

## 5. Environmental Quality

Environmental quality is a primary concern of Polk County residents and businesses. Public comment during the comprehensive plan process, and in the land use forums of Polk County cities, routinely includes strong sentiment for maintaining and even enhancing the area's environmental quality. Federal and state regulation has, furthermore, recognized that many regional and even national environmental issues must be addressed at the local level in order to achieve a cost-effective and sustainable pattern of growth, resource protection, and healthy communities.

Environmental quality is, furthermore, now understood to be a critical component of economic development, quality of life, and health and safety. Private investment gravitates to high-quality and desirable environmental areas. Functioning natural systems protect private investment, as can be seen in places where wetlands and floodplains still provide buffers and water storage during large storm events. Housing developments with access to trail systems and parks command higher prices and increase in value more rapidly than areas without such access. The interconnected nature of these plan elements is reflected in the concept of sustainability; development that is sustainable over the long term will enhance the County's economic, environmental, and social assets.

Environmental quality is therefore a critical concern for the Polk County Comprehensive Plan. The Plan integrates environmental quality into the land use, economic, and social vision by identifying, protecting, and enhancing the County's "green infrastructure."

### Green Infrastructure

Creating a sustainable plan for encouraging and directing development requires that the community first identify and plan for its "green infrastructure."

Green infrastructure is the network of open space, watersheds, woodlands, wildlife habitat, parks, and natural areas that provide vital services to maintain the health and quality of life for the County. Just as the County's system of roads, wastewater pipes, water lines, and energy distribution lines is critical to supporting development and redevelopment, so is the County's green infrastructure a necessary component of development and quality of life.

Preserving green infrastructure prior to development is not meant to imply that natural systems should always take precedence over the built environment, but rather it recognizes

*Infrastructure.* The substructure or underlying foundation, especially the basic installations and facilities on which the continuance and growth of a community depends. (*Webster's New World Dictionary*).

*Green infrastructure.* An interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations.



*The Des Moines River valley's broad floodplain is now largely protected as open space*



*Four Mile Creek*

that natural areas are systems. Preserving the County's green infrastructure, or ensuring that changes in land use preserve the functioning of this green infrastructure, can keep natural systems intact. Just as the County's road, wastewater, or electric infrastructure is of little use if disconnected from the larger system, so must natural areas be connected in order to maintain the larger natural system. These natural systems provide protection from floods and erosive stormwater, protect the quality of surface and groundwater, provide habitat for the County's native plant and animal communities, and offer recreational and visual amenities for County residents.

### Area Committees

The four area committees all raised the importance of environmental quality in their respective visions of future development and preferred land uses.

- Northwest: The Northwest Area Committee envisioned increased protection of Saylorville and Big Creek lakes and natural areas, emphasizing northwest Polk County as the recreational center of the area.
- North Central: The North Central Area Committee envisioned protected floodplains, stream corridors with substantial buffers, and an interconnected park system that supports both human and wildlife movement through the developed community.
- Southeast: The Southeast Area Committee described its landscape as interlaced with green belts that connect the Southeast with the rest of the region, and link the Southeast area's many recreational facilities.
- Northeast: The Northeast Area Committee noted the importance of conservation areas in diversifying both the rural landscape and economy, and in protecting prime agricultural soils.

All four committees also created goals that emphasized protection of and investment in green infrastructure, and land use maps that identified critical green infrastructure areas.

### Green Infrastructure Categories

In order to understand and plan for natural systems, the County has identified and mapped three categories of critical green infrastructure:

1. Storm water management infrastructure;
2. High quality natural area infrastructure, and;
3. Recreation and open space infrastructure.

The maps on the following pages identify the priority green infrastructure locations. Figure 5.1 identifies the first two categories, while the Figure 5.2 shows the third category, with

*Examples of Area Committee Goals:*

*Southeast Area Water and Stormwater Goal:* Polk County will protect streams and waterways through effective storm water management, flood plain protection, and by directing investment to enhance the County's natural infrastructure.

*North Central Environmental Quality Goal:* Polk County will conserve unique natural areas and wildlife habitat, air and water quality, and will work to expand and enhance trails, greenways, and park resources throughout the County.



*A small creek in Marquisville, North Central Polk County, could be more of a recreational amenity*

locations of existing and future trail corridors in relation to County and other regional parks and protected open space.

**Storm Water Management Green Infrastructure:** Storm water management green infrastructure includes areas with two components; infrastructure systems that mitigate harmful effects of unmanaged or poorly managed storm water, and natural areas that are highly susceptible to unmanaged storm water.

The first component includes hydric soils, wetlands, and floodplains and waterways. These natural characteristics form an infrastructure system that slows stormwater down, removes sediment and pollutants through infiltration and vegetative buffers, reduces the volume of runoff through temporary storage, and conveys water that cannot infiltrate into the soil to rivers and lakes. The primary storm water management systems include:

- large areas of hydric soils throughout the County;
- the Skunk River valley and floodplain areas in the northeast;
- the Raccoon River in the southwest; and
- the Des Moines River valley, with associated lakes, floodplain, wetlands, and hydric soils.

A number of significant streams are also identified on the map as part of the storm water infrastructure system. The Four Mile Creek watershed, along with several significant tributaries, is critical green infrastructure that cuts through almost the entire length of Polk County from north to south. Spring, Mud and Camp creeks also serve important watershed functions through the Southeast area.

The second component of storm water green infrastructure includes steep slopes and shoreland areas. These natural features are highly susceptible to erosion from unmanaged storm water. Failing to manage storm water from development or land clearing can result in erosion of these natural features and contamination of surface water with sediments and nutrients.

Critical shoreland areas are identified along a number of the County's major streams in yellow. The yellow area identifies a minimum of a quarter-mile buffer along the stream corridors to indicate the extent of potential sensitive shoreland areas. Slopes in excess of 15% are also identified as green infrastructure. Steep slopes are found primarily along the County's waterways and along the bluffs that demarcate the river valleys. Steep slopes are far more common in southern Polk County, beyond the edge of the Des Moines glacial moraine.



*Des Moines River shoreline and valley, Yellow Banks Park*



"Growing Green Communities" is a 501 (c)3 non-profit organization formed to serve as a catalyst in building greater awareness and acceptance of conservation design, watershed protection and residential stewardship. The organization works to ensure that long-term quality growth is a focal point for all future development. [www.growinggreencommunities.com](http://www.growinggreencommunities.com), <http://nemo.uconn.edu>, [www.cwvp.org](http://www.cwvp.org) ]

The *Growing Green Communities* program, a regionally-focused effort to manage storm water and protect environmental quality, provides local direction on programs, regulatory approaches, and management techniques to meet green infrastructure goals. National efforts and organizations, such as the Center for Watershed Protection and the Non-point Education for Municipal Official (NEMO) model can also provide testimony and examples for incorporating green infrastructure into new development and preservation efforts.

**High Quality Natural Areas:** The second green infrastructure category includes those areas that sustain rare, unique, or threatened plant or animal habitat. As with other green infrastructure, high quality natural areas must be part of a system in order to sustain themselves over time. A 'high quality' area is a natural area that includes indigenous plant or animal habitat that has the characteristics to be self-sustaining, or includes rare species and needs to be made self-sustaining.

The light green areas on the green infrastructure map designate high quality natural areas identified by the Polk County Conservation Board that are not included in an existing park or protected area. As can be noted from the map, in most cases the high quality natural areas lie within a specific watershed and are connected to other systems via a stream or river corridor. Significant areas include the following:

- Areas along the Des Moines River in the northwest and southeast,
- Brenton Slough and connecting streams ,
- The original water course of the Skunk River and the upland bluff areas above the Skunk River valley,
- Large areas along Four Mile Creek in and adjacent to the City of Ankeny.
- Smaller areas along streams and in wetland areas in the west, north central, and southeast.






These areas need to be protected or carefully developed (using low impact development techniques) so as not to disturb the qualities of the land that comprise the natural area.

**Recreation and Open Space.** The final category of green infrastructure includes those areas that are set aside as parks, preserved open space, recreation areas, and trails. These areas are valuable for storm water management or as natural areas, but also serve a specific human need, whether for active recreation; walking, biking, or non-motorized commuting;

# Polk County 2030 Comprehensive Plan

## Green Infrastructure


### STORM WATER MANAGEMENT

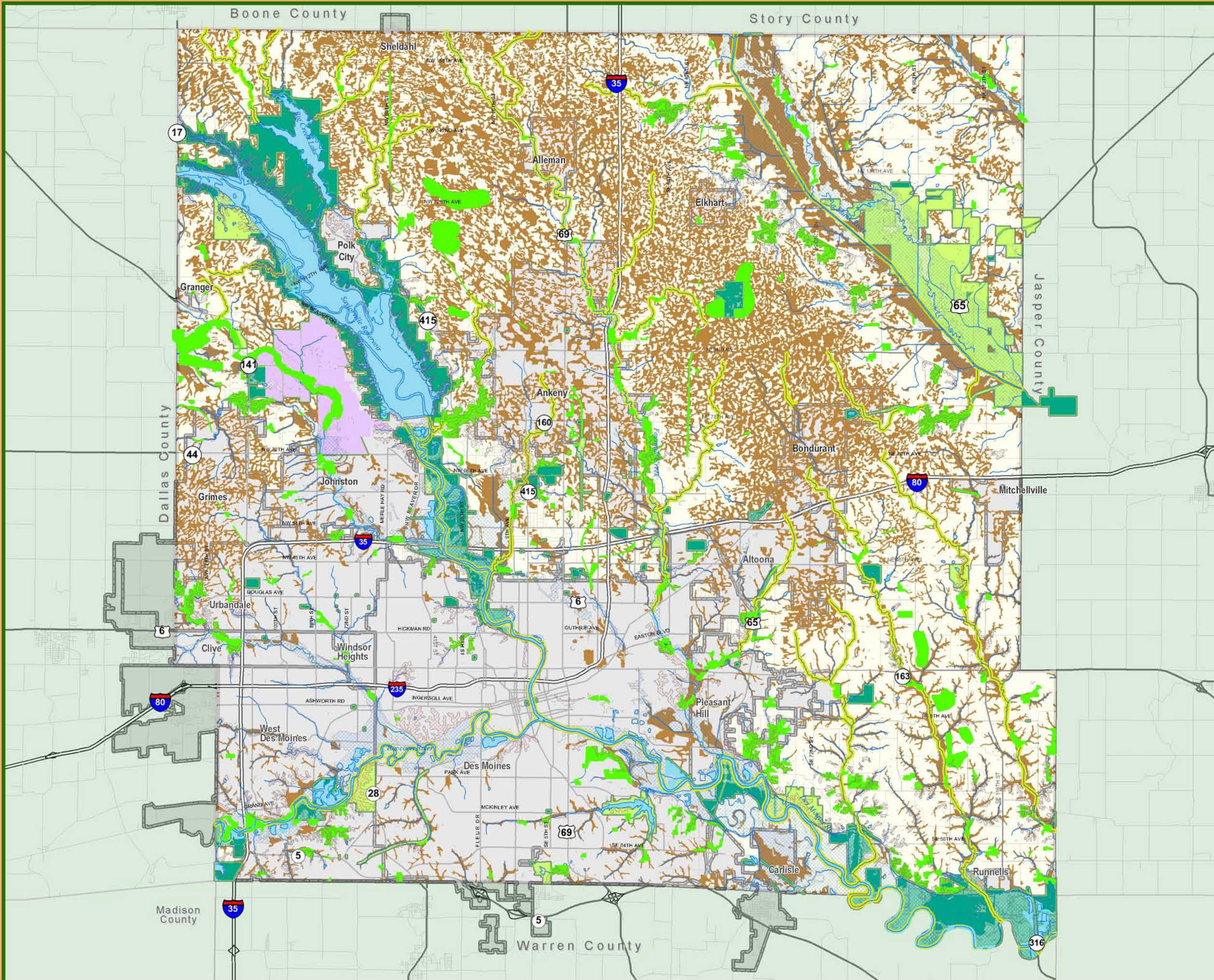
-  Rivers, Creeks and Streams with 1/4 mile buffer
-  Slopes 15% or Greater
-  Hydric Soils
-  Wetlands
-  100 Year Flood Zone

### RECREATION AND OPEN SPACE

-  Parks - County, State and Local with 200 ft. buffer
-  Other Protected Open Space with 200 ft. buffer
-  Camp Dodge

### HIGH QUALITY NATURAL AREAS

-  Polk County Conservation Board Areas of Concern



Data Sources: DMA MPO, Polk County, IDOT, DNR, Polk Co Conservation Board



0 1 2  
Miles



Figure 5.1

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passive recreation such as bird watching, nature hiking; or educational purposes.

Recreation and open space green infrastructure is, for clarity, divided between the two maps in this section. The dark green areas on Figure 5.1, Green Infrastructure, identify existing or planned recreation, open space, or park areas. The trail network, County Parks and major city parks are shown in Figure 5.2, Existing and Planned Trails.

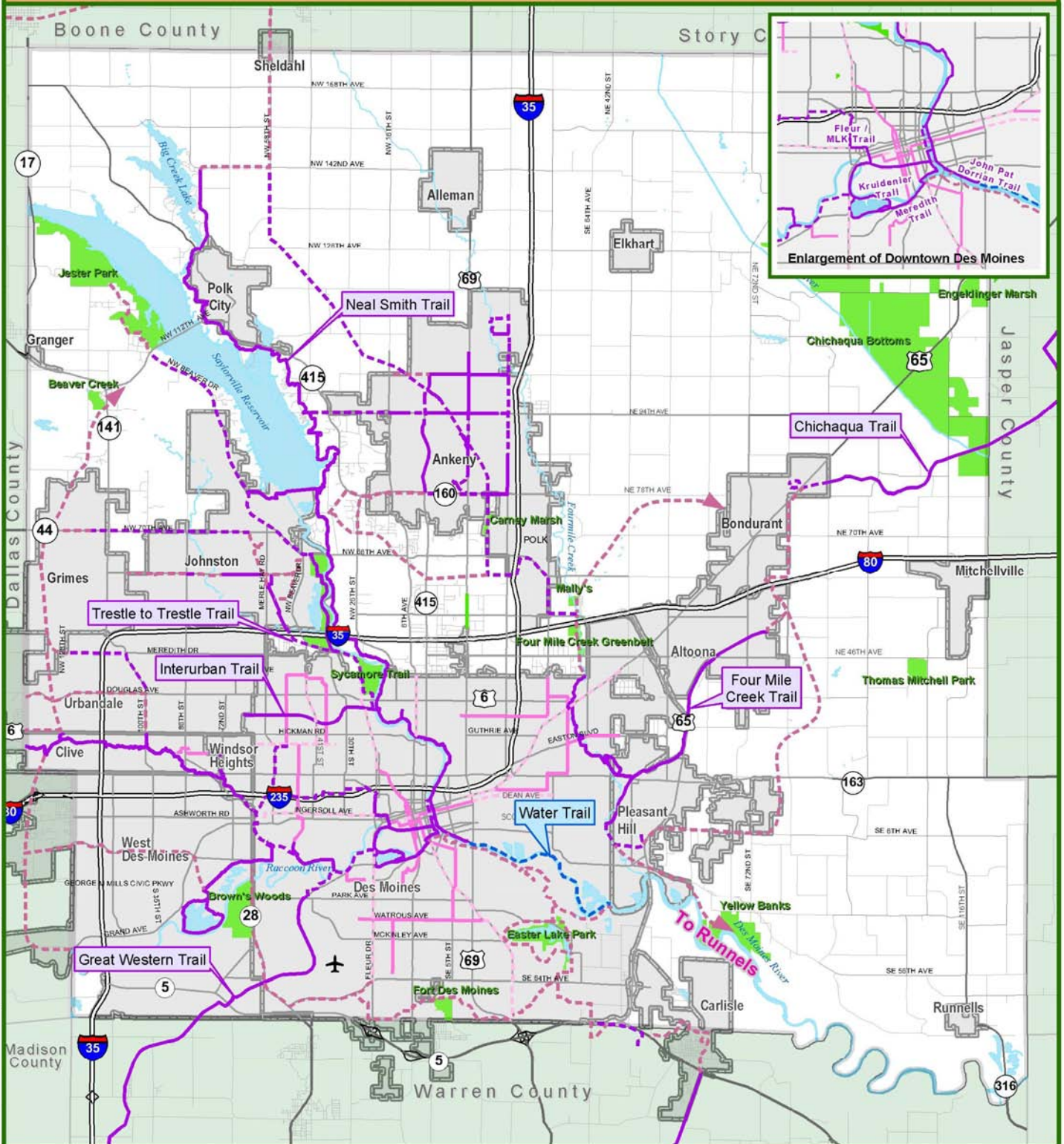
The primary park and recreation areas are centered on Polk County's primary waterways; Saylorville and Big Creek lakes, the Skunk River, the Des Moines River, and the Raccoon River. Significant effort has been made to create continuous park areas, with substantial success around Saylorville and in the Chichaqua natural area. Creating links between park systems along the Des Moines and Raccoon rivers remains a challenge, as some areas have significant development or require restoration. Significant wildlife areas also can be found away from the river valleys, such the Wildlife Management Area sites in the Northeast and Southeast areas.

Additional regional park areas are being considered by the Polk County Conservation Board, although the search areas are too broad to be shown on the map. The County is considering two new regional parks, one located in the County's northeast area and one in the southeast area.

The Trails map includes three categories of off-street multi-use trails: existing, proposed, and planned. Planned trails are those trail corridors that have been identified and for which funding is likely available. Proposed trails do not have a specific right-of-way or corridor, but merely an approximate corridor or identified end points, and may need funding before specifics can be identified. Proposed trails include priorities for filling gaps, such as between Ankeny and the Chichaqua Trail in Bondurant, the Four Mile Creek Trail connection to the Chichaqua Trail, and the planned connection from Des Moines, through Ankeny and Sheldahl, to the Heart of Iowa Trail in Boone County.



*Recreational biking is growing increasingly popular in Iowa.*



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- Trail, Existing
- - - Trail, Planned Regional
- - - Trail, Proposed Regional
- - - Bicycle Lane, Planned
- Bicycle Route, Existing



↑  
N

0      2      4  
Miles

Prepared by  
**URS**

**Figure 5.2**

Data Sources: DMA MPO, Polk County

## Solid Waste Management System

Metro Waste Authority (MWA) is an independent government agency comprised of 16 member communities, Polk County, and six planning members. Established in 1969, MWA was designated to manage the landfill for the Polk County area after state law required all Iowa communities to properly dispose of their solid waste in a sanitary landfill.

MWA operates many facilities and programs, including the Metro Park East Landfill, the Metro Transfer Station, the Regional Collection Center in Bondurant, the Metro Compost Center and two Metro Recycling Centers in Des Moines.

MWA also operates various waste reduction and recycling programs including the Curb It! recycling program, the most comprehensive curbside recycling program in the state, providing services to almost 120,000 households. Other programs managed by MWA include the Residential Scrap Tire Program, the Sharps Program and a Special Waste Assistance Program for commercial/industrial businesses.

Opened in 1972, the Metro Park East Landfill (MPE) is located at the County's eastern boundary, nine miles east of Des Moines on Iowa Highway 163 (NE University Avenue). Sitting on nearly 1,350 acres of land, with only 400 acres being used for landfill space, MPE Landfill receives approximately 15 percent of the state's waste annually. Metro Waste Authority was recognized by the Solid Waste Association of North America for Landfill Management Excellence.

The MPE landfill is managed to high environmental standards. After waste is deposited, it is compacted and covered daily with six inches of soil. The soil cover helps control odor, litter and public health problems. A combination of a liner and collecting pipes are used to catch leachate, which results from precipitation that has seeped into and through the waste. Wells are used to monitor groundwater quality. MWA's Constructed Wetlands treatment facility is the first of its kind in Iowa, and one of the first in the nation. It is designed to treat leachate collected at the landfill.

Gases produced by natural biological processes within the landfill are collected to control their release into the atmosphere and are sent to the Metro Methane Recovery Facility and converted into electricity.

The landfill has capacity through mid-century. MWA's policy has been to maintain a buffer zone around the facility by purchasing property when necessary to prevent residential development. The purpose of the buffer zone is to allow for future expansion while maintaining a sufficient distance from residential areas. However, the Countryside zoning district that applies to this area has not slowed the development of large (10 acres and up) residential lots. The Land Use Plan

recognizes this policy by formalizing this buffer zone as an Agricultural area.

#### Air Quality Management

Air quality within Polk County is generally good compared to other urban areas, and shows substantial improvement over conditions in the past. Historically, the Des Moines region was "non-attainment" for particulates and carbon monoxide during the 1970s and early 1980s. Attainment with these national standards was demonstrated in 1986-87. Since that time, the Des Moines region has remained an "attainment" area under the Clean Air Act, meaning that it meets national standards for acceptable air quality for all criteria pollutants: ozone, fine particulate, very fine particulate, lead, carbon monoxide, nitrogen oxides, and sulfur oxides.

The Air Quality Division of the Public Works Department is responsible for regulating air pollution sources within the County, and has performed that function since establishment of the U.S. EPA in 1973. Its mission is to improve the quality of the air by reducing the amount of pollutants such as ozone, carbon monoxide, fine particulates and hazardous air pollutants.

In 2003, air quality, as measured by the Air Quality Index, was "good" (AQI of 50 or less) on 71 percent of days recorded, "moderate" on 28 percent, and "unhealthy for sensitive populations" (AQI of 100-200) on only 1 percent. The median AQI value for the year was 39. The significant pollutants present in the Polk County airshed are ozone, carbon monoxide, nitrogen dioxide, particulates and toxic compounds.

## Environmental Quality Policies

Chapter Two identified two county-wide goals that serve environmental quality functions. The Environmental Quality goal, is as follows:

*Polk County will conserve unique natural areas and wildlife habitat, air and water quality, and will work to expand and enhance trails, greenways, and park resources throughout the County.*

In addition, the County has identified a separate Water Goal that also supports specific green infrastructure functions:

*Polk County will protect surface and ground water quality through protection of watersheds and management of stormwater and wastewater.*

In order to meet these goals, the County has identified several policies, as described in Chapter 2. The specifics as to how these policies move toward the County's goals and, ultimately, its 25-year vision are described below.

### Environmental Quality Policy 1 – Protect Natural and Recreational Areas

Natural and recreation areas enhance the quality of life in all areas of the County. Land use regulation and development practices in the Northwest area must protect the largest and most diverse recreation and open space area in the county – Saylorville Lake and Big Creek State Park. Regional park search efforts in the Northeast and Southeast areas will identify new parks to complement the Northeast's existing open space area and protect sensitive land forms running to the Southeast's existing recreational areas along the Des Moines River. Continued enhancement and protection of Four Mile Creek's habitat corridor and shoreline will minimize risk from ongoing development on the edge of Ankeny.

### Environmental Quality Policy 2 – Protect Green Infrastructure

Park creation and protection is only one facet of protecting green infrastructure – public lands will always just a subset of the County's natural systems. The County's land development regulations will ensure that development practices and patterns recognize the systemic nature of green infrastructure. Housing, commercial, and industrial development need to utilize low-impact development techniques to meet performance standards on infiltrating storm water. As



*Native prairies are one example of critical habitat*

Low Impact Development is a new, comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds. This design approach incorporates strategic planning with micro-management techniques to achieve superior environmental protection, while allowing for development or infrastructure rehabilitation to occur. Examples of LID techniques include:

- Bioswales
- Greenways
- Rain Gardens
- Permeable Pavement
- Level Spreaders
- Bioretention

Sources:

[www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org),  
[www.growinggreencommunities.org](http://www.growinggreencommunities.org)

shown in the Land Use Plan, development patterns should reuse existing development sites and minimize the need for new roads or other transportation-related impervious surfaces. Conservation easements or other protections should be included when subdividing land in stream corridors, problem watersheds, or with erosive slopes or soils. TIF districts could be used to help pay for the green infrastructure increment of developments that use low-impact development techniques.

### Environmental Quality Policy 3 – Trails and Recreation Areas

Trails and linear greenways are a critical element in meeting green infrastructure goals. Trails and linear greenways turn isolated natural or recreational areas into systems that serve as green infrastructure for recreation, habitat, and storm water management purposes. Polk County is well positioned to link to regional and national trail systems, and has the opportunity through development standards and public investment to connect a number of regional and local trails. The County can play a critical role in filling the gaps between existing isolated trail systems, and in ensuring right-of-way and linear greenway connections when private development occurs in County-regulated areas.



*American Discovery Trail: This developing national trail system includes the Heart of Iowa Trail from Marshalltown to Slater and the Saylorville and Neal Smith trails through Polk County*

Agricultural land cannot be condemned for trail use under Iowa law, so it is critical that other potential routes, such as stream corridors and/or sewer or power line easements, be explored. Protecting stream corridors, as development extends beyond existing city boundaries, can serve multiple goals, including trail corridor and linear greenway preservation. Innovative trail systems such as a water trail on the Raccoon and Des Moines rivers will require new recreational management concepts and public investment.

### Water Quality Policy 1 – Storm Water Management

Water quality in streams, rivers, and lakes is largely determined by the kinds of land uses and the management of land clearing in the watershed. Land clearing and paving can result in erosion and sedimentation, putting water quality and habitat at risk. Best management practices include retaining or restoring vegetative buffers along shorelands, limiting new impervious surfaces, and mitigating for impervious areas through innovative and proven techniques such as rain gardens and swales. These practices will reduce volume, energy, and pollutants carried by urban storm water. Polk County will require best management practices in both construction and site

design in order to reduce risks to water quality from development.

#### Water Quality Policy 2 – Protect Natural Infrastructure

Polk County's primary natural infrastructure is the shoreland, floodplain, and water channel system that has evolved over thousands of years in response to stormwater and floods. As development has changed the landscape over the past 150 years, the system is now burdened with more extreme peaks and valleys in surface and groundwater flows, greater velocity and erosive power, and dramatically higher amounts of sediment and pollutants. Polk County will focus on regulations, incentives and actions to protect vegetated shorelands, mitigate wetland filling within the same watershed, limit or eliminate floodplain filling or development, and invest in natural infrastructure through restoration efforts. Education, incentives, and regulation need to work in concert to protect the County's natural infrastructure.



*Small water bodies such as Avon Lake frequently suffer from poor water quality*

#### Solid Waste Management Policy 1 – Protect the Capacity of the MPE Landfill

Polk County's policy is to maintain an adequate buffer zone around the MPE Landfill to protect nearby residential properties from impacts, while allowing for future expansion of the facility.

The landfill has capacity through mid-century. MWA's policy has been to maintain a buffer zone around the facility by purchasing property when necessary to prevent residential development. However, 10-acre lots (under the Countryside zoning district that has applied to this area) have become more prevalent around the landfill.

The Land Use Plan recognizes MWA policy by designating this buffer zone as an Agricultural area with a maximum residential density of one unit per 35 acres. This designation, to be implemented through zoning changes, should be sufficient to protect the landfill from problems with nearby residential properties, and protect homebuyers from locating too close to a facility that may impact them in the future.

#### Air Quality Policy 1 – Continue Air Quality Monitoring and Promote Continued Improvement

Polk County Public Works' Air Quality Division will continue to monitor and promote improvements to air quality in the County. As cities within the County expand and roads are built or improved, negative impacts on air quality may occur, especially from those

pollutants that result from motor vehicle emissions. The Land Use Plan does not eliminate urban expansion, but it does maintain large areas of the County as agricultural, while promoting more compact growth patterns adjacent to the cities. In this way, the Plan may help to mitigate air quality impacts. Additionally, concentration of heavier industrial uses in central Polk County, where they have direct access to the regional and interstate highway systems, also creates some efficiencies in monitoring these uses for air quality compliance.