Dubuque County Sustainability Indicators

THE UNIVERSITY OF IOWA
IOWA INITIATIVE
FOR SUSTAINABLE COMMUNITIES

University of Iowa School of Urban and Regional Planning

Iowa Initiative for Sustainable Communities

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Project Partners

The members of the Dubuque Smart Planning Consortium: Dubuque County, City of Asbury, City of Cascade, City of Dubuque, City of Dyersville, City of Epworth, City of Farley, City of Peosta

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Dubuque County—an introduction

Dubuque County, Iowa, is one of the earliest settled areas in the state. It is home to approximately 90,000 people as of 2010. The local economy and the majority of the land in the county are dedicated to agriculture. The county has 21 municipalities: Asbury, Balltown, Bankston, Bernard, Cascade, Centralia, Durango, Dyersville, Dubuque, Epworth, Farley, Graf, Holy Cross, Luxemburg, New Vienna, Peosta, Rickardsville, Sageville, Sherrill, Worthington, and Zwingle.

Dubuque Regional Smart Planning

The Dubuque Regional Smart Planning Consortium, formed in 2011, consists of Dubuque County and seven of the county's largest municipalities. The Consortium is in the process of developing a regional sustainability plan to guide future development in the region. This plan is being developed in cooperation among the communities and is informed by the statewide smart planning principles as established in the 2011 Iowa Smart Planning Guide and the City of Dubuque's eleven sustainability principles—regional economy, smart energy use, smart resource use, community design, green buildings, healthy local food, community knowledge, reasonable mobility, healthy air, clean water, and native plants and animals. It is also informed by watershed planning principles established by the Dubuque Soil and Water Conservation District.

The Consortium developed the Smart Plan through a process involving research and public input gathering. More than 300 Dubuque County community members attended the 24 public meetings, participating in brainstorming activities and providing feedback to help develop what would become the Smart Plan goals and objectives. The 15 chapters of the Smart Plan each represent a substantive aspect of sustainability or are otherwise related to processes that facilitate sustainability. Each chapter consists of an overview as well as a series of goals and objectives and a map elements if necessary. The 15 chapters are as follows: Community Facilities, Land Use, Transportation, Watershed, Public Participation, Housing, Community Overview, Economic Development, Issues and Opportunities, Public Infrastructure and Utilities, Agriculture and Natural Resources, Community Character, Hazard Mitigation, Intergovernmental Collaboration, and Implementation.

Project goals and purpose

The goal of this project is to provide the Dubuque Smart Planning Consortium with a means of measuring progress toward the sustainability goals outlined in the Smart Plan. Given the abstract nature of "sustainability," it has been demonstrated that

the development and use of relevant and measurable indicators offers an important and valuable method for evaluating and tracking progress towards stated sustainability goals.

Beyond assessing current areas of strength and weakness in terms of regional sustainability, by establishing and measuring county-wide indicators, in future years, it will be possible to ascertain whether the objectives and goals outlined in the Smart Plan are in fact steering the region towards sustainability. Additionally, this project will examine how land in Dubuque County can be allocated under alternative future scenarios and under different land-use policy scenarios, providing the Consortium with both non-spatial and spatially explicit analysis of potential land-use allocations. Creating indicators, setting baseline measurements, modeling future land use scenarios, and creating a means for updating the data will make it possible for those at the helm of the Consortium to measure progress in an organized fashion.

Intended use

This report was prepared primarily for the members of the Dubuque Smart Planning Consortium, but it is the hope of the researchers that leaders in all the communities in Dubuque County find this report useful. This report is meant to be used in conjunction with the Dubuque Regional Smart Plan, not in lieu of it, complimenting the regional sustainability plan and helping to further examine and address 'how can Dubuque County manage growth sustainably?' Additionally, given the relative rarity of rural sustainability indicator projects, communities outside Dubuque County (and even outside the state of Iowa) facing urban-rural growth challenges may find this report useful as a guide for incorporating indicator-type instruments to track their path toward their sustainability goals.

2011-2012 Project

The current project builds upon the earlier work conducted in 2011-2012 by University of Iowa School of Urban and Regional Planning graduate students. This project, which culminated in a Sustainability Progress Report for the City of Dubuque, focused primarily on establishing and measuring indicators for the City of Dubuque, rather than focusing on rural and countywide sustainability. Some overlap exists between the two reports. For some indicators used in the 2012 Sustainability Report, suitable data was limited to the county/metropolitan statistical area level (the metropolitan statistical area of Dubuque is actually Dubuque County). For this reason, some indicators used in the City of Dubuque's Sustainability Progress Report are also used to measure progress towards county-wide sustainability. Additionally, some replication exists where indicators were identified as appropriate for not only the city-level urban contexts, but are also useful in measuring sustainability within smaller communities and/or at the county level. The researchers on this project thank their predecessors for their excellent work.

Part 1—Indicators

Identifying indicators

The first step undertaken by the researchers was to examine the goals and objectives of the Dubuque Regional Smart Plan. Each chapter of the plan is dedicated to an element or theme related either directly to sustainability or to processes that enable the achievement of sustainable goals. Each chapter includes a number of goals and series of specific objectives to reach the stated goals. The Smart Plan's goals and objectives were analyzed in terms of quantifiability – is there a concrete way to measure if the county or town is making progress toward meeting this goal?

The researchers also examined literature on sustainability indicators and indicator frameworks from other cities and regions (for a full list, see the Appendix). From these sources, additional indicators were identified that may not explicitly represent goals stated within the plan but are identified as relevant and important to reaching broader regional sustainability goals.

Progress toward some goals is more difficult to measure because the goal itself lacks specificity. These goals are not without value – in fact, these goals serve as guiding principles and setting them was an important exercise in stakeholders determining their own sustainability values and priorities. Progress must be measured, then, by looking at participation in programs that support the goal.

For example: the act of measuring progress toward a goal such as "To promote the protection, preservation, and enhancement of the region's bluffs, prairies, wetlands, waterways, scenic views, vegetation, wildlife, and all natural areas" means the researchers had to attempt to define progress in terms of participation in and outputs from a program such as the number of agricultural acres enrolled in conservation programs. These indicators provide a tangible means of measuring a value-based goal.

Selecting indicators

Once a large set of potential indicators was identified, the researchers used the following criteria to determine which indicators would be included in the final framework. The ultimate goal of this process was to create a user-friendly final prod-

uct that could be easily maintained and updated in subsequent years.

These criteria were:

- Alignment with goals outlined in Dubuque Regional Smart Plan – some indicators address multiple goals, and in general, indicators that addressed multiple goals were preferred.

- Availability of data – some indicators for which historical and/or comparison data were not available were included, in order to establish a baseline measurement. These were included with the understanding that trends could be established with future updating. If no data source could be identified in order to provide a current measurement, the indicator was not included in the final framework. Indicators identified as potentially important for sustainability assessment but for which there was no data currently available are included in the Appendix should the data become easily available at a future date.

- Ease of gathering data – while some indicators involved multiple steps to obtain a final metric, in general, indicators that involved fewer steps to process, or relied on data from a single source, were preferred. This will ensure that the indicator is likely to be updated in the future.

- Usefulness – the researchers asked, simply, is this something that a consortium member or community decision-maker would find useful in the decision making process? Stakeholder input was used to validate the concept of indicator "usefulness."

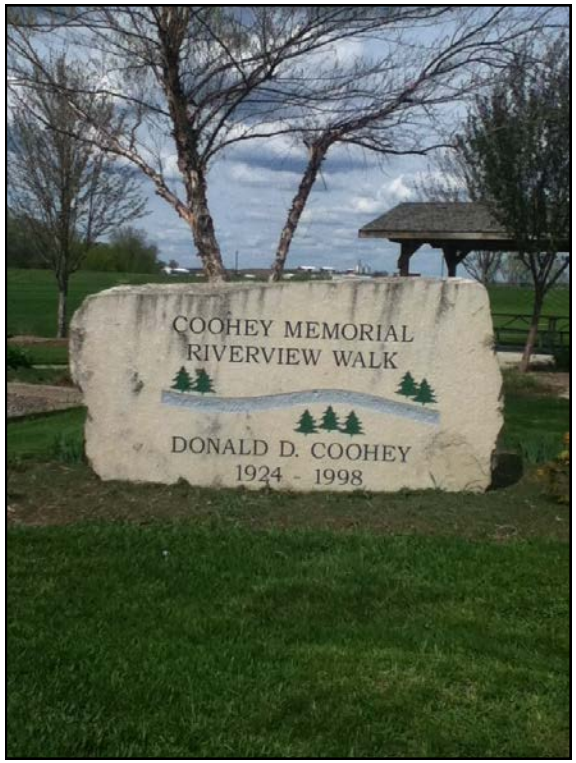
Stakeholder input

The goals and objectives in the Dubuque Regional Smart Plan were outlined with stakeholder input in a series of public meetings conducted by the Dubuque Smart Planning Consortium.

A public presentation and feedback meeting was held March 26, 2013, from 4 to 7 p.m., at the headquarters of ECIA. Approximately 63 members of the public attended the meeting.

The meeting was publicized to two email lists (Dubuque Smart Planning Consortium members and interested parties, and Sustainable Dubuque mailing lists), in three newspapers (Cascade Pioneer [weekly newspaper with a circulation of 1,820], Dubuque Telegraph Herald [daily circulation of 24,459], and Dyersville Commercial [weekly circulation of 3,982]), two radio stations (WDTH/KATF, WDBQ/KLYV), and the Mediacom Cable events listing. Even with conservative assumptions, the information reached approximately 25,000 people.

Upon entering, attendees were offered nametags and a chance to sign up for future emails from the Consortium. (These emails were submitted



separately from this final report for the sake of the attendees privacy.) Those in attendance were also asked to place a pin on a map of the county, although only a few did. The pins that were placed did indicate that people came from all parts of the county to comment on the project and the Smart Plan. Finally, attendees were shown a short video to explain how the project and the Smart Plan were connected.

The researchers prepared 9 posters, each of which represented one or two chapters of the Smart Plan/final report. Each poster listed the indicators in that chapter and a "spotlight indicator." This spotlight indicator had further explanation of the indicator and a visual representation of data. Each poster was accompanied by a blank white poster board and a few markers. The hope was that the attendees would leave comments, feedback, or ideas about how they or their community leaders could make progress toward meeting these goals. A full list of these comments (transcribed from the posters) can be found in Appendix C.

A master list of indicators was drawn up on a poster. Attendees were given 3 colored stickers and asked to rank the indicators as their first, second, or third priority. Participation in this activity was not high – only about 18 people engaged and placed stickers, and some may not have placed all 3 stickers. There were 18 blue stickers (first priority), 17 yellow stickers (second priority) and 13 green stickers (third priority).

The researchers wore matching t-shirts and walked around the room talking to those in attendance. There was some confusion by a portion of the attendees as to the purpose and scope of the project. This was partially due to the fact that they were not aware that the Dubuque County Smart Plan had been created or what its purpose was. Several people voiced concerns regarding how the project would affect their property rights and whether it was related to the United Nations' Agenda 21. In these cases, the researchers worked to clarify the relationship between the Smart Plan and indicators report as well as their purpose and (lack of) legal capacity. In some instances the researchers introduced attendees to relevant consortium officials who could better explain how the indicators project

and Smart Plan might affect their community or land.

It is important to note that the sample of people who attended the meeting was not representative of the entire County. Many of the attendees were public officials or had been involved with the Smart Plan in some way, while others were there out of concern for their property rights and/or increased government regulation. The smallest subsection of attendees was members of the public who were generally interested in sustainability and curious about the projects' findings.

Data

Data was collected from a variety of sources, both on and offline. When data is based on sampling or an average, this is noted. Data sources are cited in the report, and a full list of data sources can be found in the Appendix.

When available and appropriate, historical data has been provided so that leaders and decision-makers can have an idea of where the county had been and where it needs to go. In some cases, measuring indicators required the gathering of new data or taking new measurements. In these instances, the baseline data has been provided, and members of the Consortium will update them as necessary to begin understanding if and how progress is being made.

There was discussion of identifying comparison regions, similar to what was included in the 2011-2012 Sustainable Dubuque project. The researchers working on this project elected not to include comparison regions as the county should strive to be the best it can be in terms of progress towards sustainability and work against its own benchmarks rather than those benchmarks set by another city or county.

Selecting comparison counties

Three comparison counties were selected to provide insight into how Dubuque County compares to its peers. Without some context, the numeric values in the indicators may lack meaning to a reader. For most of the indicators, data was compared to Eau Claire County, WI; La Crosse County, WI; and Woodbury County, IA. However, due to data limitations and incompatibility across county jurisdictions, some indicators do not include all three comparison counties. When data simply could not be compared to the selected counties, national and/or statewide standards were included to help show how Dubuque County is performing in certain sustainability aspects. National or state averages were also included when it was felt they provided additional context.

The comparison counties were chosen based on comparable population size (ranging from 90,000 to 115,000) and the existence of a notable urban-to-rural gradient within the county. Selected counties are also similar to Dubuque County in the fact that their largest city is situated alongside a major river.

How to use this report

Each chapter in the indicator framework addresses the goals and objectives of a chapter of the Smart Plan. Each chapter provides an introduction to the topic at hand, followed by a series of indicators.

- *Why Is This Important?* This explains why the indicator was chosen and how it provides a measure of progress toward the goal or goals of the chapter.
- *How Are We Doing?* This explains the data and (in some cases) how the data has changed over time.
- *Summary* – This is a quick snapshot of the indicator and where the county stands.
- *Graph* – When possible, a graphic representation of the data has been provided.

Indicator summary—at a glance

This table shows all the indicators, organized by chapter, as well as the figure for the most recent year, the trend since the base year, the status, and the trend totals. "Status" indicates whether or not the quantified trend should be interpreted as progress toward the Smart Plan goals. It was hoped that an overall conclusion about trends by chapter could be determined, but as the table shows, the indicators vary widely.

CHAPTER	INDICATOR	FIGURE FOR MOST RECENT YEAR	TREND SINCE BASE YEAR	STATUS	COLOR CODE	TREND TOTALS	
Agriculture & Natural Resources	Acres of Farmland	310,817 acres	Decreasing	Worsening			
	Agricultural Land Value	$8,584	Increasing	Improving			
	Acres of Organic Farmland	2,416 acres	Baseline	Neutral		Worse	2
	Use of Farming Conservation Practices	47% of farms	Baseline	Neutral		Neutral	2
	Air Quality Index	80% "Good" Days	Increasing	Improving		Inconclusive	2
	Amount of Land in Conservation Easements	16,663 acres enrolled	Decreasing	Worsening		Improving	3
	Renewable Energy & Efficiency	20,283kWh/yr (residential)	Fluctuating	Inconclusive			
		1,587,125 (commercial/industrial)	Fluctuating	Inconclusive			
	Adopted River Miles	16 out of 34 miles adopted	Increasing	Improving			
Watershed	Miles of Impaired Water Bodies	28% of all streams and rivers assessed, 74% of assessed waters are polluted	Baseline	Neutral			
	Soil Loss	2.67 ton/acre	Decreasing	Improving		Neutral	2
	Soil Runoff	4.19 in/yr	Decreasing	Improving		Improving	2
	Impervious Surface Area	8 out of 17 drainage basins above 10% threshold	Baseline	Neutral			
Economic Development	Unemployment Rate	5.50%	Decreasing	Improving			
	Poverty Rate	9.50%	Baseline	Neutral		Worse	0
	Economic Sector Diversity	0.91 (scale of 0-1)	Increasing	Improving		Neutral	1
	Net Employment Inflow	6,196 commuters	Increasing	Improving		Improving	4
	Ratio of Primary Jobs to Total Population	Varied by city	Increasing (except for Dyersville & Farley)	Inconclusive		Inconclusive	1
	Annual Tourism Revenue	$4.02 million	Increasing	Improving			

Transportation	Time Spent on Daily Commute to Work	17.4 minutes	Increasing	Worsening	🔴		
	Vehicle Miles Traveled Per Capita	7,670 miles	Decreasing	Improving	🟢		
	Crash Fatality Rate	7.46 per 100,000 residents	Stabiliizing	Inconclusive	⚫		
	Alcohol-Impaired Crash Fatality Rate	2.13 per 100,000 residents	Fluctuating	Inconclusive	⚫		
	Crash Rate	19.4 per 1,000	Fluctuating	Inconclusive	⚫		
	Injury Rate	5.9 per 1,000	Fluctuating	Inconclusive	⚫	Worse	4
	Percent of Workers Driving Alone	83%	Increasing	Worsening	🔴	Neutral	2
	Percent of Workers Sharing Cars	7%	Decreasing	Worsening	🔴	Improving	2
	Walk Score	Dubuque, Dyersville, Abury = 52	Baseline	Neutral	🟡	Inconclusive	**4**
	Access to Bike and Hiking Trails	0.156 miles/per 1,000 residents	Baseline	Neutral	🟡		
	Transit Ridership	5988 per / 1,000 residents	Increasing	Improving	🟢		
	Percent of Workers Using Public Transit	0.9%	Increasing	Worsening	🔴		
Land Use	Job-Housing Balance	Varied by zip code	Baseline	Neutral	🟡		
	Number of Single-Unit Detached Structures	5.36%	Increasing	Worsening	🔴	Worse	**1**
	Street Density	Varied by city	Baseline	Neutral	🟡	Neutral	4
	Link-Node Ratio	Varied by city	Baseline	Neutral	🟡	Improving	0
	Per Capita Land Consumption	615.14 sq meters/person	Baseline	Neutral	🟡	Inconclusive	1
	New Building Starts	Decreasing overall, Increasing proportion occuring in unincorporated areas	Decreasing	Inconclusive	⚫		
Housing	Number of New Residential Buildings Meeting Energy Star Standards	129 homes	Increasing	Improving	🟢	Worse	**1**
	Vacancy Rate	Varied by census blocks groups	Baseline	Neutral	🟡	Neutral	1
	Utilization of Housing Rehab Programs and Energy Audits	Varied by census block groups	Unknown	Inconclusive	⚫	Imrproving	1
	Proportion of Homeowners and Renters That Are Housing Burdened	Varied by census block groups	Fluctuating	Worsening	🔴	Inconclusive	1
Community Facilities	Violent Crime Rate	155 per 100,000	Decreasing	Improving	🟢	Worse	1
	Adult Obesity Rate	27%	Fluctuating	Inconclusive	⚫	Neutral	2
	Uninsured Residents	6.8%	Increasing	Worsening	🔴	Improving	1
	Access to Parks	Varied by city	Baseline	Neutral	🟡	Inconclusive	1
	Educational Attainment	90.5% (2007-2011 Average)	Baseline	Neutral	🟡		
Hazard Mitigation	Number of Communities Enrolled in the National Flood Insurance Program	All except 1	Baseline	Neutral	🟡	Worse	0
	Degree of Hazard Planning Incorporated into Local Ordinances and Comprehensive Plans	Varied by city	Baseline	Neutral	🟡	Neutral	3
	Number of Communities with Storm Warning Systems	All except 2	Baseline	Neutral	🟡	Improving	0
Intergovernmental Collaboration	28E Agreements	5	Fluctuating	Inconclusive	⚫	Inconclusive	1

Demographics

Dubuque County and its communities

What follows is a short summary of notable data. Unless otherwise noted, the information is from the 2010 U.S. Census. Dubuque County is located in Northeast Iowa (Figure 1). Situated on the Mississippi River near the intersection of the Iowa, Illinois, and Wisconsin state borders, Dubuque County has a land area of approximately 608 mi^2 square miles (U.S. Census). The City of Dubuque is the county seat and Iowa's oldest city, chartered in 1837. Dubuque is the eighth largest city in the State of Iowa, with a 2010 population of nearly 58,000 people (U.S. Census, 2010). The population of Dubuque County in 2010 was 93,653. The county is 94% white, although individual cities vary, and the population has been growing steadily since the 1980s (See Appendix A).

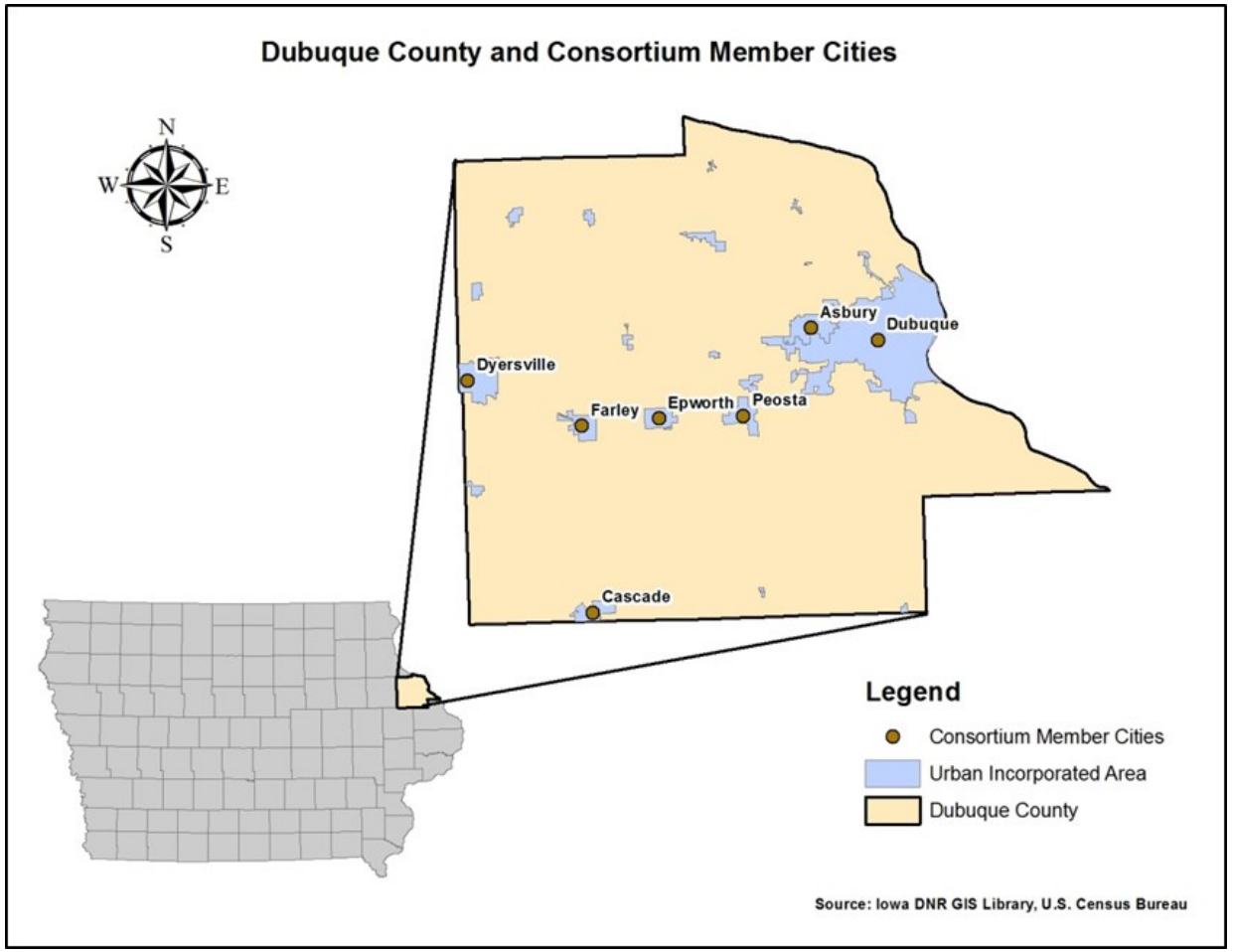


Figure 1—Dubuque County

Dubuque developed as an industrial and port city specializing in the manufacturing and transport of agricultural products, and consequently, the city and surrounding areas within the county experienced economic decline as a result of the agricultural crisis that impacted the U.S. during the mid-twentieth century.

The unique landscape of eastern Dubuque

County is characterized by steep cliffs, ravines, and caves, which are attributed to its location within the Driftless Area of the Upper Mississippi Region. This area escaped glaciation during the most recent glacial period. To the west, Dubuque County is predominantly rolling farmland more than 310,000 acres of land (79 percent of the county surface area) in agricultural use (ISU Extension, 2009).

Dubuque County demographics

The county experienced a small change in population between 2000 and 2010. The City of Dubuque lost a small portion of its population, but the two communities that are on the immediate outskirts of Dubuque had tremendous gains. The City of Peosta had a 52.7% increase in population and the City of Asbury had a 41.2% population increase. The City of Epworth came in third with a gain of 23.2%. Incidentally, Peosta and Asbury, the cities with the greatest population growth during this period, had the highest median incomes of any community in Dubuque County (see Figure 2).

For the last century, the population of Dubuque County has grown slowly but steadily, with the exception of a small decline during the 1980s – see Figure 3. This population decrease can be attributed to the economic turmoil of the 1980s, although this did not happen during the latter part of the 2010s. Dubuque County's population is projected to reach 122,000 by 2040 (Dubuque County Smart Plan).

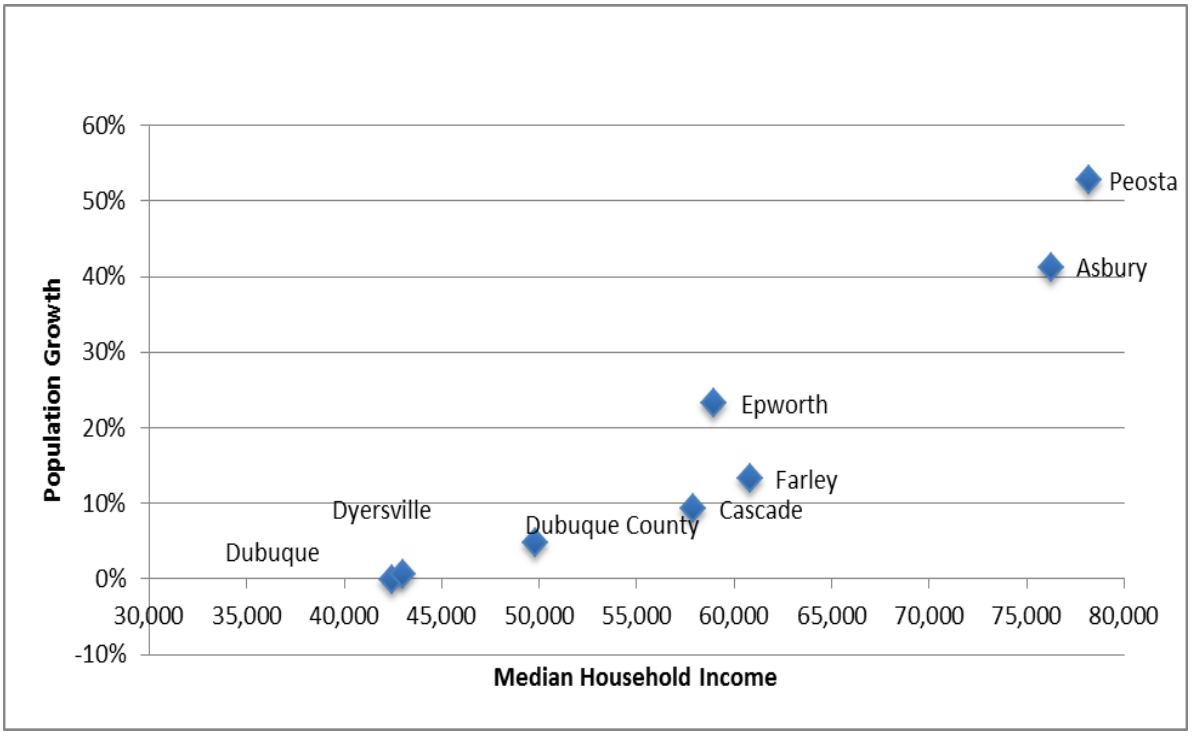


Figure 2: Median Household Income (2010) and Population Growth (2000-2010). Source: U.S. Census.

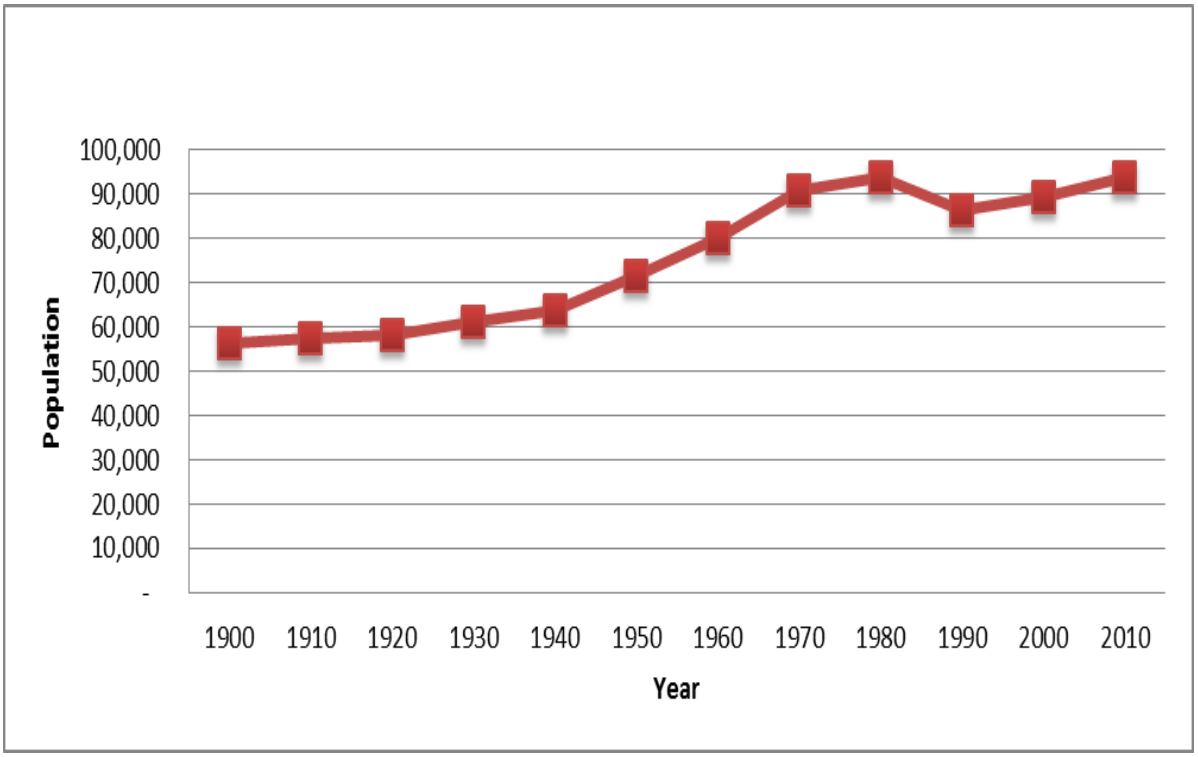


Figure 3: Population of Dubuque County. Source: U.S. Census.

Agriculture and Natural Resources

Agriculture is an important element of Dubuque County's regional economy. It employs thousands of workers, produces millions of dollars in commodity sales, and its effects ripple through the rest of the region. According to the most recent estimate, farmland accounts for 79% of all land in the county (ISU Extension, 2009). Both the economy and population of Dubuque County are expected to grow steadily in the coming decades. As a result, the loss of productive agricultural land to development is a growing concern. It is also important for the citizens of the county to be conscious of environmental impacts that can accompany growth and development. The sustainability of Dubuque County's agricultural and natural resources requires the preservation of agricultural land coupled with conservation practices that protect environmental quality.

The Smart Plan's goals for this chapter focus mainly on the preservation of agricultural land, the use of conservation practices on that land, and environmentally conscious behavior and resource use in the daily lives of citizens. It is important to note that these goals closely relate to other chapters of the Smart Plan, especially Transportation, Land Use, and Watershed. For instance, an efficient, multi-modal transportation system can have significant impacts on the use of natural resources as well as air and water quality. The Land Use chapter's emphasis on orderly development is synonymous with the protection of agriculture from the impacts of non-farm rural development. The use of conservation practices in agriculture is crucial to the health of the watershed. After evaluating the following goals and obtaining the best available data within this report's selection criteria, eight indicators were developed for the measurement of the sustainability goals of the Agriculture and Natural Resources chapter.

The Smart Plan's goals for the Agriculture and Natural Resources chapter are:

1. To encourage the creation of a sustainable environment that successfully balances urban growth and development with ecological constraints.
2. To promote the protection, preservation, and enhancement of the region's bluffs, prairies, wetlands, waterways, scenic views, vegetation, wildlife, and all natural areas.
3. To recognize agricultural land outside the urban fringe areas as an important natural resource of the region, and to preserve agricultural soils that have historically exhibited high crop yields and are considered most suitable for agricultural production.
4. Encourage farming techniques and soil conservation practices that will protect and conserve top soil and prevent degradation of water resources.
5. To minimize the conflicts between agriculture and non-farm rural development.
6. To promote conservation practices that result in responsible use of non-renewable natural resources.

7. To educate citizens about environmental issues affecting their lives and their community.

8. To protect and preserve existing water and air quality and ensure that future water and air quality is safeguarded.

9. To assure appropriate control, collection, disposal, and per capita reduction of stormwater, wastewater, solid wastes, and household hazardous wastes.

10. To promote residential and business programs that reduce, reuse, recycle, and safely dispose of the community's discard stream.

11. To promote community clean-up and beautification efforts through public and private partnerships.

12. To meet or exceed all federal, state, and local regulations for environmental quality.

Acres of farmland

Scope – County

Status – Decreasing

Goals – This indicator addresses goals 3 and 5

Why is this important?

Agriculture is a large component of Dubuque County's economy. The number of acres used as farmland signifies if and how quickly agricultural land is being converted to development. Allowing non-farm development outside of urban areas can disrupt the land's natural character, contribute to sprawl, and create conflicts between farm and non-farm uses.

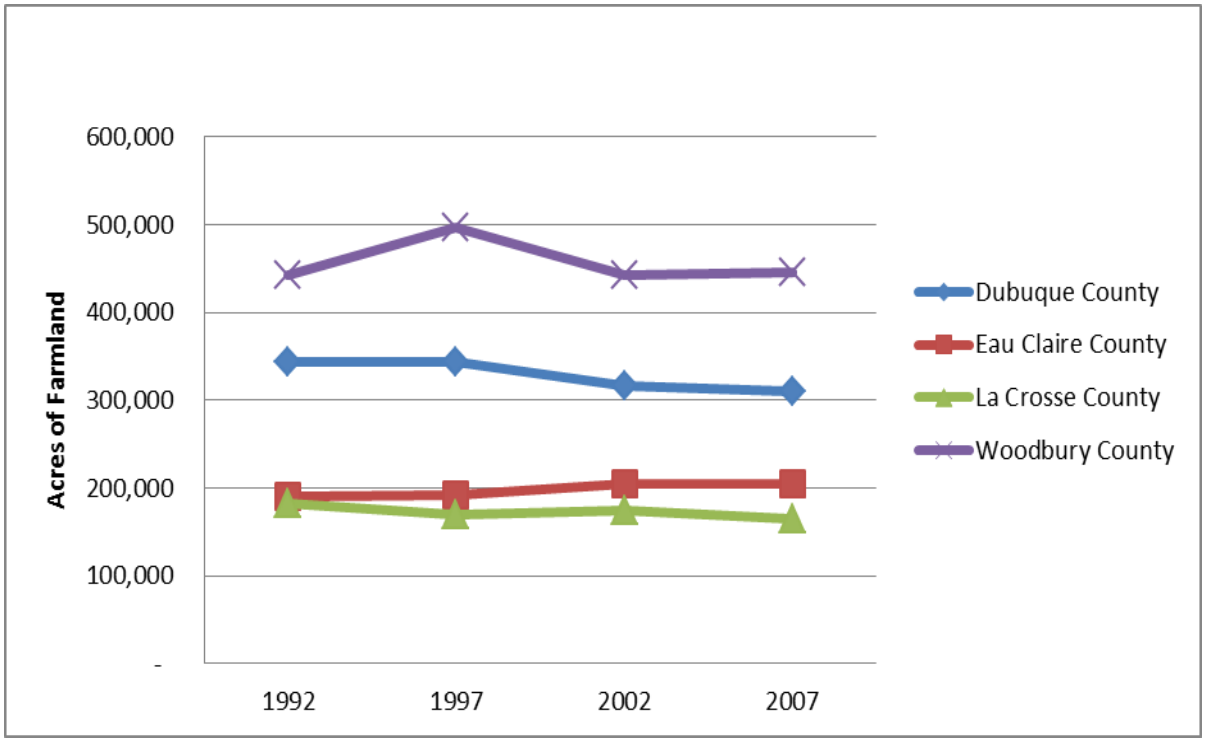


Figure 4: Acres of farmland in Dubuque and Woodbury County. Source: U.S. Census of Agriculture

How are we doing?

Dubuque County has experienced a decrease in farming over the last decade, seen in both the number of farms and acres of farmland. Between 1992 and 2007, the county lost 33,053 acres of farmland, accounting for a 9.6% total decrease (See Figure 4 and box below). During that same period of time, Woodbury County experienced a 0.75% increase, La Crosse County saw a 9.3% decrease, Eau Claire County had an 8.1% increase, and Iowa as a whole lost 1.9% of its farmland.

The Census of Agriculture's definition of acres designated as ''land in farms'' consists of agricultural land used for crops, pasture, or grazing. It also includes woodland and wasteland not actually under cultivation or used for pasture or grazing, provided it was part of the farm operator's total oper-

ation. This number also includes land enrolled in the Conservation Reserve Program (CRP) and similar programs.

By the numbers – change in acres of farmland, 1992 - 2007

Dubuque County, IA: - 9.6%
Woodbury County, IA: 0.7%
State of Iowa: - 1.9%
La Crosse County, WI: -9.3%
Eau Claire County, WI: 8.1%

Summary

Dubuque County has lost 9.6% of its farmland since 1992. This rate of loss is faster than that experienced by the three comparison counties and the state as a whole. Farming is an important component of the regional economy, and Dubuque County possesses a large amount of productive farmland that should be preserved for agricultural use in order to meet the goals in the Smart Plan.

Agricultural Land Value – Estimated market value of land and buildings

Scope – County

Status – Increasing

Goals – This indicator addresses goals 3 and 5

Why is this important?

Dubuque County's agricultural land has steadily risen in value over the last two decades. There are many factors that influence the agricultural real estate market – these include commodity prices, interest rates, availability of credit, and availability of land (Iowa State University Extension and Outreach, 2013). The market value of agricultural land is therefore partially a reflection of the prices of commodities grown on that land.

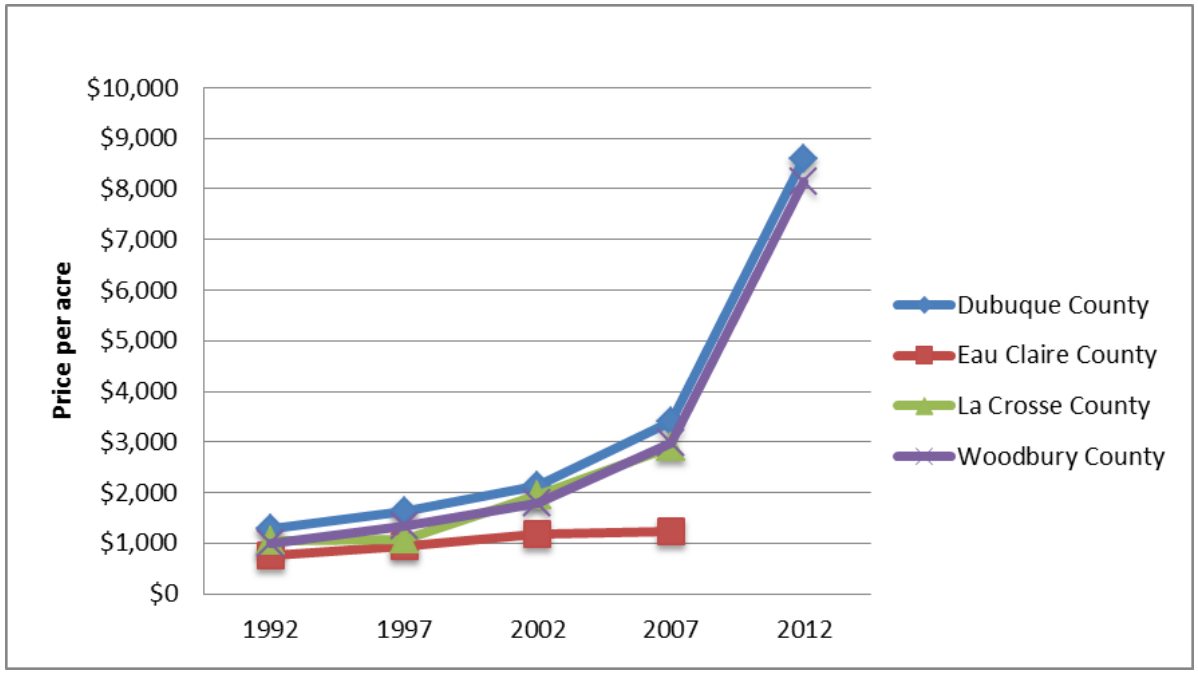


Figure 5: Market value of farmland in Dubuque County and Iowa. Source: U.S. Census of Agriculture

The 2012 Farmland Value Survey by Iowa State University Extension and Outreach found that 80 percent of respondents mentioned high commodity prices as a positive factor in the agricultural real estate market. Many respondents to the survey listed land values as a negative factor; there is concern that agricultural land might face a similar situation as the bursting of the speculative bubble in the housing market in 2008.

Ethanol subsidies are partially responsible for the boom in corn prices over the past several years. However, some of these subsidies, such as the 46 cent per gallon blender's credit, expired at the end of 2011. The blender's credit, officially known as the Volumetric Ethanol Excise Tax Credit, was created in 2004 to provide refiners with an economic incentive to blend ethanol with gasoline (U.S. Department of

Energy). The elimination of ethanol subsidies could potentially cause a decrease in the price of corn. If the price of land decreases as a result, there will be less of an incentive for farmers to retain their land for agricultural purposes and an increased likelihood that it will be sold for development. Researchers at Iowa State University predicted a modest decrease of between 8% and 10% after the expiration of the blender's credit (NPR, 2012). The U.S. maintains a mandate that requires gasoline producers to blend 15 billion gallons of ethanol into the nation's gasoline supply by 2015. There is a growing movement, particularly from the livestock industry, for the government to repeal the mandate with the expectation that it will lower the price of corn (Bloomberg, 2013).

The 2012 Farmland Value Survey found weather to be a negative factor in the market for agricultural land. However, farmland prices in the U.S. stayed strong throughout the drought of 2012, with values hitting record highs in many areas. The Federal Reserve Bank of Chicago reported that Midwest crop land values increased an average of 13% from the same quarter in the previous year (Reuters, 2012). This indicator helps measure the county's progress toward preserving agricultural soils and minimizing conflict between agriculture and development.

How are we doing?

The estimated market value of agricultural land in Dubuque County more than doubled between the 1992 and 2007 Censuses of Agriculture. The average cost per acre jumped from $1,290 in 1992 to $3,395 in 2007, an increase of 163% (Figure 5. Dubuque's land value stayed within $100 dollars of the state average over this period of time. Using data from the Census of Agriculture and the November 2012 Iowa Land Value Survey, Iowa State University Extension and Outreach estimates the current value of Dubuque's farmland at $8,584 per acre and the current state average at $8,296 (2012 values provided by ISU Extension and Outreach; all other values are directly from the Census of Agriculture). This is approximately two and a half times greater than the value from the 2007 Census of Agriculture for the county and the state. The price of agricultural land in Dubuque County has been consistently higher than that in the three comparison counties since 1992.

Summary

The price of agricultural land, along with commodity prices, has increased substantially over the last two decades. Land values continued to grow even during the Midwestern drought of 2012. However, the recent removal of the ethanol blender's credit, the removal of ethanol mandates, or the bursting of a speculative land bubble could potentially cause a decline in agricultural land values in the near future, which would increase the likelihood of farmland being converted to development. Dubuque County can discourage conversion of agricultural land to non-farm uses through strict zoning and development regulations.

Organic Farming – Acres of organic farmland

Scope – County

Status – Baseline

Goals – This indicator addresses goals 3 and 4

Why is this important?

"*Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony*" - USDA National Organic Standards Board, 2007.

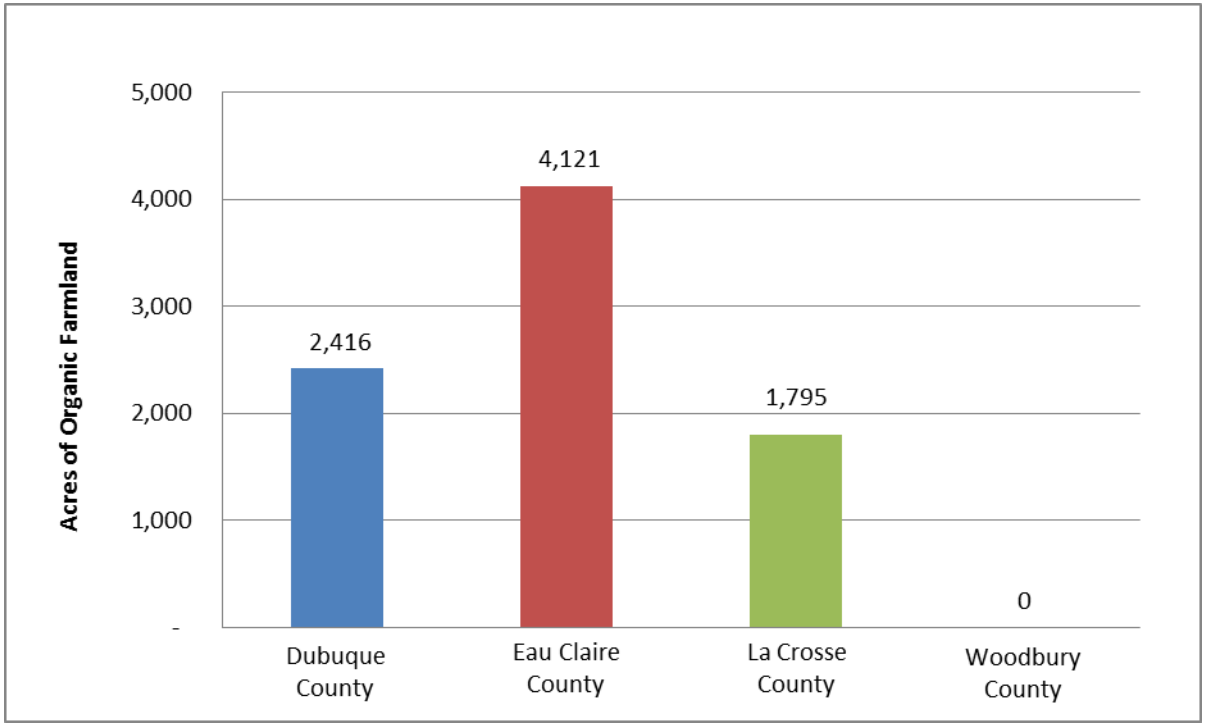


Figure 6: Acres of organic farmland. Source: U.S. Census of Agriculture

The expansion of organic agriculture is important to Dubuque County's goal of diversifying its farm economy and protecting soil, air, and water quality. Organically certified farms are required to use an array of environmentally friendly practices such as crop rotations, cover crops, organic fertilizers, and minimum tillage. Additionally, organic farmers are prohibited from using synthetic fertilizers and pesticides as well as genetically modified organisms (GMOs). Other benefits of organic farming include a greater diversity of cultivated species, enhanced water infiltration, and decreased use of fossil fuels (Food and Agriculture Organization of the United Nations, 2012).

How are we doing?

In the 2007 Census of Agriculture, Dubuque County had 2,416 acres of organic production on 21 farms. Although this accounts for less than 1% of all farmland in the county, this number is still significant. This value represents the sixth highest number of acres for all Iowa counties, behind

Winneshiek, Carroll, Johnson, Allamakee, and Washington. As shown in Figure 6, Eau Claire had the highest amount of organic farmland among the comparison counties. The number of organic farms and acres was classified differently in the Census of Agriculture prior to 2007. The 2002 Census reported 6 farms with organically certified production on an undisclosed number of acres; no information was available prior to 2002. No direct comparison should be made between the 2007 Census and previous years due to changes in the report form.

As a follow-up to the 2007 Census, the Organic Production Survey (OPS) was completed for the first time in 2008 by the USDA and National Agricultural Statistics Service (NASS). This was the first nationwide survey of organic production. Unfortunately, the OPS does not measure county-level production. The 2008 Organic Production Survey found that Iowa had 518 certified organic farms. Ranking 9th in the country, the state accounted for 2.3% of the country's total organic sales. Iowa climbed to fifth in the 2011 Organic Production Survey, but the number of farms dropped to 467.

The Census of Agriculture report form was changed in 2007 to include "acres used for organic production" rather than the previous classification of "land used to raise certified organically produced crops." The 2007 Census reported farms that followed National Organic Production (NOP) practices but were not necessarily USDA certified; 2002 Census data pertained to certified farms. No information on organics was available for Dubuque County prior to 2002. Iowa's response rate was 78% for the 2008 Organic Production Survey and 86% for the 2007 Census of Agriculture. Therefore, the data reported includes a degree of error.

Summary

Dubuque County had a relatively large amount of organic farmland compared to other Iowa counties in the 2007 Census of Agriculture with 2,416 acres and 21 farms. Organic farming requires a wide array of environmentally beneficial practices; the county should encourage expansion of organic farming to increase sustainability within its agricultural sector.

Use of Farming Conservation Practices – Number of farms using conservation methods

Scope – County

Status – Baseline

Goals – This indicator addresses goal 8

Why is this important?

The use of conservation practices in agriculture is important to the quality of Dubuque County's soil and water. This indicator measures the number of farms that reported using methods such as no-till or limited tilling, filtering runoff to remove chemicals, fencing animals from streams, and other practices. These practices increase the overall health of the watershed by decreasing the amount of sediment and other pollutants entering streams.

How are we doing?

In the 2007 Census of Agriculture, 690 farms reported using conservation methods (see Figure 7).

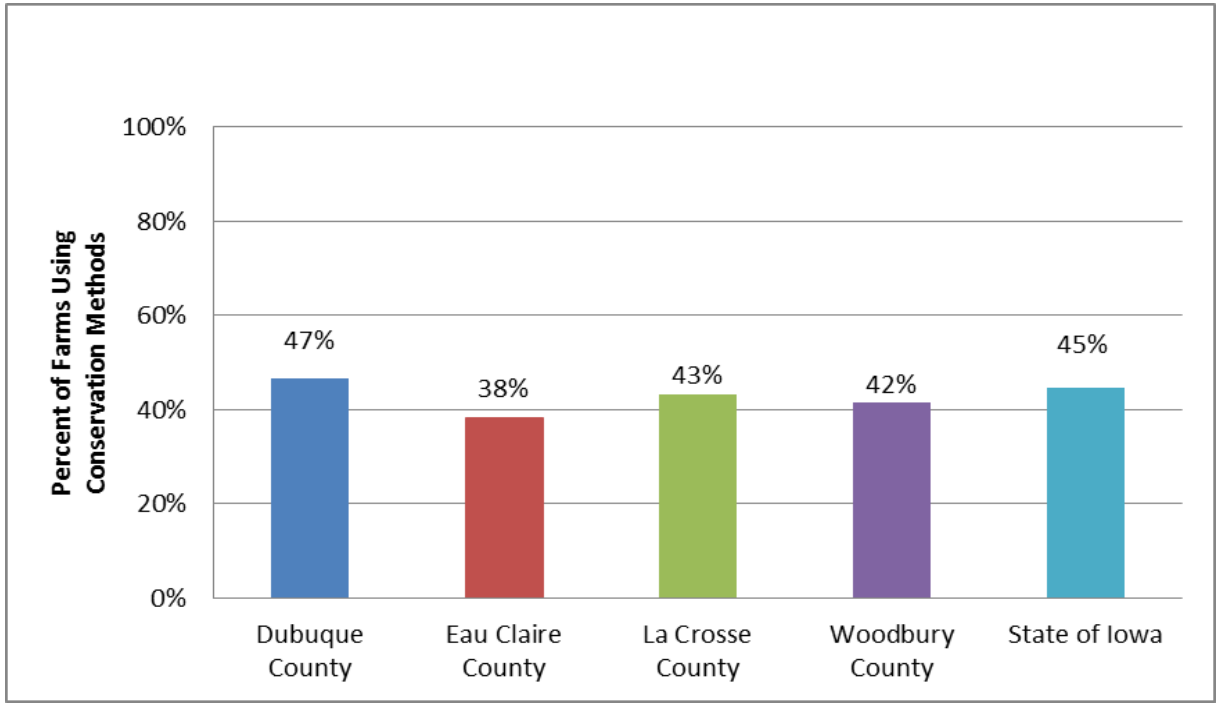


Figure 7: Percent of farms using conservation methods. Source: U.S. Census of Agriculture

This accounts for 47% of the county's total farms. This is a higher percentage than the comparison counties as well as Iowa as a whole. The 2007 Census was the first time this data was collected; it therefore establishes a baseline that can be compared with future data.

The wording in the census response form was somewhat vague with room for interpretation. The question was phrased as "At any time during 2007, did this operation use conservation methods such as no-till or limited tilling, filtering runoff to remove chemicals, fencing animals from streams, etc."

(This reporting language can be found in Appendix B of the Census.) How many methods were utilized and the extent of use was not reported. Despite data limitations, this indicator was included due to the high importance placed on conservation practices in the Smart Plan's goals.

Summary

The 2007 Census of Agriculture was the first time farmers were asked to report the use of conservation methods. Agricultural conservation practices reduce the amount of sediment and other pollution entering streams. In Dubuque County, 47% of farms used at least one type of conservation method.

EPA Air Quality Index – Percent of monitored days with "Good" air quality

Scope – County

Status – Increasing

Goals – This indicator addresses goal 8

Why is this important?

The Environmental Protection Agency's Air Quality Index (AQI) is an indicator of overall air quality for a geographic area. Good air quality is important to the region's health and symptomatic of the presence or absence of polluting industries and practices in the region.

How are we doing?

The nearest monitoring station for Dubuque County is located approximately 13 miles away in Potosi, Wisconsin. This station takes measurements approximately 120 days out of the year. The AQI uses 6 levels of health concern to classify a region's air quality (see Figure 8). As shown by Figure 9, air quality in the Dubuque region was considered "Good" on the majority of these days and "Moderate" on nearly the rest. However, the AQI fell in the "Unhealthy for Sensitive Groups" category for one day in 2007, 2009, and 2010 and two days in 2008. Air quality did not fall below "Moderate" in 2011 or any monitored days in 2012 so far, which indicates a slight improvement from previous years. Particulate matter 2.5 (PM 2.5) was the main pollutant for all measured days; attempts to increase air quality should therefore be focused on reducing this pollutant. PM 2.5 refers to particles less than 2.5 micrometers in diameter that may be found in the air in the form of dust, dirt, soot, smoke, and liquid droplets (EPA, 2012).

AQI Values	Level of Health Concern	Color
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Figure 8: AQI Classifications. Source: EPA.

The region's air quality has been hovering near PM 2.5 nonattainment levels for several years. The current threshold is 35 micrograms per cubic liter of air, averaged over three years. Data from the Iowa and Wisconsin Departments of Natural Resources show that the three-year average from 2007-2009 was right at 35 and decreased slightly to 33 for the 2008-2010 average. The most recent three-year average, 2009-2011, reported levels at 29 micrograms per cubic liter (Dubuque Regional Smart Planning Consortium, 2012). A privately funded study by the Greater Dubuque Development Corporation found that the prevailing winds come from the south; therefore air pollution may be out of the region's control to a certain extent. However, local leaders should be conscious of the

situation and attempt to identify and reduce local sources of PM 2.5.

If the region exceeds PM 2.5 thresholds to the point where the EPA deems it a nonattainment area, the state and local governments would have to develop an implementation plan outlining how the area will reduce pollutant emissions contributing to PM 2.5 concentrations (EPA, 2012). The Clean Air Act requires implementation plans to impose emission controls that are economically and technologically feasible. Plans may also include proposed actions such as increased use of carpooling and public transportation, vehicle inspection programs, and stricter permitting requirements for polluting facilities. Nonattainment areas that fail to meet their implementation plans face varying penalties, such as loss of federal highway funds or federal intervention in permitting decisions (EPA, 2010).

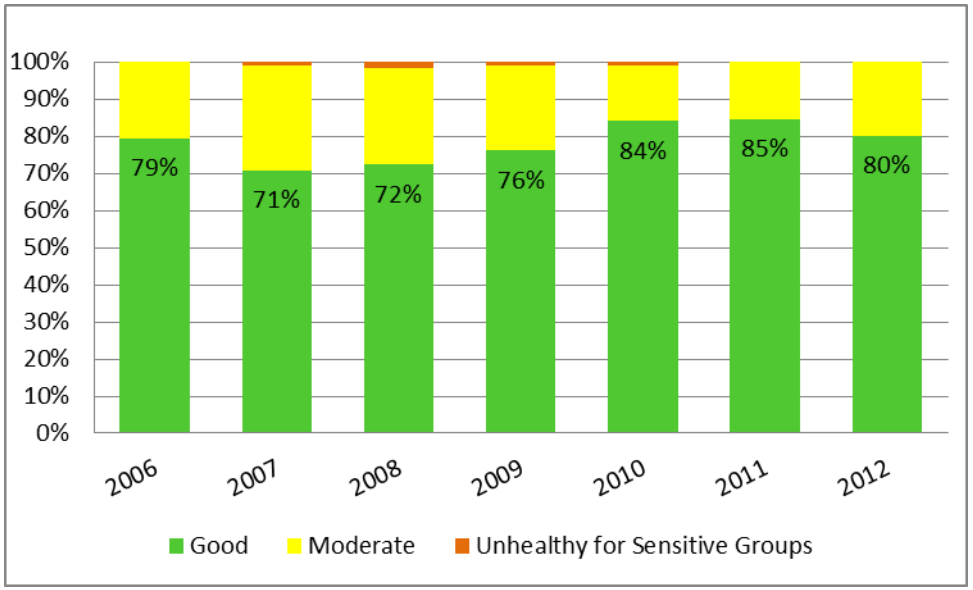


Figure 9: AQI Measurements for Dubuque County. Source: EPA

La Crosse County, WI and Woodbury County, IA had similar AQI measurements between 2006 and 2012. The majority of the days were "Good", but both counties had 1 or 2 "Unhealthy for Sensitive Groups" days per year from 2006 to 2010. The AQI did not fall below "Moderate" in either county in 2011 or 2012. No measurement was available for Eau Claire County, WI.

Summary

The Dubuque County region's air quality has been "Good" on the majority of monitored days since 2006, but its occasional reading in the "Unhealthy for Sensitive Groups" category and high PM 2.5 level is cause for concern. PM 2.5 is the main pollutant in the region; therefore any improvement in air quality should be aimed at its reduction. The nearest monitoring station is 13 miles away; a closer monitoring station would be useful in providing more detailed and accurate data for Dubuque County.

Amount of Land in Conservation Easements – Annual acres enrolled in USDA Conservation Reserve Program

Scope – County

Status – Decreasing

Goals – This indicator addresses goal 2

Why is this important?

Conservation practices and environmentally conscious behavior are essential to the success of the sustainability of Dubuque County. Conservation easements are negotiated and legally binding agreements between individuals who own property and a second-party organization. Conservation easements provide the benefits of protecting open spaces, conserving biological diversity, and preventing urban sprawl (Farmer et al., 2011).

The goals based on the Agriculture and Natural Resources chapter seek to establish directives that allow for land use controls so that negative human impact on the environment can be mitigated. The measurement of total annual acres of land designated for conservation easements can show if Dubuque County is moving toward its second goal in the Watershed chapter. This goal promotes the protection, preservation, and enhancement of natural areas.

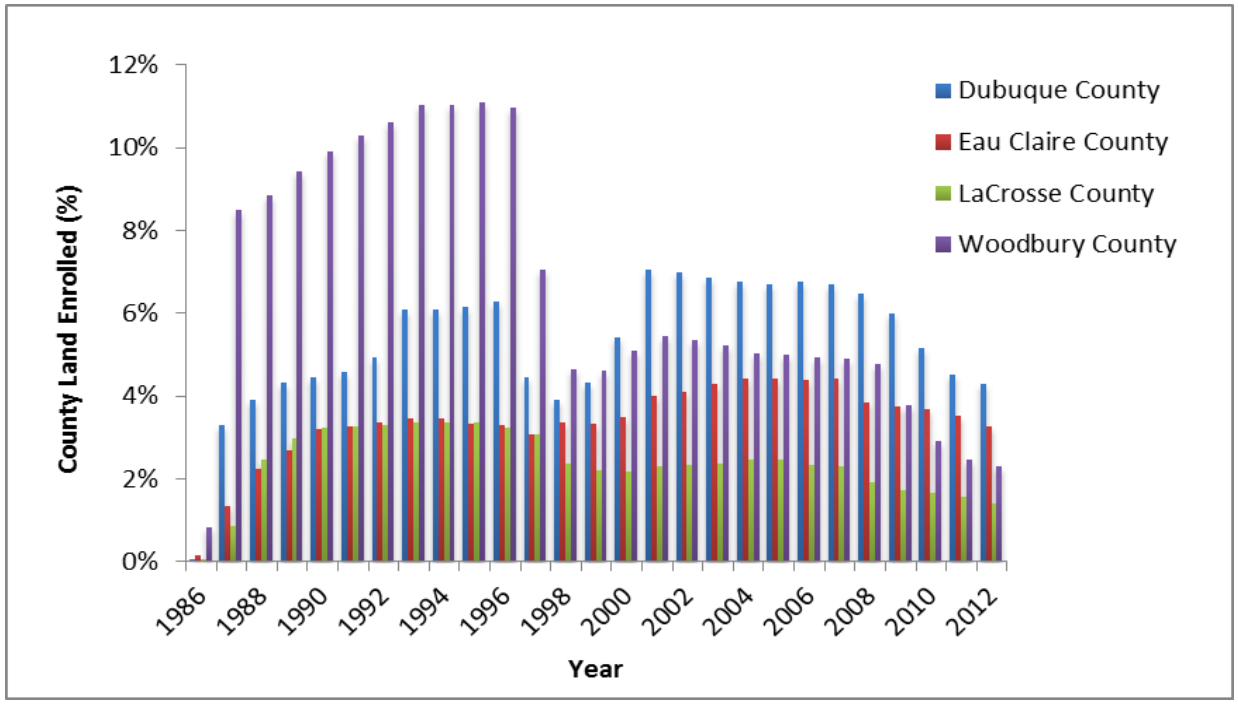


Figure 10: County comparison of annual acres enrolled in Conservation Reserve Program (1986-2012). Source: United Stated Department of Agriculture

This indicator measures the amount of acreage of Dubuque County agricultural land enrolled in the United States Department of Agriculture's (USDA) Conservation Reserve Program (CRP). The CRP is a

voluntary program between land owners and the United States government to pay rent to land owners who enroll acres of agricultural land into a conservation easement for 10 years (USDA, 2012). Data is provided to compare Dubuque County to other similar counties.

How are we doing?

According to the Dubuque County Conservation Department, there are 2 permanent agricultural easements of 400 acres. Since 2001 (see Figure 10), the amount of Dubuque County farmland enrolled in the CRP decreased by about 3% (10,765 acres). This decrease may be the result of increasing corn and soybean profits outweighing rent paid by the U.S. government to keep the land enrolled into a conservation easement. This reduces the incentive of conservation for farmers. When compared to other counties, Dubuque County currently has a higher percentage of acres enrolled than Eau Claire County, La Crosse County, and Woodbury County since the year 2000. However, prior to the year 2000, Woodbury County had substantially higher percentages of acres enrolled than all counties.

Summary

The amount of agricultural land being entered into conservation easements is declining annually, but Dubuque County has a higher percentage of acres enrolled when compared to other similar counties.

Renewable Energy and Efficiency – Annual kilowatt hours consumed and number of household fuel types

Scope – County

Status – Fluctuating

Goals – This indicator addresses goal 6

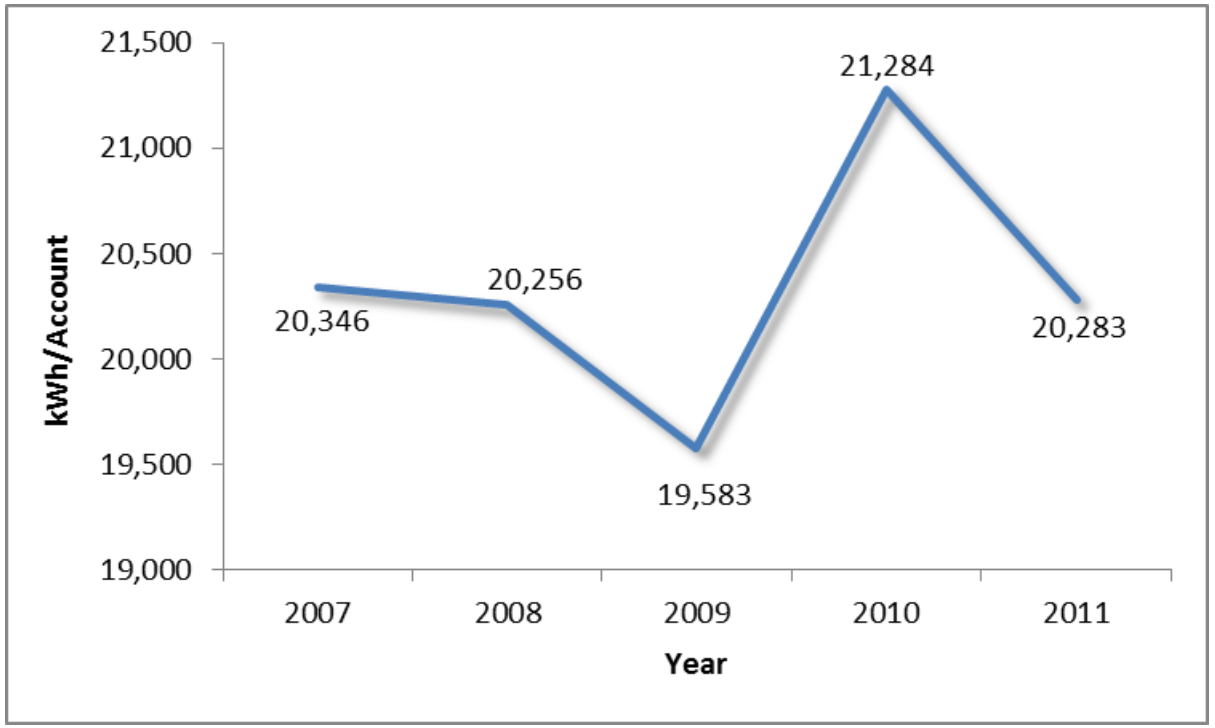


Figure 11: Annual Dubuque County residential kilowatt hour (kWh) consumption (Alliant Energy data not included.) Source: Maquoketa Valley Electric Cooperative and United States Energy Information Administration

Why is this important?

Conservation practices and behavior that are environmentally conscious are important as Dubuque County works to meet its sustainability goals. Most energy production is provided by the burning of fossil fuels. The consumption of fossil fuels creates pollution that can create negative externalities. Efficient energy use is important so that pollution is reduced and marginal benefits are closer to marginal costs (O'Sullivan, 2009).

The goals laid out in the Agriculture and Natural Resources chapter seek to establish directives that minimize negative human impact on the environment. The measurement of annual kilowatt hours (kWh) of electricity usage and the number of household heat types can show whether Dubuque County is moving towards the sixth goal of the Agriculture and Natural Resources chapter. This goal promotes conservation practices that lead to responsible use of non-renewable resources.

This indicator measures energy efficiency by the annual kilowatt hours (kWh) consumed per residential and commercial/industrial customer ac-

count and the percentage of house heating fuel types in Dubuque County. Alliant Energy, Maquoketa Valley Electric Cooperative, and The Cascade Municipal Utilities are the suppliers of electricity in Dubuque County. Data for Alliant Energy was not provided. Data from Maquoketa Valley Electric Cooperative and The Cascade Municipal Utilities were combined by account type for analysis. Data was obtained from Maquoketa Valley Electric Cooperative and United States Energy Information Administration (EIA) to measure electricity use. Information from the U.S. Energy Information Administration only provided data up to 2011 at this time. Data for 2012 will be available in September 2013. Because data from the Energy Information Administration does not limit data to county boundaries, no comparisons with similar cities could be made with Dubuque County. Household fuel type data was obtained from the 2000 United States Census Bureau and 2010 American Community Survey. Household fuel type data is provided for comparison to other similar counties.

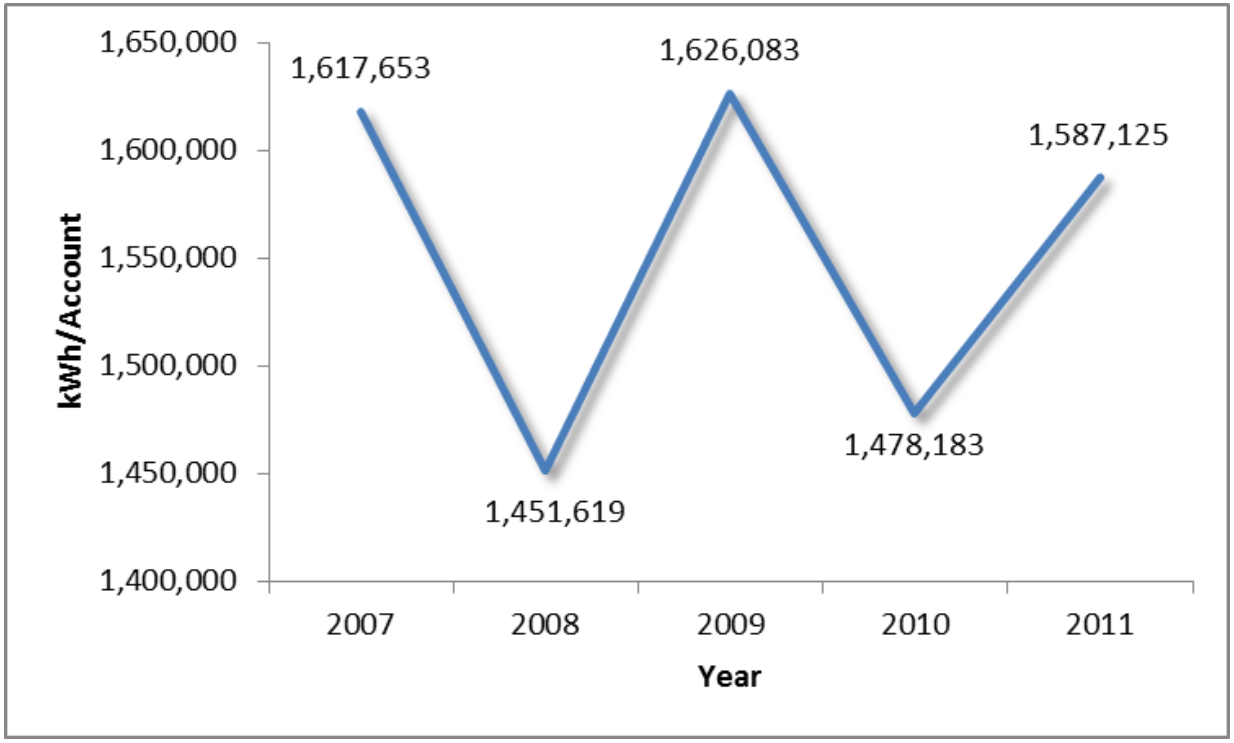


Figure 12: Annual Dubuque County commercial/industrial kilowatt hour (kWh) consumption (Alliant Energy data not included.) Source: Maquoketa Valley Electric Cooperative and United States Energy Information Administration

How are we doing?

As seen in Figure 11, the aggregated annual average of kilowatt hour (kWh) use per residential customer account from 2007 to 2011 show a fluctuating pattern. The 2011 usage is approximately the same as 2007 (20,346 kWh/yr and 20,283 kWh/yr respectively). Over a 5 year period, the lowest residential usage was 19,583 kWh/yr in 2009.

As seen in Figure 12, the data trend from 2007 to

2011 of aggregated annual average kilowatt hour (kWh) use per commercial/industrial customer account varies over time. The 2011 kilowatt hour usage is similar to 2007 (1,617,653 kWh/yr and 1,587,125 kWh/yr respectively). When Dubuque County was compared for the percentage of household fuel types from 2000 to 2010 in Figure 13, the majority of the households (72.7%) use utility gas for heating. Only .1% use solar energy. Trends are similar when Dubuque County is compared to other similar counties.

Summary

Energy consumption among all consumer account types in Dubuque County has not changed significantly over the 2007 to 2011 five-year period. In addition, no significant changes have occurred for household fuel types from 2000 to 2010. Alliant Energy chose not to take part in this project. Co-operation from Alliant Energy could add more value to this indicator in the future.

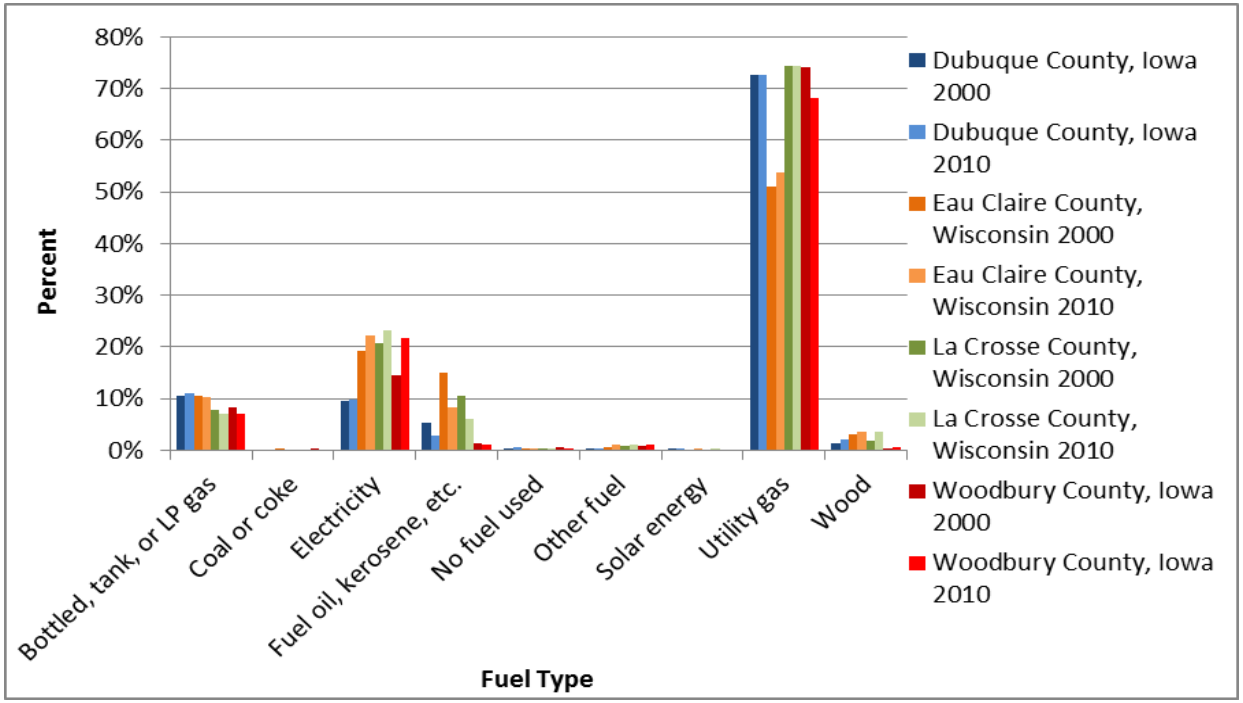


Figure 13: County comparison of percentage of household heat fuel types. Source: U.S. Census Bureau and American Community Survey.

Adopted River Miles

Scope: County

Status: In progress

Goals: This indicator addresses goals 2 and 8

Why is this important?

As Dubuque County borders the Mississippi River, the river itself and how the community treats this resource is a strong indication of sustainability. The Mississippi River, by its very nature, is not static; some of the problems that the shores of Dubuque County face are caused by upstream communities. This is not a problem indicative of Dubuque County alone, but over time river misuse has led to the deposition of garbage up and down the Mississippi River shoreline. A group that calls itself Living Lands & Waters (LL&W) has dedicated itself to the clean-up of the Mississippi River. Over the past decade, various local denizens have dedicated their time and effort to volunteering in a program called "Adopt a River Mile." This volunteer program is reminiscent of adopting highway miles for clean-up and functions in a very similar way.

Gauging the voluntary adoption of river miles is a significant indicator of Dubuque County's sustainability for a variety of reasons. First, reducing the amount of trash washed up on shore positively affects the native flora and fauna that depend on a healthy river system for sustenance. A large amount of man-made floating debris that washes up on shores is completely non-biodegradable, and is often ingested by birds, fish, turtles, and other wildlife. Wild fauna are unable to digest these non-biodegradable consumer byproducts. Furthermore, animals can become entangled in this unnatural debris. Aquatic plants that provide habitat (both food and living space) for animals are also integral to the river's ecosystem and can be choked out by an excess of floating and shoreline debris. There has been a significant reduction in biological diversity in the Mississippi River over the past several decades, and the physical removal of anthropogenic debris may contribute to revitalizing this habitat.

Second, willingness to adopt these shoreline miles shows a degree of citizen participation. The program depends entirely upon volunteer time contributions. The fact that a large amount of debris floated from upstream shows a further indication of proactive citizenship – regardless of where the garbage came from, the community actively works toward reducing its presence within their realm of influence.

Third, there is an aesthetic factor, and ultimately psychologically appealing quality, to a clean shoreline. A shoreline clear of garbage encourages recreational activity and environmental appreciation. As more people are drawn to an aesthetically pleasing river, and are educated on proper land stewardship, a rising collective appreciation for river health will logically follow.

How are we doing?

Dubuque County borders the Mississippi for a total of 34 miles of shoreline (river miles 567-601). The first mile adopted in Dubuque County was in the year 2000, and was actually adopted by a man from Wisconsin. For the purposes of this indicator, miles of Dubuque shoreline adopted by individuals or organizations outside Dubuque County will not be considered indications of Dubuque County's sustainability. Of the 34 miles along Dubuque County, 22 miles have been adopted over the past decade—16 of which by individuals and groups within Dubuque County. Adoption date data was only available for 11 of the miles. Finally, this indicator does have a cap (34 miles) after which all the available miles will have been adopted, and maintenance will be the only indication from that point on.

Summary

The voluntary adoption of Dubuque County's river miles for clean-up will benefit natural resources and wildlife, positive community involvement, and environmental aesthetics which is important to a community's overall psychological health. Of the 34 river miles along Dubuque County's shoreline, 22 have already been adopted (16 by individuals or groups within Dubuque County). Data still needs to be retrieved concerning the adoption dates of 11 of the 16 miles. Inexpensive advertising and encouragement could be utilized to increase the number of adopted river miles. It may be advisable to work with LL&W to encourage and advertise shoreline stewardship within Dubuque County. Furthermore, encouraging recreational clean-ups by the general public might yield further positive results. A number of social advertising tools might be employed without large expenditures, yet the overall health of the river along Dubuque County might increase significantly.

Suggestion for Indicator

Waste Diversion and Waste Generation Per Capita

Solid waste reduction and support of the Dubuque Metropolitan Area Solid Waste Agency's materials diversion programs are goals within the Smart Plan's Agriculture and Natural Resources chapter. We were unable to gather sufficient information to calculate recycling rates on a city by city basis. While the City of Dubuque collects data for municipal residential recycling and garbage collection, there is insufficient data available for recyclables collected by private haulers from commercial, institutional, industrial, and residential units without municipal curbside collection. There is also no way to track the source of recyclables collected at drop off locations and redemption facilities.

Recycling and garbage collection for the cities of Asbury and Farley is provided by Dittmer Recycling. Peosta and Dyersville use Bi-County Disposal Inc. for these services. Neither of these companies collects data on the amount of recycling and refuse from specific locations; it is therefore impossible to track the amount of recycling on a city by city basis. They also serve areas outside of Dubuque County, making the calculation of a county-wide rate impossible as well.

We recommend that both public and private service providers within Dubuque County begin collecting comprehensive data on waste and recycling in order to calculate waste generation and waste diversion per capita.

Watershed

The political boundary of Dubuque County encompasses portions of four different watersheds: Grant-Little Maquoketa, Turkey, Apple-Plum, and Maquoketa. Because watersheds have no political boundaries, intergovernmental collaboration is crucial to the success of protecting these areas. As a result of ongoing land use change and agriculture and natural resources protection practices, the watersheds within Dubuque County experience significant impacts. Reducing the negative impacts to these watersheds is important to the success of sustainability initiatives. Protecting water resources not only benefits the current users, but future generations as well. The importance of watersheds to Dubuque County is evident in the City of Dubuque's 2012 application for the Iowa Department of Natural Resources Watershed Management Authority Grant. As a result of this application process, the Catfish Creek Watershed Management Authority (CCWMA) board and the Smart Planning Consortium determined that watersheds should be included in the Smart Plan as its own chapter, rather than being included within the chapter on agriculture and natural resources (City of Dubuque, 2012).

The goals established in the Watershed chapter promote initiatives for reducing the negative impacts of human activity on water quality in the region. The goals focus primarily on improving water quantity and quality by minimizing and preventing soil erosion through stormwater runoff. Three indicators focusing on water quality, soil loss and runoff, and impervious surface area have been selected to measure watershed sustainability. These indicators were selected based on the criteria mentioned in the introduction of this report.

The Dubuque County Smart Plan provided the following watershed goals:

1. To prevent erosion by establishing preconstruction sediment control measures before, during, and after any land disturbing activities take place to improve the health of our local watersheds.
2. To prevent erosion and control sediment during construction.
3. To reduce the rate and volume of stormwater runoff on post construction development, while at the same time promoting better water quality using infiltration based practices and controls.
4. To preserve and reproduce pre-development hydrologic conditions whenever possible to maximize runoff infiltration and reduce flooding and to promote healthy water supplies.
5. To protect and establish site and lot vegetation to prevent erosion and infiltrate runoff.
6. To design transportation surfaces that account for and minimize stormwater runoff.
7. To design buildings and lots that account for and minimize stormwater runoff.
8. To establish standards and/or guidelines for the quantity and quality of water runoff that are flexible and that recognize the unique characteristics of each project site, to obtain maximum protection of the watersheds in the region.

9. To reduce flood damages by promoting basin wide programs stressing non-structural measures, such as floodplain regulations, flood proofing, flood forecasting, and watershed treatment, in conjunction with other structural measures, where necessary, to protect the lives and property of residents.

Water Quality – Percent of total stream and river miles assessed and percent polluted

Scope – County

Status – Unknown

Goals – This indicator addresses goals 1, 3, 4, and 8

Why is this important?

This indicator uses data from the United States Environmental Protection Agency's (U.S. EPA) *"How's My Waterway?"* Web site to measure Dubuque County's total number of miles of streams and rivers assessed since 2004 and the percentage of all rivers and streams that are polluted (See appendix for Web site link). This methodology was used because it offered a comprehensive view of water quality data that could be normalized for comparison and historical analysis. Other sources of water impairment data were not used because water data is generally collected in an inconsistent and non-uniform manner (Keller & Cavallaro, 2008). Data was collected for every stream and river by zip codes that were located in Dubuque County and compared to other similar counties (see Figure 14). Zip codes that had substantial areas outside of the county were not included. (Dubuque County zip codes 52052, 52237, 52054, and 52031 were not included). Lakes were removed from the data for water body type consistency. Major rivers, such as the Mississippi River and the Missouri River, were removed from the Dubuque County data and Woodbury County data to avoid the possibility that the water pollution source may be upstream. Unnamed water bodies were checked with maps for consistency with water body type and included in the data.

How are we doing?

As seen in Figure 15, La Crosse County, WI, has the highest percentage of all streams and rivers assessed per zip code since 2004. La Crosse County assessed 66% (189.44 miles) of the county's total miles of streams and rivers (287.42 miles). In comparison, Dubuque County had only assessed 38% (141.86 miles) of the county's total miles of streams and rivers (374.28 miles).

As seen in Figure 16, La Crosse County had the highest percentage (45% or 130.65 miles) of total polluted streams and rivers per county. Dubuque County had the second highest percentage of total polluted rivers and streams with 28% (105.64 miles). In addition, 4% (15.09 miles) were not polluted and the status is unknown for 68% (253.54 miles). Of the 38% of all streams and rivers assessed in Dubuque County, 74% of the assessed waters were reported as polluted and 11% were not polluted.

Summary

Polluted streams and rivers and the lack of water measurement data are large problem in Dubuque County. Dubuque County has 28% of all rivers and streams designated as polluted. Since 2004, Dubuque County has only assessed 38% of all

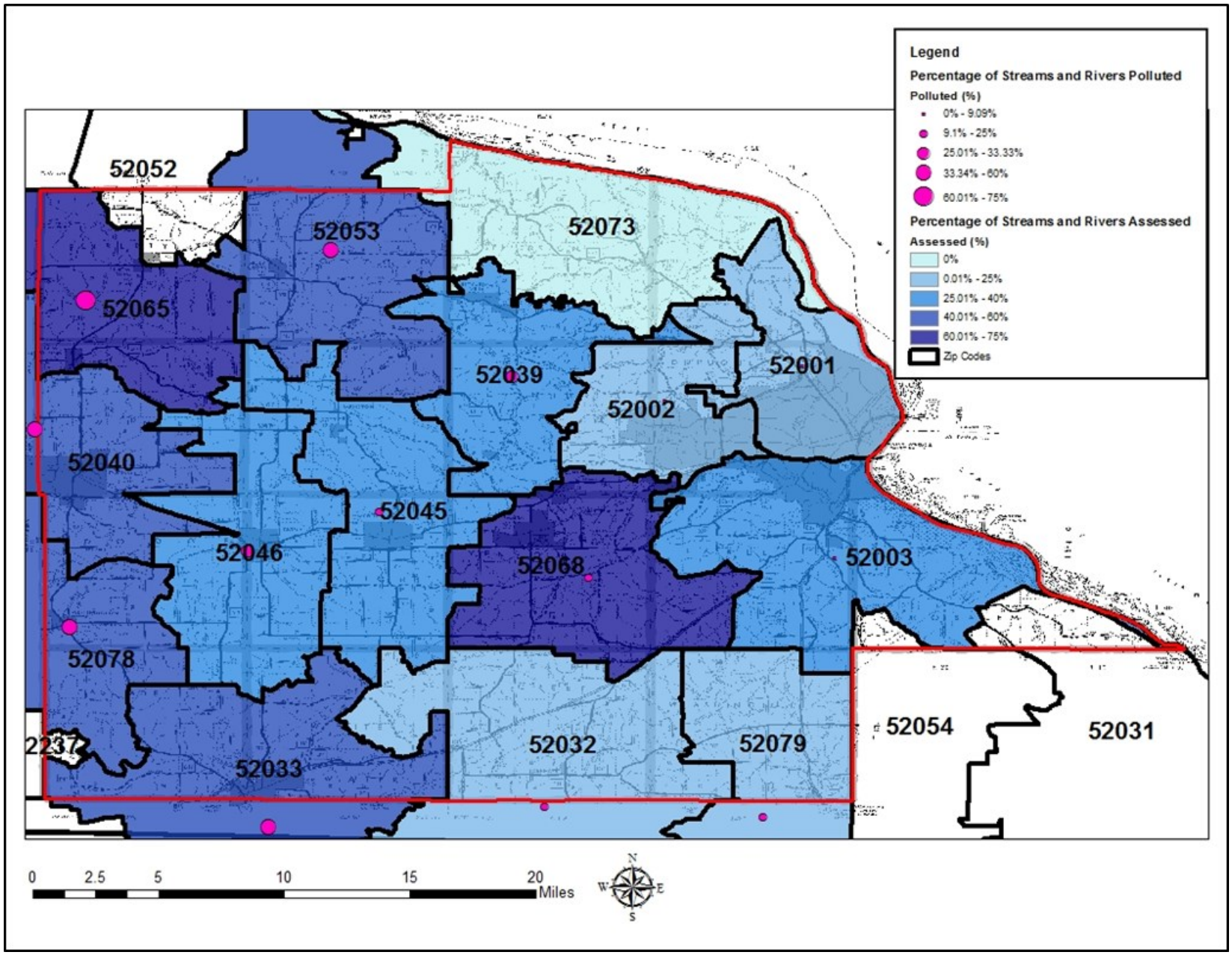


Figure 14: Percent of total stream and river miles assessed and percent polluted in Dubuque County. Source: U.S. EPA, U.S. Census Bureau 2012, and Iowa DNR.

streams and rivers located within the county (as designated by zip code). Dubuque County still has not assessed 62% of all streams and rivers in the county. Dubuque County has assessed 28% fewer streams and rivers than some of the cities it was compared to. Of all streams and rivers assessed in Dubuque County, 74% of the assessed waters were polluted. The data provided for this indicator will serve as baseline data to be utilized for future historical trend analysis.

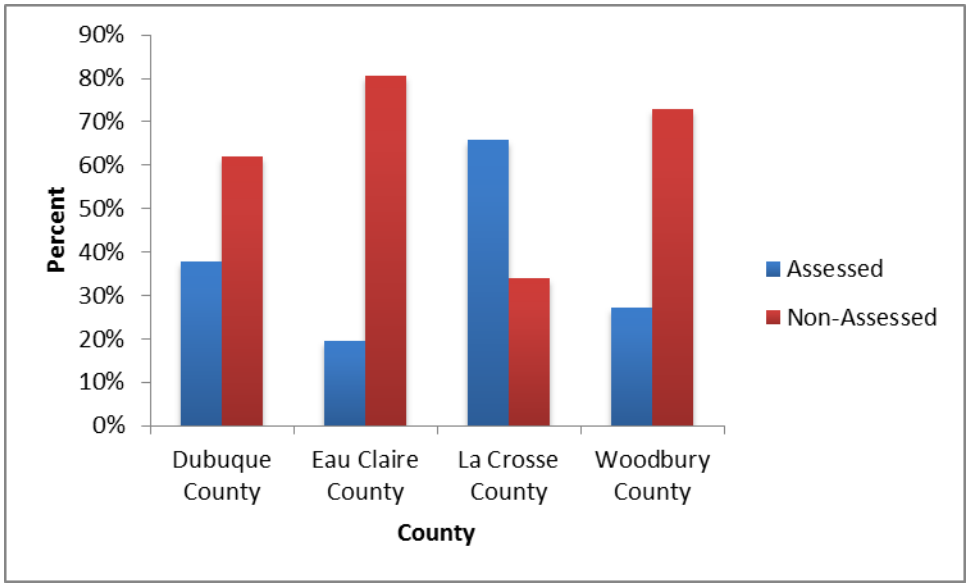


Figure 15: Percentage of total streams and rivers assessed per county. Source: EPA.

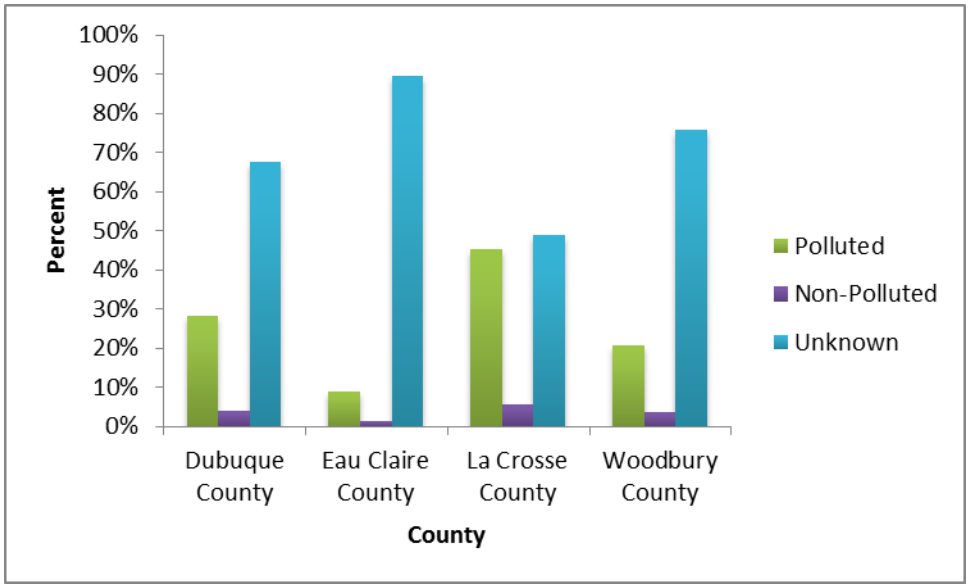


Figure 16: Water quality designation percentage of all assessed rivers and streams per county. Source: EPA.

Soil Loss and Runoff – Annual soil loss by ton per acre and annual precipitation runoff by inches per year

Scope – County

Status – Decreasing

Goals – This indicator addresses goals 1, 2, 3, 4, 5, 6, 7, 8

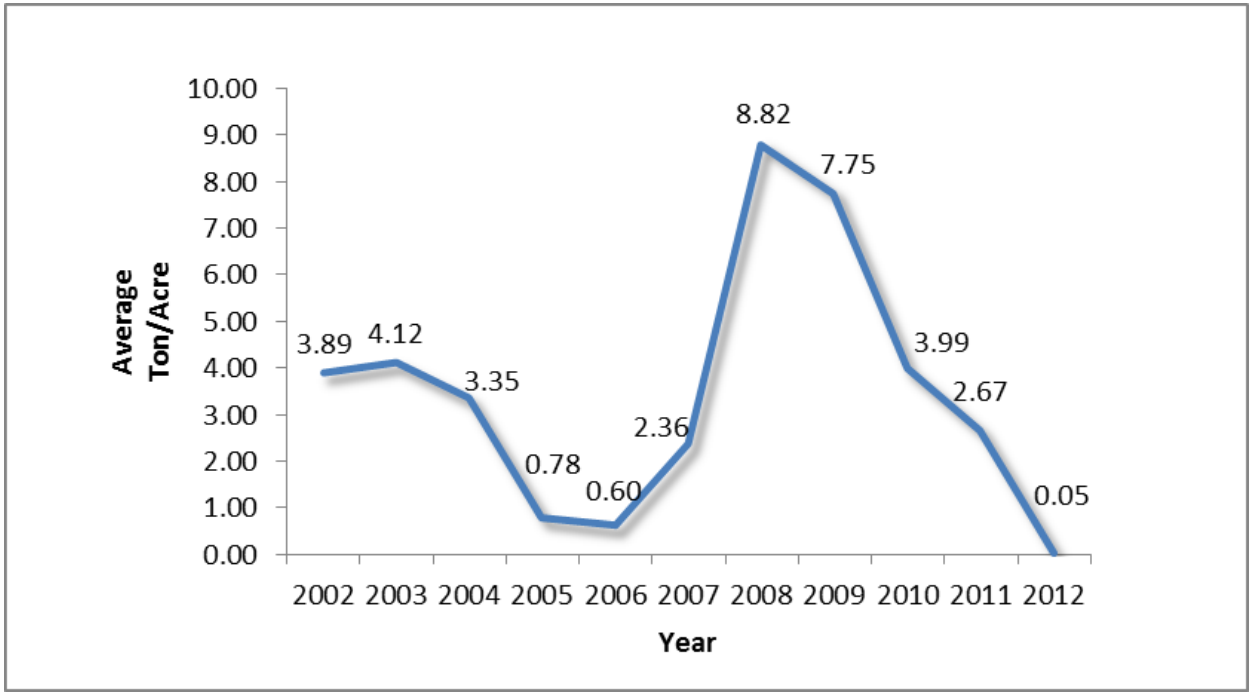


Figure 17: Annual soil loss of Dubuque County for 2002-2012. Source: ISU, WEPP.

Why is this important?

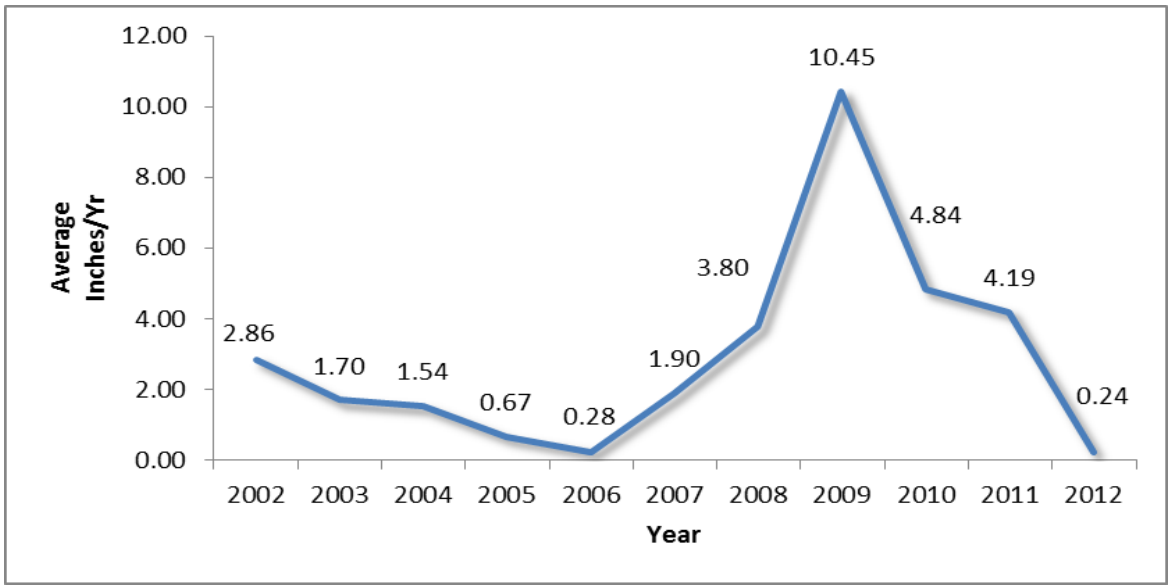
Both soil loss and runoff can contribute to the impairment of water bodies, the destruction of ecosystems, and local flooding (Grant, 2012). When soil loss is reduced, there is a reduction in water pollution. A reduction in both soil loss and runoff improves the provision of ecosystem services and reduces costs for stormwater management. The goals in the Watershed chapter focus on improving water quantity and quality by minimizing and preventing soil erosion through reducing stormwater runoff. By measuring the amount of soil loss and runoff, this indicator can provide a meaningful measurement to see if Dubuque County is moving toward its sustainability goals 1 through 8. These goals seek to reduce the loss of soil and runoff that contribute to the degradation of watersheds.

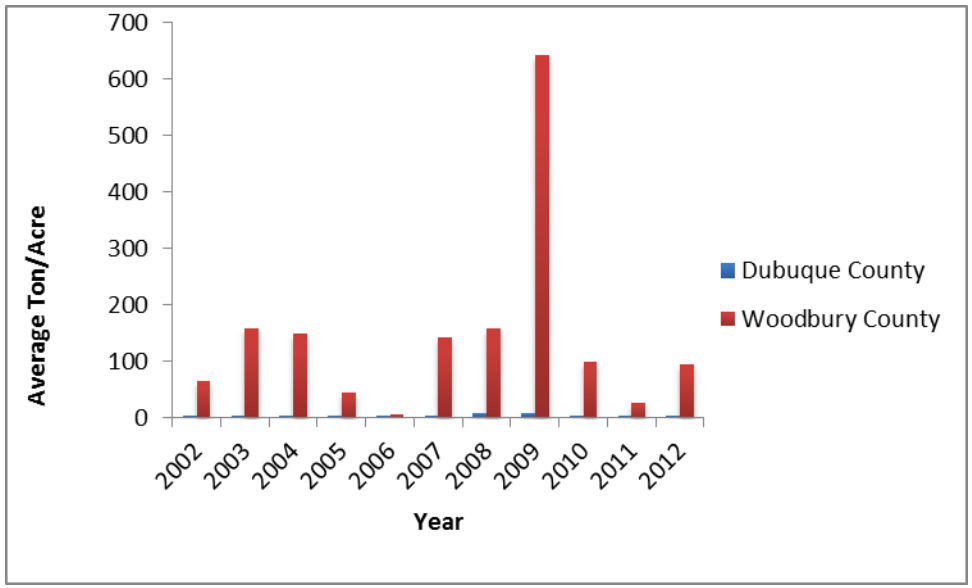
This indicator measures the annual amount of soil loss by tons per acre (tons/acre) and runoff in inches per year (inches/year) for Dubuque County. The information was obtained from Iowa State University's Water Erosion Prediction Project (WEPP) Web site computer simulation model (Iowa State University, 2012. See Appendix for link). The computer simulation model uses data

inputs from the United States Department of Agriculture Resources Conservation Service (USDA-NRCS), National Resources Inventory (NRI), NEXRAD precipitation radar, and Iowa Environmental Mesonet (Cruse, R. et al., 2006). The WEPP model was chosen over the Universal Soil Loss Equation (USLE) because WEPP is more accurate with long-term averages that can account for extreme rainfall events as well (Cruse, R. et al., 2006). Because the computer model is limited to every township in the state of Iowa, Dubuque County is only compared to Woodbury County for this indicator.

How are we doing?

As seen in Figure 17, the annual soil loss increased from .60 tons/acre in 2006 to 8.82 tons/acre in 2008. This may be the result of the 2008 flood. Since 2008 there has been an average decline in annual soil loss of 2.05 tons/acre a year. The 2012 estimate of .05 tons/acre is far below the lowest estimation of 3.89 tons/acre in 2002.





Above: Figure 18: Annual precipitation runoff of Dubuque County for 2002-2012. Source: Source: ISU, WEPP.

Left: Figure 19: County comparison of annual soil loss for 2002-2011. Source: Source: ISU, WEPP.

As seen in Figure 18, the annual inches per year (inches/year) precipitation runoff rate increased from .28 inches/year in 2006 to 10.45 inches/year in 2009. From 2009 to 2012, Dubuque County as a whole has seen an average annual decline in precipitation runoff of 2.55 inches/year or a rate of change of approximately -97%. In 2012, the annual precipitation runoff rate was .24 inches/year and surpasses pre-2008 levels. As seen in Figure 19 when annual soil loss for Dubuque County is compared to Woodbury County, Woodbury County has considerably more average tons per acre lost. In addition, in Figure 20, when annual precipitation runoff for Dubuque County is compared to Woodbury County, Woodbury County has considerably more inches of runoff.

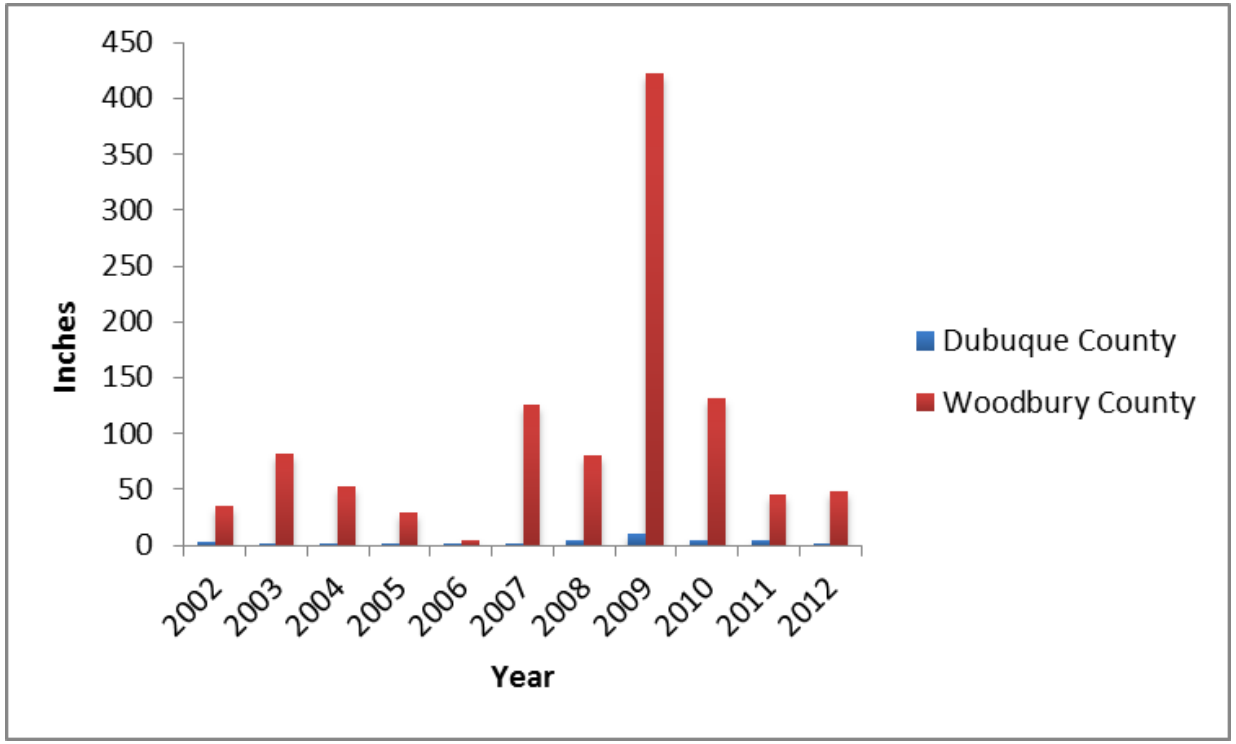


Figure 20: County comparison of annual precipitation runoff for 2002-2011. Source: ISU, WEPP.

Summary

Dubuque County has a decreasing trend of annual soil loss and runoff that surpass 2006 levels.

Impervious Surface Area – Impervious surface area per drainage basin

Scope – County

Status – Unknown

Goals – This indicator addresses goals 3, 4, 6, 7, and 9

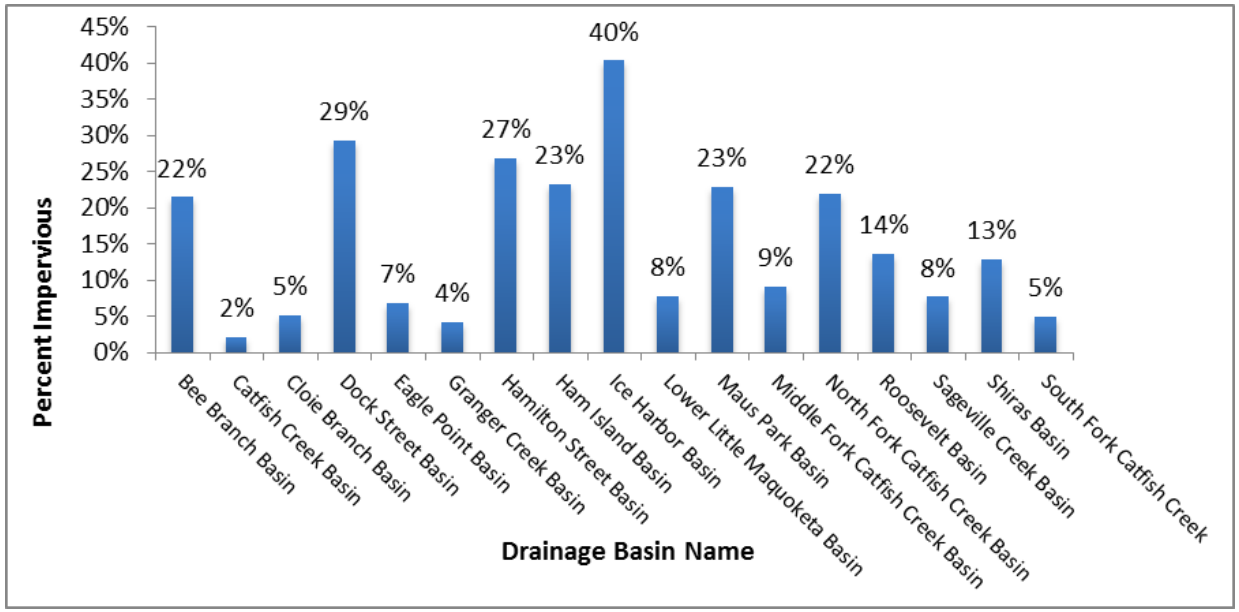


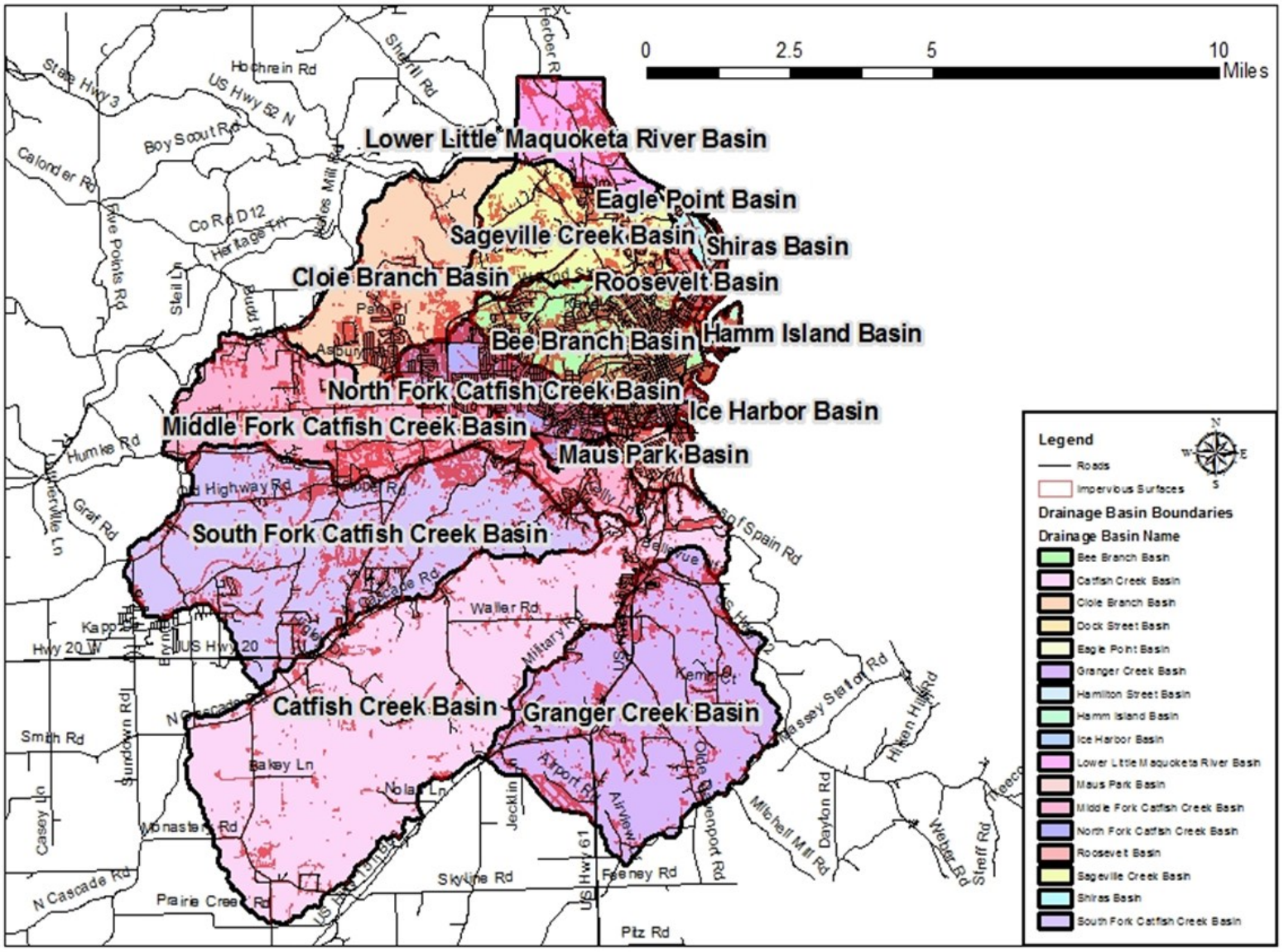
Figure 21: City of Dubuque impervious surface percentage per drainage basin
Source: Iowa Geological and Water Survey and City of Dubuque.

Why is this important?

The protection of watersheds is important to the success of Dubuque County's sustainability initiatives. According to Arnold Jr. & Gibbons (1996), impervious surface areas are comprised of roads, rooftops, sidewalks, bedrock outcrops, or compacted soil that prevent the infiltration of water into the soil. Large amounts of impervious surfaces in urban areas can contribute to flash flooding along with nonpoint source pollution that can contribute to the degradation of local water bodies. The degradation of a stream in a drainage basin first occurs when impervious surface areas exceed 10% of the surface area. A reduction in impervious surfaces can mitigate local flooding, reduce stormwater treatment costs, and facilitate evaporative cooling (Grant, 2012).

This indicator measures the percentage of impervious surface area in each drainage basin to provide a meaningful measurement to see if Dubuque County is moving toward its sustainability goals 3, 4, 6, 7, and 9. These goals strive to utilize different stormwater management mitigation techniques to reduce runoff rates in order to protect watersheds and water quality. This indicator measures the area of impervious surface of each drainage basin boundary within the City of Dubuque. A GIS drainage basin boundary shapefile for the City of Dubuque and a 2009 land use raster file (1X1 cell size) demarcating areas of impervious surface was ob-

Figure 22—Drainage Basin Boundaries.



tained from the Iowa Geological and Water Survey to create the ratio measurements. The City of Dubuque was chosen because it was the only city in the county that had a GIS drainage basin boundary file available. Comparison cities are not provided in this indicator due to the absence of GIS data as well.

How are we doing?

As seen in Figure 21, 8 out of 17 drainage basins in the City of Dubuque exceed the 10% threshold of impervious surface. Those basins are Bee Branch Basin, Dock Street Basin, Hamilton Street Basin, Ham Island Basin, Ice Harbor Basin, Maus Park Basin, North Fork Catfish Creek Basin, Roosevelt Basin, and Shiras Basin (see Figure 22). According to the city, they are currently attempting to decrease impervious surfaces within the city limits. The City of Dubuque will decrease impervious surfaces by over 5 acres when all 48 pervious alleyways are completed in 3 years.

Summary

The City of Dubuque has 8 out of 17 drainage basins that exceed the 10% impervious surface threshold. No other GIS impervious surface data is currently available for historical trend analysis. The data provided in this indicator section is intended for the future use of baseline data for comparison. When the Iowa DNR provides a newer impervious surface GIS file in the future, the City of Dubuque will be able to establish a comparison for analysis of historic trends.

Economic Development

Economic conditions are directly tied to sustainability, as a healthy, vibrant economy is a critical component in building a foundation for a sustainable future. Due to the important role the economy plays in achieving greater sustainability, the Smart Plan outlined a number of goals and objectives in an attempt to improve Dubuque County's economic well-being.

The Economic Development chapter goals and objectives predominantly focus on employment, industry, and commerce. These goals stress the need for intergovernmental collaboration across all jurisdictions as the county attempts to hasten economic development efforts. Housing, transportation, and utility systems also play an intricate role in economic development efforts.

Furthermore, improving economic conditions typically indicate a high level of stability and resiliency throughout a region. Continued economic growth is a significant factor in "quality of life," as growth brings good paying jobs and creates more opportunities for residents to access goods and services. This chapter provides six indicators that assess Dubuque County's economy. The indicators presented measure unemployment, poverty, revenues from tourism, economic sector diversity, ratio of employment inflow to total employment, and the amount of primary jobs to total population in Dubuque County and its Consortium member cities. These indicators were generated by accessing data from government sources and were selected for the important role they will play in the Consortium's ongoing plan of measuring sustainability. They were chosen in accordance with this report's selection criteria, including alignment with goals, data availability and accessibility, and usefulness.

The goals set out by the Smart Planning Consortium are as follows:

1. To reduce unemployment, achieve economic stability, and increase the standard of living for all citizens.
2. To build a highly skilled, flexible workforce.
3. To concentrate on retaining and expanding existing local businesses.
4. To increase the number of small firms within the region by fostering local entrepreneurship.
5. To recruit businesses that are suited to the region, require a highly skilled work force or are willing to train an entry-level work force and are experiencing growth.
6. To identify the economic needs of the chronically unemployed and underemployed in the region, and encourage programming – including education and retraining – to meet those needs.
7. To maintain and strengthen region's position as a tourist destination.
8. To promote and encourage preservation of the region's historic assets.
9. To strengthen the local tax base.
10. To establish and maintain housing and transportation, communication, and utility systems

which support and foster quality development.

11. To strengthen, maintain, and continually upgrade technology infrastructure and systems, and provide adequate access and capacity for current and anticipated needs.

12. To provide an adequate supply of vacant, development-ready land for commercial and industrial use.

13. To encourage development that is environmentally sensitive.

Unemployment Rate – Percent of county residents who are unemployed

Scope – County

Status – Decreasing

Goals – This indicator addresses goals 1 and 6

Why is this important?

A low unemployment rate is important for several reasons. If a region's rate of unemployment is low, it bodes well for its communities and residents. People who are consistently employed are able to sustain a quality of life superior to those who are not. They contribute to local businesses by purchasing their goods and services, ultimately increasing economic efficiency.

The unemployment rate is strongly associated with multiple economic development goals outlined in the regional Smart Plan. As an indicator, it measures the percentage of people in Dubuque County who are unemployed. According to the Bureau of Labor Statistics (BLS), a person is unemployed "if they do not have a job, have actively looked for work in the prior four weeks, and are currently available for work." The unemployment rate data presented in this report is an annual average.

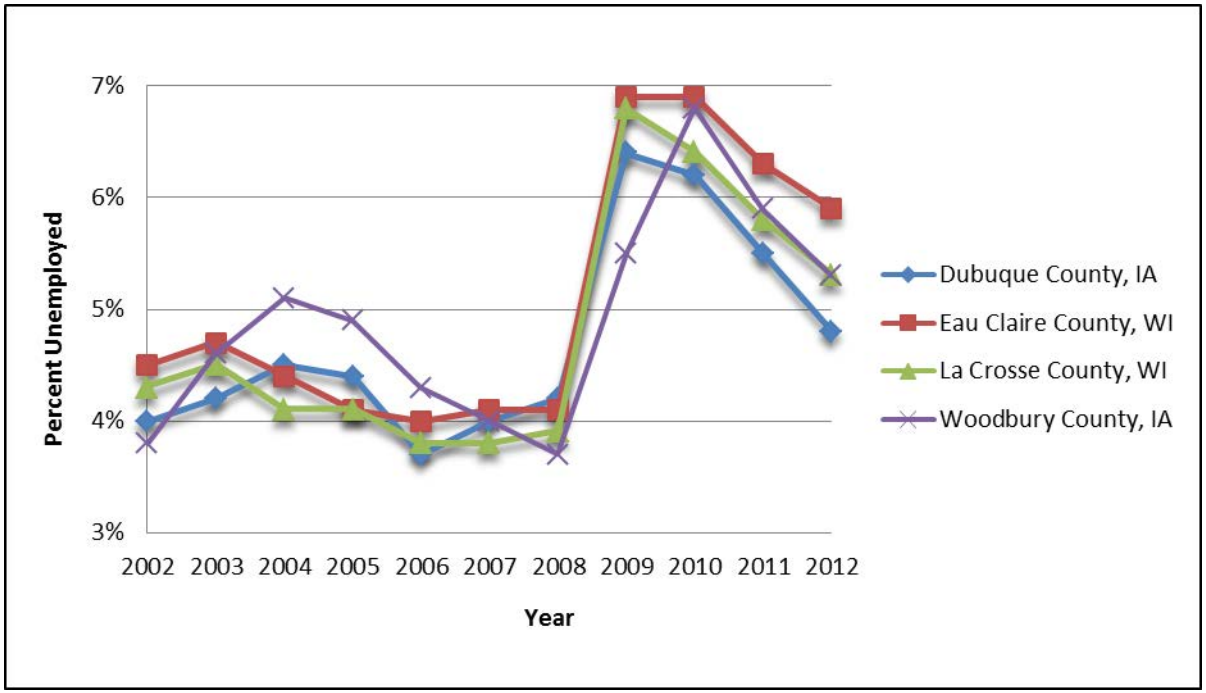


Figure 23: Unemployment rates for 2002-2011. Source: Bureau of Labor Statistics

How are we doing?

Dubuque County's 2012 unemployment rate was 4.8%. This is lower than each comparison county's rate of unemployment for the same time period, as shown in Figure 23. Dubuque County had a decreasing rate of unemployment from 2009-2012. A decreasing unemployment rate is a sign

of a strengthening economy in Dubuque County.

Summary

Dubuque County has seen three consecutive years of decreasing unemployment and is outperforming its peer counties.

Poverty Rate – Percent of county residents living in poverty

Scope – County

Status – Baseline

Goals – This indicator addresses goal 1

Why is this important?

Poverty is a social ill that affects many people. When the number of residents living in poverty is high, there is a relatively high proportion of the population lacking adequate access to health care, food, and shelter. Such inequities in terms of access, opportunities, and quality of life make achieving sustainability difficult. This indicator measures Dubuque County's poverty rate using a five-year average from the American Community Survey, and it addresses the Consortium's goal of increasing the standard of living for all residents in Dubuque County.

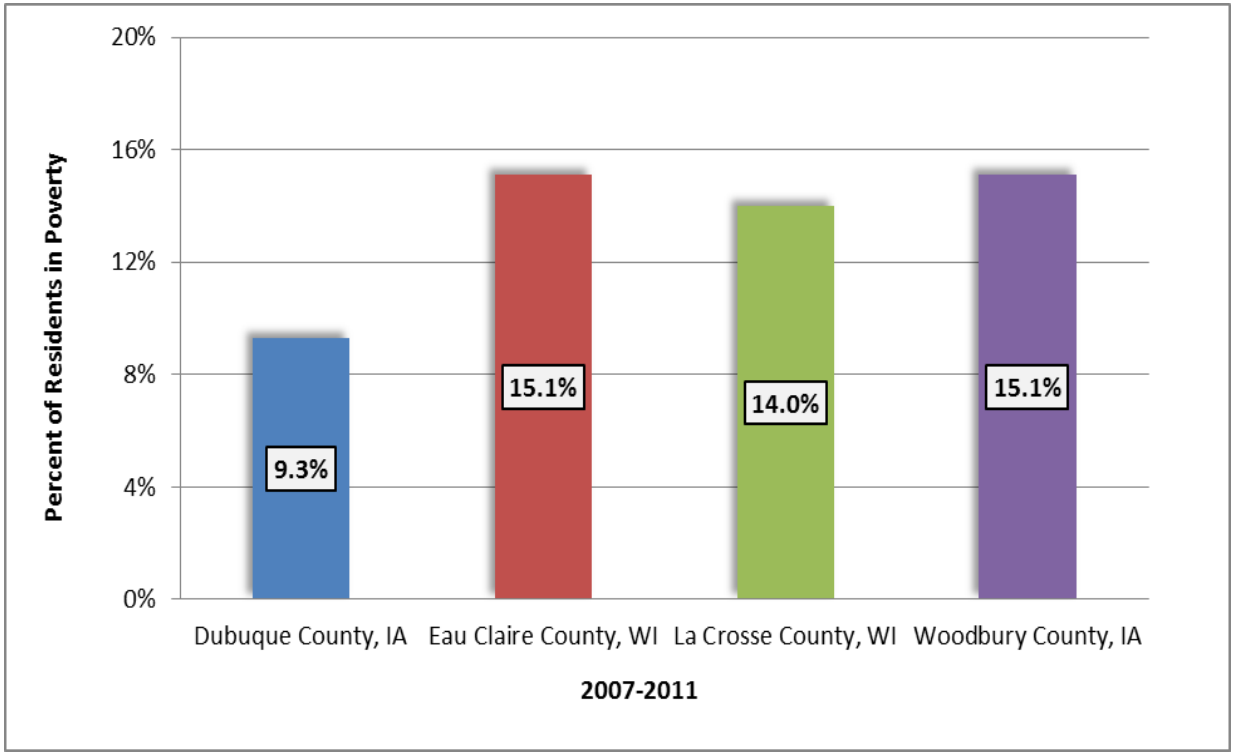


Figure 24: 5-year estimated poverty rates. Source: American Community Survey.

How are we doing?

As shown in Figure 24, Dubuque County's poverty rate from 2007-2011 was lower than each comparison county's poverty rate. The poverty rate was 9.3% in Dubuque County from 2007-2011, while its peer counties possessed a rate significantly higher than 10.0%.

Summary

Dubuque County's poverty rate from 2007-2011 was significantly lower than the rate for each of the comparison counties selected.

Economic Sector Diversity – Index measuring Dubuque County's economic sector diversity by employment

Scope – County

Status – Increasing

Goals – This indicator addresses goal 2

Why is this important?

Economic sector diversity is a crucial component in measuring economic performance. Greater economic sector diversity can benefit an economy by contributing to its stability and helping it expand in the future. Recent research shows there is a link between economic diversity and sustainability, as economic diversification can reduce a region's economic volatility and increase its real activity performance (Shediac, 2008). Increasing economic sector diversity generally indicates a flexible economy that creates employment opportunities for people of all skill levels, which are aspects that the Smart Plan incorporates in its economic development goals.

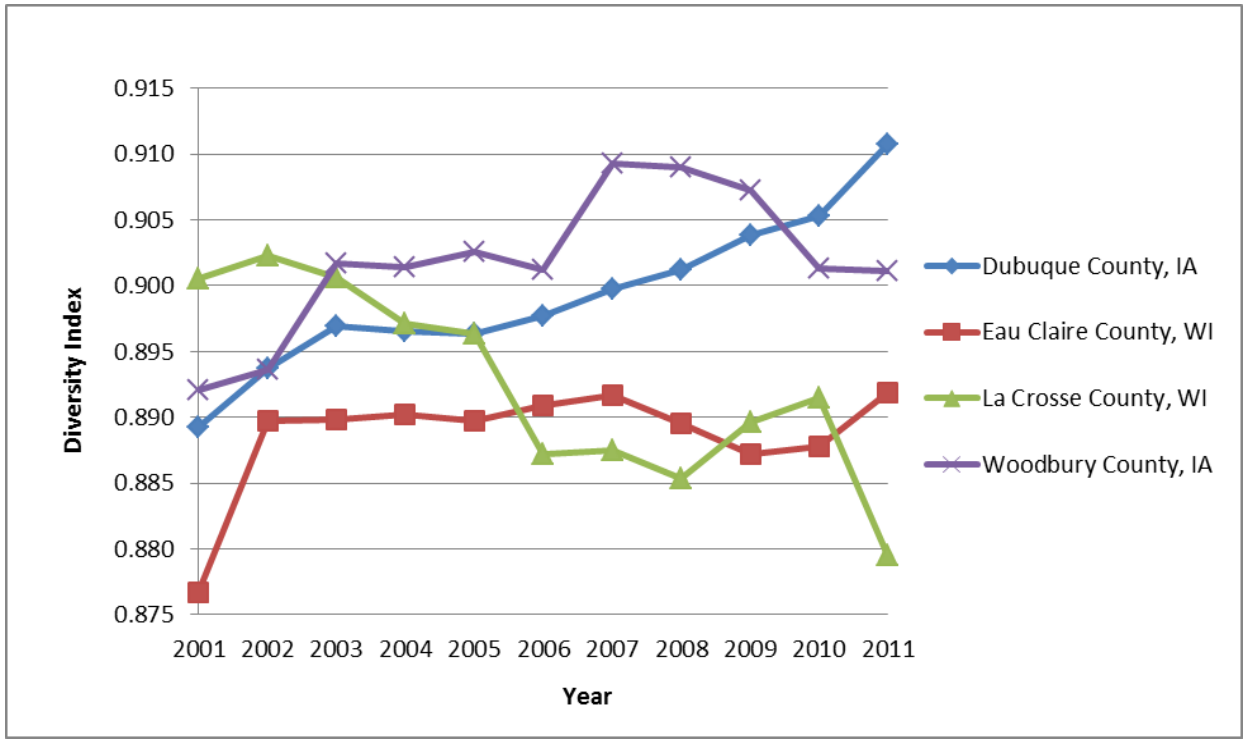


Figure 25: Economic sector diversity (Herfindahl Index). Source: Bureau of Labor Statistics.

Utilizing data made available through the Bureau of Labor Statistics (BLS), this indicator measures economic sector diversity in Dubuque County and the comparison counties using employment data for all two-digit industries. Two-digit industries are standard, large sectors within an economy (i.e. agriculture, mining, etc.). The Herfindahl Index,

which measures economic sector diversity using an index that ranges from 0 to 1, was used for this indicator. Please see the Appendix for the equation used to calculate the Herfindahl Index. A score closer to 0 generally indicates a more diversified economy, as employment share is better spread across all industries when the index value is lower. However, for the purpose of the following graph, the values were subtracted from one to show a trend line that is rising. Therefore, a score approaching 1 means higher diversity.

How are we doing?

As seen in Figure 25, Dubuque County's economic sector diversity valued 0.911 in 2011. (Please note Figure 25 does not illustrate the entire index range from 0-1). The county's economic diversity has slightly increased over the past several years. Numerous manufacturing jobs have been lost recently, while jobs in the professional and technical service industries have increased, thus enhancing economic diversity in terms of employment across industries (BLS).

Summary

Economic sector diversity has recently increased in Dubuque County. It has increased annually since 2001. Dubuque County has the highest economic sector diversity among the counties shown in Figure 25.

Employment Inflow – Ratio of net employment inflow to total employment

Scope – County

Status – Increasing

Goals – This indicator addresses goals 3 and 4

Why is this important?

Employment inflow as a proportion of total employment is a significant indicator of economic status. It plays a role in determining Dubuque County's economic standing, as a high ratio of inflow commuters in relation to total employment suggests communities in the county have a substantial number of small businesses and local firms. This keeps jobs and people working close to home and attracts people from a distance to work in those same communities. In 2010, Dubuque County had a ratio of employment inflow to total employment of 11.3%.

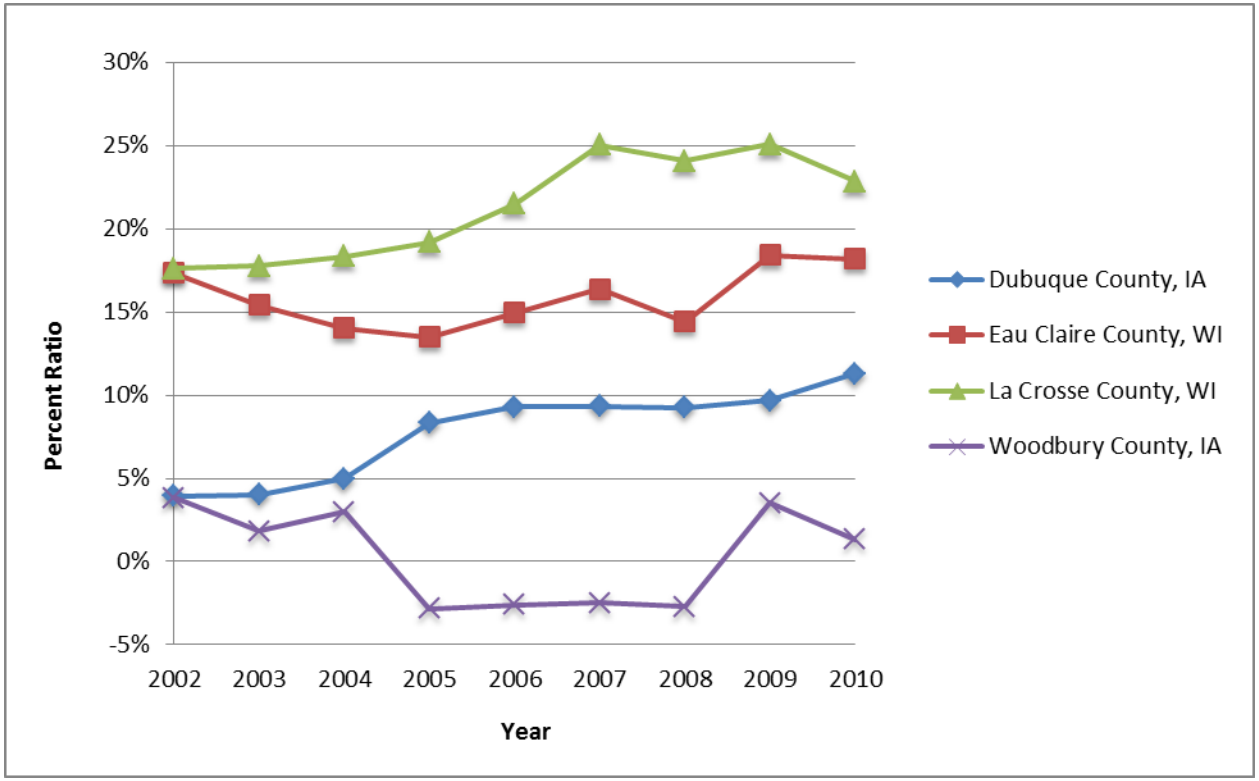


Figure 26: Ratio of net employment inflow to total employment . Source: U.S. Census Bureau.

How are we doing?

Dubuque County had a ratio of employment inflow to total employment of 11.3% in 2010, meaning for every 100 jobs in the county, approximately 11 are performed by people living outside county jurisdiction. Figure 26 shows the ratio of employment inflow to total employment. Dubuque County's ratio has increased by over 7% since 2002; this increase is representative of Dubuque County's growing economy and the addition or expansion of

several large employers (i.e. IBM, Prudential Financial, Woodward Communications, etc.) that keep people working in the county and attract commuting employees from surrounding areas.

Summary

Dubuque County's employment inflow to total population has increased over the past eight years. Yet, in 2010 the number of commuters into the county with relation to total employment was significantly lower than Eau Claire County and La Crosse County.

Primary Jobs – Ratio of primary jobs to total population

Scope – County, Consortium cities

Status – Increasing (except for Dyersville and Farley)

Goals – This indicator addresses goal 1

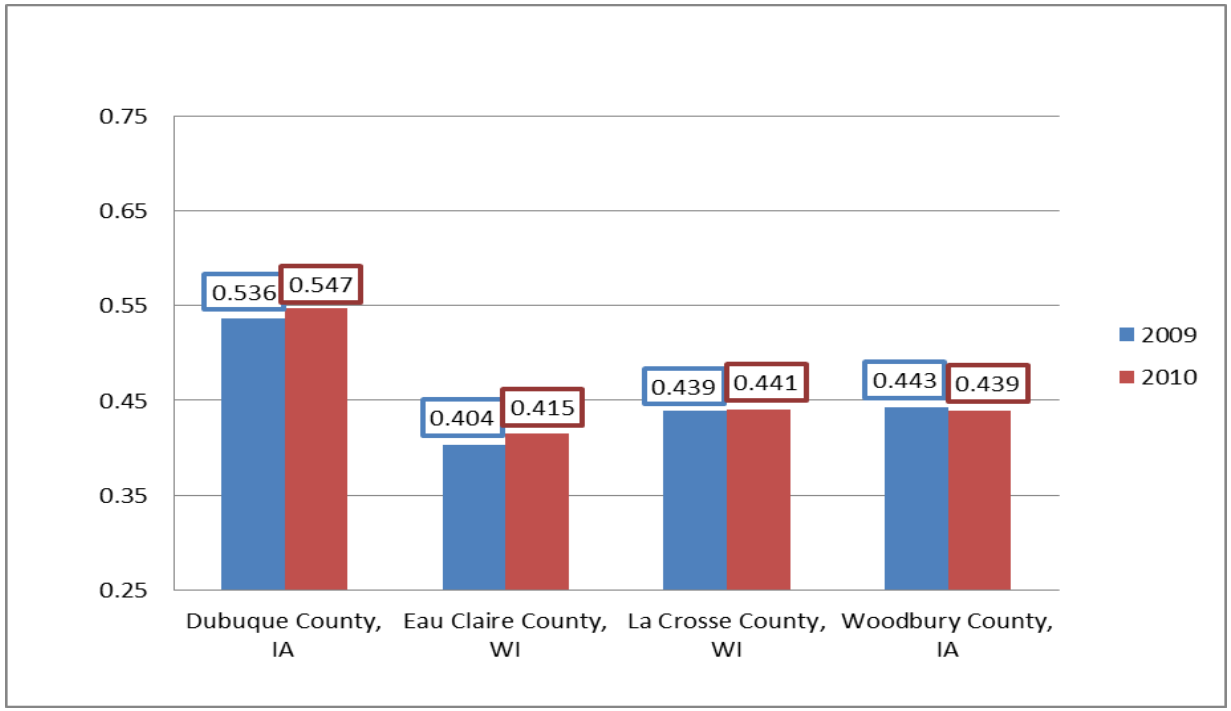


Figure 27: Ratio of primary jobs to total population. Source: U.S. Census Bureau.

Why is this important?

According to the U.S. Census Bureau, a primary job is the highest paying job an individual has in a given year. Additionally, Tucson Regional Economic Opportunities, Inc. (TREO), states that primary jobs are jobs that tend to produce goods and services in excess of what can be consumed by the local market, thus adding additional wealth to the local community rather than simply shifting money around among individuals and businesses within a community. For instance, Deere and Company, located in Dubuque, produces manufacturing goods that cannot be consumed entirely by people or businesses in the immediate region. Thus, the export goods made at Deere and Company consumed outside Dubuque County generate additional wealth that is added to Dubuque County. Finally, having an increasing number of primary jobs is a sign that an economy is stable and prime for expansion.

How are we doing?

As shown in Figure 27, Dubuque County saw an increase in its ratio of primary jobs to population from 2009-2010. Dubuque County's ratio is significantly higher than ratios found in the comparison counties. More importantly, each Consortium city increased its ratio of primary jobs to population

from 2009-2010 (see Figure 28), with exception of Dyersville and Farley. Farley was the only community to see a decrease. In general, this indicates Dubuque County has the ability to produce high-paying jobs for its residents while also attracting companies that create goods that are consumed by people outside the local area.

Summary

Dubuque County and several of its cities have seen an increase in the ratio of primary jobs to total population between 2009-2010. The county's ratio is higher than those associated with the comparison counties. This is a sign of economic stability and growing sustainability.

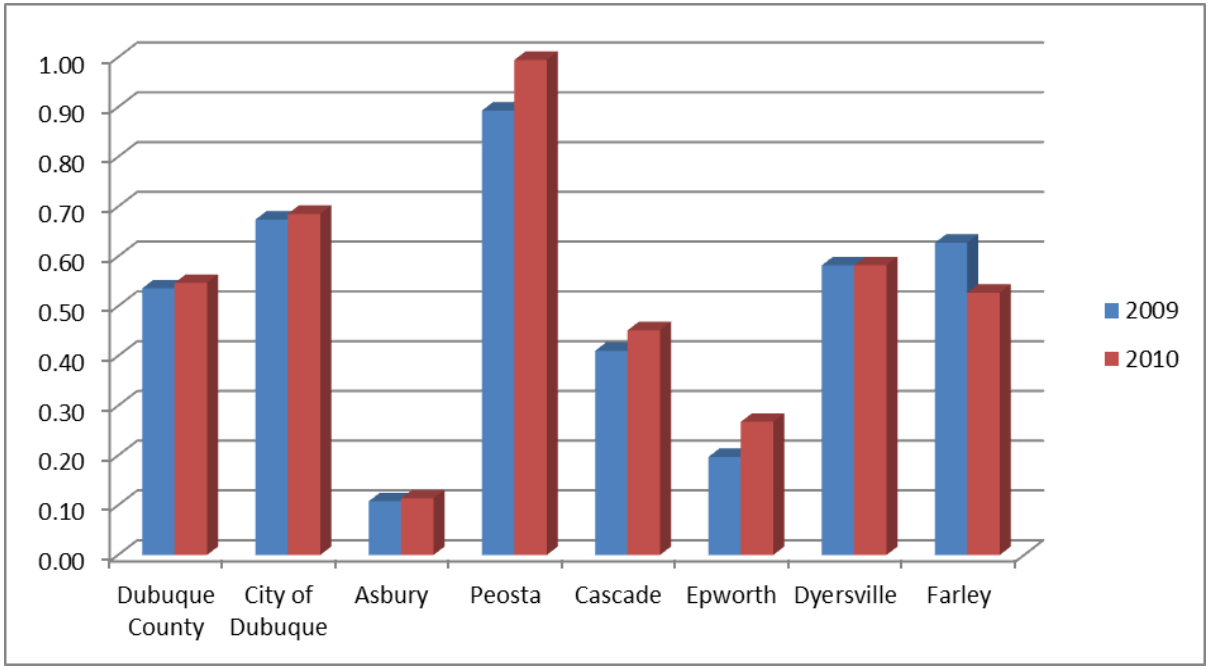


Figure 28: Ratio of primary jobs to total population. Source: U.S. Census Bureau.

Annual Tourism Revenue – Local tax revenue attributable to travel spending

Scope – County

Status – Increasing

Goals – This indicator addresses goal 7

Why is this important?

Local tax revenue attributable to travel spending is a key indicator in measuring progress toward meeting economic development goals. According to the U.S. Travel Association, travel-generated tax revenue is a major benefit to local governments, as they use funds to support travel infrastructure and help support a number of public programs (USTA). Dubuque County has a variety of tourist attractions and recreational destinations (i.e. Sundown Mountain, Heritage Trail, Diamond Jo Casino) that foster travel spending. In turn, this increases tax revenue for the county, thus providing incentive for it to strengthen its position as a regional tourist destination.

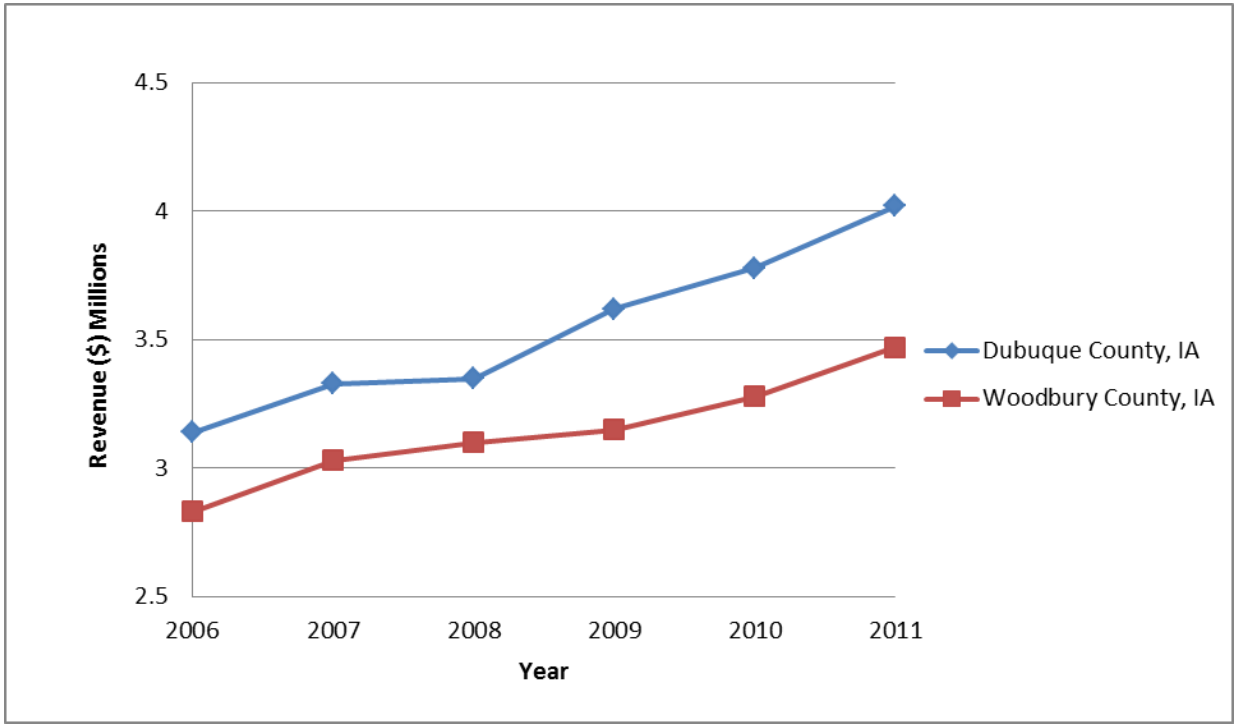


Figure 29: Local tax revenue attributable to travel spending. Source: U.S. Travel Association.

Annual tourism revenue as an indicator measures locally generated tax revenue resulting from tourism. The numbers used are derived from the Travel Economic Impact Model (TEIM) used by the U.S. Travel Association to estimate expenditures, payroll and employment, and tax revenue attributable to travel spending. The TEIM model allows for comparisons across states and counties. Data was not available for all comparison counties and therefore only Dubuque County and Woodbury County are included in the graph.

How are we doing?

Travel spending generated approximately $4.02 million in tax revenue for Dubuque County in 2011 (see Figure 29). This is significantly higher than what the county saw just five years earlier, as travel spending generated roughly $3.14 million in tax revenue in 2006. Tax revenue derived from travel spending in Dubuque County was more than half a million dollars more than in Woodbury County.

Summary

Dubuque County has seen a steady increase in revenue attributable to travel spending. It is out-performing Woodbury County and continues to attract tourists through a number of year-round attractions located within the county.

Transportation

Transportation systems are vital to everyday life within communities: they facilitate the intra- and inter-regional movement of goods and people. They also help to establish the framework for the spatial configuration of industrial and residential development and play a fundamental role in shaping the physical, social and economic landscapes in our settlements (Cytron, 2010). Well-planned transportation systems offer advantages to developing communities by enabling more efficient land consumption and transportation patterns.

On the other hand, poorly organized transportation infrastructure may directly and indirectly contribute to numerous negative externalities, including noise and air pollution, increased number of incidents on the roads, traffic congestion, high maintenance cost, automobile-dependent neighborhoods, and inadequate accessibility and mobility for elderly and social minorities.

Smart Planning Consortium members, in coordination with two regional transportation planning agencies, the Dubuque Metropolitan Area Transportation Study (DMATS) and Regional Planning Affiliation 8 (RPA), strive to provide efficient and affordable transportation to their residents and businesses. Based on the Transportation Diversity principle (as mentioned in Smart Planning elements and principles adopted by the State of Iowa) and Reasonable Mobility principle (from the City of Dubuque's eleven sustainability principles), the Dubuque County Smart Plan outlines 11 goals and objectives for the provision of high-quality transportation infrastructure and more sustainable transportation systems.

These goals seek to minimize the negative environmental impacts of transportation systems through maintaining and furthering existing intergovernmental cooperation, and through the coordination of transportation and land use planning informed by an array of best management practices and sustainable policies.

Specifically, the transportation goals are as follows:

1. To maintain a system of highways, roads, and streets that provide safe and efficient movement of goods and people.
2. To secure adequate right-of-way and facility improvements to serve development and maintain acceptable levels of service.
3. To plan long-range for both local and regional street and highway systems to ensure safe, effi-

cient access into and through the region; to support urban growth in an appropriate development pattern; and to facilitate improved four-lane access for surface transportation from Dubuque to major cities in the region.

4. Formalize policies for property acquisition necessary for future transportation Rights of Way (ROW).

5. To encourage efficient, affordable, and accessible transit systems in the region for the transit-dependent population and as an alternative means of transportation.

6. To maintain safe and efficient utilization of the Mississippi Riverfront for both land and water based commercial, industrial, and recreational traffic.

7. To provide safe and efficient airport services to the community and the region, in coordination with the Airport Master Plan.

8. To support rail opportunities for both commercial/ industrial and passenger service.

9.To establish improved pedestrian and bike routes in the region to encourage alternative modes of transportation.

10. To encourage the use sustainable design concepts to reduce the transportation system's impact on the natural environment.

11. To improve coordination between land use and transportation planning.

Time spent on a daily commute to work

Scope – County

Status – Increasing

Goals – This indicator addresses goal 1

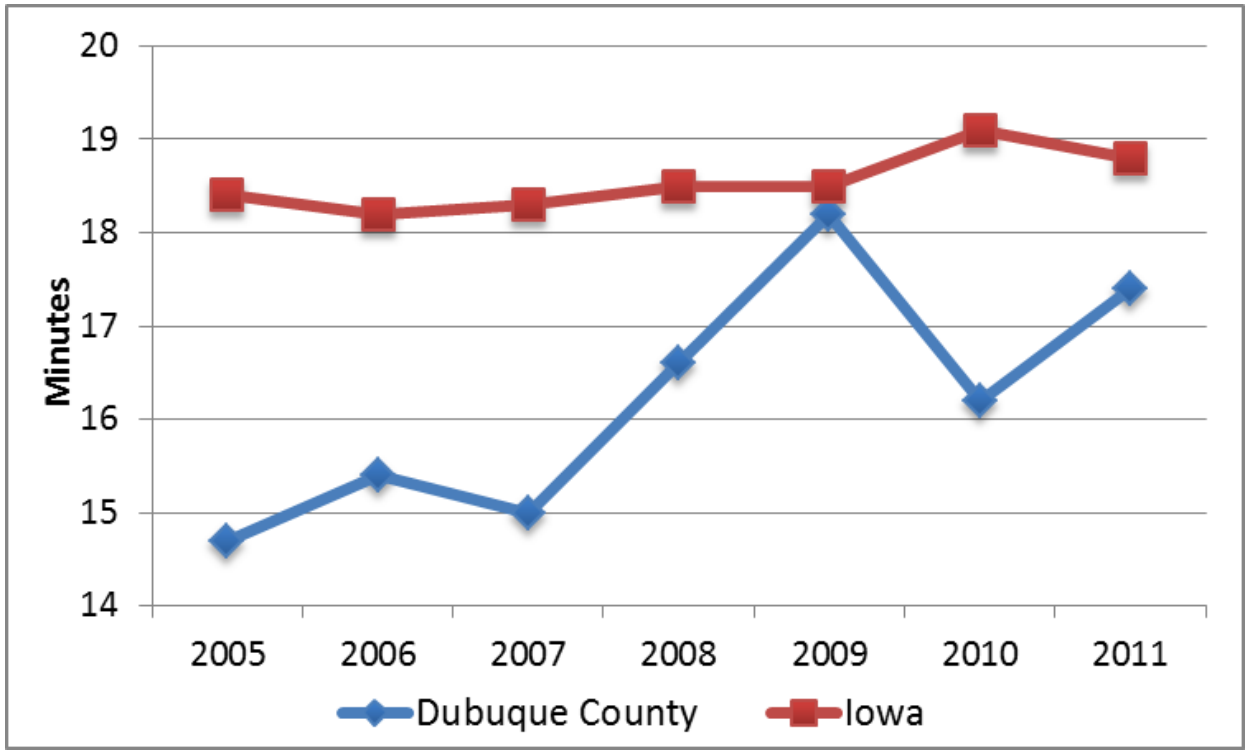


Figure 30: Daily Commute Time to Work in Dubuque County and in Iowa.

Source: U.S. Census Bureau

Why is this important?

The amount of time spent traveling from the point of origin to the point of destination plays a central role in transportation planning. Longer commutes take away productive time that could be otherwise spent. A recent study on trade-offs between commuting time and health-related activities suggests that spending an additional 60 minutes on a journey to work is associated with a 6% decrease in aggregate health-related activities (Christian, 2012). With regards to time tradeoffs, the greatest percentage of commuting time comes from reductions in sleep (28-35%), physical activity (16.1%), and food preparation (4.1%). The results of this study indicate that longer commutes are associated with behavioral patterns, which over time may contribute to obesity and other poor health outcomes.

The goals and objectives outlined in the Smart Plan call to establish and improve a more efficient traffic circulation system while limiting aggregate travel time associated with low-density development. A good measurement of aggregate travel time is the amount of time spent on a daily commute from home to work (Journey to Work). It is

measured on a monthly basis by the U.S. Census Bureau as a part of the American Community Survey and is easily accessible through the online database.

How are we doing?

Today the average commute time to work in Dubuque County is 17.4 minutes (see Figure 30). This is almost a 20% increase compared to 2005. The daily commute time increased steadily until 2009 when it peaked at 18.2 minutes, and was followed by a decline in 2010 and 2011. This translates into almost 140 hours spent on a journey to work per year*. Nevertheless, the average daily commuting time in Dubuque County remains 13% lower than the state average.

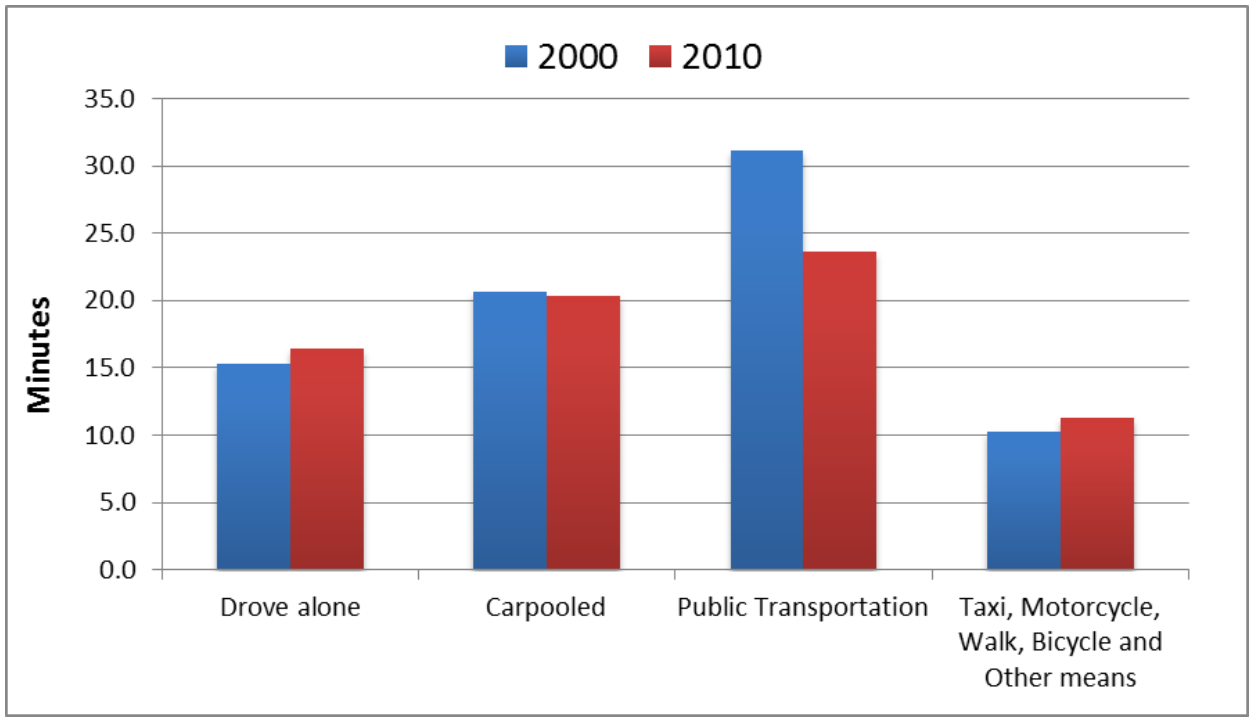


Figure 31: Mean travel time to work by mode in Dubuque County in 2000 and 2010. Source: AASHTO.

The comparison of decennial data from the American Association of State Highways and Transportation Officials (AASHTO) suggests that the mean travel time of those that drove alone increased by 1.1 minutes from 2000 to 2010. On the other hand, the mean travel time of those riding public transit decreased by 7.6 minutes (see Figure 31).

*Calculated with the assumption that there is an average of 240 business days in a year.

Summary

Although the numbers for the study area (17.4 minutes) are still lower than the national average (25.1 minutes), the daily commute time to work in Dubuque County appears to be increasing.

Vehicle miles of travel

Scope – County

Status – Decreasing

Goals – This indicator addresses goal 10

Why is this important?

One of the Smart Plan goals is to reduce vehicle miles traveled (VMT) to protect air quality. However, a reduction of VMT has other benefits, including congestion reduction, decreased number of accidents, improved mobility for non-drivers, energy conservation, and improved public health (Litman, 2012). According to the East Central Intergovernmental Association, even "modest decreases in vehicle miles traveled in the community will result in millions of dollars of savings to the community, and thousands of tons of avoided carbon emissions."

The VMT summary information was calculated from traffic counts taken on state, county, and city roadways from both manual counts as well as automatic traffic recorders (Hansen, 2012). The data was then normalized by population size for the specific observed period.

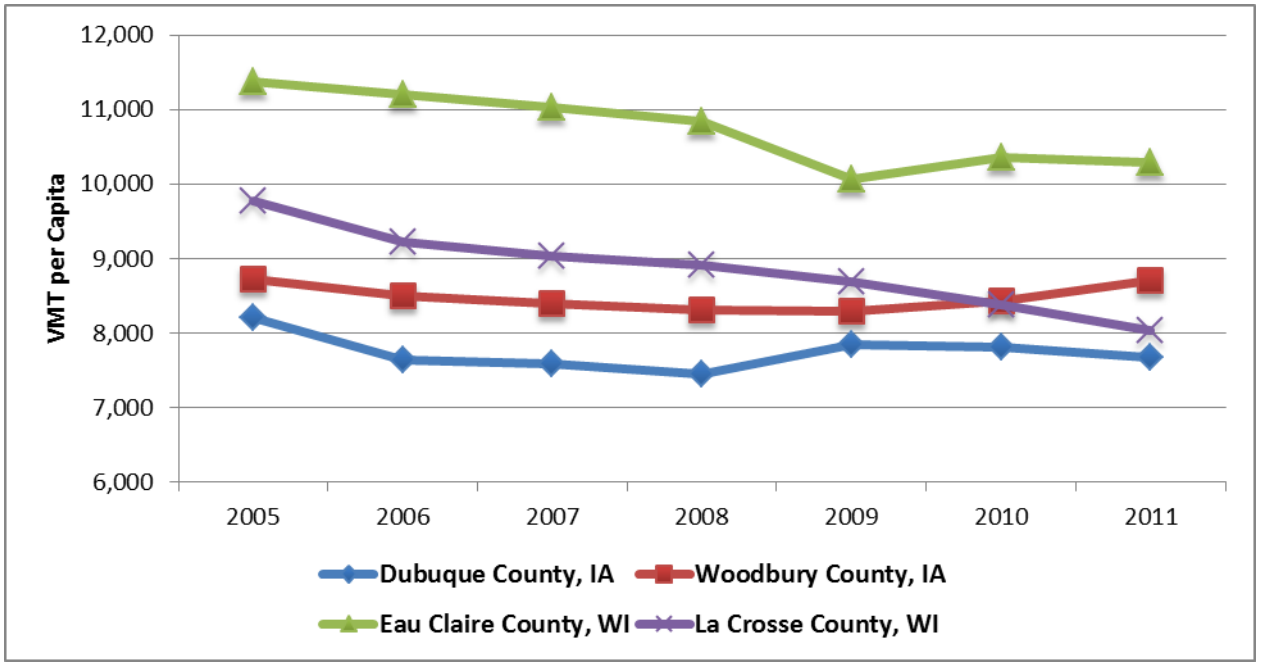


Figure 32: VMT per capita in Dubuque County, IA; La Crosse County, WI; Woodbury County, IA; Eau Claire Coun-

How are we doing?

As seen on Figure 32, the VMT per capita in Dubuque County has steadily declined since 2009. The 2011 total decreased by 6.5% compared to 2005. Overall, Dubuque County performed better than the other comparative counties – on average, the VMT in Dubuque County are about 36% lower

than in Iowa, 14% lower than in La Crosse County, WI; 39% lower than in Eau Claire, WI; and 9% lower than in Woodbury County, IA (see Figure 32). This trend is not necessarily the result of successful transportation planning in Dubuque County. Such variation in VMT per capita can be attributed to different transportation and land use patterns in the communities, as well as varying population densities in the counties.

Summary

The number of VMT has been decreasing for two years in a row. It remains the lowest among the other comparable counties.

Annual Public Transit Ridership

Scope – County

Status – Increasing

Goals – This indicator addresses goal 5

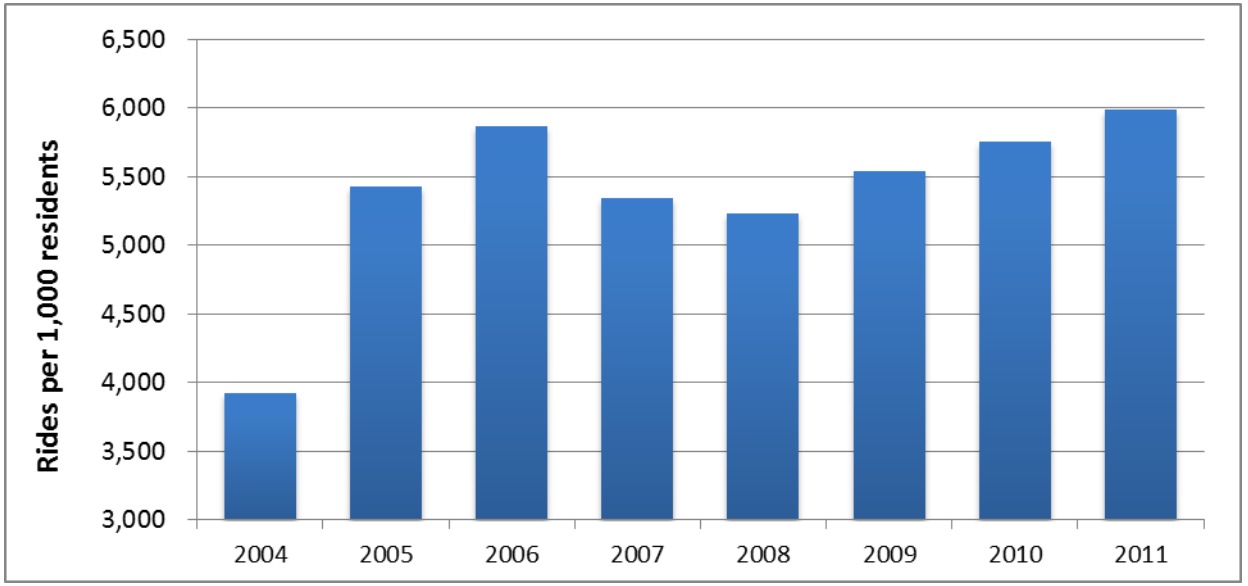


Figure 33: Public Transit Ridership in Dubuque County. Data Source: U.S. Census Bureau, ECIA

Why is this important?

Public transportation systems play a very important role in the daily life of our communities. Transit-oriented developments provide enhanced mobility among less affluent groups of the population. They save fuel, reduce traffic congestion, and stress associated with commuting, thus lowering the carbon footprint and other negative impacts on environment (Public Transportation Benefits).

The Dubuque Smart Plan recognizes the crucial role of transit. It encourages efficient, affordable, and accessible transit systems in the region while searching for the most cost-efficient solutions. The Plan also considers extending and expanding public transportation coverage to new neighborhoods where it is needed. Overall, it outlines a smart road map to better and more sustainable transit.

How are we doing?

Currently, Dubuque County is served by three transit providers: The Jule, Region 8 Transit Authority (RTA) and DuRide. The Jule currently operates seven fixed route lines within the city limits of Dubuque (Long Range Transportation Plan). It also provides seniors and disabled persons with demand response transportation through its mini bus service. RTA provides the county with daily inter and intra-city service, as well as demand response service to rural areas. DuRide is a non-profit transportation program operated by volunteers that serves the elderly population (65 and

older).

As seen on Figure 33, Dubuque County has experienced some fluctuations over the past 8 years and is currently at its highest ridership since 2005, with 5,986 rides per 1,000 residents. These annual numbers reflect the cumulative ridership from the Jule (both mini-bus and fixed route), RTA, and DuRide.

Figure 34 illustrates how the transit ridership in Dubuque County compares to equivalent measures in other counties. On average, transit ridership per 1,000 residents in Dubuque County is almost twice as low as in other comparable counties.

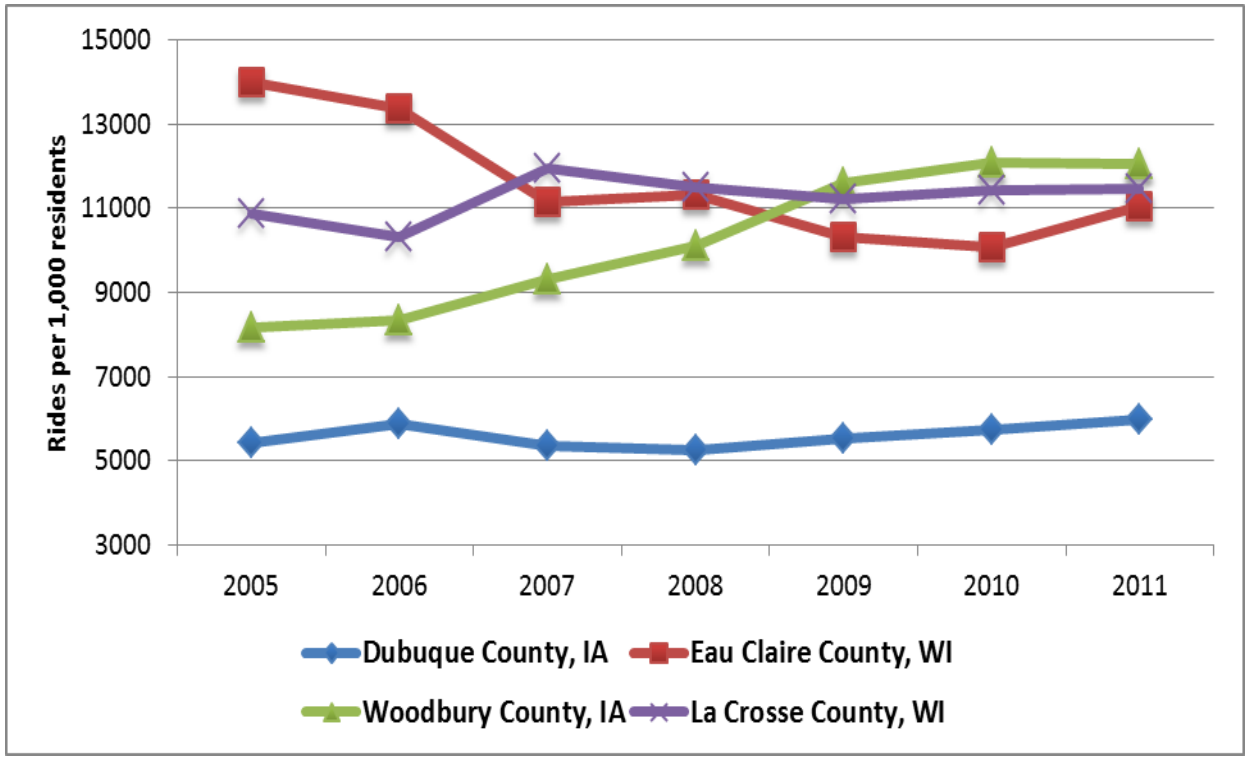


Figure 34: Public Transit Ridership in Dubuque County, Woodbury County, Eau Claire County and La Crosse County. Data Source: U.S. Census Bureau, National Transit Data (2005-2011).

Summary

Transit ridership in Dubuque County has been rising for the last four years. However, it is still relatively low compared to other counties. It is important that the County continues working on expansion of services and develops in a transit-friendly manner. This will allow additional population mobility, as well as improved air-quality.

Crash Fatality Rate

Scope – County

Status – Stabilizing

Goals – This indicator addresses goal 1 and 3

Why is this important?

More than 37,000 people die in road crashes in the U.S. each year, and an additional 2.35 million are injured or disabled (Association for Safe International Road Travel: Road Crash Statistics, 2012). According to the U.S. Department of Transportation, the total societal cost of crashes exceeds $230 billion annually, or an average of $820 per person. Contributing to the death toll are alcohol, speeding, and various other driver behaviors, plus the kinds of vehicles people drive and the roads on which they travel.

The Smart Plan seeks to ensure safe and efficient access into and through the region. It also encourages implementation of sound safety engineering principles and practices in transportation planning as well as maintenance of a system of highways, roads, and streets that minimize long-term capital and operations costs, while providing safe and convenient land access.

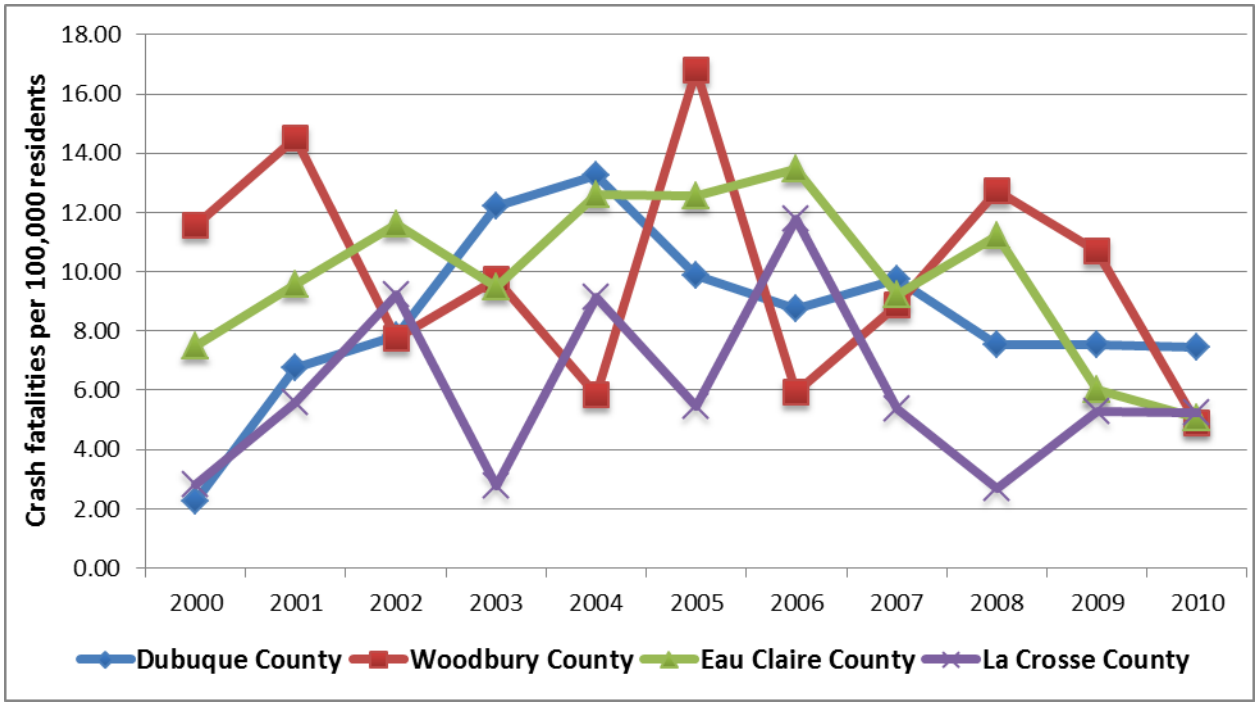


Figure 35: Crash fatality rate per 100,000 people. Source: Federal Reserve Economic Data, NHTSA, U.S. Census Bureau

The indicator measures crash fatality rate per 100,000 people, calculated as:

$$\frac{Total\ Fatalities\ in\ Study\ Area}{Total\ Population\ in\ Study\ Period} \times 100{,}000$$

How are we doing?

The fatality rate in Dubuque County has been stable for the last observed three years (2008-2010). Overall, it decreased by 5.68 since 2004 (see Figure 35). The road crash fatality rate for the state of Iowa has been higher during the observed period (1994-2010).

Summary

The fatality rate has been going down for the last 6 years and is currently stable with around 8.0 fatalities per 100,000 residents. The Dubuque County crash fatality rate remains relatively low in comparison to selected counties.

Alcohol-impaired Crash Fatality Rate

Scope – County

Status – Fluctuating

Goals – This indicator addresses goal 1 and 3

Why is this important?

Every day, almost 30 people in the United States die in motor vehicle crashes that involve an alcohol-impaired driver. This amounts to one death every 48 minutes. The annual cost of alcohol-related crashes totals more than $51 billion (Injury Prevention & Control: Motor Vehicle Safety). In 2010, 31% of all fatal crashes involved alcohol-impaired driving, where the highest blood alcohol concentration (BAC) among drivers involved in the crash was .08 g/dL or higher; and for fatal crashes occurring from midnight to 3 a.m., 66 percent involved alcohol-impaired driving (National Highway Traffic Safety Administration, 2012).

How big is the problem?

• In 2010, 10,228 people were killed in alcohol-impaired driving crashes, accounting for nearly one-third (31%) of all traffic-related deaths in the United States.
• Of the 1,210 traffic deaths among children ages 0 to 14 years in 2010, 211 (17%) involved an alcohol-impaired driver.
• Of the 211 child passengers ages 14 and younger who died in alcohol-impaired driving crashes in 2010, more than half (131) were riding in the vehicle with the alcohol-impaired driver.
• In 2010, more than 1.4 million drivers were arrested for driving under the influence of alcohol or narcotics. That's one percent of the 112 million self-reported episodes of alcohol-impaired driving among U.S. adults each year.
• Drugs other than alcohol (e.g., marijuana and cocaine) are involved in about 18% of motor vehicle driver deaths. These other drugs are often used in combination with alcohol.
Source: Center for Disease Control

The Smart Plan encourages implementation of sound safety engineering principles and practices in the area of street lighting, street layout, speed limits, street signage, street pavement striping, and traffic signals to achieve a lower incident and fatality rate. This indicator shows the alcohol-impaired crash fatality rate per 100,000 residents, calculated as:

$$\frac{Total\ alcohol-impaired\ crash\ fatality\ rate\ in\ Study\ Area\ (for\ BAC \geq 0.8)}{Total\ Population\ in\ Study\ Period} \times 100{,}000$$

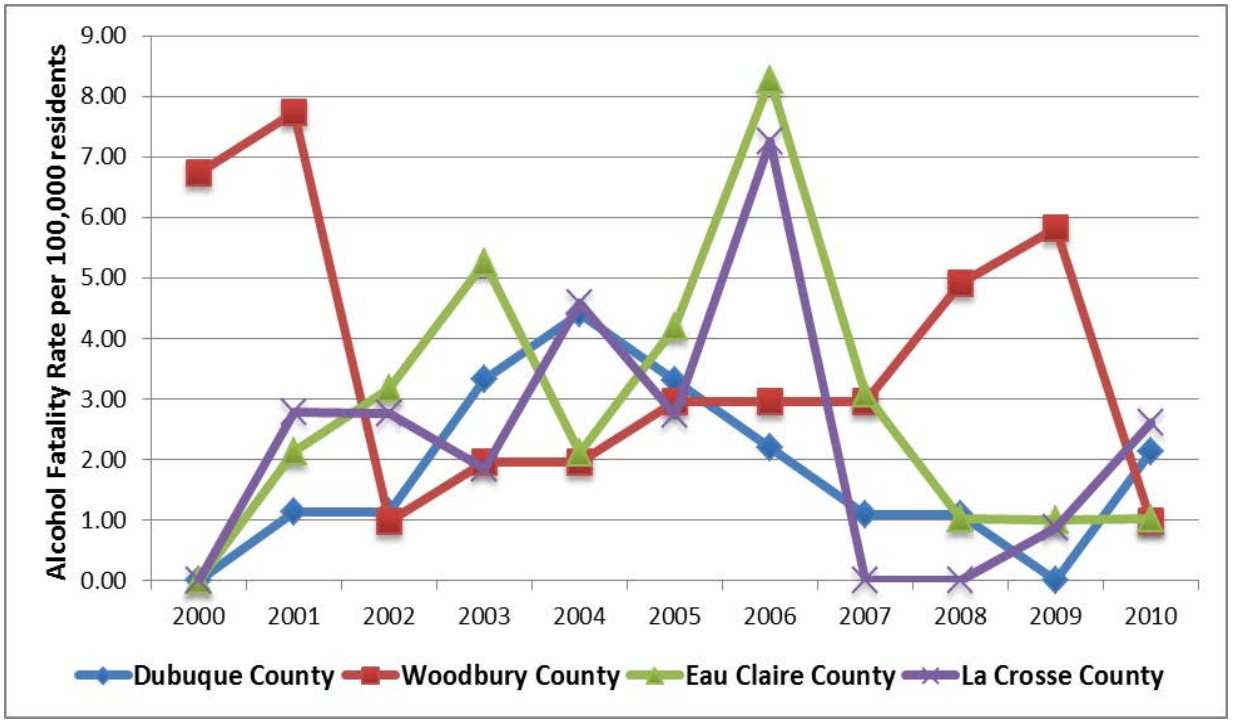


Figure 36: Total alcohol-impaired crash fatality rate per 100,000 population. Source: Federal Reserve Economic Data, NHTSA, U.S. Census Bureau

How are we doing?

The alcohol-impaired crash fatality rate in Dubuque County decreased from 2004 until 2009 (see Figure 36). In 2010, however, there was a 2.13 point increase in alcohol-related fatality rate. On average, during the observed period, Dubuque County had the lowest alcohol-impaired crash fatality rate (1.8). This is almost 29% lower than in La Crosse County (2.31), 58% lower than in Eau Claire County (2.84) and two times lower than in Woodbury County (3.63).

Summary

After fluctuating for 8 years below 3.00, the alcohol-impaired fatality rate jumped to 4.41 in 2004. The rate then decreased until 2010 when it increased rapidly by 2.13 points. Dubuque County has the lower alcohol-impaired crash fatality rate among comparable counties.

Crash and Injury Rates – Number of crashes and injuries per 1,000 people

Scope – County

Status – Fluctuating

Goals – This indicator addresses goals 1, 3, and 5

Why is this important?

Safety is a very important issue in sustainable transportation planning. High traffic volumes, dangerous driver behavior, and substandard infrastructures all lead to traffic accidents, injuries, and even death (Dubuque County Smart Plan, 2011). Crash data and injury data are reasonable indicators to measure the safety level of transportation in Dubuque County. Trends of crashes or injuries can indicate whether traffic safety is an issue. These trends can also signal the fact that policies or other programs may need to be implemented to address such an issue. This indicator addresses the Smart Plan priorities related to safe infrastructure.

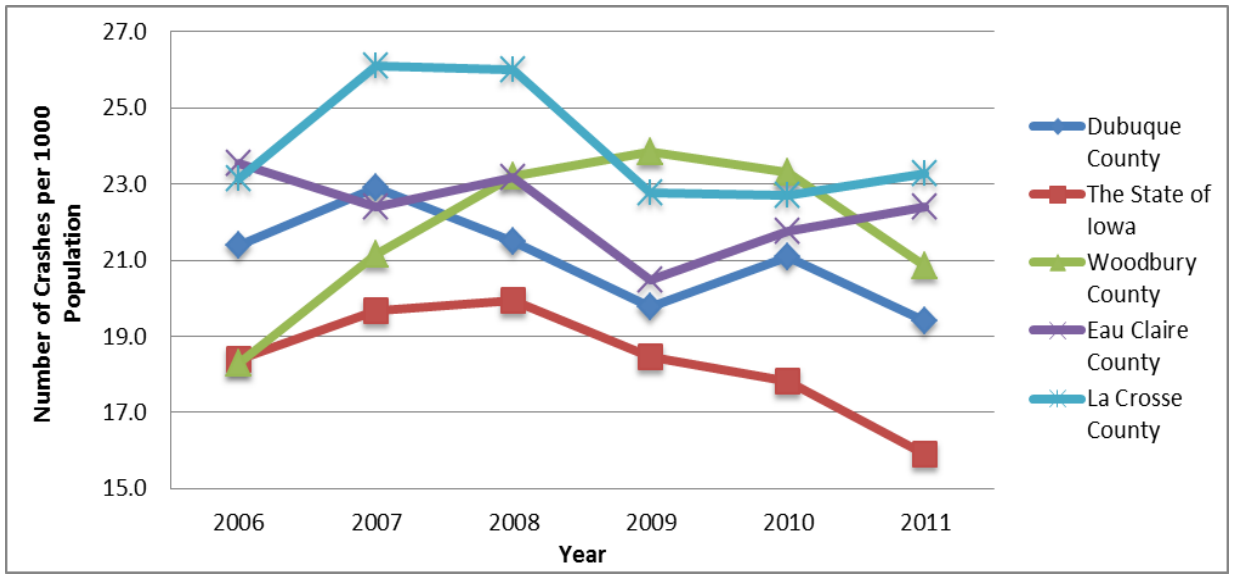


Figure 37: Number of Crashes per 1,000 People. Source: Iowa Department of Transportation Safety/U.S. Census Bureau (1-year estimate)

How are we doing?

The indicator shows annual crashes and injuries per 1,000 people from 2006-2011 in Dubuque County, which is calculated by:

$$\frac{Annual\ total\ crashes\ or\ injuries}{Total\ population} * 1{,}000\ (Dubuque\ County)$$

The crashes included are classified as follows: fatal, major crash, minor crash, possible or unknown crash, and PDO (property damage only). The injury data include fatalities, major injuries, minor injuries, possible injuries, and unknown data.

Figure 37 shows that Dubuque County has had a higher crash rate than the State of Iowa from 2006 to 2011 but lower crash rate than the comparison counties from 2008 to 2011. Additionally, the rate has fluctuated during this time. The injury rates in La Crosse County and Eau Claire County were not available. Thus, the comparison of injury

rates is only made among Dubuque County, the State of Iowa, and Woodbury County. The injury rate in Dubuque County has been decreasing and is much lower than Woodbury County. The exception is 2010, when the injury rate in Dubuque County was lower than the state average (see Figure 38).

Summary

Traffic safety in Dubuque County is improving slightly, especially in 2011, but more efforts need to be made to achieve a higher safety level. The crash rate is higher than the state average.

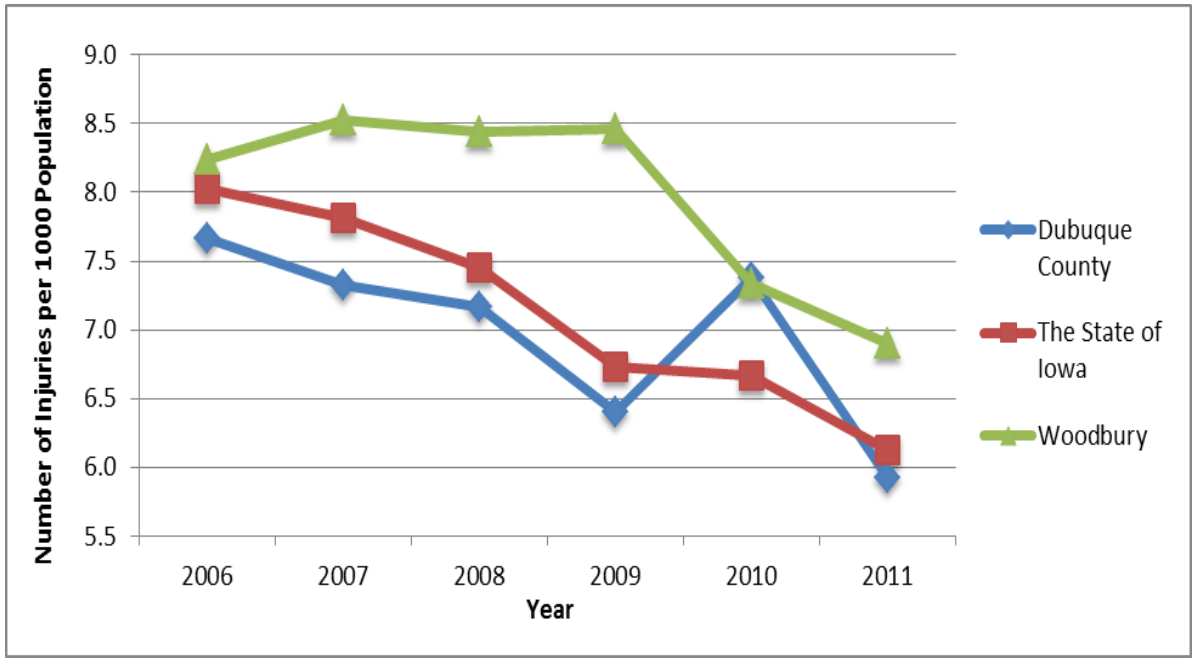


Figure 38: Number of Injuries per 1,000 People. Source: Iowa Department of Transportation Safety/U.S. Census Bureau (1-year estimate).

Mode Distribution – Percent of workers who drive alone, share cars, or take public transit in Dubuque County

Scope – County

Status – Workers driving alone – Increasing

Workers sharing cars – Decreasing

Workers using public transit - Increasing

Goals – This indicator addresses goals 1, 3 and 5

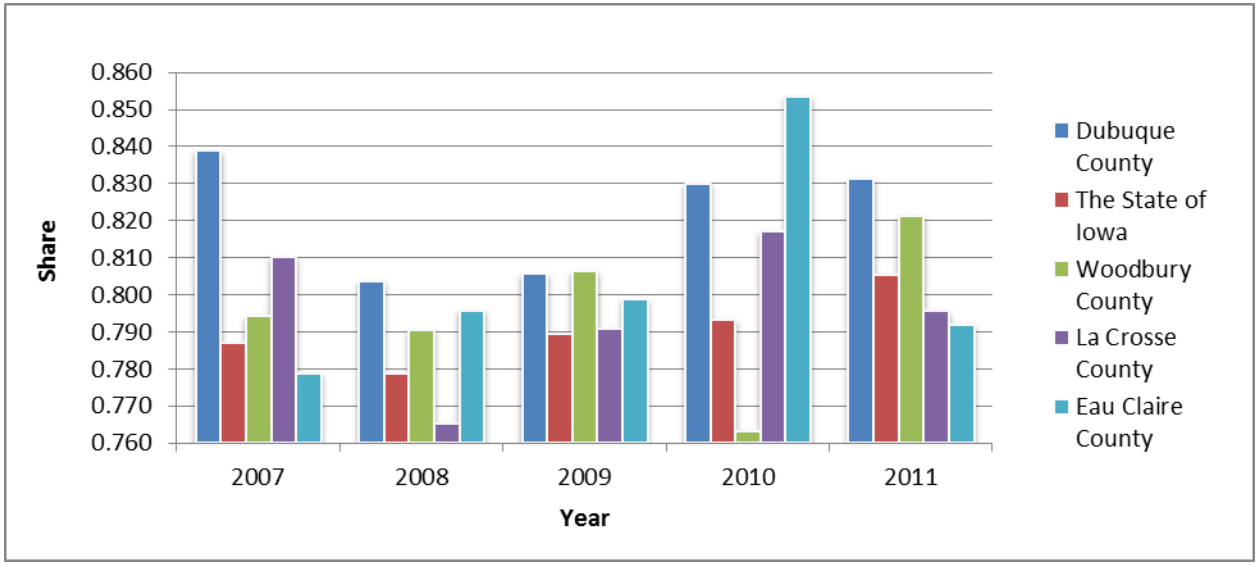


Figure 39: Share of workers who drive alone to work. Source: Federal Highway Administration.

Why is this important?

Mode distribution shows how residents travel to work. A large majority of the workers choose to drive alone because of convenience and time concerns. However, automobile dependence can cause negative effects on the environment and neighborhoods, including increased air pollution, noise, fuel consumption, and congestion. Therefore, it is necessary to encourage workers to use public transit and/or share commutes rather than driving alone.

The annual travel mode distribution indicates that there has been a change of mode choices over the past several years. More workers are transferring to car sharing and using public transportation, indicating positive progress for transportation planning in Dubuque County. In comparing the data to the State of Iowa, we can see if Dubuque County has done a good job offering mode choices and how to improve the situation.

How are we doing?

Data on mode choices for the population 16 years and older in Dubuque County, the State of Iowa and the comparison counties from 2007-2011 has been collected by the American Community Survey (see Figures 39, 40, and 41). The mode choices include car, truck, or van (drove alone); car, truck, or van (carpooled); public transportation; walked; other means; and worked at home. The annual proportion of those driving alone, sharing

cars and taking public transit in Dubuque County, the State of Iowa and the comparison counties are presented in the three following graphs. The shares of each mode choice from 2007 to 2011 for Dubuque County have fluctuated. However, Dubuque County has a higher percent of workers driving alone and a lower percent of worker who shared cars or chose public transit than the state average and the comparison counties.

Summary

Dubuque County has less sustainable mode distribution than the state, since a high percentage of workers drive alone to work. The percentage has fluctuated in recent years.

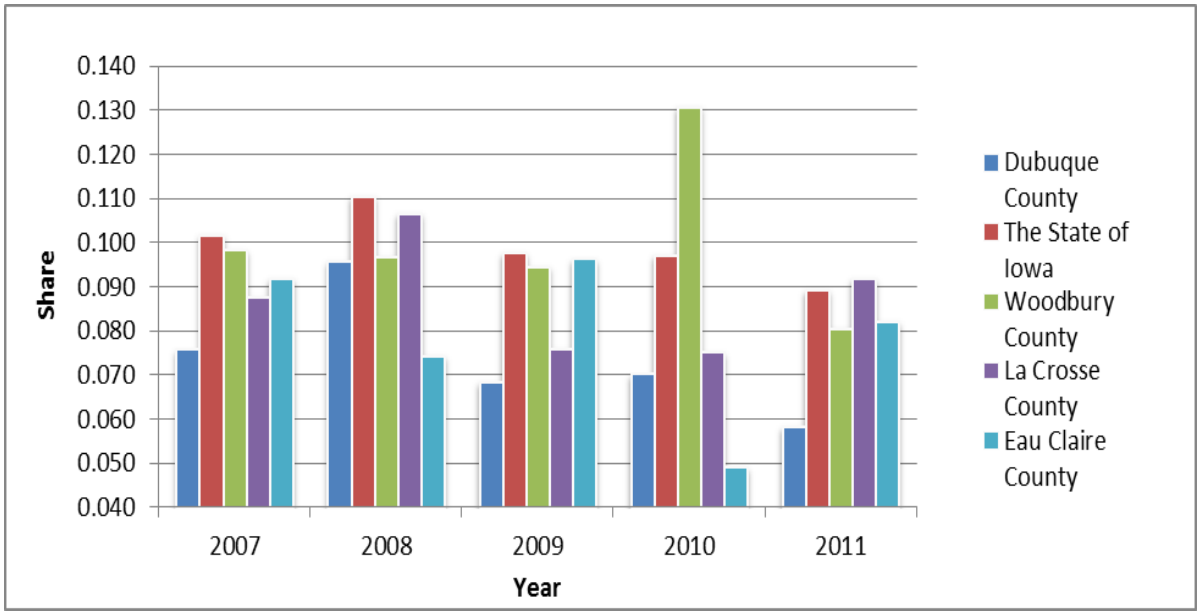


Figure 40: Share of workers who shared cars, trucks or vans. Source: Federal Highway Administration

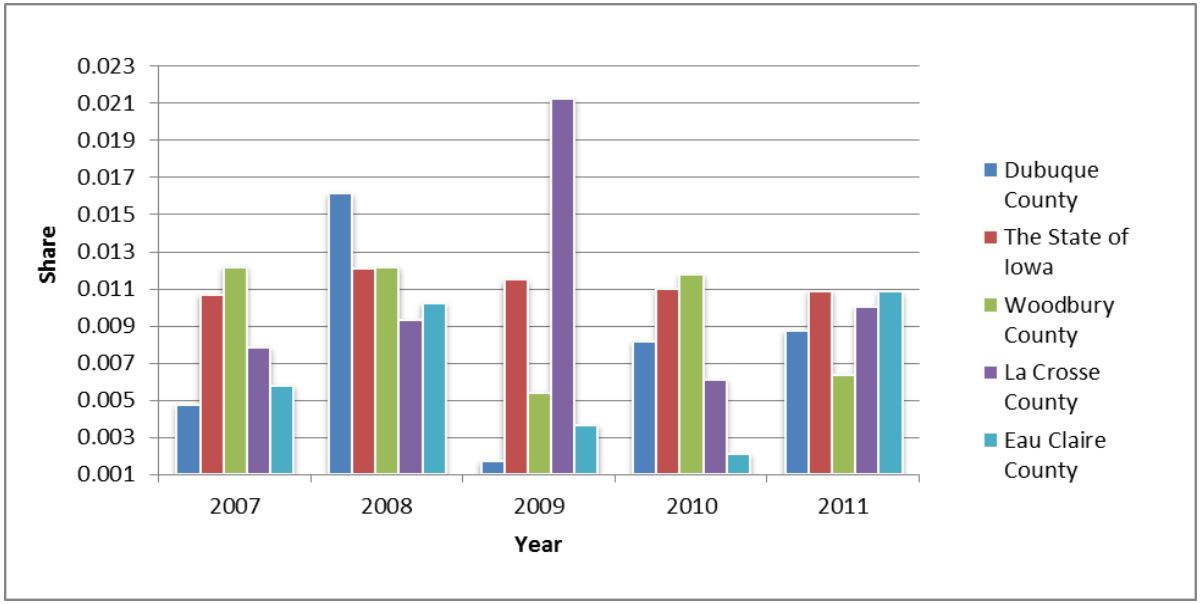


Figure 41: Share of workers who chose public transit. Source: Federal Highway Administration

Walk Score – Walkability as determined by the site Walkscore.com

Scope – City

Status – Baseline

Goals – This indicator addresses goal 9

Why is this important?

The Smart Plan's goals for transportation include the promotion of development patterns that are compatible with pedestrian travel and a pedestrian-friendly transportation network. Walking is important to multiple facets of sustainability including health, safety, and the environment. Increasing the walkability of an area can help reduce the number of vehicle miles traveled (VMT) and alleviate transportation issues such as traffic congestion and parking demand. Walkable communities also have implications for the health of residents; one study by the University of Utah found that residents living in a walkable neighborhood weighed 6 to 10 pounds less than those living in a sprawling neighborhood (Natural Resources Defense Council, 2008).

Walk Score	Description
90 - 100	**Walker's Paradise** Daily errands do not require a car.
70 - 89	**Very Walkable** Most errands can be accomplished on foot.
50 - 69	**Somewhat Walkable** Some amenities within walking distance.
25 - 49	**Car-Dependent** A few amenities within walking distance.
0 - 24	**Car Dependent** Almost all errands require a car.

Figure 42: Walk Score Classification System. Source: Walkscore.com

Walk Score is a number between 0 and 100 that measures the walkability of an address, zip code, or city (see Figure 42). Data for this indicator comes from the Web site www.walkscore.com, which uses a patent-pending algorithm that awards points based on the distance to amenities in each category (Walk Score, 2013). Amenities within 0.25 miles receive maximum points, and amenities further than one mile are awarded no points. Walk Score uses a variety of data sources including Google, Education.com, Open Street Map, and Localeze.

Walk Score is not a perfect measure of walkability. It uses an "as the crow flies" distance to amenities, meaning that the site assumes you can walk in a straight line to any point within a given dis-

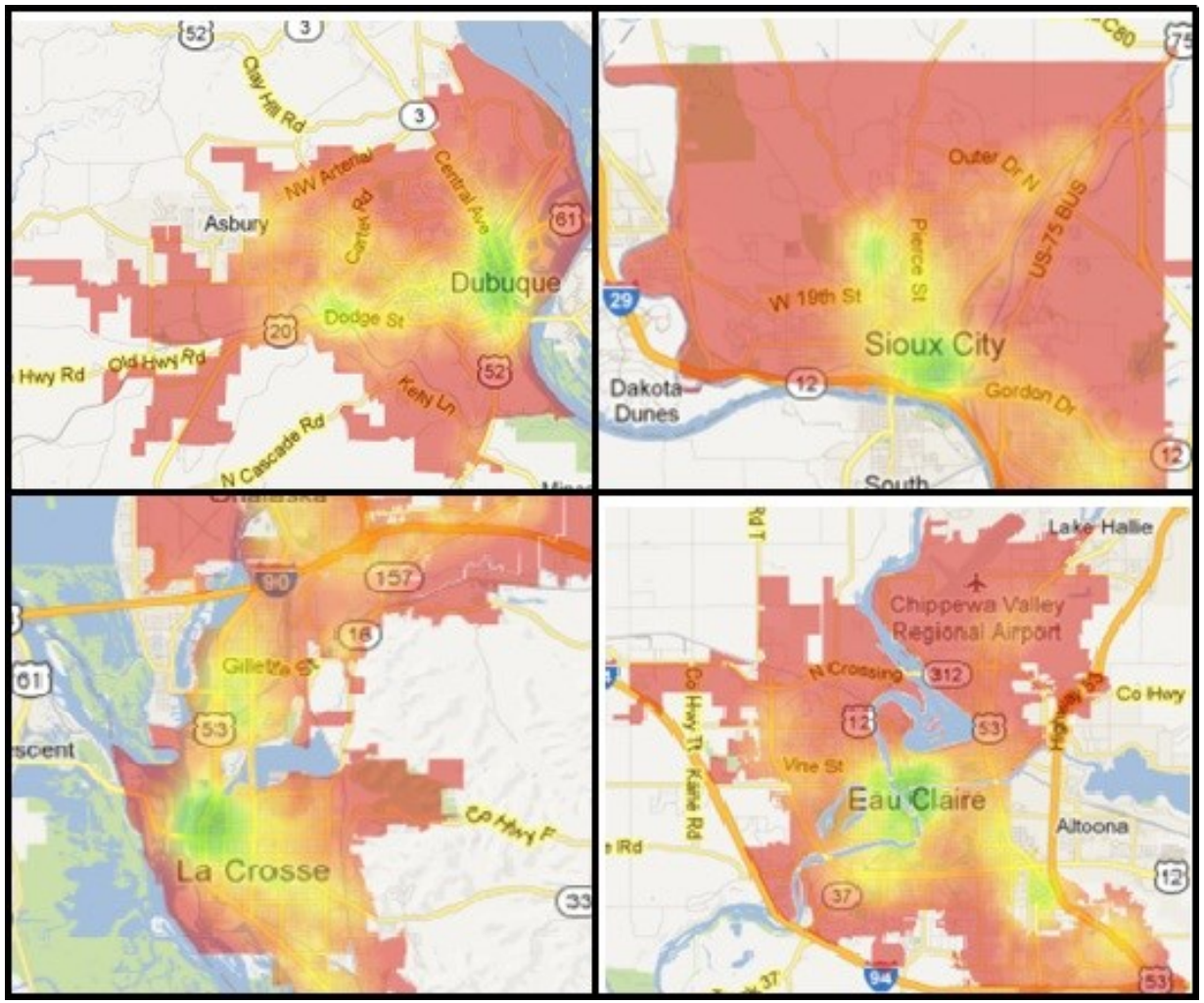


Figure 43: Heat Maps for Dubuque and Comparison Cities.

Source: Walkscore.com

tance, whether or not there are obstacles in your way or a network of sidewalks to get you there. Walk Score also does not consider the safety of road crossings, topography, or climate. Nonetheless, this is a quick and simple approximation of walkability. It is therefore easy for the cities within Dubuque County to occasionally check their Walk Score as well as compare themselves to other cities.

How are we doing?

Walk Score gives the City of Dubuque a 52, ranking it as somewhat walkable. Asbury, Cascade, and Dyersville are considered somewhat walkable as well. The very small towns in Dubuque County received extremely low walk scores because they are almost entirely residential in nature. Asbury, Cascade, Dubuque, and Dyersville have a higher Walk Score than the comparison cities of Eau Claire, WI and Sioux City, IA, but a lower score than La Crosse, WI (see Figure 44). Walk Score creates heat maps for large cities using a spec-

trum of red to green to represent the least to most walkable areas, shown in Figure 43. Increasing the number of commercial and public services in each town would increase Walk Scores by decreasing the distance that residents must travel. In addition to increasing the overall number of amenities in each community, it is important to encourage mixed use zoning districts so these amenities are located within a walking distance of residences.

Summary

The cities of Asbury, Cascade, Dubuque, and Dyersville are somewhat walkable. Bankston, Durango, Epworth, Farley, Peosta, and Sageville are car-dependent. Promoting a greater mix of land uses and variety of development in these communities would increase their Walk Score. This could be accomplished through changes to the cities' zoning codes.

Cities in Dubuque County	Walk Score	Classification
Asbury	52	Somewhat Walkable
Bankston	0	Car-Dependent
Cascade	69	Somewhat Walkable
Dubuque	52	Somewhat Walkable
Durango	0	Car-Dependent
Dyersville	52	Somewhat Walkable
Epworth	43	Car-Dependent
Farley	35	Car-Dependent
Peosta	40	Car-Dependent
Sageville	5	Car-Dependent
Comparison Cities		
Eau Claire, WI	46	Car-Dependent
Sioux City, IA	46	Car-Dependent
La Crosse, WI	60	Somewhat Walkable

Figure 44: Walk Score Comparison. Source: Walkscore.com

Access to Bike and Hiking Trails per 1,000 residents

Scope – County

Status – Baseline

Goals – This indicator addresses goal 9

Why is this important?

Good bike and hiking trails can improve residents' quality of life by reducing the number of vehicles on the road and reducing transportation cost. If more people bike and walk rather than drive automobiles, there may be a reduction in pollution. These facilities also promote a healthy lifestyle for residents. Facilities for bicycling and walking require less space than facilities for motor vehicles, and if residents utilize these facilities, it may help to reduce the traffic congestion to some extent. Increased levels of trails use can result in significant benefits in terms of health and physical fitness, not only for the individual but for the community as a whole (Trails and Open Space Coalition).

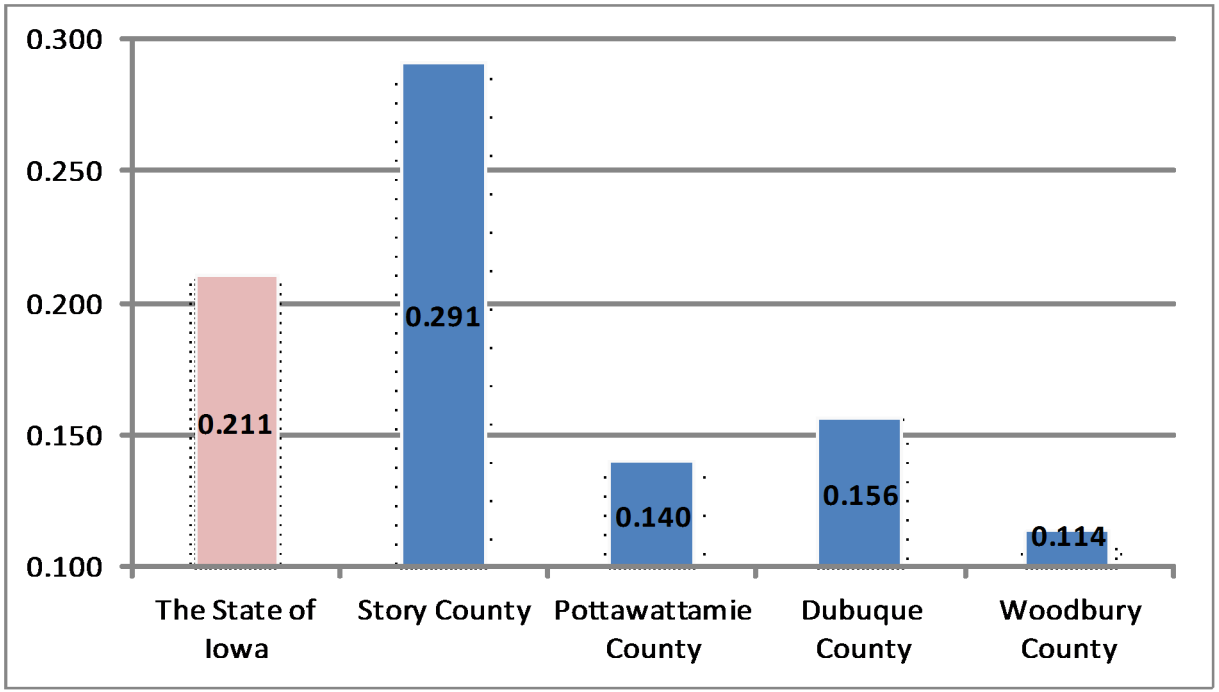
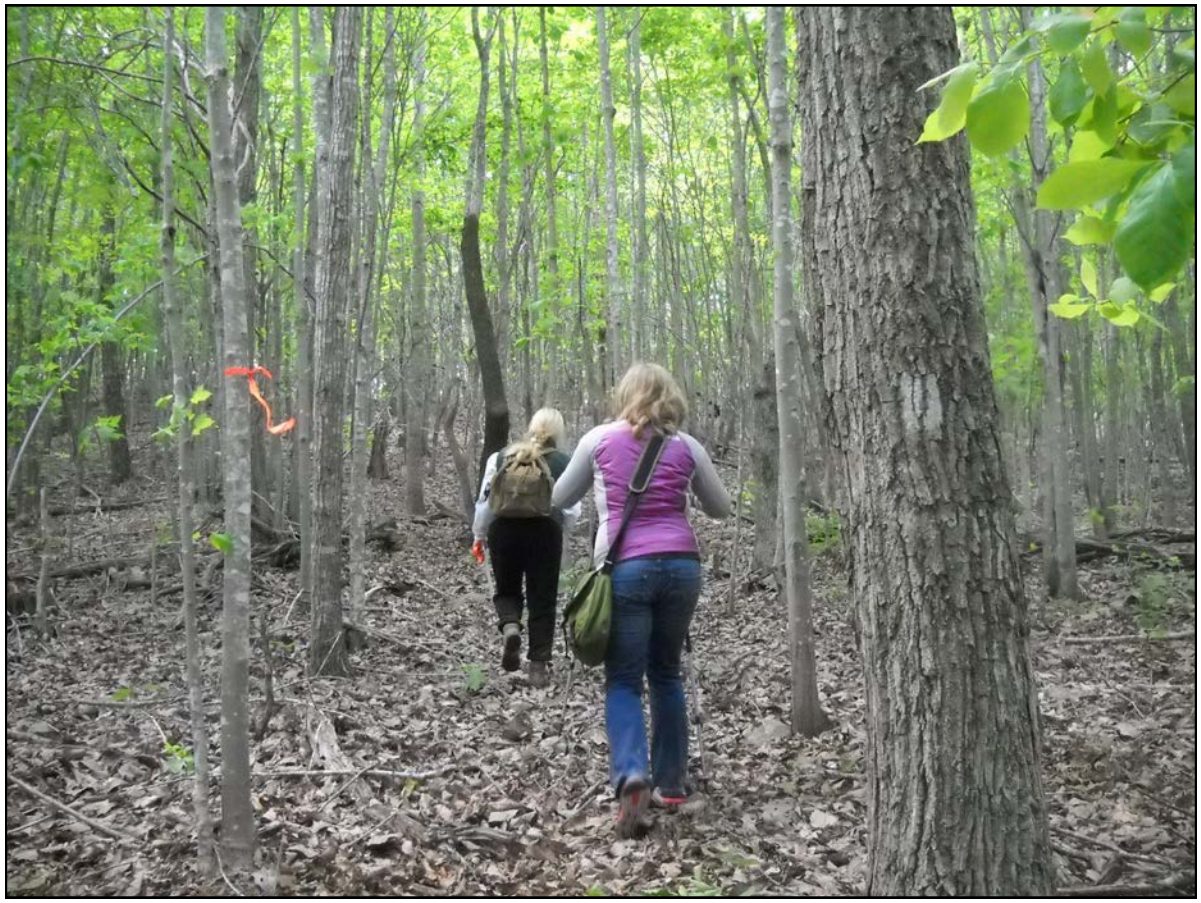


Figure 45: Miles of Bike and Hiking Trails per 1,000 residents in Dubuque County, the State of Iowa and Comparison Counties for 2011. Source: Natural Resources Geographic Information Systems Library and American Fact Finder

Trails provide alternative safe transportation routes between work places, parks, residential areas, and commercial areas. Trails also provide easily accessible and low-cost recreation for many segments of the population. These facilities can accommodate diverse activities such as walking, running, pushing a stroller, rollerblading, bicycling, horseback riding, bird watching, or studying nature (Trails and Open Space Coalition). Trails can also attract tourism. For travelers who come

from other cities, a trail can provide a more convenient and relaxing way to arrive at their destination without needing to rent a car and face traffic.

As the population and communities continue to grow, the demand for trails is likely to keep increasing.



How are we doing?

Download the GIS data from the Online Natural Resources Geographic Information Systems Library (NRGIS) and calculate the miles of bike and hike trails in Dubuque County. Since the data from La Crosse County and Eau Claire County was not available, Pottawattamie County, Woodbury County, and Story County have been selected to make comparison because these three counties have similar population and geography characteristics as Dubuque County. The average level for the whole state was also analyzed. Figure 45 displays the results. It indicates that Dubuque County has a relative lower accessibility to bike and hike trails than the state level. Story County has a relatively high level of accessibility to bike and hike trails.

Summary

Dubuque County should establish more bike and hiking trails to improve transportation safety and increase access to recreation possibilities.

Land Use

The regional land use goals and objectives are closely interconnected with goals outlined in other chapters of the Smart Plan. The manner in which land is utilized underlies all of the other chapters in the Smart Plan. Land use decisions both enable and constrain development and policies, therefore fundamentally influencing sustainability across the themes and throughout the region.

The Land Use chapter goals and objectives are designed to direct regional sustainability by managing for growth through cross-jurisdictional and intergovernmental cooperation with the ultimate goal of coordinated growth management that minimizes the spill-over effects of urban development and curbs the future potential for sprawl.

To this end, regional land use goals seek to encourage diverse, livable, and affordable residential and mixed-use communities that offer a range housing options and access to a variety of amenities and community facilities. The goals aim to provide opportunities for industrial and commercial development to support and enhance local and regional economic development while protecting sensitive areas and promoting agricultural productivity and natural resource conservation efforts. Further, the land use goals and specific objectives promote urban design that minimizes the use of raw materials and energy consumption as well as promoting multi-modal transportation options.

Given the interconnectedness of the land use goals with those set forth in other chapters, whenever possible, comprehensive indicators are constructed to measure progress towards multiple goals and objectives across themes. Many of the land use indicators are metrics commonly associated with measuring mixed use and sprawl. The indicators that are included in this report were selected in part because they fit the indicator selection criteria established (i.e., these indicators are representative of goals, data is readily available data, and the measurement is easily replicable).

The Land Use chapter goals are as follows:

1. To keep the Land Use Plan and Future Land Use Map current with changing growth conditions in the Region.
2. To plan for the future and orderly development within a regional context.
3. To protect and enhance the viability, livability, and affordability of residential neighborhoods, while integrating multifamily development throughout the region.
4. Ensure that opportunities for convenient and concentrated commercial development are provided to support both the local and regional market.
5. Provide sufficient opportunities for industrial development sites within the community.
6. To balance open space and environmental preservation with the community's development

needs.

7. Ensure that the physical character and form of the region reflects its historic setting and that the built environment is compatible with the natural environment.

8. Encourage the concept of mixed-use development to create diverse and self-sufficient neighborhoods.

9. To encourage redevelopment opportunities within the region in an effort to revitalize unused or underused property while promoting the preservation of viable and affordable housing stock.

10. To provide physical accessibility throughout the region.

11. To promote principles of good urban design as part of all development.

Job-Housing Balance – The ratio of jobs to housing units within a specified geographic area

Scale – County

Status – Baseline

Target – To be Determined

Goals – This indicator addresses goals 4 and 8

Why is this important?

Job-housing balance is a measure of employment compared to housing within a specified area of analysis. As this ratio implies that both residential housing and employment opportunities exist within the geographic area, this indicator serves as a proxy measurement for mixed-use development and the concentration of commercial markets. This indicator uses a measurement of "jobs" represented by the number of employees that were paid by business establishments, made available through the U.S. Census Bureau's County Business Patterns dataset.

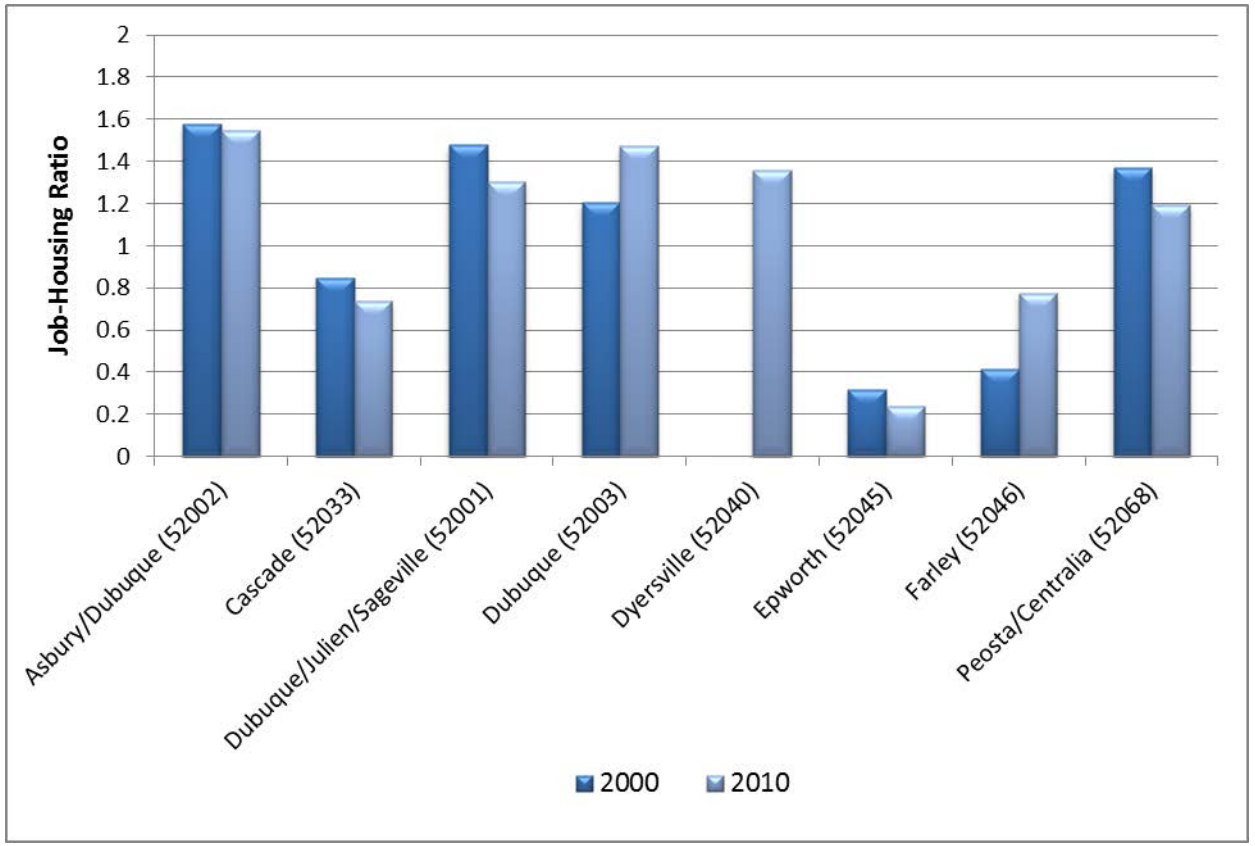


Figure 46. 2000 and 2010 job-housing ratios for Consortium member communities. Source: U.S. Census Bureau

In the absence of specific labor workforce figures, the common recommended standard or target for the jobs to housing unit ratio is 1.5:1 with a recommended range of 1.3:1 to 1.7:1 (Ewing, 1997 and Weitz, 2003). This target attempts to account for households with multiple residents in the workforce. A ratio outside of this above this range indicates that there is a possible surplus of

jobs and that the local housing stock may not be keeping up with job growth in the area. Conversely, a lower ratio can indicate a relative shortage of local employment opportunities. In both situations, an imbalance between employment and housing can indicate a relative lack of mixed-use development and higher rates of commuting into areas where jobs are available. Consequently, we may expect to see some of the environmental and social costs (e.g., traffic congestion, accident rates, and air pollution) related to greater vehicle miles traveled (VMT). Having a (un)balanced job-housing ratio, has significant implications for not only land use, but also has policy implications for local economic development and transportation.

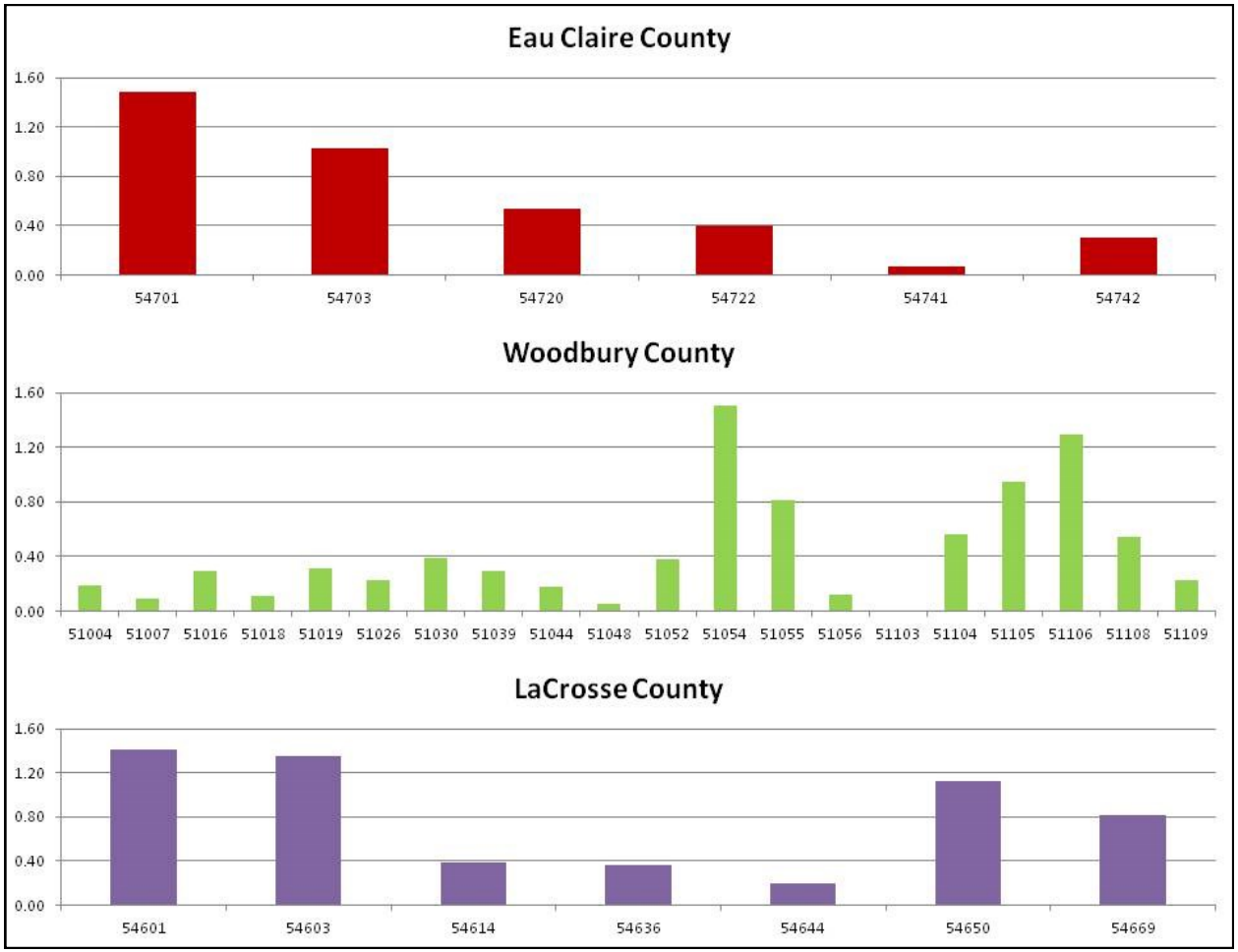


Figure 47: Job-housing ratios for comparison counties.

How are we doing?

The 2010 job-housing ratios range from 0.26:1 in Epworth to 1.55:1 in the Dubuque/Asbury area (see Figure 46). In calculating the 2010 job-housing ratio for zip codes in Dubuque County, we find that within the zip codes that represent the Consortium cities, the communities of Asbury, Dubuque, and Dyersville have relatively balanced job-housing ratios. It should be noted that 2000

employment data at the zip code level was unavailable for Dyersville. Within the zip code boundaries for the communities of Cascade, Epworth, Farley and Peosta/Centralia, there appears to be an imbalance with fewer jobs per house relative to the standard targets.

Between 2000 and 2010, there does not appear to be a consistent trend towards a higher or lower ratio across these communities. Over this time period in the Asbury/Dubuque area, there was a similar percentage change in the number of housing units and the number of paid positions (just over 30%). Despite having a low job-housing ratio, the Farley area saw over a 100% increase in area employment. While in Epworth, there was a 19% increase in housing units but an 11% decrease in jobs. It should be noted that this analysis does not include zip codes 52004 (PO Boxes only) or 52099 which is a unique zip code for McGraw-Hill.

Comparisons to Eau Claire County, WI, La Crosse County, WI, and Woodbury County, IA, are shown in Figure 47. As in Dubuque County, there is quite a lot of variation in the job-housing ratios among zip codes in the comparison counties.

Summary

In conducting the analysis at the zip code level, findings suggest that there is a relative spatial balance between employment opportunities and the labor force within the City of Dubuque and in the areas in close proximity to the west and northwest of Dubuque. When measured at the zip code level, communities farther from and south/southwest of Dubuque tend to have lower job-housing ratios.

Further detailed analysis should be conducted in order to develop a more thorough understanding of job poor and/or rich areas for specific policy targeting. A more refined analysis, for example at the census block or tract level, could provide far more nuanced details regarding communities that are considered to be job-rich and job-poor. Further, a more refined analysis in which the number of jobs is measured against the number of residents currently in the labor force may prove useful particularly in areas with a higher proportion of retirees. Additionally, future analysis could examine qualitative characteristics of local employment. For example, is there a balance between high/low wage jobs relative to the local labor force? The U.S. Census Bureau's Longitudinal Employer-Household Dynamics Program does provide some data to conduct such analysis but data is currently limited and not available for much of Dubuque County.

Ratio of population growth and single-unit structures growth

Scope – County

Status – Increasing

Goals – This indicator addresses goals 3, 8 and 11

Why is this important?

Low-density residential development occurring at the outskirts of cities is usually referred to as urban sprawl. This pattern of development, typically characterized by single-family residences, larger lot sizes, and single-use development, is commonly associated with negative consequences such as high auto dependency, various traffic complications, higher per person CO_2 emissions, worsening air quality, and the loss of agricultural land or forest. Overall, these problems make American cities and communities less sustainable. The Dubuque Smart Plan prioritizes limiting sprawl and aggregate travel time through the use of mixed-use and infill development while maximizing the utility of existing infrastructure and encouraging reinvestment to the existing neighborhoods.

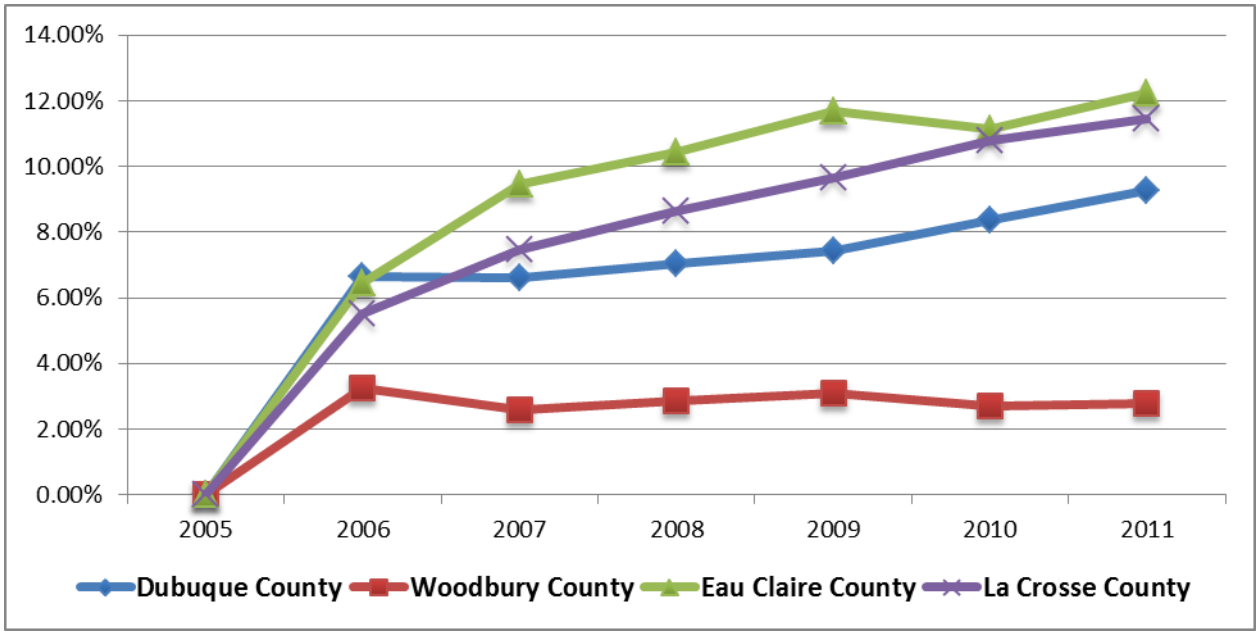


Figure 48: Population growth in Dubuque County and in Iowa. Source: ACS 1-year estimates, U.S. Census Bu-

It is evident that single-unit detached housing consumes more land per household compared to other multi-unit residential structures, and it can be expected that the local housing stock will need to keep pace in order to accommodate a growing population. The relationship between single-unit detached housing and population is analyzed as an indicator to assess the county's progress towards the Smart Plan's stated goals pertaining to increasing multi-family development throughout the region, promoting good urban design, and increasing mixed-use development. The indicator provides the ratio of the change of single-unit detached

structures to population change Dubuque County and the state of Iowa.

How are we doing?

While the rate of population change in Dubuque County was steady during the last 5 years, the annual rate at which the number of single-unit detached structures increased (Figures 48 and 49) jumped from approximately 1.5% to more than 7% in 2009, before stabilizing around 5% in 2010 and 2011. This indicates that the growth in the number of single-unit detached houses is outpacing population growth in the county.

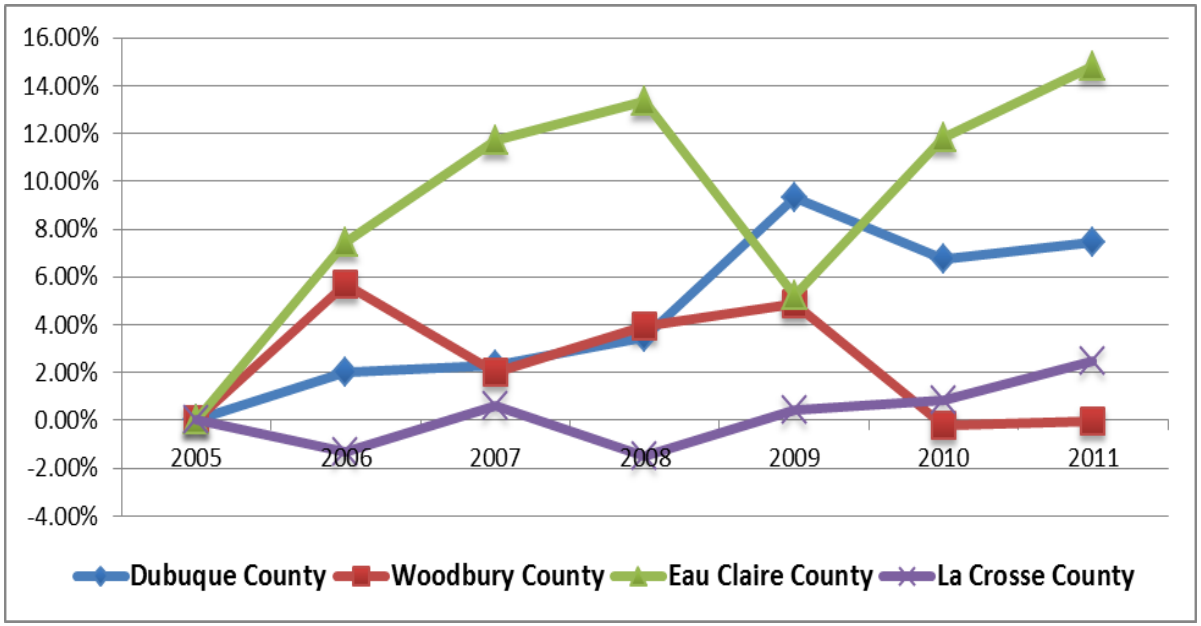


Figure 49: Increase in single-unit detached structures change. Source: ACS 1-year estimates, U.S. Census Bureau

Figure 49 illustrates the ratio of single-units percentage growth to population growth. Normally, we would expect these two variables to be roughly equal, which would be indicated in a ratio of 1. The lower the ratio, the higher the percentage increases of single-unit structures as compared to population growth.

As can be seen on the Figure 49, single-unit percentage increase surpassed the population growth in the county in observed six-year period, with the exception of 2009. On average, Dubuque County scored lower than Woodbury County and Eau Claire County, where population growth remained the same as single-unit growth. The ratio for La Crosse County is almost 80% lower than in Dubuque County. This indicates that single-unit housing growth in La Crosse County was almost 5 times as high as population growth.

Summary

Although population growth in Dubuque County remained steady since 2006, Dubuque County has experienced a rapid increase in the rate at which single-unit structures were built. This trend has been leveling off over the last 2 years, but it is still relatively high compared to Woodbury County and Eau Claire County.

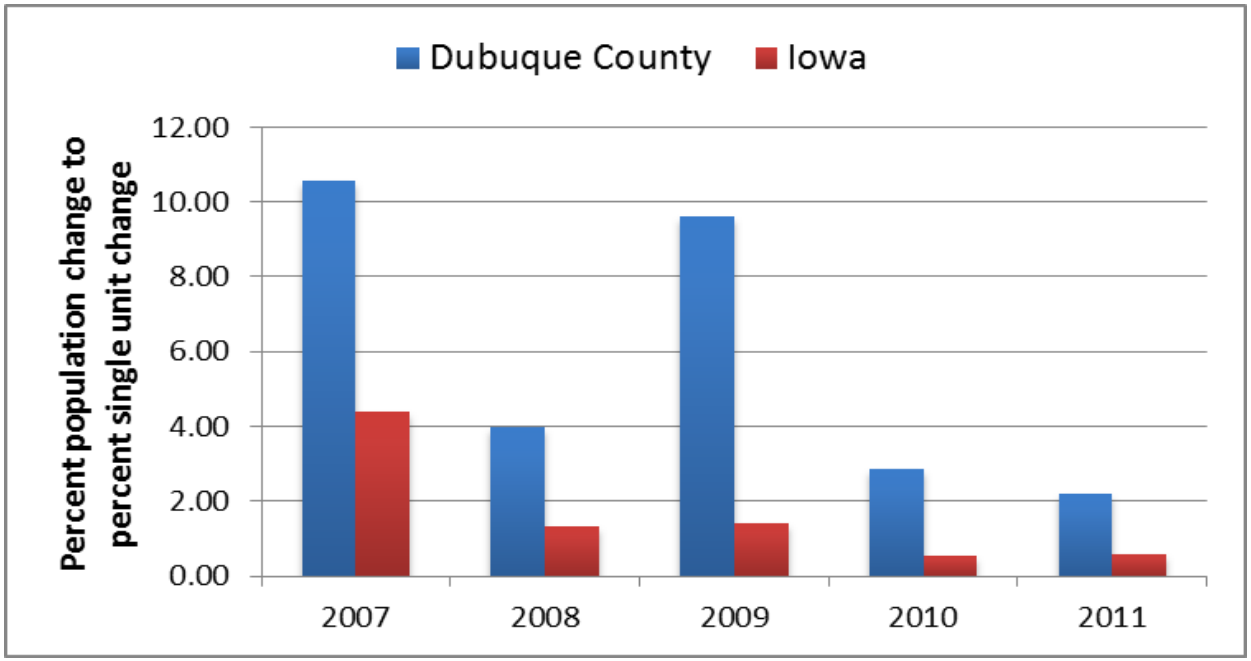


Figure 50: Comparison of single-unit structures percentile change to population percentile change in Dubuque County and in Iowa. Source: ACS 1-year estimates, U.S. Census Bureau, Iowa DNR GIS Library

Street density

Scope – County and Consortium cities

Status – Baseline

Goals – This indicator addresses goals 3 and 10

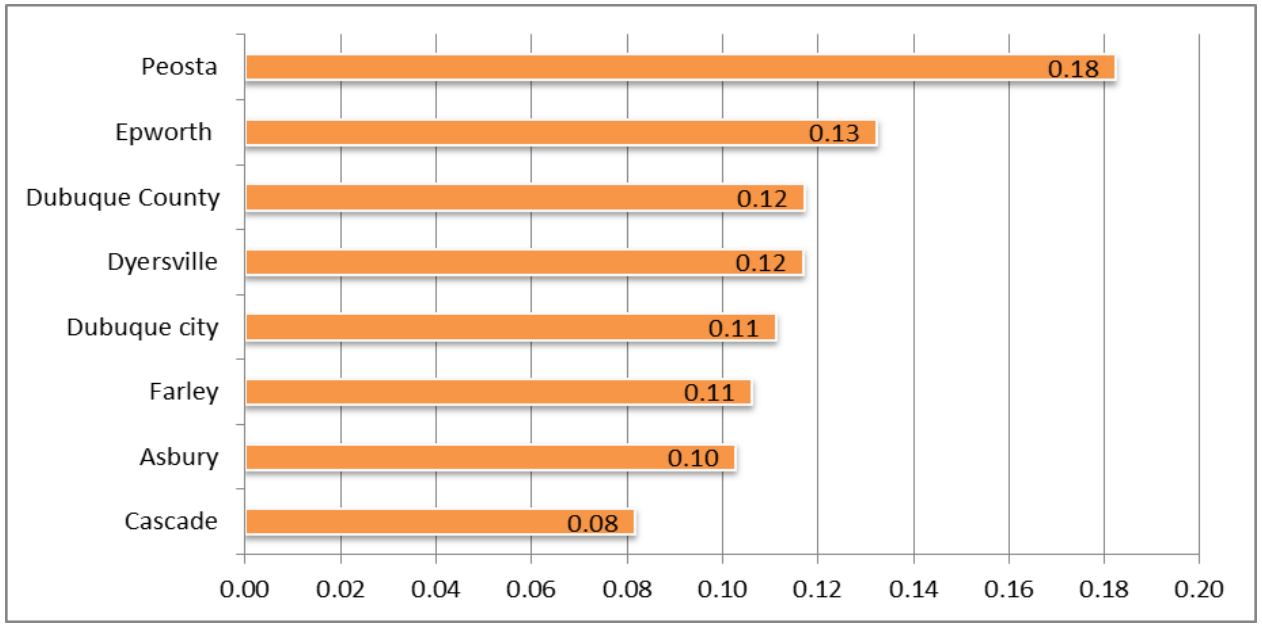


Figure 51: Street density in Consortium cities in miles per square mile. Source: U.S. Census Bureau, Iowa DNR GIS Library

Why is this important?

Streets play an important role in the livability of our neighborhoods and communities. Ideally, local streets would form a well-connected, efficient network that provides safe, direct, and convenient access by various modes of transportation (car, transit, biking, and walking). A poorly connected street network, on the other hand, primarily encourages the use of the automobile over other travel modes. This results in longer trips, fragmented neighborhoods, and limited alternative routes (Street Connectivity: Improving the Function and Performance of Your Local Streets, 2011).

The Smart Plan strives to protect and enhance the viability, livability, and affordability of residential neighborhoods while improving physical accessibility in Dubuque County. It also seeks to encourage neighborhood identity, planning, and pride of place. While this is a complex task that requires a comprehensive approach, providing better street connectivity may further the goals and objectives outlined in the Plan.

Street density is one way to measure street connectivity. The indicator measures the number of linear miles of streets per square mile of land. A higher number indicates more streets and, presumably, higher connectivity. This also suggests that the community may be more walkable and less auto-dependent. A lower score, on the other

hand, would suggest the relative lack of mobility options and limited vehicular and pedestrian connectivity.

How are we doing?

The street density varies across the Consortium cities, with maximum density in Peosta (0.18 miles/mile^2) and minimum density in Cascade (0.08 miles/mile^2). The street density for the urban incorporated area in Dubuque County is 0.12 miles/mile^2, which is exactly the mean of variation within Consortium cities (see Figure 51).

The street density is lowest in Dubuque County (2.83), compared to Eau Claire County (3.53), Woodbury County (3.74) and La Crosse County (3.92) (see Figure 52).

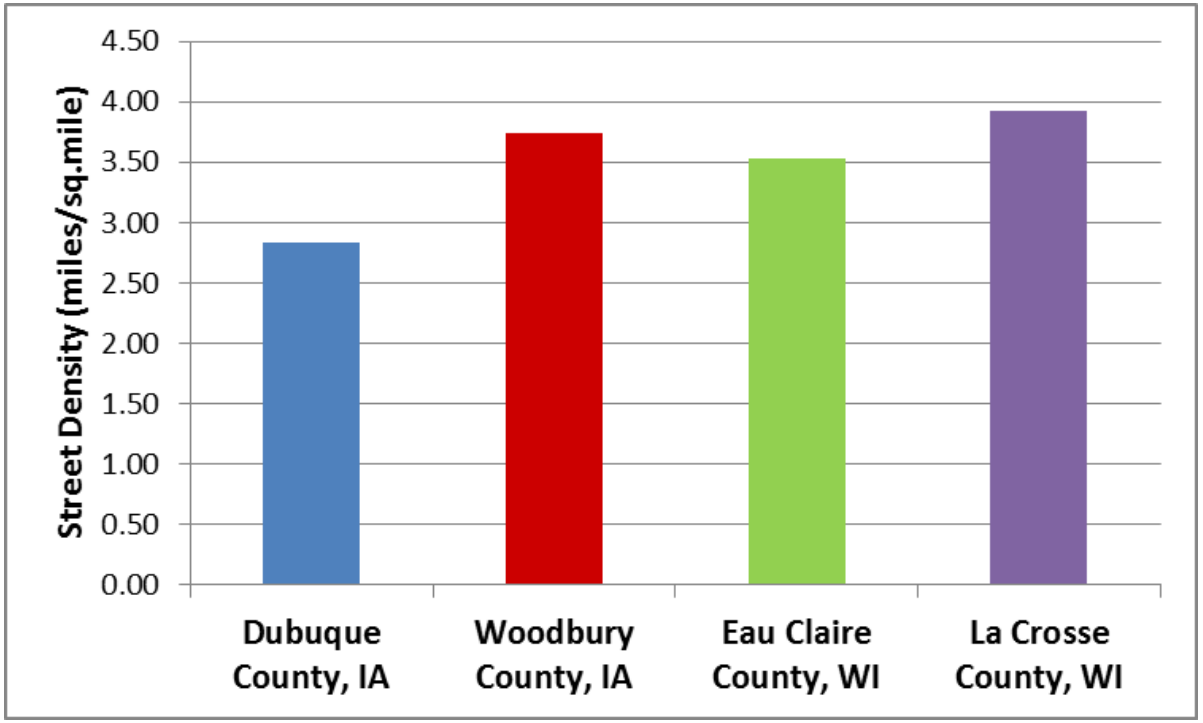


Figure 52: Street density in Dubuque County and in other comparable counties. Source: U.S. Census Bureau, Iowa NRGIS Library.

Summary

The street density is highest in Peosta, as compared to other cities in the Consortium and in Dubuque County. More thorough analysis at a neighborhood level could be useful in order to provide better recommendations.

Link-Node Ratio

Scope – County and Consortium cities

Status – Baseline

Goals – This indicator addresses goal 3

Why is this important?

Another way to capture and measure connectivity and help the communities of Dubuque County to measure their progress towards walkability and livability is link-node ratio. Link-node ratio is an index of connectivity equal to the number of links divided by the number of nodes, (where links are all roadway segments between two nodes and nodes are intersections or the ends of a cul-de-sac). Ewing (1996) suggests that a link-node ratio of 1.4 is a good target for network planning purposes. Figure 53 shows how increasing the link-node ratio can increase connectivity. Both plans have the same number of nodes yet Plan B has two additional links, resulting in a link-node ratio of 1.13 versus 0.88 for Plan A. Under Plan A there is only one route between points A and B. Under Plan B there are three potential routes (Dill, 2004).

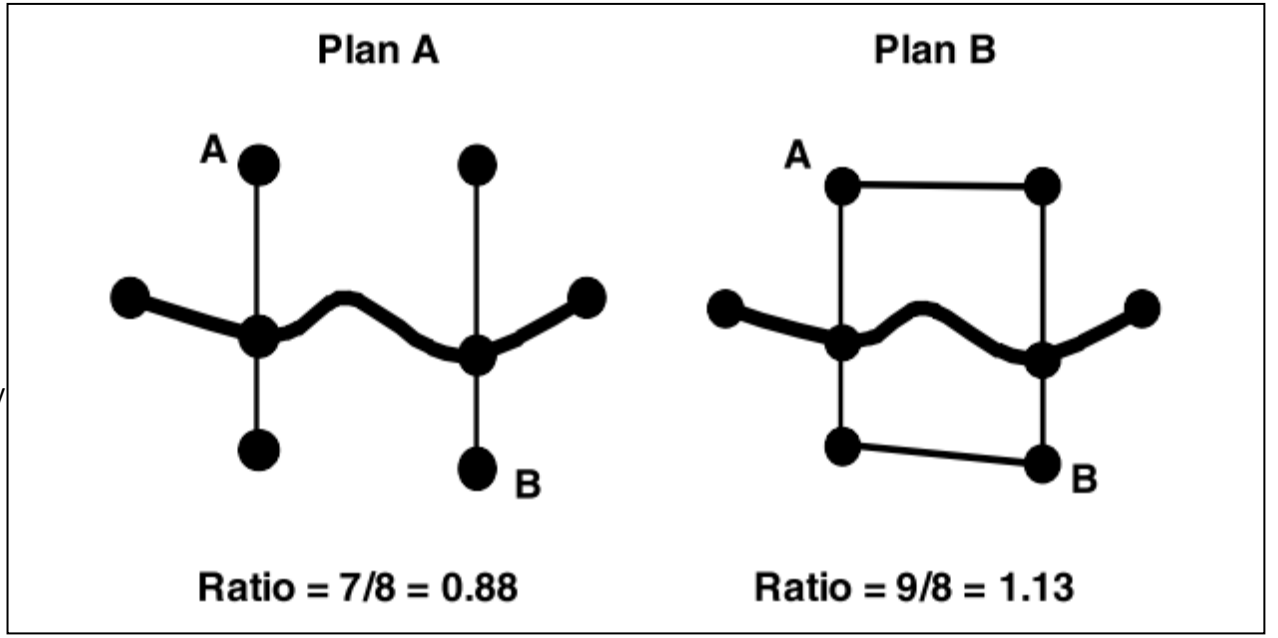


Figure 53: Link-Node Ratio. Source: Measuring Network Connectivity for Bicycling and Walking, Jennifer Dill (2004)

Two calculations have been performed to account for the role of highways in connectivity of the partner cities: the first did not incorporate state highways into dataset for analysis; and the second one incorporated all types of roads in Dubuque County (all six classes according to DOT classification).

How are we doing?

The first calculation tells us that three cities in the Consortium (Cascade, Farley, and Epworth) are closest to the recommended ratio of 1.4 (see Figure 54). The two fastest growing communities in

Dubuque County, Asbury and Peosta, however, did not meet the target ratio and had link-node ratios of 1.10 and 1.22, respectively. The link-node ratios for the second calculations (see Figure 55) were slightly lower due to the lower number of links in the dataset: 0.99 – 1.26 compared to 1.10 – 1.37. And although the results for the higher link-node quartile were different, the lowest link-node ratio was still observed in Asbury and Peosta.

Summary

In both calculations, Asbury and Peosta have the lowest link-node ratio. Construction of additional pathways and links may prove useful and better connect these communities.

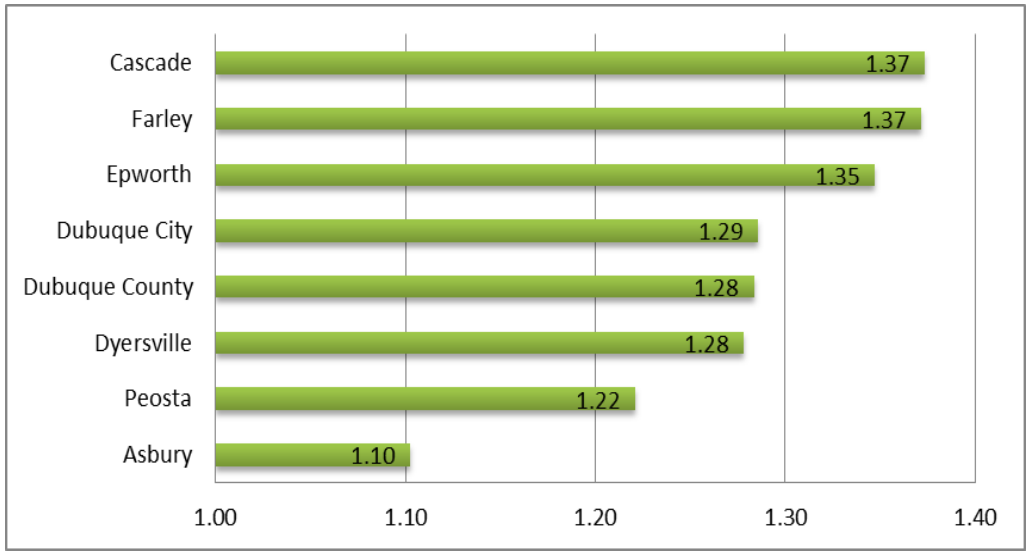


Figure 54: Links to nodes ratio in Consortium cities and in Dubuque County (Federal Function Class 3 ("Iowa Route") excluded from dataset). Source: U.S. Census Bureau, Iowa DNR GIS Library.

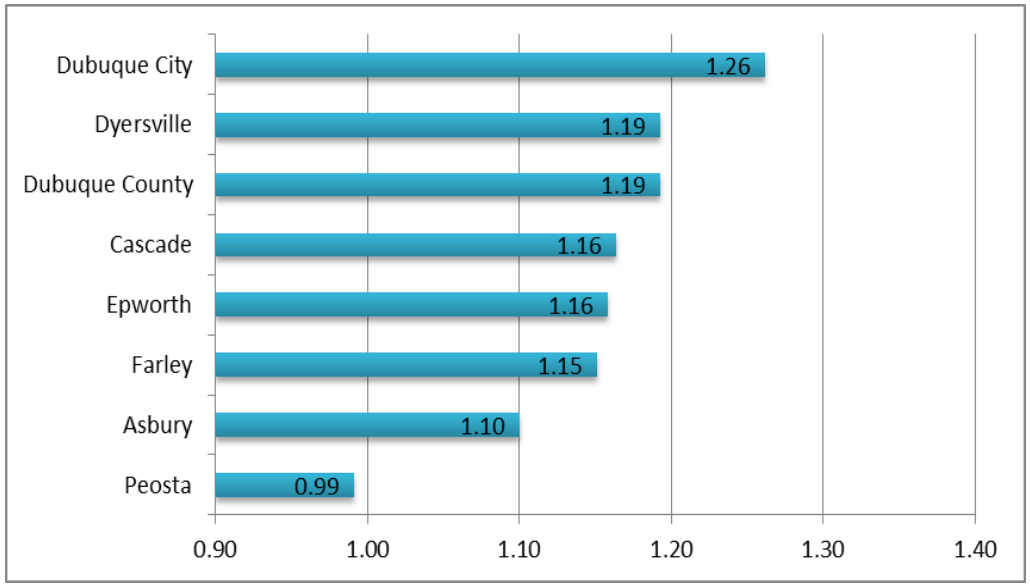


Figure 55: Links to nodes ratio in Consortium cities and in Dubuque County (all federal functional classes of highways included in dataset). Source: U.S. Census Bureau, Iowa DNR GIS Library.

Per Capita Land Consumption - The amount of developed or artificial land per person in Dubuque County

Scale –County

Status – Baseline

Goal(s) – This indicator addresses 2, 6, 7, and 11

Why is this important?

In communities across the country, population growth is spurring both residential and commercial development. Previously undeveloped and/or agricultural land must often be developed in order to accommodate growing populations. At the same time, in many areas, the rate at which land is being developed is outpacing the rate of population growth. The result is increasing per capita land consumption, the amount of developed or artificial land per person within a specific geographic area. In addition to residential development, land must be developed for non-residential uses (e.g., commercial and industrial land) as well as for transportation in order to support the population. By measuring the amount of land designated for urban uses (i.e., classified as built/artificial land cover) as well as land designated for roadways and other impervious surfaces, land consumption accounts for the fact that land must be developed for not only residential purposes but must also be converted for other uses to support the population. In areas characterized by low density, sprawling development, the amount of land consumed per person is typically greater than compared to more densely populated areas. This is closely related to the fact that low density patterns of development typically involve larger houses on larger lots as well more road networks to reach sparsely populated communities. Consequences of high per capita land consumption are similar to those commonly associated with sprawl (e.g, disturbed natural land, threats to agricultural land, etc.).

How are we doing?

Per capita land consumption was calculated using high resolution (1-meter) land cover map files made available through the Natural Resources Geographic Information System (NRGIS) Library and U.S. Census population data. 2009 population estimates were used because the high resolution land cover data is available currently only available for that year. Land consumption for three other Iowa counties was calculated and is included in Figure 56 for comparison. These counties were selected based on data availability and because the total land area of each county was similar to that of Dubuque County (between approximately 570-625 mi^2). The choice of comparison counties

is currently limited as the high resolution processing has not yet been completed for all Iowa counties. Additionally, the counties selected represent a range of population densities. The final processing for Dubuque County has not been fully completed and therefore a limitation of this analysis is that some areas along the northern edge of the county may have been omitted, potentially reducing the accuracy of the results. Still, this analysis offers a useful snapshot of current urban land use.

County	Total Built Land (m^2)	2009 Population	Per Capita Land Consumption (m^2/person)
Dubuque	**57,252,463**	**93,072**	**615.14**
Johnson	76,887,064	131,005	586.90
Polk	191,429,650	429,439	445.77
Story	59,712,262	89,542	666.86

Figure: 56 Per Capita Land Consumption for select Iowa Counties

Dubuque County's per capita land consumption is not too different from that estimated for Johnson and Story Counties. Polk County, however, does have a lower land consumption per person which is not surprising given the higher county population and density. Despite the aforementioned limitations, these measurements provide a baseline estimate of per capita land consumption. As future land cover data is made available, interannual comparisons of per capita land consumption can be made to identify trends in consumption. Additionally, as future land cover data is made available, comparisons can be made more directly between rates of population growth and land cover change.

Summary

Dubuque County's estimated per capita land consumption is in line with that estimated for other counties with similar populations and land area (e.g., Story County Iowa) and greater than other Iowa counties with higher population density (e.g., Polk County). Policies that encourage higher density residential development, cluster development, smaller lot sizes, and development in closer proximity to existing infrastructure can reduce per capita land consumption.

Building Starts – Annual building starts and comparison of building starts in incorporated vs. unincorporated areas

Scale –County

Status – Stable

Goal(s) – 2, 8, and 11

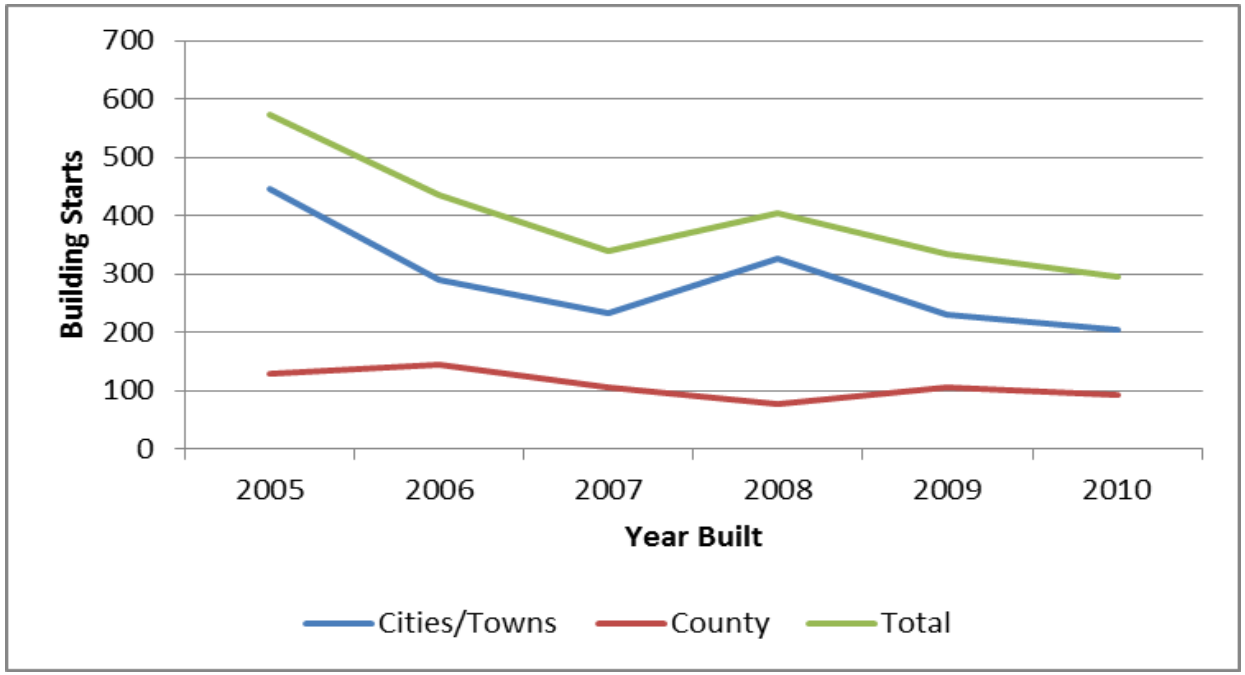


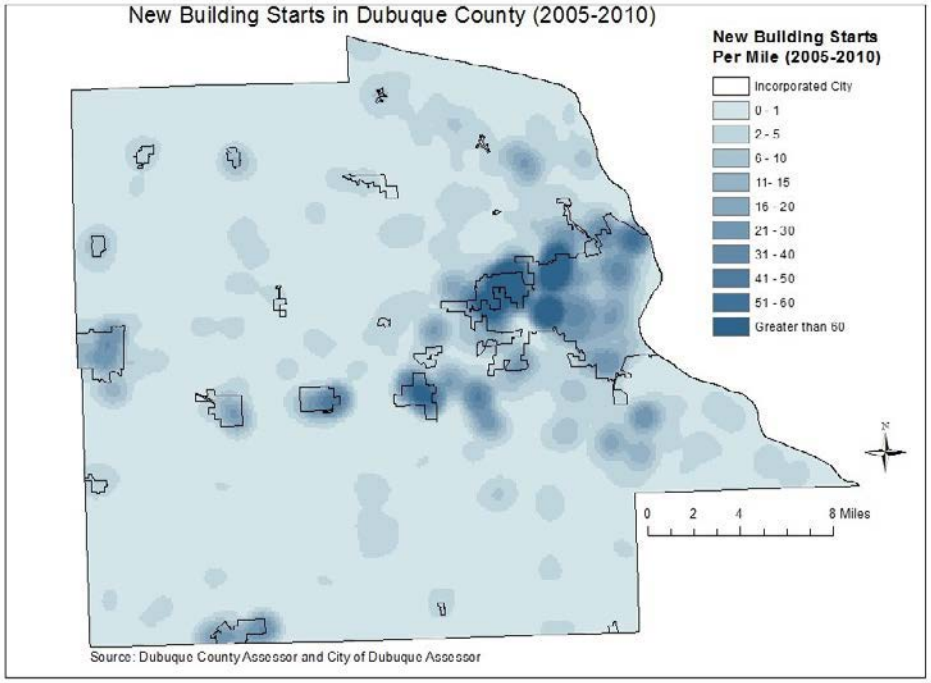
Figure 57: Building Starts in Incorporated Cities and in Dubuque County. Source: Dubuque County Assessor and City of Dubuque Assessor

Why is this important?

Building starts are the number of new privately owned residential construction projects that begin during a specified time period. The number of building starts is often used as an indicator of economic strength. Estimating not only the total number of annual housing starts for Dubuque County but also whether these new residential housing construction projects are located within incorporated municipalities or on county land is a useful land use indicator. In doing so we can begin to assess trends in whether new residential construction is concentrated in and around existing development within municipalities or if new construction is more dispersed on county land. A more decentralized population with dispersed residential development patterns, as opposed to concentrated, higher density residential development is a characteristic of sprawl and places strain on public expenditures for infrastructure. Such strain can result in reduced public utility efficiency and higher utility costs as dispersed development requires the construction of new infrastructure while limiting funding for existing infrastructural improvements.

How are we doing?

Using data made available by the County, between



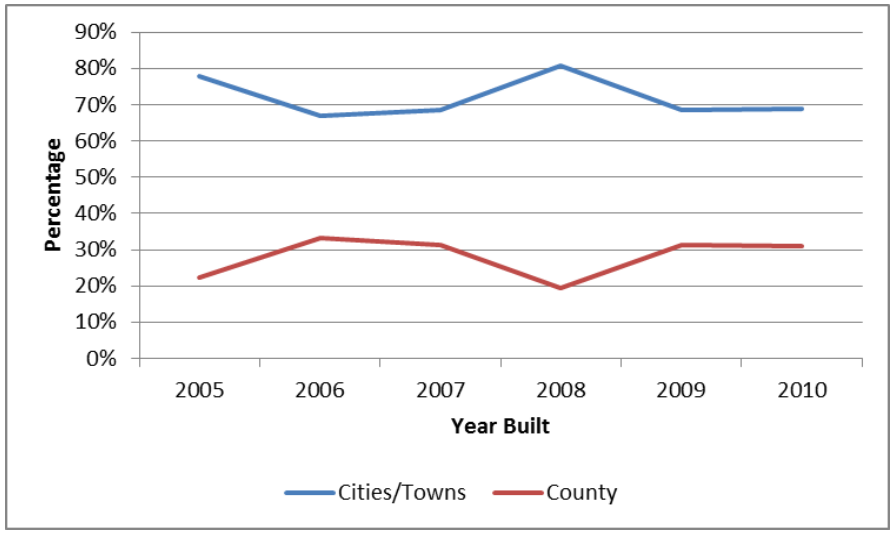


Figure 58: Comparison of Building Starts in Incorporated Cities and on County Land.

Figure 59: New Building Starts in Dubuque County Between 2005-2010. Source: Dubuque County Assessor and City of Dubuque Assessor and City of Dubuque Assessor

2005 and 2010, the number of total annual building starts has declined in recent years (see Figure 57). The percentage of building starts located within city limits as opposed to in unincorporated areas has remained relatively consistent, generally ranging from 70 to 80 percent (Figure 58). While trends of increasing county building starts might be indicative of sprawl and therefore the absence of such a trend is positive for Dubuque County, records indicate that an increasing number of building starts are occurring in smaller cities and in the urban fringe area to the west of the City of Dubuque (Figure 59).

Summary

There was a decreasing trend in the total number of building starts in Dubuque County between 2005-2010. The percentage of building starts on county land, as opposed to within city limits has remained relatively stable. An increasing number of building starts are occurring in smaller cities and in the urban fringe area to the west of the City of Dubuque. Policies that incentivize residential development within incorporated areas could further reduce the number of County housing starts.

Housing

Housing is a sustainability issue because it is a primary need of the population, but also because residential development consumes land and resources. The pattern of residential development in an area can be a major factor in influencing commercial and industrial development, and the provision of multi-family or mixed-use housing can set the standard for density in an area. Additionally, the availability of multi-family housing can impact the local and regional economy – younger generations are increasingly preferring to rent rather than own, and this population provides many of the "information workers" that newer economic development demands (Silver, 2011). As the "Baby Boom" generation ages, there will be greater demand for high-quality senior housing. Determining how the county can monitor these needs and guide this type of development will impact the land use, watershed, natural resource, and economic development goals of the Smart Plan.

The goals set out by the Smart Planning Consortium focus on two essential facets of housing sustainability – the maintenance of a stock of affordable, quality housing options for all segments of the population and the increased use of green building techniques. Aside from focusing on maintenance and construction of high-quality housing, the goals also focus on matters such as rental housing oversight, education and promotion of housing needs issues, and increasing opportunities for homeownership. The four indicators developed so far all use basic data available from government Web sites and can be easily updated in the future by Consortium members or community decision makers. More importantly, they are good for providing a snapshot of the situation "on the ground" in the housing market. The four indicators that are included thus far address specific goals, but also begin to paint a picture of the general sustainability of the housing sector in Dubuque County.

The goals set out by the Smart Planning Consortium are as follows:

1. To promote the preservation, rehabilitation, and investment in our regional housing stock and neighborhoods.
2. To promote programs, education, and training that support and encourage appropriate rental housing oversight.
3. To promote the creation and maintenance of an adequate supply of sound, affordable housing integrated throughout the region.
4. To expand the opportunities for homeownership, especially for low to moderate income households.
5. To promote fair housing opportunity for residents in all neighborhoods.
6. To assist local service agencies in providing shelter and semi-independent living for persons in need of supportive services.
7. To promote the understanding that the availability and affordability of workforce housing is an important key to successful economic development.
8. To promote the public's awareness of housing needs and issues through informational and educational efforts.
9. To provide housing resources for aging residents.
10. To continue to provide appropriate infrastructure and services to neighborhoods.
11. To provide a variety of housing types, costs and locations in cities.
12. To provide a variety of housing opportunities within the unincorporated areas in appropriate locations.
13. Increase resource efficiency, improve public health, and reduce environmental impacts by using green residential building strategies.

Green Building Standards—Number of new residential buildings that meet Energy Star standards

Scope – County

Status – Increasing

Goals – This indicator addresses goals 1 and 13

Why is this important?

The Energy Star program is a joint venture between the U.S. Department of Energy and the U.S. Environmental Protection Agency. It began in 1992 as a labeling program for home appliances, and was expanded to include ratings of new residential construction in 1995 (Energy Star). New homes that are built to Energy Star standards are more energy efficient than the average home. These homes are less costly to operate and have less of a negative impact on the environment. The other major certification program for green buildings, Leadership in Energy and Environmental Design (LEED), is more commonly used for non-residential buildings.

The energy used to service residential, commercial, and industrial buildings accounts for 43% of U.S. carbon emissions (Brown, 2008). Building new homes to more efficient standards means less energy is used to heat, cool, and run the appliances in a home. This means the house has a smaller carbon footprint and causes less of an impact on the environment. The LEED program, administered by the U.S. Green Building Council, has a certification process for homes, although no home in Dubuque County has ever pursued this designation. The USGBC also offers a process for developing neighborhoods, although no neighborhood in Dubuque County has been developed to pursue this type of certification.

This indicator addresses the Smart Plan priorities of preserving and/or rehabilitating the local housing stock and increasing the implementation of green building techniques.

How are we doing?

Between July 2011 and June 2012 there were 129 new homes rated as Energy Star certified, and between July 2010 and June 2011 there were 110 (see Figure 60). Prior to July 2010, approximately 43 were certified. Many of these homes were likely certified because local utilities offered a rebate for each home certified, but these rebates ended in the summer of 2012. Additionally, Energy Star standards became more stringent as of June 2012, which may result in fewer homes being rated.

The data provided in this indicator shows the number of homes built “in the Dubuque area” as per Energy Star records (the same qualification applies to counties used for comparison context – see below). More refined information (how many homes in each city in Dubuque County rather than just “in the Dubuque area”) and information prior to 2010 reporting period was not available, so 2010 will function as a baseline reporting period.

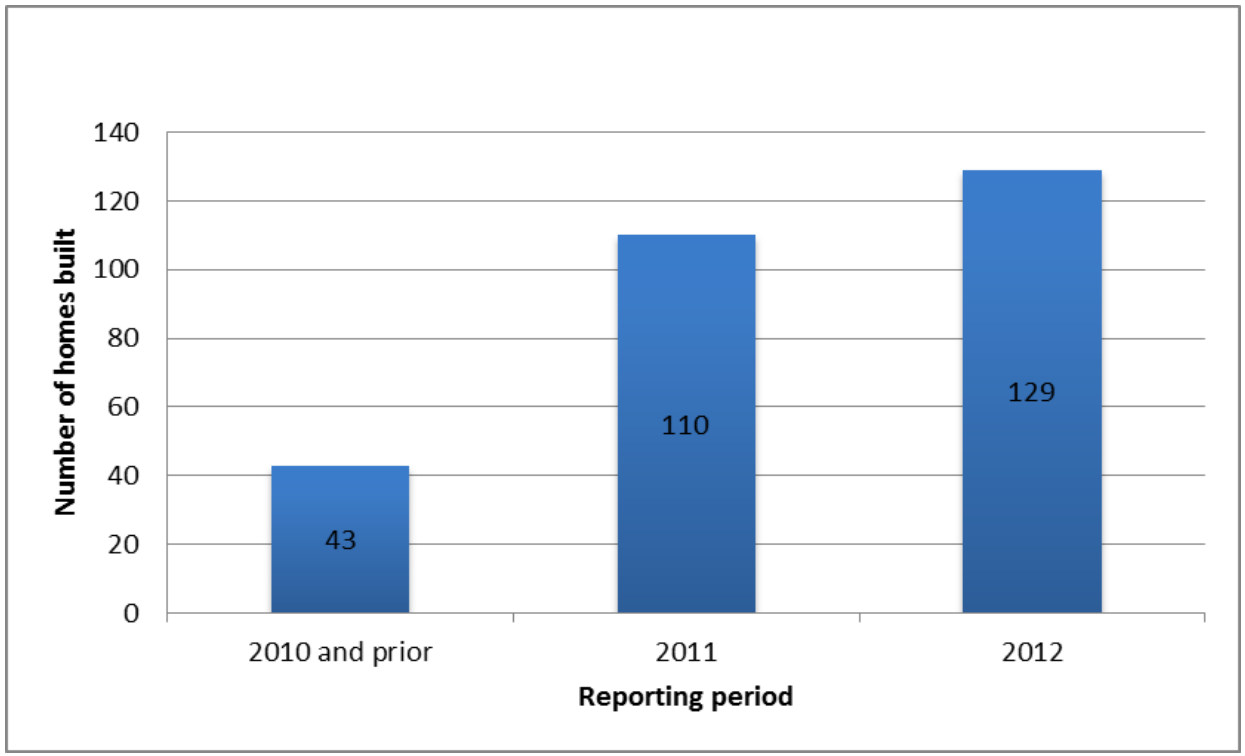


Figure 60: Number of Energy Star rated homes built "in the Dubuque area" each reporting period. Source: Energy Star

In the 2012 reporting period, there were 2,873 Energy Star rated homes built in the state of Iowa, 8 Energy Star rated homes built in the Sioux City, IA area (Woodbury County), 0 built in the Eau Claire, WI area (Eau Claire County), and 0 built in the La Crosse, WI area (La Crosse County). These numbers often rely heavily on whether local energy companies offer rebates or incentives.

Summary

The number of Energy Star rated homes have increased since 2009, but the number may go down if local governments or energy companies do not provide some sort of incentive.

Vacancy rate

Scope – County

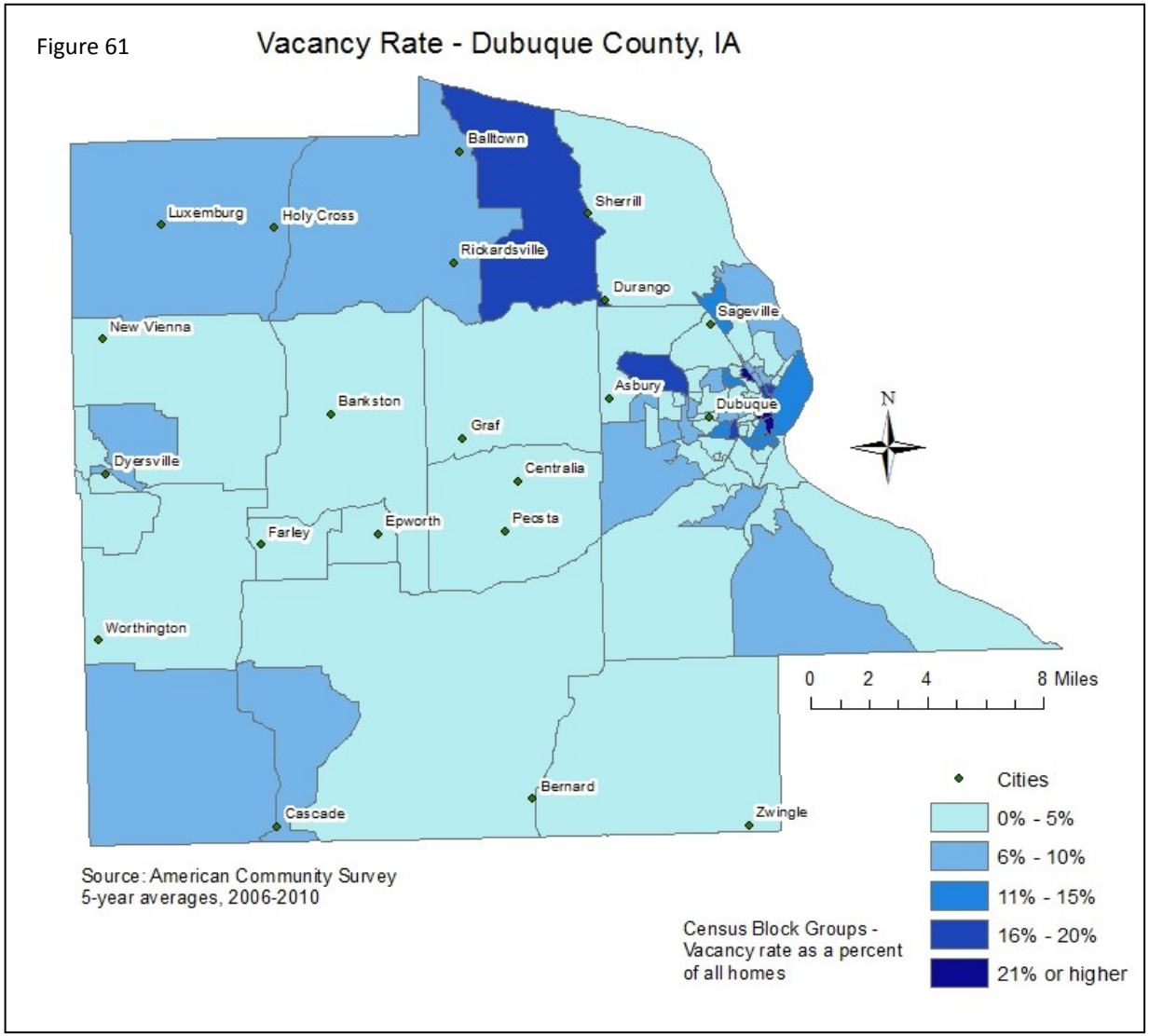
Status – Baseline

Goals – This indicator addresses goals 7, 8, 9 and 11

Why is this important?

A vacancy rate of about 5% is considered ideal to accommodate short- and medium-term growth in the population. A vacancy rate higher than this means there is housing stock that is not being used, and a lower vacancy rate may signify insufficient housing in the local market. The Smart Plan prioritizes education efforts regarding housing issues and the maintenance of a diverse housing stock. Being aware of the overall vacancy rate will help the county and communities within Dubuque County understand how to tailor their policy efforts.

Figure 61



How are we doing?

The majority of the census blocks in the county

have a vacancy rate of less than 5%, although in some areas it tops out at almost 20% (see Figure 61). In the same reporting period, the state of Iowa had a vacancy rate of about 8.3% and Woodbury County, IA had a vacancy rate of about 6.9% (ACS 2010 5-year average). This is an acceptable situation, but one that should to be continually monitored by the county and the municipalities in the county.

Summary

The vacancy rate varies across the county, with the majority of census block groups showing a 5% or lower vacancy rate.

Age of Housing Stock

Scope – County

Status – Unknown

Target – To be determined

Goals – This indicator addresses goals 1 and 3

Why is this important?

The greenest home is one that is already built. The corollary to this is the fact that older homes are less energy efficient than new homes. Housing rehabilitation and energy audits can dramatically improve the livability, adequacy, and efficiency of existing housing stock, but first, it's important to know the age of houses in the area.

How are we doing?

The majority of the homes in many census blocks were built prior to 1939, which is the oldest category measured by the American Community Survey (see Figure 62). There are notable exceptions to this – namely, the cities of Asbury and Peosta, both of which have experienced dramatic population increases in the last 10 years (see the chapter on demographics). Housing age data indicates that the housing stock in Dubuque is often quite old and could possibly benefit from the existence of rehab and energy efficiency programs. In the state of Iowa, 28.5% of homes were built before 1939. The proportion for La Crosse County, WI, is 20.7%; the proportion for Eau Claire County, WI, is 18.1%; and the proportion for Woodbury County, IA, is 33.7%.

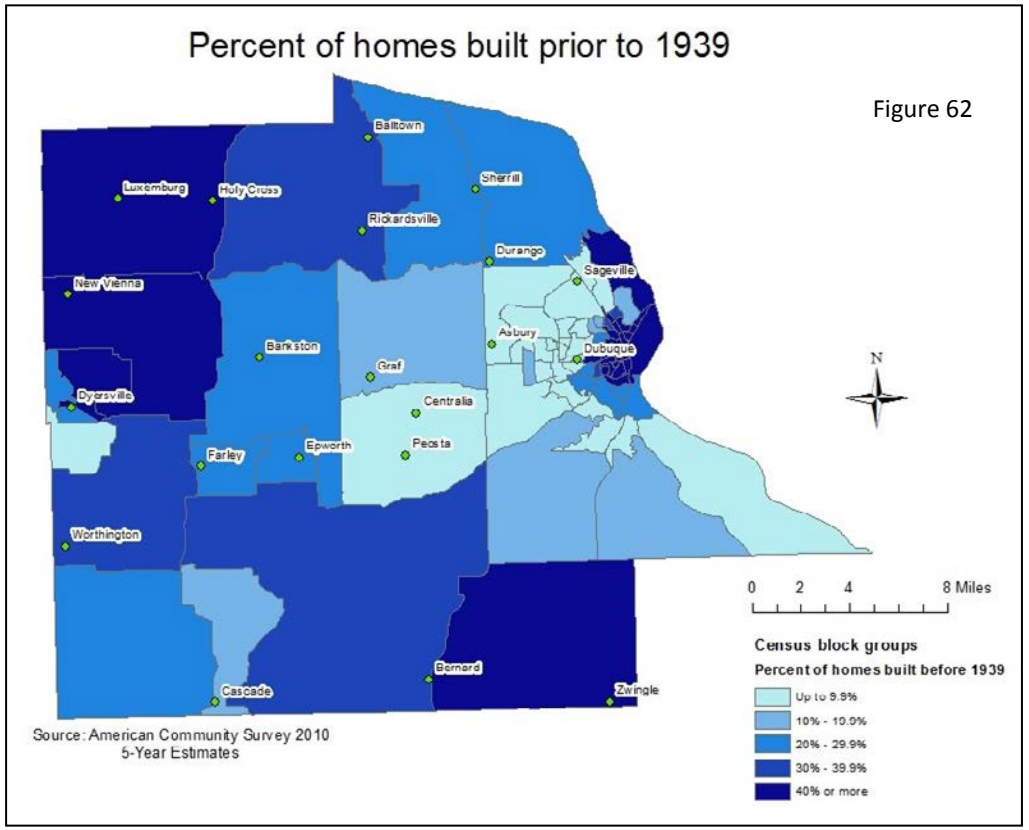


Figure 62

Summary

The housing stock in many parts of Dubuque County is old and may benefit from rehabilitation or energy efficiency auditing.

Percentage of homeowners and renters that are housing cost burdened

Scope – County

Status – Fluctuating

Goals – This indicator addresses goals 1, 3, 7, and 8

Why is this important?

Renters and homeowners who pay more than 30% of their income for their housing costs are considered "housing burdened." These households have less money to spend on consumer items, education, healthcare, etc. A sustainable housing market ideally offers affordable housing to everyone in the population. Understanding housing burden can help local policy makers address the important connection between housing and economy as well as help them educate the public about housing issues.

How are we doing?

The majority of census block groups have less than 40% of homeowners with a mortgage suffering under a housing burdened (see Figure 65. Of homeowners without a mortgage, it is generally below 40%, but the census block groups that include Bankston and Cascade have higher proportions (see Figure 66). Data is not available at the city level through the American Community Survey, although it could be collected by individual cities. The Iowa average is 24.6% for homeowners with a mortgage, and 12.3% for those without a mortgage. It is worth noting that a homeowner paying more than 30% of their income for housing costs does not indicate the household is low-income — it is possible they "bought too much house" during the boom years, or that the houses are unable to be refinanced. Given that many homeowners in Dubuque County, and in Iowa in general, do not move often, mobility is less of a concern. Nevertheless, this is a less than ideal situation, but one that may only be resolved as the market normalizes over the coming decades.

A higher proportion of renters in many census block groups pay more than 30% of their gross

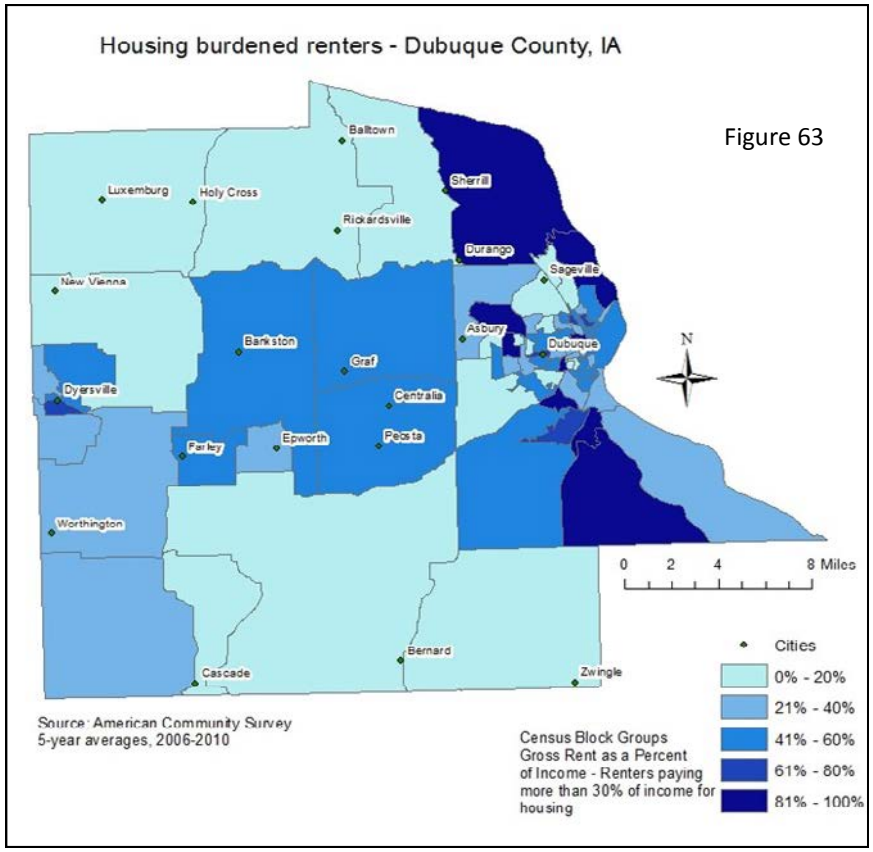
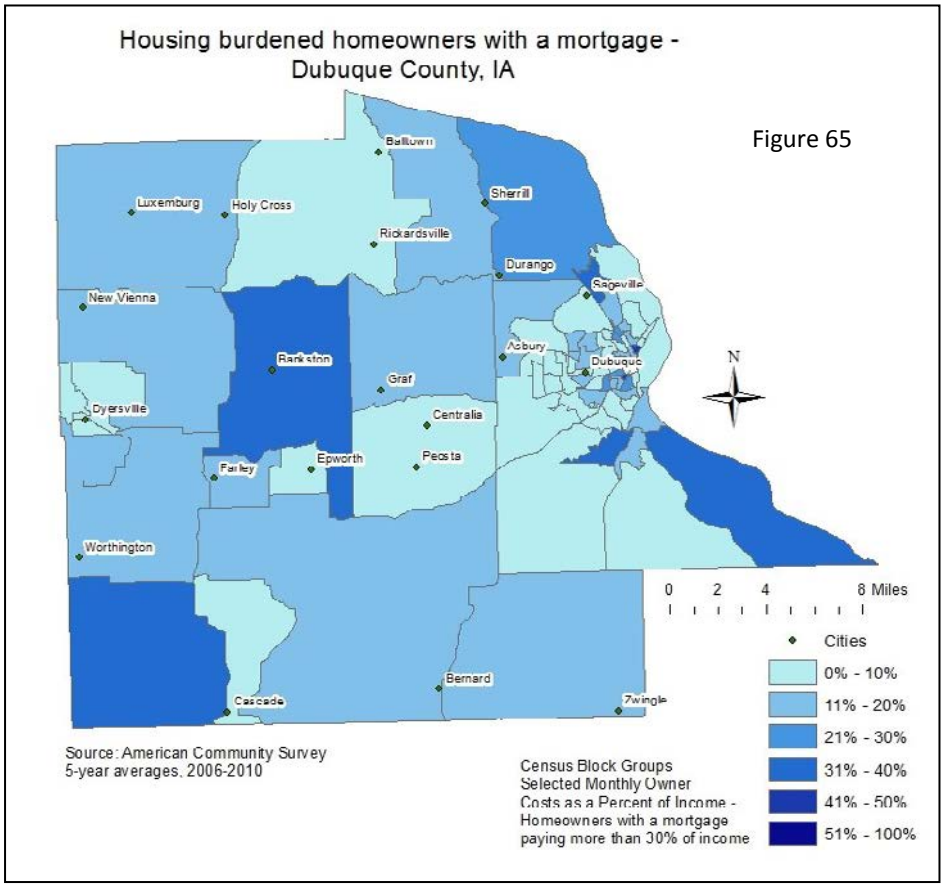
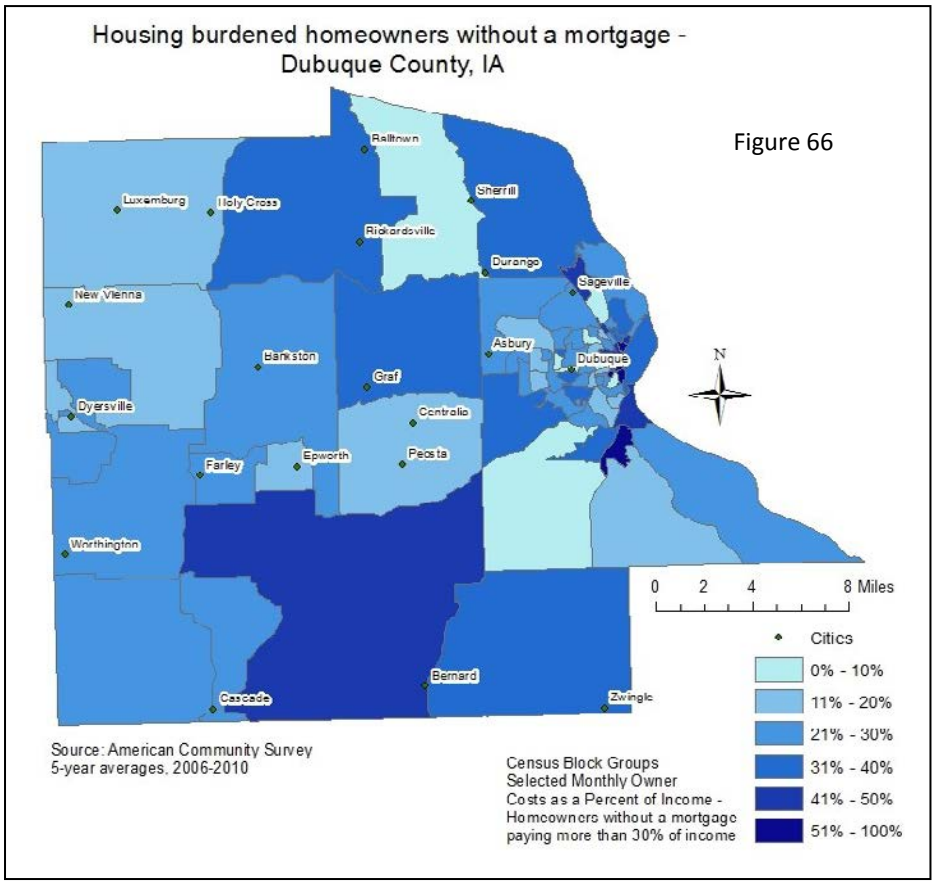


Figure 63





rent for housing. Countywide, the proportion is 51.5%, and for the state of Iowa, the proportion is 48.8%. The proportion of cost-burdened renters in Eau Claire County, WI is 54.1%, in La-Crosse County, WI is 52%, and Woodbury County, IA, is 51.6%.

Summary

Households with a mortgage seem to be less likely to be housing burdened. The households most likely to be housing burdened in Dubuque County are renters, and this speaks to a lack of affordable rental housing (see Figure 64). Programs that encourage the building of affordable rental housing could help resolve this issue.

Quality of Life

Many of the goals and objectives established in the Community Facilities and Public Infrastructure and Utilities chapters of the Smart Plan pertain to the provision of adequate services, utilities, and local facilities, more broadly, these chapters consist of goals related to promoting and ensuring social welfare and the improvement of Dubuque County residents' quality of life. These goals and objectives demonstrate that "quality of life" for Dubuque County residents can be largely defined as having equitable access to emergency services, quality health care, education services, recreational activities, and safety from crime and hazards.

The goals in these chapters either call directly for improvement in these quality of life aspects (e.g., promote healthy behaviors throughout the population), or indirectly through goals that emphasize the provision of a social welfare outcome-related service or activity (e.g., provide staff with current training and certifications). There is significant overlap between the Community Facilities and Public Infrastructure and Utilities goals and those found within other Smart Plan chapters. For instance, these goals reiterate the need for local governments within the county to maintain intergovernmental collaboration and facilitate public-private partnerships in order to provide residents with quality health care, educational opportunities, and safe living conditions. Many of the goals call for land use decision-making that will not constrain residents' access to community amenities. The goals demonstrate the role that quality community facilities and utilities play in fostering regional economic development. Additionally, several of the goals emphasize the importance on social well-being of hazard mitigation and response.

With this emphasis on community and social well-

being, the goals set forth in the Community Facilities and Public Infrastructure and Utilities chapters are important to Dubuque County's sustainability efforts. However, measuring progress toward these goals can be rather challenging due to the abstract nature of many of these goals. Therefore, this chapter includes several indicators that can be used as proxies for measuring the services and amenities that residents in Dubuque County can access. The indicators were selected while considering the usefulness of the data and the simplicity of updating the indicators going forward.

The Community Facilities goals set out by the Smart Planning Consortium are as follows:

1. To encourage the majority of future development to locate within existing cities, or adjacent to existing cities in urban fringe areas planned for annexation, where adequate public services are planned or can be provided.
2. To consider the use of sustainable design principles in Community Facilities.
3. To provide public facilities and services at levels which support a desirable "quality of life" for current and future residents.
4. To foster cost-effective emergency services and facilities that enhance and protect the lives of County residents.
5. To ensure the fair, equitable, and uniform enforcement of rules, regulations, and laws.
6. To provide all law enforcement personnel with the training needed to deliver professional service.
7. To monitor public safety equipment, facilities, and procedures to ensure that adequate service is provided.
8. To prevent and control criminal behavior.
9. To use community activities, partnerships, and outreach to foster a positive attitude, good citizenship, and cooperation with public safety efforts.
10. To foster collaboration among municipal departments and the Dubuque County Sheriff's Department.
11. To protect life and property from fire.
12. To monitor fire and emergency medical service (EMS) equipment, facilities, and procedures to ensure that adequate service is provided.
13. To minimize the impacts of manmade and natural disasters.
14. To provide staff with current training and certifications.
15. To promote community education and outreach on fire safety.
16. To maintain quality health care facilities and services.
17. To promote healthy behaviors throughout the population.
18. To prevent injuries.
19. To protect against environmental hazards.
20. To prevent epidemics and the spread of disease.
21. To prepare for, respond to, and recover from public health emergencies.
22. To strengthen the public health infrastruc-

ture.

23. To support access to good quality, affordable dependent care.

24. To maintain high quality school systems.

25. To support opportunities for life-long learning for residents of all ages.

26. To provide access to timely, accurate, and useful information through reading, audio-visual, and electronic material and programming through public libraries.

27. To create and deliver a quality education that allows all students to reach their highest potential.

28. To encourage school districts to consider smart planning and sustainable design principles when developing school facilities plans.

29. To provide opportunities for residents to enjoy outdoor recreational activities.

30. To provide a safe park and recreation system that continues to meet the community's needs for usable and accessible parkland and open space.

31. To provide a variety of affordable and accessible recreation classes and activities for people of all ages.

32. To enhance the visual attractiveness of the community and park system.

33. To provide interconnected recreation facilities for residents throughout the region.

The Public Infrastructure and Utilities goals set out by the Smart Planning Consortium are as follows:

1. To provide, maintain, and improve safe, cost-effective, functional, and self-supporting public utility systems including water, sanitary sewer, storm sewer, communications, and solid waste disposal, with a focus on sustainable materials management where applicable.

2. To plan for, build, and improve infrastructure systems to meet anticipated growth and development needs.

3. To encourage the use of low impact development and centralized water or sewer systems to preserve open space and prevent degradation of the air and water quality throughout the region.

4. To provide public facilities and services at levels which support a desirable "quality of life" for current and future residents.

Violent Crime Rate

Scope – County

Status – Decreasing

Goals – This indicator addresses Community Facilities chapter goal 8

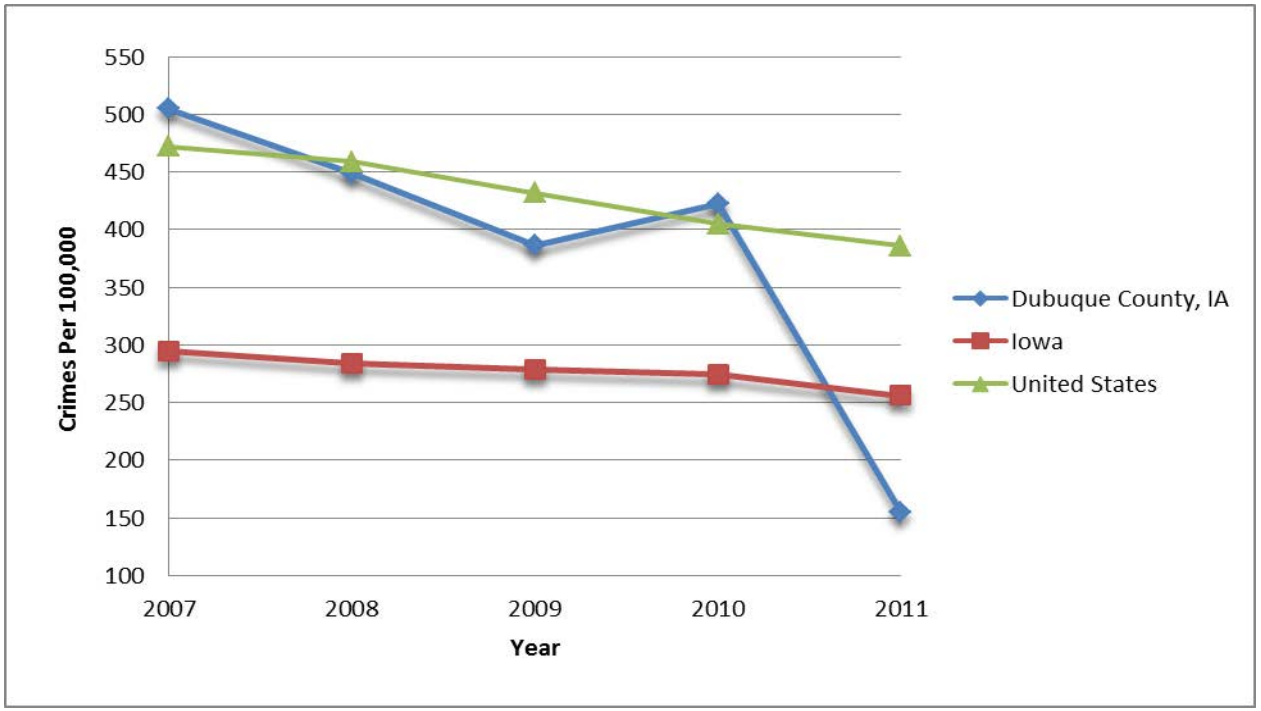


Figure 67: Violent crime rate. Source: Federal Bureau of Investigation.

Why Is This Important?

People exposed to crime face negative consequences, such as adverse psychological effects. Crime, especially in the form of violent crime, can increase stress and other stress-related disorders (Ellen, 2001). Therefore, assessing Dubuque County's violent crime rate over recent years is important, as it is a reliable indicator of social well-being. Violent crime rate also measures policing efforts, which have a strong tie to community facilities.

Violent crime rate, as an indicator, measures the number of violent crimes annually per 100,000 residents in Dubuque County. Annual data was retrieved for 2007-2011. According to the U.S. Department of Justice, violent crimes are those that fall under the categories of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. Violent crime rate as an indicator will provide the Consortium with the ability to evaluate Dubuque County's progress in controlling and preventing criminal behavior, which directly relates to the Smart Plan's goals and objectives. Finally, due to incomparable data across county jurisdictions, this indicator was compared to state and national violent crime rates.

How Are We Doing?

As shown in Figure 67, Dubuque County had a violent crime rate of 155 in 2011. In comparison, the state of Iowa's violent crime rate was 256 and the national rate was 386. More importantly, Dubuque County's rate, which had been higher than that of the state and country, fell drastically from 2010 to 2011. This trend may indicate many positives throughout Dubuque County, especially related to policing efforts and collaboration among municipal departments and the county sheriff's office.

Nevertheless, violent crime rate as an indicator has limitations. Crime statistics provided by the FBI have been criticized for assessing law enforcement action as opposed to crime itself (Shihadeh, 1996). Additionally, violent crime data provided by the FBI is collected across different jurisdictions, leaving categorization (i.e. violent or non-violent) of criminal acts open to interpretation depending on where they take place in. Thus, the data may not be a perfect representation of the actual violent crime rate (Sampson, 1987).

Summary

The violent crime rate in Dubuque County was 155 in 2011. The county rates were significantly higher in years prior to 2011. Currently, the county's violent crime rate is lower than the state of Iowa's rate and the United States.

Adult Obesity Rate – Percentage of obese residents

Scope – County

Status – Fluctuating

Goal – This indicator addresses Community Facilities chapter goal 17

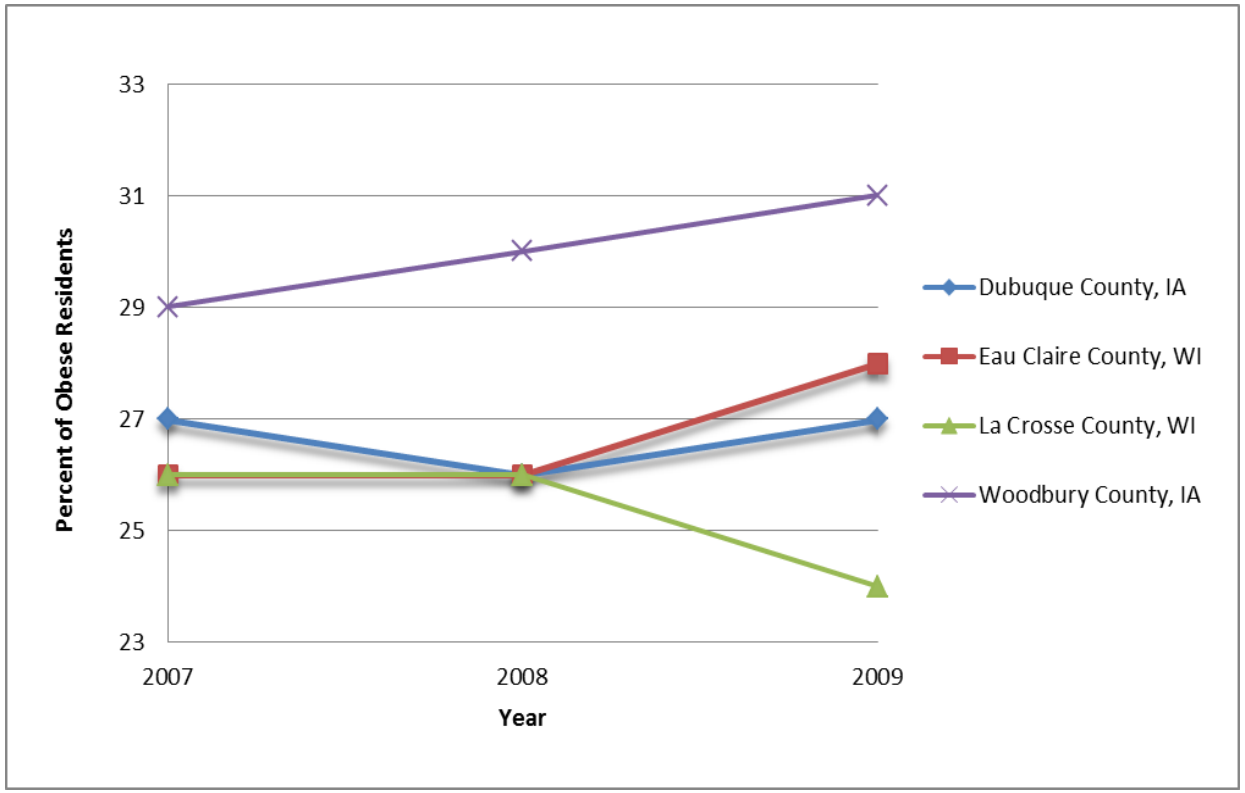


Figure 68: Adult Obesity in Dubuque County and Iowa. Source: Centers for Disease Control and Prevention.

Why is this important?

Obesity is strongly correlated with human health, which is an important factor in assessing "quality of life" and the goals and objectives set forth by the Smart Plan. Those that are obese have a body mass index greater than 30 kg/m^2 (weight in kilograms divided by height in meter squared) and are at higher risk for a number of various health issues (CDC, 2010). For instance, obese individuals are at a higher risk for heart disease, diabetes, cancer, hypertension, stroke, and respiratory problems (Mokdad, 2003). Therefore, obesity is a useful indicator for measuring the success of Dubuque County's efforts to encourage healthy habits among its population.

This indicator measures the percentage of adult residents (age 18 and over) in Dubuque County that are reportedly obese. It includes data for 2007-2009. The data for obesity come from the National Center for Chronic

Disease Prevention and Health Promotion (NCCDPHP), which exists as part of the Centers for Disease Control and Prevention. The obesity rate included was modeled as an estimate using data from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a random-digit dial telephone survey. The data represents adult respondents (age 18 and over) who are non-institutionalized and living in households with a landline telephone. This data is reported at a 90% confidence level.

How are we doing?

Obesity among Dubuque County's adult population from 2007-2009 was lower than that of Eau Claire County, WI and Woodbury County, IA. Yet, it was three percentage points higher than its peer county, La Crosse County, WI. As shown in Figure 68, in 2009, 27% of Dubuque County residents were obese, while only 24% of La Crosse County residents were considered WI. obese.

It has been reported that BRFSS data typically underestimates the population that is obese (Stewart, 1982). The data also disregards dissimilarities of ethnicity throughout the respondents. Differences of ethnicity can have an effect on body fat percentages and weight distributions, ultimately changing obesity prevalence data (Deurenberg, 1999). Finally, it is important to fill in data for 2010, 2011, and 2012 as it becomes available.

Summary

The adult obesity rate from 2007-2009 in Dubuque County was relatively stable. The percentage of obese residents in the county from 2007-2009 was lower than its peer counties with the exception of La Crosse County,

Uninsured Residents – Percent of civilian non-institutionalized population without health insurance

Scope – County

Status – Increasing

Goal – This indicator addresses Community Facility goals 16, 17, and 23

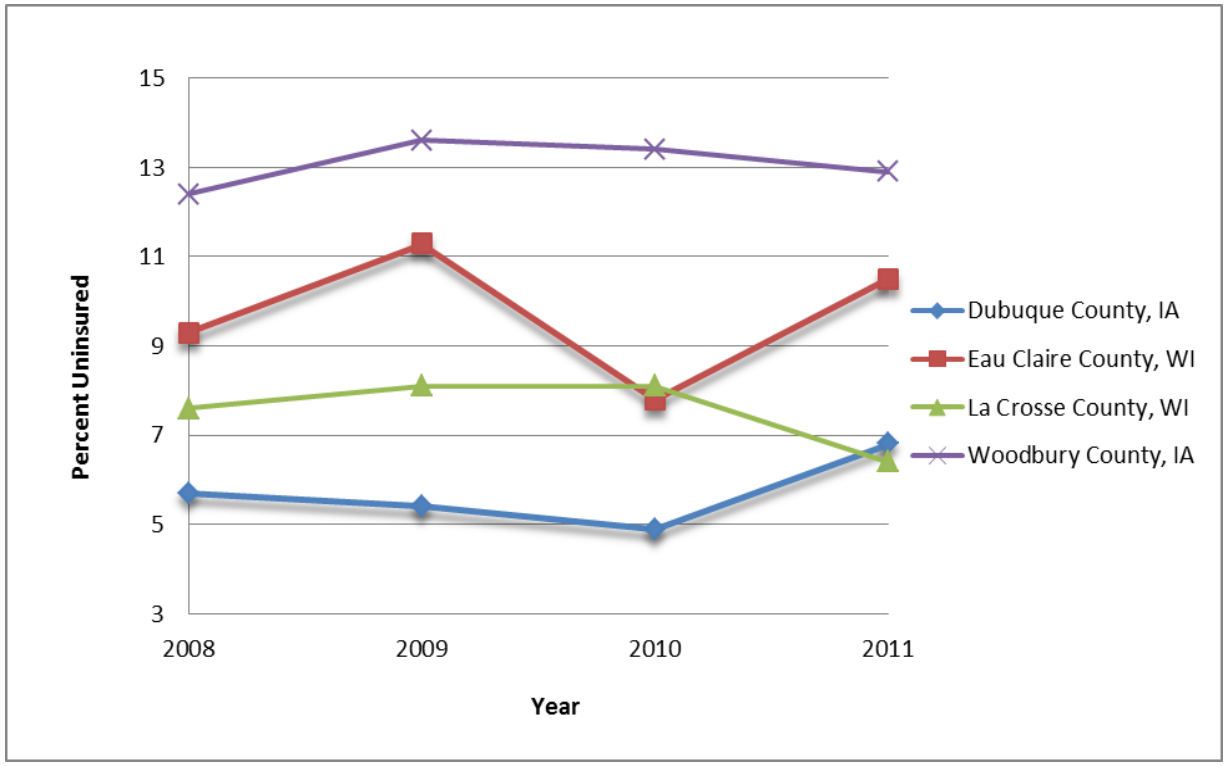


Figure 69: Uninsured residents. Source: U.S. Census Bureau.

Why is this important?

People without health insurance are vulnerable members of society. They are at higher risk for sickness and disease due to lack of preventive healthcare. Measuring the percentage of uninsured residents may indicate whether Dubuque County provides its residents with adequate access to medical services, an issue that is strongly associated with many of the goals and objectives laid out in the Smart Plan's Community Facilities chapter.

This indicator represents the percentage of non-institutionalized uninsured citizens in Dubuque County. Data was accessed from the U.S. Census Bureau's Small Area Health Insurance Estimates (SAHIE) program. SAHIE produces estimates of health insurance coverage for states and all counties. This report includes data from 2008-2011.

How are we doing?

Compared to its peers, with the exception of La Crosse County, WI, Dubuque County had a lower rate of uninsured residents in 2011 (see Figure 69). Prior to 2011, from 2008-2010, Dubuque

County outperformed each of the selected comparison counties. Still, the county's rate of uninsured residents is increasing and is currently the highest it has been in recent years.

The percentage of uninsured residents as an indicator does not come without limitations. The SAHIE program has a number of surveys that estimate the rate of uninsured citizens. However, due to the number of differentiating surveys, the results of any one survey may not be adequately representative of the entire uninsured population (Lewis, 2008).

Summary

The percentage of uninsured residents in Dubuque County increased from 2010-2011 by approximately 2 percentage points. It remains significantly lower than Eau Claire County, WI and Woodbury County, IA. However, it is slightly higher than the rate found in La Crosse County, WI.

Educational Attainment – Percent of population with high school degree or higher

Scope – County

Status – Baseline

Goals – This indicator addresses Community Facility goal 27

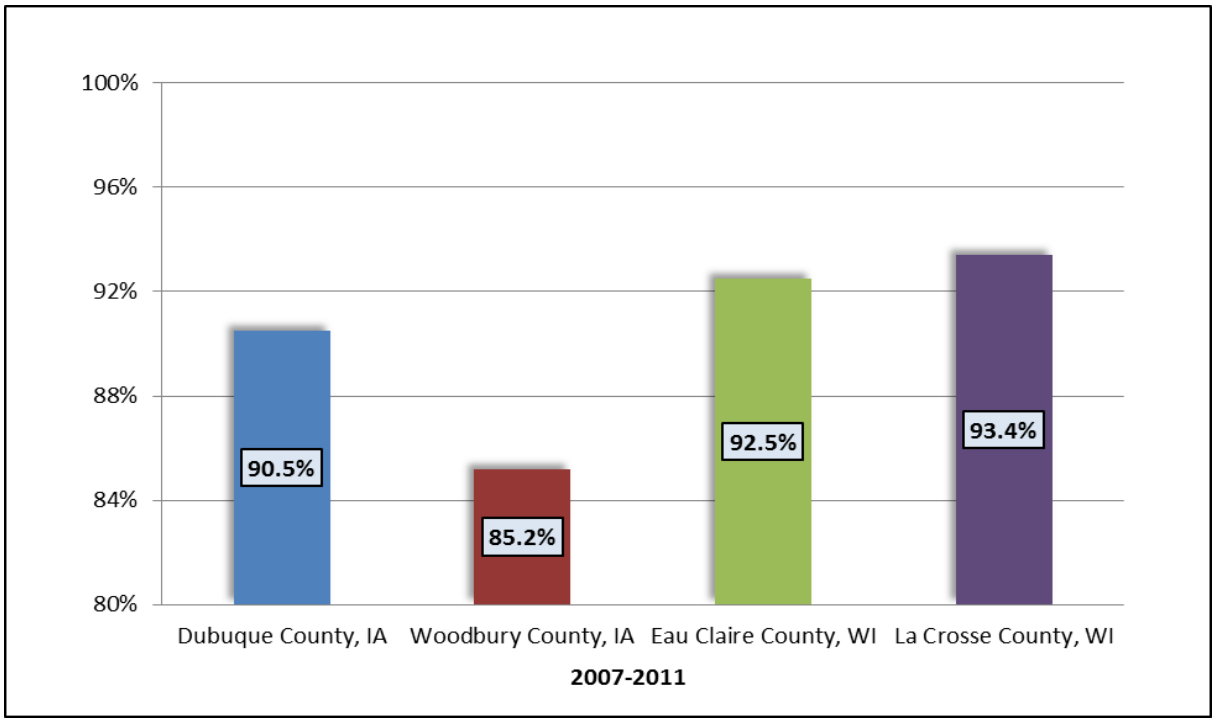


Figure 70: Educational attainment – percent high school graduate or higher. Source: U.S. Census Bureau

Why Is This Important?

Education is a primary component of sustained social and economic success. Higher levels of education can provide the basis for a better lifestyle, as educational attainment is positively correlated with income (BLS). Greater income levels allow people to purchase goods and services provided by local businesses, thus contributing to the economy. Therefore, efforts that focus on providing education to all Dubuque County citizens should be prioritized.

This indicator illustrates the educational attainment rate for Dubuque County's population. The data incorporated measures the percentage of the county's population that has attained a high school degree or higher. Percentages included are five-year estimates provided by the U.S. Census Bureau's American Community Survey (see Figure 70).

How Are We Doing?

Dubuque County's rate of educational attainment was 90.5% from 2007-2011. Dubuque County outperformed Woodbury County, IA over this five-year span but had a lower rate than Eau Claire

County, WI and La Crosse County, WI. The national rate was 85.4% for the same time period. Although Dubuque County's educational attainment rate for 2007-2011 was higher than national standards, the county should concentrate efforts in order to increase education levels throughout its population.

Summary

The educational attainment rate was 90.5% in Dubuque County from 2007-2011. This is higher than the national average (85.4%) and Woodbury County's attainment rate, but it is lower than two of the comparison counties included in the study.

Access to Parks – Acres per 1,000 residents

Scope – County

Status – Baseline

Goals – This indicator addresses goal 30

City	Population	Acres of Parkland	Acres per 1,000 residents
Dubuque County, IA			
Asbury	4,170	43.07	10.33
Cascade	2,159	8.34	3.86
Dubuque	57,637	679.07	11.78
Dyersville	4,058	88.43	21.79
Epworth	1,860	15.96	8.58
Farley	1,537	19.86	12.92
Peosta	1,377	1.60	1.16
		Average	**10.06**
La Crosse County, WI			
Bangor	1,473	0	0
Holmen	9,005	62.94	6.99
La Crosse	51,719	1468.79	28.40
Onalaska	17,736	123.55	6.97
Rockland	594	14.44	24.31
West Salem	4,837	81.54	16.86
		Average	**13.92**

Figure 71: Acres of parkland per 1,000 residents by city. Source: U.S. Census Bureau and ECIA

Why is this important?

Parks provide numerous benefits to their communities. Access to nearby places of recreation provides the opportunity for community members to be physically active and engage in leisure activities that reduce stress and enhance well-being. Parks provide environmental benefits such as floodplain protection, stormwater infiltration, natural sound barriers, and carbon uptake; they can also function as wildlife habitats. Parks also provide the public with space for community activities and social interactions. Furthermore, parks have been shown to increase the property values of homes nearby (Harnik and Welle, 2009).

This indicator measures the ratio of public parkland in each city to its population. Standards for what defines an adequate amount of parkland vary; 10 acres per 1,000 people was commonly used in the past. However, the National Recreation and Parks Association (NRPA) has ceased formally using this recommendation and no longer issues a standard ratio (City of San Antonio, 2011). The appropriate amount of parkland depends on a number of variables such as the type and size of park, the density and character of the city, and how the acres are distributed; it is therefore difficult to narrow down the standard to a single number indicating space per person or per population. The Trust for Public Land performed a survey in 2011 of numerous cities na-

tionwide, and those in the lowest population density category had an average of 35.8 acres of parkland per 1,000 (this calculation excludes Anchorage, Alaska, which was included in the published survey but is an outlier) (Trust for Public Land, 2011). It is worth noting that all cities in the survey had populations of more than 200,000. Dubuque County does not have a standard for the amount of parkland each community should have. In the county's 2002 comprehensive plan, residents expressed concerns that existing parks and recreation areas are crowded throughout much of the spring, summer, and fall, and that there is a lack of small neighborhood parks and play areas within larger rural subdivisions for use by children and families. The county therefore needs to focus on increasing the amount of parkland and further investigate specific areas that are cause for complaint.

How are we doing?

This analysis was done for Dubuque County's seven Consortium cities and the 6 incorporated villages and cities in La Crosse County, WI; results are shown in Figure 71. The necessary GIS data was not available for Eau Claire and Woodbury Counties. The amount of parkland varies greatly by city. In Dubuque County, the cities of Asbury, Dubuque, Dyersville, and Farley all exceeded the formerly accepted standard of 10 acres per 1,000 people. Epworth fell shortly behind with 8.58 acres, while Cascade and Peosta have significantly lower parkland to population ratios. In La Crosse County, three of the six cities exceeded 10 acres per 1,000 residents. On average, cities in La Crosse County had more parkland per resident than those in Dubuque County. It is important to note that there are many parks and nature areas in unincorporated parts of both counties that are short distances from these communities; this is why the standard for acres of parkland must be considered in the context of individual communities.

Summary

Asbury, Dubuque, Dyersville, Farley, and Epworth all have reasonable amounts of parkland. Cascade and Peosta have a small number of acres per resident. Residents have expressed concerns regarding the over-crowding of existing parks and lack of parks in some subdivisions. Dubuque County can work with communities to develop park standards and increase parkland in areas that need it most.

Intergovernmental Collaboration

The success of the Smart Plan will depend on the ability of individual communities' cooperation. Communities will need to share information, resources, and experience to launch regional projects. The benefits of intergovernmental collaboration include cost savings, early identification of potential issues, the ability to address regional issues, a reduction in litigation, and increased trust among communities.

Local governments in Dubuque County have made great progress toward collaboration and partnerships. Both formal and informal intergovernmental agreements are already in place. Regional organizations have established joint services to achieve mutual advantages. These regional organizations include the East Central Intergovernmental Association, the Dubuque Metropolitan Area Transportation Study (DMATS), Regional Planning Affiliation 8 (RPA 8) and the Dubuque County Smart Planning Consortium.

1. Aside from sharing information and resources, intergovernmental collaboration also helps solve conflicts between communities, especially land use conflicts such as rural development and annexation issues.

2. The Intergovernmental Collaboration chapter's goals and objectives encourage communication between communities and collaboration efficiency. This indicator was selected based on the goals of the chapter and data availability, and it can be used to measure intergovernmental collaboration and provide a sense how to improve collaboration.

3. The goals and objectives of intergovernmental cooperation are listed below:

4. Improve relationships among local governments within the region by strengthening communication and identifying opportunities for sharing information.

5. Reduce land use conflicts between neighboring jurisdictions including issues concerning annexations, urban and rural development, code compliance, and fringe area development.

6. Encourage Dubuque County communities to coordinate economic development efforts.

7. Encouraging Dubuque County communities to coordinate the planning, programming, and use of personnel, equipment, services, facilities, and infrastructure.

8. Coordinate regional agriculture and natural resource protection efforts.

9. Continue the dialog on comprehensive planning, land use regulation, and boundary issues between local governments in Dubuque County.

Number of 28E Agreements

Scope-County, Consortium cities

Status-Increasing

Goals-This indicator addresses goal 1

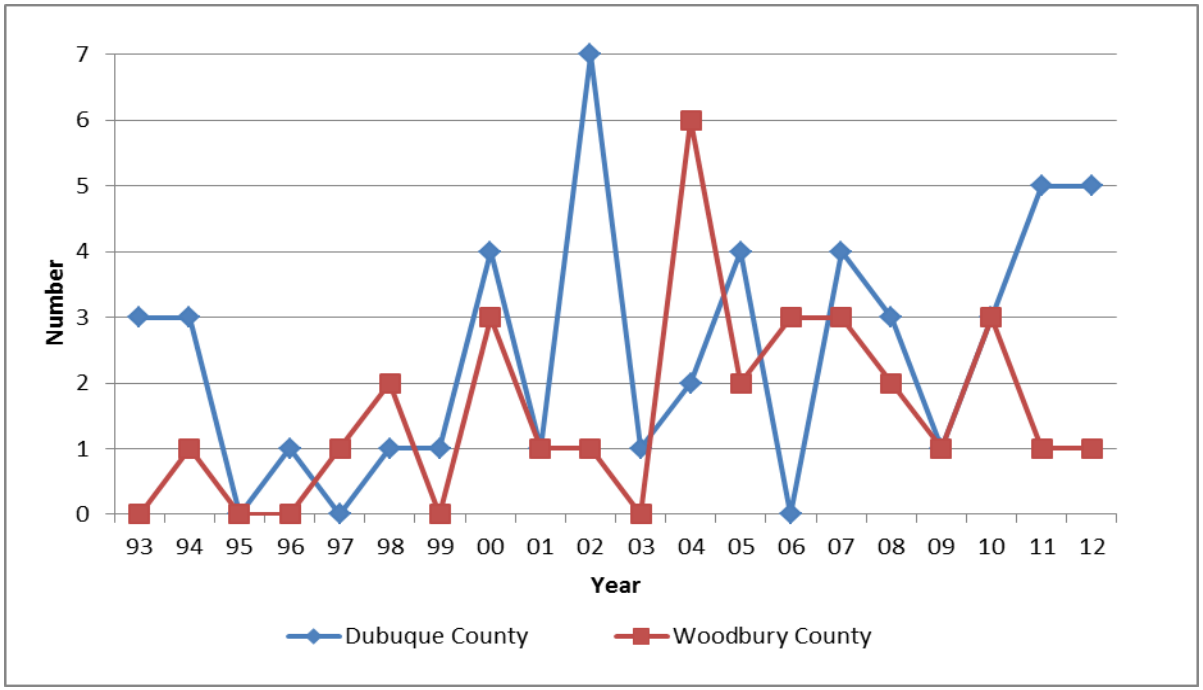


Figure 72: Number of 28E Agreements among Dubuque County communities and Woodbury County communities (1993-2012)

Why is this important?

Cooperation is an efficient way for communities to fulfill mutual interests. Communities can share resources and take advantage of the benefits of cooperation in terms of economic development, environmental protection, and transportation development. Intergovernmental agreements (Iowa Code Chapter 28E, adopted in 1965) have expanded political subdivisions' authority for intergovernmental cooperation. They allow governmental agencies to cooperate with each other in undertaking initiatives.

Weak public demand for certain services restricts cities from providing some services to citizens. In these situations, cooperative agreements between agencies are an efficient approach to provide these services at a low cost. Communities in Dubuque County have implemented agreements for sharing neighborhood services, library services, street and road systems, emergency management, fire response, planning, parks and recreation, public Transit, motor vehicles, education, police protection, sanitation, criminal investigation, hazardous materials response, and water systems.

How are we doing?

The online database of 28E agreements maintained by the Iowa Secretary of State shows all

the 28E agreements among Dubuque County communities in the past 20 years. Those agreements list the filing date, expiration date, service type, participants, and goals. Information for Woodbury County, IA, is provided as comparison. Figure 72 shows the number of 28E agreements among Dubuque County communities and Woodbury County communities from 1993 to 2012. Figure 73 shows the number of 28E agreements pertaining to different service types. The results indicate that Dubuque County communities have a greater number of collaborative agreements than Woodbury County communities. A majority of the cooperative efforts among communities in Dubuque County have focused on criminal investigation, fire response, and street and road systems.

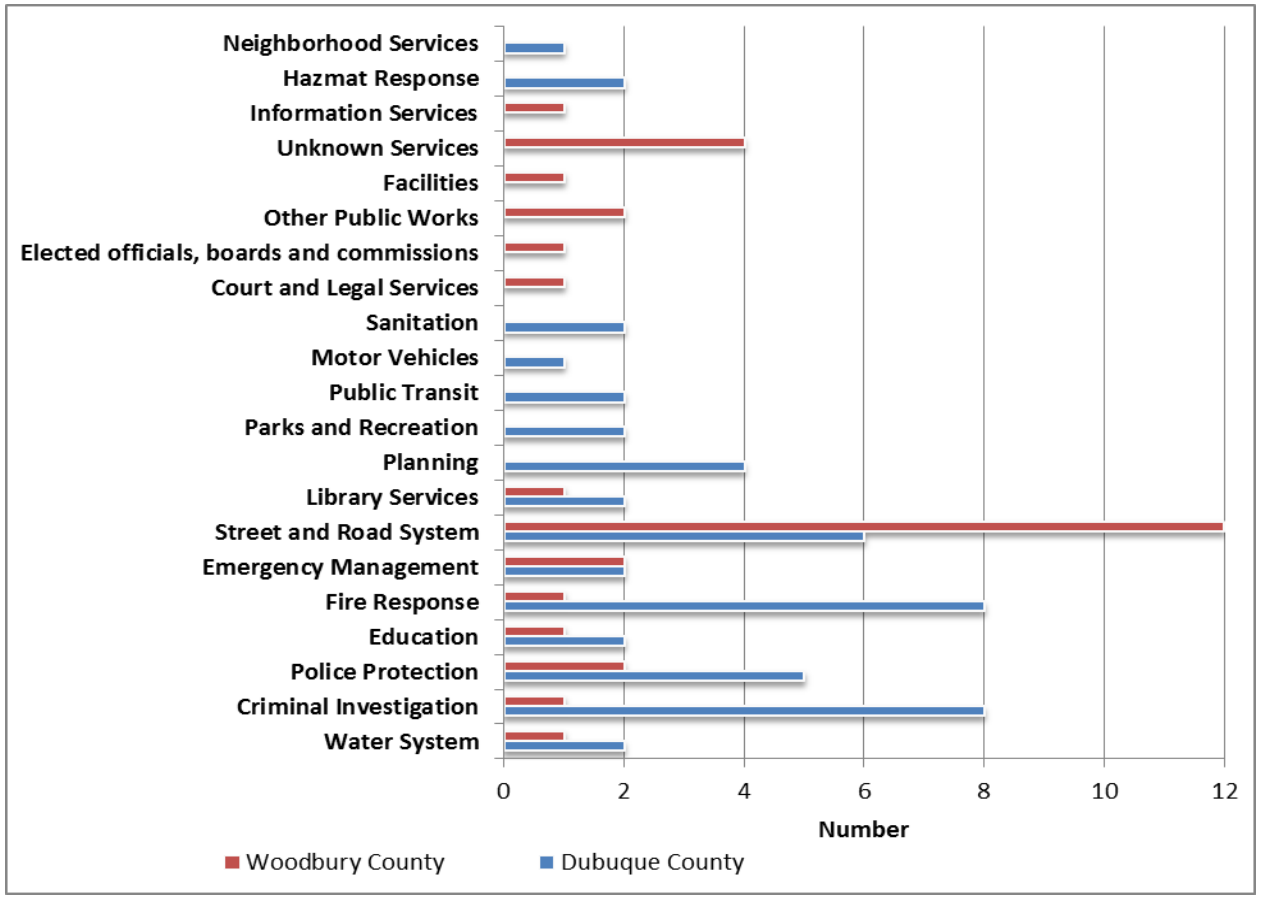


Figure 73: Number of 28E Agreements Classified by Service Types among Dubuque County communities and Woodbury County communities (1993-2012)

Summary

Criminal investigation, fire response, and street and road system agreements were most prominent in the total number of 28E agreements among communities in Dubuque County. Collaboration has gradually increased and strengthened from 2009 to 2012.

Hazard Mitigation

"Mitigation is defined as taking sustained actions to reduce or eliminate the long-term risks to people and property from hazards" (Dubuque County Regional Smart Plan, 1).

Hazards can strike anywhere, but making mitigation plans can minimize the impact of hazards. The long-term sustainability of a community or county can be threatened by an unexpected hazard, but planning ahead for the mitigation of a hazard's impact as well as recovery from damage can improve the chance of a more full recovery.

The Dubuque County Smart Plan includes a risk assessment for countywide hazards and ranks them as such (in terms of historical occurrence, probability, vulnerability, maximum geographic extent, severity, and speed of onset):

Severe Winter Storm	1
Windstorm	2
Thunderstorm & Lightning	3
Extreme Heat	4
Tornado	5
Hailstorm	6
Drought	7
Grass or Wild Land Fires	8

The Plan also includes a hazard risk analysis for each city – because of differing geographies and features, each city faces a unique set of risks (for more information, see page 5 of the Hazard Mitigation chapter of the plan). This chapter also includes a list of the 13 active emergency management plans in the county and what agency is responsible for updating it.

The main goals listed in this chapter of the Smart Plan are:

1. Increase capabilities within Dubuque County entities to mitigate the effects of hazards by enhancing existing or designing and adopting new policies that will reduce the damaging effects of hazards.
2. Protect the most vulnerable populations, buildings, and critical facilities within Dubuque County through the implementation of cost effective and technically feasible mitigation projects.
3. Improve the level of responder, government, business, and citizen awareness and preparedness for disaster.
4. Develop programs to assure that response agencies, governments, educational institutions, and local businesses are able to operate during times of disaster.
5. Coordinate a multi-jurisdictional approach to integrate hazard mitigation and land use planning.
6. Coordinate future transportation plans with appropriate hazard mitigation plans including the Regional Evacuation Plan and the Incident Management Manual.

Number of communities enrolled in the National Flood Insurance Program

Scope – County

Status – Stagnant

Goals – This indicator addresses goals 1 and 2

Why is this important?

The National Flood Insurance Program (NFIP) was created in 1968 to provide flood insurance to homeowners and business owners because flooding is not usually covered in standard insurance policies. The NFIP offers flood insurance to individuals if their community participates in the NFIP. In July 2012, President Barack Obama signed legislation extending the NFIP's authority through 2017. The goals of this chapter of the Smart Plan include protections for "vulnerable populations, buildings, and critical facilities," and this should include insurance.

Even if a community is not prone to flooding, offering the possibility of this extra coverage is important. "Nearly 20% of flood insurance claims come from moderate-to-low risk areas" (www.floodsmart.gov). In Iowa, 626 communities are enrolled in NFIP, 121 are not enrolled in NFIP, and 262 have not been mapped by the Federal Emergency Management Agency (out of the 1009 municipalities recognized by the U.S. Census).

How are we doing?

Six municipalities in Dubuque County are not enrolled in NFIP or have not been surveyed by FEMA for floodplain maps (Community Status Book).

Asbury – not enrolled in NFIP

Balltown – not surveyed by FEMA

Bankston – not surveyed by FEMA

Luxemburg – not enrolled in NFIP

Rickardsville – not enrolled in NFIP

Sherrill – not surveyed by FEMA

All three comparison counties (La Crosse County, WI; Eau Claire County, WI; and Woodbury County, IA, are all enrolled in the NFIP. All the incorporated municipalities in La Crosse County are enrolled, all except one in Eau Claire County are enrolled, and all except two in Woodbury County are enrolled.

Summary

Six of the 21 communities in Dubuque County are not enrolled in the NFIP or have not been surveyed by FEMA for floodplain maps.

Degree of hazard planning incorporated into local ordinances and comprehensive plans

Scope – County

Status – Poor

Goals – This indicator addresses goals 3, 4, 5, and 6

Why is this important?

There is great benefit to integrating mitigation plans in a hazard section of a comprehensive plan.. In states where municipalities are required to have comprehensive planning, integrating hazard mitigation plans into the comprehensive plan gives mitigation activities legal priority (Schwab, 30). Iowa does not require cities to have comprehensive plans, however. Moreover, common planning tools can enhance hazard mitigation plans, such as mapping to delineate hazards, reviewing land for potential hazards before allowing subdivision, and municipal purchasing of properties in hazard-prone areas (Schwab, 30).

How are we doing?

Currently, the City of Dubuque is the only municipality in the county which has incorporated hazard mitigation elements into a comprehensive plan. Several other municipalities (Asbury and Cascade, for example) have ordinances that restrict floodplain development. This doesn't establish as effectively that comprehensive hazard mitigation is a policy priority, but nevertheless furthers some of the goals established in the Smart Plan.

All jurisdictions in the county adopted in 2012 the Multi-hazard Mitigation Plan developed by ECIA. Many had previous hazard mitigation plans, which are noted in the chart below, and are supplemented by the MHMP. The ultimate goal of providing emergency preparedness and hazard mitigation is met by the MHMP, although mitigation goals would be more effectively furthered by incorporation into a comprehensive plan.

Summary

Many of the municipalities in the county do not have comprehensive land plans, so if and when these are developed, they should include elements of hazard mitigation to further the legal priority of these policies and activities. While the Dubuque County Multi-Jurisdictional Multi-Hazard Mitigation Plan has been adopted and establishes that mitigation is a priority, more incorporation at the local level would be better.

JURISDICTION	APPROVAL DATE OF PREVIOUS PLAN
Dubuque County, Lead Jurisdiction	02/08/2011
City of Asbury	10/16/2009
City of Balltown	No plan
City of Bankston	10/07/2009
City of Bernard	03/31/2009
City of Cascade	07/11/2005
City of Centralia	2003
City of Dubuque	01/27/2011
City of Durango	No plan
City of Dyersville	03/25/2011
City of Epworth	06/23/2005
City of Farley	06/29/2005
City of Graf	06/03/2008
City of Holy Cross	11/09/2010
City of Luxemburg	12/07/2009
City of New Vienna	07/14/2009
City of Peosta	06/16/2009
City of Rickardsville	2003
City of Sageville	02/02/2007
City of Sherrill	05/29/2009
City of Worthington	07/09/2009
City of Zwingle	2002

Source: Dubuque County Multi-Jurisdictional

Multi-Hazard Mitigation Plan

2012

Developed by ECIA, Dubuque, Iowa

Number of communities with storm warning systems

Scope – County and Consortium municipalities

Status – Varied

Goals – This indicator addresses goals 2 and 3

Why is this important?

A storm warning system is one the most basic emergency preparedness services a municipality can provide. It can be used to alert the population of impending natural or man-made hazards, at which time individuals can seek out additional information or seek appropriate shelter.

How are we doing?

All municipalities except two have at least one warning siren (see Figure 74). The unincorporated areas of the county do not have any sirens, but was reported as "in progress" in developing "Emergency Alert Notification System "for vulnerable unincorporated areas of Dubuque County (i.e. text alert, email, voice, recording, etc.) to notify residents of pending/possible disasters (pg. 229 MHMP). Graf and Rickardsville should be assisted in seeking grant funding or raising private funds to hook into a disaster warning siren system.

Summary

The vast majority of the municipalities in Dubuque County have warning sirens, but two cities are lacking this service. There should be periodic review of new growth areas to determine if additional sirens are needed to keep the population safe.

Figure 74: Storm Warning Systems

JURISDICTION	
City of Asbury	Asbury has 6 outdoor weather sirens.
City of Balltown	The City of Balltown has 1 outdoor warning siren.
City of Bankston	Bankston – Joyce Davidshofer – 563-744-3188
City of Bernard	Bernard has a siren on the water building
City of Cascade	The City of Cascade has five outdoor warning sirens located within city limits.
City of Centralia	The City of Centralia has one outdoor warning siren located at the fire house.
City of Dubuque	The City of Dubuque has 16 outdoor warning sirens, with plans to add another in the summer of 2013.
City of Durango	The City of Durango has one outdoor warning siren located between Burton's Furnace Road and US Highway 52.
City of Dyersville	The City of Dyersville has 6 outdoor warning sirens.
City of Epworth	The City of Epworth has two outdoor warning sirens coordinated through the fire department.
City of Farley	The City of Farley has three outdoor warning sirens and plans to add another one for the northeast section of town by the school and park.
City of Graf	Graf does not have an outdoor warning siren but in recent years provided free weather radios to all city residents.
City of Holy Cross	Holy Cross has 2 outdoor sirens.
City of Luxemburg	Luxemburg has one outdoor weather siren.
City of New Vienna	New Vienna – Angela Oberbroeckling – 563-853-4615
City of Peosta	Peosta has an outdoor warning system operated by the fire department.
City of Rickardsville	The City of Rickardsville does not have an outdoor warning siren for alerting citizens of all hazards. While the mayor and city council would like to have one in the city, the cost has been prohibitive.
City of Sageville	The City of Sageville has one outdoor warning siren for alerting citizens of all hazards.
City of Sherrill	Sherrill has an outdoor weather siren.
City of Worthington	The City of Worthington has two outdoor warning sirens – one on the east side of town and one on the west.
City of Zwingle	The City of Zwingle has one outdoor warning siren.

Part II—Land use modeling

Overview

Given expected population and employment growth and shifts within the county, the Dubuque Regional Smart Planning Consortium expressed interest in identifying or developing land-use models for projecting land development needs in relation to population change and job projections. Additionally, the Consortium expressed interest in tools and methods for assessing how development needs and impacts may vary under different future land-use scenarios.

In approaching these tasks, four research questions were developed:

- Which areas are most suitable for future development given different land development preferences?
- What are some of the different social and environmental impacts that may result from different development scenarios?
- Is there currently enough land zoned for each use classification to support future populations?
- Is there currently enough land zoned commercial and/or industrial to support future employment?

Development suitability analyses and build-out analyses that used population estimates for 2010 and projections for 2020 and 2030 were conducted to answer these research questions. While the current analyses are limited to Asbury and Peosta, the county's fastest growing communities, the methods developed can be expanded to incorporate other communities in the future.

The modeling process utilized publicly available data from a variety of county and city sources, Google Earth, the Natural Resources Geographic Information Systems (NRGIS) Library, and the U.S. Census Bureau and American Community Survey. The suitability and build-out analyses were conducted using CommunityViz. CommunityViz is a GIS-based planning software program that facilitates local and regional land-use planning and decision making. CommunityViz works as an extension to ArcMap and has an easy-to-use interface. This interactive and flexible software provides tools which allow users to create, visualize, and communicate alternative land-use scenarios. Additionally, software users can analyze the socioeconomic and environmental impacts of land-use decisions. Its visualization and communication capabilities help to promote the incorporation of public participation and collaborative decision-making.

Two different development scenarios that attempt to model "conventional" versus "cluster/conservation development" guided the suitability and build-out analyses. The Conventional Development model represent a more business-as-usual approach to development and attempts to reflect existing or historical development patterns. The Cluster/Conservation Development

scenario incorporates aspects of low impact development (LID), which the Consortium has identified as an important component of future regional development. The results of these combined analyses indicate whether, based on ratios of current population to land use classification, there is enough of each land use type zoned to accommodate future populations.

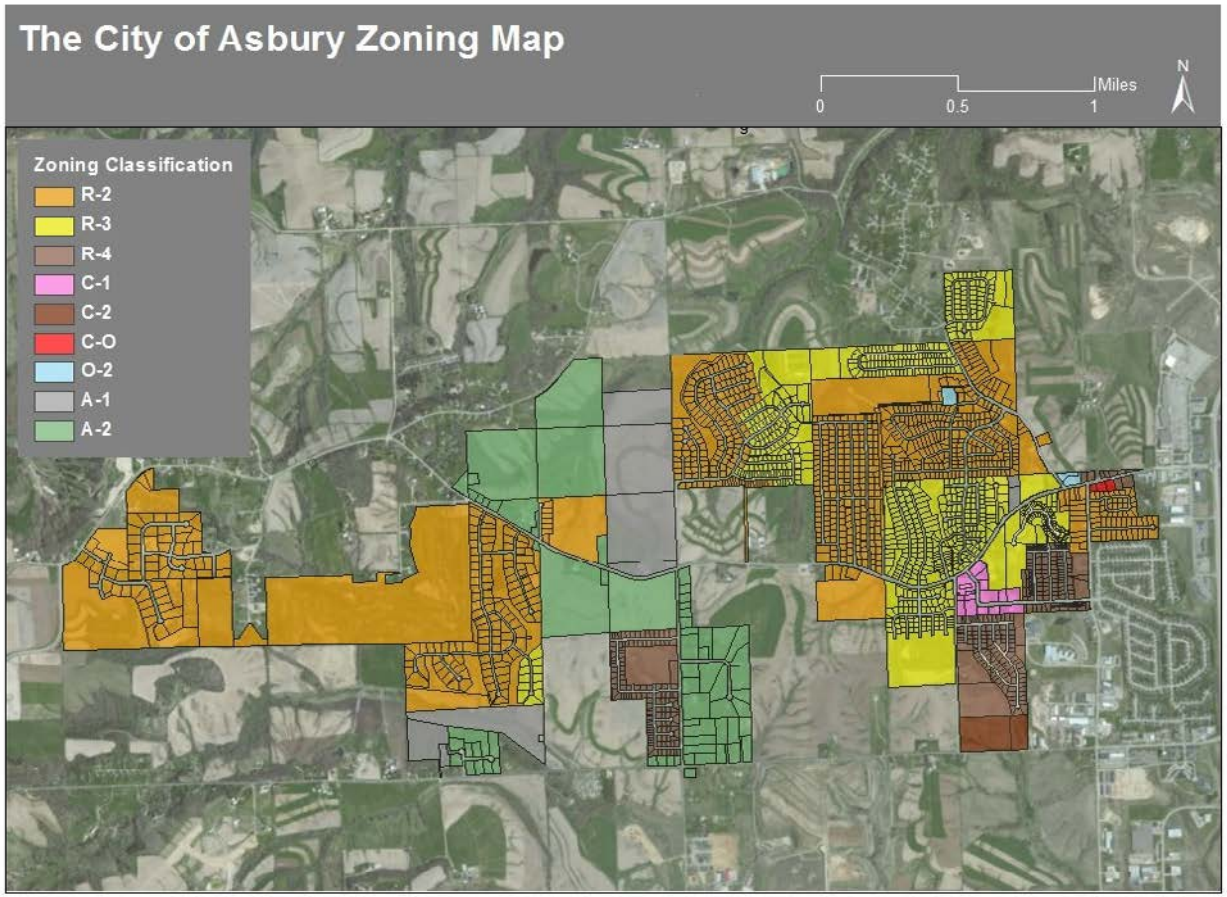
Additionally, the results of the build-out analyses were used to estimate "common impacts" in CommunityViz. The Common Impacts tool uses relatively simple multipliers and coefficients to calculate a variety of indicators associated with the impacts of development. Examples of these indicators include per person daily vehicle trips, carbon dioxide emissions, and water and energy usage.

Finally, an interactive suitability analysis tool was also created using CommunityViz's WebShots program to allow users, including members of the public, to modify variable inputs based on user preferences for suitability factors thereby allowing users to quickly view how such modifications lead to changes in the development desirability of parcels.

In the following sections, the methods used for addressing each of the aforementioned questions will be detailed along with findings. The section examines the analysis done in Asbury and then Peosta. The methods used in each community are very similar, if not identical, with the exception being that the weights used in the Conventional Development suitability analyses varied among the communities. While it may result in redundancies, details of the methods are repeated in both the Asbury and Peosta sections so that each section may be read on its own. Following the community-specific results, there will be an overview of the interactive "WebShots" land use suitability tool as well as recommendations and suggestions for incorporating these methods and CommunityViz software into future community planning.

Land use—Asbury

The City of Asbury, located just west of the City of Dubuque, is one the county's fastest growing communities. With a current population of approximately 4,170 residents, rapid population growth is projected to continue in the future with a projected 2040 population of more than 9,000 (Dubuque Smart Planning Consortium, 2013). Asbury has a younger median population age than the county average. This trend is also expected to continue into the future. Asbury's unemployment rate is low at 1.5 percent, and the majority of Asbury residents work in management, professional, sales, and office occupations (Dubuque Smart Planning Consortium, 2013). Given expected population growth and the consequent need for additional employment opportunities, it is important to understand future land use needs and the potential impacts of future development.



Suitability Analysis

Suitability analyses determine how suitable a location (in this case a parcel) is for development, given predetermined factors and weighted preferences (e.g., parcels on soils with high Corn Suitability Rating (CSR) may have a lower development suitability score compared to parcels on land with lower CSR). Using CommunityViz's Suitability Wizard tool, a suitability analysis was completed for the City of Asbury in Dubuque County in order to help identify areas where future development should occur. A suitability analysis determines which sites either meet certain criteria for development or are otherwise unsuitable for development. A suitability score is assigned to each parcel based on predetermined suitability factors.

Through digital editing using Google Earth, developed and undeveloped parcels in the City of Asbury were separated and new GIS shapefiles were created. Two different development scenarios guided the determination of suitability, resulting in two different suitability maps. Those scenarios are Conventional Development and Cluster/ Conservation development.

The Conventional Development scenario represents a more business-as-usual approach to development and attempts to reflect existing or historical development patterns. Suitability scores were then assigned to each undeveloped parcel based on specific weighted factors. Weights were assigned to each factor (0 least important to 10 most important) based on current development patterns:

Conventional Development Scenario

Proximity to Roads (undeveloped parcels closer to roads will score higher) – 5
Proximity to Floodplain (undeveloped parcels closer to the floodplain will score lower) – 10
Proximity to Wetlands (undeveloped parcels closer to the wetlands will score lower) – 0
Corn Suitability Rating – (undeveloped parcels on land with high CSR will score lower) – 0
Proximity to Existing Development – (undeveloped parcels closer to roads will score higher) –5

As the conventional development scenario attempts to reflect "business as usual" development patterns, the aforementioned weights were assigned based on a visual analysis of Asbury's existing development patterns. When the visual survey was conducted, visual analysis provided the following arguments for indicator preference scores (see Figure 75):

Roads: It appears that most, but not all, of the existing development has occurred along roads. It appears that the community values development next to roadways but does not have a strong preference for it. Therefore a weight of 5 was given for this indicator to show a moderate preference for development near roadways.

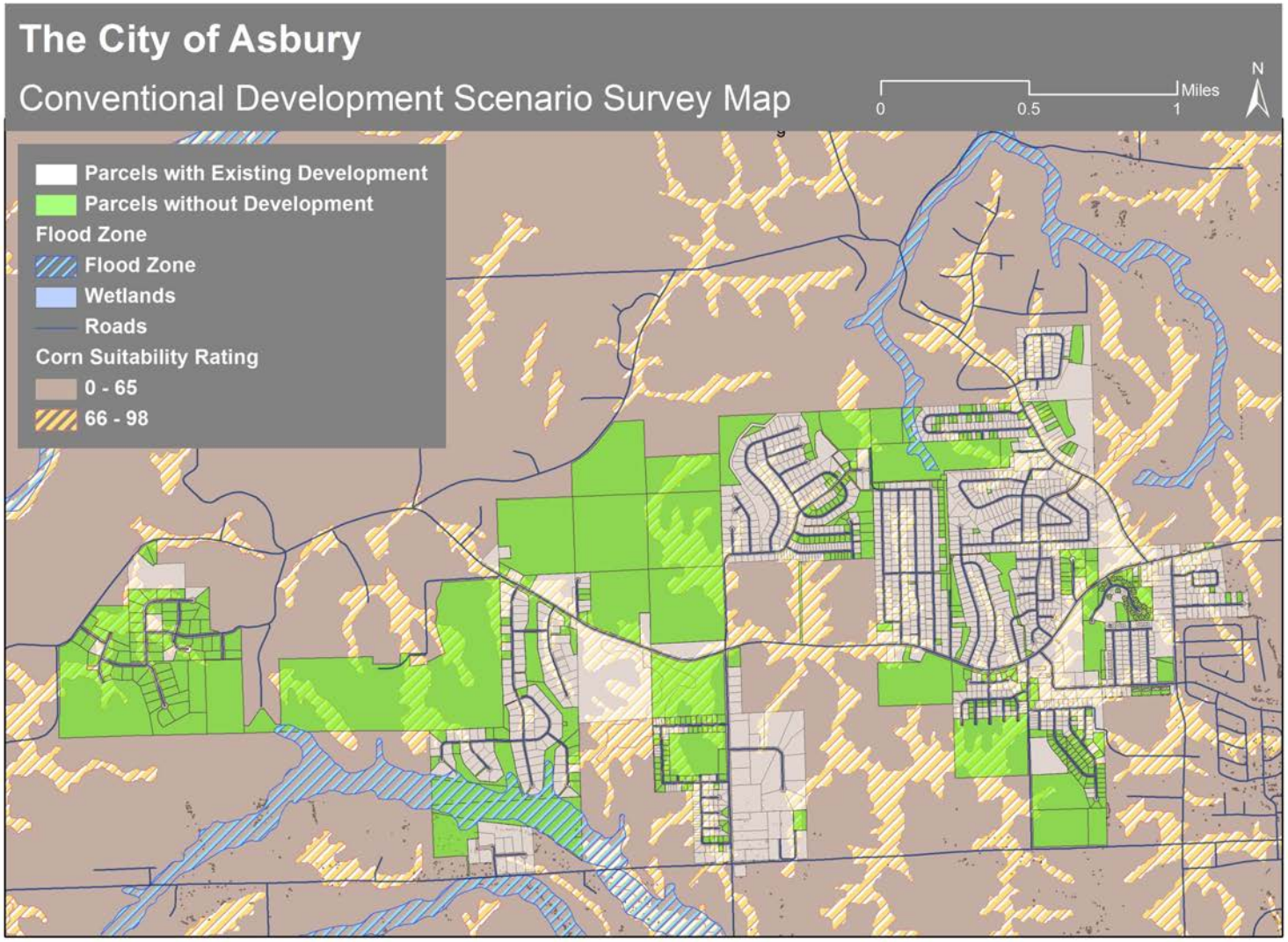


Figure 75: City of Asbury Conventional Development Scenario Survey Map

Floodplain: Development has not occurred on the floodplains, therefore it appears that the community values avoiding floodplain development. Therefore, a weight of 10 was given for this indicator to show a strong preference to not build in floodplain areas.

Wetlands: Development has occurred on wetlands. It appears that the community does not value wetlands. Therefore a weight of 0 was given for this indicator to show a low preference for the conservation of wetlands.

Corn Suitability Rating: Development has occurred on top of soils with high Corn Suitability Ratings. It appears that the community does not value soils with high CSR. Therefore a weight of 0 was given for this indicator to show a low preference for the conservation of soils with high CSR.

Proximity to existing development: Development has occurred next to existing development. However, there also appears to be a leapfrog development pattern. This suggests that the community has valued new development in close proximity to existing development, but not with a strong preference. Therefore, an indicator weight of 5 was provided to show a moderate preference for development next to existing parcels with development.

The results of the Asbury suitability analysis under a Conventional Development scenario are shown in Figure 76. The areas in red indicate existing development. While the areas in green are parcels that earned a suitability score of 60 or higher on a scale of 0-100. These areas with scores of 60 or above were identified as preferred areas for development. Suitable parcels were concentrated in the western, north central, and south eastern portions of the city. In assessing the current zoning type associated with each suitable parcel, the Conventional Development suitability analysis resulted in nearly 264.5 acres available for future residential development, 21.5 for commercial land use, 0 acres for office, and would result in 187 agricultural acres would be taken out of production for development (see Figure 77).

According to the Iowa DNR (2005), Low Impact Development (LID) uses site design development that conserves natural features and clusters development in one section of the site rather than the whole parcel. The benefits associated with LID are lower infrastructure costs and environmental considerations that result in the reduction of runoff and the preservation of open space. To create a LID land use scenario, a Cluster/ Conservation Development scenario was created using weights to provide indicator preference scores that reflect values in support of LID development. Therefore, the preferences for cluster or high density development, along with the preservation of natural features and open space are to have weights that supported these values. Suitability scores were assigned to each undeveloped

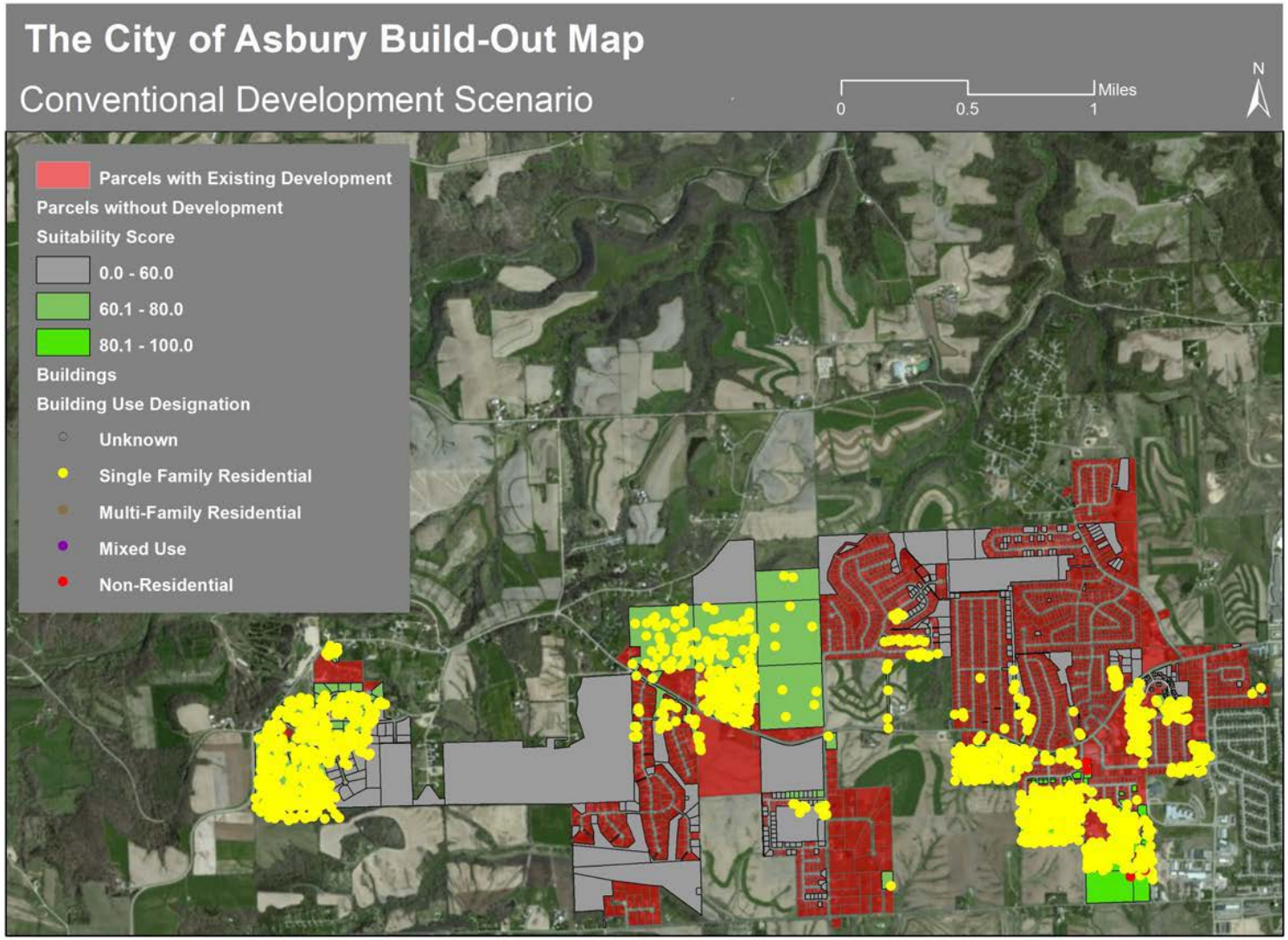


Figure 76: City of Asbury Suitability Map: Conventional Development Scenario

parcel based on specific weighted factors. Weights were assigned to each factor (0 least important to 10 most important):

Cluster/Conservation Development Scenario

Proximity to Roads (undeveloped parcels closer to roads will score higher) – 0

Proximity to Floodplain (undeveloped parcels closer to the floodplain will score lower) – 7.5

Proximity to Wetlands (undeveloped parcels closer to the wetlands will score lower) – 10

Corn Suitability Rating (undeveloped parcels on land with high CSR will score lower) – 7.5

Proximity to Existing Development (undeveloped parcels closer to roads will score higher) – 0

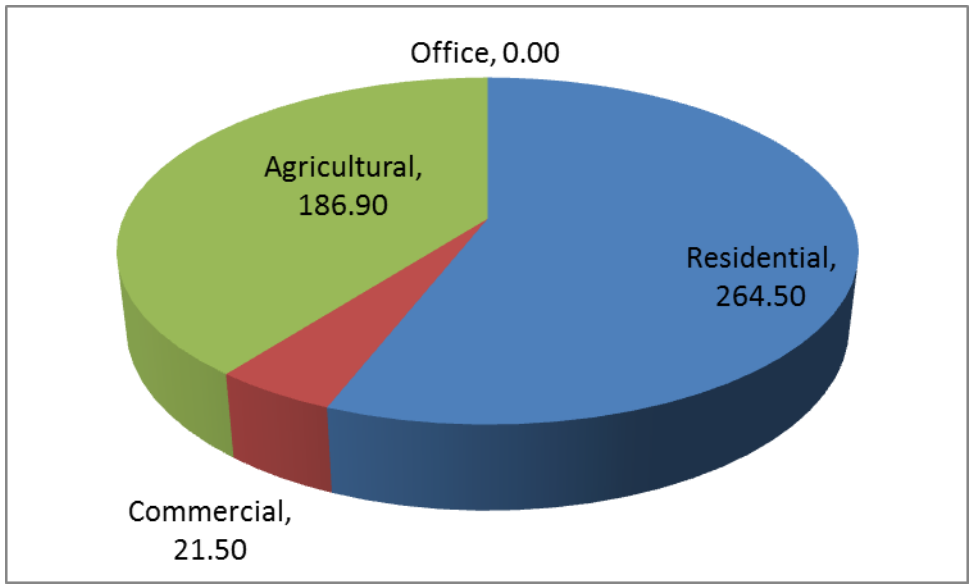


Figure 77: Results of Conventional Suitability Analysis for the City of Asbury: Acres Available for Future Development by Zoning Type (land with suitability score of 60 or higher)

The following arguments were used to for indicator preference scores associated with Cluster/ Conservation Development:

Roads: LID development seeks to preserve open space by advocating for development in cluster patterns rather than development on a whole parcel. Therefore a weight of 0 was given to show a low preference for development along roadways. Cluster development is not dependent on development along roadways.

Floodplain: LID aims to reduce runoff. However, it does not limit building near a floodplain. A weight of 7.5 was given for this indicator to show a lower preference for development occurring near floodplains.

Wetlands: The goal of LID is to preserve natural features and reduce runoff. A weight of 10 was given to show a high priority given to development that does not occur on wetlands.

Corn Suitability Rating: LID promotes development that is built in clusters to preserve highly productive agricultural lands. However, it does

not limit that development is not to occur on agricultural lands. A weight of 7.5 was given to show a higher preference to conserve lands that had a CSR higher than 65.

Proximity to Existing Development: LID seeks to reduce the cost of infrastructure by locating development in clusters. Because the size of the city is limited geographically and infrastructure is already in place, it is not necessary to provide a heavier weighted value for development to occur next to other existing development, but rather emphasize environmental conservation instead. Therefore a weight of 0 was given to show a lower priority to develop on parcels next to existing development

The results of the Asbury suitability analysis under a Cluster Development scenario are shown in Figure 78: Suitable parcels were concentrated in only the north central part of the city (next page).

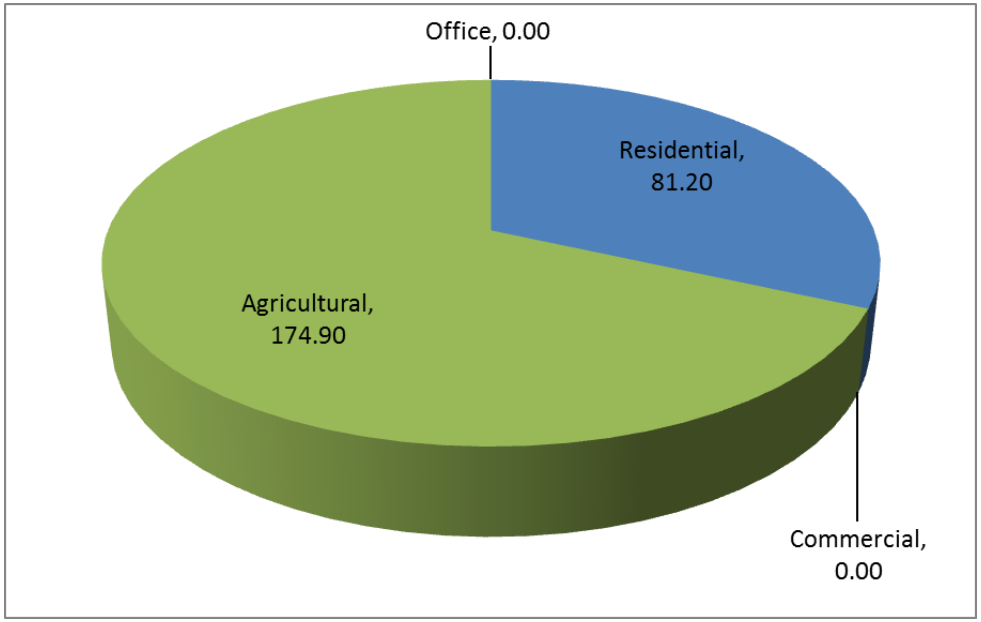


Figure 79: Results of Cluster/ Conservation Suitability Analysis for the City of Asbury: Acres Available for Future Development by Zoning Type (land with suitability score of 60 or higher)

In assessing the current zoning type associated with each suitable parcel, the Cluster suitability analysis resulted in 81.2 acres available for future residential development, 0 acres for both commercial and office development, and resulted in 174.9 acres of agriculture taken out of production (see Figure 79).

Compared to the Conventional Development scenario, the Cluster/Conservation Development scenario for suitability analysis identifies less land as "suitable" for future development. The cluster scenario results in a 69 percent reduction in area suitable for residential development. The amount of agriculture land used for development decreases from 186.9 acres in the Conventional Development Scenario to 174.9 acres in the Cluster/ Conservation Development scenario. There is no

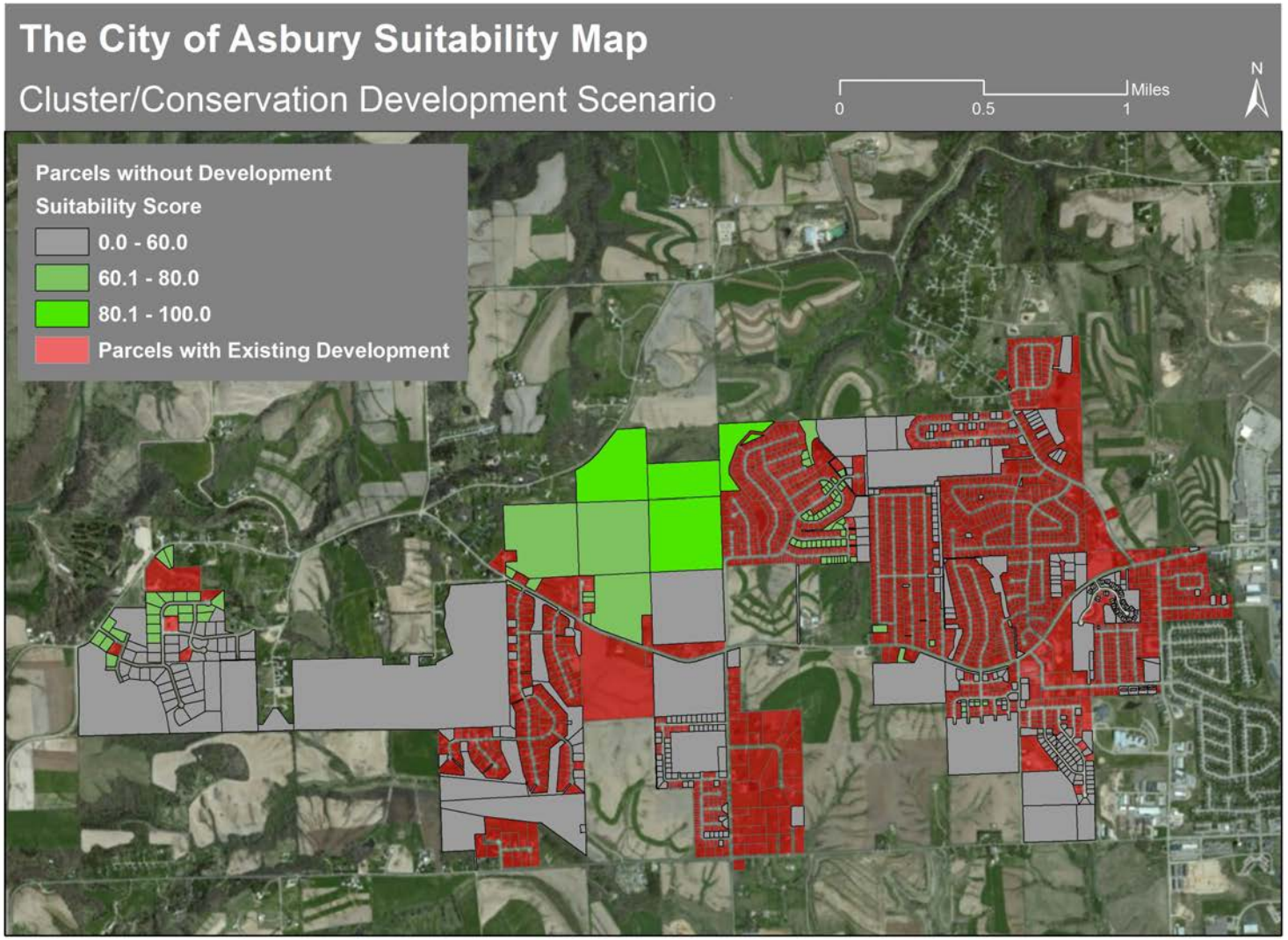


Figure 78: City of Asbury Suitability Map: Cluster/ Conservation Development Scenario

change in the amount of land for office (0 acres) but there is a 100% reduction in area suitable for commercial development. When weights were provided for preferences that value cluster/ conventional development, the resulting suitability analysis excluded land zoned for commercial and office space. This is in part due to the fact that there is relatively little land currently zoned for commercial or office use.

It is important to note that these results are for two different possible scenarios that each use a single weighting scheme for suitability factors. While these analyses do provide insight, what may be important moving forward are the actual methods that were used in developing the suitability maps and how they may be adapted. The current suitability factors and their respective weights were selected based on observation and information on the basic characteristics of low impact development. However, future analyses could utilize factors and weights that are determined through a more exacting process that utilizes local knowledge and even by using information gained through a public input process.

Asbury: What are some of the different social and environmental impacts that may result from different development scenarios?

Build-out analyses for each development scenario (i.e, Conventional and Cluster) for the City of Asbury were first conducted. The results of the build-out analyses were then used as inputs into the CommunityViz "Common Impacts Wizard" in order to evaluate the potential differences in social and environmental impacts that may results from the two development scenarios.

Build-out Analysis

A build-out analysis provides an estimate for the maximum development capacity for the land (see Figures 79 and 80). In other words, the build-out analysis estimates how many buildings the area can accommodate based on current policies, zoning, and building specifications. In order to conduct build-out analyses for the City of Asbury, the undeveloped parcels that scored above 60 in the suitability analysis (on a scale of 0-100 with 100 being the most suitable for development) were identified as available for future development.

The zoning classification of the parcels and the zoning ordinance specifications for each zoning class were used as parameters to guide development. Using the suitability maps generated for the Conventional Development scenario, future buildings were developed in a spatially "random" pattern. This "randomness" reflects more typical suburban development patterns. Conversely, in the build-out analysis for the Cluster/ Conservation Development scenario development, a grid pattern of development was used to more appropriately reflect efficient development patterns associated with neo-traditional development as suggested in the CommunityViz modeling program.

Under the Conventional Development scenario, given existing zoning specifications and the number of developable parcels identified as part of the two suitability analyses, the results of the build-out analysis for Asbury indicate a total of approximately 1,300 new buildings can be built, with no reference to time, and with the vast majority of these buildings being residential dwelling units (see Figure 81). While the results of the numeric build-out indicate a slight higher number of possible buildings (1,344), spatial limitations reduce that maximum number to 1,335 buildings. In the Conventional scenario, development is concentrated in the west, central and southeastern portions of Asbury. A total commercial floor area of 191,285 ft^2 is possible and these non-residential buildings would be concentrated in the southeastern portion of the city due to existing zoning.

The Cluster/Conservation Development scenario results in significantly fewer possible buildings, 460 units, all of which are residential dwelling units. An explanation for this difference is because the indicator preference scores for Cluster/ Conservation suitability analysis resulted in fewer

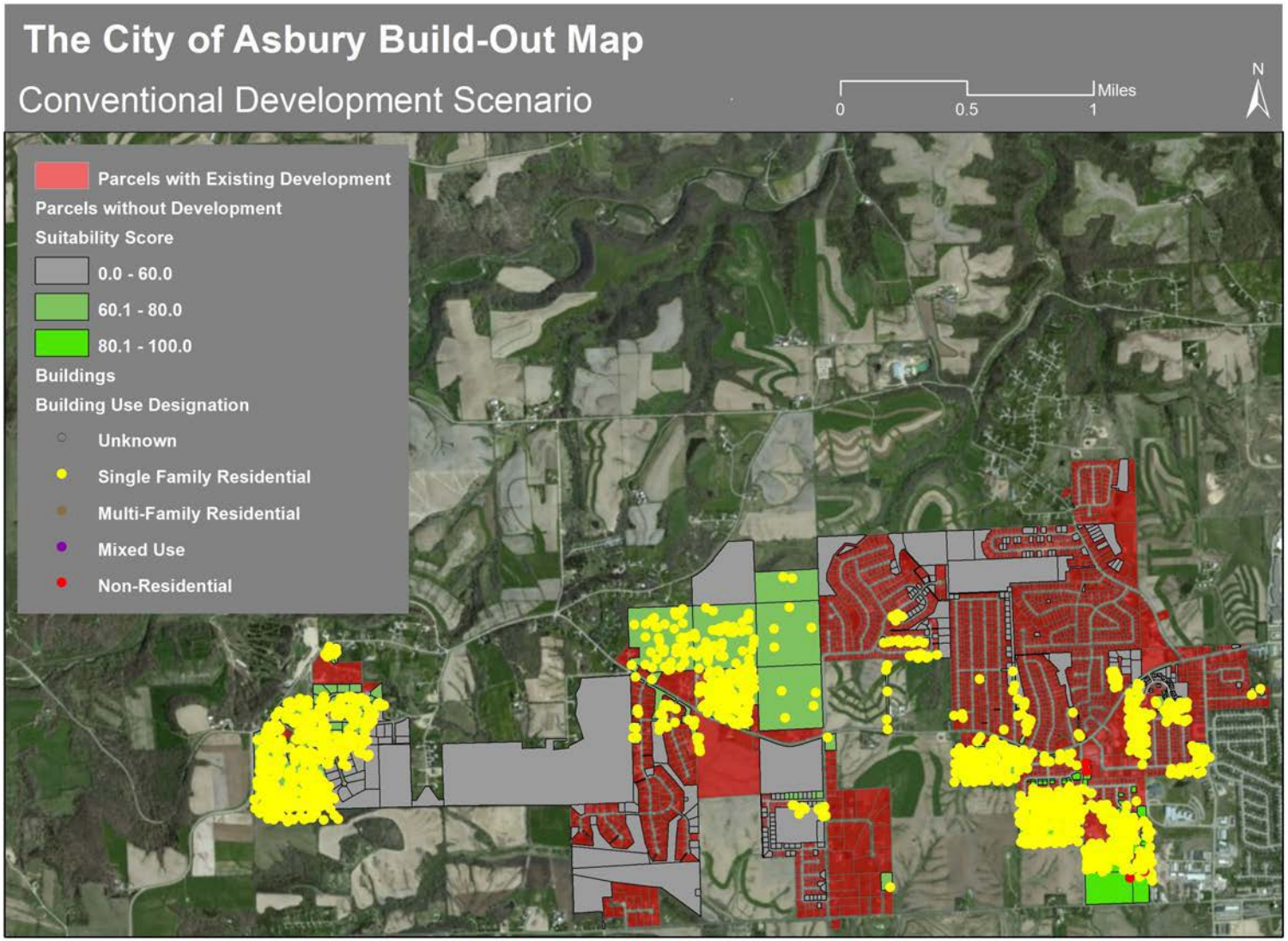
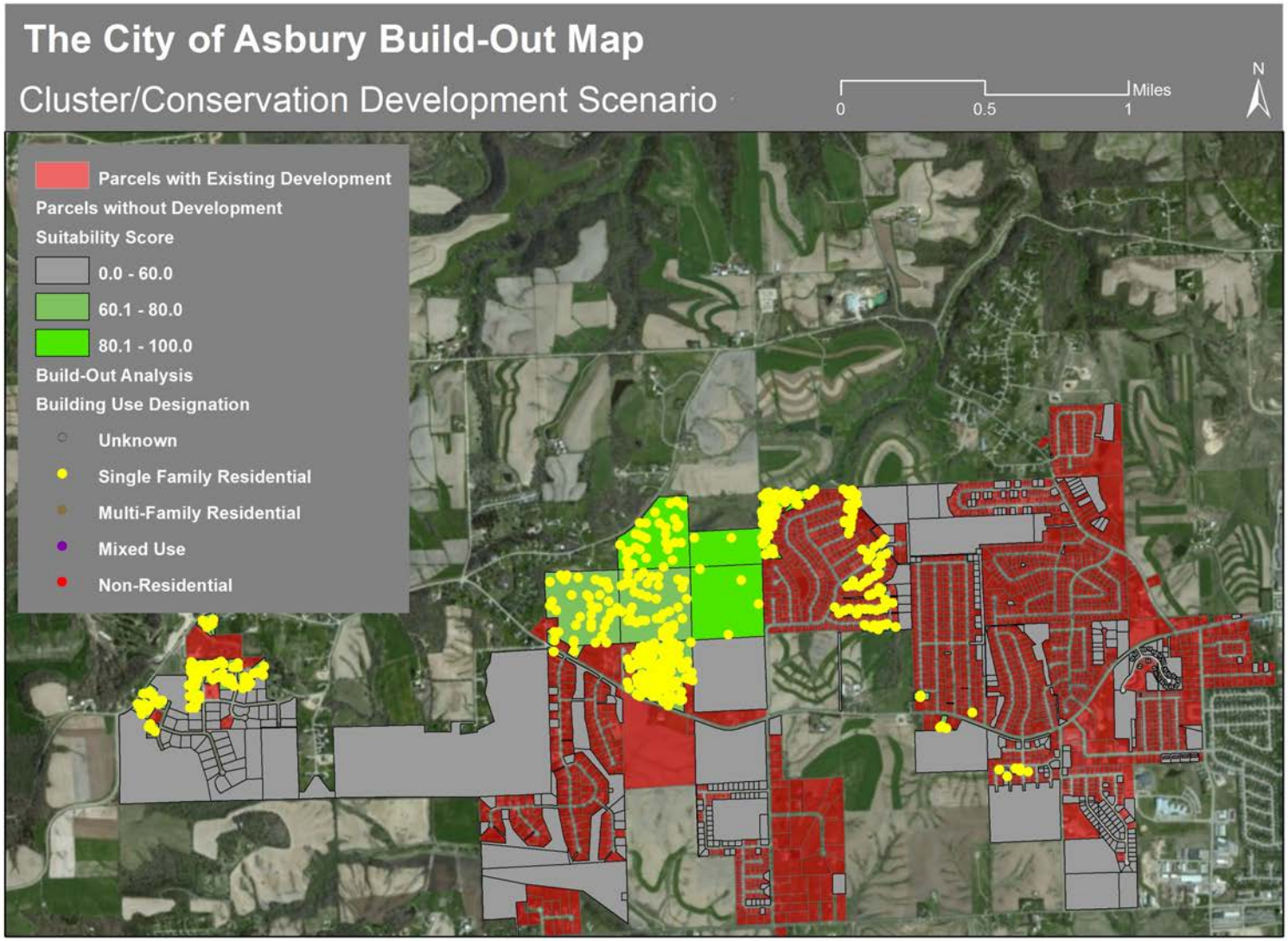


Figure 79: City of Asbury Build-out Analysis Map: Conventional Development Scenario

Figure 80: City of Asbury Build-out Analysis Map: Cluster/ Conservation Development Scenario



parcels available for development. Therefore, the Cluster/Conservation Development scenario resulted in significantly less land capacity available than the conventional scenario. In addition, the Asbury zoning ordinances governed how the build-outs under each scenario would occur. It may be possible that cluster development patterns would produce more development than the conventional scenario if lot size minimums, setbacks, and mix-use alterations were made to the zoning regulations currently in place. The build-out analysis did not result in the development of non-residential buildings. In this scenario, development is concentrated in the north central part of Asbury as this was the primary area where parcels were determined to be suitable for development. The low preference for avoiding wetlands was a prime determinant in the resulting low suitability scores elsewhere in the city.

	Conventional		Cluster	
	Numeric	**Spatial**	**Numeric**	**Spatial**
Dwelling Units	1,340	1,331	461	460
All Buildings	1,344	1,335	0	0
Commercial Floor Area (ft^2)	191,285	191,285	0	0

Figure 81: Results of Build-Out Analysis for the City of Asbury

Common Impacts

The Common Impacts tool in CommunityViz uses relatively simple multipliers and coefficients to calculate a variety of indicators associated with the impacts of development. To assist with the process, U.S. national averages are built into the tool and used as defaults.

	Conventional	Cluster
Annual CO^2 Emissions (tons/year)	11,566	3,997
Vehicle Trips Per Day	7,533	2,604
Residential Water Use (gallons/year)	136,999,830	47,347,800
Residential Energy Use (mil BTU/year)	126,445	43,700

Figure 82: Results of Asbury Common Impacts Analysis

The results of the two build-out analyses are used as inputs into the Common Impacts tool so that the number of potential buildings provides estimates for total population, based on estimated household size, and building footprints. The results indicate that the cluster scenario would potentially result in lower CO2 emissions, as well as reduced vehicle trips per day, water usage, and energy usage. This is largely due to the fact that the cluster/conservation scenario allows for less land to be developed and therefore results in a smaller population. Zoning that allows for higher density could allow Asbury to support a larger population while lessening per person and overall impacts. These impacts could themselves be used as sustainability indicators in the future as they relate directly to several of the Smart Plan goals and objectives pertaining to vehicles miles traveled as well as to water and energy consumption. The resulting data gathered from common impacts of build-out scenarios could provide valuable insight into the potential impacts land use policies and development can have on sustainability indicators. For example, if a land use development scenario were to show an increase in the number of vehicle trips per day, it would be intuitive to see how this could affect the vehicle miles traveled (VMT) sustainability indicator and provide a challenge to the goals that seek to reduce it. As seen in Figure 82, the vehicle trips per day reached 7,533 trips under the Conventional Development scenario and 2,604 trips per day under the Cluster/Conservation Development scenario. If the City of Asbury were to pursue the reduction of VMT, the Cluster/Conservation scenario may be a better choice. The similar connection can be

made from the Annual CO2 Emissions impact to the air quality indicator and the residential and energy use impacts to the energy efficiency indicator. This would also contribute to increased greenhouse gas emissions. Again, under these scenarios, Asbury might want to pursue LID over conventional development because the CO2 emissions, water use, and energy use were significantly lower than the conventional scenario. The cluster/conservation development resulted in 3,997 tons/year of CO2, 47, 347,800 gallons/year of water use, and energy use of 43,700 mil BTU/year These findings provide further support that future development patterns can likely have a significant impact on local and regional sustainability. The indicators presented in this report can help communities and the county to evaluate progress towards specific sustainability goals however, progress towards sustainability will require development patterns that incorporate elements of LID.

Land Use Analysis Based on Population Projections

With rapidly expanding populations, it is important for communities to know whether there is currently enough land to support future projected populations (see Figure 83). To address this research question, a non-spatially explicit land use analysis was conducted using future population projections and current per person land demands by zoning type (e.g., how many acres of residentially zoned land is there per person). The results of this analysis indicate whether, for example, if the population based land use ratios remain the same, is there enough land zoned "residential" that could be developed to accommodate the population in 2020 and 2030?

The summary results of the 2020 and 2030 land capacity analyses based on population projections are given in Figure 84. Detailed results for 2020 and 2030 are provided in Figures 85 and Figure 86, respectively. The process that was used in this analysis is detailed in Appendix F. The results are discussed below.

2010	2020 (Pop. Est.)	2030 (Pop. Est.)
4,170	5,470	6,990

Figure 83: City of Asbury Population and Population Projections (Source: U.S. Census and Dubuque Regional Smart Plan)

Agricultural

For the 2020 population projection, demand for agricultural zoned parcels will be 72.21 acres. Under the Conventional Development scenario, 186.90 acres will be available and under the Cluster/Conservation Development scenario, 174.90 acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 114.69 acres and the Cluster/Conservation Development scenario will be able to support the demand with an excess of 102.69 acres.

For the 2030 population projection, demand for agricultural zoned parcels will be 92.27 acres. Under the Conventional Development scenario, 186.90 acres will be available and under the Cluster/Conservation Development scenario, 174.90 acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 94.63 acres and the Cluster/Conservation Development scenario will be able to support the demand with an excess of 82.63 acres.

Commercial

For the 2020 population projection, demand for commercially zoned parcels will be 4.10 acres. Under the Conventional Development scenario, 21.50 acres will be available and under the Cluster/Conservation Development scenario, no acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 17.40 acres. However, the Cluster/Conservation Development

	2020 - Land Availability				2030 - Land Availability			
	Conventional Scenario		Cluster/Conservation		Conventional		Cluster/Conservation	
Zoning Classification	Yes	No	Yes	No	Yes	No	Yes	No
Agricultural	✓		✓		✓		✓	
Commerical	✓			✗	✓			✗
Office		✗		✗		✗		✗
Residential	✓			✗	✓			✗

Land Use Type	Current Land Demand (Person Per Acre)	Land Demand under current trends needed for 2020 (Acres)	Land Supply under Conventional Scenario	Land Supply under Cluster Scenario	Net acreage of land available under Conventional Development	Net acreage of land available under Cluster Development
Agricultural	75.75	72.21	186.90	174.90	114.69	102.69
Commercial	1,332.53	4.10	21.50	0.00	17.40	-4.10
Office	140.96	38.81	0.00	0.00	-38.81	-38.81
Residential	51.23	106.78	264.50	81.20	157.72	-25.58

Top: Figure 84: Summary Results for Land Use Analysis Based on Population Projections for the City of Asbury.

Center: Figure 85: Land Use Analysis Based on Population (2020) Projections for the City of Asbury.

Land Use Type	Current Land Demand (Person Per Acre)	Land Demand under current trends needed for 2030 (Acres)	Land Supply under Conventional Scenario	Land Supply under Cluster Scenario	Net acreage of land available under Conventional Development	Net acreage of land available under Cluster Development
Agricultural	75.75	92.27	186.90	174.90	94.63	82.63
Commercial	1,332.53	5.25	21.50	0.00	16.25	-5.25
Office	140.96	49.59	0.00	0.00	-49.59	-49.59
Residential	51.23	136.46	264.50	81.20	128.04	-55.26

Bottom: Figure 86: Land Use Analysis Based on Population (2030) Projections for the City of Asbury

scenario will not be able to support the demand and will result in a net loss of 4.10 acres.

For the 2030 population projection, demand for commercially zoned parcels will be 5.25 acres. Under the Conventional Development scenario, 21.50 acres will be available and under the Cluster/Conservation Development scenario, no acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 16.25 acres. However, the Cluster/Conservation Development scenario will not be able to support the demand and will result in a net loss of 5.25 acres.

Office

For the 2020 population projection, demand for office zoned parcels will be 38.81 acres. The Conventional Development and Cluster/Conservation Development scenario will not have land available to meet this demand. As a result, there will be a shortage of 38.81 acres for both scenarios.

For the 2030 population projection, demand for office zoned parcels will be 49.59 acres. The Conventional Development and Cluster/Conservation Development scenario will not have land available to meet this demand. As a result, there will be a shortage of 49.59 acres for both scenarios.

Residential

Based on the current population of Asbury, it was determined that residential land consumption is 51.23 persons per acre. For the 2020 population projection, demand for residentially zoned parcels will be 106.78 acres. Under the Conventional Development scenario, 264.5 acres will be available and under the Cluster/Conservation Development scenario, 81.2 acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 157.72 acres. However, the Cluster/Conservation Development scenario will not be able to support the demand and will result in a net loss of 25.58 acres.

For the 2030 population projection, demand for residentially zoned parcels will be 136.46 acres. Under the Conventional Development scenario, 264.5 acres will be available and under the Cluster/Conservation Development scenario, 81.2 acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 128.04 acres. However, the Cluster/Conservation Development scenario will not be able to support the demand and will result in a net loss of 55.26 acres.

These findings suggest that the City of Asbury may want to consider either rezoning to allow for more non-residential uses and mixed-use (i.e., commercial and/or office uses), or consider the potential social and environmental impacts of

having a shortage of non-residential uses and consequently fewer employment and retail opportunities within city limits. Such impacts may include, for example, a lower job-housing balance ratio and consequently higher per capita vehicles miles traveled as residents commute elsewhere to work and shop. This is particularly important with regards to the cluster/conservation scenario. While this pattern of development may directly result in more conserved land, the potential unintended consequences of policies aimed at reducing development may actually include negative environmental impacts if zoning does not allow for more mixed use.

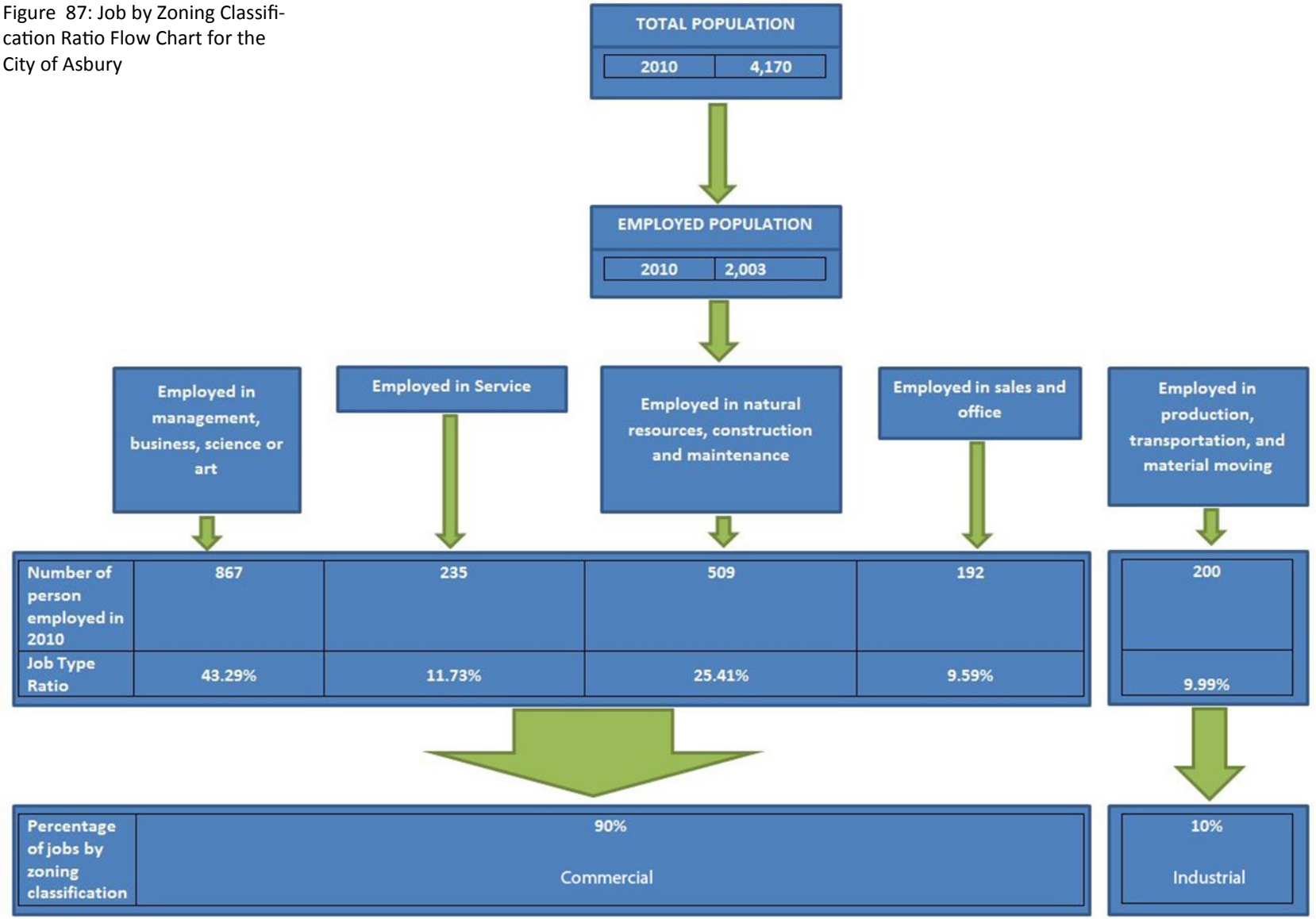
Land Use Analysis Based on Job Type Distribution per Zoning Classification

Land use analysis based on job projections and current land demands per zoning classification shows whether Asbury can provide for the future land demands to sustain the employment of its own residents. American Community Survey data were used to identify the number of persons age 16 and over, the number of persons age 16 and over employed, and the number of persons employed by employment type. As depicted in Figure 87, this data was used to calculate the current ratios for the workforce population of Asbury. A detailed description of the process can be found in Appendix F. These ratios were then used to project the workforce population for 2020 and 2030.

Each employment type as classified in the American Community Survey was assigned to a zoning classification (i.e., commercial or industrial). Management, business, science, and arts occupations, service occupations, sales and office occupations, and natural resources, construction, and maintenance occupations are occupations typically found on lands zoned for commercial and therefore were assigned a commercial zoning designation. Production, transportation, and materials moving occupations are jobs typically found on land zoned as industrial and were therefore assigned an industrial zone designation. In addition, the number of persons employed per zoning classification was used to calculate current the percentage of persons employed per zoning classification in order to project future trends. These percentages were approximately 90 percent and 10 percent respectively. This suggests that 90 percent of Asbury's 2010 workforce (1,803 employees) would be supported on commercially zoned land and 10 percent (200 employees) would be supported on industrial zoned land. While it is almost certain that there is at least some employment in and outflow of the city boundaries, this analysis is primarily interested in whether the City of Asbury could theoretically support its workforce based on existing land zoning.

As seen in Figure 88, these ratios were used with the projected workforce population to calculate the projected number of workers per zoning classification (see page 149).

Figure 87: Job by Zoning Classification Ratio Flow Chart for the City of Asbury



	Population Employed per Zoning Classification 2010	Population Employed per Zoning Classification 2020	Population Employed per Zoning Classification 2030
Commercial	1,803	2,365	3,022
Industrial	200	262	335

Figure 88: Asbury population/persons employed per zoning classification

The summary results of the 2020 and 2030 land capacity analyses are given in Figure 89 (see next page). Detailed results for 2020 and 2030 are provided in Figures 90 and Figure 91, respectively.

Commercial

For the 2020 population projection, demand for commercially zoned parcels will be 1.77 acres. Under the Conventional Development scenario, 21.50 acres will be available and under the Cluster/Conservation Development scenario, no acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 19.73 acres. However, the Cluster/Conservation Development scenario will not be able to support the demand and will result in a net loss of 1.77 acres.

For the 2030 population projection, demand for commercially zoned parcels will be 2.27 acres. Under the Conventional Development scenario, 21.50 acres will be available and under the Cluster/Conservation Development scenario, no acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 19.23 acres. However, the Cluster/Conservation Development scenario will not be able to support the demand and will result in a net loss of 2.27 acres.

Industrial

There currently are no lands designated for industrial zoning in the city of Asbury. Therefore, land calculations are not included. Population projections show that the persons employed in professions associated with industrial land zoning will continue to increase up to the year 2030. If Asbury were to sustain its own workforce, land would need to be zoned under the industrial classification.

	2020 - Land Availability (acres)				2030 - Land Availability (acres)			
	Conventional Scenario		Cluster/Conservation		Conventional		Cluster/Conservation	
Zoning Classification	Yes	No	Yes	No	Yes	No	Yes	No
Commerical	✓			✗	✓			✗
Industrial		✗		✗		✗		✗

Figure 89: Summary Results for Land Use Analysis Based on Employment Projections for the City of Asbury

	Land Demand for 2020	Land Supply under Conventional Scenario	Land Supply under Cluster Scenario	Net acreage of land available under Conventional Development	Net acreage of land available under Cluster Development
Commercial Acres Needed	1.77	21.50	0.00	19.73	-1.77
Industrial Acres Needed	0.00	0.00	0.00	0.00	0.00

Figure 90: 2020 Land availability for projected employment growth

	Land Demand for 2030	Land Supply under Conventional Scenario	Land Supply under Cluster Scenario	Net acreage of land available under Conventional Development	Net acreage of land available under Cluster Development
Commercial Acres Needed	2.27	21.50	0.00	19.23	-2.27
Industrial Acres Needed	0.00	0.00	0.00	0.00	0.00

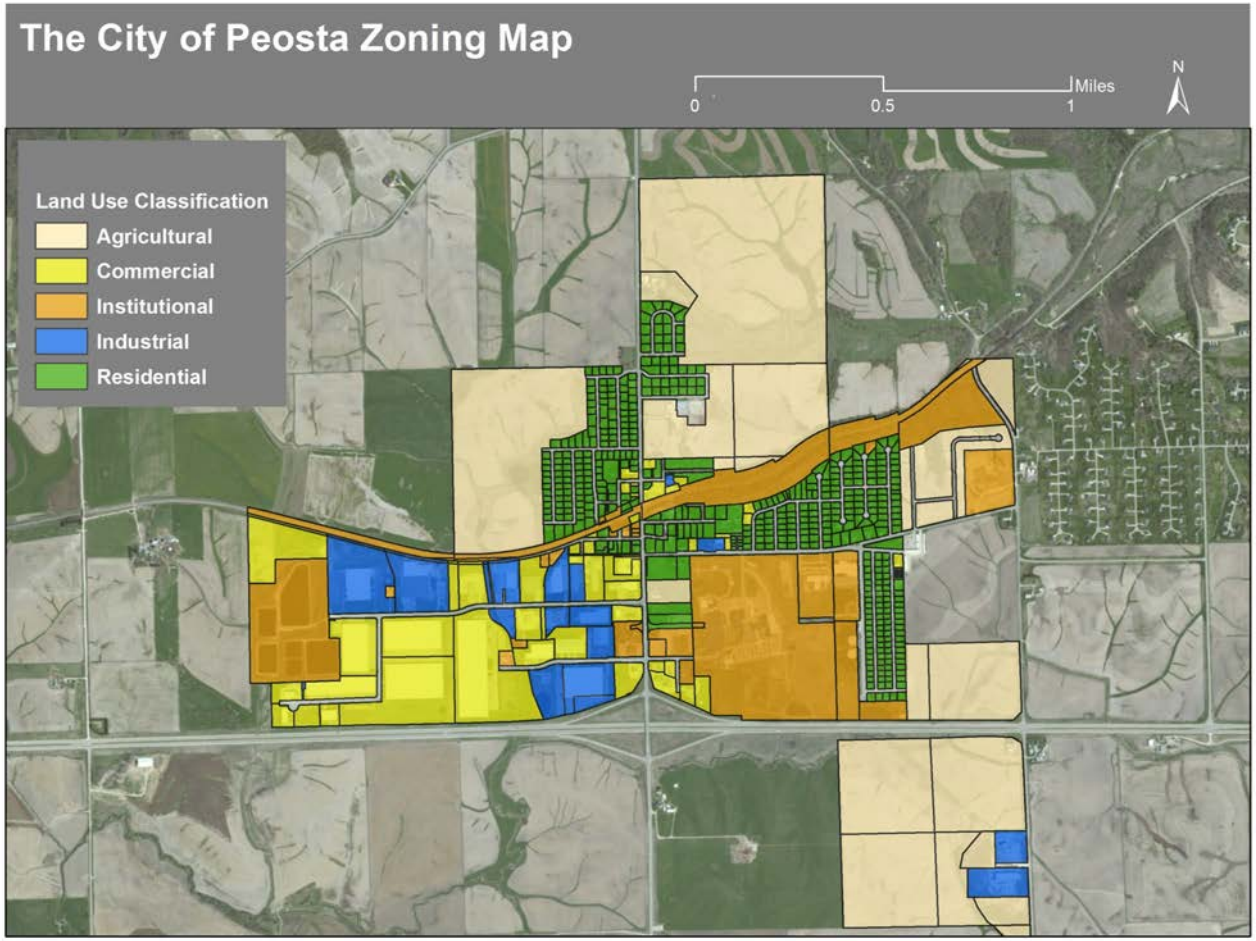
Figure 91: 2030 Land availability for projected employment growth

Conclusion

In order to accommodate a rapidly growing population in a sustainable manner, Asbury should consider incorporating more mixed use zoning to encourage further commercial, retail and office development within city limits. This may have the added bonus of improving the city's job-housing balance and potentially reducing negative impacts associated with the higher vehicle miles traveled that result from residents commuting to other communities for employment. Should Asbury decide to use elements of cluster or LID to guide future development, they will have to identify the prime land for annexation to support their future growth with minimal impact on environmentally sensitive land.

Land use—Peosta

The City of Peosta, located southwest of the City of Dubuque, is another one the county's fastest growing communities. Between 1990 and 2010 Peosta's population grew by over 920 percent and this high rate of growth is expected to continue into the future with a projected 2040 population of 3,750 (Dubuque Smart Planning Consortium, 2013). The majority of Peosta's growth is due to immigration, young individuals, and families. Like Asbury, Peosta's population is more highly educated compared to the rest of the county and the majority of Peosta residents work in management, professional, sales, and office occupations (Dubuque Smart Planning Consortium, 2013). Given expected population growth and the consequent need for additional employment opportunities, it is important to understand future land use needs and the potential impacts of future development.



Suitability Analysis

Suitability analyses determine how suitable a location, in this case a parcel, is for development given predetermined factors and weighted preferences (e.g., parcels on soils with high Corn Suitability Rating (CSR) may have a lower development suitability score compared to parcels on land with lower CSR). Using CommunityViz's Suitability Wizard tool, a suitability analysis was completed for the City of Peosta in order to help identify areas where future development should occur. A suitability analysis determines which sites either meet certain criteria for development or are otherwise unsuitable for development. A suitability score is assigned to each parcel based on predetermined suitability factors.

Through digital editing using Google Earth, developed and undeveloped parcels in the City of Peosta were separated and new GIS feature files were created. Two different development scenarios guided the determination of suitability, resulting in two different suitability maps. Those scenarios are Conventional Development and Cluster/Conservation Development. The Conventional Development scenario represents a more business-as-usual approach to development and attempts to reflect existing or historical development patterns. The Cluster/Conservation Development scenario is designed to model aspects of Low Impact Development (LID). Suitability scores were then assigned to each undeveloped parcel based on specific weighted factors. Weights were assigned to each factor (0 least important to 10 most important):

Conventional Development Scenario

Proximity to Roads (undeveloped parcels closer to roads will score higher) – 10
Proximity to Floodplain (undeveloped parcels closer to the floodplain will score lower) – 5
Proximity to Wetlands (undeveloped parcels closer to the wetlands will score lower) – 0
Corn Suitability Rating – (undeveloped parcels on land with high CSR will score lower) – 0
Proximity to Existing Development – (undeveloped parcels closer to roads will score higher) –10

When the survey was conducted, visual analysis provided the following arguments for indicator preference scores (see Figure 92 on next page)_ :

Roads: The southern tip of Peosta is located along Highway 20. This proximity to an arterial road allows easy access to jobs and other destinations in the county and other neighboring communities. It appears that the community puts a high value on locating next to roadways, which is expressed in a weight preference of 10 for the Suitability Analysis.

Floodplain: Some development has occurred on the floodplains on the south side of Peosta. But overall the community seems relatively concerned about construction in the flood zone.

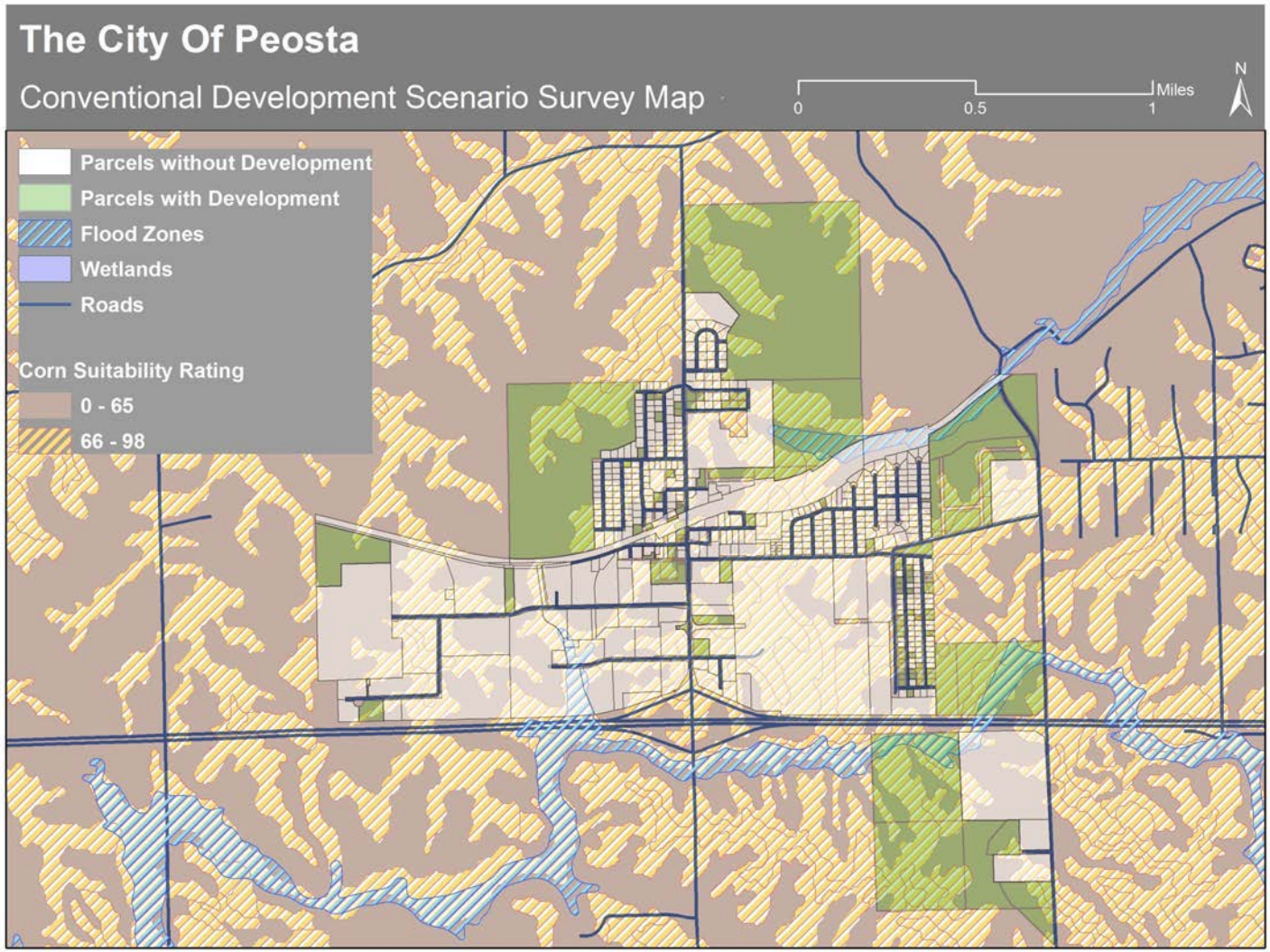


Figure 92: City of Peosta Conventional Development Scenario Survey Map

Therefore, a weight of 5 was given for this indicator.

Wetlands: There are no wetlands within the urban boundary of Peosta. Therefore, a weight of 0 was given for this indicator to show a low preference for the conservation of wetlands.

Corn Suitability Rating: Development has occurred on top of soils with high Corn Suitability Ratings. It appears that the community has not considered soils with high CSR in making previous development decisions. Therefore a weight of 0 was given for this indicator to show a low preference for the conservation of soils with high CSR.

Proximity to existing development: It appears that most of construction in Peosta occurred next to existing development. Therefore, an indicator weight of 10 was selected to show a strong preference of the community for development next to developed parcels.

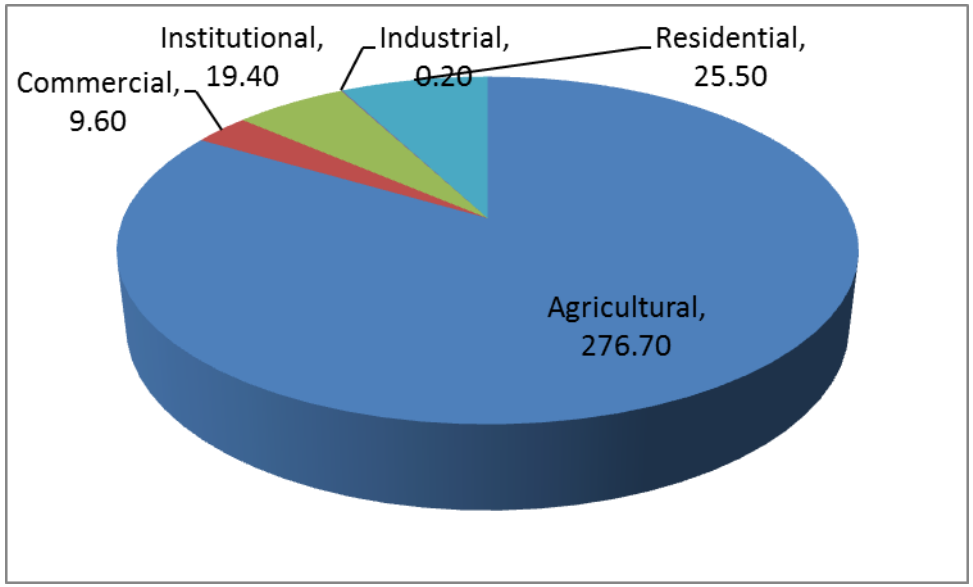


Figure 93: Results of Conventional Suitability Analysis for the City of Peosta: Acres Available for Future Development by Zoning Type (land with suitability score of 60 or higher)

The results of the Peosta suitability analysis under a Conventional Development scenario are shown in Figure 94 (next page). The areas in red indicate existing development. While the areas in blue are parcels that earned a suitability score of 60 or higher on a scale of 0-1000. These areas with scores of 60 or higher were identified as preferred areas for development. In assessing the current zoning type associated with each suitable parcel, the conventional suitability analysis resulted in 25.5 acres available for future residential development, 19.4 acres for institutional, approximately 9.6 acres for commercial/industrial land use, and 276.7 acres of agriculture being taken out production for development (see Figure 93).

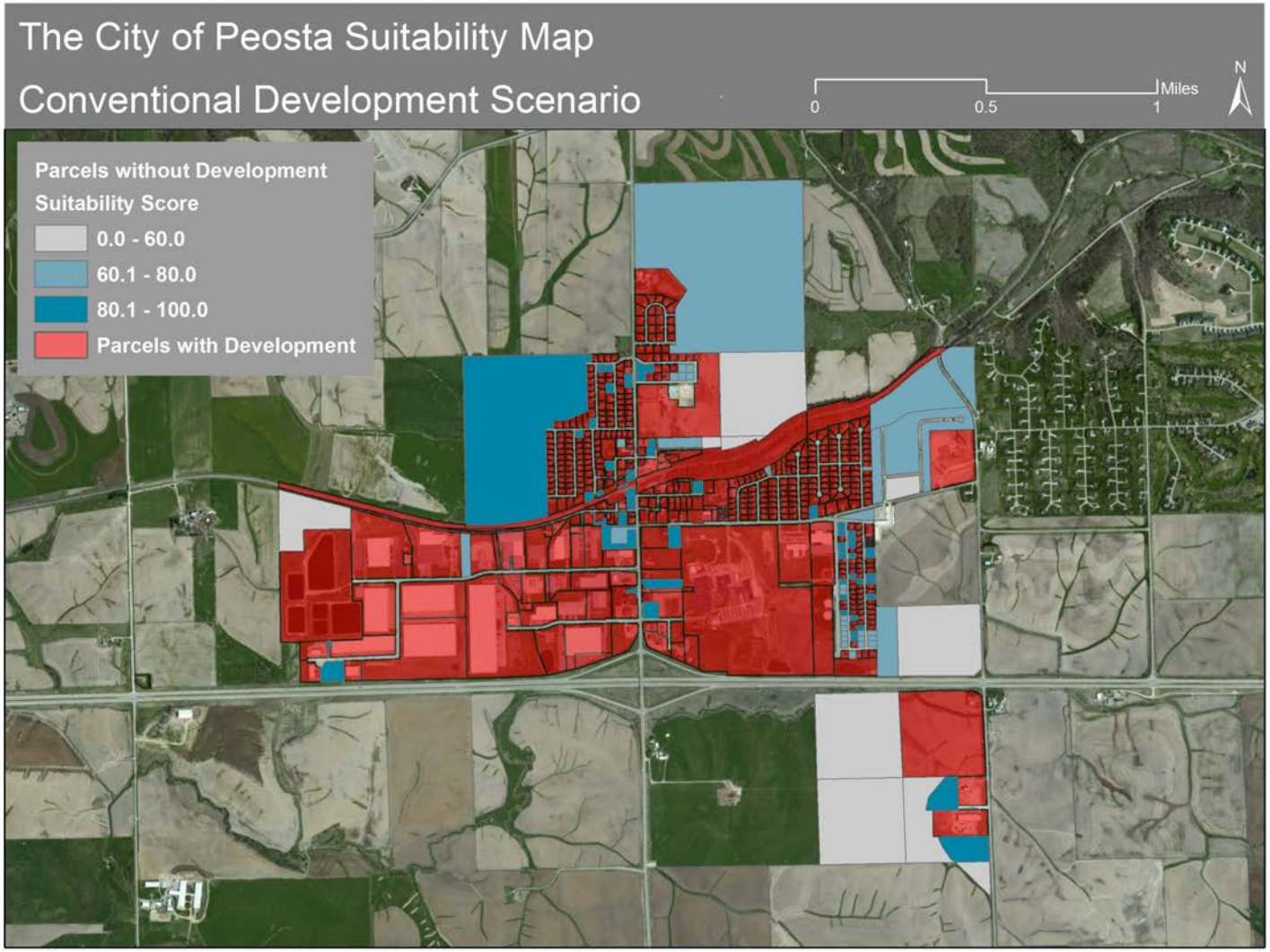


Figure 94: City of Peosta Suitability Map: Conventional Development Scenario

According to the Iowa DNR (2005), Low Impact Development (LID) uses site design development that conserves natural features and clusters development in one section of the site development rather than the whole parcel. The benefits associated with LID are lower infrastructure costs and environmental considerations that result in the reduction of runoff and the preservation of open space. To create a LID land use scenario, a Cluster/Conservation Development scenario was created using weights to provide indicator preference scores that reflect values in support of LID development. Therefore, the preferences for cluster or high density development, along with the preservation of natural features and open space are to have weights that supported these values. Suitability scores were assigned to each undeveloped parcel based on specific weighted factors. Weights were assigned to each factor (0 least important to 10 most important):

Cluster/Conservation Development Scenario
Proximity to Roads (undeveloped parcels closer to roads will score higher) – 0
Proximity to Floodplain (undeveloped parcels closer to the floodplain will score lower) – 7.5
Proximity to Wetlands (undeveloped parcels closer to the wetlands will score lower) – 10
Corn Suitability Rating (undeveloped parcels on land with high CSR will score lower) – 7.5
Proximity to Existing Development (undeveloped parcels closer to roads will score higher) – 0

The following arguments were used to for indicator preference scores associated with Cluster/ Conservation Development:

Roads: LID development seeks to preserve open space by advocating for development in cluster patterns rather than development on a whole parcel. Therefore a weight of 0 was given to show a low preference for development along roadways. Cluster development is not dependent on development along roadways.

Floodplain: LID aims to reduce runoff. However, it does not limit building near a floodplain. A weight of 7.5 was given for this indicator to show a lower preference for development occurring near floodplains.

Wetlands: The goal of LID is to preserve natural features and reduce runoff. A weight of 10 was given to show a high priority given to development that does not occur on wetlands.

Corn Suitability Rating: LID promotes development that is built in clusters to preserve highly productive agricultural lands. However, it does not limit that development is not to occur on agricultural lands. A weight of 7.5 was given to show a higher preference to conserve lands that had a CSR higher than 65.

Proximity to Existing Development: LID seeks to

reduce the cost of infrastructure by locating development in clusters. Because the size of the city is limited geographically and infrastructure is already in place, it is not necessary to provide a heavier weighted value for development to occur next to other existing development, but rather emphasize environmental conservation instead. Therefore a weight of 0 was given to show a lower priority to develop on parcels next to existing development

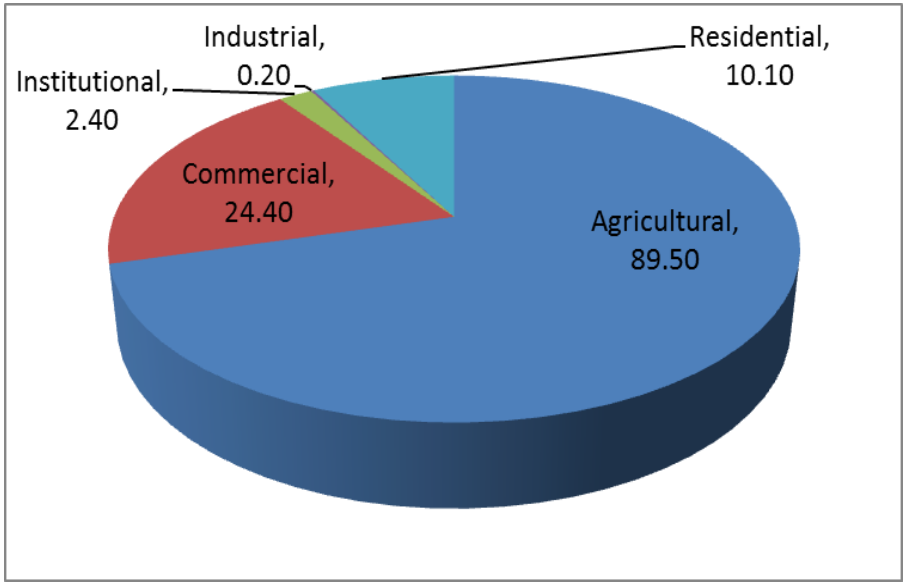


Figure 95: Results of Cluster/Conservation Suitability Analysis for the City of Peosta: Acres Available for Future Development by Zoning Type (land with suitability score of 60 or higher)

The results of the Peosta suitability analysis under a Cluster Development scenario are shown in Figure 96 (next page): Suitable parcels were concentrated in the western half of the city. In assessing the current zoning type associated with each suitable parcel, the Cluster suitability analysis resulted in 10 acres available for future residential development, approximately 27 acres for commercial/industrial uses, 2.4 acres for institutional uses, and nearly 90 acres for agriculture (see figure 95).

The cluster scenario resulted in significantly less agriculture land being taken out of production for development (89.5 acres compared to 276.7 acres). The cluster scenario also results in a 60% reduction in currently zoned residential land that is suitable for future development. The cluster scenario does, however, result in an increase in land suitable for commercial and industrial development; however, much of this increase comes at the expense of institutional development. Compared to the Conventional Development scenario, the Cluster/Conservation Development scenario suitability analysis identifies significantly less land as “suitable” for future development.

It is important to note that these results are for two different possible scenarios that each use a single weighting scheme for suitability factors. While these analyses do provide insight, what may be more important moving forward are the actual methods that were used in developing the suitability maps and how they may adapted. The current suitability factors and their respective

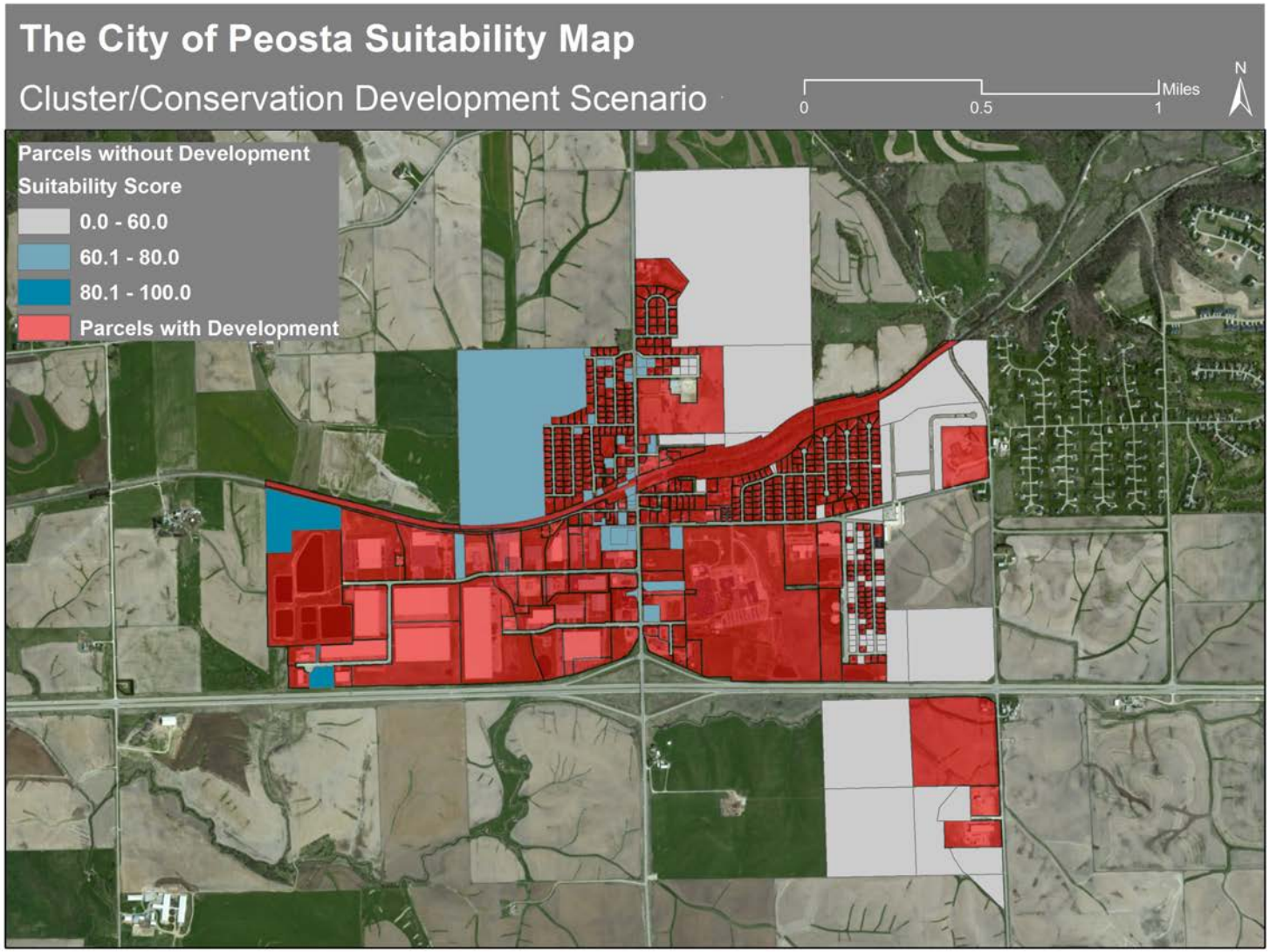


Figure 96: City of Peosta Suitability Map: Cluster/ Conservation Development Scenario

weights were selected based on observation and information on the basic characteristics of low impact development, however, future analyses could utilize factors and weights that are determined through a more exacting process that utilizes local knowledge and even by using information gained through a public input process.

Peosta: What are some of the different social and environmental impacts that may result from different development scenarios?

In order to address this question, build-out analyses for each development scenario (i.e, Conventional and Cluster) for the City of Peosta were first conducted. The results of the build-out analyses were then used to as inputs into the CommunityViz "Common Impacts Wizard" in order to evaluate the potential differences in social and environmental impacts that may results from the two development scenarios.

	Conventional		Cluster	
	Numeric	**Spatial**	**Numeric**	**Spatial**
Dwelling Units	454	454	132	132
All Buildings	469	469	146	146
Commercial Floor Area (ft^2)	3,733,288	3,733,288	2,417,823	2,417,823

Figure 97: Results of Build-Out Analysis for the City of Peosta

Build-out Analysis

A build-out analysis provides an estimate for the maximum development capacity for the land. In other words, the build-out analysis estimates how many buildings the area can accommodate typically based on current policies, zoning, and building specifications. In order to conduct build-out analyses for the City of Peosta, the undeveloped parcels that scored above 60 in the suitability analysis (on a scale of 0-100 with 100 being the most suitable for development) were identified as available for future development. In the absence of a zoning map for the City of Peosta, an existing land use map was used and building specifications (with the exception of setback specifications) were drawn from the Asbury zoning code and FAA regulations for building height.

The parcels' land use classification and the zoning specifications associated with each use class were used as parameters to constrain development. Using the suitability maps generated for the Conventional Development scenario, future buildings were developed in a spatially "random" pattern, using CommunityViz's terminology. This "randomness" reflects more typical suburban development patterns. Conversely, in the build-out analysis for the "Cluster/Conservation scenario development, a grid pattern of development was used to more appropriately reflect development patterns associated with neo-traditional development as suggested in the CommunityViz modeling program.

Given existing land use, zoning specifications (adopted from the City of Asbury for the purposes of this analysis), and the number of developable parcels identified as part of the two suitability analyses, the results of the build-out analysis for Peosta indicate that 469 new buildings (residential and non-residential) can be built, with the vast majority of these buildings being residential dwelling units, under the Conventional Development scenario. In the Conventional scenario, development is likely to occur to the central, northern, and eastern portions of Peosta.

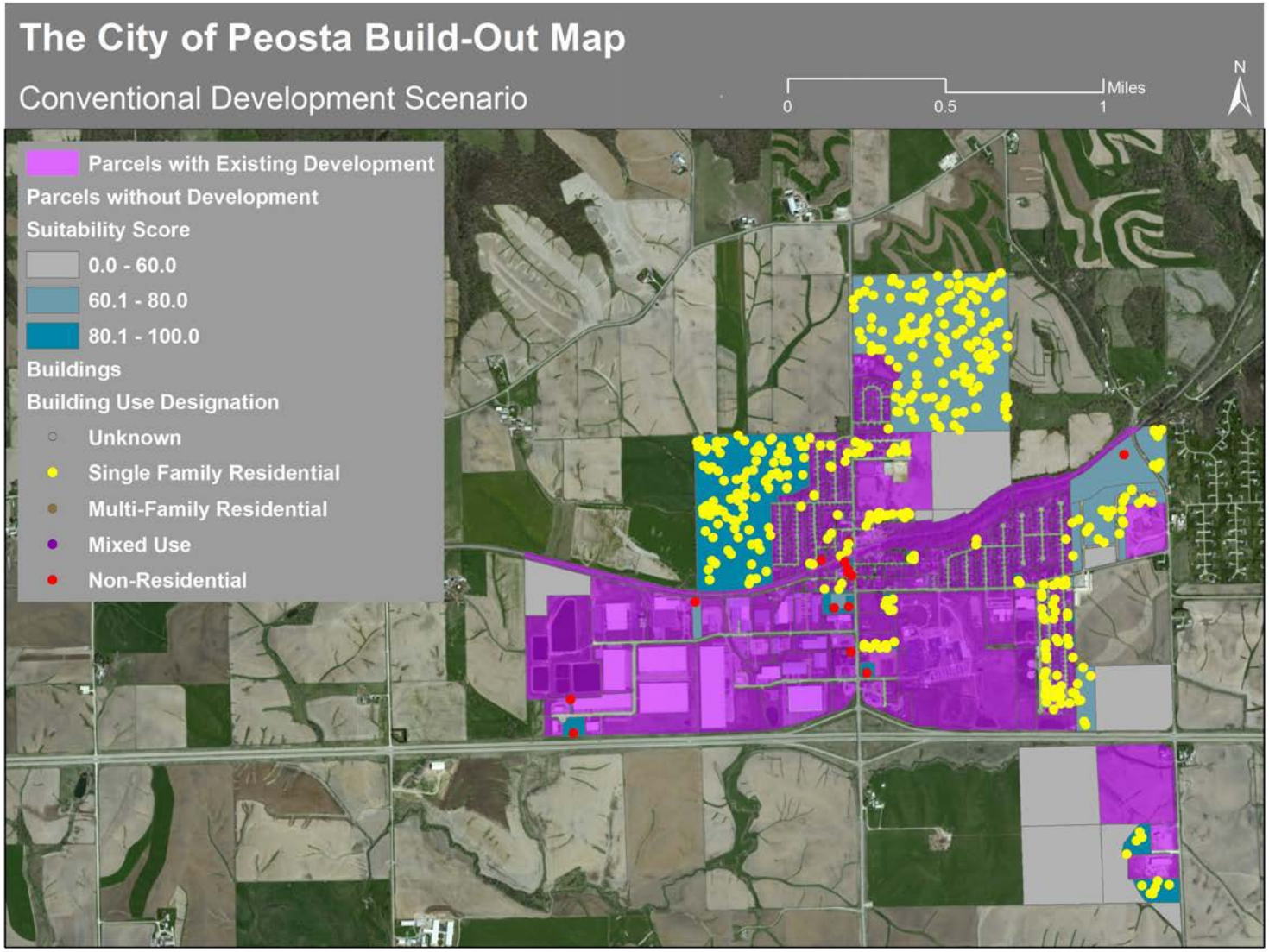


Figure 98: City of Peosta Build-out Analysis Map: Conventional Development Scenario

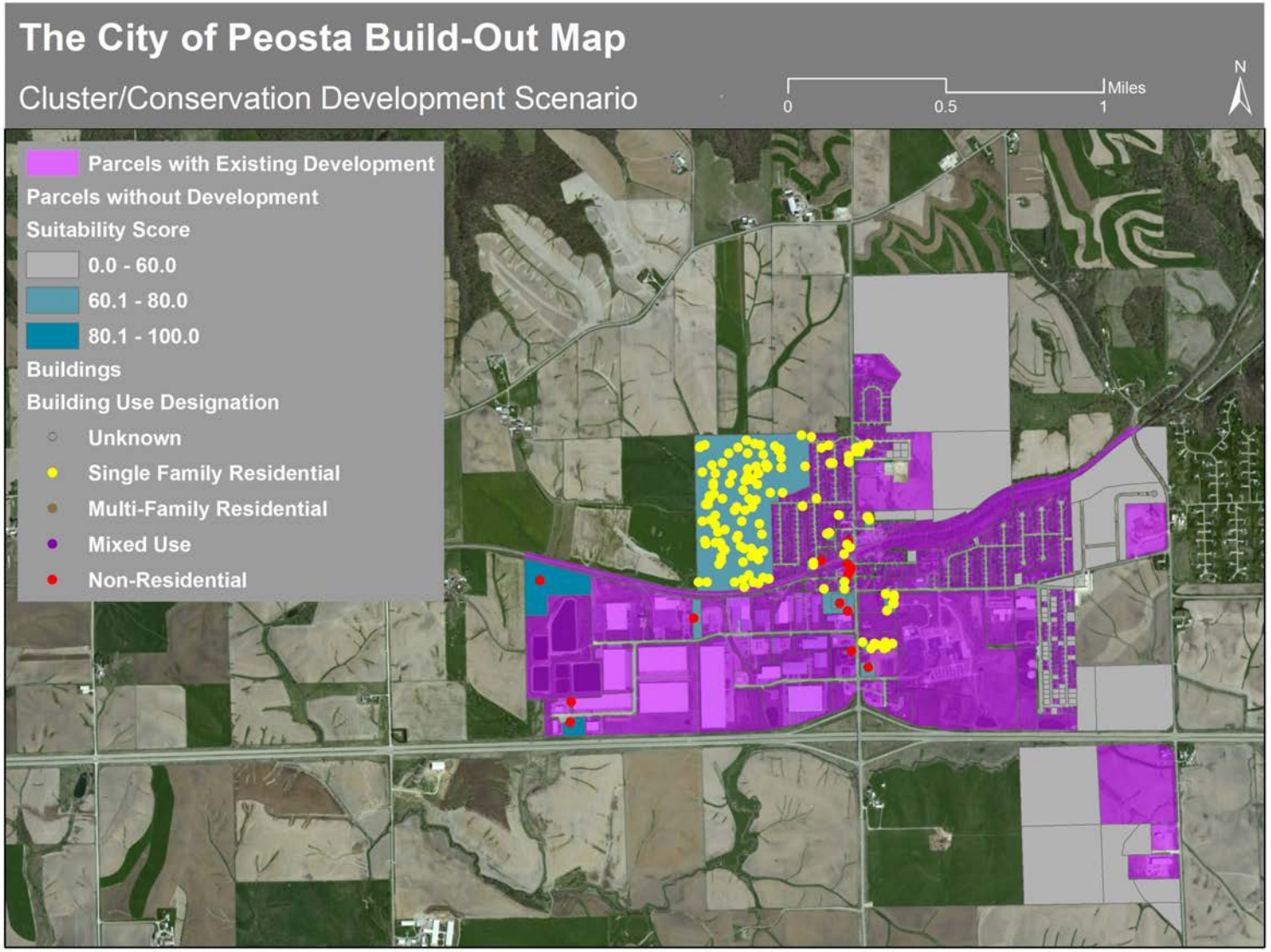


Figure 99: City of Peosta Build-out Analysis Map: Cluster/ Conservation Development Scenario

The Cluster/Conservation scenario results in significantly fewer possible buildings, 146 buildings, most of which are residential dwelling units. In this scenario, development is concentrated in the north central part of Peosta.

Common Impacts

The Common Impacts tool in CommunityViz uses relatively simple multipliers and coefficients to calculate a variety of indicators associated with the impacts of development. To assist with the process, U.S. national averages are built into the tool and used as defaults.

	Conventional	Cluster
Annual CO^2 Emissions (tons/ year)	3,945	1,147
Vehicle Trips Per Day	2,570	2332
Residential Water Use (gallons/year)	46,730,220	13,586,760
Residential Energy Use (mil BTU/year)	43,130	12,540

Figure 100: Results of Peosta Common Impacts Analysis

The results of the two build-out analyses are used as inputs into the Common Impacts tool so that the number of potential buildings provides estimates for total population, based on estimated household size, and building footprints. The results indicate that the Cluster scenario would potentially result in significantly lower CO2 emissions, as well as reduced water and energy usage. This is largely due to the fact that the Clustered scenario allows for less land to be developed and therefore results in a smaller population. However, the LID or "cluster" development would not result in great reductions in vehicle trips per day. These impacts could themselves be used as sustainability indicators in the future as they relate directly to several of the Smart Plan goals and objectives pertaining to vehicles miles traveled as well as to water and energy consumption. The resulting data gathered from common impacts of build-out scenarios could provide valuable insight into the potential impacts land use policies and development can have on sustainability indicators.

Land Use Analysis Based on Population Projections

With rapidly expanding populations, it is important for communities to know whether there is currently enough land to support future projected populations. To address this research question, a non-spatially explicit land use analysis was conducted using future population projections and current per person land demands by zoning type (e.g., how many acres of residentially zoned land is there per person). The results of this analysis indicate whether, for example, if per person land consumption remains the same, is there enough land zoned "residential" that could be developed to accommodate the population in 2020 and 2030?

The summary results of the 2020 and 2030 land capacity analyses based on population projections are given in Figure 102. Detailed results for 2020 and 2030 are provided in Figures 103 and Figure 104, respectively. The process that was used in this analysis is detailed in Appendix F. The results are discussed below.

2010	2020 (Pop. Est.)	2030 (Pop. Est.)
1,377	2,035	2,807

Figure 101: City of Peosta Population and Population Projections (Source: U.S. Census and Dubuque Regional Smart Plan)

Agricultural

For the 2020 population projection, demand for agricultural zoned parcels will be 72.41 acres. Under the Conventional Development scenario, 276.70 acres will be available and under the Cluster/Conservation Development scenario, 89.50 acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 204.29 acres and the Cluster/Conservation Development scenario will be able to support the demand with an excess of 17.09 acres.

For the 2030 population projection, demand for agricultural zoned parcels will be 99.88 acres. Under the Conventional Development scenario, 276.70 acres will be available and under the Cluster/Conservation Development scenario, 89.50 acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 176.82 acres and the Cluster/Conservation Development scenario will not be able to support the demand with a shortage of 10.38 acres.

Commercial

For the 2020 population projection, demand for commercially zoned parcels will be 23.96 acres. Under the Conventional Development scenario, 9.60 acres will be available and under the Cluster/Conservation Development scenario, 24.40 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 14.36 acres. The

Top: Figure 102: Summary Results for Land Use Analysis Based on Population Projections for the City of Peosta.

Middle: Figure 103: Land Use Analysis Based on Population Projections (2020) for the City of Peosta.

Bottom: Figure 104: Land Use Analysis Based on Population Projections (2030) for the City of Peosta

	2020 - Land Availability				2030 - Land Availability			
	Conventional Scenario		Cluster/Conservation Scenario		Conventional Scenario		Cluster/Conservation Scenario	
Zoning Classification	Yes	No	Yes	No	Yes	No	Yes	No
Agricultural	✓		✓		✓			✗
Commerical		✗	✓			✗		✗
Industrial		✗		✗		✗		✗
Institutional		✗		✗		✗		✗
Residential	✓			✗		✗		✗

Land Use Type	Current Land Demand (Person Per Acre)	Land Demand under current trends needed for 2020 (Acres)	Land Supply under Conventional Scenario	Land Supply under Cluster Scenario	Net acreage of land available under Conventional Development	Net acreage of land available under Cluster Development
Agricultural	28.10	72.41	276.70	89.50	204.29	17.09
Commercial	84.92	23.96	9.60	24.40	-14.36	0.44
Institutional	55.72	36.52	19.40	2.40	-17.12	-34.12
Industrial	134.27	15.16	0.20	0.20	-14.96	-14.96
Residential	92.96	21.89	25.50	10.10	3.61	-11.79

Land Use Type	Current Land Demand (Person Per Acre)	Land Demand under current trends needed for 2030 (Acres)	Land Supply under Conventional Scenario	Land Supply under Cluster Scenario	Net acreage of land available under Conventional Development	Net acreage of land available under Cluster Development
Agricultural	28.10	99.88	276.70	89.50	176.82	-10.38
Commercial	84.92	33.05	9.60	24.40	-23.45	-8.65
Institutional	55.72	50.39	19.40	2.40	-30.98	-47.98
Industrial	134.27	20.91	0.20	0.20	-20.71	-20.71
Residential	92.96	30.20	25.50	10.10	-4.70	-20.10

Cluster/Conservation Development scenario, on the other hand, will be able to support the demand with a minute excess of 0.44 acres.

For the 2030 population projection, demand for commercially zoned parcels will be 33.05 acres. Under the Conventional Development scenario, 9.60 acres will be available and under the Cluster/Conservation Development scenario, 24.40 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 23.45 acres. Neither will the Cluster/Conservation Development scenario be able to support the demand and will result in a shortage of 8.65 acres.

Industrial

For the 2020 population projection, demand for industrial land will be 15.16 acres. Under the Conventional Development scenario, 0.20 acres will be available and under the Cluster/Conservation Development scenario, 0.20 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 14.96 acres. Neither will the Cluster/Conservation Development scenario be able to support the demand and will result in a shortage of 14.96 acres.

For the 2030 population projection, demand for industrial land will be 15.16 acres. Under the Conventional Development scenario, 0.20 acres will be available and under the Cluster/Conservation Development scenario, 0.20 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 20.70 acres. Neither will the Cluster/Conservation Development scenario be able to support the demand and will result in a shortage of 20.70 acres.

Institutional

For the 2020 population projection, demand for parcels zoned institutional will be 36.52 acres. Under the Conventional Development scenario, 19.40 acres will be available and under the Cluster/Conservation Development scenario, 2.40 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 17.12 acres. Neither will the Cluster/Conservation Development scenario be able to support the demand and will result in a shortage of 34.12 acres.

For the 2030 population projection, demand for parcels zoned institutional will be 50.37 acres. Under the Conventional Development scenario, 19.40 acres will be available and under the Cluster/Conservation Development scenario, 2.40 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 30.98 acres. Neither will the Cluster/Conservation Development scenario be able to support the demand and will result in a shortage of 47.98 acres.

Residential

For the 2020 population projection, demand for residential land will be 21.89 acres. Under the Conventional Development scenario, 25.50 acres will be available and under the Cluster/ Conservation Development scenario, 10.10 acres will be available. As a result, the Conventional Development scenario will be able to support the demand with an excess of 3.60 acres and the Cluster/Conservation Development scenario will not be able to support the demand falling 17.09 acres short of land demand.

For the 2030 population projection, demand for residential land will be 30.20 acres. . Under the Conventional Development scenario, 25.50 acres will be available and under the Cluster/ Conservation Development scenario, 10.10 acres will be available. As a result, neither the Conventional Development scenario nor the Cluster/ Conservation Development scenario will be able to support the demand falling 4.70 acres and 20.10 acres short of necessary amount of land respectively.

Peosta: Is there currently enough land zoned commercial and/or industrial to support future employment?

Land Use Analysis Based on Job Type Distribution per Zoning Classification

Land use analysis based on job projections and current land demands per zoning classification shows whether Peosta has sufficient supply of land to sustain the employment of its own residents. American Community Survey data were used to identify the number of persons age 16 and over, the number of persons age 16 and over employed, and the number of persons employed by employment type. As depicted in Figure 106 (next page), this data was used to calculate the current ratios for the workforce population of Peosta. A detailed description of the process can be found in Appendix F. These ratios were then used to project the workforce population for 2020 and 2030.

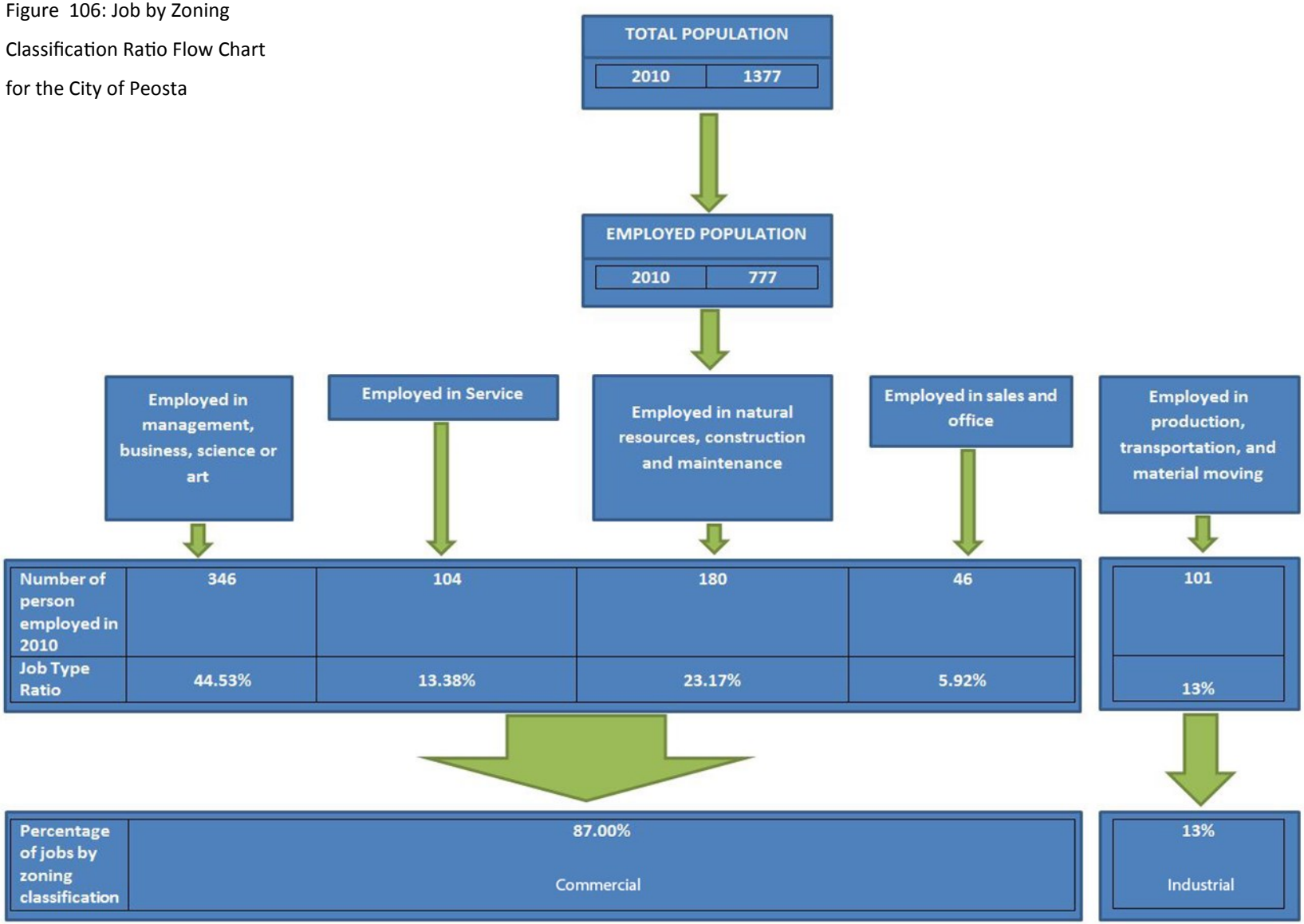
Each employment type as classified in the American Community Survey was assigned to a zoning classification (i.e., commercial or industrial). Management, business, science, and arts occupations, service occupations, sales and office occupations, and natural resources, construction, and maintenance occupations are occupations typically found on lands zoned for commercial and therefore were assigned a commercial zoning designation. Production, transportation, and materials moving occupations are jobs typically found on land zoned as industrial and were therefore assigned an industrial zone designation. In addition, the number of persons employed per zoning classification was used to calculate the percentage of persons employed per zoning classification in order to project future trends. These percentages were approximately 87 percent and 13 percent respectively. This suggests that 87 percent of Peosta's 2010 workforce (676 employees) would be supported on commercially zoned land and 13 percent (101 employees) would be supported on industrial zoned land. While it is almost certain that there is at least some employment in and outflow of the city boundaries, this analysis is primarily interested in whether the City of Peosta could theoretically support its workforce based on existing land zoning.

As seen in Figure 105, these ratios were used with the projected workforce population to calculate the projected number of workers per zoning classification.

	Population Employed per Zoning Classification 2010	Population Employed per Zoning Classification 2020	Population Employed per Zoning Classification 2030
Commercial	676	999	1,378
Industrial	101	149	206

Figure 105: Peosta population/ persons employed per zoning classification

Figure 106: Job by Zoning Classification Ratio Flow Chart for the City of Peosta



The summary results of the 2020 and 2030 land capacity analyses are given in Figure 107 (next page). Detailed results for 2020 and 2030 are provided in Figures 108 and Figure 109, respectively.

Commercial

For the 2020 population projection, demand for commercially zoned parcels will be 11.76 acres. Under the Conventional Development scenario, 9.60 acres will be available and under the Cluster/Conservation Development scenario, 24.40 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 2.16 acres. However, the Cluster/Conservation Development scenario will be able to support the demand with an excess of 12.64.

For the 2030 population projection, demand for commercially zoned parcels will be 16.23 acres. Under the Conventional Development scenario, 9.60 acres will be available and under the Cluster/Conservation Development scenario, 24.40 acres will be available. As a result, the Conventional Development scenario will not be able to support the demand with a shortage of 6.63 acres. However, the Cluster/Conservation Development scenario will be able to support the demand with an excess of 8.17.

Industrial

For the 2020 population projection, demand for industrial land will be 2.68 acres. Under the Conventional Development scenario, 0.20 acres will be available and under the Cluster/Conservation Development scenario, 0.20 acres will be available. As a result, neither the Conventional Development scenario nor the Cluster/Conservation Development scenario will be able to support the demand falling both 11.56 acres short of necessary amount of land.

For the 2030 population projection, demand for industrial land will be 3.70 acres. Under the Conventional Development scenario, 0.20 acres will be available and under the Cluster/Conservation Development scenario, 0.20 acres will be available. As a result, neither the Conventional Development scenario nor the Cluster/Conservation Development scenario will be able to support the demand falling both 16.03 acres short of necessary amount of land. While this approach can identify basic trends and needs, this approach can be improved if projections for the whole region are completed. Such a more regional approach could help individual communities identify land uses or development that they may want to "trade." For example, if Peosta chooses to position itself as a bedroom community, the city may want to consider trading industrial and commercial development with Dubuque City or another city in Dubuque County.

	2020 - Land Availability				2030 - Land Availability			
	Conventional		Cluster/Conservatio		Conventional		Cluster/Conservatio	
Zoning Classification	Yes	No	Yes	No	Yes	No	Yes	No
Commercial	✓		✓		✓			✗
Industrial		✗	✓			✗		✗

Figure 107: Summary Results for Land Use Analysis Based on Employment Projections for the City of Peosta

	Land Demand for 2020	Land Supply under Cluster Scenario	Land Supply under Conventional Scenario	Net acreage of land available under Cluster Development	Net acreage of land available under Conventional Development
Commercial Acres Needed	11.76	9.60	24.40	-2.16	12.64
Industrial Acres Needed	2.68	0.20	0.20	-11.56	-11.56

Figure 108: 2020 Land availability for projected employment growth

	Land Demand for 2030	Land Supply under Cluster Scenario	Land Supply under Conventional Scenario	Net acreage of land available under Cluster Development	Net acreage of land available under Conventional Development
Commercial Acres Needed	16.23	9.60	24.40	-6.63	8.17
Industrial Acres Needed	3.70	0.20	0.20	-16.03	-16.03

Figure 109: 2030 Land availability for projected employment growth

Conclusion

Peosta has a good mix of residential, commercial, and industrial development, but there is no mixed -use development. Should Peosta decide to use elements of cluster or LID to guide future development, they will have to identify the prime land for annexation to support their future growth with minimal impact on environmentally sensitive land.

One of the Consortium's primary goals is the encouragement of public involvement and participation in the smart planning and development processes. To assist the Consortium in meeting this important goal, an interactive suitability analysis tool was also designed to allow users to modify variable inputs based on user preferences for suitability factors thereby allowing users to quickly view how such modifications lead to changes in the development desirability of parcels.

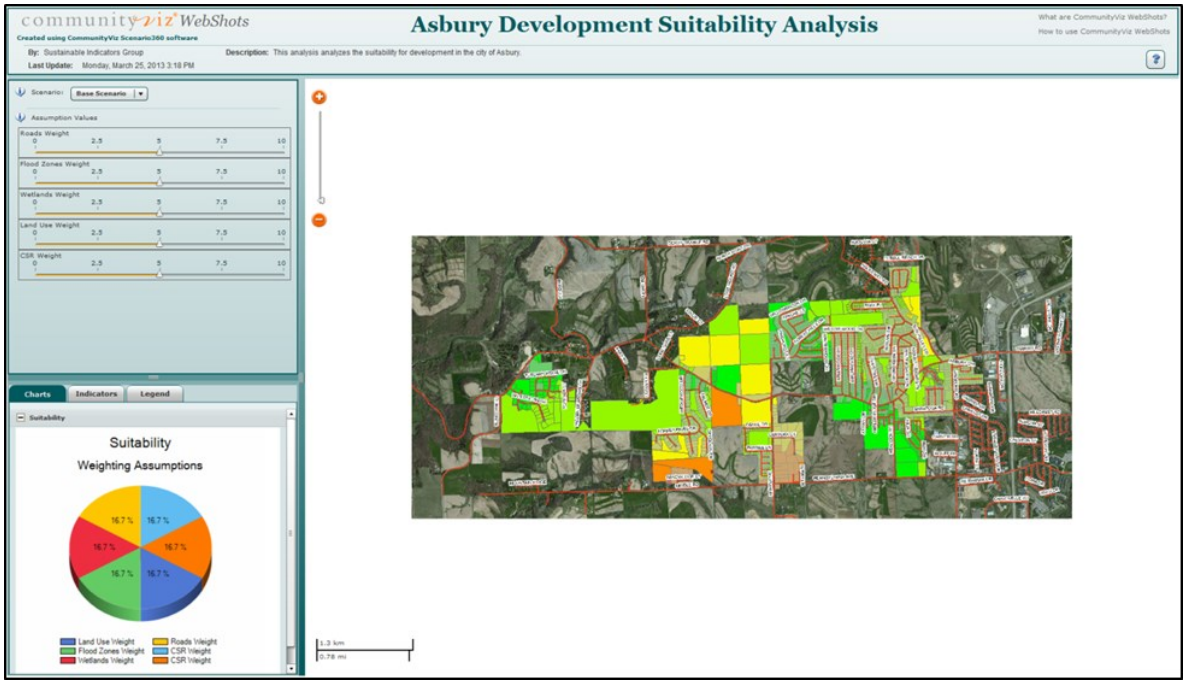


Figure 110: An example of how the interactive suitability tool user interface

This tool not only provides a means for communicating how suitability factors influence the ranking of parcels for development but also serves as a potential conduit or dialogue starter with members of the community as they are able to interact with maps of the local area and provide feedback on potential future growth patterns. For example, one of the tools that enable this collaborative interaction is Community WebShots. This tool has the potential to capture selected results from the CommunityViz analysis and display them in a web browser for anyone to view and explore. The results of the analysis are usually displayed as a combination of color-coded maps, charts, variable inputs we call "assumptions," alternatives we call "scenarios," and numeric results we call "indicators." Depending on how the WebShots have been set up, interested parties can either page through a "slide show" that displays a series of pre-selected screens with particular settings/assumptions, or explore and interact with the maps and graphics by changing inputs and scenarios, or both.

This suitability tool could be incorporated into any public planning meeting with either direct community member access to the tool or public participants guiding single operator input. Additionally, the necessary files uploaded and embedded into the Dubuque Smart Planning Consortium Web site for interactive open access.

The ways in which land is utilized and developed within and across communities in Dubuque County will continue to significantly influence regional sustainability in the future. Indicators have already been constructed to measure the impacts of land use decisions, but progress towards the region's sustainability goals will also require proactive and coordinated land use planning to ensure that future development occurs in a manner that is both fiscally efficient and environmentally sensitive.

The land use scenarios presented in this report provide possibilities for different types of development and their projected outcomes. The outputs from these scenarios provide the value to visualize and analyze the possible impacts that different land use scenarios may have on communities, thereby facilitating the informed and effective decision making. The scenarios developed and evaluated in this report reflect only a few of the possibilities and it is anticipated that the Dubuque Regional Smart Planning Consortium and its member cities may expand on these methods in order to develop other future scenarios, evaluate future land use needs and constraints, and to assess potential impacts. In doing so, this report recommends the use of CommunityViz software as a valuable tool to create a variety of different scenarios by using different data, different preference options, and stakeholder input. CommunityViz offers users the ability to project any land use inefficiencies that may result in otherwise unintended consequences of land use decisions and policies. The benefit of CommunityViz is that it provides real-time results and the capability for users to analyze multiple case scenarios, making more alternatives available to the public so that informed land use decisions can be made.

Recommendations

Implementing the Indicators Report in Conjunction with the Smart Plan

The purpose of this report is to provide data that can be used to guide the decision-making process in a way that is consistent with the goals and objectives described in the Smart Plan. Neither this indicators report nor the Smart Plan has legal authority on its own. The value of these documents will be realized if and when they are incorporated into related documents. After relevant documents have been updated to include the Smart Plan's goals, the sustainability indicators can then be re-measured to see what progress has been made. Incorporating the Smart Plan's goals into the comprehensive plans of individual communities is of critical importance to the implementation process. Consortium members have already agreed to consider these goals during the comprehensive plan updates for their own communities.

Local zoning ordinances and fringe area agreements can also be used to promote smart planning principles. Zoning ordinances should include mixed-use development and promote walkable communities adjacent to existing development. Fringe area agreements can help ensure that new development occurs in an orderly fashion that protects agricultural and environmentally sensitive land.

Passing stormwater management ordinances is another way that individual communities can implement the Smart Plan's goals and as well as improve the status of indicators related to water quality and runoff. These ordinances prevent erosion and sedimentation during construction and require increased infiltration techniques. Dubuque County and the cities of Dubuque, Asbury, and Epworth have already adopted stormwater management ordinances.

General recommendations by chapter

The recommendations in this section address individual indicators as well as larger, more holistic sustainability issues that do not tie directly to one indicator. These are only general recommendations, and more substantial policy decisions will require additional analysis and consideration.

Chapter: Agriculture and Natural Resources

Air Quality Index

Overall, Dubuque County has good air quality. However, there are some days when the region's air quality reaches a level that is unhealthy of sensitive groups. Efforts to increase air quality should be aimed at PM 2.5, which is the area's main pollutant. The county could receive more accurate data by independently monitoring air quality at a location within its borders or lobbying for provision of a closer AQI monitoring station.

Acres of Farmland and Agricultural Land Value

It is recommended that Dubuque County and the cities within it implement stricter zoning and de-

velopment regulations to prevent further loss of agricultural land to development. The county would then also be prepared to fend off non-farm development if land prices should happen to drop due to the removal of ethanol subsidies or any other reason.

Organic Farming

Dubuque County could potentially promote the expansion of organic farming through loan, grant, and other incentive programs. This can be achieved by educating prospective farmers about available federal programs provided through the USDA or Farm Service Agency (FSA) as well as the creation of county-level initiatives.

Use of Farming Conservation Practices

Dubuque County can improve the health of its watershed through continued promotion of conservation practices in agriculture. Efforts should be made to educate landowners on the benefits of using such practices. Improvement in this area could be better monitored with better data collection and availability. The Census of Agriculture was the only source with data available for this indicator.

Chapter: Watershed

The Smart Plan has goals that mainly address controlling soil erosion and runoff to conserve water quality. Collecting data for watershed indicators is difficult to find because the data is very scarce. Because this data is lacking, goals need to be included in the chapter that seeks to obtain more data. The data collected could be more water quality collection samples and counts of various green infrastructure within the county. In addition, watersheds are not defined by political boundaries. Dubuque County should develop goals to promote more collaboration for the conservation of watersheds with neighboring coun-

ties to have a larger impact on water quality. Collaboration between cities within Dubuque County is needed as well. The current fringe development patterns threaten watershed sustainability. Watershed chapter goals that aim to reduce fringe development are needed to move Dubuque County toward watershed sustainability as well.

Chapter: Economic Development

Dubuque County has a strong and stable economy. Yet, there are areas that can be improved upon. With relation to the indicators that measure Dubuque County's economic development goals, the county should target weaknesses going forward to improve overall economic health.

In the coming years, maintaining a county-wide consensus for directing efforts toward economic development is crucial going forward. In doing so, programs that include education and work training will help lower both the unemployment rate and poverty rate in Dubuque County. Further, there must be a regional determination to promote further diversification of the economy and direct resources specifically to aid in economic development. These tactics will most likely increase the diversity of employment and bring more jobs into the communities across the county.

Chapter: Transportation

Most contemporary sustainable transportation policies gravitate around provision of public transit, alleviation of congestion, safety and cost-effective management and maintenance of the existing road network. And while most of the transportation problems would be equally applicable in bigger and smaller metropolitan areas, the magnitude of these problems would vary depending on political geography of place where the problem occurs. Dubuque County, for instance, would have less traffic congestion than New York City, while at the same time the provision of economically viable public transit would be more challenging because of the lower density. Therefore, it is very important to consider general social, economic, and demographic features of the place when trying to make recommendations.

Reducing Commute Time and Vehicle Miles of Travel

Although the average commute time in Dubuque County is relatively low (17.4 minutes) compared to the national average (25.1 minutes), Dubuque Community should plan to offset potential increases in aggregate travel time to work by discouraging development on the outskirts of the urban area through timely and orderly planning and intergovernmental coordination between transportation and land use planning agencies. Other potentially applicable and useful policies include carpooling, car sharing, cash-out programs, parking restraints and taxes, and tax-free transit vouchers.

Reducing Traffic Injuries and Fatalities

Many countries around the world, as well as some states and cities within the U.S. have committed to achieve zero fatality rate in the near future. For instance, the City of Chicago is planning to eliminate all pedestrian, bicycle, and overall traffic crash fatalities by 2022 (Goodyear, 2012). The State of Washington is setting forth a vision to reduce traffic fatalities and serious injuries to zero by the year 2030.

Dubuque County could also join the new initiative of the Federal Highway Administration called "Toward Zero Deaths: A National Strategy on Highway Safety" as a tool to formulate its own safety plan and set achievable targets for reduction of total crash fatalities.

Other strategies contributing to decrease in crash fatality rate include traffic calming measures (speed bumps in residential neighborhoods, large concrete pots in downtown areas), speed limits, safer car design, active enforcement of traffic safety laws, etc.

Reducing Alcohol-impaired Crash Fatality Rate

Effective prevention measures usually include active enforcement of alcohol-related laws: 0.08% blood alcohol level, minimum legal drinking age, zero tolerance laws for drivers younger than 21 in all states, etc. (Injury Prevention & Control: Motor Vehicle Safety). Dubuque County could also consider using sobriety checkpoints, health promotion efforts, and community-based approaches to DWI prevention. Extra attention should be given to work with the following groups of drivers: young people, and motorcyclists and drivers with a prior conviction for DWI, as they are at a higher risk of being involved in a crash.

Chapter: Land Use

In conducting the jobs-housing analysis at the zip code level, findings suggest that there is a relative spatial balance between employment opportunities and the labor force within the City of Dubuque and in the areas in close proximity to the west and northwest of Dubuque. When measured at the zip code level, communities farther from and south/southwest of Dubuque tend to have lower job-housing ratios. Local policies that support mixed-use development and commercial development are recommended for all areas, with a special need in areas that are experiencing population growth.

Policies are needed that encourage multi-family housing so that the expansion of single-unit detached housing does not continue to outpace population growth. With regards to future development, the county and local municipalities should consider both street density and the relationship between links and nodes in order to promote not only connectivity within and among communities but to also encourage pedestrian and bike travel.

Chapter: Housing

It appears that the most pressing housing issues in Dubuque County relate to a lack of available housing and a lack of multifamily housing. This is probably best addressed at a city level, and could be influenced by unrealized constraints in the zoning codes. Additionally, the housing stock in parts of the county is quite old, so programs to encourage energy audits and energy efficiency measures should be encouraged and publicized. Housing rehabilitation programs should also be well-funded and promoted.

Chapter: Quality of Life

Maintaining a high quality of life for residents in Dubuque County is crucial in its sustainability efforts. Therefore, components such as community facilities and infrastructure and utilities must be prioritized throughout the county's jurisdictions in attempt to increase overall well-being. Aspects such as access to education, healthcare, policing services and other city services should be considered top priority for Dubuque County and its localities. Furthermore, it is important for Dubuque County and its communities to coordinate the provision of public infrastructure and utilities across the region. Doing so will allow the county and its individual communities to lessen the impact that infrastructure and utilities have on land uses, environmental quality, and in turn economic development. In sum, improving community facilities and infrastructure and utilities throughout Dubuque County will have a favorable effect on its quality of life.

Chapter: Intergovernmental Collaboration

Dubuque County communities have had closer collaboration in recent several years, especially from 2009 to 2012. However, most of the efforts have been devoted to criminal investigation, fire response and street and road systems. Compared with Woodbury County, no agreements referring to informational services, facilities, and court and legal services have been made among Dubuque County communities. Therefore, Dubuque County should address more intergovernmental collaboration on these issues in future work.

Chapter: Hazard Mitigation

Continued monitoring of preparedness plans and infrastructure projects will help assure that the county and its municipalities are prepared in the event of a disaster. The cities that do not have storm warning systems should pursue grant funding for the installation of these systems, and those municipalities that are not part of the National Flood Insurance Program should pursue this goal.

Appendix A—Demographics

City	Population, 2010	Percent White, 2010
Asbury	4,170	97.6%
Cascade	2,159	96.6%
Dubuque	57,637	93.4%
County	93,653	95.3%
Dyersville	4,058	98.4%
Epworth	1,860	94.1%
Farley	1,537	99.7%
Peosta	1,377	97.7%

City	Percent Change in Population, 2000-2010	Median Household Income
Asbury	41.2%	$76,250
Cascade	9.3%	$57,891
Dubuque	-0.1%	$42,447
County	4.8%	$49,776
Dyersville	0.6%	$43,017
Epworth	23.2%	$58,988
Farley	13.2%	$60,795
Peosta	52.7%	$78,167

Appendix B—Other Documents

Other Sustainability Indicator Frameworks Consulted

Central Texas Sustainability Indicators Project - http://www.centex-indicators.org/

Sustainable San Mateo County - http://www.sustainablesanmateo.org/

PlaNYC - http://www.nyc.gov/html/planyc2030/html/home/home.shtml

King County Benchmark Project - http://www.kingcounty.gov/exec/PSB/BenchmarkProgram.aspx

Sustainable Seattle - http://www.sustainableseattle.org/

Sustainable Penrith - http://www.penrithcity.nsw.gov.au/sustainability/

Melbourne Sustainable Society Institute - http://www.sustainable.unimelb.edu.au/content/pages/sustainability-indicators-local-government

Minneapolis Sustainability - http://www.minneapolismn.gov/sustainability/

Appendix C—Public meeting comments

Public Meeting Poster Comments by Chapter (transcribed as written)

Land Use

Population growth & single structures:

Q Is the increase in single unit structures a result , or go in hand w/ family income levels increasing. Or is it due to something else? (Good work!)

Encourage conservation set-aside subdivisions

Housing

How does educational attainment relate to cost-burdened housing. How do these relate to job-housing balance. Where do we find incongruous between this data and what is it due to?

Lead and radon abatement

All new housing should be vented for radon

Talk with local NAACP chapter about housing problems.

Watershed

Can these basins be overlayed on a google map so we can see where the more urban areas are?

What is the hypothetical cost of surface (imperv) reduction. How can we utilize local resources to help solve this issue. How much of this surface area plays other critical roles in the community.

What are the multiplier effects of doing nothing?

How are baseline years chosen? i.e. for runoff 2006 was used this was one of 2-3 driest in the last 20 years

Who controls or who should control watershed, IDALS, DNR, Corps, EPA, Dubuque Co. please don't tell me all. I think IDALS should at a state level.

Having IDALS enforce water quality is like having the fox guard the chicken coop.

Public Infrastructure and Community Facilities

Are there benchmarks against which percentages can be interpreted? Are there optimal ratios, e.g., 1,000,000 inhabitants: 250 "violent" crimes?

Area's where there is more gun ownership has Lower murder rate than Restricted area such as Chicago why is that?

With all the worry about obese population and everything that's been tried why doesn't these stats drop.

More trails & paths to attract people to exercise

Work with the Dubuque Non-Violence Coalition

Agriculture and Natural Resources

With FSA, IDALS, DNR, EPA, Corps of Eng. Do you think we have enough oversight on Ag that we don't need or want anymore on a county level.

I would like to know more about the causes of urban sprawl in Dubuque County. Why is it happening? Is it possibly due to the low cost of incent renting. How can we curb this issue? What groups are majority affected by this?

Protect viewsheds along great river road (Bluffland conservation zone)

Economic Development

From where? State, out-of0state, world? [Tourists]

What has ag done to lower unemployment and improve Iowa's and Dubuque County's economy compared to US levels?

Welcoming Community

Intergovernmental Collaboration and Hazard Mitigation

How can we measure the success ratio of 28 E agreements compared to projects that are tackled without collaborations.

What are the multiplier effects that 28 E's bring about?

There seems to be a lot of overlap between Dubuque, Woodbery, Éclair, and L cross: on final project you should make the same ones the same colors *very simple suggestion

Don't build in Floodplains (e.g. Schmidt Island)

Transportation

What about Texting, I-pod, Radio's, are they included in Data? Also sleep apnea

Seek walkable & bicycle friendly award status

Build middle Fork Catfish Creek rail

Car pooling parking lots

Inadequate bus scheduling for the working poor night/weekend problem

Appendix D—References

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Durango – Margaret Schemmel – 563-552-1613

Dyersville – Tricia Maiers – 563-875-7724

Epworth – Janet Berger – 563-876-3320

Farley – Danielle Hartke – 563-744-3475

Graf – Kurt Chipperfield – 563-583-5773

Holy Cross – Donna Sweeny – 563-870-2475

Luxemburg and New Vienna – Angela Oberbroeckling – 563-853-4615

Peosta – Karen Snyder – 563-556-8755

Rickardsville – Vicky Cleary – 563-552-1302

Sageville and Worthington – Mary Habel – 563-855-2825

Sherrill – Rhona Mueller – 563-552-2298

Zwingle and Bernard – Karla Mahoney – 563-879-3566

Appendix E—Updating indicators

Chapter: Agriculture & Natural Resources

Indicator: Amount of Farmland

Time: 1 Hour

For 2007 and 2002 Data:

Go to http://www.agcensus.usda.gov/index.php

1. Select Find Historical Census Data
2. Select Find Current Data By > State & County > Iowa
3. Under State and County Reports, click on County. Select Table 8: Farms, Land in Farms, Value of Land and Buildings, and Land Use: 2007 and 2002

For 2002 and 1997 Data:

1. Go to http://www.agcensus.usda.gov/index.php
2. Select Find Historical Census Data
3. In the Census Publications drop-down menu, choose 2002.
4. Under State and County Reports, choose All Counties by State by Table
5. Select Iowa. Select Table 8: Farms, Land in Farms, Value of Land and Buildings, and Land Use: 2002 and 1997

For 1992 Data:

Go to http://www.agcensus.usda.gov/index.php

1. Select Find Historical Census Data
2. In the Census Publications drop-down menu, choose 1992.
3. Under Publications, select Volume 1, Chapter 2 County Level Data
4. Select Iowa. Select Table 1: County Summary Highlights: 1992

Indicator: Agricultural Land Value

Time: 1 Hour

For 2007 and 2002 Data:

Go to http://www.agcensus.usda.gov/index.php

1. Select Find Historical Census Data
2. Select Find Current Data By > State & County > Iowa
3. Under State and County Reports, click on County. Select Table 8: Farms, Land in Farms, Value of Land and Buildings, and Land Use: 2007 and 2002

For 2002 and 1997 Data:

Go to http://www.agcensus.usda.gov/index.php

1. Select Find Historical Census Data
2. In the Census Publications drop-down menu, choose 2002.
3. Under State and County Reports, choose All Counties by State by Table
4. Select Iowa. Select Table 8: Farms, Land in Farms, Value of Land and Buildings, and Land

Use: 2002 and 1997

For 1992 Data:

Go to http://www.agcensus.usda.gov/index.php

1. Select Find Historical Census Data
2. In the Census Publications drop-down menu, choose 1992.
3. Under Publications, select Volume 1 Chapter 2 County Level Data
4. Select Iowa. Select Table 1: County Summary Highlights: 1992

Indicator: Organic Farming

Time: 45 Minutes

2007 Data:

Go to http://www.agcensus.usda.gov/index.php

1. Select Find Historical Census Data
2. Select Find Current Data By > State & County > Iowa
3. Under State and County Reports, click on County. Select Table 43: Organic Agriculture: 2007

2002 Data:

Go to http://www.agcensus.usda.gov/index.php

1. In the Census Publications drop-down menu, choose 2002
2. Under State and County Reports, choose All Counties by State by Table
3. Select Iowa
4. Select Table 8: Farms, Land in Farms, Value of Land and Buildings, and Land Use: 2002 and 1997
5. Summaries of the 2008 and 2011 Organic Production Survey can be found at: http://www.nass.usda.gov/Statistics_by_State/Iowa/Publications/Other_Surveys/

Indicator: Use of Farming Conservation Practices

Time: 15 Minutes

Go to http://www.agcensus.usda.gov/index.php

1. Find Current Data By: State & County
2. Select Iowa
3. Under State and County Reports select County. Select Table 44: Selected Practices 2007

Indicator: EPA Air Quality Index

Time: 1 Hour

Go to the EPA's Air Quality Index Report page at http://www.epa.gov/airdata/ad_rep_aqi.html

1. Select desired year > Wisconsin> Grant County, Wisconsin (this is the closest monitoring station to Dubuque County)
2. Record the total number of monitored days and days in each category. Repeat for each year

Indicator: Amount of Land in Conservation Easements- annual acres enrolled in USDA Conservation Program

Time: 30 minutes

1. Go to the USDA Farm Service Agency Conservation Program statistics Web site at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=rns-css
2. On the bottom of the webpage, click on "CRP Enrollment and Rental Payments by County, 1986-2012." An Excel spreadsheet will download with acres enrolled payment and average rental payments for every county in the U.S. The title will change with to update of a new Excel spreadsheet every year.
3. Find Dubuque County, as well as other relevant counties for comparison, under the "Acres" sheet and scroll to the current year offered to find the total amount of acres enrolled into the CRP program for the current year.

Indicator: Energy Use

Time: 3 hours

1. For The Cascade Municipal Utilities consumption information go to http://www.eia.gov/electricity/sales_revenue_price/index.cfm
2. In the right margin select the year.
3. Download tables T6, T7, and T8.
4. After opening each table, scroll down to IA, Cascade Municipal Utilities.
5. Take the Sales (megawatt hours) value and multiply it by 1,000 to get Sales (kilowatt hours)
6. For Maquoketa Valley Electric Cooperative data, contact:

Patty Manuel
Director, Business Development & Communications
Maquoketa Valley Electric Cooperative
109 N. Huber Street
Anamosa IA 52205
319-462-3542

7. Maquoketa Valley Electric Cooperative combines commercial and industrial usage together by annual kilowatt hours.
8. Sum the annual usage data for each account type (residential and commercial/industrial) to get aggregate sum of electricity usage in Dubuque County.

Data for heating fuel types:

1. Go to http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml147
2. Click on "Geographies."
3. Select "County" in the dropdown box, then Iowa and Dubuque.
4. Click on "add to your selections."
5. In the left margin, click on "Topics."
6. Click on "housing→ "physical characteristics→ "heating fuel."
7. Choose Census 2000 Summary File 3 (SF 3) H040 and American Community Survey 2006-2010 file B25040.
8. Download or open both files to obtain percentage of house heating fuel types.

9. Repeat steps 1-8 to obtain data from other counties.

Chapter: Watershed

Indicator: Soil Loss and Runoff

Time: 1 Hour

1. Go to Iowa State's WEPP webpage at http://wepp.mesonet.agron.iastate.edu.
2. Click on "By Township."
3. Click on "Yearly Result."
4. Select the year in the dropdown box.
5. Enter in the "Township" input field with the corresponding Web site code to retrieve the annual soil loss and runoff data.

Dubuque	
Town/City	**Web site Code**
Luxemburg	T90NR02W
Holy Cross	T90NR01W
Balltown/Rickardsville/Sherrill	T90NR01E
Durango/Sageville	T90NR02E
New Vienna/Dyersville	T89NR02W
Bankston	T89NR01W
Graf/Centralia	T89NR01E
Asbury/Dubuque	T89NR02E
Worthington/Farley	T88NR02W
Farley/Epworth	T88NR01W
Peosta/Centralia	T88NR01E
Dubuque	T88NR02E
Dubuque	T88NR03E
Cascade	T87NR02W
Cascade	T87NR01W
Bernard	T87NR01E
Zwingle	T87NR02E

Woodbury	
Town/City	**Web site Code**
Sioux City	T89NR47W
Sioux City	T89NR46W
Lawton	T89NR45W
Moville	T89NR44W
Pierson	T89NR43W
Correctionville	T89NR42W
Sgt. Bluff/Sioux City	T88NR47W
Bronson	T88NR46W
Wolf Creek Township	T88NR45W
Moville Township	T88NR44W
Anthon/Correctionville	T88NR43W
Cushing/Correctionville	T88NR42W
Salix	T87NR47W
Grange Township	T87NR46W
Westfork Township	T87NR45W
Grant Township	T87NR44W
Miller Township	T87NR43W
Morgan Township	T87NR42W
(No name provided)	T86NR47W
Sloan	T86NR46W
Hornick	T86NR45W
Smithland	T86NR44W
Oto	T86NR43W
Danbury	T86NR42W

6. Annual soil loss and runoff total can be found at the bottom of the table of the webpage.
7. Sum up the annual totals for each Town/City to get Dubuque County totals.

Indicator: Impervious Surface Area

Time: 1 hour

1. For Dubuque County 1X1 cell Land Use raster file contact:

    Peter Kallasch
    Remote Sensing Analyst
    Iowa Geological and Water Survey
    109 Trowbridge Hall
    Iowa City, IA 52242
    (319)335-1578

2. For the City of Dubuque Drainage Basin Boundary GIS files contact:

    Jeff Miller
    GIS/IT Project Coordinator
    720 Central Ave Dubuque, IA 52001
    (563) 589-7896

3. In ArcMap10, take the land use file and convert it to a polygon. In the search menu type in "Raster to Polygon"
4. In the "Raster to Polygon" tool, enter in the Land Use file as the input and save the output to a geodatabase.
5. Take the newly created land use polygon file and go to the "selection" menu. In the "selection" menu, click on "select by attributes."
6. Choose the land use polygon file and select classification 12 for impervious surfaces.
7. Right click on the land use polygon file, select "data" and then "export data." Label the file as "impervious surfaces."
8. In the "geoprocessing" menu, choose "intersect" and intersect the impervious surface file with the drainage basin file. Save the intersect polygon file output into a geodatabase.
9. Separate each drainage basin area by selecting by attributes; similar to the process described in steps 5-7. To export each basin separately, select the intersected polygon file and a drainage basin name under the "Name" attribute.
10. Create a Microsoft Excel Spreadsheet to calculate the percentage of impervious surface per drainage basin area.
11. In ArcMap, open the attribute table from the original drainage basin shapefile. Under the "Area" attribute, take the area for each drainage basin and copy it to the Excel spreadsheet.
12. Calculate the area of impervious surface for each drainage basin. In ArcMap10, open each drainage basin file attribute table. Add a field to each attribute table and label it "Impervious Area" and select "float." Highlight the "Impervious Area" column and click on "GeoCalculator." Under the 2nd dropbox, select "Acre", then "ok". Highlight the "Impervious Area" column again and click on summary. Copy the sum of the impervious area for each drainage basin and copy it to the Excel spreadsheet.

13. Take the impervious area and divide it by the drainage basin area. This will give you the percentage of impervious surface area for each drainage basin.

Indicator: Water Quality

Time: 1 hour

1. Go to the U.S. EPA's *"How's My Waterway?"* Web site to measure Dubuque County's total number of miles of streams and rivers assessed since 2004 and the percentage of all rivers and streams that are polluted.
2. Enter in the zip codes from the table below to obtain data.
3. On an Excel spreadsheet, enter in the length of each stream, river, creek, coulee, or hollow.
4. Enter a value of "1" if a stream, river, creek, coulee, or hollow have been assessed. If it has not been assessed, enter a "1" for non-assessed.
5. Enter a "1" into the spreadsheet if the stream, river, creek, coulee, or hollow are designated as polluted, non-polluted, or unknown.
6. Exclude data from the Mississippi or Missouri River.
7. Highlight the column for non-assessed and sort from smallest to largest.
8. Total the sum of all columns for non-assessed rivers and streams and total all columns for assessed rivers and streams. This will result in 2 different row totals.
9. At the bottom of the excel sheet, add up the total number of miles of all streams, rivers, creeks, coulees, or hollows for both assessed and non-assessed.
10. Get the total sum for all streams, rivers, creeks, coulees, or hollows assessed and not assessed from step 7.
11. Divide the total of each category of assessed, non-assessed, polluted, non-polluted, and unknown by the total in step 9 to get percentages.
12. Divide the total of each category of assessed, non-assessed, polluted, non-polluted, and unknown by the total number of miles to get the number of miles per each category.
13. To get assessed river and stream percentage data by category, take the total miles of polluted, not polluted, and unknown categories and divide each by the total number of assessed river and stream miles.

Chapter: Economic Development

Indicator: Unemployment Rate

Time: 30 minutes

Data for this indicator were obtained from the Bureau of Labor Statistics.

Go to http://www.bls.gov/lau/

1. Hover cursor over "Subject Areas" and choose "National Unemployment Rate." On the right side of the page, click on icon under "Annual Averages" to retrieve data for U.S.
2. From home page, scroll down and on the right

sidebar; choose "Iowa" under "Regional Resources." Check the "Iowa" and "Dubuque, IA" box and then select "Retrieve Data."

3. Update indicator by using annual data.

Indicator: Poverty Rate

Time: 30 minutes

Data for this indicator were obtained from the American Community Survey.

Go to http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

1. Under "Community Facts" on the left sidebar, type either "Dubuque County, Iowa"; "Iowa"; or "United States."

2. Under the "American Community Survey" drop-down menu, choose "Income, Employment, Occupation, Commuting to Work…"

3. Scroll down to find 5-year estimated poverty rates for the geographic locations.

Indicator: Economic Sector Diversity

Time: 4 hours

Data for this indicator were obtained from the Bureau of Labor Statistics.

Go to www.bls.gov/data

1. Under "Employment", choose "Quarterly," and then choose "State and County Employment and Wages."

2. Select "Iowa" in part 1, select "Dubuque County" or "Iowa-Statewide" in part 2, select all the industries with 2 digit codes in part 3, select all ownerships listed in part 4, select all establishments sizes listed in part 5, select "All Employees" in part 6. In part 7, click "Add To Your Selections", and then click "Get Data."

3. Click "More Formatting Options;" choose "All Years" and "Annual Data" in the table on the left.

4. Click "Retrieve Data" and download all the excel tables to one folder.

5. Combine all the tables into one table based on the industry sectors. Sum the "Annual Employment" for each sector in each year.

6. Calculate employment share for each sector annually and get the square of share. Sum all the shares^2 annually. The result is the diversity index for the economic sectors in Dubuque County and the State of Iowa.

7. Create a graph to show the trends of annual diversity index for Dubuque County and Iowa. Compare the diversities between Dubuque County and Iowa and analyze their trends.

8. Repeat these steps for each comparison county, replacing county names when necessary and substituting "Wisconsin" for "Iowa" when needed.

The following formula was used to calculate the Herfindahl Index:

$$H = \sum_{i=1}^{N} s_i^2$$

Where s_i is the market share of sector *i* in the market and *N* is the number of sectors. Thus, in a market with two sectors that each have 50 percent market share, the Herfindahl index equals $0.50^2+0.50^2 = 1/2$.

Indicator: Ratio of Net Employment Inflow to Total Employment

Time: 2 hours

Data for this indicator were obtained from the U.S. Census Bureau.

1. Go to http://onthemap.ces.census.gov/
2. Type in "Dubuque County" in "Search", click "Dubuque County, IA."
3. Click "Perform Analysis on Selection Area."
4. Next, click on "Analysis Settings", choose "home" in column "Home/Work Area," choose "Inflow/Outflow" in column "Analysis Type", choose all years listed in column "Year" and choose "All Jobs" in column "Job Types."
5. Total employment will also be available using this process.
6. Click "Detailed Report" on the left side, and click "Export to XLS."
7. Create a table to show the annual net job inflow as a ratio to total employment for Dubuque County.
8. Follow the same process to formulate tables and graphs for all other Consortium cities and comparison counties.

Indicator: Ratio of Primary Jobs to Total Population

Time: 1 hour

Data for this indicator were obtained from the U.S. Census Bureau.

Go to http://onthemap.ces.census.gov/

1. Type in "Dubuque County" in "search", click "Dubuque County, IA."
2. Click "Perform Analysis on Selection Area."
3. Next, click on "Analysis Settings", choose "Work" in column "Home/Work Area," choose "Area Profile" and then select "All Workers" in column "Analysis Type", choose all years listed in column "Year" and choose "Primary Jobs" in column "Job Types."
4. Total population will also be available using this process.
5. Click "Detailed Report" on the left side, and click "Export to XLS."
6. Create a table show the annual primary jobs for Dubuque County and create a ratio over its total population.
7. Follow the same process to formulate ta-

bles and graphs for all other Consortium cities and comparison counties.

Indicator: Annual Tourism Revenue

Time: 15 minutes

Data for this indicator were obtained from the U.S. Travel Association.

1. Go to http://www.traveliowa.com/aspx/general/dynamicpage.aspx?id=30
2. Specify year and click on full report of *Economic Impact of Travel on Iowa Counties* for year wanted.
3. Scroll down to tables that list characteristics of "Domestic Travel Impact on Iowa."
4. Retrieve number associated with "Local Tax Receipts ($ Millions)" for Dubuque County and Woodbury County.

Chapter: Transportation

Indicator: Street density

Time: 1.5 hours

1. Download necessary data: population change for the consortium cities and Dubuque County (Census Viewer), road centerline shapefile (IOWA DNR GIS Library), incorporated urban area within Dubuque County (Iowa DNR GIS Library), County boundary (IOWA DNR GIS library);
2. Open the aforementioned files in ArcMap. Clip both the Incorporated Urban Area and Road Centerline shapefiles by the County boundary;
3. Add a new field "SLength" to the attribute table of Road Centerline file, set the "float" type for the field. Right click on a newly created field and click "Calculate Geometry". Select "Length" and set "miles" as units of measurement, then press OK. Do the same for the urban incorporated areas, only this time calculate the shape in miles.
4. Under "Selection" click "Select by Attributes". Define the road centerline layer as a source layer, in the query field type in the following: NOT "FFC" = '3' (this will eliminate Federal Interstates from the layer);
5. Export selection as a new File and Personal Geo-database file (we will refer to it as Local_Roads).
6. Spatially join Incorporated Urban Areas to Local_Roads, while summing up the shape area.
7. Create a separate excel file with 6 new columns and fill in a, b, c, and d from the attribute table from ArcMap:

a. Name
b. Shape_Area
c. Street_Length
d. Street Density
e. Calculate "d" by dividing length by area.

Lay the information on the graph.

Indicator: Time Spent on a Daily Commute

Time: 15 minutes

Go to http://factfinder2.census.gov, select Dubuque County, IA for geography in the topic con-

text menu. Then, define DP03 (Selected Economic Characteristics) as a parameter of your search. Download the data for the most recent year and connect the data to the existing dataset.

1. Connect the retrieved information to the provided dataset. Lay out new data on the graph.

Indicator: Transit Ridership

Time: 15 minutes

Go to http://factfinder2.census.gov, select Dubuque County, IA for geography in the topic context menu. Then, define B01003 (Total Population) as a parameter of your search. Download the data for the most recent year and connect the data to the existing dataset.

1. Acquire transit ridership data from The Jule, RTA and Du Ride. Sum total ridership for all three operators and normalize it by population in 1,000. Lay out new data on the graph.

2. To get the profile of other comparable counties go to National Transit Database (http://www.ntdprogram.gov/ntdprogram/). Then click on "NTD Transit Profiles", select the region of interest, search for the state of interest and then select the transit provider within the area, choose the most recent year. Connect the data to the dataset and graph it.

Indicator: VMT per capita

Time: 20 minutes

1. Go to http://factfinder2.census.gov, select Dubuque County, IA for geography in the topic context menu. Then, define B01003 (Total Population) as a parameter of your search. Download the data for the most recent year and connect the data to the existing dataset.

2. Go to http://www.iowadot.gov/maps/msp/vmt/ and select the most recent year data in the column captioned "VMT by County and System. Retrieve only total VMT for the County (Attention: VMT provided is in 1000s!).

3. Divide the aggregate VMT by the total population for the most recent period of time.

4. Go through steps 1-3, to get the aggregate data for the state of Iowa.

5. Connect the retrieved data to the existing dataset. Lay the information on the graph.

Indicator: Crash fatality rate

Time: 20 minutes

1. Go to National Highway Traffic Safety Administration (NHTSA) FARS Encyclopedia at http://www-fars.nhtsa.dot.gov/Main/index.aspx, select "States" and "Fatalities and Fatality rate" at the top right corner of the screen. Scroll down to the State of Iowa and click on it. In the top right corner click "Export XLS" button. Retrieve the data for the most recent year and connect it to the existing dataset.

2. Go to http://factfinder2.census.gov, select Dubuque County, IA for geography in the topic context menu. Then, define B01003 (Total Pop-

ulation) as a parameter of your search. Download the data for the most recent year and connect the data to the existing dataset.

3. To get the fatality rate per 100,000 use the following formula: (# Fatalities / Population) *100,000

4. Lay the information on the graph

Indicator: Alcohol-impaired Crash Fatality rate

Time: 20 minutes

1. Go to National Highway Traffic Safety Administration (NHTSA) FARS Encyclopedia at http://www-fars.nhtsa.dot.gov/Main/index.aspx, select "States" and "Alcohol" at the top right corner of the screen. Then select the most recent period of time. Scroll down to the State of Iowa and click on it. Find Dubuque County, look for the number with BAC>0.08. Copy-paste the data to the existing dataset.
2. To get the alcohol related fatality rate per 100,000 use the following formula: (# Alco Fatalities / Population)*100,000

3. Lay the information on the graph

Indicator: Crash and Injury Rate

Time: 30 minutes

1. Reportable crash history data of crashes and injuries in Dubuque County, Woodbury County and State of Iowa for the years 2006-2011 was provided by Michael Pawlovich of the Iowa DOT.
2. Reportable crash history data of crashes in Eau Claire County and La Crosse County was downloaded from Wisconsin DOT. http://www.dot.wisconsin.gov/drivers/drivers/traffic/crash/final.htm
3. The Population data was downloaded from Census Bureau, using one-year estimate data of American Community Survey.

Indicator: Mode distribution

Time: 2 hours

Data for this indicator were obtained from the Census Transportation Planning Products.

Go to http://www.fhwa.dot.gov/planning/census_issues/ctpp/data_products/acsdataprod.cfm

1. Click "2006-2010 Transportation Profiles."

2. Choose "Iowa State" or "Dubuque County" and download the spreadsheet.. Select the mode distribution at place of residence.

Indicator: Walkscore

1. Go to www.walkscore.com

2. Type in city name

Chapter: Land Use

Indicator: Ratio of 1-unit detached structures change to population change

Time: 20 minutes

1. Go to http://factfinder2.census.gov, select

Dubuque County, Iowa as geography to retrieve County wide data. Then, define B01003 (Total Population) as a parameter of your search. Download the data for the most recent year and connect the data to the existing dataset.

2. Retrieve the same kind of data for the state of Iowa and connect it to the existing dataset.

3. Lay the information on the graph.

Indicator: Job-Housing Balance

Time: 1 hour

1. Go to http://censtats.census.gov/cgi-bin/zbpnaic/zbpsect.pl and enter in zip code and year of interest to obtain the number employees in a specific zip code for given year.

2. Go to http://www.zip-codes.com/ to obtain easy to access U.S. Census housing unit data for each zip code.

3. To calculate ratio, divide the number of employees (jobs) by the number of housing units for year of interest.

Indicator: Link-Node Ratio

Time: 1.5 hours

1. Download necessary data for Dubuque County, including county boundary, road centerlines, and urban incorporated area boundary.
2. Click "Select," "By attribute." In a query field type in NOT "FFC" = '3.' Export selection as a new layer. This will exclude Iowa Routes from network dataset, that you're about to create. Name the file Local_roads.
3. Clip the local roads shapefile by the county boundary (filename: Clip_Local_Roads).
4. Create the network dataset for Dubuque County (Mark Pooley helped to create the network dataset. He also agreed to provide a detailed description for the consecutive version of the report).
5. Spatially join both layers within network dataset (for links and nodes) to Urban Incorporated Area layer (file names: SJ_urbinc_link and SJ_urbinc_nodes).
6. Click "Select," "By attribute." In a query field type in the name of the study area (Asbury), make sure that you select from SJ_urbinc_links. Look at the number of selected items in the attribute table of the working layer and put the number in the existing dataset (excel file).
7. Repeat step 5 for six other cities in the Consortium to calculate aggregate.
8. Click "Select," "By attribute." In a query field type in the name of the study area (Asbury), make sure that you select from SJ_urbinc_nodes. Look at the number of selected items in the attribute table of the working layer and put the number in the existing dataset (excel file).
9. Repeat step 7 for six other cities in the Consortium to calculate aggregate shape area.
10. The number for Dubuque County will be the

total amount of links and nodes for the whole urban incorporated area.

11. Connect collected data to the existing dataset and lay out the graph.

Indicator: Building Starts

1. Obtain updated building starts from Dubuque County Assessor and City of Dubuque Assessor.
2. Sort by year
3. Add new build starts number to appropriate table to populate graphs.
4. Merge city and county "Building Starts" GIS shapefile
5. Use "Select by Attributes" tool to select for only starts from 2005-2010.
6. Convert all building starts features into points using "Feature to Point" tool.
7. Use the spatial analyst tool "Kernel Density" to create density map
8. Leave "Population field" blank
9. Set the search radius to 5280 feet
10. Under "Environments" tab, set "Processing extent" to the Dubuque County shapefile; under "Raster Analysis" set the mask to the county shapefile.

Indicator: Per Capita Land Consumption

1. 1. Download HRLC_2009 land cover files from NRGIS (http://www.igsb.uiowa.edu/nrgislibx/).
2. 2. Open attribute table and sum counts "Structures" and "Roads and Impervious" classes.
3. 3. The total "count" will provide an estimate of total 1 meter cells of built/urban land. Convert this total count (m^2) to prefered metric.
4. 4. Divide total bult area by population (obtained from U.S. Census Bureau).

Chapter: Housing

Indicator: Green Building Standards

Time: 30 minutes

1. Go to: http://www.energystar.gov/index.cfm?fuseaction=new_homes_partners.showAreaResults&s_code=IA&msa_id=96
2. If the link is not current, go to www.energystar.gov and find the New Homes tab. Click on "find an Energy Star builder" and choose Iowa, then Dubuque. Note the number of new homes reported for each builder in the most recent reporting period. Reporting periods run from July to June.

Indicator: Vacancy rate

Time: 1 hour

1. Obtain the" vacancy rate" file from the most recent American Community Survey 5-year average set. The file number is B250004. The indicator uses census block groups, although census tracts could be used.
2. Obtain the census block group or census tract shape file from the U.S. Census TigerLines service.

3. Using ArcGIS, join the table of block groups or census tracts to the corresponding shape file and display by the desired attribute (For rent, Sold, Sold but not occupied, etc.) The indicator displayed included those homes for sale and for rent. Normalize this by the total number of homes in each block group or tract.

Indicator: Age of Housing Stock

Time: 1 hour

1. Obtain the "year structure built" file from the most recent American Community Survey 5-year average set. The file number is B250034. The indicator uses census block groups, although census tracts could be used.
2. Obtain the census block group or census tract shape file from the U.S. Census TigerLines service.
3. Using ArcGIS, join the table of block groups or census tracts to the corresponding shape file and display by the desired attribute. The indicator displayed included those built prior to 1939. Normalize this by the total number of homes in each block group or tract.

Indicator: Proportion of homeowners and renters that are housing burdened

Time: 1 hour

1. Obtain the files for "mortgage status by selected monthly owner costs as a percent of household income" and "gross rent as a percentage of household income" from the most recent American Community Survey 5-year average set. The file numbers are: B250091 (SMOCAPI) and B250070 (GRAPI). The indicator uses census block groups, although census tracts could be used.
2. Obtain the census block group or census tract shape file from the U.S. Census TigerLines service.
3. Using ArcGIS, join the table of block groups or census tracts to the corresponding shape file and display by the desired attribute. The indicator displayed shows GRAPI as one map and then breaks the homeowner data into those with and without mortgages. Normalize this by the total number of homes in each block group or tract.

Chapter: Quality of Life

Indicator: Violent Crime Rate

Time: 30 minutes

Data for this indicator were obtained from the Federal Bureau of Investigation.

Go to http://www.fbi.gov/stats-services/crimestats

1. Under "UCR Data Tool" select the year for the data to be collected.
2. On the following page, choose "Violent Crime" under the heading "Offenses Known to Law Enforcement."
3. Under "Browse By" select "Metropolitan Statistical Areas (MSAs) (Table 6)."

4. Scroll down until Dubuque, IA M.S.A. is visible and retrieve the violent crime data.

5. Repeat the above steps, with the exception of choosing "State totals" under "Browse By," to retrieve the violent crime rate for the State of Iowa.

Indicator: Adult Obesity Rate

Time: 30 minutes

Data for this indicator were obtained from the Centers for Disease Control and Prevention via the County Health Rankings & Roadmaps Web site.

Go to http://www.countyhealthrankings.org/#app/iowa/2012/measures/factors/11/map

1. Click on Dubuque County within the map of Iowa.

2. Scroll down and click on "Adult obesity."

3. Notice the above menu and select the year for the data to be retrieved.

4. Data for both Dubuque County and Iowa will be on the same webpage for the specific year being viewed.

Indicator: Uninsured Residents

Time: 30 minutes

Data for this indicator were obtained from American Community Survey estimates via the U.S. Census Bureau Web site.

Go to http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

1. On the left sidebar click on "Topics," "People," "Insurance Coverage," and "Health Insurance."

2. On the left sidebar click on "Geographies." Select "County," "Iowa," and "Dubuque County, Iowa."

3. Choose "Selected Economic Characteristics" for the desired ACS 1-year estimate table.

4. Health insurance coverage data will be contained within the table selected.

Indicator: Educational Attainment

Time: 30 minutes

Data for this indicator were obtained from American Community Survey estimates via the U.S. Census Bureau Web site.

Go to http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

1. On the left sidebar click on "Topics," "People," "Education," and "Educational Attainment."

2. On the left sidebar click on "Geographies." Select "County", "Iowa", and "Dubuque County, Iowa."

3. Choose "Selected Economic Characteristics" for the desired ACS 5-year estimate table.

4. Educational attainment data will be contained in the table provided.

Repeat process, substituting "Wisconsin" and

"Woodbury County, Iowa," "Eau Claire County, Wisconsin," and "La Crosse County, Wisconsin" when necessary.

Indicator: Access to Parks – Acres per 1,000 residents

Time: 3 Hours

1. Download necessary data: Shapefiles for incorporated areas and Dubuque County boundary (available from Iowa DNR GIS Library and TIGER Census Web site); shapefile for parks (available from Dan Fox at ECIA)
2. Open a new map in ArcGIS10 and add the layers from previous step
3. Open an editing session; open the attribute table for the parks layer and delete Heritage Trail, Bunker Hill Golf Course, Dubuque Golf and Country Club, and Meadows Golf Club. Close editing session and save edits.
4. Add a basemap and zoom in on Cascade. Open an editing session – trace over the park that is not included in the existing park layer (because it is part of Jones County). Calculate geometry for the new entry as U.S. acres. Close editing session and save edits.
5. Open the attribute table of incorporated areas and select a city. Choose "Selection" from the toolbar and choose Select by Location > Target layer: parks > Source layer > incorporated areas, check use selected features > Spatial selection method: Target layer features have their centroid in the Source layer feature > OK.
6. Open the attribute table for parks. Choose the selected features tab. Right-click on Acres > Statistics. Manually record the sum in an Excel table.
7. Repeat for each Consortium city.
8. Look up the population for each Consortium city on Census QuickFacts of Wikipedia.
9. Record all populations and acres in Excel. Use the formula (acres of parkland/(population/1000)) to find the acres of parkland for 1,000 people in each city.
10. Repeat for all incorporated cities and villages in La Crosse County (Bongor, Holmen, La Crosse, Onalaska, Rockland, and West Salem). A parks file can be obtained from Ron Roth - GIS Specialist/Land Information Officer by calling 608-785-9637 or emailing rroth@lacrosscounty.org

Chapter: Intergovernmental Collaboration

Indicator: Number of 28E Agreements

Time: 2 hour

Data for this indicator were obtained from the Iowa.gov-The Official Web site of the State of Iowa

Go to http://sos.iowa.gov/28E/Controller.aspx?cmd=SOSSearch

Under "Organization Type" select "Dubuque" and click "Search by Details."

On the following page, check the agreements one by one and write down the agreements information which Dubuque Com-

munities or Woodbury Communities are involved.

Chapter: Hazard Mitigation

Indicator: Number of communities enrolled in the National Flood Insurance Program

1. Check all communities in the National Flood Insurance Program Community Status Book at http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book

Indicator: Degree of hazard planning incorporated into local ordinances and comprehensive plans

1. A periodic check with city clerks (see the end of Appendix D for contact information) and on documents published online will help determine if any of the municipalities have made headway in incorporating hazard mitigation planning in their comprehensive plans.

Indicator: Number of communities with storm warning systems

1. Contact city clerk in cities to determine if storm warning system is in place.

Appendix F—Updating land use models

Step-by-step process to calculate land use capacity based employment data

With the instructions, you will learn how to:

Calculate the percentage of the population employed (step 7).

Calculate the percentage of occupation per commercial and industrial land zone designation (steps 9 – 13).

Get the projected number of people employed per commercial and industrial land zone designation (step 14).

Calculate the land demand for commercial and industrial land zone designations (step 15).

Evaluate the land capacity to support commercial and industrial land demands (step 16).

Go to American Factfinder Web site to obtain:

city population

population over 16

occupation by class.

http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

On the American Factfinder Web site, select "Geographies."

From the "Geographies" window, select "place" as the geographical type, select "Iowa" as the state and then choose the cities of Asbury and Peosta.

Then on the left tab, choose "Topics", click on the Populations tab and choose "Population Total."

Then in the "Topics" window, click on the "Employment" tab and choose "Class of Worker."

Download tables DP-1, Profile of General Population and Housing Characteristics 2010 and table DPO3, Selected Economic Characteristics.

From the DPO3 Selected Economic Characteristics table, take the total number of jobs and divide it by the population 16 and over to get the percentage of the population employed.

Take the population age 16 and over and multiply it by the percentage of the population that is employed in step 8. This will give you the number of people employed.

Take the data from the DPO3 Selected Economic Characteristics table to calculate percentages of employment per zoning classification.

Take occupation the categories:

Management, business, science, and arts occupations

Service occupations

Sales and office occupations

Natural resources, construction, and maintenance occupations and label them as occupations that are found on land zoned for commercial uses.

Take the occupation category Production, transportation, and material moving occupations and label it as an occupation that is found on land zoned for industrial use.

Take the number for each occupation category listed in step 11 and divide it by the total number of jobs. This will give you the percentage of jobs per category.

Get the sum of all percentages of jobs per category for occupations labeled as commercial from step 12. You now have a workforce percentage to calculate the number of persons employed on commercial and industrial land zoning designations.

To calculate the number of people employed under commercial or industrial land use zoning classifications for the year 2020 and 2030, take the percentage per land use zoning classification from step 13 and multiply it by the value of the projected population for each corresponding year. You now have the number of persons employed for each zoning classification (commercial and industrial) for the years 2020 and 2030.

To get the current demand for each land use zone (commercial and industrial), take the value of persons/acre for each land zoning classification from the suitability/build-out analysis table and divide it by the number of people employed per zoning classification described in step 14. This will provide you with the land demand for each zoning classification for each year 2020 and 2030.

Take the land supply of each scenario by land zone classification of either commercial or industrial (conventional scenario and cluster/conservation scenario) and subtract the land demand of the same zoning classification calculated in step 15. This will tell you if the land capacity exists to support the demand.

Step-by-step Description of Land-use Projections, based on constant person-per-acre share.

Retrieve total population for the city of interest through American Factfinder

Summarize amount of land available by different zoning designations (acres)

To calculate current person/acre ratio, divide total population by the amount of land for every zoning designation

To calculate land demand under current trends, retrieve population projections for the period of interest and multiply it by current person/acre ratio

To calculate land supply under Conventional Development scenario aggregate the amount of land per zoning type available under Conventional Development suitability assumptions

To calculate land supply under Cluster/Conservation Development scenario aggregate the amount of land per zoning type available under Cluster/Conservation Development suitability assumptions

To calculate net acreage of land available under Conventional Development scenario subtract land demand from land supply for the specified period of time

To calculate net acreage of land available under Cluster/Conservation Development scenario subtract land demand from land supply for the specified period of time