



environment

Chapter Overview

The City of Bloomington has a long-held commitment to environmental protection. The City has often been a leading voice within small cities nationally to implement measures that improve the quality of life through a healthier environment. This chapter contains goals, policies, and programs that are informed by the Vision and Goal Statement. This chapter introduces subsections that express Bloomington’s long-term commitment to the environment. The Environment Chapter highlights; "Think Globally, Act Locally", Solid Waste, Water, Air and Emissions, Energy and Natural Resources, subsections, which are introduced below:

Think Globally, Act Locally | The City of Bloomington has been at the forefront the environmental movement locally, and its status as a cultural and education center means that focus has global implications. This subsection defines the holistic approach towards thinking globally and acting locally that the City of Bloomington leadership embraces with every land use and development decision.

Solid Waste | Bloomington has invested heavily in recycling and solid waste recovery programs to minimize solid waste entering landfills. This subsection defines

current efforts and places emphasis on the importance of continued investment in systems to reduce reliance on landfills.

Water | Bloomington is known as the gateway to “Scenic Southern Indiana” and as such, protecting downstream habitats are of principal importance to the community. This subsection illustrates storm water and agricultural runoff implications to reservoirs, natural areas, and Karst topography.

Green Building | Bloomington has over 80,000 residents and has a strong and diverse construction market focused on the development of new sites and redevelopment of previously developed sites. This subsection summarizes efforts to reduce waste and improve the efficiency of the built environment.

Air and Emissions | Clean air is a natural resource we tend to take for granted. Many air pollutants are not visible, have no odor, or immediately detectable impacts. Significant impacts by greenhouse gas emissions from burning fossil fuels result in trapping heat and making the planet warmer. Electricity, transportation, and land uses are leading economic sectors that are primary sources of greenhouse emissions. This subsection supports efforts



by the City of Bloomington to reduce greenhouse gas emissions and protect clean air.

Energy | The City of Bloomington supports solutions to implement a higher percentage of renewable energy sources to provide affordable alternatives to fossil fuel use and combat climate change at a local level. This subsection supports efforts by the city to be a responsible consumer of energy resources, minimize the use of non-renewable energy, and become a leader in continuing to support innovation to mitigate the severity of climate change.

Natural Resources | Bloomington is situated on some of the most diverse geography in the Midwest and has sustained industry as a limestone producer because of that geography. This subsection is focused on protection of natural areas and wildlife corridors, promote a renewed connection to natural systems through food systems and recreation.

This chapter also includes Goals, Policies, and Programs that are implementation based and focus on creating quantifiable outcomes. Outcomes and indicators are tailored to track effectiveness and Goals, Policies and Programs with measurable results.

Think Globally, Act Locally

Bloomington has a reputation for being an environmentally-

friendly and naturally beautiful place. As a community, it's been on the forefront of the environmental movement in Indiana. Since 1971, the City of Bloomington Environmental Commission has advised the City on how its actions and policies may preserve and enhance the quality of Bloomington's environment. In 2005, the addition of the Bloomington Commission on Sustainability helped further economic development, environmental health, and social equity for present and future generations. As a community, Bloomington protects environmentally sensitive areas from development activities and strive to preserve economically sensitive areas in perpetuity. In 2009, the City acquired 58 acres, known as the "Switchyard" with the intent of restoring natural systems and creating a large community park. As a city, Bloomington supports infill redevelopment to minimize sprawl while promoting walkable neighborhoods. These are just a few of Bloomington's initiatives to protect the environment holistically. Natural resources, urbanization, food water and energy are topic areas that offer plenty of opportunities to improve upon locally by minimizing our impacts.

Solid Waste

A byproduct of modern life is the large amount of waste generated in the form of solid, liquid, or gas. The EPA annually reported in 2012 that the average amount of trash each person generates per day was 4.38 pounds,

which was up from 2.68 in 1960, however, recycling is also respectively up from 6.4% to 34.5% over the same time period. While recycling diverts some items from the waste stream, recycling is an energy-intensive process and only addresses part of the problem. Furthermore, the vast majority of apartment residents, businesses, and industries do not prioritize recycling or have recycling services readily available. Efforts by the Monroe County Solid Waste District continue to manage local solid waste and advocate for a local waste stream materials recovery systems or MRF. By taking this route, an MRF would capture recyclables without requiring sorting. Some communities have used MRF's to additionally utilize waste for energy production and composting, like Recology in San Francisco. The San Francisco Bay Area set a goal of zero waste by 2020 and Recology is fundamental in reaching that goal. The old adage "reduce, reuse, recycle" still offers plenty of viable ways to lessen our impacts through best solid waste management.

Water

Water sustains our existence, but it often is unseen and unnoticed. Flowing underground or in streams, it can be easy to forget the interconnectedness of the water system as it moves from culverts back underground again – especially with Bloomington's significant geologically sensitive Karst geology; limestone bedrock. As one of our most precious natural resources, we need to be more cognizant of how water flows through and fits into our urban ecosystem. The City will continue to look more aggressively at opportunities to reduce, reuse, and recycle water. The City of Bloomington Utilities (CBU) is responsible for managing storm water runoff within Bloomington. Both urban and agricultural runoff have a significant impact on water quality. These range from flooding to non-point waste generators that lead to increases in soil loss or stream turbidity, thermal heat gain in lakes and streams, and leaches in runoff that can pose serious concerns for managing storm water. The CBU will expand its efforts to implement best management practices regarding stormwater such as; restoring wetlands, utilizing rain gardens and using green infrastructure to minimize water quality impacts.

Air & Emissions

Clean air is another natural resource we tend to take for

granted. Many air pollutants are not visible, have no odor, or immediately detectable impacts. Fortunately, indoor air quality has improved tremendously with actions such as bans on smoking. The overall success of the Clean Air Act also may be to blame for our complacency regarding clean air. Since the Act's adoption, the national emission of ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead have dropped an average of 72% while gross domestic product grew by 219 %. The EPA continue to revise emission standards aimed to protect health, but pollution levels in many locations exceed at least one air quality standard for these six pollutants. Bloomington has one air monitoring site for particulate matter managed by the Indiana Department of Natural Resources. For particulate matter, Bloomington seems to be in the permissible range, but for the other five emission categories, there are no monitoring stations or information.

Green Building

The location, manner, and materials that are used to construct the built environment present existing opportunities to reduce Bloomington's waste stream footprint. Nationally, Leadership in Energy Efficiency and Design (LEED) building standards have changed the way building systems function by measuring performance on multiple facets – including waste. Today, some innovative projects working under a "Living Building" framework are using decentralized water systems that capture rainwater and reuse both gray and black water for many purposes. Current standards, codes, and regulations favor the status quo. Bloomington needs to be proactive regarding asking more of building architects and landscape architects especially regarding reducing water runoff and requiring at minimum reuse of gray water on landscape features.

Energy

Bloomington's on-going commitment to mitigate the impacts of climate change is clear. It is also clear that the community desires a multifaceted approach in order to find implementable solutions. Bloomington relies heavily on non-renewable energy sources; coal, natural gas, and other non-renewable sources. Although energy use data is currently limited on the municipal level, what is available reveals that Bloomington relies almost exclusively on energy generated from coal and natural gas according to the 2009

Sustainability and Trends Assessment Report (STAR – new report with new data) by the Commission on Sustainability. According to the US Energy Information Administration’s 2013 energy estimates, Indiana was ranked eighth nationally using coal-fired electric power plants that provided 84% of the state’s net electricity. Southern Indiana Renewable Energy Network (SIREN), sees the potential for solar energy and promotes renewable energy in Southern Indiana.

Local examples of solar power are becoming more prevalent and are an optimistic trend. However, the wind, geothermal and other alternative energy sources are mostly small, low impact experiments. For example, Fairview Elementary School has a successful geothermal system in place. Additionally, policy concepts for district energy are outlined for the Downtown Certified Technology Park Master Plan. The foundation for a larger, commercial alternative energy project is taking shape where examples can be drawn from Indiana and around the nation to help lead the way. This plan aims to provide guidance and accelerate local efforts.

Natural Resources

According to the US Department of Agriculture, riparian corridors are used by over 70 percent of all terrestrial wildlife species during some part of their life cycle, including many threatened and endangered species. Corridors provide food and nesting, brooding, loafing, and protective cover for wildlife. They also afford wildlife relatively safe access to adjacent natural resources and serve as travel ways for species dispersal and migration. This is ever important as the natural landscape is increasingly fragmented with our man-made urban landscapes that are less suitable for all wildlife.

The challenge both locally and nationally is to minimize the fragmentation of what is left of natural habitats; additionally, we can look for opportunities to create more connected habitats with green spaces, greenways, and riparian buffers. Habitat fragmentation refers to human activities and development that make it impossible for animals to travel freely within or beyond protected areas. Habitat fragmentation threatens the existence of many species and accelerates the loss of genetic diversity. Separate, fragmented, islands of conserved land are often not as suitable for many species because of relatively small

interior habitat areas. Protecting existing and establishing new wildlife conservation corridors is a priority. This will help replenish our natural assets from our ecological systems and will someday re-balance our built environment.

As we reconnect to the natural systems that sustain us, interest in local food and urban agriculture has increased. We are what we eat, and the production of the plants and animals we eat has a large impact on the environment. Pesticides, soil nutrients, pollution, and the use of energy, water, and other resources for food production and distribution have major environmental implications. The sustainable and local food movements strive to address these challenges. Bloomington resident desire to know how their food was made and where it comes from so they can consider the impacts to our environment and their own well-being when selecting what they eat. The Bloomington Community Farmer’s Market, Bloomington Winters Farmer’s Market, Local Grower’s Guild, Bloomington Community Orchard, Mother Hubbard’s Cupboard, and Bloomington Food Policy Council are just a few of the many organizations that support local food access and availability in our community. One indicator of our green thumb ambitions is the number of people and merchants attending the Farmer’s Market on any given Saturday, which in 2013, boasted 6,904 visitors and 97 merchants. The City of Bloomington would like to ensure that community members have opportunities to produce, process, sell, purchase, and consume local foods of their choosing.

Residents continue to challenge Bloomington to become “greener,” focusing on innovative strategies to become more environmentally sustainable. In ImagineBloomington surveys and at workshops throughout the community, residents shared their hopes for tomorrow: that we reduce our reliance on coal, and that we reduce waste, to increase recycling and composting. How we use, reduce, reuse, and recycle our natural resources is fundamental to sustainable Bloomington and its natural resources.

Chapter 3 | Environment

Goals, Policies, and Programs

Goal 3.1 Preserve our open space, natural and urban habitats, and protect the ecosystems and natural resources that are the foundations of our environment.

 Policy 3.1.1: Support regional efforts to acquire, develop, operate, and maintain an open space system including land linkages and trail connections.

- Program: Seek additional sources of funding, including State and Federal programs, to finance open space acquisition, maintenance, and conservation.
- Program: Work with Indiana University and Monroe County to create multi-use trail connections between urban areas and open space including creeks and rights of way.

 Policy 3.1.2: Carefully manage access and use in environmentally sensitive areas to ensure that the habitat and sensitive wildlife is protected.

- Program: Develop an environmental management and sustainability plan that inventories assets and formally recommends changes to the UDO to create consistency.

 Policy 3.1.3: Protect sensitive plant and animal resources from the impacts of development.

 Policy 3.1.4: Pursue opportunities to enhance and expand habitat for endangered and rare species.

 Policy 3.1.5: Support native plant restoration and conservation efforts in and around parks and open spaces to encourage healthy, diverse ecosystems.

- Program: Work cooperatively with community partners to control invasive plants, install native plants and provide other native habitat features.

 Policy 3.1.6: Provide ongoing education for City staff, homeowners, contractors and developers regarding landscaping, tree maintenance practices and irrigation practices that protect the urban forest.

Goal 3.2 Conserve water resources and protect water quality to support our natural environment, public health and safety, plant and animal life, and the vitality of our diverse urban activities with special attention to protecting the Lake Monroe watershed.

 Policy 3.2.1: Reduce pollution in urban runoff from residential, commercial, industrial, municipal, and transportation land uses.

- Program: Work with regulatory agencies, environmental groups, affected businesses, and other stakeholders to identify economically viable Best Management Practices (BMPs) for reducing stormwater pollution. Participate in BMP pilot studies to identify new pollution control measures.
- Program: Continue public education programs on water quality issues, including BMPs for residents, businesses, contractors, and City employees.
- Program: Retain and utilize rainwater on site to the extent possible. Use native or simulated natural



drainage systems for buffers and filtration to the extent possible.

- Program: Prevent sanitary sewer overflows to ensure compliance with applicable state and federal requirements and to avoid pollution of surface or ground water.

-  Policy 3.2.2: Continue to limit the amount of impervious surface in new development or public improvement projects to reduce urban runoff into storm drains, creeks, and other watersheds.
 - Program: Promote the use and maintenance of permeable paving materials that allow for natural percolation and site drainage through a Stormwater Rebate Program or other incentives.

-  Policy 3.2.3: Improve storm drainage performance by constructing new system improvements where necessary and replacing undersized or otherwise inadequate lines with large lines or parallel lines.

-  Policy 3.2.4: Promote the inclusion of Low Impact Development (LID) measures such as rainwater harvesting and storm runoff infiltration in private developments and public improvement projects, when feasible, as required by the City's storm water discharge permit.

-  Policy 3.2.5: Explore the development of a City Sustainability Plan through Economic and Sustainability Department to address concerns on waste management, air quality, energy consumption, etc.

Goal 3.3 Protect life, ecosystems and property from natural and man-made hazards.

-  Policy 3.3.1: Expand citizen awareness of Karst and geologic hazards through public education and preparedness.
-  Policy 3.3.2: Minimize exposure to geologic hazards including slope instability, subsidence, and expansive soils.

- Program: Review and update as appropriate City code requirements for excavation, grading, and filling to ensure that they conform to currently accepted standards.

Chapter 3 | Environment

Outcomes & Indicators

3.1 Quality and function of habitat are enhanced

- Area of functional habitat
- Percent of nonfunctional habitat restored annually

3.2 Tree cover is enhanced

- Area of tree canopy expanded in City
- Number of native and non-native trees planted annually

3.3 Rainwater is sustainably managed

- Percent of rain events retained, infiltrated, and reused in the City
- Ratio of pervious to impervious surface in City
- Private development projects with sustainable stormwater reuse and infiltration designs

3.4 Water Quality is enhanced

- Annual water quality index scores for surface water and ground water
- Annual water quality index score for storm water runoff at point of reaching Waters of the United States

3.5 Potable water is used efficiently

- Gallons of water used daily per capita residential customers annually
- Gallons of water used daily per non-residential customers annually

3.6 Waste is diverted from landfills

- Percent of nonhazardous waste diverted from landfills annually
- Per capita overall waste generation rates

3.7 The residual value of organic wastes are captured

- Percent of organic waste diverted for energy recovery or composting

Profile

The Benefits of an Urban Forest

Trees can be very beneficial to a community, but their species, design, location, and maintenance must be carefully considered to ensure their health and vitality. For example, using continuous planting beds can be beneficial for the health of trees, and close attention should be paid to tree species and planting locations. Such benefits fall under several categories and are listed below.

Scale and Safety: Trees can bring the scale of an urban environment from an auto-oriented to a pedestrian-oriented scale. This can induce traffic calming, and make an environment more safe and attractive to pedestrians. Trees can also act as a buffer between vehicles and pedestrians to further insure pedestrian safety.

Reduced Temperatures: Trees in an urban environment can combat the effects of urban heat islands. An urban heat island is the result of solar radiation reflecting from the built environment and causing increased temperatures. Trees and other plants absorb these rays, rather than reflecting them, resulting in lower temperatures, as well as the added benefits of providing shade. Water evaporation occurring from trees and other plants can also cause lower temperatures.

Character and Beauty: Trees can be used to define a space physically, to create an identity and enhance the character of an area, to create buffers for sound, odor, and pollution, to create screens from undesirable views, and to add beauty through the addition of natural elements. Trees and other plants can also add color to an environment, soften harsh building lines, and some flowering trees can produce pleasant fragrances into an area.

Storm Water and Pollution: Trees in an urban setting can reduce stormwater collected by storm sewers. A tree's roots

provide extra channels into the ground so stormwater can be more easily absorbed into the ground water supply. Trees can also reduce air pollution through their natural processes, such as absorbing polluted air and through lowering air temperatures which can lower the harmful effects of some pollutants. This air pollution can be a result of businesses, automobiles, factories, and other sources.

Environment and Habitat: Trees located in an urban environment can reduce energy consumption by providing shade during the summer and blocking winds during the winter (and therefore creating less of a need for artificial heating and cooling). This also causes a reduction in the use of natural resources, such as fossil fuels, needed to produce electricity used for climate control, as well as the pollution created from converting fossil fuels into electricity. Plant and trees also provide habitats for urban wildlife, such as birds, squirrels, and other small animals.

Economy: Trees can have economic benefits as well. Trees are psychologically more attractive than a sterile built environment, and people are more likely to linger on a street with trees, and therefore a street that is more physically comfortable through shading, as well as psychologically attractive, than on a street without. This allows more opportunity for retail business sales, and a healthier economic environment. Trees can also increase the value of commercial (or residential) property, and can extend the life of paved surfaces. Direct sunlight and hot temperatures on paved surfaces can cause reactions of the oils used in road materials, causing road damage and requiring more frequent paving. The shade that trees provide can lower temperatures and reduce the frequency of repaving.



Case Study

Innovative Rain Water Management System

While Georgia Street demonstrates how a street can be designed to be easily transformed into a major event venue, the other exceptional design of Georgia Street is the rain water management system that is mostly unseen below ground. How does this innovative system work?

Step 1 Rain water enters the system through the boardwalk in the center of the street. The boardwalk allows rain water through while preventing large debris from entering the system.

Step 2 Once filtered through the boardwalk, rain water enters settlement settling fore bays that channel the water to irrigation water storage tanks. Once the irrigation tanks are full, the remaining rain water overflows into infiltration chambers residing directly below the boardwalk.

Step 3 The infiltration chambers have open bottoms that open directly into the City's highly pervious alluvial outwash bank run gravel subsoils. The alluvial subsoils accommodate a high rate of percolation and provide a final polishing of the rain water prior to arriving at the White River aquifer. A 12" deep replaceable sand filter resides on top of the native subsoils allowing for long term protection of the permeability of the native subsoils.

This innovative storm water design allows the City of Indianapolis to meet and exceed its Municipal Storm Water Permit requirements by capturing all storm water within the footprint of the street infrastructure system.

