (60 percent) took place in areas with prime farmland soils, which is roughly equivalent to their natural occurrence in the Chicago region. While the economic impact of the loss of 100,000 acres of agricultural lands in the region is not known, it is assumed to include not only the loss of production revenues but also cascading affects on the processing and distribution-related industries in the region.

Development continues to impact natural resources

From 2001-15, 27 percent, or 38,000 acres, of greenfield development in the region occurred on natural lands. The quality and value of these areas can be inferred by comparing all newly developed lands against the Green Infrastructure Vision (GIV), a regional map of key natural resources. GO TO 2040 used the GIV as a way to prioritize land preservation and restoration activities and recommended that land development and infrastructure expansion avoid impacting these resources. Between 2001 and 2015, 42,500 acres, of all development on agricultural and natural lands occurred in locations which had been identified in GIV 2.3.⁴ Approximately 30,500 acres of development occurred on lands identified as ecological networks within GIV 2.3 – which delineate core landscape types and corridors for woodland

⁴ The GIV presents both existing natural assets as well as potential connections and corridors that may currently be in agricultural use.

forests, prairie and grasslands, wetlands, and lakes and streams. This represents a loss of five percent of the GIV and an estimated loss of \$186 million annually of four critical ecosystem services – flood control, groundwater recharge, water purification, and carbon storage.⁵

A portion of the lands within the GIV are regulated by state and federal laws that aim to reduce development impacts on key resources. However, the region continued to see development in these areas. Overall, 11 percent of new development occurred on lands with a higher degree of environmental regulations, defined here as lands within the 100-year floodplain and/or containing a wetland.⁶ Nearly 12,000 acres of new development occurred within the floodplain, which could be placing buildings, infrastructure, and residents at higher risk of flooding events absent appropriate design standards.

CMAP's review of the local and county subdivision ordinances of 14 communities and three counties found wide variation in how the site plan review process identifies natural resources. Conversations with a subset of local decision-makers revealed that this process can be influenced by planning staff capacity and the case-by-case nature of some development proposals, particularly those using the planned unit development process. Other interviewees reflected on how much local residents can play a role and identified examples of how engaged residents, or lack thereof, can influence the protection of specific site resources. The three county subdivision ordinances each contained a more robust evaluation of existing site resources in the development process than many of the municipal ordinances.

At the larger scale, new development can have natural resource impacts beyond the development footprint. For example, development may impact the GIV beyond the site acreage by exacerbating habitat fragmentation, reducing core habitat size, and indirectly causing the spread of invasive plant and animal species.⁷ At the watershed scale, impervious cover can lead to water pollution, erosion, and degraded stream health. Research has shown that subwatersheds with less than 10 percent impervious cover tend to maintain the health of streams.⁸ Further increases of impervious cover can lead to impacted streams that could be restored with intervention; however, once impervious surfaces cover the majority of the watershed, recovering pre-development stream conditions can be difficult or impossible. Between 2001 and 2011, the overall imperviousness of several subwatersheds in the region increased above this threshold and new development on agricultural and natural lands contributed to this change (Figure 4). Most of the remaining biologically significant streams are located in areas with less than 10 percent imperviousness.

The location and form of new development can also increase demand on drinking water supplies. Between 2001 and 2015, greenfield development occurred in locations that are predominantly served by shallow, glacial, and sandstone groundwater aquifers and the Fox River, sources that are susceptible to quantity and quality concerns (Figure 5). Water 2050, the region's water supply and demand plan, found that regional withdrawals from groundwater aquifers can exceed the recharge rate and pose adverse impacts for existing and future populations relying on these sources. A 2015 Illinois State Water

⁵ GIV 2.3 Ecosystem Service Valuation. The Conservation Fund, 2014. See <https://datahub.cmap.illinois.gov/group/green-infrastructure-vision>.

⁶ CMAP analysis based on 2001 NLCD wetland classes, 2016 National Flood Hazards Layer floodplains, and 2016 DuPage preliminary floodplains.

⁷ CMAP, 2016. "ON TO 2050 Strategy Paper: Integrating Green Infrastructure." See www.cmap.illinois.gov/onto2050/strategy-papers/green-infrastructure#gistrategypaper

⁸ Schueler, Thomas R., et al. "Is Impervious Cover Still Important? Review of Recent Research" *Journal of Hydrologic Engineering*, Vol. 14, No., 4, April 2009.

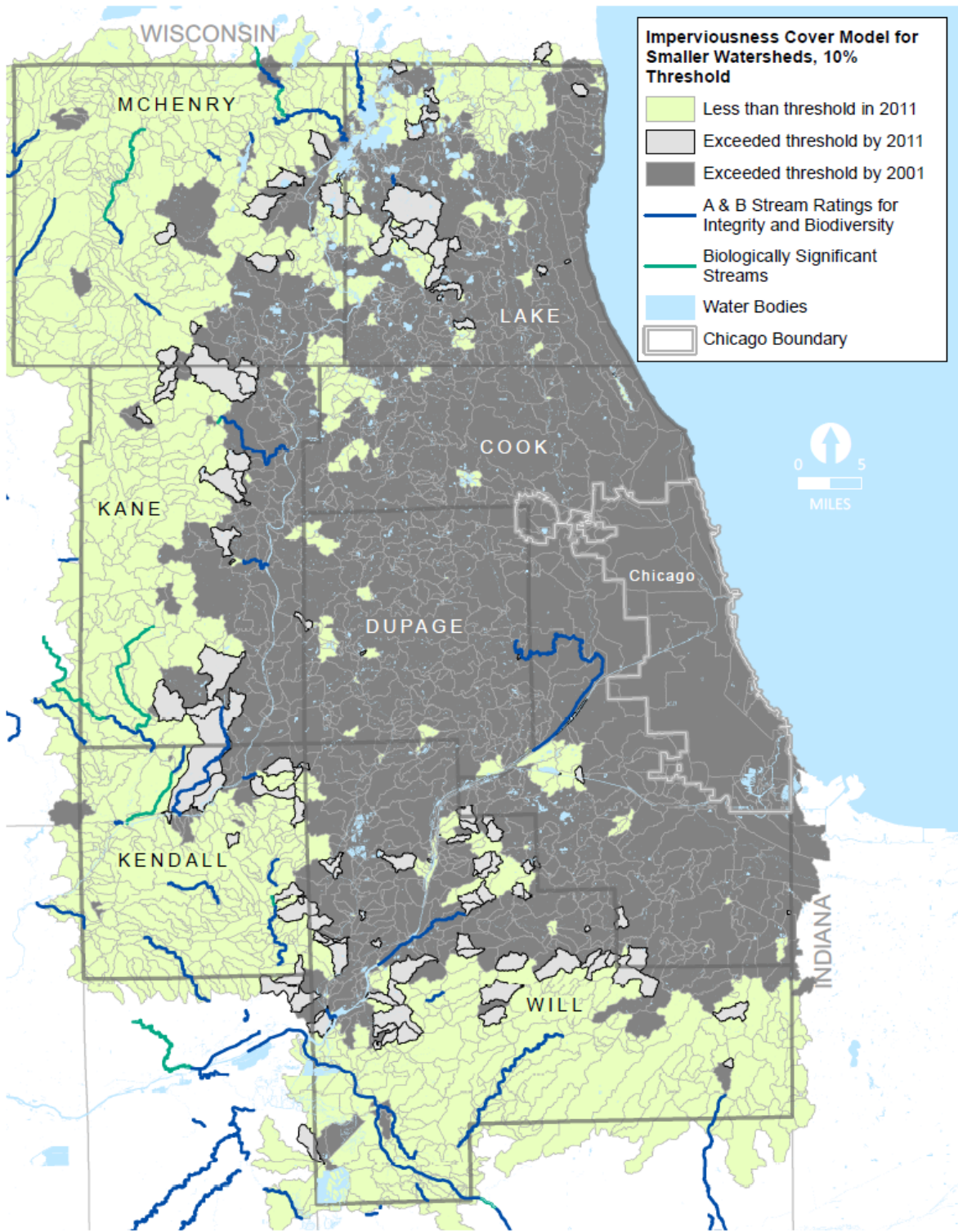
Survey report identified specific areas in the southwestern portion of the region where the sandstone aquifers are at risk of partial or complete desaturation due to withdrawals.⁹ In addition, withdrawals from shallow groundwater aquifers can reduce groundwater fed baseflow in rivers and streams and impact aquatic life. At the same time, new development, with its addition of impervious surface, can reduce the amount of rainwater infiltrating back to shallow groundwater aquifers. Beyond quantity concerns, new streets and corresponding road salting practices can lead to higher chlorides in the drinking water supply, impacting both treatment costs and ecosystem health.¹⁰

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⁹ Daniel B. Abrams, et al. "Changing Groundwater Levels in the Sandstone Aquifers of Northern Illinois and Southern Wisconsin: Impacts on Available Water Supply" Illinois State Water Survey Prairie Research Institute Contract Report: 2015-02. Available at: www.isws.illinois.edu/pubs/pubdetail.asp?CallNumber=ISWS+CR+2015-02

¹⁰ Walt R. Kelly. "Long-Term Trends in Chloride Concentrations in Shallow Aquifers near Chicago. Groundwater Vol. 46, No. 5 September–October 2008 (pages 772–781). See www.isws.illinois.edu/hilites/press/080528chigwcont.asp

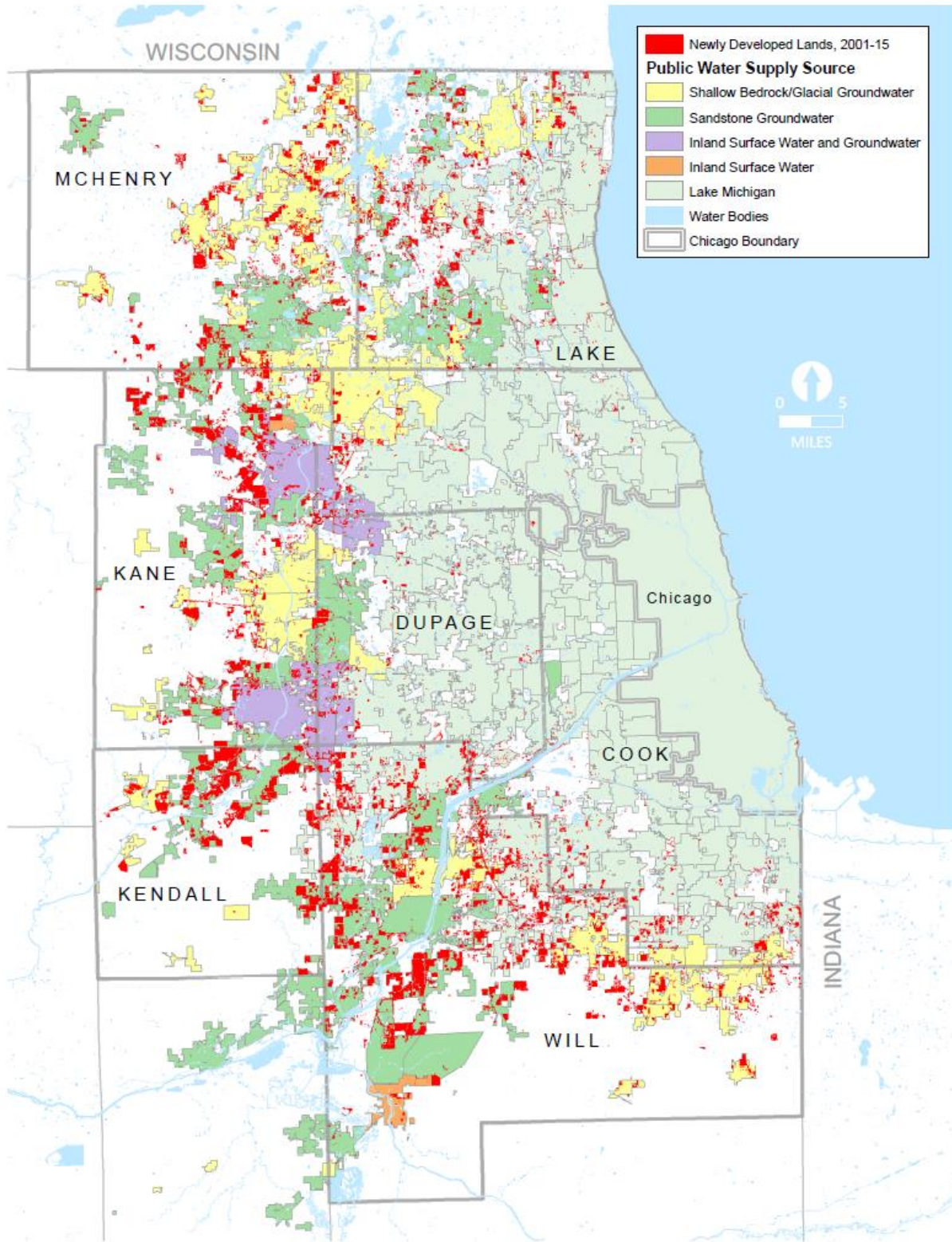
Figure 4. Sub-Watershed Catchments that Exceeded 10% Impervious Cover, 2001 and 2011.



Sources: 2001-2011 National Land Cover Dataset, 2015 Northeastern Illinois Development Database, Illinois Department of Natural Resources, and CMAP analysis of National Hydrography Dataset.

Source: 2001-2011 National Land Cover Dataset, 2015 Northeastern Illinois Development Database, Illinois Department of Natural Resources, and CMAP analysis of National Hydrography Dataset Plus v2.

Figure 5. New development and drinking water source by municipality.



Sources: 2001-2011 National Land Cover Dataset and 2015 Northeastern Illinois Development Database, and 2014 Illinois State Water Survey.

Source: 2001-2011 National Land Cover Dataset, 2015 Northeastern Illinois Development Database, and 2014 Illinois State Water Survey.

Most development occurred in newly annexed areas

CMAP reviewed where development was happening in relation to the collective 2001 municipal boundary¹¹ to get a better sense of the governmental units guiding the development process (Figure 6). Understanding where development is occurring within these jurisdictional categories provides the corresponding context of whether local or county land use policy and development regulations apply. In addition, it provides insights into the development priorities of decision-makers.

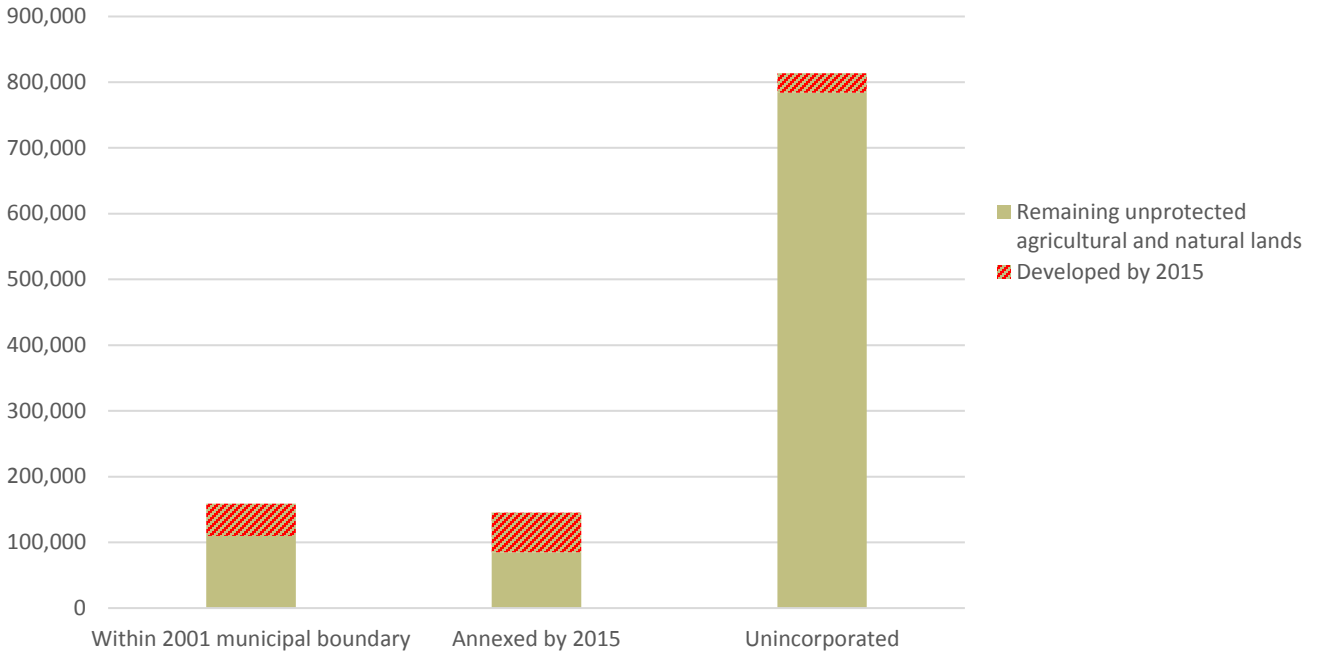
Most notably, there is a significant amount (110,000 acres) of unprotected agricultural and natural lands remaining within the historical 2001 municipal boundary. Despite potentially developable land within existing boundaries, municipalities annexed 145,000 acres of unprotected agricultural and natural lands between 2001 and 2015.¹² The annexations signal municipalities' interest in expanding their jurisdictional service areas. This could be due to a variety of reasons, including not actively focusing development within existing municipal areas, coordination issues with private landowners, or specific attributes of newly annexed land, such as proximity to a key transportation corridor or interchange location.

The largest portion of greenfield development, 43 percent or 60,500 acres, occurred in locations that were annexed into a municipality by 2015. Most of this occurred on previously agricultural lands (85 percent). Similarly, the majority of greenfield development within the 2001 municipal boundary occurred on agricultural lands (64 percent or 32,000 acres). Local land use policy, state and federal regulations, and community sentiment may be steering development away from natural lands despite potential advantages to developing within the existing municipal boundary. However, over 17,000 acres of natural lands within the 2001 municipal boundary were developed. The remaining portion of greenfield development (21 percent) occurred in areas that were unincorporated as of 2015. This development was under the purview of the corresponding county's land use policy and development regulations and almost 40 percent occurred on natural lands.

¹¹ The collective 2001 municipal boundary is composed of each municipal boundary within the region as of 2001.

¹² The 2001 and 2015 municipal boundaries were compared to create an annexed lands area, which identifies locations that were incorporated during this time period.

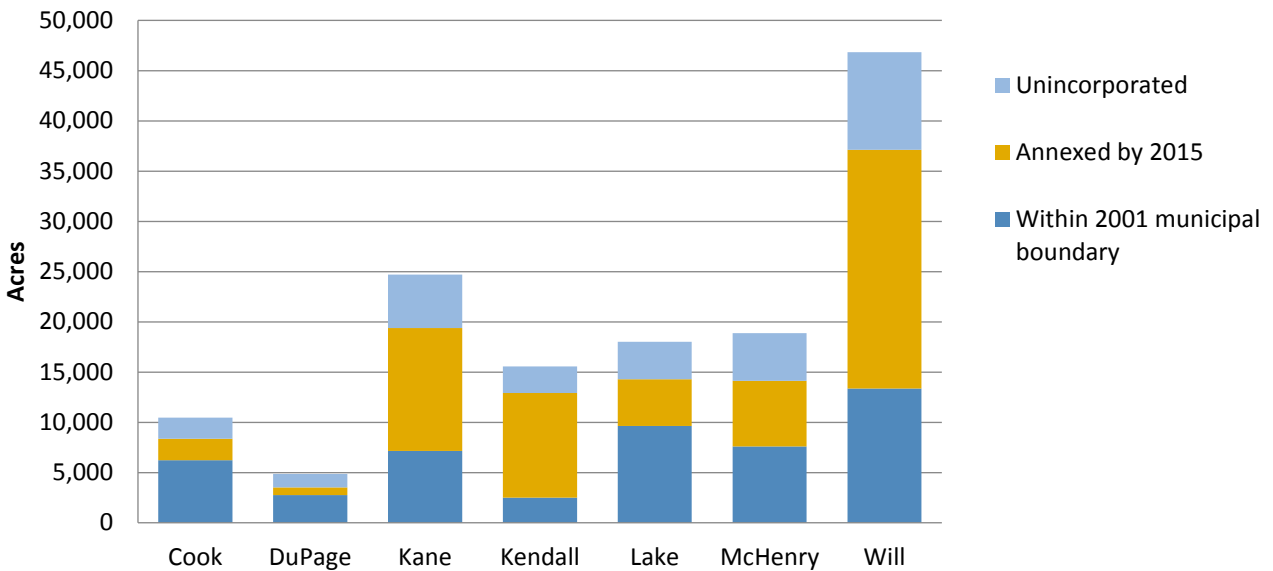
Figure 6. Total acreage of developed agricultural and natural lands from 2001-2015 and remaining unprotected agricultural and natural lands by jurisdictional location



Source: 2001 and 2015 Municipal boundaries, 2001-2011 National Land Cover Dataset, and 2015 Northeastern Illinois Development Database.

Variation on what proportion of development is occurring in relation to jurisdictional boundaries also exists between Counties (Figure 7). Cook, DuPage, and Lake Counties all had the majority of development on agricultural and natural lands occurring within the 2001 municipal boundaries. Kane, Kendall, and Will Counties saw a majority of their development in lands that were annexed into a municipality by 2015. McHenry County experienced a more distributed spread with 40 percent of new development on lands that were annexed by 2015.

Figure 7. Developed land by jurisdictional location by county, 2001-2015



Source: 2001 and 2015 Municipal boundaries, 2001-2011 National Land Cover Dataset, and 2015 Northeastern Illinois Development Database.

Significant share of development is residential

The current land use of newly developed land is distributed across all categories; residential land use is the single largest category, representing 23 percent of development (Figure 8).¹³ When corresponding residential open space¹⁴ and vacant residential lands¹⁵ are included, residential land use comprises nearly 52,000 acres or 37 percent of the total land developed on previously agricultural and natural lands from 2001 to 2015. Approximately 14,000 acres of new development has been identified as vacant residential and these are primarily located on lands annexed by 2015. During the case study interviews, many local decision-makers stated that they were prioritizing the completion of vacant subdivisions that were left in the wake of the 2008 recession. Some counties and municipalities are encouraging a reassessment of the market and potential re-design of these subdivisions where feasible. For example, in Yorkville, new housing consisting of smaller lots with smaller building footprints than originally planned for are being used to complete a subdivision to respond to shifts in market demand.

At the regional scale, less is known about the design characteristics of the newly developed land. Data from NLCD on development intensity shows that most of the newly developed areas were developed at

¹³ Data was calculated by comparing the newly developed areas on previously agricultural or natural lands against the 2013 CMAP Land Use Inventory, which is parcel based. New constructed streets serving the new development are typically not included in parcels; acreages associated with streets instead appear in the unknown land use category.

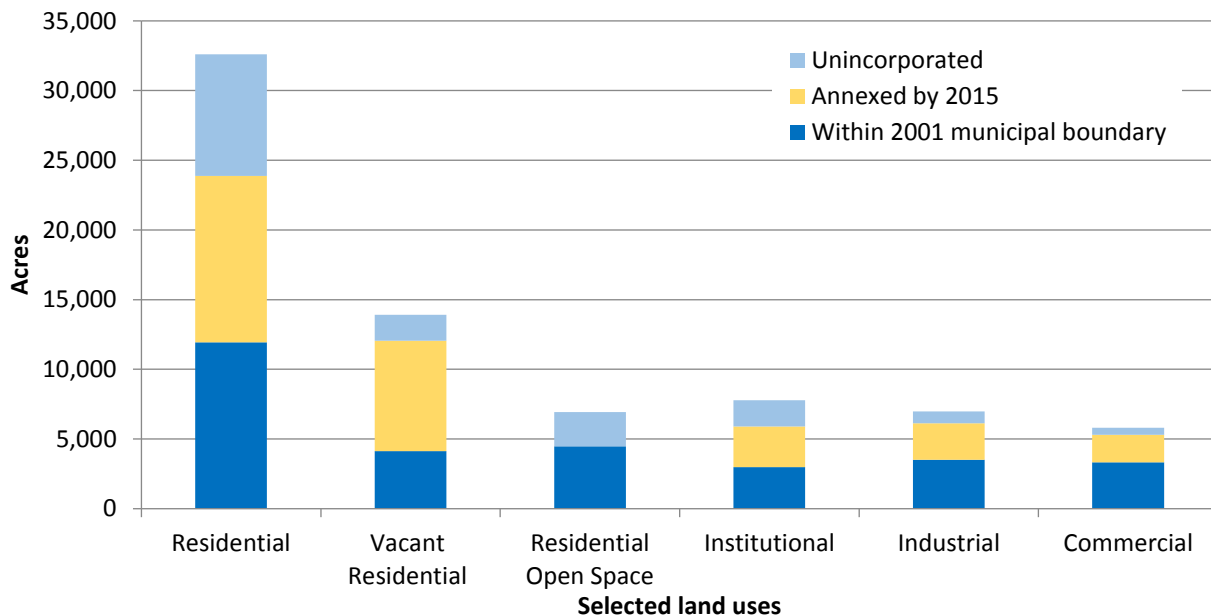
¹⁴ Residential open space is a land use category for parcels that are legally distinct from the private parcels in a subdivision and are often maintained by a homeowner’s association. The lands presented in this category do not have a conservation easement associated with them.

¹⁵ This includes development sites that were prepared with infrastructure but the final buildings were not constructed.

densities similar to those of large- or medium-lot single-family homes.¹⁶ While a comprehensive regional list is not available, a small portion of residential developments were designed using conservation design principles where new development is clustered on the site in order to minimize the impact to natural features and permanently preserve natural or agricultural lands.

The majority of new commercial and industrial development occurred within the 2001 municipal boundary, followed by areas annexed by 2015. A sizeable amount of institutional land use was developed in all three jurisdictional categories, including 1,900 acres in unincorporated areas.

Figure 8. Select land uses of newly developed lands by jurisdictional location, in acres, 2001-2015^a



^a The current land use of newly developed lands is distributed across all land use categories. Those not shown here include transportation/communication/utility/waste facilities (8,400 acres), non-residential open space (developed portions) (10,900 acres), vacant other (7,900 acres), unknown (which includes new streets) (11,800 acres), and under construction (700 acres).

Source: 2013 CMAP Land Use Inventory, 2001-2011 National Land Cover Dataset, and 2015 Northeastern Illinois Development Database.

Infrastructure expanded to serve new areas

New development on agricultural or natural lands typically requires the extension of new infrastructure such as streets, drinking water and wastewater services, and other utilities.¹⁷ It can also lead to changes in school, police, fire, public works, and other services provided by municipalities, separate districts, or counties. In 2014, CMAP conducted a review of fiscal impact practices and found that most growing communities rely on previously determined development impact fee schedules and negotiated compensation for parks and trails, water and sewer connections, and other amenities. More formalized

¹⁶ The National Land Cover Database 2011 has four different developed land use categories representing different levels of development intensity. See www.mrlc.gov/nlcd11_leg.php

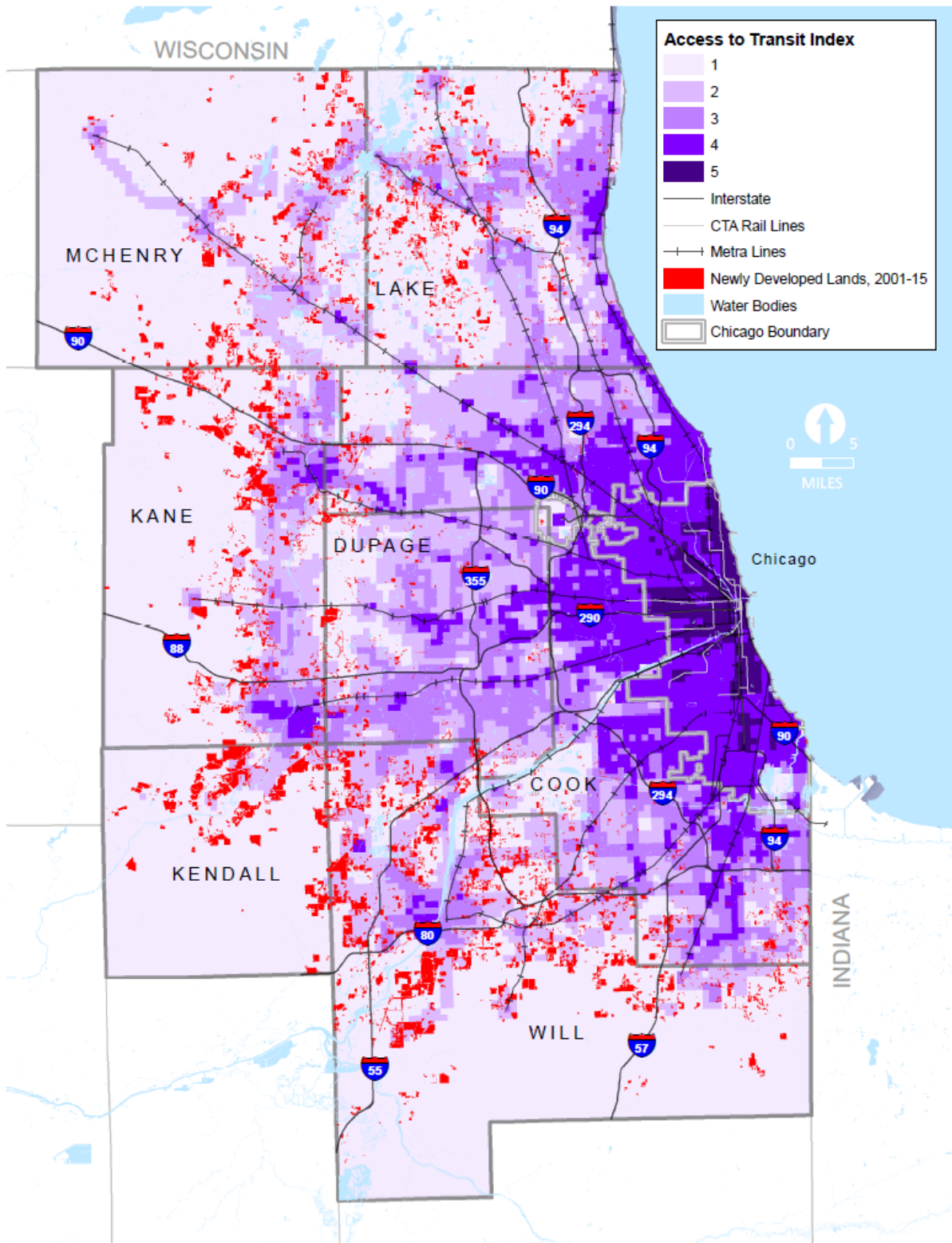
¹⁷ The extent of new infrastructure expansion varies by location and the availability and capacity of nearby infrastructure. The potential to connect and utilize existing infrastructure seems highest for new development on agricultural or natural lands that took place within the 2001 municipal boundary. However, that is not always the case as infrastructure service areas do not always match municipal boundaries.

fiscal impact analysis is required of developers for larger development proposals, if used at all, and frequently focuses on transportation impacts.¹⁸

In conversations with local decision-makers from the eight case study municipalities conducted as part of this project, almost all stated that their primary focus is to ensure coverage of the near-term costs of new infrastructure and services associated with the development – either by the developer covering the initial construction costs or through development impact fees. At the same time, local decision-makers revealed that they are keenly aware of their current struggle to maintain the community’s older infrastructure and reflected on how development standards may not be designed with attention to long-term maintenance costs. Namely, the location and form of a proposed development can significantly impact the long-term maintenance costs, which could be reduced through design. Many communities are reluctant to raise taxes and fees to cover the costs of the new infrastructure and services. Growing communities often end up bearing the burden of costs to expand services and infrastructure as new development occurs, significantly decreasing the fiscal benefits they receive from new development. They then find themselves needing additional revenue sources to replace road, water, and other infrastructure over the long term.

¹⁸ CMAP, Fiscal and Economic Impact Analysis of Local Development Decisions. January 2014.
<http://www.cmap.illinois.gov/documents/10180/211419/Fiscal%20Econ%20Impacts%20Dev%20FINAL.pdf/6fc7ed1c-aba7-4d6a-a057-8d251aa7fbdc>

Figure 9. Access to Transit Index and newly developed lands.



Sources: 2015 CMAP Access to Transit, 2001-2011 National Land Cover Dataset and 2015 Northeastern Illinois Development Database

Source: 2015 CMAP Access to Transit, 2001-2011 National Land Cover Dataset, and 2015 Northeastern Illinois Development Database.

In addition to local infrastructure and services, the location and form of new development can also impact regional transportation service. New development can change travel patterns and place different demands on the regional road network. New commercial and industrial development is often located on main transportation corridors, and can bring higher traffic volumes and corresponding maintenance costs. Despite being a local land use decision, some of these costs will be covered by either the state or county transportation agency, depending upon the jurisdiction responsible for the road.¹⁹

CMAP developed the Transit Availability Index to measure the relative level of access residents have to the transit system.²⁰ The index is comprised of four factors, including weekly frequency of the transit service, activities that can be reached via a single direct transit route, proximity to a transit station, and the pedestrian friendliness of the surrounding area. A comparison of greenfield development with the 2015 CMAP Access to Transit Index reveals that the majority of new development (94 percent) occurred in areas that currently have a low transit score of 1 or 2 (Figure 9). This means that residents and employees in these newly developed areas will likely rely on the road network for most trips. This also represents a potential lost opportunity of adding new residents and jobs in locations already served by transit infrastructure and improving the cost efficiency of this existing regional asset.

Land protection

From 2001 to 2015, an estimated 61,500 acres of conservation open space were permanently protected.²¹ This additional protection represents 22 percent of the total protected areas of the region, a substantial contribution in just 15 years (Figure 10). As of 2015, the regional total of 258,642 acres of conservation open space was close to the GO TO 2040 target for 2015 of permanently protecting 275,000 acres.²²

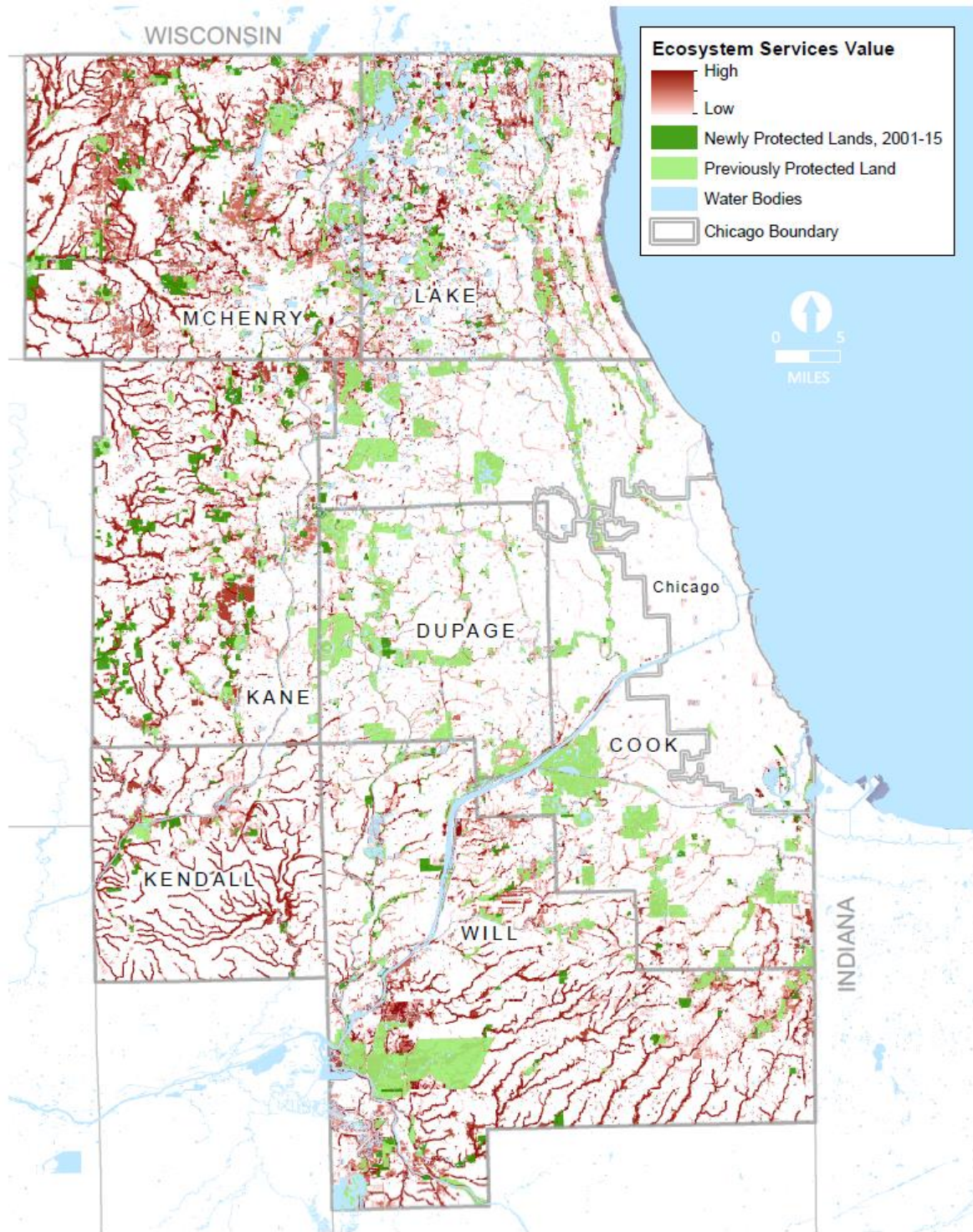
¹⁹ CMAP, Fiscal and Economic Impact Analysis of Local Development Decisions. January 2014. See www.cmap.illinois.gov/documents/10180/211419/Fiscal%20Econ%20Impacts%20Dev%20FINAL.pdf/6fc7ed1c-aba7-4d6a-a057-8d251aa7fbdc

²⁰ CMAP Data Hub, Transit Availability Index Documentation and data. See <https://datahub.cmap.illinois.gov/dataset/access-to-transit-index>

²¹ CMAP defines conservation open space using the CMAP Land Use Inventory. Conservation open space could have a variety of land cover types and likely does not include lands protected specifically for agricultural production.

²² 2015 analysis using methodology outlined in GO TO 2040 Plan Update: Appendix: Indicator Methodology. See www.cmap.illinois.gov/about/2040/update

Figure 10. Newly protected lands, previously protected lands, and the GIV

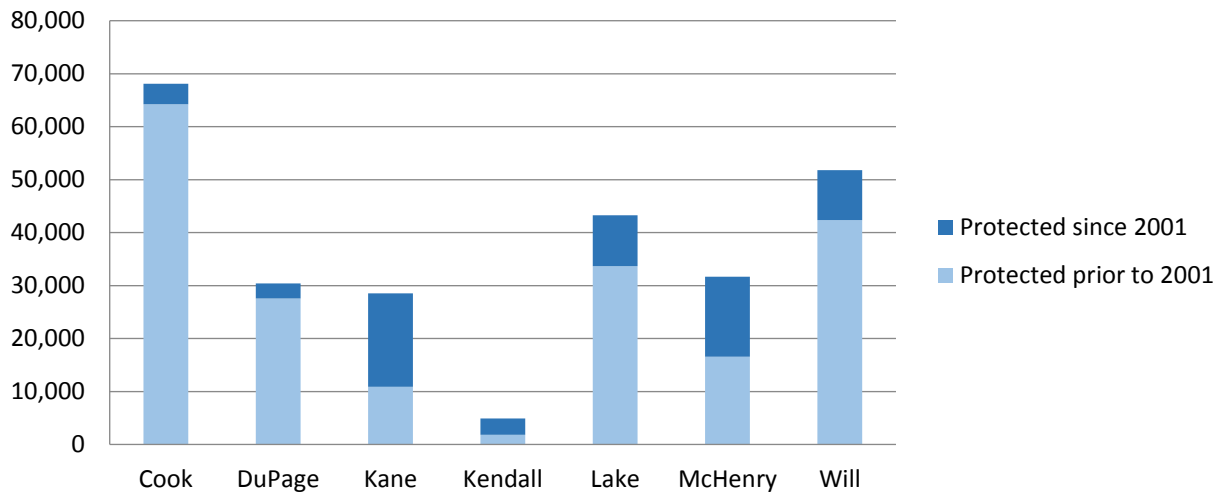


Sources: 2001/2005/2013 CMAP Land Use Inventory, 2012-2015 National Conservation Easement Database, 2014 Kendall County Forest Preserve District Master Plan, 2016 Trust for Public Land Conservation Almanac, 2016 I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands, and Green Infrastructure Vision 2.3.

Source: 2001/2005/2013 CMAP Land Use Inventory, 2012-15 National Conservation Easement Database, 2014 Kendall County Forest Preserve District Master Plan, 2016 Trust for Public Land Conservation Almanac, 2016 I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands, and Green Infrastructure Vision 2.3 Ecosystem Service Valuation.

Kane and McHenry Counties saw the most land protection between 2001 and 2015, with protected lands within Kane County tripling and McHenry County nearly doubling (Figure 11). While Cook County contains the largest share of total protected lands, Will County is a close second. Almost three-quarters of newly protected lands remain in unincorporated areas as of 2015 and less than 10 percent are located in areas that were annexed by municipalities in this time period.

Figure 11. Protected land by county, in acres



Source: CMAP Land Use Inventory, Illinois Department of Natural Resources, County Forest Preserves or Conservation Districts, Kendall County Forest Preserve District Master Plan, and I-View: Prairie State Conservation Coalition’s database of Illinois protected natural lands.

Concentrating land protection within the GIV

GO TO 2040 identified the GIV as a way to prioritize open space acquisition and preservation. While land protection efforts often have to be opportunistic, a significant portion, 33,000 acres or 62 percent of the newly protected lands, are identified as ecological networks within the GIV 2.3.^{23/24} As described earlier, nearly 30,000 acres of the lands identified as ecological networks in GIV 2.3 were also developed during this same time period.²⁵

CMAP’s ecosystem service valuation study estimates that the newly protected lands provide \$363 million annually in just four ecosystem services – flood control, groundwater recharge, water purification, and carbon storage.²⁶ Compared with the estimated ecosystem services lost to development (\$186 million), land acquisition efforts appear to be conserving sites of higher ecosystem service value. The unprotected lands remaining in the GIV provide an estimated \$3.1 billion annually in the four ecosystem services evaluated.

²³ Given the overlap of the time period of this study and the creation of the GIV, the vast majority of newly protected lands from 2001-2015 were already identified within the GIV protected lands layer and therefore appear in GIV HUB Layer 3.

²⁴ The GIV 2.3 uses the term Ecological Network to refer to the core landscape types and corridors.

²⁵ The GIV presents both existing natural assets as well as potential connections and corridors that may currently be in agricultural use.

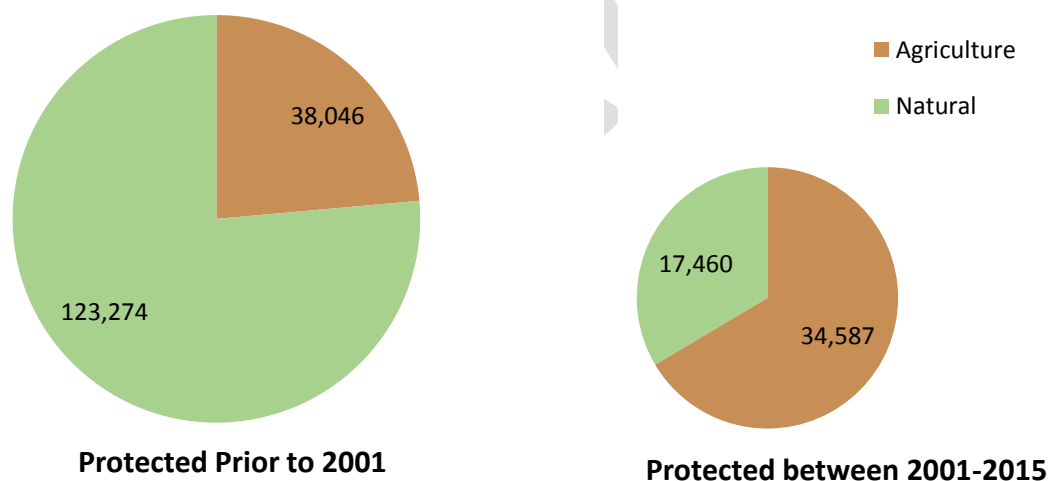
²⁶ CMAP, GIV 2.3, 2015, estimated the value of four ecosystem services – flood control, groundwater recharge, water purification, and carbon storage for the GIV Composite or Hub Layer 3. The agricultural and natural layers

Increasing land protection for areas with agricultural land cover

Habitat fragmentation and the importance of larger habitat cores—combined with a decreasing amount of high quality natural lands left to protect—have led conservationists to focus land acquisition strategies on high quality remnant natural areas, building larger core preserve areas, and maintaining or creating connections between existing natural areas. The GIV itself was based on these ecological principles and helps to identify opportunities across jurisdictional boundaries to maintain and restore habitat connectivity. From 2001 to 2015, efforts to protect existing natural areas included the acquisition of agricultural parcels that likely contained high quality remnant ecosystems. The rest of the parcel has the potential to be restored in the future to create larger habitat areas and/or connect habitat areas to one another, or to remain in agricultural production.

At the same time, efforts have been increasing to support the region’s farming economy. Farmland protection measures, such as limiting agricultural conversion and preventing conflicts with farming operations, aim to retain valuable farmland in production given their significant economic and cultural contributions to our communities. In recent years, the region has increased the number of agricultural conservation easements, particularly in Kane County. Established in 2001, the Kane County Farmland Preservation Program advocates the importance of agricultural land use policies and has acquired over 6,000 acres of farmland conservation easements, predominantly located in southwestern Kane County. Overall, the amount of agricultural lands under protection doubled during this period (Figure 12).²⁷ While agricultural protection programs contributed to this increase, this figure also reflects agricultural lands protected in order to achieve natural area goals in the future through restoration.

Figure 12. 2001 Land cover of previously protected and newly protected lands, in acres^a



^a Portions of protected conservation open space were found to contain impervious surfaces and are not identified as agricultural or natural land cover by the 2001 National Land Cover Dataset. These acreages have been removed to more accurately track agricultural and natural lands.

Source: CMAP Land use Inventory, Illinois Department of Natural Resources, County Forest Preserves or Conservation Districts, Kendall County Forest Preserve District Master Plan, and I-View: Prairie State Conservation Coalition’s database of Illinois protected natural lands.

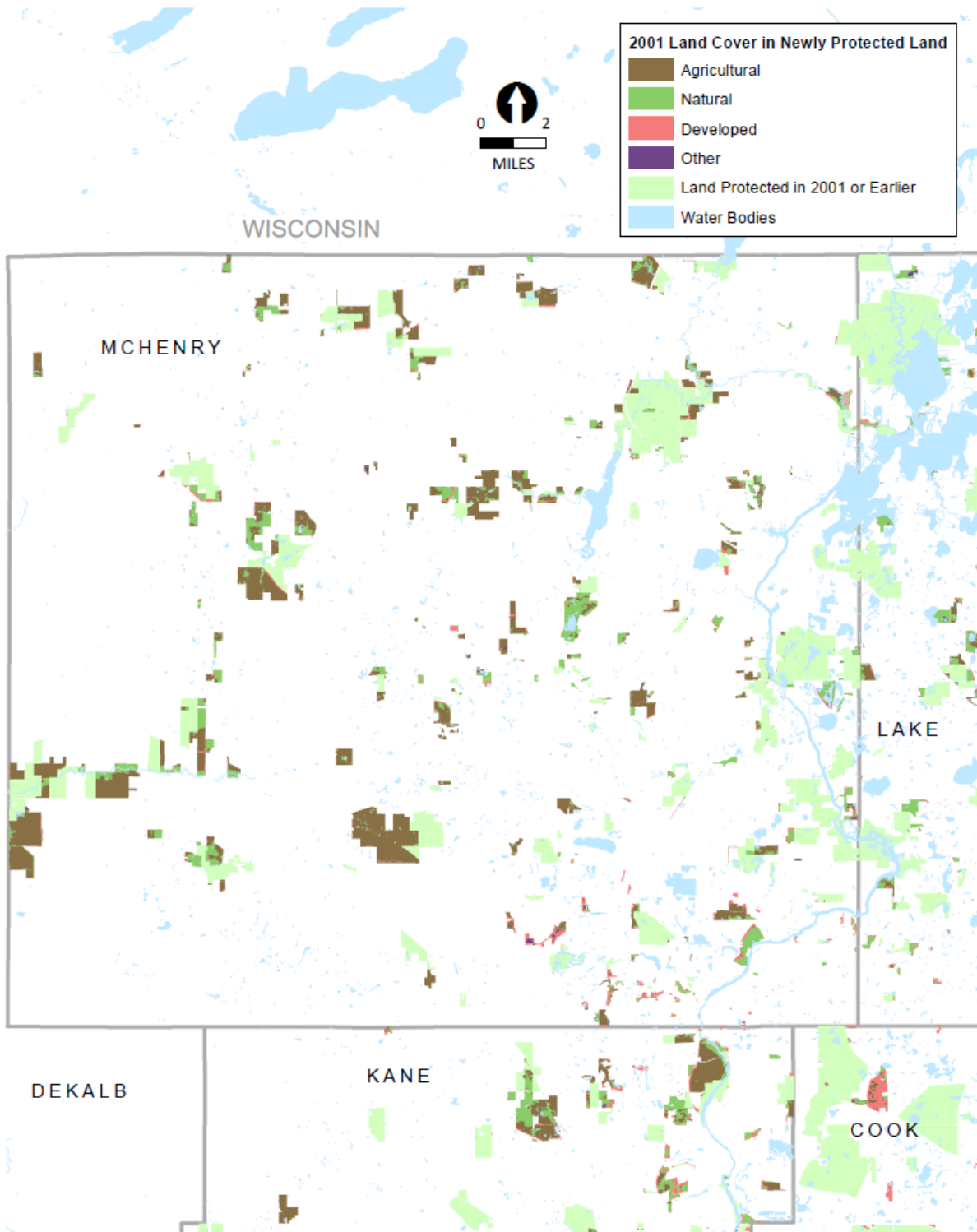
²⁷ This analysis is of the 52,700 acres of newly protected lands that were identified as agricultural or natural land in the 2001 NLCD. Other land cover types exist within the newly protected lands, such as water, barren lands, and developed lands (such as a building, road, or parking lot).

For example, a review of the land cover of newly protected lands in McHenry County shows a number of locations with a mixture of agricultural and natural land cover as of 2001 (Figure 13). Approximately 14,000 acres of natural and agricultural lands were protected in McHenry County and nearly 70 percent of those lands had agricultural land cover. McHenry County has an Agricultural Conservation Easement and Farmland Protection Commission, which was established in 2012 and has yet to find a dedicated source of funding.

In addition to permanently protected agricultural lands, several landowners in various counties have voluntarily elected to place their landholdings in designated agricultural areas for at least ten years.²⁸ Agricultural areas provide some protection from nuisance complaints, municipal annexation, and urban infrastructure expansion such as new sewer lines or new road right of ways. There are 11 voluntary designated agricultural areas in the CMAP region: nine in McHenry (20,796 total acres) and one each in Kane County (575 acres) and Will County (469 acres).

²⁸ Illinois Agricultural Conservation and Protection Act (505 ILCS5/). Given the temporary nature of the agricultural districts, these lands were not considered permanently protected and not reflected in overall protected acreages.

Figure 13. Land cover of newly protected lands, McHenry County



Sources: 2001/2005/2013 CMAP Land Use Inventory, 2012-2015 National Conservation Easement Database, 2014 Kendall County Forest Preserve District Master Plan, 2016 Trust for Public Land Conservation Almanac, and 2016 I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands.

Source: 2001 and 2011 National Land Cover Dataset, CMAP Land use Inventory, Illinois Department of Natural Resources, County Forest Preserves or Conservation Districts, Kendall County Forest Preserve District Master Plan, and I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands.

Counties protect the most land

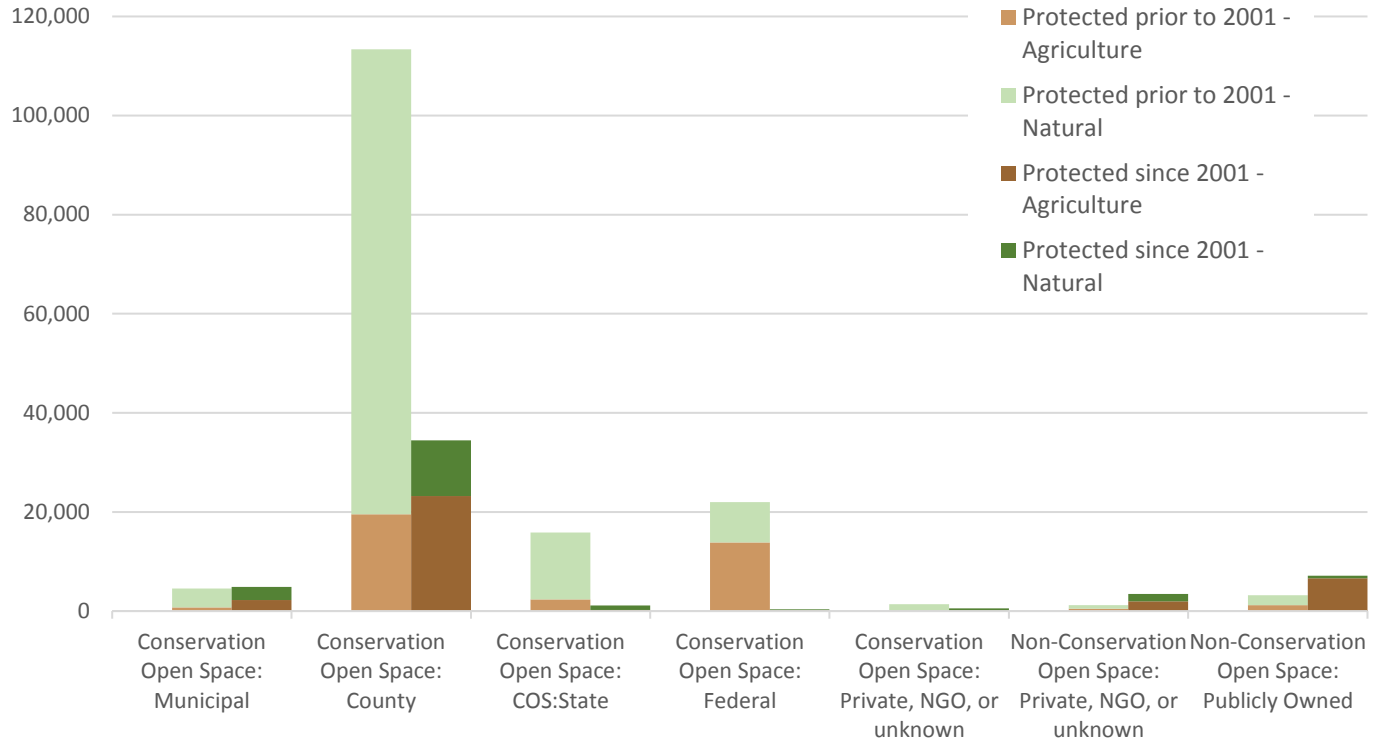
Counties, through their Forest Preserve and Conservation Districts, remain the region's largest landowners of protected lands. Recent acquisition efforts represent a 25 percent increase in Forest Preserve and Conservation District direct landholdings and a doubling of lands that had agricultural land cover in 2001 (Figure 14). County Forest Preserve and Conservation Districts were formed with the specific intent of protecting and preserving natural lands.²⁹ While districts may have acquired lands with agricultural cover, and temporary farming leases are commonly used, the long-term vision for these areas may include natural habitat areas and depends on the availability of restoration and stewardship funds.

Other landowners have also made significant contributions. Municipal ownership as well as private and non-profit ownership of conservation open space has more than doubled in the last 15 years. Approximately 17 percent or 40,000 acres of the region's protected agricultural and natural land is in state or federal ownership. However, the state acquired less than 1,000 acres in the Chicago region since 2001 and the federal government acquired just 400 acres.³⁰ The state's landholdings are focused on natural land protection (86 percent).

²⁹ The Illinois' Forest Preserve District Act of 1913 allowed for the creation of Forest Preserve Districts to: "acquire ... and hold lands ... containing one or more natural forests or lands connecting such forests or parts thereof, for the purpose of protecting and preserving the flora, fauna and scenic beauties within such district, and to restore, restock, protect, and preserve the natural forests and said lands together with their flora and fauna, as nearly as may be, in their natural state and condition, for the purpose of the education, pleasure, and recreation of the public." See <http://guides.library.illinois.edu/c.php?g=347701&p=2344735>

³⁰ The State of Illinois acquired under 1,500 total acres; this analysis focuses on those acres with agricultural or natural land cover in 2001.

Figure 14. Land ownership of protected lands by 2001 land cover, 2001-2015^a



^a Non-conservation open space refers to protected lands that are not identified as conservation open space within the CMAP Land Use Inventory. These lands may contain natural features, but most commonly are used for agriculture. For example, Kane County’s agricultural conservation easements are reflected in the non-conservation open space held by local and county government, private landowners, and non-profit organizations. Source: CMAP Land use Inventory, Illinois Department of Natural Resources, County Forest Preserves or Conservation Districts, Kendall County Forest Preserve District Master Plan, and I-View: Prairie State Conservation Coalition’s database of Illinois protected natural lands.

Growing role of conservation easements

Based on an analysis of protected lands with acquisition information available, most of the region’s total protected lands (85 percent) have been acquired through fee simple acquisition, where the new owner acquires the full or maximum ownership of the land. Nearly seven percent or 19,000 acres, of the lands protected during this time period used conservation easements (Table 2). Conservation easements are a voluntary, permanent agreement between a landowner and a qualified organization, like a local government or land trust, which restricts future development on the property while the rest of the ownership rights remain with the original owner. Donating conservation easements comes with tax advantages. First enacted temporarily in 2006 and then made permanent in 2015, Congress established a federal tax incentive for conservation easement donations.³¹ Conservation easements are the main preservation strategy for protecting non-conservation open space, and state, county, and non-profit organizations, such as land trusts, are the main easement holders.

³¹ Land Trust Alliance, see <http://www.landtrustalliance.org/topics/taxes/income-tax-incentives-land-conservation>

Table 2. Landowners and type of protection of conservation and non-conservation open space, as of 2015.

Landowner type	Acres of Land by Protection Type				
	Fee Simple	Conservation Easement	Other ^a	N/A ^b	Total
Conservation Open Space					
County	173,510	5,444	183	3,660	182,797
Federal	18,238	-	-	6,890	25,128
Municipal	10,001	1,693	457	3,347	15,498
State	21,121	174	3	501	21,799
Private, NGO, or Unknown	2,599	130	-	4	2,734
Non-Conservation Open Space					
Publicly owned ^c	3,325	7,154	3,297	159	13,937
Private, NGO, or Unknown	309	4,045	-	2,028	6,382
Total	229,103	18,641	3,940	16,590	268,274

^a Leased, managed, or other type of easement

^b The type of land protection status is not known for 16,590 acres, roughly 6 percent of the total protected lands.

^c Publicly owned lands could include federal, state, county, municipal, and township ownership.

Source: CMAP Land use Inventory, Illinois Department of Natural Resources, County Forest Preserves or Conservation Districts, Kendall County Forest Preserve District Master Plan, National Conservation Easement Database, and I-View: Prairie State Conservation Coalition's database of Illinois protected natural lands.

Significant conservation spending

Acquiring land or conservation easements depends not only on the willingness of private landowners but also available funding. Since 2001, federal, state, and local financial support have been essential in protecting 60,000 acres. The Trust for Public Land's Conservation Almanac tracks conservation spending and has documented the expenditure of \$1.15 billion in the protection of open space from 2001 to 2012/2013 in the Chicago region.³² Preservation costs vary considerably by location. For example, the amount of land protected in Lake and Will County was very similar during this time period, yet Lake County spent nearly 90 percent more than Will County for roughly the same acreage.³³ Average costs of conservation easements between counties ranged from \$6,000 to \$80,000 per acre and the average costs of fee simple acquisitions between counties ranged from \$10,000 to \$108,000 per acre between 2001 to 2012/2013.³⁴

Local funding has been critical to success

Nearly 80 percent of the total funding for land preservation comes from local funding sources, identified here as Forest Preserve and Conservation District spending and associated municipal spending spent as a match. With taxing authority, the Forest Preserve and Conservation Districts have used open space referenda to fund natural land acquisition and restoration efforts. Overall, 24 bond measures and 2 tax

³² The Trust for Public Land, Conservation Almanac, 2016. <http://www.conservationalmnanc.org/secure/> The total protected acres reported in the Conservation Almanac do not perfectly match those identified by CMAP. The Almanac is lacking data from the early 2000s from the Kane County Forest Preserve District.

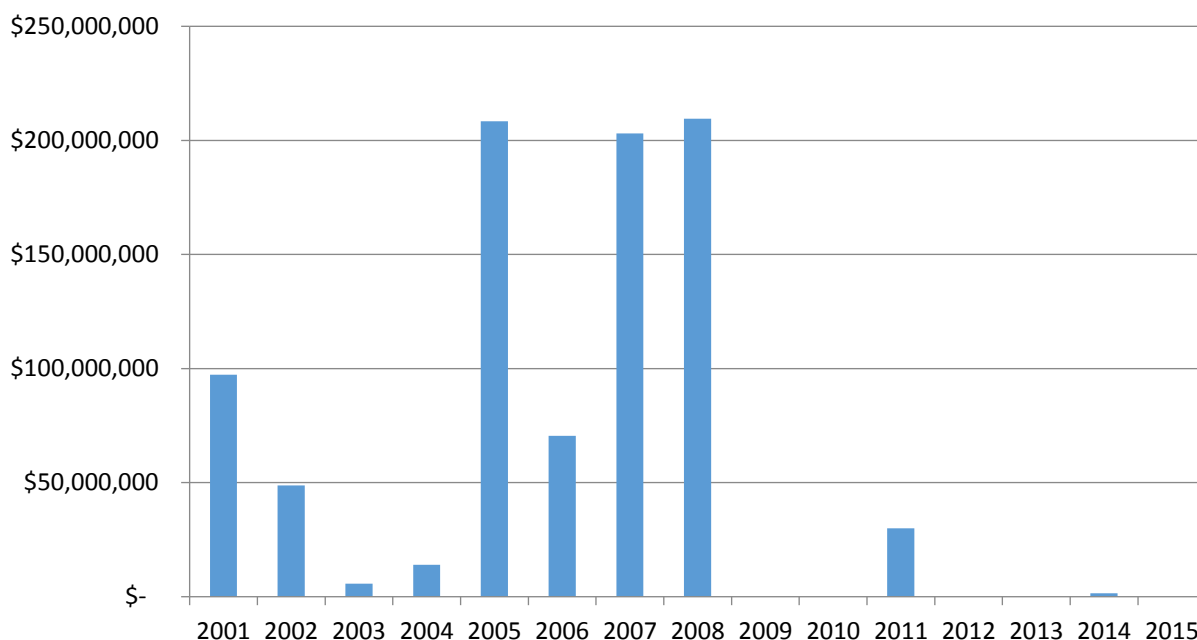
³³ Between 2001 and 2012/2013, 8,600 acres were protected in Lake County for an estimated total of \$334 million. Approximately 8,500 acres were protected in Will County for \$183 million.

³⁴ The Trust for Public Land has reported on total spending, but only pairs specific acquisition or easement costs with acreages for locations with known GIS spatial data. In the Chicago region, nearly 81 percent of open space parcels could be paired with financial data. Average costs per acre by county were calculated only using those acres preserved where a purchasing amount was recorded.

increases successfully passed for a combined total of \$888 million (Figure 15). The passage of such a large number of open space bonds is a testament to how valuable conservation efforts are to local voters. Open space referenda were particularly successful in the years before the 2008 recession, perhaps due to a strong economy as well as voter response to the levels of greenfield development seen in the region.

However, the number of referenda being proposed and subsequently passing have rapidly declined in recent years. County Forest Preserve and Conservation Districts had large bond measures successfully pass in 2005, 2007, and 2008, but have not proposed referendum questions since that time given concerns about voter response after the recession. However, the successful passage of Kane County Forest Preserve District’s \$50 million land acquisition and improvement referendum may signal a change in this trend.³⁵

Figure 15. Approved open space referendum amounts by year in the Chicago region.



Source: The Trust for Public Land, Conservation Almanac, 2016.

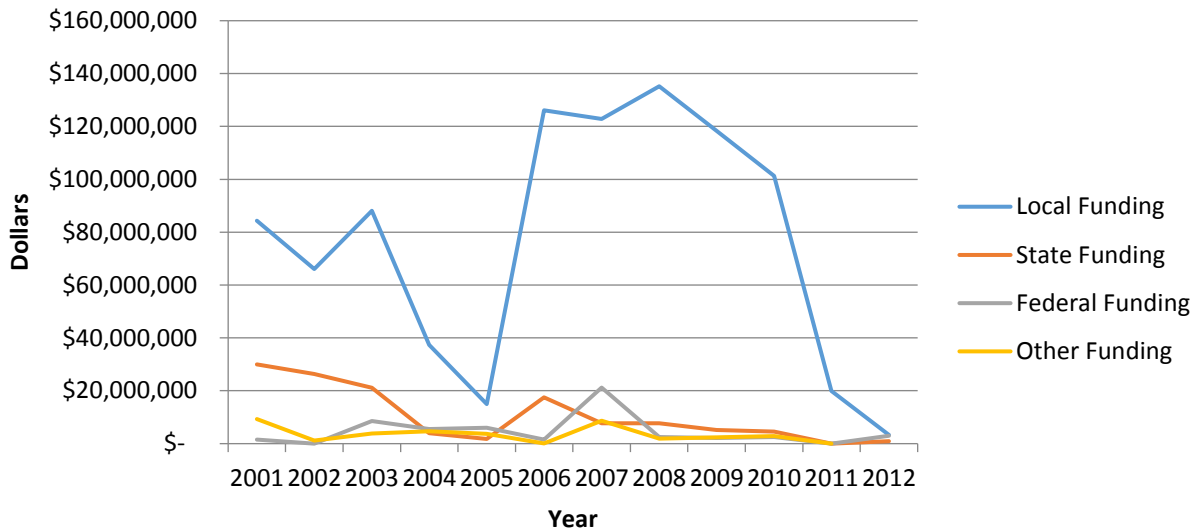
Declining funds for land protection

Overall, funding for open space protection has dramatically dropped in recent years (Figure 16). State funding sources have generally been declining since the Open Lands Trust program ran out of funding in 2003, which was based on general fund appropriations. Since that time, the Illinois Natural Areas Acquisition Fund (NAAF) and the Open Space Lands Acquisition and Development Program (OSLAD) have been the main state funding sources; however only a portion of OSLAD supports the creation of new parks and an increasing share of NAAF funds support IDNR staff given other cuts in IDNR funding. As the

³⁵ Elgin Courier-News. Gloria Casas. “Voters support Kane Forest Preserve District \$50 million referendum. April 5, 2017. See <http://www.chicagotribune.com/suburbs/elgin-courier-news/news/ct-ecn-kane-forest-preserve-referendum-st-0406-20170404-story.html>

State has struggled to pass a budget in recent years, these grant programs have been suspended or delayed. State and federal grants often require a local match, which was likely provided through funds approved through open space referenda. Lacking bond measures, the ability of local and county governments to access grants has likely declined. In addition, Forest Preserve Districts are not allowed to raise funds for agricultural preservation, making them ineligible to match federal agricultural-focused grants.

Figure 16. Conservation funding by source, 2001-2012



Note: Protected acres do not perfectly match those identified by CMAP; Local spending is forest preserve spending (lacking spending data from the early 2000s from the Kane County Forest Preserve District) and associated municipal spending spent as a match. It does not include comprehensive spending data from municipalities. Other funding includes private, non-profit, and unknown sources.

Source: The Trust for Public Land, Conservation Almanac, 2016.

Increasing pressures from climate change

Climate change is already affecting the quality and viability of the region’s remaining agricultural and natural lands. As documented in CMAP’s Climate Resilience strategy paper, our natural areas are a key component of the region’s resilience to a changing climate.³⁶ At the same time, with changing temperature and precipitation patterns, these same areas will be impacted by altered hydrology and species composition. With drought, the region is expected to see reduced water levels in streams, wetlands, and lakes as well as lower water quality. Climate change is also expected to result in more frequent flooding due to heavier rain events. As the climate changes, plant and animal species either adapt, move to more suitable habitat, or become increasingly rare or extinct. These impacts will likely alter the quality of natural areas as well as the strategies to restore and maintain their ecosystem functions.

Farming has always been susceptible to weather; and climate change will increasingly affect farms in the Chicago region. Warmer average temperatures in the Midwest have been lengthening growing seasons, enabling greater agricultural productivity and higher economic returns. However, other climate impacts

³⁶ CMAP. 2016. ON TO 2050 Climate Resilience Strategy Paper. See www.cmap.illinois.gov/onto2050/strategy-papers/climate-resilience

such as heat waves, drought, more frequent freeze-thaw cycles, unpredictable weather patterns, and extreme precipitation events and flooding can have the opposite effect on agricultural resources, causing significant crop failure, greater survival rates of invasive pests, and lost revenue. Despite the fact that total annual precipitation could increase by 20-30 percent by century's end,³⁷ midwestern summers are expected to be drier and the average number of days in the region without precipitation is likely to increase. Drought has already had significant recent agricultural impacts; the 2012 drought was responsible for over \$3 billion of crop losses from heat and hot winds in Illinois.³⁸ There is little question that the impacts of climate change on the region's growers could be significant. Recent analyses indicate that Illinois may be the most affected state in the Midwest region from crop losses from an economic standpoint; extreme heat could lead to crop losses of up to 24 percent each year for some areas of the state.³⁹

Taking a broader view, climate impacts to agricultural systems outside of the Chicago region may affect the region's future food supply as well as the regional agricultural economy. California, Florida, Mexico, and other geographies that the region relies upon heavily to produce its food could suffer devastating effects from climate change, inducing other geographies including the Chicago region to ramp up food production.⁴⁰ As agricultural production patterns shift, the region's processing and distribution sectors may be impacted and may need to rely more on local production.

³⁷ CMAP. 2013. [Climate Adaptation Guidebook](#), Appendix A: Primary Impacts of Climate Change in the Chicago Region. See <http://www.cmap.illinois.gov/livability/sustainability/climate-adaptation-toolkit>

³⁸ Natural Resources Defense Council, "Record-Breaking \$17.3 billion in Crop Losses Last Year; Significant Portion Potentially Avoidable," August 27, 2013, available: www.nrdc.org/media/2013/130827.asp. See also: <http://farmdocdaily.illinois.edu/2013/03/drought-crop-insurance-loss-2012.html>.

³⁹ Gordon, Kate, et al. Heat in the Heartland: Climate Change and Economic Risk in the Midwest. Risky Business: The economic risks of climate change in the United States. January 2015. See <http://riskybusiness.org/site/assets/uploads/2015/09/RBP-Midwest-Report-WEB-1-26-15.pdf>

⁴⁰ Baylis, Kathy et al. Preparing for Climate Change in Illinois: An Overview of Anticipated Impacts. Institute of Government and Public Affairs: Climate Change Policy Initiative May 28, 2015. See <https://igpa.uillinois.edu/sites/igpa.uillinois.edu/files/reports/Preparing-for-Climate-Change-in-Illinois.pdf>

Strategies for lands in transition

Parts of the Chicago region will continue to experience development pressure on agricultural and natural resources. Land development and protection decisions have impacts on the market viability of area farms, habitat connectivity of our natural areas, and the costs associated with constructing and maintaining new infrastructure and services. In turn, these have ramifications not only on the new residents and businesses in growing areas but their existing neighbors, nearby municipalities, and the region as a whole. The ON TO 2050 plan should recommend strategies that help to both maintain and protect the critical role of our agricultural economy and natural ecosystem functions and support wise development decisions, especially in areas of sensitive or high quality natural resources.

The strategies presented below (and summarized below in Table 3) recommend actions that CMAP should take to support land preservation and stewardship and coordinate new development. The strategies identify specific agency programs or projects that can implement the recommendations. CMAP functions broadly include transportation programming, the Local Technical Assistance program, local ordinances and toolkits, policy research and development, and ongoing or upcoming work to develop ON TO 2050.

Table 3. Strategies for lands in transition.

Enhance natural land protection and stewardship	<ul style="list-style-type: none"> Refine key natural areas mapping with best available data Prioritize land protection within conservation areas Establish sustainable state funding sources for land acquisition and stewardship Expand financing strategies to protect critical lands Increase private landowner conservation and stewardship
Strengthen regional agricultural systems	<ul style="list-style-type: none"> Recognize farmland and agriculture as economically valuable Identify key agricultural lands Encourage resilient agricultural systems in a changing climate Support diversification of agricultural systems Support state and county farmland preservation programs
Prioritize resource considerations in development decisions	<ul style="list-style-type: none"> Identify agricultural and natural assets in land use and transportation planning Update ordinances to better protect agricultural and natural resources Identify areas with higher development pressure Encourage compact and conservation-oriented development Incorporate long-term infrastructure maintenance into expansion decisions

1. Strengthen natural land protection and stewardship

CMAP should pursue strategies that strengthen natural land protection and stewardship activities in order to maintain and enhance the regional green infrastructure network. The pressures facing natural land protection and stewardship continue to increase as development, invasive species, and climate change place greater demands on natural systems. At the same time, fewer public resources available for land protection and stewardship have reduced the ability of land managers to respond to these issues. And precisely because of these pressures, the region's remaining natural lands are providing an ever increasing role in providing ecosystem services and habitat for species in a fragmented landscape.

GO TO 2040 called for the continued protection of conservation open spaces through coordinated land acquisition and prioritized restoration efforts. The plan outlined a number of strategies to achieve these recommendations, including establishing dedicated open space acquisition and operational funding, increasing the role of private landowner and conservation organizations, and using the GIV to guide land acquisition efforts and steer future development to other locations. These recommendations continue to be at the core of natural land protection strategies for the region; ON TO 2050 should reiterate these essential strategies and explore additional methods to engage new funding sources and partners.

1.1 Refine key natural areas mapping with best available data

The region's green infrastructure network consists of core natural areas, surrounding hubs that buffer the core areas, and corridors that provide important connections between landscapes. GO TO 2040 used the Green Infrastructure Vision (GIV) to identify the existing natural resources as well as potential connections that could be restored within the region. The Plan and subsequent CMAP policy work recommend the use of the GIV to prioritize conservation investments and minimize development impacts.⁴¹ In recent years, the regional GIV has been refined and updated, first for the seven-county region of northeastern Illinois and subsequently for the broader region served by Chicago Wilderness.⁴² The most recent update, GIV 2.3, added an economic valuation of several key ecosystem services. In addition, counties and municipalities across the region have created their own green infrastructure plans. These more localized mapping efforts have allowed local decision-makers to identify natural assets, based on local expertise and available data, to achieve their own policy objectives.

As outlined in CMAP's Integrating Green Infrastructure Strategy Paper, the GIV, which presents a vision of a future green infrastructure network for the region, is based on outdated datasets and presents both existing natural assets as well as potential connections and corridors, which can be difficult to interpret.⁴³ As part of the development of ON TO 2050, CMAP is creating a series of "layers" to cater the content of a regional plan to local partners through more spatially specific recommendations. One of the layers under development is a conservation areas layer that will build on local green infrastructure plans to present regional priorities for conservation, which will support ON TO 2050 policy goals. The layer will also provide spatial data on natural resources that is easy for CMAP to update and for implementers to understand and use. Sharing some similarities with the GIV, the conservation areas layer will identify areas within the region that are preserved or protected as well as currently unprotected areas with

⁴¹ CMAP. 2014. Policies to Encourage the Preservation of Regional Green Infrastructure. See <http://www.cmap.illinois.gov/livability/sustainability/open-space/green-infrastructure-vision>

⁴² The Chicago Wilderness is a regional alliance of membership organizations focused on preserving, improving, and expanding nature and quality of life in parts of Illinois, Indiana, Wisconsin, and Michigan.

⁴³ CMAP. 2016. ON TO 2050 Integrating Green Infrastructure Strategy Paper. See <http://www.cmap.illinois.gov/onto2050/strategy-papers/green-infrastructure>

valuable natural resources that are therefore high priorities for conservation. CMAP's Integrating Green Infrastructure Strategy Paper articulated the key ecological principles needed in conservation efforts, such as large core areas and complexes, buffer areas, and corridors.⁴⁴ The conservation areas layer builds on the framework of the GIV with more current data and includes county green infrastructure mapping efforts that reflect local priorities and knowledge. Where county mapping efforts have not yet been conducted, CMAP is using regionally available datasets and commonly used thresholds to identify important natural resources.

The conservation areas layer will allow CMAP and partners to use updated data, such as recent research on oak forests, to prioritize investments. However, other datasets are currently only available for specific counties. For example, sensitive groundwater recharge areas have been mapped for a subset of counties in the region; regional coverage hinges on funding the Illinois State Geological Survey and Illinois State Water Survey to complete groundwater modeling. CMAP supports funding for continued research of natural resources by the Prairie Research Institute, Illinois Department of Natural Resources, Illinois Environmental Protection Agency, and other conservation organizations to help inform future versions of the conservation areas layer.

CMAP remains committed to maintaining regional natural resource data to improve decision-making, and will update the conservation areas layer on a regular basis as new data becomes available. CMAP currently foresees three key areas where the results of additional research may require a more extensive update – advancements in ecosystem service valuation, an improved understanding on how climate change may impact our conservation priorities, and an update of the restoration or vision component of the GIV. CMAP will need to rely on the work of partners for this information, and supports efforts to improve our understanding in these key areas.

The recent addition of ecosystem services added a valuable component to the GIV, but it could only provide estimates for four services due to limitations in current research. As national and local research continues in this valuable area, CMAP and partners should work to update the ecosystem service valuation in the future. This update could also look outside of the traditional boundaries of the GIV to consider the ecosystem services provided by the region's farmland. To a limited extent, the GIV 2.3, with its consideration of carbon storage performed by soils, reflected some of the ecosystem services performed by agricultural lands.⁴⁵ Agricultural fields do provide services, such as flood control and groundwater recharge, that could be better understood through a sibling study to the ecosystem services value of conservation areas.

The identification of the region's natural assets also needs to respond to changing conditions and corresponding management goals due to the impacts of climate change. With changing temperature and precipitation patterns, natural areas will be impacted by altered hydrology and species composition; maintaining connectivity between green spaces takes on a critical role within a changing climate.⁴⁶ As a region, our land acquisition and stewardship strategies need to respond to these changing patterns not only to maintain the ecosystem services that can help humans mitigate and adapt to climate change but

⁴⁴ CMAP. 2016. ON TO 2050 Integrating Green Infrastructure Strategy Paper. See www.cmap.illinois.gov/onto2050/strategy-papers/green-infrastructure

⁴⁵ CMAP. 2015. Green Infrastructure Vision 2.3: Ecosystem Service Valuation. See <https://datahub.cmap.illinois.gov/dataset/green-infrastructure-vision-2-3-ecosystem-valuation>

⁴⁶ Derby Lewis, A., Hall, K.R. and Hellmann, J.J. 2012. Advancing Adaptation in the City of Chicago: Climate Considerations for Management of Natural Areas

also to respect the inherent value of these ecosystems. CMAP and partners should work to enhance regional natural resource mapping with a better understanding of the locations and vulnerability of these existing unprotected connections and work to identify future connections and reduce habitat fragmentation. This work could result in an updated vision of restoration and connectivity between existing natural areas that was first showcased in the GIV.

1.2 Prioritize land protection within conservation areas

GO TO 2040 used the GIV as way to define the minimum level of connected open space that should be planned for and maintained even with future development in the region. The plan recommends protecting a significant amount of natural lands, prioritizing land preservation of 400,000 total acres within the green infrastructure network.⁴⁷ Natural lands can be protected in two main ways – direct preservation through ownership or easements or by averting the direct or indirect impacts of development on natural resources. While strategies for minimizing development impacts will be covered in Strategy 3, this section will highlight strategies for focusing direct land preservation within the conservation areas layer.

Land preservation programs are focused on acquiring or otherwise protecting significant land resources based on a range of ecological, planning, and spatial factors. While the central goal is to protect lands that feature high ecological integrity, provide hard-to-replace ecosystem services, and/or are contiguous to or connect other such resources, preservation decisions are necessarily driven in part by opportunity, such as the availability of lands and the willingness of landowners. Strategic frameworks that rely on ecological and planning indicators – like the conservation areas layer – can help maximize the benefits of land protection efforts by coordinating different actors across jurisdictional boundaries.

In 2014, CMAP called for state and local land managers to use the GIV as a guide for land acquisition and as a funding criteria.⁴⁸ The regional GIV as well as more localized mapping efforts have already informed strategic land preservation activities. In 2012, the Forest Preserve District of Cook County updated its Land Acquisition Plan to include GIV data to identify focus areas for acquisition, with the goal of acquiring 21,000 more acres.⁴⁹ The McHenry and Kane County Green Infrastructure Plans establish implementation goals of guiding future acquisitions, private conservation easements, and local planning and zoning activities. Lake County Forest Preserves recently developed a Green Infrastructure Vision for the County that outlines strategic habitat conservation areas for protection. In addition, land trusts and foundations, such as the Grand Victoria Foundation, often require land acquisition projects to contribute to a connected system of natural lands. CMAP and land management agencies and organizations such as the forest preserves, Illinois Clean Energy Community Foundation, IDNR, and U.S. Fish and Wildlife Service, should use the conservation areas layer data to inform preservation strategies and refer to the vision developed in the GIV.

In addition, CMAP and regional land protection implementers should work collaboratively with local conservation agencies and organizations to explore ways to identify priority areas within the conservation areas layer for protection. Known nationally as Priority Conservation Areas (PCAs), this approach uses a locally-driven prioritization process to identify specific lands or landscape types for

⁴⁷ CMAP. 2010. GO TO 2040: Expand and Improve Parks and Open Space., p. 127.

See <http://www.cmap.illinois.gov/2040/open-space>

⁴⁸ CMAP. 2014. Policies to Encourage the Preservation of Regional Green Infrastructure. See <http://www.cmap.illinois.gov/livability/sustainability/open-space/green-infrastructure-vision>

⁴⁹ Forest Preserve District of Cook County. 2015. Next Century Conservation –Five Year Strategic Plan

preservation, funding, or other reasons. Once identified, these areas can be part of a performance-based investment approach to most effectively and efficiently target conservation efforts. Some of the foundational work has already been accomplished by other organizations, including the IDNR Wildlife Action Plan and county green infrastructure plans. The PCA concept could also draw upon the ecosystem services work that has been incorporated into the latest version of the GIV. CMAP should explore the feasibility of a PCA program, including potential funding sources (Strategy 1.4).

Another form of land acquisition, compensatory wetland mitigation, could be prioritized by type and location via the conservation areas layer. The Clean Water Act requires projects to avoid impacts to wetlands and other water resources. For unavoidable impacts, compensatory mitigation is required to replace the loss of wetland, stream, and/or other aquatic resource functions. The Chicago District of the U.S. Army Corps of Engineers (USACE) handles permit review for Northeastern Illinois and current regulations for selecting compensatory mitigation sites require consideration of habitat connectivity, land use trends, and compatibility with adjacent uses.⁵⁰ CMAP should continue to recommend that the USACE Chicago District encourage mitigation bank developers and applicants proposing mitigation to locate their compensatory mitigation projects within the conservation areas layer.⁵¹ A potential mitigation site within the conservation areas layer has a better chance of seeing its surroundings remain in a natural state and can contribute to a larger network of connected open spaces.

1.3 Establish sustainable state funding sources for land preservation and stewardship

Land acquisition efforts from 2001 to 2015 resulted in nearly 60,000 additional acres for roughly \$1.15 billion from a variety of federal, state, and local sources.⁵² Looking forward, the region will need to protect an additional 132,000 acres in order to reach the GO TO 2040 target of 400,000 acres of protected open space. A rough calculation, based on past costs using county averages, would place the minimum funding goal at \$3.14 billion in today's dollars.⁵³ And yet this underestimate only includes acquisition and easement costs, not the resources needed to properly restore and maintain existing and newly acquired lands. In the coming years, stewardship funding is anticipated to become more and more critical as restoration efforts will need to respond to development, invasive species, and the changing climate. While no regional restoration assessment has been conducted, forest preserve and conservation districts estimate substantial restoration needs.

The State of Illinois plays an important role in conserving natural areas and providing funding through various grant programs to local governments for acquiring and managing parks and open lands. The

⁵⁰ Other considerations include the principles that mitigation is supposed to occur within the same 8-digit watershed where the impact occurred and that mitigation is supposed to replace the lost functions and values of the specific wetlands that were impacted.

⁵¹ CMAP. 2014. Policies to Encourage the Preservation of Regional Green Infrastructure. See <http://www.cmap.illinois.gov/livability/sustainability/open-space/green-infrastructure-vision>

⁵² The Trust for Public Land, 2016 Conservation Almanac. <http://www.conservationalmanac.org/secure/>

⁵³ This estimate was based on a number of assumptions. In line with Strategy 1.2, it assumes that the new 132,000 protected open space acres would be located within the GIV and that the proportion of the additional acreage in each county would correspond with the proportion of the unprotected GIV remaining within that county. Given the variability in land values across the region, the average costs of both conservation easements and fee simple acquisitions from 2001 to 2012 for each county were used. The calculation assumes that land would be acquired via donations, fee simple acquisition, and conservation easements at a similar rate for each county as seen from 2001 to 2012. The calculation does not account for inflation or increases in property values.

state operates and maintains nearly 17,000 acres of open space throughout northeastern Illinois. In addition, the state has several programs like the former Conservation 2000 and Open Lands Trust and current Illinois Natural Areas Acquisition Fund (NAAF) and Open Space Lands Acquisition and Development Program (OSLAD) that have provided important grant funding to help county and municipal governments acquire natural lands.⁵⁴ Within the past 15 years, the high point of the state's contribution occurred between 2001 and 2003 when the state averaged approximately \$45 million a year in land conservation spending.⁵⁵ Since that time, no new state land acquisition program has been launched and funding for both NAAF and OSLAD have declined due to declining revenues from the real estate transfer tax and other government decisions that have redirected these funds, including the 2015 freeze on nonessential state spending. For example, the recent stopgap budget of 2016 included the sweep of \$40 million from OSLAD to fund other, non-related programs. In addition, the recent passage of the Safe Roads Amendment could impact the license plate fees that generated funding for IDNR via the 2013 DNR Sustainability Bill.⁵⁶

Since the adoption of GO TO 2040, CMAP has called for the elimination of fund diversions from IDNR and the support of legislative initiatives that increase funding to conserve lands and coordinate open space investment. CMAP continues to support the creation of a substantial, dedicated source of funding for land preservation and stewardship. Such a program would allow the state to make strategic investments in state landholdings as well as provide matching funds and grants to local governments and nonprofit land conservation organizations. In addition to funding acquisition costs, state funding should also be available for restoration and stewardship activities on existing and future protected lands. Continued support for IDNR operations is critical as the agency also provides valuable technical assistance, data, and condition assessments that foster informed decision-making about land preservation and stewardship activities.

CMAP supports funding criteria that prioritizes land protection within the conservation areas layer, the regional network of green infrastructure (Strategy 1.2). To ensure that state investment in land conservation is used effectively, the program should also incentivize county and municipal governments to minimize development impacts on natural lands by including criteria related to natural resource protections in local policy (Strategy 3.2). CMAP should work with land managers and other partners investigating future funding strategies at the state level, such as the Forest Preserve and Conservation Districts, land trusts, non-profit advocacy organizations, philanthropies, and others.

1.4 Expand financing strategies to protect critical lands

Since 2001, the vast majority of protected conservation open space has been funded through local and county referendums. The passage of such a large number of substantial funding streams is a testament to how valuable open space protection is to local residents. Local voters have recognized the benefits open space provides to property values, recreation activities, and economic development. They are also increasingly aware of the contribution large natural areas make in sustaining drinking water supplies and providing other ecosystem services like flood control. County and municipal governments have been

⁵⁴ While OSLAD has provided funding for natural land acquisition, it is primarily focused on recreational open space.

⁵⁵ Andrew Flynn, Trust for Public Land, personal communication 2016.

⁵⁶ In 2013, drivers who renewed their license plates paid an extra \$2 fee to provide a steady source of funding for parks improvement and maintenance. The fee is deposited in the Parks and Conservation Fund and was anticipated to generate \$18 to \$22 million annually.

able to use the funds from open space referendum to meet local match requirements of both state and federal funding programs.

Going forward, local funding will likely continue to provide the majority of resources needed to reach both local and regional land protection and stewardship goals. CMAP supports the expansion of existing financing options at the local and county scale as well as the exploration of new, innovative options that bring additional resources to address conservation needs. CMAP supports efforts by the Forest Preserve and Conservation Districts, as well as municipalities, to raise essential funding through open space referenda. In 2014, CMAP proposed the creation of FUND 2040 in order to maintain funding for important regional assets, include open space. CMAP should continue to explore options and work with land managers and other conservation partners to build a regional fund for conservation open space to address regional priorities such as maintaining high quality drinking water supplies or reducing flooding. Priorities for a regional fund could include targeted conservation within the conservation areas layer or a subset of lands locally identified as Priority Conservation Areas. Other regions across the nation have initiated regional open space funds to tackle regional based needs. For example, 70 partners from nine counties in the San Francisco region developed the San Francisco Bay Water Quality Improvement Fund in 2008 to restore wetlands and watersheds and reduce polluted runoff.

CMAP should support the exploration and testing of innovative financing strategies to achieve regional conservation open space goals, including public-private partnerships, transfer of development rights programs (Strategy 2.5),⁵⁷ water quality and stormwater volume control trading, State of Illinois Public Water Supply Loan Program, and greenhouse gas credit markets. Innovative trading programs could potentially address multiple objectives, but should be done in a way that does not create hotspots of pollution or runoff, particularly in environmental justice communities. Since 2012, ComEd and Openlands have jointly run the Green Region environmental grant program that has provided important funding for municipal conservation and environmental projects. In addition, as innovative stormwater management options, such as volume control trading that allows off-site green infrastructure for dense infill sites, are explored, there may be an opportunity to use these new funding sources for land acquisition and long-term maintenance. While not a direct funding option, Cook County is looking to establish a prequalified pool of conservation real-estate organizations to facilitate the purchase of priority acquisition sites when direct purchasing by the Forest Preserve in the short-term is not an option. These types of strategies can help extend the reach of individual land conservation organizations and take advantage of existing opportunities. Local land trusts are often at the forefront in their use of innovative strategies to finance acquisition and engage the public in stewardship. CMAP supports continued efforts to build the capacity of these private conservation organizations.

1.5 Increase private landowner conservation and stewardship

Private landowners own the majority of unprotected natural lands within the region. Even with ambitious regional goals for open space preservation, most natural areas will continue to remain in private hands and conservation inherently includes the active participation and support of landowners. The State of Illinois already recognizes the valuable caretaking responsibilities being performed by private landowners. The Illinois Nature Preserves Commission works to protect rare natural areas on privately owned lands through voluntary measures, such as conservation agreements, in exchange for

⁵⁷ Implementation of TDR programs across the region requires changes in state legislation, see strategy 2.5.

reductions in assessed property values (and property tax) and stewardship assistance.⁵⁸ Agricultural based programs that help to preserve remnant habitats are also critical in engaging private landowners (Strategy 2.3). The CMAP Integrating Green Infrastructure Strategy Paper outlines a number of strategies for encouraging restoration on community-scale green spaces, including golf courses, institutional campuses, office parks, subdivisions, and backyards.⁵⁹ Restoration and native landscaping education of private property owners throughout our communities, particularly those within or adjacent to lands identified in the conservation areas layer, are essential. CMAP supports the work of partners who are educating landowners and homeowner associations about the value of the natural resources on their property and how to properly maintain and restore these assets. This work is done in a variety of ways, from region-wide educational programs about endangered species and their habitats to volunteer restoration projects that not only restore public lands but also train participants in stewardship activities.

Partners are also educating landowners about the financial incentives of land or conservation easement donations made to a public or private conservation agency. First enacted temporarily in 2006 and then made permanent in 2015, Congress established a federal tax incentive for conservation easement donations.⁶⁰ This legislation raises the amount of the deduction a landowner can take to 50 percent of their annual income and extends the period of tax deduction to 15 years. While inherently linked to finding a willing land conservation organization to manage the donated conservation easements, these incentives could be harnessed to improve the natural resource protections on private lands. CMAP and partners should work with land trusts to build their capacity, which will allow them to continue to engage and educate private landowners, accept more conservation easements of priority natural lands, and encourage more widespread adoption of easements as a protection mechanism.

2. Strengthen regional agricultural systems

Illinois' diverse agriculture sector, including all elements of production, processing, and distribution, contributes significant economic strength and employment to the state. Our food processing and manufacturing cluster is the second largest of the nation's metropolitan areas by employment,⁶¹ and the transportation and logistics role of the region is critical for moving state and regional agricultural products to local and global markets. Changes in consumer preferences, climate dynamics, environmental quality, and the food preferences of a growing global population will impact the sector at large. Illinois and the region stand to benefit from some of these changes and may suffer from others. The region should focus on increasing the diversity and resilience of the commodity export system as well as the local food market.

The production side of the agricultural system is less significant in the Chicago region compared to the rest of the state, though it can be a significant component of local economies. For agricultural production to continue to be viable, a critical mass of farms, and corresponding distribution and

⁵⁸ The Illinois Nature Preserves Commission utilizes the Illinois Nature Preserve designation for high quality natural lands and the Illinois Land and Water Reserve for lands and water that support significant natural heritage or archaeological resources.

⁵⁹ CMAP. 2016. ON TO 2050 Integrating Green Infrastructure Strategy Paper. See <http://www.cmap.illinois.gov/onto2050/strategy-papers/green-infrastructure>

⁶⁰ Land Trust Alliance, Income tax incentives for land conservation. see <http://www.landtrustalliance.org/topics/taxes/income-tax-incentives-land-conservation>

⁶¹ FARM Illinois. 2015. A Food and Agriculture Roadmap for Illinois. See <http://farmillinois.org/farm-illinois-plan-2>

processing centers are required. Development of agricultural lands, as well as the region's ability to respond to changing global economic and climatic conditions, threaten the long-term viability of this sector. In response, the region should support two primary goals: strengthen the regional agricultural economy, and support agricultural land protection strategies. GO TO 2040 included both of these goals. ON TO 2050 is expected to support the agricultural and local food policies laid out in GO TO 2040, emphasizing greater local food production and farmland preservation. This strategy paper builds on these principles and presents a refined set of policy directions based on the implementation experience of partners and CMAP, as well as new data and information.

2.1 Recognize farmland and agriculture as economically valuable

Illinois' diverse food and agriculture sector and supporting businesses make up a significant component of the state economy. In the Chicago region, the agriculture, forestry, fishing and hunting industries⁶² contributed approximately \$350 million to the regional economy in 2015, and crop and animal production supported approximately 8,200 regional jobs in 2016.⁶³ While these figures represent a small fraction of the total regional gross domestic product (GDP) of \$490 billion, these industries can be extremely important for some local economies, a fact that is often absent from discussions about economic development. In addition to agricultural production, the Chicago region is an essential center of logistics, transportation, and processing for regional and national agricultural and food products, which are critical elements of the agricultural supply chain. Yet, the true impacts of this supply chain are not as well understood as other industrial clusters in our region. Recent efforts by the Illinois Manufacturing Excellence Center (IMEC) and RW Ventures, LCC have explored the manufacturing and processing portion of the food cluster.⁶⁴

Despite these economic contributions, as well as the cultural and scenic benefits, farmland can often be perceived as a staging area for future development and many economic assessments do not consider the role agricultural production plays in the local economy. Over the past few years, CMAP and partners⁶⁵ have been working together to improve our understanding of the local food system by providing a baseline of the current local food system outputs and estimating the potential volume of local foods that could be produced regionally.⁶⁶ A greater understanding is needed in different aspects of local food production as well as other components of the agricultural sector more generally to inform both industry stakeholders and policy makers on how best to support and grow this cluster. CMAP should review past efforts to understand economic components of the agricultural system and identify areas in need of further exploration. This could include conducting an economic cluster analysis on the

⁶² The Bureau of Labor Statistics defines the Agriculture, Forestry, Fishing and Hunting sector as establishments primarily engaged in growing crops, raising animals, harvesting timber, and harvesting fish and other animals from a farm, ranch, or their natural habitats. See industries at a glance: www.bls.gov/iag/tgs/iag11.htm

⁶³ CMAP calculated the gross domestic product as the total sales of the agricultural industry (the value of all final goods and services produced by the industry) minus all input costs (cost of labor, equipment, chemicals, etc.) Data through 2015 are actual reported data from the U.S. Bureau of Economic Analysis (BEA); 2016 and beyond are Moody's Analytics Estimated forecast data. Employment estimates are from Economic Modeling Specialists International (EMSI) data.

⁶⁴ RW Ventures and Illinois Manufacturing Excellence Center. 2015. Chicagoland FOOD: Seizing the Opportunity to Grow Chicagoland's Food Industry. [http://rw-ventures.com/publications/downloads/Chicagoland%20FOOD%20Report%20\(Final\).pdf](http://rw-ventures.com/publications/downloads/Chicagoland%20FOOD%20Report%20(Final).pdf)

⁶⁵ Partners include Openlands, the Liberty Prairie Foundation, and Fresh Taste, through funding from The Searle Funds at the Chicago Community Trust's Food:Land:Opportunity program. See <http://cctfiles.cct.org/flo>.

⁶⁶ The Regional Food System Study is in late stages but has not yet been released.

regional food and agriculture system, including processing, distribution, and logistics, to help quantify the contribution of the system to the region's economy and further define ways to strengthen it.

A more localized examination of the region's agricultural sectors may be necessary in specific communities. Standard local economic development analysis typically does not consider nearby agricultural production and its connections with other sectors within a community. CMAP and partners should develop tools to assist communities in understanding the economic contribution of nearby farmland to better inform economic development strategies as well as land use planning and transportation investments.⁶⁷ With more localized information, CMAP, counties, and communities can begin to incorporate the value of agricultural systems into local plans through local planning efforts, including contributions of food production, processing, and other services that farmland provides to local economic activity. CMAP could use the LTA program to explore best practices and develop a way to include this type of analysis in relevant locations across the region.

CMAP should support the creation of a regional platform of policy and development strategies to strengthen regional agricultural systems on a variety of fronts, including climate resilience and diversification, infrastructure and logistics, and land protection strategies. The beginnings of such a platform can be found in the work of Farm Illinois, a statewide association to coordinate efforts across the food and agriculture system. To advance the platform, an organization is needed to lead and convene stakeholders, coordinate efforts, and advise local governments and private entities on policy and development strategies.⁶⁸ Such an entity could consult with CMAP, and should coordinate efforts with the Illinois Local Food, Farms and Jobs Council, and the Illinois Local and Organic Food and Farm Task Force, as well as regional initiatives such as the Regional Food Systems study. CMAP can support these efforts by supplying data, and working with local governments and other partners to incorporate findings and strategies into local plans and policies, transportation investments, and other local initiatives.

2.2 Identify key agricultural lands

In a region with abundant prime farmland soils, identification of key agricultural areas may seem unnecessary. Yet, agricultural lands continue to be lost to development, as does our region's ability to maintain its agricultural economy. Understanding where our most important agricultural assets are located will help facilitate their preservation and guide local and regional development and infrastructure investment decisions, such as transportation. The presence of prime farmland soils alone does not necessarily indicate an agricultural asset worth preserving, since much of the remaining farmland in the region is high quality soil. Governments and organizations across the nation have recognized several criteria that are important to maintain for a successful agricultural economy. The State of Illinois and the Soil and Water Conservation Districts (SWCD) use the Land Evaluation and Site Assessment (LESA) system, which identifies prime farmland as well as locations with a critical mass of farming activities and minimal urban intrusion.

⁶⁷ United States Department of Agriculture. 2016. The Economics of Local Food Systems: A toolkit to Guide Community Discussions, Assessments, and Choices. https://www.ams.usda.gov/sites/default/files/media/Toolkit_Designed_FINAL_3-22-16.pdf

⁶⁸ FARM Illinois proposes the creation of the "Illinois Council for Food and Agriculture to serve as an independent umbrella organization in Illinois, representing all stakeholders of the food and agriculture sector, including but not limited to nonprofit organizations, state agencies, trade associations, commodity groups, and research and education institutions. It will serve as liaison between public and private food and agriculture entities and will be dedicated to the sector's advancement and development throughout the state." See <http://farmillinois.org/farm-illinois-plan-2>

Working with partners, CMAP should develop a regional map of key agricultural areas to help inform local and regional decision-making. The CMAP region is home to both conventional, larger scale farming and local food production on smaller farms. Given the different requirements for different farming activities, a regional map of key agricultural areas may designate different areas based on a variety of factors. In addition to the criteria used in the LESA system, CMAP should consider criteria that reflect the current and future needs of agriculture in northeastern Illinois, such as those identified in Kane and McHenry Counties, but could also reflect other regional approaches. Examples from the nearby Southeastern Wisconsin Regional Planning Commission (SEWRPC) may most closely reflect the conditions seen here. Wisconsin's Farmland Preservation law requires counties to update their farmland preservation plans as one of the conditions for continued landowner participation in the farmland preservation tax credit system. Subsequently, SEWRPC has worked with local counties to update their plans. Starting with Class I and Class II agricultural lands, the areas were refined based on non-soil factors, such as a minimum farm block size that varied based on location. In Washington, Snohomish County identifies important agricultural areas by their soil type, parcel size, and location outside of sewer service area boundaries. Portland Metro also considers the concentration of nearby farms, appropriate adjacent land uses, and sufficient agricultural infrastructure.

In addition to collaborating with the Natural Resource Conservation Service (NRCS) and local SWCDs, CMAP should work with the counties, Illinois Farm Bureau and local chapters, Farm Illinois, and Openlands to ensure that the regional map accurately reflects the key agricultural areas of the region. Once key agricultural areas are identified, CMAP should encourage local partners to incorporate this information into local planning and decision-making (see Strategy 3.1). Through the LTA program, CMAP can encourage the utilization of this information to inform future land use planning efforts and explore LTA projects that would directly advance county planning work. Based on available research, CMAP could potentially include an analysis of the value of ecosystem services, such as flood control and carbon storage, being provided on agricultural land as part of the regional map.

2.3 Encourage resilient agriculture systems in a changing climate

From production to processing and distribution, many aspects of the region's agricultural economy will experience disruptions due to both local and global changes in climate. Local changes in temperature and precipitation are anticipated to alter crop yields and economic returns of the farms in our region. As crop production patterns shift nationally, the role of the region's agricultural processing sector and transportation network will likely need to adapt to new products and routes. In order for the agricultural economy to withstand these changes, CMAP and partners should explore a number of strategies, including increased support for sustainable farming techniques and investments in infrastructure.

Current estimates of yield declines and crop losses assume current agricultural practices will continue with no adaptive measures. The ability of farmers to adapt to climate change—through planting decisions, resilient strains of crops, farming practices, irrigation and land drainage strategies, and use of technology—can reduce its impact on production, farm commodity prices, and farmer returns.⁶⁹ Sustainable agricultural management practices help improve the health of our land and water resources and better prepare them for shocks and stresses to the system. Such practices as cover crops, no-till

⁶⁹ Malcolm, Scott, et al. Adaptation Can Help U.S. Crop Producers Confront Climate Change. USDA Economic Research Service. 2013. See <http://www.ers.usda.gov/amber-waves/2013-february/adaptation-can-help-us-crop-producers-confront-climate-change.aspx#.V2wjfkrLmF>

cultivation, and smarter irrigation practices can help to retain our fertile soil and water supplies.⁷⁰ Many of the region's farms are served by drain tiles to dry the soil to allow for planting. As the climate changes and flashier storms reduce the amount of water infiltrating the soils, the removal of tile drains may become necessary to improve crop production.⁷¹ The region should support agricultural practices that result in a more sustainable and resilient agriculture system in order to improve and maintain our land and water resources.

Recent efforts have increased as partners work to implement the Illinois Nutrient Loss Reduction Strategy, which highlights practices such as cover crops, terraces, filter and buffer strips, and grass waterways to reduce nutrient and soil loss, rebuild soil organic matter and sequester carbon, and minimize denitrification.⁷² These practices can be particularly important on agricultural land adjacent to natural areas, forest preserves, and other conservation areas. The McHenry County Conservation District already encourages the use of NRCS approved land resource management plans for farming activities near natural areas.⁷³ This practice could become more widespread among conservation land managers with agricultural landholdings.

CMAP can work with local stakeholders to provide access to resources on sustainable agricultural practices. Through its LTA program, CMAP should support sustainable land management practices on agricultural lands to support soil and water health, including protecting groundwater resources from contamination. CMAP should support the funding of organizations and programs that promote resilient land management practices on agricultural lands. The Soil and Water Conservation Districts⁷⁴ and Natural Resource Conservation Service are two of the primary assistance providers in the region, and should be supported with long term funding.⁷⁵ The 2014 Farm Bill streamlined existing conservation programs and allocated \$1.2 billion in federal funding, available over the next decade, to address crucial conservation concerns, yet the local NRCS and SWCD offices are currently underfunded.⁷⁶

With changing climatic conditions, some of the region's agricultural landscapes may no longer be suitable for agricultural production. Some of these areas may already harbor remnant natural systems such as oak woodlands and prairies, often along hedgerows, in farmed wetland areas, or within the soil profile that would better serve the region as restored natural areas. Other landscapes are highly flood

⁷⁰ Developing one inch of topsoil can take at least 100 years, depending on climate, vegetation, and other factors. Unfortunately, an estimated 1.5 bushels of soil are lost for every bushel of corn produced. Conservation tillage practices by our farmers and land stewards help reduce this loss, as well as reducing the runoff of nutrients.

⁷¹ Baylis, Kathy et al. Preparing for Climate Change in Illinois: An Overview of Anticipated Impacts. Institute of Government and Public Affairs: Climate Change Policy Initiative May 28, 2015. See <https://igpa.uillinois.edu/sites/igpa.uillinois.edu/files/reports/Preparing-for-Climate-Change-in-Illinois.pdf>

⁷² The ON TO 2050 Water Strategy Paper will explore these strategies.

⁷³ Breaking Ground, a 2016 land access guide produced by Openlands, the Liberty Prairie Foundation, and Food:Land:Opportunity

⁷⁴ Conservation Districts were created in the 1930s to assist landowners with agricultural land management, soil loss reduction, and resource conservation. Illinois' districts are funded by the state, and may be supplemented by grants from organizations to carry out specific tasks. Each district helps develop state and national agricultural conservation policy. Illinois law also allows the districts to review subdivision or other plans.

⁷⁵ Programs include the NRCS Conservation Stewardship Program (CSP), Conservation Reserve Enhancement Program (CREP), Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentives Program (EQIP), the Wetland Reserve Program, the Agricultural Conservation Easement Programs, Regional Conservation Partnership Program (RCP), and Partners for Conservation.

⁷⁶ FARM Illinois. 2015. A Food and Agriculture Roadmap for Illinois. See <http://farmillinois.org/farm-illinois-plan-2>

prone or exhibit high runoff and erosion challenges, and have potential to manage stormwater and restore hydrology for an area. CMAP should work with partners and local communities to consider taking sensitive land out of agricultural production and restoring to natural state, such as erodible land, steep slopes, wet soils, areas with high conservation potential (either due to location near other conservation areas or highly restorable areas).

The Chicago region is an essential transportation and logistical link in getting the state and regional agricultural products to both local and global markets, but the degrading transportation system puts the region at risk of losing its competitive edge with respect to the movement of goods. In addition, shifts in national agricultural production patterns in response to climate change could place new demands on our transportation network. For example, grain production changes combined with less ice cover on the Great Lakes may result in more commercial barge transport. Enhancing local production and building better connections with processing and distribution sectors may become more necessary as longer supply chains are disrupted. The region should prioritize investing in its freight, logistics, and transportation infrastructure, including rail, waterways, roads and bridges, airports, and logistics facilities, to ensure that they remain up to date, in a state of good repair, and open to the free movement of goods throughout the region and to global markets.⁷⁷ This includes ensuring that the system is adequate to move locally produced agricultural products to the regional market. CMAP can incorporate the needs of the regional food and agriculture industry into long-range transportation planning, the deliberations of the Freight Committee, related collaborative regional initiatives such as CREATE, and the planning and investment activities of the county departments of transportation. CMAP should also coordinate efforts with other state and regional entities to ensure that transportation and logistics systems are connected. Other logistical considerations include cold storage facilities, aggregation facilities (i.e., food hubs, such as the one planned for Kane County), processing facilities, and distribution hubs where large freight vehicles transfer goods to smaller vehicles for distribution in the city.

2.4 Support diversification of agricultural systems

Due to the fertile soils and climate variations across the state, Illinois farmers can produce a wide variety of commodities, livestock, and specialty crops. However, nearly 57 percent of the region's agricultural production consists of corn and soybeans that are produced for export, ethanol, feed, and processed foods and additives.⁷⁸ From both an economic and environmental perspective, the region could benefit from a greater diversity of agricultural products. Some crops could deliver higher returns on a per acre basis as well as support a greater number of jobs. Greater and more diverse production in our region would also enhance our resilience to potential disruptions to the global food supply chain, which could increase with climate change. Locally, a changing climate could lead to productivity impacts and diversification could help the region's farms adapt to changing conditions (strategy 2.3).

One of the key ways to diversify the region's agricultural system is to increase local food production. GO TO 2040 included a number of recommendations that continue to remain relevant today, such as:

- Encourage revisions of federal policy to promote local food, such as incentive programs
- Support local food production through institutional support and procurement processes
- Build regional nonprofit capacity to support and promote local food systems

⁷⁷ CMAP is developing strategies related to transportation network improvements in several other papers, including the Freight Plan and Asset Management and Highway Operations strategy papers.

⁷⁸ USDA, National Agricultural Statistics Service, 2001 Illinois Cropland Data Layer. See www.nass.usda.gov/Research_and_Science/Cropland/SARS1a.php

- Improve data collection and research on local food production, distribution, and other needs
- Provide training and information sharing that supports local food systems
- Provide technical assistance to incorporate local food systems in comprehensive plans and ordinances

One of the key ways to increase diversification of agricultural production is to assist new farmers in gaining access to farmland and related capital for equipment. New farmers tend to be interested in local food production and have not already invested in materials for corn and soybean production. Since GO TO 2040, CMAP and partner research, such as the Lake County Sustainable Local Food Systems Report, have identified land affordability and availability of suitable parcels (size and infrastructure) as significant barriers to new farmers interested in local food production, while policy and regulatory barriers were found to be relatively minor.⁷⁹ The cost of providing for these needs, coupled with operating costs and annual risk of losses, raise additional financial barriers for greater local food production for new and/or small farms, which do not enjoy the same range or scale of support as commodity crop production. Current commodity farmers who convert to a more diversified system are not likely to have the same issues as a new farmer, but may still experience some of these challenges.

Protected agricultural lands provide an opportunity to help new farmers gain access to farmland. Currently, some forest preserve districts temporarily lease lands for agricultural use as an interim measure and a few districts are exploring opportunities to encourage local food production on forest preserve and conservation district lands. Making public land available for small-scale farming or pasture operations can reduce management costs for the public landowner, improve soil and water health, respond to demand for local food, and increase government revenues by allowing farming until more permanent uses are developed. Good candidates for food production include areas with good soils, infrastructure, utilities, proximity to other food production operations, and publicly owned lands already being leased for agricultural production.

Counties and local governments in relevant areas should consider working together with chambers of commerce, economic development professionals, stakeholders, and the local or state Farm Bureau to discuss needs for a more diversified system, which may lead to infrastructure investments if a collective need for such support is identified and resources pursued. This coordination may also help connect farmers to each other in order to share equipment or supplies. Joint projects may stem from the findings of a local economic development approach that incorporates the agricultural economy (Strategy 2.1).

2.5 Support state and county farmland preservation programs

Illinois supports agricultural land preservation and economies through a variety of state policies and programs such as the Farmland Preservation Act, the Agricultural Areas Conservation and Preservation Act, and right-to-farm laws. A state-enabled land use assessment procedure allows agricultural land to be taxed based on soil productivity rather than development market value.⁸⁰ Other legislation requires the state to assess the degree of prime farmland conversion to other uses induced by state-led or funded activities, as well as notification of local Soil and Water Conservation Districts if a municipality

⁷⁹ CMAP. 2013. Lake County Sustainable Local Food Systems Report. See www.cmap.illinois.gov/programs-and-resources/Ita/lake-county-food

⁸⁰ 35 ILCS 200/Art. 10, Div. 6

intends to rezone or subdivide agricultural land, though the extent to which this actually occurs is unknown.

Despite these state programs, over 100,000 acres of the region's farmland were developed between 2001 and 2015, while 35,000 acres of farmland were preserved.⁸¹ GO TO 2040 included a number of recommendations that continue to remain relevant today and should be reinforced in ON TO 2050 - including the continuation and expansion of farmland protection programs. The plan emphasized the expansion of county conservation easement and protection programs, coordination with conservation open space preservation efforts, and permitting counties to use referenda to raise revenue for agricultural preservation.⁸²

Currently, the majority of farmland preservation activity in the region occurs at the county level. Lake, McHenry, Kendall, Will, and Kane Counties include explicit agricultural land policies within their comprehensive and land use plans and zoning maps; some have implemented conservation easement and acquisition programs and other activities. Kane, Kendall, and McHenry Counties have established voluntary conservation easement programs, though only Kane County has a dedicated revenue source that allows them to take advantage of the federal match.⁸³ CMAP should support legislation that provides counties with the authority to create and finance county agricultural easement programs through local referenda, potentially opening up access to federal funding. The state may also consider providing matching funds for these programs in counties where farmland is at risk of conversion and where preservation is a priority. County programs could focus on locations that have been identified regionally or locally as key agricultural areas (Strategy 2.2).

As of January 2015, at least 28 states have state-level agricultural conservation easement programs, which together had acquired 14,541 easements to protect over 2.5 million acres of farm and ranch land. CMAP supports the establishment of a comprehensive farmland protection policy at the state level, which could include an agricultural conservation easement program. Beyond state actions, additional funding opportunities and incentives for landowners to protect farmland should be explored.

As a similar strategy, Transfer of Development Rights (TDR) programs have shown to be effective at conserving open space.⁸⁴ This land use strategy transfers development potential from priority open space, farmland, or natural areas, where owners voluntarily enact protective easements, to priority development areas where communities want increased density and growth located closer to municipal services.⁸⁵ Property owners retain ownership of the protected land while they receive compensation for the development value of their property. However, TDR programs can be difficult to administer,

⁸¹ Many of these acres were protected with conservation goals in mind, not necessarily agricultural preservation.

⁸² CMAP. 2010. GO TO 2040 Implementation Action Area #1. Facilitate Sustainable local food Production. P 154.

⁸³ Kane County has worked with interested landowners to preserve over 5,500 acres across over 30 family farms. The program was partially funded through approximately \$20 million in funds from Grand Victoria casino revenues, with matching funds (\$12 million) from the USDA NRCS Federal Farm and Ranch Lands Protection Program, which is part of the Agricultural Conservation Easement Program (ACEP). ACEP provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits.

⁸⁴ As of 2007 at least 181 TDR programs had conserved 300,000 acres of land in 33 states, indicating that it can and has been successfully implemented elsewhere, though much depends on local and state laws and regulations. Pruetz, Rick and Erica Pruetz. Transfer of Development Rights Turns 40. American Planning Association Planning & Environmental Law. June 2007, Vol. 59, No. 6, p.3.

⁸⁵ American Planning Association. 1999. Policy Guide on Agricultural Land Preservation. See <https://www.planning.org/policy/guides/adopted/agricultural.htm>

especially within the zoning process for areas receiving additional development. More recently, variations to TDR programs have been emerging as a way to meet carbon, wetland mitigation, or water quality goals. For example, a wastewater utility could purchase open space or development credits to help meet pollution reduction goals. CMAP should explore how different TDR programs would work in the region given existing land use authority.⁸⁶

3. Prioritize resource considerations in development decisions

Agricultural and natural lands will likely continue to face challenges stemming from national and global forces. However, development pressure is a significant challenge in which our municipalities and counties have more influence. CMAP should continue to promote strategies that minimize the negative impacts of greenfield development in order to maintain and enhance the region's agricultural systems and natural resources. New development on agricultural and natural lands can be located and designed in such a way to reduce impacts, maintain ecosystem functions and the local agricultural economy, build municipal financial health, and address other community goals.

GO TO 2040 called for compact development, particularly in transit-served locations, and site planning that accounts for natural resources. ON TO 2050 can provide further guidance on how to avoid development in high quality natural areas and productive agricultural areas. The plan can also encourage more compact and conservation-oriented development and explore ways to incentivize standards that encourage this type of development. In addition, CMAP could encourage consideration of the financial implications of different land use decisions. ON TO 2050 can prioritize these strategies for communities where development pressure on agricultural and natural lands is expected to be the highest during the plan horizon.

3.1 Identify agricultural and natural assets in land use and transportation planning

One of the simplest ways to signal the importance of agricultural and natural lands is to identify these areas in county and local planning efforts. Mapping farmland and natural resources allows a community to communicate their value and sets the expectation of how and where land should be preserved or developed within the planning area. Kane and McHenry Counties already identify extensive agricultural and natural lands in their county future land use maps. While their plans acknowledge that anticipated population growth could result in the conversion of undeveloped land, much of the existing agricultural and natural land cover is anticipated to remain in its current use. These land use plans provide more targeted direction for new development in locations with or adjacent to existing infrastructure.

CMAP has provided technical assistance to several comprehensive planning efforts that resulted in future land use maps with prominent agricultural and/or natural resource land use categories. These plans reflect the contribution of these lands to local and regional economies and ecosystems. For example, approximately 50 percent of the existing municipal land area in the City of Harvard is currently in agricultural production. The City's future land use plan uses an agricultural land use category and envisions continued agricultural production, with some development anticipated immediately adjacent to existing city infrastructure. CMAP can best assist local and county land use decision making by

⁸⁶ Currently, TDR programs are only permitted for home rule units of government in the State of Illinois; Cook County, as the only home rule county in the state, is the only county that could establish a TDR program at this time.

providing data and technical assistance through the LTA program. Local and County governments can use the regional agricultural and conservation area layers, as proposed in strategies 1.1 and 2.2, in their land use planning efforts.

At the regional scale, CMAP estimates environmental impacts of candidate transportation projects as part of the evaluation process for the regionally significant projects in ON TO 2050.⁸⁷ Specifically, CMAP uses the regional travel demand model to estimate a project's potential impact to the transportation network and the number of new households and businesses likely to locate in different areas in response to the investment. CMAP currently reviews where the additional development may overlap with the GIV as a measure of a project's impact on terrestrial and aquatic environmental resources. As CMAP develops the conservation areas layer and explores the creation of a key agricultural layer, these updated datasets could be used to evaluate future transportation projects.

3.2 Update ordinances to better protect agricultural and natural resources

In addition to land use planning strategies, zoning and subdivision ordinances play a large role in guiding the location and form of development. From zoning districts to site plan review, these standards can be updated to accommodate development while also protecting key community assets. There are a number of different strategies municipal and county governments can use, including agricultural and natural resource overlay zoning districts, modernized definitions and standards relating to agriculture and natural resources, updated protection measures within subdivision ordinances, and establishing provisions for long-term stewardship of protected open space.

The use of agricultural zoning districts is one of the main tools to protect farmland from development conversion. Newly annexed land is often placed in an agricultural zoning district as a holding district that can easily be changed once development is proposed. However, the use of an agricultural preservation zoning district should indicate a clear goal of retaining the rural character of the area and discouraging other land uses in those areas that might conflict with farming practices. Even if a community envisions eventual expansion into agricultural areas, the use of agricultural zoning districts could help ensure more orderly, sequential development by directing development to locations that have adequate infrastructure to support it. Additional measures that minimize potential conflicts between agricultural lands and nearby development through the use of buffers, road design, and other measures can help maintain farm productivity. Natural resource overlay districts can supplement other zoning requirements and identify key areas that should be protected during the development process. For example, the Village of Campton Hills uses green infrastructure overlay districts to highlight areas with known natural resources for protection.

For this strategy paper, CMAP reviewed ordinances from a sample of communities⁸⁸ and found varying practices during the site plan review process that do not necessarily include the important natural resources in the community. The findings of this limited review are consistent with the experience

⁸⁷ Regionally significant projects are to be either (a) highway capacity projects on the National Highway System (NHS) and transit capacity projects with separate right-of-way or priority over other traffic that are greater than \$100 million, or (b) state of good repair projects on particular transit lines or roadways that are at least \$250 million (as opposed to system-wide programs of projects).

⁸⁸ In order to better understand land development and protection trends in the region, CMAP reviewed the local land use plans and development ordinances of 14 municipalities and three counties with the most development or land protection between 2001 and 2015.

gained by CMAP through various LTA projects.⁸⁹ While most ordinances require natural resource information such as the topography, waterbodies, or existing drainage patterns, other important natural resources, such as groundwater recharge areas, threatened and endangered species, prairies, woodlands, or a tree inventory, are not covered in the preliminary plat. Without recognizing these assets, the development process may allow the proposed development to impact these resources. Similarly, the Soil and Water Conservation Districts provide natural resource information for proposed developments on agricultural or natural lands including the Land Evaluation and Site Assessment (LESA) score. However, this information is not necessarily incorporated into the development process. A more consistent and comprehensive set of natural resource information can help inform municipal staff and elected officials during decision-making processes.

Once natural resources have been identified during site plan review, additional guidance could be provided to ensure natural areas are protected during construction and maintained long after the development is complete. Improved guidance on setting aside conservation open space and maintaining natural areas, such as common open space, riparian buffers, and naturalized stormwater facilities in perpetuity could assist municipal and county processes and improve long-term maintenance. Some municipalities and counties who are particularly interested in land protection efforts may want to pursue local mitigation ordinances where developers are required to permanently protect an amount of agricultural and natural land elsewhere if such lands are impacted by development.⁹⁰ Such a program could help fund open space protection efforts and acquisition could be encouraged within locally-identified areas or the regional conservation areas layer (strategy 1.2).

CMAP can encourage counties and municipalities to update the development process to accommodate agricultural and natural features in a variety of ways, including continued work through the LTA program to directly update ordinances. CMAP's predecessor, the Northeastern Illinois Planning Commission (NIPC), produced several model ordinances designed to help governments protect natural resources and reduce the impacts of construction on downstream water quality, flood storage, and aquatic habitat.⁹¹ However, the model ordinances could be updated to reflect current best practices and better integration with modern development ordinances. In addition, best practices in county ordinances could be used as models for municipalities updating their development regulations. For example, McHenry County's Subdivision Ordinance includes a comprehensive review of natural resources, which in turn can trigger conservation design requirements. Conversations with municipal staff revealed concerns about the long-term management of open space areas, specifically the lack of enforcement provisions or funding to ensure proper maintenance.⁹² In addition to providing guidance during the site plan review process, CMAP could help support the establishment of long-term stewardship provisions for conserved areas.

⁸⁹ CMAP. 2013. Silver Creek and Sleepy Hollow Creek Watershed Comprehensive Plan and Ordinance Assessment. See www.cmap.illinois.gov/programs-and-resources/lta/silver-creek-sleepy-hollow-watershed

⁹⁰ American Planning Association. Farmland Protection Toolbox

⁹¹ NIPC created four model ordinances: Model Soil Erosion and Sediment Control Ordinance, Model Floodplain Ordinance, Model Stream and Wetland Protection Ordinance, and Model Stormwater Drainage and Detention Ordinance. See www.cmap.illinois.gov/livability/water/supply-planning/resources

⁹² For this paper, CMAP interviewed local decision-makers from eight municipalities that experienced a high amount of development on agricultural and natural lands in the last 15 years.

3.3 Identify areas with higher development pressure

As the Chicago region's population grows, valuable agricultural and natural resources will likely continue to face development pressure, particularly in locations within or adjacent to existing municipal boundaries. As part of the ON TO 2050 process, CMAP is developing a series of "layers" to cater the content of the regional comprehensive plan to local partners through more spatially specific recommendations. In recognition that the more rural areas of the Chicago region require a different set of policy priorities than other parts of the region, CMAP should identify communities that have a significant amount of agricultural or natural lands within or adjacent to their boundaries. These are areas that could experience greenfield development pressure within the planning horizon. For development in unincorporated areas, CMAP could use past development trends to highlight those counties that could see greenfield development pressure outside of municipal boundaries. The resulting coordinated growth layer could be used by implementers to prioritize policy recommendations aimed at minimizing the negative impacts of greenfield development, such as the strategies outlined in strategies 3.1, 3.2, and 3.4 of this paper. Updates to future land use plans and development ordinances should take into account larger scale open space protection and long-term infrastructure costs associated with expansion decisions. These recommendations can then be incorporated into the comprehensive planning process, and inform future revisions of subdivision, zoning, and other ordinances. Ideally, if there is development pressure in these locations, the ultimate form of development could minimize impacts and help maintain connectivity between larger blocks of farmland and conservation open space.

While the coordinated growth layer would highlight communities with a significant amount of agricultural or natural lands; agricultural and natural lands exist in smaller amounts throughout the region. CMAP could use a more conceptual approach to identify where greenfield development pressure could exist and the corresponding strategies that could be used to minimize the negative impacts of such development. One communication tool that could be used is the urban to rural transect, which illustrates the variation in the development pattern that is seen across municipalities and regions. CMAP should consider using this communications tool to connect different development related strategies, including those being developed in other strategy papers, to different urban conditions. For the strategies present in this paper, CMAP could highlight the policies that are particularly relevant for areas that retain a fair amount of agricultural and natural lands.

While the coordinated growth areas concept is new to CMAP, this strategy builds on the work of local and national partners. Kane County's 2040 Plan identifies "Critical Growth Areas", which are intended to preserve agriculture and natural habitat in developing areas. The Delaware Valley Regional Planning Commission in Philadelphia, Pennsylvania has adopted a similar, though more typology-based, approach, identifying "Growth Areas" where new, compact development could be accommodated. Where the coordinated growth layer overlaps with critical agricultural and natural resources provides an opportunity for discussion and more informed decision-making. Local leaders could explore options for redirecting growth to more suitable locations, or ensuring that the development occurs in a way that preserves the land's vital economic and environmental functions. Reviewing the coordinated growth layer and conservation areas layer (strategy 1.1) in conjunction could highlight opportunities for maintaining or restoring habitat connectivity during future land use planning efforts.

3.4 Encourage compact and conservation-oriented development

Redevelopment of previously developed land—known as infill—is one of the best ways to create vibrant downtowns and neighborhoods while also minimizing the impacts of our built environment on farmland and natural resources. GO TO 2040 encouraged infill development and CMAP continues to support this

policy recommendation for a variety of reasons beyond open space conservation, including efficient use of existing infrastructure and creating more walkable communities.

For development that does occur on agricultural and natural lands, more compact and conservation-oriented designs can help to minimize the size of the development and reduce the long-term maintenance costs. For remaining agricultural fields that are largely surrounded by previous development, slightly more compact development standards, such as shorter blocks and narrower and connected streets, are a more efficient use of land and help achieve other community goals. Demographic trends are placing a higher demand for walkable, mixed-use communities⁹³ and many municipalities are responding by revising their development standards. Since the 2008 recession, some communities are redesigning vacant subdivisions to respond to this market demand for more compact development.

Conservation-oriented development clusters the buildings on the site in order to maintain larger agricultural or natural areas in perpetuity. By allowing flexibility in the lot and block layout, a similar amount of development can be accommodated while still achieving agricultural preservation or habitat conservation goals. Other design features help to further reduce the impact of development, from minimal grading to the incorporation of stormwater best management practices. The Chicago region has seen several conservation-oriented developments over the past 15 years and several municipal and county subdivision ordinances now include or require such provisions for sites with significant natural resources.

GO TO 2040 encouraged conservation-oriented designs, and CMAP has helped communities incorporate these design principles in various LTA and watershed planning projects. CMAP should continue to encourage municipalities to adopt compact and conservation-oriented development standards and explore ways to encourage best practices. Recent efforts through the LTA program have included trainings on conservation design regulations as well as direct incorporation of conservation design standards within zoning and subdivision ordinances updates. In 2003, the Northeastern Illinois Planning Commission (NIPC) and the Chicago Wilderness published the Conservation Design Resource Manual to assist local planners.⁹⁴ Since that time, conservation design has evolved as practitioners have learned from existing developments. For example, recent research into the performance of conservation developments in southeastern Wisconsin revealed areas for improvement in both the original design as well as long-term maintenance.⁹⁵ While conservation design generally protects more land than conventional subdivisions, the core size and connectivity between protected open spaces could be improved to foster environmental goals. Considering the size, shape, and configuration of open spaces is an important part of the design process and could be informed by the conservation areas layer. A related study found that the permitting process and zoning ordinance are often the largest barriers to successful implementation of conservation design practices.⁹⁶ CMAP should explore conservation design best practices and continue to encourage adoption among communities with agricultural and natural

⁹³ National Association of Realtors 2015 Community Preference Survey. See www.nar.realtor/reports/nar-2015-community-preference-survey

⁹⁴ CMAP. Conservation Design Principles and Practices. GO TO 2040 Strategy Papers. See <http://www.cmap.illinois.gov/about/2040/supporting-materials/process-archive/strategy-papers/conservation-design/principles-and-practices>

⁹⁵ Gocmen, Z. Asligul. Assessing the Environmental Merits of Conservation Design. *Journal of Planning Education and Research*. December 11, 2013.

⁹⁶ Gocmen, Z. Asligul. Barriers to successful implementation of conservation subdivision design: a closer look at land use regulations and subdivision permitting process. *Landscape and Urban Planning* 110 (2013) 123-133.

resource lands. Given that most greenfield development occurs on agricultural lands, CMAP should also investigate conservation design practices that work best with agricultural activities.

3.5 Incorporate long-term infrastructure maintenance costs into expansion decisions

Many communities across the region are currently grappling with how to maintain their local infrastructure, primarily due to aging streets and sewers, declining federal and state support, and a lack of full cost pricing at the local level. Some municipalities across the region use development impact fees and/or fiscal impact analyses to ensure that developers and/or new property owners are covering the initial costs of service provision, but municipalities are largely responsible for the long-term maintenance and eventual replacement of infrastructure.⁹⁷

For this paper, CMAP interviewed local decision-makers from eight municipalities that experienced a high amount of development on agricultural and natural lands in the last 15 years. Almost all stated their primary focus is to ensure coverage of the near-term costs of new infrastructure and services associated with a development proposal. However, they are keenly aware of their current struggle to maintain existing infrastructure and some recognized that the development design standards were established without consideration of the long-term maintenance and replacement costs. During the housing boom, many growing communities substantially increased the number of street and sewer miles that they are now responsible for maintaining. However, the property tax and fee revenue generated from the development over the long term may not be enough to cover future maintenance of that infrastructure. In addition, past infrastructure investments in anticipation of future development, such as increasing the capacity of wastewater treatment facilities or building a road to accommodate larger volumes, may create an incentive or need to attract development in order to meet payment obligations. In addition, such decisions could be made in isolation and not consider the long-term costs of other associated infrastructure.

The net fiscal impact of a development depends on a variety of factors including land use and tax rates, among others.⁹⁸ Some municipal costs, including roads, water and wastewater, stormwater, fire protection, school transportation, and solid waste collection, are more dependent on the location and density of development than others. For example, where a development proposal is positioned in relation to existing infrastructure capacity impacts the costs associated with providing water and sewer service to that location. Lot size, minimum block length, and street design standards in zoning and subdivision ordinances influence the length and width of streets and the corresponding density of development that helps to provide financial support for the eventual maintenance and replacement of those streets. While future land use plans and zoning and subdivision ordinances dictate the development pattern, the planning process rarely factors in the long-term financial impacts of those requirements or considers the costs of that additional infrastructure within the context of the municipality's existing liabilities.

However, many of the compact and conservation-oriented development standards discussed above can reduce the expansion of infrastructure and reduce long-term infrastructure costs. Incorporating long-term financial health into development decisions provides additional motivation to use more compact

⁹⁷ CMAP. 2014. Fiscal and Economic Impact Analysis of Local Development Decisions. See www.cmap.illinois.gov/economy/tax-policy/impacts-of-local-development-decisions

⁹⁸ CMAP. 2017. ON TO 2050: Tax Policies and Land Use Trends Strategy Paper. See www.cmap.illinois.gov/onto2050/strategy-papers/tax-policy-land-use

and conservation-oriented development standards and reduce the development pressure on agricultural and natural lands. Some communities may conclude that it does not make financial sense to expand development in specific locations. CMAP should explore ways to encourage more coordination between local land use and transportation planning efforts and municipal finance and asset management decisions. CMAP could use the Local Technical Assistance program to explore how the fiscal impacts of different development patterns could be considered during a planning project, such as a subdivision ordinance update or a comprehensive planning process. This could build on recent CMAP work that has analyzed the role of tax policy and land use on development decisions.

At the regional scale, CMAP supports first maintaining and modernizing the transportation system before investing in expansion projects. This concept is also relevant at the local and county scales, where careful and strategic investments about expanding local roads and sewers can minimize the burden of infrastructure maintenance. In terms of long-term financial health, communities can minimize their infrastructure maintenance costs by limiting expansion and building more compactly when they do extend roads and sewers to new locations. CMAP should explore ways to incentivize development ordinance updates through existing transportation and infrastructure funding programs. For example, through the Surface Transportation Program, Councils of Mayors and the City of Chicago could identify additional secondary criteria for communities with ordinance provisions that highlight their commitment to strategic and cost-effective expansion of their infrastructure. The criteria could be tailored based on the community context. For example, where new local streets are possible projects in communities with ordinance provisions that encourage compact designs and narrower street widths could be awarded additional points. In other areas where most of the streets already exist, the incentives could focus on materials and asset management techniques. There is a precedent for using more land use and design based criteria for transportation funding programs: CMAP includes transit-supportive land use criteria for transit investments applying for Congestion Mitigation Air Quality Program funding.⁹⁹ Similarly, state funding programs, such as the State of Illinois Public Water Supply Loan Program, could also incentivize compact and conservation-oriented ordinances. CMAP should explore how other state and peer MPOs are using funding programs to limit infrastructure expansion.

Next Steps

The policy framework presented in this document sets the direction for the protection and development of agricultural and natural lands in ON TO 2050. Given that land development and protection activities are inherently linked to many aspects of planning, this framework presents many considerations for other planning topics in ON TO 2050. CMAP expects these recommendations to inform future strategy papers, snapshots, technical assistance projects, policy updates, research products, and data sharing. The recommendations of ON TO 2050 are expected to synthesize these strategies into a comprehensive vision for the region. Regional partners are critical to the implementation of many of the strategies discussed in this paper. Continued collaboration will be essential as the agency develops and then implements ON TO 2050.

⁹⁹ CMAP. Congestion Mitigation and Air Quality Improvement Program and Transportation Alternatives Program Application Booklet: Federal Fiscal Years 2018-2022 (CMAQ) and 2018-2020 (TAP). See www.cmap.illinois.gov/documents/10180/604402/FFY2018-22+CMAQ+-+2018-2020+TAP+Application+Booklet/b508ed03-850e-472c-9b5b-efb89fef68e7