

CHAPTER CONTENTS

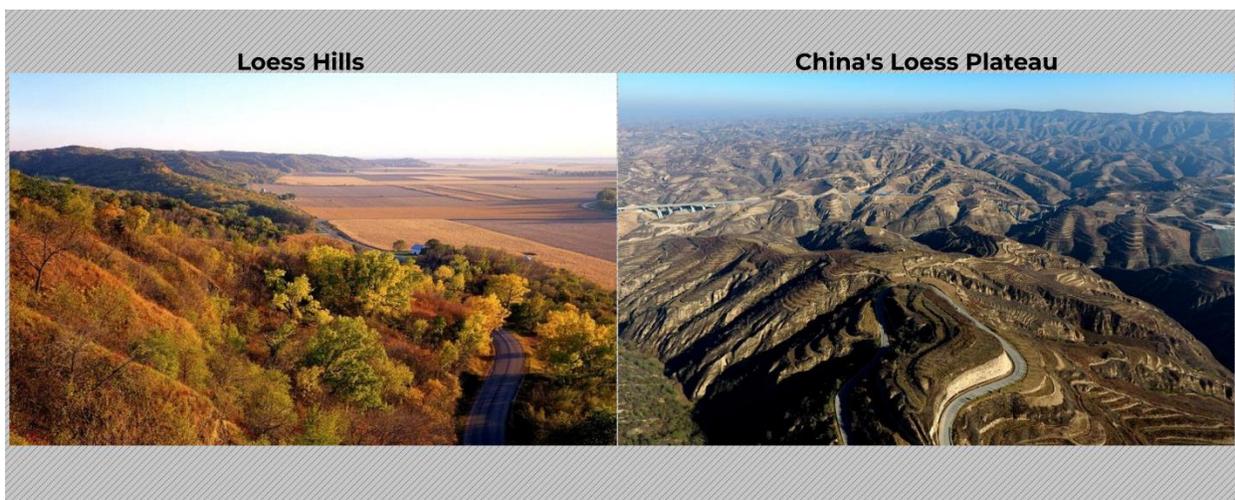
- Environmental Issues
- Alternative Fueling
- Land Use and Land Cover
- Air Quality
- Environmentally sensitive Areas
- Recommendations

Chapter 7: Environmental Impacts discusses the natural environment of the SIMPCO MPO planning area. It includes key geomorphological features, habitats, land cover and land uses, and the impacts that the transportation system has on these phenomena. It discusses potential alternative fueling systems, recent natural disasters, and provides recommendations for future work to reduce anthropogenic effects to the natural environment.

KEY GEOMORPHOLOGICAL FEATURES

The SIMPCO MPO planning area sits the confluence of the Missouri, Big Sioux, and Floyd Rivers. In addition to these three major tributaries, Perry and Bacon Creeks both drain into the Missouri River in the same vicinity (Map 7.1). The hydrology of these five waterways varies greatly, due to diverse channelization and flood control projects.

While the area's waterways are significant, the SIMPCO MPO planning area's location within the Loess Hills is truly its defining feature. This area's Loess Hills formation is one of only two Loess, or windblown sediment, land formations in the world, the other located in China's Loess Plateau in the upper and middle Yellow River area. The Loess Hills National Scenic Byway runs through the MPO planning area, connecting state highways and county roads in Plymouth and Woodbury to the rest of the byways south of these two counties. This conservation effort has brought attention to the Loess Hills formation in the area.



ENVIRONMENTAL ISSUES

FLOODING

Flooding is the most significant environmental issue that the SIMPCO MPO planning area experiences. This area was chosen for settlement because of its ease of access to the rivers. While this was the crux of the area's development, it has also been a great detriment. Major and historic flooding has occurred on all five waterways since the start of urban development. Map 7.2 shows the FEMA 100-year flood floodplains with this plan's programmed and planned projects.



In the spring of 2011, historic snowfall and rains in the headwaters of the Missouri River led to historic flooding that filled many of the reservoirs north of Sioux City. The US Army Corp of Engineers' controlled flooding from Garrison Dam in North Dakota to the confluence of the Mississippi River in St. Louis, MO, through the summer months. Many agricultural and residential areas were damaged or destroyed by this flood, and I29 was closed from Nebraska City, NE, to Rock Port, MO.

In the spring of 2014, the Big Sioux River flooded to more than a foot above the 1969 record flood height. This flooding significantly affected North Sioux City, Dakota Dunes, CID, and Union County, SD, Sioux City, and Plymouth County, IA. A portion of I29 near the mouth of the Big Sioux River was closed for ~24 hours during the crest, and traffic was redirected onto Nebraska Highway 12 during this time.



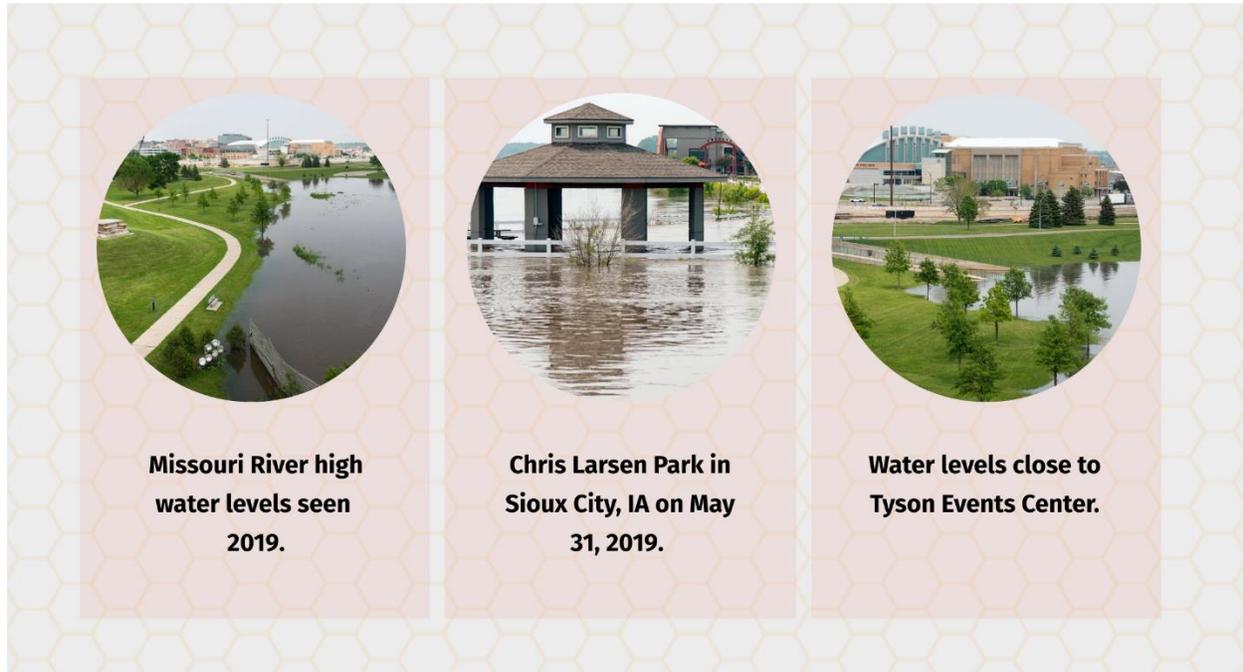
Most recently, in 2019, the Missouri River Basin experienced more historic flooding. Data recorded in the last 122 years shows the 2011 flood remains the highest runoff year with 2019 as second. The 2019 flood was triggered by a bomb cyclone. The bomb cyclone that struck over large parts of Iowa, Nebraska and South Dakota that day dumped several inches of rain. Warming temperatures quickly melted the many inches of snow still on the ground. All that water rushed across the still-frozen ground into ice-covered streams and rivers, sending torrents of water, ice chunks and debris downstream, flooding towns and damaging or washing out dozens of roads and bridges. When the water receded, counties were left to contend with millions of dollars of damage to roads and bridges that would take months to repair. It was the beginning of a year in which water played a major role.

Cold, rainy weather throughout May prevented soil from heating up and drying, keeping many farmers out of soggy fields until well past the normal planting time. Planting for many farmers stretched into June, increasing the likelihood of reduced yields caused by a shorter growing season.



CHAPTER 7: ENVIRONMENTAL IMPACTS

Hundreds of acres never were planted. Even if crops were planted on time, frequent rains in October delayed harvest because of muddy fields and crops too wet to pick.



Frequent heavy rains fell across portions of Nebraska, the Dakotas and Montana throughout the summer, leading to near-record amounts of runoff into the Missouri River in the basin above Sioux City and filling the river's six reservoirs. Still coping with all the runoff from the March bomb cyclone, the U.S. Army Corps of Engineers, which manages the river and reservoir system, spent the entire spring, summer and fall trying to evacuate the second-highest amount of runoff in 121 years of record-keeping.

Water levels remained high for the remainder of 2019 due to wet weather conditions and oversaturated soils. High water remained a factor into because repairs to the lower basin levee system have been nearly impossible with the continued flooding events.



CHAPTER 7: ENVIRONMENTAL IMPACTS

THREATENED AND ENDANGERED SPECIES

The SIMPCO MPO planning area houses important habitat for the following threatened and endangered species listed below. Many of these are associated with the Missouri River, are thus monitored by the US Fish and Wildlife Service, as well as the Missouri River Recovery Program. All threatened and endangered species and their habitats are inventoried and assessed during the NEPA process.

Threatened and Endangered Species

- Least Tern
- Piping Plover
- Pallid Sturgeon
- Prickly Pear Cactus
- Prairie Bush Clover
- Northern Long-Eared Bat
- Western Prairie Fringed Orchid

IMPAIRED WATERS

The Big Sioux River is on Iowa's impaired waters list due to pollution from human and animal waste that has infiltrated the surface water. This waste could be from automobiles, winter salt application to roads, wastewater treatment centers, industrial plants, agricultural chemicals (fertilizers, pesticides, herbicides), failing septic systems, and runoff carrying livestock and wildlife waste. To repair this damage, the watershed remediation of the pollution needs to occur. To mitigate this damage, the environmental impacts of transportation projects to the project's location should be as minimal as possible.

WATERWAYS AND BRIDGES

There are numerous bridge structures in the SIMPCO MPO planning area due to its hydrologic features and varied terrain; 43 of these bridges span waterways that have tendencies to flood on a regular basis (Map 7.1). This impacts the transportation system, as bridges are more expensive to construct than a transportation project that does not require bridges.

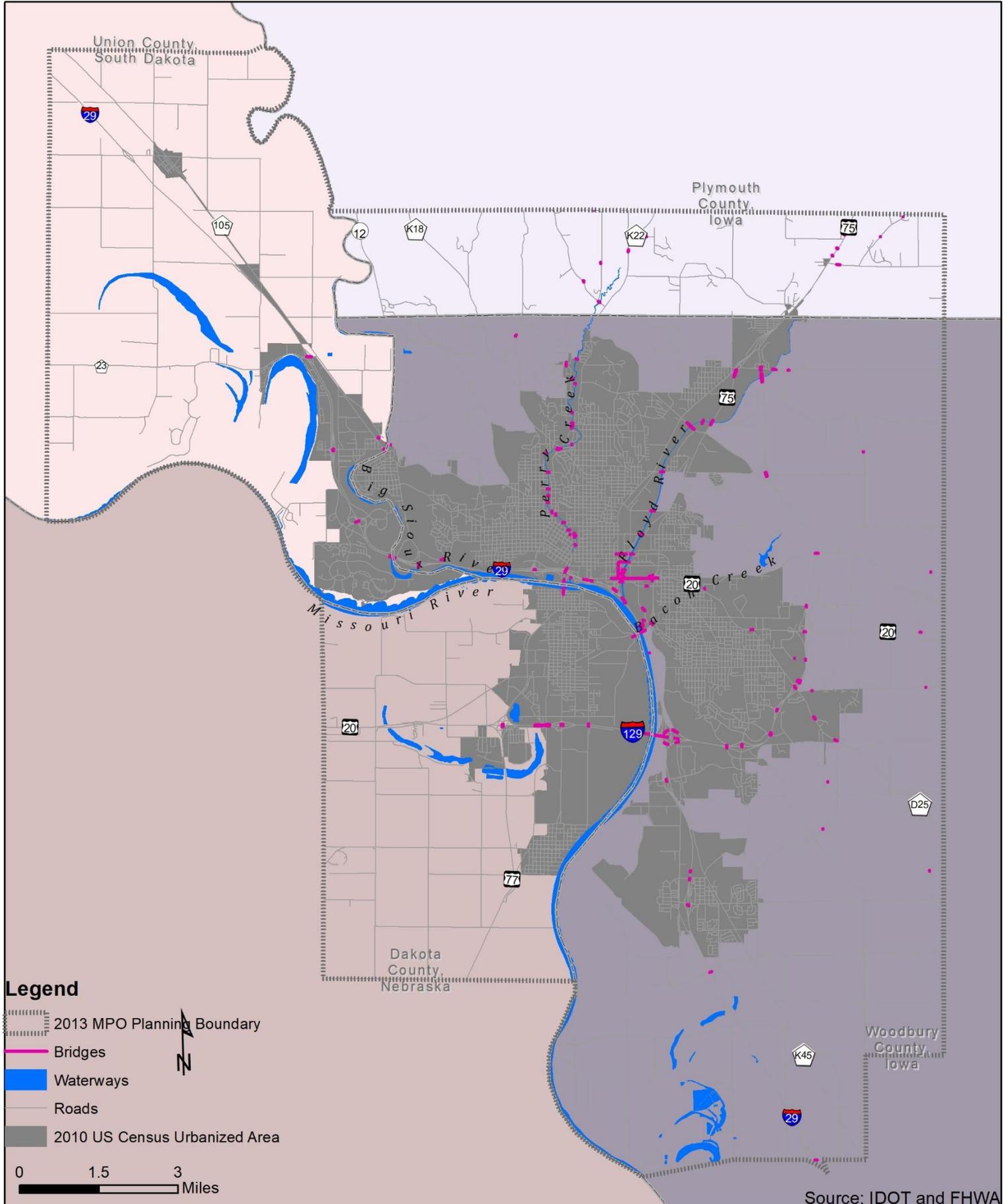


Floyd River in Sioux City, IA



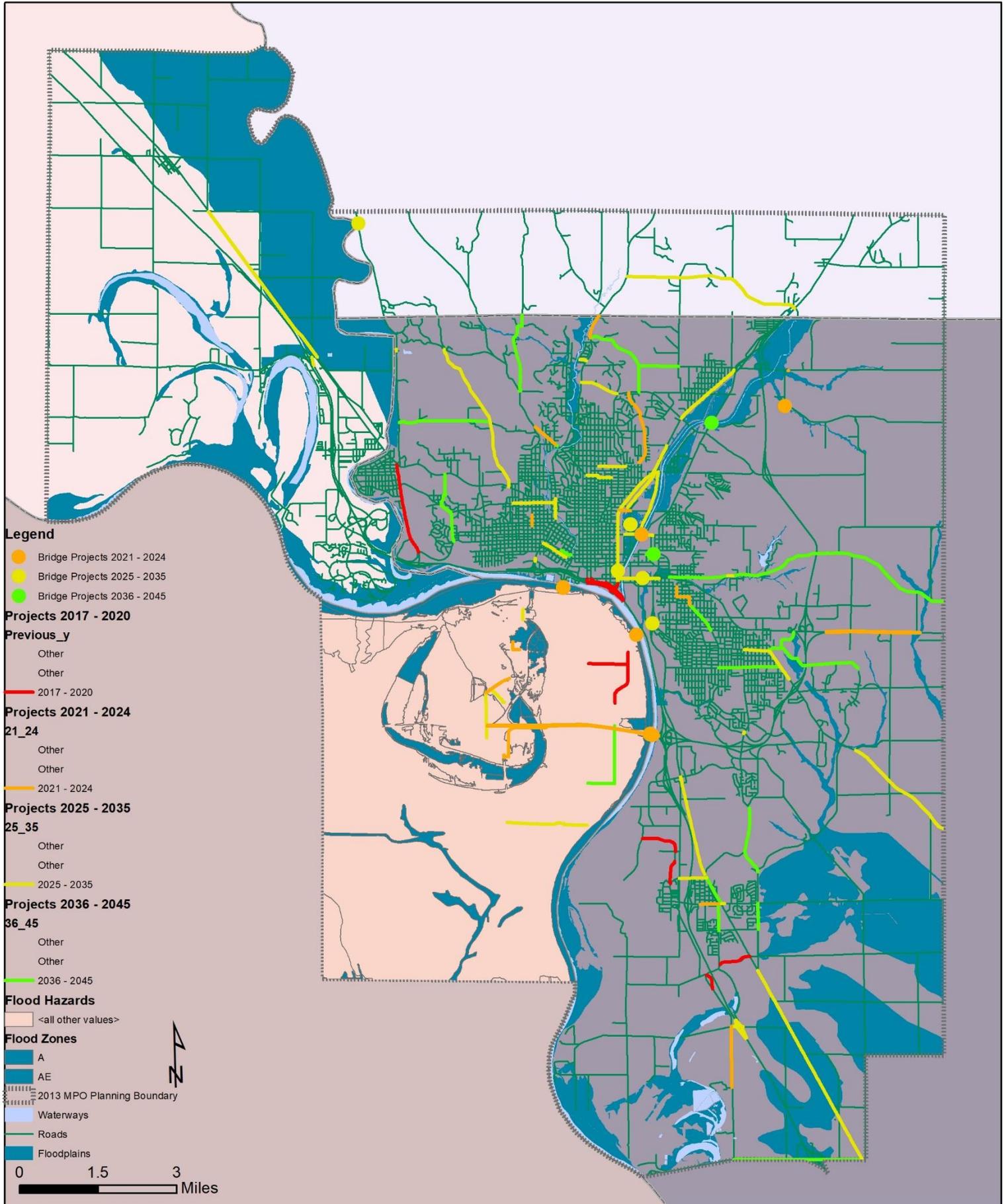
SIMPCO MPO

Waterways and Bridge Structures



SIMPCO MPO

Floodplains and Projects



ALTERNATIVE FUELING SYSTEMS

AUTONOMOUS VEHICLES

Autonomous vehicles, or self-driving cars, are a future technology that is being rapidly developed. These vehicles have the potential to reduce crashes and fatalities since the vast majority of crashes are caused by human error. They could change the way transit and taxi services are provided to the public. Additionally, they could eliminate transportation barriers for those unable to drive or operate vehicles on their own.



The City of South Sioux City is discussing the possibilities of implanting automated buses. While it is still unclear when this technology will be readily available and to what extent it will impact the transportation system, policy should be designed to take advantage of the vehicles' potential while promoting the goals outlined in this plan.

ELECTRIC VEHICLES

The city of South Sioux City has begun utilizing electric vehicles for staff cars. The new electric cars are an effort by the City to go green and encourage the greater Siouxland area to do the same. There are currently 4 electric fueling stations in South Sioux City. In addition to these fueling stations, there are two centrally located in Sioux City (Map 7.3).



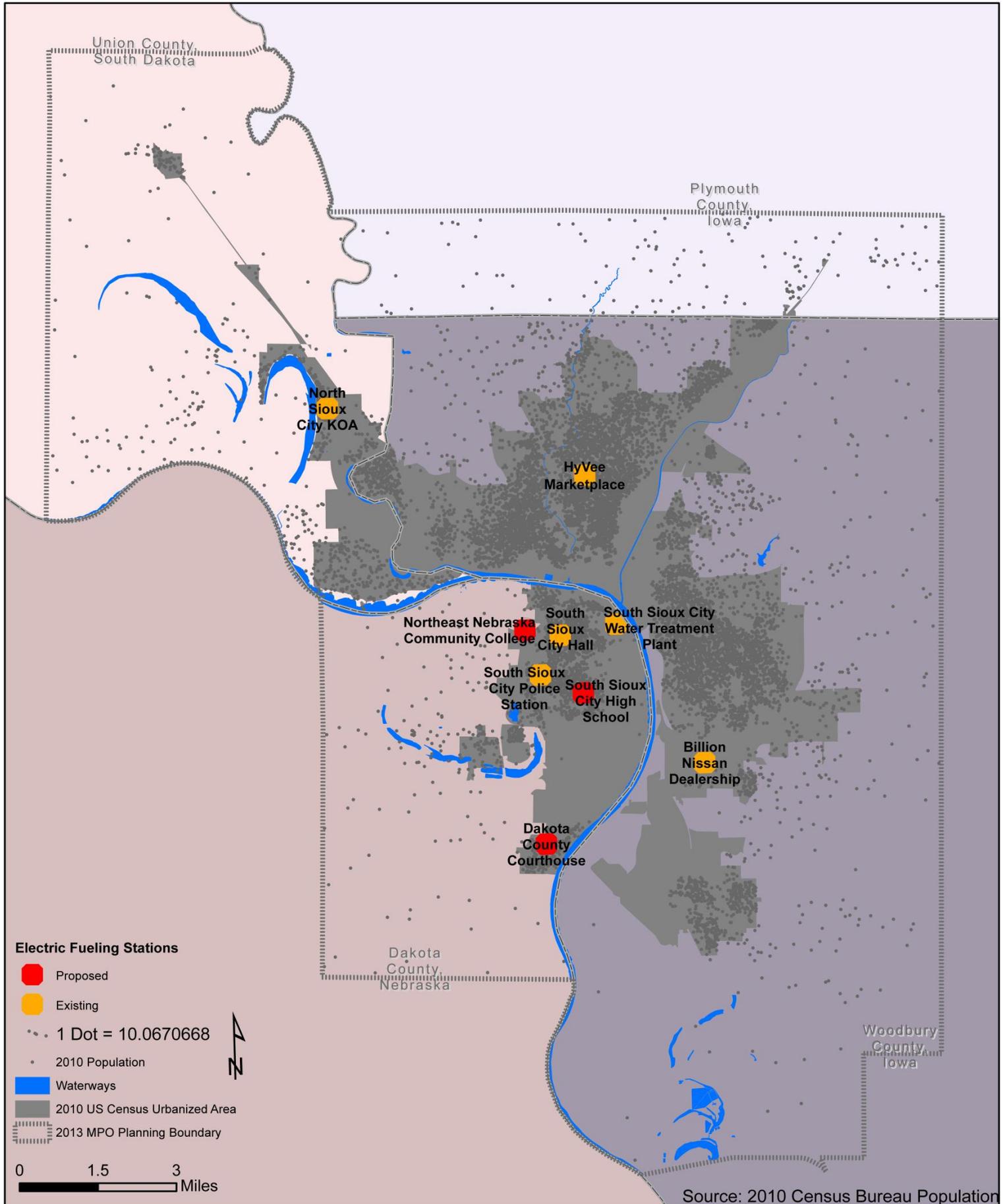
The SIMPCO MPO sees this as a great contribution towards reducing the environmental impacts of day-to-day motorist travel. By using less petroleum-based fuel and more electricity based fuel, which has the potential to come from wind or solar energy, the electric fueling system allows for reduction in greenhouse gas production.

To alleviate range anxiety when driving electric vehicles, MidAmerican Energy Company has initiated an Electric Vehicle Charging Network Program to incentivize businesses and non-residential community partners to serve as host sites for electric vehicle fast-charging stations. Proposed site locations are scattered across the state of Iowa and include potential siting in Sioux City.



SIMPCO MPO

Existing and Proposed Electric Fueling Stations



CHAPTER 7: ENVIRONMENTAL IMPACTS

COMPRESSED NATURAL GAS

While there has been some discussion of the conversion of older busses to electric-powered or the addition of new electric busses to the Sioux City Transit System fleet, their staff feels that a compressed natural gas (CNG) fueling system has the most potential as an alternative fueling system. This would allow for current busses to be retrofitted from diesel fuel technology to CNG technology.

Because of the increase in availability of natural gas due to fracking, natural gas has become an economically viable alternative fueling system. Cheaper fuel and the ability to retrofit busses make CNG economically viable. While using less petroleum is good, it is important to note that fracking's environmental consequences are great, and it has contributed to the



contamination of groundwater and destruction of habitat in the US and other counties. Furthermore, it must be noted that while CNG produces less carbon dioxide, non-methane volatile organic compounds, and nitrogen oxides, it emits unburned methane, which is 30 times more potent than carbon dioxide as a heat-trapping gas, and therefore has the potential to contribute to climate change significantly more than traditional diesel fuel.

HYBRID ELECTRIC TRANSIT BUS

The Sioux City Transit System is in the process of applying for a grant for a new hybrid electric bus. A hybrid electric bus combines a conventional internal combustion engine propulsion system with an electric propulsion system. In a series hybrid bus, the internal combustion engine (ICE) is connected to an electric generator which converts the energy produced by the ICE into electric power. This electricity powers a motor which turns the wheels of the vehicle. The generator also recharges a battery pack which provides supplemental power to the motor. Since the ICE is not connected to the wheels, it can operate at an optimum rate and can even be switched off for short periods of time for a temporary all-electric operation of the bus.



Hybrid buses are estimated to cut emissions by as much as 75 percent when compared to conventional diesel buses. The emissions reductions are a function of the electric drive, ultra-low-sulfur diesel (ULSD) fuel use in conjunction with particulate trap technology and improved fuel economy from the hybrid system.



CHAPTER 7: ENVIRONMENTAL IMPACTS

LAND USE AND LAND COVER CONVERSION

Map 7.4 shows the current land covers from the 2011 National Land Cover Dataset. Land covers of identified tracts of land to be converted to land uses that have been identified by staff persons from each jurisdiction are shown.

AIR QUALITY MONITORING

Air quality has an important influence on human health and environmental wellness. For this reason, Iowa's and South Dakota's Departments of Natural Resources and Nebraska's Department of Environmental Quality monitor air quality for their portions of the SIMPCO MPO planning area (Map 7.5). The SIMPCO MPO planning area is currently in attainment with federal air quality requirements, and has never been in non-attainment status. However, a continued effort to improve air quality must be given in order to keep pace with increasingly strict federal air quality regulations.



The SIMPCO MPO is continually working to improve air quality by pursuing projects that lead to reduced air pollutant emissions within the planning area.

Ways to reduce transportation air pollution include reducing the total number of vehicles driving, using alternative fuel vehicles, and reducing idling.



Therefore, multimodal projects that provide better pedestrian, bicyclist, or transit options as an alternative to the conventional vehicle and projects that incorporate intelligent transportation systems are considered best.

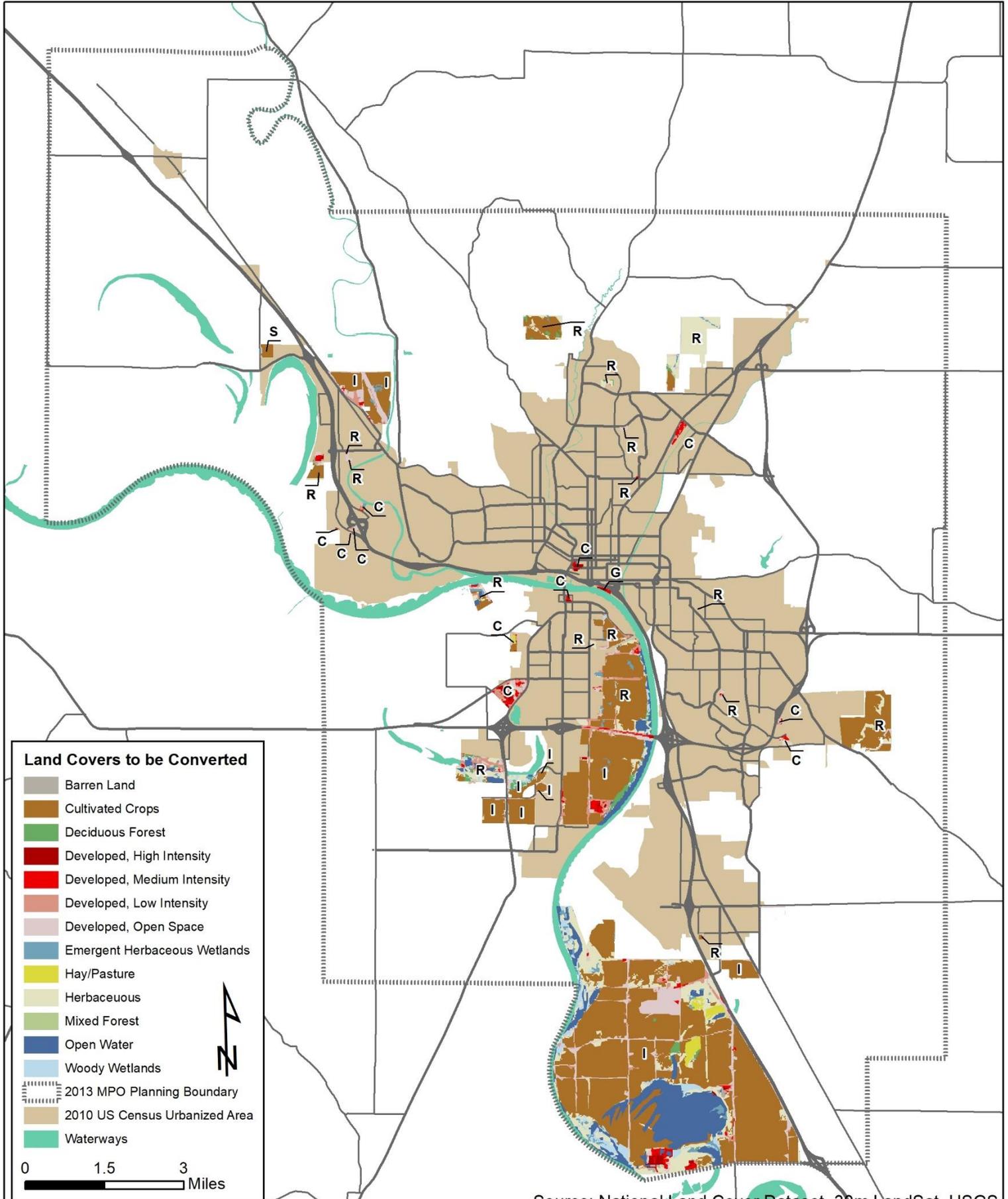
Projects that provide better access to alternative fuels or alternative fuel vehicles would also be beneficial. This plan includes projects of these types.



SIMPCO MPO

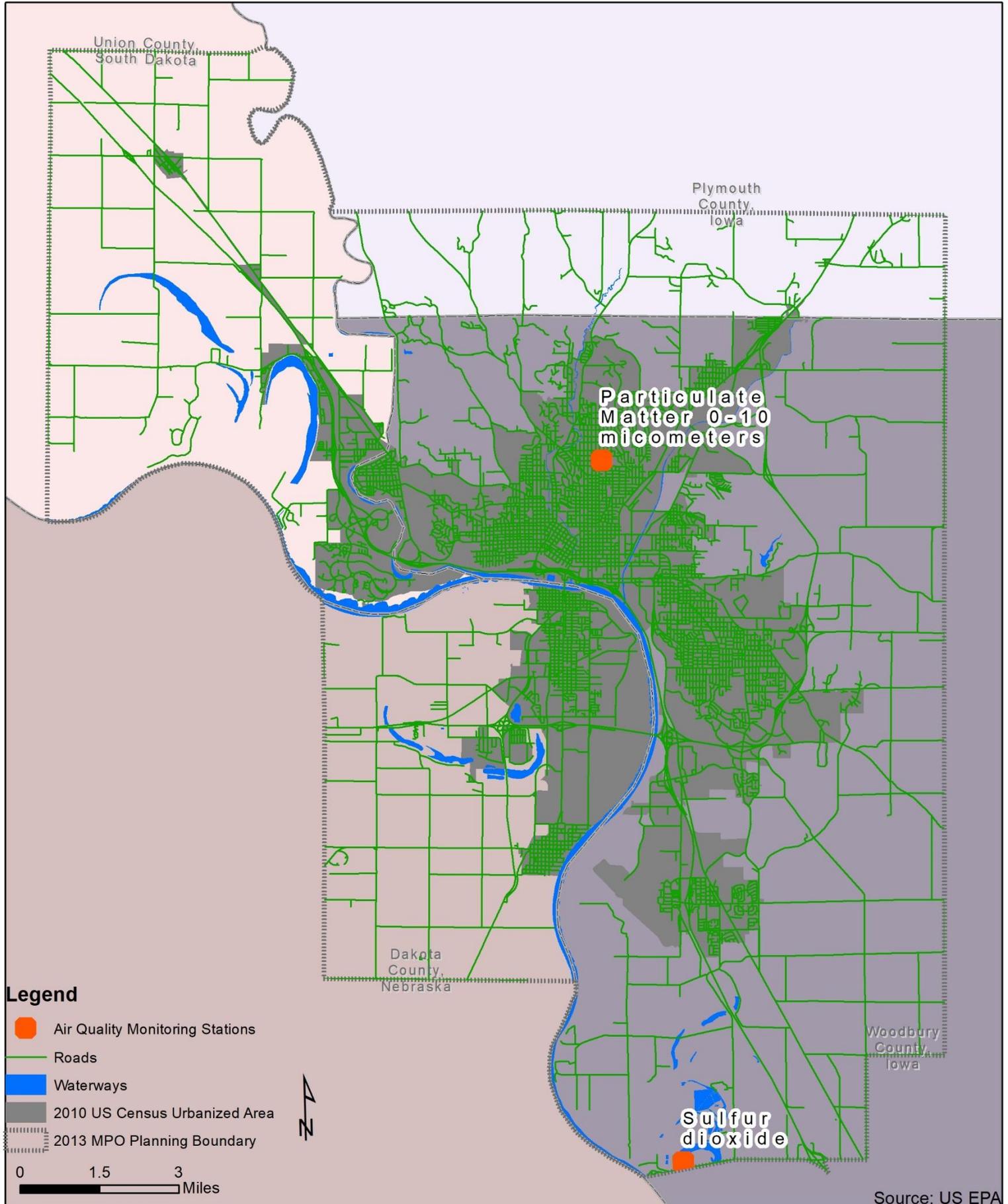
Land Covers of To-Be-Developed Parcels

R=Residential
 C=Commercial
 I=Industrial
 S=School
 G=Green space



SIMPCO MPO

Air Quality Monitoring Stations



CHAPTER 7: ENVIRONMENTAL IMPACTS

PROJECTS AND ENVIRONMENTALLY SENSITIVE AREAS

When looking at the environmental impacts of maintaining and improving the metro transportation network, it is beneficial to determine what environmentally sensitive areas may be affected by planned or proposed projects. For this plan, environmentally sensitive areas include the Loess Hills land formation, state parks/preserves, wildlife management areas, and federally designated wetlands (Map 7.6). Cultural and historical resources are not addressed directly in this plan, as their geographic location information is not available to the public, for protection reasons. However, notification of the development of this plan and opportunity to comment was provided to state cultural resource agencies as a part of the SIMPCO 2018 Public Participation Plan, and all funded projects will go through NEPA protocols and review.

Due to Sioux City's location on the Loess Hills land formation, many of the projects in this plan will affect, in some capacity, the area's Loess Hills. Currently, there is no protection plan for this land formation, other than near the [Loess Hills National Scenic Byway](#). Conserving historical land formations and natural resources such as the Loess Hills should be a priority for any community.

Mitigation of negative effects is important. Potential environmental impacts mitigation activities include:



Wetlands and Water Resources

- Avoid transportation improvements that cross or affect wetlands.
- Take steps to minimize harm and compensate for impacts.
- Retain open spaces and vegetated natural buffers that are around wetlands.
- Reduce and/or prevent highway storm water runoff from entering wetlands.
- Employ low-impact development and construction activities.



Threatened and Endangered Species

- Avoid new construction in and around areas with known threatened and/or endangered species.
- Take steps to minimize harm and compensate for impacts.
- Provide proper maintenance of wildlife fencing.
- Keep the roadway free of trash.
- Use minimal amounts of deicing agents.
- Alert drivers to possible presence of wildlife.
- Provide buffer strips along streams and rivers.
- Maintain natural lighting to the extent possible



Parks and Recreational Lands

- Avoid new construction around parks and recreational areas.
- Take steps to minimize harm and compensate for impacts.
- Provide enhancements to the properties including possible enhancements to the pedestrian/bicycle networks around these areas.
- Reduce vehicle speeds and volumes near parks and recreational areas.
- Replace park/open space acreage taken.



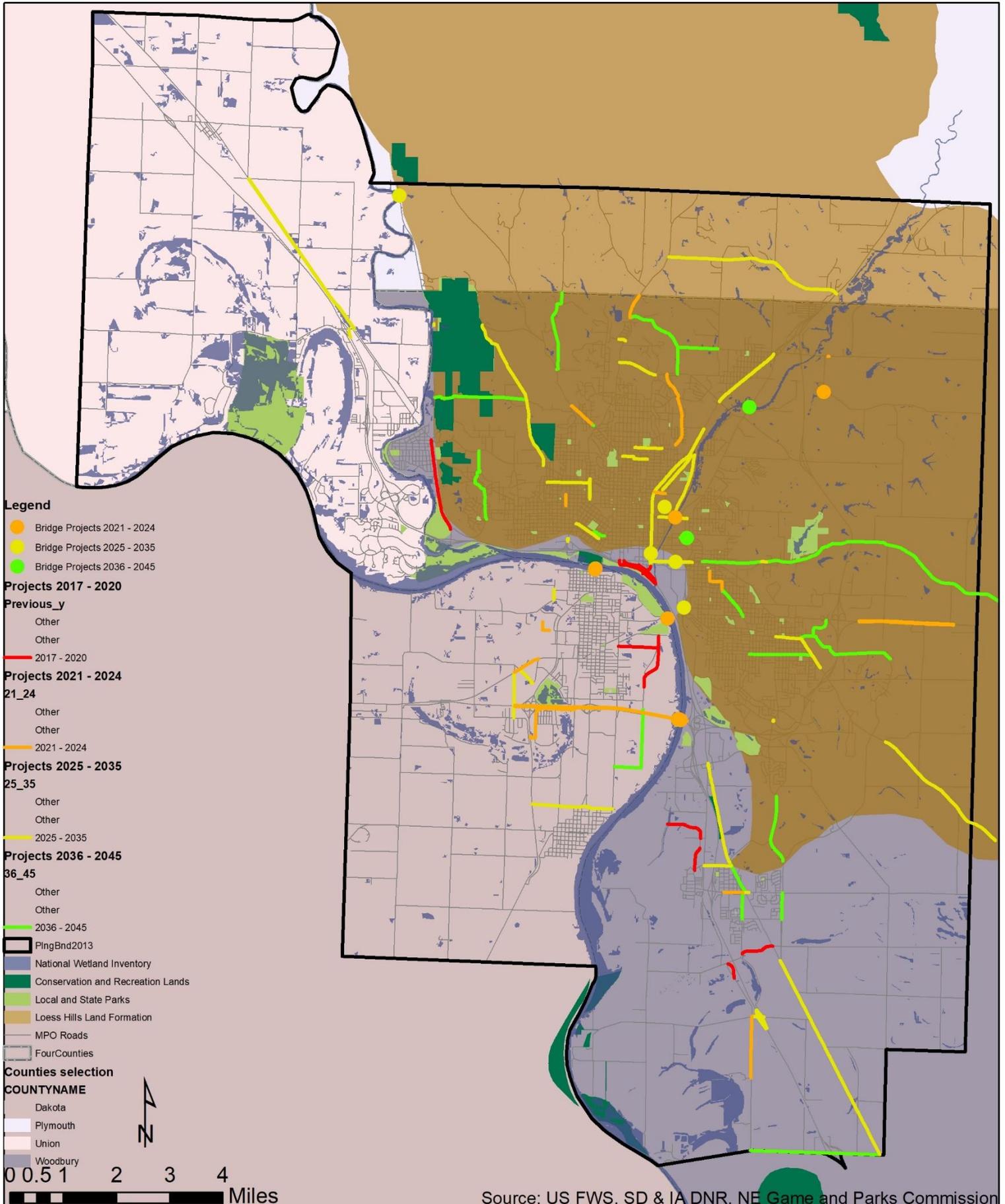
Cultural Resources

- Avoid construction around areas of cultural significance.
- Takes steps to minimize harm and compensate for impacts.
- Include buffers and/or berms in project plans.
- Conduct archeological surveys if unable to avoid the area



SIMPCO MPO

Environmentally Sensitive Areas and Projects



RECOMMENDATIONS

Continue to assess alternative transportation options for public transit and city/county fleets. This includes the consideration of electric or hybrid busses and fleet vehicles reducing environmental impacts in the MPO. In addition, encourage the use of electric vehicles throughout the metro area by increasing the number of electric charging stations available to the public.

The MPO staff should continue to collaborate with the newly formed SIMPCO Water Resource Committee as well as the following organizations listed below to improve environmental stewardship. The intent to collaborate with one another is to review and analyze future projects in the MPO planning area. Members of these groups includes MPO staff and any staff, volunteers, or board and club members from the list below.

In addition, it is recommended that the Engineer and Public Works departments of member agencies consult with local environmental experts, in addition to state departments of natural resource and the U.S. Environmental Protection Agency, to determine if their proposed transportation projects will create heightened impacts to the ecosystems, habitat, and land formations in the region.

- SIMPCO Water Resource Committee
- Sioux City Environmental Advisory Board
- Woodbury County Conversation
- Plymouth County Conservation
- Sierra Club Northwest Iowa
- Keep Northeast Nebraska Beautiful
- Dakota County Soil and Water Conservation District
- Union County Conservation District

