



GNARLY TREE
SUSTAINABILITY
INSTITUTE

City of Bloomington Sustainability Action Plan Environmental Quality and Natural Systems Meeting Two

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SPEA

Lead for the Greater Good



#Bloomington200



Current Situation in Bloomington

NATURAL RESOURCES:

- A. **Soils:** Sensitive soils accounted for approximately 25% of Bloomington's overall land area. *Source: City of Bloomington Environmental Resource Inventory (2003)*
- B. **Wetlands:** Wetlands accounted for approximately 2% of Bloomington's overall land area, all the wetlands in Bloomington are freshwater wetlands. *Source: City of Bloomington Environmental Resource Inventory (2003)*
- C. **Floodplains and Water Resources:** Two major water bodies are Griffy Reservoir and Lake Wapehani; 2 main waterways are Jackson Creek and Clear Creek; There are 6 major drainage basins in Bloomington. The Indiana Department of Natural Resources has issued fish consumption advisories for Griffy Reservoir, Lake Wapehani and Clear Creek. *Sources: City of Bloomington Environmental Resource Inventory (2003); City of Bloomington Environmental Commission, Release remediation, inventory and recommendation Report (2011)*
- D. **Karst Geology and Topography:** Initial analysis revealed the highest concentration of features was found in the west and southwest portions of the City, followed by the south and southeast. Bloomington topography contains hillsides, gullies, and draws. Bloomington's landscape was created by soil erosion and bedrock weathering caused by water. *Source: City of Bloomington Environmental Resource Inventory (2003)*
- E. **Special Habitats:** Bloomington contains several special habitat areas. These include areas of recorded observations of 1 state endangered species (Bobcat), 1 state threatened species (Troglobitic Crayfish), 1 species of state special concern (Sharp-Shinned Hawk), and 2 natural communities of state-wide significance (Dry-Mesic Upland Forest and Mesic Upland Forest). Areas having these species and/or natural communities in Bloomington are managed locally as parks, nature preserves, and/or conservation areas. *Source: City of Bloomington Environmental Resource Inventory (2003)*



Biodiversity and Natural Ecosystems

WILDLIFE AND PLANTS:

- **Vegetative Cover:** Overall, 11% of Bloomington's land area is shrubland/grassland, 10% is sparsely wooded, and 22% is forested
Source: City of Bloomington Environmental Resource Inventory (2003)
- **Endangered, Threatened Species, and Species of Special Concern:** 60 species in Monroe County, Indiana
Source: Indiana DNR Report (2018)
- **Griffy Woods:** contains 565 terrestrial plant species, including 15 flora species identified as endangered, threatened or rare; nearly 160 bird species; almost 50 reptile and amphibian species; and over 100 small mammal species. *Source: Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*

HIGHLY SENSITIVE AREAS IN BLOOMINGTON:

- The highest sensitivity ratings areas are located in the vicinity of the Twin Lakes, Lake Wapehani, Clear Creek, Jackson Creek, University Lake, Griffy Reservoir, and Cascade Creek areas. Areas such as these provide unique habitats for wildlife as well as create corridors for wildlife migration. *Source: Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*

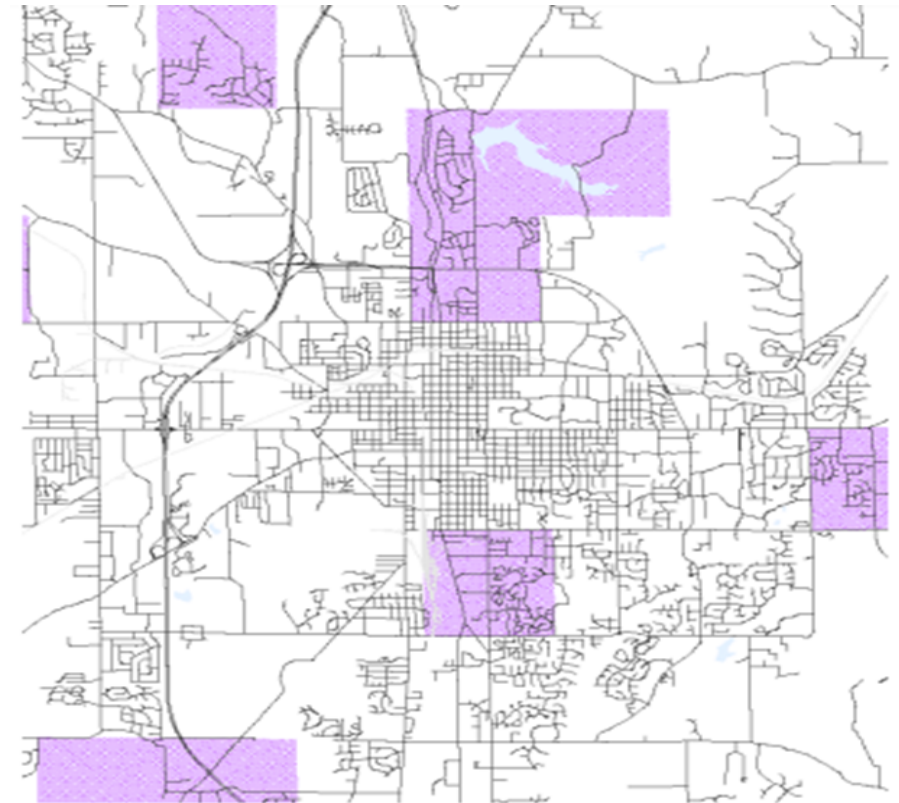


Figure 7. Map of special habitats in Bloomington and surrounding areas
The shaded areas above represent square mile buffers that contain special habitats observed in Bloomington. Overall, there were 5 different species and natural communities on 4 different state lists.



Current Situation in Bloomington

INVASIVE SPECIES:

- **TERRESTRIAL PLANTS:**
- At least 10 types of priority invasive plant species are identified in the city of Bloomington(.Source: MC-IRIS Report)
 - Asian Bush Honey Suckle, Japanese Honey Suckle, Burning Bush, Asian Bittersweet and the Purple Wintercreeper are still sold for landscaping in Indiana. *Source: Report from the Invasive Plant Advisory Committee to the Indiana Invasive Species Council (September 19, 2013)*
- **AQUATIC:** Griffy Lake has long been infested with invasive species such as Eurasian watermilfoil. A targeted treatment of invasive species has not occurred in the lake since 2009, and there is also a presence of Curly leaf pondweed.
 - Griffy Lake Aquatic Vegetation Management Plan 2017-2021 was prepared to identify invasive species and implement invasive species eradication programs. *Source: Griffy Lake Aquatic Vegetation Management Plan 2017-2021*
- **INVERTEBRATES:** 7 Species found: ex. Emerald ash borer, Japanese Beetle. *Source : IDNR report*

URBAN FOREST AND GREEN SPACES:

- Bloomington has maintained a Tree City USA designation since 1984.
- The 2007 inventory data reveals that Bloomington's street tree population totals 12,169 trees with an additional 4,083 planting sites available. *Source: Bloomington Street Tree Report (2007)*
- In 2012, there were 16,252 street trees in Bloomington, Indiana. *Source: IU Urban Forestry Inventory (2012)*
- In 2011 the total areas of green spaces was 6,438 acres (*Source: Green Space Trends Report 2007-2011*) of which 2273.32 acres consists of parks maintained by the City of Bloomington Parks and Recreation Department (*Source: Bloomington Parks and Recreation Department master plan 2016-2020*)



Current Situation in Bloomington

DEER MANAGEMENT :

- The Joint City of Bloomington and Monroe County Deer Management Task Force was established in 2010.
- Two areas of primary concern:
 - A) Griffy Woods: Introduction of an alternative stable state of the forest, affects the growth of herbaceous , regenerative capacity of the forest; the current Deer Capacity in Griffy woods is 13 times greater than the carrying capacity of the woods.
 - B) Neighborhood Deer: population doubles every 3 to 4 years. *Source: Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*
- Urban, Suburban and exurban Deer have survivability rates between 69%-87%. *Source : Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*
- The Deer harvest rate in Monroe County (2011) was 1,361. *Source : Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*
- In the year 2011 there were 40 deer-vehicle collisions in Bloomington, mostly on State road 46 by pass, near Lake Griffy, the State Road 46-State Road 446 intersection and near the Renwick development area. *Source : Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*
- At present, it is illegal to discharge a firearm within city limits, there is no prohibition on the discharge of a bow-and-arrow on private property. *Source: Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*



Metrics Recommended in ISO 37120 and STAR

	ISO 37120 (2014)	STAR (2016)
NATIVE SPECIES AND BIODIVERSITY	<ul style="list-style-type: none">Percentage change in number of native species (S.I)	NS-2 : maintain the urban ecosystem at levels that promotes biodiversity and manage or prevent invasive species <ol style="list-style-type: none">Threatened SpeciesHabitat conservation and connectivity.Invasive species management
GREEN AREA	<ul style="list-style-type: none">Green area(hectares) per 100,000 population. (C.I)The amount of green area, natural and semi-natural, parks and other open spaces are indicatorsAnnual number of trees planted per 100,000 population (S.I)	



Metrics Recommended in ISO 37120 and STAR

	ISO 37120 (2014)	STAR (2016)
NATURAL SYSTEMS		<p>NS-3: Protect, enhance and restore natural ecosystems and cultural landscapes to confer resilience and support clean water and air, food supply, and public safety.</p> <p>Identify all natural parkland and other natural resource areas for evaluation.</p> <ol style="list-style-type: none">1. Natural Resource Areas.2. Wetlands , Streams, Shoreline buffers.3. Connectivity.4. Restoration



Metrics Found in Bloomington Documents

INVASIVE SPECIES:

1. Identification of ten priority invasive species for removal. *Source: MC-IRIS Report (2011)*
2. 6 acres of invasive species removed from Bloomington rail trail in 2018. *Source: <https://indianapublicmedia.org/news/bloomington-rail-trail-closed-invasive-species-removal-143844/>*
3. 93 invasive plant species eradication events between June 2017 –December 4, 2017 have been undertaken by the Bloomington Parks and Recreation department along the city trails. *Source: <https://bloomington.in.gov/parks/trails/b-line-trail>*
4. Invasive species identification, mapping and eradication program in Dunn Woods, Latimer Woods in 2011 and 2012). *Source: MC-IRIS Report (2011)*
5. Removed 427 hazardous trees from city parks and streets. *Source: 2016 Annual Report City of Bloomington Indiana Parks and Recreation Department*
6. Treated 29 street trees (City owner) for Emerald Ash Borer. *Source: 2016 Annual Report City of Bloomington Indiana Parks and Recreation Department*
7. In 2016 22.3 acres of Griffy lake are infested with invasive species *Source: Griffy Lake Aquatic Vegetation Management Plan (2017) - <https://bloomington.in.gov/sites/default/files/2017-06/Griffy%20Lake%20Aquatic%20Vegetation%20Management%20Plan%20Feb%202017.pdf>*



Fig: Map of invasive species at Dunn Woods(source:<http://mc-iris.org/dunn-woods-project.html>)



Metrics Found in Bloomington Documents

HABITAT CREATION AND RESTORATION AND URBAN FORESTRY:

1. Allocated 65 acres under the Switchyard Plan to create natural habitat and corridors and include the restoration of clear creek. *Source: Bloomington Parks and Recreation Department master plan 2016-2020*
2. Since 1993, lost over 2,000 acres of green space(decrease of greenspace by 24%), between 2007-2011, regained 9 acres. *Source: Green space trends report 2007-2011*
3. Installed 2500+ pollinator gardens and native plants and at City Hall, Waldron, Hill and Buskirk Park, operations center, Kirkwood avenue and Peoples Park. *Source: 2016 Annual Report City of Bloomington Indiana Parks and Recreation Department*
4. Planted 583 trees in public areas. *Source: 2016 Annual Report City of Bloomington Indiana Parks and Recreation Department*
5. Total miles of trail in Bloomington : 35.39 miles. *Source: Bloomington Parks and Recreation Department master plan 2016-2020*

DEER MANAGEMENT:

1. Total number of vehicle-deer collisions: 40 in Bloomington Indian in 2011. *Source: Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*
2. 66 % of the respondents are concerned about vehicle –deer collision in Bloomington. *Source : Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*
3. 49.6 % of the survey response indicate a public perception of increase in the number of deer in the neighborhood areas in Bloomington. *Source : Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*



Community Goals found in Bloomington Documents

URBAN FOREST:

- Measure current tree canopy coverage in Bloomington and work to reach 40% coverage by 2020
- Use Urban forests to enhance habitat , protect and promote biodiversity and ensure food security. *Source: Urban Forestry Plan 2014-2019*

DEER MANAGEMENT:

- Recommendation for the creation of Urban Deer Zone in Bloomington Indiana similar to Urban Deer zones created in Marion County, Lake County. *Source : Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*
- Suggestion to establish “green-space hunting” in Bloomington. *Source: Joint City of Bloomington-Monroe County Deer Task Force Report (2012)*

INVASIVE SPECIES:

- Identify the presence of invasive plant species in Dunn Woods and the implementation of an invasive species eradication program. *Source: MC-IRIS report*
- Identify the presence of various aquatic invasive species under the Griffy Lake Aquatic Vegetation Management Plan 2017-2021. *Source: Griffy Lake Aquatic Vegetation Management Plan (2017)*
- Inform and educate residents about the presence of invasive species and initiate volunteer actions to control invasive species through programs like Adopt- an- ACRE Program. *Source: Bloomington Environmental Action Plan*
- Educating the resident on how to create habitats for native species e.g., “ Creating habitats for native pollinators: Mason Bees.” *Source: City of Bloomington, Environmental Commission information brochures (2012)*
- Formulation and Implementation of rules and ordinances that makes it unlawful to sell invasive species in Indiana; namely the Terrestrial Ban Rule (2018) *Source: <http://www.indianaeconomicdigest.net/main.asp?SectionID=31&SubSectionID=135&ArticleID=91352>*



Community Goals found in Bloomington Documents

BIODIVERSITY:

- Promote biodiversity by protecting, enhancing, and expanding native wildlife habitat areas by 2020. *Source: Bloomington Environmental Action Plan*
 1. Conserve habitat before, during, and after development;
 2. Prioritize the habitat potential and permanent habitat connectivity of an area when making land use decisions;
 3. Connect isolated areas of habitat by producing greenspace corridors;
 4. Enhance habitat quality in stable areas by planting native species and removing invasive;
 5. Inform Bloomington residents of the ecological benefits of habitat connectivity and encourage citizen involvement in habitat restoration
 6. Hire more employees to the Parks and Recreation Department to help control invasive species
 7. Provide educational resources to the residents about invasive species management
- Protect sensitive areas and conserve three identified high-quality habitat in Bloomington and Monroe county, namely-Griffy Lake, Clear Creek, and Jackson Creek. *Sources: Bloomington Habitat Connectivity Plan (2017); City of Bloomington Resource Inventory (2003)*
- Creating environmentally sustainable community. *Source: City of Bloomington Comprehensive Plan (2017)*



Metrics Used in Other Cities

- Percent of tree canopy cover (Ann-Arbor, Michigan)
- Number of trees planted (Iowa City, Iowa)
- Number of acres of land, open space and forest restored for habitat protection (Chicago, Illinois, Boulder County, Colorado)
- Number of riparian areas restored (Boulder County, Colorado)
- Number of invasive species ordinances enforced (Chicago, Illinois)
- Average length of trail 66.67 miles (Iowa City , Iowa, Bend, Oregon)



Actions Used in Other Cities

- Increase the preservation and protection of landmark/special trees on public and private lands. (*City of Ann-Arbor Sustainability Plan*)
- Develop, communicate, and follow an urban forest best management practices manual for use by city staff, partners, other entities, and the community. (*City of Ann-Arbor Sustainability Plan*)
- Develop a citywide public and private reforestation campaign/Engage nonprofits, corporations, individuals, institutions, and community organizations, to plant trees citywide. Raise media attention and encourage groups to achieve a set target, such as 10,000 trees per year. (*City of Saint-Louis Sustainability Plan*)
- Increase and protect habitat that is friendly to bird and other species (*Chicago Sustainable*)
- Enforce the terrestrial and aquatic invasive species ordinance and work with state and federal partners on regional coordination on prevention (*Chicago Sustainable*)
- Monarch Initiative: a variety of public events centered around Monarch education held throughout the year. The events provide community members with the tools to support Monarchs within their own neighborhoods. (*City of Iowa City Sustainability Plan*)
- Street tree inventory and tree planting program (*City of Iowa City Sustainability Plan*).



Actions Recommended in STAR

BIODIVERSITY AND INVASIVE SPECIES:

1. Create a plan for the management of local species that minimize damage from invasive species and enhance biodiversity.
2. Adopt or enforce an ordinance requiring control of listed priority invasive species or enact a preferred plant ordinance for private and public landscaping
3. Partner with state or federal agencies to monitor manage and report on status of threatened and I invasive species
4. Partner with local volunteer groups or neighborhoods associations to restore priority natural systems area by planting native plants and improving local wildlife habitat
5. Partner with local volunteer groups to monitor areas at greatest risk of invasion and remove invasive species
6. Inform residents and / or plant and animal sellers about the benefit of native species and the hazards of invasive species
7. Use incentive programs to encourage local businesses and private owners to grow and sell native plants and animals and not to sell invasive species.
8. Enforce regulations to control the use and sale of invasive species
9. Ensure the all local government-owned building use native and /or sustainable, site-appropriate species in landscaping
10. Take actions to prevent the spread of invasive species in priority natural systems areas, such as monitoring, eradication and other control programs.



Actions Recommended in STAR

NATURAL SYSTEMS:

1. Develop a plan to protect and restore natural resources through land conservation, corridor connectivity, and restoration of biological integrity and function.
2. Adopt land use regulations that establish appropriate wetland, stream, and shoreline buffer widths and adjacent land uses, creating buffers around sensitive ecosystems is a highly effective way of protecting these natural resources.
3. Create an advisory board to inform land conservation and restoration activities.
4. Partner with adjacent jurisdictions, state and federal agencies, and local or regional non-profit organizations to advance land conservation and restoration efforts.
5. Sponsor activities to increase ecological literacy and knowledge about natural resource protection.
6. Adopt land use strategies to incentivize permanent land conservation.
7. Implement local and market-based financing strategies to acquire land or development easements, or fund restoration and maintenance activities
8. Restore, maintain, and monitor conserved natural lands to increase natural resource resilience, adaptability, and biological integrity.



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Thank You

Questions and Answers