3.6 SUSTAINABLE ENVIRONMENT

Goal 3.6.A. Appreciate, protect and enhance the natural environment to meet the community's needs today without compromising the ability of future generations to live and prosper.

Minimize the impacts of climate change.

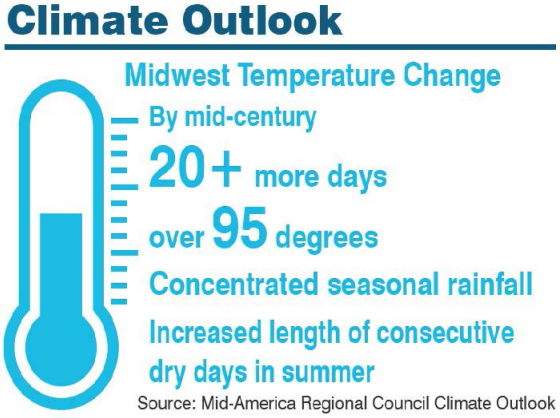
Context

Climate change refers to the long-term shift in global or regional climate patterns. Currently, our climate is changing due to human activities such as burning fossil fuels, natural gas, oil and coal that is increasing the level of greenhouse gases in the atmosphere. The impacts of climate change are causing an increase in global temperatures, sea levels, glaciers melting, and severe weather.

The Weather Channel's weather.com Climate Disruption Index report ranks Kansas City fifth in the list of 25 U.S. cities that will face the greatest challenges from climate change. According to the report, Kansas City will experience disruptions in the form of hotter temperatures due to the Urban Heat Island effect, extreme drought, and increased average rainfall. Heat islands can develop due to buildings, roads and a lack of open land or vegetation. However, more trees and parks, white roofs and alternative materials for urban infrastructure can help reduce the effects of urban heat islands.

Insight

Understanding and managing a changing climate is necessary to a safe and sustainable community. There are numerous related-planning initiatives including:



Metro KC Climate Action Plan (2020)	KC Climate Action Playbook (2019)
Will support an inventory of greenhouse gas emissions in the Kansas City region and help coalition members formulate Metro KC Climate Action Plan.	Builds on locally demonstrated successes and contains additional climate solutions that can be implemented by cities, cities, counties and school districts.

Trends & Foresight

Increased frequency of extreme weather events threatens infrastructure, human safety, biodiversity, water supply and economic viability. Climate change impacts are shown to affect vulnerable populations typically disproportionally. Parallel to changing weather patterns are changing energy use patterns.

By the end of the century, the Kansas City metro area could see an increase of 8-19% in electricity demand (with a 1-in-20 chance of an increase over 23%), even when combined with lower heating demand as winters become warmer. This translates into a likely increase of 14%-38% in energy costs, the highest energy cost increase of any Midwest metro area. Energy increases may lead to the degradation of local air quality and adversely impact human health.

Protect air quality.

Context

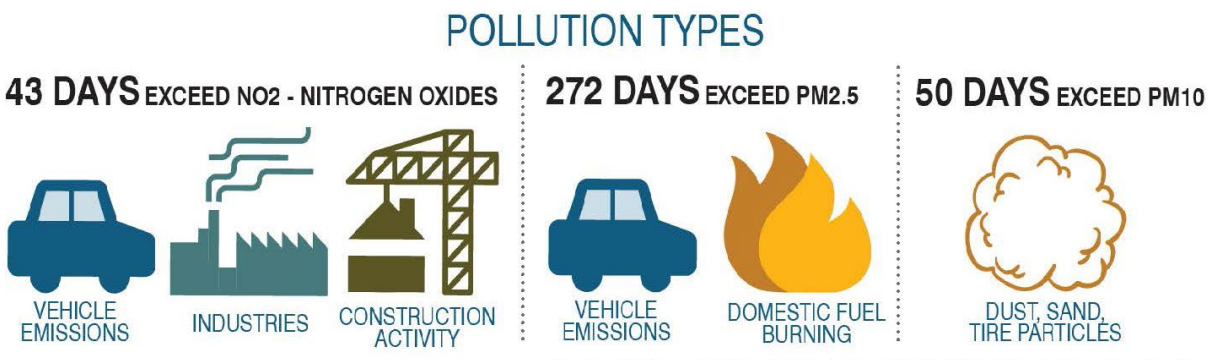
Managing air quality in the Kansas City Region is important to the health of residents, the economy and the environment. Federal and State regulatory agencies set how much of each type of air pollutant is allowed in the air based upon human health impacts and environmental studies. Air monitors are in each region to measure the concentration of pollutants in the air.

What is polluting the air?

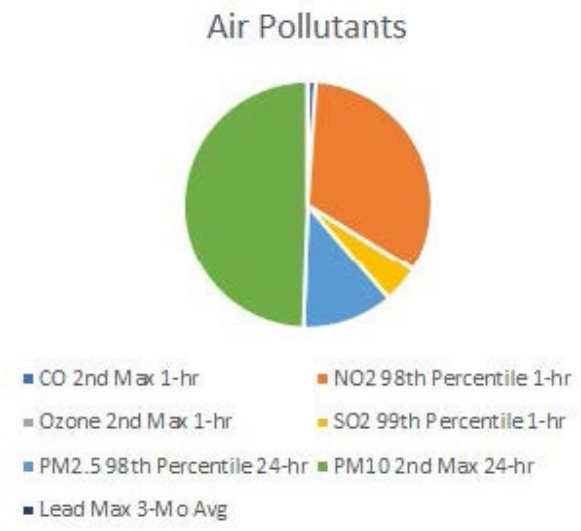
Air pollution comes from many different sources including natural, area, stationary, and mobile sources. Some sources are natural such as windblown dust and smoke from wildfires. Other sources are human-made such as emissions from automobiles, factories, power plants, construction equipment, small businesses and open burning. These air pollutants can be solids, liquids, or gases and are found all over the United States. Air pollutants include particulate matter, carbon monoxide, ground-level ozone, sulfur oxides, nitrogen dioxides and lead. These pollutants can harm human health, animal health, the environment, and infrastructure. Of these six criteria pollutants, particulate matter and ground-level ozone are the most widespread health threats. In Lee's Summit, particulate matter is the highest source of pollutants.

Source:
http://www.usa.com/lees-summit-mo-air-quality.htm

Particulate Matter (PM) or Particle Pollution includes smoke, soot, dust and dirt particles. Particulate matter is an airborne mixture of liquid droplets and solid particles made up of organic chemicals, metals, acids or dust particles. There are two groups of PM that matter the most since they can be easily inhaled. PM10 are particulate matter smaller than 10 micrometers and are frequently found near roadways and dust-

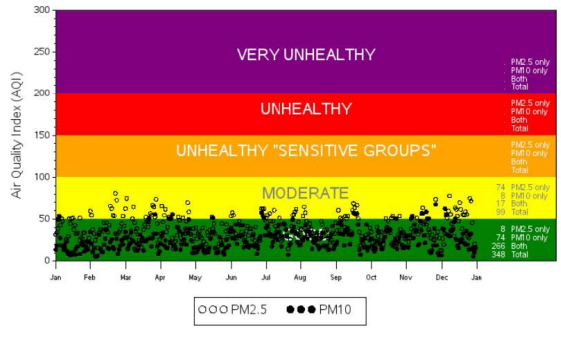


Source: Environmental Protection Agency (EPA), 2019 AQI - Jackson County, Mo



creating industries. PM2.5 are 2.5 micrometers and smaller. PM2.5 hangs in smoke coming from burning oil, coal, wood or residential waste; smog, haze, and vehicle exhaust. In addition to size distinction, these smaller particles may have a different chemical composition than larger particles.

Ground-level ozone is a pollutant that forms when emissions from human-made sources such as cars, lawnmowers and industry react with heat and sunlight. Ground-level ozone is invisible, so high concentrations can occur even when the air appears clear. For health reasons, the U.S. Environmental Protection Agency (EPA) sets a limit on how much ozone our air can contain. Areas that do not meet these standards must develop and carry out plans to reduce the amount of ground-level ozone in their air, which often means reducing emissions. The current national standard for ground-level ozone is not to exceed 75 parts per billion (ppb) over an average 8-hour period.

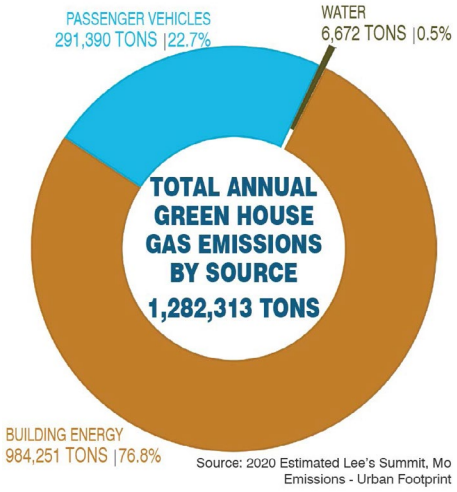


Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: March 9, 2020

Greenhouse gases are substances that absorb the sun's UV rays and reemit them as infrared rays. The resulting infrared heat is trapped in the atmosphere and causes a warming effect like the glass in a greenhouse or a parked automobile. The most prevalent greenhouse gases are water vapor, carbon dioxide (CO_2) and methane. In one regard, this heat-trapping is responsible for moderating global temperatures and making the earth's surface habitable. However, in high concentrations, these gases exacerbate climate impacts. The EPA recently began regulating greenhouse gas emissions under the Clean Air Act.

Insight

Air quality is not a major concern in Lee's Summit, but a growing population is likely to increase emissions. For years, Greater Kansas City has been at risk of violating the EPA's ozone standard though the trend is generally improving. In addition to public health impacts, a designation of noncompliance with the ozone standard would trigger increased regulations that could harm the regional economy. Increased regulations could limit the types of businesses able to move into the region or place restrictions on existing businesses.



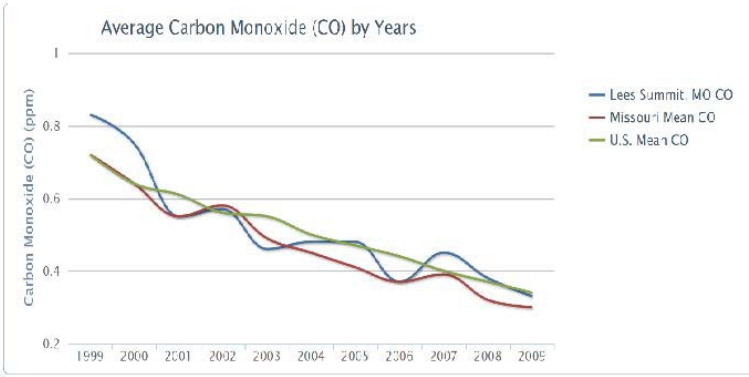
Source: 2020 Estimated Lee's Summit, Mo Emissions - Urban Footprint

Air quality is measured using an index developed by EPA's Air Quality Index (AQI) which tracks ground-level ozone and particle pollution. The graphic shows the mean Air Quality Index for the Kansas City Region for the years 1999 to 2009, compared to both the Missouri and U.S. mean for the same timeframe. "Good" air days are in the 0-50 range on the chart. The lower the number, the better the air quality. As AQI increases, a greater percentage of the population will experience severe health effects. The Kansas City Region Average AQI generally follows the Missouri average and the U.S. mean.

Trends & Foresight

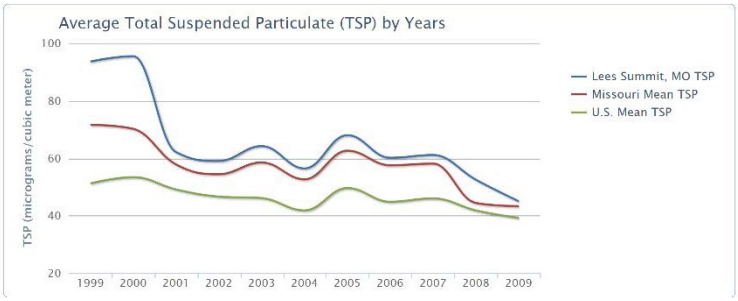
As the region grows, meeting air quality standards will become more challenging. Air quality regulations change frequently, often with new federal administrations. As discussed in Objective 6.A.1 climate change will bring hotter weather, increasing the challenge to meet air quality standards in the summer months. In the event the region goes into nonattainment of Air Quality Standards, there could be serious economic impacts as well as increased public health impacts. While business and industry contribute to poor air quality, more than half of all ozone pollution comes from emissions caused by day-to-day activities like driving, mowing, fueling vehicles. Therefore, the whole community must partake in reducing emissions. Communities can promote healthy air quality by planting urban vegetation to reduce temperatures, air pollutants, and emissions in the atmosphere.

Carbon Monoxide (CO)



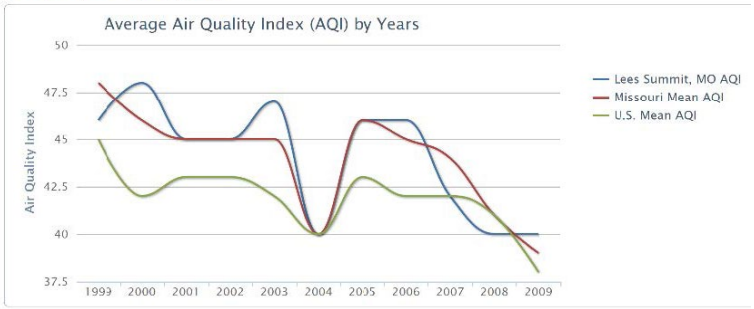
Total Suspended Particulate (TSP)

Tiny airborne particles or aerosols that are less than 100 micrometers are collectively referred to as total suspended particulate matter (TSP).



Air Quality Index Lee's Summit Missouri Mean vs. Missouri and US Mean, 1999- 2009.

Air Quality Index (AQI), #439



Air quality indices (AQI) are numbers used by government agencies to characterize the quality of the air at a given location. As the AQI increases, an increasingly large percentage of the population is likely to experience increasingly severe adverse health effects. Air quality index values are divided into ranges, and each range is assigned a descriptor and a color code. Standardized public health advisories are associated with each AQI range. The United States Environmental Protection Agency (EPA) uses the following AQI

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
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

http://www.usa.com/lees-summit-mo-air-quality.htm

Protect water quality.

Context

Our region's water resources are a tremendous asset for residents and a draw for tourists who desire clear and clean lakes for recreation. Protecting water quality is essential for drinking water, commercial uses, recreation (boating, fishing, hiking, wading), economic stability and growth, and quality of life. The Missouri Department of Natural Resources (MDNR) establishes which waterways are protected, the beneficial uses of each waterway and the corresponding water quality criteria to protect those uses. Water quality is particularly important to the environmental and economic health of Lee's Summit and the surrounding communities. Longview Lake, Prairie Lake, and Jacomo Lake, just outside of the city, are the important lakes used for recreation, tourism, and wildlife.

Watersheds

Lee's Summit is located at the top of the Little Blue River and Big creek watersheds. The north, west and southwest portions of Lee's Summit drain into the Little Blue River watershed. Watersheds are more than drainage areas, they not only support plants and animals but provide recreation opportunities. The protection of watersheds is essential to a healthy ecosystem.

Groundwater

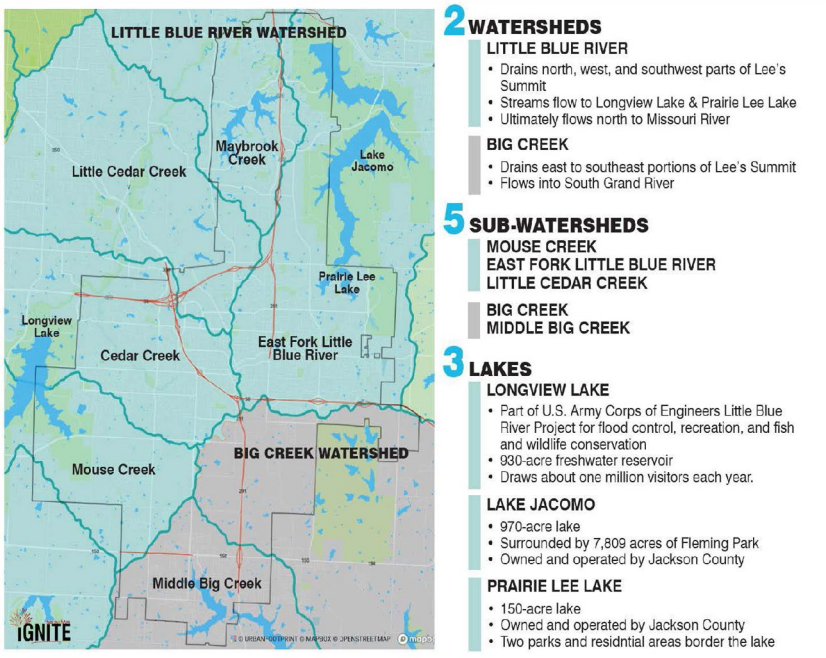
Potable groundwater in the West-Central Missouri groundwater province is typically difficult to obtain and is impractical to develop a suitable groundwater source in Lee's Summit. This province contains about 0.24 percent of the state's resources.

What is the quality of our water resources?

Any body of water may reasonably be expected to contain some contaminants. The types of contaminants depend on many factors and can originate from a wide range of sources; point discharges from industrial land uses and wastewater treatment facilities and non-point sources such as natural stream erosion, recreational activities on or near the water, failing septic systems, leaky sewer pipes and stormwater runoff from urbanization and agricultural land uses. Contaminants can also include, bacteria, nutrients (nitrogen and phosphorous), toxins, increased sediment, trash and bank erosion.

Water quality is measured by a set of criteria established under the Clean Water Act (CWA) regulations, which are enforced by the state of Missouri. The state's water quality criteria established by the Missouri Department of Natural Resources (MDNR) includes chemical, physical, and biological properties that are necessary to protect the beneficial uses of a water body. Waterways not meeting the water quality criteria are deemed 'impaired' by MDNR. Big Creek is the only stream within Lee's Summit on the impaired waters list of MDNR.

Water Resources



Insight

The City Lee's Summit's water quality management is regulated through its National Pollutant Discharge Elimination System (NPDES) MS4 permit issued by MDNR. As a requirement of that permit, the City developed a Stormwater Management Plan that addresses potential water quality concerns within the City because of both City operations and private activities. Currently, the City is not experiencing any significant water quality issues, though sediment is an ongoing concern.

Imparied Water Bodies

WATER BODY	YEAR	SIZE	IMPAIRED WATER USE	POLLUTANT	SOURCE	TMDL PRIORITY; SCHEDULE
LONGVIEW LAKE	2002	953 ACRES	HUMAN HEALTH PROTECTION	MERCURY IN FISH	ATMOSPHERIC DEPOSITION	LOW; > 10 YEARS
RAINTREE LAKE	2020 (PROPOSED)	248 ACRES	PROTECTION OF WARM WATER AQUATIC LIFE	CHLOROPHYLL A	NONPOINT SOURCE	LOW; > 10 YEARS
JOHN KNOX LAKE	2016	3 ACRES	HUMAN HEALTH PROTECTION	MERCURY IN FISH	ATMOSPHERIC DEPOSITION	LOW; > 10 YEARS
LITTLE BLUE RIVER	2018	35 MILES	SECONDARY CONTACT RECREATION	E. COLI	URBAN RUNOFF/ STORM SEWERS	HIGH; 2004

Big Creek was assigned a Total Maximum Daily Load (TMDL) of pollutants by the MDNR who ruled in 2017 that "No Additional Controls Demonstration" was needed.

Exotic zebra mussels are invasive in lakes, rivers, and streams

Source: Missouri Department of Natrual Resources

Trends & Foresight

Lee's Summit faces several water quality challenges including continued development and management options. As Lee's Summit continues to grow, the development will increase causing the increase of impervious surfaces and a corresponding increase in the quantity of stormwater runoff to receiving waterways. Further, construction can also negatively impact water quality. When construction sites are poorly managed or lack well-maintained erosion controls, litter and sediment from the site can be washed away by rain, clogging storm inlets and polluting waterways. Compounding the matter, climate change is projected to increase the intensity and frequency of storms, exacerbating the impacts of stormwater runoff and increasing the amount of toxic blue-green algal blooms in our lakes.

Stormwater quantity controls and water quality facilities, such as retention facilities, detention ponds, wetlands, rain gardens, and bioswales, can reduce the impacts of stormwater runoff quantities and water quality. However, long-term maintenance is challenging given resource constraints and siting of some on private property, thus reducing their effectiveness to reduce pollutants. A Stormwater Master Plan is underway. The absence of a city stormwater utility to guide the long-term system, maintenance, and improvements, including water quality facilities, creates a continuous challenge for stormwater management and overall water quality. Additionally, the city may seek to increase regional participation in water quality management efforts as many waterways overlap or adjacent to neighboring jurisdictions.

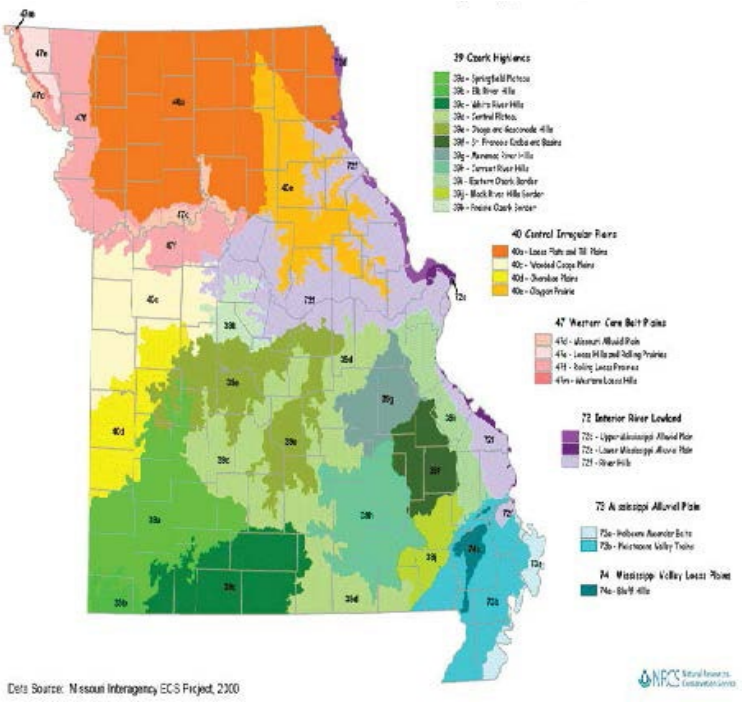
Preserve natural resources.

Context

The preservation and management of natural resources are closely tied to all aspects of a community's environmental, social and economic wellbeing. Located in west-central Missouri, the Kansas City Region enjoys a diversity of natural resources due to Missouri's location in the center of the continental United States, two major river systems (Mississippi and Missouri), and geologic history with inland seas and glaciers. The state is divided into four major ecological regions which denote areas of general similarity in ecosystems and the type, quality, and quantity of environmental resources. Lee's Summit is in the Osage Plains ecoregion. Missouri's ecoregions are depicted on this map.

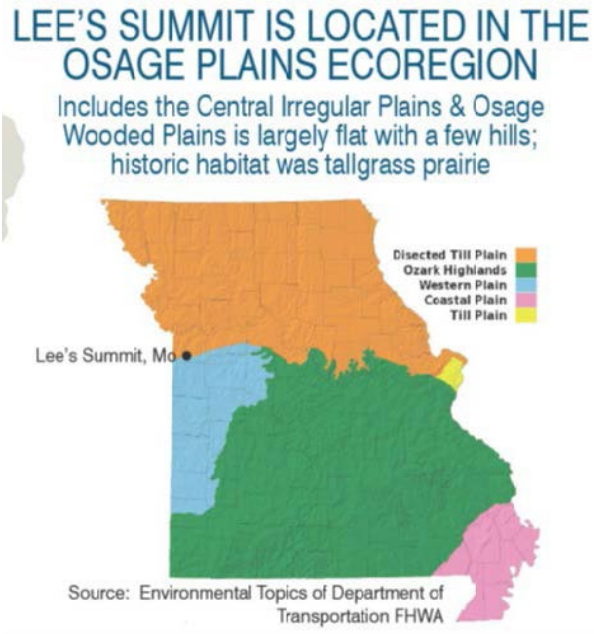
The U.S. Environmental Protection Agency (EPA) and U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) further divides Missouri's ecological regions, placing Lee's Summit in the Central Irregular Plains, Osage Wooded Plains.

Level III and IV USEPA Ecoregions
US Environmental Protection Agency (USEPA)



Lakes and Streams

The streams, lakes and riparian corridors are a natural resource asset for the Lee's Summit community providing habitat for wildlife (plants and animals) and economic benefit. The City's Design Construction Manual (DCM) includes provisions for stream buffers along streams with a drainage area larger than 40 acres. The stream buffer requirement is a valuable tool to protect this resource. Waivers to this requirement are rarely given for development projects.



Forest/Woodland Resources

The woodland resources in Lee's Summit are found primarily in the suburban tree canopy of residential neighborhoods, parks, and riparian corridors of streams and lakes.

Tree cover in Lee's Summit is approximately 13,683 acres or 33% of city area. Lee's Summit actively pursues TRIM grants through the Missouri Department of Natural Resources to support its tree preservation and management efforts and was awarded a TRIM 2018 to complete a tree inventory. With this grant, the City recorded the location, health, size and species of 2,000 trees located in maintained areas within Lee's Summit parks. The inventory was completed in April 2019 and will support the City's efforts to improve tree management within its parks system. Lee's Summit has also invested in pollinator habitats with wildflower and native species plantings throughout the community and parks. These activities are supported in the Parks Master Plan and Ignite! Strategic Plan.

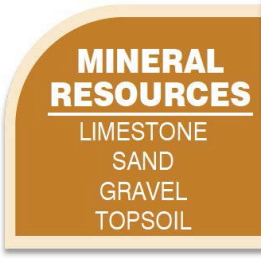
Wildlife Resources

Biodiversity in plant and animal life is a measure of healthy habitats and ecosystems. The Missouri Department of Conservation (MDC) works with communities and property owners, educating and advising on state Species of Concern, Threatened and Endangered species regulated by U.S. Fish & Wildlife and invasive and exotic species causing habitat damage. Habitat values are important since the Kansas City metropolitan region is part of the Midwest flyway for migratory songbirds (e.g., orioles and warblers) and monarch butterflies. The streams, lakes and riparian corridors support woodlands, wetlands and other habitats needed by these species.

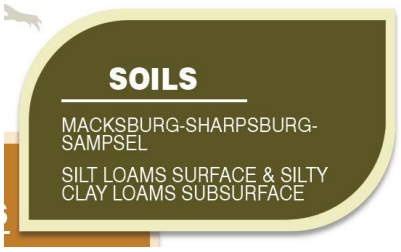
Farmland Resources

Current open spaces or undeveloped land is either designated park space or used for agriculture. The historic grasslands of the Lee's Summit area make the land valuable for agriculture, pasture and hay production. Agriculture makes up 242 acres (0.65%) of the City's land use.

Lee's Summit soil is identified as the Macksburg-Sharpsburg-Sampsel association. The soils are used for cultivated crops such as corn, soybeans, grain sorghum, and wheat. Erosion and wetness are the main agriculture hazards.



The current land use map for Lee's Summit does not include areas for farming and agriculture. Areas of the city used for agriculture purposes are identified for future development or parks and recreation facilities.



Insight

The State of Missouri is home to more than 400 species of native bees including the bumblebee, carpenter, sweat, and leafcutter bees. Over the past couple of years, in alignment with the national trend, the bee population has declined likely due to the use of harmful insecticides and certain beekeeping practices. According to the USDA, bees are responsible for pollinating nearly 75% of all fruits, nuts and vegetables grown in the United States. Fortunately, planting more vegetation, like colorful native plants, can attract more bees and increase the bee population. It is essential to maintain a healthy bee population to sustain vegetation, food production, and many flora species.

Trends & Foresight

Climate change has the potential to stress the natural resources within Lee's Summit but also provides opportunities to temper local impacts. As our climate warms, plant and animal species native to regions south of Missouri will migrate north. The presence of armadillos in southern and central Missouri is a prime example. Plant species intolerable of cold winters will be able to survive in Lee's Summit, both native plants and imported exotic species.

Trees and native vegetation are important resources as climate shifts. Not only can vegetation regulate temperatures and urban heat island effects, but it also promotes biodiversity in flora and fauna. Vegetation also captures and stores carbon dioxide, reducing emission impacts.

The map at the end shows Lee's Summit Natural Resources

Reduce resource consumption & increase waste diversion.

Context

Lee's Summit closed its landfill in February 2016. Before the closure, the revenue from the City's landfill funded diversion and recycling programs and the cost of the transfer station. Because of its closure, there are little funds left to finance diversion and recycling programs. Currently, 10 haulers provide trash service and recycling services in Lee's Summit. Residents are responsible for choosing a trash collector and scheduling pick up times. Residents are also responsible for dropping off Household Hazardous Waste (HHW), certain recyclable materials, and yard waste at the Resource Recovery Park.

The City recognizes having many different trash collectors can create additional wear on streets and adversely impacts air quality and is considering streamlining residential trash service. The Mid America Regional Council (MARC) lead an initiative to create a public landfill to serve the southeast metro region but it was not successful. The City is currently looking into other options for a private business to build and operate a new transfer station within or closer to the city. Lee's Summit is considering converting the former landfill site into park space; however, this is in the early planning and research stage.

In efforts to increase waste diversion, the City hosts a diversion and recycling event once a year. RecycleFEST is a free community-wide event providing Lee's Summit residents an opportunity to properly dispose of a variety of materials, including those that would otherwise be difficult to recycle.

Insight

Reducing the consumption of materials such as single-use products and increasing the diversion of waste to recycling and composting can significantly reduce greenhouse gas emissions in the air and reduce the strain on landfills. Over the past couple of years, participation in recycling and composting programs have increased and more materials are properly being disposed of that would otherwise end up in a landfill. However, due to the increase of recyclable materials, many recycling facilities are running out of space and have resorted to transporting recyclable materials to landfills. Many countries like China, who used to accept recyclable materials from the United States, have recently banned such actions, creating difficulties for recycling facilities and waste management programs.

Trends & Foresight

The emissions from landfills are exacerbating the levels of greenhouse gas emissions in our atmosphere and therefore accelerating the impacts of climate change. On average, each person in the United States produces over 1,500 pounds of waste per year. The EPA reports that most of the landfill waste comes from food waste that could have been composted. Food waste that decomposes in landfills produces high levels of methane due to anaerobic conditions while producing no methane gases while being composted. Without a coordinated approach to waste management and diversion, the City and residents face rising costs to haul away waste, which increases wear and tear on roads and contributes to air pollution.

Reduce land pollution.

Context

Land Pollution is the deterioration of the Earth's land surface. Human activities and the misuse of land whether directly or indirectly, polluting the land due to the improper use of the following five materials: chemicals, petroleum products, heavy metals, trash and litter, and wastewater.

Chemicals in Industrial and household waste includes many chemicals such as surfactants, lubricants, solvents, glues and acids and bases. These chemicals can be used in many households, including cleaning solutions and are often disposed of improperly. Petroleum products such as gasoline, diesel fuels, oil and lubricants can leak or spill in the environment due to accidents, mishandling or from our vehicles. Heavy metals, like lining on our car brakes, can tear down road surface and be transported through our waterways via stormwater runoff which can pollute our land. Trash and litter from businesses and households can litter our land, highways, cities, and country. The improper use and disposal of fertilizers and pesticides on agricultural land and failing septic tanks can result in the pollution of wastewater systems, soils, streams, lakes, and groundwater. The improper use or disposal of any of the five land pollution sources can pollute our land.

Historically, a variety of materials were used in manufacturing and products that later were found to be hazardous to human health and the environment. Asbestos-containing materials (fireproofing, insulation, roof and siding tiles, soundproofing) and lead based paint are two of the most common. Old dump sites were often selected based on topography in low areas or at old mining sites. These disposal sites were used before state and local regulations were in place, often resulting in leaching of chemicals and land contamination.

In Lee's Summit, industrial and household waste was disposed of in the same landfill. During this time, the City's landfill accepted domestic and industrial wastes from the region, and mixing wastes was standard practice. Currently, there are two active hazardous waste sites in Lee's Summit. One is an Underground Storage Tank (UST) removal and cleanup at Blue Parkway Used Car Dealership, 1029 S.W. Blue Parkway.

The second area of concern is the former Rock Island rail corridor, south parcel, where historically chemicals were used to keep vegetation out of the rail corridor. It is currently listed as a Brownfield site. A hike-bike trail is proposed in the abandoned corridor to connect the Katy Trail with the Kansas City region.

The former ATT facility in the industrial park, northeast corner of Highway 50 and Chipman Road, is a federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA superfund) site. It was remediated with the property's use limited to industrial purposes.

The Missouri Department of Natural Resources keeps a database of historic and active hazardous material sites. The Environmental Remediation Program at MDNR regulates hazardous material sites and oversees their cleanup. https://dnr.mo.gov/ESTART/

Insight

Environmental protection and economic development are often seen as opposite goals in communities, but they go together as the management of all our natural resources are interconnected. Quality of life is associated with clean air, water, and land as well as recreational and open spaces because people want to live, work, and play in communities that have a balance of natural and human amenities. Reducing and mitigating land pollution improves our communities.

Trends & Foresight

Through many environmental movements, more people are understanding the impacts of land pollution on our Earth and are practicing better behaviors to mitigate or reduce land pollution and its impacts. However, we still face many challenges in improving current practices. Identifying the pollutants, locations and sources of land contamination can be a long and extensive process, sometimes taking several years. Finding new landfills and hazardous waste facilities are especially difficult to site and permit because of local opposition ("Not in My Backyard"). Shipping waste to other communities or disposal facilities is expensive and generally adds to the cost of environmentally sound waste disposal. Finally, identifying solutions to land pollution requires communication and coordination from the whole community, including support from local, state, and federal government.

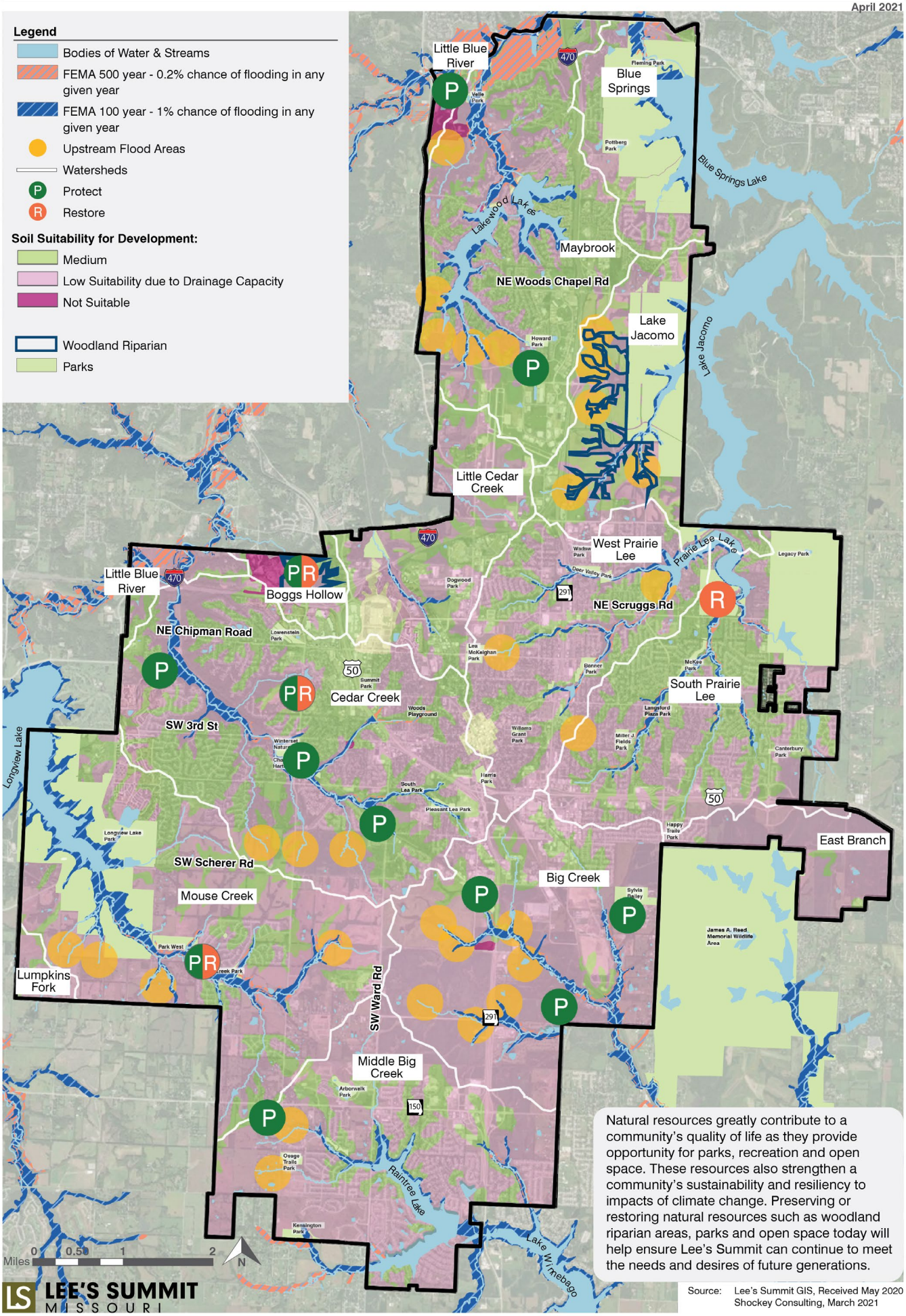
In Lee's Summit, the City hosts several community-wide events each year to mitigate impacts of littering and illegal dumping, including its Stream Team, Storm Drain Stenciling, Adopt-a-Street, and Adopt-a-Stream events. Some properties with soil contamination were remediated by the responsible party. The remediated properties have been repurposed. Properties of concern remain in the older industrial districts and former mining areas.

Lakewood Lake

Fuel Our Future
IGNITE
comprehensive plan

Natural Resources

April 2021



Natural resources greatly contribute to a community's quality of life as they provide opportunity for parks, recreation and open space. These resources also strengthen a community's sustainability and resiliency to impacts of climate change. Preserving or restoring natural resources such as woodland riparian areas, parks and open space today will help ensure Lee's Summit can continue to meet the needs and desires of future generations.

LEE'S SUMMIT
MISSOURI

Source: Lee's Summit GIS, Received May 2020
Shockey Consulting, March 2021