

CHAPTER 7: ENVIRONMENTAL IMPACTS

Chapter 7 discusses the natural environment of the SIMPCO MPO planning area, including 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. This section has been sent to environmental, historic, and cultural agencies during the public review period of this plan's adoption.

CHAPTER CONTENTS

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

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.

Most recently, 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, and 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.

Also in the spring of 2014, flooding along Perry Creek occurred. This caused significant damage to the pedestrian bridge that connects the County Club area of Sioux City to Clark Elementary School and the Hamilton/Outer Drive corridors. This has created a serious disconnect for the neighborhood, Clark school, and the Clark walking school bus program, which is on hiatus until the bridge is fixed in 2017.

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. Because of the extra precipitation, reservoirs' storage capacity was diminished, thus necessitating 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. This, and the closure of the Mormon Bridge on I680, which links northeast Omaha to Iowa, caused major traffic detours that affected major travel routes throughout the Midwest. While there was no significant damage to the road network in the MPO planning area, there was significant economic loss due to the damage and destruction of homes and businesses in the floodplains of the Missouri and Big Sioux Rivers.



Image 7.1: 2011 Missouri River flooding looking towards Bev's on the River and South Sioux City, NE.

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
- Western Prairie Fringed Orchid
- Prairie Bush Clover
- Northern Long-Eared Bat
- Prickly Pear Cactus

IMPAIRED WATERS

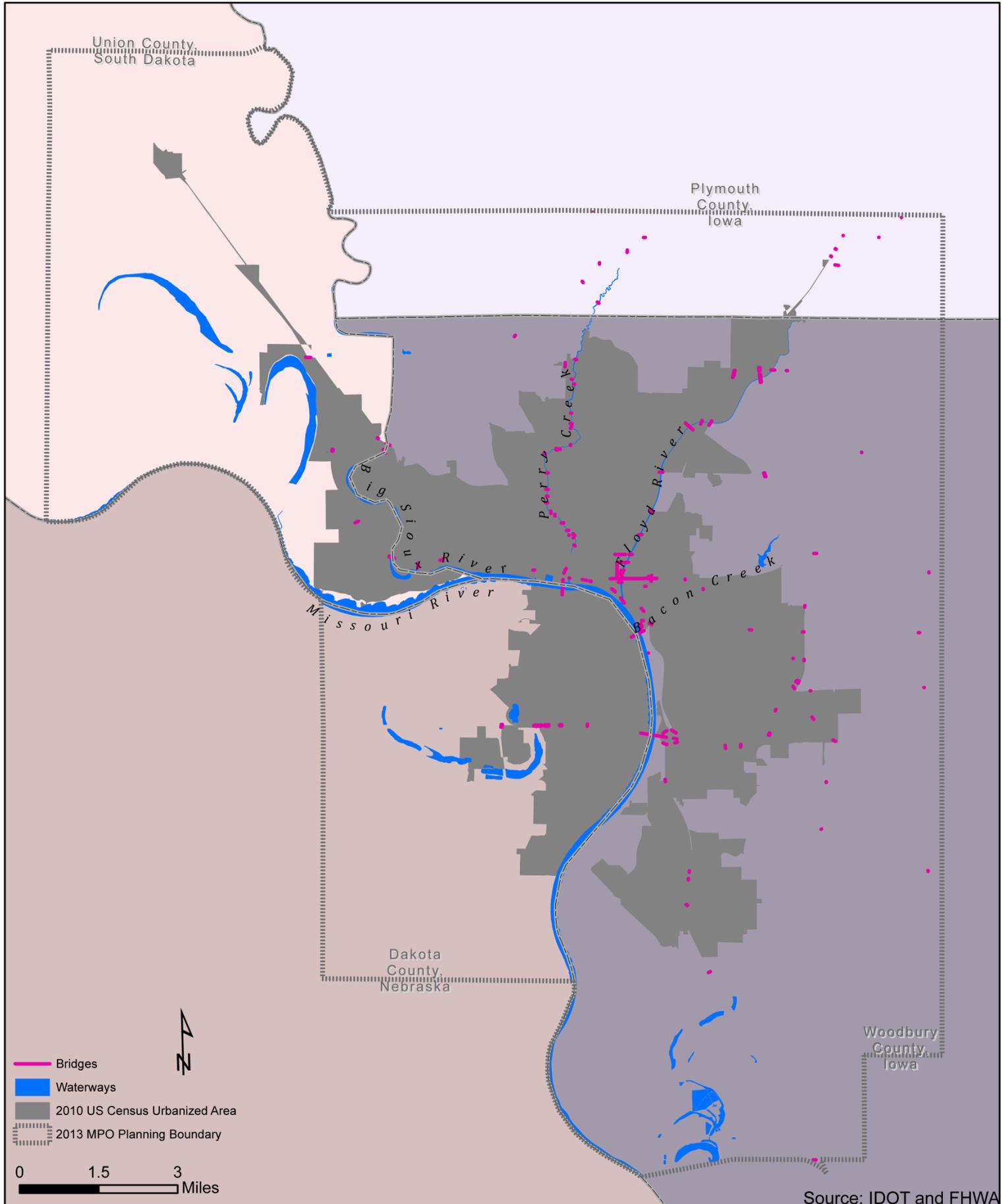
The Big Sioux River is on Iowa's impaired waters list due to pollution from human and animal waste that has infiltrated the surface water. This waste could be from automobiles, winter salt application to roads, wastewater treatment centers, industrial plants, agricultural chemicals (fertilizers, pesticides, 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

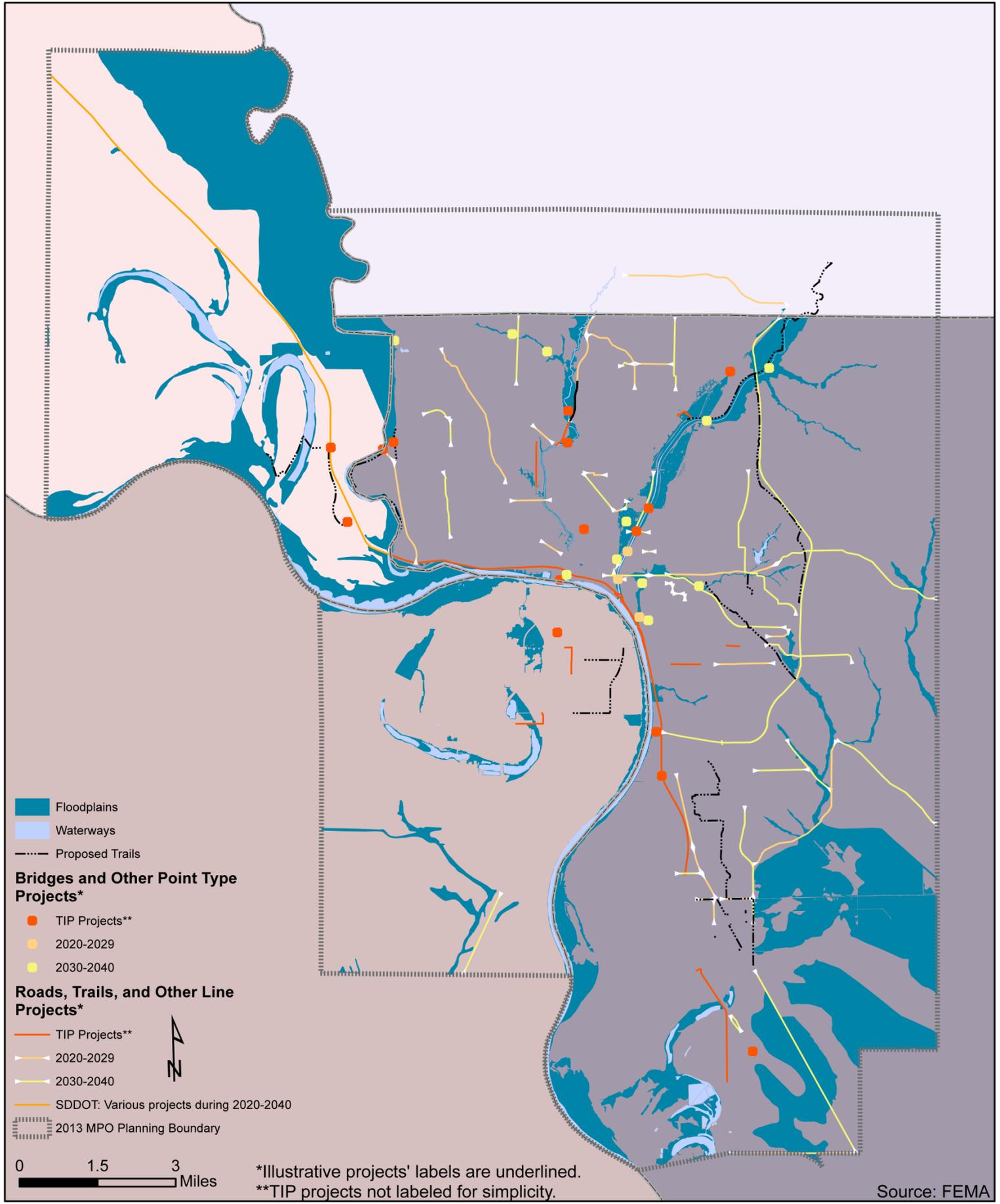
There are numerous bridge structures in the SIMPCO MPO planning area due to its hydrologic features and varied terrain; 43 of these bridges span waterways that have tendencies to flood on a regular basis (Map 7.1). This impacts the transportation system, as bridges are more expensive to construct than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

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Waterways and Bridge Structures



SIMPCO MPO Floodplains and Projects



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ALTERNATIVE FUELING SYSTEMS

ELECTRIC VEHICLES

The city of South Sioux City has begun utilizing electric vehicles for staff cars. There are currently 4 electric fueling stations in South Sioux City. In addition to these fueling stations, there is one 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.



Image 7.2: South Sioux City's electric vehicle

COMPRESSED NATURAL GAS

While there has been some discussion of the conversion of older busses to electricity 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,¹ which is 30 times more potent than carbon dioxide as a heat-trapping gas², and therefore has the potential to contribute to climate change significantly more than traditional diesel fuel.



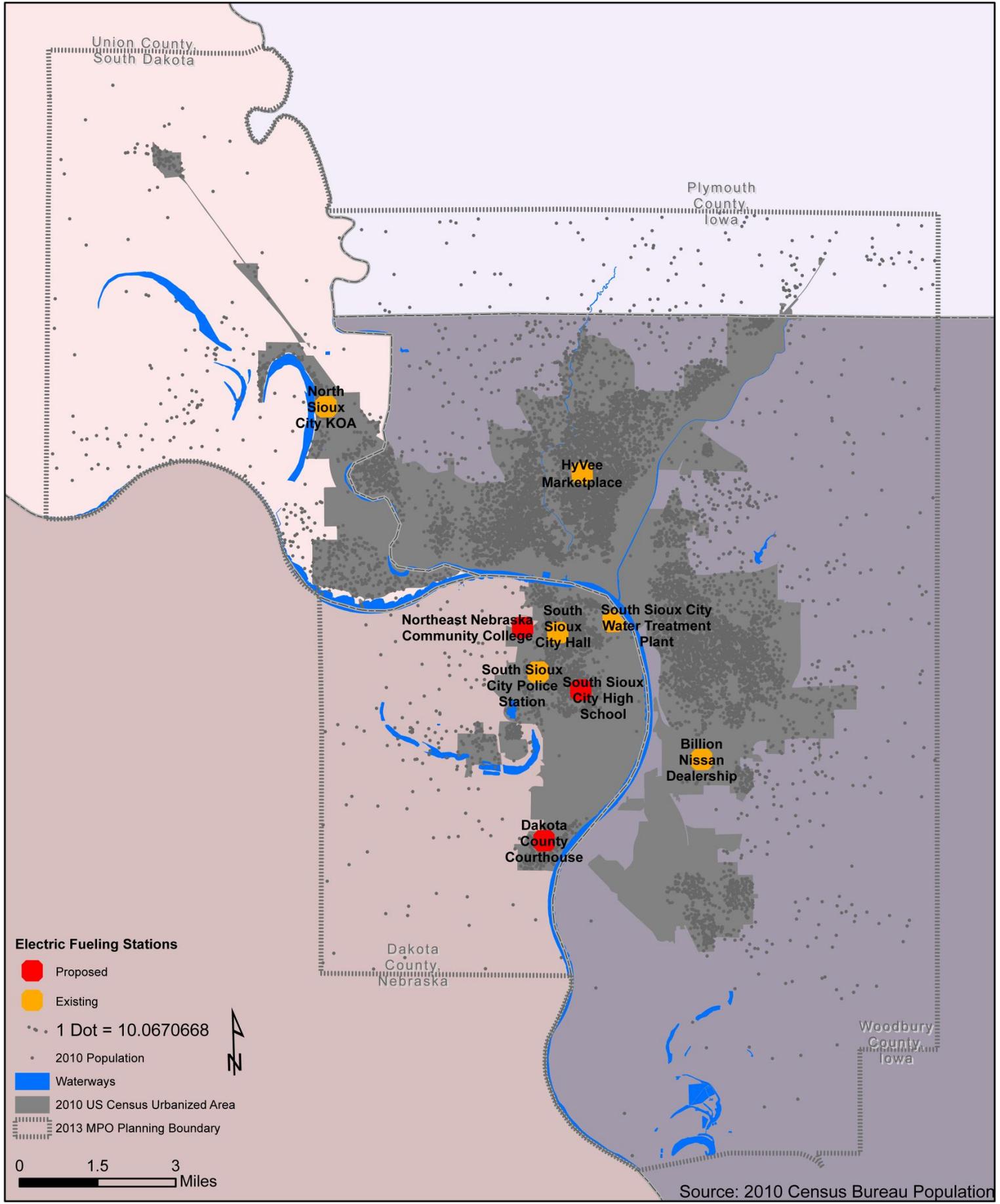
Image 7.3: South Bend Transpo CNG bus in California

¹ National Academies of Sciences, 2010: Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use.

² Gabriel Yvon-Durocher, Andrew P. Allen, David Bastviken, Ralf Conrad, Cristian Gudasz, Annick St-Pierre, Nguyen Thanh-Duc, Paul A. del Giorgio. Methane fluxes show consistent temperature dependence across microbial to ecosystem scales. *Nature*, 2014; 507 (7493): 488.

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Existing and Proposed Electric Fueling Stations



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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. Zoning maps from comprehensive plans were not used since many of these plans are outdated, use the same zoning layer as the 2035 LRTP, and will be updated after the approval of this plan.

Table 7.1 shows the total acres of new land uses that will be implemented in the duration of this plan. Table 7.1 also shows the total acres of land cover that will be lost to those new land uses. Of significance is the conversion of 9,246 acres of agricultural land to a new land use. While agricultural land presents its own issues like chemical runoff that pollutes ground and surface water, and livestock that contribute a large portion of greenhouse gases, commercial, industrial, and residential land also cause environmental issues due to necessary impervious surfaces and other practices which inevitably create litter, chemical storage container leaks, lawn fertilizer runoff, and the urban heat island effect, among others.

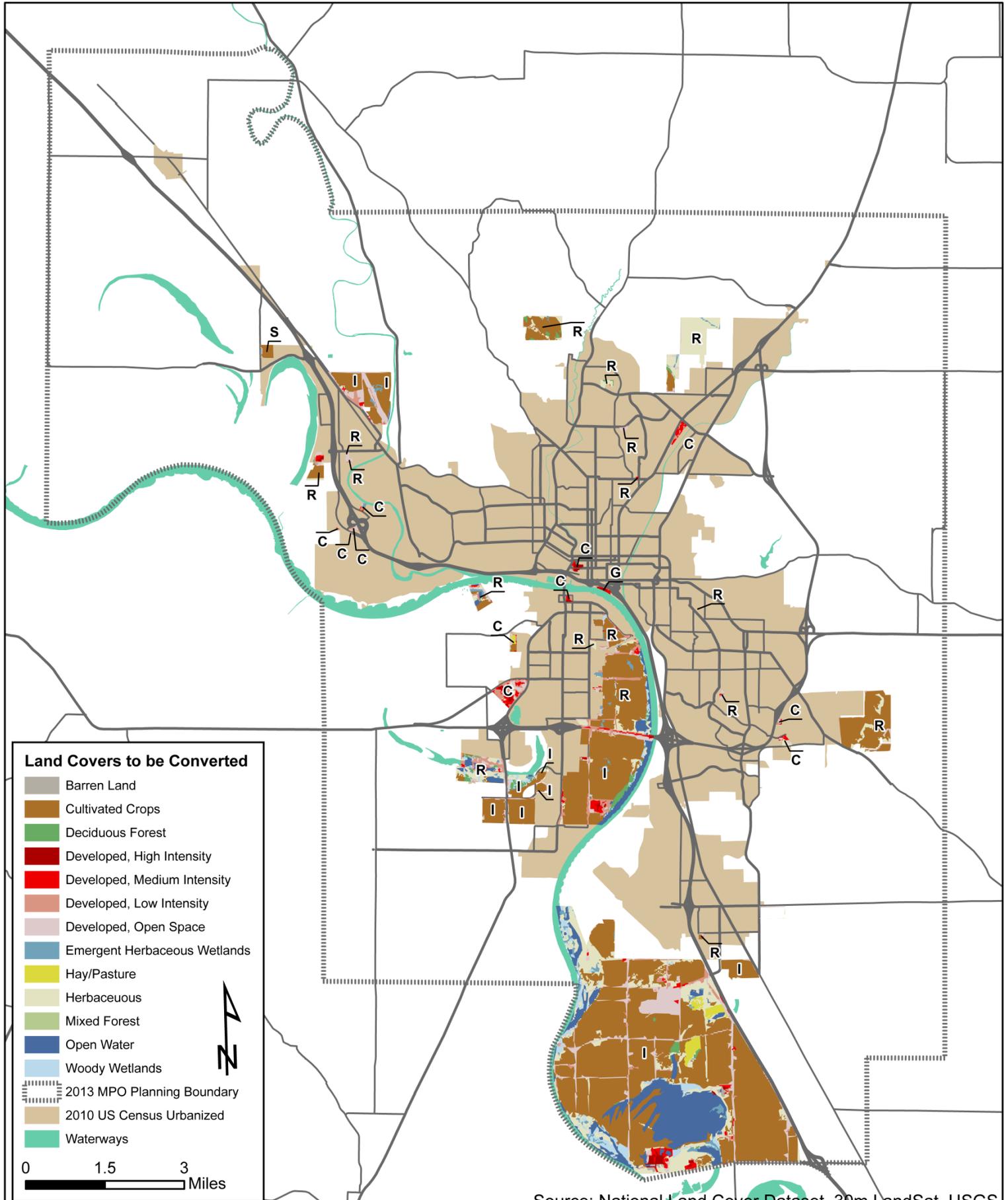
Table 7.1: Acres of new land uses to be converted in the future and the to be converted land.

New Land Use	Total Acres	% Acres	Old Land Cover	Total Acres	% Acres
Commercial	245	1.53	0.16	26	0.16
Green Space	21	0.13	59.32	9,628	59.32
Heavy Commercial	14	0.09	5.4	854	5.32
Industrial	12,760	79.50	7.16	1,153	7.18
Residential	3,011	18.76	13.67	2,131	13.28
Total	16051	100.00	9.6	1,498	9.3
			Wetlands	760	4.74
			Total	15,587	100.00

AIR QUALITY MONITORING

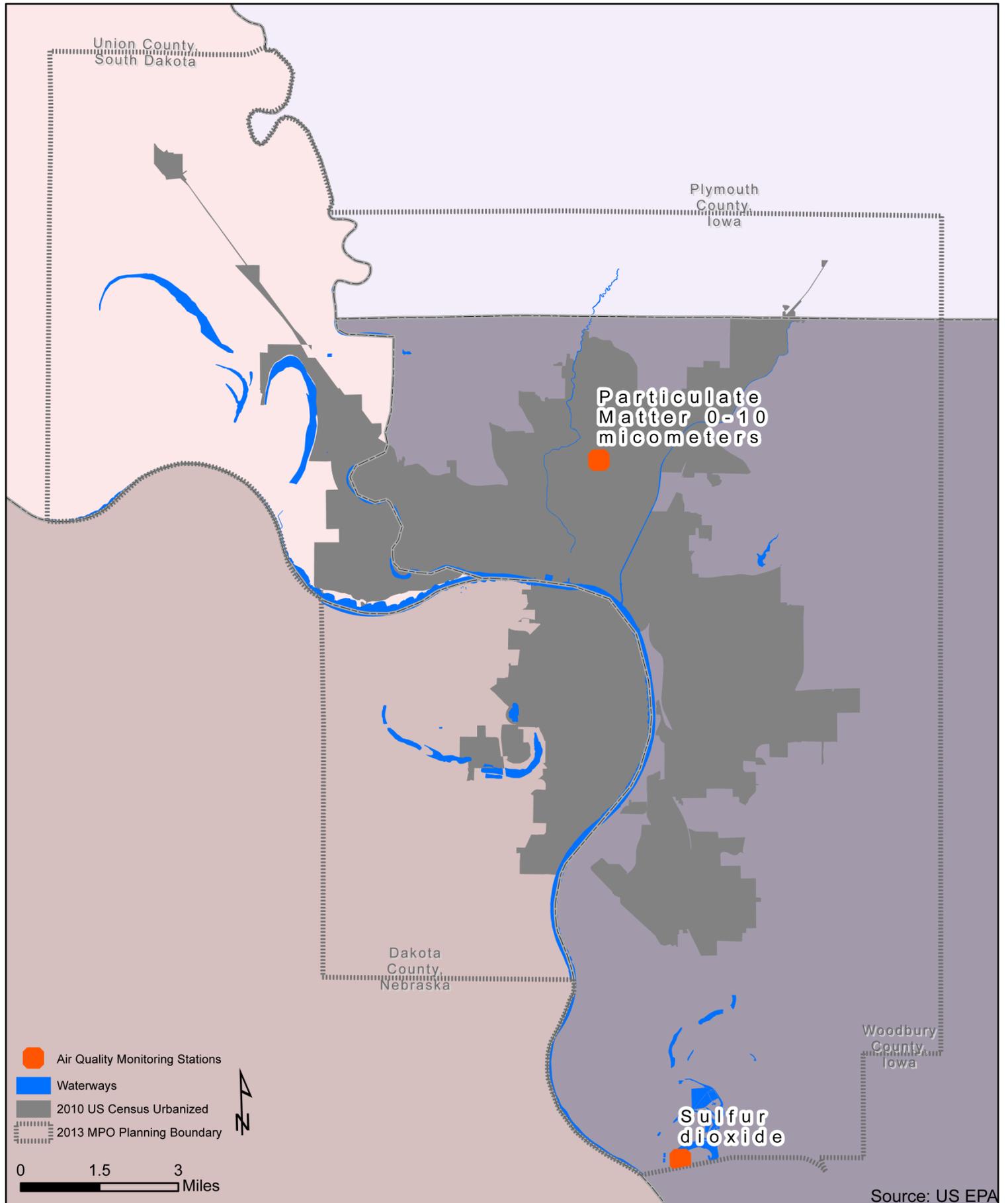
Air quality has an important influence on human health and environmental wellness. For this reason, Iowa's and South Dakota's Departments of Natural Resources and Nebraska's Department of Environmental Quality monitor air quality for their portions of the SIMPCO MPO planning area (Map 7.5). The SIMPCO 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.



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Air Quality Monitoring Stations



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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, this plan was sent to state cultural resource agencies as a part of the SIMPCO 2014 Public Participation Plan, and all funded projects will go through NEPA protocols and review. In addition, this plan has been presented to local environmental advocacy groups, including the city of Sioux City Environmental Advisory Board, Keep Northeast Nebraska Beautiful, and the Northwest Iowa Sierra Club Chapter.

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. Looking at specific projects, there are many that are near, or through, conservation and recreation lands, or area of rugged terrain (project numbers: 204011, 204017, 204018, 204020, 204030, 204032, 204033, 204035, 204037, 4039, 204046, 204054, 204055, 204056, 204057). These projects could prove costly due to the need for alignment and design iterations, the large amount of necessary grading, and the potential need for switchbacks to avoid/protect the natural terrain.

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

Wetlands and Water Resources

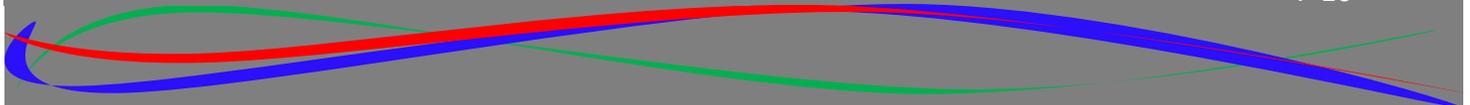
- Avoid transportation improvements that cross or affect wetlands.
- Take steps to minimize harm and compensate for impacts.
- Retain open spaces and vegetated natural buffers that are around wetlands.
- Reduce and/or prevent highway storm water run-off from entering wetlands.
- Employ low-impact development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

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.



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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

RECOMMENDATIONS

After the approval of this plan, MPO staff intend on developing a Transportation Environmental Roundtable, a group of persons whose work or volunteer work entails environmental stewardship. The intent of this group would be review and analysis on transportation projects in the MPO planning area. Members of this group could include 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.

- Sioux City's Environmental Analyst
- Municipal storm and waste water treatment staff
- Iowa County Conservation Board
- USDA National Resource Conservation Service
- Department of Natural Resources
- Nebraska's Game and Parks Commission
- Nebraska's Papio-Missouri Natural Resources District
- Missouri River Recovery Implementation Committee
- Hungry Canyons Alliance
- Sioux City Environmental Advisory Board
- Keep Northeast Nebraska Clean
- Sierra Club

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Environmentally Sensitive Areas and Projects

