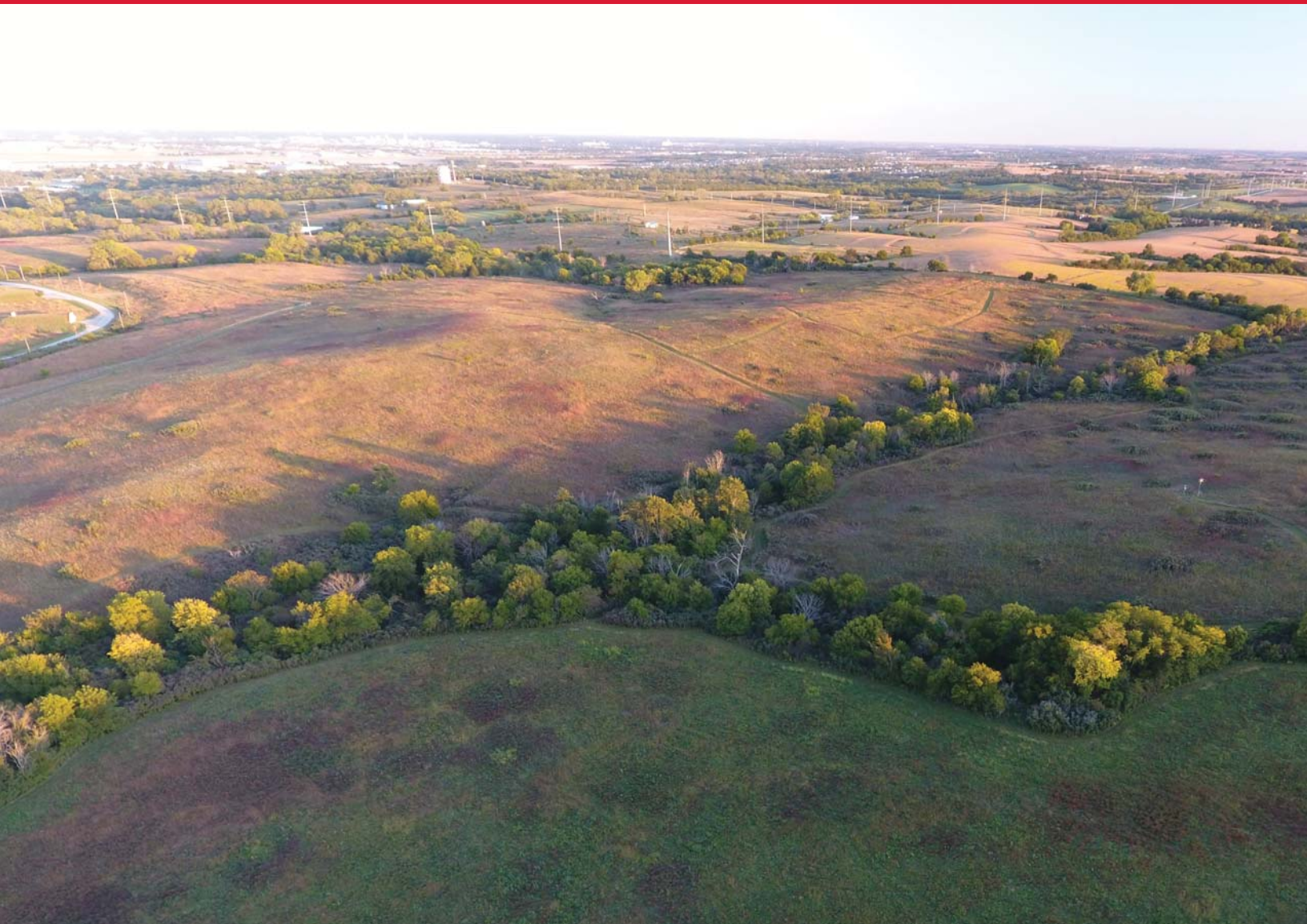


Nine-Mile Prairie Environs



Master Plan

April 2020



CENTER FOR GRASSLAND STUDIES

ACKNOWLEDGEMENTS

The Nine-Mile Prairie Environs Master Plan was initiated by the University of Nebraska Institute of Agriculture and Natural Resources' (IANR) Center for Grassland Studies. To pool resources and ideas, the IANR Vice Chancellor appointed an Advisory Council for Nine-Mile Prairie which includes representatives of the surrounding landowners (public and private), UNL, City of Lincoln, Lincoln Airport Authority, Lower Platte South Natural Resources District, and Natural Resource Conservation Service (NRCS). Funding for the project was provided through the University of Nebraska Foundation.

The following individuals served on the Advisory Council and provided oversight for the project and review of the planning document: Dr. David Wedin - UNL Center for Grassland Studies; Dr. Steve Waller - Former Interim Director of Grassland Studies; Dr. Walter Schacht - Interim Director of Grassland Studies; Robert McNally - Lincoln Airport Authority; Nicole Fleck-Tooze - City of Lincoln Parks & Recreation; Dan Schulz - Lower Platte South NRD; Neil Dominy - NRCS; Michael Forsberg - Platte Basin Timelapse/UNL; Bill Oberg - Private Property Owner.

Select photos sources:

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Nine-Mile Prairie hilltop photos from Platte Basin Timelapse Project

Photo of Dr. John Weaver: University of Nebraska-Lincoln Library Archives

Western Prairie Fringed Orchid: U.S. Forest Service

Regal Fritillary Butterfly: U.S. Fish and Wildlife Service

Married Underwing and Whitney's Underwing: Tom Middagh

Iowa Skipper: MaryAnn Friedman

Sedge Wren: Audubon Society

Yellow-Gray Underwing: Ken Childs (butterfliesandmoths.org)

Zabulon Skipper: Bob Moul (butterfliesandmoths.org)

Southern Wild Senna: missouri.gov

Spring Ladies' Tresses: goorchids.org

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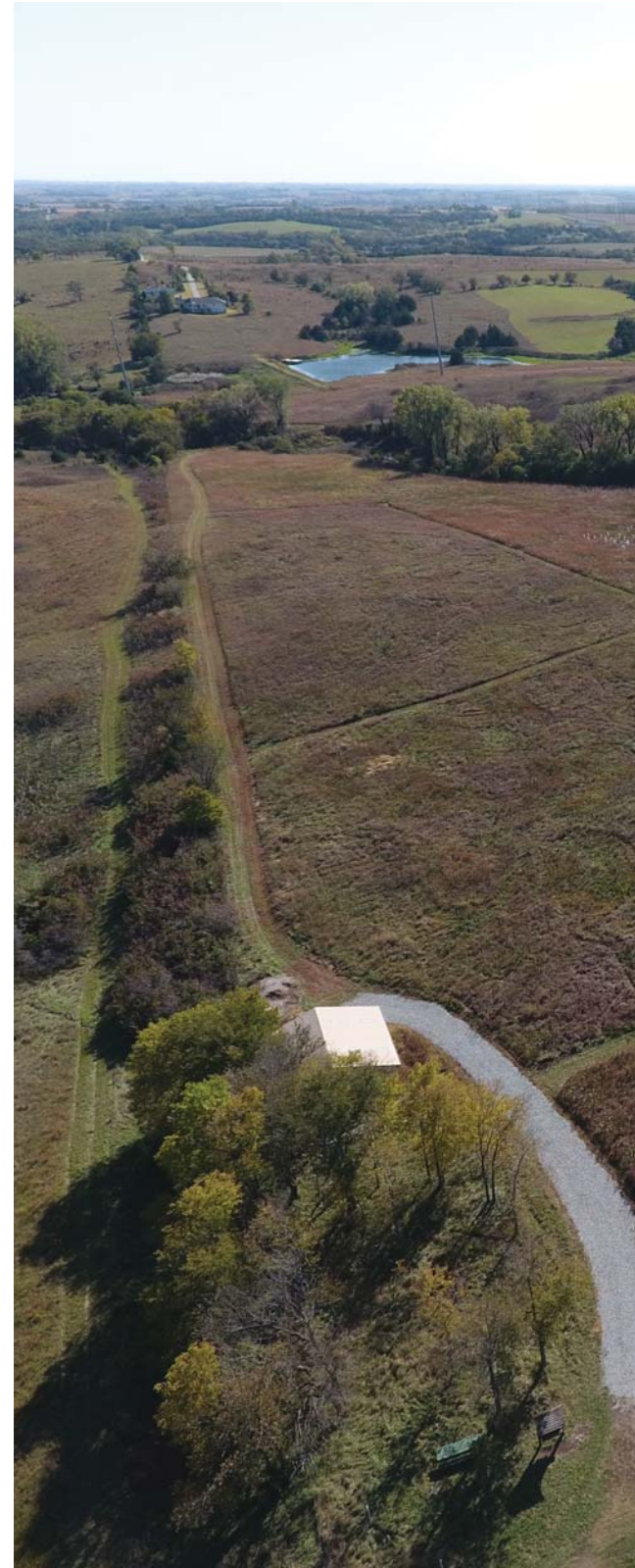
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“Grassland soils through untold centuries have been thoroughly protected by the unbroken mantle of prairie vegetation. The vegetation and soil are closely related, intimately mixed, and highly interdependent upon each other and upon climate. Hence prairie is much more than land covered with grass. It is a slowly evolved, highly complex organic entity, centuries old. It approaches the eternal. Once destroyed, it can never be replaced by man.”

*John Ernest Weaver, the “Founding father of modern plant ecology”
January, 1944
UNL Professor 1915-1952*



*Nine-Mile Prairie photo taken by
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NINE-MILE PRAIRIE ENVIRONS MASTER PLAN EXECUTIVE SUMMARY

A red and white checkered water tower stands atop the hills on Lincoln's northwest fringe. The tower sustains water pressure and is a waypoint finder for air traffic approaching the Lincoln airfield. In addition to these services, the tower's checker pattern can symbolize the surrounding patchwork of native unplowed tallgrass prairie that comprises the Nine-Mile Prairie (NMP) Environs. At the core is NMP, a 230-acre public property full of tallgrass prairie biodiversity and Nebraska history. An area surrounding NMP, referred to as the "Environs" in the context of this strategic planning document, is almost entirely grassland or agricultural cropland. The story of NMP Environs includes Nebraska history, diverse and compatible land uses, biodiversity preservation and tallgrass prairie protection. NMP's future lies not only within the property boundary but equally or of greater importance is the management of the environs around the prairie with compatible land use.

Background and History

Influenced by natural and anthropogenic forces, the tallgrass prairie is always changing. Areas of unplowed soil provide a unique window to Nebraska's natural history. Early inhabitants of the Great Plains likely came and went through the NMP Environs. When the early people of the plains put down roots for permanent villages, the human connection to the prairie soil began. This connection to the land is a significant part of the people of Nebraska's past, present and future identity. A visitor to NMP today can walk the tallgrass prairie on the same native soil as a Central Plains tradition person did hundreds of years ago.

The property was one amongst a regional network of tallgrass prairie field sites studied for monumental plant ecology research in the 1930s by the founder of prairie ecology, Dr. John Weaver. Dr. Weaver's research on prairie plant root systems and drought tolerance was a critical component to the University of Nebraska's land grant university success and standing. Research at NMP by Dr. Weaver's student T.L.



Looking northwest toward NMP

Steiger in the late 1920s has provided a detailed snapshot of frequency and cover at the prairie almost 90 years ago. A recent revisit of this research reveals a snapshot of the dynamic nature of tallgrass prairie.

The NMP property changed ownership between families and a railroad company until purchase by the U.S. Department of Defense in 1953 as a fenced buffer around a Cold War era bomb storage depot. In 1978, the bomb storage depot was deactivated and the property was deeded directly to the Lincoln Airport Authority (LAA). The first step toward the prairie's preservation was to lease 230 acres from LAA to Wachiska Audubon Society but the purchase cost was still too expensive. With the help of then-University of Nebraska Chancellor and agronomist Martin Massengale, the University of Nebraska Foundation became a willing buyer and purchased the property in 1983 with additional financial support from Marguerite Hall Metzger in honor of her late husband Neil W. Hall. In the mid-1980s, NMP was added to the National Historic Registry and it also received a Nebraska State Historical Marker.



"St. John's Wort" at Nine-Mile Prairie
Photo by Michael Farrell/PBT

In January 2019, the IANR Vice Chancellor Michael Boehm appointed an Advisory Council for NMP and charged it with developing a long-range strategic plan for the NMP Environs. The Advisory Council includes representatives of the surrounding landowners (public and private), UNL, City of Lincoln, LAA, Lower Platte South NRD, and Natural Resource Conservation Service (NRCS).

In January 2019, the IANR Vice Chancellor Michael Boehm appointed an Advisory Council for NMP and charged it with developing a long-range strategic plan for the NMP Environs. The Advisory Council includes representatives of the surrounding landowners (public and private), UNL, City of Lincoln, LAA, Lower Platte South NRD, and Natural Resource Conservation Service (NRCS).

The original tallgrass prairie stretched from Manitoba to Texas and east to Indiana covering approximately 200 million acres. According to the Nebraska Natural Legacy Project (2011), less than 1% of the original tallgrass prairie area remains today in the continental U.S. and about 2% in Nebraska in remnant pieces of 80 acres or less making NMP an outlier with an area of 230-acres. NMP and surrounding environs are home to a wide variety of tallgrass prairie plants and animal species that constitute a subset of Nebraska species statewide. Based on research findings, NMP itself is home to over a quarter of the plant diversity across Nebraska and one-fifth of the bird species.



Looking southeast from above NMP



Plan Purpose and Boundary

The master plan goal is to encourage and facilitate long-range land management strategies that are compatible with tallgrass prairie conservation and protection for NMP and surrounding area. Furthermore, the planning effort strives to instill an extended management and utilization philosophy in the surrounding public and private-owned landscape that creates a lasting land buffer around NMP. This also includes working with willing landowners within the NMP Environs to manage, protect and conserve tallgrass prairie on their respective properties.

Define Planning Area Boundary

Establish draft and working planning area boundary based on geographical barriers and grassland extents adjacent to NMP. To conserve and protect sensitive resources within the planning area existing grasslands, woodlands, riparian corridors, agricultural fields, and urban areas were analyzed spatially and prioritized based on habitat diversity and connectivity to the Salt Valley Greenway.

Develop Suitable Land Use Recommendations

Plan outlines recommendations for Advisory Council to plan for myriad of landuse changes on macro- and micro-scales (e.g. linear corridor buffers and pollinator habitat plots).

Identify Land Management Strategies

Document how natural resources and management of the Nine-Mile Prairie Environs fit into a larger signature landscape that is the planning area.

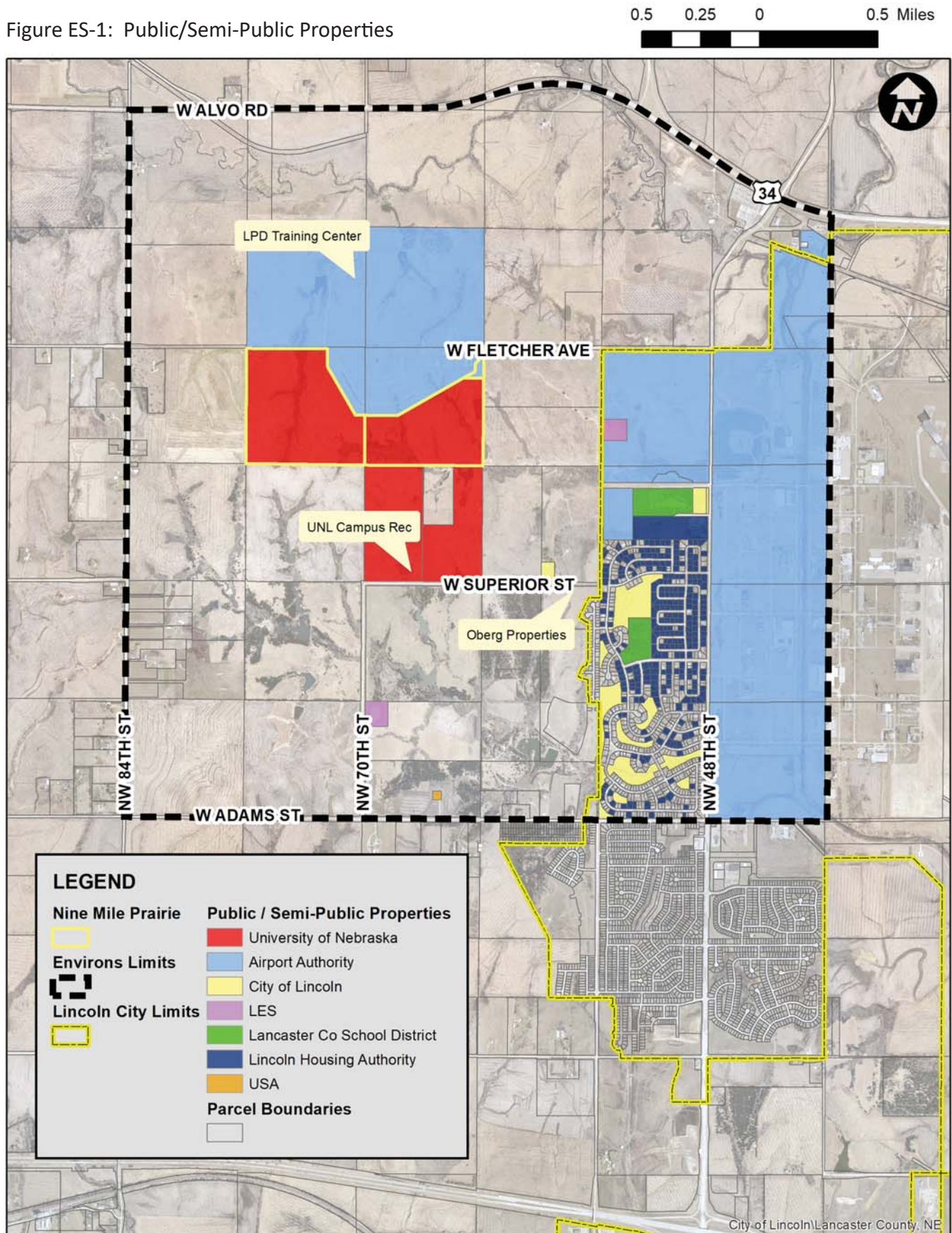
Outline Funding and Organizational Strategies

Outline strategies for Advisory Council consideration that could provide funding to implement planning strategies. Document leadership role duties that could implement the plan. Explore federal, state and local funding sources for Tier 1 and Tier 2 species.

One of the first steps in the strategic planning process for NMP and surrounding area was to establish a draft and working planning boundary. For this planning document, the term “NMP Environs” is used to describe NMP and a planning area around it. The establishment of an initial working environs boundary around NMP seeks to promote and coordinate long-range management strategies compatible with tallgrass prairie enhancement, preservation, and protection. The boundary was based on early strategic planning discussions conducted by the Advisory Council before the initiation of this planning effort. The boundary is influenced by existing features as there is not a planning industry standard that defines or recommends a planning area offset distance from a property like NMP. Furthermore, the draft boundary was determined based on Advisory Council guidance, drainage boundaries/alignments, public land ownership, and major roadways in area. The relative scale of the Prairie Corridor in southwestern Lancaster County surrounding Spring Creek Prairie generally influenced the size of the NMP Environs area. The environs boundary is dynamic and may change as the plan evolves over time with implementation.

There are many existing properties in the environs that are used/managed in a way that is compatible to the protection and preservation of NMP. These properties, as well as the draft environs boundary, are shown on ES-1.

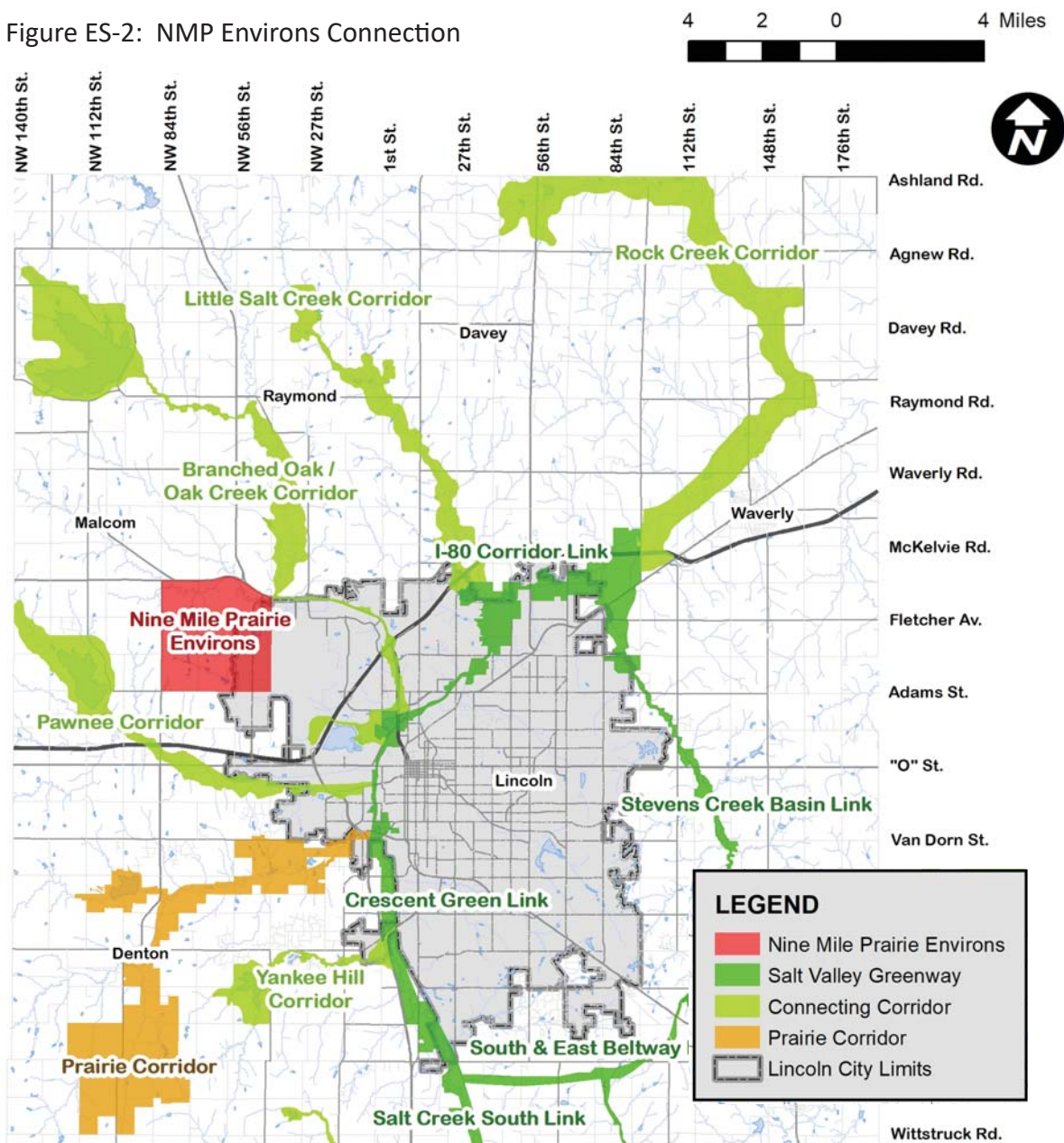
Figure ES-1: Public/Semi-Public Properties



The Salt Valley Greenway (SVG) Master Plan (2012) established a large loop primarily consisting of Salt Creek and Stevens Creek to form the primary Salt Valley Greenway (see Figures ES-2). This large greenway loop is anchored in hydrologic features such as streams, wetlands and floodplains of Salt Creek and tributaries and ecological factors like existing physiography, soils and slopes, woodlands, grasslands, and wildlife habitat. The broader SVG is comprised of links, connecting corridors, and nodes.

The NMP Environs, a boundary that is dynamic and may change as the plan evolves over time with implementation, could be a new corridor with NMP as a node as defined in the LPlan 2040. This will be a key corridor for the conservation and protection of NMP Environs and will provide a leading role in implementing corridors and nodes as assets of the SVG as a whole. Of particular note, Lplan 2040 also amended LPlan 2030 so as not to bring residential housing up to the east edge of NMP, as had once been envisioned. The NMP Environs Master Plan recommends inclusion of the NMP Environs corridor in the upcoming Comprehensive Plan update for 2050.

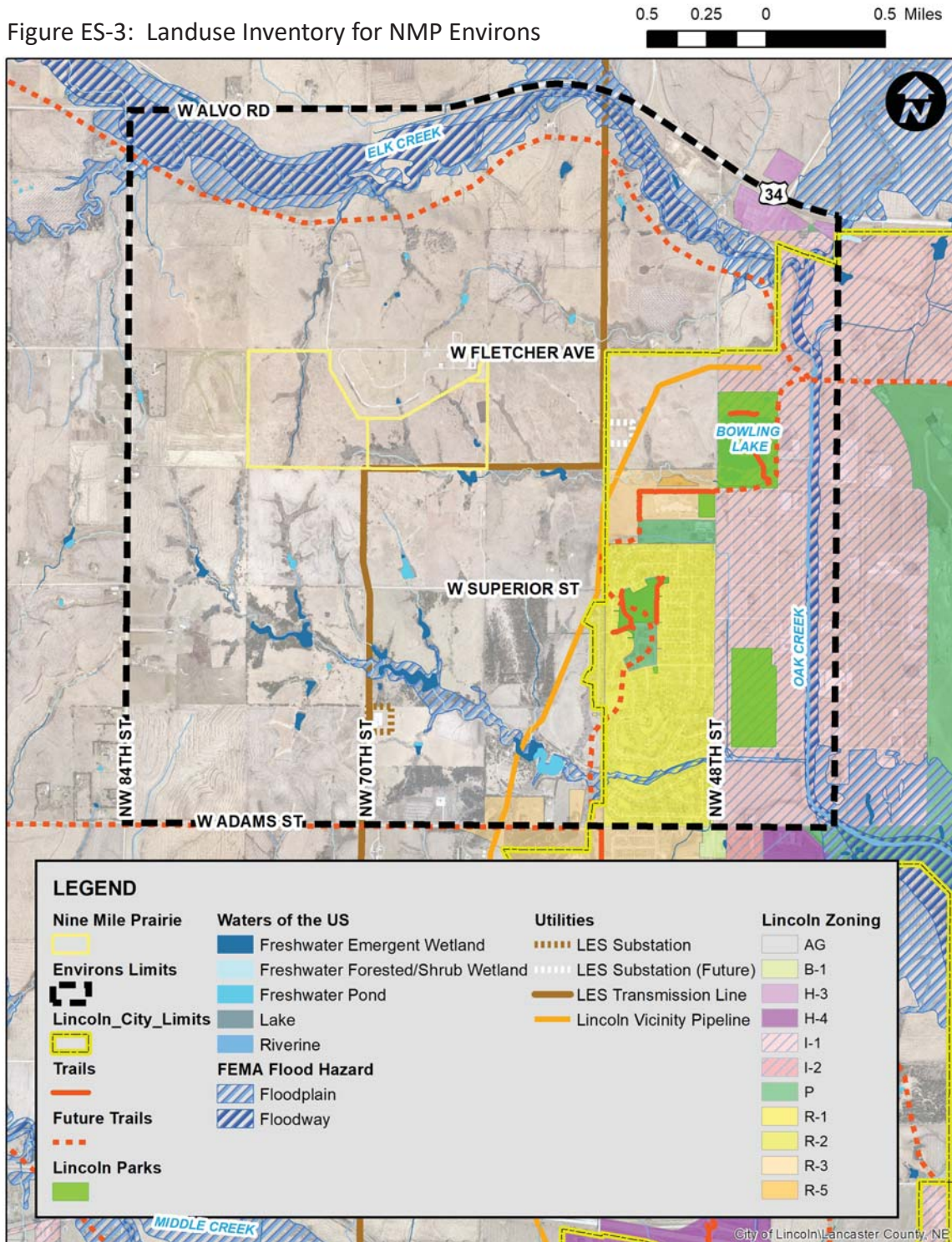
Figure ES-2: NMP Environs Connection



Land Use Inventory and Assessment

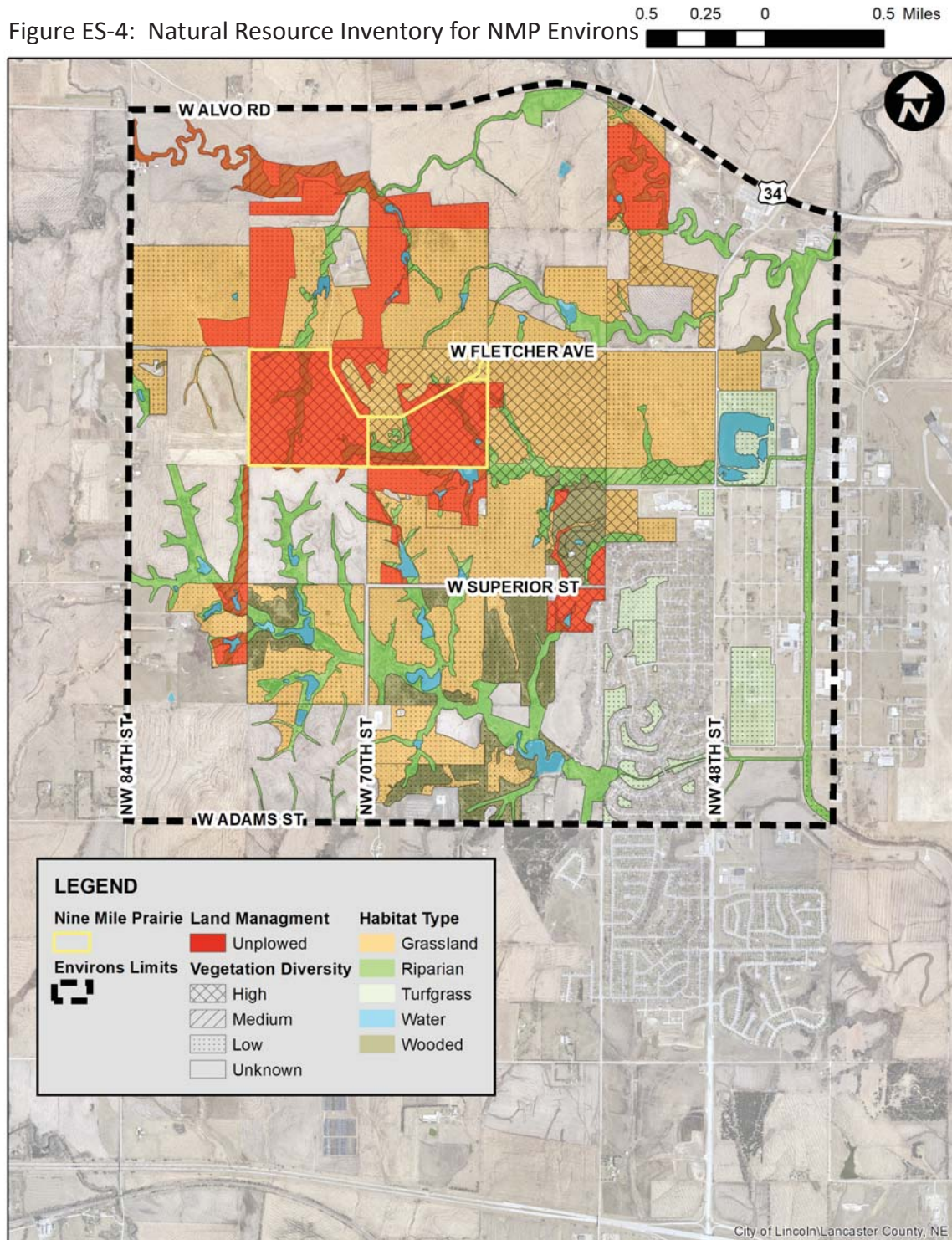
The City of Lincoln and Lancaster County have mapped existing and future land uses to facilitate urban growth planning. Within the NMP Environs existing land uses include, but are not limited to environmental, grassland/pasture, riparian, agriculture, industrial and residential areas. The environmental landuse designation covers NMP, portions of the UNL Campus Recreation Property and the adjacent Lincoln Airport Authority decommissioned bomb shelter property due to the presence of sensitive prairie habitat and unique features. A comparison of existing land use designations with 2018 aerial imag-

Figure ES-3: Landuse Inventory for NMP Environs



ery and site surveys found areas of change. The existing land use map has been updated in this Master Plan to better reflect the current landuse in the area. Land use maps were updated and categorized based on habitat diversity and historic plowing metrics. Figure ES-3 is a landuse map comprised of available GIS datasets from the City of Lincoln such as existing and future trail locations and future landuse planning. Figure ES-4 includes datasets generated for this Master Plan, depicting natural resources (as described in Part 3).

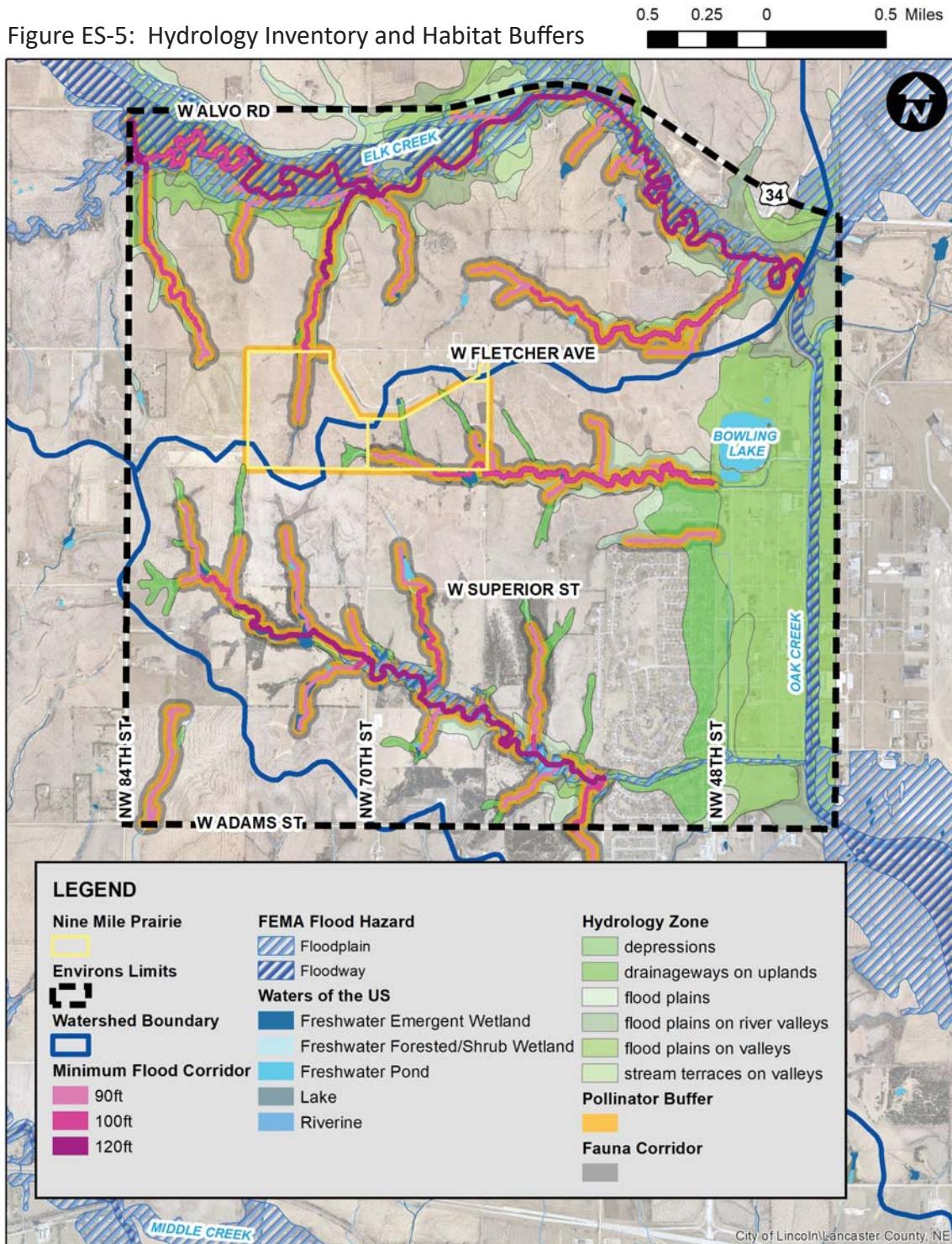
Figure ES-4: Natural Resource Inventory for NMP Environs



Hydrology Inventory and Buffers

The NMP Environs is situated on the watershed divides of Elk Creek, Oak Creek and Middle Creek. Numerous tributaries to these large streams have head-waters located on or near NMP. Tallgrass prairies play an important role in the hydrologic cycle. Several GIS datasets are available for identifying and inventorying stream corridors, floodplains and wetlands. These include the National Wetlands Inventory, Regulatory Floodplains and Flood Corridors, and soil geomorphology. Hydrology inventory information is included in Figure ES-5.

Figure ES-5: Hydrology Inventory and Habitat Buffers



Spatial Analysis and Prioritization Methodology

Current land use within the NMP Environs is generally compatible with management activities used to protect species diversity in high quality prairies. The City of Lincoln's comprehensive plan indicates that the City's future growth needs will include urbanization within the NMP Environs. This future growth/urbanization would be subject to review and/or changes in future comprehensive plan(s). To fulfill the mission of the NMP Environs Master Plan for natural resource protection, connection to the Salt Creek Greenway, and compatible landuse planning, spatial analyses were employed. GIS data derived for the Environ's existing landuse, hydrology, and buffer inventory were ranked based on habitat diversity and connectivity. These rankings were applied across the Environs on a 20ft by 20ft grid basis to account for discrepancies in input data, spatial resolution, and accuracy. A ranking matrix (as shown in Part 4) was applied to establish an overall priority ranking for habitat protection. Areas with a higher priority ranking require special consideration for compatible landuse planning. This includes identifying and protecting existing natural resources and maintaining corridors for faunal movement and recreational trails.

Habitat Diversity Analysis

The criteria used to develop the habitat diversity ranking considered the type of landuse, plowing and disturbance history, and known areas of higher vegetation species diversity. A ranking score of 10 represents the highest likelihood of species diversity, while 2 represents the lowest. Figure ES-6 demonstrates how the landuse inventory was used to derive the habitat diversity score map. Figure ES-7 shows the habitat diversity score for the NMP Environs.

Figure ES-6: Habitat Diversity Ranking Example

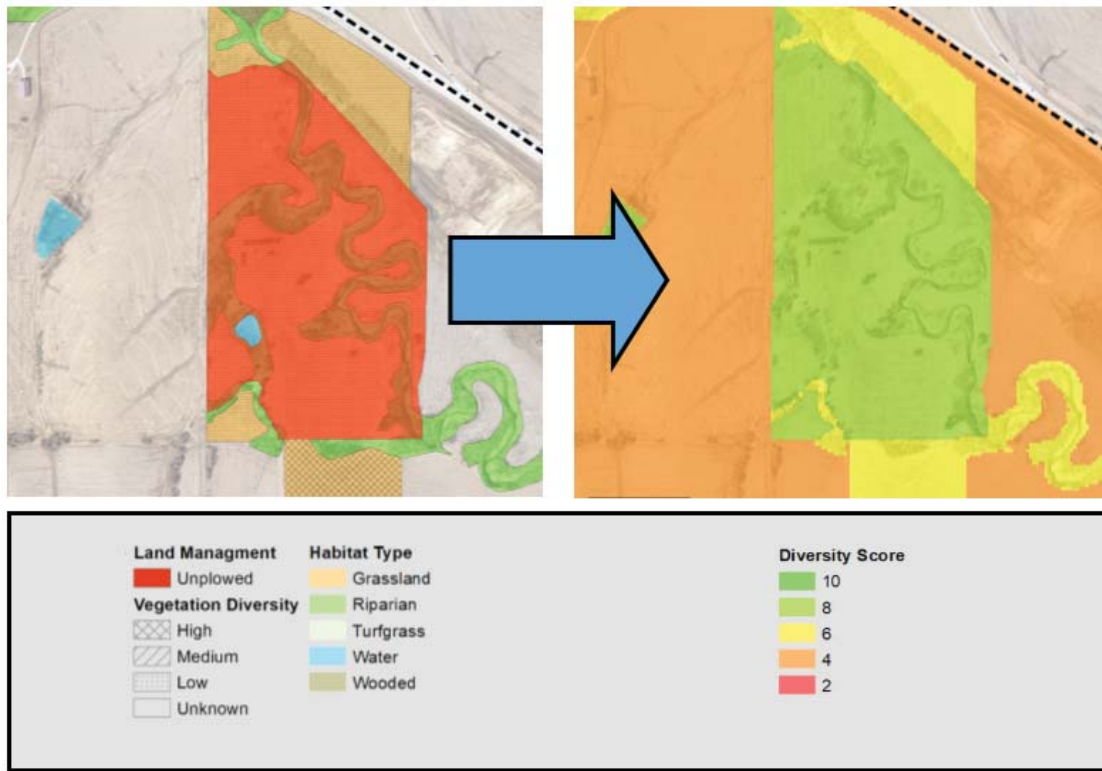
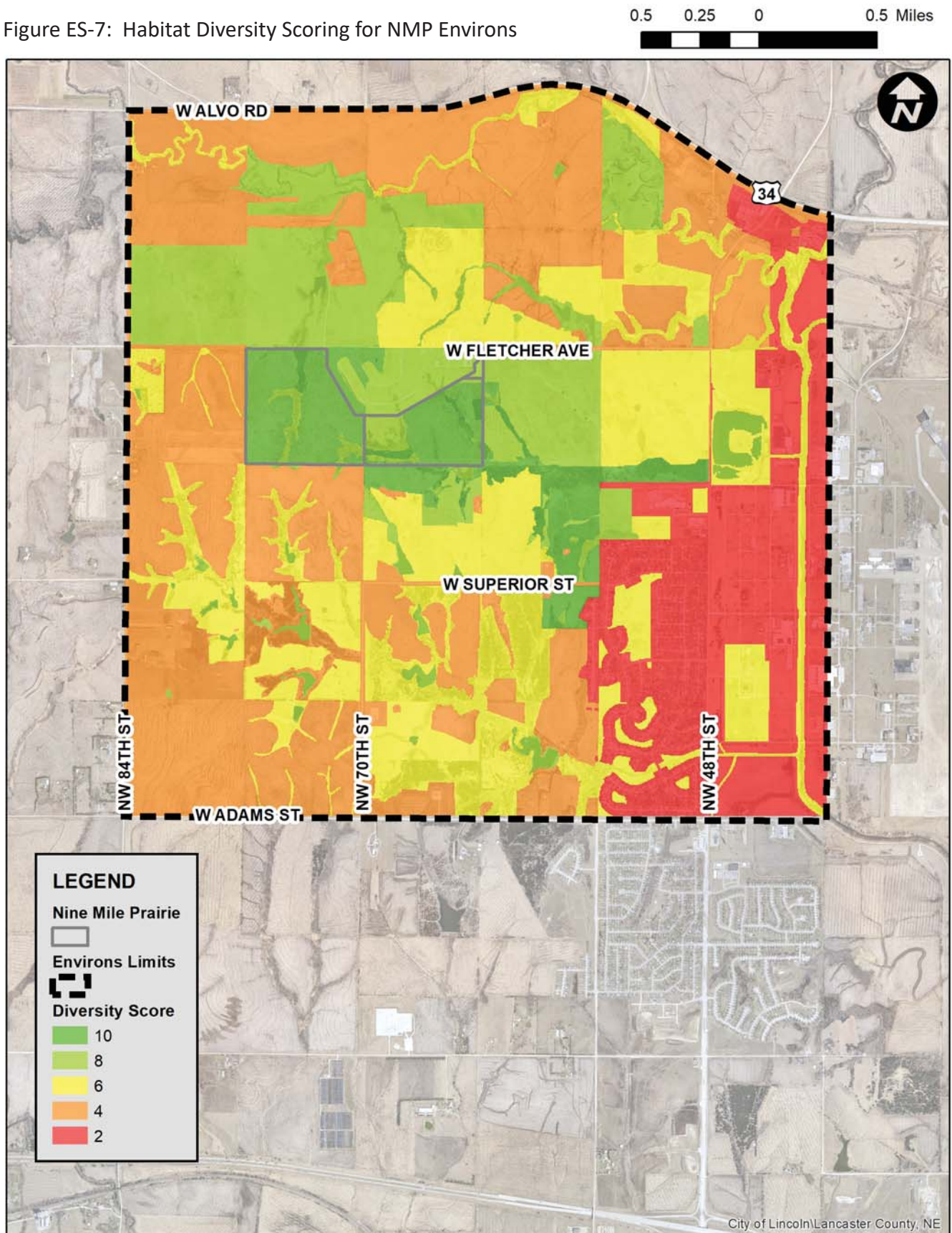


Figure ES-7: Habitat Diversity Scoring for NMP Environs



Habitat Connectivity Analysis

Criteria were also used to develop the habitat connectivity weighting score. Connection between NMP and the Salt Valley Greenway can be achieved along protected stream corridors with regulatory floodplains and minimum flood corridors. Functioning as the headwaters, several stream corridors connect NMP to Elk Creek and Oak Creek, whose confluence is a connecting corridor to the Salt Valley Greenway. This weighting also considered a pollinator buffer to NMP, soil geomorphology along corridors, and minimum corridor widths for faunal movement. A weighting of 2.5 represents the highest level of corridor connection, while 1 represents the lowest. Figure ES-8 demonstrates how the hydrology inventory and habitat buffers were used to weight habitat connectivity to the Salt Valley Greenway. Figure ES-9 shows the habitat connectivity weighting score for the NMP Environs.

Figure ES-8: Habitat Connectivity Weighting Example

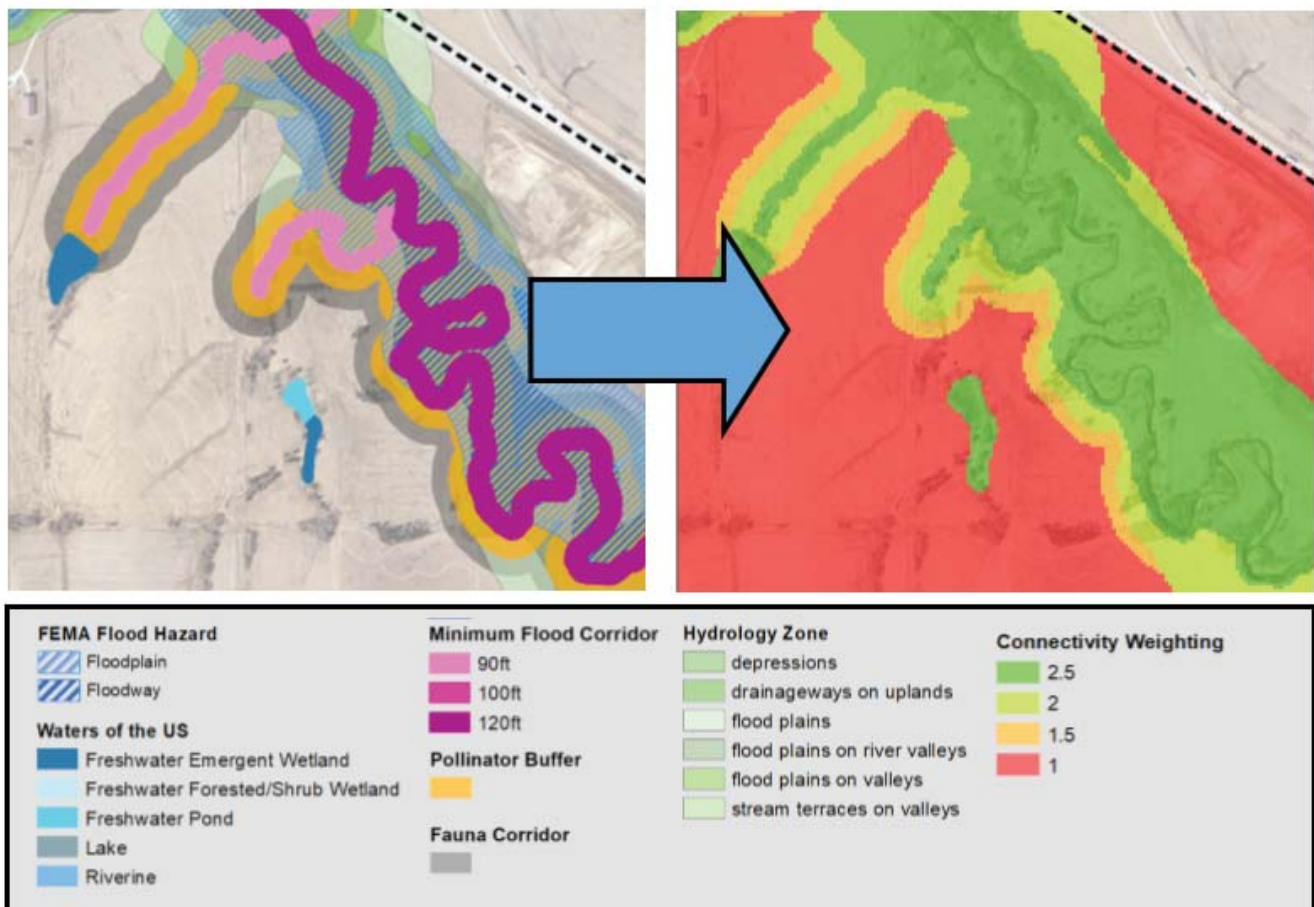
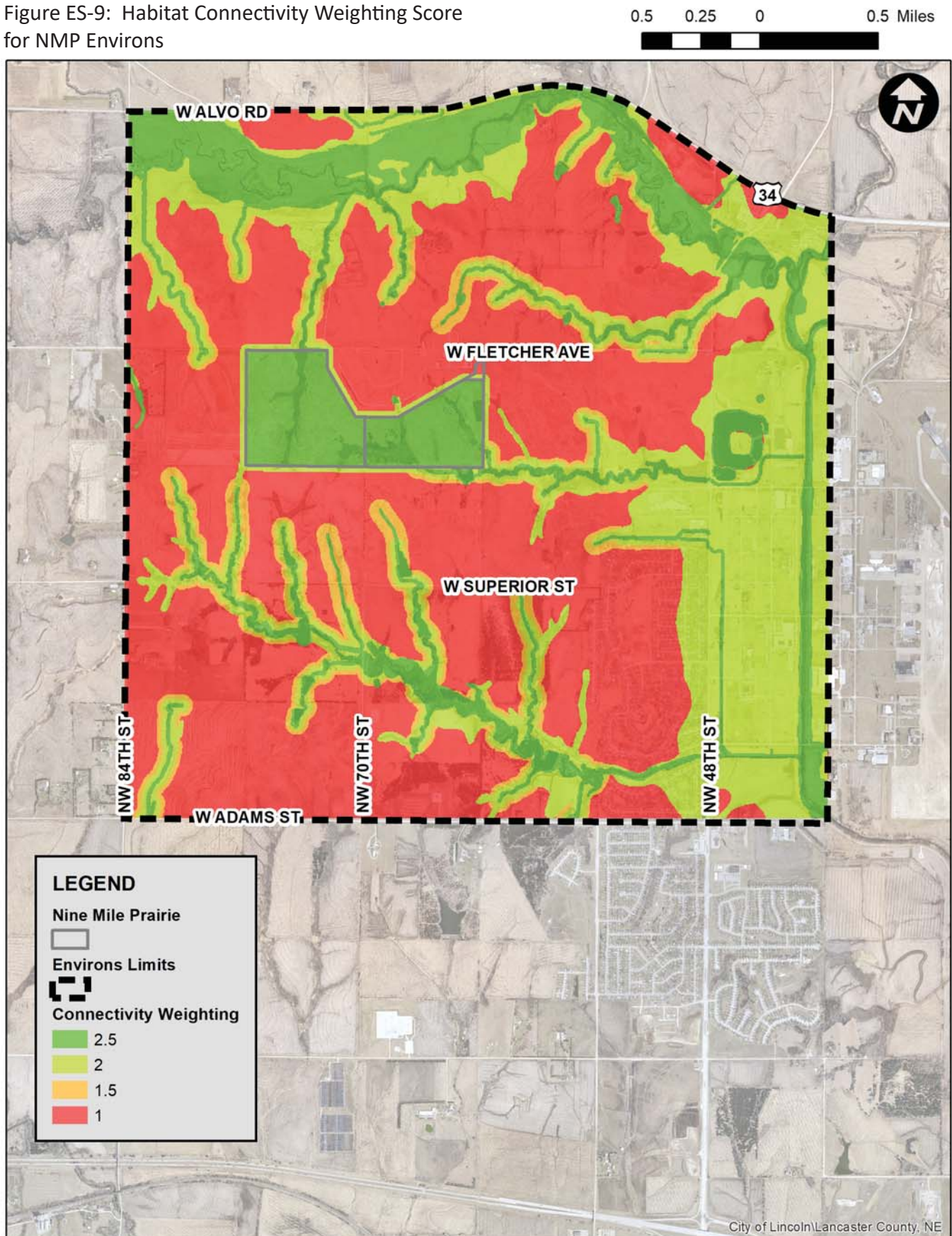


Figure ES-9: Habitat Connectivity Weighting Score for NMP Environs



Habitat Priority Overall Score

The matrix results depicted on Figure ES-10 demonstrate how the habitat diversity ranking score is weighted by habitat connectivity to develop an overall priority score. Priority scores were grouped in increments of 0 to 2.5 (lowest), 2.5 to 5, 5 to 7.5, 7.5 to 10, and over 10 (highest). Figure ES-11 shows the habitat priority score for protection and suitable landuse planning.

Figure ES-10: Habitat Priority Scoring Example

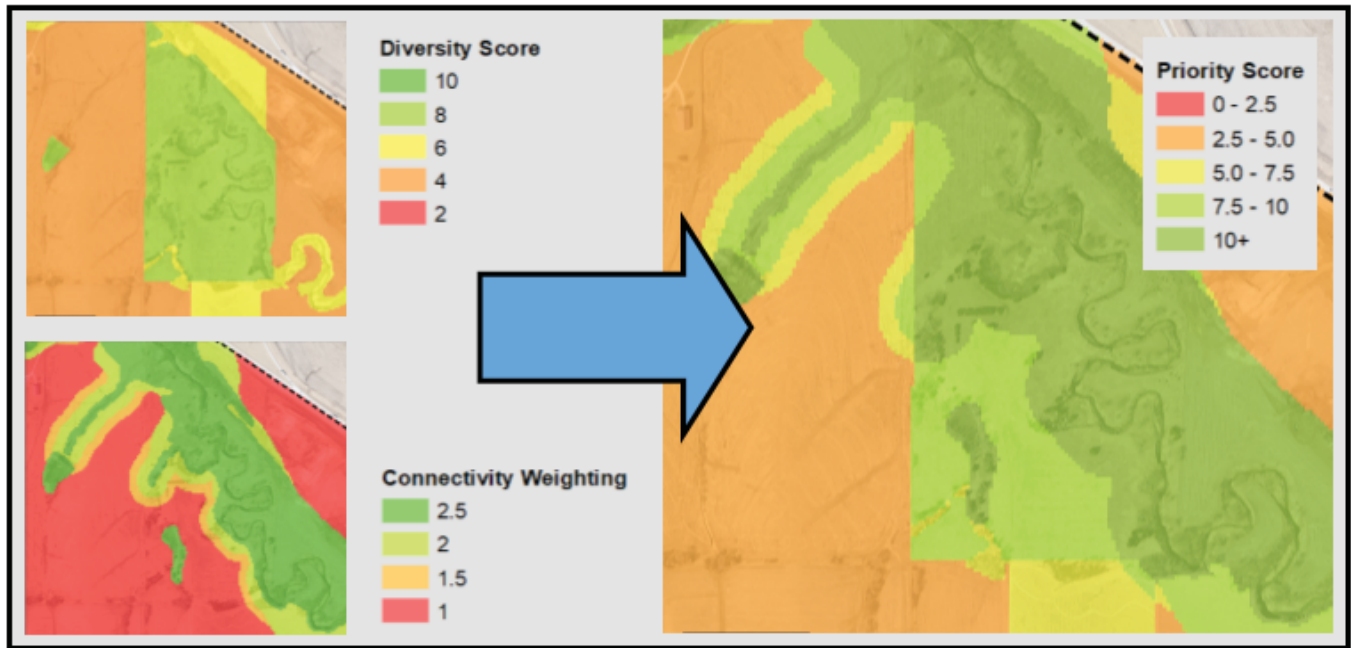
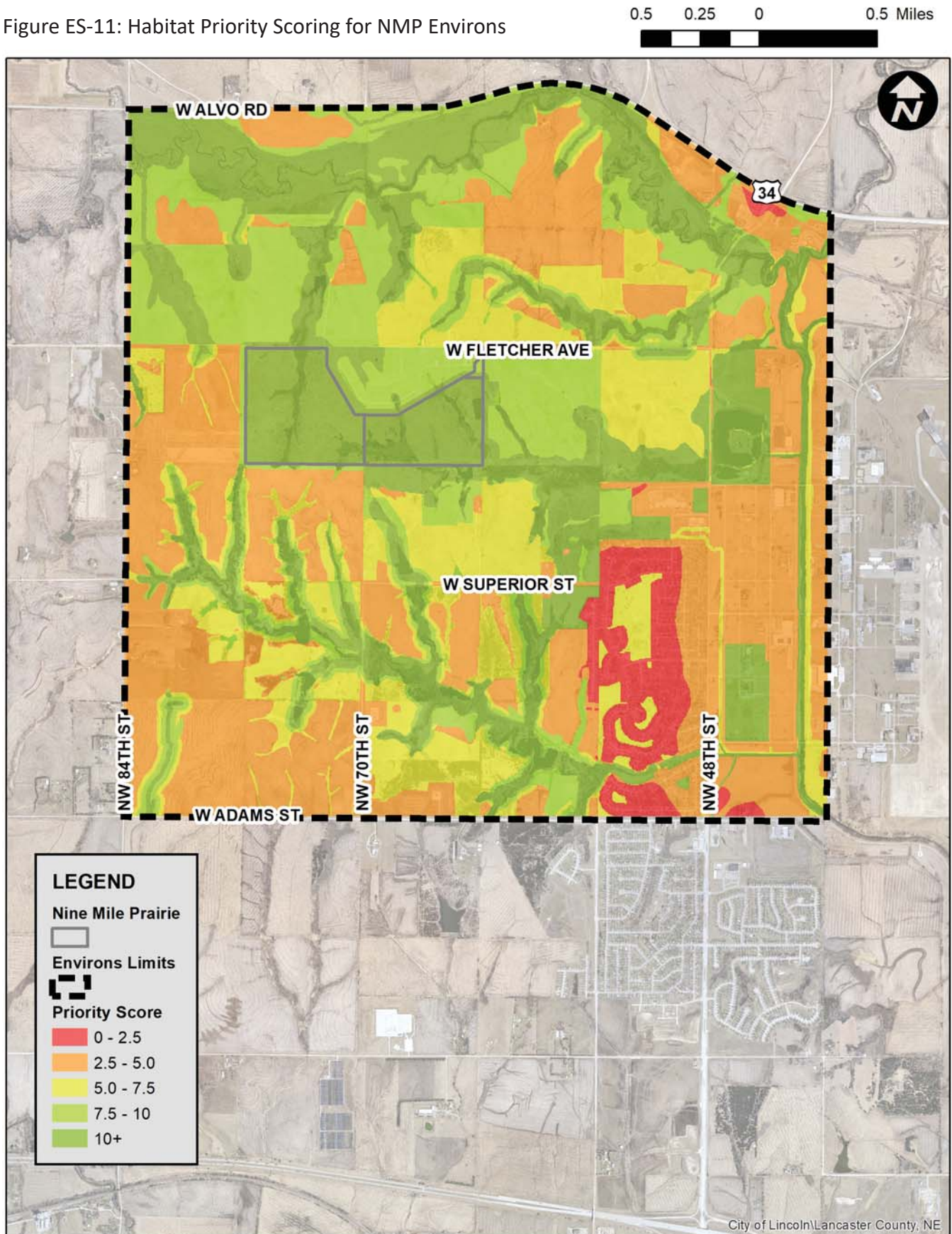


Figure ES-11: Habitat Priority Scoring for NMP Environs



Planning Considerations for Nine-Mile Prairie Environs

Based on the resources inventory and assessment, the spatial analysis for habitat diversity and connectivity produced habitat prioritization maps to help the Advisory Council and other environs' stakeholders with future planning decisions.

Connections to LPlan

The objectives outlined in this master planning document are compatible with the current Lincoln-Lancaster County Comprehensive Plan (LPlan) in regard to LPlan's commitment to sustainable growth through preservation of unique and sensitive habitats and the encouragement of creative integration of natural systems into developments. This master plan will be a useful tool for the Advisory Council and other stakeholders during the "Plan Forward 2050" update to the Lincoln-Lancaster County Comprehensive Plan. This master plan will help guide discussions between the Advisory Council, stakeholders, and City of Lincoln Planning Department staff during upcoming public information gathering meetings later this year.

Land-Grant University Role in Tallgrass Prairie Protection and Preservation

As part of its mission as a land-grant university, UNL's Center for Grassland Studies will continue to work beyond the formal boundaries of NMP with public and private neighbors. Part of the approach outlined in the planning document addresses each of the core mission areas of a land-grant university: teaching, research, and outreach (extension).

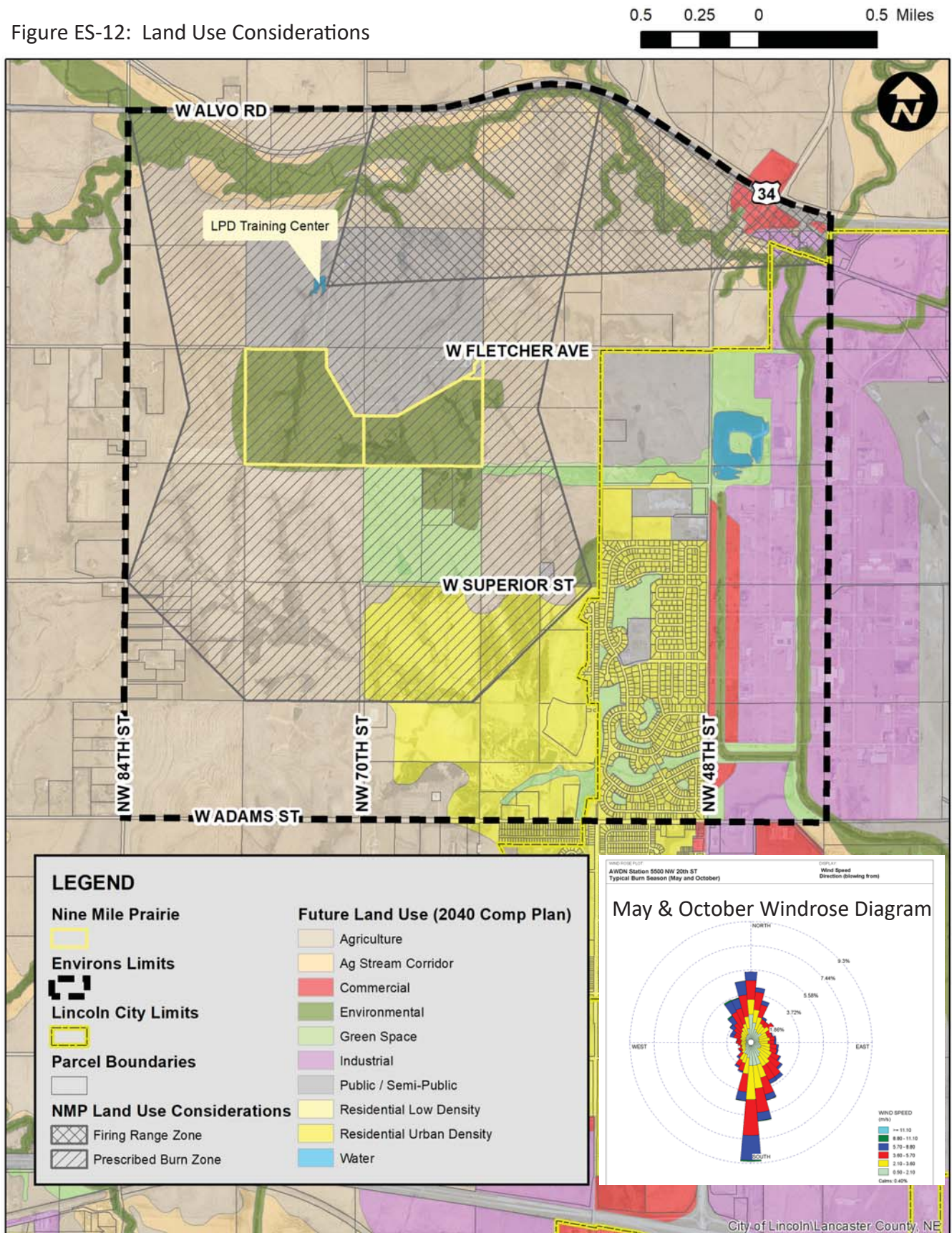
Public Outreach and Land Preservation

This plan recommends a comprehensive approach for natural resource protection and preservation through outreach with neighboring property owners, general land preservation approaches, water quality best management practices (BMPs) in concert with City of Lincoln regulations, and other land use considerations. Land preservation approaches may include public access easements, fee simple acquisitions, and conservation easements. The City of Lincoln's water quality standards could provide opportunities to protect habitat in existing stream corridors through BMPs that could include wet and dry detention basins, bio-swales and expansion of the minimum flood corridor with conservation buffers.

The NMP Environs is predominantly in rural land uses, but the City of Lincoln limits do extend into the southeast portion of the Environs and the 2040 Comprehensive Plan projects some additional urban growth in this area. A major update to the Plan, "Plan Forward 2050," is underway. This plan has outlined considerations for conservation and management of natural resources in the context of a growing community. Prescribed burning is a key tallgrass prairie management tool which becomes limited with urban development. NMP is typically burned in May and September when regional air quality, wind, and moisture conditions are most favorable. Figure ES-12 depicts land use considerations as they relate to management of native prairie by prescribed fire and the use of the LPD firearm training and practice facility. The boundary of the prescribed burn zone is based on the windrose diagram for May and October. The boundary of the firing range zone is based on the directional alignment of the outdoor firing range but there would also be noise from the firing range in all directions. This figure also provides a windrose diagram for May and October based on 10-year period of record. The windrose diagram shows the prevalent wind patterns for this time of year.



Figure ES-12: Land Use Considerations



Land Management Strategies

Land management strategies within the NMP Environs are generally separated into two groups: grasslands (including native prairie) and non-grasslands (e.g. row-crop agricultural production, low-density residential, etc.). NMP contains a relatively large contiguous areas of unplowed tallgrass prairie. High quality tallgrass prairie also exists elsewhere in the environs. The tallgrass prairie in the environs is managed for a number of purposes but the primary purpose is biodiversity. According to Chris Helzer, Prairie Ecologist with The Nature Conservancy in Nebraska, there are two key concepts to consider for managing a prairie for biodiversity:

1. **Prairie management is essentially managing prairie species competition.** The competition between prairie plant species can be utilized to foster diversity. By developing an understanding of how different species thrive or die-off through competition with one another, a greater number of species will be able to survive in a particular prairie (Helzer 2020).
2. **Diverse management is necessary to maintain prairie biodiversity.** Changes to timing and frequency of management techniques and employing different strategies (e.g. haying, grazing, prescribed fire) can help achieve highest level of diversity. Different micro-habitat management approaches (tall, short, dense, sparse) also support animal and insect biodiversity (Helzer 2020).

The master plan outlines different management techniques including prescribed burning, herbicide control, grazing, haying, and overseeding/reseeding. Additionally, there are federal program resources for grassland conservation and overall land conservation.

Suitable Activities/Features

Signature landscapes, as described in LPlan 2040, must remain whole if their integrity as a natural resource feature and historical community asset is to thrive and continue. As a signature landscape, native prairies (e.g. NMP) are an increasingly rare feature on the Nebraska landscape. A significant part of the landscape's future involves suitable activities/features. The master plan goal is to encourage and facilitate long-range land management strategies that are compatible with tallgrass prairie conservation and protection for NMP and surrounding area. As the Lincoln/Lancaster County community continues to grow, a cooperative effort between the NMP Advisory Council and environs property owners will be critical to finding solutions (e.g. development standards) that are suitable activities/features within the environs. This cooperative effort will provide opportunity to evaluate activities or features that are compatible and may be suitable to the protection and preservation of NMP. Although native prairie



Looking southeast at NMP



and grassland within the NMP Environs is the preferred landuse, other activities/features currently exist (and may in the future) that allow for protection and preservation of NMP.

Funding Strategies

In addition to the easement and acquisition options, other property preservation techniques can also be implemented that may be attractive to private land owners which may include donation, right of first refusal/option, or life estate. A variety of other funding strategies on the local, state and federal level are also outlined in the plan.

Organizational Strategies

An important consideration for the NMP Environs is the continuity of the previously formed (public-private partnership) NMP Advisory Council. This group (or member participants) will be essential to realize the goals of this plan. It is critical to the success of this project that the full responsibility for implementation not fall on any one agency or private organization, but that this coalition work cooperatively to bring their strengths and resources to this project.

The University of Nebraska should be the lead agency for the initiation and early implementation of this plan, working cooperatively to solidify full membership and partnership to the Advisory Council. Current Advisory Council partners include the University of Nebraska, the City of Lincoln, the Lincoln Airport Authority, NRCS, the Lower Platte South Natural Resource District and private land owners. Additional members (e.g., environmental and trails organizations, businesses and business organizations, conservation trusts, private foundations and donors, etc.) may be appropriate. The next step would be to formalize the Council partnership via an agreement to implement this Master Plan and any supplemental planning documents.

While the overall representation from varied groups will be essential to the planning process, a primary leadership role is highly recommended. A NMP Environs coordinator should oversee the project details and work with the partnership to:

- Promote and support implementation of the recommendations of the NMP Environs Master Plan
- Coordinate activities for plan implementation
- Conduct public outreach and education
- Participate in and promote fundraising activities for NMP Environs
- Encourage planning actions that promote the maintenance and/or establishment of native prairies and restorative actions

The coordinator would be a leader toward conservation and protection in the environs. The NMP Environs will be a working landscape and a coordinator would be tasked with execution of strategies as outlined in this plan and by the Advisory Council in addition to a role as liaison between neighboring landowners. The coordinator would provide the lead role in assisting neighboring landowners with federal programs such as easements, cost-sharing, deed restrictions, etc. The land manager/steward would work closely with UNL-CGS to maintain NMP as central feature of the planning area and as a guide for conservation and protection of other properties in the planning area. The role would also include communications with similar roles in the Prairie Corridor in Lancaster County as a way to pool resources and educate the public about the importance of native tallgrass prairie.

PART I: BACKGROUND & HISTORY

1.1 INTRODUCTION - NAME AND PLACE

Located five miles west and four miles north of the University of Nebraska-Lincoln's downtown campus is Nine-Mile Prairie (NMP). Owned by the University of Nebraska Foundation, the 230-acre property is one of a few tracts of tallgrass prairie that survived the agricultural plow. The property is part of Nebraska's land-grant university legacy as formative research on the theory of plant succession ecology was conducted on the property. Professor John E. Weaver, the "father of grassland ecology", began research on the site in the 1920s which likely bestows NMP with the title of longest studied

natural area in Nebraska. Dr. Weaver's pioneering theories and research on plant root systems presents a fitting metaphor for NMP as a deep root in Nebraska's legacy for the field of grassland and rangeland ecology as well as the university's stature as an accredited land grant university.



NMP is located on a hilltop vista that overlooks the city of Lincoln. The area surrounding NMP, referred to as the "environs" in the context of this strategic planning document (further described in Part 2), is almost entirely grassland or agricultural cropland. As articulated by Dr. Dave Wedin (Director of NMP) at the NMP 25th anniversary celebration in October 2009 (see Appendix B), the future of NMP lies not only within the property boundary but equally or of even greater importance is the management of the environs around the prairie with compatible land use.

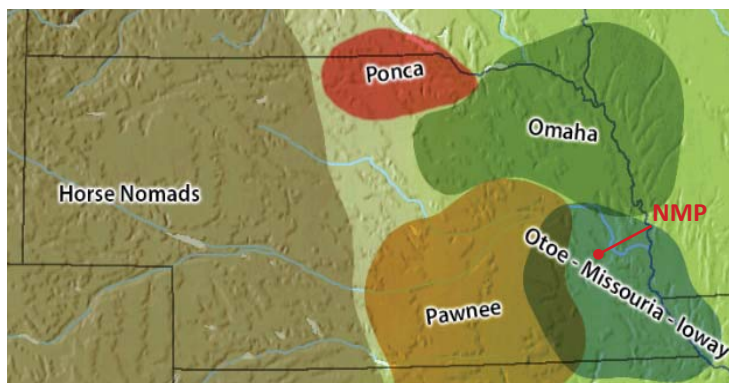


Looking southeast at Nine-Mile Prairie

1.2 HISTORY

1.2.1 Land Inhabitants and Ownership

After the last ice age in Nebraska about 11,500 years ago, Paleo-Indians inhabited the Great Plains in the area of present-day Nebraska. These people were nomadic and followed game to be hunted for food and clothing. Tools and weapons collected from the land were used to kill mammoths and ancient bison. About 8,000 years ago, early Archaic Period Native Americans further relied upon the land for bison, deer, fish, small mammals and wild plants for survival. For the next 7,000 years, Great Plains inhabitants relied more on the land by growing plants like corn and sunflowers and this sustained more permanent villages. From about 1,100-1500 A.D., artifacts reveal that Central Plains tradition people were more reliant on farming by evidence of clay storage pots and farming tools made of animal bones (NET Nebraskastudies.org).



Adapted map of Native American villages in southeastern Nebraska around 1600-1850s.

Source: NET Nebraskastudies.org

But something changed around 1,400 A.D. as prehistoric tribal groups moved away from the plains toward the Missouri River floodplains and didn't return until about 1,600 A.D. One possible reason was climatic change which impacted the growing season of corn and bison populations. The Otoe-Missouria-Ioway tribes were originally from central Iowa and immigrated into southeastern Nebraska in the area of NMP. The Otoe-Missouria-Ioway inhabited the Lower Platte until they were forced to move to reservations in Oklahoma in the mid to late-1800s. The Otoe Native American tribe word for "flat water" is Ni-braska which later became the state name (NET Nebraskastudies.org).



Looking southwest at Nine-Mile Prairie



NMP's earliest pioneer ownership is tied to the Ira Davenport family dating to 1871, just 8 years after Daniel Freeman received the first Homestead Act certificate for land near Beatrice, Nebraska in 1863. Ownership changed over the years between families and a railroad company before purchase by the U.S. Department of Defense in 1953 as a fenced buffer zone around a Cold War era bomb storage depot. Once the bomb storage depot was deactivated it was deeded directly to the Lincoln Airport Authority (LAA) in 1978 (UNL Center for Grassland Studies webpage).

Post-Settlement Land Ownership at Nine-Mile Prairie

1871 -1906 west half owned by Ira Davenport family
1906 -1914 west half various owners
1914 -1953 west half of NMP owned by Tilman Flader family
1880 - 1884 east half owned by Burlington Missouri River RR company
1884 -1934 east half various owners
1934 –1953 east half owned by E. Frank Schramm family
1953 -1978 owned by US government
1978 -1983 owned by Airport Authority
1979 -1982 leased by E. Rousek on behalf of the Wachiska chapter of the Audubon Society
1983 – presently owned by University of Nebraska Foundation

In 1978, UNL trained soil scientist and Wachiska Audubon member Ernie Rousek decided it was time to seek ways to preserve NMP for perpetuity. Along with UNL biology professor A.T. Harrison, the two men approached the Nebraska Legislature in an effort to change the state constitution in order to sell NMP for less than market value to an organization like Audubon Society. (Note: The State of Nebraska no longer has this authority as use and disposition of property owned and controlled by the LAA is regulated by the federal government.) The first step toward the prairie's preservation was to lease 230 acres from LAA to Wachiska Audubon Society but the purchase cost was still too great. With the help of then-University of Nebraska Chancellor and agronomist Martin Massengale, the Foundation became a willing buyer and purchased the property in 1983 with additional financial support from Marguerite Hall Metzger in honor of her late husband Neil W. Hall. Mr. Hall had been a volunteer land manager at NMP after he retired from banking (Adams 1984, Knopp 2007, Lincoln Journal Star 1984).

1.2.2 UNL Foundation Lease Terms

NMP was purchased by the Foundation from the LAA in 1983. The Foundation committed to a long-term lease with the University of Nebraska Regents (UN Regents) on behalf of UNL to ensure the property will be used "for public use as a facility for the research and study of virgin tallgrass prairie. The University shall not permit any use that will alter in any way the character of the leased property as a virgin tallgrass prairie."

The administration and management of NMP was delegated by the Foundation to the Institute of Agriculture and Natural Resources (IANR) of UNL. Furthermore, IANR assigned the administrative and management duties to the Center for Grassland Studies. Land management is conducted in a manner to maintain, enhance and preserve Nebraska's grassland heritage for future generations in line with the overarching lease terms with the University of Nebraska Board of Regents.



In January 2019, the IANR Vice Chancellor Michael Boehm appointed an Advisory Council for NMP and charged it with developing a long-range strategic plan for NMP environs. The Advisory Council includes representatives of the surrounding landowners (public and private), UNL, City of Lincoln, LAA, Lower Platte South NRD, and Natural Resource Conservation Service (NRCS).

1.2.3 UNL Titans of Plant Ecology

A significant part of NMP's story is its role in the formation of the field of plant ecology. That academic legacy is partly rooted in the study of the prairie's subterranean habitat. The academic research and UNL connection of three pioneering scientists across two generations established UNL as a leading institution in the field of plant ecology (Wedin 2009).

Renowned American botanist Charles Bessey came to the University of Nebraska in 1885 and was a pioneering scientist and University administrator and chancellor. Dr. Bessey developed modern plant classification and advised numerous students that would become leaders in various scientific fields including plant ecology. One of those students, Dr. Frederic Clements, was born in Lincoln and studied botany at UNL. Dr. Clements developed leading theories on vegetation community and the theory of plant succession (Wedin 2009).

John Weaver was a student of Dr. Clements who strongly defended his ecological theories of plant succession. Referred to as the “father of prairie ecology”, John Weaver began his career as assistant professor at UNL in 1915. Not long after, Dr. Weaver began to study below the land surface of the prairie by digging trenches and holes as deep as 20 feet, mapping out root systems with drawings of over 140 species (Adams 1984). His study and understanding of root systems became even more relevant as the academic community was called upon to solve agricultural cropping problems associated with the great drought of the mid-1930s. Dr. Weaver and his students received money from the U.S. government to study the drought's impact on prairie grasses and forbs. As the drought receded, the research team monitored the prairie's recovery. Some of Dr. Weaver's findings on grassland succession and renewal after droughts are still relied upon to this day (Adams 1984).



Photo of John E. Weaver. UNL Library Archives Collection.

A review of Dr. Weaver's files at UNL archives revealed an extensive publication collection. Dr. Weaver's initial research focused on wheat-grass but transitioned to a broader investigation of prairie plant root systems in conjunction with drought tolerance and recovery post-drought.

One of John Weaver's students named T.L. Steiger published a paper called “Structure of Prairie Vegetation” in 1930. Mr. Steiger recognized the disappearance of prairie due to agricultural land development and conducted extensive field work during 1927 and 1928 at NMP. Dr. Steiger placed 40 one-square meter plots at NMP to study prairie soils, vegetation and ecology. His work included a complete flora inventory on the west half of NMP.

At present day, the theory of climax vegetation as developed by Dr. Clements has been amended and replaced by newer theoretical work in the scientific community. The research of Dr. Steiger and Dr. Weaver at NMP captured a part of the prairie's history but the prairie is now interpreted not as a climactic state but rather as one of transition between the loss of grazing bison and recovery from drought of the mid-1930's. In 2011-12, Dr. David Wedin and a team of botanists returned to the area where Dr. Steiger had conducted his broad plant inventory work. Most of the native plant species identified in the late 1920s at NMP are still present but in different locations and comprise a different part of the prairie's identity (Wedin 2015).

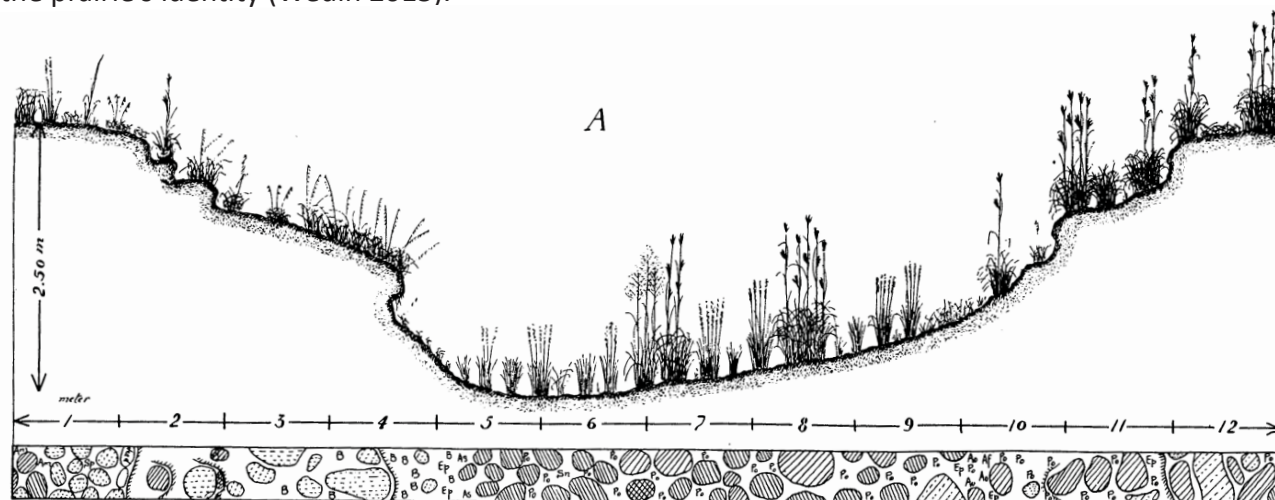


Figure 1.2.3. Cross-section drawing from T.L. Steiger's "Structure of Prairie Vegetation", 1930, research paper from work at Nine-Mile Prairie.

1.2.4 National Historic Registry

At the entrance to NMP near NW 62nd and Fletcher Road, the Nebraska Historical Society has erected a marker sign to designate the property as historically significant. The historical marker reads: "Marguerite Metzger Hall and Neil W. Hall NMP Memorial as a living tribute to our Pioneer Forebears and as a legacy for future generations – A memorial to the Past, a joy to the Present, a heritage for the Future." Dedicated September 16, 1984 by the UNL Foundation and Nebraska State Historical Society. Mr. and Mrs. Hall made a leading contribution toward the purchase of NMP.

NMP was added to the National Registry of Historic Places on July 30, 1986. A central theme to the nomination form is the role Dr. John Weaver played in the formulation of plant ecology discipline and how NMP was used for his research. The historic Great Plains drought in the mid-1930s during the Great Depression led to a change in land use from row crops to pasturage. The increase in pasturage in conjunction with drought led to overgrazing which further destroyed grasslands. During the drought, grassland scientists focused efforts on better range management and grassland conservation. Dr. Weaver was a leading scientist in the crusade to save Great Plains grasslands during the drought. He trained the most academic scientists in the drought crisis and his work in conjunction with Dr. Clements was instrumental in establishment of UNL as a leading academic institution (Kaul et al 1986).

In the mid-1980's, NMP received a Nebraska State Historical Marker. The marker describes NMP as one of the largest remaining tracts of unplowed tallgrass prairie in the Great Plains as well as a tribute to John E. Weaver for his contributions to the scientific field of plant ecology (Nebraska State Historical Society 2009).

1.2.5 Environs Ownership History Essay

Jon H. Oberg, a landowner of property adjacent to NMP, prepared an essay in 2013 (see Appendix C) detailing the land ownership history of Section 1 of Middle Creek precinct in Lancaster County. A portion of NMP resides in the northwest quarter of this section. Mr. Oberg's essay focuses on the human history connections to NMP Environs since the 1800s by telling stories about the Nebraska pioneers, educators and statesmen with land ownership of the environs and NMP itself. E. Frank Schramm, Joseph E.A. Alexis and Amos S. Eager are among some of the notable Nebraska names that Mr. Oberg researched and described in his essay. Mr. Oberg posed the question of what can be learned from the notable Nebraskans that owned land in the NMP environs and how that could guide the future of the environs.



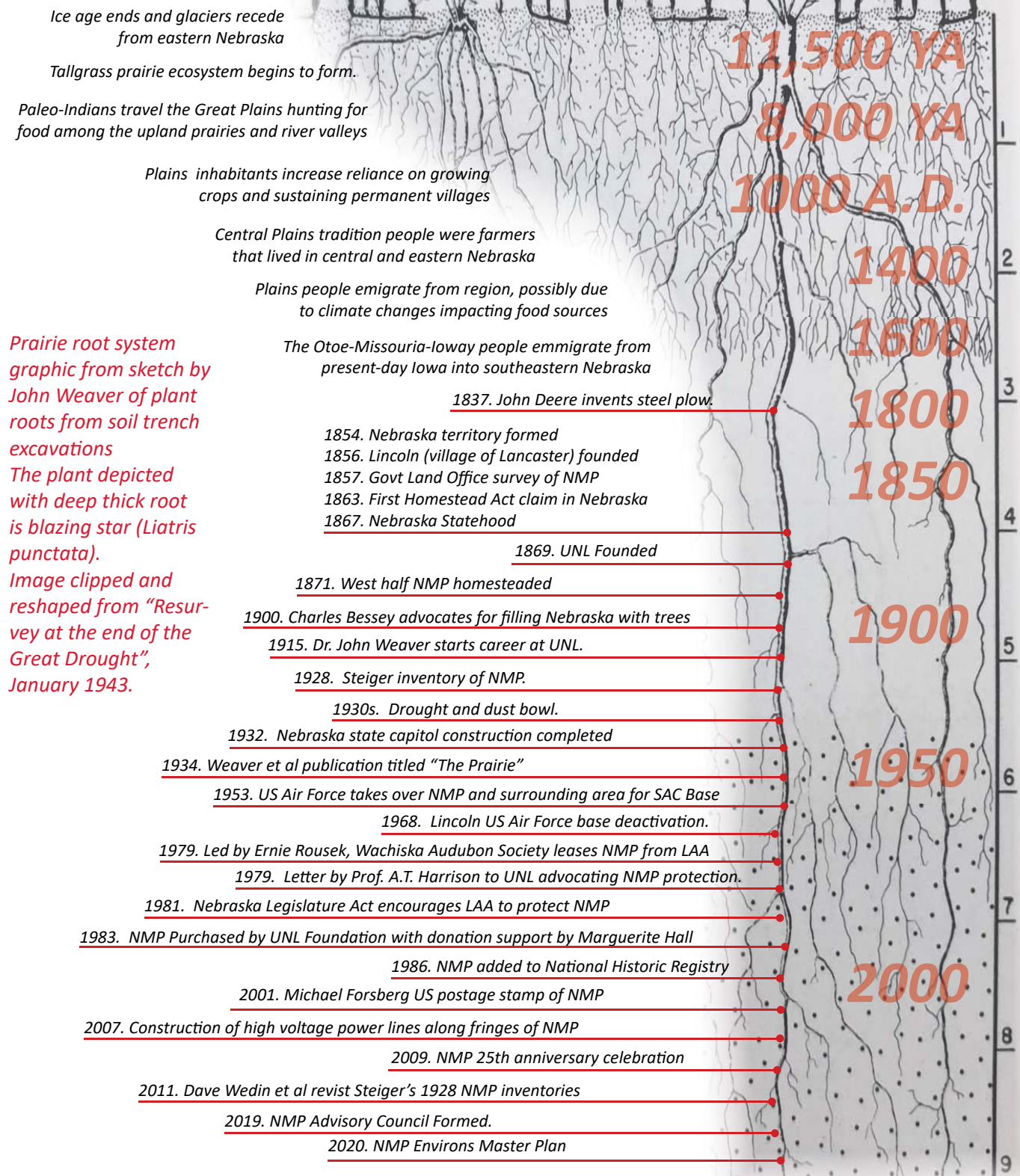
Looking southeast toward the City of Lincoln

Figure 1.2.5 shows a graphical timeline of historical events in the NMP Environs. Other historical notes include the U.S. Postal Service selection of Michael Forsberg's NMP picture as the fourth stamp in the Scenic American Landscapes Series. The stamp was issued in 2001.



U.S. Postal Service stamp photo. Michael Forsberg Photography.

Figure 1.2.5 Timeline Nine-Mile Prairie Environs Rooted in History



Prairie root system graphic from sketch by John Weaver of plant roots from soil trench excavations

*The plant depicted with deep thick root is blazing star (*Liatris punctata*).*

Image clipped and reshaped from "Resurvey at the end of the Great Drought", January 1943.

1.3 Place in Great Plains and Tallgrass Prairie Ecoregion

Prior to European settlement and large-scale agricultural land conversion, the Great Plains were covered by three types of grasslands: shortgrass, mixed, and tallgrass prairies. The boundaries of these three grassland types are largely determined by annual precipitation with a range of 10-50 inches/year with about 30-50 inches/year for tallgrass. The Rocky Mountain effect on precipitation causes less precipitation in the west which is shortgrass, intermediate moisture in the middle region which leads to mixed grass prairie and then tallgrass prairie in the east area that has the greatest amount of precipitation. The grassland designation is met by a landscape with less than 10% cover from trees (Audubon 2019). Figure 1.3.1 shows the historic grassland types and boundaries of North America.



Figure 1.3.1. Historic grassland types in North America. From Audubon's "North American Grasslands and Birds Report", 2019.

The original tallgrass prairie stretched from Manitoba to Texas and east to Indiana and covered approximately 200 million acres (Audubon 2019). According to the Nebraska Natural Legacy Project (2011), less than 1% of the original tallgrass prairie area remains today in the continental U.S. and about 2% in Nebraska as remnant pieces of 80 acres or less which makes NMP an outlier with an area of 230 acres. The Kansas Flint Hills region includes the 11,000-acre publicly owned Tallgrass Prairie National Preserve. The Nature Conservancy's (TNC) Tallgrass Prairie Preserve in Oklahoma is the largest protected remnant of tallgrass prairie at almost 40,000 acres. Thousands of additional acres remain in private ownership. Most remnant acres were never plowed in part because of rocky soils that are poor for agriculture.

The majority of NMP soil remains in a condition that was generally present before millions of tallgrass prairie acres across the Great Plains were converted to agricultural land or other development. The conversion of tallgrass prairie to agricultural land began with the Homestead Act of 1862. The unplowed portion of NMP as well as other pieces of land in the environs that remain unplowed provide a unique public value as a connection to the past as historic grasslands of the Great Plains.

Figure 1.3.2 shows the historical boundary of tallgrass prairie throughout the Great Plains in the light green color. The dark green color shows the area of present-day tallgrass prairie with large portions in the Flint Hills of Kansas and in Oklahoma.



Figure 1.3.2. Estimated boundaries of historic tallgrass prairie (light green) and present day tallgrass prairie (dark green). Image adapted from TNC.

1.4 Environs as Haven of Tallgrass Prairie Biodiversity

In addition to the valuable historical and cultural resources of the NMP Environs, the area is home to a wide variety of tallgrass prairie plants and also animal species that constitute a subset of Nebraska species statewide. UNL has reported that there are 392 vascular plant species and over 80 species of birds observed at NMP; the surrounding environs may contribute more. Table 1.4.1 shows some statistics for NMP compared to Nebraska statewide. NMP is home to over a quarter of the plant diversity across Nebraska and one-fifth of the bird species. In addition to UNL's NMP data, the Oberg family has collected bird survey data on their properties and grouped the data by bird habitat type (e.g. agroforest, pine trees, prairie, riparian, wetlands) for a number of years with the help of UNL ornithologists and acoustic recording devices (see Appendix D).

Table 1.4.1 Biodiversity Statistics Snapshot	
NMP	NE Statewide
392 Plant Species	1,470 Plant Species
80 Bird Species	400 Bird Species

Nebraska is home to an estimated 30,000 different animal species, the majority of which are insects. This includes about 500 bee species, more than 200 butterflies, and many other pollinators. Bees and other insects assist with pollination by transferring pollen between flowers of plants such as forbs and agricultural plants (Mollet 2019).

Since 1987, the Nebraska Game and Parks Commission (NGPC) Natural Heritage Program has “developed, managed, and distributed scientific information critical to the conservation of Nebraska’s biological diversity”. Data and information collected for the Natural Heritage Program played a key role in formation of the Nebraska Natural Legacy Project. Given the high number of insect species in Nebraska, addressing conservation on an individual species basis would be difficult. Therefore, NGPC has approached species conservation by focusing on subsets of species that co-occur in natural communities or habitats that exist in repetition across landscapes. By focusing on subsets, there is a greater chance of conserving a wider cross-section of biological diversity (NGPC 2020).

NGPC has developed a two-tiered approach to prioritize which species to focus resources toward. Tier 1 species are globally or nationally at-risk and Tier II species are at-risk within Nebraska but have more favorable population num-



bers in other parts of their habitat range. The Nebraska Natural Legacy Project works to prevent imperilment of species and prevent their listing and also to help recover species with goal of delisting (NGPC 2020).

There are a number of Tier I and Tier II rare species occurrences from the Nebraska Natural Heritage Database recorded at NMP since 1985 that include the federally-threatened western prairie fringed orchid (*Platanthera praeclara*), the regal fritillary butterfly (*Speyeria idalia*), Married Underwing, Whitney's Underwing, Iowa Skipper, Sedge Wren, Yellow-grey Underwing, Zabulon Skipper, Senna, and Spring Ladies' Tresses (Schneider et al 2011), as shown in Figure 1.4. In addition to these rare species as individuals, many species provide complementary resources to other species such as the reliance of regal fritillary butterfly caterpillars on prairie violet flowers as a food source and the reliance of forbs on pollinator species (Wedin 2018).

Figure 1.4 Highlighted Biodiversity of the Nine-Mile Prairie and Environs

Nebraska Natural Heritage Database Tier 1 and Tier 2 Species

NGPC Tier 1 Species



Western Prairie Fringed Orchid
ESA Status: *Threatened*
Threats: Conversion of habitat to cropland, overgrazing, intensive hay mowing, drainage, herbicide use, over-collecting
Photo Source: US Forest Service

NOTABLE SPECIES



Regal Fritillary Butterfly
Status: *Vulnerable and under review for ESA listing status*
Threats: tallgrass prairie conversion, pesticide use
Photo Source: USFWS



Married Underwing
Catocala nuptialis
©Tom Middagh (1)
Host plant: Leadplant

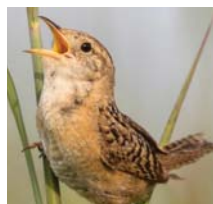


Whitney's Underwing
Catocala whitneyi
©Tom Middagh (1)
Host plant: Leadplant



Iowa Skipper
Atrytone arogos iowa
©MaryAnn Friedman (1)
Host plant: Bluestems

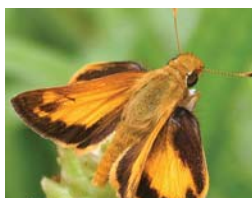
NGPC Tier 2 Species



Sedge Wren
Cistothorus platensis
Source: Audubon



Yellow-Gray Underwing
Catocala resecta
©Ken Childs (1)



Zabulon Skipper
Poanes zabulon
©Bob Moul (1)



Southern Wild Senna
Senna marilandica
Source: Missouri.gov



Spring Ladies' Tresses
Spiranthes vernalis
Goorchids.org

(1) Butterfliesandmoths.org

In regard to specific species groups, the Nebraska Natural Legacy Project has identified 18 at-risk pollinators needing special protection in Nebraska. These species include 8 butterflies, 2 moths and 8 species of bumble bee.

In a step to address these biodiversity conservation challenges, NGPC developed the Conservation and Environmental Review Tool (CERT) which is a GIS-based interactive tool for conservation planning and NGPC environmental review. The CERT “provides conservation information on biological diversity, protected lands, and other natural resources for planning purposes...” (NPGC 2020). As previously described, the NGPC Nebraska Natural Heritage Database prepares lists for species of greatest conservation need in Nebraska. When the Western Association of Fish & Wildlife Agencies Crucial Habitat Assessment Tool (CHAT) GIS-layers are active in CERT, the CERT map further reveals high rankings at a general planning scale for Species of Concern and Natural Vegetation (see Figures 1.4.2 and 1.4.3 below) in the NMP Environs. As seen in the figures, NMP Environs have the highest rankings for both Species of Concern and Natural Vegetation (WAFWA 2020). This mapping data further shows the biological importance of NMP Environs on a county scale.

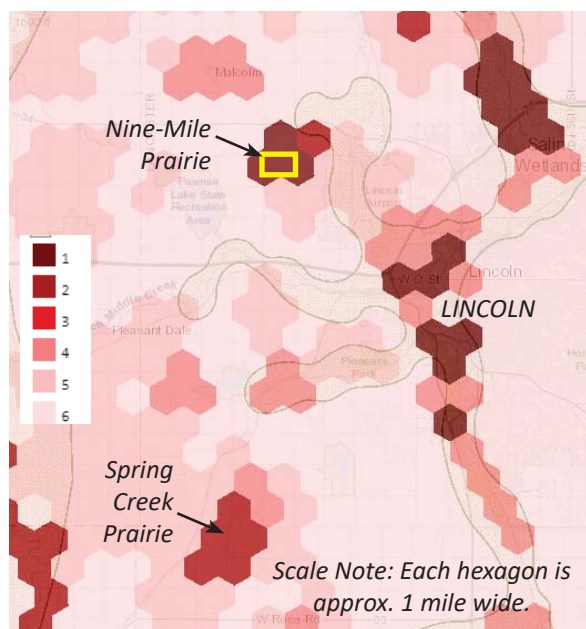


Figure 1.4.2 shows CHAT Species of Concern mapping data.

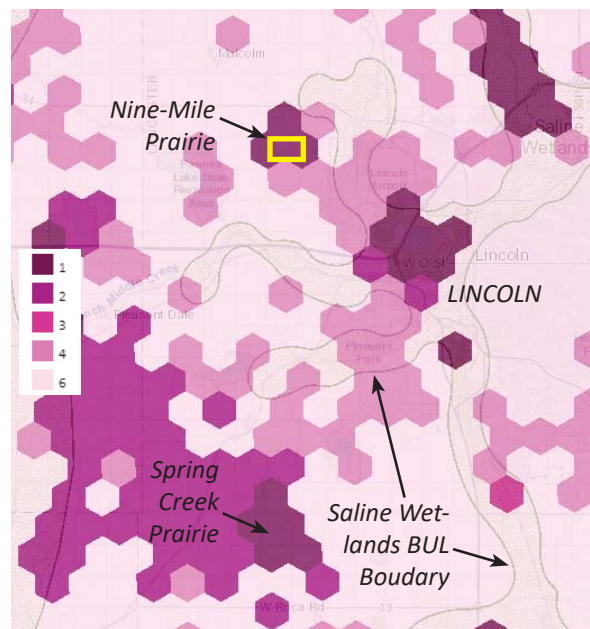


Figure 1.4.3 displays the CHAT Natural Vegetation mapping layer.

Color coded ranking scale for each map is included as inset in addition to Saline Wetlands Biologically Unique Landscape (BUL) Boundary. Rating of 1 is highest concern and 6 is lowest concern. Mapping data shows high rankings for species of concern and natural vegetation in NMP Environs.

Tallgrass prairie is a remarkable part of Nebraska’s natural biodiversity heritage and a core resource imperative to the community. NMP provides an opportunity to celebrate Nebraska’s prairie biodiversity, the University of Nebraska’s grassland studies legacy and to build on the unique sense of place and strengths of Lincoln and Lancaster County. NMP is a complement to Lincoln’s Prairie Corridor in the Haines Branch watershed to the south of NMP and part of broader Nebraska network of native prairie properties that provide educational, cultural and historical destinations for the public.

Lincoln and Lancaster County are located in the Tallgrass Prairie Ecoregion, a Level III Ecoregion as defined by the Nebraska Natural Legacy Project and the Environmental Protection Agency, which covers about 25% of the state. There are 105 Level III ecoregions across the U.S. that are grouped by type, quality and quantity of environmental resources and are used to provide a “geographic structure for environmental resources research, assessment, monitoring, and management (EPA 2020). Figure 1.4.4 shows the state of Nebraska’s four Ecoregions demarcated by bold red lines.

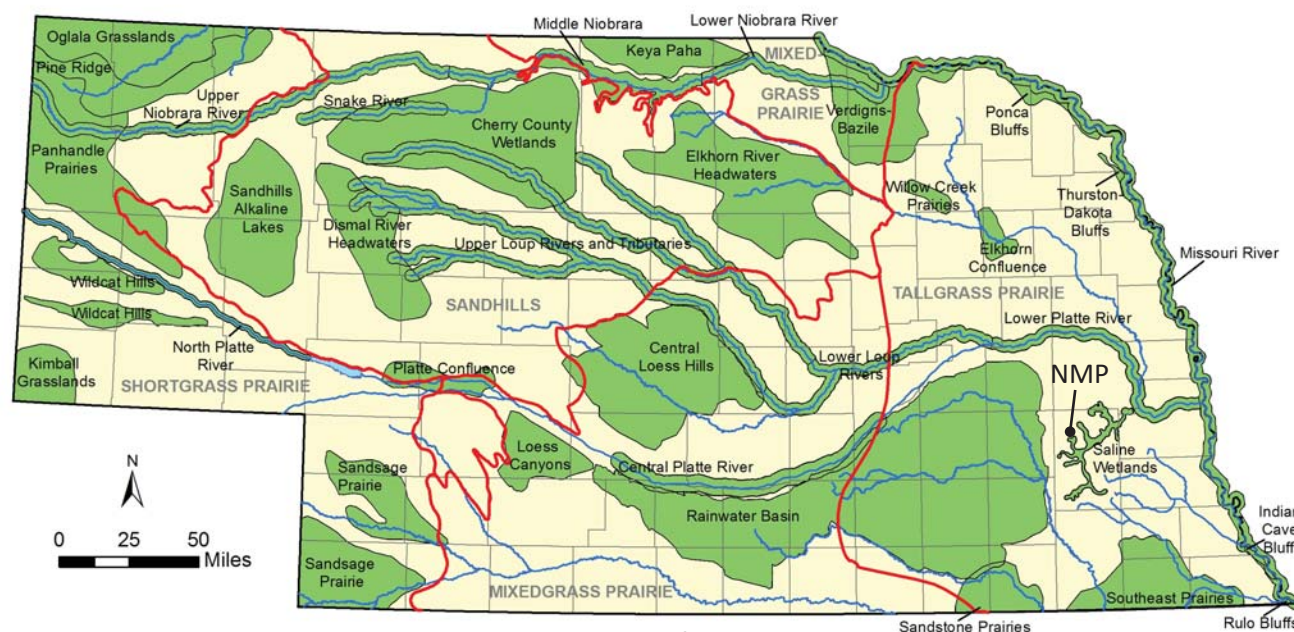
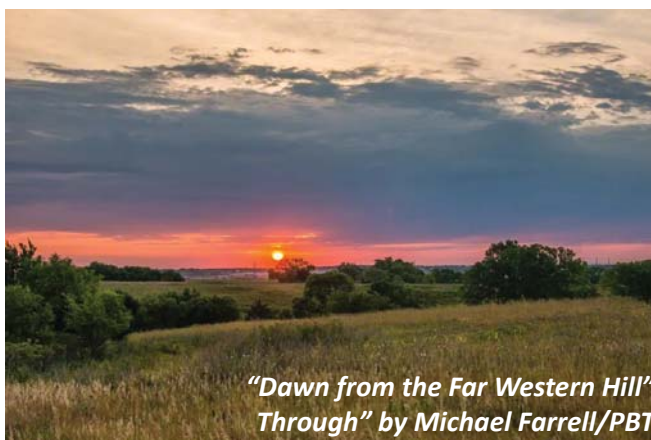


Figure 1.4.4 shows the Biologically Unique Landscapes of Nebraska as well as EPA Ecoregions marked with bold red lines.

NMP is located between two of Nebraska’s Biologically Unique Landscapes (BUL) of the Tallgrass Prairie Ecoregion, as shown on Figure 1.4.4. The Rainwater Basin wetland region is west of NMP in the Platte and Blue River basins and contains remnants of ephemeral playa wetlands that interspersed the prairie grassland plain. Directly to the east of NMP are the saline wetlands of the Salt Basin. NMP is located within the Oak Creek and Elk Creek basins and is a groundwater recharge zone of the saline wetland landscape.

The Saline Wetlands BUL contains rare saline groundwater supported wetlands that are home to the federally endangered Salt Creek tiger beetle. NMP’s upland topography captures precipitation that is hydrologically connected to the saline wetland ecosystem and helps to recharge the local aquifer. Additionally, saline wetlands are home to more than 200 species of migratory birds and other wildlife as well as a state endangered plant called saltwort and these species all rely on the hydrology of the saline wetland ecosystem for survival.



1.5 Ecosystem Services and Public Values of Tallgrass Prairie

The U.S. Forest Service administers 17 National Grasslands throughout the Great Plains with management purposes that include forage, fish and wildlife, timber, water and recreation resources. In many of these grasslands, there are tangible natural resource goods and recreational benefits from prairies that provide direct economic value. At NMP there is no cost for public visitation so it is difficult to assess an economic value benefit from the prairie due to visitation. Properties in the vicinity of NMP lease and rent land for haying which provides an economic return on the land. There are also many ecosystem services and public values provided by tallgrass prairie that do not have specific economic values.

As described by the U.S. Forest Service, the various ecosystem services provided by grasslands include seed dispersal, drought and flood mitigation, nutrient movement and cycling, waste decomposition, agricultural pest control, maintain biodiversity, generate and preserve soils, support climate stability, soil erosion protection, watershed protection, crop pollination, aesthetic beauty, wildlife habitat, recreation, and research opportunities (U.S. Forest Service 2020). Tallgrass prairie also provides value as a seed source of local genotypes of grasses and wildflowers that can be collected and used in prairie restoration seeding in the region.

Some services, like pollination, are essentially irreplaceable for different animal species such as bats, bees, moths, butterflies, birds that provide pollination through nature. Additionally, carbon sequestration by grasslands is difficult to measure. Scientific research has shown a connection between increasing global temperatures and rising levels of carbon dioxide. Grassland plants can help remove carbon dioxide from the atmosphere and capture it within the soil (U.S. Forest Service 2020).

According to Chris Helzer, Prairie Ecologist with The Nature Conservancy in Nebraska, the argument for prairie functional values like pollination and carbon sequestration compared to cropland, housing, roads or woodlands hasn't been very successful as prairies continue to disappear across Nebraska and globally. Educating people about the aesthetic and cultural values of prairies is arguably the best approach to conservation and protection (Helzer 2017).

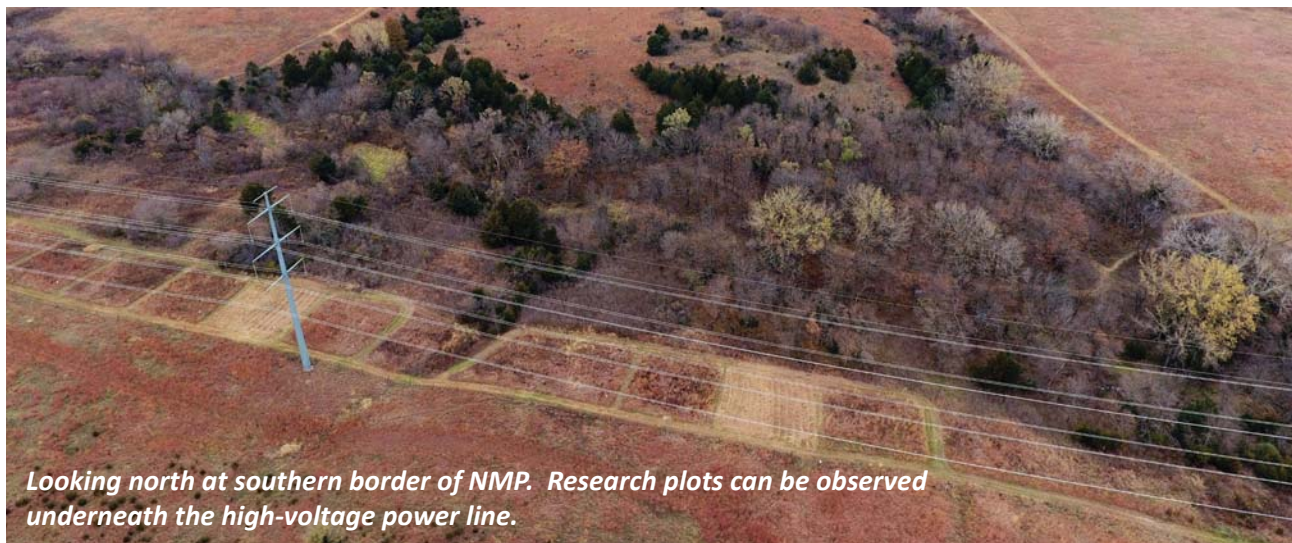


1.6 Past and Ongoing Research Opportunities

NMP is one of the most studied natural areas in Nebraska. Beginning with Dr. Weaver's research in the 1920s, the prairie has been a research site for studies on botany, ornithology, coleoptera (beetles), orthoptera (grasshoppers, locusts, crickets), prairie soil profiles, regal fritillary butterfly, and impact of drought, fire, fertilizer and atrazine on tallgrass prairie vegetation. A chronology of documents for research at the property can be found on the IANR NMP webpage. A summary of academic focused activities at NMP is included in Appendix C and a compilation of historic documents (historic aerials, ecological surveys, etc.) are included in Appendix D.

Despite the fact that NMP has been studied for nearly 100 years, ongoing research shows that much is still unknown about the dynamic ecosystem. The changing composition, soils and succession of different species is still ongoing. The site is one of the largest high quality intact tallgrass prairies remaining in the Great Plains and offers unique research opportunity for a window into the past. Additional research topics could include the impact of urban encroachment on tallgrass prairie biodiversity due to various changes such as less nighttime darkness due to artificial lighting, various predator impacts to bird species, or loss of species habitat.

There is a wide-range of educational opportunities at NMP ranging from 4th graders on school field trips to more formal academic research projects through UNL, University of Nebraska-Omaha, Doane College (Crete, NE), and Nebraska Wesleyan. Other groups that use the prairie for education and conservation ecology include the Lower Platte South NRD, Wachiska Audubon Society, Bluestem Sierra Club, and the Omaha Audubon Society. The site is also used to educate the general public about tall-



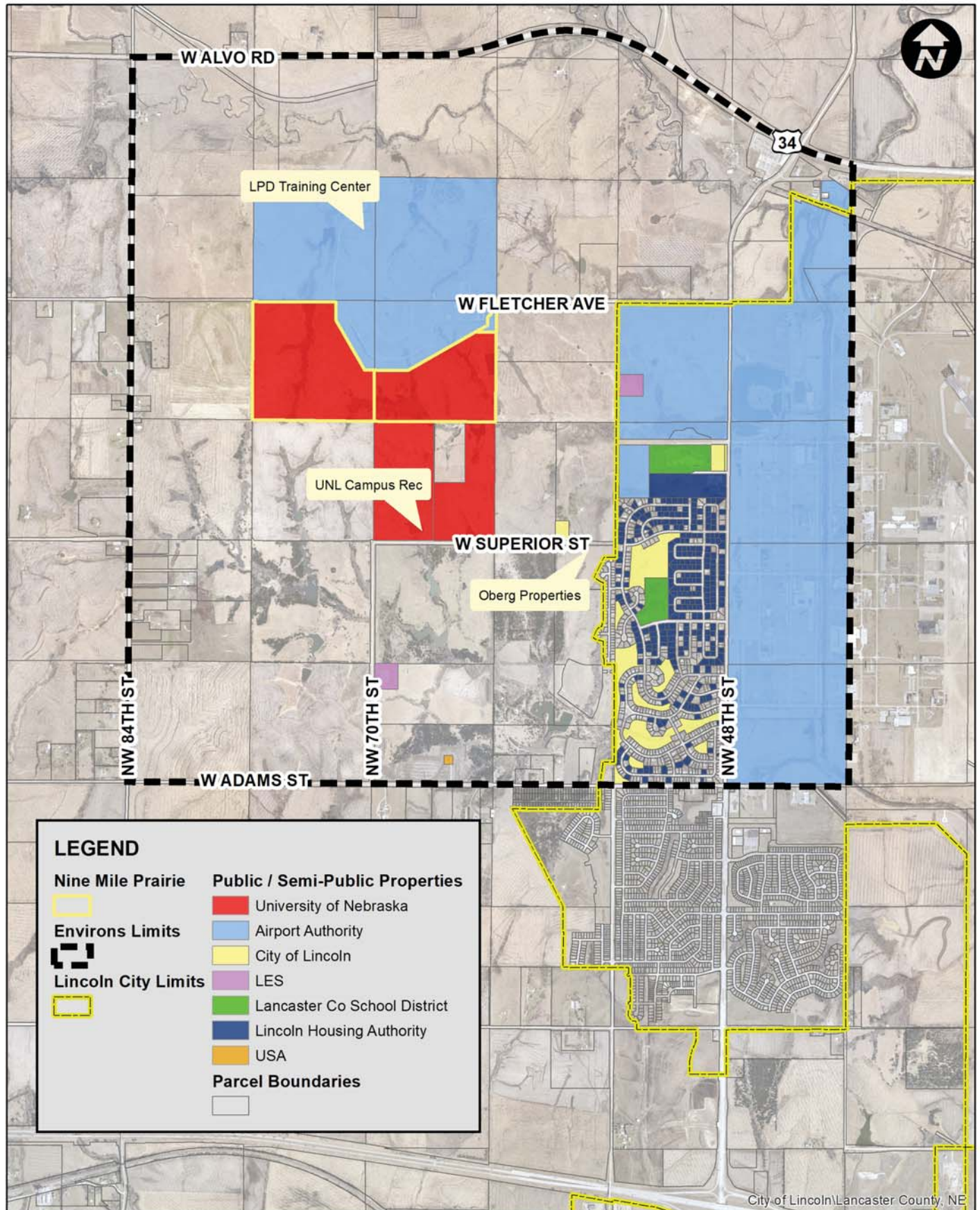
1.7 Neighboring Properties

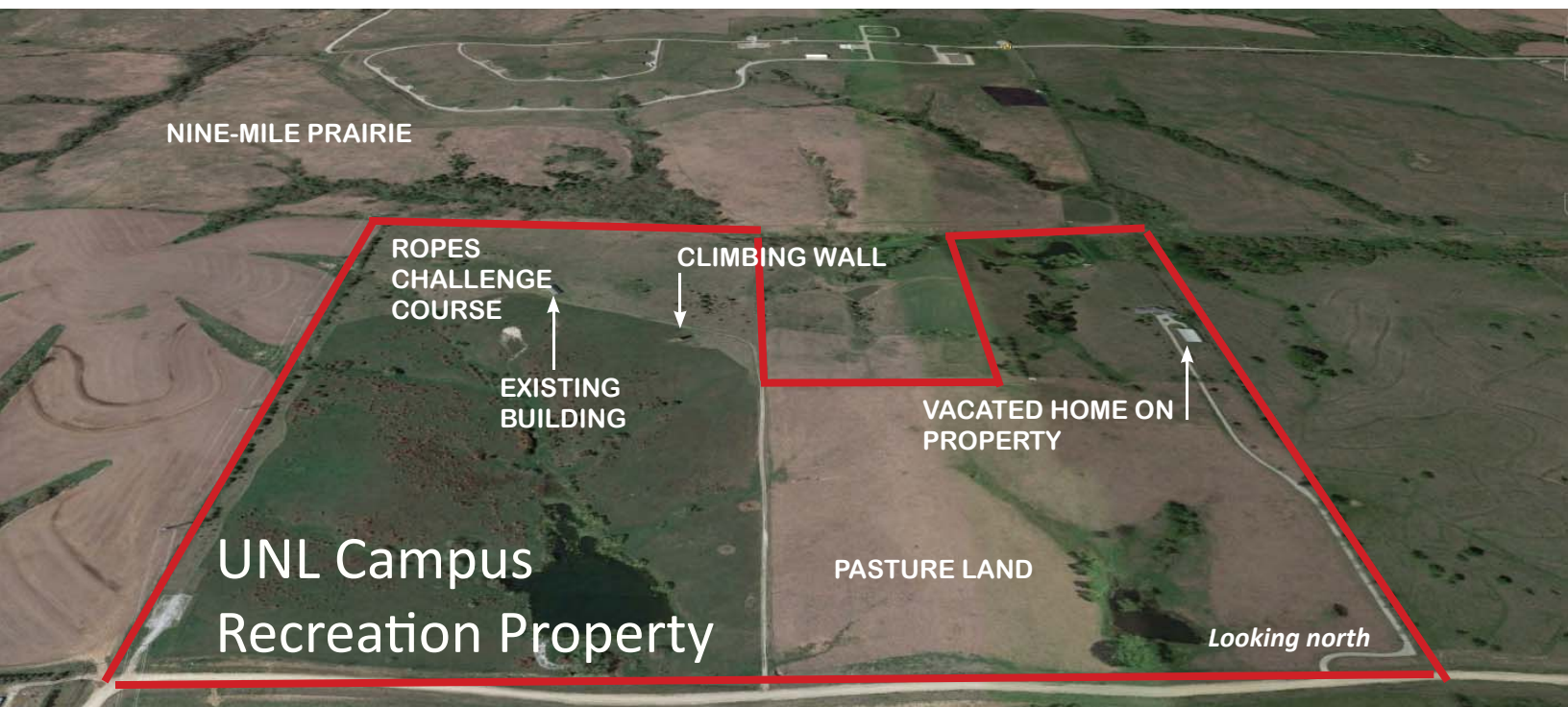
A number of properties neighboring NMP have similar and compatible land uses. Publicly or semi-publicly owned properties are shown in Figure 1.7.1.



Figure 1.7.1: Public/Semi-Public Properties

0.5 0.25 0 0.5 Miles

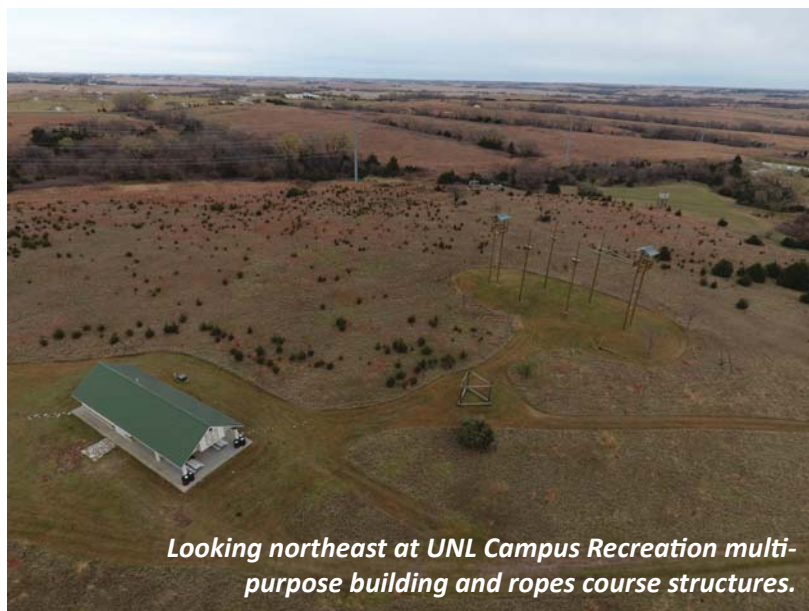




1.7.1 UNL Campus Recreation Property

UNL Campus Recreation acquired the west 80-acre property in 2000 and subsequently constructed a challenge course in 2001 with the pavilion in 2005. A water well was installed but water quality has been very poor due to high salinity of the groundwater. Prior to purchase, previous land use was grazing. An additional 60-acres was purchased in 2010. The property remains closed to the public due to public safety risks of unauthorized usage of the climbing structures. The site is supported financially by UNL student fees. The minimum maintenance road along the south side of the property (W. Superior Street) was improved in 2014 and that has greatly improved accessibility for visitors to the property. Other land uses at the property include fisheries studies of the ponds by UNL faculty and students.

The property is predominantly grassland and includes remnants of unplowed tallgrass prairie. A former 40-acre field on property was replanted to native prairie grasses. Land management on the property has included haying (2-3 times), cedar tree removal and prescribed burning south of the building and climbing structures. Future plans on the property include access road improvements and new parking near the existing building. The land is part of Farm 10513 (tracts 12336, 12765) as reported by the University of Nebraska Board of Regents. All land management planning for property will be directed through the Division of Campus Recreation.





*Looking north toward UNL
Campus Recreation property.*



Looking southwest toward UNL Campus Recreation property and multi-purpose building.



Looking southeast at LAA Property

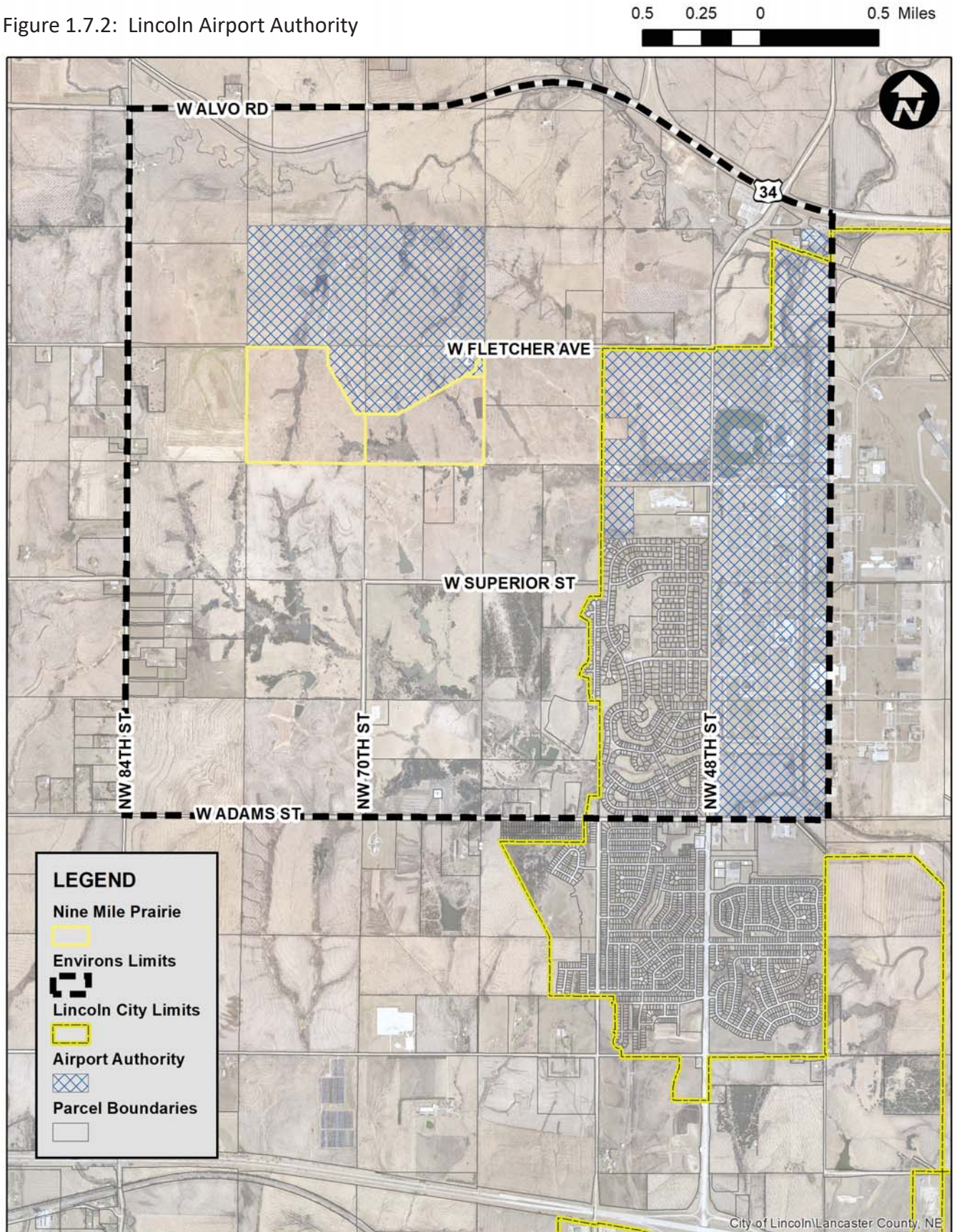
1.7.2 Lincoln Airport Authority Properties

The City of Lincoln Municipal Airport was dedicated in 1930. In 1942, the U.S. Army began construction of military facilities at the airport at a cost of \$20 million. As part of the arrangement, the City of Lincoln provided 2,750 acres of land as well as water supply and electricity to support the Lincoln Army Airfield. At the end of 1945, the Lincoln Army Airfield became temporarily inactive and then was declared surplus in mid-1946. The U.S. government surrendered its lease in 1948 which transferred all facilities on airport land to the City of Lincoln (Coffman Associates, Inc. 2007).

In 1952, the U.S. Air Force began a lease for the airfield and purchased additional property to form the U.S. Air Force Base. NMP's purchase by the U.S. Air Force occurred in 1953. The LAA was created in 1959 and the airfield was transferred to the City of Lincoln/LAA from the U.S. Air Force in 1966. During the 12-year lease of the airport by U.S. Air Force, 850 acres of land were purchased for facilities expansions. This additional land was also turned over to LAA but included separate deed restrictions for use (Coffman Associates, Inc. 2007).

NMP itself was sold by LAA to the UNL Foundation in 1983 but LAA still maintains ownership of many properties in the planning area. Figure 1.7.2 shows the LAA current property ownership in the area at the time of this planning effort.

Figure 1.7.2: Lincoln Airport Authority





1.7.3 Oberg Family Properties

The south Oberg Family property was purchased in 1985 and it includes 25-acres of unplowed tallgrass prairie, riparian habitat, small pond and a residence. The property is bounded to the east by residential neighborhood. The north boundary is W. Superior Street which dead ends at the northeast corner of the property. Historically, W. Superior Street was laid out as the emergency escape from the air base during World War II.

The north Oberg Family property is 80-acres and includes unplowed tallgrass prairie, areas of planted and naturally occurring diverse woodlands, and riparian habitat. The property is bounded to the east by residential development and LAA property in the northeast portion, LAA grassland property to the north, and grazed rangeland to the west. Beekeepers, ornithologists, and other scientists have assisted the Oberg family with data collection and inventories of various flora and fauna on their property over the years.





Looking northeast toward LPD Law Enforcement Training Center

1.7.4 Lincoln Police Department Law Enforcement Training Center

The Lincoln Police Department (LPD) entered into a 50-year lease with LAA in 2016 for the operation of an 80-acre firearm training and practice facility. LPD indicated that the facility is one of the premier firing ranges throughout the midwest. The facility is used not only by LPD but also Nebraska State Patrol, Lancaster County sheriff's office, Nebraska Department of Corrections, Nebraska National Guard, and also various US military groups that visit the Lincoln area. The facility hosts well over 1,000 users per year. The facility has potential for future expansion.

The Lower Platte South Natural Resources District (LPSNRD) partnered with LPD and LAA to plant trees along east side of range for noise abatement and visual screening. The facility's location in a lowland area further dampens noise. The property is primarily grassland and includes remnants of unplowed tallgrass prairie. The surrounding area is currently agriculture and low density residential/farmsteads.

PART 2: PLAN PURPOSE AND BOUNDARY

2.1 Master Plan Objectives

The master plan goal is to encourage and facilitate long-range land management strategies that are compatible with tallgrass prairie conservation and protection for NMP and surrounding area. Furthermore, the planning effort strives to instill an extended management and utilization philosophy in the surrounding public and private-owned landscape that creates a lasting land buffer around NMP. This also includes working with willing landowners within the NMP Environs to manage, protect and conserve tallgrass prairie on their respective properties.

Define Planning Area Boundry

Establish draft and working planning area boundary based on geographical barriers and grassland extents adjacent to NMP. To conserve and protect sensitive resources within the planning area existing grasslands, woodlands, riparian corridors, agricultural fields, and urban areas were analyzed spatially and prioritized based on habitat diversity and connectivity to the Salt Valley Greenway.

Develop Suitable Land Use Recommendations

Plan outlines recommendations for Advisory Council to plan for myriad of landuse changes on macro- and micro-scales (e.g. linear corridor buffers and pollinator habitat plots).

Identify Land Management Strategies

Document how natural resources and management of the Nine-Mile Prairie Environs fit into a larger signature landscape that is the planning area.

Outline Funding and Organizational Strategies

Outline strategies for Advisory Council consideration that could provide funding to implement planning strategies. Document leadership role duties that could implement the plan. Explore federal, state and local funding sources for Tier 1 and Tier 2 species.



Looking southeast toward Lincoln from above NMP



2.2 Nine-Mile Prairie Environs Planning Area Boundary

One of the first steps in the strategic planning process for NMP and surrounding area was to establish a draft and working planning boundary. For this planning document, the term “NMP Environs” is used to describe NMP and a planning area around it. The establishment of an initial working environs boundary around NMP seeks to promote and coordinate long-range management strategies compatible with tallgrass prairie enhancement, preservation, and protection. The boundary was based on early strategic planning discussions conducted by the Advisory Council before the initiation of this planning effort. The boundary is influenced by existing features as there is not a planning industry standard that defines or recommends a planning area offset distance from a property like NMP. Furthermore, the draft boundary was determined based on Advisory Council guidance, drainage boundaries/alignments, public land ownership, and major roadways in area. The relative scale of the Prairie Corridor in south-western Lancaster County surrounding Spring Creek Prairie generally influenced the size of the NMP Environs area. The environs boundary is dynamic and may change as the plan evolves over time with implementation.

As further described in Part 5, another element of defining a planning area boundary is connected to UNL-Center for Grassland Studies’ (CGS) role as a land grant university. The three core mission areas of a land-grant university are teaching, research, and outreach (extension). The creation of a draft planning boundary for the NMP Environs helps UNL-CGS work toward its mission of partnering with NMP neighbors and other agencies which is an objective of this master plan.

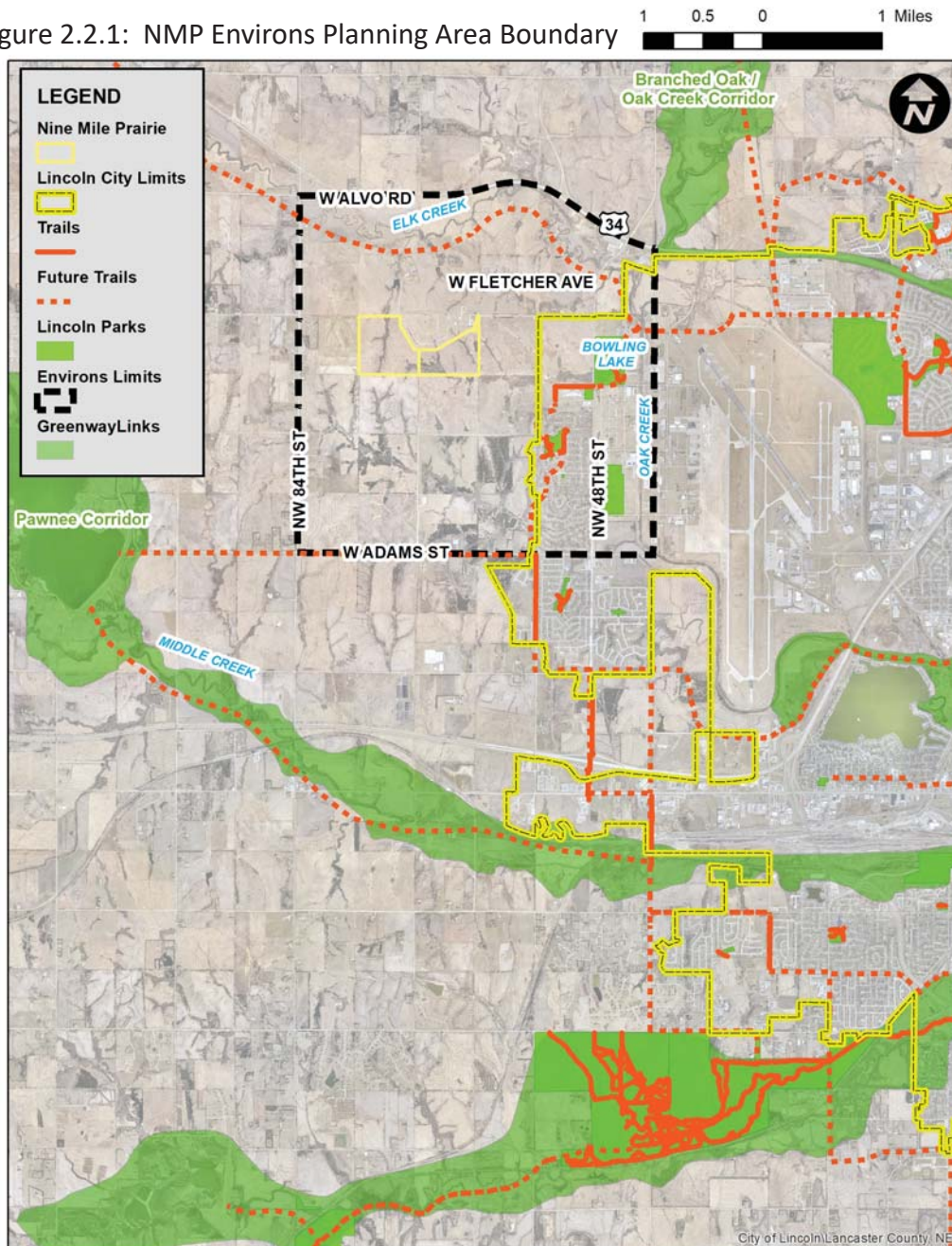


Looking northwest from above northwest corner of NMP



The NMP Environs planning boundary (Figure 2.2.1) was defined to include key geographical features to meet the Master Plan objectives. Situated along the Elk and Oak Creek watershed divide, the planning area contains headwaters to numerous stream tributaries. Key features within the Environs include Nine-Mile Prairie itself and adjacent prairies and grasslands, woodlands, upland riparian stream corridors, future sites for recreational trails, Elk Creek and Oak Creek. The Environs cadastral boundary was selected based on section lines demarked by NW 40th St (east), NW 84th St (west), US highway 34 (north), and Adams St. (south). The east boundary coincides with Oak Creek, which has been straightened through the Lincoln Airport Authority property. The north boundary follows US Highway 34, which travels just north of Elk Creek. The west and south boundaries follow major collector roadways, which form a man-made barrier and also coincide with a general change in predominate landuse from grassland to agriculture. The Environs planning boundary includes the confluence of Elk and Oak creek, which falls within the Salt Valley Greenway Branched Oak / Oak Creek connecting corridor.

Figure 2.2.1: NMP Environs Planning Area Boundary



2.3 Connection to Greenway

2.3.1 Greenway Concepts Background

Greenways are linear open spaces that include but are not limited to natural corridors like river or stream drainages, right-of-way passages converted for recreational trail use, scenic roads, or other routes along a corridor. The concept of a greenway is focused on connections between people and the land, natural settings, open space, public parks, historic places, preservation and human experiences. Greenways can have varying functions, conditions and definitions but often protect natural, cultural and scenic resources.

The Salt Valley Greenway (SVG) Master Plan (2012) outlined historical context in Lincoln-Lancaster County with greenway planning dating back to 1961 when a linear park was included in the City's (Lincoln) Comprehensive Plan. Named the "Crescent Green", the project outlined a continuous greenway and open space corridor along the west and north part of Lincoln. A subsequent master plan for Wilderness Park was completed in 1972 that helped establish a framework and responsibilities for Crescent Green Park with updates in 1986. This effort established the first formal greenway concept in Lancaster County.

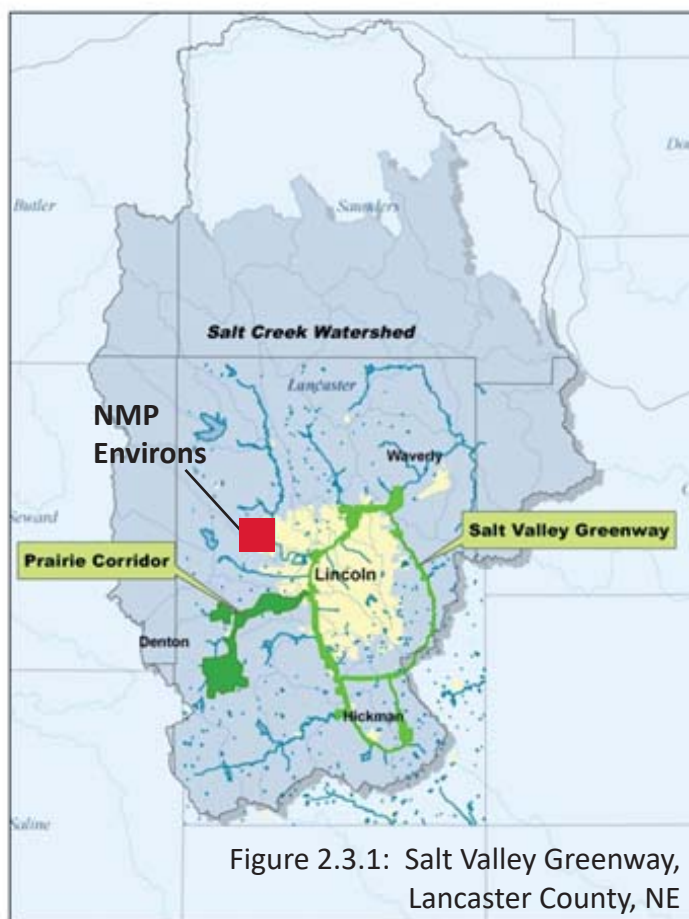
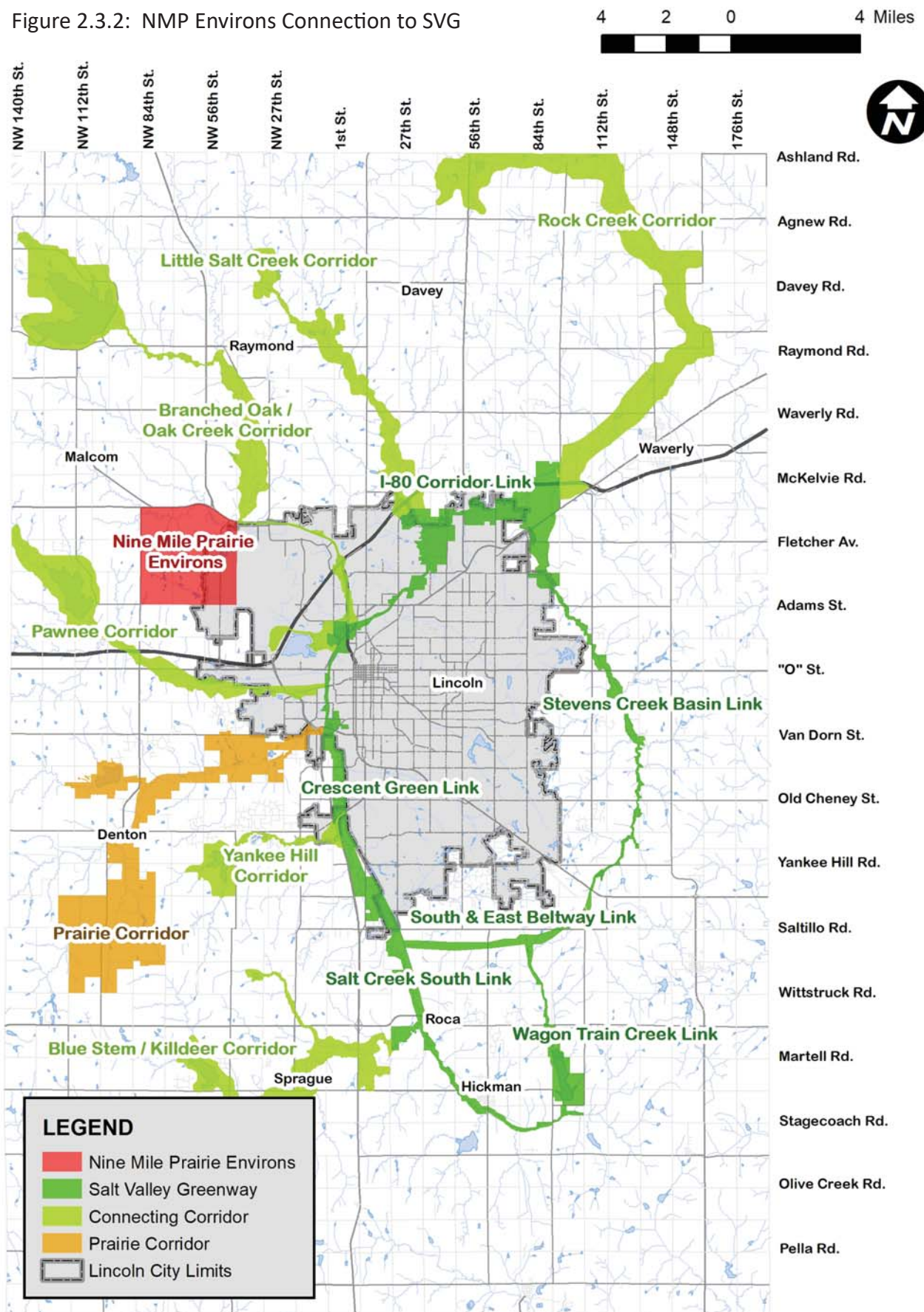


Figure 2.3.1: Salt Valley Greenway, Lancaster County, NE

In 2001, the City of Lincoln-Lancaster County (City-County) Planning Department developed the Greenprint Challenge with other agency partners. The Greenprint Challenge was designed to provide the City-County with an approach for sound development providing a county-wide snapshot of the resources of Lancaster County for inclusion in the 2025 Comprehensive Plan. The Greenprint Challenge documented existing environmental conditions in the City-County and helped define how the community should draw upon its natural and cultural resources in future planning efforts. The 2040 Comprehensive Plan referenced the Greenprint Challenge and noted the unique opportunity of Lancaster County for creating an overall greenway and associated linkages (SVG Master Plan 2012).

Lancaster County is located almost entirely within the Salt Creek drainage basin which includes numerous tributaries forming the natural landscape of the county. The SVG Master Plan (2012) established a large loop primarily consisting of Salt Creek and Stevens Creek to form the primary Salt Valley Greenway (see Figures 2.3.1 and 2.3.2). This large greenway loop is anchored in hydrologic features such as streams, wetlands and floodplains of Salt Creek and tributaries and ecological factors like existing physiography, soils and slopes, woodlands, grasslands, and wildlife habitat.

Figure 2.3.2: NMP Environs Connection to SVG



The NMP Environs includes nearly all of the greenway resources included in the 2001 Greenprint Challenge (Figure 2.3.3). The resource categories identified as well as brief descriptions of resource components within NMP Environs are included in Table 2.3.1.

Table 2.3.1: Greenprint Challenge Resources List and Resources Present at NMP Environs	
Greenprint Challenge Resource Categories	NMP Environs Resources
Native Prairie	Unplowed tallgrass prairie exists throughout the environs in addition to diverse tallgrass prairie and grassland areas
Freshwater Wetlands	Drainageways and ponds support wetlands
Saline Wetlands	No specific areas mapped but saline groundwater in the environs has caused water quality concerns for consumption. Conversely, the naturally occurring saline groundwater is vital to function of saline wetlands.
Threatened & Endangered Species	Numerous plant species as described in Part I
Basins & Streams	Headwaters for numerous streams connecting to multiple basins
Floodplains & Riparian Areas	Corridors traverse NMP Environs across drainageways and riparian zones
Parks, Trails, & Other Recreation Areas	NMP is open to public and includes parking and trails
Urban Forest	No current urban components so no presence of urban forests
Woodlands	Native and managed woodlands areas throughout
Agricultural Lands	Working landscape of agricultural production within and surrounding NMP Environs
Cultural & Historic Landscapes	NMP on National Historic Registry, legacy of NMP as research site for Dr. Weaver as “father of grassland ecology” and other Nebraska history aspects
Views & Vistas	Watershed highpoints at NMP Environs provide views in many directions including views of City of Lincoln and Nebraska state capitol

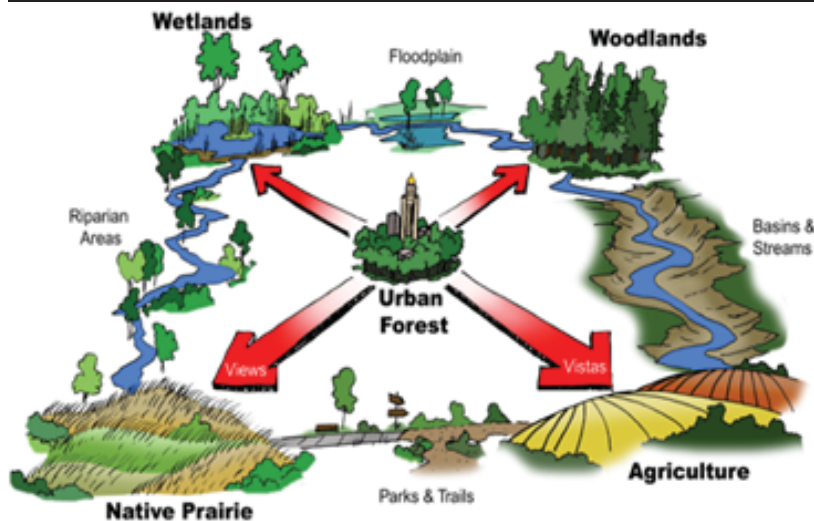


Figure 2.3.3: Greenway Resources
Source: City of Lincoln Greenprint Challenge (2001)

2.3.2 NMP Environs Connection to Salt Valley Greenway

The SVG Master Plan employed a number of boundary terms to describe components of the broader SVG and those include links, connecting corridors and nodes (see Figure 2.3.4).

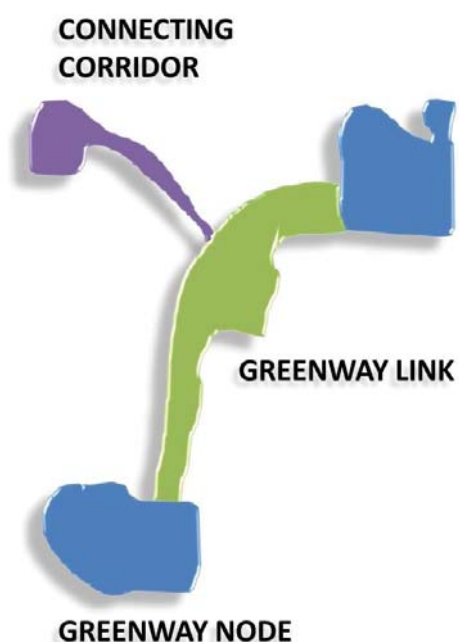


Figure 2.3.4

Links – These areas are the segments that make up the total greenway. Ranging in length from 3.5 miles long to 16 miles long within the Salt Valley Greenway, these links are split up by separate basins and streams, developed or rural landscape and transportation corridors.

Connecting Corridors – The connecting corridors tie natural resource features and public areas outside the boundary of the greenway back to the greenway itself. The connecting corridors follow tributary streams that connect with Salt Creek.

Nodes – These greenway planning components highlight natural resource features that are offset from the connecting corridor or link. An example of a node is a native prairie area. A node can exist at the end of a connecting corridor but could also be adjacent to a portion of the connecting corridor or link.

LPlan 2040 notes the importance of the Salt Valley Greenway for recreation, transportation, resource preservation, education and economic development. It is anticipated that this opportunity to achieve cross-benefit from multiple resources within the greenway will solidify a sense of community and enhance regional tourism.

Connecting corridors follow tributary streams and tie natural resource features and public areas outside the main loop of Salt Creek and Stevens Creek back to the Salt Valley Greenway. LPlan 2040 identifies the following key connecting green corridors to the SVG which are included in Figure 2.3.2:

- Oak Creek Corridor to Branched Oak Lake
- Prairie Corridor on Haines Branch corridor to Conestoga SRA and Spring Creek Prairie
- Cardwell Branch Corridor to Yankee Hill WMA
- Middle Creek Corridor to Pawnee SRA; Salt Creek Corridor to Killdeer and Bluestem SRA
- Salt Creek Corridor East up the Little Salt Creek and Rock Creek Corridor

The NMP Environs, a boundary that is dynamic and may change as the plan evolves over time with implementation, could be a new corridor with NMP as a node as defined in the LPlan 2040. This will be a key corridor for the conservation and protection of NMP Environs and will provide a leading role in implementing corridors and nodes as assets of the SVG as a whole. Of particular note, Lplan 2040 also amended LPlan 2030 so as not to bring residential housing up to the east edge of NMP, as had once been envisioned. The NMP Environs Master Plan recommends inclusion of the NMP Environs corridor in the upcoming Comprehensive Plan update for 2050.

PART 3: RESOURCE INVENTORY & ASSESSMENT

3.1 Land Use Inventory

The City of Lincoln and Lancaster County have mapped existing and future land uses to facilitate urban growth planning. Within the NMP Environs existing land uses include, but are not limited to environmental, grassland / pasture, riparian, agriculture, industrial, and residential areas. The environmental landuse designation covers NMP, portions of the UNL Campus Recreation Property and the adjacent Lincoln Airport Authority decommissioned bomb shelter property due to the presence of sensitive prairie habitat and unique features. A comparison of existing land use designations with 2018 aerial imagery and site surveys found areas of change. The existing land use map has been updated in this Master Plan to better reflect the current landuse in the area. Land use maps were updated and categorized based on habitat diversity and historic plowing metrics. Figure 3.1.1 is a landuse map comprised of available GIS datasets from the City of Lincoln such as existing and future trail locations and future landuse planning. Figure 3.1.2 includes datasets generated for this Master Plan, depicting natural resources described below.

3.1.1 Grasslands

Mapped grasslands included prairie, pasture, and hay field areas. Boundaries were established along the edges of agricultural fields, the presence of contiguous woody vegetation, and parcel property lines (i.e. areas outside of the public road right of way). Low density residential acreages and farmsteads with tallgrass areas were included in this designation; however, buildings and visibly mowed turfgrass areas were not mapped as grasslands. Each grassland area was classified based on habitat diversity and whether the location had been plowed. Grasslands known to have a large distribution of species were designated as having “High” habitat diversity. “Low” habitat diversity was designated for monocultures such as known brome hay fields and areas that appear to lack diversity in aerial imagery. UNL Center for Grassland Studies prepared a historic plowing map to classify grasslands as either “Plowed” or “Unplowed”. “Unplowed” grasslands show no record of agriculture or other land use based on review of historic aerials dating back to the 1940s.



Looking northeast toward NMP parking lot



3.1.2 Riparian Corridors and Woodlands

Riparian corridors and woodlands were mapped for contiguous areas that are either predominately covered by woody vegetation or are perennially vegetated swales within an agricultural field. Boundaries were derived using a combination of 2018 Aerial imagery and LiDAR topography data. Riparian corridors were distinguished from woodlands as being along drainage paths. Habitat diversity of vegetation species were classified as either high, medium, low, and unknown. High and medium diversity areas were denoted in areas with native desirable tree species like oak and cottonwood. Low diversity areas were designated for woodlands dominated by eastern red cedar trees, which are an invasive species. Unknown diversity areas were designated for all other riparian corridors and woodlands, due to the difficulty with assessing species diversity with aerial imagery.

3.1.3 Turfgrass

Turfgrass areas were designated for City of Lincoln parks and open space outlots. Turfgrass boundaries were delineated using parcel datasets. All turfgrass areas were assumed to have “Low” habitat diversity. Generally, park areas are seeded with a blend of 1 or 2 turf-type grasses, which are intended to reduce vegetation diversity. Turf management practices such as frequent mowing, fertilization and use of herbicides to remove weeds perpetuate this condition. However, parks and open spaces do facilitate faunal diversity and often function as corridors for faunal movement between natural spaces.



*“Cottonwood Canopy - New Leaves
Photo by Michael Farrell/PBT*



Looking south at NMP



Looking north along west edge of NMP

Figure 3.1.1: Landuse Inventory for NMP Environs

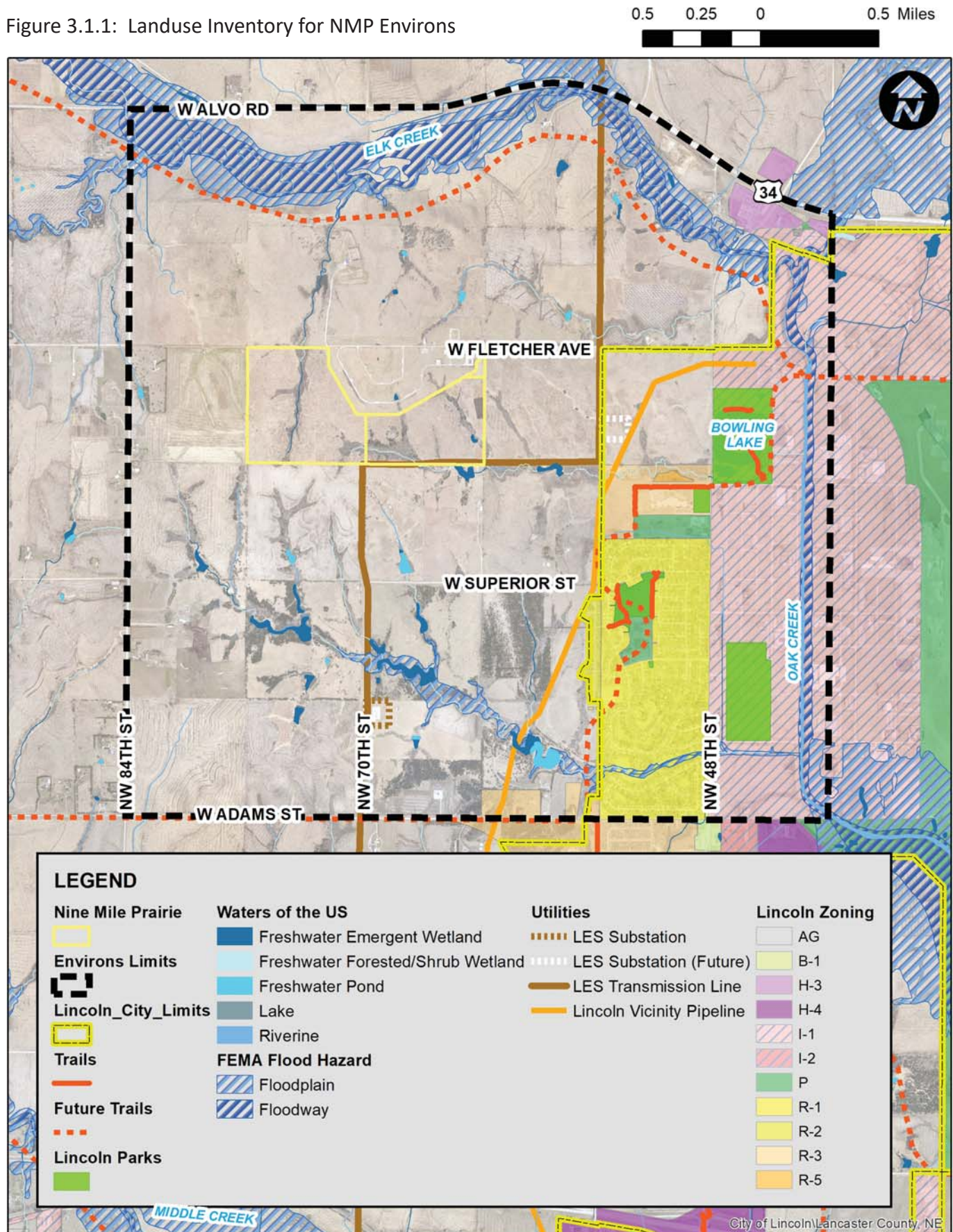
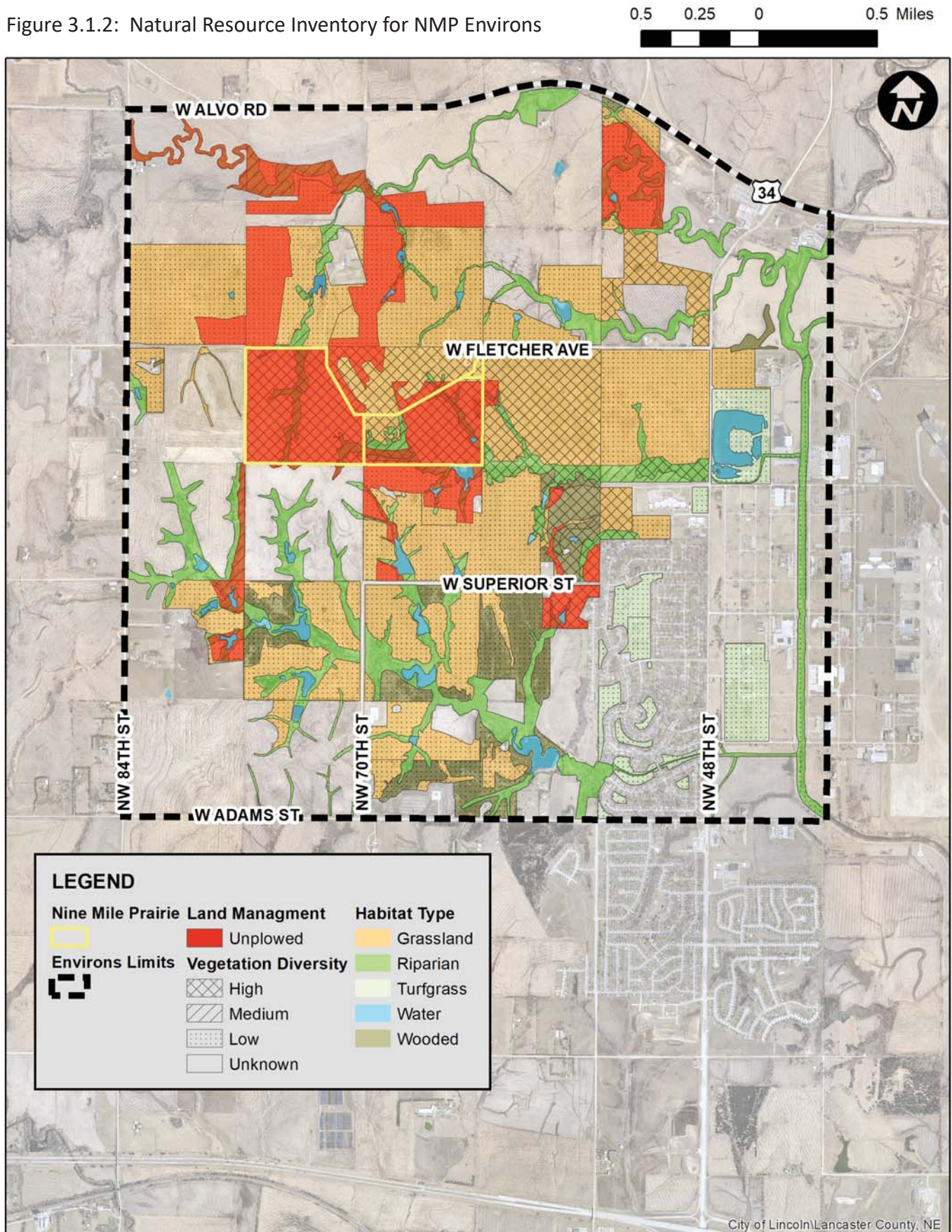


Figure 3.1.2: Natural Resource Inventory for NMP Environs



3.1.4 Agriculture

Agricultural areas include row crop, small grain, and alfalfa fields. Mapped boundaries were based on 2018 Aerial Imagery, site visits/windshield surveys, and existing parcel property lines.

3.1.5 Urban

Urban areas include residential neighborhoods, commercial developments, and industrial areas. Mapped boundaries were based on Lincoln's zoning map and parcel property lines. Within the planning area, properties east of NW 48th St are predominately zoned industrial, and to the west agriculture. The Arnold Heights neighborhood was developed in the 1950s to serve Air Park. In 2009 a new Arnold Elementary school was built to the north of the neighborhood. Around Arnold Elementary school and along Adams Street, there are undeveloped and low-density residential parcels that are currently zoned for future residential neighborhoods.

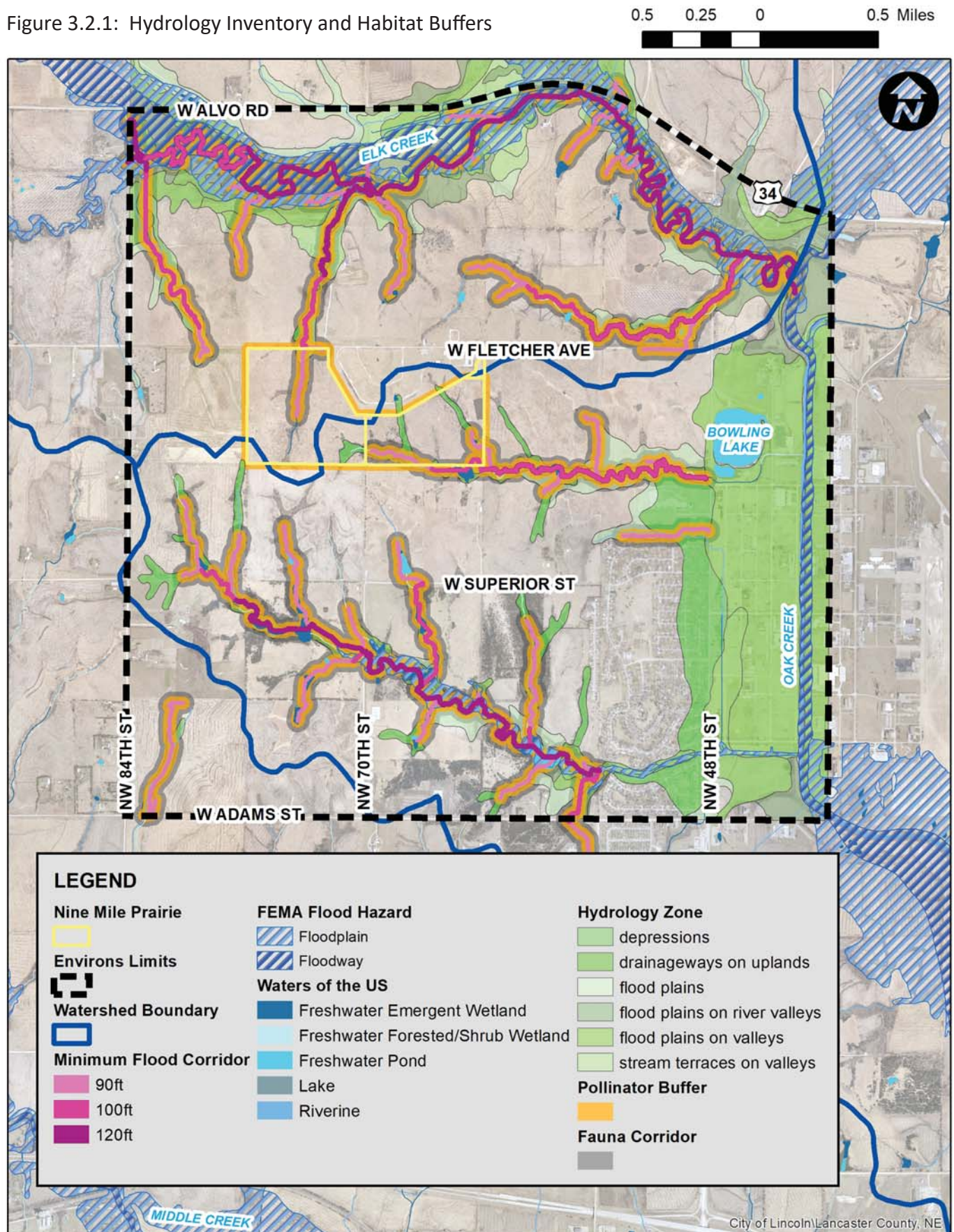


3.2 Hydrology Inventory

The NMP Environs is situated along the watershed divides of Elk Creek, Oak Creek and Middle Creek. Numerous tributaries to these large streams have head-waters located on or near NMP. Tallgrass prairies play an important role in the hydrologic cycle through evapotranspiration and percolation processes. Tall grasses promote infiltration and transpiration of water, reducing storm water runoff and flood potential for downstream urban areas. Water percolated into the ground is stored and slowly released through seeps, providing a sustainable and filtered baseflow to nearby streams and wetlands. Several GIS datasets are available for identifying and inventorying stream corridors, floodplains, and wetlands. These include the National Wetlands Inventory, Regulatory Floodplains and Flood Corridors, and soil geomorphology. Hydrology Inventory maps are depicted in Figure 3.2.1.



Figure 3.2.1: Hydrology Inventory and Habitat Buffers



3.2.1 National Wetlands Inventory

The U.S. Fish and Wildlife Service (FWS) is the principal U.S. Federal agency tasked with providing information to the public on the status and trends of our Nation's wetlands, lakes, and riverine habitats. The National Wetlands Inventory is a spatial database established by the U.S. Fish and Wildlife Service that identifies and classifies wetlands and deepwater habitats from aerial imagery.



"Female Snapper Lays Her Eggs"
Photo by Michael Farrell/PBT

3.2.2 FEMA Floodplains

The Federal Emergency Management Agency (FEMA) provides information on the existence and severity of flood hazards. Regulatory floodplains and floodway in Oak Creek and Elk Creek were mapped during the City of Lincoln's 1978 Flood Insurance Study. Development within the floodplain and floodway are regulated through Lincoln's Drainage Criteria Manual and minimum FEMA requirements. Oak Creek's floodplain and floodway are generally contained within the existing channel banks, which occurred when the channel was straightened and the area was developed by the U.S. Air Force prior to the 1950's. New bridges or other channel encroachments must meet minimum FEMA requirements to provide no adverse effect in the floodway and less than one-foot of rise in the floodplain. Elk Creek is located outside of the City of Lincoln's corporate limits but is within the 3-mile jurisdictional limits, and is therefore subject to the City's New Growth Standards in addition to FEMA's minimum requirements. These standards are a higher regulatory requirement, which call for No-Net-Rise in the floodplain (less than +0.05feet) and compensatory storage for fill placed in the floodplain.

3.2.3 Minimum Flood Corridors

The City of Lincoln requires minimum flood corridors to be mapped along stream channels located within new urban developments. Under current standards, effective in March 2020, minimum flood corridors apply to any channel draining more than 150 acres and channels with a defined bed and bank. Due to the subjectivity of what qualifies as a defined bed and bank, the City of Lincoln investigated alternative criteria through the Oak Creek Watershed Master Plan. The Oak Creek Watershed Master Plan studied several drainages, one of which is located within the NMP Environs, to develop a correlation between drainage area and defined bed and bank. The watershed master plan recommended that all channels that drain 40-acres or more have a Minimum Flood Corridor. The corridor has a set width of 90-ft, centered on the channel thalweg. This width increases to 100-ft for catchments greater than 100-acres, and 120-ft for catchments greater



Looking south at NMP



than 200-acres. These criteria were used to map Minimum Flood Corridors in the NMP Environs for channels located outside of Lincoln's Corporate Limits.

3.2.4 Soil Geomorphology

The Natural Resource Conservation Service (NRCS) mapped soils across the United States for general farm, local, and wider planning. These soil maps were completed on a County basis and include valuable information about soil properties and qualities. Soil geomorphology describes the setting of how a soil component is formed in the natural landscape. Geomorphic features such as depressions, drainageways, floodplains and stream terraces on valleys indicate a hydrologic connection (hydrology zone) see Figure 3.2.1.

3.3 Habitat Buffers for Pollinators and Fauna Movement

The U.S. Forest Service authored a design guideline document for buffers, corridors, and greenways. In the document, various buffer widths are outlined for various species ranging from 100-600ft. For this Master Plan, a faunal buffer corridor width of 500-ft centered on the stream channel was employed for movement between natural habitats. Chemical spray drift can negatively impact pollinator species in sensitive habitats. A 130-ft buffer between agricultural fields treated by ground spraying is recommended to protect vegetation, aquatic, and invertebrate species (Bentrop 2008). These buffers are shown along hydrologic features and NMP Environs in Figure 3.2.1.

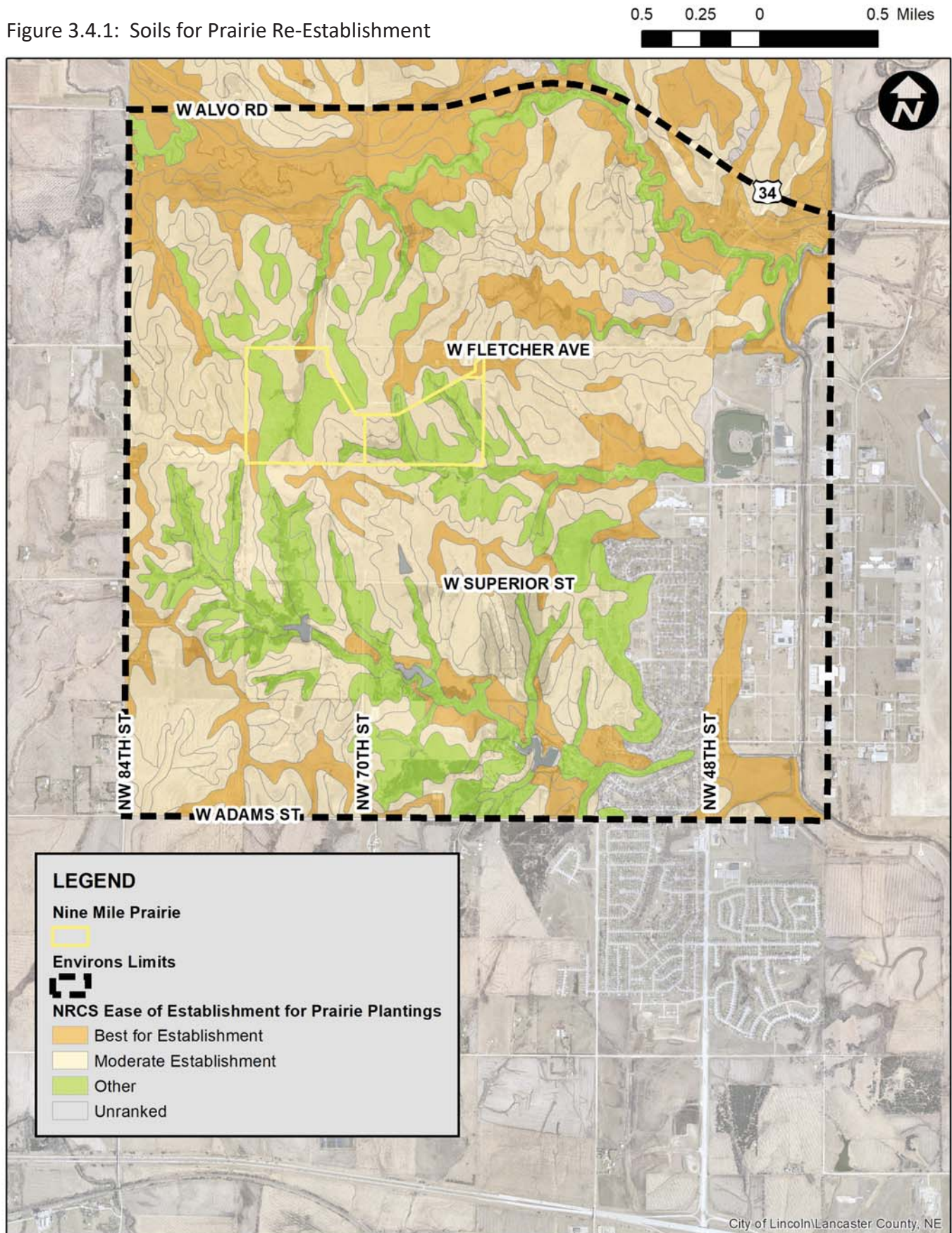


3.4 Soils for Prairie Re-Establishment

In addition to soil properties and qualities, the NRCS soil database provides general guidelines for soil suitability and limitations for various activities. One of these resources is the suitability of prairie establishment on disturbed soils. Soils are ranked based on soil erosivity potential, land slope, and soil formation. Seeding prairie grasses on disturbed soils can be difficult due to the long germination and establishment periods required for warm season grasses. Disturbed soils with a good or moderate ranking would be more desirable for enrolling into a conservation reserve program (CRP). Conversely, soils ranked as "other" that are currently grassland could be difficult to re-establish as a prairie if plowed under or temporarily disturbed for an adjacent development. Prairie establishment suitability for soils in the NMP Environs are shown in Figure 3.4.1.



Figure 3.4.1: Soils for Prairie Re-Establishment



PART 4: SPATIAL ANALYSIS

4.1 Prioritization Methodology

Current land use within the NMP Environs is generally compatible with management activities used to protect species diversity in high quality prairies. The City of Lincoln's comprehensive plan indicates that the City's future growth needs will include urbanization within the NMP Environs. This future growth/urbanization would be subject to review and/or changes in future comprehensive plan(s). To fulfill the mission of the NMP Environs Master Plan for natural resource protection, connection to the Salt Creek Greenway, and compatible landuse planning, spatial analyses were employed. GIS data derived for the Environ's existing landuse, hydrology, and buffer inventory (Section 3) were ranked based on habitat diversity and connectivity. These rankings were applied across the Environs on a 20ft by 20ft grid basis to account for discrepancies in input data, spatial resolution, and accuracy. A ranking matrix as shown in Table 4.1 was applied to establish an overall priority ranking for habitat protection. Areas with a higher priority ranking require special consideration for compatible landuse planning. This includes identifying and protecting existing natural resources and maintaining corridors for faunal movement and recreational trails.

NMP Environs Matrix Priority Ranking Score for Protection and Suitable Landuse Planning				Habitat Connectivity Weighting				
				Nine Mile Prairie	Min Flood Corridor	Floodplain & WOTUS	Pollinator Buffer	Hydrology Zone
Habitat Diversity Ranking Score				2.5			2	1.5
Diversity	Plowed	Description						1
High	Unplowed	Tallgrass	10	25			20	15
High	n/a	Riparian / Wooded						10
High	Plowed	Tallgrass	8	20			16	12
Low	Unplowed	Tallgrass						8
Medium	n/a	Riparian / Wooded	6	15			12	9
Low / Unkwn	Plowed	Tallgrass / Turfgrass						6
Low / Unkwn	n/a	Riparian / Wooded	4	10			8	6
n/a	n/a	Agriculture						4
n/a	n/a	Developing Res	2	5			4	3
n/a	n/a	Commercial						2
n/a	n/a	Industrial						
n/a	n/a	Developed Res						

Table 4.1 NMP Environs Matrix - Conservation and Protection Priority Scores



Looking south at NMP



CENTER FOR GRASSLAND STUDIES



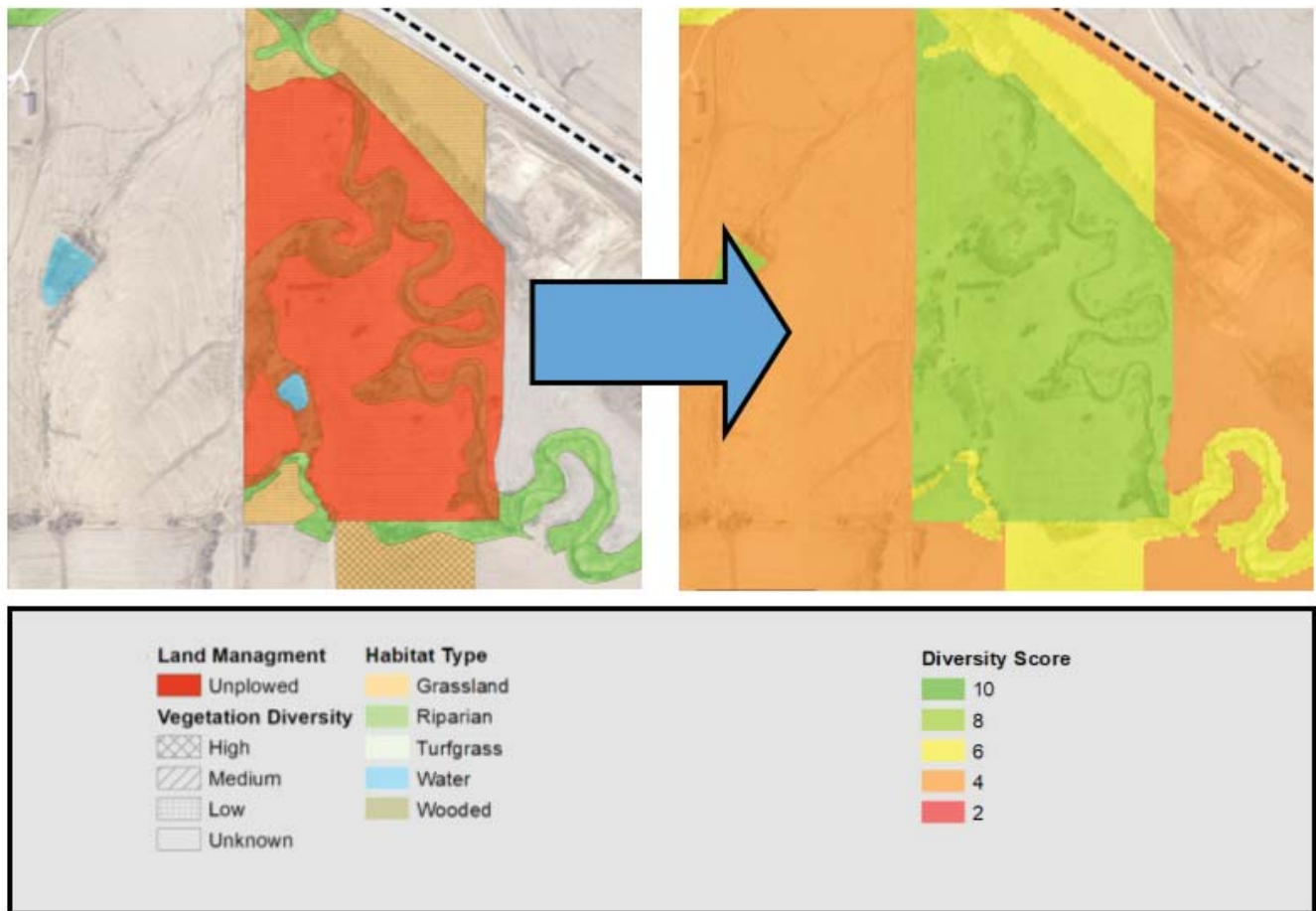
Nine-Mile Prairie Environs Master Plan
Part 4 - Page 1 of 7

4.2 Analysis

4.2.1 Habitat Diversity

The criteria used to develop the habitat diversity ranking score are also indicated in Table 4.1. This score considered the type of landuse, plowing and disturbance history, and known areas of higher vegetation species diversity. A ranking score of 10 represents the highest likelihood of species diversity, while 2 represents the lowest. Figure 4.2.1 demonstrates how the landuse inventory was used to derive the habitat diversity score map. Habitat diversity maps are provided in Appendix G. Figure 4.2.2 shows the habitat diversity score for the NMP Environs.

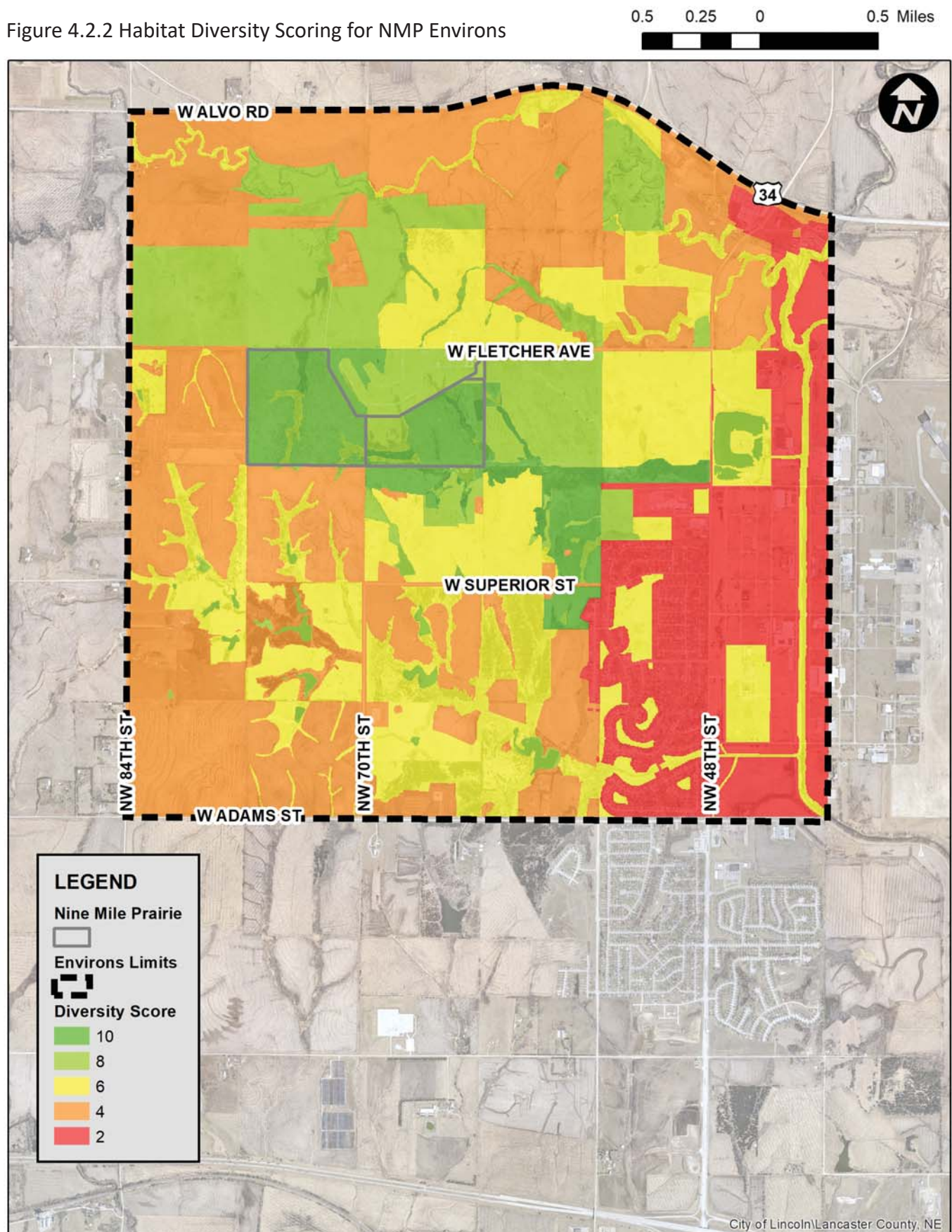
Figure 4.2.1 Habitat Diversity Ranking Example



Looking southwest at NMP



Figure 4.2.2 Habitat Diversity Scoring for NMP Environs



4.2.2 Habitat Connectivity

Criteria used to develop the habitat connectivity weighting score is also provided in Table 4.1. Connection between NMP and the Salt Valley Greenway can be achieved along protected stream corridors with regulatory floodplains and minimum flood corridors. Functioning as the headwaters, several stream corridors connect NMP to Elk Creek and Oak Creek, whose confluence is a connecting corridor to the Salt Valley Greenway. This weighting also considered a pollinator buffer to NMP, soil geomorphology along corridors, and minimum corridor widths for faunal movement. A weighting of 2.5 represents the highest level of corridor connection, while 1 represents the lowest. Figure 4.2.3 demonstrates how the hydrology inventory and habitat buffers were used to weight habitat connectivity to the Salt Valley Greenway. Figure 4.2.4 shows the habitat connectivity weighting score for the NMP Environs. Habitat connectivity maps are provided in Appendix G.

Figure 4.2.3 Habitat Connectivity Weighting Example

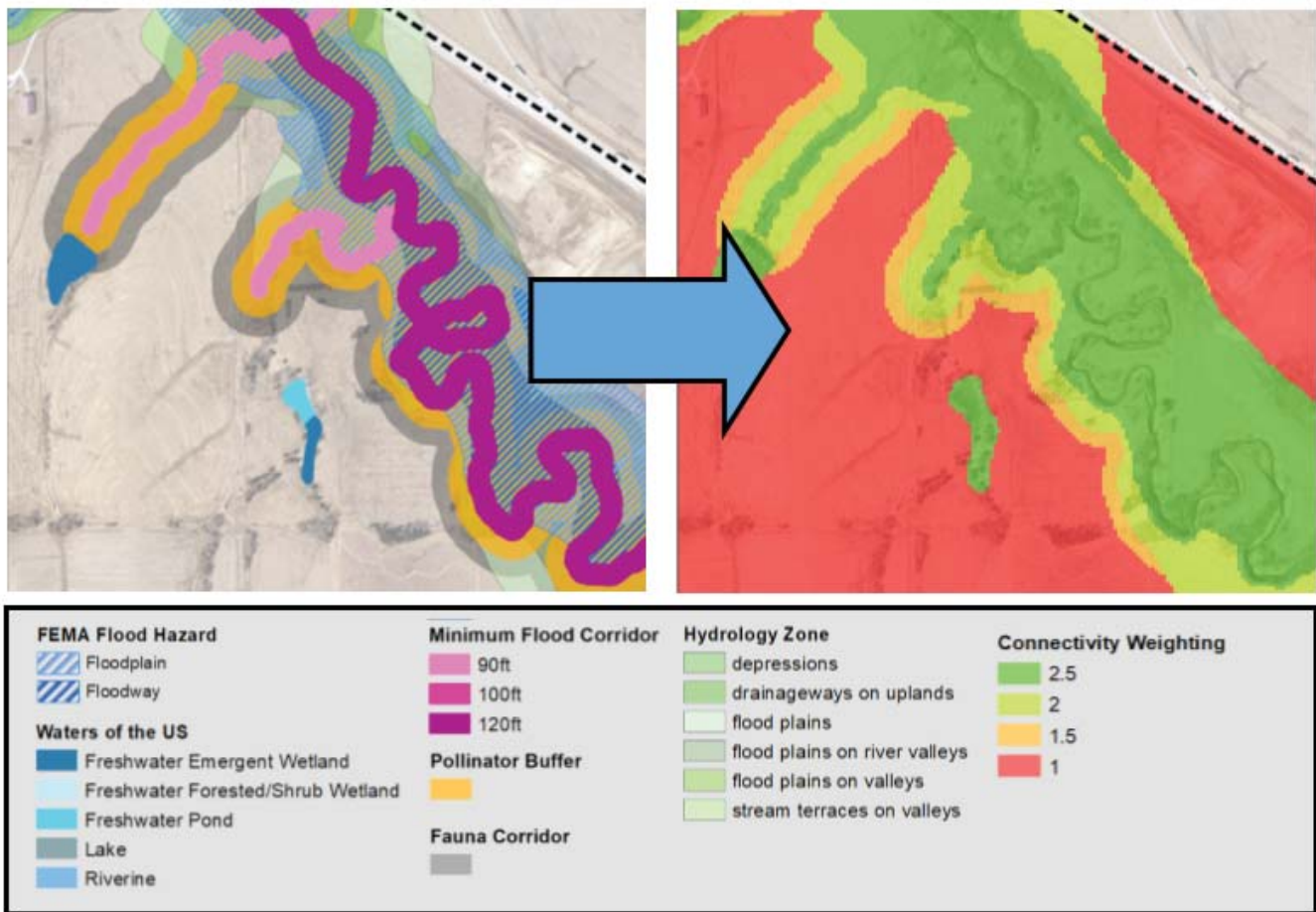
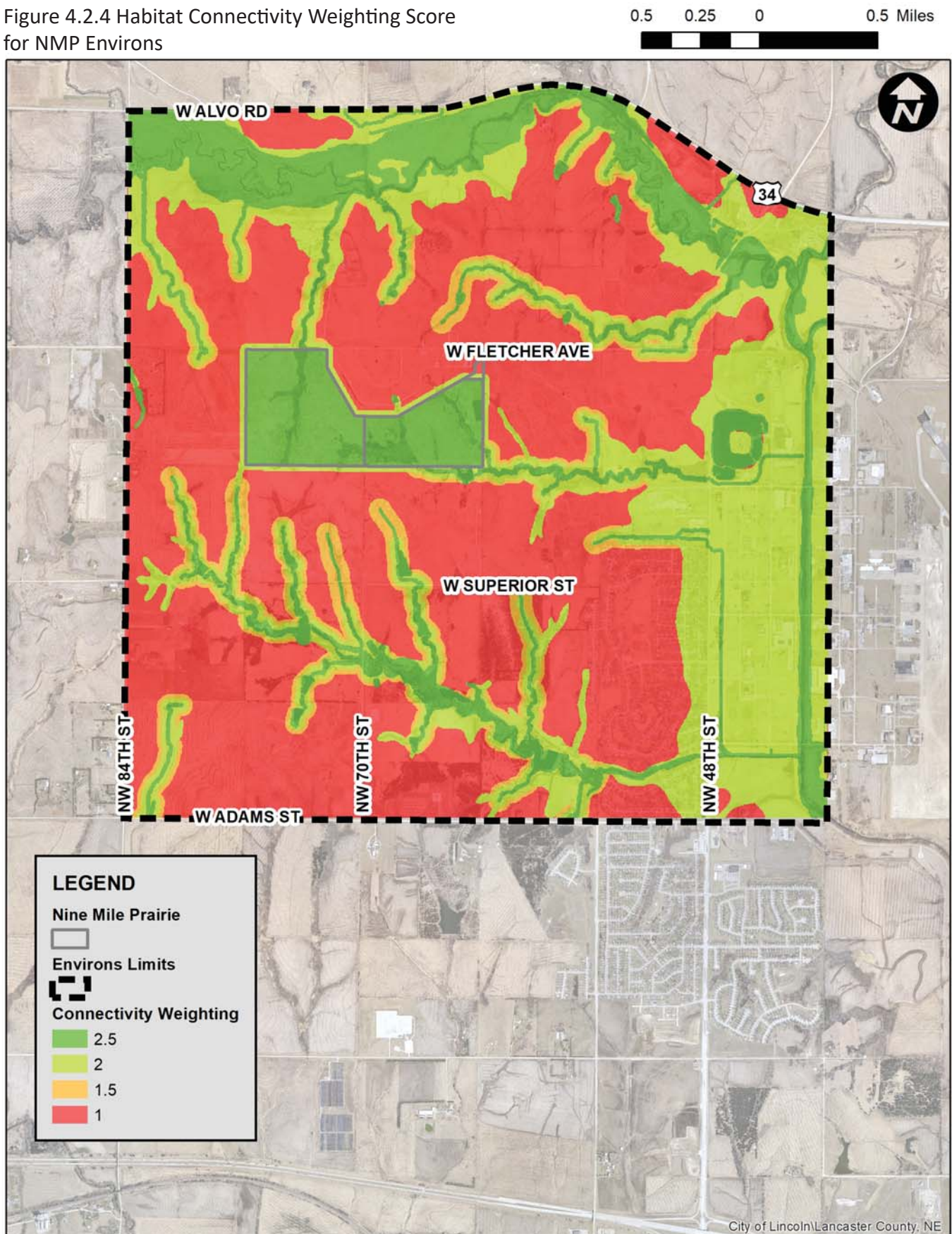


Figure 4.2.4 Habitat Connectivity Weighting Score for NMP Environs



4.3 Habitat Prioritization Results

The matrix shown in Table 4.1 and depicted on Figure 4.3.1 demonstrate how the habitat diversity ranking score is weighted by habitat connectivity to develop an overall priority score. Priority scores were grouped in increments of 0 to 2.5 (lowest), 2.5 to 5, 5 to 7.5, 7.5 to 10, and over 10 (highest). Figure 4.3.2 shows the habitat priority score for protection and suitable landuse planning. Habitat prioritization maps are provided in Appendix G.

Figure 4.3.1 Habitat Priority Scoring Example

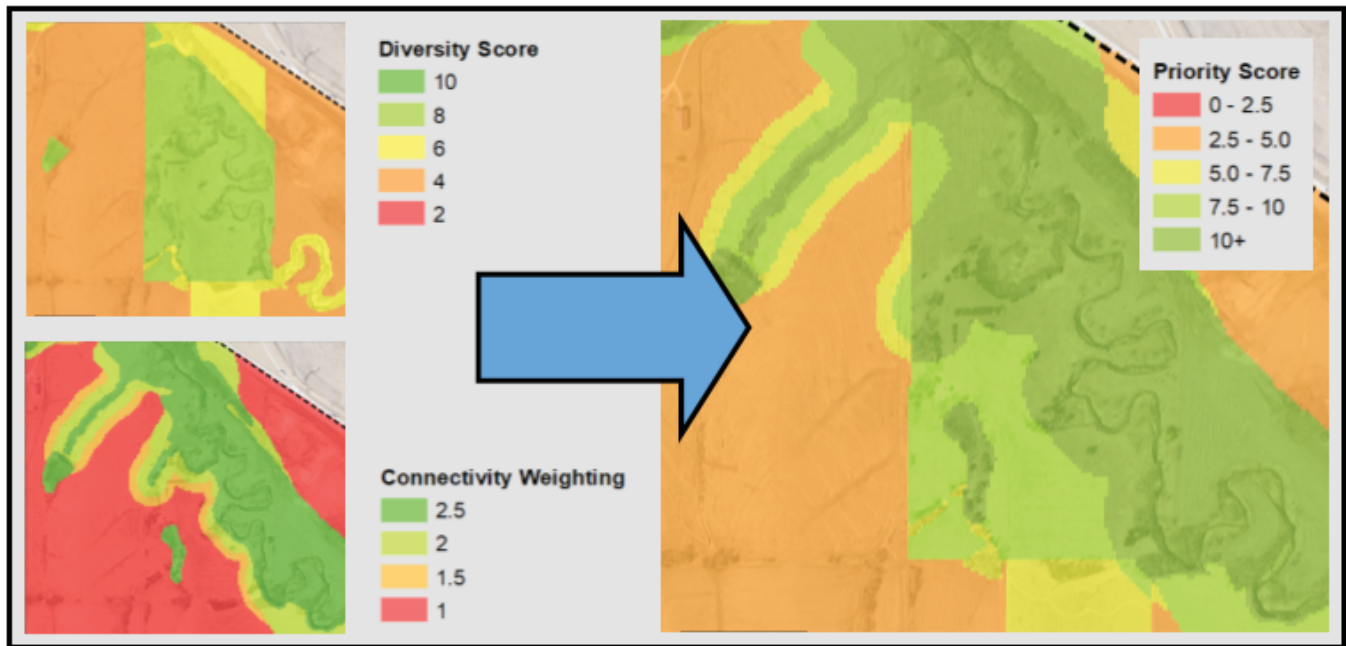
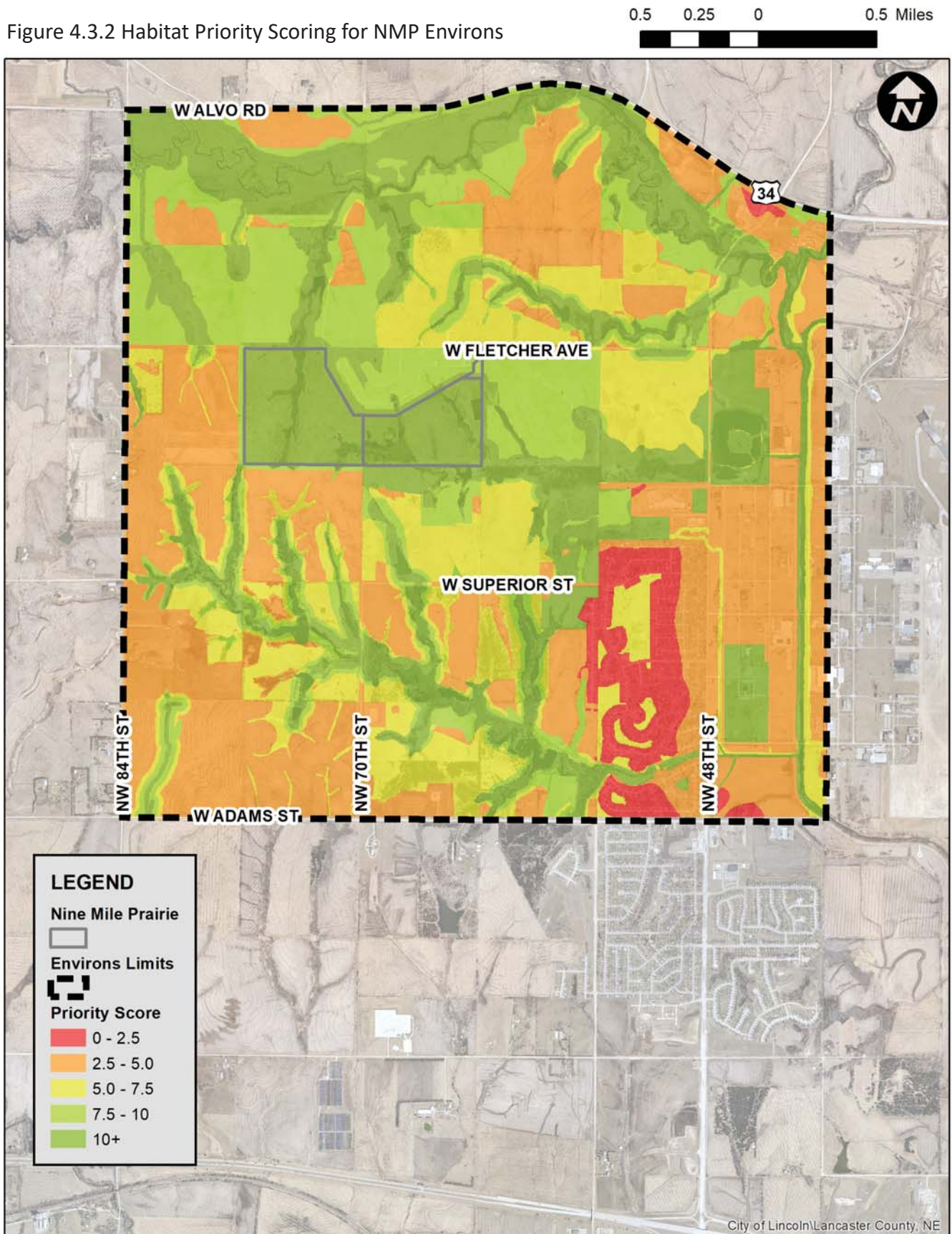


Figure 4.3.2 Habitat Priority Scoring for NMP Environs



PART 5: DETAILED PLAN

5.1 Connections to LPlan

The current Lincoln-Lancaster County Comprehensive Plan (LPlan) identifies a community vision to the year 2040. In addition to identifying where, how and when the community will grow, the LPlan documents a vision to preserve and enhance the characteristics that make Lincoln and Lancaster County unique. The LPlan recognizes for a “good quality of life,” that natural and cultural resources are fundamental to enriching lives.

The LPlan describes a community that values natural resources. Lincoln and Lancaster County have committed to sustainable growth through preservation of unique and sensitive habitats and the encouragement of creative integration of natural systems into developments. The LPlan identifies a number of goals based on Environmental Stewardship and Sustainability. A few are noted below:

Preservation of natural and environmentally sensitive areas. Wetlands, native prairies, endangered species, and stream (riparian) corridors shall be preserved to ensure the ecological health of the community.

The community offers an interconnected network of trails, parks, open space and natural resources called the Salt Valley Greenway that contribute to a unique sense of place.

Natural features such as tree masses in areas for future development are integrated into new development to provide for green spaces within the built environment.

Lancaster County has a diverse set of natural resources and landscape types that should be maintained. The County is home to a distinctive association of threatened and endangered species of plants and animals. These and other environmental resources should be considered as future policy and development decisions are made.

The LPlan places an emphasis on focusing attention on “Unique Landscapes”. Signature landscapes provide visual images of the community’s natural and cultural history and serve as a reminder of the ecosystem that forms the community’s urban and rural economic base. Signature landscapes will require thoughtful management if their long-term viability is to be ensured. Similarly, it is important to identify areas that require preservation and plan for those resources accordingly. The community should invest planning resources into the early identification of those areas that are most valued as part of the Greenprint Challenge. This principle supports the notion of “getting ahead of the game” by knowing what resources are most valued, where they are located, and what actions should be made within the broader planning process to secure their future for the community.

Lancaster County’s natural features are characterized by uplands, stream terraces, and bottom lands. The region was historically covered by native tallgrass prairie that served as home to buffalo, antelope, grassland birds, and many other smaller species of plants and animals. The NMP Environs could be identified as new Salt Valley Greenway corridor with NMP identified as a node in the corridor. In addition to the NMP property, the surrounding area is home to unplowed and plowed prairie lands and is a signature landscape for the City of Lincoln and Nebraska. Protection of this landscape and associated natural resources is an important connection to the community heritage and history.

5.2 Land-Grant University Role in Tallgrass Prairie Protection and Preservation

As part of its mission as a land-grant university, UNL's Center for Grassland Studies will continue to work beyond the formal boundaries of NMP with public and private neighbors. Part of the approach outlined in this planning document addresses each of the core mission areas of a land-grant university: teaching, research, and outreach (extension).

Teaching

The newly created UNL undergraduate program "Grassland Systems" within CGS trains students broadly in both the conservation of prairie heritage and the stewardship of working grasslands and rangelands. Furthermore, the capstone Grassland Conservation course for seniors 1) demonstrates the tools in the grassland management "toolbox" (fire, grazing, herbicides, seeding), 2) introduces students to diverse agency partners (NRCS, City of Lincoln Parks and Recreation, NGPC, TNC, Prairie Plains Research Institute, Pheasants Forever), and 3) has students develop management plans that go beyond individual fields and address grassland conservation challenges at the landscape scale.

Research

Regarding ongoing research needs, the scientific community points to global changes for climate, invasive species, altered nutrient cycles and an expanding human population. Conservation strategies used on small prairie preserves 50 years ago are arguably no longer adequate today. Research will play a key role in determining how grasslands can continue to provide ecosystem services for themes such as pollinator habitat, clean water resources and carbon sequestration in a time of increasing demand from society.

Outreach

Nebraska is a grassland state with over 50% of its land area in grasslands (rangelands, pastures, prairies) but the overwhelming proportion of the land (>95%) is privately owned. A challenge for Nebraska's grassland management in the 21st century will likely be conserving its grassland biodiversity and diverse ecosystem services on working lands. Working grasslands will also be needed to pay property taxes, produce forage and hay, and provide living space for homes and recreation. The mission of extension and outreach of UNL's IANR will address these working grassland challenges. The work with stakeholders outside the NMP boundary is arguably just as central to UNL's land-grant mission as protecting and preserving NMP itself.



5.3 Public Outreach and Land Preservation

This plan recommends a comprehensive approach for protection and preservation through outreach with neighboring property owners, general land preservation approaches, water quality BMPs in concert with City of Lincoln regulations, and other land use considerations.

5.3.1 Neighboring Properties Outreach

Adjacent property land use, activities and management plays an important role in native prairie protection. A solid and long-term vision for outreach and education will be essential for the protection and sustainability of the NMP Environs. Developing and maintaining relationships with adjacent property owners and property managers will be the foundation to furthering community awareness on the importance of protecting this resource. An effective outreach program, in addition to addressing important needs, should also target a particular audience. Determining the needs of the target audience will allow the project proponents to identify key members of the community to consult with at the onset of public outreach.



"Checker Tank - Wide Shot Snow Scene"
by Michael Farrell/PBT

Small and larger-scale habitat protection can be effective on neighboring properties. The NRCS prepared a detailed table that lists conservation practices and associated pollinator descriptions for smaller scale pollinator habitat on neighboring properties. These conservation practices and pollinator descriptions could be used by neighboring property owners to develop habitat regardless of the landowner's participation in federal conservation programs. The pollinator descriptions focus on creation or enhancement of pollinator habitat and support of predators and parasitoids of crop pests. The table is included in Appendix F (USDA 2014).

5.3.2 General Land Preservation Approaches

There are cases (e.g. when public access is desired or when a property has high priority natural resources) when acquisition is the most appropriate mechanism to achieve the desired goal. General land preservation approaches and programs that are consistently used in greenway planning, identified in the Salt Valley Greenway plan, and that can be used for the NMP Environs are summarized and described below.

Public Access Easement. A public access easement specifically provides public access to a defined area of land for a specific purpose (e.g. a trail along a greenway corridor).

Fee Simple Acquisition. Fee simple acquisition requires direct purchase of land from the present owner and involves the conveyance of all rights associated with land ownership, including use, access, development, subdivision, and disposition. Because there is transfer of all rights, fee simple acquisition is a costly form of acquisition over large areas. Depending on the considerations for purchase, funding sources could potentially include donations, private foundations, grants, local or state resource agency



funds, and/or municipal funds. Other potential tools include lease-back agreements (e.g. term agreement to lease back agricultural land for production or open space to offset purchase prices).

Conservation Easement. A conservation easement is a legal agreement limiting the use and development of land in order to protect natural resources. The easement can be purchased or donated and restrictions and the degree of public access are agreed upon by both parties. If the easement is permanent and provides public access, the property owner may be eligible for tax benefits and/or estate and gift tax reductions. All conservation easements in Nebraska state statute are perpetual.

5.4 Land Management Strategies

Land management strategies within the NMP Environs are generally separated into two groups: grasslands (including native prairie) and non-grasslands (e.g. row-crop agricultural production, low-density residential, etc.).

5.4.1 Tallgrass Prairie Conservation and Protection

NMP contains a relatively large contiguous areas of unplowed tallgrass prairie. High quality tallgrass prairie also exists elsewhere in the environs. The tallgrass prairie in the environs is managed for a number of purposes but the primary purpose is biodiversity. According to Chris Helzer, Prairie Ecologist with The Nature Conservancy in Nebraska, there are two key concepts to consider for managing a prairie for biodiversity:

1. **Prairie management is essentially managing prairie species competition.** The competition between prairie plant species can be utilized to foster diversity. By developing an understanding of how different species thrive or die-off through competition with one another, a greater number of species will be able to survive in a particular prairie (Helzer 2020).
2. **Diverse management is necessary to maintain prairie biodiversity.** Changes to timing and frequency of management techniques and employing different strategies (e.g. haying, grazing, prescribed fire) can help achieve highest level of diversity. Different micro-habitat management approaches (tall, short, dense, sparse) also support animal and insect biodiversity (Helzer 2020).

There are a number of tools that land managers can employ to support prairie conservation in NMP Environs. Available resources from the academic community, conservation groups, land managers, working prairies and others at the Great Plains regional level should be presented to neighboring property owners through public outreach.

The following section provides an overview of different management techniques including prescribed burning, herbicide control, grazing, haying, and overseeding/reseeding.



























Prescribed burning

Fire management helps remove detritus from previous growth, control trees and other woody vegetation, and improve plants appeal to grazing animals. A key component of prescribed fire for prairie management is also the timing. Figure 5.4.1 below shows a table for burn seasons and impact on plant communities. A summary of prescribed burning at NMP is included in Appendix E.



Figure 5.4.1: Affect of Burn Timing on Plant Community

Source: Iowa Native Prairie Planting Guide (USDA-NRCS 2018)

Affect of Burn Timing on Plant Community				
 Positive  Neutral  Negative				
Prescribed Burn Schedule				
Dates	Forbs	Warm Season Grasses	Introduced Cool Season Grasses	Trees
11/15-4/1		 		
*4/1-4/15				
4/15-5/15		 	 	 
7/15- 8/31	 			  

*These dates vary, but it's a time when the introduced grasses are actively growing and fire will set them back. The forbs are just starting, so the fire will have minimal impact.

Herbicide control of woody vegetation and non-native plants

The selective use of herbicide can be an effective tool for focused woody and non-native vegetation control. Many deciduous trees will grow back if simply cut and herbicide treatment is often necessary to fully kill the plant. Herbicide application can be labor intensive over large tracts of land.

Grazing

The use of grazing for prairie management can be effective but there is a risk of over-grazing. Grazing by cattle or bison can be good for plant diversity and habitat management and the success is based on timing, frequency, intensity and overall grazing time.

Haying

Haying can be employed to improve growing conditions for many plants but it can also empower some plants like smooth brome with the ability to outcompete more desirable prairie species. Annual haying is often used with burning on 2-3 year rotations. During the haying process, all plants are cut so this can be difficult to use for focused species management.

Managing species: overseeding/reseeding/restoration

Seeding and overseeding can be used to focus dispersal of native plant seeding in focused areas or across larger tracts of prairie. The tactic can be employed as response to various stresses (e.g. drought, flooding, construction disturbance), after prescribed fire in focus areas, or for restoring an area from



crop land or non-native grassland. Seeding rate, composition and diversity are all key considerations with this management tool.

5.4.2 Federal Programs for Grassland and Land Conservation

There are a variety of federal programs that could be utilized by landowners for prairie/grassland conservation and protection.

The NRCS's Agricultural Conservation Easement Program (ACEP) was established to assist landowners, land trusts, and other entities to protect, restore and enhance grasslands, working farms and ranches, and wetlands in the way of conservation easements. This program has existed for 25 years and has enabled NRCS to work with landowners toward protection of more than 4.4 million acres of wetlands and agricultural lands toward the improvement of soil health, water and air quality and wildlife habitat (NRCS 2020). The ACEP is a component of the U.S. Farm Bill which was most recently passed in 2018.

An additional federal program for land protection reauthorized by the most recent 2018 Farm Bill is the Conservation Reserve Program (CRP) which is administered through the Farm Service Agency (FSA) division of NRCS on behalf of USDA's Commodity Credit Corporation. CRP is a voluntary program that involves a contract between agricultural producers and NRCS so environmentally sensitive land is not farmed or ranched but rather is devoted to conservation benefits. Long-term and resource-conserving plant species such as approved grasses or trees are used to control soil erosion, improve water quality and develop wildlife habitat. In exchange, FSA provides enrollee with rental payments and cost-share assistance (USDA CRP Fact Sheet 2019).

Lastly, the Conservation Stewardship Program (CSP) can help producers build upon existing conservation efforts and help improve their operation on working lands. CSP is the largest conservation program in the U.S. NRCS can help producers identify natural resource problems in their operation (e.g. soil loss, impact of excess water) and share technical and financial assistance to solve problems or improve land stewardship in environmentally beneficial ways (e.g. improve the cover, food, and water available for domestic and wildlife species). Annual payments are available to compensate participants for conservation practices implemented across an entire agricultural operation (NRCS 2020).

To protect the conservation values and agricultural production of eligible lands, NRCS administers financial assistance to selective partners toward the purchase of Agricultural Land Easements (ALE). One of the goals of the easement program is to help farmers and ranches maintain their land in agricultural production. Additionally, the ALE program protects grazing uses and similar conservation values by conserving grasslands like rangelands and pasturelands which are very common in the region (NRCS 2020).

With the ALE program, NRCS may contribute up to 50% of fair market value of the easement. In situations where NRCS decides the grasslands are of special environmental significance then NRCS may pay up to 75% of the fair market value of the easement land. The easement includes minimum conservation deed restrictions which include an ALE plan, limitations on impervious surfaces and nonagricultural uses, preserving agricultural uses and maintenance of existing historical or archaeological resources on the property (NRCS 2017).

There is a specific ALE program for grasslands called the ALE-Grasslands of Special Environmental Significance (GSS). The program is similar to ALE with further emphasis on support of grazing operations,



maintenance and improvement of plant and animal biodiversity and protection of grasslands and shrublands under threat of conversion to cropping, urban development and other non-grazing uses (NRCS 2017).

The CRP Grasslands is another federally funded option for agricultural producers that wish to voluntarily maintain environmentally sensitive agricultural land for conservation benefits instead of farming or ranching. The program focuses support on grazing operations, plant and animal biodiversity and grassland and land containing shrubs and forbs under greatest threat of land conversion (USDA CRP Grasslands 2020).

The most recent 2018 Farm Bill named prairie strips as an eligible conservation practice within the Clean Lake, Estuaries and Rivers Initiative (CLEAR) of CRP. The CLEAR initiative of CRP prioritizes water quality practices on program enrolled land that helps reduce sediment loadings, nutrient loadings and harmful algae blooms. CLEAR initiative programs that could be part of NMP Environs protection and conservation goals may include but are not limited to grass waterways (CP-8A), riparian buffer (CP22), marginal pastureland wildlife habitat buffer (CP29), and prairie strips (CP43).

In December 2019, a new CRP-CLEAR practice was outlined and identifies as a CP43-Prairie Strip. The prairie strip conservation practice goal is to reduce erosion, improve water quality and provide wildlife habitat through planting of diverse prairie perennial vegetation. The prairie strips can be planted around the crop field, through the field, in terrace channels, next to waterways and/or at pivot corners. This prairie strip option could also provide pollinator habitat and therefore offer multiple benefits from a single conservation strategy.

Additional federal programs include Conservation Reserve Enhancement Program (CREP) and Environmental Quality Incentives Program (EQIP). CREP is a land retirement program established to assist agricultural producers with protection of environmentally sensitive land, decrease erosion, restore wildlife habitat, and protect ground and surface water. EQIP promotes agricultural production by assisting participants with installation or implementation of structural and conservation management practices.

5.5 Suitable Activities/Features

Signature landscapes, as described in LPlan 2040, must remain whole if their integrity as a natural resource feature and historical community asset is to thrive and continue. As a signature landscape, native prairies (e.g. NMP) are an increasingly rare feature on the Nebraska landscape. A significant part of the landscape's future involves suitable activities/features. A master plan goal is to encourage and facilitate long-range land management strategies that are compatible with tallgrass prairie conservation and protection for NMP and surrounding area. As the Lincoln/Lancaster County community continues to grow, a cooperative effort between the NMP Advisory Council and environs property owners will be critical to finding solutions (e.g. development standards) that are suitable activities/features within the environs. This cooperative effort will provide opportunity to evaluate activities or features that are compatible and may be suitable to the protection and preservation of NMP. Although native prairie and grassland within the NMP Environs is the preferred land use, other activities/features currently exist (and may in the future) that allow for protection and preservation of NMP.



5.5.1 Examples of Suitable Non-Grassland Activities/Features

1. **Lincoln Police Department (LPD) training facility and firing range.** Located north of NMP, the land is owned by the LAA and includes a 50-year lease. It is located in a drainage valley and is not visible from a majority of NMP. The LPD training facility produces noise pollution.
2. **Former nuclear bomb bunkers within LAA property.** The area north of NMP includes limited activities and the cleanup required for bomb bunker removal would be significant.
3. **UNL Campus Recreation outdoor adventure park.** Located south of NMP, the property includes grasslands, association with UNL, and known seasonal activity schedules.
4. **Overhead High-Voltage LES Power Lines.** Installation of the power lines (running along NMP property lines) improved vehicle access and land management. An easement agreement between LES and UNL-IANR allows for land management underneath the power lines.
5. **Lincoln Municipal Airport Aircraft Traffic.** Various flight lines and associated aircraft noise overlap the environs.



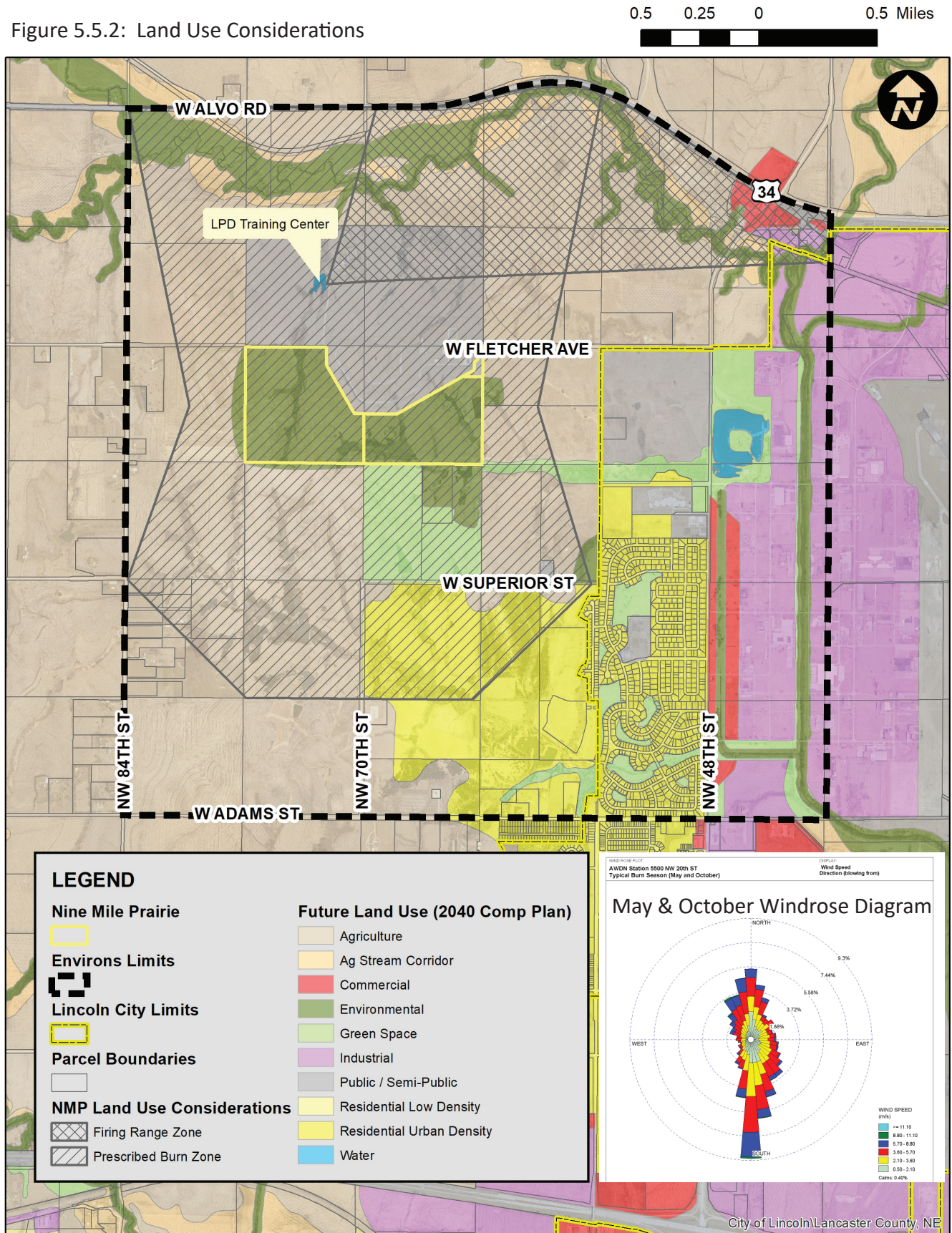
5.5.2 Land Use Considerations

The NMP Environs is predominantly in rural land uses, but the City limits do extend into the southeast portion of the Environs and the LPlan projects some additional urban growth in this area. A major update to the LPlan, “Plan Forward 2050,” is underway. This section outlines considerations for conservation and management of natural resources in the context of a growing community. Burning is a key management tool for prairie preservation, which becomes limited with urban development. NMP is typically burned in May and October when regional air quality, wind, and moisture conditions are most favorable. Spring burns are avoided in April due to coincidence with large scale prairie burns in the Flint Hills of Kansas. Figure 5.5.2 depicts land use considerations as they relate to use of the firing range and management of native prairie by prescribed fire. The boundary of the prescribed burn zone is based on the windrose diagram for May and October. The boundary of the firing range zone is based on the directional alignment of the outdoor firing range but there would also be noise from the firing range in all directions. This figure also provides a windrose diagram for the month of September based on 10-year period of record. The windrose diagram shows the prevalent wind patterns for this time of year.

Additionally, land uses should be carefully considered as they relate to habitat diversity and connectivity. Areas in Figure 4.4.2 with Habitat Priority Scores of 7.5 -10 should be considered for Green Space and Environmental Resources land use designations in the plan. In particular, there is an opportunity to identify the east-west drainageway connecting Bowling Lake and NMP as a greenway and trail corridor. Options should be considered for making trail connections between Bowling Lake, Arnold Elementary, NMP and NW 56th Street.



Figure 5.5.2: Land Use Considerations



Lincoln's water quality standards for new developments provide an opportunity to promote connectivity between NMP and SVG through protection of habitat in existing stream corridors. Minimum flood corridors as described in Part 3.2.3 are required for any stream channel draining 40-acres or more. Additionally, Lincoln requires water quality best management practices (BMP) for any new development based on the size of the development and percentage of impervious surfaces. Examples of best management practices include wet and dry detention basins, bio-swales and expansion of the minimum flood corridor with conservation buffers. Locating BMPs in higher priority areas along stream corridors and higher quality grasslands is preferred for the NMP Environs. Figure 5.5.3 provides an example of how water quality projects can be leveraged for maximum benefit.

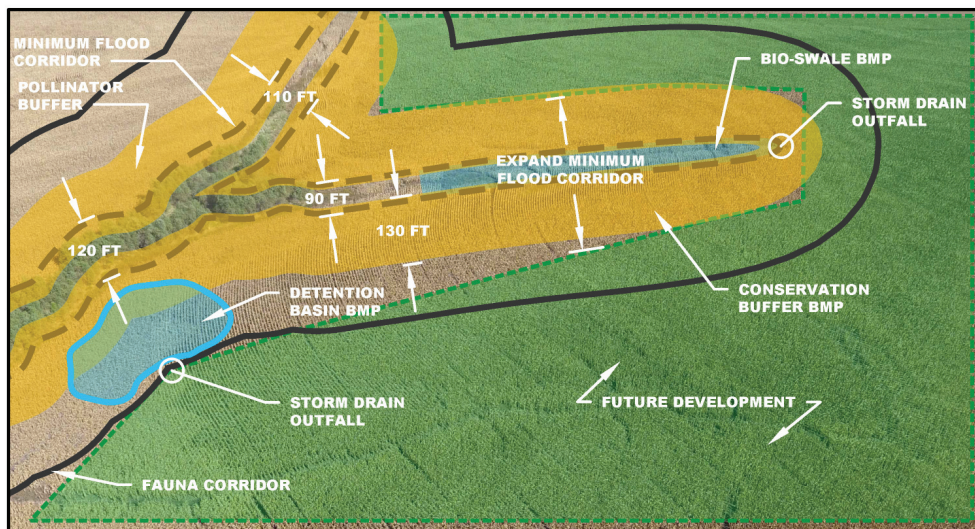


Figure 5.5.3: Water Quality BMP Concept for NMP Environs

5.6 Funding Strategies

In addition to the easement and acquisition options, other property preservation techniques can also be implemented that may be attractive to private land owners.

Donation. A donation or gift of land involves a property owner giving all or a portion of private ownership to the organization. Any development and/or maintenance costs should be evaluated as part of the acquisition by donation technique. Donations may present advantages to the private landowner in the way of property tax credits or estate or income tax deductions.

Right of First Refusal/Option. The right of first refusal technique is a legal agreement into which a conservation organization would enter with a property owner that provides the organization the first opportunity to purchase the property before it is listed on the open market. The conservation organization is given a limited amount of time to exercise the option to purchase the land.

Life Estate. A life estate technique would allow a property owner to donate to a municipality or conservation organization upon landowner's death. Private landowners (heirs) may benefit from reduced taxes and are ensured the property is preserved for prairie protection purposes.



In addition to the federal funding program opportunities described in previous sections, there are additional potential funding sources and the administering bodies are summarized below in Table 5.6.1.

Table 5.6.1: Administering Bodies and Potential Funding Sources	
Administered By	Funding Resource
Public: Federal	FHWA-ISTEA, NPS, FWS
Public: State	NGPC, NDOT, NET, DEE
Public: Local	Lincoln, Lancaster Co., LPSNRD
Private: Individual or Corporation	Private Fundraising
Private: Foundation	Private Grants
Private: Other	Land Trusts, Conservation Organizations

The following Table 5.6.2 provides summarized notes about federal funding programs for land conservation.

TABLE 5.6.2: Federal Funding Programs for Land Conservation and Protection			
NRCS Program Name	Eligibility/Parameters	NRCS/FSA Contribution	Duration
Agricultural Land Easement (ALE) - (Part of Agricultural Easement Program (ACEP))	American Indian tribes, state and local governments, non-governmental organizations	50% of fair market value, up to 75% of fair market value on land of special environmental significance	Not specified
ALE-Grasslands of Special Environmental Significance (GSS)	American Indian tribes, state and local governments, non-governmental organizations	Up to 75% on grasslands of GSS	Not specified
Conservation Reserve Program (CRP)	Participant ownership of land for at least 12-months prior; for cropland, land must be planted or considered planted to ag commodity for 4-6 years from 2012-2017; land must be physically and legally plantable	Rental payments; cost-share assistance	10-15 year contract duration
CRP Grasslands	Same as CRP with grassland focus	Rental payments; cost-share assistance	14-15 years
Conservation Reserve Enhancement Program (CREP)	Lands that address impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species	Annual payment plus cost-share up to 50%	10-15 year commitment
Environmental Quality Incentives Program (EQIP)	Land used for agricultural commodity or livestock production	Financial and technical assistance to offset costs of NRCS-approved conservation practices	Annual payment rates



Conservation Stewardship Program (CSP)	Private and tribal lands; any production land	Annual payments to compensate participant for conservation practices implemented across entire agricultural operation	5-year contracts
Prairie Strips in CRP Initiative of CLEAR	No greater than 25% of cropland area/field; 30-120ft in width; equipment traffic allowed on locations that replace turn rows on field perimeter	Rental payments; cost-share assistance up to 50% cost	10-15 years of annual payments

Table 5.6.3 below shows a selective list of funding opportunities for pollinator habitat programs as outlined in Mollet 2019. Pollinator habitat could be enhanced with native prairie and grasslands and also established within margins of non-grassland areas.

TABLE 5.6.3: Selective Pollinator Habitat Programs for Land Management			
Program Name	Organization	Summary	Funding
Seed A Legacy Program	Bee and Butterfly Fund	Program in 12 states including Nebraska that provides cost share for pollinator seed mixes	Seed mix cost share of 25-75% for projects greater than 25 acres; No seed cost for projects between 2-25 acres
National Institute of Food and Agriculture (NIFA) Grants	USDA	Public or private lands;	Dependent on grant selected and availability at time of grant
Monarch Butterfly and Pollinators Conservation Fund	National Fish and Wildlife Foundation	Funds projects to conserve monarch butterfly and other at-risk pollinators	Up to \$440,000 total from public and private sources
Source: NebGuide/Mollet 2019			

5.7 Organizational Strategies

An important consideration for the NMP Environs is the continuity of the previously formed (public-private partnership) NMP Advisory Council. This group (or member participants) will be essential to realize the goals of this plan. It is critical to the success of this project that the full responsibility for implementation not fall on any one agency or private organization, but that this coalition work cooperatively to bring their strengths and resources to this project.

The University of Nebraska should be the lead agency for the initiation and early implementation of this plan, working cooperatively to solidify full membership and partnership to the Advisory Council. Current Advisory Council partners include the University of Nebraska, the City of Lincoln, the Lincoln Airport Authority, NRCS, the Lower Platte South Natural Resource District and private land owners. Additional members (e.g., environmental and trails organizations, businesses and business organizations, conservation trusts, private foundations and donors, etc.) may be appropriate. The next step would be to formalize the Council partnership via an agreement to implement this Master Plan and any supplemental planning documents.



The Council's agreement should consider the following:

- Vision for project leadership and outcome
- Long-term goals
- Priorities
- Project guidelines or parameters for implementation
- Resources - the financial, technical, staffing or organizational support that is needed to implement various elements of the plan and how to make it available
- Roles and responsibilities of the partners relative to:
 - Planning and technical evaluation
 - Outreach to other partners, landowners and the public
 - Negotiations with private landowners
 - Acquisition of land or easements
 - Land management
 - Habitat restoration
 - Active and passive recreation areas
- Methods for measuring and reporting progress

Time-specific objectives, actions, budgeting and funding commitments should be outlined in an annual work plan that is reviewed on a regular basis with the council.

5.7.1 NMP Environs Coordinator

While the overall representation from varied groups will be essential to the planning process, a primary leadership role is highly recommended. A coordinator should oversee the project details and work with the partnership to:

- Promote and support implementation of the recommendations of the NMP Environs Master Plan
- Coordinate activities for plan implementation
- Conduct public outreach and education
- Participate in and promote fundraising activities for NMP Environs
- Encourage planning actions that promote the maintenance and/or establishment of native prairies and restorative actions

The coordinator would be a leader toward conservation and protection in the environs. The NMP Environs will be a working landscape and a coordinator would be tasked with execution of strategies as outlined in this plan and by the Advisory Council in addition to a role as liaison between neighboring landowners. The coordinator would provide the lead role in assisting neighboring landowners with federal programs such as easements, cost-sharing, deed restrictions, etc. The land manager/steward would work closely with UNL-CGS to maintain NMP as central feature of the planning area and as a guide for conservation and protection of other properties in the planning area. The role would also include communications with similar roles in the Prairie Corridor in Lancaster County as a way to pool resources and educate the public about the importance of native tallgrass prairie.



APPENDIX A

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Bibliography/Chronology of Nine-Mile Prairie Related Documents from the IANR-SNR Webpage for Nine-Mile Prairie

Chronology of Documents from IANR-SNR Nine-Mile Prairie Website		
YEAR	Document Type	Document Citation
1930	Research article	Steiger, T.L. 1930. Structure of prairie vegetation. Ecology 11:170-217.
1982	News clippings	News stories on the protection of 9MP.
1983	Research article	Bomberger, Mary L., Shelly L. Shields, A. Tyrone Harrison and Kathleen H. Keeler. 1983. Comparison of old field succession on a tallgrass prairie and a Nebraska Sandhills prairie. The Prairie Naturalist. 15:1 pp. 9-15.
1983	Popular article	Wachiska Audobon's Ernie Rousek recounts the struggles to protect Nine Mile Prairie from the late 1970's until its purchase by University of Nebraska - Lincoln in 1983.
1984	News clipping	Marguerite Hall at the dedication of NMP. Mrs. Hall generously donated half the purchase price to the University of Nebraska Foundation. A state historic marker honors Mrs. Hall and her late husband Neil W. Hall. A second historic marker recognizes the early prairie research done of Dr. J.E. Weaver, and the efforts of E. Rousek and A.T. Harrison to protect 9MP (see Nebraska Historical Marker Texts).
1985	Popular article	Adams, J.L. 1984. A Prairie Classroom. Nebraskaland Magazine
1987	Research article	Kaul, R.B. and S. B. Rolfsmeier. 1987. The characteristics and phytogeographic affinities of the flora of Nine-Mile Prairie, a western tallgrass prairie in Nebraska. Transactions of the Nebraska Academy of Sciences XV:23-25.
1990	SCS report	Detailed descriptions of two Soil Conservation Service (SCS) soil profiles at 9MP. Also, the soil survey map of 9MP (see entire soil survey).
1992	Research article	Schmidt, J.M. and A. E. Antlfinger. 1992. The level of agamospermy in a Nebraska population of <i>Spiranthes Cernua</i> (Orchidaceae). American Journal of Botany 79:501-507.
1992	Research article	Masters, R.A., K.P. Vogel, and R.B. Mitchell. 1992. Response of Central Plains tallgrass prairies to fire, fertilizer, and atrazine. Journal of Range Management 45:291-295.



1996	Research article	Mitchell, R.B., R.A. Masters, S.S. Waller, K.J. Moore, and L.J. Young. 1996. Tallgrass prairie vegetation response to spring burning dates, fertilizer, and atrazine. <i>Journal of Range Management</i> 49:131-136.
1998	Literary essay	Robert King. 1998. Poets on the Prairie. <i>Weber Studies</i> 16.1.
2000	Research article	Huebschman, J.J. and T. B. Bragg. 2000. Response of regal fritillary (<i>Speyeria idalia</i>) to spring burning in an eastern Nebraska tallgrass prairie, USA. <i>Natural Areas Journal</i> 20:386-388.
2001	Postage stamp	Nine-Mile Prairie postage stamp. Release event for the 9MP postage stamp with Michael Forsberg's photo.
2005	Lancaster County	Lancaster County Open Space Plan. Summary document from Lincoln/Lancaster county 2025 plan featuring 9MP.
2007	Literary essay	Lisa Knopp, Nine-Mile Prairie, <i>Michigan Quarterly Review</i> , Summer 2007, Pages 443 - 459

Nine-Mile Prairie Activities (2008-2015)

Compiled by: Dr. David Wedin, Professor, School of Natural Resources & NMP Director since 2007

Classes using Nine-Mile Prairie

- NRES 498 (Grassland Conservation: Planning and Management) new course developed in 2014 by D. Wedin and W. Schacht, 25 students
- BIOS207 (Ecology and Evolution) 150 students
- PLPT270 (Biology Invaders) 35 students
- AGRO240 (Forage Crop and Range Management) 60 students
- AGRO440 (Vegetation Analysis) 10 students
- NRES222 (Principles of Ecology) 85 students
- NRES476 (Mammology) 20 students
- NRES465 (Soil Geomorphology) class 20 students
- Wildland Fire Certification 5-15 students doing prescribed burns per year
- UNL Army ROTC (field exercises 2012, 2013) 60 students
- Nebraska State Patrol (sniper / camouflage exercise 2011)
- NRCS (rangeland inventory crew training 2011)

Undergraduate and graduate theses using Nine-Mile Prairie

- Maggie Olsen - Plant parasitic nematode diversity at Nine-Mile Prairie (undergrad thesis)
- Sydney Paige - Exploring nematode diversity in tallgrass prairies (undergrad thesis)
- Sandra Schaeffer – Invertebrate diversity on switchgrass (M.Sc.)
- Dakota Ahrens – Phylogenetic diversity and conservation (UNO M.Sc. student)
- Amy Oden – Bird Habitat Use (M.Sc.)
- Rebecca Houser – Reptiles and amphibians of prairie remnants (M.Sc.)
- R. Matt Adams – Spider evolution (Ph.D.)
- Michael Mellon - Effects of Nutrients and Spider Predators on a Native Thistle *Cirsium Altissimum* (Ph.D.)
- Marie-Claire Monier Chelini – Crab spider, flower, pollinator interactions (Ph.D.)



News Stories, Humanities, Creative Writing

- <http://www.youtube.com/watch?v=qYdGPzL5pUw> (news story)
- <https://www.youtube.com/watch?v=QVWGnxPGNRA> (Extension – Backyard Farmer)
- Cristopher Cartmill, *The Nebraska Dispatches*, 2011 (play and book commissioned by the Lied Center.)
- Lincoln Journal Star, 5/18/2014. Prairie can help maintain pollinators.
- Lincoln Journal Star, 7/20/2012. Amateur photographer from Lincoln takes home international award.
- Lincoln Journal Star, 10/17/2009. Nine-Mile Prairie celebrates 25 year in UNL hands.

Neighbors and Partners

- UNL Campus Recreation (SNR assists in prescribed burns, redcedar clearing, and pond management of the 140 acres of UNL land south of Nine-Mile Prairie)
- Lower Platte South Natural Resources District (their educators bring K-12 students to 9MP as an outdoor classroom)
- Lincoln Airport Authority (vegetation management along shared fenced lines, prairie plant inventories on LAA's unplowed land, seed harvesting of rare species on LAA land)
- Lincoln Police Department (we are assisting with planning and conservation management of LPD's new firing range, located on 80 acres north of 9MP)
- Lincoln Electric System (demonstration project on management of grassland Right-of-ways for high diversity, started 2014)
- Mrs. Joyce Urbanovsky (we assisted with planning and managing CRP contract on her 160 acres adjoining Nine-Mile Prairie to the east)
- Prairie Plains Resource Institute (Aurora, NE) (they use Nine-Mile Prairie for harvesting native seed to use in prairie restoration contracts)
- Wachiska Chapter of Audubon Society (longtime partners, manage information kiosk and bluebird boxes)
- Stock Seed Farm (demonstration high-diversity "pollinator" planting in spring 2014)
- Jon and Bill Oberg (we have assisted these 9MP neighbors with vegetation assessment and monitoring)

Rare and unique species

- The Nebraska Game and Parks Commission database of at-risk species (plants, birds and insects) lists five Tier 1 species and five Tier 2 species observed at Nine-Mile Prairie since 1985.

Research grants involving Nine-Mile Prairie

- National Science Foundation: "A test of adaptive divergence across altitudinal gradients: population genomics of deer mice", J. Storz et al., 2006-2009, \$492,000.
- National Institutes of Health/NHLBI: ARRA Supplement award, J Storz et al., 2009-2011, \$263,352.
- National Institutes of Health/NHLBI : "Mechanisms of hemoglobin adaptation to hypoxia in high-altitude rodents", J. Storz et al. ,2008-2013, \$1,411,572.
- National Science Foundation: "Integrative Taxonomy and Biogeography of Criconematidae", T. Powers et al., 2012-2014, \$528,561.
- National Science Foundation: "Methane uptake by grassland soils: Biogeochemistry, microbial ecology and integrative modeling." J. von Fischer (CSU), D. Wedin, et al. 2011-2014. \$1,200,000.

Scientific papers involving Nine-Mile Prairie

- Liang, Z., R.A. Drijber, D.J. Lee, I.M. Dwiekat, S.D. Harris and D.A. Wedin. 2008. A DGGE-cloning method to characterize arbuscular mycorrhizal community structure in soil. *Soil Biology and Biochemistry* doi:10.1016
- Thiel, J., T. Hefley, L. Beck-Johnson and E. Matthews. 2009. Monitoring early season mosquito and bird populations: implications for West Nile Virus in Lancaster County, Nebraska. *Rurals* 4(3:1):1-12.
- Vogel, K. et al. 2010. Registration of “Homestead” Canada wildrye. *Journal of Plant Registrations* 4:123-126.
- Russell FL, KE Rose and SM Louda. 2010. Seed availability and insect herbivory limit recruitment dynamics of a native thistle. *Ecology* 91:3081-3093.
- Schaeffer, S., F. Baxendale, T. Heng-Moss, G. Sarath, and R. Mitchell. 2011. Characterization of the arthropod complex associated with switchgrass. *J. Kan. Entomol. Soc.* 84: 87-104.
- Rose KE, FL Russell and SM Louda. 2011. Integral projection model for insect herbivore effects on *Cirsium altissimum* populations along productivity gradients. *Ecosphere* 2:Art97.
- Cheviron, Z. A., G. C. Bachman, A. Connaty, G. B. McClelland, and J. F. Storz. 2012. Regulatory changes contribute to the adaptive enhancement of thermogenic capacity in high-altitude deer mice. *Proceedings of the National Academy of Sciences USA*, 109: 8635-8640.
- Cheviron, Z. A., G. C. Bachman, and J. F. Storz. 2013. Contributions of phenotypic plasticity to population differences in thermogenic performance between highland and lowland deer mice. *Journal of Experimental Biology* 216: 1160-1166.
- Tufts, D. M., I. G. Revsbech, Z. A. Cheviron, R. E. Weber, A. Fago, and J. F. Storz. 2013. Phenotypic plasticity in blood-oxygen transport in highland and lowland deer mice. *Journal of Experimental Biology* 216: 1167-1173.
- Cheviron, Z. A., A. Connaty, G. B. McClelland, and J. F. Storz. Functional genomics of adaptive population differences in thermogenic performance between highland and lowland deer mice. (Evolution, in press)
- Natarajan, C., N. Inoguchi, R.E. Weber, A. Fago, H. Moriyama and J.F. Storz. 2013. Epistasis among adaptive mutations in deer mouse hemoglobin. *Science* 340:1324-1327.



APPENDIX B

Nine-Mile Prairie 25th Anniversary Celebration Remarks by Dr. David Wedin.

10/16/09



CENTER FOR GRASSLAND STUDIES



Nine-Mile Prairie Environs Master Plan
APPENDIX B

Remarks at the Nine-Mile Prairie 25th Anniversary Celebration (10/16/09)

By Dave Wedin, School of Natural Resources, UNL and Director of Nine-Mile Prairie

History

To many of us, Nine-Mile Prairie (9MP) symbolizes the birthplace of prairie ecology. It was added to the National Register of Historic Places in 1986. The state historic marker celebrates the University of Nebraska (NU) scientist John Weaver, the “father of prairie ecology.” Looking east toward the capitol in downtown Lincoln, and west to the 230-acre native prairie, I feel a connection to three big names in the history of science at NU.

John Weaver grew up in Iowa and came to Nebraska as an undergraduate to study under the famous botanist Charles Bessey. Bessey was installed in the Nebraska Hall of Fame in June 2009, and his bust is now in the capitol. Bessey came to NU in 1885, and led it to early prominence as one of the great public universities in the country. He died in 1915.

Today, we’re also celebrating a century of grassland research at the University of Nebraska. John Weaver received his bachelor’s degree from NU in 1909, and went on to receive a master’s here. Was this piece of land already known at that time as a beautiful prairie that had escaped the plow? Did Weaver and Bessey ever come here in those years? We don’t know, but I like to think they did. From Nebraska, Weaver went to the University of Minnesota where he finished his Ph.D. under Frederick Clements in 1916. Of these three biologists – Bessey, Weaver and Clements – Clements is probably the most famous. He was a Lincoln kid who went to NU in the 1890s, got caught under Bessey’s spell, and continued on for his Ph.D. here. Clements’ Ph.D. laid out a theory and framework that dominated the field of ecology throughout the 20th century. Every ecology textbook written in the last 50 years spends at least a page on Frederick Clements and his theory of succession. NU and the University of Chicago are known as the two birthplaces of ecology in North America.

John Weaver returned to NU as an assistant professor in 1915 and spent his career here, retiring in 1952. He is known for three things: 1) his detailed study of roots and below-ground ecology; 2) laying the foundations of grassland and rangeland ecology; and 3) promoting and defending Clements’ ecological theories until his death in 1966.

One standard that scientists use to measure their impact is the Science Citation Index, a computerized database of the entire scientific literature since 1990. Weaver is still one of the most cited NU scientists in the *current* scientific literature -- half a century after his retirement! His papers and books have been cited over 2300 times by other scientists since 1990. That count only includes works on which he was the lead author, not his papers co-authored with 40+ graduate students. Few scientists leave that kind of legacy and ongoing impact in their discipline.

Although 9MP was privately owned, Weaver recognized it in the 1920s as a unique native prairie remnant that became a research site for him and his students. A key paper describing the site’s vegetation, soils and climate was published in 1930 in the journal *Ecology* by Weaver’s student T. Steiger.

After WWII, 9MP and the land around it was taken over by the U.S. Air Force as part of the Lincoln Air Base. Lincoln had a fully operational SAC nuclear air base from 1952 to 1966. The bomb bunkers north of 9MP (visible from the entrance) are a tangible legacy of this cold war history. It’s an interesting twist that 9MP would probably never have been preserved if it had not been part of a nuclear air base and subsequently Lincoln Airport Authority (LAA) property for 40 years.

The LAA acquired 9MP as well as Air Park from the U.S. government in the 1970s. Throughout the 50s, 60s and 70s, this area was managed with annual haying. Sometime in the 1970s, NU biologists and members of the local Wachiska Audubon Society started drawing attention to 9MP as an area important for both conservation and history. Biology professor A.T. Harrison and Audubon member Ernie Rousek were the leaders of that effort. On behalf of the Audubon Society, Ernie personally leased 9MP from the LAA for several years. They began an effort to purchase 230 acres of the best remaining prairie from the Airport Authority as a nature reserve. Documents from that time are available on our website (<http://snr.unl.edu/9mp>).

In 1981, a legislative act was passed by the Nebraska Unicameral with the sole purpose of encouraging the LAA to protect 9MP and transfer it to either a conservation group or NU. Under the leadership of then-Chancellor Martin Massengale, the NU Foundation purchased it in 1983. Much of the purchase price was donated by Mrs. Marguerite Hall in honor of her late husband, Neil W. Hall. This wonderful picture of Mrs. Hall in front of the podium today was taken when she was here at 9MP for the dedication ceremony 25 years ago. She has since passed away. A family member told me one regret Mrs. Hall had was that she never got to see a prescribed fire. My only thought is that when we do burns today, the plume of smoke goes very high... perhaps Mrs. Hall can see it from where she is now.

Over the last 25 years, 9MP has been managed by NU faculty with help from the Wachiska Audubon Society. It has never had a regular budget. Instead, it has been managed by the passion and commitment of dozens of people. At NU, those people included



Martin Massengale, Director of the Center for Grassland Studies, welcomes the crowd of prairie enthusiasts.

Photo by Brett Hampton



Steve Waller, Dean of the College of Agricultural Sciences and Natural Resources, talks about the importance of Nine-Mile Prairie to the University of Nebraska, the state and the country.

Photo by Brett Hampton

Robert Kaul, Jim Stubbendieck, Rob Masters, Rob Mitchell and Jim Locklear. From Wachiska Audubon, Ernie Rousek and Carol Closter have been tireless in helping the prairie. Sadly and tragically, two of the prairie's greatest friends have died in recent months. If you're a regular visitor to 9MP, you've seen the color photos in the wooden information kiosk. Those photos were taken by George Schade, who died in May 2009. George was an NU faculty member in mechanical engineering. In the kiosk over the years were visitor register books. Those books were made by Curt Twedt, who died in September 2009. The register books remind us of Curt's efforts on behalf of conservation and prairies during his career with the Nebraska Game and Parks Commission.

Three other points round out Nine-Mile Prairie's recent history. In 2001, a U.S. postage stamp featuring a photo of 9MP by Michael Forsberg was released. In 2008, we made our contribution to the new electrical power grid for the 21st century when 9MP received a large Lincoln Electric System power line along its southern property line. And finally, in 2009 we expanded 9MP's entrance in cooperation with the Lincoln Airport Authority. It didn't even take an act of the legislature this time. The Airport Authority has been a wonderful neighbor and partner.

Stewardship, Science and Education

Nine-Mile Prairie also symbolizes NU's ongoing commitment to grasslands. NU manages over 25,000 acres of grassland. Most of this land is in the Sandhills at Gudmundsen Sandhills Laboratory, Barta Brothers Ranch, and Arapaho Prairie. We also have several areas near Lincoln including 9MP, Prairie Pines, Reller Prairie, and UNL Campus Recreation's 80 acres just south of us. The University of Nebraska-Omaha manages Allwine Prairie, a 160-acre preserve outside of Omaha. These grasslands are a tremendous resource, but also a tremendous responsibility. The different properties have diverse management goals including research, education, recreation, nature preservation, and beef production. However, regardless of the management goals, the public recognizes good (or bad) stewardship when they see it. Are we being good stewards? Are we teaching good land stewardship to our students by example?

These grasslands give NU a chance to do long-term research that would be difficult to do on other public or private land. Nine-Mile Prairie's current research portfolio includes studies of native thistles, nematodes, switchgrass, flickers, reptiles, orchids, and invasive plants. The unique role of 9MP as a university educa-



Grassland ecologist Dave Wedin, Director of Nine-Mile Prairie, provided historical background and context for the afternoon before the tours began.

tional resource complements the education/outreach mission and facilities at two other prairie areas: Lincoln Parks and Recreation's Pioneers Park and the Audubon's Spring Creek Prairie. More than 10 NU classes a year use 9MP. Although most are science classes, the list includes the occasional literature and art class.

A new education initiative is to certify more of our natural resources students in the federal "red card" wildland fire training system. The need for both wildland fire control and prescribed fire as a management tool has increased dramatically in the last decade. This effort is a partnership with the Nebraska Forest Service and its wildland fire educator Casey McCoy. The students trained by Casey or other state and federal agencies through summer fire fighting jobs now form the backbone of our student fire crew for prescribed burning at 9MP.

To maintain 9MP's unique legacy of prairie biodiversity, we need to continue to improve our management. In addition to prescribed burning on a roughly three-year rotation, our management includes cutting back encroaching woody vegetation and killing invasive species such as leafy spurge and sericea lespedeza. However, we still seem to be gradually losing species. One of our

two federally endangered species, a beautiful orchid, has not been seen in a decade. Species documented here in the 1920s are gone. Do we need new and creative approaches to managing for biodiversity? We may need to follow the lead of others in the southeast Nebraska prairie community and introduce grazing and haying into our management.

(continued on back page)



Tour participants saw how seed is harvested at Nine-Mile Prairie.



Photo by Brett Hampton

Nine-Mile Prairie (continued from page 5)

Regardless of how we manage *inside* Nine-Mile Prairie's fence, the major conservation issue for the next 25 years is what happens *outside* our fence. Today, 9MP lies at the center of over 1300 acres of grassland. Our neighbors are diverse with diverse goals, but all are concerned with stewardship of their land and their neighborhood. Our partners already include the LAA, Wachiska Audubon, the Nebraska Game and Parks Commission, the Natural Resources Conservation Service, Prairie Plains Resource Institute, the Nature Conservancy, and UNL's Campus Recreation Department. The key to Nine-Mile Prairie's future will be strengthening these existing partnerships and forming new partnerships based on shared goals for this unique open landscape.



Photo by Brett Hampton

Ernie Rousek (second from left), Dave Wedin and others aren't sure how badly they want to see the non-plant life of the prairie "up close and personal" as herpetologist Dennis Ferraro shows them a specimen.

Recent Accolades to CGS Associates

Steve Baenziger, Irv Omtvedt Innovation Award from UNL Institute of Agriculture and Natural Resources.

Chuck Francis, 2009 Educator's Award from the Sustainable Agriculture Education Association.

Roch Gaussoin, Cyril Bish Distinguished Professor of Horticulture Award.

Terry Klopfenstein, 2009 Morrison Award from the American Society of Animal Science.

Rick Rasby, 2009-2011 Wendell Burgher Beef Industry Award.

Richard Sutton, tapped as Fellow of the American Society of Landscape Architects.

Kim Todd and colleagues, 2009 Extension Materials Award from the American Society for Horticultural Sciences

Steve Waller, 2009 Distinguished Educator Award from the North American Colleges and Teachers of Agriculture.

APPENDIX C

“A Prairie and Its People: Conflict and Cooperation”

by Jon H. Oberg, 2013



CENTER FOR GRASSLAND STUDIES



Nine-Mile Prairie Environs Master Plan
APPENDIX C



A Prairie and Its People: Conflict and Cooperation

E. Frank Schramm, Joseph E.A. Alexis, the Amos Eager Family, the University of Nebraska and Other Notable Owners of Nine Mile Prairie and its Environs¹

Summary: This study looks at the social history of individuals connected to a particular geographic quadrant -- Section 1 of Middle Creek precinct, Lancaster County, Nebraska. This an area famous for its natural history, as it is the home of Nine Mile Prairie. But the property owners in this section have a colorful history that encompasses the fields of sports, politics, academics, foreign wars, and crime. The study looks primarily at E. Frank Schramm, Joseph E.A. Alexis, and the Amos Eager family, who with other owners contributed importantly to the history and development of the City of Lincoln and the State of Nebraska.

¹ Top, from left, Alta Nelson Felsing, Frank D. Eager, Joseph E. A. Alexis, E. Frank Schramm; bottom, from left: Merrill R. Reller (with Caril Ann Fugate), Earl "Gus" Eager and Earl "Dog" Eager, Virginia Reller. Individual photo credits: *Lincoln JournalStar*.

Introduction

Section 1 of Middle Creek precinct, Lancaster County, Nebraska, is a remarkable place. Its northwest quarter now comprises the eastern domain of Nine Mile Prairie, a tallgrass prairie listed on the National Register of Historic Places and honored with its image on a U.S. postage stamp. The rest of this rural section, located on the northwest border of Lincoln's city limits, is no less special for its own grasslands and native prairies, its riparian woods and wetlands, its views over the city of Lincoln, and its notorious salt water formations that have foiled well diggers and human inhabitants for over a century.

Although the area's natural history and preservation have captured more attention, it is the human history of this particular section that tells an intricate story of Nebraska pioneers, educators, and statesmen. E. Frank Schramm, Joseph E. A. Alexis, and the Amos S. Eager family -- all historically important Nebraskans whose influence extended worldwide -- owned parts of this section for many decades.

How well did these owners know each other and how did they view the future of their land? How did they care for it and did they know of its importance to botanical theory and research? How did the three leading citizens interact with other Section 1 landowners? Some of the others were a colorful, litigious, romantic, foreclosure-prone, knife-pulling and axe-wielding cast of characters, who would have been at home in the pages of Mari Sandoz's controversial Nebraska-based novels, *Slogum House* (1937) and *Capital City* (1939). Even a foreign war-crimes question from the Philippine-American War recurs more than a century later.

Did Schramm, Alexis, and the Eagers belong to the same organizations and socialize together in Lincoln, where they lived? There is little evidence of social connections or that they saw their lands as something other than individual, income-producing parcels, not especially worthy of preservation as part of a larger prairie, as some scientists and conservationists now envision.

But that does not make their stories, and the stories of those around them, any less engaging. Their experiences may provide lessons for future prairie research, recounted as they are in this monograph through the method of looking intensely at a defined geographical quadrant.

To be sure, their politics did not bring these people together. Joseph Alexis ran for Congress as a Republican. Frank Schramm was an avowed political independent and showed no interest in politics. Amos Eager, first among them to own land in Section 1, came from a Republican family that converted to the Populists. His son Frank owned and published the most prominent Populist newspaper of its day and, as the Populists faded, became an outspoken Democrat. Younger son Earl Eager was a "wet" Republican in the Nebraska legislature.

These landowners had more in common through their University of Nebraska associations. Indeed, it is the connection of the University to this rural section that

provides a narrative arc that spans over a century. Frank Schramm and Joseph Alexis were longtime professors in the College of Arts and Sciences. Frank Eager, who had been a military science student of John J. Pershing, headed the commission (and financed the land purchases) that expanded the University's main campus near downtown Lincoln. Earl ("Dog") Eager was a famous halfback on the early football team and later became the manager of the athletic department. He organized the first state basketball tournament of its kind in the nation and acquired the property for Memorial Stadium. His own son Earl ("Gus") Eager played his father's position in football four decades later. In recent years, the University itself and its associated foundation have become the largest landowners in Section 1. The University's own record on prairie heritage is decidedly mixed, although new efforts show promise.

The following history provides a closer look at this prairie and its most notable owners. It does not rely on a conventional approach to historiography but looks at people for their connection to a *quadrant* of land, much as NU scientists Clements and Weaver (see below) used a similar approach for their pioneering theories of plant-succession ecology.

E. Frank Schramm (1883-1967)

If you visit Nine Mile Prairie today via West Fletcher Avenue, you enter onto what was the property of Frank Schramm from January of 1934 until two decades later when the U.S. government took it to build bunker storage of nuclear weapons in the Cold War.

Professor Schramm bought the northwest quarter (See Fig. 1, below) of Section 1, Middle Creek precinct, for \$7,000 from Security Mutual Life Insurance Company, \$6,500 of which he borrowed back at 5% per year, due March 1, 1941.² He leased the property to local farmer Riley F. Uland, who raised a few acres of corn, oats, and sweet clover. The terms of lease, common for the time, were 2/5 of grain and straw proceeds, 1/2 of all hay, and \$4/acre of pasture not to exceed 20 acres. Most of the land was native prairie and given over to haying. The corn and sweet clover were at the north edge of the property, which is now part of the remaining bunker complex.

The \$44 per acre Schramm paid for the quarter was much less than the \$83 per acre Mary Kathrine McManaman paid for it in 1917. She and her husband James purchased the northwest quarter of Section 1 along with the west half of the southwest quarter, which adjoined their farmstead across West Superior Street to the south. But the boom years of World War I, when crop and land prices were high, soon gave way to a farm depression in the 1920s. Mrs. McManaman, who survived being rushed in 1917 through a snowstorm to Lincoln's St. Elizabeth Hospital for delivery of

² E. F. Schramm, Papers (RG 32-01-03). Archives & Special Collections, University of Nebraska–Lincoln Libraries. Unless otherwise noted, the Schramm records and correspondence are from these papers.

her last child (by the efforts of three different ambulances³), died in 1924 at age forty-seven. Three years later, James McManaman sold at public auction "26 head of good horses and colts (these are mostly mares and raised on my farm), 37 head of cattle, 13 hogs, Ford car and machinery."⁴ By the time Professor Schramm offered to buy it, the McManamans' northwest quarter of Section 1 was in the hands of Security Mutual Life.

Although professors' salaries were more likely to pay off mortgages than the collapsing agricultural economy, which only got worse in the 1930s, these paychecks were also vulnerable. University of Nebraska professors in the Great Depression had to think about outside incomes because of the substantial cuts to faculty salaries imposed both by Chancellor Edgar A. Burnett (10%) and by the Nebraska legislature (22%).⁵ University funding was cut during the 1933 legislative session when hundreds of farmers successfully demonstrated at the new Capitol against bank foreclosures, achieving a temporary foreclosure moratorium.⁶ Land, if it could be acquired at depressed prices, was also an alternative investment to risky financial securities.⁷

³ "Auto Raced in Storm with Stork" *The Lincoln Daily Star*, December 13, 1917, 5. The voluble Dr. W.H. Slattery, who gave many such stories to the newspapers for good or ill, spoke too soon about the arrival of a bouncing baby girl. The baby, Parselene McManaman, died two days later. Communication with Helen Skidmore, granddaughter of James and "Kate" McManaman, August, 2011.

⁴ Classified advertisement, *The Lincoln Star*, February 9, 1927, 19.

⁵ Robert Knoll, *Prairie University* (Lincoln: University of Nebraska Press, 1995) 88, 89. Chafing about salary was not new to Schramm: a decade earlier he had written to Chancellor Samuel Avery, "Looking over the salary record ... you can readily see that if I had not engaged in commercial geological work during the summer months, I would soon have been either in the hands of the undertaker or my creditors...." See R. McLaren Sawyer, *Centennial History of the University of Nebraska* (Lincoln: Centennial Press, 1973) 11.

⁶ David J. Aiken, "Foreclosure Moratoria and Farm Credit Mediation: Nebraska's Legal Response to Two Agricultural Crises," *The History of Nebraska Law*, Alan G. Gless, ed. (Athens, Ohio: Ohio University Press, 2008) 126ff.

⁷ Nebraska Hall of Fame member Mari Sandoz wrote of the times in her political novel *Capital City*. Of the financial speculation of the late 1920s, she offered: "[B]usiness men thought they could make more loaning their money in the call market or trading in securities themselves than in their own companies." To which she added a description of a fictional bankers' convention in a capital city in the early 1930s: "[T]he bankers did a good bit of government baiting during convention hours. Outside of that it was mostly bragging ... of farms and buildings foreclosed. One more bad year for the farmer who still imagined that war profits might soak down to him and the last of the good places would begin to break loose, like an ice jam in the spring." See Mari Sandoz, *Capital City* (Lincoln: Bison Books edition, 1982) 251, 264. For her novel, which many Lincolniters thought was about them, Sandoz was rewarded with vituperation and moved from Lincoln to Denver.

More mundane concerns on Section 1 soon came to Professor Schramm's attention. A fence -- all-important to those with livestock -- bordered the west side of his new property. After meeting with his new neighbor to the west, the farmer and local leader Tilman Flader⁸, Schramm was advised in a quickly handwritten note that, by law, his fences needed mending.

Oct 3 - 1934

Pro Schram I looke[d] at that fence and it's bad and it can't be fixed the way you said as it takes Post and wire

here is the Law on fence I am sending you,

*Yours Resp Tilman Flader
333 North 11th St.
Lincoln Nebr.
[Enclosure] Lawful Wire Fences*

Professor Frank Schramm was a noted geologist, if not a prompt fence-mender. He traveled the U.S. and the world, working mostly with oil, mining, and railroad companies. He was listed in *Who's Who in America* and testified in courts as an expert witness on matters of petroleum geology. Born in Dewitt of German ancestry, a graduate of the universities of Oklahoma and Nebraska, he was a popular professor in Lincoln for 43 years, from 1908 to 1951, and kept in touch with his students long after their graduation. On his retirement, he received a book of letters from his former students working in oil and mining companies representing 34 states and 17 countries.⁹ Among friends he was known as "Bo". Unmarried, he lived at the Lincoln YMCA in a suite that had once been built for the visits of William Jennings Bryan.¹⁰

Schramm was a colleague and close friend of Professor Erwin H. Barbour, a paleontologist who discovered the fossils of many prehistoric creatures throughout the plains and built Morrill Hall on the University's city campus. Schramm succeeded him as chairman of the Geology Department. Their lively correspondence from various digs illuminates the conditions under which they worked and how Barbour struggled with the construction of the building that was soon to house "Elephant Hall", one of the best collections of mammoths and mastodons in the world.

⁸ Tilman Flader is still a legend in his family and the community. Not only did he lecture a professor on the law of fences, he helped create the authority that re-channeled periodically flooding Oak Creek. Some of his former land holdings now comprise the Lincoln Airport. He died in 1959 at 100 years of age.

⁹ "Retiring Prof. Schramm Honored by NU Friends," *The Lincoln Star*, May 22, 1951, 2:2.

¹⁰ "Once It Was Bryan--Now Schramm" *The Lincoln Star*, May 21, 1951, 1:1.

Schramm himself directed the Cherry County expedition where the first shovel-tusked mastodon in the nation was unearthed. Schramm sat on the Ph.D. committee examining C. Bertrand Schultz, who later led both the State Museum at Morrill Hall and the Nebraska Academy of Sciences. Beyond his faculty post, Schramm worked for the U.S. Forest Service as a coal expert and served as the geologist for the Union Pacific Railroad.

One day at the depth of the Great Depression, when a red dust storm settled gritty particles all over Nebraska, Professor Schramm measured off two square yards of sidewalk, swept up the dust, and took it to his campus laboratory. He calculated that ten grams of dust fell per square yard, amounting to thirty-five tons per square mile, meaning that an estimated 2,500,000 tons of gypsum, volcanic ash, and silt from Texas and Oklahoma had been deposited in one day in Nebraska.¹¹

In the fall of 1934, after what he hoped was a drought-breaking rain, Schramm wrote to the farmer to whom he leased his land, Riley F. Uland, half brother of Tilman Flader, announcing that he had decided to plant trees on it.

*Lincoln, Nebraska.
September 28, 1934.*

*Mr. Riley Uland,
Malcolm, Nebraska*

Dear Mr. Uland:

I have decided not to plant any wheat on my land this fall. That soaking rain has convinced me that I should plant trees on that land next spring. Will let the weeds grow up on it for awhile to keep the soil from eroding away.

Hope I got some water in the pond.

*Cordially yours,
(signed)
Apt. "A" Y.M.C.A.
Lincoln, Nebraska*

EFS-H

The trees were to be planted by the Emergency Conservation Work, recently established by the U.S. Forest Service in nearby Denton.¹² Schramm preferred Russian Olive and Siberian Elm for his property, which he believed were best suited to Nebraska prairies. State arborist Earl G. Maxwell provided a shipment of trees in the

¹¹ *Mason City Globe Gazette*, May 9, 1933, 3.

¹² The U.S. Forest Service itself chose Lincoln, Nebraska, for its headquarters in the tree-planting efforts to combat the Dust Bowl. Its initial director was Paul H. Roberts.

spring of 1935. (There is no evidence today of where they were planted and none seems to have survived.)

Schramm also had early plans for a structure on the site. He corresponded with a South Dakota supplier of ponderosa pine lumber but a letter of apology from the lumberyard indicates that the delivery never was made. He attempted to buy a railroad car from the Burlington Railroad to use as a toolshed, but the company turned him down, not wanting to compete with local lumberyards.

This quarter section (and the adjacent property of Tilman Flader) was what his University faculty colleague, professor of plant ecology John E. Weaver, first called "Nine Mile Prairie".¹³ Weaver and Schramm together gave presentations on earth sciences to meetings of the Nebraska Academy of Sciences at Morrill Hall. Nine Mile Prairie was one of the sites influencing Weaver, in the period 1934-1942, to revise his thinking about natural cycles ("succession") of prairie development.¹⁴ The summer of 1934 was the hottest ever on record in Nebraska. The drought -- despite that September soaking rain -- lasted through the decade. Experimenting on Nine Mile Prairie, Weaver came to recognize that prairies were somewhat different ecological systems than he and his mentor, Professor Frederic E. Clements¹⁵ of NU and later the Carnegie Institution of Washington, had previously theorized in their co-authored publications.¹⁶

Ironically, Weaver's work eroded the Clementsian paradigm of plant ecology that had dominated the field of botany for decades, worldwide.¹⁷ Clements, born in

¹³ The prairie was nine miles from downtown Lincoln.

¹⁴ The exact location of Weaver's work is a matter of speculation. It may have been on Schramm's property or on his neighbor Tilman Flader's, or both. Some of Weaver's local work was also done on a prairie in Belmont, closer to the University. See Lisa Knopp, "Nine Mile Prairie," *Michigan Quarterly Review*, Vol. 46 Nr. 3, July 2007. The uncertainty is compounded by the fact that Weaver, in a dispute with the University, at his death instructed his heirs to destroy his papers and pull his stakes from the research plots.

¹⁵ Considered the founder of plant ecology studies, Clements was a member of the NU *Seminarium Botanicum* along with Albert F. Woods (who became president of the University of Maryland) and Roscoe Pound (who became dean of the Harvard Law School). See Knoll, *Prairie University*, ill. 23. He received his doctorate in botany and married fellow graduate student and *Sem Bot* member Edith Schwartz of Omaha in 1899. She was a teaching assistant in German (helpful for translating the botanical works of Goethe, Humboldt, and especially Drude), received a Ph.D. in botany herself in 1904 and collaborated with her husband in plant ecology studies throughout the country. See Ronald C. Tobey, *Saving the Prairies: The Life Cycle of the Founding School of Plant Ecology, 1895-1955* (Berkeley: University of California Press, 1981) 76-79.

¹⁶ Knopp, "Nine Mile Prairie," 453. Tobey, *Saving the Prairies*, 201, 202.

¹⁷ Weaver apparently departed from the Clementsian view that plant associations were themselves complex organisms that could be studied like individual organisms, but did not abandon the concept of stages of plant succession. See Sharon E. Kingsland, *The Evolution of*

Lincoln in 1874, was a student of Charles E. Bessey at the University of Nebraska and co-author with Roscoe Pound of *Phytogeography of Nebraska*. He developed a compelling plant succession theory through a quantitative research technique known as the quadrant method, in which actual counts of plant species were painstakingly inventoried in marked squares. Clements's work helped establish what historian Ronald Tobey called the "golden age of the Nebraska group" and was no small factor in the invitation from the prestigious Association of American Universities to the University of Nebraska to join its ranks in 1909.¹⁸

Clements did not reject his colleague Weaver's work. Together they modified their plant succession theory to account more for droughts and human intervention. Clements himself became an advocate for New Deal programs to protect fragile prairies and grasslands. A poet and dreamer, he also envisioned social and political changes necessary to save the prairies. How this new public policy direction influenced Weaver and particularly Schramm (the apolitical owner of the very property on which the original Clementsian theory foundered) must be left to others to scour the records of Weaver's and Schramm's reactions.

Ralph Densberger, a neighbor living north of nearby Woodlawn, hayed and farmed the Schramm property for several years after leases with Riley Uland and another neighbor, Jacob Deinert, expired.¹⁹ Densberger and Schramm put livestock on the pasture, purchasing more fencing with proceeds from wool sales. This suggests that

American Ecology, 1890-2000 (Baltimore: The Johns Hopkins University Press, 2005) 144, 163. This may be too simple an explanation, however, as Clements' works are undergoing new scrutiny and his star is again rising. See Christopher Eliot, "Method and Metaphysics in Clements's and Gleason's Ecological Explanations," *Studies in History and Philosophy of Science*, Part C: Studies in History and Philosophy in Biological and Biomedical Sciences, Volume 38, Issue 1, March 2007, 85-109. The work of Lynn Margulis on symbiosis and epigenetics as factors in evolution, which has rescued Lamarck from ridicule, also elevates Clements, who lost favor at one time because of his association with Lamarckianism. What is not in doubt is that Clements established the leading theory and that his *Research Methods in Ecology* (1905), written while on the NU faculty, is one of the foundation documents of the discipline.

¹⁸ Tobey's work examines "the full mathematical quality of the foundations of ecology in this golden age of the Nebraska group." See Tobey, *Saving the Prairies*, 71. The University of Nebraska Lincoln was removed from the AAU in 2011 by a narrow vote of its members based on a questionable method of ranking contributions to research which the author, himself a quantitative researcher, believes would not have survived thorough analysis.

¹⁹ Ralph Densberger engaged in many farm-related businesses and farmed other properties that Schramm bought around Malcolm and Ashland. He trucked hay to the King Ranch in Texas and once had an International Harvester tractor dealership. He showed sheep at the county fair, likely those that grazed on Nine Mile Prairie. He and Professor Schramm got along well; when the professor came to Densberger's own farm, he brought pennies to scatter for the children to pick up, calling them "chicken feed." Conversation with James Densberger, Malcolm, Nebraska, October, 2011.

sheep grazed on Nine Mile Prairie in the 1930s, which may have been important for some of Weaver's experiments on Schramm's property.

Meanwhile, Schramm the investor collected "farm bargain" advertisements in newspapers and kept a list of area farms foreclosed by the Lincoln Joint Stock Land Bank. He bought several other Nebraska farm properties around the state and eventually willed to the State of Nebraska a property along the Platte River between Lincoln and Omaha, now known as Schramm Park. He also willed to the University Foundation 6,000 acres of other property, worth a million dollars at the time, to be used for scholarships and for care of the University's mineral collections.²⁰ Schramm Hall, a dormitory, is named for him.

Frank Schramm kept detailed records of his teaching, his consulting, his farms, and his personal life. He owned a Cadillac and later, during World War II, a Hudson. He had a driver, as he did not drive himself. According to the son of Ralph Densberger, who was named Frank after the professor, Schramm gave up driving after he was in an auto accident that killed his girlfriend.²¹ He never married.

Professor Schramm committed much time to helping University student organizations and activities, including the Kosmet Klub, the Interfraternity Council, the Student Union, and the Innocents Society. Among the paper receipts he kept: a one-dollar donation for a gift for Chancellor Burnett (who had slashed faculty salaries in the Depression) and a one-dollar membership to the AAUP. In 1939 he spent sixty dollars at Ben Simon's, a Lincoln menswear store.

Schramm was a member of the Knights of Pythias in Lincoln as well as the Knife and Fork Club, the Crucible Club, the Y.M.C.A., the Nebraskana Society, and the Unitarian Church. Over sixty boxes of his records are located in the archives of the University library. With the foresight and help of the Wachiska Audubon Society and donations from Marguerite Hall Metzger and others²², in 1983 the University of

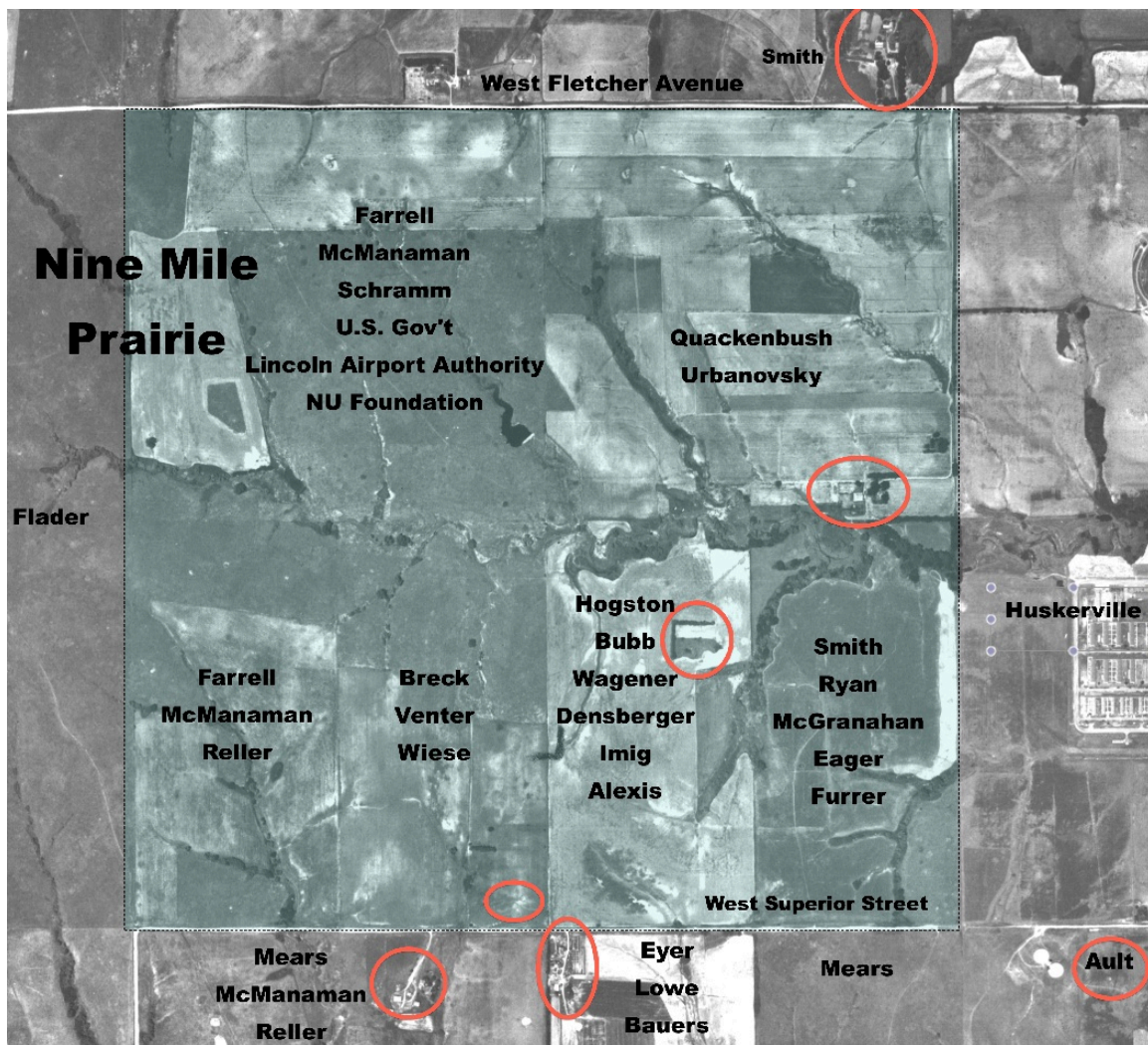
²⁰ "Schramm Will Leaves NU Land Worth Million," *The Lincoln Evening Journal*, April 4, 1967, 1.

²¹ Conversation with Frank Densberger, October, 2011. When Professor Schramm visited the Densberger home, sometimes his driver would come in, sometimes not. They exchanged Christmas gifts: the Densbergers would give Professor Schramm wine, which he liked to mix half-and-half with whiskey, and cigars. The professor gave the Densberger children tours of Morrill Hall, pointing out with delight the mastodons he uncovered, and other University attractions. Frank Densberger gave his sons the middle name of Frank, following Frank Schramm's request to keep his name going.

²² Marguerite Hall Metzger was the widow of Neil W. Hall, who managed Nine Mile Prairie as a volunteer until his death, at age 65, in 1977. He had been president of the Nebraska Reclamation Association and director of the Salt-Wahoo Watershed, as well as head of the farm and mortgage loan departments of two Lincoln banks. Instrumental in the effort to preserve Nine Mile Prairie were Ernie Rousek of the Wachiska Audubon Society and biology professor A. T. Harrison.

Nebraska Foundation acquired Frank Schramm's former Middle Creek property from the Lincoln Airport Authority, which had title to it after the military departed its bunkers. Today, the School of Natural Resources at the University's Institute of Agriculture and Natural Resources manages it, along with part of Tilman Flader's former property to the west, as Nine Mile Prairie.²³

Figure 1. Selected 19th and 20th Century Owners and Farmsteads, Section 1 (shaded), Middle Creek Precinct and Environs. Adapted from 1949 Aerial Photograph.



²³ See <http://snr.unl.edu/aboutus/where/fieldsites/ninemileprairie.asp>, accessed September 5, 2011.

Joseph E. A. Alexis (1885-1969)

Joseph Alexis and his descendants have owned eighty acres of Section 1 for over five decades. Alexis was a gifted linguist who taught at the University of Nebraska from 1910 until 1960. He authored language texts in Spanish, German, and French in addition to teaching Swedish. Born in York County, he was descended from Swedish immigrants. His work on Swedes in Nebraska, his studies and lectures in Europe, and his outreach on behalf of Scandinavian peoples earned him recognition from King Gustaf V of Sweden, who honored him with the Royal Order of Wasa.

Joseph Alexis held bachelors and masters' degrees from Augustana College and the University of Michigan, and doctoral degrees from the University of Chicago and the University of Paris. He also attended the Universities of Lund in Sweden, Dijon in France, and Madrid in Spain.

He co-authored his first German textbook with his University of Nebraska faculty colleague Andrew D. Schrag, who, as a descendant of Mennonite Germans in Kansas, was suspected by the University of being a traitor against the United States during World War I. Schrag was accused of making pro-German comments in his classes and in his publications. Schrag had studied at the University of Berlin, the institution founded by Wilhelm and Alexander von Humboldt, after which American research universities were modeled. In May 1918, after nine days of hearings by the University's Board of Regents, Schrag was exonerated but he was not re-hired.²⁴ Joseph Alexis was not accused, although the teaching of German was circumscribed.

In the 1920s and 1930s, Alexis was among the University's best-known professors, along with Frank Schramm. Starting in 1943, he administered the foreign language instruction of military trainees who came to the University and were housed in Love Library and in the athletic department's fieldhouse. That year the student union became a mess hall. Many of the trainees "were easterners and believed [Nebraskans] were backwoodsmen when they first arrived. They later changed their minds. They like the way the faculty conducted their classes ... and look with pride on the accomplishments at the University of Nebraska." Professor Alexis's colleagues in administering the military college were C. Bertrand Schultz, Olin J. Ferguson, and Charles H. Oldfather.²⁵

²⁴ Schrag, who held a Ph.D. from Johns Hopkins University, relocated and became a banker in Davenport, Nebraska. He passed the Nebraska bar examination without formal legal training and became a WPA administrator in the Great Depression as well as a beehive inspector for the state. He came back to Lincoln as a defense industry instructor in World War II. In an ironic twist, his grandson, John Wiltse, became associate general counsel for the University and, seven decades after the confrontation, rehabilitated his grandfather's reputation. See "The Andrew Schrag Story 1876-1956" accessed September 5, 2011 at http://www.swissmennonite.org/feature_archive/2002/200212.html.

²⁵ Sawyer, *Centennial History*, 26, 123.

Toward the end of his career in the 1950s, Joseph Alexis wrote *Deutschland Heute* and published it at the Midwest Book Company of Lincoln. It was a popular German language reader, describing student travels through post-World War II Germany. For his several language books, Joseph Alexis was recognized in *Who's Who among North American Authors*.

Professor Alexis retained many records of his work, especially those dealing with his publishing enterprises at the Midwest Book Company.²⁶ His class rosters and personal notebooks are in the archives of the Nebraska State Historical Society. In early notes to himself, he deals with separable German verbs and the uses and cases of the prepositions that go with them, perhaps in preparation for his 1919 dissertation at the University of Chicago.²⁷

Marjorie Odman of Mead, another descendant of Swedish immigrants, married Joseph Alexis in Valparaiso, Nebraska, in 1917. They had four children. They lived at 1420 Garfield Street and at 1924 South 17th Street in Lincoln. Joseph Alexis was a member of the local Chamber of Commerce, the Rotary Club, Grace Lutheran Church, and the Nebraskana Society.

Like Professor Schramm, Professor Alexis bought farm properties around the state in the 1930s. Among other properties in Dixon, Antelope, and Dakota counties, he bought two through sheriff's sales in Thurston County in 1936, after Prudential Insurance foreclosed on John T. Ashford.²⁸ Ashford had been a student at the University when Alexis was on the faculty. Ashford, however, soon landed on his feet in Omaha, as he became regional manager for Emergency Crop & Feed Loan, then saw his son John Donald Ashford become a decorated World War II pilot. His grandson John Bradley Ashford became a state senator and another grandson, W. Mark Ashford, became a district court judge in Douglas County.²⁹ Two of the professor's grandchildren still own the former Ashford farms in Thurston County.

²⁶ Alexis, Joseph Emanuel Alexander. Papers [RG5674.AM]. Archives, Nebraska State Historical Society.

²⁷ The published dissertation, "Concerning the German Relatives after Neuter Substantivized Adjectives...in Eighteenth Century Prose" is still available at <http://www.archive.org/stream/concerninggerman00alexrich#page/n3/mode/2up>, accessed September 5, 2011.

²⁸ Interview with Thurston County clerk, July, 2011.

²⁹ Communication from Senator Brad Ashford, August, 2011.

Professor Alexis did not become the owner of property in Section 1, Middle Creek precinct until many years later, with a purchase from Mrs. Lillian (Nelson) Imig. Mrs. Imig was a notable Lincoln owner of the Hi-Acres Cafe in the 1930s, after which she opened the New Central Restaurant and later the Rancho Motel. She came to Lincoln from Seward, where she had barely survived an attack with a gas pipe by her husband Jacob Imig in December, 1933. After the attack he "went to a slaughter house and blew off his head with a ... shotgun."³⁰ At her Hi-Acres Cafe on High Street, known as an "after hours club," Lillian Imig was arrested multiple times in the late 1930s and early 1940s for serving alcohol without a license and running a "disorderly house". She fought back in headline trials with top counsel. Her lawyers once flummoxed the prosecution by pointing out that the ordinance under which she was charged was invalid, as prohibition had been repealed years earlier.³¹ Despite her run-ins with police, she promoted herself as one of Lincoln's top businesswomen and a great cook. Her daughter, Alta Nelson, was a musician and toured on the vaudeville circuit with her own orchestra, "Boots and Her Buddies." Although it had no liquor license, the Hi-Acres Cafe had a license as a dance hall. Alta was the hostess for the special events Orchid Room at Mrs. Imig's New Central Restaurant, on 13th and P Streets, which opened in 1945.³²

³⁰ "Mrs. Imig May Recover from Gas Pipe Blows: Seward Man Kills Self After Beating His Wife Over Head," *The Lincoln Star*, December 19, 1933, 1. After a much-litigated probate, Lillian Imig received one-quarter of the Jacob Imig estate, which consisted of a Seward grocery business, stocks, and several parcels of Seward County land. She also got the automobile. (Interview with Seward County court clerk August, 2011.) This provided a stake for Lillian Imig's Hi-Acres restaurant.

³¹ "Ordinance Ridiculed in Mrs. Imig's Trial," *Evening State Journal*, April 25, 1938, 2.

³² According to Kenneth Felsing, stepson of Alta Felsing who grew up under Alta's and Lillian Imig's care, neither Lillian nor Alta ever spoke of the difficult events of their earlier lives, including six marriages between them. He remembered them as "good people" with Lillian being a superb cook and Alta being talented socially and musically. A member of the

FEARS A WOMAN.

Hogston Seeks Peace Warrant Applying to Mary E. Smith.

The quarrel over the possession of a tract of eighty acres of land which belongs to some of the heirs of the late Michael Smith, who was killed last October at West Lincoln, promises to bob up several times yet in court before it is settled. Recently John Hogston, claiming right to the property by a lease ahead of the dower rights of Mary E. Smith, widow of the deceased, brought an injunction suit to restrain her from trying to get possession of the land. This was decided by Judge Holmes, he holding that no grievance worthy the granting of an injunction existed. Now Hogston has applied for the placing of Mrs. Smith under bond to keep the peace. She lives on one side of the eighty and he lives on the other. He says that when he has had his cattle in the field, she has come out and chopped down the fence posts and has let his cattle out. He further asserts that she has come at him with an ax and has on several occasions struck him. In the language of the application, he fears that she will strike, beat, wound and assault him, and because she has put him in great bodily fear, he demands that the law step in and make Mrs. Smith behave herself. The hearing will come up in county court soon.

As you stand on Nine Mile Prairie today -- it is open to the public year-round -- and look toward the southeast, the Alexis property acquired from Lillian Imig lies between the former Schramm property and the checkered city water tower. Its legal description is the west half of the southeast quarter of Section 1 of Middle Creek precinct. The Nine Mile Prairie watershed provides the main source of water for the Alexis property's woods and wetlands, which are still owned by descendants of Joseph and Marjorie Alexis.

The northeast part of the Alexis property in Section 1 was the site of a 19th Century farmstead, owned at the turn of the century by Clara Belle Hogston. She raised cattle and hogs with her husband John and their three daughters. Fences were an issue in 1900 with neighbor Mary Smith, who knocked the fences down, tried to scatter the Hogston cattle, and against whom John Hogston sought a peace order. In his plea to a judge, he alleged that Mary Smith attacked him with an axe and that he feared for his life.³³ The Hogstons and their three daughters eventually moved out of state. William H. Bubb, his wife (Mary) Estelle and their two daughters subsequently purchased and farmed the property, but William Bubb died in 1923 on the farm, at age 59, and Estelle sold out.

This farmstead's angular windbreak, still visible in aerial photographs from 1949, would have been a landmark to Professor Weaver, graduate student Theodor Steiger,³⁴ and others who, while doing their acclaimed prairie research, looked out

Lincoln Symphony, Alta practiced violin "all the time" for Lincoln Symphony performances at the Stuart Theater at 13th and P Streets, an anchor building along Frank Eager's P Street row and adjacent to Lillian Imig's former New Central Restaurant. Interview, Kenneth Felsing, August, 2011.

³³ "Fears A Woman," *The Nebraska State Journal*, April 17, 1900, 6.

³⁴ Theodor L. Steiger did extensive research in 1927 and 1928 on Nine Mile Prairie and its environs, which at that time encompassed about 800 acres. See T. L. Steiger, "Structure of Prairie Vegetation," *Ecology*, Vol. 11, No. 1 (January, 1930), 170-217. Steiger emigrated from Switzerland to San Diego, California, in 1910, at age seventeen. He and his wife Bertha, also Swiss, had two children: Mari, born in South Dakota in 1921 when Theodor taught at Redfield College; and Walter, born in 1923 in Colorado. The family came to Lincoln where Steiger became minister at Ebenezer Congregational Church at 8th and B Streets before seeking his doctorate in botany at the University of Nebraska, which he received in 1929. Two of his students at Redfield became ministers in Lincoln's German speaking *Volgadeutsch* communities; the Rev. C. George Kuhn followed Steiger in the South Bottoms at Ebenezer; the Rev. John H. Wacker served Immanuel Reformed Church in the North Bottoms at 10th and Charleston Streets. In 1930, doctorate in hand, Steiger became an advocate for retaining the newly established Pioneers Park as native prairie: "It took nature thousands of years to produce this grassland. It is a living witness to the countless ages which elapsed before the white man began to sink the glistening plough into the ancient sod. Not enough of it is left today to convey to future generations an appreciation of the prairie. Are we going to permit its complete extinction in favor of the dull and unimaginative blue grass sod?" See "The Beauty of the Prairie," *The Lincoln Star*, May 13, 1930, 12. Steiger left Lincoln in 1931 with a fellowship from the National Research Council

over the prairie heights toward Lincoln. This farmstead, like others in the area, probably was abandoned because of the lack of a reliable fresh water well.³⁵ Among its last inhabitants were Gertrude and Abel Wagener and their three adult children, who lost the property to a sheriff's deed in 1933. After several ownership changes, Ralph Densberger, who leased Professor Schramm's nearby pasture and hay fields, acquired the property and owned it for sixteen years before selling it to Lillian Imig. In the 1950s, the windbreak was removed and the property was later terraced for grain production. In recent decades under Alexis ownership it has been returned to grassland on which cattle graze in the summer from West Superior Street on the south to the property's wetlands a half-mile to the north. The fences are in good repair.

Although he did not farm his properties himself, Professor Alexis considered himself a farmer in his Republican primary runs for both U.S. House (1950) and Senate (1954) seats. A campaign flyer reads: "Joseph Alexis, Educator and Farmer; Alexis Knows Conditions at Home and Abroad from Experience." Another flyer reads: "Born in York County, son of a Swedish pioneer pastor; worked his way through college and university; Farmer, vitally interested in agriculture; Lecturer in Europe and Mexico on international relations." His campaign efforts were dignified and high-toned. His speeches to Nebraska service clubs reflected his knowledge of world affairs and an internationalist outlook; his personal experiences and language abilities perhaps over-qualified him in the minds of voters. He did not have the support of the Republican State Central Committee. He lost in 1950 to Carl Curtis in the House primary election and in 1954 to Hazel Abel for the Senate.

to study Swiss meadow vegetation at the University of Zurich. He returned to the United States to teach at Sul Ross College at Alpine in the Big Bend region of Texas, then joined the botany faculty at Wellesley College in Massachusetts. After World War II, he spent two years in Greece working on agriculture projects with the United Nations Relief and Restoration Administration, UNRRA. He returned to the United States in 1947, convinced that Greece should become an American protectorate. He researched New Hampshire grasslands and discovered a new orchid, to be named *Spiranthes Steigeri Correll*. In retirement, he returned to the ministry with the Unitarian Church. His son Walter, who attended his father's South Bottoms church as a child in Lincoln, studied physics at MIT and at the University of Cincinnati and joined the faculty at the University of Hawaii, where he became known as the grandfather of Hawaiian astronomy for bringing observatories to Hawaii's tallest mountains.

³⁵ Abandoned and disappeared farmsteads include those of the Hogstons and Venters on the north side of West Superior, the Eyer and McManaman farmsteads on the south, and the Quackenbush farmstead on the vacated NW 56th Street. Of a dozen or more test wells attempted in the past twenty years on Section 1, none has yielded fresh water although there is plentiful salt water at around 200 feet. This is the salt-water source that in former times came to the surface two miles to the east and attracted both Indians and settlers, and led to the establishment of the village of Lancaster and the City of Lincoln. The salt-water marshes to the north of Lincoln are the home of the endangered Salt Creek Tiger Beetle (*Cicindela nevadica lincolniensis*).

The descendants of Joseph and Marjorie Alexis are scattered across the country. Their daughter Josephine Alexis Molloy was the wife of the late Judge John Molloy of Arizona, who wrote the ill-fated Arizona Supreme Court opinion in the *Miranda v. Arizona* case dealing with the constitutional right to counsel.³⁶ Their son Carl Odman Alexis was a naval officer (influenced toward seagoing by his transatlantic voyages as a child, accompanying his father, mother, and siblings to Europe several times on the Cunard Line); he later became a geologist with the Navy in Washington, D.C. His daughter Karin is active at the Embassy of Sweden and lectures at the National Gallery of Art. The many Alexis descendants still operate the farm in Section 1 of Middle Creek precinct through United Farm Management of Lincoln.

The Eager Family:
Amos S. (1844-1932)
Minerva S. (1855-1942)
Frank D. (1872-1960)
Earl O. (1881-1962)

Amos S. Eager, whose Welsh forbearers came to America in 1720³⁷, was a Nebraska pioneer who bought the east half of the southeast quarter of Section 1 in 1906. The Eager family was to own the property for the next six decades, the longest stretch of Section 1 ownership since the 1854 cession of lands from the Otoe-Missouria Indians. The property had been owned by the Burlington & Missouri Railroad as part of President Grant's 1872 railroad grants, and subsequently by several other owners before the Eager purchase.³⁸

In 1900, John Hogston, whose wife Clara owned the eighty acres to the west, had briefly leased what would become the Eager property from then-putative owner Mary Smith. Mary was the widow of Michael Smith, who was killed in 1899 when his team and wagon, full of lumber and headed for their farmstead on West Fletcher, was struck by a Union Pacific passenger train in West Lincoln. Investigators suspected he

³⁶ The *Arizona Daily Star* reported on his death in 2008 that Judge Molloy disagreed with the U.S. Supreme Court about *Miranda*: "Sitting with the state Supreme Court in 1966, Molloy wrote the final *Miranda v. Arizona* decision, which later was overturned by the U.S. Supreme Court in the landmark case that required police to inform suspects of their rights." Marjorie Molloy Letson (granddaughter of Joseph and Marjorie Alexis) told the newspaper: "He felt very strongly that he had made the right decision and that the courts were letting criminals go free." See "J. Molloy dies; was AZ appeals court judge," July 14, 2008, accessed September 5, 2011, at http://azstarnet.com/news/local/article_a26f403c-4aae-5ed1-98d7-66ef7fd2d5e1.html.

³⁷ *Who's Who in Nebraska: Lancaster County* (Lincoln: The Nebraska Press Association, 1940, NEGenWeb Project Resource Center On-Line Library, accessed September 5, 2011.) Eager family records suggest that Amos Eager is descended from William Eager, who came to Massachusetts from Wales in 1630 on a ship of Governor John Winthrop.

³⁸ Abstract of Title, Ray Frohn Company, August 2, 1971, No. 40594.

had been drinking, as a liquor bottle was found near the wreck, but evidence was inconclusive as his body "was ground to a pulp".³⁹ Michael Smith's first wife, also named Mary, had likewise met misfortune. In the Blizzard of 1888, she froze to death at their farm when temperatures reached minus 37 degrees Fahrenheit, only hours after experiencing an unusually warm winter day. The second Mary Smith's alleged axe attacks on John Hogston in the spring of 1900 (see above) were soon overtaken by another legal difficulty: relatives of the first Mrs. Michael Smith, led by Bridget Ryan of Greenwood in Cass County, successfully asserted their right to the title after Michael's death; they then sold the property to Julia Donnelly, who sold it to Thomas McGranahan, who in turn sold it to Amos Eager in 1906.⁴⁰

At the time of the purchase, Amos Eager was retired from his original Homestead Act property north of Lincoln, in Section 34 of Rock Creek precinct near Davey. He and his wife Minerva Saffer Eager had originally settled there in the 1870s after the Civil War. Amos fought for the Wisconsin Infantry at Fredericksburg, Rappahannock, and Gainesville, where he was wounded. In 1887 he and Minerva moved to 835 North 14th Street in Lincoln, where the Eager family also had a grocery and feed store at 825 North 16th Street.⁴¹

When Amos Eager died in 1932, his widow Minerva and his two sons Frank and Earl inherited the Middle Creek property in Section 1. This property abuts what is now Lincoln's suburb Arnold Heights; five acres have been carved at the top of the hill for a city water tower, a landmark to airline passengers traveling to and from Lincoln's nearby municipal airport.

³⁹ "Body Reduced to a Pulp: Horrible Fate of Michael Smith of Woodlawn," *The Nebraska State Journal*, October 22, 1899, 3. This was not the first time that Michael Smith and his family were in the newspapers. In 1893, Mr. and Mrs. Smith were in court for a divorce, but made up before the judge. In 1899, only a few months before the train accident, "Mary Smith" spent the night in jail after coming to Lincoln drunk and disorderly after a party in Woodlawn, near the site of their farmstead. Because the others in her party were two young men and another young woman, the person in question was likely Mary Smith's daughter from a previous marriage, Mary Conlan, who was also known in census records as Mary Smith.

⁴⁰ Michael Smith, his first wife Mary and his second wife Mary, accessed their Section 1 property via a county road that once ran along the east side of Section 1 from West Fletcher to West Superior. It also provided access to the farmstead of Joseph Quakenbush in the south half of the northeast quarter of the section. Presumably this was also the route the second Mary Smith took to destroy John Hogston's fences and to attack him with an axe. Only large scraps of culvert remain where the road crossed the creek at the half-mile point.

⁴¹ The 14th street address is today the back entrance to the Military and Naval Science building; the 16th street address is the current site of Delta Upsilon fraternity.

Frank and Earl Eager began their lives on their family's Davey Homestead. Frank attended school for several years in a sod schoolhouse;⁴² he moved on to University prep school and then to the University of Nebraska, graduating in 1893. Like his contemporary student Willa Cather, who took mathematics from John J. Pershing⁴³, Frank Eager also studied under Lieutenant Pershing. Frank was chosen as the outstanding cadet at the University. He became a lawyer, businessman, and Populist publisher in Lincoln and, in 1897, clerk of the Nebraska House of Representatives. In becoming clerk, no doubt he had the help of his uncle, Dewitt Eager, a pioneer legislator from Beaver Crossing who had bolted the Republican Party in 1890 to become a Populist.

In 1898, Frank Eager volunteered for the Spanish American War. He was commander of Company H and adjutant for the 1st Nebraska Volunteer Infantry, which spent a year in the Philippines. He was severely wounded in the native Filipino insurgency that followed the war and awarded the Silver Star. He fought at the battle in which the Nebraska Regimental commander, Colonel John M. Stotsenburg (who taught military science and tactics at the University after Pershing), was killed. Stotsenburg was buried at Arlington National Cemetery with President McKinley at the gravesite; Fort Stotsenburg in the Philippines, which later became Clark Field, was named after the fallen Nebraska commander.⁴⁴

⁴² As did middle son, Carl, who later attended Lincoln Business College in Lincoln and operated a general merchandise store in Davey. He died in 1894. Two other Eager children, Benjamin and Pearl, died in 1892 and 1894. Frank and Bertha Eager's son Franklin died in 1916 at age two.

⁴³ At the Plaza Hotel in New York, on the Pulitzer Prize dais with fellow Pulitzer winner Willa Cather in 1933, General John J. Pershing revealed to a laughing audience that he was already acquainted with Cather, but she had not done well in his mathematics class at the University of Nebraska.

⁴⁴ In 1942, a native of the Dutch-settled area south of Lincoln, Jack Obbink, was forced to march to Fort Stotsenburg from the opposite side of Manila Bay from where his fellow Nebraskans had fought in 1899. This became infamous as the Bataan Death March. Obbink survived and later became Director of Aeronautics for the State of Nebraska. In the election year 1960, he authorized the use of a state airplane to transport Senator John F. Kennedy, who had been in Lincoln to give the Democratic Party's Jefferson-Jackson address and would be elected president later that year, to Kansas City. Governor Dwight Burney, the Republican lieutenant governor who had succeeded Democrat Ralph Brooks upon Brooks's death in office, fired Bataan-survivor Jack Obbink. Obbink went on to become a federal official. Nebraska Democrats Frank Morrison and J. James Exon, good friends of Jack Obbink, won four of the next five gubernatorial contests.

"WE'RE ALL GLAD TO GET HOME."

"THE men are all glad to get home again," said Lieutenant Colonel Frank Eager of the Nebraska regiment, in speaking of the men who came in on the troopship. "They are tired and worn out, but they did their duty and they have earned a rest. They are in very good condition; they are comfortable, and now that we are at home, they are happy. The sick list is not a large one, and a good many of the men on it do not belong to this regiment or to the Utah Artillery."

"There does not seem to be any desire on the part of the men to re-enlist; there was only one man from this regiment who remained in the islands for that purpose, and I do not think there will be any more who will enlist here."

"I do not think the regiment has much to complain of in the treatment it has received while in service. The work was hard and the duty arduous, but the men obeyed like true soldiers. They never lost a battle, and they never lost an inch of ground. They were in a charge once, and General Hale sent an orderly to have them stop. The orderly came on the line and, running up to an officer, he asked: 'Where are the Nebraskans?' 'There they are,' said the officer, pointing to the boys running over a big ricefield and driving the Filipinos before them; 'there they are, and all hell can't stop them!'"

"That's a story they tell on the boys, and while I don't know how true it is I do know that it expresses no more than the truth. General Otis gave us permission to stop at Nagasaki and Yokohama and to allow the men to spend a day on shore. The trip home has been on the whole a pleasant one—and I tell you we are all glad to get here."

Frank Eager returned from the war with injured soldiers on the transport *Hancock*, making stops in 1899 at Nagasaki and Yokohama, Japan, on its way home to San Francisco. There he was met by a contingent of Nebraskans, including Governor William A. Poynter (of the Populist-Democrat fusion party) and his mother Minerva Eager, before traveling back to Nebraska.⁴⁵ Back in Lincoln, Frank Eager again took up his work as publisher at his Populist newspaper, *The Independent*, where his editor was the estimable but controversial Thomas H. Tibbles, who had fought alongside John Brown in Kansas and led the landmark effort to recognize Chief Standing Bear's rights in federal court in Omaha. Tibbles was married to Standing Bear's interpreter, Susette LaFlesche ("Bright Eyes"); they had been first on the scene to report to the country the 1890 massacre at Wounded Knee in South Dakota.⁴⁶ Suzette LaFlesche Tibbles subsequently wrote for Frank Eager's weekly paper on her experiences with

⁴⁵ *The Call*, a San Francisco newspaper, reported on July 31, 1899, that Frank Eager's ship, the transport *Hancock*, was met by his mother Minerva and sister, who went on board to greet him. It could not have been his only sister, Pearl, who died in 1894; perhaps it was Minerva's "servant girl", as described in the 1900 Census, or one of her own sisters. Frank was probably not the only soldier Minerva greeted; among those returning from the war were Davey farmers Charles Knudson and Peter Madsen, her former neighbors. Lieutenant Colonel Eager was the spokesman for the Nebraska regiment. He told *The Call*, "The men are all glad to get home again. They are tired and they have earned a rest. There does not seem to be any desire on the part of the men to re-enlist. I do not think the regiment has much to complain of. The work was hard and the duty arduous, but the men obeyed like true soldiers. They never lost a battle, and they never lost an inch of ground." See "We're All Glad to Get Home," *The Call*, July 31, 1899, 1.

⁴⁶ Frank Eager already had a connection to the tragedy at Wounded Knee. His mentor Pershing had been at the massacre, as that had been among Pershing's previous assignments before the University of Nebraska. Tragedy visited Pershing himself in 1915, when his wife and three daughters were killed in a fire in San Francisco. His son Warren survived the fire and grew up in Lincoln, where Pershing owned a home in which his sister, May, lived. The Eagers and Pershings were social friends; Frank and Bertha hosted Warren and his father at a dinner in Lincoln in the 1930s.

the U.S. Senate and on populist themes.⁴⁷ T.H. Tibbles went on to become the Populist Party's candidate for Vice President in the 1904 national election.

Colonel Frank Eager volunteered to be commandant of cadets at the University of Nebraska in 1901, the U.S. Army having made no other appointment. That year he married Bertha Sawyer, a Doane College graduate and daughter of Saline County banker George Sawyer. Frank and Bertha Eager honeymooned in New Orleans, Cuba, and New York.⁴⁸

Thomas Tibbles and Frank Eager struggled with U.S. imperialism. A July 24, 1902 editorial, "Why They Degenerate", addressed the mindset of a soldier in the U.S. military who could torture Filipinos and execute them without trial: "He ceases to be governed by his former code of ethics," which is the "inevitable effect of imperialism and wars of conquest upon the army and the standard of morality at home."⁴⁹ The reference to torture refers *inter alia* to a practice called the water cure, a variation of which is now called waterboarding.

The *Independent* editorials may have been expiation for Colonel Eager. It is unlikely that a protégé of Pershing and a son of Amos Eager, who fought with the Wisconsin "Iron Brigade" in the Civil War, would be implicated in torture, but the organization of the Nebraska regiment, of which Frank Eager was adjutant, was rigid on physical training but loose on command structure and good order.⁵⁰ The

⁴⁷ Susette LaFlesche Tibbles, since 1983 honored in the Nebraska Hall of Fame, wrote on Populist themes for Frank Eager's *Independent*. In an October 18, 1895 article, "The U.S. Senate", she wrote: "I have had rare opportunities during the past two years of observing for myself the course pursued by many of these senators and it has been an interesting study, as all studies from active human life are, and much more so than studies from books. During the past year the congressional representatives of the various political parties have been slowly disintegrating, evolving and dividing themselves from their own bodies politic, and the dissolving question has been the money question." (*Author's note: Plus ça change...*) In a November 8, 1895 piece, "Our Universities", she wrote, "People do not seem to realize to what an extent our universities are being run to suit the views of the millionaires and corporations of the country. It is a subtle danger and it is to be regretted that the trustees and presidents of these institutions should think it necessary to curry favor with and cater to the views of such men ... in the fear that they may withhold pecuniary favors for endowments to the institutions under their charge." (*...plus c'est la même chose.*) See writings of Susette LaFlesche Tibbles, accessed September 5, 2011, at <http://ualr.edu/sequoyah/index.php/home/research/tribal-writers-digital-library/>

⁴⁸ "The Social Calendar," *The Nebraska State Journal*, October 7, 1901, 2.

⁴⁹ George Berge, Papers [RG3105.AM]. Archives, Nebraska State Historical Society.

⁵⁰ Command of the Nebraska regiment was determined by the Nebraska governor, over which there was "fierce strife" in the regiment's officer ranks. Colonel John P. Bratt, who took the regiment to Manila, resigned from command as the Spanish American War concluded, prior to the Filipino insurrection. He recommended Colonel Stotsenburg as his replacement. Governor Poynter instead offered command to Colonel George R. Colton, but some of the regiment's officers objected because Colton had not been part of the regiment

Philippine American War was started, in fact, by Lincolnite William Grayson; while on guard duty, he shot a Filipino who insulted Colonel Stotsenburg. Hearing the gunshots, General Arthur McArthur ordered an attack on the insurgents. When the *Hancock* returned to San Francisco, Frank Eager gave the press the official account of the Nebraska regiment's participation in the war, but Private Grayson positioned himself conspicuously on deck to give interviews as "First Shot" Grayson.⁵¹

Mark Twain called American troops in the Philippine War "uniformed assassins." The appellation seems more pointed toward the later months and years of the war. Congressional hearings on the water cure concerned events four months after the Nebraskans departed the Philippines. Nonetheless, Frank Eager with his Silver Star could not have been pleased with the unwanted spotlight on the behavior of American troops in the Philippine War and used his newspaper to distance himself from their conduct.

Frank Eager was member of the Lincoln Chamber of Commerce and wanted to see the University permanently located in its downtown Lincoln location, rather than moved to the State Farm (now known as the East Campus) as favored by Chancellor Samuel Avery. After a 1912 victory over the chancellor's plan, cemented by a statewide referendum, he and other city leaders put up \$700,000 to expand the downtown campus eastward to 16th Street. Frank Eager by that time was the major

when Bratt resigned. So the appointment went to Stotsenburg. After Stotsenburg was killed, Governor Poynter again offered command to Colton, who declined in favor of an appointment as collector of customs for the port of Manila. The Governor appointed Colonel Harry B. Mulford instead. When the regiment returned to San Francisco, Mulford remained in the city. The regiment returned to Nebraska under Colonel Eager. See "Bit of Military History: Poynter Made the Tender...Mulford the Governor's Second Choice," *The Nebraska State Journal*, January 7, 1902, 3. Frank Eager told the story in simpler terms to his young granddaughter Nancy, with whom he often talked about his war experiences in the Philippines. In the library of his home, in grandfatherly chats with her before the maid interrupted them for dinner, the colonel attributed his rise in command to the deaths of others who were above him, which was at least partially true. Interview with Nancy Eager Dindinger, August, 2011.

⁵¹ Major newspapers focused on Private William Grayson. See "The Man Who Fired the First Shot of the War Against the Filipinos Conspicuous on Deck," *The New York Times*, July 31, 1899, 1. Grayson was an immigrant from England who was a Lincoln hotel worker before volunteering for the war. Giving interviews was a common practice for Grayson, who also posed for many pictures in the Philippines at the location where he fired the first shot. Not all Nebraskans were so proud of their involvement. Sergeant Arthur H. Vickers of Madison County, whose two brothers also were part of the Nebraska Regiment and came from a military family that had fought in the Revolutionary War, War of 1812, Mexican War, and Civil War, said on February 5, 1899, "I am not afraid, and am always ready to do my duty, but I would like someone to tell me what we are fighting for." He was killed on March 30, 1899, at Guiguinto, fighting Filipino insurgents after the war with Spain had ended. See <http://philippineamericanwar.webs.com/filamwarbreaksout.htm>, accessed September 5, 2011.

force in developing Lincoln's nearby P Street, building hotels, movie houses, and office buildings. He saw the University population as his clientele.⁵²

In 1933, Frank and Bertha Sawyer Eager admirably helped to pay off depositors to the full value of their accounts at her late father's bank in Saline County, which had been closed in a bank holiday earlier that year. They and other Sawyer family members obtained a loan from the Reconstruction Finance Corporation⁵³ to go beyond the required depositor guarantees.⁵⁴

Earl ("Dog") Eager followed his brother's footsteps to attend the University of Nebraska, where he was a halfback on the football team, 1902-04. A favorite play of the time was the "Dog", in which the small Earl Eager was physically thrown forward by his teammates, like a dog. He became the manager of athletics in 1906 and acquired property on the campus for the football field and stadium. He became a lawyer in 1907 and was elected to the lower house of the state legislature in 1910. He was responsible for establishing the first boys' state basketball tournament in 1911, an event soon replicated throughout the country.

Earl Eager's politics were vaguely Republican. Before the 1910 election, he told a Lincoln newspaper that he was not sure he subscribed to his party's positions, but he knew as a "wet" that he did not agree with his party on the issue of county option prohibition. The newspaper helpfully suggested to readers that Earl Eager "is supposed to represent university interests particularly in a financial way".⁵⁵

⁵² The minister of St. Paul Methodist Church was not pleased with the prospect of students attending Sunday movies at Colonel Eager's theaters. See advertisement "Dr. [Walter] Aitken Will Answer Col. Frank Eager on Sunday Shows," *The Lincoln Star*, October 9, 1926, 2. But at least one professor was pleased that the university would remain at its original site: E. H. Barbour wrote to his former colleague Frederic Clements that he came away with a commitment to build Morrill Hall on the downtown campus to house his growing collection of mammoths and mastodons.

⁵³ Congress created the RFC in January, 1932, during the Herbert Hoover Administration. It was directed first by Charles G. Dawes, a Lincolnite, Nobel Peace Prize laureate (for his work on World War I reparations), former Vice President under Calvin Coolidge (although they did not get along), and close friend, like Frank Eager, of General John J. Pershing. Dawes was soon replaced by Hoover after it was alleged that he gave loan preferences to his former Chicago bank. President Franklin D. Roosevelt expanded the RFC under the New Deal; the RFC provided financing for several Section 1 and surrounding properties during the Depression. The Charles Dawes house, now restored as a restaurant with many more pictures of William Jennings Bryan than Dawes, is located one block west of the Governor's Mansion in Lincoln.

⁵⁴ This was not a good time for Frank Eager to guarantee the deposits of others, as one of his own Lincoln properties, the Liberty Theater, was in default on its mortgage payments. The matter was finally resolved, after eight years of litigation, by the Nebraska Supreme Court. See "Reorganization of the Liberty is Upheld," *The Nebraska State Journal*, April 10, 1941, 5.

⁵⁵ "How They Stand On Option", *The Nebraska State Journal*, July 22, 1910, p. 8.

In his hey-day, Earl Eager was among the most well known people in Lincoln, in part for his auto speeding, an arrest on a streetcar, a fraternity lawsuit, traffic collisions, and forgetfulness about going to court. Once he told a judge that he simply forgot to appear, for which he was fined one dollar.⁵⁶ According to family lore, his wife Marie Pauline was the first person in Nebraska to register an automobile in a woman's name.⁵⁷ Perhaps her husband's driving contributed to the milestone.

But Earl Eager failed in an election for State Railway Commission and, after a power struggle with Chancellor Samuel Avery and University Regents, he lost his job as manager of University athletics in 1912 and was replaced by coach E. O. ("Jumbo") Stiehm. He continued in sports as a football referee, became an insurance executive, then completed a long and successful career as a wholesale grocer.

During this time, he managed his father Amos's farms, including the property in Section 1 of Middle Creek precinct. Through yearly classified ads in Lincoln newspapers, he leased up to sixty acres of Section 1 alfalfa prairie to local farmers who paid five dollars per acre per season.

It is likely that both Frank and Earl Eager were well acquainted with Frederic Clements, the founder of the discipline of plant ecology. Frank and Frederic were contemporary cadets under John J. Pershing.⁵⁸ Frederic taught at the University when Earl was a student; Frederic was known in Lincoln for having played football in high school and at the University, before Earl. Frederic was known for dressing the part of the enterprising field researcher: in jodhpurs, laced boots, and campaign hat. That the larger than life Frederic Clements went on to be a renowned scientist would not have been lost on Frank Eager, who led Lincoln parades in military uniform on horseback, and his brother Earl, with his own flair for publicity.

If ever there was a superb opportunity for the Eagers to lead an outing in Lincoln, it was passed up by their erstwhile adversary Chancellor Avery on August 9, 1913, when Avery hosted internationally prominent plant scientists who came to Lincoln for the Second International Phytogeographic Excursion.⁵⁹ Tansley of Cambridge,

⁵⁶ "Eager Remembers and Pays Fine," *Lincoln Daily News*, May 13, 1912, 1.

⁵⁷ Conversation with Dr. Steven E. Eager, August, 2011. Earl "Dog" Eager descendants have a stadium blanket inscribed with "Dog" as an artifact of his football exploits. Earl Eager was also a baseball and basketball standout and a sports promoter extraordinaire.

⁵⁸ Clements was co-founder of the Pershing Rifles, according to biographical information compiled by the Yale ecologist Paul Bigelow Sears. Sears' work is on file at the American Heritage Center at the University of Wyoming, where the Clements papers are housed.

⁵⁹ Cecil Crampton, Scotland; Adolf Engler, Germany; Arthur Tansley, England; Theodoor J. Stomps, Netherlands; Carl Schroeter, Switzerland; Carl Skottsberg, Sweden; Ove Paulsen, Denmark; Marie Charlotte Brockmann-Jerosch, Switzerland; Heinrich Brockmann-Jerosch Switzerland; Willis Linn Jepsen, USA; George E. Nichols, USA; George Fuller, USA; Alfred

who had hosted the first excursion in England in 1911, Paulsen of Copenhagen, Rubel and Stomps of Zurich, von Tubeuf of Munich, Druce of Oxford, Klebs of Heidelberg and others joined seven American scientists in Lincoln to see virgin prairie, representative of the Great Plains. They debarked their train at the Burlington station dressed for fieldwork with well-worn khakis, heavy shoes, botanical equipment, and Tansley himself in research helmet. They came away disappointed, believing the area was totally under cultivation. Avery, instead of arranging for Frank or Earl Eager to take the luminaries to the nearby Eager native prairie on West Superior Street, scheduled furniture retailer William E. Hardy, department store founder Jack Miller, two faculty members and himself to drive the visitors around the city in cars. Governor John Henry Morehead, a Democrat, confessed to knowing little about botany and told the group at a luncheon about Nebraska roads, after which Dean Bessey got the subject back on track by introducing the Englishman Tansley, who lamented that Nebraskans were doing nothing to preserve their prairies for posterity. Some of the scientists slipped away from an afternoon lantern show "entertainment" to explore the Lincoln salt bottoms before the group's train departed Lincoln at 6 p.m. that evening.⁶⁰

Soon after the death of their father Amos in 1932, Frank and his mother sold their share of the Middle Creek property to Earl, who owned it alone until his death in California in 1962. His California heir, Earl ("Gus") Eager, who attended Northwestern University medical school and located his practice in Merced, later sold the Middle Creek property to Weston Furrer of Lincoln, who had been its farm manager under his father's ownership.

Dachnowsky, USA; Edith S. Clements, USA. Organizers: Henry Chandler Cowles and Frederic Clements, USA. See

http://en.wikipedia.org/wiki/International_Phytogeographic_Excursion, accessed November 22, 2011.

⁶⁰ "European Scientists Pay Visit to Lincoln," *Lincoln Daily News*, August 9, 1913, 8. In a somewhat different list from that above, the newspaper notes the presence of G. Claridge Druce, Oxford; F. J. Lewis, Edmonton; and G. J. Tanfilief, Odessa. According to the American Memory project of the Library of Congress (which has yet another list), Dean Bessey again got the party on track in subsequent days as he showed the travelers, in 108-degree heat, the effects of intensive cultivation and grazing in the Sandhills (At least according to one account: see <http://memory.loc.gov/ammem/collections/ecology/aeps6.html>, accessed November 22, 2011.) The Sandhills would not have been a new experience to excursion organizer H. C. Cowles of the University of Chicago, who began his teaching career at Gates College in Neligh, Nebraska, which he left after trying to uphold academic standards against student plagiarism. See Victor M. Cassidy, *Henry Chandler Cowles: Pioneer Ecologist* (Chicago: Kedzie Sigel Press, 2007) 22. And where was Frederic Clements, co-organizer of the excursion, on the day it came to his hometown of Lincoln? The newspaper does not note his presence or his leadership. Perhaps he and his wife Edith left the party to visit E. G. Clements, Frederic's father, with whom they had lived when first married, at 646 North 13th Street. At the site today stands Morrill Hall. Or they had gone ahead to their Alpine Laboratory at Pikes Peak to prepare for the arrival of the visiting botanists, who would remain there for several days.

Although most of the Eager property was terraced in the 1960s and put into grain production (milo), like all property in Section 1 it was rocky and ill suited for farming. Wes Furrer and his wife Winnie gave it the name "Rocky Hill" and planted trees on it in the mid 1980s with the assistance of the local Natural Resources District and forester Richard Lodes.

They spared the far southeastern corner. These seven acres of the property, like most of the former Schramm property in Section 1 and a twenty-five acre parcel in the adjoining section to the south, are still native prairie, unplowed since the Otoe-Missouria tribe's cession of its prairie land to the United States.⁶¹

Until his death in 1960, Frank Eager lived at 1948 Sewell Street, only a few blocks from the Lincoln home of Joseph Alexis. Frank Eager was a member of the Lincoln Country Club, the Rotary Club, the Chamber of Commerce, U.S. War Veterans (state chairman), the University Alumni Association, BPOE, Masons, Shriners, the Nebraska State Historical Society, and First Plymouth Congregational Church.⁶² He lectured, organized and led parades, made broadcasts, and wrote on the history of the Spanish American War and other conflicts. A Populist and Democrat, he brought his own views and unique experiences into his works. He was a civic booster nonpareil, raising money and enthusiasm for streets, paved roads, the Ashland water works, the University, and hospitals. He worked with Goodhue architects on planning the current Capitol. He led the effort to raise money for a new hospital wing at Bryan Memorial Hospital, simultaneously publicizing its naming after Bryan.

Earl Eager, his wife Marie and their children lived for many years at 2035 South 18th Street, only a block from Joseph Alexis and his family. Marie Eager was active in the First Christian Church and the couple was socially prominent in the newspapers of the day. They entered young Earl Benjamin ("Gus") Eager in the Nebraska State Fair's better baby contest. Early on, Earl Eager served occasionally on his brother's civic

⁶¹ The Otoe-Missouria were paid 42.6 cents an acre in 1854 for land that included Section 1, Middle Creek precinct. One hundred and one years later, a federal Court of Claims ruled that the tribe should have been paid \$1 per acre. See David J. Wishart, *An Unspeakable Sadness: The Dispossession of the Nebraska Indians*, (Lincoln: University of Nebraska Press, 1994) 241.

⁶² Quite unknown to me before I wrote this, my life coincidentally tracked that of Frank Eager, two generations later. I grew up near Davey less than a mile from the Eager homestead, attended a one-room country school (my mother attended grade school on the same Garr Creek site as Frank Eager), graduated from the University of Nebraska where I minored in military and naval science (ROTC was a requirement at the time), shipped out of San Francisco on the *USS Rainier* for the Philippines, traveled to Manila through the site of the battle where Frank Eager was wounded, made a port call at Nagasaki on the *USS Arlington*, became a Nebraska state government official, and married at First Plymouth church (for which Frank Eager had been a fund-raiser as well as member). Decades apart, my path likewise crossed with that of Joseph Alexis, a fellow Swedish-American, who wrote in *Deutschland Heute* of a student visit to the Freie Universität Berlin, where I took a degree.

committees, but Earl and Frank became estranged. Earl never tired of being asked to recount his remarkable football, basketball, and baseball stories.

Other Owners In and Around Section 1, Middle Creek Precinct

Joseph and Jane Quackenbush were 19th century Nebraska pioneers who settled in the 1870s on the eastern edge of Section 1. They owned the northeast quarter of the section. The Quackenbushes located their farmstead, probably the first built on Section 1, below a spring on the north side of the creek that runs toward the east. By 1900 their son John and his wife Fannie were also living on the site with their own children. They accessed their property via a dirt road that once ran between West Fletcher and West Superior on Section 1's east border. Some of the Quackenbush farm buildings are still visible in a 1949 aerial photo.

The Quackenbushes were members of the thriving Lancaster County Farmers Club, which met around the turn of the century at members' farmsteads with noontime feasts and afternoon music, literary readings, and educational lectures on farming practices. Within a few miles in Oak, Elk, and West Lincoln precincts lived the Mann, Paswater, Cheney, Drain, and other member families. The meetings sometimes attracted dozens of farmers, who were fed and entertained under tents erected on members' farmsteads. The Farmers Club debated the merits of such questions as threshing small grain from shocks or from stacks, and the best ways of handling and curing tame hay.

Joseph Quackenbush once led a club discussion on his experience with the cultivation of an orchard he attempted on Section 1 of Middle Creek. He advised it was not profitable but a pleasure to plant and cultivate the trees and a luxury to eat the rare fruit.⁶³

Farmers Club members Matthew and Lucy Cheney, originally from New York state, had been witnesses in 1869 to the laying of the cornerstone of the first University of Nebraska building, followed by a banquet at the State Capitol; they were so impressed with the area and its people they decided to settle in Lancaster County just east of Middle Creek precinct.⁶⁴ Matthew Cheney, a captain in the Civil War who fought at Gettysburg, joined in club discussions with other settlers who were Civil War veterans. He was also a Nebraska state senator from 1878 to 1880. Lucy Cheney, a former teacher, and club colleague Virginia Drain were members of the Daughters of the American Revolution and assisted with the literary discussions of the club.⁶⁵

⁶³ "Happy Farmers: Members of the County Club Meet for Enjoyment," *The Nebraska State Journal*, April 16, 1901, 4.

⁶⁴ At the northeast corner of what is now NW 48th Street and West Adams.

⁶⁵ Another member and founder of the Deborah Avery chapter of the DAR in Lincoln was Laura Biddlecome Pound, mother of Roscoe, Louise, and Olivia Pound. Roscoe Pound became a friend of the Cheney's son Luke at the University of Nebraska Latin (Prep) School; in 1898 Pound published the historic *Phytogeography of Nebraska* with Frederic Clements.

Club member Andrew Drain was a lieutenant colonel in the Civil War and, with wife Virginia, operated the Lancaster County poor farm, three miles northeast of the Quackenbushes in Oak Precinct. One can only imagine the diverse scene at the poor farm when the Drains hosted their neighbors. The Drain's son James became a lawyer in Washington, D.C., and in 1908 as president of the National Rifle Association and publisher of the periodical *Arms and the Man*, he established the main NRA offices in Washington to establish closer political ties to Congress.⁶⁶

Despite the Club's pleasant talk of orchards and haying, the early settlers had memories of prairie fires and grasshopper plagues. Lucy Cheney remembered a prairie fire that swept all before it in 1872, including settlers' homes and livestock, but a lucky shift in the wind spared their farmstead. Prairie fires were not uncommon. She and Matthew had travelled westward through Middle Creek precinct to Seward earlier that year to attend a wedding and reported seeing no trees or even bushes all the way to Seward. But around their farmstead she reported antelope, deer, and the tracks of bison.⁶⁷

Grasshoppers had devastated the whole state in 1874. The ruin of crops and settlers' dreams was in contrast to the Nebraska horticultural idyll described and promoted by Nebraska political leader J. Sterling Morton, who promised settlers an Elysian paradise.⁶⁸ Lucy Cheney described dead grasshoppers blowing up into windrows across the fields.

Luke became a judge in Stockton, Nebraska. The Pound family's maid, Emma Bates, married John O'Connell, who farmed three miles north of Nine Mile Prairie. Emma was so impressed with how Laura Pound educated her children that she attempted to emulate the Pound family in raising her own children, according to her son Frank O'Connell in his 1962 memoir of turn-of-the-century Lancaster County life, *Farewell to the Farm*. Laura Pound offered comfort and advice on the death of John and Emma's son Everett. U.S. Army Colonel Frank O'Connell became adjutant of the American Legion in Nebraska, director of the Nebraska Game, Forestation, and Parks department for fifteen years, and was founder and editor of *Outdoor Nebraska*.

⁶⁶ James Drain was also a member (and captain) of the U.S. shooting team at the 1908 London Olympics. See <http://www.usashootingnngb.com/alumni/officials.html>.

⁶⁷ Julius Sterling Morton, *Illustrated History of Nebraska*, Volume II. (Lincoln: Jacob North & Company, 1906.) 603.

⁶⁸ J. Sterling Morton engaged in a titanic legal battle -- eventually resolved against him by both the Nebraska Supreme Court and the U.S. Supreme Court -- over "salt lands" two miles east of Matthew and Lucy Cheney's farmstead. Morton claimed the lands as his own. His son Joy Morton went on to find better salt sources in other states and founded the Morton Salt Company. But the legal defeats over the Lancaster County salt lands became a liability for Democrat J. Sterling Morton in his unsuccessful 1884 gubernatorial race, when Republicans accused him of trying to steal the lands. In an unusual move, Nebraska Supreme Court judge George B. Lake came to Morton's defense during the campaign with a letter to Morton indicating he was not guilty of any fraud or deception. In his 1942 biography of J. Sterling Morton, historian James C. Olson uncharacteristically fails to note a

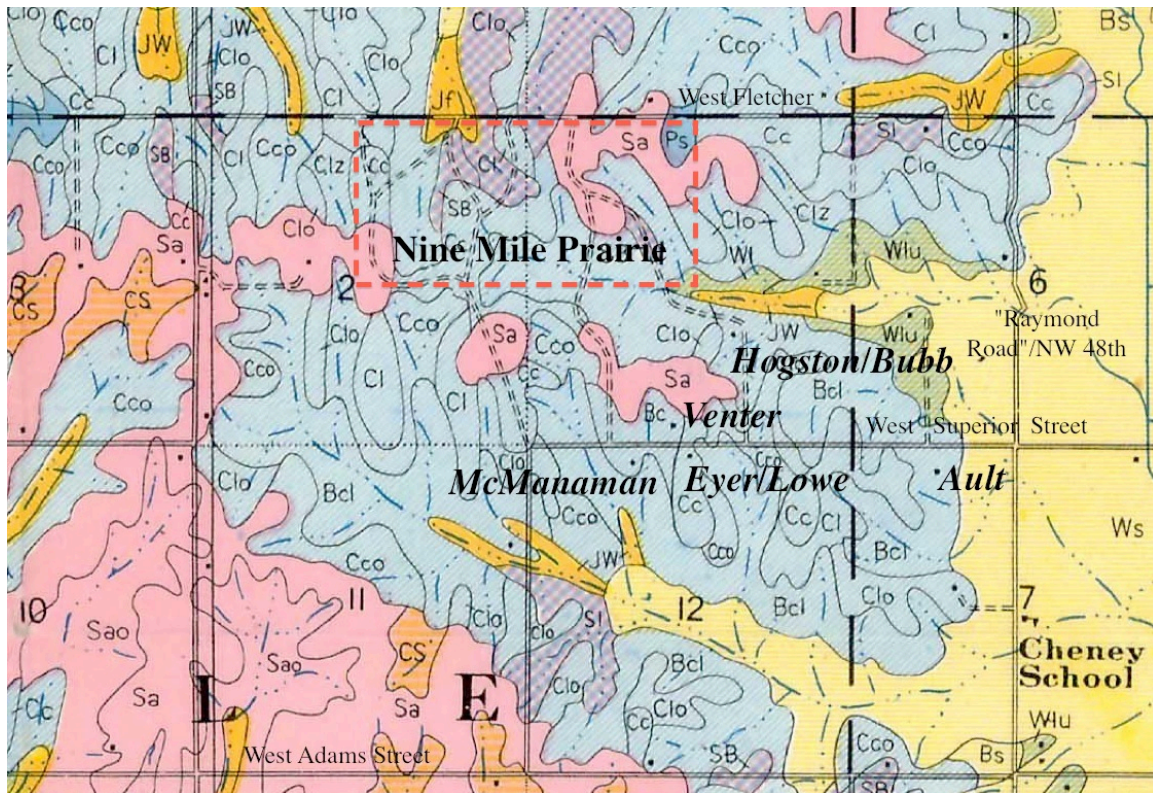
A part of the Cheney's property a half mile east and a half mile south of Section 1, on the east side of the Raymond Road (now NW 48th Street) became the site of the District 18 public elementary school, called the Cheney School. For several decades it was the school for Section 1 children and their neighboring schoolmates from across West Superior.

In 1900, according to census records, the Hogston daughters Ione, Hazel, and Ruth from Section 1 attended the Cheney School. In 1920, so did the Bubb daughters Alberta and Nora and the several McManaman children. They would have walked to and from school (as was the custom) along West Superior, a dirt road that provided access to their farm lanes. Nora Bubb and Anthony McManaman completed 8th grade together in 1923. Nora became a teacher herself in Battle Creek, Nebraska, in the 1930s.⁶⁹

reason why Judge Lake may have written the exoneration: the judge's daughter Carrie was married to Sterling's son Joy Morton. Cf James C. Olson, *J. Sterling Morton: Pioneer Statesman, Founder of Arbor Day* (Lincoln: University of Nebraska Press, 1942, reprint 1972) 309.

⁶⁹ At the turn of the century, the Ellis T. Hartley family lived a half mile south at the corner of what is now NW 48th Street and West Adams. Hartley was an early superintendent of the Lincoln public schools until changing careers to become an orchardist at the family farm and other sites near Lincoln. His children Carl, born in 1887, and Faye, born in 1888, attended the University of Nebraska where they studied botany under Professor Charles Bessey and trained in experimental ecology under Professor Frederic E. Clements and his wife, Dr. Edith Schwartz Clements, at the Clementses' summer Alpine Laboratory at Pikes Peak. Faye co-authored the University Song "Our Nebraska" and was a director of The College Equal Suffrage League, whose members included Louise Pound and Grace Bryan, daughter of W. J. Bryan. Faye Hartley, as editor of the *Daily Nebraskan*, called early attention to the works of Dorothy Canfield and Willa Cather. Carl Hartley completed a Ph.D. at Berkeley, California, worked for the Dutch government in Java, and became a leading forestry expert for the U.S. Department of Agriculture. His work on tree diseases of the Great Plains, in 1918, was the first of its kind.

Figure 2. Location of the Cheney School, with Section Lines, Roads, Trails (double dotted lines), and Farmsteads (dots). Adapted from undated soils map, circa 1920s.



Comings and goings along West Superior sparked a romance between Grace McManaman, age 20, and Dewey Eyer, age 24, who lived just up the hill to the east of the McManamans, on the south side of West Superior. They were married in 1922. But before the McManaman family could add the Eyer property to their growing estate through marriage, Dewey's father Benjamin died. His mother Hattie sold out in 1925.⁷⁰ One of the Eyers stayed near the home place: Dewey's brother Russel married Jennie Ault, another girl on West Superior, and raised a family on the Ault farmstead a mile to the east, in the middle of what is now Arnold Heights.

Across West Superior northwest of the Eyers, in Section 1, lived Wayne and Rose Venter and their two children. Young Venter, in 1917, had traveled to Council Bluffs, Iowa, with Miss Rose Vanicek of Ceresco, to get a marriage license. A Lincoln newspaper felt obliged to report, "The bridegroom evinced some concern lest news of his wedding should get into the paper, but the officials at the court house were unable to give him any assurance of suppression."⁷¹

⁷⁰ Local farmer Lawrence O. Rolofson raised Poland China hogs and Holstein cattle on Mrs. Eyer's farm, but sold his stock at auction in 1922 and moved to Cairo in Hall County. In 1973, he was killed in a tractor accident near Cairo, Nebraska.

⁷¹ *The Lincoln Daily Star*, July 10, 1917, 5.

Richard F. Lowe, a 1906 German immigrant and hired man for August Deinert, a neighbor a mile south and a mile west, bought the Eyer property in 1925 and began a family of two daughters and a son with his wife Alona. Her baked goods and bedspreads won prizes at the Nebraska State Fair. But the Lincoln Joint Stock Land Bank, part of the tax-exempt land bank system, took the Lowes to court in 1934, at the depths of the Depression; the family relocated to another farm south of Lincoln. Their son Harold Lowe, a U.S. Army sergeant who attended District 18 school as a child, fought against his family's former countrymen in World War II in Normandy, Belgium, and Germany. Sgt. Lowe was badly wounded and awarded the Bronze Star. Meanwhile, due to a resurgence of the economy as a result of the war, the Lincoln Joint Stock Land Bank sold its foreclosed farms more quickly than anticipated and paid off investors early.⁷²

In mid-twentieth century the southwest corner of Section 1 (and the adjacent quarter section south of West Superior) became the property of Virginia and Merrill R. Reller. Virginia was the daughter of John C. Price, of the Lincoln Joint Stock Land Bank, and leader of the Nebraska Republican Women. Once pasture for the McManamans, the Rellers likewise put cattle on the property. With a new dam across the stream flowing to the south, an impressive farm pond became a favorite (and jealously guarded⁷³) fishing site for the Rellers, who also provided public-pay access to stocked fishing in small lakes they owned north of Lincoln.

Merril Reller was a Lincoln attorney who was briefly famous nationally in 1958 as the lawyer for Caril Ann Fugate, Charles Starkweather's fourteen-year-old companion on a murder spree across Nebraska and Wyoming. Fugate's own mother and family had been among the victims. She sobbed uncontrollably on Reller's shoulder at her conviction. Sometimes a Republican candidate for local office, Reller also traveled the globe as a big game hunter, making several trips to East Africa and recounting them on KUON TV, Lincoln's public television station. Merrill Reller died in 1968, after which Virginia Reller's farm manager had trouble keeping their cattle fenced in. In 1974, the absentee farm manager for the big game hunter's widow ran a lost-and-found ad to recover local domestic stock of uncertain breed, somewhere along West Superior:

Strayed - 5 head yearling cattle, steers & heifers, could be black Hereford or Charolais cross. Have yellow ear tag in ear, branded on left shoulder, approx weight 500 lbs. Vicinity Reller pastures, west of Arnold Heights area...

⁷² W. E. Barkley, president of the bank and husband of one-time Dean of Women Edna Barkley, later gave a \$30 million dollar fortune to the University of Nebraska Foundation but as a separate trust, the investments of which are still instrumental in Lincoln financial circles.

⁷³ Interview with Arthur Eilers of Malcolm, Nebraska, August, 2011.

West Superior to this day remains a narrow road, intersecting native prairie on both sides, for a quarter mile west of the Lincoln city limits. It was blocked during and after World War II, first as a prohibited west entrance to military air base housing and then as forbidden access to the municipal airport, to prevent pilfering of leftover surplus war property. Earl Eager petitioned the Lincoln city council in 1948 to open the road to the east so as to permit farmers to access his property, but the council declined. Thick with deer and turkeys, but devoid of country school children, it remains blocked against cut-through traffic to and from Lincoln's Arnold Heights subdivision.

A Conflicted Past, a Cooperative Future

Section 1 of Middle Creek precinct has witnessed more than a century of conflicts: between bankers and farmers⁷⁴; between neighbors about fences; between a future of trees or grasslands; between agriculture and national defense; between fresh water and salt water; between people and blizzards, grasshoppers, and fires; between plowshares and rocks.

There were other conflicts. Ethnic and religious tensions surrounded Section 1 when it was first settled. Historically, it was an Irish stronghold. The east half of Nine

⁷⁴ The Section 1 property now owned by Joseph Alexis' descendants typifies the farmer-banker conflicts of the 1920s and 1930s. Ownership changed among Roscoe Anderson, Mary Haslam, Benjamin and Christina Mattice, Thomas Eckery, and Gertrude Wagener, whose family lived on the property as owner until a sheriff's deed transferred it back to Eckery. It was financed in these years by mortgage holders Folsom Bros., the Lincoln Joint Stock Land Bank, the Federal Land Bank, and the Land Bank Commissioner. Only in 1942, when Ralph Densberger purchased it, did it return to financially stable ownership. Densberger, however, became caught up himself in a subsequent land development scandal perpetrated by Commonwealth Savings and Loan owner S. E. Copple and his sons, Marvin and Newton Copple. Densberger, a good-hearted farmer with an infectious laugh, who during the Depression and after had helped many families, lost his life savings. In bad health, he ended his life in July, 1985. The eighty-acre parcel directly south in Section 12, across West Superior, has a similar unfortunate history. After the Lincoln Joint Stock Land Bank foreclosed on Richard Lowe's family, it received a sheriff's deed for the property and refinanced it twice through the federal Reconstruction Finance Corporation before selling it to Mabel A. Bauers and husband Carl in 1943. The Bauers lived on the farmstead (the last family to do so) and in 1950 sold the property to Floyd Flader (son of Tilman Flader) and family, neighbors to the south on West Adams Street. Hub Hall Realty bought the property in 1980 in anticipation of a development plan drawn up by Commonwealth. The State of Nebraska shut down insolvent Commonwealth in a 1983 scandal that also brought down the State Banking Director, Paul Amen, who was fired, and the State Attorney General, Paul Douglas, who was impeached. (The author recalls flying, by coincidence, to Washington in October, 1983, with Paul Amen, once a fellow department head in state government, as Amen tried to find a federal agency to intervene and rescue Commonwealth. "This will be messy beyond anything ever seen in Nebraska," Amen predicted without naming the institution, "There's never been anything like it.") In the aftermath, the West Superior property was purchased, and is still owned, by Professor Stanton Harn of the College of Dentistry.

Mile Prairie was owned by Irishman Thomas Farrell, who sold it to the proudly Irish (County Mayo) McManamans before Frank Schramm acquired it. The star-crossed Smiths and Bridget Ryan, who owned the east half of the southeast quarter, were Irish, as were Julia Donnelly and Thomas McGranahan, who sold it to the Eagers. The McManaman farmstead across West Superior from Section 1 was previously owned by Irishman Patrick "Patsy" Mears. The Mears family also owned the eighty acres directly south of the Eagers'.

Patsy Mears, a well-known construction contractor who assembled hundreds of teams of horses and mules to build railroads in Nebraska and Kansas in the 1880s and 1890s, was a dedicated member of the Irish National League and represented its Lincoln chapter at the League's 1891 convention in Chicago. In the Lancaster County election of 1893, he drew a knife on candidate Fred Schmidt, of German heritage, when he learned that Schmidt had signed a pledge circulated by the American Protective Association that he would not, if elected county clerk, hire a Catholic. The APA was dedicated to placing "Americans and Protestants" in office. Mears sheathed his knife when friends told him that Republican Party workers, their common opponents, had lured Schmidt into unwisely signing the pledge. Mears took to heart a comment from a prominent German that there were more Germans than Irish in the county and "they don't draw the line of nationality unless it is forced on them."⁷⁵

The people of Section 1 played out roles in an even greater struggle that continues to influence the nation today: Morton versus Bryan. J. Sterling Morton envisioned Nebraska as a tree-covered state, like the forested states where he had grown up. In that sense, tree-planters Quackenbush, Schramm, and Furrer (and the local Natural Resources District) are his disciples. But Morton was more than the founder of Arbor Day. He was deeply conservative, a Democrat who had opposed abolition and, after the Civil War, opposed the Freedmen's Bureau. He was a railroad lobbyist and defender of the gold standard. He served controversially in Grover Cleveland's second administration as Secretary of Agriculture. He was bitterly opposed to William Jennings Bryan and repelled by Thomas Tibbles.

Among the people of Section 1, the role of Bryan disciple in the Morton-Bryan struggle is cast to Frank Eager, who employed Tibbles and was a Bryan enthusiast. Frank Eager was the parade marshal for welcoming Bryan home to Lincoln on the eve of election day, 1908, the last of Bryan's tries for the presidency. On Bryan's arrival at the train depot, Eager led him down P Street (which he was developing) in a fireworks and searchlight parade.⁷⁶ Bryan lost three presidential elections, but he changed the Democratic Party forever, away from the Morton wing of the party, and later served in Woodrow Wilson's cabinet as Secretary of State and leader of the party's progressive wing.⁷⁷

⁷⁵ *The Evening News* (Lincoln, Nebraska), November 7, 1893, p.1.

⁷⁶ "Bryan Plea Follows Parade," *The Nebraska State Journal*, November 3, 1908, 2.

⁷⁷ An issue on which Morton and Bryan agreed was U.S. imperialism; both were against it. When Morton tried to lead on the issue against the McKinley administration, he found

A less consequential difference of opinion arose in the 1930s and 1940s about the chance that oil might be found under Section 1. Professor Schramm, the geologist, said if oil was to be found in Nebraska, it would be in the west, not the east, where, he joked, any finds were likely to be leaks in cities from oil tanks.⁷⁸ Nevertheless, Merrill Reller and Ralph Densberger granted oil leases on their properties, as did the Lincoln Joint Stock Land Bank and Floyd Flader, son of Tilman, across West Superior to the south, on the former Lowe and Mears properties. Time has proved Professor Schramm right. Frank Eager got into the oil business in a more practical way in 1938, forming the wholesale and retail Power Oil Company in Lincoln with his adopted son George.⁷⁹

Serious disputes associated with Nine Mile Prairie in more recent times involved the University of Nebraska and the papers of Frederic Clements and John Weaver. Clements was among NU's most famous and accomplished graduates; Weaver was his disciple and gained renown on the NU faculty as the greatest expert on North American prairies. It was under Clements' leadership and funding through the Carnegie Institution (where Clements worked from 1917-1941) that Weaver did much of his research, including that on Nine Mile Prairie.

After Frederic Clements' death, his widow Dr. Edith Schwartz Clements, herself an NU graduate and the first woman to whom the University awarded a Ph.D., offered the Clements papers to their *alma mater*. Incredibly, the University turned down the offer. B. W. Allred of the U.S. Soil Conservation Service, co-author of *Dynamics of Vegetation* with Edith Clements, recounted in a letter to a colleague that NU was saving its shelf space for unnamed ecologists on its faculty who were about to retire.⁸⁰ This is a possible reference to Weaver or to Dr. Raymond Pool, another Clements protégé. The huge collection, which includes much of the early history of the discipline of ecology, went instead to the American Heritage Center at the University of Wyoming.

Bryan already out front. Which leads to one of many paradoxes in the life of Frank Eager, who seems proudly to have fought the unapologetically imperialistic Philippine American War (after the Spanish America War had concluded). On the death of Theodore Roosevelt, Frank Eager lauded Roosevelt's foreign policy record, against which Bryan ran in 1908. In the July-September 1943 edition of *Nebraska History*, he speaks well of the Spanish American War. It was not the only paradox in Frank Eager's life. A populist, he once opposed paying minimum wage on a City of Lincoln water project.

⁷⁸ "Schramm Says Best Prospects for Oil In West Nebraska," *The Lincoln Star*, February 2, 1931, 2.

⁷⁹ George Eager, son of Frank, raised a herd of bison on the family homestead near Davey in the 1970s. Fences, as always, remained an issue. The beasts of the prairie broke down the fences and were not popular with the neighbors.

⁸⁰ Letter of B.W. Allred, Box 20, Edith S. and Frederic E. Clements Papers, Collection Number 01678, American Heritage Center, University of Wyoming.

John Weaver's own papers did not find a home at NU, however. Weaver was never fully comfortable on the NU faculty. In World War I, he had been a conscientious objector, for which he endured much criticism from his colleagues and the greater community. In a dispute with NU over his retirement status at the time of his death in 1966, Weaver instructed his son, viticulturist Dr. Robert Weaver of the University of California - Davis, to burn his papers and to see that all stakes and markers at his research sites were removed. This has made it difficult for subsequent ecologists to replicate Weaver's work, let alone locate the sites of the research in Section 1 and perhaps in nearby areas now owned by the Lincoln Airport Authority.



John Ernst Weaver, Ph.D. (photo credit Nebraskaland Magazine)

More recent researchers within the University have been frustrated that the institution has not done more to build upon the heritage of its great botanists and ecologists: Bessey, Clements, Weaver, and Pool. After the University acquired Nebraska Hall (the former Elgin Watch building), a large federal grant renovated space in the building to provide ideal conditions for the Bessey Herbarium and its huge collections.⁸¹ But the herbarium has languished as a low priority; funding has been cut and it is now maintained by volunteers and by undergraduate students on work-study support. As in the case of the lost Clements and Weaver papers, the opportunity is passing for the University to create its new research-oriented Innovation Campus ("Food, Fuel, and Water") in acknowledgement of the institution's remarkable but increasingly forgotten and neglected heritage.

Conflicts and differences still arise in Section 1. The City of Lincoln proposed in 2010 to zone much of the eastern half of the section for housing development, which

⁸¹ The Bessey Herbarium contains over 300,000 specimens, many collected by such world-class botanists as Roscoe Pound, Frederic Clements, and Per Axel Rydberg.

would about Nine Mile Prairie.⁸² But in 2011 it backed away, not only leaving the city limits at the eastern border of Section 1, but also protecting threatened and endangered species in the area with a special designation. The decision helps preserve, at least for the moment, over 12,000 trees that were planted by the Natural Resources District on the section's southeast parcel, and preserves its seven acres of native prairie. A special designation may also save a viewshed corridor from the prairie heights toward the State Capitol.

More than a century of conflict may be yielding to an era of cooperation. It is noteworthy that the University, one of the few⁸³ institutions Schramm, Alexis, and the Eagers shared in common, has in the twenty-first century stepped in to buy most of the southwest quarter of Section 1 in order to protect Nine Mile Prairie from development encroachment.⁸⁴ The west half of that quarter is now a University obstacle course, which explains the curious structures amid what was once part of the McManamans' farm, before they lost it, and the Rellers' pasture.

⁸² Placing housing adjacent (or within one-half mile) to a prairie would limit the ability of prairie managers to use fire to preserve and restore. Housing also would inevitably bring domestic cats onto the prairie, which would decimate native birds.

⁸³ Although the three owners and their families participated in different social and political circles, they knew each other well through the University. Joseph Alexis was once the main speaker for Frank Schramm's Knife and Fork Club. They both lectured at University Week, a public showcase featuring students and faculty. According to a University chronicler, "In the Thirties the University community was relatively small...and the faculty knew one another intimately." See Knoll, *Prairie University*. That may have led to discussions of ways and means to acquire farm property cheaply. They also shared a common desire not to let their properties fall into the hands of others whose use of the land would not meet their approval. Frank Schramm had no choice other than to sell to the U.S. government, but the Alexis property is still in the hands of the Alexis descendants and its management as pasture has not changed for decades. Earl Eager put his Middle Creek land into trust at his death with restrictions on its sale, and Frank Eager did the same with the original Davey homestead, according to those who later bought the properties.

⁸⁴ Section 1 is threatened by those who see in it potential acreages, which would degrade Nine Mile Prairie ecologically as well as diminish the view over woods and prairies toward Lincoln. The writer Lisa Knopp found the view already impeded by an "enormous, rather new house," located just west of the Alexis pasture on the eighty once owned by secretive Wayne Venter and his bride Rose in the 1920s. House Beautiful, it looks poised for the arrival of a suburban bridge club, not a farmers' club. Its long driveway covers the prairie with a strip of asphalt over a quarter mile long, and the driveway's row of city-style streetlights, when illuminated, destroys the nighttime prairie's darkness. The owner died in an accident while mowing the property, which is now owned by the University. Inasmuch as no one now lives on Section 1, the Lincoln Electric System has routed a high-tension line across it with few objections, obstructing the view of Lincoln from the prairie heights. The lack of strong objection from the University did not go down well with local environmental organizations, which wanted the prairie protected. LES also has located a sub-station on the power line, one half mile south, the nighttime illumination of which is a source of area light pollution.

The University managers of Nine Mile Prairie, led by Professor David A. Wedin, are currently working with the owners of the adjacent northeast quarter, once the Quackenbush property that separated the hostile Hogstons and Smiths, to put 160 acres into the Conservation Reserve Program as part of a prairie restoration project.⁸⁵ Surveys of flora and fauna are underway throughout the Nine Mile Prairie environs.

These efforts may become part of a larger plan to protect most or all of Section 1 of Middle Creek precinct as part of the Nine Mile Prairie environs and its unusual natural resources, of which its human history is an indelible part. Currently the section is uninhabited; all is grassland, wetland, or forest. But a successful plan will take a common vision and uncommon cooperation among all the current landowners and local governments.

Frank Schramm is buried in Oklahoma. Members of both the Alexis family (Joseph and Marjorie and others in the Alexis and Odman families) and the Eager family (Amos, Minerva, Frank, Bertha, Earl, Marie and others) are buried not far from each other in Wyuka Cemetery in Lincoln. Wyuka is also the resting place of the Quackenbushes (Joseph, Jane, John, and Fannie), their Farmers' Club neighbors Lucy and Matthew Cheney, and of Jennie Ault and Russel Eyer, who courted decades ago along West Superior.⁸⁶

Thus concludes an attempt to look at history through a geographical quadrant, reconstructing a community whose relationships begin to appear more clearly when examined by connections to the land itself. I hope it is useful in both method and content.

--Jon H. Oberg, 2013

⁸⁵ Currently owned by the heirs of Donald Urbanovsky, who through a scholarship program support Czech language instruction at the University. The confluence of historic ownership in the middle of Section 1 among descendants of Swedish, German, Irish, and Czech immigrants is a microcosm of much of Lancaster County.

⁸⁶ Wyuka Cemetery also is the site of the graves of others who appear in this narrative: Tilman Flader, Riley F. Uland, Mary S. and William H. Bubb, Mabel A. and Carl H. Bauers, Jack D. Obbink, C. George Kuhn, John H. Wacker, J. James Exon, William A. Poynter, May Pershing, Laura Pound, Louise Pound, Olivia Pound, Ellis T. Hartley, Carl P. Hartley, William E. Hardy, Edgar A. Burnett, Samuel Avery, Erwin H. Barbour, Olin J. Ferguson, Fred Schmidt, John P. Bratt, S. E. Copple, Newton Copple, Charles Starkweather, and Edna M. and William E. Barkley. Here also are the remains of the great scientists Charles E. Bessey and Frederic E. Clements.

APPENDIX D

Oberg Property - Bird Survey

June-September 2011

Data Collected by John Quinn and Amy Larson



CENTER FOR GRASSLAND STUDIES



Nine-Mile Prairie Environs Master Plan
APPENDIX D

OBERG PROPERTY

BIRD SURVEY

June-September 2011
 John Quinn and Amy Larson
 jquinn2@unl.edu and amerooski4@yahoo.com



During the summer and fall of 2012, thirty-six bird species (Table 1) were detected at six sampling points in five habitat types (Figs 1&2). Data was collected for ten minutes hourly, between 6am and 10am and at 9pm, with acoustic recorders from Wildlife Acoustics.

Species	Habitat Type				
	Agroforest	Pine	Prairie	Riparian	Wetlands
American Crow	X	X	X	X	
American Goldfinch		X	X	X	X
American Robin	X		X	X	X
Black-capped Chickadee				X	X
Blue Jay	X	X	X	X	X
Bobolink					X
Brown Thrasher		X			X
Brown-headed Cowbird			X		
Chipping Sparrow			X	X	
Common Nighthawk			X		
Common Yellowthroat			X		X
Dickcissel	X				X
Downy Woodpecker	X			X	
Eastern Kingbird			X		X
Eastern Meadowlark			X		X
Eastern Towhee					X
Eastern Wood-pewee			X		X
Field Sparrow	X	X	X	X	X
Grasshopper Sparrow			X		
Great Crested Flycatcher				X	X
House Wren	X		X	X	X
Indigo Bunting					X
Killdeer			X		X
Mourning Dove					X
Northern Bobwhite		X	X	X	X
Northern Cardinal	X	X	X	X	X
Northern Flicker	X				X
Red-bellied Woodpecker	X		X	X	X
Red-winged Blackbird					X
Ring-necked Pheasant			X		X
Spotted Towhee					X
Warbling Vireo					X
Western Meadowlark			X		X
White-Breasted Nuthatch			X	X	
Yellow Warbler					X
Yellow-billed Cuckoo					X

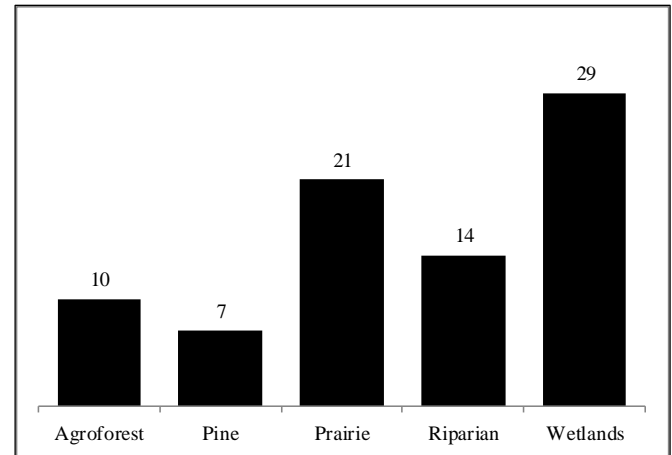


Figure 1. Bird richness in each habitat type

Figure 2. Sampling points, 2011



APPENDIX E

Record of Misc. Historic Documents Related to NMP



Summary
Prescribed burning at Nine-Mile Prairie
1979-2019

Since 2010, we have maintained nine large burn units at Nine-Mile Prairie with permanent mowed firebreaks. These firebreaks double as trails, and increase accessibility to the prairie for visitors, students, and researchers. The units range in size from 10 to 30 acres (average size of 22 acres).

We have records for prescribed fire at Nine-Mile Prairie dating back to 1979. UNL acquired it in 1983, so these early burns were done in cooperation with the Wachiska Audubon Chapter. Over these 40 years, grasslands at Nine-Mile Prairie have been burned, on average, every 3.8 years. We estimate there have been 99 prescribed fires since 1979.

In 2015 we began an instructional burn program for UNL students. We created approximately 20 small (<2 acre) burn units with mowed breaks. Since 2015, we have had a permit from the Lincoln-Lancaster County Health Department for instructional burns any time of year as long as weather conditions (including the Air Quality Index) were acceptable. From 2015-2019, we averaged 5 instructional burns per year, with an average annual acreage for instructional burns of 6.5 acres. These instructional burns have taught, on average, 31 students per year. In 2018 and 2019, these totals included students in the wildland fire “Red Card” certification class taught by the Nebraska Forest Service in cooperation with SNR.

We still attempt to burn 2 to 4 large units (e.g. 20 acres) each year, although we have fallen behind on larger burns in the last 5 years. The instructional burns are a great experience for our students, but, frankly, do not add up to many acres. We upgraded our prescribed fire capabilities in 2018 when we purchased a Kawasaki Mule equipped with a 60 gallon water tank and pump. The purchase of this \$15,000 unit was shared by the Center for Grassland Studies, Nebraska Forest Service, School of Natural Resources and the Department of Agronomy & Horticulture. We have also assisted with mowing fire breaks on UNL’s Campus Recreation land to the south, and Mrs. Joyce Urbanvosky’s CRP field to the east. Campus Recreation is interested in increasing the use of prescribed fire as a management tool. Counting prescribed burns on Campus Rec and Urbanovsky CRP land (burns conducted by other groups) over 410 acres have been managed with prescribed fire in the greater Nine-Mile Prairie landscape within the last decade.



June 7, 2013

Dwedin1@unl.edu

Assistant Chief Brian Jackson
Lincoln Police Department
575 S. 10th Street
Lincoln, NE 68508

Dear Chief Jackson,

Thank you for the opportunity to provide input in the planning process for the new LPD firing range and training facility. I am a professor in the School of Natural Resources and have been Director of Nine-Mile Prairie since 2007. Nine-Mile Prairie is managed by UNL's Institute of Agriculture and Natural Resources and is permanently leased from the University of Nebraska Foundation, the official owner of the property. Although Nine-Mile Prairie is open to the public, its main users are University of Nebraska staff and students for teaching and research. University research has occurred at the site since the 1920's, and several threatened or endangered prairie species are found there. As the state historical marker at Nine-Mile Prairie says, it is valued as a remnant of the once common tallgrass prairies of eastern Nebraska.

One of your proposed locations for the new LPD training facility is on Lincoln Airport Authority land north of Nine-Mile Prairie. Although the facility would be about 0.3 miles from Nine-Mile Prairie at its closest point, it would be 0.75 miles from the entrance to Nine-Mile Prairie and >0.5 miles from any of our commonly used paths. Because the proposed site is tucked in a valley between several ridges, it would not be visible from most of Nine-Mile Prairie. In May we arranged for tests to determine how loud firing at the proposed range site would be for users of Nine-Mile Prairie. Our concern was that noise from the range could have a negative impact on Nine-Mile Prairie users and visitors.

We conducted our noise impact tests on May 17, 2013 with half a dozen officers from LPD and seven staff and students from UNL. A summary of those tests is attached. Four observers at each of two locations on Nine-Mile Prairie rated the noise level using a 5 point scale as LPD officers fired 5 different weapon types at the proposed range site. The observers were diverse, including firearm users and non-users. Overall, the noise from the test firing were remarkably low: 42% of the test firings were rated as "noise not noticeable", 50% as "noise noticed but not disruptive", and only 8% as "mildly or moderately disruptive". Several factors contributed to this: the proposed range site is tucked in a valley, shots were fired to the northeast (away from the prairie), hills block the site from most of Nine-Mile Prairie, and background wind noise is common on the prairie. However, it is also important to note that the test results were dependent on the conditions of the test. Under other weather conditions, noise associated with the range might be more noticeable on the prairie.

Here's my assessment of the possible impacts on Nine-Mile Prairie of the proposed firing range. Most of the time, noise from the range would be faint, if noticeable at all. There would undoubtedly be times when the noise is more noticeable and some users might occasionally consider them disruptive. I am presuming those incidents will be rare. If this discussion involved one of Lincoln's more heavily visited public prairies, such as Wilderness Park or Spring Creek Prairie, I would set a higher standard for "noise pollution". However, Nine-Mile Prairie already has noise and visual impacts from military and civilian aircraft, a UNL outdoor recreation facility, a major regional powerline, and former nuclear weapons bunkers.

I recognize the need for LPD to find an isolated, yet reasonably convenient location for their new facility. I also recognize that the LAA has a responsibility to find appropriate uses for its land, which it manages on behalf of the public. The proposed LPD training site would utilize a piece of LAA land that is currently undeveloped and it would, in my opinion, be a compatible land use with the University's goals for Nine-Mile Prairie. One of my goals as Director of Nine-Mile Prairie is to work with public and private land owners surrounding Nine-Mile Prairie to encourage compatible land use that protects the open, natural qualities of the prairie while meeting the needs of diverse land owners. I believe that the proposed LPD training site, if designed and managed well, meets that goal.

Thank you again for the chance to provide input to your planning process. Good luck as you choose a new site for your training site and feel free to contact me if I can help in any way.

Sincerely,

Dr. David Wedin
Director, Nine-Mile Prairie
Professor of Natural Resources

Copy: John Wood (LAA), Bob McNally (LAA), Tala Awada (UNL), Archie Clutter (UNL), Keith Miles (NU Foundation)



February 1950 – construction of weapons storage facility

Legislature of Nebraska
Eighty-seventh Legislature
First Session
Legislative Bill 58
Final Reading

A BILL

FOR AN ACT relating to virgin prairie; to authorize any state agency or political subdivision to sell such property as prescribed. Be it enacted by the people of the State of Nebraska,

Section 1. The Legislature finds that:

(1) Examples of Nebraska's prairie soil in a condition which existed before the state was settled during the early part of the nineteenth century are becoming increasingly rare;

(2) Such virgin prairie is an important tool for scientists who seek to determine the highest and best use of Nebraska's soil resources;

(3) Such virgin prairie is an important part of botanical and zoological studies offered by institutions of learning in this state; and

(4) It is in the public interest that such virgin prairie which has been used as an educational tool by an educational institution of this state in suitable quantities be preserved and protected.

Section 2. When any agency or political subdivision of the state of Nebraska, except the Board of Educational Lands and Funds, owns land with virgin prairie as described in section 1 of this act, such agency or political subdivision may take action to establish the location and boundaries of such virgin prairie or a part thereof that may be preserved and protected. Such action shall be taken only after holding a public hearing with at least one week's advance notice of such hearing in a newspaper of general circulation in the county where the virgin prairie is located. Any such agency or political subdivision which has established the location and boundaries of such virgin prairie and which decides to sell such land may require the purchaser to enter into a covenant to continue to preserve and protect the area established as virgin prairie, and such covenant by its terms shall run with the title to the land binding future owners. In the event such covenant to preserve and protect the area as virgin prairie should lapse or be declared invalid or unconstitutional by any court of competent jurisdiction, the agency or political subdivision which sold the land or its successor in interest shall be afforded first option to repurchase the land at the current market value to be determined as if the covenant were valid and enforceable.

Section 3. No sale authorized under this act shall take place after July 1, 1983.

LAW OFFICES

CROSBY, GUENZEL, DAVIS,

KESSNER & KUESTER

LINCOLN BENEFIT BUILDING

134 SOUTH 13TH STREET, SUITE 400

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July 22, 1982

ROBERT B. CROSBY
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JAMES D. MCFARLAND
SCOTT J. NORBY

JACK M. PACE
OF COUNSEL

Mr. Ernie Rousek
385 South 56th Street
Lincoln, Nebraska 68510

Dear Ernie:

Re: Nine-Mile Prairie

Having been out of town on Tuesday and tied up with appointments all day yesterday I did not see the enclosed news item until last evening. You can bet it brought a big smile to my face.

I am hastening to use this letter to express my heartiest congratulations to you. You have every right to feel deep satisfaction and pride. Your work in preserving Nine-Mile Prairie has earned my admiration and respect.

I hope that you and others who have worked for Nine-Mile Prairie will remember the important legislative work of Senator Harold Sieck, who introduced the legislation and carried it to enactment, and of Senator Dave Landis whose help as a member of the committee was indispensable. Although the attorney for the Airport Authority insisted that the legislation had legal flaws, I am sure that the members of the Airport Authority were significantly influenced by the fact that the Nebraska Legislature would enact special legislation for Nine-Mile Prairie.

With highest personal esteem, I am

Sincerely yours,

CROSBY, GUENZEL, DAVIS,
KESSNER & KUESTER

By



Robert B. Crosby

RBC:ik
Enclosure

APPENDIX F

2014 Farm Bill Programs for Pollinator Conservation





United States
Department of
Agriculture

May 2015

Biology Technical Note No. 78, 2nd Ed.

Using 2014 Farm Bill Programs for Pollinator Conservation



May 2015

Cover photos: Clockwise from top left: Monarch butterflies feed on pentas (L. Pete Heard, USDA NRCS); Bumble bees on a squash blossom (Nancy Lee Adamson, Xerces Society); Blooming field border planting in Montana (Jennifer Hopwood, Xerces Society).

Photo credits are identified with each photo. The authors wish to thank the photographers who generously allowed use of their images. Copyright of all photographs remains with the photographers.

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Persons with disabilities who wish to file a program complaint, please see information above on how to contact us by mail directly or by email. If you require alternative means of communication for program information (e.g., Braille, large print, audiotope, etc.) please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Acknowledgments

The original technical note was produced jointly by the NRCS National Plant Data Center, Xerces Society for Invertebrate Conservation, and San Francisco State University in June 2008. Authors were **Mace Vaughan**, Xerces Society for Invertebrate Conservation; and **Mark Skinner**, USDA NRCS National Plant Data Center.

The passage of the 2014 Farm Bill precipitated an update to the technical note. The authors of the this update are **Anne Stine**, **Mace Vaughan**, **Nancy Adamson**, **Kelly Gill**, and **Eric Mader** of the Xerces Society; and **Casey Shrader**, State Biologist, USDA NRCS, Lexington, Kentucky; **Philip J. Barbour**, Wildlife Biologist, USDA NRCS, Central National Technology Support Center (NTSC); and **Hank Henry**, Wildlife Biologist, USDA NRCS, East NTSC, Greensboro, North Carolina; with assistance from **Jessica Groves**, Acting Director, Easement Programs Division (EPD), USDA NRCS, Washington, DC; **Sharif Branham**, Manager, Conservation Reserve Program, Biomass Conservation Assistance Program, and Healthy Forest Reserve Program Manager, Easement Programs Team, EPD, USDA NRCS, Washington, DC; **Gerry Moore**, Leader, National Plant Data Team, USDA NRCS, East NTSC, Greensboro, North Carolina; **Mark Parson** and **Natasha Brown**, Environmental Quality Incentives Program Specialists, Environmental Improvement Programs Branch, Financial Assistance Program Division (FAPD), USDA NRCS, Washington, DC; **Eric West**, Conservation Stewardship Program Specialist, Stewardship Programs Branch, FAPD, USDA NRCS, Washington, DC; **Rebecca Salazar**, Natural Resource Specialist, Programs Deputy Area, USDA NRCS, Washington, DC.

Contact Mace Vaughan (mace.vaughan@por.usda.gov) for comments or suggested revisions to this publication.

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Using 2014 Farm Bill Programs for Pollinator Conservation

Introduction

More than 30 percent of our food relies on insect pollination, which is overwhelmingly provided by bees. Honey bees are estimated to support \$15 billion in crop production, while wild native bees supply an estimated \$3 billion in pollination services. Native bees have declined due to habitat loss and use of pesticides, among other factors. The health of honey bees, our primary managed crop pollinator, has also deteriorated in recent years. Managed colonies of European honey bees have suffered a 50-percent decline in recent decades and face immediate threats from pesticide exposure, habitat loss, invasive diseases, and pests. These threats to beekeepers have led to unsustainable annual winter losses. Between 2006 and 2014, approximately one in three managed honey bee hives were lost each winter (<http://beeinformed.org/>).

Recent research has shown that wild native bees, which number more than 4,000 species in North America, contribute substantially to crop pollination on farms where their habitat needs are met. In some cases studied, such as squash production in New Jersey, native bees provided 100 percent of the necessary pollination. As securing hives of European honey bees for crop pollination becomes more difficult and expensive, protecting and restoring habitat for native pollinators becomes ever more important. This same pesticide-free habitat is also critical for helping to support local beehives and can help sustain beekeeping operations.

The Agricultural Act of 2014, otherwise known as the Farm Bill or 2014 Act, authorizes the USDA to undertake a broad range of incentive-based conservation programs on agricultural land (table 1).

The 2014 Farm Bill builds upon the 2008 Farm Bill and earlier rulemaking. Prior to the 2008 Farm Bill, the USDA established conservation of pollinator habitat as a goal of the Conservation Security Program (now the Conservation

Stewardship Program (CSP)) and a priority for the Conservation Reserve Program (CRP) State Acres for Wildlife (SAFE) practice. The 2008 Farm Bill made pollinators and their habitat a priority for USDA, and authorized special consideration when determining payments for practices that promote pollinator habitat during Environmental Quality Incentive Program (EQIP) implementation. Wild and managed (both native and introduced) pollinators are to be considered during the review or development of Farm Bill conservation practice standards. Most important of all, the 2008 Farm Bill authorized the Secretary of Agriculture to encourage “the development of habitat for native and managed pollinators; and the use of conservation practices that encourage native and managed pollinators” during administration of any conservation program.

With the 2014 Farm Bill, Congress again recognized that pollinators are a crucial part of healthy agricultural and natural landscapes. The 2014 Act retains all of the pollinator conservation provisions of the 2008 Farm Bill and adds targeted support for the creation of honey bee habitat. The 2014 Farm Bill condenses 23 conservation programs into 13 (see "[Comparison of 2008 and 2014 Farm Bill Programs](#)" on the NRCS Web site.), retaining all of the conservation practices that can be used to create or improve pollinator habitat.

This technical note—

- Outlines opportunities within current Farm Bill programs for NRCS field staff to help eligible producers implement conservation practices and activities that benefit pollinators, (see section: Field-level Opportunities).
- Identifies opportunities for NRCS State, area, basin, and watershed offices to support conservation of crop-pollinating native bees and provide habitat for European honey bees (see section: State-level Opportunities) by developing technical notes with State-appropriate plant lists, conservation program fact sheets, and other guidance documents for field conservationists.

- Summarizes the existing pollinator conservation guidance developed by and for most NRCS State offices in the United States.

NRCS programs focus on supporting habitat protection and creation that has multiple benefits for agriculture and surrounding environments. Protecting and creating habitat for native bees and honey bees also supports an array of other pollinators and beneficial insects, such as butterflies, moths, flies, beetles, and wasps, including predators and parasitoids of crop pests. Native bees have a keystone role in the healthy and complex food webs that support diverse wildlife, feeding other wildlife either directly or by producing many of the plants and plant fruits that sustain birds, mammals, and other wildlife. These conservation practices fundamentally protect watershed health, help improve water infiltration, and reduce runoff and soil erosion from farmlands.

In addition, the NRCS and Farm Service Agency (FSA) targeted \$3 million through EQIP and \$8 million through CRP in fiscal year (FY) 2014 to improve habitat for honey bees in the core honey bee-resting and honey-producing States in the Upper Midwest (North Dakota, South Dakota, Minnesota, Wisconsin, and Michigan). This is similar to a 2009 effort in California, where the California NRCS State office targeted approximately one-third of their Wildlife Habitat Incentive Program (WHIP) funding to pollinator conservation projects in the State. It is possible that such targeted efforts will continue, or even expand to address other critical or iconic pollinators in decline, such as the monarch butterfly.

Field-level Opportunities

Contracting pollinator conservation projects using current conservation practices under EQIP

Tables 2 and 3 provide details on how current EQIP conservation practices can be used to benefit pollinators, particularly crop-pollinating native bees and honey bees, as well as other beneficial insects (predators and parasitoids of crop pests). Pollinator conservation practices provide permanent or seasonal habitat to—

- Increase the abundance of pollen and nectar.
- Expand the availability of blooming plants through the growing season, ideally from early

in the spring (e.g., willow) through late fall (e.g., goldenrod).

- Add or protect potential nest sites.
- Provide refuge from pollinator-toxic pesticides.

Most of the conservation practices outlined in table 2 allow field office planners to include diverse flowering plants that provide sequential bloom through the growing season. Some practices allow for creation or protection of nest sites, such as snags, brush piles, or stable untilled ground for solitary bees, or small cavities (usually created by rodents) for bumble bees. Any practice that increases areas of pollinator habitat that are not exposed to pesticides or creates buffers to reduce pesticide drift will minimize harm to pollinators and other beneficial insects (see The Xerces Society publication *Farming for Bees: Guidelines for Providing Native Bee Habitat on Farms* for more information). Whenever possible, conservation planners should consider using native plants since native pollinators and other wildlife are adapted to them for food and shelter. However, for many farm landscapes, the inclusion of nonnative, noninvasive plants can be a less expensive and useful strategy. For example, NRCS is increasingly interested in supporting honey bees, as well as soil health. Planners should consider adding or diversifying cover cropping practices, or incorporating noninvasive forage legumes into pasture or biomass plantings to create temporary but high-value blooming crops. These practices will benefit managed honey bees in farm or ranch landscapes while also breaking pest cycles, improving soil tilth, reducing erosion, and adding soil nutrients. To be of benefit to bees and other pollinators, these crops need to be allowed to complete their bloom cycle before they are terminated.

Table 2 lists conservation practices contracted under the EQIP program and describes the potential for each practice to supply or improve habitat for pollinators. The pollinator notes column describes pollinator habitat components that can be provided by each practice and offers recommendations for management practices to benefit or reduce harm to pollinators (for those such as mowing or fire that require careful timing). Table 3 presents the general habitat requirements of pollinators and lists the conservation practices that can be used to supply these requirements.

Table 1 Major Farm Bill conservation programs that can be used to promote pollinators on working lands. All programs are voluntary. See the NRCS Web site for more information (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/>), and visit the USDA service center locator to find USDA offices that administer these programs (<http://offices.sc.egov.usda.gov/locator/app>).

Program	Purpose	Land Eligibility	Type of Assistance
Environmental Quality Incentives Program (EQIP)	Promotes agricultural production and environmental quality as compatible national goals by helping eligible participants install or implement structural and management practices.	Land on which agricultural commodities, livestock, or forest-related products are produced.	EQIP provides financial and technical assistance to eligible producers to help offset the cost of implementation of NRCS-approved conservation practices. Payment rates developed each fiscal year are based on the estimated incurred cost and potential income foregone resulting from practice implementation. The 2014 Act eliminated the WHIP program but incorporated WHIP priorities into EQIP including a requirement that at least 5% of available financial assistance funds be targeted to development of wildlife habitat, which includes pollinators. Contact NRCS State or local office: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/ .
Conservation Reserve Program (CRP)	Land retirement program that encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Addresses issues raised by State, regional, and national conservation initiatives.	Highly erodible land, wetland, stream-side areas in pasture land, certain other lands. Eligible wetlands must have been cropped 3 of 10 previous years; highly erodible cropland 4 of 6 previous years.	50% cost-share for establishing permanent cover and conservation practices, and annual rental payments for land enrolled in 10- to 15-year contracts. Additional financial incentives are available for some practices. CRP is administered by FSA. NRCS provides conservation planning and supports practice implementation. Contact NRCS or FSA State or local office: http://www.fsa.usda.gov/programs-and-services/conservation-programs/index
Conservation Reserve Enhancement Program (CREP)	Land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. An offshoot of CRP, CREP emphasizes partnerships among State, Tribal, or local governments, private groups, and the USDA.	Lands that address an agriculture-related environmental issue of State or national significance, such as impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species, soil erosion, and reduced habitat for fish populations, such as salmon. Enrollment in a State is limited to specific geographic areas and practices.	Annual payment plus cost-share of up to 50% of the eligible costs to install the practice. CREP contracts require a 10- to 15-year commitment to keep lands out of agricultural production. CREP is administered by FSA. NRCS provides technical assistance. Contact NRCS or FSA State or local office: http://www.fsa.usda.gov/programs-and-services/conservation-programs/index

Program	Purpose	Land Eligibility	Type of Assistance
Conservation Stewardship Program (CSP)	<p>Encourage producers to address priority resource concerns and improve and conserve the quality and condition of natural resources in a comprehensive manner by—</p> <ul style="list-style-type: none"> • Undertaking additional conservation activities; and • Improving, maintaining and managing existing conservation activities. 	<p>All of the eligible land on an applicant's agricultural operation where eligible land means—</p> <ul style="list-style-type: none"> • Private and Tribal land on which agricultural commodities, livestock, or forest-related products are produced; and • Land upon which priority resource concerns could be addressed through a contract under the program. • Eligible land includes cropland, grassland, rangeland, pastureland, nonindustrial private forest land, and other agricultural lands including cropped woodland, marshes, and agricultural land used or capable of being used for the production of livestock as determined by the Chief of NRCS. 	<p>Annual payments to compensate a participant for installing and adopting additional conservation activities, and improving, maintaining, and managing existing conservation activities across the entire agricultural operation in a manner that increases or extends the conservation benefits in place at the time the contract offer is accepted by NRCS.</p> <p>Supplemental payments to a participant receiving annual payments, who also agrees to adopt or improve a resource-conserving crop rotation as defined by NRCS to achieve beneficial crop rotations as appropriate for the eligible land of the participant 5-year contracts renewable for another 5 years.</p> <p>Contact NRCS State or local office: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/.</p>
Agricultural Conservation Easement Program (ACEP)	<p>ACEP is a new easement program introduced in the 2014 Farm Bill. It replaces the Wetlands Reserve Program, Grassland Reserve Program, and Farm and Ranch Land Protection Program. ACEP helps prevent agriculture working land conversion to nonfarm activities. It also encompasses restoration, protection, and enhancement of wetlands on agricultural lands.</p>	<p>Land in production for crops, grazing, or private forests is eligible for the agricultural land easements.</p> <p>Wetlands that have been converted to agricultural purposes but which could be effectively restored are eligible for the wetland reserve easements.</p>	<p>For agricultural land easements, NRCS contributes up to 50% financial assistance; up to 75% on grasslands of special environmental significance.</p> <p>For wetland easements, NRCS may pay 100% of the value for a permanent easement and 75% for 30-year easements. NRCS can also help with costs associated with recording the easement.</p> <p>Additionally, NRCS may pay between 75–100% of the restoration costs on a permanent easement; and 50–75% of the restoration costs on a 30-year easement.</p> <p>Contact NRCS State or local office: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/</p>

Table 2. Conservation practice standards that can be used under the EQIP program to create or enhance pollinator habitat and support predators and parasitoids of crop pests.

Conservation Practice Name (units)	Code	Pollinator Notes
Alley Cropping (acres)	311	Can include trees or shrubs for producing wood or tree products in addition to agronomic crops (e.g., black locust (<i>Robinia pseudoacacia</i>), <i>Rubus</i> spp., etc.), vines, or row covers (e.g., various legumes, buckwheat, etc.) that provide nectar or pollen in addition to improving crop or forage quality and reducing runoff. NOTE: Black locust should be used with care because it is invasive in certain habitats outside of its natural range.
Conservation Cover (acres)	327	Permanent plantings can include diverse native and nonnative forbs to increase plant diversity and ensure flowers are in bloom for as long as possible, providing nectar and pollen throughout the growing season.
Conservation Crop Rotation (acres)	328	Cover crops used during conservation crop rotations can include forbs (e.g., various legumes, buckwheat (<i>Fagopyrum</i> spp.), phacelia (<i>Phacelia</i> spp.), etc.) that provide abundant forage for honey bees, native bees, and other pollinators. Insecticides should not be applied to these cover crops. Moving insect-pollinated crops no more than 800 feet during the rotation may help maintain local populations of native bees that have become established because of a specific crop or cover crop.
Contour Buffer Strips (acres)	332	Can include diverse legumes or other forbs that provide pollen and nectar for bees. In addition, mowing only every 2 or 3 years to benefit wildlife also will benefit nesting bumble bees. To protect bumble bee nests, mowing should occur in the late fall when colonies have died for the year and queens are overwintering.
Cover Crop (acres)	340	Can include diverse legumes, other forbs, and diverse or single species plantings that provide pollen and nectar for honey bees and native bees. Cover cropping can include planting blocks of a single species (e.g., crimson clover) designed to provide short-term but abundant bloom, multiple blocks of single species, or a diverse mix of species that provide a sequence of bloom throughout the year. A set of covers with sequential blooms could include clover (<i>Trifolium</i> spp.), phacelia (<i>Phacelia tanacetifolia</i>), buckwheat (<i>Fagopyrum esculentum</i>), and sunflower (<i>Helianthus</i> spp.). Many “beneficial insect” cover crop blends include plant species that will also provide forage for pollinators.
Critical Area Planting (acres)	342	Can include bunch grasses and flowering forbs, shrubs, or trees that provide abundant pollen and nectar for native bees and other pollinators, while also helping to prevent erosion on steep slopes. Planted areas may support stable soil for ground-nesting solitary bees, shrubs, or trees for cavity-nesting species, or dense vegetation under which bumble bees may hibernate or nest.
Early Successional Habitat Development/Management (acres)	647	This management practice is important for maintaining open and sunny habitat for pollinators. NOTE: To minimize damage to pollinator populations, disturbance practices should be implemented only every 2 to 3 years in rotation and, ideally, on only 30% or less of the overall site. This allows for habitat heterogeneity and opportunities for recolonization of nontreated habitat. For example, managers could mow or burn a small portion of the habitat (less than 1/3 of the site each year or two) on a 3- to 6-year cycle, or 1/5 of the site each year on a 5-year cycle. Avoid disturbance when pollinators are most active or during ground-nesting bird season. For details, see The Xerces Society publication “Pollinators in Natural Areas: A Primer on Habitat Management.” (http://www.xerces.org/)

Conservation Practice Name (units)	Code	Pollinator Notes
Field Border (feet)	386	Can include diverse legumes or other forbs that provide pollen and nectar for bees. Strive for a mix of forbs, vines, and shrubs that come into bloom at different times throughout the year. Site management (for example, mowing) should occur in the late fall to minimize impacts on pollen and nectar sources used by pollinators. Alternatively, allowing field borders to become overgrown may provide nesting habitat for bumble bees, as well as abundant forage. Stable (untilled) field borders may provide opportunities for solitary bees to nest in the soil. Field borders planted as pollinator habitat must be protected from pesticide drift from adjacent crops.
Filter Strip (acres)	393	Can include legumes or other forbs that provide pollen and nectar for native bees. Plant a diverse mix of cover crops that provide a sequence of bloom throughout the year. Site management (for example, mowing or burning) should occur in late fall to early spring to minimize impacts on pollinators. Filter strips should not be in bloom when pesticides may drift onto the habitat. Mowing prior to pesticide use in adjacent crops will lessen potential negative impacts for pollinators.
Grassed Waterway (acres)	412	Can include diverse legumes or other forbs that provide pollen and nectar for bees. In dry regions, these sites may be able to support flowering forbs with higher water requirements and thus provide bloom later in the summer.
Hedgerow Planting (feet)	422	Can include forbs, vines, shrubs, and small trees that provide pollen and nectar for bees. Ideally, plant a diverse mix to provide a sequence of bloom throughout the year. Bee nesting habitat may be created by including plants with pithy stems, such as sumac and elderberry, or ensuring there are some areas of untilled, semi-bare ground. Bumble bees may nest in unmowed grasses planted along the edge of the hedgerow. If designed with plants that do not attract pollinators at the time crops are sprayed, this practice also can help reduce the drift of pesticides into areas of pollinator habitat by capturing pesticide particulates. Hedgerows can also provide additional sources of income (fruit, nuts, wood, cut flowers, etc.).
Herbaceous Weed Control (acres)	315	Can be used in combination with other practices for weed abatement prior to planting for practices such as Conservation Cover or Hedgerow.
Herbaceous Wind Barriers (feet)	603	Can include diverse perennial or annual forbs that provide pollen and nectar for bees. Plant a diverse mix to provide a sequence of blooms throughout the year.
Integrated Pest Management (acres)	595	In general, implementing integrated pest management (IPM) for a crop reduces the use and impact of pest control chemicals on pollinators. In addition, plant species commonly used in IPM to support beneficial insects that help manage pests also can support bees. Examples of these plants include: phacelia (<i>Phacelia</i> spp.), sunflowers (<i>Helianthus</i> spp.), buckwheat (<i>Fagopyrum esculentum</i> spp.), and yarrow (<i>Achillea</i> spp.). Guidance on conservation practices and IPM strategies that help reduce risks to pollinators is available in Title 190, Agronomy Technical Note No. 9, “Preventing or Mitigating Potential Negative Impacts of Pesticides on Pollinators Using Integrated Pest Management and Other Conservation Practices.” (Feb. 2014).
Multistory Cropping (acres)	379	Plantings consisting of an overstory of trees or shrubs with an understory of specialty or agronomic crops or forage can include woody plants carefully chosen to supply pollen and nectar for pollinators throughout the growing season, as well as nesting habitat for cavity-nesting bees,
Forage and Biomass Planting (acres)	512	Can include diverse legumes (e.g., alfalfa or various clovers) or other forbs that, when in bloom, provide pollen and nectar for bees.

Conservation Practice Name (units)	Code	Pollinator Notes
Prescribed Burning (acres)	338	<p>Can greatly benefit pollinators by maintaining a diverse mix of open, early successional habitat in various stages of maturity. NOTE: It is best if—</p> <ul style="list-style-type: none"> • Only 30% or less of a site is burned at any one time to allow for recolonization by pollinators and other beneficial insects from adjacent habitat, • Burning occurs only every 3 to 6 years, • Burning occurs when pollinators are least active, such as when most plants have senesced, in fall, winter, or early spring. <p>The timing of burns can also be used to manipulate the local plant community. Depending on the season, burning can suppress or promote forbs, cool-season grasses, warm-season grasses, or woody plants. Where the primary aim of management is to support butterfly species, prescribed burning may not be the best tool.</p>
Prescribed Grazing (acres)	528	Can help maintain early successional habitat and its associated flowering plants. Ensure that grazing objectives include a diverse plant community that incorporates legumes, forbs, and appropriate flowering woody species to create floral and structural diversity. The natural foraging preferences of livestock can be used to manipulate the local plant community. For example, at moderate-to-low-stocking rates cattle will preferentially consume grass, giving forbs a competitive advantage.
Range Planting (acres)	550	Can include diverse legumes, other forbs and shrubs that provide pollen and nectar for bees. This practice is typically used when the wildflower seed bank has been depleted in a range setting.
Residue and Tillage Management, No-Till/Strip Till/Direct Seed (acres)	329	Can protect bees that are nesting in the ground at the base of the plants they pollinate. Tillage can destroy or block emergence from these nests (located 0.5 to 3 feet underground) of new adult bees bred the preceding year.
Restoration and Management of Rare and Declining Habitats (acres)	643	<p>Can be used to provide diverse locally grown native forage (forbs, shrubs, vines, and trees) and nesting resources for pollinators. Many specialist pollinators that are closely tied to rare plants or habitats may significantly benefit from efforts to protect rare habitat. Certain rare plants require pollinators to reproduce.</p> <p>NOTE: Pollinator plants should only be planted if they were part of the rare ecosystem you are trying to restore.</p>
Riparian Forest Buffer (acres)	391	Can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. These areas can be especially important in mid-summer if drought reduces the availability of pollen and nectar sources in upland sites. The stable habitat may supply nest sites to solitary ground- and wood-tunnel-nesting bees, as well as bumble bees. This practice also can help reduce drift of pesticides onto areas of pollinator habitat.
Riparian Herbaceous Cover (acres)	390	Can include diverse forbs that provide pollen and nectar for native bees. Many forbs of riparian areas flower in summer to fall, when pollinator forage is needed most.
Silvopasture Establishment (acres)	381	If grazing intensity is low enough to allow for plants to flower, this practice can include legumes and other forbs that provide pollen and nectar for bees. Trees and shrubs that provide pollen and nectar also can be planted. Reduced canopy cover tends to increase forb abundance and flowering, so thinning a stand to enhance or establish forage can be beneficial for bee habitat.
Stream Habitat Improvement and Management (acres)	395	Plants chosen for riparian habitat improvement can include trees, shrubs, and forbs that provide pollen and nectar for pollinators. Maximizing plant diversity along riparian corridors will result in more pollinators and other terrestrial insects to feed fish in the waterways.
Stream bank and Shoreline Protection (feet)	580	If vegetation is used for stream bank protection, plants can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Good candidates include willow (<i>Salix</i> spp.), shrub dogwood (<i>Cornus</i> spp.) and goldenrod (<i>Solidago</i> or <i>Euthamia</i> spp.).

Conservation Practice Name (units)	Code	Pollinator Notes
Strip-cropping (acres)	585	Can include diverse legumes or other forbs that provide pollen and nectar for bees. If insect-pollinated crops are grown, plants used in adjacent strips of vegetative cover may be carefully chosen to provide a complementary bloom period to the crop, such that the flowering period is extended.
Structures for Wildlife	649	New (2014) national conservation practice that includes all types of nesting structures or wildlife friendly retrofits. Can include structures for nesting habitat, such as nesting blocks, cut bamboo bundles, etc.
Tree/Shrub Establishment (acres)	612	Can include trees, shrubs, and vines especially chosen to provide pollen and nectar for pollinators. Woody plants with pithy stems (e.g., elderberry (<i>Sambucus</i> spp.), box elder (<i>Acer negundo</i>), and raspberries (<i>Rubus</i> spp.)) also may be chosen to provide potential nest sites for solitary bees that nest in woody stems.
Upland Wildlife Habitat Management (acres)	645	Can include managing for pollinator forage or pollinator nest sites, such as including nest blocks or snags for solitary bees that nest in tunnels in wood, access to bare soil for ground-nesting solitary bees, and small mammal burrows or overgrown grass cover for bumble bees. NOTE: See Early Successional Habitat Development/Management (647) and Prescribed Burning (338) for management techniques that minimize the disruption of pollinator communities.
Vegetative Barriers (feet)	601	Permanent strips of stiff, dense vegetation established along the general contour of slopes or across concentrated flow areas. Can include plants that provide pollen and nectar for pollinators.
Wetland Creation (acres)	658	Can include stable soil as nesting substrate in more upland areas, as well as plants that provide pollen and nectar for native bees and other pollinators. Plant genera of high value to pollinators that also have obligate or facultative wetland species include: <i>Asclepias</i> , <i>Bidens</i> , <i>Cephalanthus</i> , <i>Cornus</i> , <i>Crataegus</i> , <i>Epilobium</i> , <i>Eupatorium</i> , <i>Helianthus</i> , <i>Hibiscus</i> , <i>Hypericum</i> , <i>Iris</i> , <i>Juncus</i> , <i>Ledum</i> , <i>Lobelia</i> , <i>Ludwigia</i> , <i>Lysimachia</i> , <i>Mimulus</i> , <i>Ranunculus</i> , <i>Rhexia</i> , <i>Rhododendron</i> , <i>Ribes</i> , <i>Rosa</i> , <i>Rubus</i> , <i>Rudbeckia</i> , <i>Salix</i> , <i>Solidago</i> , <i>Spiraea</i> , and <i>Vaccinium</i> . Look for appropriate wetland plants from these and other genera for your region.
Wetland Enhancement (acres)	659	Wetland and adjacent upland can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Snags can be protected or nest blocks for bees erected.
Wetland Restoration (acres)	657	Wetland and adjacent upland can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Snags can be protected or nest blocks for bees erected.
Wetland Wildlife Habitat Management (acres)	644	Wetland and adjacent upland can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Snags can be protected or nest blocks for bees erected. NOTE: See Early Successional Habitat Development/Management (647) and Prescribed Burning (338) for management techniques that minimize the disruption of pollinator communities.
Windbreak/Shelterbelt Establishment (feet)	380	Can include trees, shrubs, vines, and forbs especially chosen to provide pollen and nectar for pollinators. Windbreaks and shelter belts are a good place to put nesting structures for native bees, and they can help reduce drift of insecticides onto a site. Guidance on establishing pesticide barriers can be found in “Designed with pollinators in mind.” Windbreaks: These aren't your grandfather's shelterbelts, <i>Inside Agroforestry</i> , Volume 20, Issue 1. (http://nac.unl.edu/publications/insideagroforestry.htm)
Windbreak/Shelterbelt Renovation (feet)	650	Can include trees, shrubs, vines, and forbs especially chosen to provide pollen and nectar for pollinators. If appropriate, dead trees and snags may be kept or drilled with holes to provide nesting sites for bees. Can also be used to create drift barriers to protect habitat from pesticide drift, or reduce offsite drift. See guidance for Windbreak/Shelterbelt Establishment (380).

Table 3. Pollinator requirements and the conservation practices that support them in the field

Pollinator Resource	Code and Conservation Practice Name (units)
Forage (diverse sources of pollen and nectar that support pollinators, predators, and parasitoids throughout the growing season)	311 – Alley Cropping (acres)
	327 – Conservation Cover (acres)
	328 – Conservation Crop Rotation (acres)
	656 – Constructed Wetland (acres)
	332 – Contour Buffer Strips (acres)
	340 – Cover Crop (acres)
	342 – Critical Area Planting (acres)
	386 – Field Border (feet)
	393 – Filter Strip (acres)
	412 – Grassed Waterway (acres)
	422 – Hedgerow Planting (feet)
	315 – Herbaceous Weed Control (acres)
	603 – Herbaceous Wind Barriers (feet)
	595 – Integrated Pest Management (acres)
	379 – Multi-Story Cropping (acres)
	512 – Forage and Biomass Planting (acres)
	528 – Prescribed Grazing (acres)
	550 – Range Planting (acres)
	643 – Restoration and Management of Rare and Declining Habitats (acres)
	391 – Riparian Forest Buffer (acres)
	390 – Riparian Herbaceous Cover (acres)
	381 – Silvopasture Establishment (acres)
	395 – Stream Habitat Improvement and Management (acres)
	580 – Stream bank and Shoreline Protection (feet)
	585 – Strip-cropping (acres)
	612 – Tree/Shrub Establishment (acres)
	645 – Upland Wildlife Habitat Management (acres)
	601 – Vegetative Barriers (feet)
	659 – Wetland Enhancement (acres)
	657 – Wetland Restoration (acres)
	644 – Wetland Wildlife Habitat Management (acres)
	380 – Windbreak/Shelterbelt Establishment (feet)
	650 – Windbreak/Shelterbelt Renovation (feet)

Pollinator Resource	Code and Conservation Practice Name (units)
Nest sites (stable ground, holes in wood, native bunch grasses or cavities for bumble bees, or overwintering sites for bumble bee queens and other beneficial insects)	656 – Constructed Wetland (acres) 332 – Contour Buffer Strips (acres) 342 – Critical Area Planting (acres) 386 – Field Border (feet) 422 – Hedgerow Planting (feet) 409 – Prescribed Forestry (acres) 329 – Residue & Tillage Management, No-Till/Strip Till/Direct Seed (acres) 643 – Restoration and Management of Rare and Declining Habitats (acres) 391 – Riparian Forest Buffer (acres) 649 – Structures for Wildlife 612 – Tree/Shrub Establishment (acres) 645 – Upland Wildlife Habitat Management (acres) 659 – Wetland Enhancement (acres) 657 – Wetland Restoration (acres) 644 – Wetland Wildlife Habitat Management (acres) 380 – Windbreak/Shelterbelt Establishment (feet) 650 – Windbreak/Shelterbelt Renovation (feet)
Pesticide protection (refuge from spray, buffers to drift, etc.)	322 – Channel Bank Vegetation (acres) 656 – Constructed Wetland (acres) 342 – Critical Area Planting (acres) 422 – Hedgerow Planting (feet) 595 – Integrated Pest Management (acres) 391 – Riparian Forest Buffer (acres) 657 – Wetland Restoration (acres) 380 – Windbreak/Shelterbelt Establishment (feet)
Site management for pollinators	647 – Early Successional Habitat Development or Management (acres) 595 – Integrated Pest Management (acres) 338 – Prescribed Burning (acres) 528 – Prescribed Grazing (acres) 643 – Restoration and Management of Rare and Declining Habitats (acres) 645 – Upland Wildlife Habitat Management (acres) 644 – Wetland Wildlife Habitat Management (acres)

Conservation Reserve Program, Pollinator Practices

Table 4 lists conservation practices commonly used to improve pollinator habitat, either through establishing new habitat or improving existing sites by adding more pollinator plants. The column labeled "Notes" lists how these CRP enhancements can support pollinators.

Table 4. CRP enhancements that can be used to improve pollinator habitat.

Code	Practice Name	Notes
Practices to create pollinator habitat		
CP2	Native grasses	Can include pollinator forbs or legumes
CP4D	Permanent wildlife habitat	Can include high percentage of forbs or legumes
CP42	Pollinator habitat	Used to contract permanent high-value pollinator wildflower seed mixes
Practices that can include pollinator plants		
CP3A	Hardwood trees	Can include pollinator trees ¹
CP4B	Wildlife habitat corridor	Can include high percentage of forbs or legumes
CP12	Wildlife food plot	Can include pollinator forbs or legumes
CP22	Riparian buffer	Can include high percentage of forbs or legumes
CP23	Wetland restoration	Can include high percentage of forbs or legumes
CP25	Rare and declining habitat	Can include high percentage of forbs or legumes
CP29	Wildlife habitat buffer (marg. pasture)	Can include high percentage of forbs or legumes
CP30	Wetland buffer (marg. pasture)	Can include high percentage of forbs or legumes
CP31	Bottomland hardwood trees	Can include pollinator trees
CP32	Hardwood trees (previous expired)	Can include pollinator trees
CP33	Upland bird habitat buffer	Can include high percentage of forbs or legumes
CP41	Flooded prairie wetland (FWP)	Can include high percentage of forbs or legumes
¹ Pollinator trees produce high-quality pollen, nectar, or both that support native bees and honey bees, or have pithy stems that provide nesting sites for cavity-nesting bees.		

Conservation Stewardship Program, pollinator enhancements

CSP includes many enhancements that may be contracted to conserve pollinators. Current enhancements, such as pollinator and/or beneficial insect habitat (PLT15), provide additional incentives for incorporation of pollinator habitat into CSP contracts. Other enhancements, such as grazing management to improve wildlife habitat (ANM09); prairie restoration for grazing and wildlife habitat (ANM21); and renovation of windbreak, shelterbelt, or hedgerow for wildlife (PLT06) may target other resource concerns, but can be designed to include nectar and pollen resources for bees and other pollinators. In addition, in fiscal year 2015, a new national supplement to PLT15 was developed for the monarch butterfly to aid in the conservation of this species. In fiscal year 2016, a new enhancement for monarch butterfly habitat establishment will be available.

Agricultural Conservation Easement Program, pollinator conservation opportunities

During the restoration planning process for conservation easements, there are many opportunities to incorporate the habitat needs of pollinators. Diverse pollinator-friendly native

wildflowers, shrubs and trees, milkweed, and other butterfly host plants, and nesting structures, such as brush piles, are all compatible with ACEP restoration projects. In the past few years, for example, some States have included pollinator habitat as a goal for all WRP restoration projects, which under the 2014 Farm Bill are part of ACEP.

State-Level Opportunities

Pollinator conservation biology technical notes

Each State can develop pollinator conservation biology technical notes to help field conservationists promote pollinators in their conservation planning and implementation. Ideally, the notes will:

- Emphasize the importance of leaving as much land as possible undisturbed and in relatively natural condition since many pollinators require this for successful completion of their life cycles.
- Provide details on the native and nonnative plants used by honey bees, native bees, or other pollinators, such as butterflies, that could be included in various conservation practices throughout the State. Important information to include for each plant is—
 - Flowering period.
 - Suitable habitat conditions for planting.
 - Information on seeding rates.
 - Site preparation.
 - Seeding methods.
 - Timing.
- Stress the importance of having multiple species of flower in bloom throughout the growing seasons. In practice, this means providing at least three blooming pollinator plants during each season: spring, summer, and fall (and winter in some southern regions).
- Highlight the importance of nest sites for crop-pollinating native bees. These nest sites include—
 - Partially bare, well-drained ground for solitary ground-nesting bees.
 - Plants with pithy stems or tunnels in standing dead wood for solitary cavity-nesting bees.

Figure 1 Common eastern bumble bee pollinating a tomato

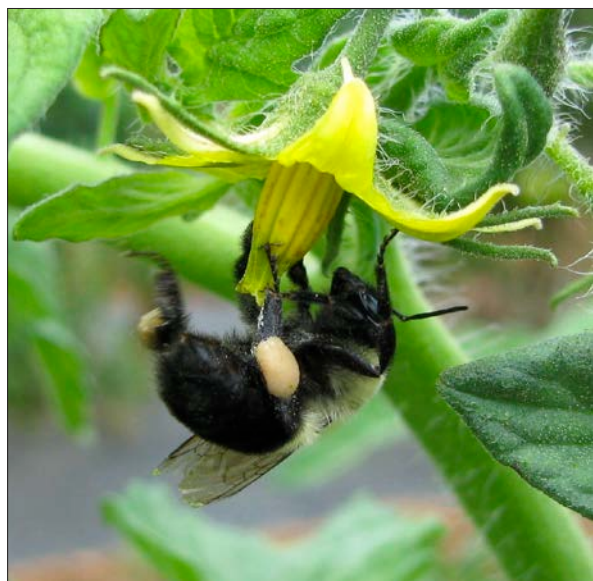


Photo by Nancy Adamson, Xerces Society

- Small cavities or areas of overgrown, fallen grass (where abandoned rodent burrows may be found) for bumble bees.
- Narrow tunnels in standing dead wood or plants with pithy stems for solitary tunnel-nesting bees.
- Small cavities, such as abandoned rodent burrows or areas of overgrown, fallen grass for bumble bees.
- Emphasize the value of added diversity for other wildlife, for ecosystem stability, and for ensuring successful pollination when one or more pollinator species declines in one season or over a longer period. Increased plant diversity leads to higher insect diversity and better nutrition for birds and other wildlife.
- Emphasize the value of diverse niche habitats in supporting and providing refuge for other beneficial arthropods that help reduce crop pest problems. Arthropods beneficial for agriculture include spiders, predatory wasps, beetles, bugs, lacewings, and parasitic wasps, flies, and beetles.
- Emphasize the value of improved plant health by maintaining healthy soil flora with reduced use of pesticides and herbicides when managing for pollinators and other beneficial arthropods.
- Encourage use of a variety of strategies, from wildflower meadows to cover crops, forage legumes, and hedgerows, along with managed grazing or burning, to encourage landowners to take actions that fit their budget and landscape.

Many NRCS State offices have produced pollinator conservation biology technical notes, and others are in the making. To find technical notes for your State, check your State's Field Office Technical Guide, contact your State biologist, or look for examples on the table of NRCS pollinator conservation technical documents found at <http://plants.usda.gov/pollinators/NRCSdocuments.html>. If your State doesn't have such guidance, consider looking at examples from nearby States.

Other State and national guidance documents include plant lists, habitat installation guides, habitat assessment guides, integrated pest management technical notes, webinars, and more. Pollinator Conservation Job Sheets aid in contracting pollinator conservation projects. Many States have developed job sheets, implementation requirements, or other tools to help conservation

planners work with their clients on project design. These planning guides usually provide general criteria and specifications, details on site maintenance, lists of appropriate plants, and tools for site planning. Many examples are available from across the United States, and they can be adapted by any State office technical staff to meet the needs of that State.

Most of the available NRCS technical resources are categorized and linked on line at the following Web address: <http://plants.usda.gov/pollinators/NRCSdocuments.html>. Here you will find NRCS pollinator conservation guidance organized by region, State, and type of resource. This Web site provides conservation practitioners, agency personnel, and others a quick index of available information for their own and neighboring States.

Conservation Activity Plans

State offices also can choose to offer landowners the opportunity to apply for funding to pay a technical service provider to supply guidance under the EQIP conservation practice conservation activity plan (CAP). CAPs address specific conservation needs, including pollinator habitat enhancement (CAP 146). To be most useful, completed CAPs

Figure 2 Fire can be used in many settings to encourage forbs that feed and shelter pollinators



Photo by Jeff Vanaga, USDA NRCS

for pollinators should provide a pollinator habitat assessment, farm-specific suggestions for habitat improvements, and recommendations for adjusting farm management practices to reduce negative impacts to bees and other pollinators. CAPs also should provide information on financial assistance opportunities.

The first step in obtaining a CAP for pollinator habitat enhancement is to request a conservation plan from your local NRCS service center. More information on CAPs and links to each State's EQIP page listing ranking criteria, priority resource concerns, and eligible conservation practices, can be found on NRCS's CAP page for the current fiscal year. Other CAPs that can be used to plan for improving pollinator habitat include Forest Management (106), Integrated Pest Management (114), Organic Transition or Organic Cropland (138), and Fish and Wildlife Habitat Management (142).

Payment scenarios for pollinator conservation

Many pollinator conservation projects require the use of more expensive native plant materials. For example, milkweed seed is relatively expensive when compared to other native seed, and including it in pollinator seed mixes can increase the price of a high-value native seed mix. In addition, for practices like wildflower meadows, it is important to adequately prepare the site prior to planting. This requires aggressive weed abatement during the growing season prior to planting. The higher costs of these practices should be considered when developing payment scenarios for pollinator practices contracted under Conservation Cover (327) or Herbaceous Weed Control (315), for example.

Other State Opportunities

NRCS State programs can add pollinator habitat criteria to their existing Wildlife Habitat Evaluation Guides, or develop specific documents that assess pollinator habitat. They can also incorporate information on pollinators into their State vegetation guides. To see an example of a Pollinator Habitat Evaluation Guide, The Xerces Society has developed a general template for agricultural landscapes (<http://www.xerces.org/wp-content/uploads/2009/11/PollinatorHabitatAssessment.pdf>), as well as for rangelands and natural areas. (http://www.xerces.org/wp-content/uploads/2014/12/PollinatorHabitatAssessment_NaturalAreasRangelands_web.pdf).

Plant materials center assistance

Regional NRCS plant materials centers (PMCs) and plant material specialists are conducting field trials on pollinator plantings and seed mixes, helping to bring new and important plant materials, such as milkweed, into production. PMCs are a critical resource for supporting field office staff and growers in developing and implementing pollinator conservation projects. PMC staff can work with States to produce regional pollinator conservation biology technical notes and other documents, or refine existing pollinator plant lists and guidelines. For information on the NRCS Plant Materials Program and publications, visit <http://www.nrcs.usda.gov/wps/portal/nrcs/site/plantmaterials/home/>.

State office assistance

The NRCS national technology support centers (NTSC) and several private foundations fund the Xerces Society to provide NRCS State offices with technical support to help implement pollinator conservation measures. NRCS State offices are welcome to contact your regional NTSC or Mace Vaughan (mace.vaughan@por.usda.gov) if you are interested in this service.

For more information about pollinator conservation measures, please see:

NRCS "How NRCS is Helping Pollinators" Web page:

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/>.

NRCS technical documents and online trainings developed to support pollinator conservation efforts:

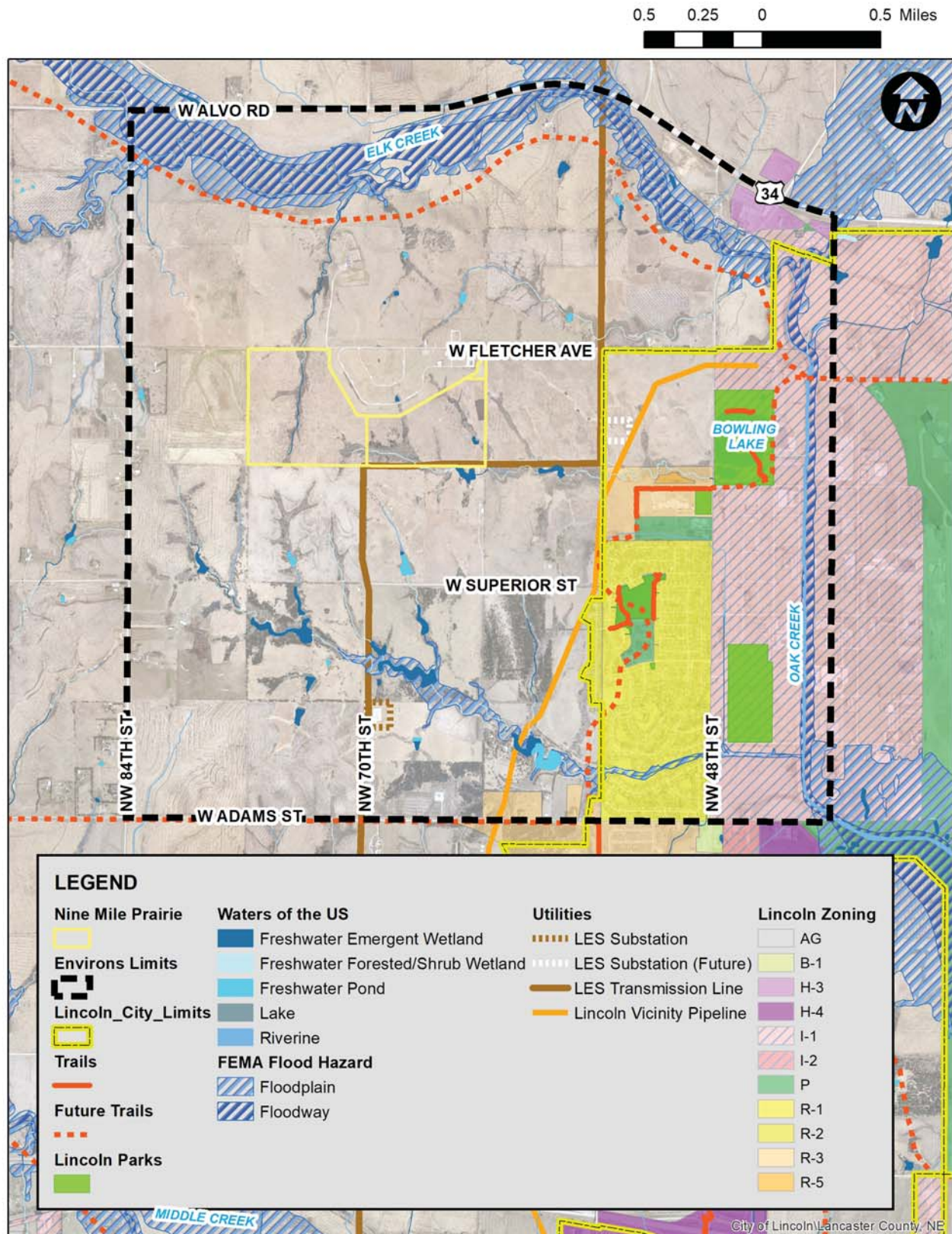
<http://plants.usda.gov/pollinators/NRCSdocuments.html>

Xerces Society Pollinator Conservation Resource Center:

<http://www.xerces.org/pollinator-resource-center/>

APPENDIX G

Landuse Inventory for NMP Environs



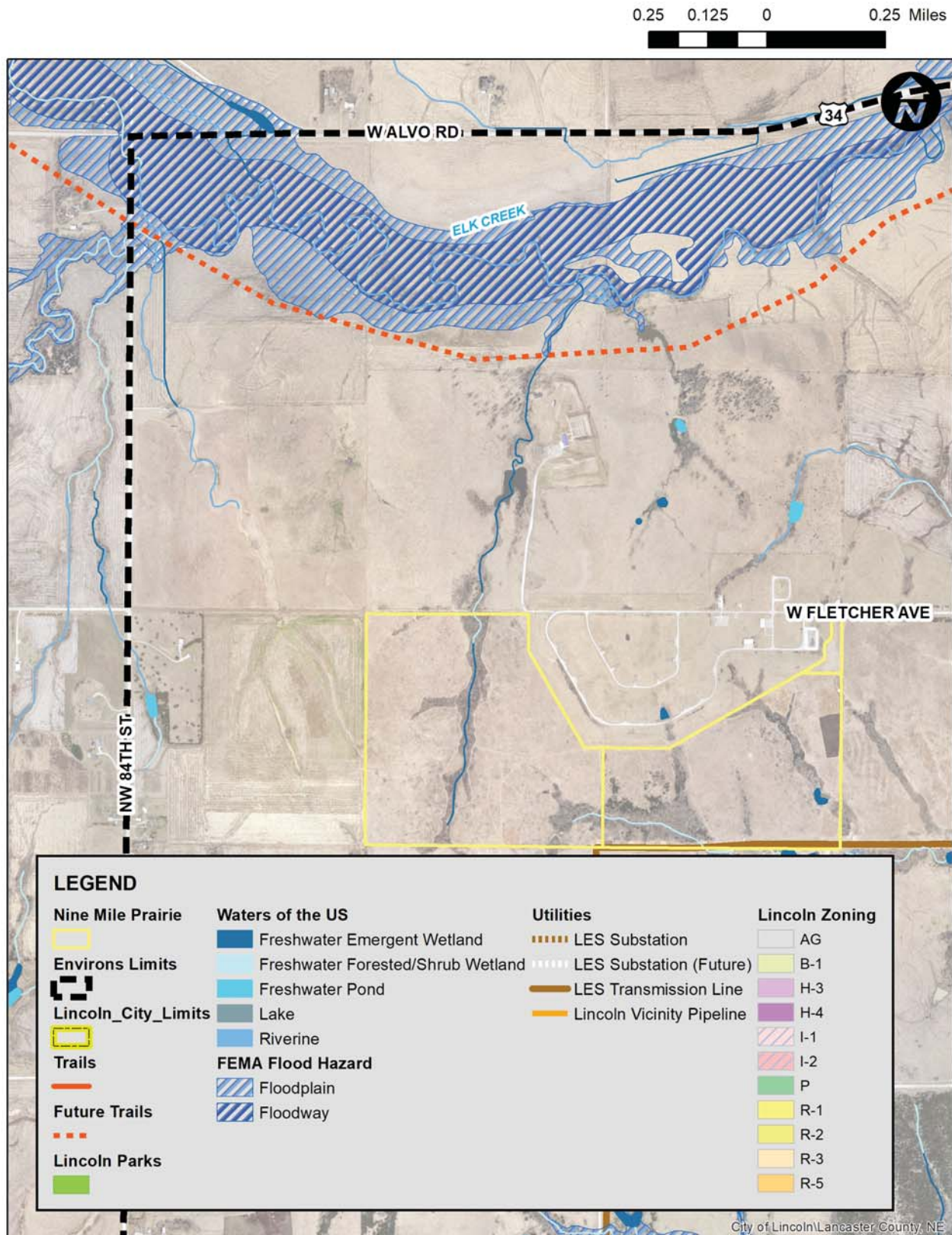
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Nine-Mile Prairie Environs Master Plan
APPENDIX G - Spatial Analysis Maps

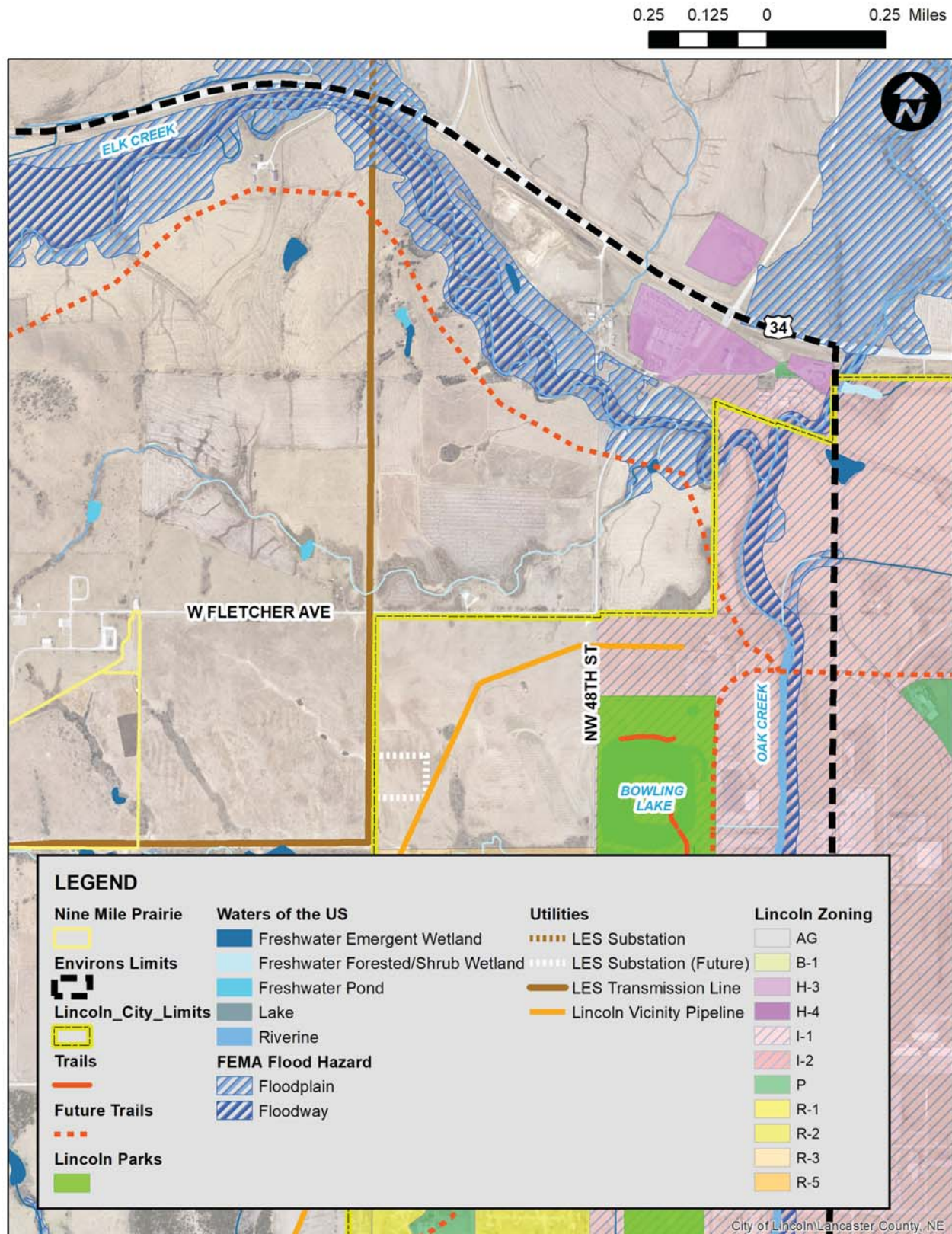
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Landuse Inventory for NMP Environs - NW Quadrant



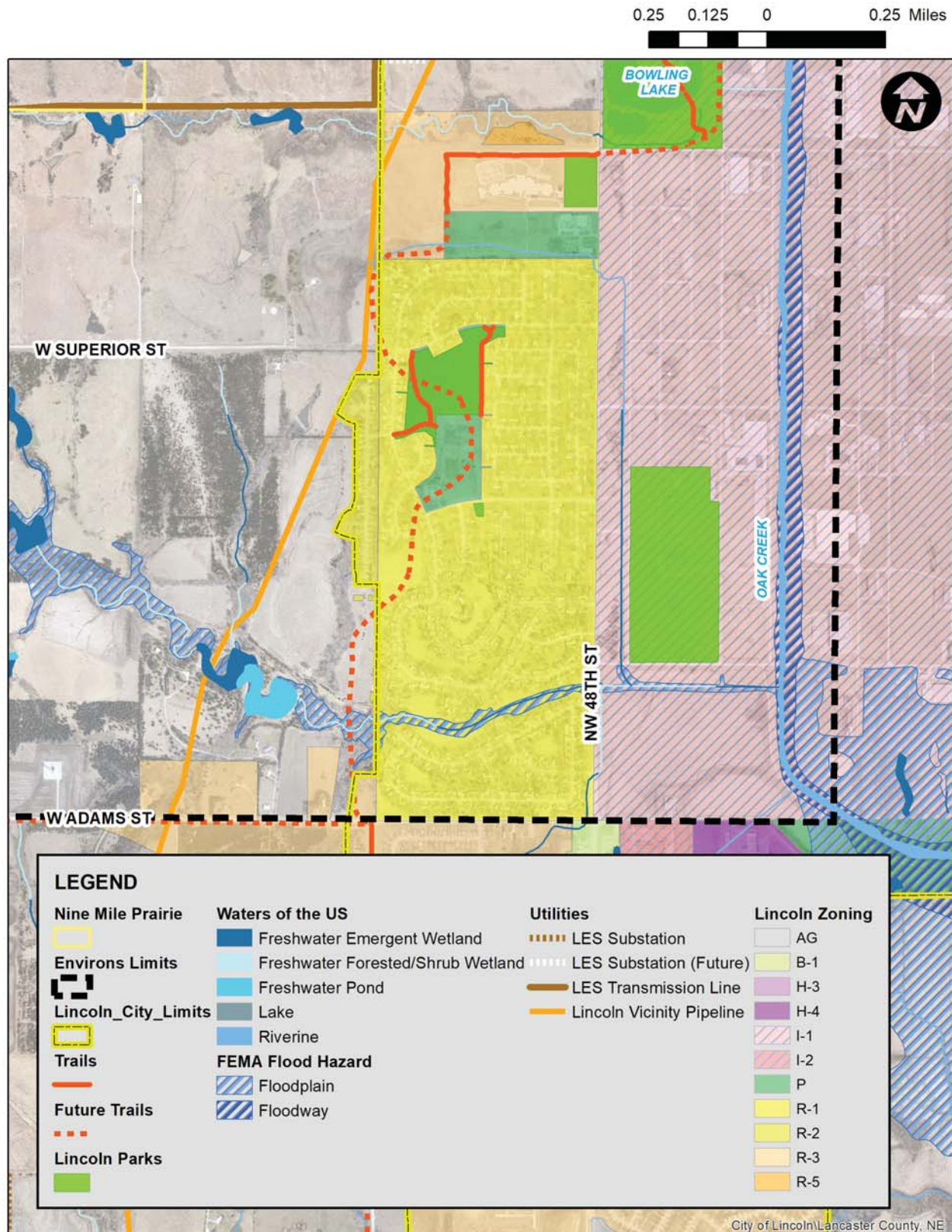
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Landuse Inventory for NMP Environs - NE Quadrant



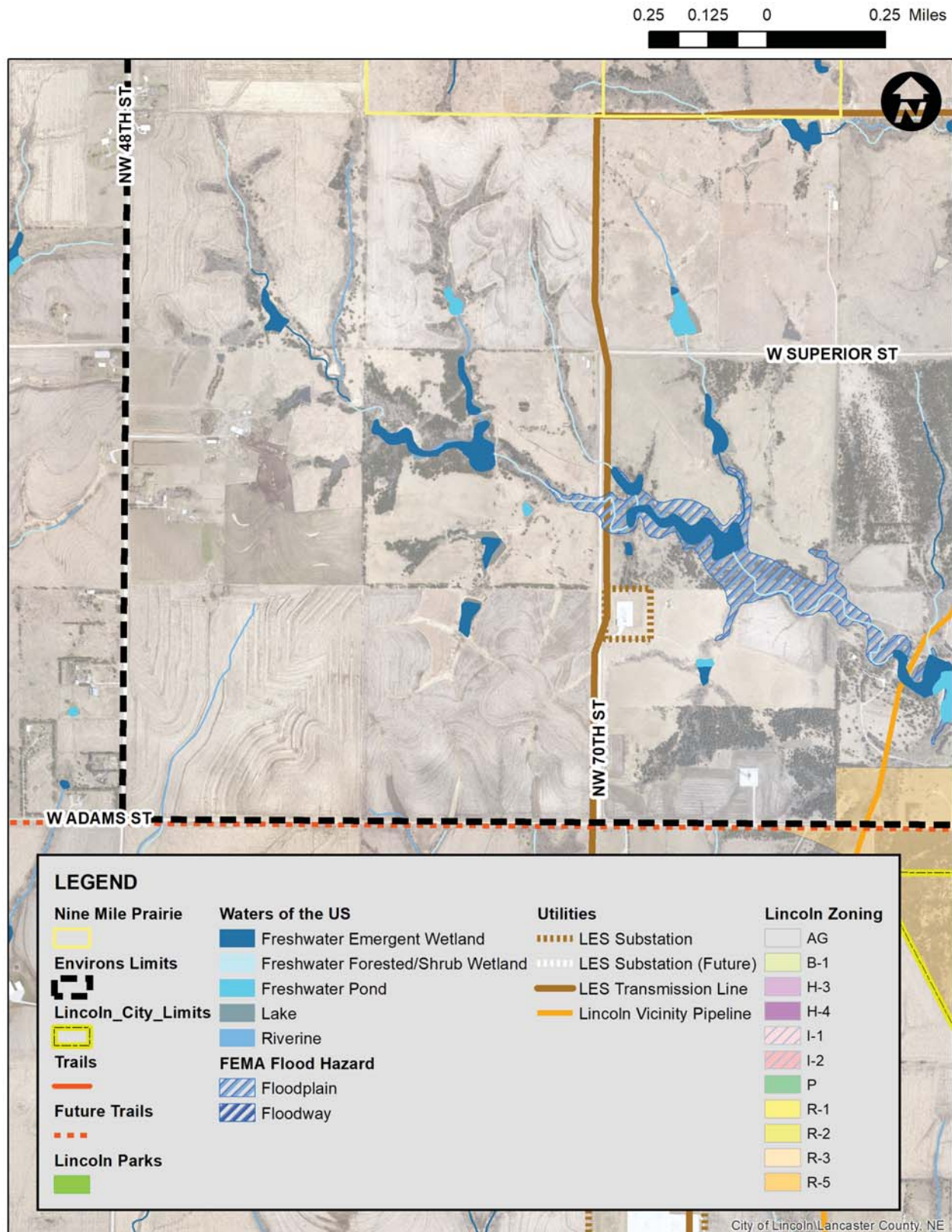
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Landuse Inventory for NMP Environs - SE Quadrant



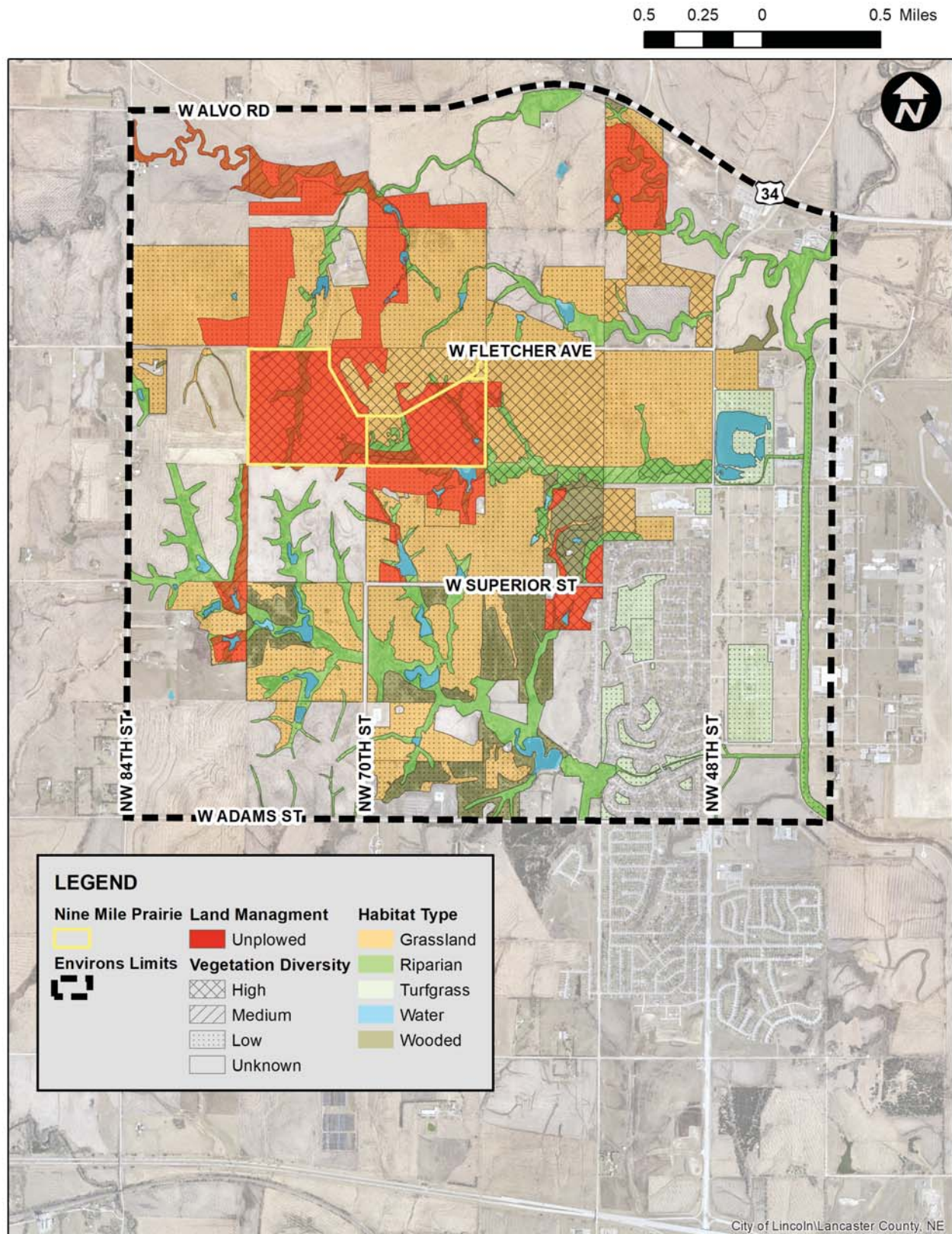
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Landuse Inventory for NMP Environs - SW Quadrant



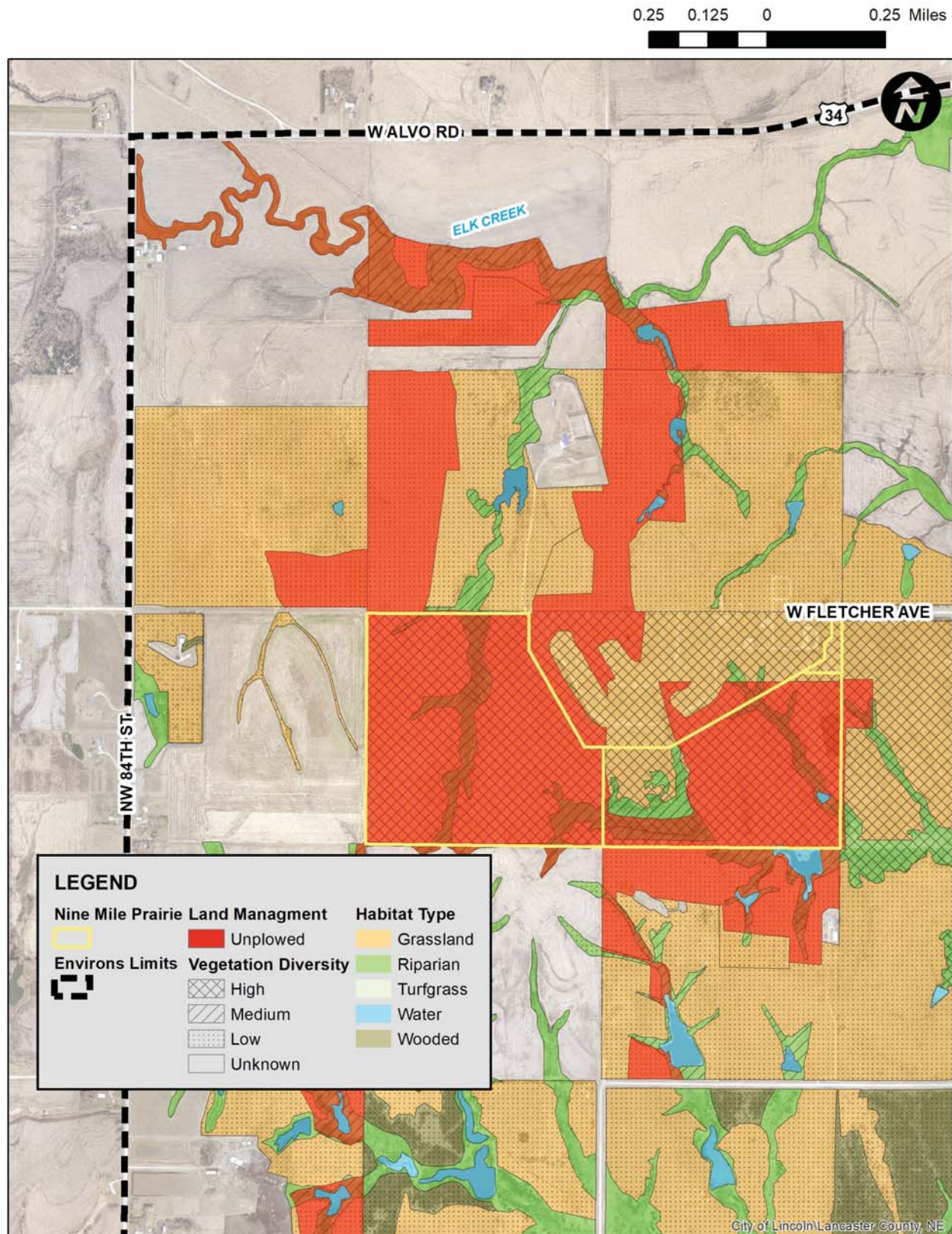
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Natural Resource Inventory for NMP Environs



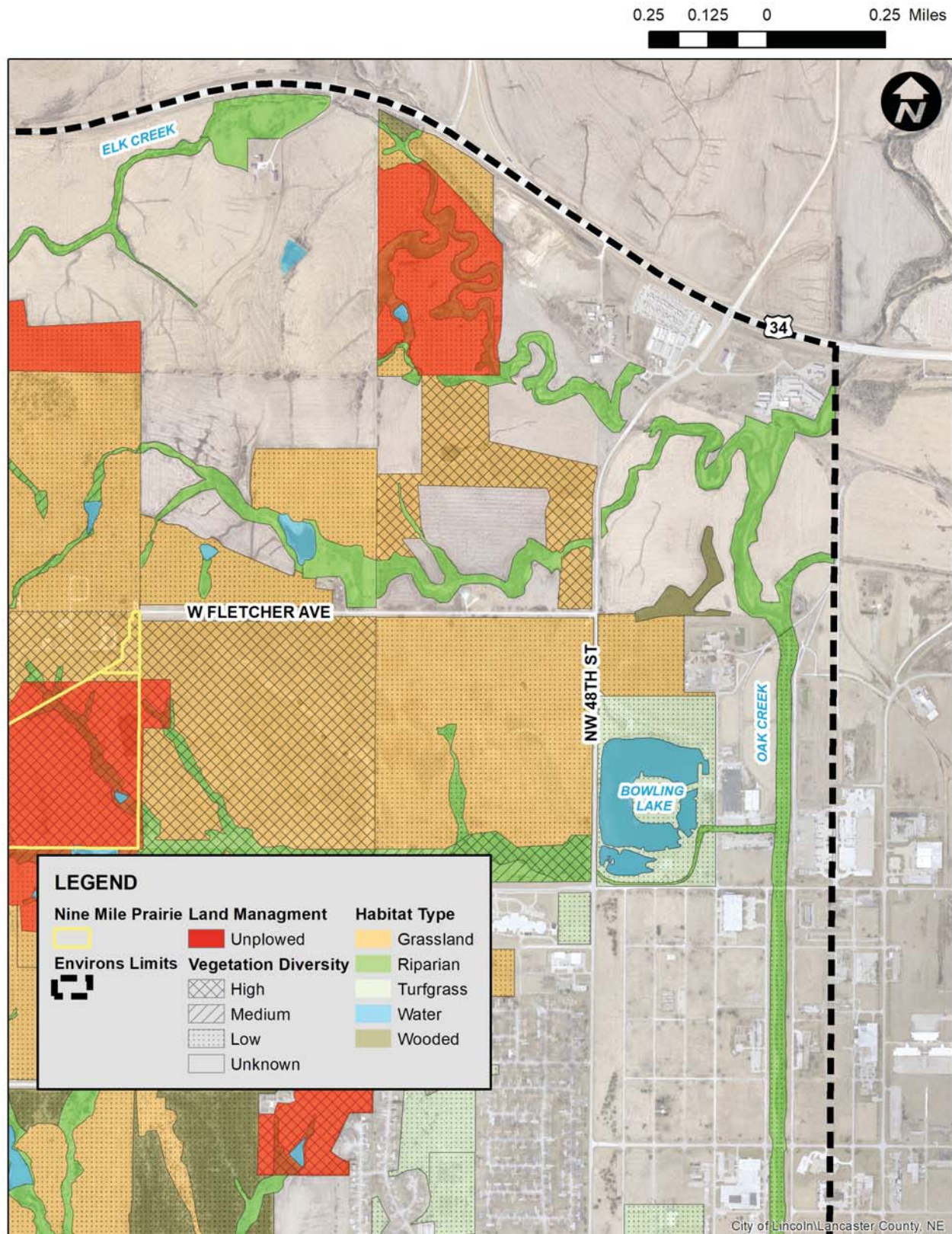
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Natural Resource Inventory for NMP Environs - NW Quadrant



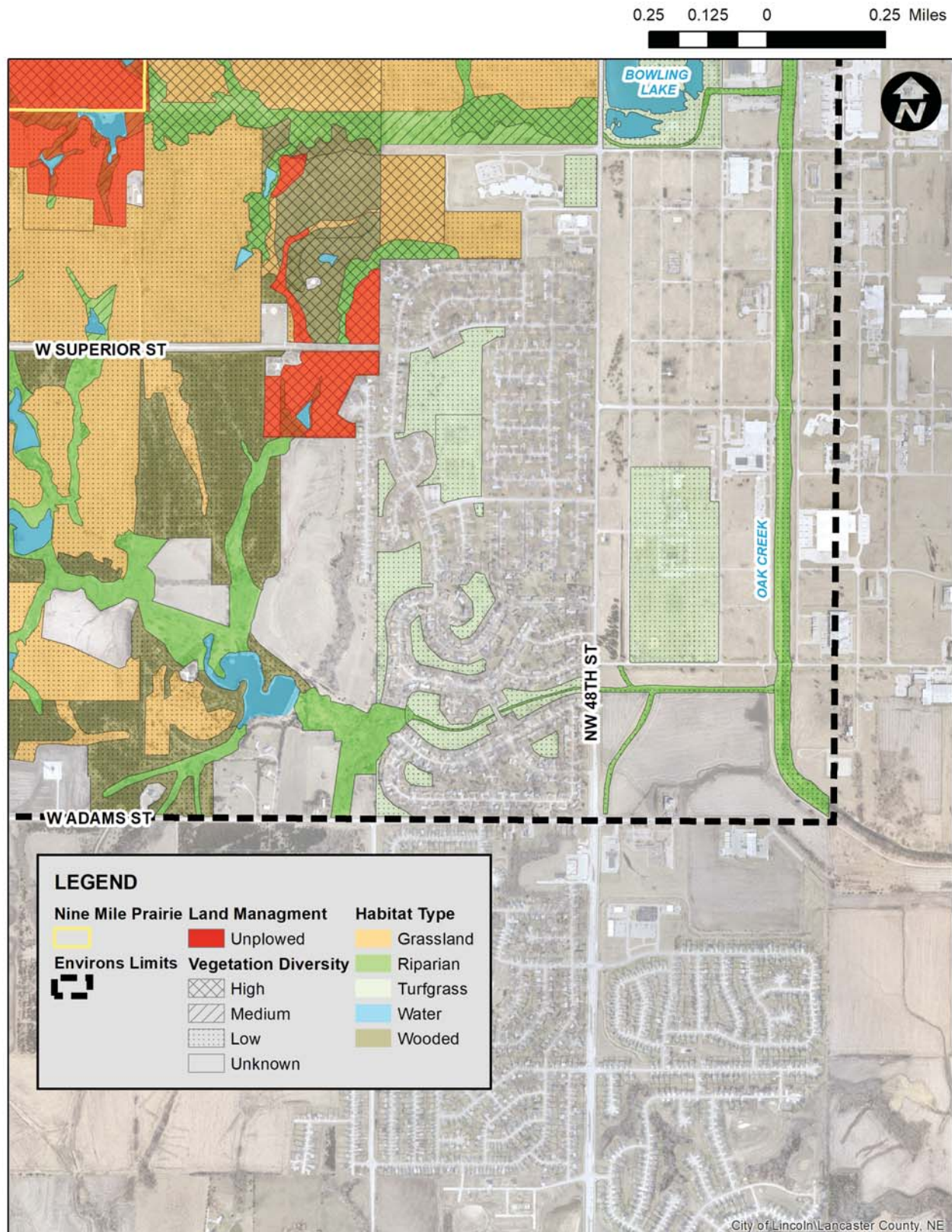
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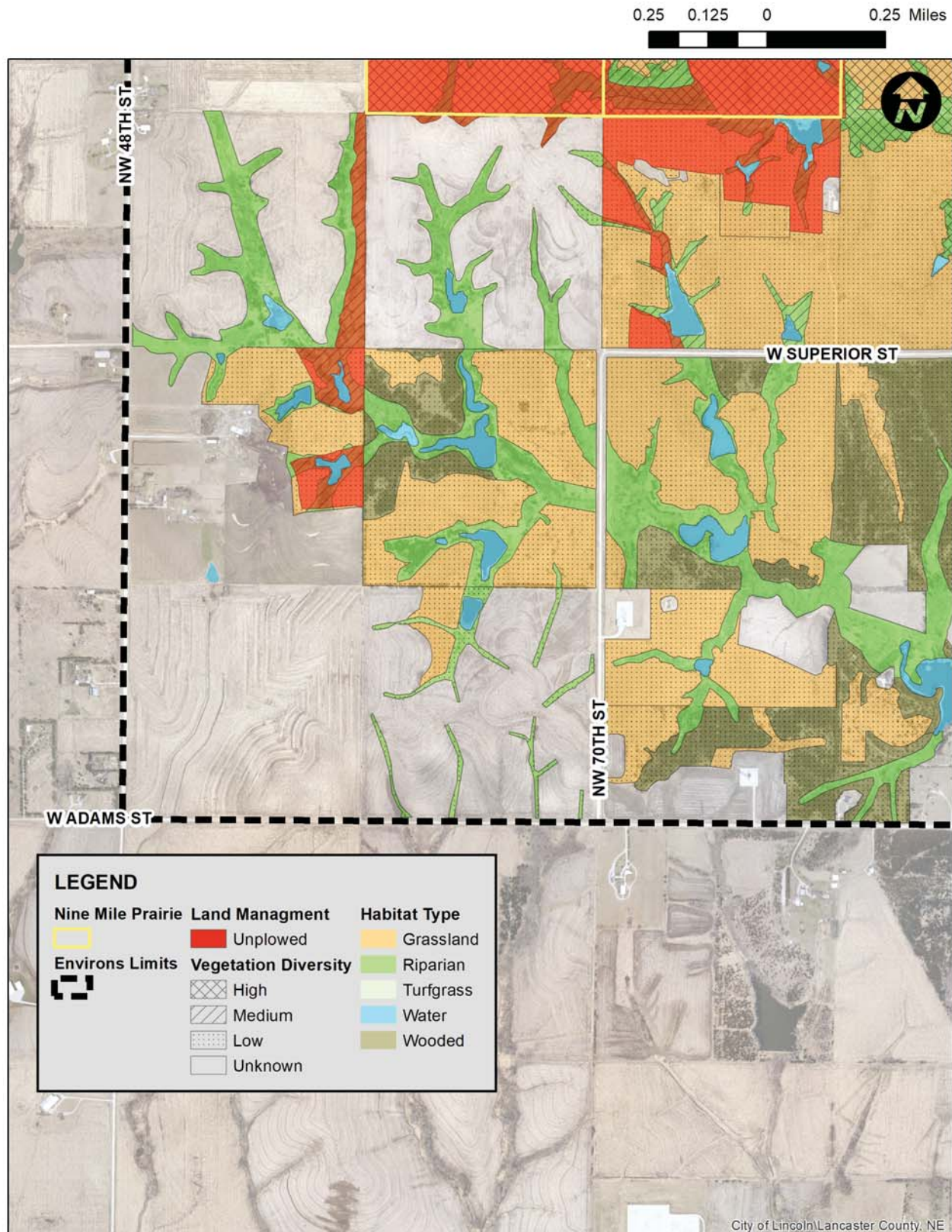
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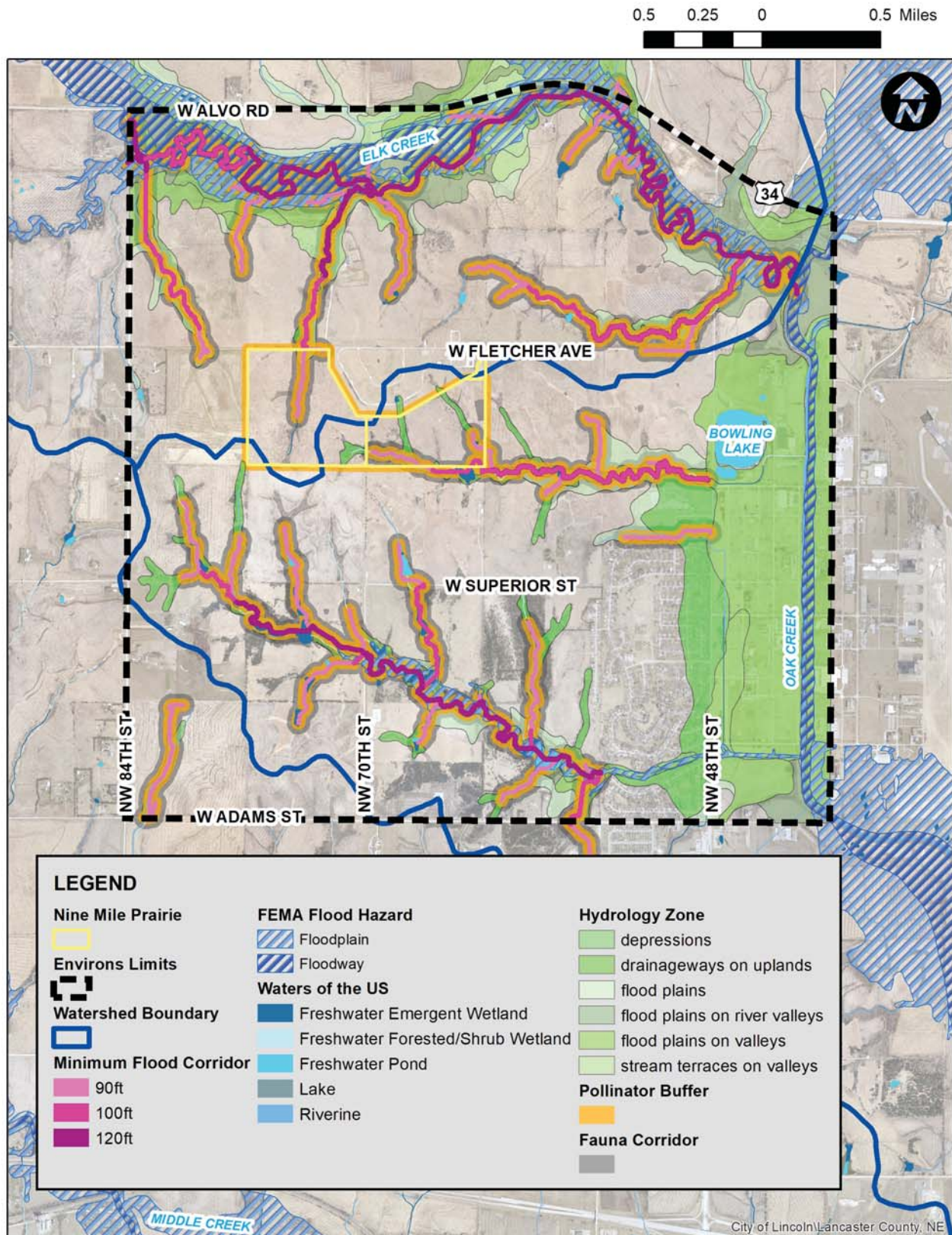
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Natural Resource Inventory for NMP Environs - SW Quadrant



APPENDIX G

Hydrology Inventory and Habitat Buffers



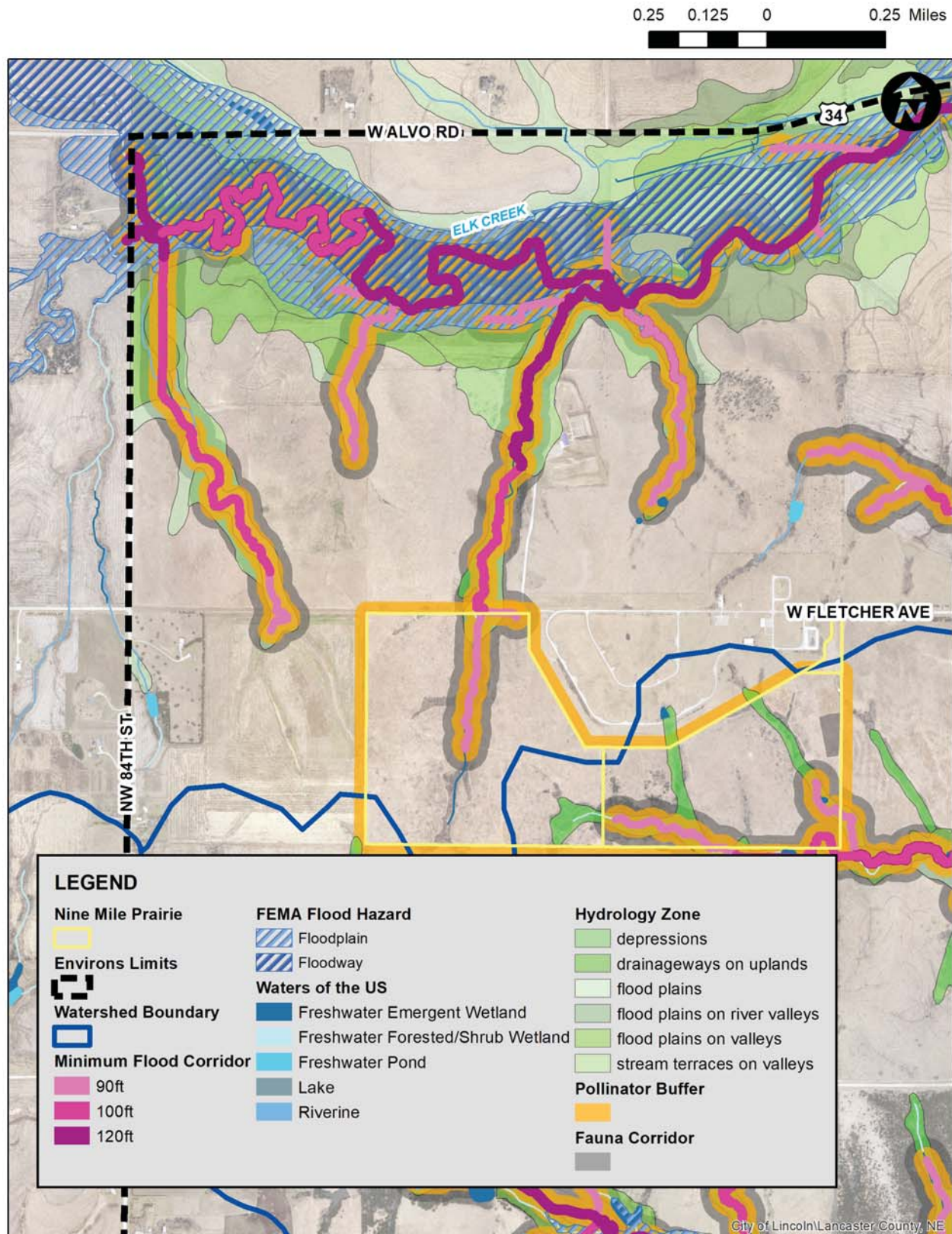
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Nine-Mile Prairie Environs Master Plan
APPENDIX G - Spatial Analysis Maps

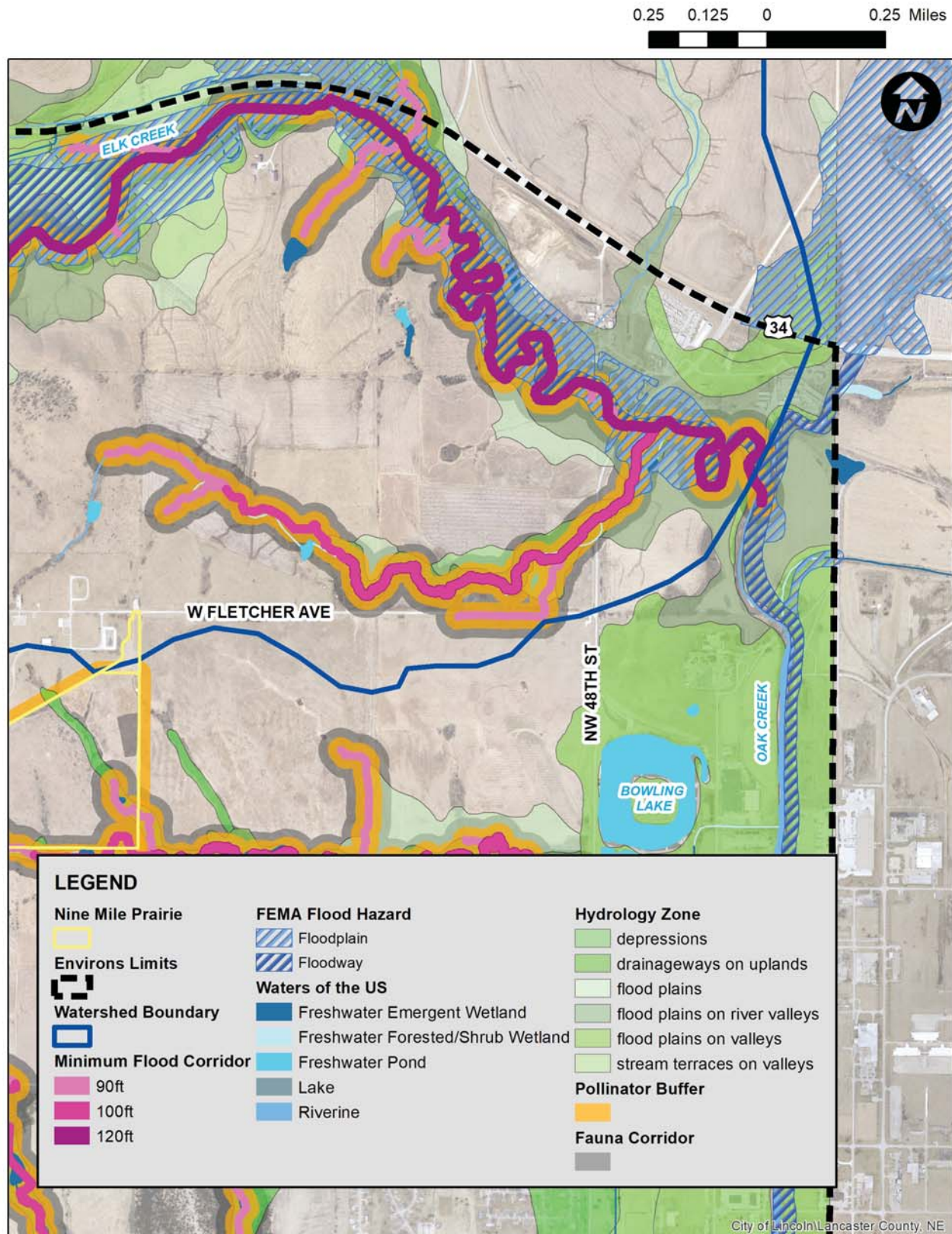
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Hydrology Inventory and Habitat Buffers - NW Quadrant



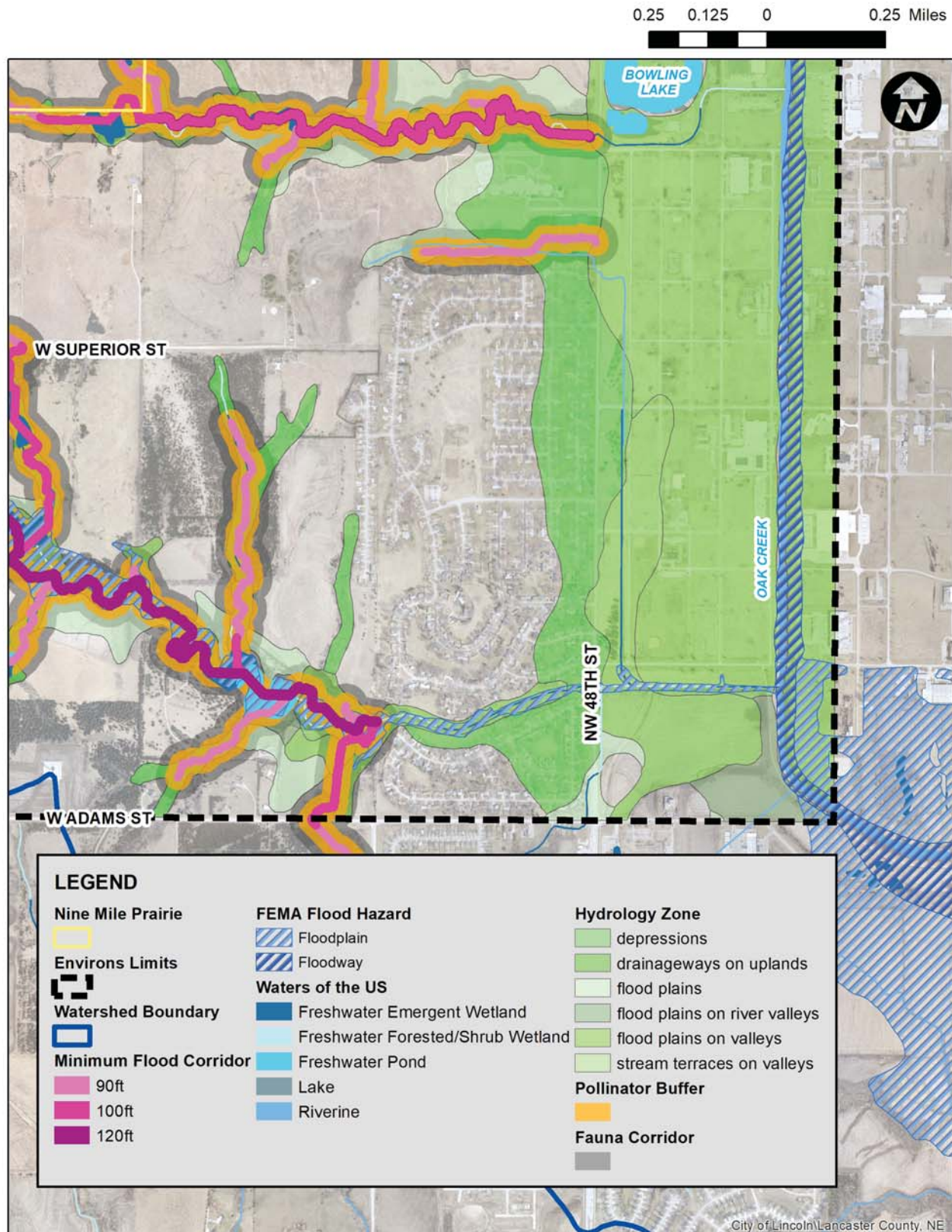
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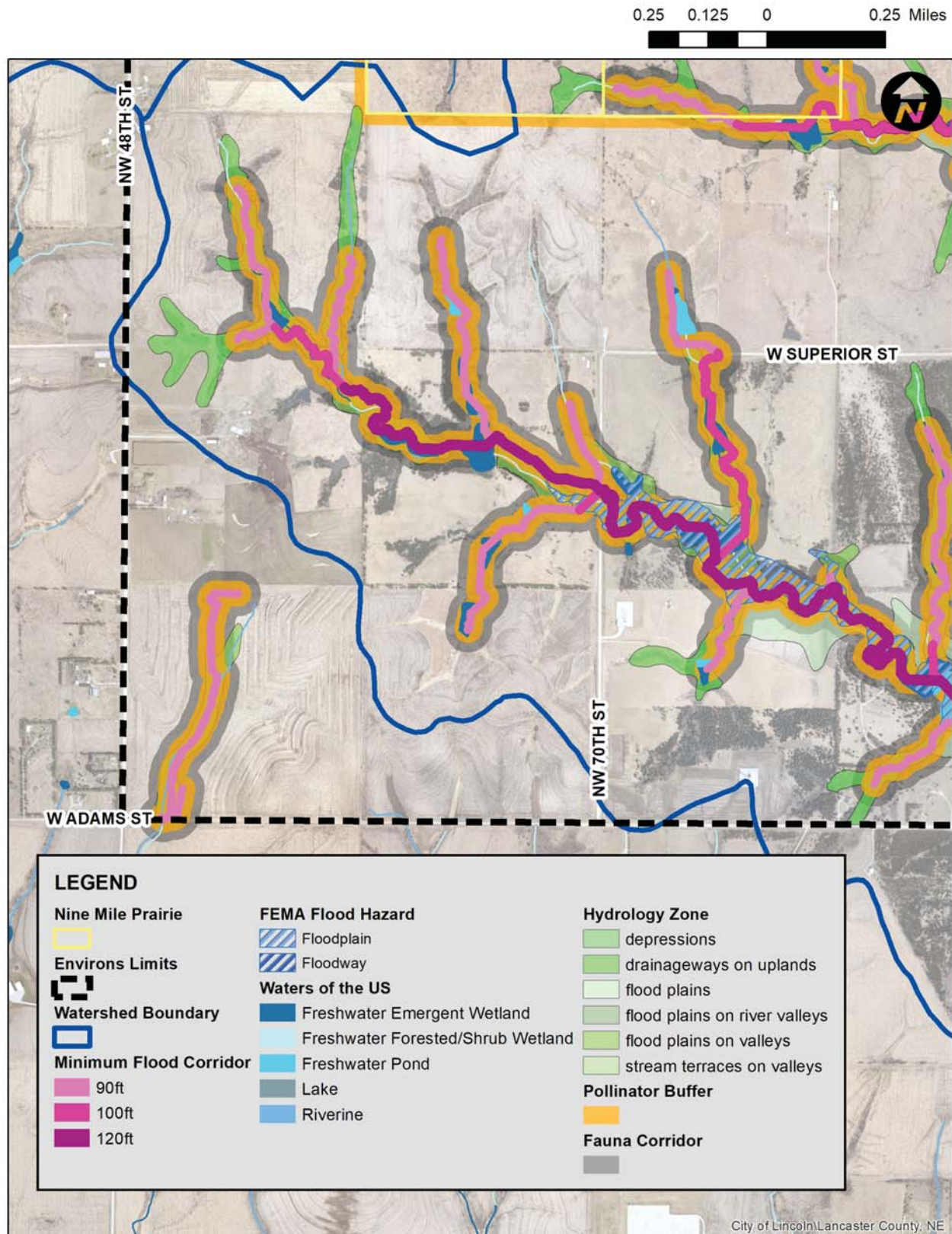
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Hydrology Inventory and Habitat Buffers - SE Quadrant



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Hydrology Inventory and Habitat Buffers - SW Quadrant



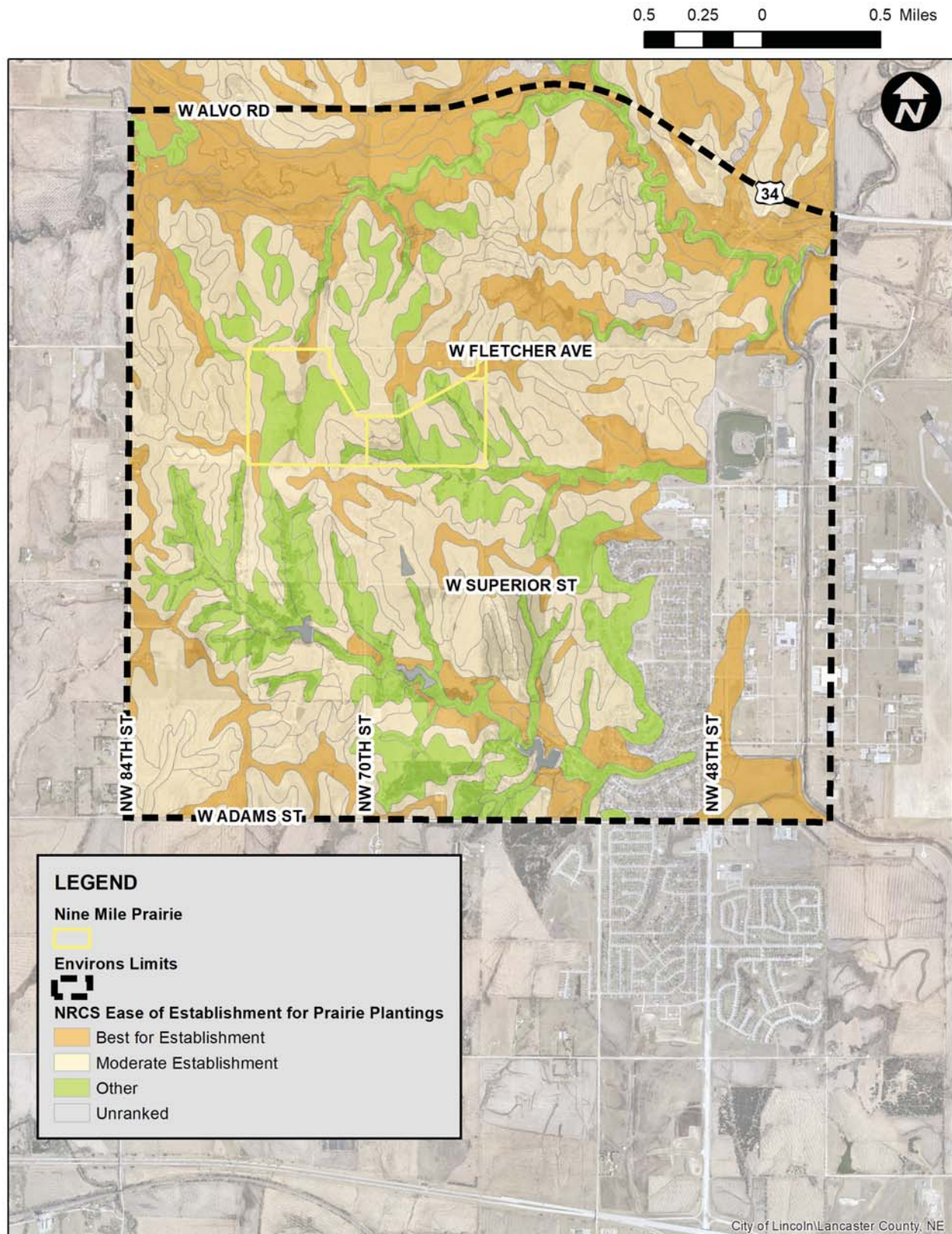
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APPENDIX G - Spatial Analysis Maps

APPENDIX G

Soils for Prairie Re-Establishment



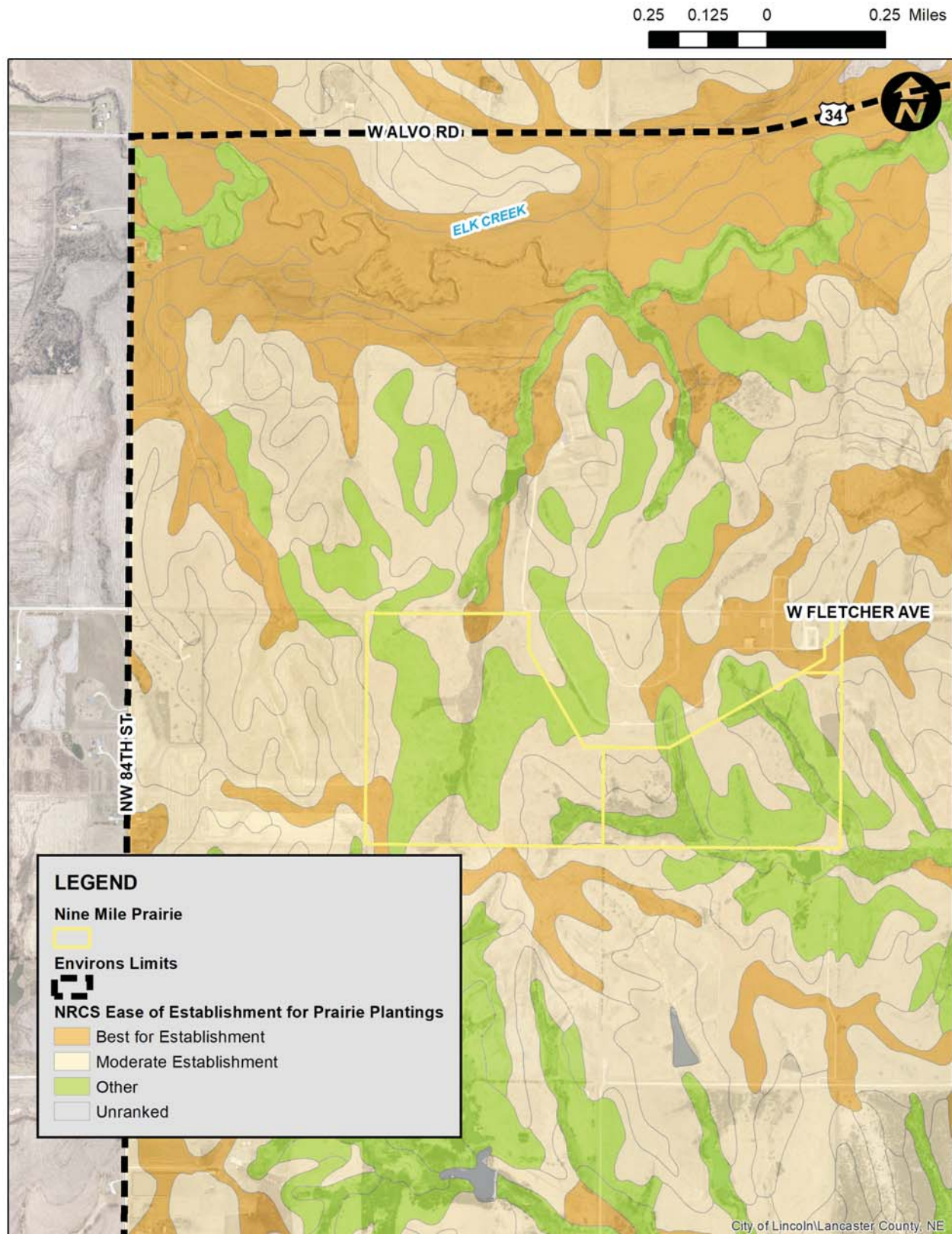
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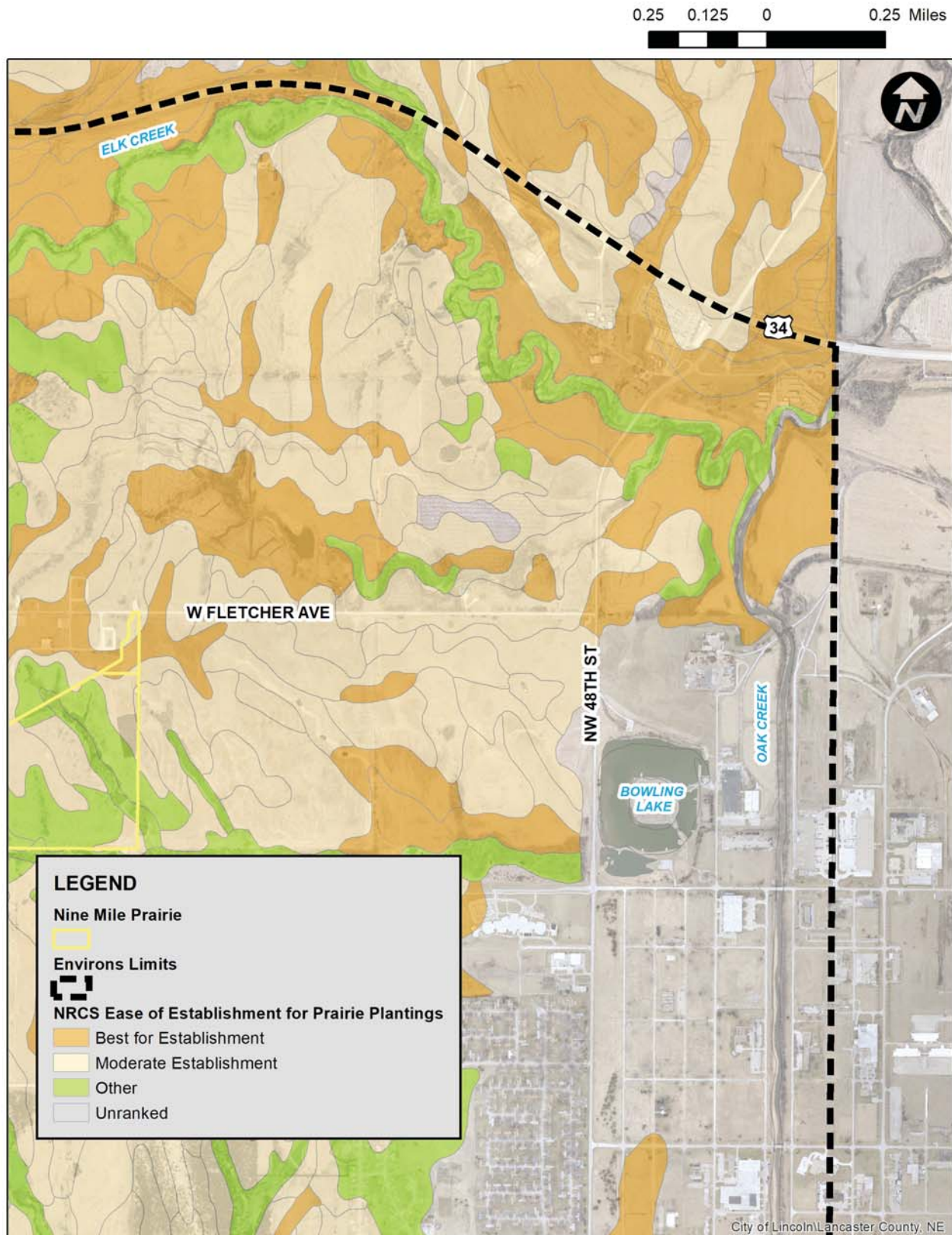
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Soils for Prairie Re-Establishment - NW Quadrant



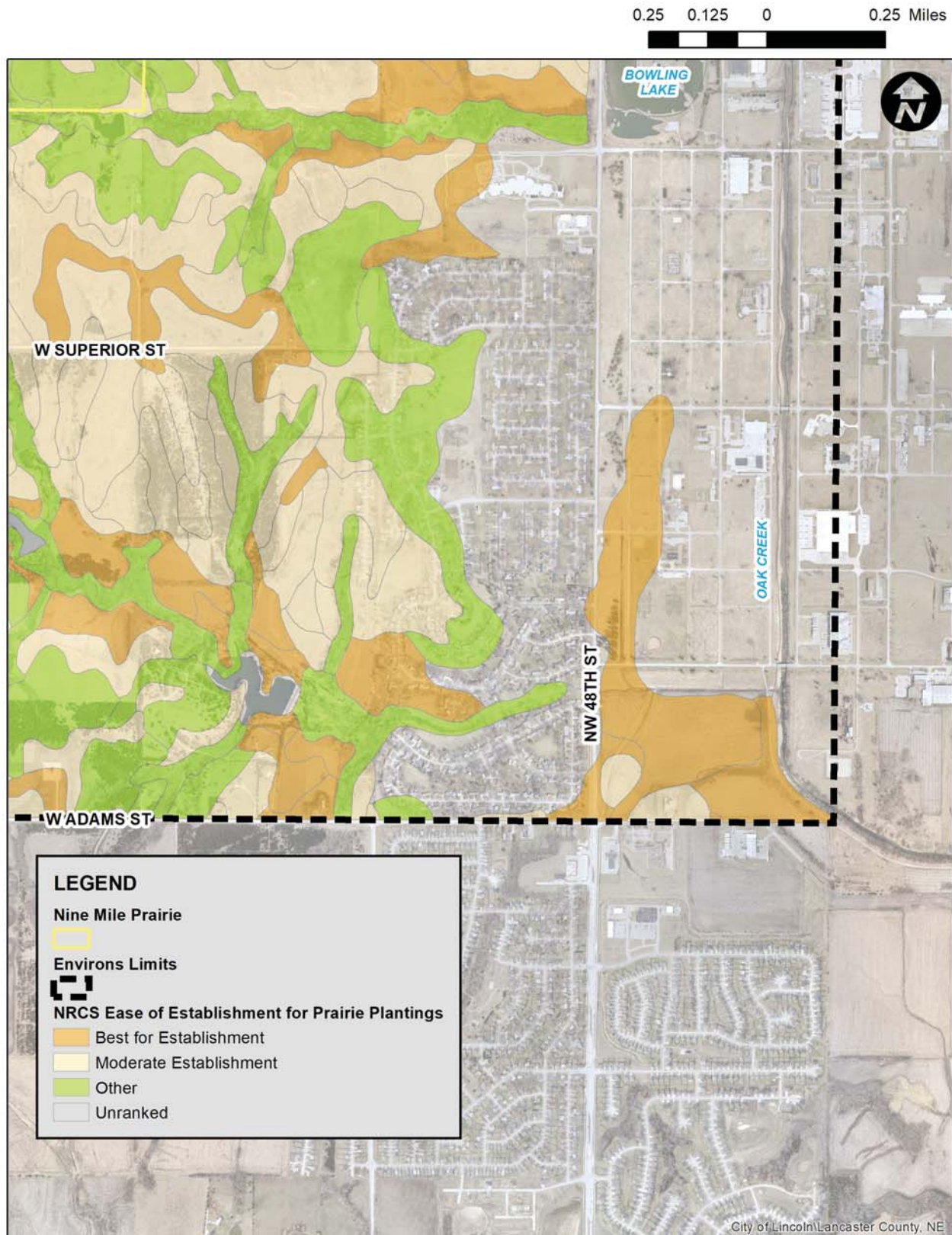
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Soils for Prairie Re-Establishment - NE Quadrant



APPENDIX G

Soils for Prairie Re-Establishment - SE Quadrant



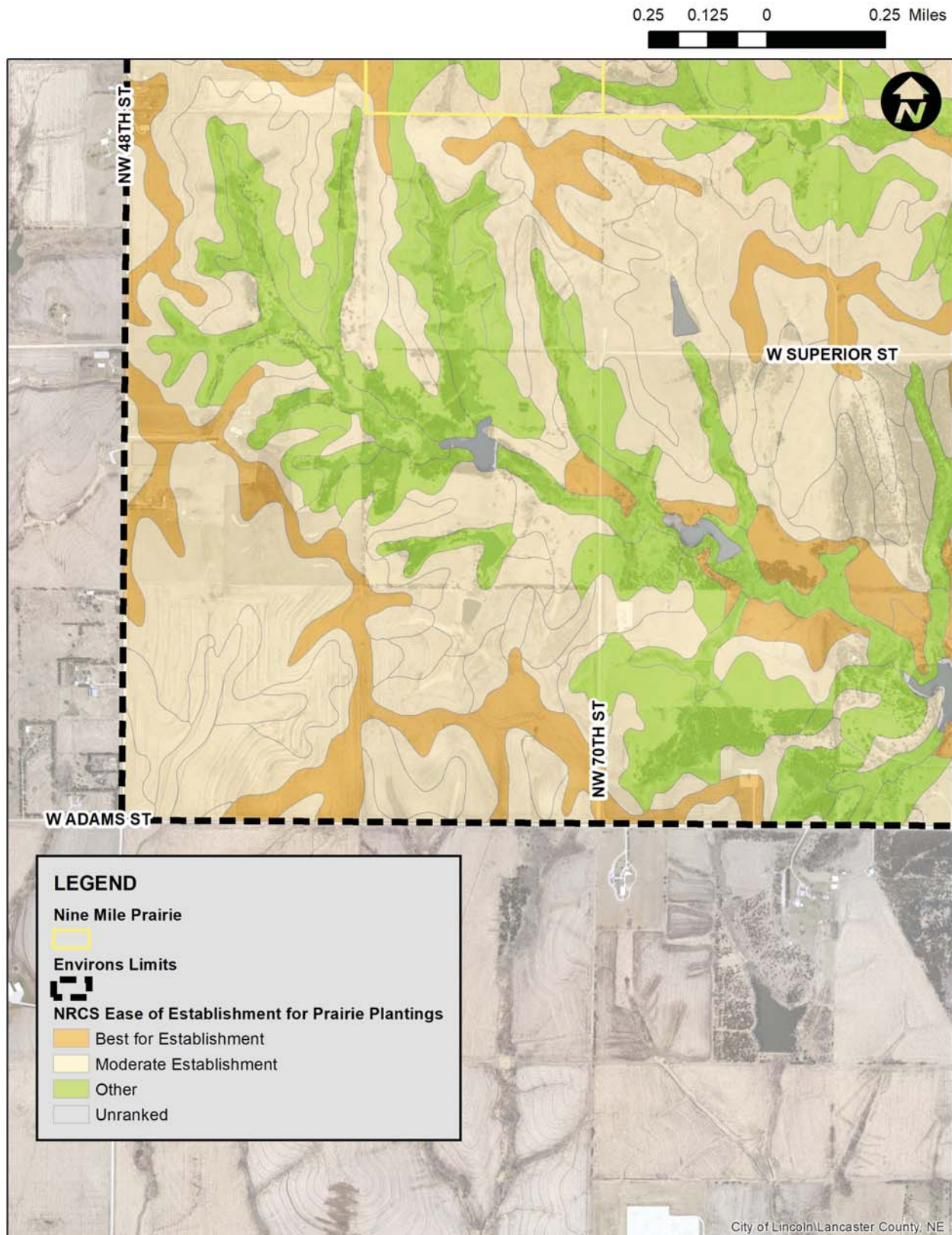
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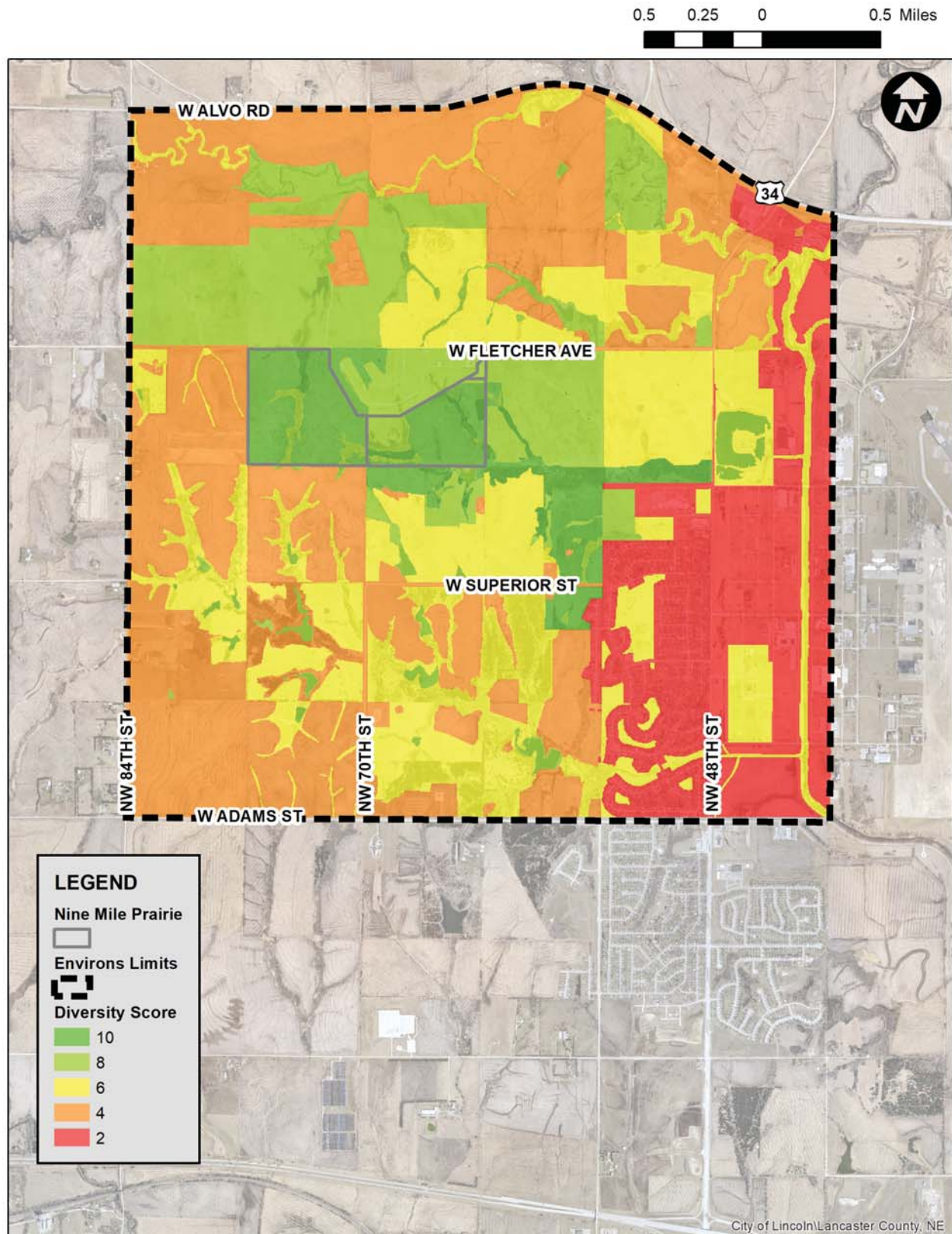
APPENDIX G

Soils for Prairie Re-Establishment - SW Quadrant



APPENDIX G

Habitat Diversity Scoring for NMP Environs



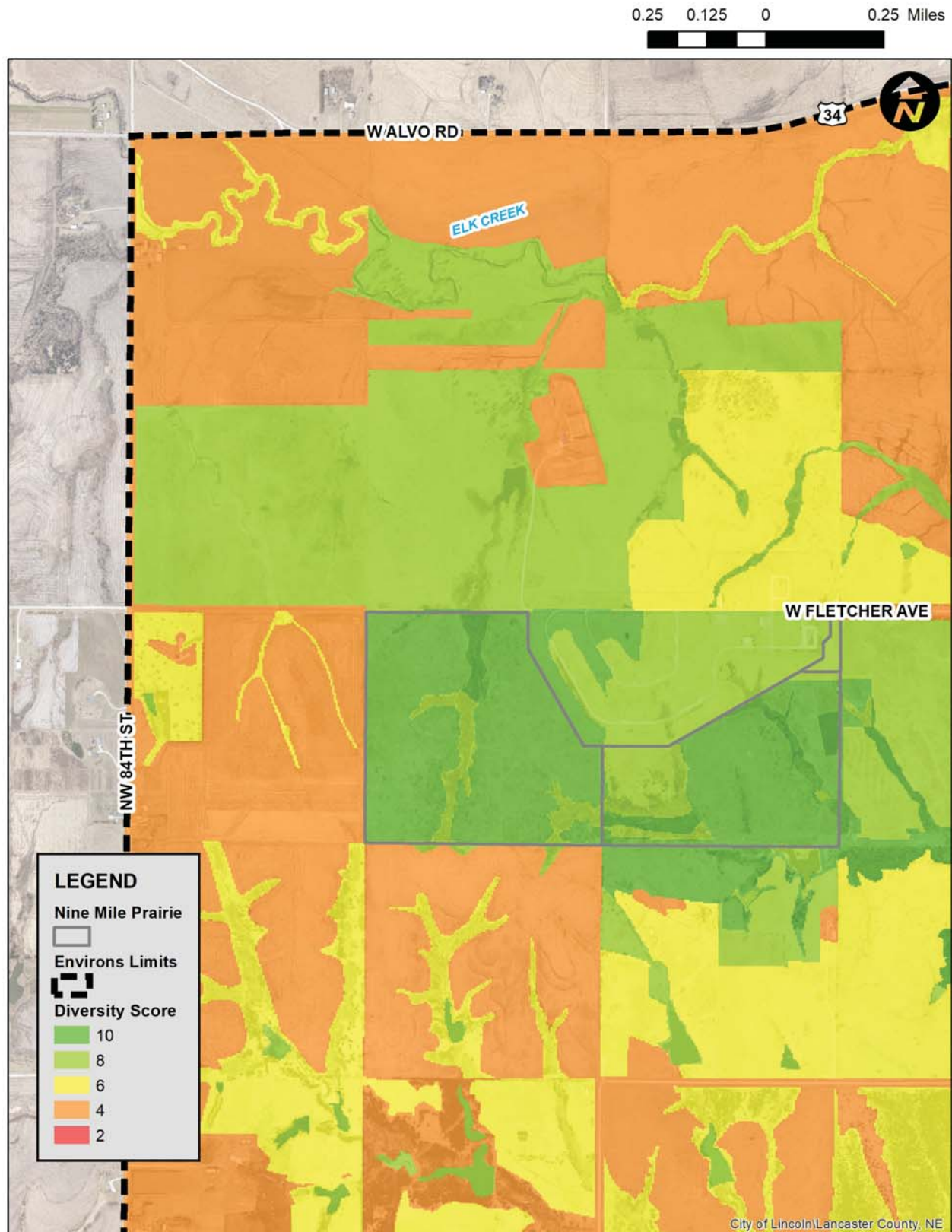
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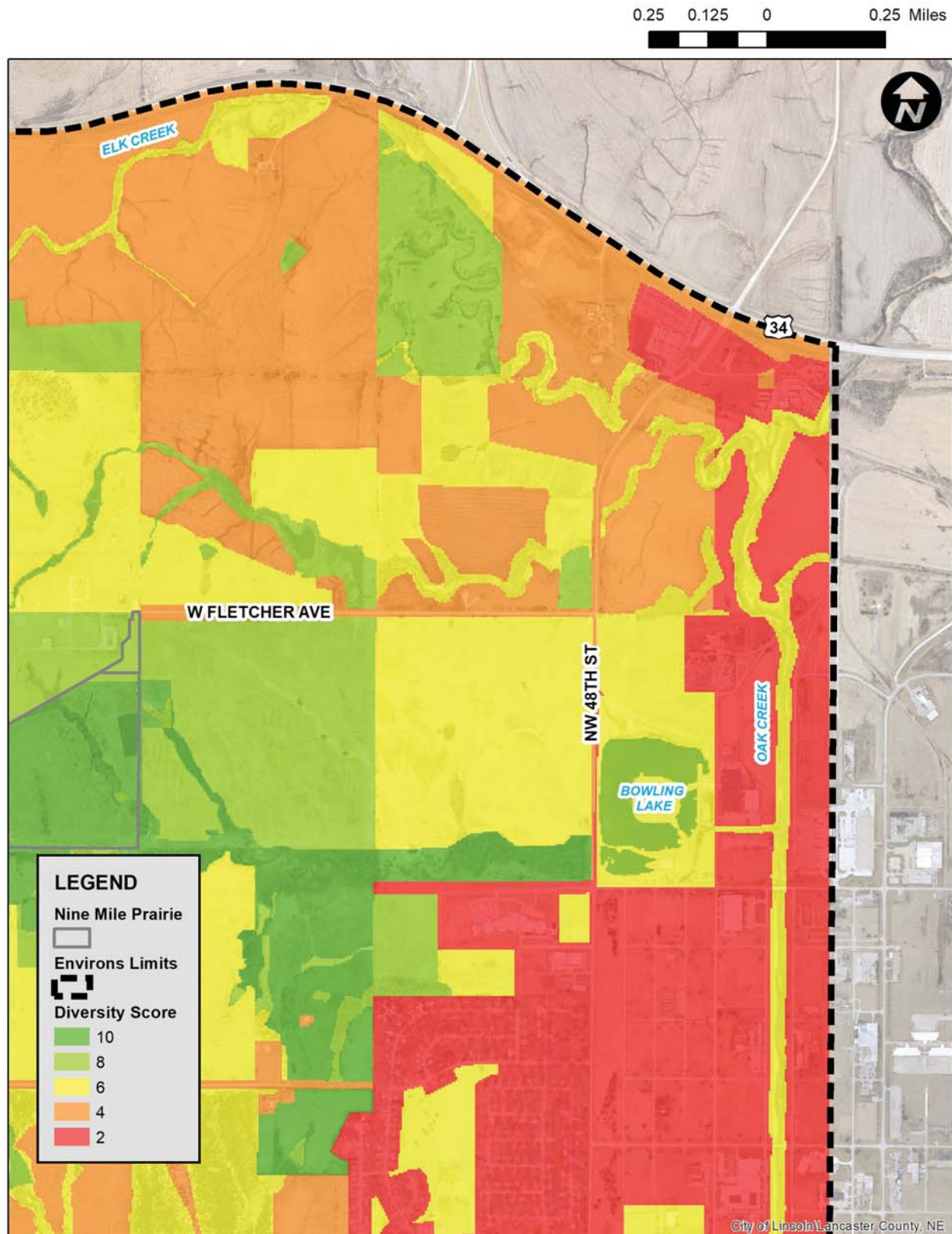
APPENDIX G

Habitat Diversity Scoring for NMP Environs - NW Quadrant



APPENDIX G

Habitat Diversity Scoring for NMP Environs - NE Quadrant



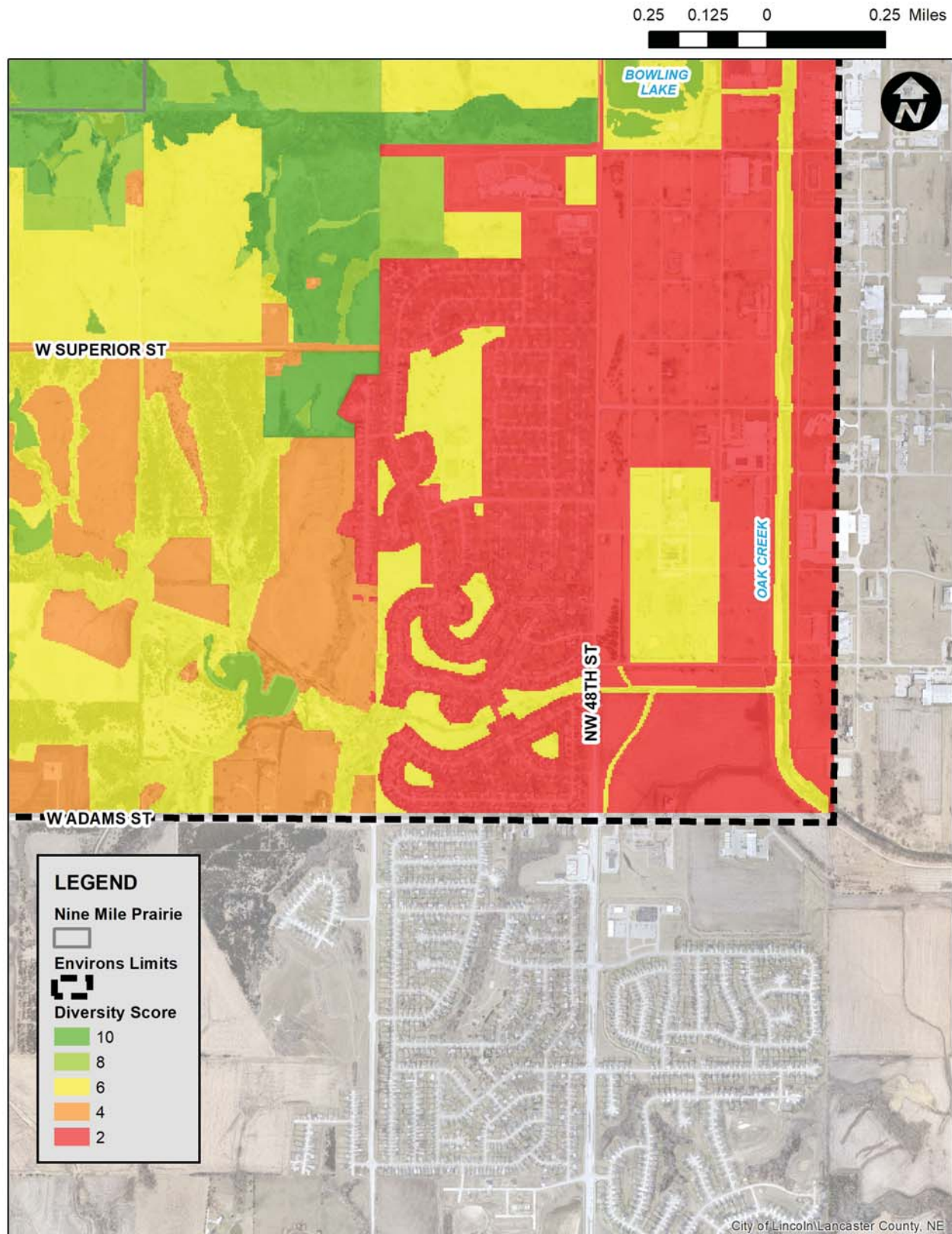
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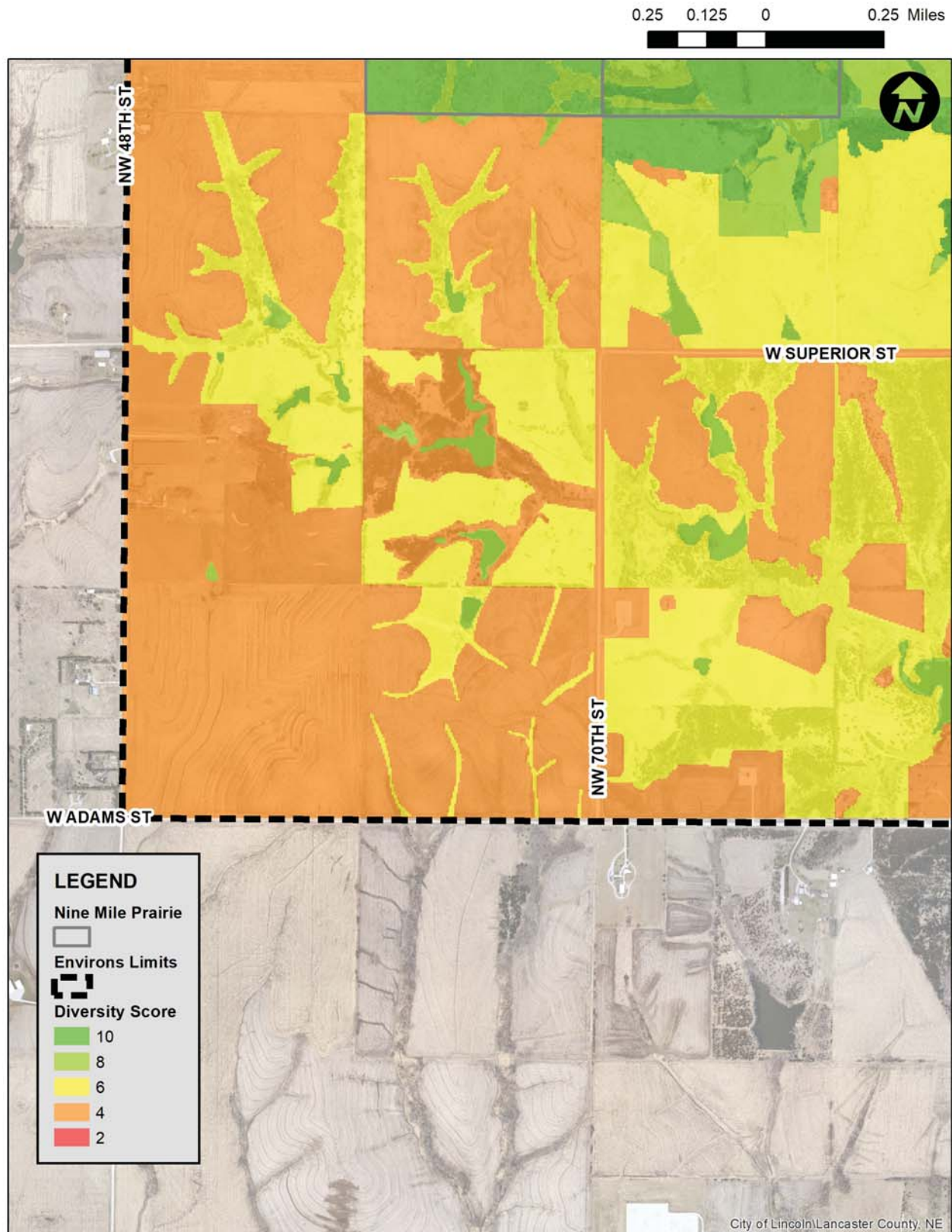
APPENDIX G

Habitat Diversity Scoring for NMP Environs - SE Quadrant



APPENDIX G

Habitat Diversity Scoring for NMP Environs - SW Quadrant



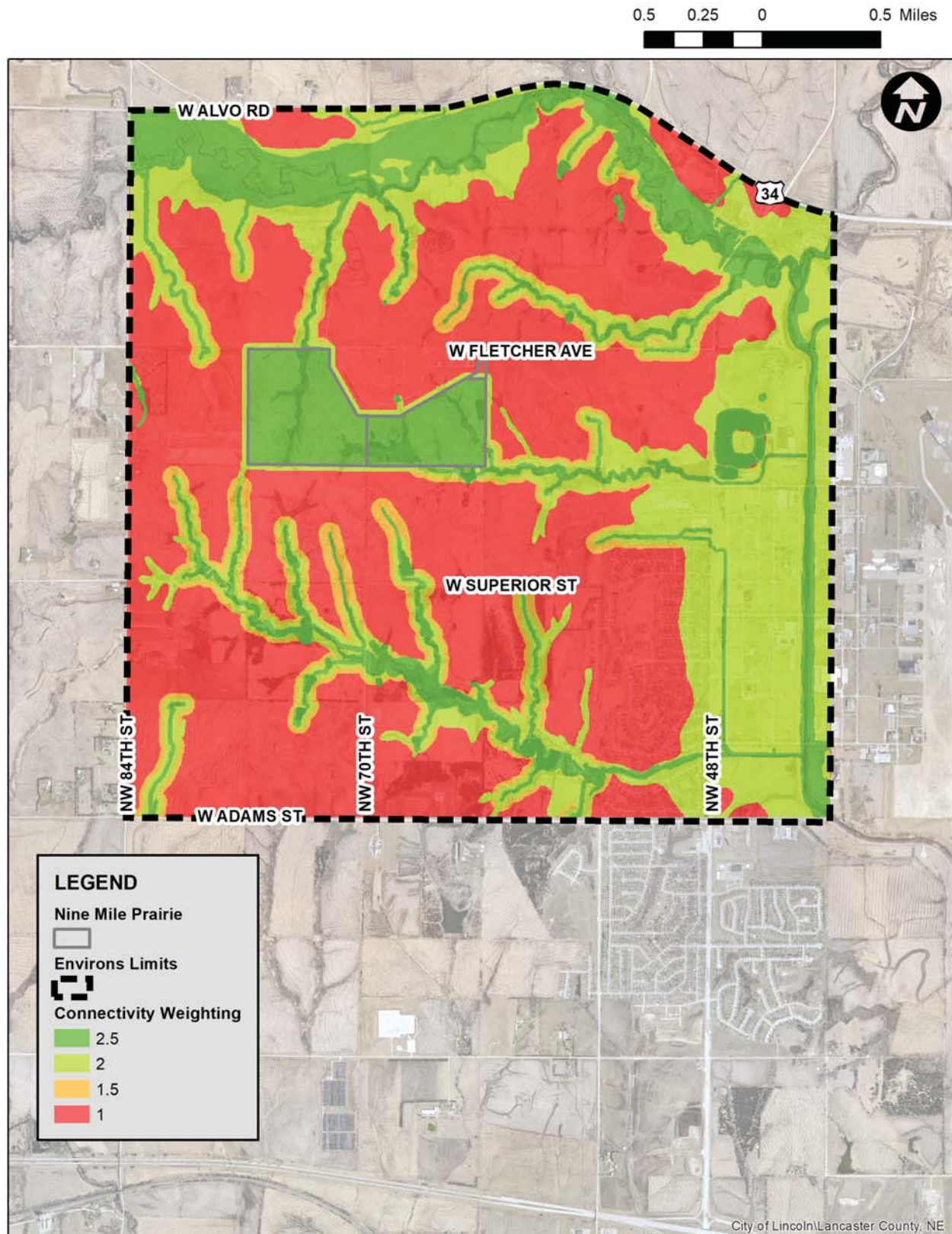
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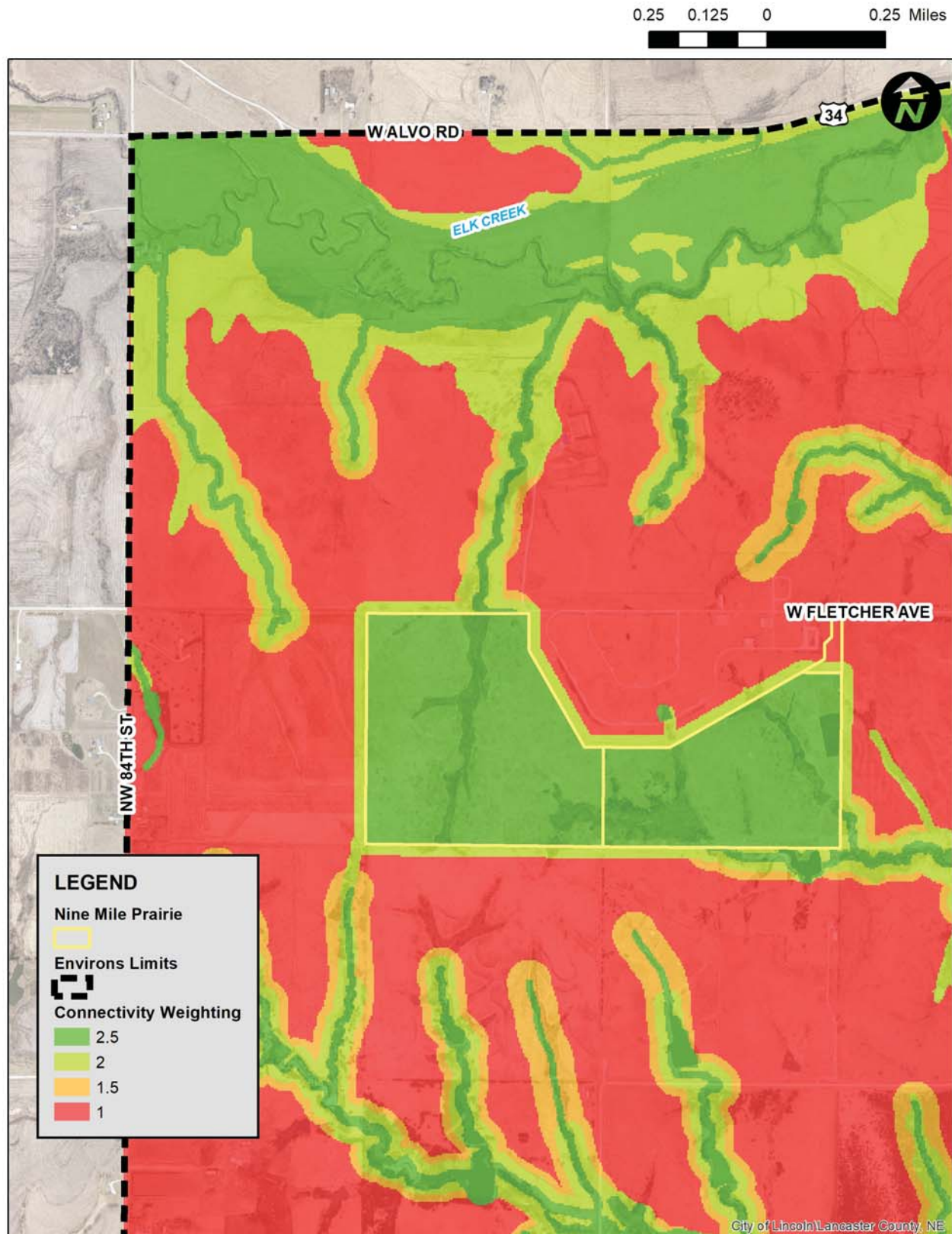
APPENDIX G

Habitat Connectivity Weighting Score for NMP Environs



APPENDIX G

Habitat Connectivity Weighting Score for NMP Environs - NW Quadrant



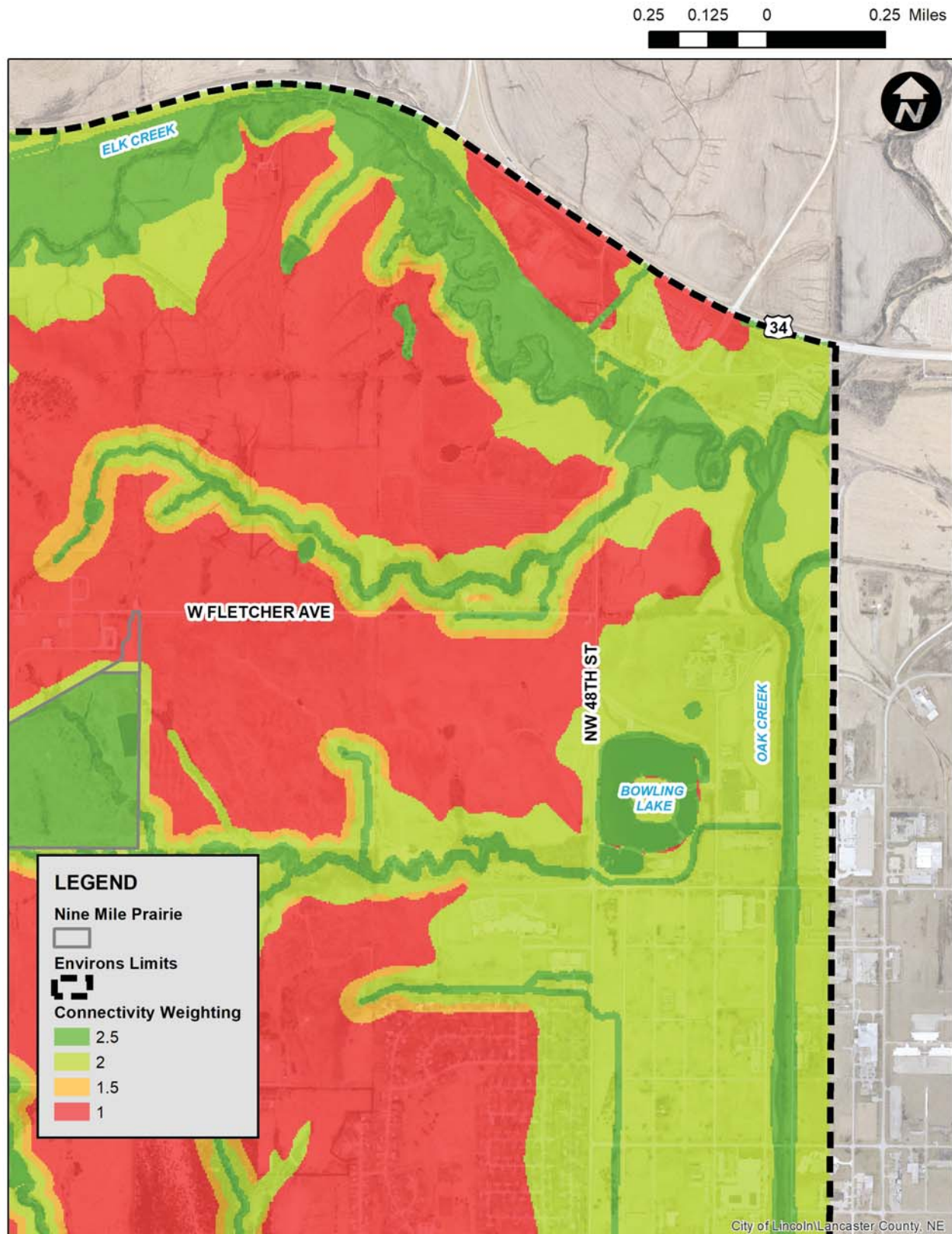
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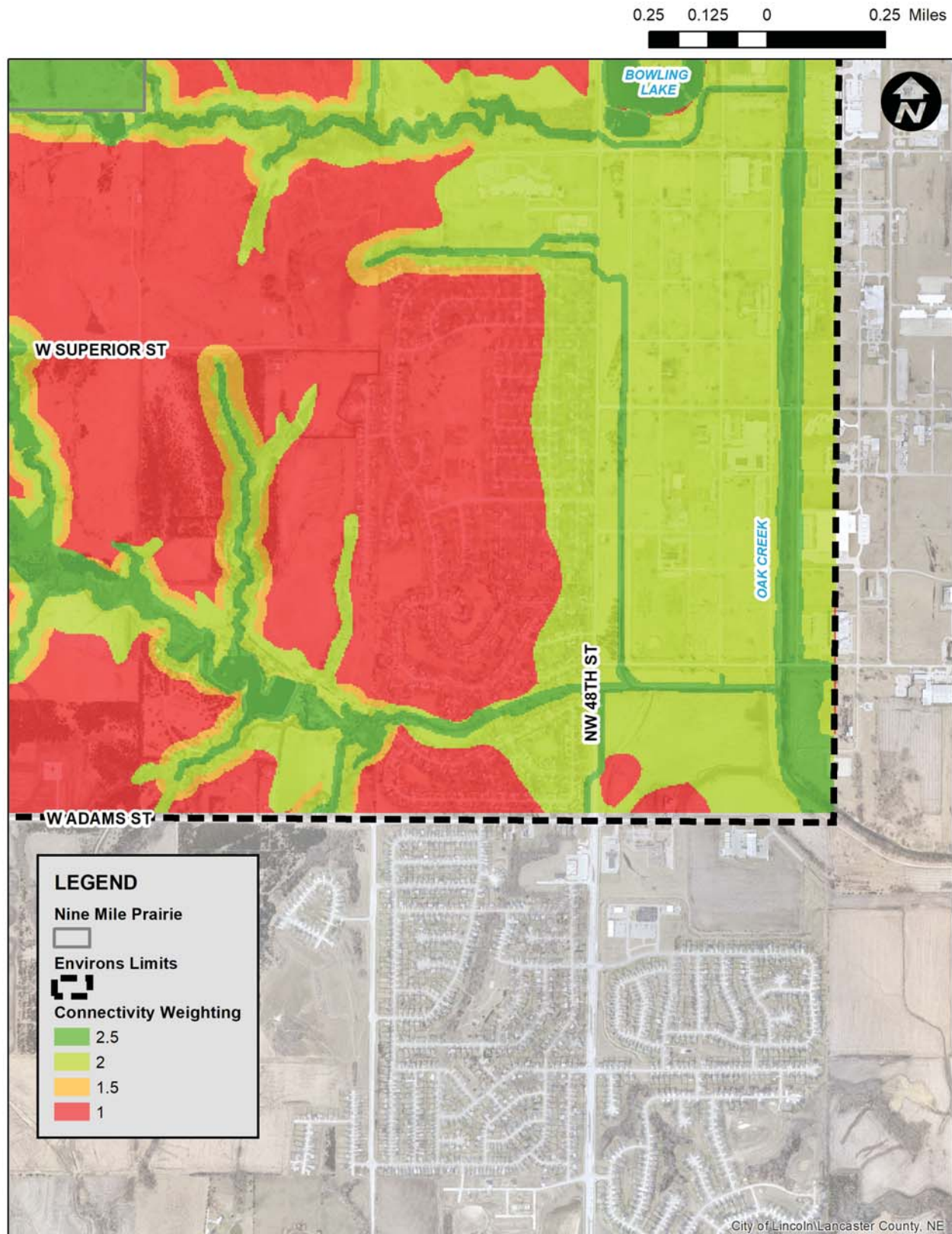
APPENDIX G

Habitat Connectivity Weighting Score for NMP Environs - NE Quadrant



APPENDIX G

Habitat Connectivity Weighting Score for NMP Environs - SE Quadrant



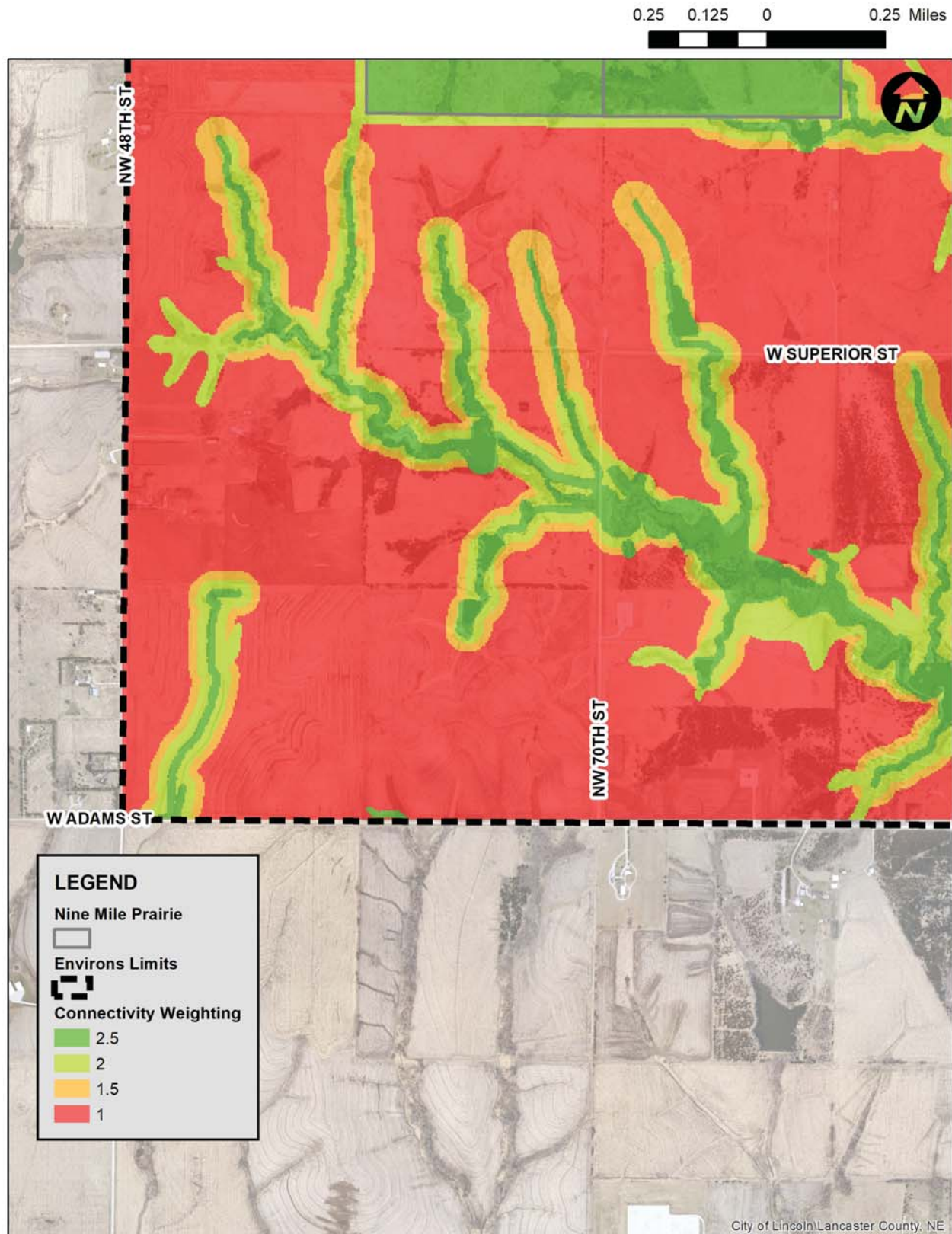
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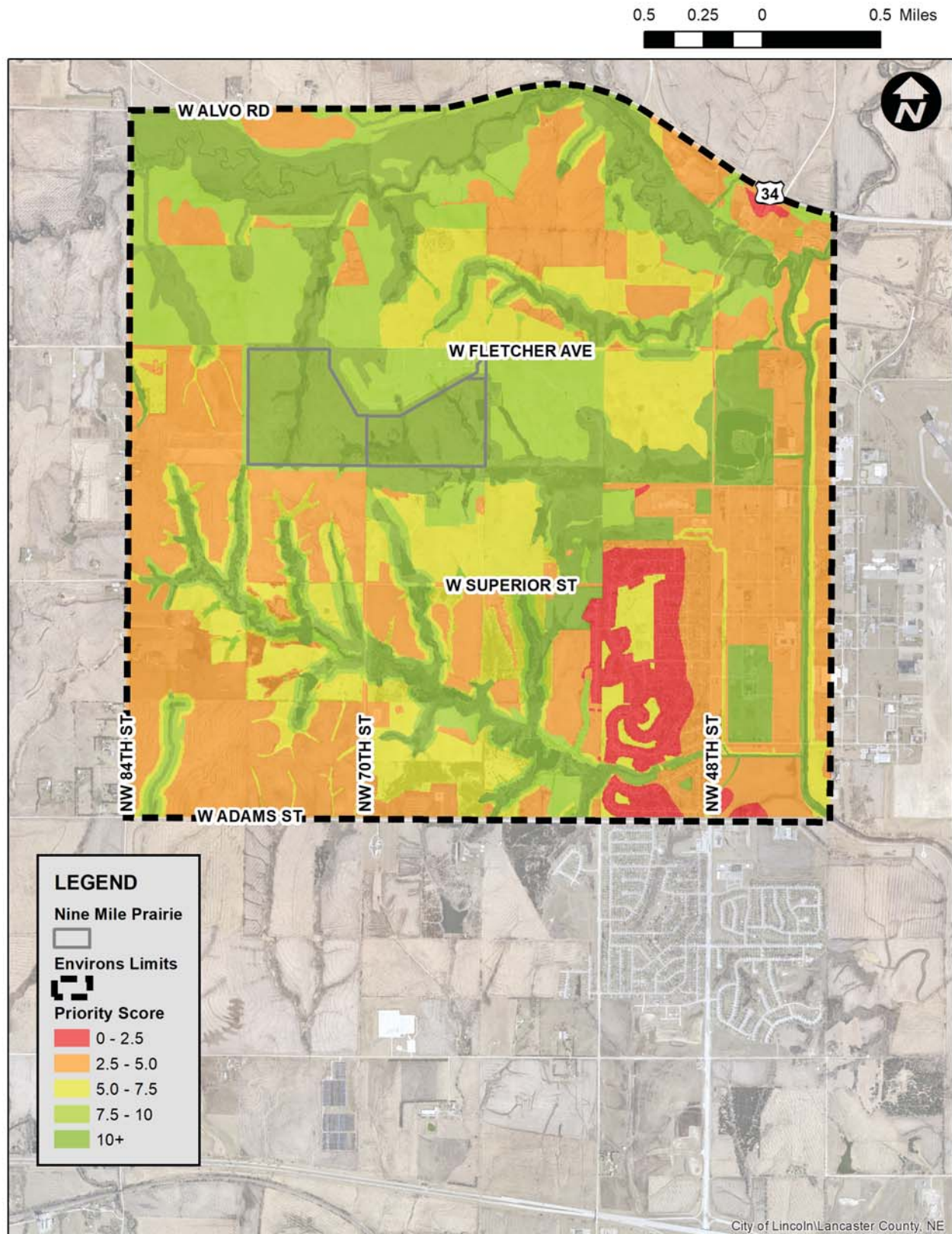
APPENDIX G

Habitat Connectivity Weighting Score for NMP Environs -SW Quadrant



APPENDIX G

Habitat Priority Scoring for NMP Environs



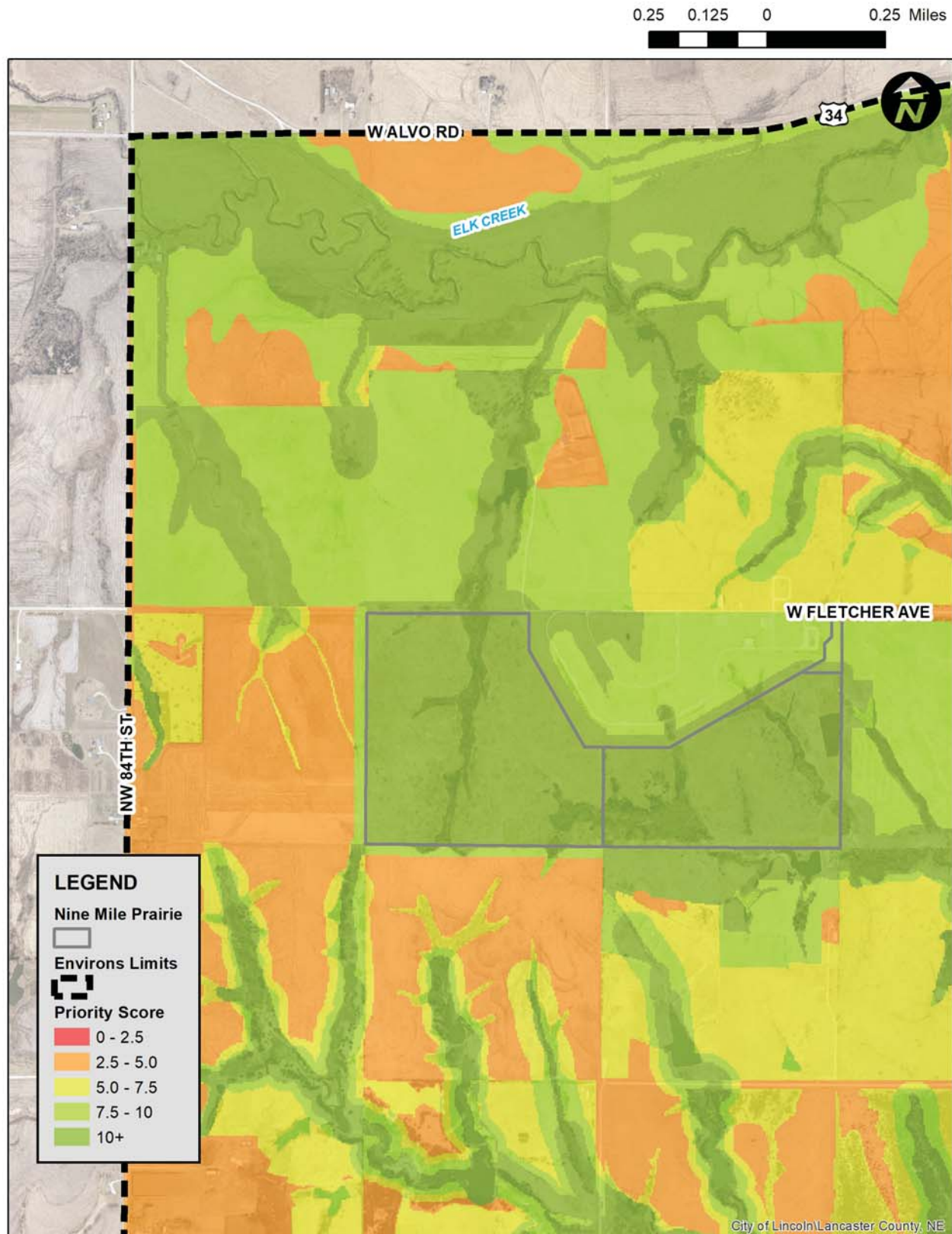
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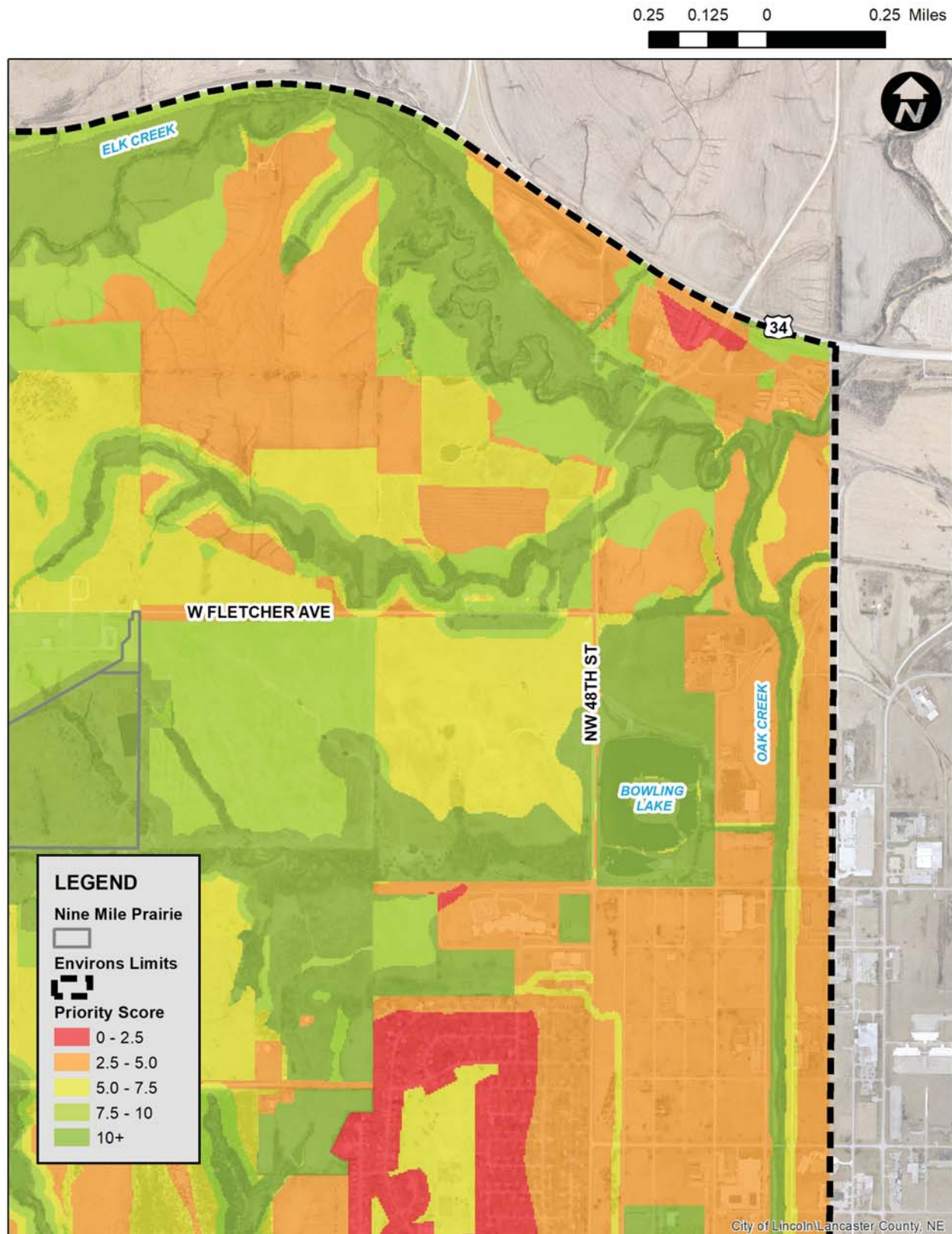
APPENDIX G

Habitat Priority Scoring for NMP Environs - NW Quadrant



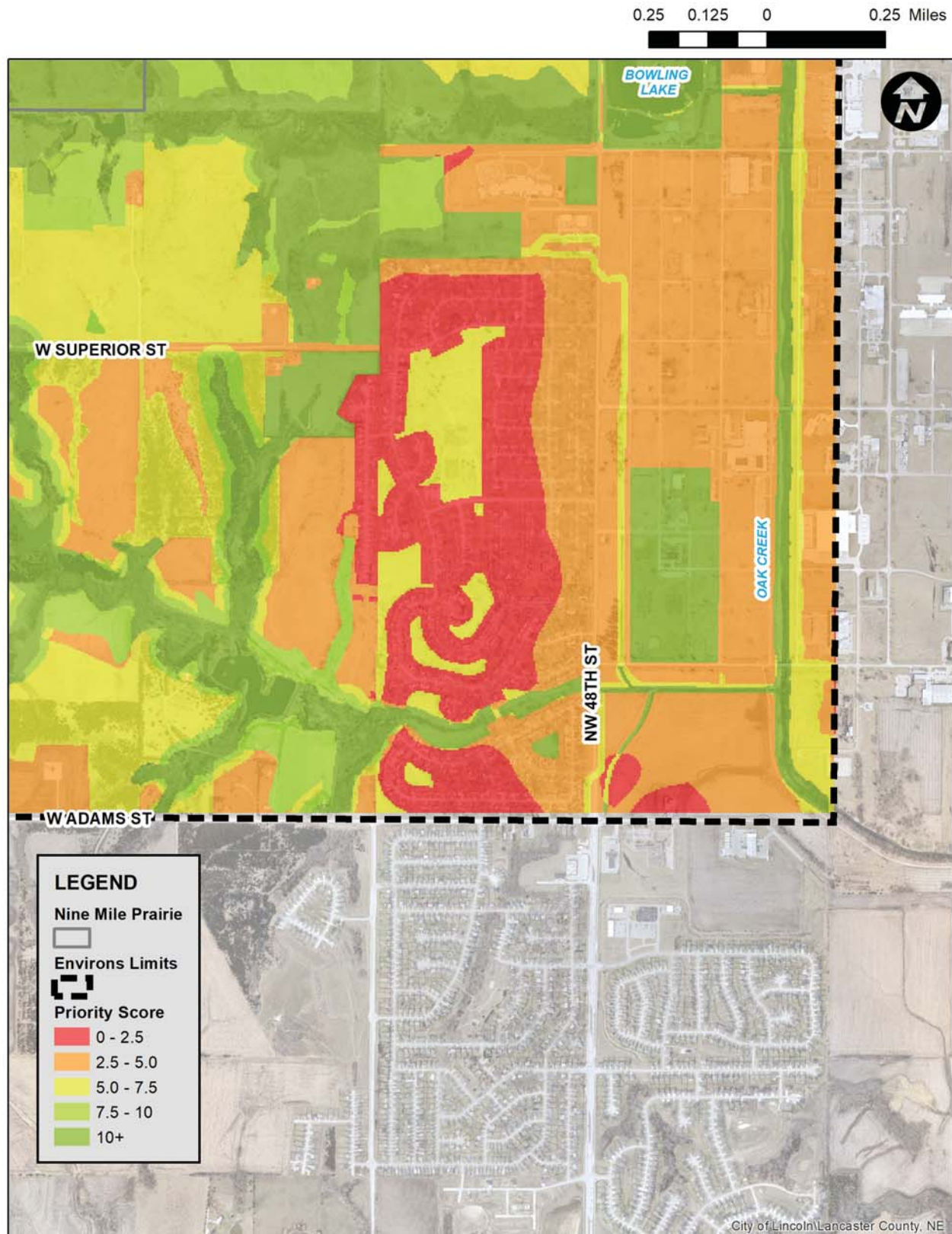
APPENDIX G

Habitat Priority Scoring for NMP Environs - NE Quadrant



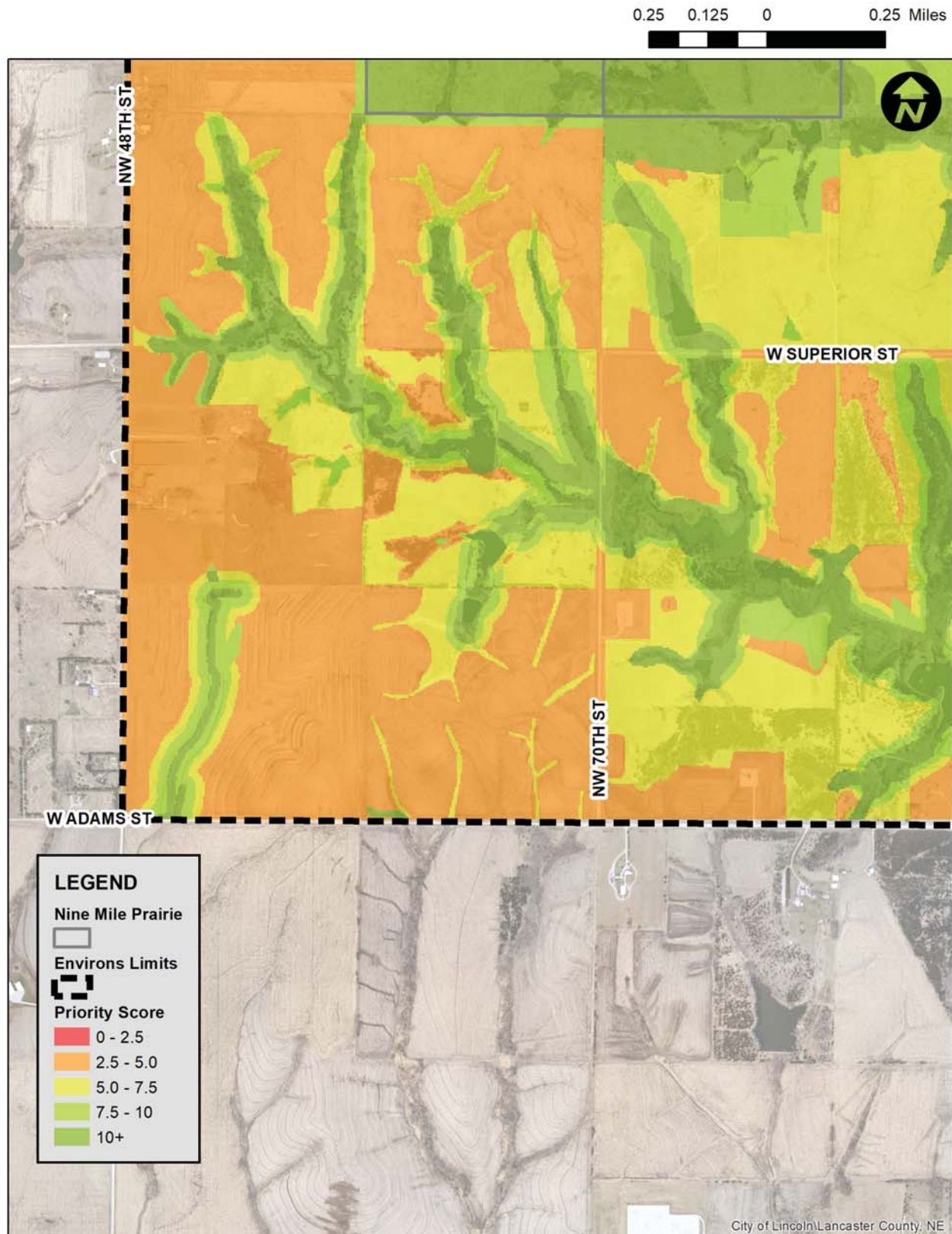
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Habitat Priority Scoring for NMP Environs - SE Quadrant



APPENDIX G

Habitat Priority Scoring for NMP Environs - SW Quadrant



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