

# Land Use

## **Introduction**

Understanding the characteristics of the land and how the land within the incorporated and unincorporated areas of Allen County is currently being used is a key element of the plan. Land is an exhaustible resource that, once developed and converted to a use, is often difficult to change. Land will continue to be developed, but the pattern, rate, timing and location of that development are up to the individual community. The question is not whether the community will grow and change, but *how* it will grow and change.

This chapter of the Existing Conditions report provides a description of regional growth, the current pattern of development and the rate at which land is being consumed. It also identifies the remaining land that is suitable for development and the amount of land area necessary to support projected increases in population.

This chapter is organized into the following subsections:

- Scope
- Overview
- Regional Influence
- Developed Land: Pattern and Utilization
- Undeveloped Land: Preserve and Reserve Areas
- Developable Land
- Development Capacity

## **Scope and Methodology**

This analysis serves as a general assessment of how land is currently being used in Allen County and Fort Wayne, the rate at which it is being consumed, and based on that rate, the amount of developed land necessary to support the projected population. It serves as a basis for building a future land use scenario for the community, which includes making choices about how and where future development should take place.

The analysis is based primarily on mapping data supplied by the City of Fort Wayne's Geographic Information System (GIS) and population projections provided by the Indiana University Business Research Center. The existing Allen County land use, including Fort Wayne, unincorporated Allen County and the remaining jurisdictions (Grabill, Hometown, Leo-Cedarville, Monroeville, New Haven, Woodburn, and Zanesville) are based on a 2003 GIS inventory from the City of Fort Wayne. References to Allen County include: the City of Fort Wayne, unincorporated Allen County within existing townships and the other jurisdictions within the County.

## **Key Findings**

The following gives a brief overview of the key land use findings:

### **Regional Influence**

- Surrounding counties toward the north and west of Allen County (Whitely, Noble, Dekalb) show steady population growth and solid commuter ties to Allen County.
- Between 1990 and 2000, 28.7 percent of the lots platted within Allen County were in Aboite Township.

### **Developed Land: Pattern and Utilization**

- Land uses within Allen County and the City of Fort Wayne have become more spatially segregated.
- Next to agriculture (65.3 percent), single-family residential (14.7 percent) occupies the second largest amount of the total land area in the County.
- Over 50 percent of the County's developed land area is residential.
- Residential land use occupies the most land area (35.3 percent) within the City of Fort Wayne.
- All incorporated Allen County communities have similarly distributed land uses.
- Population density, according the U.S. Census, has declined from ten to less than five persons per acre as development has located outward from the City of Fort Wayne's core.
- Population density has declined in the City of Fort Wayne by 21 percent since 1987.
- Over the past 16 years, the amount of land within the City of Fort Wayne was developed or consumed (62.7 percent increase in developed land area) at over twice the population growth rate (27.5 percent).

- Growing Allen County communities surrounding the City of Fort Wayne have comparable densities.
- The amount of land consumed per household in the City of Fort Wayne (including recently annexed land) has increased by 27.3 percent since 1987.
- Per household land consumption is nearly three times more in the area outside the City of Fort Wayne than within the City.

#### **Undeveloped Land: Preserve and Reserve**

- Agricultural land with “prime” characteristics covers over 93.6 percent of the undeveloped land area in the County.
- Hydric soils (soils that have high moisture content) make up over 46.4 percent of the undeveloped land area in the County and City.
- Preserve and reserve lands, which include some agricultural land, make up over 11.2 percent of the County’s undeveloped land.

#### **Developable Land**

- Over 17.0 percent of the undeveloped land area is classified as both preserve and reserve.

#### **Development Capacity**

- Allen County is projected to grow to approximately 410,349 persons (Holts) by 2025.
- Development densities, or persons per developed acre, vary by location within the County, and range from 5.99 persons per developed acre within the area of Fort Wayne developed prior to 1950 to 0.70 persons per developed acre within the rural area.
- At densities representing the Post-1950 area (2.77 persons per acre), the amount of land necessary to support future population projections is equal to ten percent of the remaining developable land.

#### **Policy Implications**

Derived from the assessment and the key findings, the following implications should be considered when formulating planning policies:

- Strong regional commuting links means people today live “regionally.”
- Declining population densities mean an increase in infrastructure costs and public services, loss in productivity and, potentially, overall economic performance.
- Spatially segregated land uses means an increase in vehicle miles traveled, energy consumption and pollution.
- Development control through zoning districts not only means separate uses, it also means a separation of the natural environment from the man-made environment.
- Lower population densities of land consumed at the periphery means an encroachment on environmentally sensitive lands and loss of rural character.

- Lack of incentives to improve underdeveloped and vacant land, especially toward the center of Allen County, means continued investment in development at the periphery.
- Investment in the core means having a direct “return” to the entire regional economy.

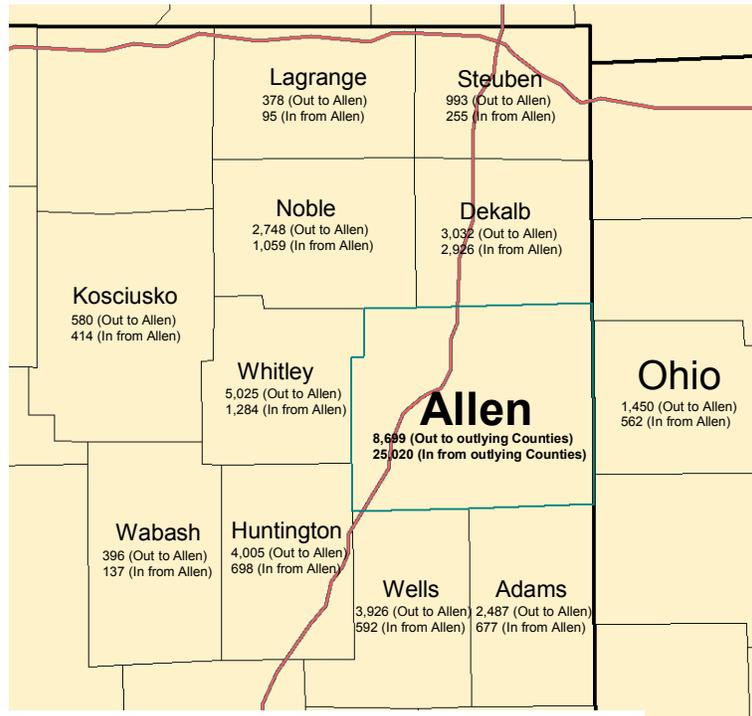
## **Regional Influence**

### **Surrounding counties toward the north and west of Allen County (Whitley, Noble, Dekalb) show steady population growth and solid commuter ties to Allen County.**

As stated earlier (see Demographics) the counties adjacent to, and within, the seven county region (especially the counties directly north and west of Allen County) have all experienced positive population growth rates with many exceeding Allen County’s 10.3 percent growth rate from 1990-2000.

Noble County leads the other counties with a 22.2 percent growth rate followed by Dekalb (14.0 percent) and Whitley (11.1 percent) Counties. Although outside the seven county region, the second tier of counties have also experienced similar growth rates ranging from 20.9 (Steuben County) to 13.4 percent (Kosciusko County). Counties south and east of Allen County have grown at slower rates, with several nearby Ohio counties (Paulding and Van Wert) losing population.

### Map 4.1: Regional Commuting Patterns



Source: Stats Indiana

\*Based on year 2000 tax returns (Indiana Department of Revenue)

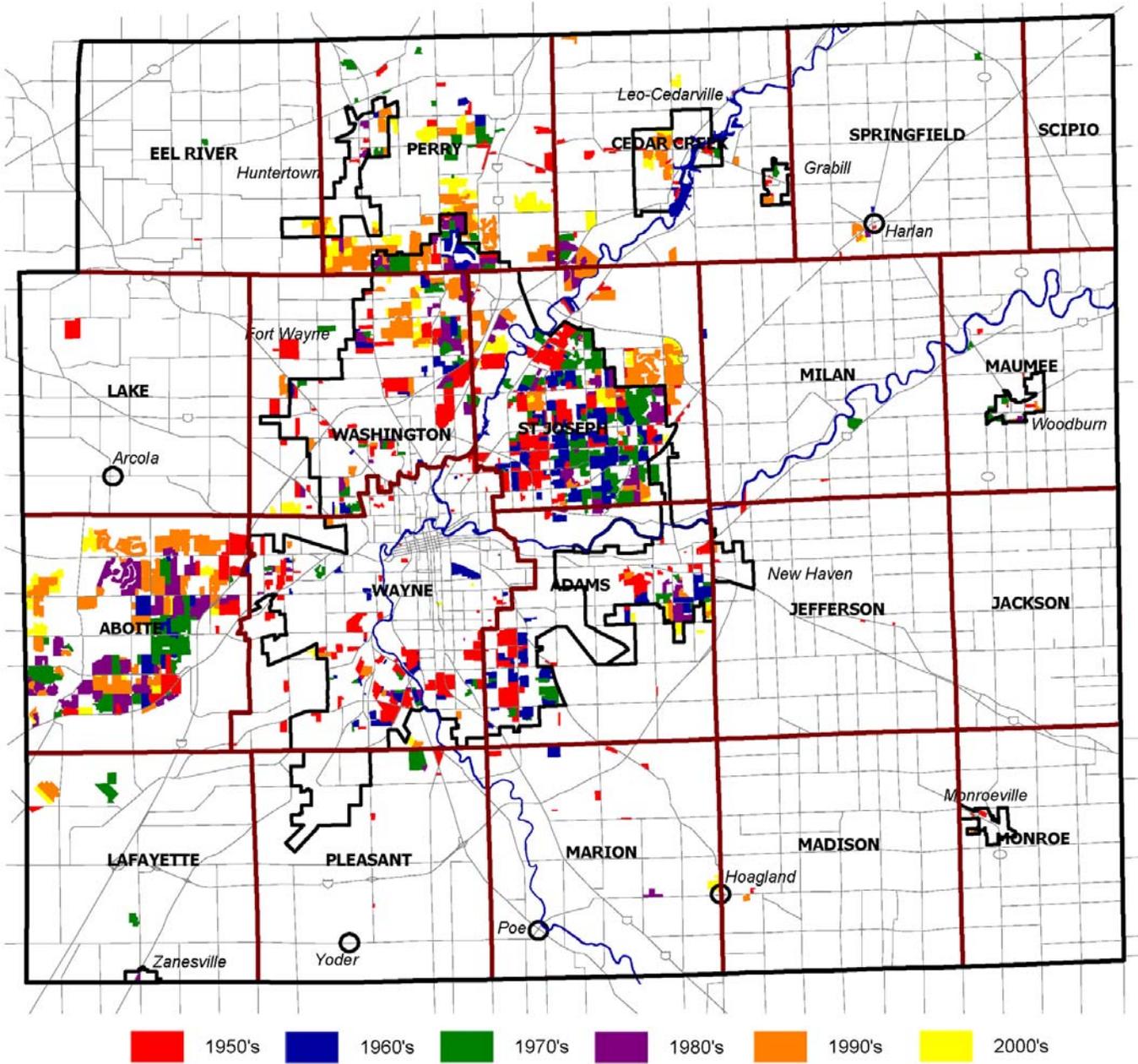
The ties are even more apparent when looking at regional commuting patterns. Allen County and Fort Wayne remain as the region's primary job center, importing over 25,000 employees. Over 90 percent of these employees are from the adjacent tier of counties. (See Map 4.1)

### Between 1990 and 2000, 28.7 percent of the lots platted within Allen County were in Aboite Township.

Map 4.2 shows subdivision activity in Allen County and Fort Wayne over the past 50 years. Most of the platting activity in the past 50 years has been mostly suburban and outside the core or urban part of the City of Fort Wayne, but within the current City boundaries. This area forms what would be considered the older, suburban part of the City and County. Between 1990 and 2000, an increasing amount of residential platting activity occurred in the western, northern and northeastern parts of the County.

Aboite Township (west) platted the largest number of single-family subdivisions between 1990 and 2000 (116), followed by St. Joseph Township (northeast) at 93, and Perry Township (north) at 85. The average number of acres per parcel was 2.16 with Jefferson Township having the highest number of acres per parcel (3.0) and Maumee Township having the lowest (1.33) due to their agricultural land uses.

Map 4.2: Subdivision Activity (1950's-2000's), Allen County



Source: City of Fort Wayne

Several factors have contributed to growth in the western and northern parts of the community, especially residential development in these areas. The first involves the general attractiveness of the school districts to new residents. Second, the availability of utilities, especially sanitary sewer, has also contributed to fueling this growth (see Utilities chapter). Third, commuting patterns and improved accessibility to employment centers from outlying areas has also been a contributing factor.

**Density:** The population of an area divided by the amount of urbanized land in that same area.

**Developable Land:** Developable land is land (mostly agricultural and vacant) minus land that is either physically or naturally constrained and is protected from development (e.g. floodway, nature preserves, etc.)

**Developed Land:** Urbanized land includes all the land that is urbanized to accommodate growth. This includes residential, commercial, industrial, roads, urban parks, etc.

**Mixed-Use:** A form of development in which two or more uses are located within the same building. This is distinguished from multi-use where several uses may exist on the same site, but are not integrated.

**Vacant Land:** This land is presently not classified as an agricultural use; or not being used to support an urban activity including land that is mostly void of physical structures.

### **Developed Land: Pattern and Utilization**

How the land is currently being used, both in the pattern of development and the proportion of land uses to the total land area (and developed land) is critical to understanding the future use of land. This also includes the utilization of the land and how efficiently the population is distributed over the area. Utilization and efficiency are expressed in terms of population density (persons per acre) and land consumption (acres per person or per household).

### **Land uses within Allen County and the City of Fort Wayne have become more spatially segregated.**

Map 4.3 shows a development pattern typical of most urbanizing areas that has occurred as a result of land use regulation or the “zoning” of uses. The pattern of uses within the core area of Fort Wayne reveals small concentrations of nonresidential uses (commercial, industrial, office, etc.) adjacent to residential districts, creating a distinct neighborhood pattern. This area was largely developed *prior* to zoning or the segregation of uses (mostly housing separated from shopping and work) through the application of land use “districts”.

Moving out from the core it becomes apparent that commercial and industrial uses are more concentrated, to the exclusion of other uses including residences, on large parcels at major intersections (e.g. Coliseum Boulevard and S.R. 27) or interchanges and along major roadway arterials. The distance from a residence to the center of a shopping area is measured in miles compared to blocks in the core part of the community. This area was largely developed *after* zoning, physically segregating housing from shopping and work through districting. Even in several of the outlying communities (Leo-Cedarville, Hometown, Grabill, etc.) the pattern is similar.

A review of the City zoning regulations shows that, with the exception of the downtown districts provisions and the Board of Zoning Appeals allowing very specific “contingent” and “special uses” in any district (under certain conditions), the ability to mix residential with shopping and employment is limited. Instead, these districts allow multiple uses that are permitted in the same district but are typically separated by setbacks and buffers and not fully integrated as a true mixed use (e.g. downtown Fort

Wayne). In Allen County, the ability to mix housing with retail and employment areas under current zoning is restricted in a similar way.

**Next to agriculture (65.3 percent), single family residential (14.7 percent) occupies the second largest amount of the total land area in the County.**

Allen County, the largest County in Indiana in terms of land area, includes approximately 422,484 acres or 660 square miles of land within its jurisdictional boundaries. Agricultural lands make up 65.3 percent of the total land area in the County. The other dominant land use, single-family residential, makes up 14.7 percent of the total land area in the County. Multi-family occupies the least land area of all uses at 0.7 percent.

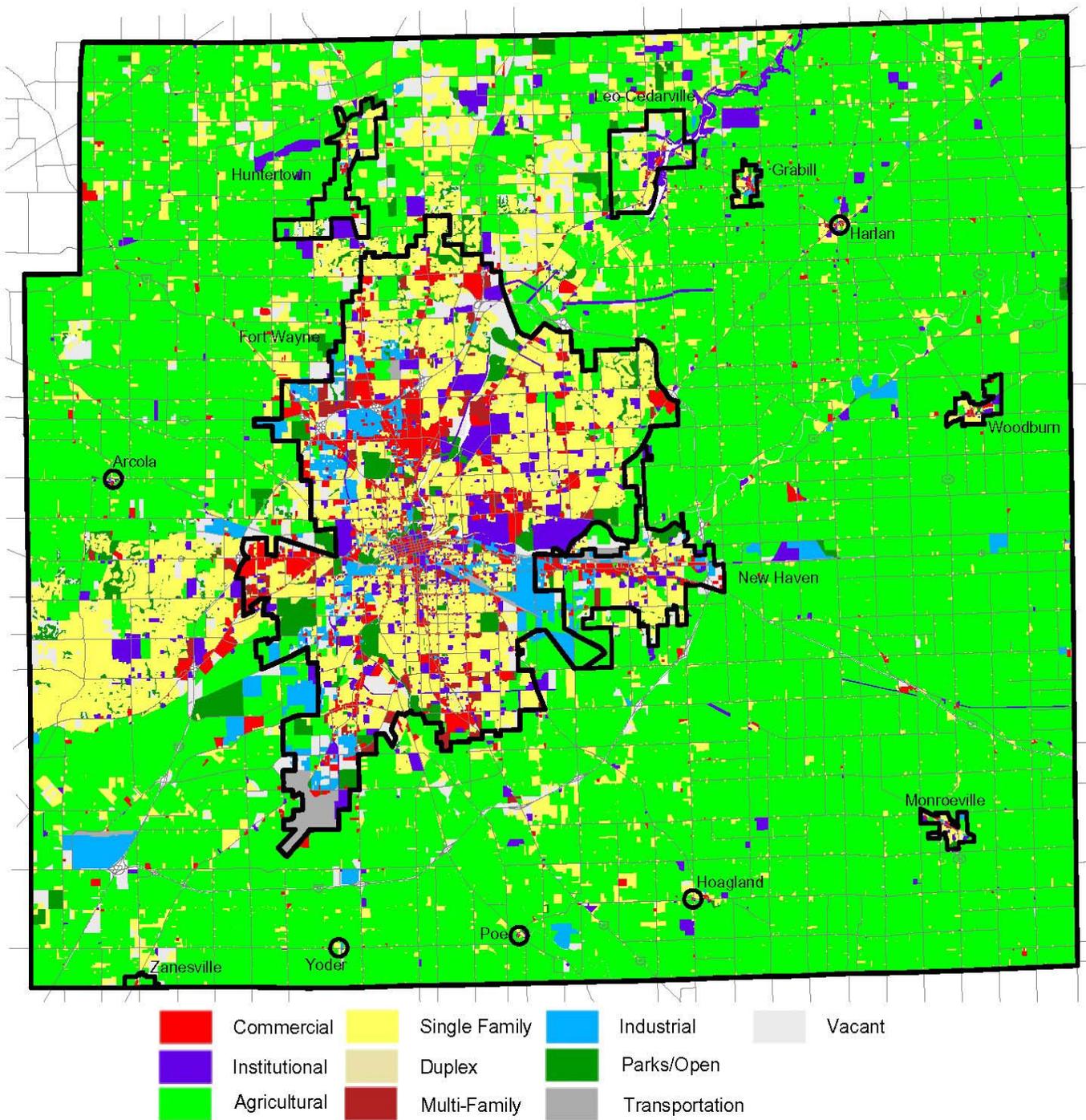
Non-residential uses, including commercial, industrial, and other uses (government, schools, utilities, etc.) make up 7.5 percent of the total land area. With the exception of Downtown Fort Wayne, most of the commercial development is situated along major corridors (e.g. U.S. Routes 27 and 33), intersections, and interchanges with I-69 and I-469. Other non-residential uses occupy 3.3 percent of the County, followed by industrial and commercial, both at 1.8 percent. Parks and open space occupy 2.4 percent of the land area. Approximately 4.4 percent of the land in the County is vacant. Map 4.3 illustrates the existing land use for the Allen County, the City of Fort Wayne and the remaining incorporated jurisdictions.

**Over 50 percent of the County's developed land area is residential.**

Developed land area includes all the land (less vacant and agriculture) that is currently under development (see side bar for explanation). Of the County's total land area, nearly 30 percent or 128,105 acres is already developed. Of this amount, over 50 percent is in residential (single-family and multi-family) use. Over 56 percent of the developed land within the unincorporated part of the County is residential. Residential occupies the largest amount of the developed acreage in the County as a whole, and within the unincorporated portion of the County (Table 4.3). Even though residential is a major land use in the City (over 18 percent of the developed land), it does not occupy nearly as much of the developed land as in the area outside the City.

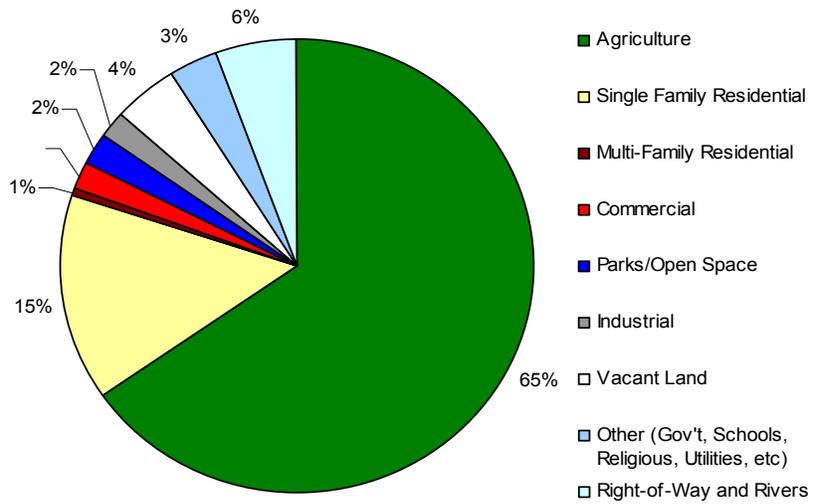
The land use pattern in Fort Wayne is considerably different than the community as a whole. Single family development is the most dominant land use in Fort Wayne, and has increased by 7.26 percent since 1987. Multi-family housing did not increase at the same rate as single family housing. During the same time period multi-family housing only increased by .03 percent. Vacant land decreased by 1.94 percent in the City. Figures 4.1-4.2 show the breakdown of land uses in the County.

Map 4.3: Existing Land Use, Allen County



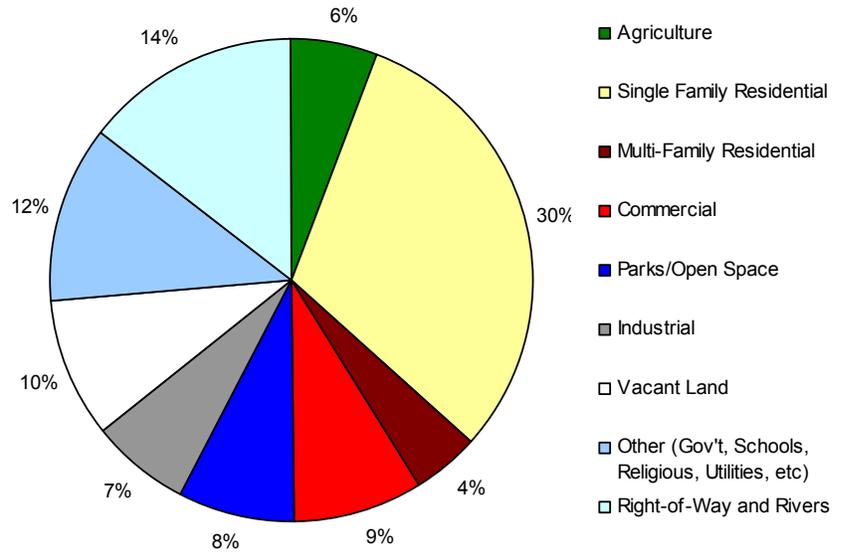
Source: City of Fort Wayne

**Figure 4.1: Existing Land Use, Allen County**



Source: City of Fort Wayne

**Figure 4.2: Existing Land Use, City of Fort Wayne**



Source: City of Fort Wayne

**Table 4.1: Existing Land Use, Allen County-2003**

<b>Land Use</b>	<b>Acres</b>	<b>Percentage</b>
Agriculture	275,759	65.3%
Single Family Residential	62,086	14.7%
Multi-Family Residential	3,026	0.7%
Commercial	7,443	1.8%
Parks/Open Space	10,200	2.4%
Industrial	7,786	1.8%
Vacant Land	18,614	4.4%
Other (Gov't, Schools, Religious, Utilities, etc)	13,948	3.3%
Public Right-of-Way and Rivers	23,625	5.6%
<b>Total</b>	<b>422,484</b>	<b>100%</b>

*Source: City of Fort Wayne*

**Table 4.2: 1987 Land Use, City of Fort Wayne**

<b>Land Use</b>	<b>Acres</b>	<b>Percentage</b>
Agriculture	2,339	6.2%
Single Family Residential	11,017	29.0%
Multi-Family Residential	1,643	4.3%
Commercial	2,807	7.4%
Parks/Open Space	1,955	5.1%
Industrial	1,901	5.0%
Vacant Land	5,035	13.2%
Other (Gov't, Schools, Religious, Utilities, etc)	5,476	14.4%
Public Right-of-Way and Rivers	5,856	15.4%
<b>Total</b>	<b>38,029</b>	<b>100.0%</b>

*Source: City of Fort Wayne*

**Table 4.3: Existing Land Use, Unincorporated Area**

<b>Land Use</b>	<b>Acres</b>	<b>Percentage</b>
Agriculture	268,933	76.2%
Single Family Residential	40,789	11.6%
Multi-Family Residential	286	0.1%
Commercial	1,792	0.5%
Parks/Open Space	4,978	1.4%
Industrial	3,278	0.9%
Vacant Land	11,575	3.3%
Other (Gov't, Schools, Religious, Utilities, etc)	6,337	1.8%
Public Right-of-Way and Rivers	14,738	4.2%
<b>Total</b>	<b>352,706</b>	<b>100.0%</b>

*Source: City of Fort Wayne*

### **Residential land use occupies the most land area (35.3 percent) within the City of Fort Wayne.**

Although residential land use does not occupy as much of the total land area in the City as it does in the overall County, it is still the largest land use, followed by rights-of-way (14.6 percent) and rivers and other uses (11.8 percent). Vacant and agricultural land combined makes up 15.5 percent of the total land area.

Within the City of Fort Wayne, comparing the 2003 land use with the 1987 land use (from the 1987 Fort Wayne Land Use Study) shows not only an increase in the percentage of land area devoted to residential (from 29.0

percent to 31.0 percent of the land area) but also an increase in the conversion of land to non-residential uses.

Commercial uses accounted for 7.4 percent of the total land area in 1987 in Fort Wayne, increasing to 8.6 percent and adding another 2,265 acres, or nearly doubling the amount of commercial land. Assuming an average density of 10,000 square feet per acre (typical of most suburban retail development), amounts to nearly 22,650,000 square feet. On a per household basis, this represents an increase of .04 to .06 square feet per household.

Land devoted to industrial uses increased, in the same time period, from 5.0 to 6.6 percent of the total land area or an increase of 1,971 acres. The amount of land dedicated to parks and open space also increased from 5.1 percent in 1987 to 7.8 percent or 2,603 acres.

Vacant land accounts for nearly 9.7 percent of the total land area in the City of Fort Wayne, a 3.5 percent drop of 663 acres since 1987. This may include development of infill sites or sites that were suitable for development.

**Table 4.4: Existing Land Use, City of Fort Wayne-2003**

<b>Land Use</b>	<b>Acres</b>	<b>Percentage</b>
Agriculture	3,419	5.8%
Single Family Residential	18,268	31.0%
Multi-Family Residential	2,556	4.3%
Commercial	5,072	8.6%
Parks/Open Space	4,598	7.8%
Industrial	3,872	6.6%
Vacant Land	5,698	9.7%
Other (Gov't, Schools, Religious, Utilities, etc)	6,938	11.8%
Public Right-of-Way and Rivers	8,586	14.6%
<b>Total</b>	<b>59,007</b>	<b>100.0%</b>

*Source: City of Fort Wayne*

**All incorporated Allen County communities have similarly distributed land uses.**

As Table 4.5 shows, a majority of the land area within incorporated Allen County is devoted to either agricultural or residential use. Although the distribution of non-residential land uses is similar to Allen County and Fort Wayne, incorporated Allen County has a proportionally larger amount of vacant land available, with over 15 percent of the land without an identified use.

**Table 4.5: Outlying Jurisdictions Land Use, 2003**

	<b>Grabill</b>	Percent of Total Land Area	Percent of Developed Land Area	<b>Huntertown</b>	Percent of Total Land Area	Percent of Developed Land Area	<b>New Haven</b>	Percent of Total Land Area	Percent of Developed Land Area
Agriculture	112.5	32.7%		1,022.9	49.0%		1,182.1	22.7%	
Single Family	102.7	29.9%	45%	465.7	22.3%	62%	1,444.3	27.7%	42.5%
Multi-Family	2.9	0.8%	1%	3.6	0.2%	0%	171.3	3.3%	5.0%
Commercial	22.0	6.4%	10%	60.7	2.9%	8%	412.1	7.9%	12.1%
Parks/Open Space	22.7	6.6%	10%	116.2	5.6%	16%	338.1	6.5%	10.0%
Industrial	49.8	14.5%	22%	28.1	1.3%	4%	510.0	9.8%	15.0%
Vacant	2.8	0.8%		319.4	15.3%		631.8	12.1%	
Other	9.1	2.7%	4%	71.1	3.4%	10%	275.0	5.3%	8.1%
ROWs and Rivers	19.5	5.7%	9%	0.0	0.0%	0%	243.7	4.7%	7.2%
<b>Total Land Area</b>	<b>344.0</b>	100.0%		<b>2,087.8</b>	100.0%		<b>5,208.5</b>	100.0%	
Developed Land Area*	228.8	66.5%	100%	745.5	35.7%	100%	3,394.5	65.2%	100%
Undeveloped Land Area	115.2	33.5%		1,342.3	64.3%		1,814.0	34.8%	

	<b>Monroeville</b>	Percent of Total Land Area	Percent of Developed Land Area	<b>Leo-Cedarville</b>	Percent of Total Land Area	Percent of Developed Land Area	<b>Woodburn</b>	Percent of Total Land Area	Percent of Developed Land Area
Agriculture	100.5	24.7%		806.5	36.8%		182.1	34.3%	
Single Family	139.7	34.3%	47%	701.2	32.0%	67%	175.0	33.0%	54.4%
Multi-Family	1.6	0.4%	1%	0.0	0.0%	0%	4.4	0.8%	1.4%
Commercial	13.6	3.4%	5%	32.3	1.5%	3%	38.5	7.2%	12.0%
Parks/Open Space	36.1	8.9%	12%	97.5	4.4%	9%	12.6	2.4%	3.9%
Industrial	38.4	9.4%	13%	0.0	0.0%	0%	9.0	1.7%	2.8%
Vacant	11.5	2.8%		347.5	15.8%		27.4	5.2%	
Other	40.5	10.0%	14%	208.1	9.5%	20%	68.9	13.0%	21.4%
ROWs and Rivers	24.8	6.1%	8%	0.0	0.0%	0%	13.2	2.5%	4.1%
<b>Total Land Area</b>	<b>406.7</b>	100.0%		<b>2,193.2</b>	100.0%		<b>531.0</b>	100.0%	
Developed Land Area*	294.7	72.5%	100%	1,039.2	47.4%	100%	321.5	60.6%	100%
Undeveloped Land Area	112.0	27.5%		1,154.0	52.6%		209.5	39.4%	

Source: City of Fort Wayne

**Population density, according the U.S. Census, has declined from ten to less than five persons per acre as development has located outward from the City of Fort Wayne’s core.**

As Map 4.4 shows, population density (according to the U.S. Census) has decreased as development has moved outward from Fort Wayne’s core, especially within the unincorporated portion of Allen County. Other higher density areas in the Community are in New Haven, Hometown, Grabbill, Woodburn and Monroeville. Older neighborhoods closer to the urban core also have high densities when compared to the County, while areas in unincorporated Allen County typically have lower densities. This is based on the Census definition of Urbanized Area as any area with a central place of 50,000 or more residents and a population density of 1,000 people or more per square mile (640 acres), excluding the inner ring and most suburban areas. While the Census measurement of density is valid, it is not a measurement of the amount of developed land that each person requires to live in the City and County. Map 4.4 illustrates the population density in the year 2000, by Census Block, over the entire County.

**Population density, based on developed land area, has declined in the City of Fort Wayne by 21 percent since 1987.**

Density, as used here, is measured by calculating the number of residents per acre of developed land. For the City of Fort Wayne (this information was not available for Allen County as a whole), the overall 1987 population density was 5.6 persons per developed acre. However, in 2003 the density dropped to 4.4 persons per developed acre, for a 21 percent decrease. This decline in density is primarily due to the rapid growth in suburban Fort Wayne and the result of annexing significant amounts of mostly developed acreage from the County into the City over that time period.

A declining population density indicates that land is not being used as efficiently as it once was. Growth in outlying areas has been occurring for over 50 years in Fort Wayne and other similar Midwest communities, but this 21 percent drop in density has occurred *recently* or over the past 17 years. A decrease in density not only means more land is being consumed at an increasing rate, but necessary infrastructure and associated costs – sewer, water, roadways - required to serve the newly developed land has increased as well. The increased costs can be found in both capital (construction) costs and operating or service costs.

In a recent study (Speir and Stevenson, 2002) it was found that “lot size” (or density) is the spatial attribute that has the most impact on water and sewer operating costs. In other words, they were able to demonstrate that dispersed large lots at low densities result in significantly higher public service costs than smaller lots closer together.

It was also found in a University of Kentucky analysis of 10 Kentucky counties (Table 4.6) that the per unit costs (to the governments) for police,

fire, highway, schools, sewer, and solid waste services were consistently lowest in counties whose growth was more concentrated in established areas. The more established places, it was concluded, accommodate growth at lower costs than newer, more spread out ones, with fire protection, schools, and police driving much of the result.

**Table 4.6: Dollar Costs of New Services per 1,000 New Residents for a Family of Four (Bollinger, Berger, and Thompson)**

<b>Central City Counties</b>	<b>Development Pattern</b>	<b>Cost</b>
Fayette	(more concentrated)	(\$1.08)
Jefferson	(more spread out)	\$37.55
<b>Suburban Counties</b>		
Shelby	(more concentrated)	\$88.27
Pendelton	(more spread out)	\$1,222.39
<b>Counties with Small Towns</b>		
Warren	(more concentrated)	\$53.89
Pulaski	(more spread out)	\$239.93
<b>Outer ring and rural</b>		
Gerrard	(more concentrated)	\$454.51
McCracken	(more spread out)	\$618.90

\* Services include police, fire, highway, schools, sewer, and solid waste)

**Over the past 16 years, the City of Fort Wayne’s developed land area increased by 62.7 percent which was over twice the population growth rate of 27.5 percent.**

Nationally, between 1982 and 1997, the amount of urbanized land in the United States increased by 47 percent. During that same time period, the nation’s population grew by 17 percent. Most metropolitan areas are consuming land for urbanization much more rapidly than they are adding population, especially in the Northeast and Midwest.

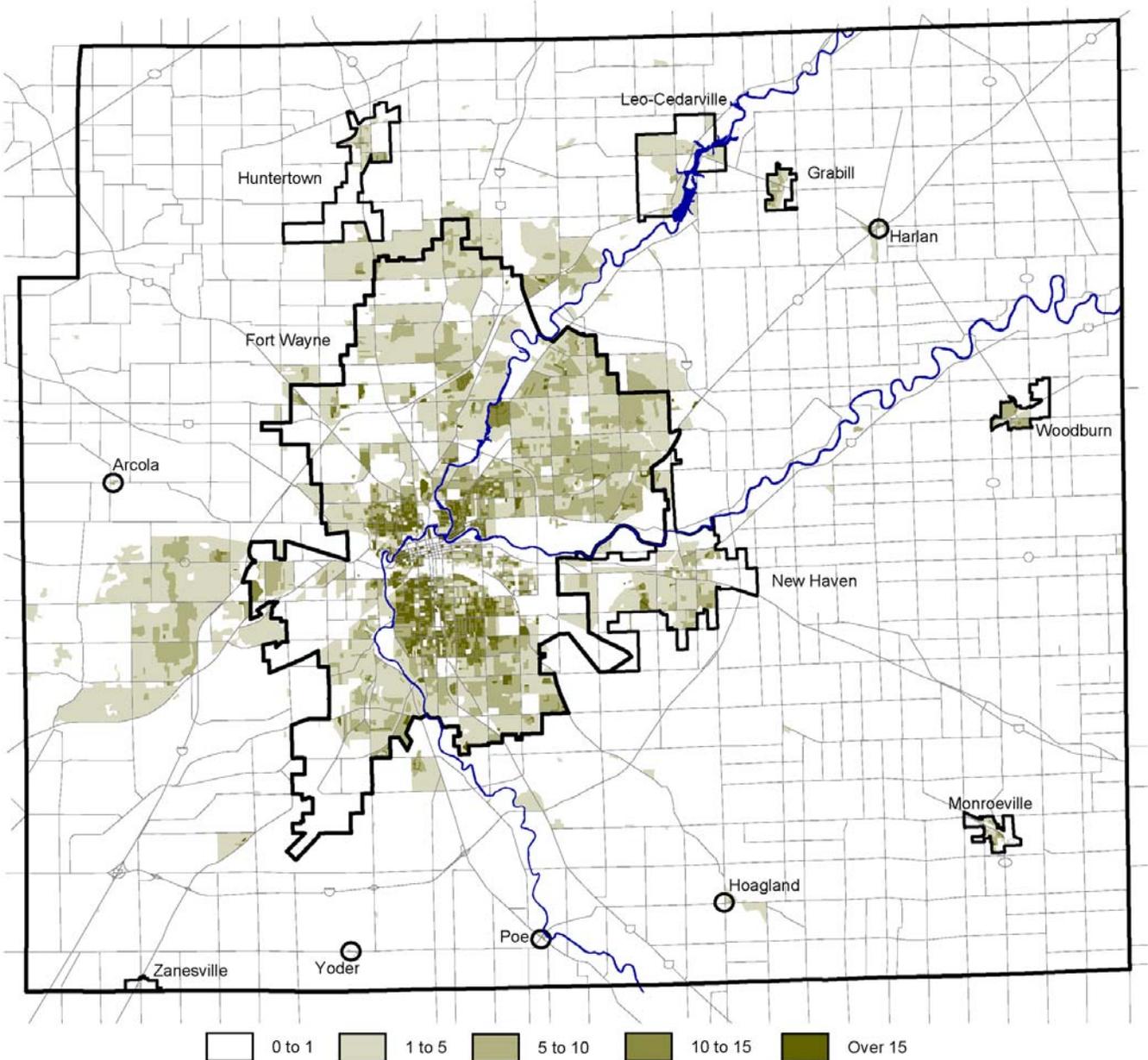
As Table 4.7 shows, in 1987 the Fort Wayne Metropolitan Statistical Area or Fort Wayne MSA (which includes Allen, Adams, Dekalb, Huntington, Wells, and Whitley Counties) had a population density of 3.63 persons per acre. By 1997, the density dropped by over 19 percent. When compared to peer communities, the Fort Wayne MSA ranked second in the drop in density but was comparable to a 19.03 percent average drop across other Midwest MSA’s. The amount of land area consumed within the Fort Wayne MSA increased by over 39 percent in the same 15 year time period, while the population increased by 12.3 percent.

**Table 4.7: Comparison of Change in Population, Urbanized Land and Density to Peer Community MSA's– 1987-1997**

MSA	Density 1997 Persons/Acre	Pop. Change 1982-1997	Urbanized Land Change 1982-1997	Change in Density 1982-1997
South Bend, IN	4.16	8.9%	35.9%	-19.8%
Fort Wayne, IN	3.63	12.3%	39.5%	-19.5%
Evansville, IN	3.35	4.8%	22.1%	-14.2%
Dayton, OH	3.64	1.8%	17.9%	-13.6%
Grand Rapids, MI	3.32	26.9%	45.2%	-12.6%
Des Moines, IA	4.26	18.6%	35.3%	-12.3%
Madison, WI	4.89	24.2%	32.1%	-6.0%
<b>Average</b>	<b>3.3</b>	<b>12.7%</b>	<b>27.4%</b>	<b>-11.2%</b>

Source: The Brookings Institution

**Map 4.4: 2000 Block Population Density – Persons Per Acre**



Source: U.S. Census Bureau – City of Fort Wayne

**Growing Allen County communities surrounding the City of Fort Wayne have comparable densities.**

As Table 4.8 shows, densities in surrounding communities also vary, regardless of the population and the amount of developed area. The highest density areas are Grabill and Woodburn with Leo-Cedarville with the lowest population density. Leo-Cedarville and Hometown, the communities with the most recent increases in population growth, were also the closest to Allen County’s overall density of 2.6 persons per acre. Data was not available for Zanesville.

**Table 4.8: Acres Per Person of Developed Land Area**

<b>Location</b>	<b>Developed Land Area</b>	<b>Population Estimate 2003</b>	<b>Persons/Acre</b>
Grabill	228.8	1,147	5.01
Hometown	745.5	2,335	3.13
Leo-Cedarville	1,039.2	2,874	2.77
Monroeville	294.7	1,275	4.33
New Haven	3,394.5	13,592	4.00
Woodburn	321.5	1,629	5.07
Zanesville	N.A.	602	N.A.
<b>Average</b>			<b>4.05</b>

*Source: US Census Bureau of Population and City of Fort Wayne*

**The amount of land consumed per household in the City of Fort Wayne (including recently annexed land) has increased by 27.3 percent since 1987.**

Land consumption patterns provide an understanding of how an area has utilized its capacity of developable land. In other words, this measurement reinforces the direct correlation between land consumption and density. The per household land consumption (PHLC) is another indicator that measures the efficiency of land development by trends in density over a period of time. PHLC is calculated by dividing the total developed land by the number of households that reside in the developed area, excluding the population living in group quarters such as colleges, prisons, and other institutionalized dwelling units. Also excluded is a portion (50 percent) of those uses that were considered regional in size or served a much larger population than Allen County, including Fort Wayne. A decrease in PHLC over time represents an increase in the density of development, while an increase in PHLC indicates a decrease in the density of development.

As an example, Table 4.9 shows, the City of Fort Wayne’s PHLC grew by 27.3 percent from 0.44 acres per household in 1987 to 0.56 acres per household in 2003. These figures indicate that over a 16-year period, the City of Fort Wayne consumed land at an increasing rate but with lower development densities and possibly less efficient use of developable land.

**Table 4.9: Change in per Household Land Consumption, 1987-2003**

	1987	2003	Percent Change
Population	172868	220486	27.5%
Number of Households	68951	87535	26.9%
Developed Land	30655	48666	58.8%
PHLC	0.44	0.56	27.3%

*Source: U.S. Census-City of Fort Wayne*

**Per household land consumption is nearly three times more in the area outside the City of Fort Wayne than within the City.**

The amount of land consumed per household in 2003 (using 2003 Census estimates and 2003 land use data) varied considerably, depending on the location. Within the City, the amount of land area consumed per household at 0.56 acres was nearly half of what was consumed over the entire County.

**Table 4.10: 2003 Estimated Household Size & Per Household Land Consumption**

Estimated 2003 Data	Allen County	Fort Wayne	Allen County Less City of Fort Wayne
Total Population	340,153	220,486	119,667
Number of Households	133,452	87,535	45,917
Population in Group Quarters	5,832	5,343	489
Estimated population in household	335,321	210,181	119,178
Average Household Size	2.56	2.46	2.61
Estimated Avg. Household Size	<b>2.51</b>	<b>2.40</b>	<b>2.73</b>
Developed Area Less Regional Uses (Acres)	126,645	48,666	77,979
PHLC (per household land consumption)	<b>0.95</b>	<b>0.56</b>	<b>1.70</b>

*Source: ACP-City of Fort Wayne*

**Undeveloped Land: Preserve and Reserve**

Undeveloped land covers over 70 percent of the total land area in the County and includes land that is currently in agricultural use or vacant. This area is further composed of land that is permanently protected and land that could be developed, but with limitations (e.g. steep slopes, floodplain, etc.) Although technically capable of being developed, a portion of this land is not suitable for development. This section distinguishes those lands that are not suitable for development from the total, undeveloped land area in order to determine the amount of land available for development.

**Land with prime agricultural soils covers over 93.6 percent of the undeveloped land area in the County and City.**

Over 99 percent of the agriculture land in Allen County is of prime agricultural quality. Prime agricultural land, as defined by the Natural Resources Conservation Service (NCRS) is “that land which is best suited for producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season and moisture supply content to produce sustained yields of crops economically if treated and managed according to modern

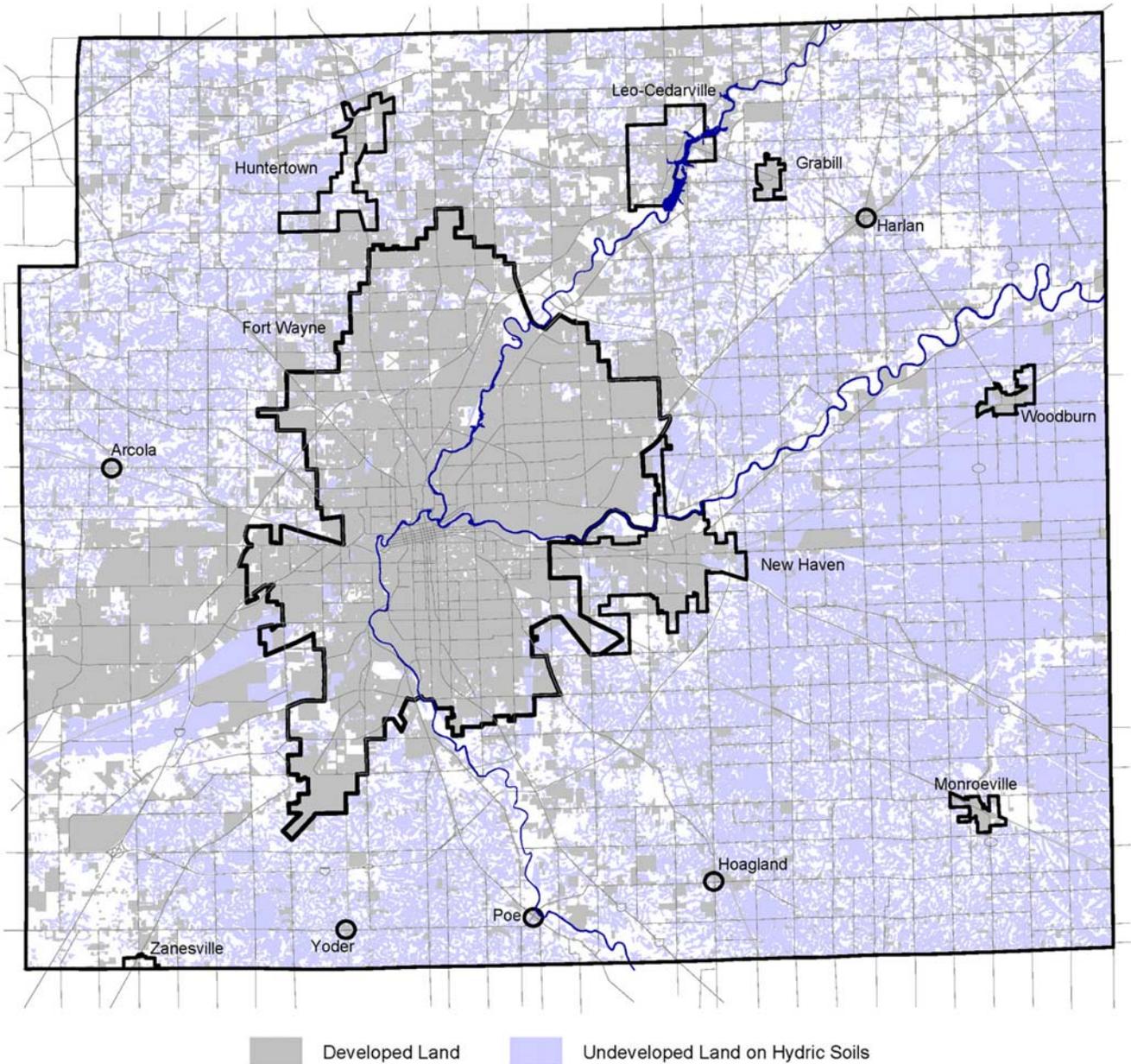
farming methods.” According to the National Resource Inventory, (NRI), between 1982 and 1997, Indiana urban-suburban development increased by 67 square miles or 434,600 acres, with the most loss coming from farmland. Indiana ranked 7th in the U.S. in loss of prime agricultural land between 1992 and 1997. In that same five year time period, Allen County lost 3.3 percent of its farmland to urbanization, or nearly 9,345 acres at a rate of 1,800 acres per year.

In the areas served by central sewer, the pattern of development does not consume as much land as the areas without central sewer (see Utilities chapter). The areas without central sewer require larger lots to accommodate on-site treatment systems, with even larger lots necessary in areas with poorly drained, hydric soils. It is this pattern of development that consumes the largest amount of land, most of which is productive farmland, leaving a patchwork of developed land that makes it difficult to farm the remaining agricultural land economically. Excess land that is now a part of each individual lot as yard space could be consolidated into larger tracts of interconnected land that could be developed at the same overall density.

**Hydric soils make up over 46.4 percent of the undeveloped land area in the County and City.**

Hydric soils, or soils that have a high moisture content, make up 136,610 acres or nearly half of the undeveloped land area. Hydric soils are defined as saturated soils at or near the surface for sustained periods of time during the growing season. The primary restriction on hydric soils is their use as development sites with sufficient area for leaching septic-tank discharge, which is the preferred method of development in the rural areas of the County. This development, most of which is single-family residential, often requires large tracts of land per housing unit. This means that development in the County is not only absorbing large amounts of farmland (see above), but also converting it to low-density development - at nearly three times the consumption rate of the City of Fort Wayne (1.7 acres per household of developed land) - in order to accommodate on-site treatment of effluent.

Map 4.5: Undeveloped Land on Hydric Soils, 2003



**Preserve and reserve lands make up over 11.2 percent of the County's total land area.**

Not all the agricultural and vacant land, or that land which is *available* for development, is entirely *suitable* for development. Hydric soils are an example of a condition that limits, but does not prohibit development, particularly if it is adequately drained and served by central sewer. For the purpose of this analysis, the remaining undeveloped land (excluding prime agricultural land and hydric soils) has been classified into two groups: preserve lands and reserve lands. Preserve lands are those lands which are permanently protected by federal, state and local regulations or ownership

and include nature preserves, parks, floodways, wetlands, water bodies, and rivers and are, therefore, set aside from development. This amounts to over 17,941 acres or 4.2 percent of the County’s total land area.

Reserve lands include those lands that have limitations on their development due to more natural restrictions. These include floodplains, and steep slopes (over 12 percent) all of which could be developed, but not without additional effort or cost. Although certainly a factor in considering the amount of land available to develop, the amount of land under vegetative cover, or covered by woodlands, was not available in GIS format.

The amount of land in reserve amounts to over 29,547 acres or 7.0 percent of the County’s total land area. Ideally, prime farmland would be a part of the area designated reserve. But, because so much of the County is considered prime agricultural land the issue, as stated earlier, is not the gross acreage being converted: it is development that turns over increasingly larger acreage at very low densities, especially low density unplanned development.

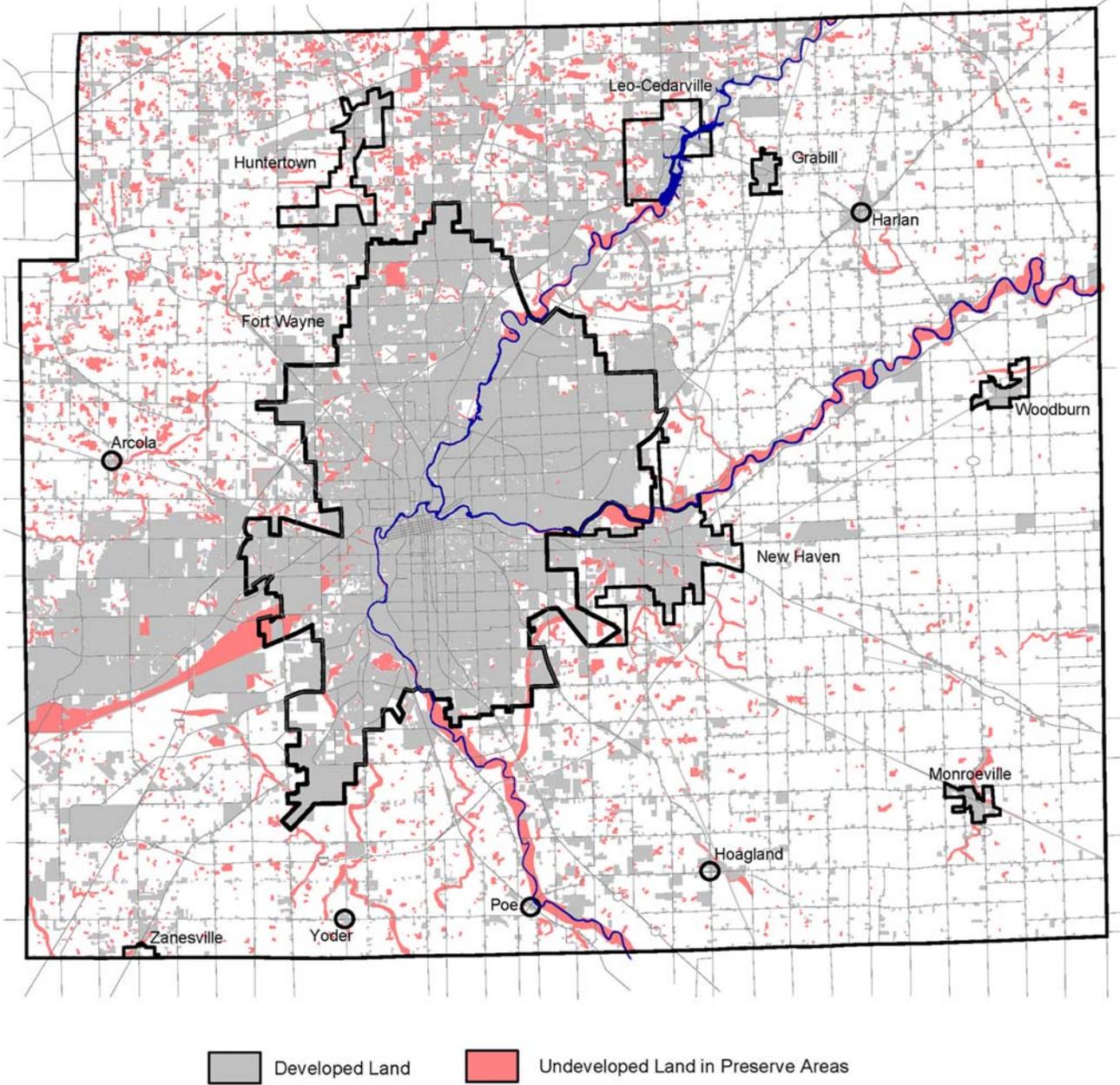
As stated earlier, the Per Household Land Consumption (PHLC) for the mostly undeveloped area outside the City of Fort Wayne, but within the County, is 1.7 acres per household. This is nearly *triple* the land area consumed per household in the City of Fort Wayne (0.57 acres per household). Once agricultural land has been converted to development in these areas, it is permanently lost.

**Table 4.11: Reserve and Preserve Areas as a Percent of Total Land Area-2003**

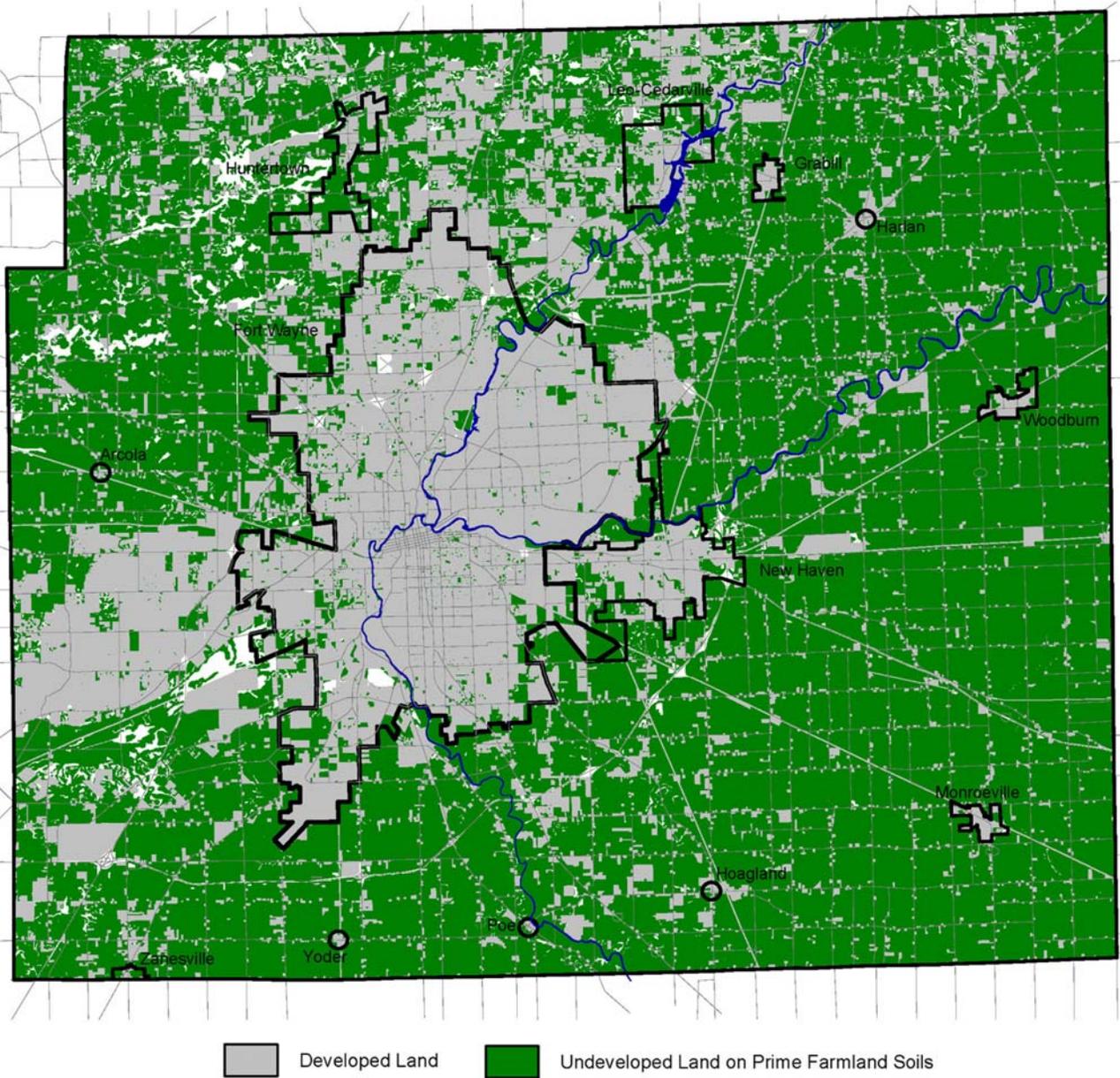
Reserve & Preserve	Allen/Fort Wayne (Acres)	Percent of Total Land Area	Fort Wayne (Acres)	Percent of Total Land Area	Allen County Less City of Fort Wayne (Acres)	Percent of Total Land Area
<b>Preserve</b>	17,941.0	4.2	1,652.1	2.8	16,288.9	4.5
<i>Wetlands</i>	8,334.1	2.0	529.9	0.9	7,804.2	2.1
<i>Parks &amp; Nature Preserves</i>	5,060.4	1.2	1,963.0	3.3	3,097.4	0.9
<i>Rivers</i>	1,878.4	0.4	495.5	0.8	1,382.9	0.4
<i>Floodway</i>	10,047.9	2.4	1,096.0	1.9	8,951.9	2.5
<b>Reserve</b>	29,547.6	7.0	1,503.8	2.5	28,043.8	7.7
<i>100 Year Floodplain</i>	27,562.5	6.5	1,424.6	2.4	26,137.9	7.2
<i>Steep Slope</i>	1,408.4	0.3	88.9	0.2	1,319.5	0.4
<b>Hydric Soils</b>	136,610.2	32.3	2,678.8	4.5	133,931.4	36.8
<b>Prime Farmland</b>	275,420.3	65.2	8,008.0	13.6	267,412.3	73.6
<b>Total Land Area</b>	422,484.0		59,007.0		363,477.0	

As Map 4.6 shows, the highest concentration of preserve areas are also within the area experiencing the rural development activity (eg. nature preserves and wetlands). As Map 4.7 shows, the highest concentration of prime farmland soils is to the south and eastern portion of the County.

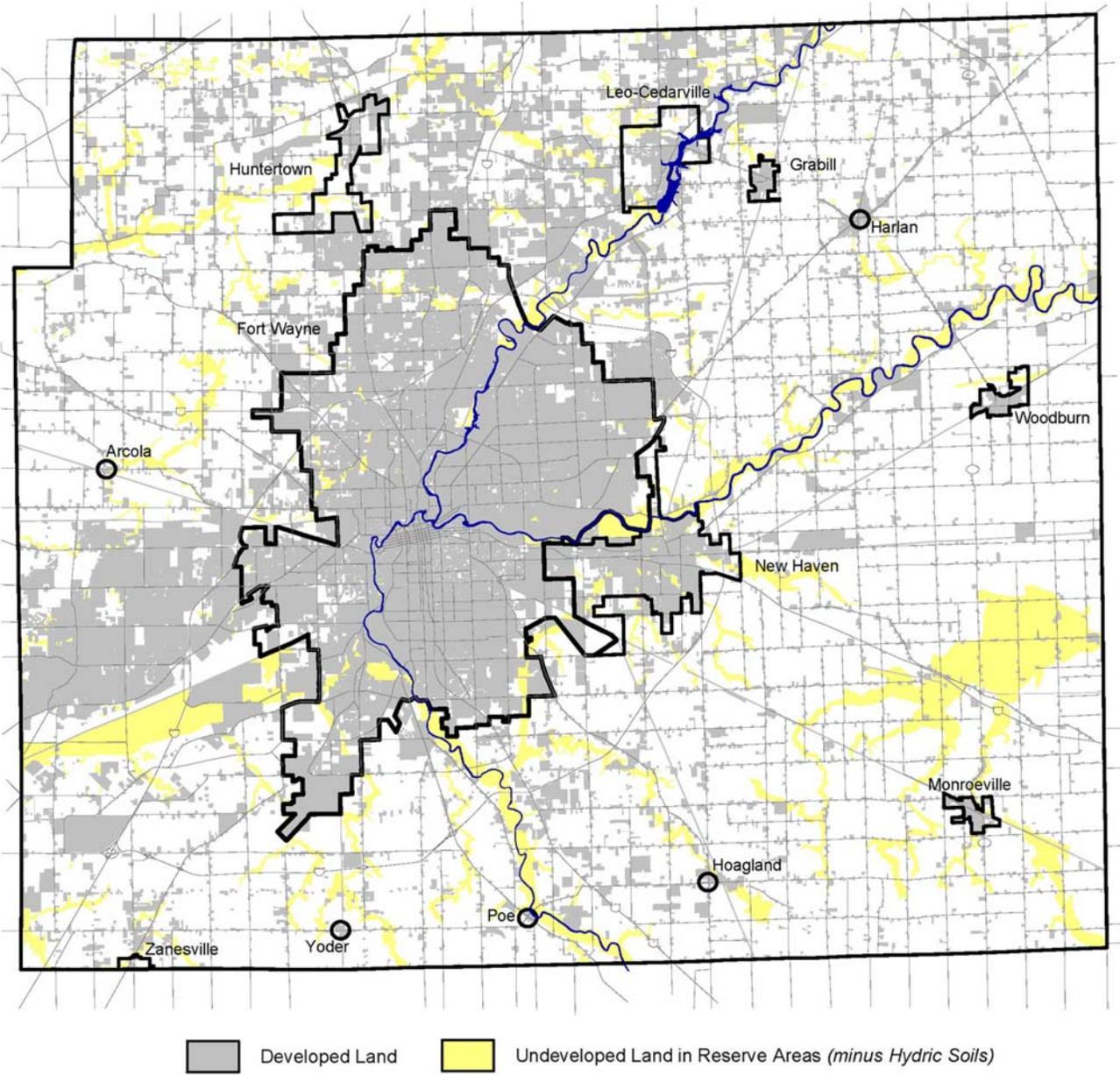
Map 4.6: Undeveloped Land in Preserve Areas, 2003



Map 4.7: Undeveloped Land on Prime Farmland Soils, 2003



Map 4.8: Undeveloped Land in Reserve Areas



### **Developable Land**

As defined earlier, undeveloped land is the total land in the County that is not physically developed. Developable land is land that does not have major physical constraints to development. It equals the undeveloped land *minus* the land that is held in preserve. Preserve lands are those lands which are permanently protected by federal, state and local regulations or ownership, and include nature preserves, parks, floodways, wetlands, water bodies, and rivers and are, therefore, set aside from development. Reserve lands include those lands that have limitations on their development due to more natural restrictions. These include hydric soils, floodplains, and steep slopes (over 12 percent) all of which could be developed, but not without additional effort or cost.

**Over 17.0 percent of the undeveloped land area is classified as both preserve and reserve, leaving approximately 83.0 percent of land considered developable.**

Approximately 47,488 acres of Allen County's developable land area is considered reserve and preserve. This amounts to over 17.0 percent of the *undeveloped* land area. Removing both the reserve and preserve land area from the available undeveloped land leaves approximately 246,833 acres of land that is considered developable. This amounts to nearly twice the amount of land *already* developed (128,105 acres) in the County. This assumes that the remaining prime agricultural land is developable. If all hydric soils were removed from the developable land area, the amount of this land would be reduced by nearly 44.6 percent or 110,233 acres to 136,600 acres.

### **Development Capacity**

Whether or not there is enough available land to accommodate future growth in Allen County depends on three major factors: the anticipated amount of future population growth, the overall density of that growth, and the location. Population projections were only available for the County as a whole, so reliable estimates for individual jurisdictions could not be prepared.

**Allen County is projected to grow to approximately 410,349 persons (Holts) in 2025.**

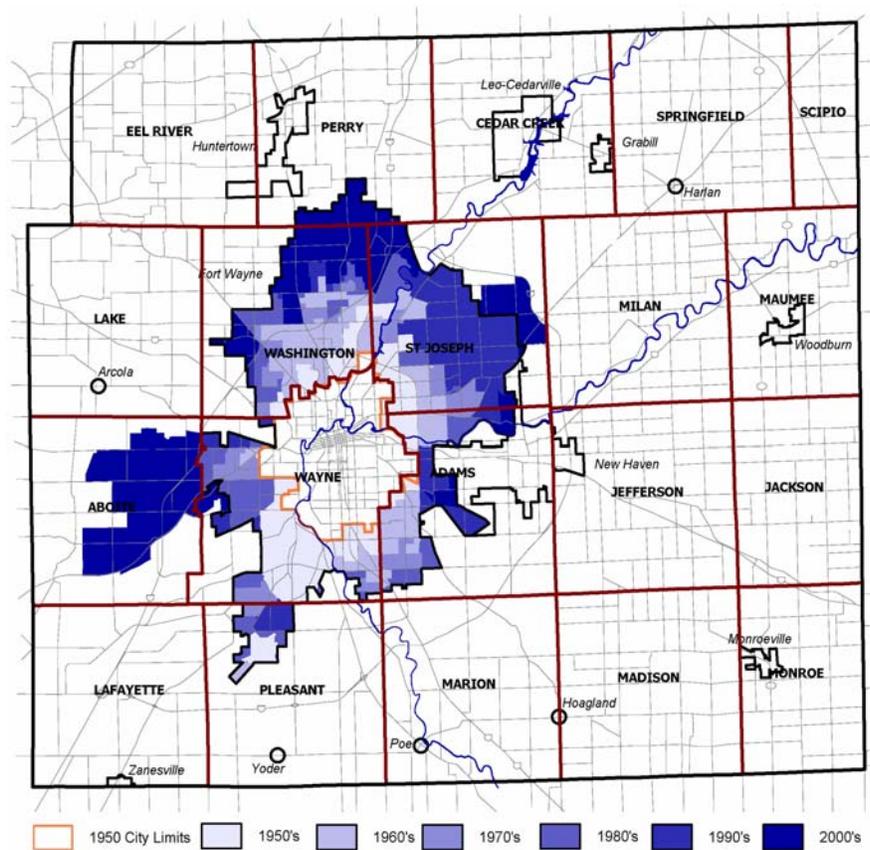
Although this growth rate is less than the rate experienced over the past several decades, these additional 70,196 persons will require additional, mostly residential land area, especially if the population density continues to decline. Based on two projection methods by the Indiana University Business Research Center, Allen County's population for the next 21 years will increase by 15.8 (Cohort) and 18.2 (Holts) percent reflecting a slower growth rate than the 12.7 percent population increase over the past 13 years. The Holts forecast, as prepared by the Indiana business Research Center,

estimates population using an extrapolation of historical total population trends (see Appendix).

**Development densities, or persons per developed acre, vary by location within the County, and range from 5.99 persons per developed acre within the area of Fort Wayne developed prior to 1950 to 0.70 persons per developed acre within the rural area.**

In order to give a more accurate picture of development densities (which varies by area within the community), the County was divided into four zones: pre-1950, post-1950, rural and town. The area defined as pre-1950 includes the area (including regionally serving uses) within the City of Fort Wayne’s 1950 corporate limits. The area between the 1950 corporate limits and the current corporate boundaries (including regionally serving uses) was defined as the post-1950 area and the remaining area within the County, less the area within each remaining jurisdiction or town (Huntertown, Leo-Cedarville, etc.), was defined as rural (Map 4.9).

Development densities, or population per developed land area for zones within the City of Fort Wayne range from 5.9 persons per acre for the pre-1950’s zone to 2.77 persons per acre in the post-1950’s zone. The population per developed acre within the unincorporated portion of the county is 0.70 persons per developed acre. The surrounding community or town development density averaged 4.05 persons per developed acre.



**At densities representing the post-1950 area ( 2.77 persons per acre), the amount of land necessary to support future population projections is equal to ten percent of the remaining developable land.**

As an example, if the additional population were dispersed at the pre-1950 development densities, roughly 12,000 acres would be required to support that population. At the post-1950 densities, which are more like today's pattern, the developed area would be approximately 26,000 acres, with an average absorption of approximately 1,300 acres of developed land per year. This represents approximately ten percent of the remaining developable land.

Developing at densities closer to the pre-1950's level will not only consume less land, the costs to serve that land, as stated earlier, over time, will be reduced as well. At the pre-1950 densities, only 12,000 acres or 66.7 percent of the 18,614 acres of vacant land will be needed to accommodate additional population growth. Likewise, at the post-1950 densities, developing most of the of vacant, undeveloped land remaining in the County will satisfy 14 years of absorption or 71.0 percent of the estimated land area needed for the next 21 years of population growth. Obviously, not all of the vacant land is suitable or available for development. Grayfield (underutilized retail sites) and brownfield (sites containing environmental contaminants) require considerable preparation before being marketable.

Most of this infill growth can be accommodated without the costs associated with extending infrastructure to sites currently in the rural or greenfield zone and without the significant loss of productive, prime farmland. By concentrating development, additional open space can be preserved as well.

# Appendix: Study Methods

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## **Population Projection Method**

The population projections for Allen County were executed by three methods: Linear Regression Model, Holt's Exponential Smoothing, and Cohort Survival.

### A. Linear Regression Model

Linear regression is the most common method used for population estimates. The forecast is expressed as a linear regression equation obtained from the numbers of populations in a base (t) year and a target year. Then, using the equation with the number of population in the base year and the growth rate between the years, the number of population in (t+n) year can be calculated.

### B. Holt's Exponential Smoothing

In Holt's exponential smoothing, the concept is a weight scheme where time periods are weighted by order and previous forecasts, and adjusted by a weighted average of the previous forecast error.

### C. Cohort Survival

In the cohort-component method, population change along with fertility, mortality, and net migration are projected for each separate birth cohort. The simple equation is as follows:

Population [t+1] = Population[t] + Natural Increase (or Decrease) + Net Migration

The population at the next time interval ( $t + 1$ ) is calculated by the sum of the population at the time interval ( $t$ ), the net natural increase (or decrease), and the net migration. This is projected separately for men and women for each birth cohort. The U.S. Census Bureau provides 5-year age cohorts for men and women.

### **Sprawl and Density**

In this report, defining sprawl and density follows the definitions of a paper prepared by Center on Urban & Metropolitan Policy (2001), *Who Sprawls Most? How Growth Patterns Differ Across the U.S.* According to the paper, sprawl is “land resources consumed to accommodate new urbanization.” Namely, if land consumption is faster than population growth, then the area can be said as “sprawling.” Also, if population growth is faster than land consumption, then the area can be said as “densifying.” In this context, this report defines density as the number of people divided by the acres of urbanized land in the region. The amount of urbanized land area of the City of Fort Wayne and Allen County was calculated with GIS-based spatial data. Information on peer communities was obtained from the National Resources Inventory (NRI).

### **Per Household Land Consumption (PHLC)**

In Land Use report, per household land consumption (PHLC) was used to identify the efficiency of land development by trends in density over a period of time. For the calculation steps, *Where Are We Growing – Socio-Economic Tools – Sprawl* prepared by Green Communities was referenced. Following are steps for measuring the PHLC.

1. Determine the acres of developed land for a base year and the target year.
2. Find the population data including the number of households, estimated population in households, and average household size for both years.
  - a. To calculate the estimated population living in households, find population estimates for years and subtract out the population living in group quarters such as colleges, prisons and other institutional arrangements.
  - b. To calculate the estimated average household size, divide the population living in households by the number of households.
  - c. To get the number of households, divide the estimated population in households by the estimated average household size.
3. PHLC is calculated by dividing the total developed land by the number of households.