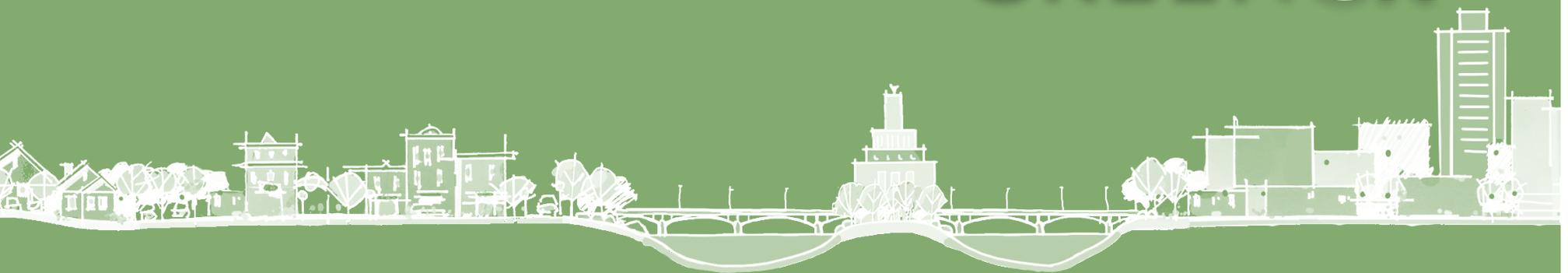


GREENCR



GREENCR

Farmland largely surrounds the City of Cedar Rapids. These working lands yield job opportunities and economic vitality through the growing bio-economy and the long-time staple of grain/food processing. These agricultural lands also present natural resource challenges, especially when coupled with under-planned urban development.

Past flooding and water quality issues leave Cedar Rapids leadership fully aware of these issues. To achieve goals for a community rooted in healthy water, air, and landscapes, the following are considered:

- Post-flood recovery work
- Plans for parks and trails
- Public and natural resources health data and initiatives
- Environment-related committee/task force reports
- Ongoing statewide work related to smart growth and low-impact design
- Tools for habitat protection, green infrastructure, and stormwater management
- Energy conservation and innovation strategies

Working with past and ongoing parks and trails planning efforts makes particular sense in Cedar Rapids as a means to speak to the city's leadership in natural resources. Cedar Rapids enjoys a high number of park acres per resident. When these park lands reflect sound natural resources management, life in Cedar Rapids receives numerous benefits:

- Improved stormwater management and water quality
- Diverse habitat for recreation and resource health
- Opportunities for the public to get outdoors frequently for personal and public health
- General overall "quality of life" improvements

Similarly, trails continue to put Iowa on the map as a regional/national attraction. Cedar Rapids' commitment to trails leaves the community poised for an ever-expanding role in cycling tourism and economic development, neighborhood connections, active living and again, public health.



GREENCR GOALS

1. Be stewards for the environment, promoting economic and social growth while restoring the relationship between the city and the natural environment.
2. Have the best parks, recreation, and trails system in the region.
3. Lead in energy conservation and innovation.



GOAL 1: Be stewards for the environment, promoting economic and social growth while restoring the relationship between the city and the natural environment.

Throughout the EnvisionCR process, the importance of natural resources management was reinforced again and again. A comprehensive watershed approach coupled with an Iowa wildlife "gap analysis" is used to address habitat needs.

Through this approach, the following was analyzed:

- Water and drainage-related resources, including wetlands, floodplains, streams and other watercourses, lakes, and permanent small water bodies
- Parks and trails
- Steep slopes that can limit development or cause significant erosion and water quality impairment
- Water table depth
- Hydric (i.e. wet) soils
- Habitat/vegetation
- Species "richness," i.e., the likelihood of finding amphibian, reptile, and bird populations in particular locales

The highlights of the relationship between these environmental characteristics results in the following:

- **Identification of two prime areas that should receive special analysis prior to development.** The term "Critical Natural Resource Areas" is used to reflect compatibility with terms used in Linn County's planning process and to reflect the importance of these areas. These areas may be preserved by development permitting and site specific approvals on private property, easements, or public acquisition. Protection for these areas can be achieved through the Environmental Conservation Overlay (EC) discussed in GrowCR.



- **Assessment of areas likely suitable for green infrastructure.** Opportunities were identified where infiltration-based best practices can balance the demands of maximizing development yield and protecting critical resources. This analysis has identified areas that are especially appropriate for techniques that promote infiltration (i.e. "soaking up") of rainwater. But it is important to note that a suite of natural stormwater management practices (e.g. permeable paving, rain gardens/bioswales/bio-retention, stream buffers, wetland restoration, grassed waterways) are appropriate throughout Cedar Rapids.
- **Direction to build cohesive natural systems and support vibrant development.** This plan identifies methods to maintain and restore habitat continuity, link communities and features through trail and pathway corridors, and strives to manage stormwater where it falls to the greatest degree possible. The resulting benefits include enhanced recreation and habitat protection, flood/stormwater improvements and increased water quality.

How the Watershed and Habitat Approach Works

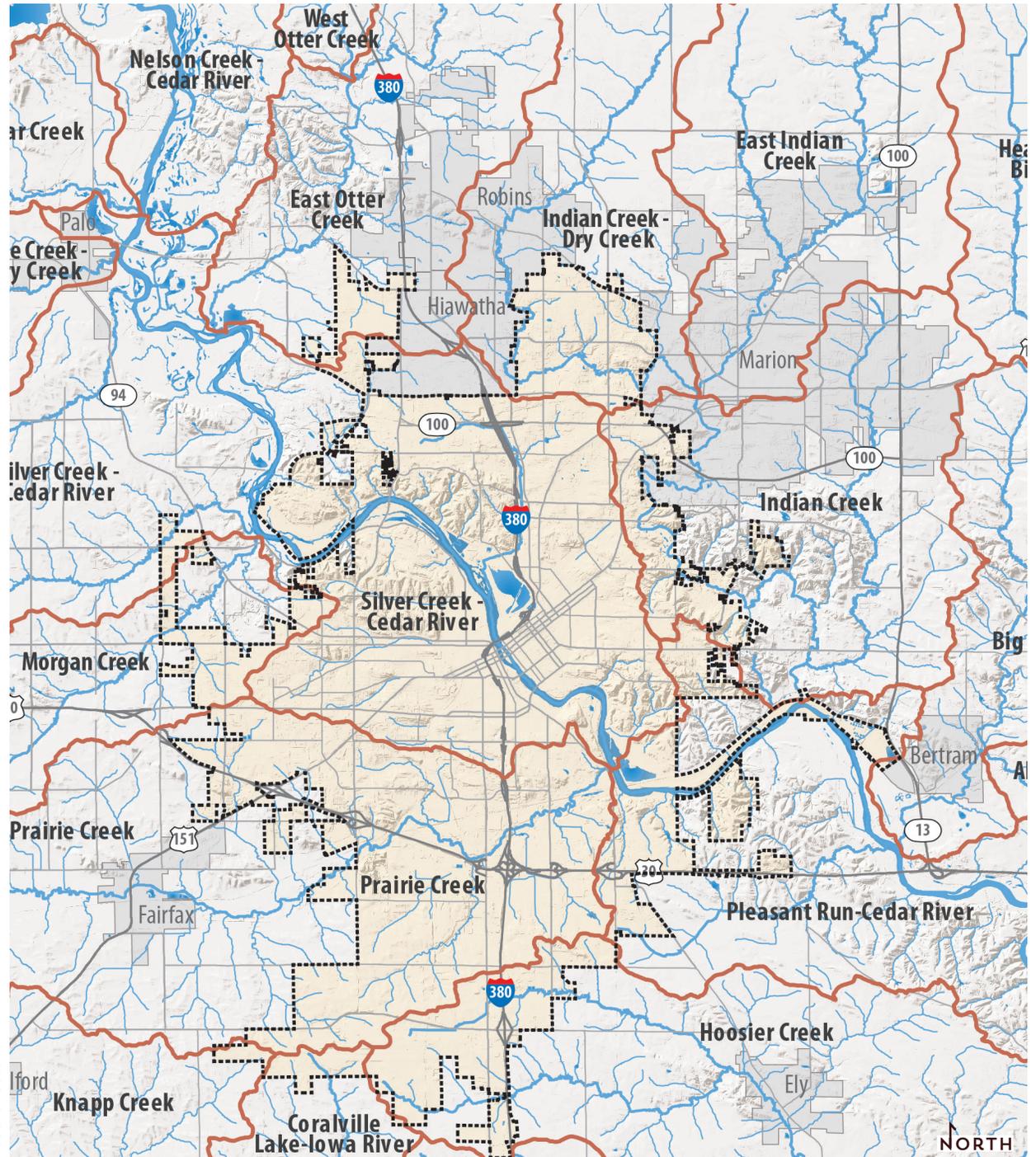
The watershed and habitat approach looks at a series of natural resource factors – described here – and then layers these factors to identify critical natural resource areas. The final product essentially produces a "green heat map." As layers are added on top of each other, intersections of valued green features are identified, making these lands prime for proactive attention.

Some of the individual maps tell important stories on their own. For example, infiltration (water soaking through the soil) can be seen from looking at sandy soils, and something as simple as topography (slopes) can tell about lands that must be protected to help prevent erosion. The mapping layers considered are on the following pages.

WHAT IS A WATERSHED?

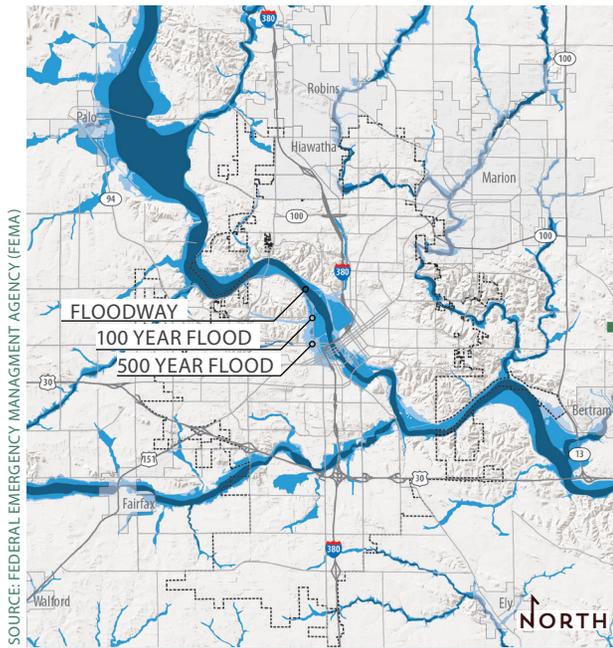
A watershed is an area of land that drains to a common body of water, such as a creek, stream, river or lake. Think “drainage area.” The water can flow by many means including over land, through drain tile, or via underground waterways. Due to Cedar Rapids’ flood history, an understanding of watersheds is considerably more common in this community than elsewhere.

MAP 1: Watersheds

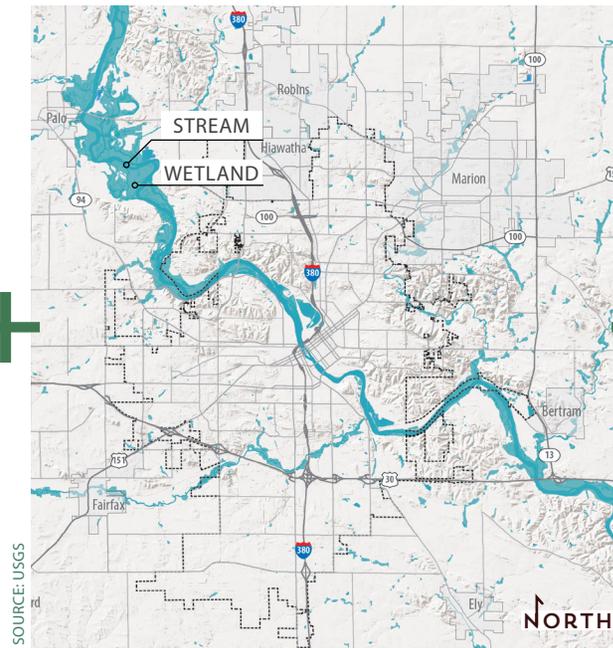


SOURCE: USGS

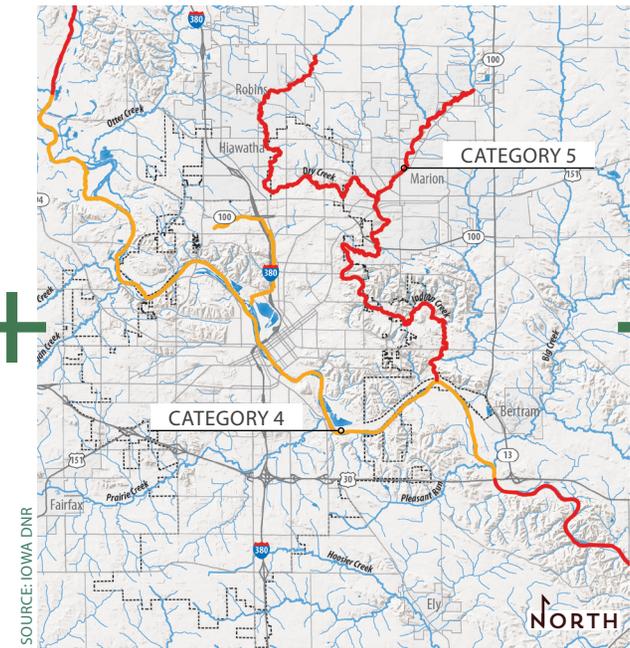
MAP 2: Floodplains



MAP 3: Wetlands and Streams



MAP 4: Impaired Stream Segments



Floodplains

Floodplains are fundamental to the watershed and habitat approach. The 100-year floodplain indicates a 1% chance of flooding in any given year, while the 500-year floodplain indicates a 0.2% chance of flooding in any given year.

Since the tragic floods of 2008, Cedar Rapids has been rebuilding, ever mindful of the impacts of volatile river systems and floodplains. The citizens of Cedar Rapids know all too well the importance of floodplains in terms of infrastructure protection, ecology, and water quality and quantity. The floodplain, when properly managed, can provide an important community asset. A minimal-development greenway approach can likely achieve important social, economic, and environmental goals. Cedar Rapids is already embarking on a strategy to establish a greenway corridor along the Cedar River. Current and potential regulation are also factors. Floodplain developments should be avoided wherever possible due to their potential costly impacts on development at times of intense storms/high water. The establishment of the greenway seems an excellent way to manage the floodplain throughout much of Cedar Rapids.

Wetlands and Streams

Wetland mapping is an important strategy to look at connecting the hydric (wet) soils and sensitive areas. Most of the wetlands are adjacent to streams or within the floodplain, but a number of small scale wetlands are scattered throughout the region. Wetlands are essential to the hydrologic ecosystem because of their water cleansing properties. The number of wetlands surfacing in the region indicates value in exploring the potential of a wetland mitigation bank to serve this region. When wetland mitigation occurs within the watershed of the original wetland, it's more effective at replicating the functions of the original wetland, assuming the mitigating wetland is well designed and managed.

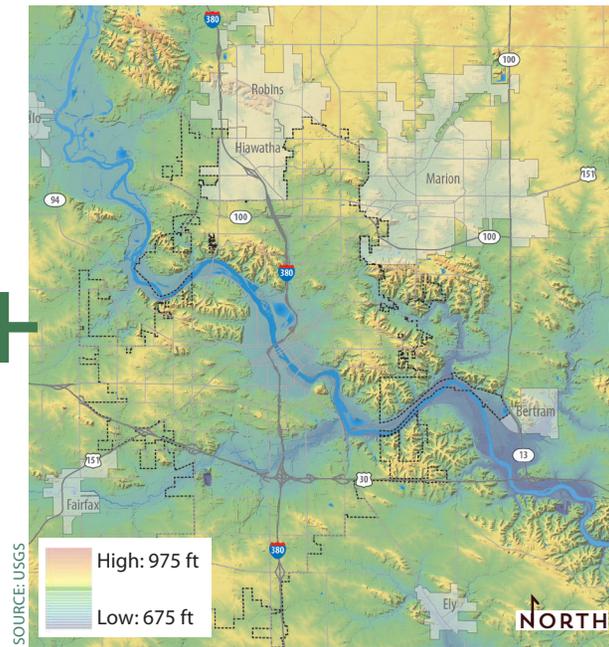
Impaired Stream Segments

The Iowa Department of Natural Resources publishes impaired stream data every two years with the last data published in March of 2013 (2012 data). This plan is based on that 2012 data. When looking at stream impairment, it's important to recognize impaired waterways can range from slight to severe. This analysis focuses here primarily on Category 5 impairments – those stream segments requiring a Total Maximum Daily Load (TMDL). A TMDL is essentially a study of how much pollution (i.e. "load") a stream segment can withstand and still meet state water quality standards. The TMDL study provides a detailed look at that stream segment's impairment and often offers details that relate to potential corrective measures. Due to the number of impaired waters in Iowa, a significant time lapse often occurs between calling out the need for a TMDL and actually completing a TMDL study. At this "comprehensive plan" level, impaired stream segments reveal stream stretches that likely need buffers. When work on the impairment does occur, buffers will help that work reach its full potential.

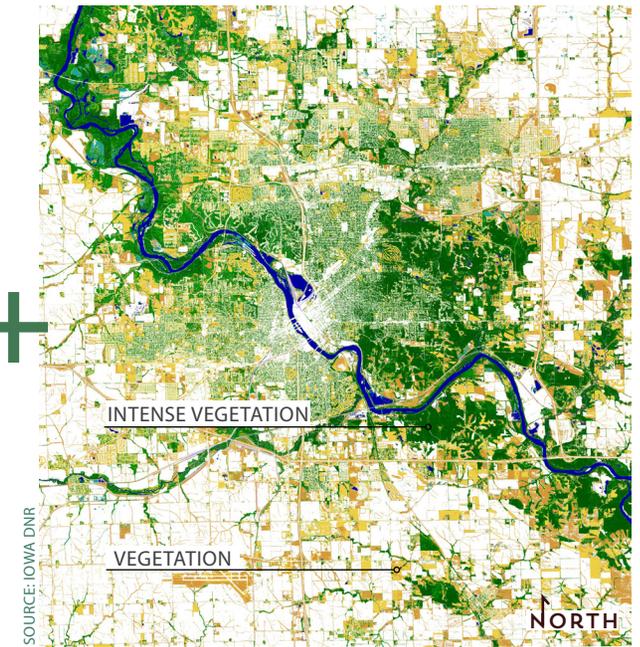
MAP 5: Hydric Soils



MAP 6: Slopes and Topography



MAP 7: Vegetation



Hydric (Wet) Soils

The United States Department of Agriculture defines hydric soils as those soils that are sufficiently wet in the upper part to develop anaerobic conditions (saturation) during the growing season. Not surprisingly, Cedar Rapids area soils with a high potential for saturation follow drainage/water ways very closely and reinforce the need for buffering and connections of creeks, streams, and drainage ways.

Slopes and Topography

Slopes have a direct impact on flooding/erosion, development suitability, and habitat. Much of Cedar Rapids experiences flatter, low-lying topography. But even modest slopes in excess of 6% can have a significant impact on development, particularly in areas where the building footprint requiring flat terrain is large. Much of Cedar Rapids' steeper-sloped terrain is included in the proposed Critical Natural Resource Areas. Avoiding development in areas with steep slopes typically (greater than 8%) will help prevent excessive erosion – ultimately helping to stabilize stream corridors. When land cover is changed, unprotected or disturbed slopes are one of the primary contributors to “suspended solids loading” (i.e., water transporting solid, polluting materials – primarily dirt), leading to soil erosion and muddy waters.

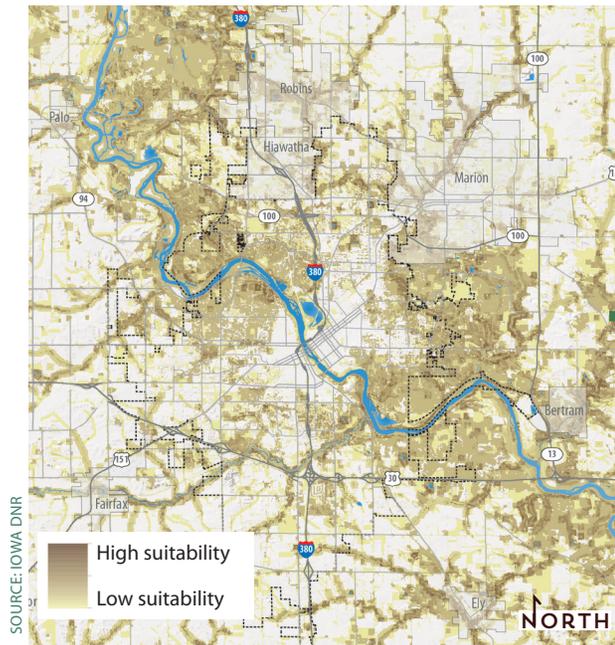
Vegetation

Vegetation and land cover are major resources that can help manage stormwater, prevent erosion, moderate microclimates, and provide more appealing physical environments. It might seem counter-intuitive that a well-developed area like Cedar Rapids would serve as an “oasis” for vegetation. When considering woodlands and grasslands, however, urban areas often offer some respite in a largely agricultural landscape. Cedar Rapids is no exception.

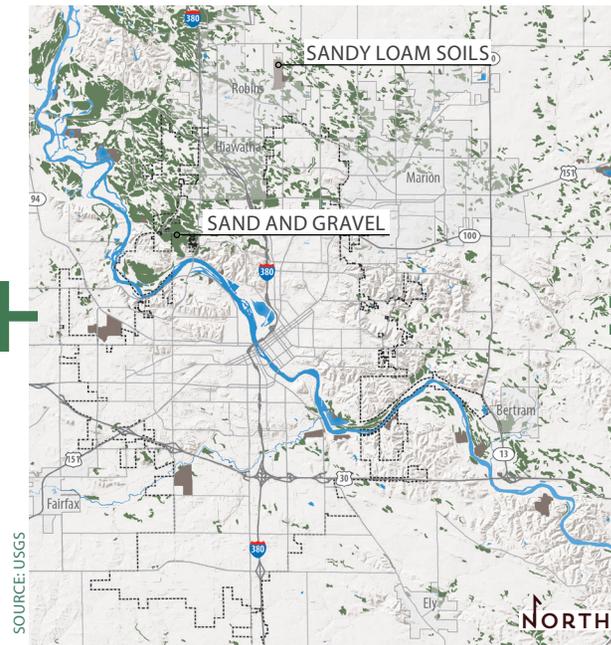
Restoring and/or preserving native vegetation helps protect habitat and provide opportunities for migratory birds and wildlife. Cedar Rapids has a high correlation between species richness (see maps 7 and 8) and some of the city's more wooded areas. Many of these areas have been difficult for development (due in some instances to wet conditions, in others to steep slopes) and therefore have left their vegetation largely intact.

It is recommended that steps are taken to minimize development within these areas and instead secure them to function for stormwater management, habitat, and appropriate recreation.

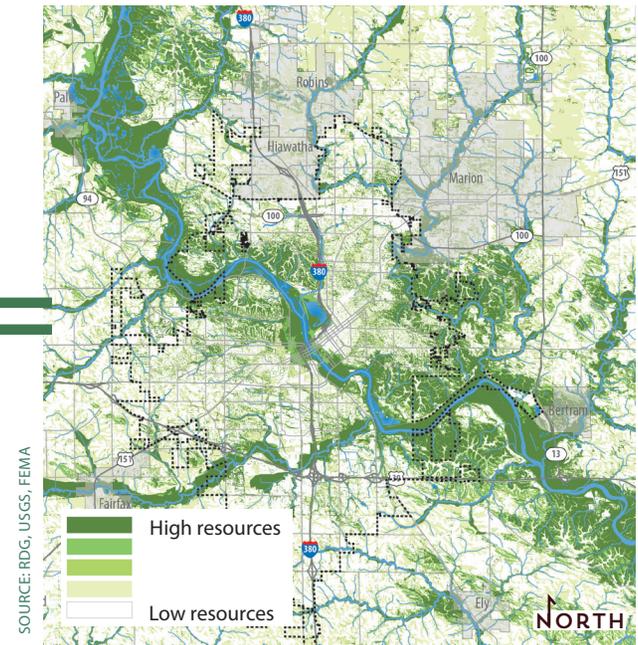
MAP 8: Species Richness



MAP 9: Sandy Soils and Green Infrastructure



MAP 10: Critical Natural Resource Areas



Species Richness

Using a gap analysis provided by Iowa State University and the Iowa Department of Natural Resources, one can understand Cedar Rapids' capacity for supporting amphibians, reptiles, and bird species. The zones of light to modest development in the region are largely reflected in the species richness maps because the least disturbed lands tend to better support wildlife than areas that have been plowed or paved. There may still be pockets, however, of environmentally sensitive areas and/or native vegetation throughout the region.

In addition to the Critical Natural Resources Area(s) identified here, it is recommended to follow the recommendations of the November 17, 2009 Environmentally Sensitive Areas Task Force's Final Report to the Cedar Rapids City Council and develop a process for mapping environmentally sensitive areas in the Cedar Rapids region.

Sandy Soils and Green Infrastructure

"Green infrastructure" speaks to the use of a series of natural systems to replace or supplement pipe and concrete infrastructure that has traditionally been used to manage stormwater in modern times. Buffers, rain gardens, and other practices that promote slowing and soaking up water make up green infrastructure.

Systems that use infiltration (soaking) methods – rain gardens and bioswales– are best suited to sandier soils, particularly in areas with a lower water table. In Cedar Rapids, the sandier soils are concentrated north of downtown and east of the river as well as south of downtown and to the east. This does not mean infiltration practices cannot be employed elsewhere, but these are good locations, especially where the sandy soils are farther from the river channel.

Infiltration is not the whole of the green infrastructure story. Surface based water quality improvement practices (filter strips, buffers) help remove "suspended solids" and harmful pollutants (fertilizers, oils) while slowing water down before it reaches a creek or stream.

Critical Natural Resource Areas

The Critical Natural Resources Areas broadly identified via this composite map can be used to point the city in the direction of areas to be included in the Environmental Conservation Overlay (EC) introduced in GrowCR. The EC will help to maintain the natural resource functions of these lands. These functions include erosion prevention/watershed protection, potentially some modest level of flood mitigation, wildlife/habitat protection, and potential recreation functions.

To repeat an important point made in the Species Richness section:

There may still be pockets of environmentally sensitive areas and/or native vegetation throughout the region that are beyond the loose "boundaries" of these Critical Natural Resource Areas. It is recommended the city develop a process for mapping environmentally sensitive areas in the Cedar Rapids region.

INITIATIVES

The following initiatives will help achieve Goal 1:

20. Coordinate with adjacent jurisdictions to identify environmentally sensitive areas in need of protection such as wetlands, habitats, and other areas of biological diversity for inclusion in the Environmental Conservation Overlay.

The overlay will identify environmentally sensitive areas in need of protection, based on the environmental maps created for this plan. The overlay will establish protections for these areas.

21. Create a green streets policy that encourages future development and repairs to improve the permeability of the paving system and/or buffering of run-off, as well as a stormwater best management practices cost-share program that elicits community involvement, and, thereby advancing “green infrastructure”.

Creation of a policy will include best practice research to identify methods suitable to Cedar Rapids’ environment.

22. Prepare a Strategic Plan for iGreenCR initiatives that includes staffing, resources, and priority programs and policies.

Development of the plan will involve most city departments in its creation.

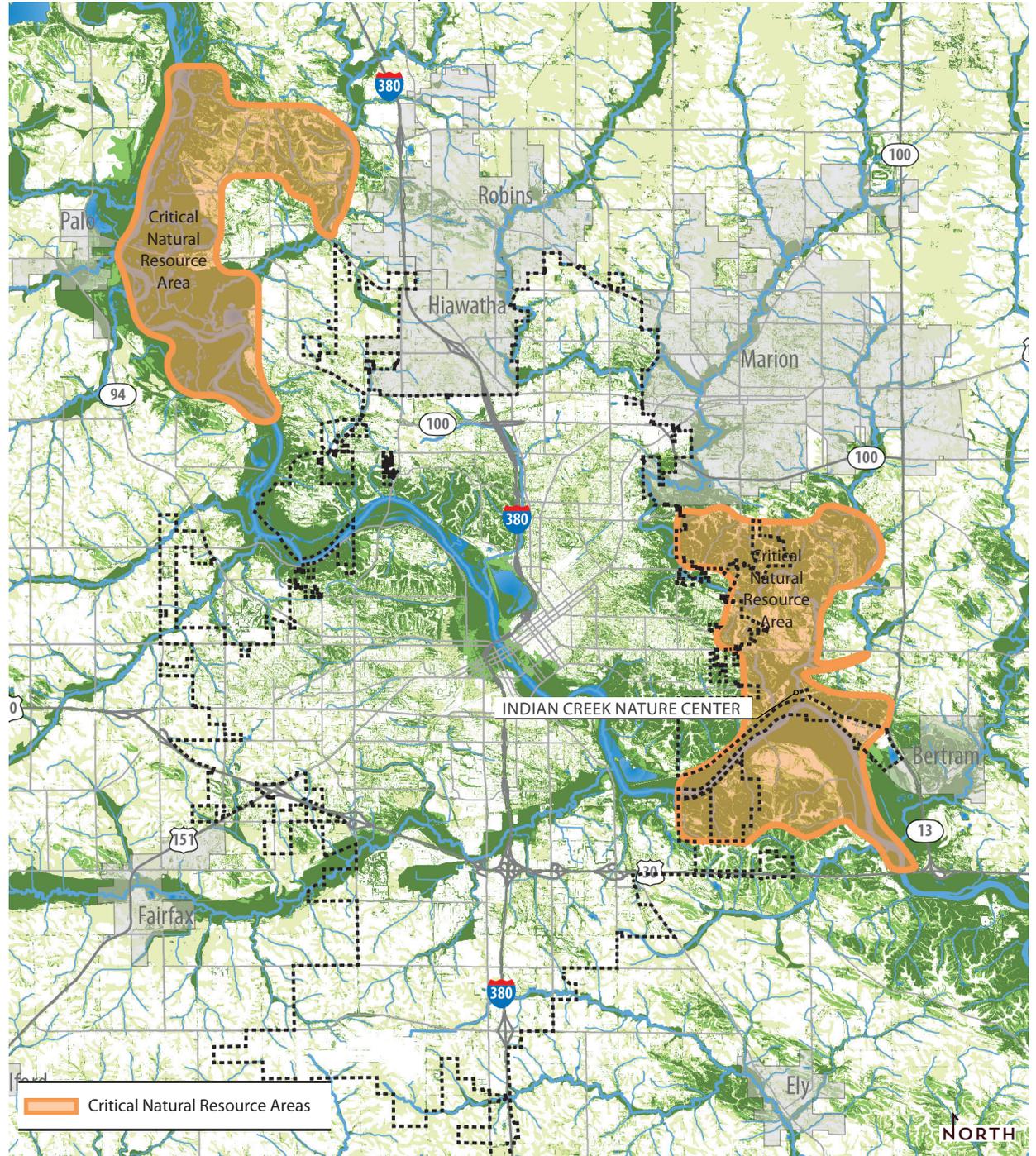
23. Explore the development of a water conservation ordinance.

This initiative will be a companion to the next one.

24. Build customer capacity to respond to drought conditions which may include a rebate program, educational campaign, and future updates to the municipal code as part of the green building program.

The educational campaign portion of this initiative will be helpful in the development of the water conservation ordinance listed above.

MAP 11: Critical Natural Resource Areas - Possible Policy Areas





GOAL 2: Have the best parks, recreation, and trails system in the region.

The Parks and Recreation Master Plan (2010) and the Cedar Rapids Comprehensive Trails Plan (2012) identify a system of parks and trails for Cedar Rapids. EnvisionCR supports the continued implementation of these plans and recommends additions for future updates.

GreenCR also provides some additional detail related to the Parks and Recreation Master Plan's goal to:

"ensure that adequate and appropriate parks and open space is provided to new residential developments as the city grows."

(City of Cedar Rapids Parks and Recreation Master Plan (PRMP), April 2010, p. 28)

Future Parks and Trails

To maintain its high level of park service, Cedar Rapids must add parks and trails as its population grows. Map 13 highlights potential future park locations in growth areas. The trails network for the Cedar Rapids region is identified in Map 14. The trails planning included in this document reinforces the park master plan goal to develop a "connected recreational trail system" (PRMP, p. 36).

The following principles guide the new park locations:

- Establishing parks of multiple benefit, that is, parks that address habitat and water quality benefits as well as recreational/community service benefits.
- Providing a neighborhood or community park within ¼ to ½ mile walking distance of residential areas. (Note: 80% of respondents queried in a PRMP survey asked for a park within walking distance, p. 11)
 - Map 12 shows which areas of the city are currently within a quarter mile or half mile service area of a park. Most areas of town are covered by one or more of these park service areas.

- Using parks as a focal point for new neighborhoods, often providing a community gathering space.
- Using new parks and trails as a catalyst for encouraging development in desirable areas.

The Results

The potential new park sites in potential growth areas would add approximately 575 acres to the current park system. Specifically, EnvisionCR identifies the following approximate locations of significantly sized new park land:

1. 45 acres made up of three neighborhood-scale parks collected in the vicinity of C avenue and North of Echo Hills Road
2. 15 acres North of Echo Hills Road and Northwest of the river
3. 10 acres of two neighborhood-scale parks by Highway 30 and Interstate 380
4. 160 acres (regional in nature) North of Highway 30 and near Highway 100
5. Nearly 70 acres (regional in nature) North of Ellis Road by Covington Road and South of the new Highway 100
6. 155 acres (regional in nature) directly east of the new Highway 100
7. 120 acres (regional in nature) South east of Highway 30

These parks are identified in Map 13 on page 105.

The map also shows the value of continuing to buffer and connect parks. As opportunities arise to buffer and link current facilities, opportunities are created for:

- Green infrastructure.
- Habitat corridors and/or an expanded greenway system.
- Creek/stream buffers for water quality protection and erosion control.
- An overall reduction (over time) of paved surfaces to prepare for current and future shifts in climate and storm extremes.

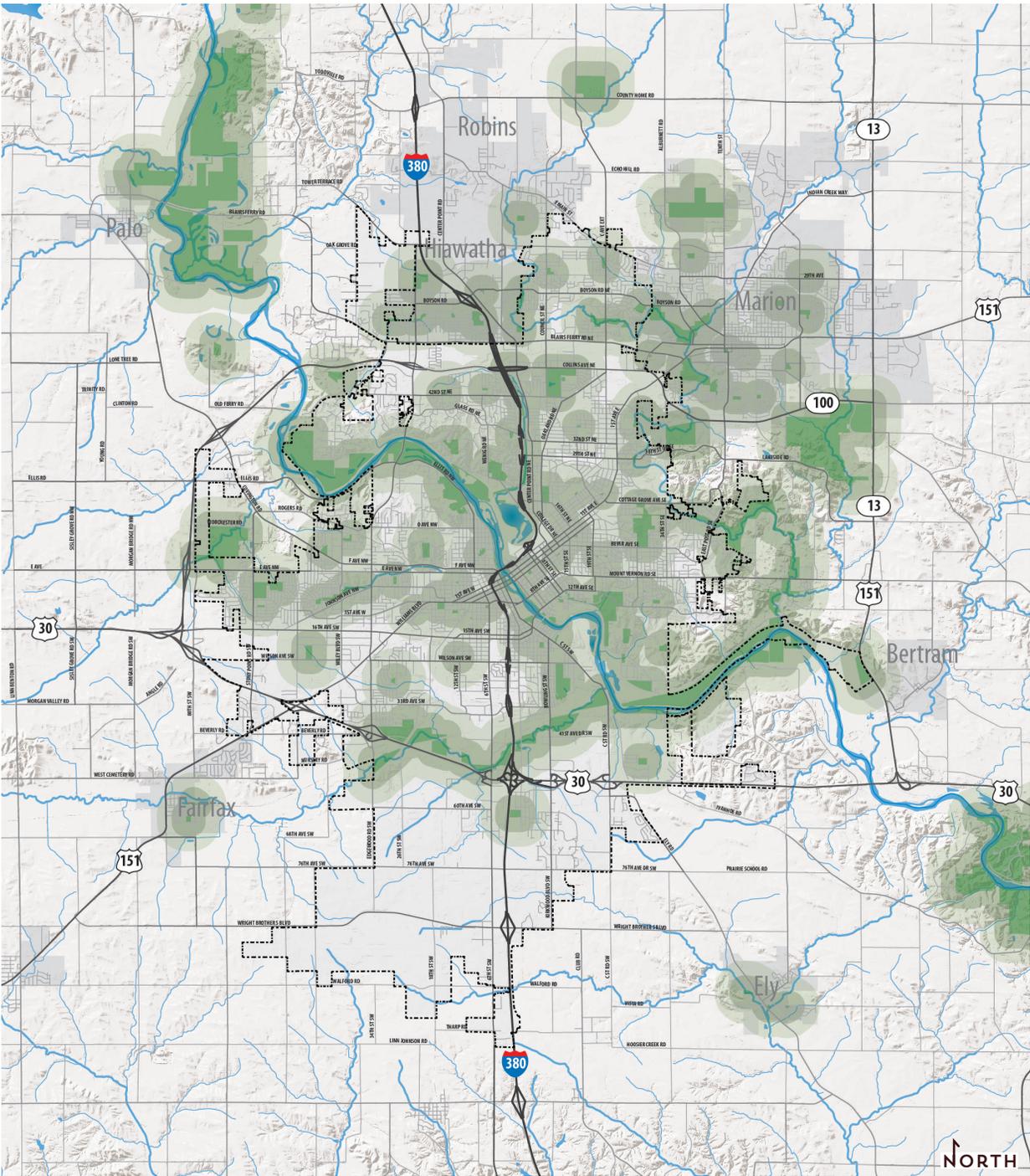
Finally, the potential exists for a significant watershed and wildlife protection zone north of the city within the Critical Natural Resource Areas designated on Map 11. It is also shown on the parks map.

Due to the steep slopes in this area and its proximity to the Cedar River upstream of the city, setting this land aside as a natural open space would serve the city well. While the city and county have established a number of corridors for water and wildlife protection, many species need a broader expanse of area to thrive (i.e., a system of corridors alone will not accommodate all the wildlife needing support). Those areas do exist within Cedar Rapids and Linn County, but this would provide an additional notable area of breadth for habitat protection. Generally speaking, across the state, Iowa needs additional aggregated areas for wildlife and immersive recreation experiences in "wild lands."



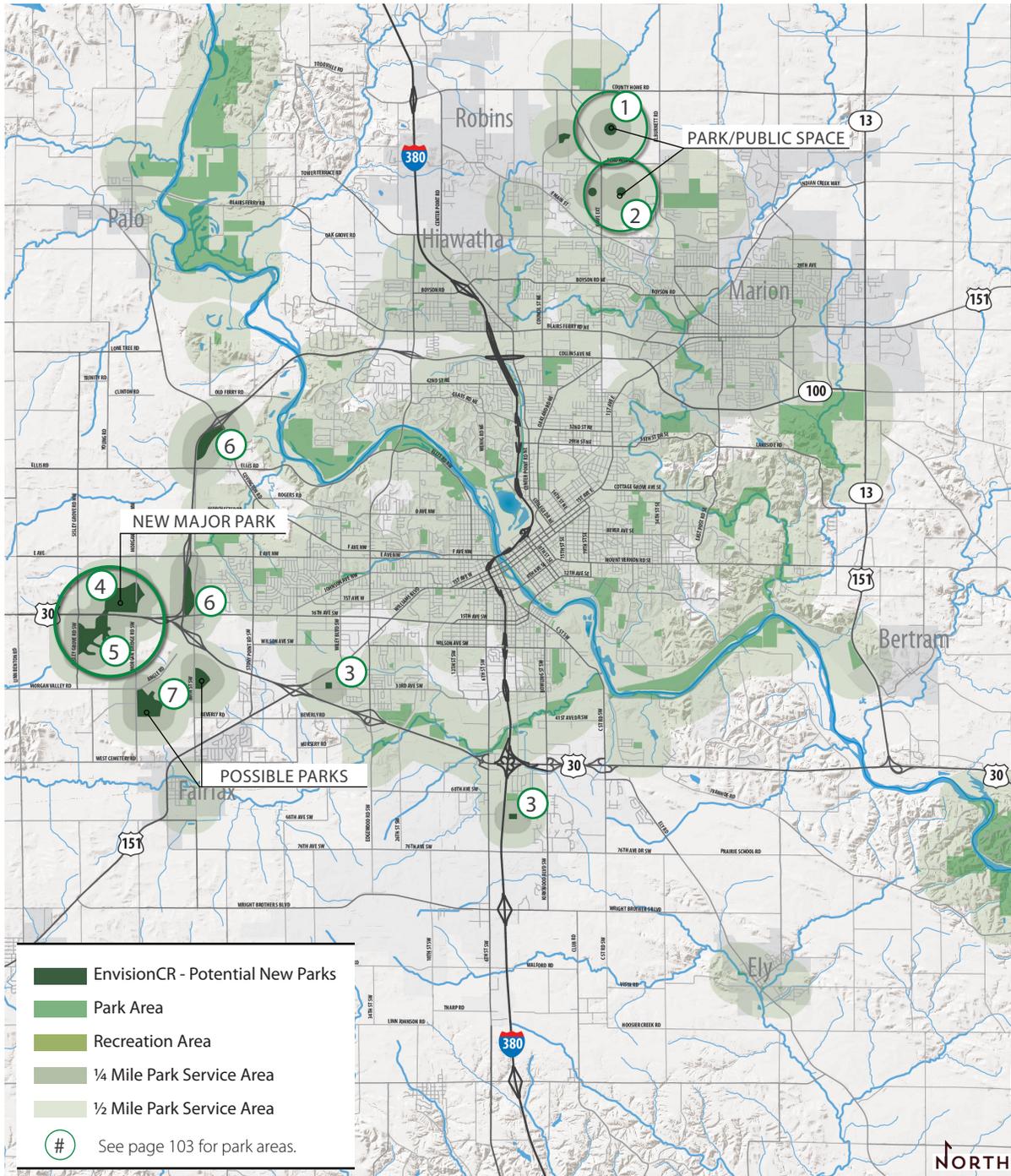
- Park Area
- Recreation Area
- ¼ Mile Park Service Area
- ½ Mile Park Service Area

MAP 12: Current Park Service Areas



SOURCE: CITY OF CEDAR RAPIDS, RDG PLANNING & DESIGN

MAP 13: Potential Park Additions



SOURCE: CITY OF CEDAR RAPIDS GIS, RDG PLANNING & DESIGN, HR GREEN

INITIATIVES

The ongoing implementation of the Parks and Recreation Master Plan should be a primary measure of success, with an emphasis placed on greenway development, park buffers, and trail connections. Longer term initiatives include:

25. Update the Parks and Recreation Master Plan to include a needs analysis, gap analysis, evaluation of existing facilities and programs, asset management strategies, and implementation actions.

The current parks and recreation master plan was completed in April 2010. The plan should be updated every 6-8 years.

26. Develop a city policy to require developers of large residential projects to develop new public areas.

This would require consultation with the adopted parks and recreation master plan.

27. Develop site master plans, prior to making improvements, for each of the following signature parks: Noelridge Park, Bever Park, Ellis Park, Jones Park, and Cherry Hill Park.

These plans are key to maintain these parks, and their unique identities, as destinations for the city and region.

28. Convert select areas of park turf grass to native prairie or woodland plantings to create wildlife habitat and reduce long-term maintenance costs.

The city continues to look for opportunities to reduce its costs while providing a benefit to the natural environment.

29. Track progress in identifying a funding strategy, ensuring CIP includes maintenance costs, and ensure coordination between CIP projects related to the Cedar Rapids Comprehensive Trails Plan.

Coordination can lead to improved efficiencies and opportunities to construct trail projects as part of other city infrastructure projects.

30. Develop a land acquisition strategy for new parks and expansion of existing parks.

Map 13 identifies locations for potential future parks.

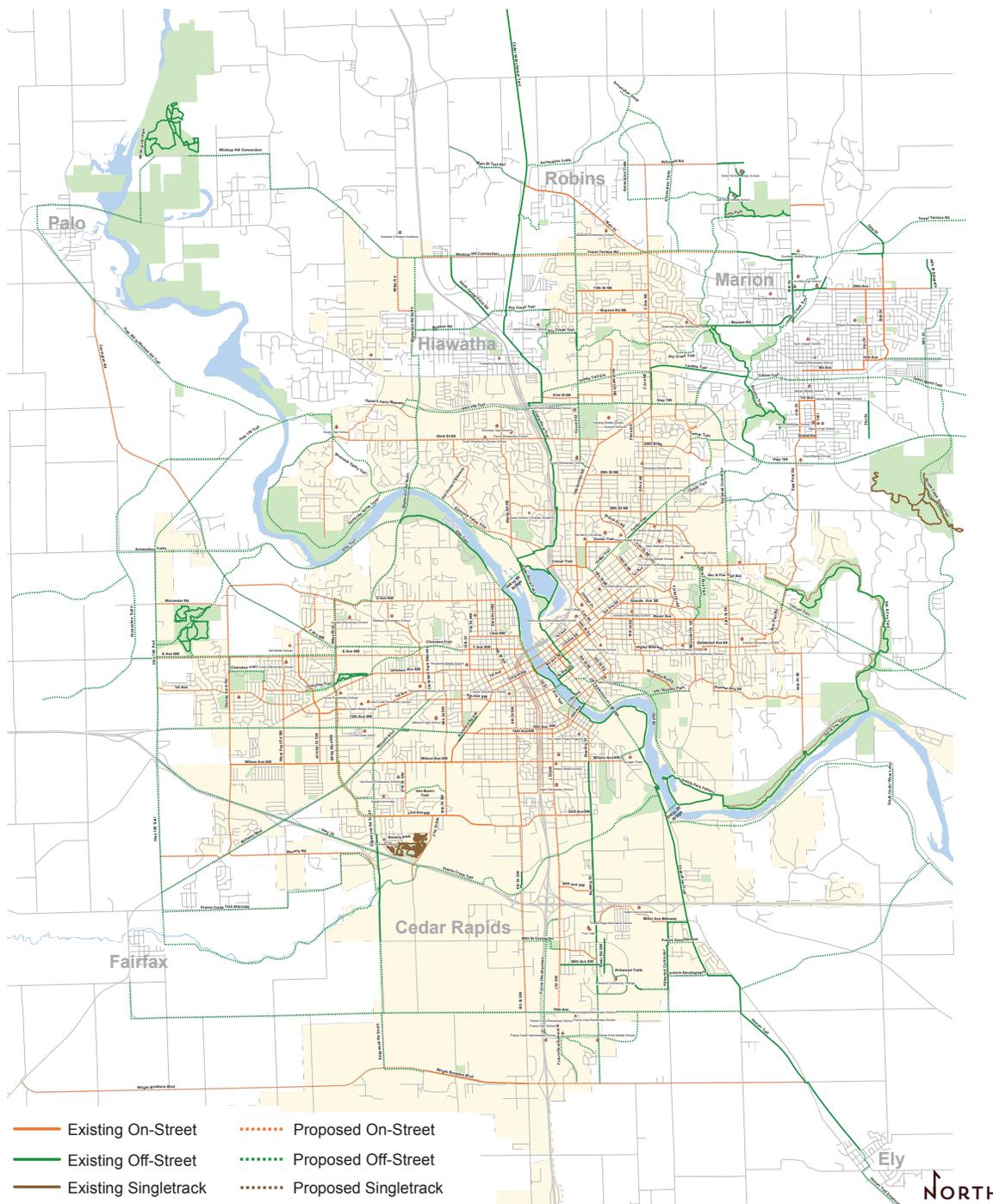
31. Identify ways to incorporate parks and open space into new subdivisions as part of the update to the subdivision code.

Many cities require dedication of park land by developers, typically as a function of the number of acres or dwelling units in the development. Some cities allow developers to provide a payment for parks, in lieu of land dedication, but the legal precedent for this in Iowa is complex - cities should consult with their attorney on this issue.

32. Complete infrastructure removal and track progress in completing short term projects of the Cedar Rapids Greenway Parks Plan.

In the aftermath of the 2008 flood, the city has committed to transforming the hardest hit neighborhoods into three sections of greenway totaling 130 acres.

MAP 14: Trail Network



SOURCE: CITY OF CEDAR RAPIDS GIS, RDG PLANNING & DESIGN, SHIVE-HATTERY



GOAL 3: Lead in energy conservation and innovation.

To prepare for severe storms and floods of the future, a longer term effort is required to try to curb climate extremes and prepare for changes in our energy future. EnvisionCR reflects the public's desire for a sustainable city – one that will be vibrant, dynamic and stand the test of time.

Severe weather events have already caused Cedar Rapids great hardship. It makes sense for Cedar Rapids to lead in prevention – not just by armoring its stream banks and down-playing floodplain development, but by addressing root causes of these climate crises: greenhouse gases. To keep it simple, GreenCR focuses on carbon. As communities, corporations, and nations continue to reduce carbon-absorbing vegetation and burn fossil fuels (releasing carbon), climate problems are compounded. Cedar Rapids can serve as a model community by addressing energy consumption, alternative/distributed energy and natural resources restoration (outlined above) through this comprehensive plan.

Cedar Rapids can show leadership in the region through development of a Climate Action Plan (CAP). Much of what is discussed in this chapter and throughout this plan aligns with CAP content. At a minimum, such an effort would address the National Renewable Energy Laboratory's (NREL) Nine-Step Community Energy Planning Cycle:

1. Identify/convene stakeholders
2. Form a leadership team
3. Develop energy vision
4. Develop energy baseline
5. Develop specific goals
6. Evaluate and rank programs
7. Identify funding sources
8. Compile the plan
9. Measure and verify, plan alterations

Peer communities across the country have been benchmarking building use and setting energy budgets. They identify road maps for improving after benchmarks

are known and make informed decisions using economic and environmental metrics. They look at a variety of energy/greenhouse gases and other resource conservation measures, including:

- Energy efficiency and renewable energy
- Vehicle fleet
- Employee commute
- Waste reduction and recycling
- Green building and environmentally preferable purchasing
- Light pollution reduction
- Value of water and its relationship to energy (looking for opportunities as a community to passively treat water and incorporating water audits to reduce building water use, catch leaks, and reduce hot water demand – i.e. flush and flow fixtures, appliances, etc.)

With current technology, incentives, and net metering laws, there has been a decrease on simple payback models with many existing buildings remodeled to achieve 50% less energy with a payback of less than 10 years. Iowa makes revolving loan funds available for this work.

Increasingly, CAPs address adaptation, prevention and mitigation. They may go beyond energy, buildings, and water to understand impacts on local species/habitat and monitor for impacts. They also afford opportunities to promote regional collaboration/planning efforts as well as engaging the public in taking personal responsibility for energy/water conservation and greenhouse gas emissions. Do-One-Thing campaigns (encouraging individuals to do one thing for the environment) have been popular in peer communities for this reason.

INITIATIVES

The recommended approach is for the city to complete a municipal climate action plan first to help start the conversation and provide an educational opportunity on the purpose and benefit of climate action plans. Development of a community-wide climate action plan would then follow.

33. Prepare a municipal Climate Action Plan that builds off of the Energy Management Plan and addresses emissions from land use, transportation, street lights, water consumption, waste generation, and building energy.

This plan would include developing a municipal greenhouse gas emissions inventory and associated reduction target. It would also identify measures for reducing emissions to reach the identified target and outline an approach for implementation and financing.

34. Prepare a community-wide Climate Action Plan that builds off of the Energy Management Plan and addresses emissions from land use, transportation, street lights, water consumption, waste generation, and building energy.

Similar to the municipal plan but focused on the community.

Climate Change

The Iowa climate information on these pages provides a sampling of the data that will drive climate action planning of the future.

Charts 1 and 2 show the current increases in rainfall and the projections for the future that show shifts in Iowa's rainfall amounts.

Climate changes in Iowa are already occurring, as reported in the Iowa Climate Change Impacts Committee's Report to the Governor and the Iowa General Assembly.

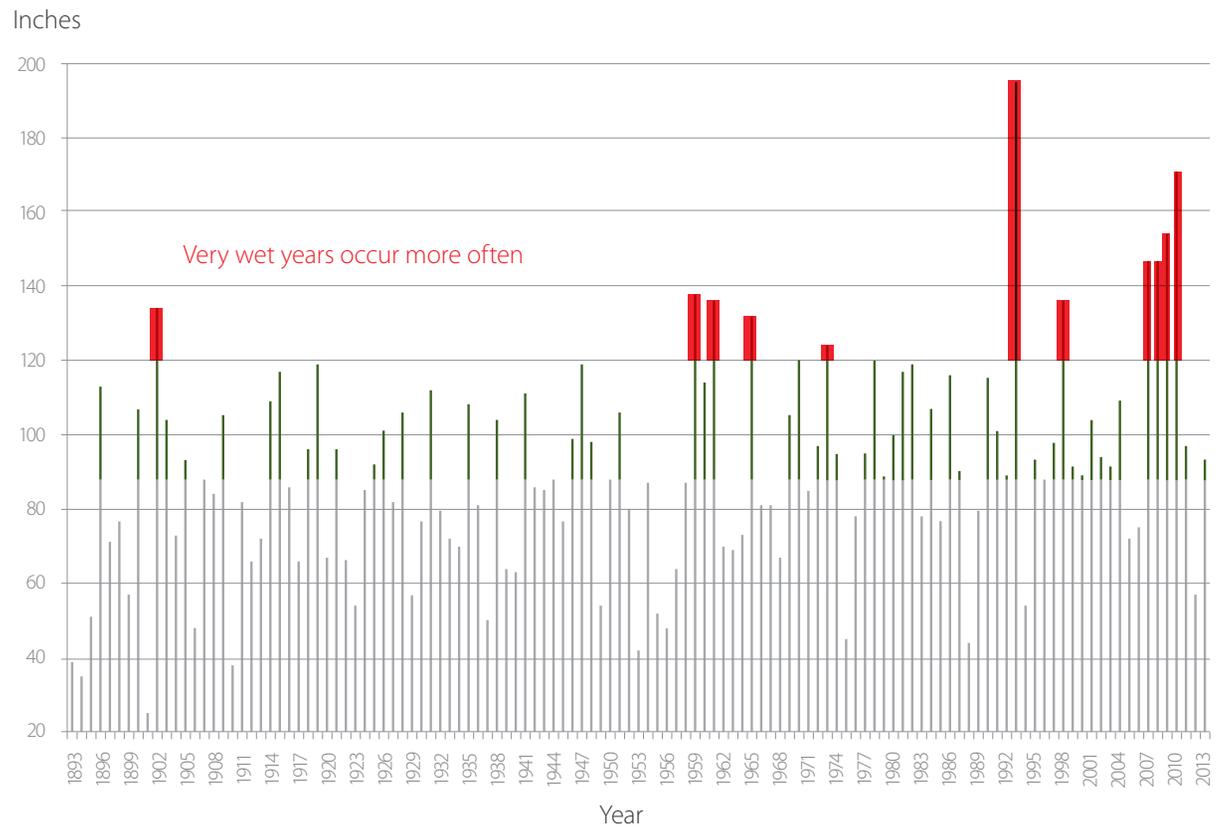
More Precipitation

- Increased frequency of precipitation extremes that lead to flooding.
- Increase of 8 percent more precipitation from 1873 to 2008.
- A larger increase in precipitation in eastern Iowa than in western Iowa.

Higher Temperatures

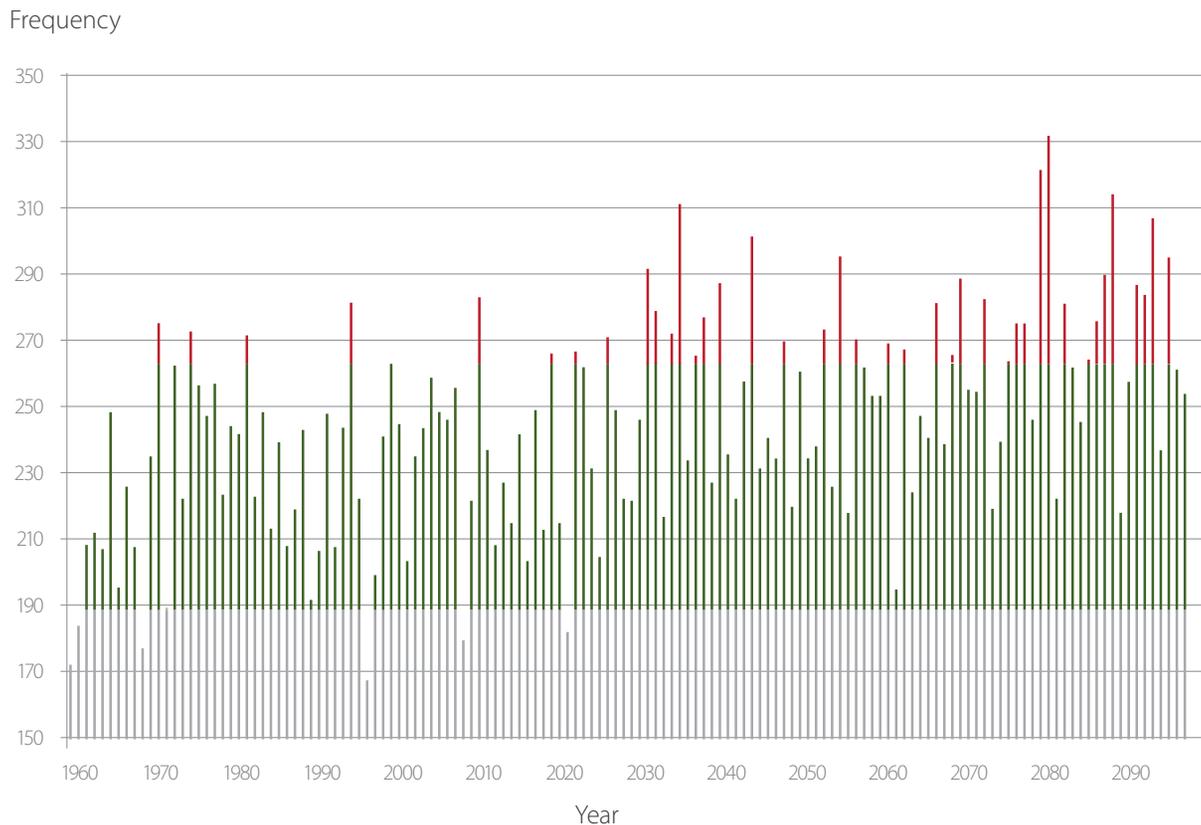
- Long-term winter temperatures have increased six times more than summer temperatures.
- Nighttime temperatures have increased more than daytime temperatures since 1970.
- Iowa's humidity has risen substantially, especially in summer, which now has 13 percent more atmospheric moisture than 35 years ago as indicated by a 3° to 5° F rise in dew-point temperature. This fuels convective thunderstorms that provide more summer precipitation.

CHART 1: Historical frequency of very wet days (exceeding 1.25" per day of rainfall) in Iowa from 1893-2013



SOURCE: CHRISTOPHER J. ANDERSON, PhD FROM IOWA STATE UNIVERSITY

CHART 2: Historical and projected frequency of “wet springs,” based on May-June rainfall



SOURCE: CHRISTOPHER J. ANDERSON, PhD FROM IOWA STATE UNIVERSITY

The red bars show the threshold for unusually wet May-June periods during 1960-1999. Beyond 2020, these wet springs are projected to happen more frequently than in the historical period. Flooding often occurs during wet springs or saturated soils from wet springs lead to flooding later in the season.

Agricultural Challenges

- Climate extremes, not averages, have the greater impact on crop and livestock productivity.
- Increased soil erosion and water runoff.
- Increased challenges associated with manure applications.
- Favorable conditions for survival and spread of many unwanted pests and pathogens.

Habitat Changes

- Plants are leafing out and flowering sooner.
- Birds are arriving earlier in the spring.
- Particular animals are now being sighted farther north than in the past.

Public Health Effects

- Increases in heart and lung programs from increasing air pollutants of ozone and fine particles enhanced by higher temperatures.
- Increases in infectious diseases transmitted by insects that require a warmer, wetter climate.
- An increased prevalence of asthma and allergies.

The complete report is available on the Iowa Climate Change Advisory Council's website.