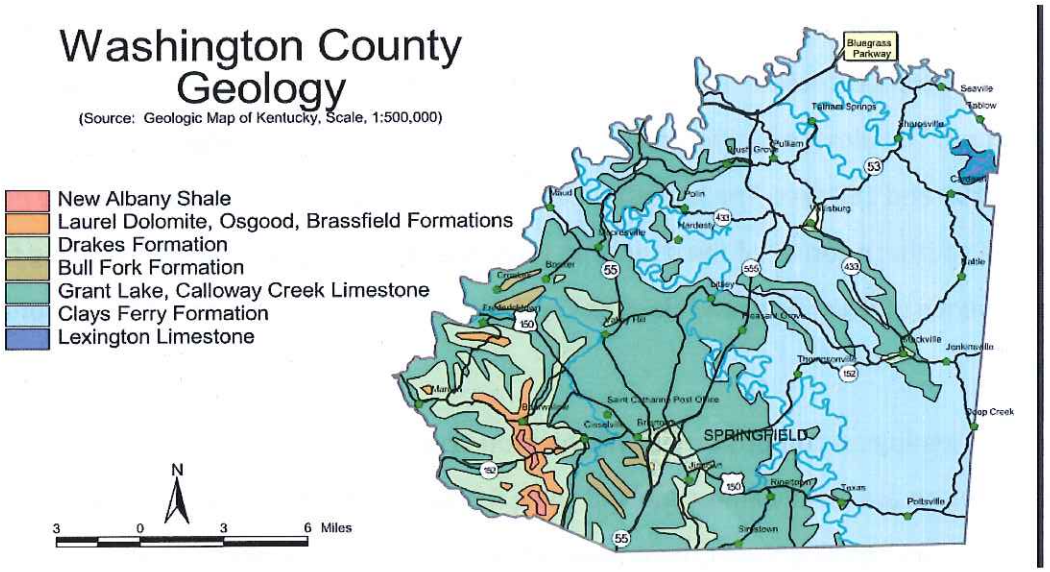
V. Environmental Analysis

The City of Springfield and Washington County can be found in the Outer Bluegrass Region of central Kentucky.[1] The area is characterized by irregular hills and ridges with very little flatland. The elevation differences between valley bottoms and ridgetops is generally between 100 and 150 feet. The highest elevation in Washington County can be found near U.S. 150 in the southern corner of the county at 1,020 feet with the lowest elevation being found at the confluence of Brush Fork and Hardins Creek in the northwestern corner of the county at 475 feet.

The geological composition of Washington County is very similar to other parts of Kentucky which are mainly limestone and shale formations left over from a period hundreds of millions of years ago when the Commonwealth was covered by an ancient body of water. The county is home to unconsolidated deposits of alluvium as well as Lexington Limestone and High Bridge Group Limestone. Washington County also contains New Albany Shale which is the predominant shale grouping in the rest of Kentucky. Other interbedded limestone and shale groups within the county include Laurel Dolomite, Osgood Formation, Brassfield Formation, Drakes Formation and Bullfork Formation, Grant Lake Limestone, Calloway Creek Limestone, and Clays Ferry Formation. Figure 5.1 shows the areas of Washington County with each type of formation.[2]

[1] Washington County Topography https://www.uky.edu/KGS/water/library/gwatlas/Washington/Topography.htm
[2] Geology of the County https://www.uky.edu/KGS/water/library/gwatlas/Washington/Geology.htm

Figure 5.1: Washington County Geology



Soils[3]

According to a soil survey conducted by the U.S. Department of Agriculture (USDA), around 21% of Washington County is comprised of prime farmland. This is land that is well suited for producing food, feed, forage, fiber, and oilseed crops in a manner that is favorable for economic production. This 21% of the county amounts to around 39,920 acres of land and growth in urban and industrial land use in the area has meant a reduction in the use of this land for farm production. The survey conducted by the USDA also details the various types of soils found in Washington County as well as the qualities they possess. Table 5.1 below gives the names of these soils and a brief description of what and where these soils are.

Table 5.1: Washington County Soils

Soil Type	Name	Description
BeB	Beasley silt loam	2 to 6 percent slopes; deep, well-drained, gently sloping soil atop ridges in western portion of the county
BeC	Beasley silt loam	6 to 12 percent slopes; deep, well-drained, located on narrow ridgetops and side slopes in western portion of the county

[3] Soil Survey of Washington County, Kentucky
https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/kentucky/KY229/0/washington.pdf

Bo	Boonesboro silt loam	Occasionally flooded; moderately deep, well-drained located on narrow floodplains through the county
CrB	Crider silt loam	2 to 5 percent slopes; deep, well-drained, gently sloping soil located on broad, karst ridgetops and side slopes in western portion of the county
CrC	Crider silt loam	6 to 12 percent slopes; deep, well-drained sloping soil located on karst, narrow ridgetops and side slopes in western portion of the county
Du	Dunning silty clay loam	Frequently flooded; deep and very poorly drained; located in flood plains and depressions throughout the county
EdD2	Eden silty clay loam	6 to 20 percent slopes eroded; moderately deep, well-drained; sloping to moderately steep and moderately eroded on narrow ridgetops in northern and eastern portions of the county
EeE3	Eden flaggy silty clay	20 to 30 percent severely eroded; moderately, well-drained; located on side slopes in northern and eastern parts of the county
EkA	Elk silt loam	0 to 2 percent slopes; deep, well-drained; located on low stream terraces throughout the county
EkB	Elk silt loam	2 to 6 percent slopes; deep, well-drained; located on stream terraces throughout the county
EkC	Elk silt loam	6 to 12 percent slopes; deep, well-drained sloping soil on side slopes of stream terraces throughout the county
FaD	Fairmount-Rock outcrop complex	6 to 20 percent slopes; shallow, well-drained located on narrow ridgetops and side slopes throughout the county
FaF	Fairmount-Rock outcrop complex	20 to 50 percent slopes; shallow, well-drained located on side slopes throughout the county
FdB	Faywood silt loam	2 to 6 percent slopes; moderately deep, well-drained located on ridgetops throughout the county
FoC2	Faywood silty clay loam	6 to 12 percent slopes eroded; moderately deep, well-drained, moderately eroded on narrow ridgetops and side slopes throughout the county
FoD2	Faywood silty clay loam	12 to 20 percent slopes eroded; moderately deep, well-drained, moderately steep and eroded on side slopes throughout the county
FwC3	Faywood silty clay loam	6 to 20 percent slopes, severely eroded; moderately deep, well-drained on side slopes and narrow ridgetops throughout the county
FyE3	Faywood-Shrouts silty clay loams	12 to 30 percent slopes, severely eroded, very rocky; moderately deep, well-drained on moderately steep to steep side slopes in western portion of the county
La	Lawrence silt loam	Deep, poorly drained; located on stream terraces and colluvial fans throughout the county
LoB	Lowell silt loam	2 to 6 percent slops; deep, well-drained gently sloping soil on ridgetops and foot slopes throughout the county besides the western portion
LoC2	Lowell silt loam	6 to 12 percent slopes, eroded; deep, well-drained moderately eroded soil on narrow ridgetops, side slopes, and foot slopes throughout the county

LoD2	Lowell silt loam	12 to 20 percent slopes; deep, well-drained, moderately steep and eroded soil on side slopes throughout the county
LwC3	Lowell silt clay loam	6 to 12 percent, severely eroded; deep, well-drained; located on side slopes throughout the county besides the western portion
Ne	Newark silt loam	Frequently flooded; deep and poorly drained soil located on floodplains throughout the county
NhB	Nicholson silt loam	2 to 6 percent; deep, moderately well drained; located on ridgetops throughout the county
NhC	Nicholson silt loam	6 to 12 percent slopes; deep, moderately well drained; located on narrow ridgetops and side slopes throughout the county
No	Nolin silt loam	Occasionally flooded; deep, well-drained soil on flood plains and alluvial uplands throughout the county
OtA	Otwell silt loam	0 to 2 percent slopes; deep, moderately well drained; located on stream terraces throughout the county
OtB	Otwell silt loam	2 to 6 percent slopes; deep, moderately well drained soil on stream terraces throughout the county
SeB	Shelbyville silt loam	2 to 6 percent slopes; deep, well-drained soil on broad ridgetops in central and southern portions of the county
SeC	Shelbyville silt loam	6 to 12 percent slopes; deep, well-drained soil on side slopes and narrow ridgetops in central and southern parts of the county
ShB	Shrouts silt loam	2 to 6 percent slopes; moderately deep, well-drained soil on ridgetops in western portion of the county
ShC2	Shrouts silt loam	6 to 12 percent slopes eroded; moderately deep, well-drained soil on narrow ridgetops and upper side slopes in western portion of the county
Sk	Skidmore gravelly loam	Occasionally flooded; deep, well-drained soil on narrow flood plains and alluvial fans in the northwestern part of the county

Air Quality

The City of Springfield and Washington County are located in the Frankfort Region of the Division for Air Quality (DAQ) with this region being one of the eight total governed by the Kentucky Energy and Environment Cabinet.[4] The DAQ has the mission of protecting the health of the environment and population by maintaining air quality through a number of ways such

[4] Division for Air Quality Regional Office Boundaries https://eec.ky.gov/Environmental-Protection/Air/Documents/RegionMap-CountyNames.pdf

as comprehensive monitoring, dissemination of accurate and useful information, and maintenance of a compliance program.[5]

The current air quality in Springfield as of 2022 is 92.23% good and 7.77% moderate[6] with the radon risk in Washington County being denoted as Zone 2 moderate potential risk.[7] The karst landscape of Kentucky means the state is prone to rock formations that can produce radioactive elements such as uranium. These elements produce radioactive gases such as radon that can pose some risk if precautionary measures for proper air filtering are not taken.

Water Quality

Drinking Water

The Environmental Working Group (EWG) keeps track of a number of environmental factors that may have an impact on the health of communities. One of these factors is water quality, and the EWG maintains a database of tap water quality across numerous communities. In 2021, it was reported that Springfield Water Works had six contaminants that exceeded guidelines put in place by the EWG. These contaminants included arsenic, haloacetic acids HAA5 and HAA9, nitrate, radium, and total trihalomethanes (TTHMs). None of these contaminants were found to be at levels that were harmful for human consumption, and it is shown that Springfield Water Works complied with federal standards for drinking water. Filtering of tap water is recommended to deal with these contaminants, and it was determined that the use of reverse osmosis would be able to remove all of them.[8]

[5] About the Division for Air Quality https://eec.ky.gov/Environmental-Protection/Air/Pages/About-the-Division-of-Air-Quality.aspx
[6] Springfield, KY Air Quality Information https://www.homefacts.com/airquality/Kentucky/Washington-County/Springfield.html
[7] Washington County, KY Radon Risk and Information https://www.homefacts.com/radon/Kentucky/Washington-County.html
[8] EWG's Tap Water Database https://www.ewg.org/tapwater/system.php?pws=KY1150415

Recreational Water

The Kentucky Energy and Environment Cabinet creates integrated reports to track safety levels for its public waterways. Washington County had the following impaired waterways listed in the 2018/2020 integrated report which was approved by the Environmental Protection Agency (EPA) in January of 2022:

Beech Fork UT 0.0 to 1.7 miles: Severe impairment of Warm Water Aquatic Habitat due to altered chemical, physical, biological, and/or radiological integrity. The suspected source is agriculture or other habitat modification.

Cartwright Creek 0.0 to 6.6 miles: Sever impairment to Primary Contact Recreation as concentrations did not meet water quality standard. The suspected source is agriculture.

Cartwright Creek 12.7 to 15.3 miles: Moderate impairment in Warm Water Aquatic Habitat with the cause being undetermined.

East Fork Beech Fork 0.0 to 1.9 miles: Moderate impairment in Warm Water Aquatic Habitat with the cause being undetermined.

Mill Creek UT 0.0 to 1.7 miles: Severe impairment to Warm Water Aquatic Habitat due to problems associated with nutrient enrichment. The source is unknown.

Pleasant Run 4.2 to 6.9 miles: Moderate impairment to Warm Water Aquatic Habitat due to altered chemical, physical, biological, and/or radiological integrity. Problems with nutrient enrichment are also evident as well as sediment deposition. Agriculture, habitat modification, and unrestricted cattle access are among the causes.

Road Run 0.0 to 7.15 miles: Moderate impairment to Warm Water Aquatic Habitat due to problems with nutrient enrichment and sediment deposition. Impervious surface/parking lot runoff, loss of riparian habitat, municipal point source discharges, and other runoff sources were found to be the cause.

Short Creek 0.0 to 5.0 miles: Moderate impairment to Warm Water Aquatic Habitat. Source and cause of the impairment were undetermined.

Willisburg Lake: Severe impairment to Warm Water Aquatic Habitat due to problems with nutrient enrichment. The source is suspected to be agriculture.

Addressing Water Quality

The Washington County Conservation District (WCCD) works with landowners and state and federal agencies to address issues of water quality across the county. Numerous opportunities are available to all landowners in the county with applications for certain practices within impaired watershed considered high priority.

Agricultural Water Quality Plans: Kentucky requires that landowners complete an Agricultural Water Quality Plan. The WCCD works to help landowners develop these plans that must also be updated every 5 years or in case of a significant change to their current farming operations. These plans help to identify potential areas of concern while also developing Best Management Practices (BMP) to address these areas of concern. Water Quality Plans do include measures for lakes and streams within the landowner's property.

KY Nutrient Management Plans/Comprehensive Nutrient Management Plans: The WCCD can assist landowners in creating a Nutrient Management Plan that helps them detail how to store/spread manure. These plans require the taking of nutrient samples as well as plans for when and how much manure can be applied to specific fields. Operations for storing/applying manure and nutrients are required to use this plan.

Kentucky Soil & Water Cost Share Program: A state-level program that is administered through the conservation districts, it is designed to address concerns of natural resources. The Grazing and Manure System is used to help with erosion and water quality issues and can include Nutrient Management Plans, Manure Storage, Heavy Use Areas, and Rotational Grazing. Landowners that operate within impaired watersheds are considered a high priority.

Environmental Quality Incentive Program (EQIP): EQIP is a federal program that also addresses natural resource concerns and uses Grazing/Manure Systems to do so. These systems can include fencing livestock out of sensitive areas or fencing off existing ponds to help prevent erosion and preserve water quality. Heavy Use Areas/Winter Feeding Areas can be created to give landowners spaces for winter feed to reduce compaction and erosion. Nutrient management plans are required for this. Other options more specific to landowners' operations can be made through EQIP.

Notice of Violation: The WCCD can assist landowners given a Notice of Violation through the Division of Water. This includes developing plans and BMPs to address the issue.

Educational Outreach: The WCCD can provide technical assistance to landowners along with help in creating plans for farm operations. They are also in attendance at local field/green days to educate the public on different environmental concerns. Tree and seed giveaways are another opportunity to educate the public on overall environmental issues such as erosion, air quality, and wildlife diversity.

Woodland

The soil survey of Washington County goes on to describe the native woodlands of the county and the capacity of the region to recuperate native trees. The county resides within the Mesophytic Forest region which hosts a variety of tree species including Chinkapin Oak, White Oak, Hackberry, Sugar Maple, Black Walnut, Black Cherry, Kentucky Coffeetree, America Elm, Shagbark, Bitternut Hickory, and Eastern Redcedar. The total commercial woodland in Washington County amounts to 18% of the total area or 34,600 acres. Hickory-oak type trees make up the majority of the woods in this area (51%) with the next most extensive tree types being oak-pine (19%), loblolly-shortleaf pine (16%), elm-ash-red maple (9%), and maple-beech birch (5%).[9]

[9] Soil Survey of Washington County, Kentucky
https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/kentucky/KY229/0/washington.pdf

The City of Springfield and Washington County are situated within the Kentucky Division of Forestry's (KDF) region that is managed by a branch in the City of Campbellsville. This is one of six regions across the Commonwealth that were created with the goal of protection and conservation of the forests in the state as a key economic, social, and environmental resource.[10] The KDF publishes an annual report that encompasses much of the work done regarding this goal. The 2019 report shows that the Commonwealth had over 2,500 loggers and 731 wood manufacturing facilities across 113 counties in 2018. These manufacturing facilities employed over 26,000 Kentuckians and contributed $13 billion to the state's economy. Two of these facilities were reported to be within Washington County.[11]

In 1998, the Kentucky Forest Conservation Act (KFCA) was passed to assist landowners and wood manufacturers in preserving the unique environment of the Commonwealth. The KDF works to enforce the KFCA by conducting inspections of manufacturing and logging facilities and provides a variety of programs to landowners who wish to preserve their woodland areas. The KDF also supports the Kentucky Master Logger Program which ensures that logging operations and practices are conducted in a manner that best preserves the vitality and economic sustainability of Kentucky's forests.

Climate

The City of Springfield experiences warm and muggy summers with cold and wet winters. Temperatures vary between 27- and 87-degrees Fahrenheit through the course of the year and rarely fall below 11 degrees or go above 93 degrees.[12] Furthermore, the city gets an average of 49 inches of rain each year along with an average yearly snow fall of 11 inches. There is also an average of 194 sunny days in Springfield each year which is just below the U.S. average of 205.[13]

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[10] About the Division of Forestry https://eec.ky.gov/Natural-Resources/Forestry/about-kdf/Pages/default.aspx
[11] Division of Forestry Annual Report https://dof-2019-annual-report-kygis.opendata.arcgis.com/pages/ky-forest-conservation-act
[12] Climate in Springfield https://weatherspark.com/y/15181/Average-Weather-in-Springfield-Kentucky-United-States-Year-Round
[13] Climate in Springfield, KY https://www.bestplaces.net/climate/city/kentucky/springfield

An article released by the EPA in 2016 on climate change in the Commonwealth noted that while temperatures have not increased as drastically in Kentucky as in other parts of the U.S., the impact could still be troublesome. Average annual rainfall has been steadily increasing leading to higher flood risk throughout Kentucky but the concentration of this rainfall in the wetter seasons means prolonged drought-like conditions in the dry seasons. Efforts to combat increased flood risk while also maintaining the state's water resources may prove to become more cumbersome as the climate continues to change.[14]

Public Health[15]

In comparison with the rest of the Commonwealth, Washington County was in the top quartile in both health outcomes and health factors in 2021, making the county one of the healthiest in Kentucky. Although Washington County had a higher premature death rate than the top U.S. performers, 8,000 deaths for every 100,000 individuals versus 5,400, it was lower than the premature death rate in Kentucky which was 9,500 in 2021. Washington County did have a similar percentage of adult smokers, adults with obesity, and physical inactivity as compared to the rest of the Commonwealth, but interestingly had a much higher percentage of alcohol-impaired driving deaths. Washington County saw 41% of its premature deaths come from alcohol-impaired driving whereas Kentucky only saw 25%, both of which are higher than the nation's top performers at 11%. Washington County does have a higher clinical care to population ratio than both Kentucky and the top performers in the country. Primary care physicians outnumber the population 3,020:1 while the ratio is 1,540:1 in Kentucky and 1,030:1 in the top performing counties. This same trend is seen in dentists (2,420:1) and mental health providers (930:1) in which both the Commonwealth (1,490:1 & 420:1) and the top performing counties (1,210:1 & 270:1) come up short.

[14] What Climate Change Means for Kentucky https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-ky.pdf

[15] County Health Rankings & Roadmaps https://www.countyhealthrankings.org/app/kentucky/2021/rankings/washington/county/outcomes/overall/snapshot

Data from the American Community Survey showed that health insurance coverage in Springfield has increased in the time since 2016.[16] In looking at the age groups of under 19, 19 to 34, 35 to 64, and 65 plus, every group saw a decrease in the percentage of people who were uninsured besides the 65 plus group which remained completely insured. Those aged 19 and under decreased their noninsured percentage from 1.18% in 2016 to 0.07% in 2020; the 19 to 34 group decreased from 5.44% to 3.06%; and the 35 to 64 group decreased from 5.85% to 0.93%. This same trend was seen in Kentucky with the 19 to 34 and 35 to 64 age groups both seeing a near two percent decrease in noninsured persons: 4.06% down to 2.09% in the 19 to 34 group and 4.41% down to 2.54% in the 35 to 64 group. The LTADD also followed this trend with the 35 to 64 age group seeing the largest decrease from 4.28% in 2016 down to 2.13% in 2020. Washington County saw a varied trend in noninsured individuals with the 19 to 34 and the 65 plus groups both decreasing by over two percent but the 19 and under and the 35 to 64 groups seeing an increase in the number of uninsured individuals. Table 5.2 details these trends in each region.

Table 5.2: Noninsured Individuals by Age Group

2020				
Age Group	Springfield	Washington County	LTADD	Kentucky
Under 19	0.07%	2.02%	0.84%	0.95%
19-34	3.06%	2.21%	1.77%	2.09%
35-64	0.93%	4.18%	2.13%	2.54%
65+	0.00%	0.00%	0.04%	0.04%
2016				
Age Group	Springfield	Washington County	LTADD	Kentucky
Under 19	1.18%	0.04%	1.09%	1.09%
19-34	5.44%	4.68%	3.97%	4.06%
35-64	5.85%	3.58%	4.28%	4.41%
65+	0.00%	2.07%	0.05%	0.05%

[16] US Census Bureau ACS 5-year estimates *Types of Health Insurance Coverage by Age* https://data.census.gov/cedsci/table?q=B27010%3A%20TYPES%20OF%20HEALTH%20INSURANCE%20COVERAGE%20BY%20AGE&g=0100000US_0400000US21_0500000US21027,21085,21093,21123,21155,21163,21179,21229_1600000US2172660&tid=ACSDT5Y2016.B27010

Conclusion

The City of Springfield and Washington County are ideally situated within Central Kentucky and thus are known across the state and the nation for its gently rolling hills and many square miles of pristine natural land. Also, world renowned is the karst landscape on which the community resides which has produced a unique soil structure that provides for ideal agricultural practices. Both air and water quality in the county has been noted for its high quality and although some recreational waters in the region have been identified as needing special attention, the Washington County Conservation District, in conjunction with the Kentucky Division of Water and the Environmental Protection Agency, offers numerous programs and opportunities for individuals and organizations alike to remediate these effects. Further work with the Kentucky Division of Forestry has helped to preserve and support the natural woodlands in the county.

Springfield and Washington County are also ideally located for prime weather conditions year-round and it's likely this helps to contribute to the region's high scores in health outcomes and health factors. Adding this to a high concentration of healthcare providers makes Springfield well prepared in maintaining a happy and healthy population that can contribute to future economic growth and continued high quality of life outcomes. Moving forward, Springfield and Washington County should look towards encouraging higher rates of insured individuals and continued conservation efforts to ensure all residents can enjoy the scenic landscapes for years to come.

VI. Springfield Land Use Element

In completing the comprehensive land use plan update for the City of Springfield, it is designated by KRS 100 that we include proposals for the most appropriate, economic, desirable and feasible patterns for the general location, character, extent and interrelationship of the manner in which the city should use its public and private land at specified times as far into the future as is reasonable to foresee.

This culminated into Springfield's Land Use Element which may also include, without limitation, public and private, residential, commercial, industrial, agricultural, and recreational land use. It is further required via KRS 100.91 that proper research and analysis into the nature, extent, adequacy, and needs of the community for the existing land and building use, transportation, and community facilities in terms of their general location, character, and extent, including, the identification and mapping of agricultural lands of statewide importance and analysis of the impacts of community land needs on these lands be conducted.

Population Overview

The 2020 U.S. Decennial Census showed that Springfield had a population of 2,846. This was a 13.0% increase from the 2010 Decennial Census showing a bounce back from the population decline between 1990 and 2010. Washington County had a 2020 population of 12,027 which was a 2.65% increase from its 2010 population, continuing a steady population increase since 1990. Table 6.1 below details populations in Springfield and Washington County since 1990 as well as projections for each area in 2030 and 2040.

Table 6.1: Population

Year	Population	
	Springfield	Washington County
1990	2,875	10,441
2000	2,634	10,916
2010	2,519	11,717
2020	2,846	12,027
2030	3,121	11,767
2040	3,266	11,507

In 2020, Washington County was ranked 92nd among the 120 counties of Kentucky in total population while being the 36th most racially diverse county in the Commonwealth. Springfield mirrored this ranking as the 41st most racially diverse among 541 incorporated cities, towns, and other Census Designated Places, placing within the 93rd percentile.

It is important to note that 20.6% of Springfield's population is under the age of 18, and 23.2% of the City's population lives below the poverty line. While Springfield is projected to grow by 275 residents in 2030, recent data from the 2023 population estimate indicates that the city has actually declined by 2 people in 2021. Based on current trends, Springfield's population growth appears to be experiencing flat-to low growth.

Existing Goals & Objectives

The City of Springfield has held the following goal for its Land Use Element since its previous comprehensive plan:

"Preserve, maintain and enhance Springfield's natural resources; as well as its rural, cultural and historic character, while increasing employment, housing and recreational opportunities by fostering the best possible relationship among various types of land use."