

## INDICATOR: LAND USE CHANGE IN SOUTHEAST MICHIGAN

### Background

The history of land use in southeast Michigan begins along the Detroit River. In the early 1700s, Antoine de la Mothe Cadillac established a military post along the waterway to advance French control of the fur trade. The land was seen as a secondary asset compared to the river which allowed military activities and easier transport of trade goods. The expansion of urban development began in earnest in the early 1800s when significant changes occurred in transportation methods. At that time, the waterfront was becoming lined with many docks to support the steamboats and ships containing goods of all kinds as Detroit became a center of commerce. The 1860s marked a decrease in water transport as an extensive network of railways were built. Recognized as a geographic center for population and business, Detroit was linked to the electric interurban railway system in the late nineteenth and early twentieth centuries. Since 1950, the region has experienced increases in urban area development and decreases in density due to the automobile.

Southeast Michigan is a major urban area with nearly five million people. Like many major urban areas throughout the United States, people in southeast Michigan began moving away from Detroit beginning in the 1950s seeking suburban areas with more space and within driving distance to their workplace as the suburbs developed. Personal automobiles and cheap fuel made this possible. In addition, federal tax subsidies for home mortgage interest and property taxes, as well as infrastructure financing policies, all supported new growth outside existing cities (SEMCOG 2003).

Different beliefs in private property rights and the role of government have emerged due to the rapid, new development outside the cities. Anti-sprawl or “Smart Growth” proponents are now advocating for denser, more walkable neighborhoods with a diversity of home designs and mass transit. Others see regulations on growth as infringing on private property rights and a challenge to economic consumer demand. The 2001 Detroit Area Study found that 70% of respondents to a survey preferred the suburban auto-oriented neighborhood instead of one that was more walkable and transit-oriented (SEMCOG 2003). The effects of current sprawl are realized in increased housing prices, decreased water quality, need for additional infrastructure and transportation, loss of open space and natural habitat, and decreasing tax revenues in older communities.

The Southeast Michigan Council of Governments (SEMCOG) has identified four factors contributing to current land use trends:

- Population
- Households
- Employment
- Income

Population has continually increased in southeast Michigan and this affects how land is used. Recently, there has been an increase of 67,000 people between 2000 and 2006 which contributes to an increase in demand for housing and business infrastructure (SEMCOG 2006a). However, it is not only the increase in population that controls land development. More importantly, it is the increasing number and size of houses. This means that about the same number of people are occupying more houses, and every additional house is consuming more land. The demand for larger homes on more land is made possible because more jobs have been created, thus increasing average income. Fewer people on average are living in each house and this is primarily due to the decrease in the number of children being born. The number of people in each house decreased with an average of 2.66 people per house in 1990 decreasing to 2.58 in 2000 (SEMCOG 2003).

## Status and Trends

Very early land use changes started at the riverfront in the early 1800s as large docking structures for holding ferries and steamboats were constructed. By the late 1800s, docks lined five miles of riverfront (Kerr et al. 2003).

By the 1890s, Detroit's role changed from a commercial city with an even diversity of wholesale trading and retailing to one of heavy industrial manufacturing. At this time, convenient transportation was available with new electric horsecar lines, steam railroads, and steam-powered boats. This resulted in dense urban development that grew up around public transport.

A very significant change in land development occurred in the first half of the twentieth century (Figure 1). A new transportation revolution began about 1920 as the number of people owning automobiles increased dramatically. There were 54,366 registered motor vehicles in 1913 and 989,010 in 1925 in the state of Michigan (U.S. Census Bureau 1926). Development was no longer focused around rail lines as paved roads were built throughout the region. The urbanized area increased from 1.5% in 1890 to 9% in 1950 (SEMCOG 2001). Freeways and more affordable automobiles made transportation cheap and encouraged urban growth.

Agriculture in southeast Michigan peaked between 1880 and 1900 and has decreased since 1910 (USGS 2003). More recent land use changes in southeast Michigan are evident in our rapid transformation of agricultural areas and open space to low density residential, commercial, and business developments (Norris et al. 2002). The rate of residential land development continues to increase because of a greater demand for new, lower density housing.

Each house is consuming more land. Between 1990 and 2000, the amount of land used for homes increased by 19%, while the number of households only grew by 9% (SEMCOG 2001 and 2003). Prior to 1990, there were 2.84 housing units per acre, but this has decreased to an average of 1.26 after 1990 (SEMCOG 2003). This increase in the amount of land used for each house is significant because it accounts for 43% more land developed than would have been with the higher-density construction before 1990.

The demand for housing development is not the only reason for the decrease in agricultural land. Some land previously farmed is no longer used since farming is

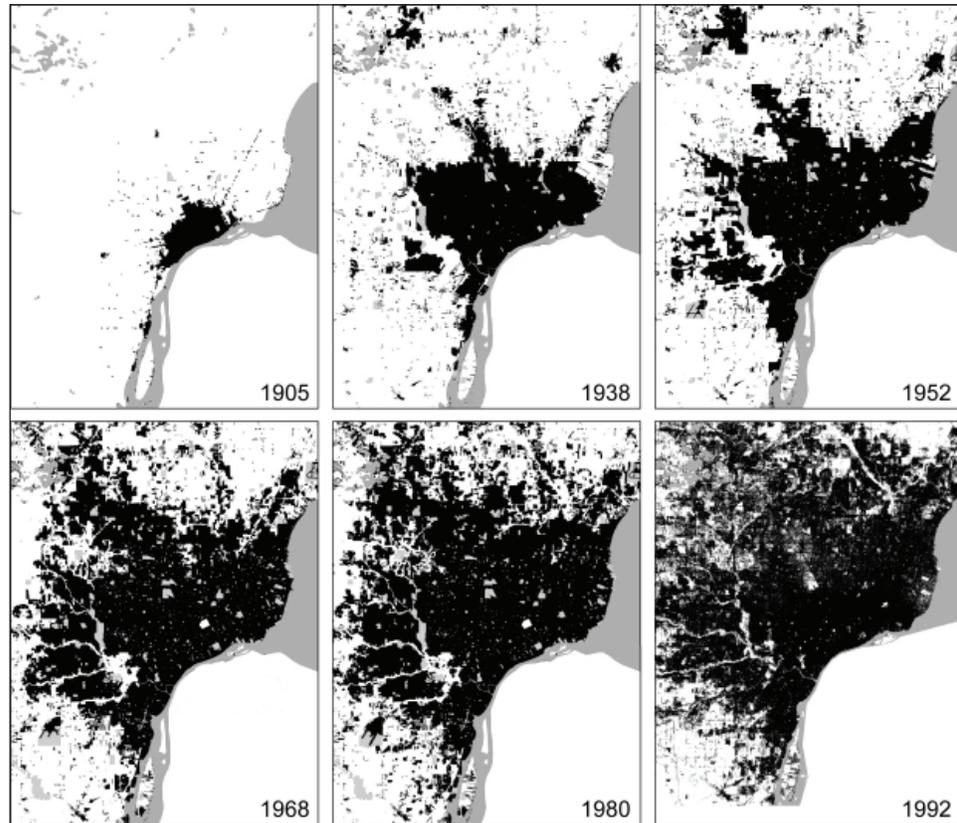


Figure 1. The history of developed land in southeast Michigan, 1905-1992 (USGS 2003). This image shows the general rate of urban land growth in southeast Michigan through the twentieth century where the shaded areas represent area covered by “urban or built up land” according to Anderson et al. (1976).

generally becoming less profitable, especially for small farms where operating costs are high compared with revenue. The overall decrease has been a loss of 13% or 56,980 hectares (140,800 acres) of agricultural land between 1990 and 2000 (SEMCOG 2003).

Not only have the total number of households and residential space increased in southeast Michigan, but the pattern of development has changed substantially with out-migration from Detroit to suburbs. This pattern of out-migration has generally led to less investment in established infrastructure that has resulted in lower property values, further encouraging people to leave. Today, Detroit’s population is about half of what it boasted during its peak in the 1950s. Detroit has experienced a 7% decrease in population between 1990 and 2000, creating more vacant land (SEMCOG 2003). It is estimated that 12% of the suburban housing development in southeast Michigan is due to households relocating from Detroit (SEMCOG 2003).

Changes in other types of land use, including industrial, extractive, and roadways were not as significant in the last few decades compared to residential development. Industrial land development over the last decade has increased by 4,218 hectares (10,423 acres) (SEMCOG 2004). This represented a 15% increase from 1990 to 2000. Between 1996 and 2005, general nonresidential development showed a peak between the years 1998 and 2002. An average of 2,508,382 square meters (27 million square feet) of development occurred during those five years compared with an average of 1,486,448 square meters (16 million square feet) for 1996, 1997, 2003, 2004, and completed projects in 2005

(SEMCOG 2006b). In 1990, there were 936,700 acres of developed land and two million acres of undeveloped land. In 2000, there were 1.1 million acres of developed land and 1.8 million acres of undeveloped land (SEMCOG 2003).

## **Management Next Steps**

Future land use planning must balance the need for environmental protection, economic progress, and human development. There is a need for well-defined roles and responsibilities in land use planning at all government levels under a common future vision (Norris et al. 2002). This can be done by establishing concrete regional goals, specific responsibilities for each level of government, and empowering local governments with the best available information (Michigan Land Use Leadership Council 2003). To carry out their responsibilities, local land use decision makers have a number of training resources available to them. The Planning and Zoning Center at Michigan State University, the Michigan Association of Planning (MAP), and Michigan State University Extension offer training sessions for planning officials. The Michigan Municipal League (MML) and the Michigan Townships Association (MTA) provide advice to elected officials. In addition, the Michigan Land Use Leadership Council (2003) has constructed nine recommended actions that serve to guide future decisions in the state. In summary, these recommendations include preserving farmland and open space by incorporating new incentives for landowners, encouraging partnerships with universities, foundations, and private and public entities, and clearly defining the allocation of funds in possible use of state bonds. More emphasis needs to be placed on developing model ordinances for sustainable land use practices. These model ordinances should be broadly disseminated throughout southeast Michigan.

Regional land use trends and programs need to be systematically evaluated and benefits assessed to help communities directly connect cost-efficiency and land use decisions (American Forests 2006). The Urban Dynamics Research Program was created by the U.S. Geological Survey to aid community decision makers in managing urban sprawl. Its focus is modeling land use change with respect to population growth. The National Science Foundation sponsors a Biocomplexity and Environment Program, one project being Project SLUCE (Spatial Land Use Change and Ecological Effects). From 2001 to 2006, researchers based at the University of Michigan investigated land use change at the urban-rural fringe and the environmental interactions and impacts using models. Their research focused on southeast Michigan and, ultimately, they want to be able to use their models to evaluate the potential for specific government interventions in creating better land use choices. An important first step for many communities is to implement a master or comprehensive plan.

## **Research/Monitoring Needs**

Agricultural land and open space is currently changing most rapidly. The value of agricultural land in maintaining biodiversity across the landscape is well established. Therefore, research must focus on alternatives to the current rate of development because it is unsustainable. Land is being transformed from rural to urban faster than the population is growing and the negative impacts on the environment are real. Future research needs include inventorying land use models and assessing their accuracy at predicting what actually will occur on the land. Others include understanding ecosystem

response to current development patterns. There is also a growing need to evaluate the ecosystem response of different land use practices and its impact on climate (U.S. Climate Change Science Program 2003). Continued research is needed in sustainable, best management practices for urban areas. In addition, research in cover crops, those that improve soil quality and farming sustainability, will better equip farmers with tools for managing their farms for profit and sustainability. Finally, emphasis must be placed on quantifying economic, environmental, and societal benefits of best management practices in land use planning and management. Such benefits assessment can be compelling rationale for sound land use decision making.

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#### Links for More Information

Michigan Land Use Institute: <http://www.mlui.org>

Michigan Land Use Leadership Council: <http://www.michiganlanduse.org/>

Michigan State University Extension - Home page for Kurt Schindler's land use page: [http://www.msue.msu.edu/portal/default.cfm?pageset\\_id=160691](http://www.msue.msu.edu/portal/default.cfm?pageset_id=160691)

People and Land: <http://www.peopleandland.org/>

Project SLUCE Biocomplexity Program: <http://www.cscs.umich.edu/research/projects/sluce/>

Southeast Michigan Council of Governments: <http://www.semcog.org/>

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