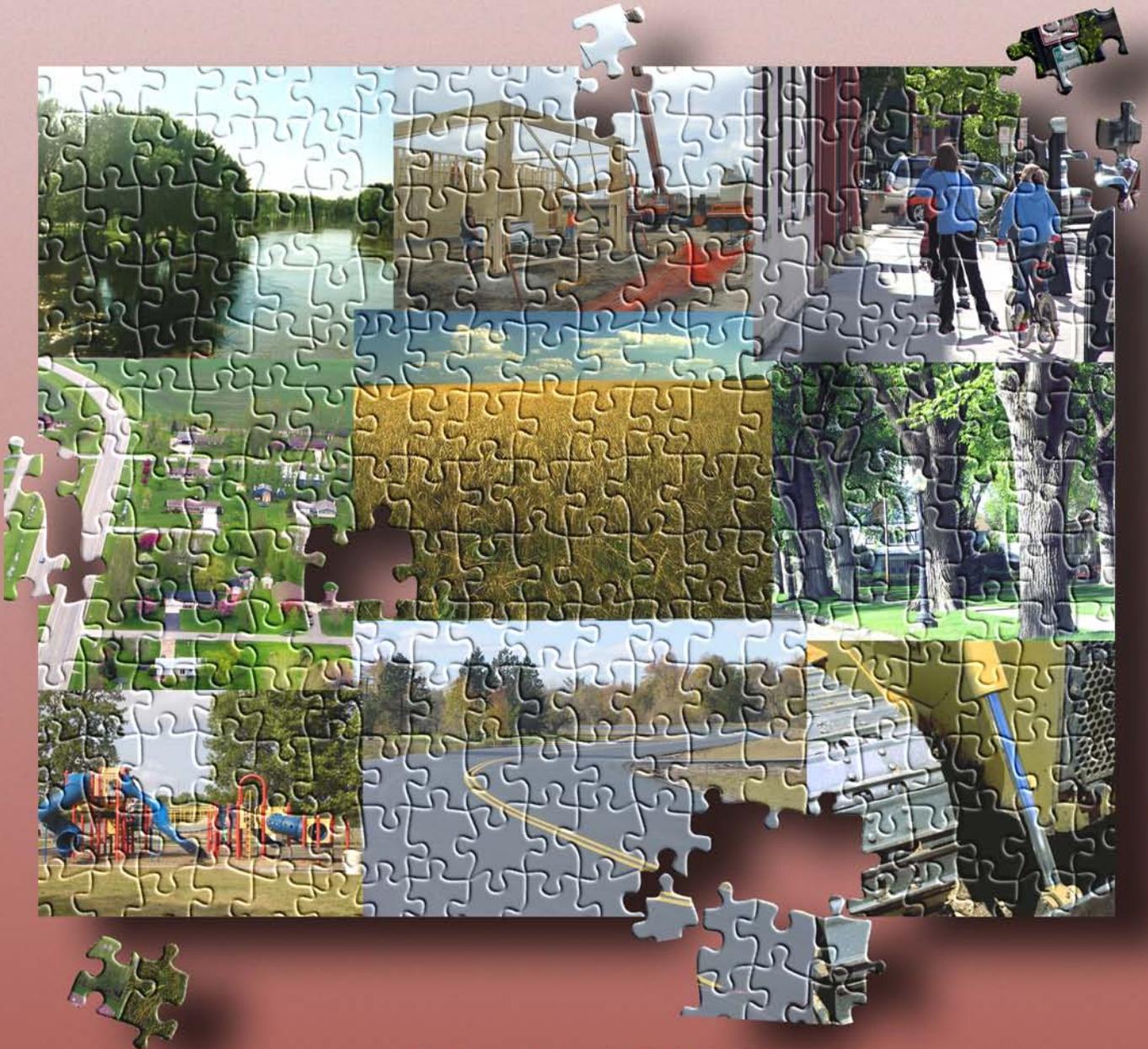


Cass County Comprehensive Plan



Adopted 2005

CASS COUNTY
GOVERNMENT



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ACKNOWLEDGEMENTS

CASS COUNTY PLANNING COMMISSION

Current	Former
Linda Coates	Don Hanson
Todd Ellig	John Meyer
Kenton Jenson	Jean Rayl
Mark Johnson	Bryan Schulz
Ken Lougheed	Scott Wagner
Keith Monson	
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CASS COUNTY STAFF

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Keith Berndt, County Engineer	Joel Quanbeck, Planner
Mike Zimney, County Planner	
Heather Worden, Auditors Office	

STATE AND LOCAL AGENCIES

Cass County Water Resource Boards	Dr. Donald Schwert, NDSU Geosciences
Metropolitan Council of Governments Staff	Jay Mar, NRCS
City of Fargo Planning Staff	Terry Ludlum, Fargo-Cass Public Health
City of West Fargo Planning Staff	U.S. Department of Agriculture Fargo Service Center
Local City and Township Officials	Natural Resources Conservation Service
Dave Ripley, State Water Commission	Fargo Service Center

CONSULTANT

Matthew E. Johnson, Mid-Minnesota Development Commission

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INTRODUCTION

The Cass County Planning Commission began discussing an update to the county's Comprehensive Plan in the Fall of 2003. Cass County's original Comprehensive Plan was adopted in 1979 and subsequently updated in 1988. The increased growth in the county, the need to examine the need for smarter or controlled growth, and the time span since the last update all necessitated the need to update of the Comprehensive Plan. Beginning in the 2004, the Cass County Planning Commission began the process of updating the county's Comprehensive Plan. Numerous Planning Commission meetings were held to review and discuss material, listen to presentations, and review drafts of the Plans individual chapters.

By the fall of 2004 the Planning Commission had developed a working draft of the update to the Comprehensive Plan and began distributing this draft to the County's townships, cities, and various local and state agencies, groups, and associations. The complete working draft of Comprehensive Plan was also made available on the county's website and the county held a public input meeting in Casselton on the evening of December 13th, 2004.

Following the public input meeting and after the comment period for the Plan had closed all input was compiled and presented to the Planning Commission. The Planning Commission reviewed the compiled input and made the necessary changes to reflect this input. The final components of the Plan were completed and entire Plan was presented to the Planning Commission at their regular meeting on January 28, 2005 and their recommendations for the Plan were made and forwarded to the County Commission

The Plan and supplemental information was presented to the Cass County Commission at their regular meeting on February 7, 2005 and a motion to move forward with the Plan and begin the process to adopt the Plan as an ordinance was approved by the Commission. The first reading of the Plan, including Board adoption of the 2005 Comprehensive Plan with the exception of Chapter Six, which will be established by

ordinance, was held on February 22, 2005 at the regular Commission Meeting. A summary of the enactment of Chapter Six was published in the official newspaper on February 28, 2005, and the Commission held the second reading of the ordinance, including opportunity for public comment, at their regular meeting on March 21, 2005. After this hearing, the Commission approved Ordinance #2005-1.

Fundamentals of the Plan

The primary purpose of the Plan is to develop the framework or blueprint to base and establish the county's policies towards development and growth. This framework is established by developing the vision for the county's future growth; a vision based on the public's desire as well as including elements to protect the health, safety, and general welfare of the county's citizens and tax payers. The first portion of the Plan comprehensively reviews the county, townships, and incorporated cities. This review and inventory provides both a sense of the basic characteristics of the county and also helps identify the current and emerging issues impacting the county. Building upon the comprehensive review and the identification of the current and emerging issues the Plan details the components of the vision for the county's future growth and development. This section develops the general goals, the specific objectives to meet the goals, as well as policies creating the course of action or way in which programs and activities are coordinated to achieve the identified goals and objectives. The final aspect of the Plan creates a general work plan to establish how the Comprehensive Plan and all its components will be implemented.

CHAPTER ONE:

County Profile

Cass County is located in southeastern North Dakota (Figure 1.1) in the Red River valley and what was the lake bottom of glacial Lake Agassiz. The Red River of the North establishes Cass County's eastern border, separating it from Minnesota. The county has a total area of over 1.13 million acres with a maximum dimension of 42 miles north-south by 44 miles east-west. Fargo, located in the eastern portion of the county along the Red River is county seat and largest city with a 2000 Census population over 90,000 residents (U.S. Census Bureau 2004).

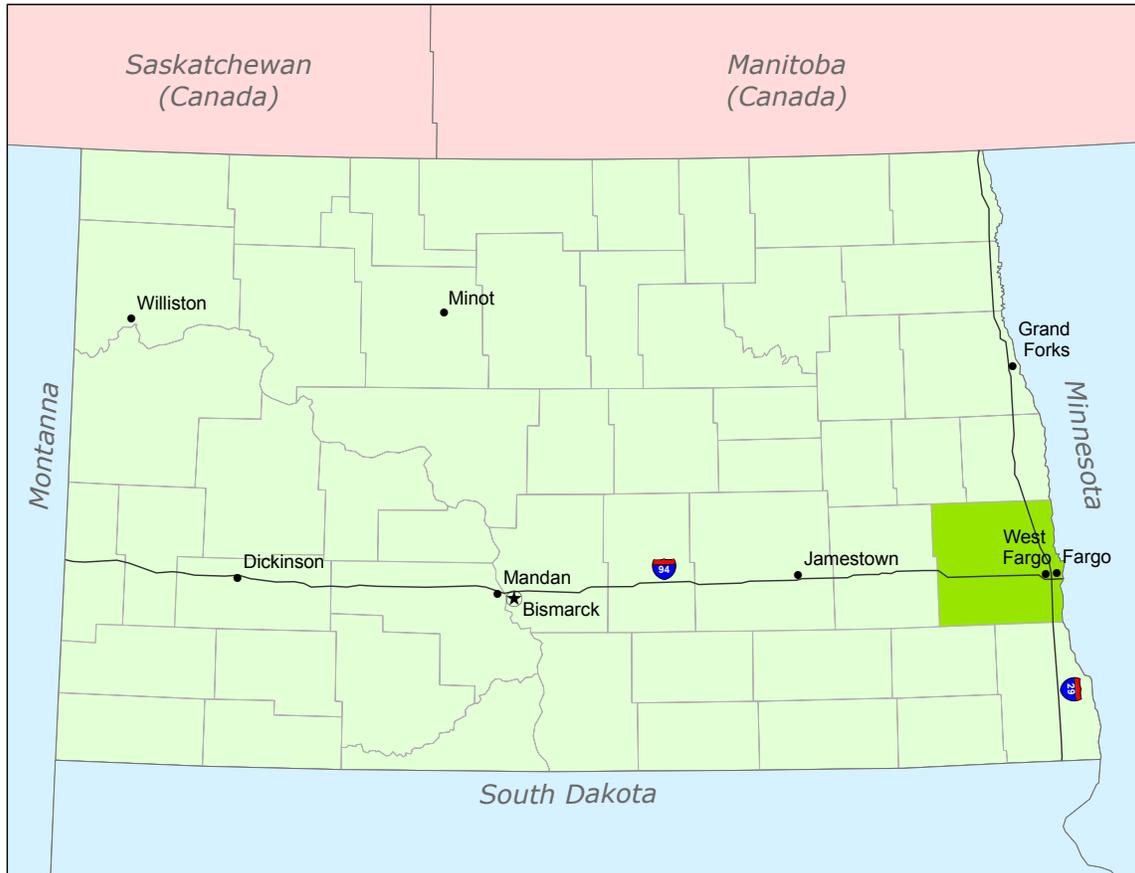


Figure 1.1. Location of Cass County and the major cities of North Dakota.

History and Background

Sisseton and Wahpeton bands of the Sioux Native Americans occupied what is now Cass County. The first European settlers migrating west across North America were fur bearers. As such, the first settler in Cass County, Peter Goodman in 1866 or 1867, was an employee of the Hudson Bay Company. The new pioneers relied heavily on the areas waterways, settling along the Red, Wild Rice, and Sheyenne rivers for sources of wood, water, resources, and transportation. (Commission of Cass County and the Cass County Planning Department 1988).

The area now known as Cass County was originally part of Pembina County which included all of northern Dakota Territory east of the Missouri River. As settlement increased in the area, Pembina County was carved into several smaller counties. Cass County, named after George W. Cass, the President of Northern Pacific Railway, was officially created in 1873, with the first County Commission meeting being held on October 27, 1873 (Commission of Cass County and the Cass County Planning Department 1988).

The expansion of the Northern Pacific Railway crossing in 1871 at what now is Fargo marked the beginning of western development into the county. This expansion brought new settlers which combined with the discovery of the fertile soils of the Red River Valley created large bonanza farming operations. These settlers performed the arduous task of sod busting, exposing the natural soils to seed various small grains; spring wheat provided the areas first cash crop and its success largely responsible for the increased number of settlers into the region (USDA 1983, 1-2). The intensive farming practices of the bonanza farms contributed to the 1930's Dust Bowls and led to soil conservation practices used to prevent the erosion of the fertile topsoil (Commission of Cass County and the Cass County Planning Department 1988).

The increased utilization of the automobile and the expansion and creation of a higher quality road network allowed residents to travel longer distance more rapidly and

reliably. Regional trade centers grew as a result, providing more products and services within relatively short distance to the rural residents (Commission of Cass County and the Cass County Planning Department 1988). As of late, the increased mobility has also allowed the residents of metro area the ability to live in the county's hinterlands and commute to the metro area for work, school, shopping, and recreation.

Climate

Cass County's continental climate contributes to an extreme of temperatures experienced over four distinct seasons. The average annual temperature for Fargo is 41.5° F with an average yearly precipitation of 21.19 inches. The typical average winter temperature is 11.1° F with an average yearly snowfall of 40.0 inches; the actual precipitation is 1.92 inches, accounting for only 9% of the annual precipitation. The typical summer averages 68.5° F and one can expect on average 12 days with a high temperature above 90° F. Summer is also the wettest season, with normal precipitation of 8.91 inches and 23 days of thunderstorms (United States 2002, 7-9).

North Dakota has a relatively short growing season compared to southern states, however long and sunny summer days make up for this briefness. The high latitude contributing to the cold winters also creates daylight lasting as long as 16 hours per day during the summer months. On average, the state experiences more cloudy than clear days, however July and August will generally experience twice as many sunny days. The combination of extended daylight hours and the clear and sunny days during the summer months makes successful agriculture operation possible despite a short growing season (Jenson no date).

Topography

The major geomorphologic feature making up the eastern three-fourths of Cass County is the Red River Valley of North. This valley is a lake plain formed by glacier melt waters of a massive glacial ice lobe which occupied the area some 10,000 to 15,000 years ago. The sediment in the glacier melt formed a flat valley ranging from 15 to 70 miles wide

and is considered some of the richest and most productive farmland in the world (Miller and Frink 1982).

The plain of Lake Agassiz is flat and nearly featureless with a northward slope of 1.5 feet per mile and a eastward slope ranging from 2 feet per mile near the Red River to 20 feet per mile farther west (USDA 1983, 3). At the bottom of the Red River Valley lies the Red River of the North, a northward flowing river beginning in southeastern North Dakota and eventually draining into Lake Winnipeg in Canada (United States 2002).

Geology

The Pleistocene Epoch, which occurred between 10,000 and 1.6 million years ago, was a period of intense cold. Throughout this period glaciers repeatedly passed across North America bringing tremendous ecological and topological changes. During this time ice sheets advanced over the area, as these glaciers retreated a portion in eastern North Dakota was blocked and formed Glacial Lake Agassiz as it melted (Commission of Cass County and the Cass County Planning Department 1988).

The eastern two-thirds of the county is the flat plain formed by the sedimentation of the Lake Agassiz. Two types of sediments are present in this area, silt and clay, which sit atop the till and associated glacial and stream deposits. Beach ridges and deltas are the principle relief features of this area; a locale containing some of the most fertile soils in the nation (Commission of Cass County and the Cass County Planning Department 1988).

The western one-third of the county to the east of the lake plain is an area descriptively referred to as the “Drift Prairie.” This plains area is modified by slightly eroded glacial drift forming low and relatively rough hills and gentle rolling topography. These features, the result of the retreating ice sheets are also the location of the majority of the county’s wetlands (Commission of Cass County and the Cass County Planning Department, 1988) (Figure 1.2).

Cass County County Profile

Surface Geology

- Clay
- Cross-Bedded Sand
- Sand
- Silt
- Till

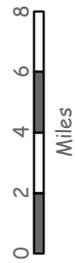


Figure 1.2. The general geology of Cass County.

Soils

The Soil Conservation Service's *Soil Survey of Cass County, North Dakota* describes the types, locations, and characteristics of the county's soils. This information is helpful when planning the logical location for development based on the intended land use. The soil survey provides the suitability, limitations, and management of the soils for specified uses; included in this information is the steepness, length, and shape of slopes, drainage, crop types and native plant species, and the types of bedrock (U.S. Department of Agriculture 1983).

The *Soil Survey of Cass County, North Dakota* breaks the soils into six categories: order, suborder, great groups, subgroup, family, and series. Cass County has 41 (Appendix A) different series (Figure 1.3), these series consisting of soils having similar horizons in their profile (Figure 1.4) which are similar in color, texture, structure, reaction, consistency, mineral and chemical composition, and arrangement (U.S. Department of Agriculture 1983).

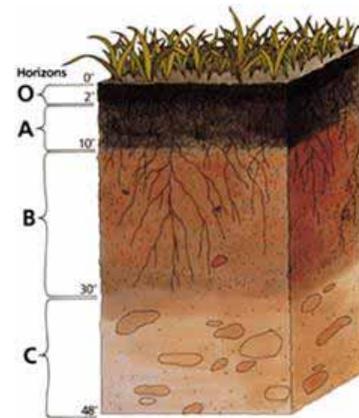


Figure 1.4. Profile of soil horizons (NRCS 2004).

While the sediment in the melt waters of Lake Agassiz produced some of the richest farmland in the world it also created underlying soils having poor construction conditions for the majority of the county. The soils high shrink-swell properties and plasticity can lead to foundation shifting, pavement failure, and bank slippage and the soils ability to expand from the absorption of water effectively degenerates its strength capability (Figure 1.5). These soils are highly susceptible to failure in locations where they are unconfined, most commonly on the slopes along rivers one will find evidence of slump, flow, creep, and earthflow. The added weight of structures, added fill or rip-rap, irrigated lawns, septic drain fields beneath the slopes, and removal of natural vegetation all compounds the natural soil stability problems (Schwert 2003).

Cass County County Profile

STATSGO Soils

- Arvilla - 1
- Barnes - 4
- Brantford - 3
- Colvin - 9
- Doran - 5
- Embsden - 16
- Fargo - 22
- Gardena - 25
- Gilby - 9
- Glyndon - 10
- Hamerly - 29
- Hecla - 30
- Hegne - 31
- Heimdal - 32
- La Prairie - 33
- Vallers - 53

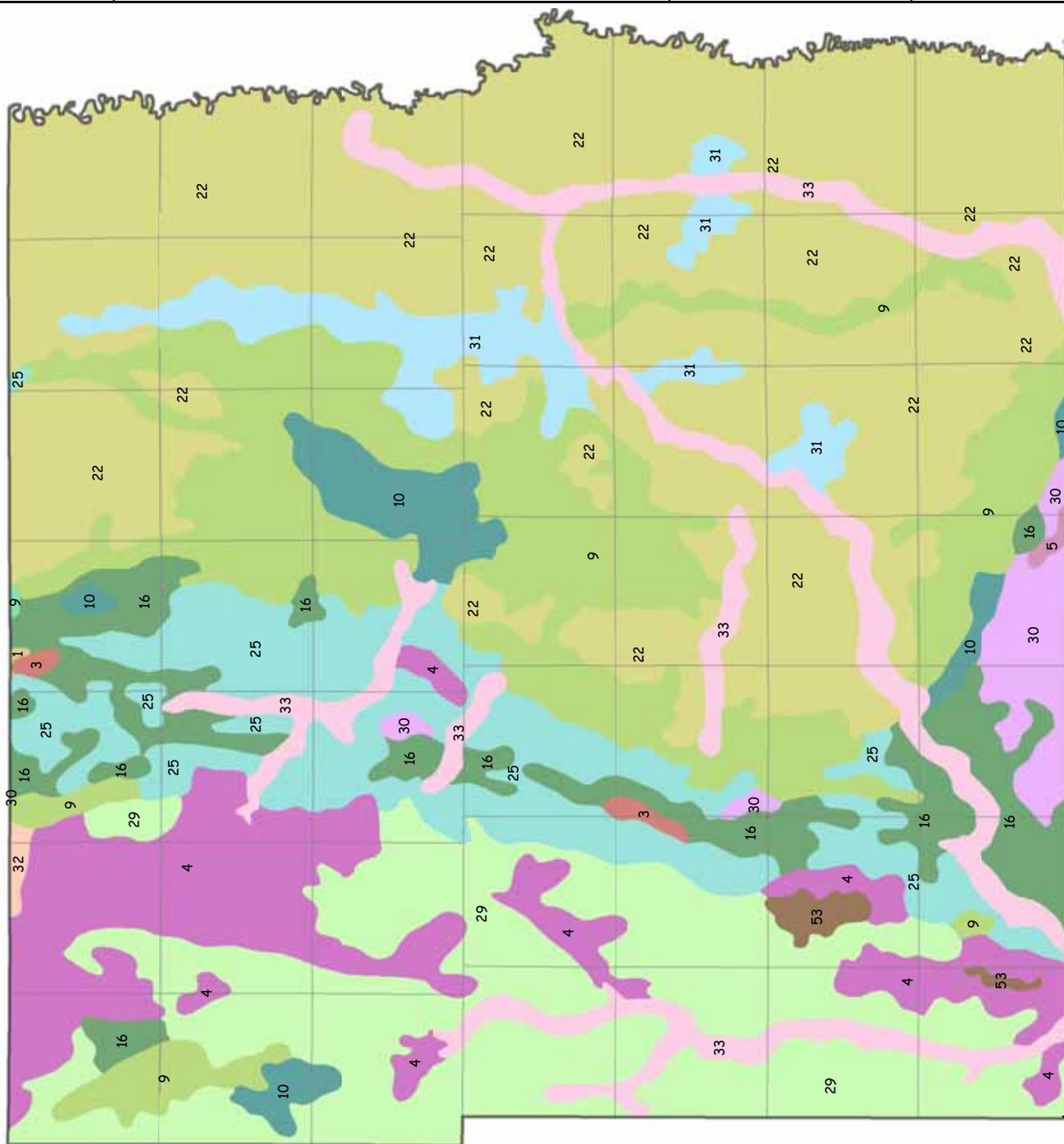


Figure 1.3. Cass County State Soil Geographic (STATSGO) soil survey.

GENERAL CONSTRUCTION CONDITIONS IN CASS COUNTY, NORTH DAKOTA, AND CLAY COUNTY, MINNESOTA

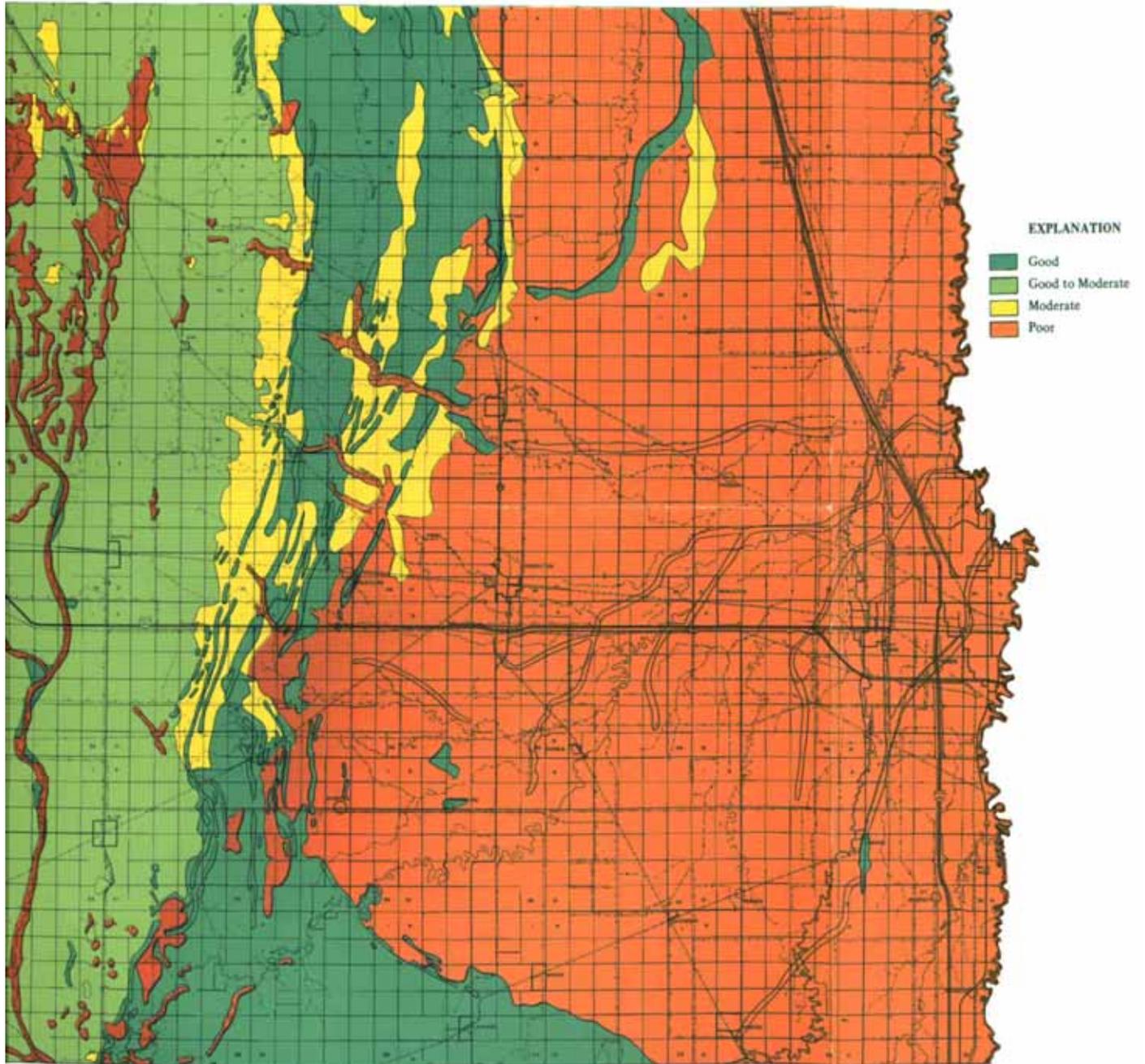


Figure 1.5. General construction conditions in Cass County (adapted from Arndt and Moran 1974).

Minerals

The majority of minerals found in Cass County are sand and gravel, small deposits of glacial boulders and brick clay also exists. These limited deposits of sand, gravel, and boulders are located along the beach ridges in the west central portion of the county, while the brick clay deposits are in the eastern portion. The sand and gravel are used mainly for construction of roads and highways; the limited amount of this resource results in its production being a small fraction of the county's economy. There are no known commercial quantities of gas or oil and the county has no other known deposits of minerals (Commission of Cass County and the Cass County Planning Department, 1988).

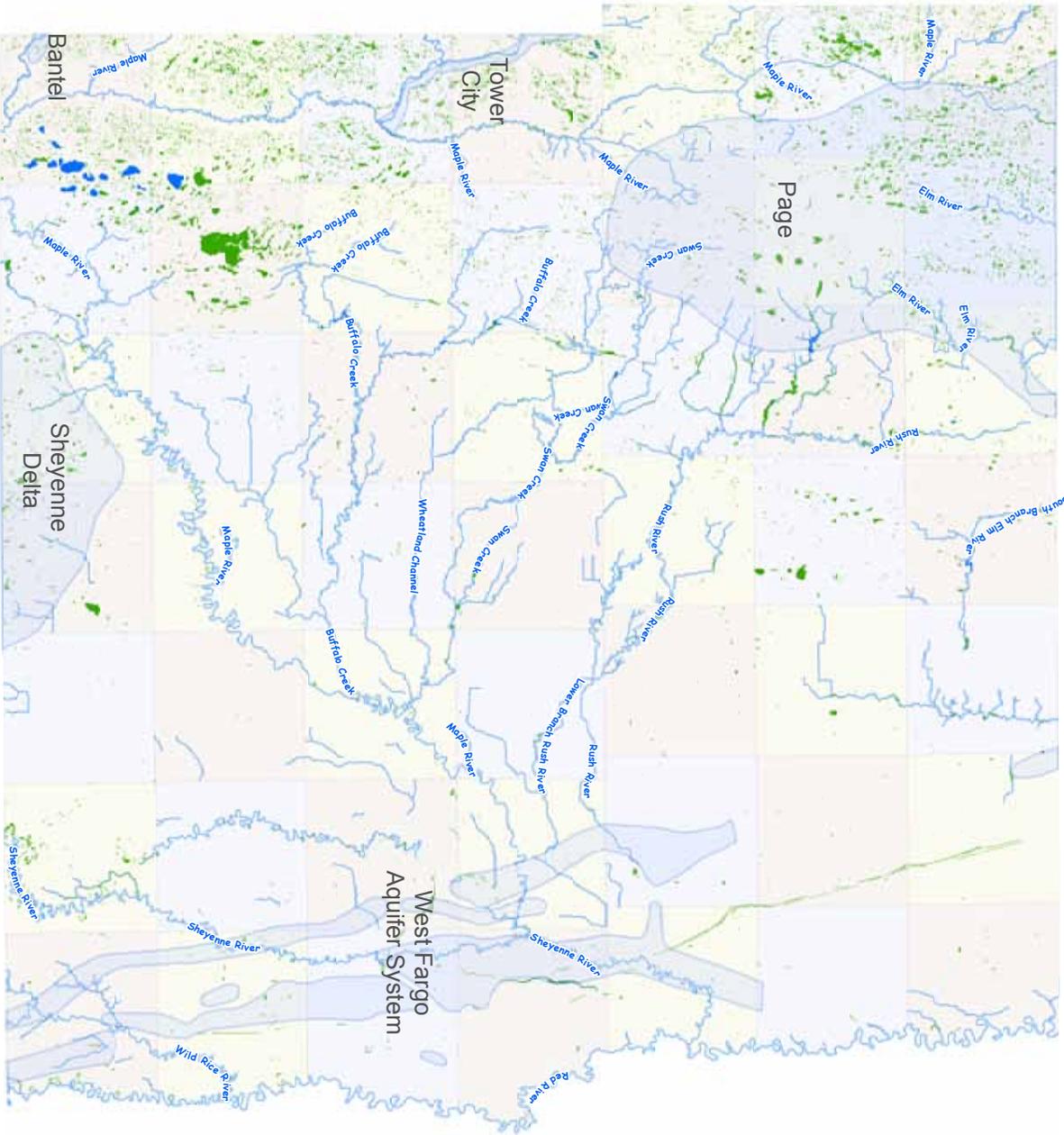
Water

Rivers

Five rivers comprise the major components of Cass County's surface drainage systems: Red River of the North, Sheyenne, Maple, Rush, and Wild Rice (Figure 1.6). These rivers play an important role in irrigation, recreation, and municipal water supply. General flow characteristics and drainage basin area figures for these rivers are presented in Table 1.1. The large variation between the mean and the maximum river flows indicates potential flooding issues are present in the county. The flat nature of the Red River valley, the minimal gradient of the rivers, and northerly flow of the Red River make the area prone to extensive flooding during the spring melt.

River	Flow (feet³/sec)		Basin Area (miles²)
	Mean	Max	
Red River	680	28,000	1,750
Sheyenne	201	11,000	1,295
Maple River	227	7,150	900

Table 1.1. Stream flows of Cass County's rivers (USGS 2004).



Cass County County Profile

Hydrology

-  Rivers/Streams
-  Lakes
-  Aquifers
-  Wetlands

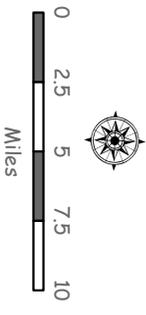


Figure 1.6. Cass County's rivers, streams, lakes, wetlands, and aquifers.

Flooding

The regional drainage of the Glacial Lake Agassiz's water some 9,000 years ago created what is now known as the Red River Valley. This valley is one of the youngest geological features of the lower 48 states, dating thousands instead of tens of million years old, and is one of the flattest regions on earth. As a result, the river is still forming its river valley; a valley that has yet to carve out a significant flood plain to hold in high waters. The lack of a significant valley makes the actual floodplain for the Red River the flat expanse of the Lake Agassiz's lake plain, allowing flood waters to cover considerable areas (Figure 1.7) (Schwert 2003).

Compounding the topographic features causing flooding is spring thawing, ice jams, and a lack of gradient as the river moves downstream. The Red Rivers northerly flow and the spring thaw in the region progressing northward along the valley results in the southern valleys snow melt merging with fresh runoff as it moves north increasing the total amount of water in the river. Furthermore, the rivers inconsistent thaw can cause ice jams as large broken pieces of ice moves north reaching impassable frozen sections of the river creating ice dams retaining the water upstream. Finally, as the river moves north its gradient also decreases, this decreasing gradient causing the river to pool upstream (Schwert 2003).

While the geological formations of the Red River Valley and its potential for flooding can not be changed and flooding on already established neighborhoods and developments can only be lessened with substantial financial investments, if it all, it is still possible to lessen the damage of floods for new developments by taking a proactive approach, "Often the most efficient approach to resolving a geological problem is to avoid the problem in the first place" (Schwert 2003, 14). Using a proactive planning approach will not fix past mistakes, but can help to eliminate or lessen burdens created by flooding for future development. Allowing development in flood prone areas by infilling or diking not only puts these structures at risk for flooding, but also reduces natural storage area and creates bottlenecks in the flow of the river. Restricting growth in these

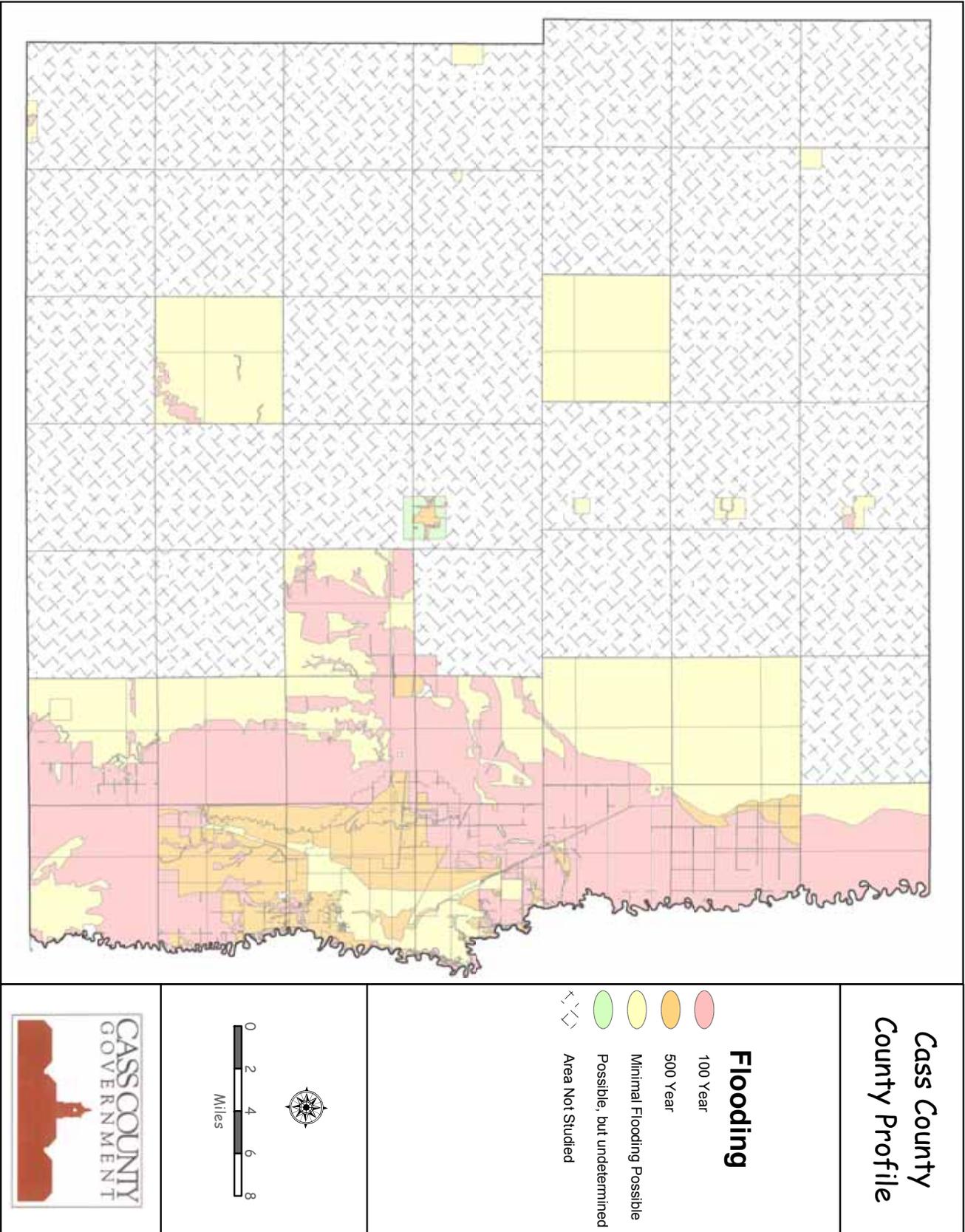


Figure 1.7. Location of Cass County's flood prone areas (FEMA Q3 Digital Data).

natural low lying areas creates a natural storage area for high waters and the lack of structures permits unobstructed flow.

The relatively infrequent flooding in the valley can tend to cause citizens to believe major flooding in the Red River Valley is a random occurrence which statistically should not have happened or expected to occur again, but with greater examination reveals the Red River Valley has many characteristics ideal for flooding (Schwert 2003). Unfortunately, the county will likely be impacted by flooding in the future, making it only a question of when, not if, flooding will occur.

Lakes, Reservoirs, and Wetlands

Cass County has 32 lakes found mostly in the west and southwest averaging 42 acres in size and 10 artificially created lakes averaging 36 acres in size. These lakes and reservoirs provide flood protection, irrigation, and recreation. The remaining sources of surface water found in the county are wetlands; which are valuable for surface and subsurface water storage, nutrient cycling, retention of sedimentation, and plant and animal habitats. The fertile soils found in wetland areas make them productive areas for farming and resulted in drainage and removal of many acres of wetlands; many of these wetlands are now protected by federal and state laws. According to the National Wetlands Inventory, Cass County has 21,036 acres of wetlands (excluding lakes and rivers); of this area 7,693 acres are permanently or semi-permanently flooded (Figure 1.6).

Aquifers

The county has several larger aquifers being utilized to varying degrees which possess limited additional development possibility. These aquifers include the West Fargo Aquifer System (WFAS), the Page Aquifer, and the Sheyenne Delta Aquifer (Figure 1.6).

The West Fargo Aquifer System is made of multiple loosely related aquifer units located in the Fargo metro area from Argusville through West Fargo down to the Wild Rice (Ripley 2000), roughly the same areas experiencing high growth during recent years. These nine aquifer units share similar characteristics and are loosely connected; meaning changes in one unit could likely be somewhat transmitted to the other units. The individual channels of the WFAS were created during different times of glacial melting traveling through the valley that predated the Red River Valley as we know it. As a result, this aquifer system is covered by glacial lake clays of the bottom of Lake Agassiz; these clays inhibiting seepage of surface water into the aquifer to recharge water levels (Ripley 2004).

Recharge of an aquifer is limited to the snowmelt and rainfall seeping through the ground down to the aquifer. In the case of the WFAS, the 60 to 90 feet of lake clays above the aquifer limits any recharge. This is a benefit in reducing contamination, but results in an aquifer with a finite amount of water (Ripley 2004). The profile of the water in the WFAS indicates the majority of the water has characteristics of cold water precipitation, rather than mixture of cold and warm water precipitation. The fact that the area only receives a small portion of precipitation in the form of snow indicates the water in the WFAS dates back to the cold water trapped during the glacial melts, meaning little apparent modern day recharge has occurred (Ripley 2000).

The declining levels in the WFAS's finite amount of water suggest little potential for new users to aquifer. The WFAS has experienced some of the largest water declines in the area; as a result, proper planning of new development will need to find other sources of water and in the future current users of the system will likely need to find alternative water sources.

The Page Aquifer is another significant aquifer which is located in the northwest portion of the county and extends into Traill and Steele counties (Ripley 2004). This aquifer was primarily used as municipal water supply for the town of Page and since 1976 15,000 acres of land have been supplied water for irrigation from the Page Aquifer (Arndt and

Moran 1974, Ripley 2004). This aquifer has received significant recharge since 1993 following the droughts of the 1980s and is considered imbalanced with recharge and managed as a sustainable resource, which may allow for some additional water to new users (Ripley 2004).

The Sheyenne Delta Aquifer is a large and substantial aquifer located in southern Cass, northern Richland, northeastern Sargent, and eastern Ransom counties. While this is a large aquifer, the majority of it is located outside the county, limiting its usefulness for Cass County (Ripley 2004).

Cass County also has smaller and less significant aquifers having lower potential and water output, with some more greatly affected by climatic extremes. Included in this group are the Tower, Bantel, and Dakota aquifers (Arndt and Moran 1974, Ripley 2000, Ripley 2004).

The Tower Aquifer located in western Cass County supplies the water needs of Tower City. This shallow aquifer is very vulnerable to climatic extremes and experienced declining water levels during the 1980s and early 1990s drought conditions. Since 1993, the aquifer has begun a period of recharge, but its small size limits its usefulness to supplying only the current water requirements of Tower City (Ripley 2004).

The Bantel Aquifers use has been limited to domestic and stock wells in southwest corner of Cass County. This aquifer is capable of recharge and should have increased levels as a result of the current wet cycle (Arndt and Moran 1974, Ripley 2004).

The Dakota Aquifer is the deepest aquifer in Cass County, with some wells in western portion of the county descending 800 feet, covering areas from the eastern to western borders of Cass County. The water in this aquifer contains high amounts saline and mineralization, deterring its use, except for limited applications for watering stock (Arndt and Moran 1974).

The data points to the fact that the use of groundwater in Cass County is limited to the current users and currently used aquifers, with only the Page Aquifer appearing to have limited potential for new users in certain geographical areas. Either the aquifers are being used at or near capacity or not being utilized because they are too small, too deep, or poor water quality; all of which will not change. The WFAS is unique in that the area it is located is expected to witness continued growth and the lack of recharge results in a finite amount of water. This will demand proper planning to protect the current resource as well as determining sources for future development. It should be noted that during the last 15 years of increased growth experienced by Fargo and West Fargo has also been during a wet cycle. The increased amount of precipitation has reduced the demands on the ground and surface water needed by the area and it should be expected these demands will only increase with the greater populations and during times of drought conditions.

Flora and Fauna

The natural environment of Cass County and the Red River valley has changed significantly since the 1880s. The region was dominated by long prairie grass and almost no natural woodlands or trees. This natural ground cover provided habitat for many animals no longer present in the area, such as bison, elk, prairie dogs, wolves, grizzly and black bears. The increased development and removal of natural vegetation has reduced the habitats and populations of many animals. The long prairie grasses and their deep roots also prevented erosion and runoff resulting in a fraction of the sedimentation currently found in the river systems. The increased sedimentation in the county's rivers has altered the riverain flora and fauna from what was found by the original settlers.

The endless "seas of grass" first welcoming settlers in the late 19th century were quickly sod busted to reveal some of the richest farmland in the world. What was once endless miles of long prairie grass are now replaced by crops, shelter belts, farmsteads, and urban development. Many of the natural prairie potholes providing habitats for many plants and animals have also been drained and filled to provide land for agricultural and

residential uses. As a result of these changes, several flora and fauna in the county are now listed as endangered, threatened, or candidate species.

Based on the current information from the U.S. Fish and Wildlife Service, there are currently three species in the Threatened or Endangered categories, protected by the Endangered Species Act of 1973, with a likelihood of occurring in Cass County. These three birds are the Bald Eagle, Whooping Crane, and Peregrine Falcon which all have their migratory range within the county. In addition to these three birds, the county also has nine other plants and animals species that were former candidates for the list and currently a concern for species management. This includes the Western Burrowing Owl (bird), Black Tern (bird), Northern Goshawk (bird), Loggerhead Shrike (bird), Ferruginous Hawk (bird), Greater Redhorse (fish), Wolf's Spike-Rush (plant), Regal Fritillary (butterfly), and Elktoe (mollusk) (US Fish and Wildlife Service 1995).

Cass County is also located within the Central Flyway, the corridor used semi-annually by waterfowl between their breeding and wintering grounds (Figure 1.6). Ten states, two provinces, and one territory make up the Central Flyway; the wetlands, river systems, lakes, and vegetation along this corridor are used as the birds move between their breeding grounds in the north and the wintering grounds in the south. The marshlands and wetlands found in Cass County created by the natural prairie potholes provide ideal habitats for these migrating birds (Figure 1.8). Waterfowl numbers have been greatly reduced since early settlement of North America from the drainage of these types of marshlands for developments (Central Flyway Waterfowl Council 1994).



Figure 1.8. Location and members of the Central Flyway (Central Flyway Waterfowl Council 1994).

Due to scarcity of wildlife habitat in Cass County, land use decisions affecting wildlife habitat must be made with great care. Management of land use is crucial to the survival and diversity of wildlife within the county and the citizens will need to determine the role of wildlife will play in the county's future and plan in accordance to these goals.

CHAPTER TWO:

Demographics, Transportation, and Land Use

Population Profile

The early 1600s marked the first census conducted on what would become the United States. Shortly after gaining independence Secretary of State Thomas Jefferson conducted the first U.S. census totaling 3.9 million inhabitants. The surveys collected the general statistical information from individuals and establishments to compile the decennial statistics for the country. Since 1790 the census has evolved to gather greater amounts of information providing the statistics needed to understand the trends in society and to plan for growth (U.S. Census Bureau 2004).

Regional Population

To better appreciate the population characteristics of Cass County it might first help to understand the populace of the North Dakota and the surrounding counties. These statistics will demonstrate the unique characteristics and issues faced by the county.

North Dakota

The State of North Dakota has experienced both positive and negative growth over the last 90 years, the overall trend however being one of decline (Figure 2.1, Table 2.1). The states highest population was attained in 1930 with a population of 680,845, a figure continually declining since this date. A 5.65% growth rate occurred in 1980, the highest positive growth change over the last 90 years, but population since this point has declined or stagnated. The states average population for the last 90 years is 641,471 with a -0.02% growth rate. The Census 2000 recorded a 0.53% growth rate for North Dakota the lowest of all states, compared to a national average growth of 13.1%.

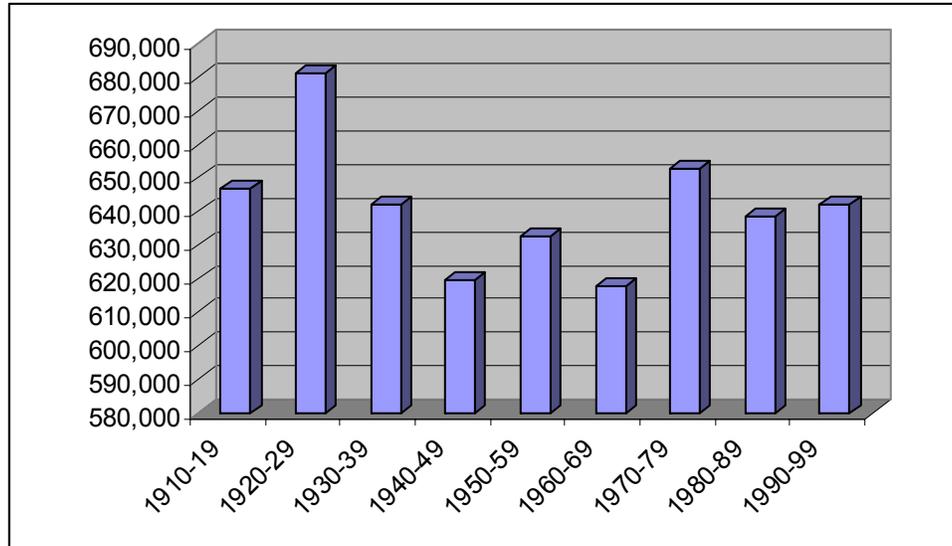


Figure 2.1. North Dakota population from 1920 to 2000 (U.S. Bureau of the Census, Decennial Censuses).

Year	Population	Percent Change
1910-19	646,872	
1920-29	680,845	5.25
1930-39	641,935	-5.71
1940-49	619,636	-3.47
1950-59	632,446	2.07
1960-69	617,792	-2.32
1970-79	652,717	5.65
1980-89	638,800	-2.13
1990-99	642,200	0.53
Average	641,471	-0.02

Table 2.1. North Dakota total population and change from 1920 to 2000 (U.S. Bureau of the Census, Decennial Censuses).

North Dakota's slow growth rate is more apparent when viewing the 2000 population pyramid, which shows both the age distribution and the male/female ratio. The spectrum for growth pyramids range from top heavy inverted pyramids consisting of an ever growing older population (indicating low birth rates or large out-migration of the young) to a bottom heavy population pyramids having a larger ratio of young to old (often the result of high birth rates or in-migration), with the majority of areas resembling a square indicating slow and sustained growth (CensusScope.org). North Dakota is somewhat unusual in that it appears in transition from more of a bottom heavy to a top heavy population pyramid (Figure 2.2). This trend indicating an aging population, which either has had reduced birth rates or increased out-migration.

Age Distribution, 2000

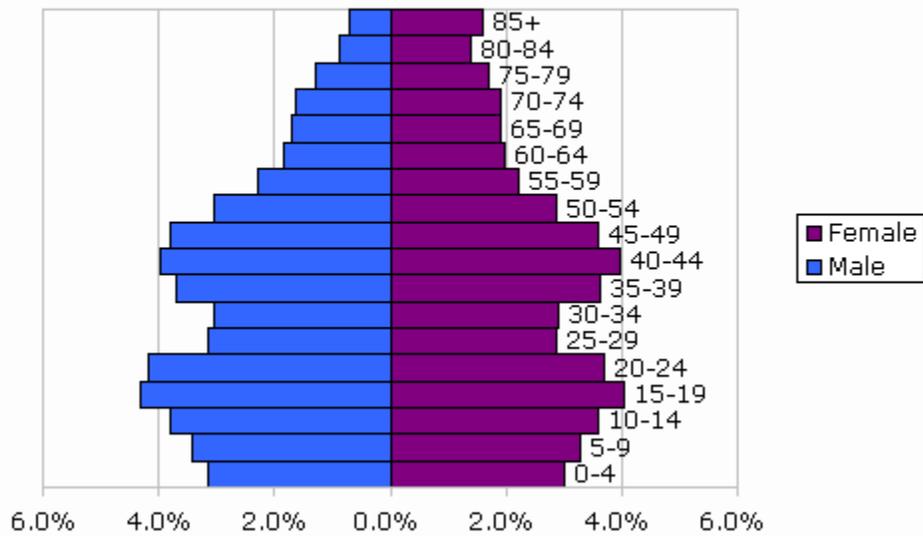


Figure 2.2. North Dakota population pyramid (CensusScope.org).

In the case of North Dakota, out-migration is probably the determining factor for the states aging and slow-growth population. The census estimated a natural increase for the state (births-deaths) of 5,028 between April 2000 and July 2003. It was also estimated 2,379 people migrated into the state, while 15,662 migrated out of the state creating a net migration of -13,288. The out-migration leads to a diminished population, but also decreases the birth rates since most of those leaving are of child bearing age.

During the last century North Dakota has evolved from a largely rural population to one having more residents living in an urban setting (Figure 2.3 and Table 2.2). At the turn of the last century, nearly 93% of North Dakotans were classified as rural dwellers. The 20th century witnessed a push from rural to urban living and in 2000 nearly 58% of North Dakota residents lived in an urban setting. The 2000 census defines urban as any housing within an urbanized area or urban cluster, including any block or block group having a density greater than 1,000 people sq/mile and those surrounding block groups with a density greater than 500 people sq/mile.

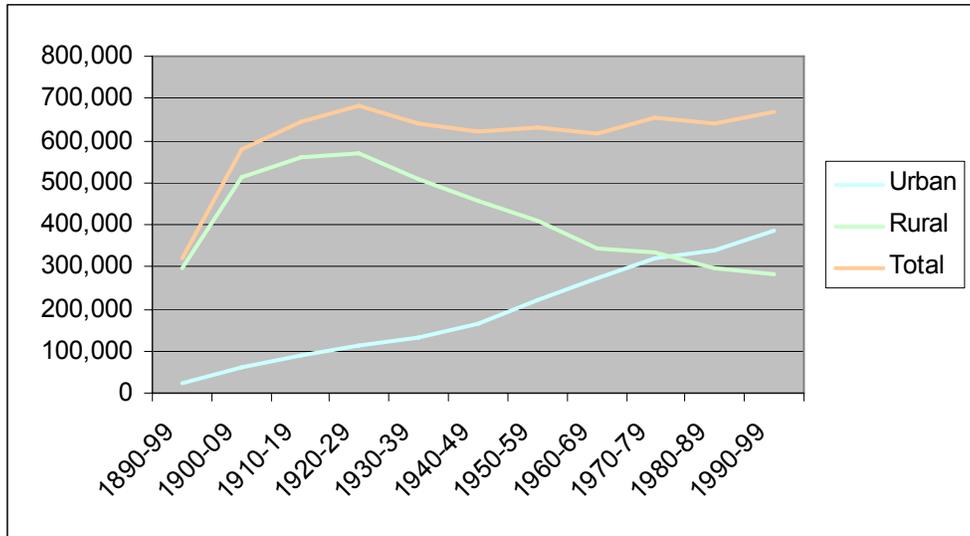


Figure 2.3. North Dakota urban vs. rural population from 1900-2000 (U.S. Bureau of the Census, Decennial Censuses).

Year	Urban	Percent Urban	Rural	Percent Rural	Total
1890-99	23,413	7.34%	295,733	92.66%	319,146
1900-09	63,236	10.96%	513,820	89.04%	577,056
1910-19	88,239	13.64%	558,633	86.36%	646,872
1920-29	113,306	16.64%	567,539	83.36%	680,845
1930-39	131,923	20.55%	510,012	79.45%	641,935
1940-49	164,817	26.60%	454,819	73.40%	619,636
1950-59	222,708	35.21%	409,738	64.79%	632,446
1960-69	273,442	44.26%	344,319	55.74%	617,761
1970-79	318,310	48.77%	334,407	51.23%	652,717
1980-89	340,339	53.28%	298,461	46.72%	638,800
1990-99	385,958	57.66%	283,424	42.34%	669,382

Table 2.2. North Dakota urban and rural populations and percentages for 1900-2000 (U.S. Bureau of the Census, Decennial Censuses).

In summary, the overall trend of North Dakota's population is one slowly shrinking in size, while growing older in age. The decreased birth rates and the negative net migration only compounds this problem, producing the possibility of a very unstable growth structure consisting of an every aging population.

Surrounding Counties

Eight counties surround Cass County, five in North Dakota and three to the east of the Red River in Minnesota (Figure 2.4). The five North Dakotan counties have very similar population characteristics of the state. All experienced growth during the first quarter of the 1900s (Figure 2.5), but their populations have been in a state of decline since the 1930s. The average total population loss during the 19th century was 2,012 residents, averaging -0.24% decrease (Table 2.3). The three Minnesota counties fared better, with an average growth of over 8,200 residents in the last century. However, closer inspection shows only Clay County, directly to the east of Cass County, experienced growth with its population almost tripling in size over 100 years. Norman and Wilkin both suffered population losses of -50.54% and -11.66% respectively, between the 1900 and 2000 censuses (U.S. Bureau of the Census, Decennial Censuses).

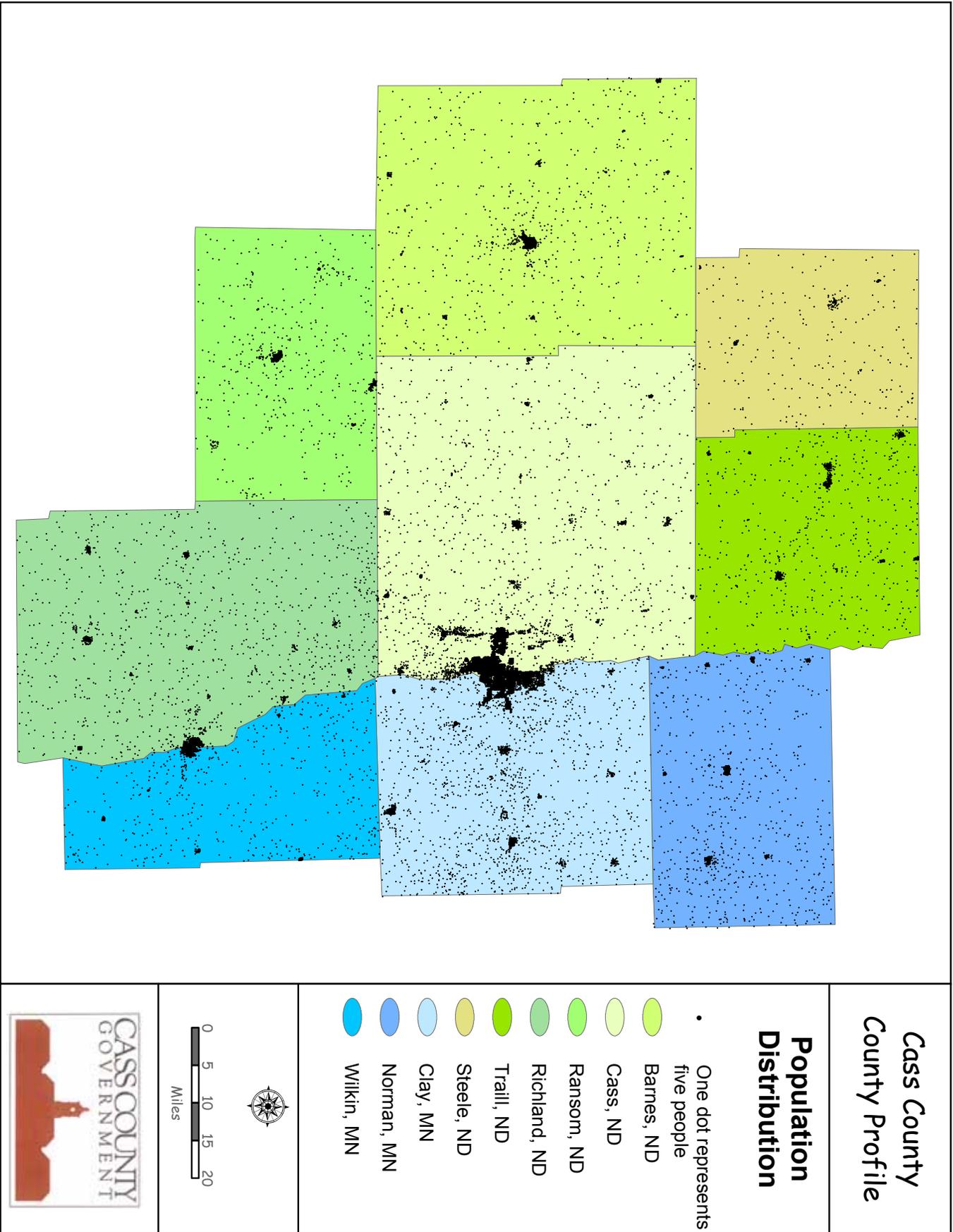


Figure 2.4. Counties surrounding Cass County, North Dakota

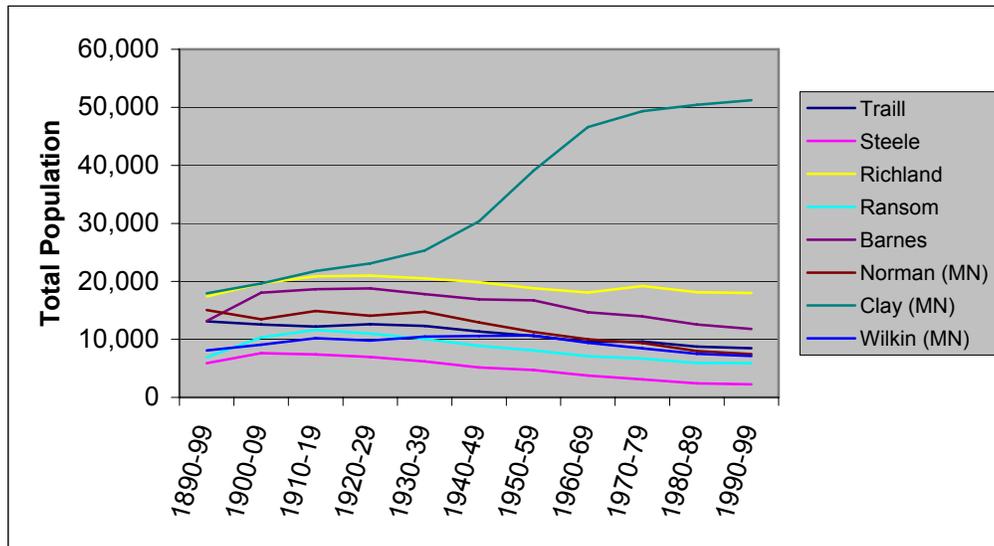


Figure 2.5. Surrounding counties total population from 1900-2000 (U.S. Bureau of the Census, Decennial Censuses).

Year	Traill	Steele	Richland	Ransom	Barnes	Norman (MN)	Clay (MN)	Wilkin (MN)	
1890-99	13107	5888	17387	6919	13159	15045	17942	8080	
1900-09	12545	7616	19659	10345	18066	13446	19640	9063	
1910-19	12210	7401	20887	11618	18678	14880	21780	10187	
1920-29	12600	6972	21008	10983	18804	14061	23120	9791	
1930-39	12300	6193	20519	10061	17814	14746	25337	10475	
1940-49	11359	5145	19865	8876	16884	12909	30363	10567	
1950-59	10583	4719	18824	8078	16719	11253	39080	10650	
1960-69	9571	3749	18089	7102	14669	10008	46585	9389	
1970-79	9624	3106	19207	6698	13960	9379	49327	8454	
1980-89	8752	2420	18148	5921	12545	7975	50422	7516	
1990-99	8477	2258	17998	5890	11775	7442	51229	7138	
Change: 1900-2000	Total	-4630	-3630	611	-1029	-1384	-7603	33287	-942
	Percent	-35.32%	-61.65%	3.51%	-14.87%	-10.52%	-50.54%	185.53%	-11.66%
Change: 1990-2000	Total	-275	-162	-150	-31	-770	-533	807	-378
	Percent	-3.14%	-6.69%	-0.83%	-0.52%	-6.14%	-6.68%	1.60%	-5.03%

Table 2.3. Surrounding counties population change from 1900-2000 (U.S. Bureau of the Census, Decennial Censuses).

Cass County Historic Population

To accurately envision the future growth and development of Cass County it is beneficial to understand the historical growth patterns of the county. Figure 2.6 displays the county's population growth over the past century. Table 2.4 displays the percent change between the decennial censuses. The county achieved strong growth at the beginning of the 20th century, averaging 19.4% growth rate for the first 30 years of the century. Growth then slowed during the middle part of the century until the last third which averaged 18.7% growth (U.S. Census Bureau Decennial Censuses). Unlike North Dakota and the majority of the surrounding counties, Cass County has been able to maintain strong positive growth over the last century. This making the county very atypical of the state in growth and even the entire U.S. which averaged around 13% growth in the 2000 census. As a result, Cass County currently makes up the largest portion of North Dakota's total population (19.17%) and leads the state in population growth from the 1990 census figures (Census 2000).

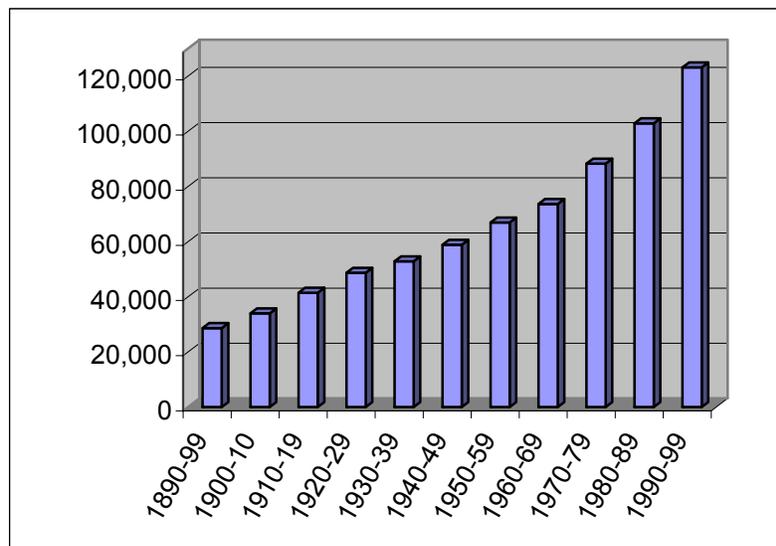


Figure 2.6. Cass County Census Population for the 20th century (US Census Bureau).

Year	Population	Percent Change
1890-99	28,625	
1900-10	33,935	18.55
1910-19	41,477	22.22
1920-29	48,735	17.50
1930-39	52,849	8.44
1940-49	58,877	11.41
1950-59	66,947	13.71
1960-69	73,653	10.02
1970-79	88,247	19.81
1980-89	102,874	16.58
1990-99	123,138	19.70

Table 2.4. Cass County Census Population for the 20th century (US Census Bureau 2004)

Population projections for the county will be discussed in greater detail later in the chapter, but based on the Figure 2.6 it should become apparent that the county should expect continued growth into the future. Proper planning and development will require the county to adjust goals, regulations, and policies in light of the expected growth and the demands and changes it will create.

Census 2000 Facts and Figures

The 2000 Census compiled an immense amount of data covering many topics. The amount of data available to research and study an area covers numerous subjects, while astonishingly going into great deal. As a result, the following section discusses only the data pertinent to this report, providing the general scope of Cass County's demographics without delving too deep into the details.

Cass County's 2000 population reveals a stable population, both in a nearly equal male to female ratio and also in the ratio of young to old. The 2000 population pyramid (Figure 2.7) shows Cass County's population is more heavily weighed in the pre-retirement age with a smaller percentage of elderly population. However, looking at the 1990 population pyramid reveals some interesting trends (Figure 2.8). First, on a positive level the 0-10 age group has grown slightly since 1990, increasing 1.71%; this is a good sign that more young couples are staying in the area and having children (the average number of children per family has fallen since 1990, so this increase is more likely the result of

additional families then more kids per family). However, it is also noticeable that the county's average age is continuing to rise, the 25-39 years old categories have simply increased one 10-year iteration from the previous census. More disturbing is the trends occurring with college age residents. This age group has historically been the highest in the county, but the numbers never continue beyond this age indicating college students are migrating out of the area following graduation.

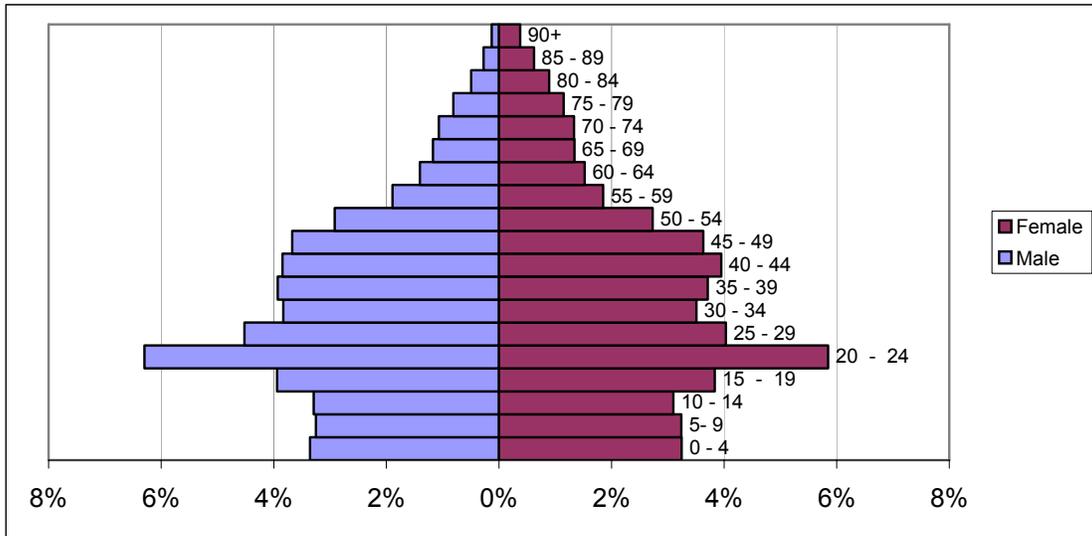


Figure 2.7. Cass County 2000 Census population pyramid (US Census Bureau).

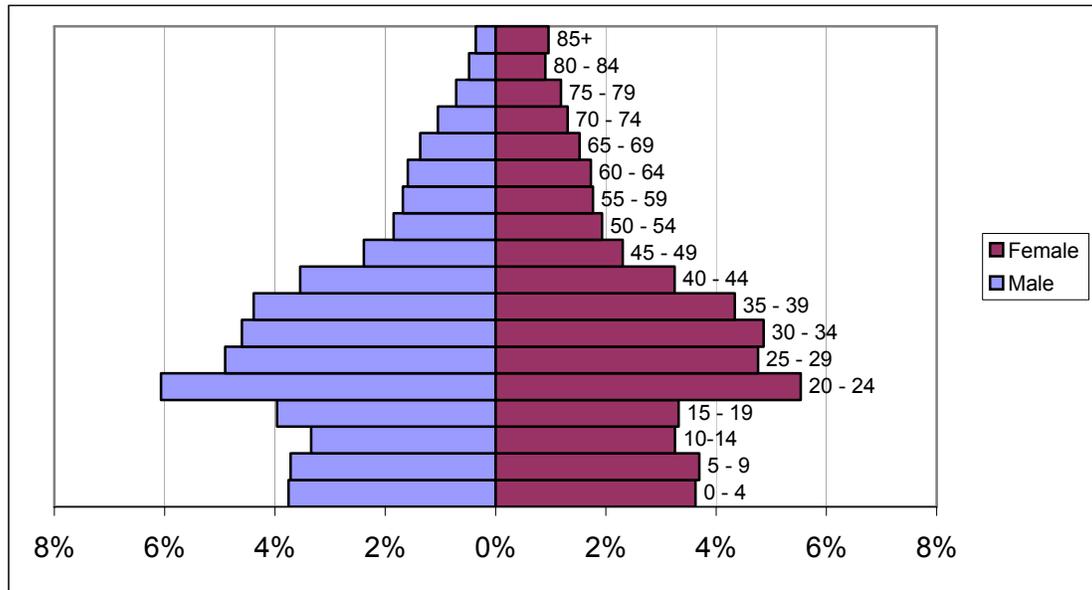


Figure 2.8. Cass County 1990 Census population pyramid (US Census Bureau).

Cass County’s educational attainment is very similar to national and regional averages (Table 2.5). The county has a lower percentage of high school graduates compared to both the state and the nation. However, in respects to the higher education Cass County has higher average number of bachelor degrees attainment, then North Dakota, Minnesota, and the nation. The number of graduate degree attainment is also quite respectable to the surrounding area and national trends.

	U.S.	Minnesota	North Dakota	Cass County
High School	28.6%	28.8%	27.9%	22.9%
Bachelors	15.5%	19.1%	16.5%	23.1%
Graduate	8.9%	8.3%	5.5%	8.2%

Table 2.5. High school and high education degree attainment (US Census Bureau).

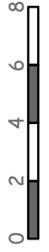
Cass County, like North Dakota and the U.S., has witnessed a shift from a mostly rural to mostly urban population (Figure 2.9). Cass County 86% urban population is roughly 7% greater than then the national average and over 30% higher than North Dakota's average. This greater urban population is also the result of increased in-migration to the county. In the 2000 Census 14.3% of those surveyed indicated they resided in a different state in 1995 and 10.7% resided in a different county in North Dakota. On the national average, only 8.4% surveyed indicated they were previously residing in another state and North Dakota only saw 10% new residents from different states. Of this ever increasing urban population only a very small percentage of Cass County’s residents were born outside the United States (3.2%), the majority of these residents were born in Europe, Asia, and Africa and the vast majority of the county’s ancestry (nearly 80%) are decedents of Germany and Norway.

This shift to urban population is also evident in the industries and jobs in the county. The early pioneers settling the Red River Valley quickly discovered the regions rich and fertile soils and began transforming the natural grasslands into prime agricultural lands. The valley has historically had strong ties to agriculturally oriented operations; however Cass County has begun to diversify the industries and workers found in what still is considered the best soils in the world. Only 1.8% of Cass County’s industries are agricultural, compared to 8.2% for the state. The highest numbers are now found in education and health services, finance and real estate, and retail trade. The majority of

citizens in the county would be classified as having “white collar” jobs, the majority being managers and professionals (Table 2.6). The median income for Cass County is \$38,147 and the median family income is \$51,469. The county has higher percentage of residents living below the poverty level (10.1%) compared to the state (8.1%), but the county is roughly two points lower than national levels (US Census Bureau).

OCCUPATION	Total	Percent
Management, professional, and related occupations	23,530	33.4
Service occupations	10,306	14.6
Sales and office occupations	21,680	30.8
Farming, fishing, and forestry occupations	428	0.6
Construction, extraction, and maintenance occupations	5,811	8.2
Production, transportation, and material moving occupations	8,730	12.4

Table 2.6. Listed occupation for Cass County residents (US Census Bureau).

<p>Cass County County Profile</p>	<p>Population Distribution</p> <ul style="list-style-type: none"> • One dot represents two people  City Limit 	  <p>Miles</p>	
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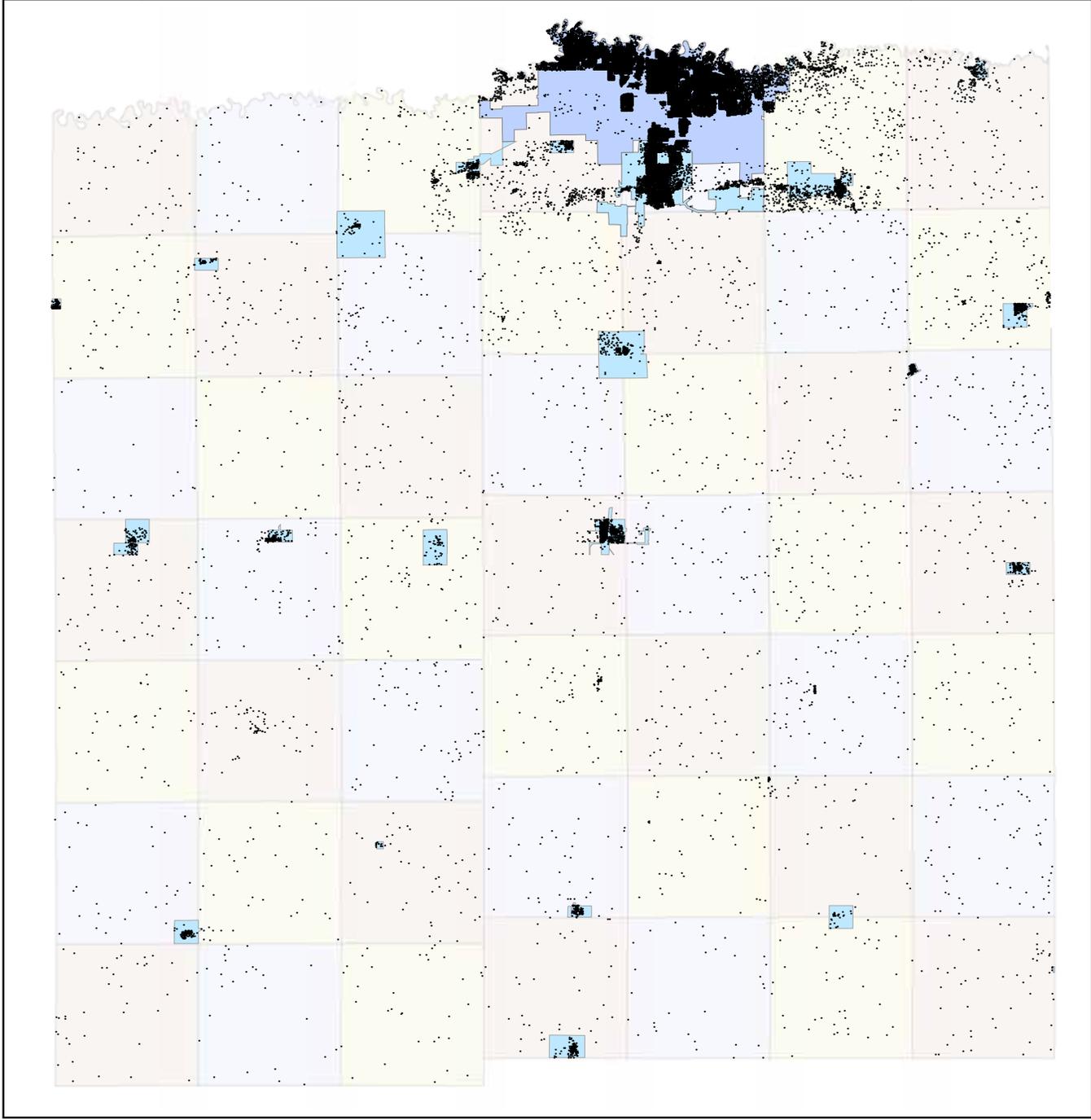


Figure 2.9. Cass County's population distribution and density (Census 2000).

Population Projections

Population projections allow past population trends to be extended into the future, giving a glimpse to possible demographic pictures for an area. However, because population projections depend on extending past trends into the future it creates a methodology perceived as much scientific as it is an art (Fargo-Moorhead Metropolitan Council of Governments; U.S. Bureau of the Census 1977). The following section calculates Cass County's 2010, 2020, and 2030 population projections, more specific projections for the county's incorporated cities and townships are available in third and fourth chapters.

Obviously for planning purposes possessing quantitative information about future demographics of an area allow the necessary steps to be established to account for the anticipated changes. The common solution to provide the data is using projections, often defined as the numerical outcome of a set of assumptions made about future trends, typically with consideration to past trends. However, for these projections to be accurate requires the predicted trends to actually occur. With this in mind, one must realize projections are based solely on past information and trends and any unforeseen changes occurring in the projection period can greatly change the actual outcome (U.S. Bureau of the Census 1977, 3).

Several characteristics of the methodology and study area greatly affect the quality of the projection, while not an exhaustive list these factors include: size, time, methodology, special populations, and policies. Larger areas, larger populations, shorter projection periods, and projections accounting for multiple variables all will likely have less deviation between the projected population and the actual future population (U.S. Bureau of the Census 1977, 4-9).

Keeping the previous information in mind several population projections will be provided using three different periods of historic data to project Cass County's population to 2030. Decennial censuses from 1900 to 2000 were used to calculate the projections, using three periods of time: 1900-2000, 1950-2000, and 1970-2000. Using a greater range of data sets helps to increase the accuracy of the projection as long as the current trends for an

area are reflected over the entire data set. For example, if an area has had high growth over the last 30 years, but before this had slow growth it would not be appropriate to use the population trends including the slow growth period.

Nine different models were used to calculate the population projection for Cass County: linear, exponential, modified exponential, linear regression, exponential regression, modified exponential regression, parabolic regression, gompertz, and logistic. Each period of time (1900-2000, 1950-2000, and 1970-2000) was calculated using each of these nine models. The mean absolute percentage error (MAPE) statistical testing was employed to determine the most accurate model for each of the three time periods by determining if the results were strongly influenced by outliers (Swanson, D.A. *et al.* 2000).

The first projection is based on decennial census data from 1900 to 2000 to calculate the population projection for Cass County to the year 2030. Based on the nine models, exponential regression was the most accurate with a MAPE of 3.24%. This model projected the 2010, 2020, and 2030 populations to be 135,000, 155,000, and 178,000 respectively (Figure 2.10).

The second projection using census data from 1950 to 2000 projected the county's 2030 population to be 200,000 with a MAPE of 1.08%. This projection used the population trends from a shorter period of time and exhibited a smaller associated error and larger projected populations than the projection using data from 1900 to 2000 (Figure 2.11).

The final projection used the smallest set of data, but is a set which most accurately resembles Cass County's recent growth pattern. Examining Cass County's historical growth (Table 2.4) illustrates the county's growth has not been constant, but has followed a parabola or "U" shaped pattern of higher growth in the first part of the century, slower growth during the middle portion, and then increased growth again occurring in the last 30 years. Based on this pattern, the final projection uses only the population trends from last 30 years and projects the populations for 2010 at 146,000 residents, 2020 at 173,000

residents and found the highest 2030 population of the three tests with 205,000, but more importantly had the lowest associated error of 0.45% using an exponential model (Figure 2.12).

These projections were very closely duplicated in the 2003 report by the Bureau of Reclamation. The report used demographic modeling to project population figures for counties and cities in the Red River Valley, this cohort-component method used population, births, deaths, and net migration variables to project the population. This “estimate of most likely future population” for Cass County found a 2010 population of 147,500, 2020 population of 174,500, and 2030 population of 203,200 (Bureau of Reclamation 2003).

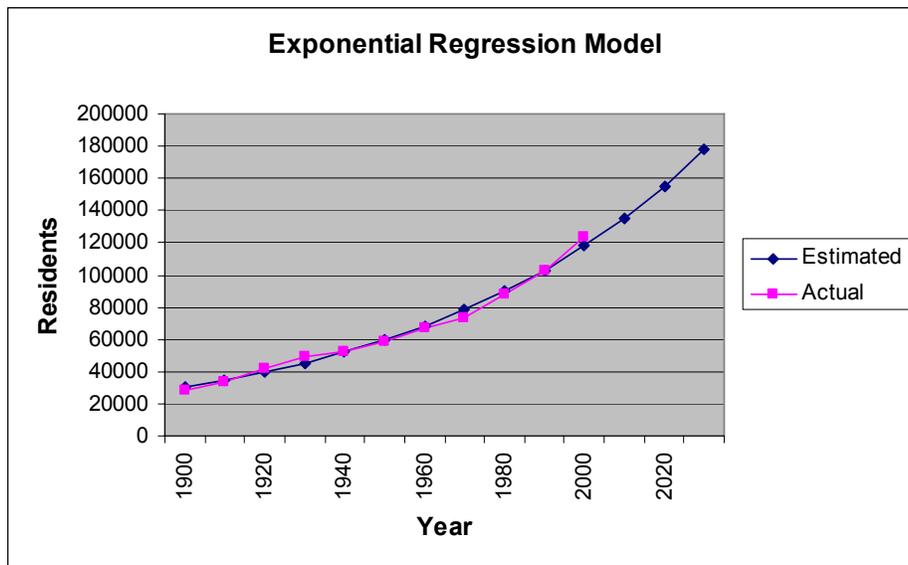


Figure 2.10. Population projection using decennial data from 1900-2000.

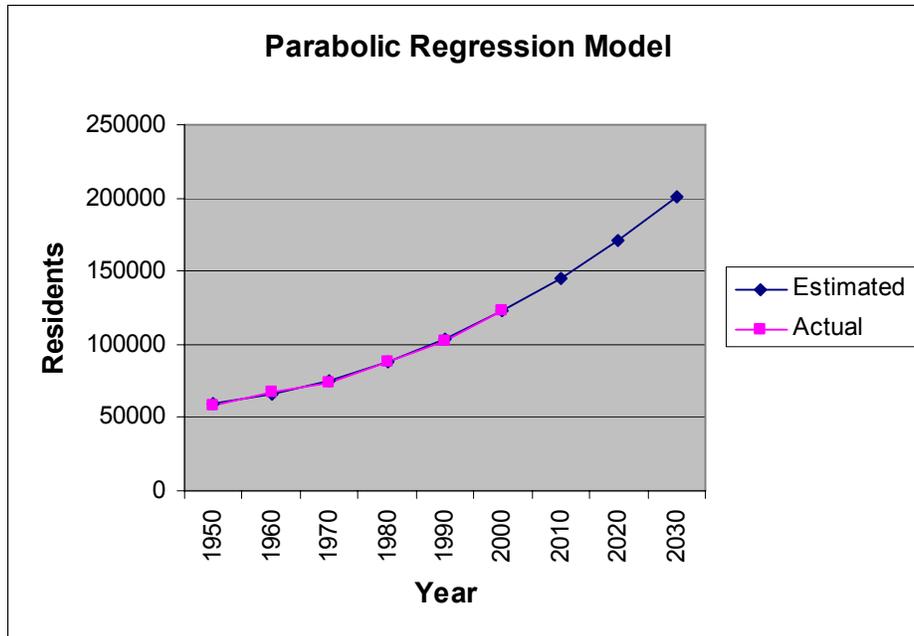


Figure 2.11. Population projection using decennial data from 1950-2000.

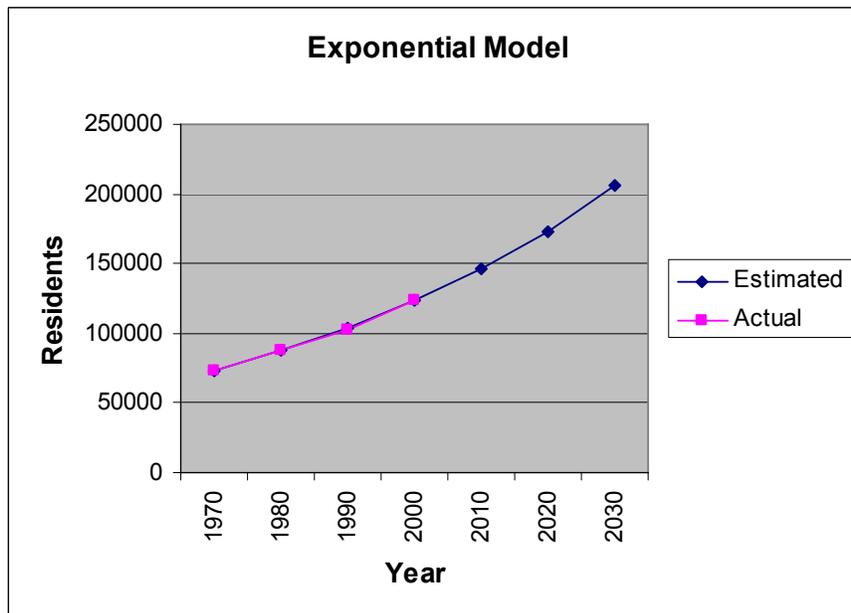


Figure 2.12. Population projection using decennial data from 1970-2000.

Transportation

Mass Transit

The Metropolitan Area Transit System, MAT, is the public bus system serving Fargo, West Fargo, and Moorhead, Minnesota. The metro area's first public transportation began in the 1870s with horse drawn coaches; these were replaced with electric trolley cars during the first half of the 20th century. Bus service began in 1926 and in 1971 tax dollars were allocated to transit. The Fargo-Moorhead Council of Governments began management of the metro areas transit in 1984, marking the beginning of MAT. Fargo and Moorhead have since reclaimed independent control of their transit systems, but coordination and cooperation continues with the MAT system (MatBUS 2004).

The MAT provides 21 fixed routes throughout Fargo, West Fargo and Moorhead along with Paratransit service providing door to door service for those individuals unable to readily use the fixed routes. MAT has approximately 55 drivers operating 15 buses in Fargo and 12 in Moorhead on fixed routes along with eight paratransit vehicles. Fargo's ridership in 2003 was 617,027, a 38% percent increase from 2000 and even when the NDSU routes are disregarded the ridership has still increased 20%. Relating to this, MAT has recently started the U-Pass allowing students from the metro area colleges to ride any MAT bus for free. The universities pay a set fee for the service with the students benefiting from economical and convenient transportation and the cities on a whole benefiting from reduced traffic congestion and parking shortages (MatBUS 2004).

The Fargo Senior Commission also provides bus service throughout Cass County. This service focuses on transit for the elderly and disabled via one 26 passenger bus outfitted with a wheelchair lift. The bus follows a fixed route and time schedule, splitting the county into north and south routes, providing transportation to Fargo for Tower City, Buffalo, Page, Hunter, Gardner, Harwood, Casselton, Davenport, Kindred, and Leonard . The service is provided eight times monthly with an estimated annual ridership of 2,600.

Railroads

Three railroad companies provide freight service to Cass County: Burlington Northern Santa Fe (BNSF), Red River Valley & Western, and Canadian Pacific (Figure 2.13). Burlington Northern Santa Fe operates lines in the northern half of the county, while Red River Valley & Western operates tracks in the southern half and Canadian Pacific has a short amount of tracks in the very southwest corner of the county.

Burlington Northern Santa Fe has the most miles of track in the county, 230 miles, with all the lines converging into the Fargo area. Red River Valley & Western currently uses 60 miles of abandoned BNSF's rail lines providing continued rail service in southern portions of the county.

One of the main uses of these rail lines is the transportation of agricultural products from the farm to different regional and national markets. Currently there are 20 different elevators throughout the county, some locations having multiple elevators for a total of 31 different elevators (Table 2.7)

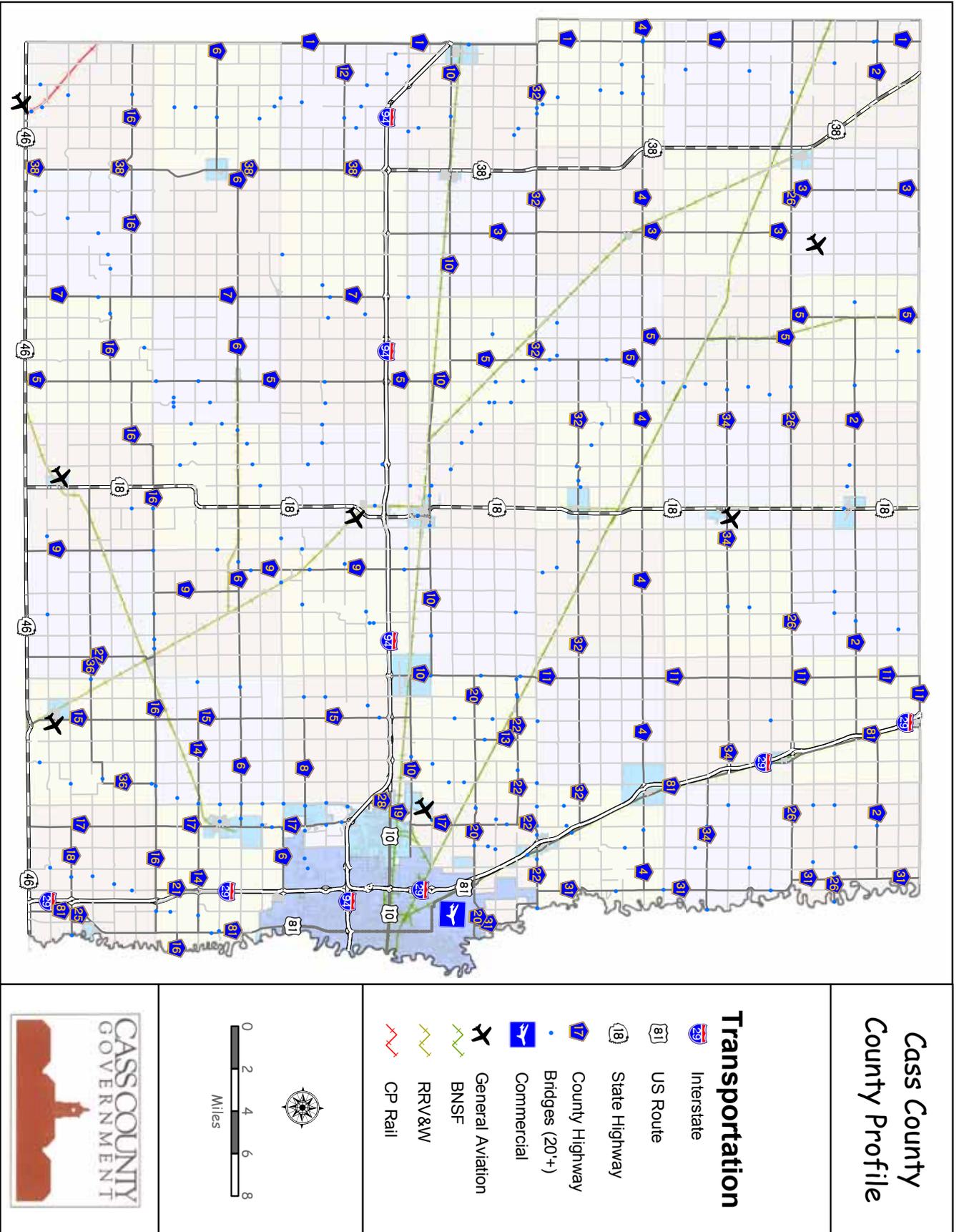


Figure 2.13. Cass County's transportation system.

Elevator	City	Railroad	Size (Rail Cars)	Capacity (Buschels)
ADM Benson-Quinn	Page	BNSF	50	766,000
ADM Edible Bean Specialties, Inc.	Casselton	BNSF	0	712,916
AGP Grain Ltd.	Casselton	RRVW	56	645,000
Anderson Seed Co. Inc.	Durbin	RRVW	50	368,000
Arthur Companies Inc.	Arthur	BNSF	25	1,069,000
Arthur Companies Inc.	Ayr	BNSF	99	1,400,000
Buffalo Farm Supply Inc.	Buffalo	BNSF	54	288,000
Buffalo Grain Co., LLC	Buffalo	BNSF	54	211,000
Busch Agricultural Resources Inc.	Amenia	BNSF	50	412,000
Busch Agricultural Resources Inc.	Grandin	BNSF	26	536,000
Busch Agricultural Resources Inc.	West Fargo	BNSF	39	2,035,000
Cenex Harvest States Co-Ops	Harwood	BNSF	10	204,000
Cenex Harvest States Co-Ops	Horace	RRVW	54	438,000
Cenex Harvest States Co-Ops	Kindred	RRVW	100	1,469,000
Cenex Harvest States Co-Ops	West Fargo	BNSF	54	977,000
Chaffee-Lynchburg Farmers	Lynchberg	RRVW	27	950,000
Chaffee-Lynchburg Farmers	Leonard	RRVW	50	1,072,000
Dahlgren & Co. Inc.	Fargo	BNSF	0	550,000
Embden Grain Co.	Embden	RRVW	10	583,000
Evergreen Grain Co.	Tower City	None	0	297,000
Harvest States Sunflower	Grandin	BNSF	27	3,058,500
Hunter Grain Co.	Gardner	BNSF	0	434,000
Hunter Grain Co.	Hunter	BNSF	54	1,462,000
Lockhart Elevator Co.	Grandin	BNSF	0	75,000
Peterson Farms Seed Inc.	Harwood	BNSF	1	173,000
Prosper Farmers Cooperative	Prosper	BNSF	54	1,125,000
Red River Commodities Inc.	Fargo	BNSF	0	1,746,000
Roman Meal Milling Co. Inc.	Fargo	BNSF	1	188,600
SB&B Foods Inc.	Casselton	RRVW	1	50,000
Unity Seed Co.	Casselton	RRVW	1	100,000
Valley Grain Service	Casselton	RRVW	1	150,000

Table 2.7. Size and location of Cass County’s elevators (UGPTI).

Aviation

Cass County has seven general aviation public airports and one commercial airport along with numerous private airports (Figure 2.13). The seven general aviation airports are located in Page, Arthur, Casselton, West Fargo, Kindred, Leonard, and Enderlin. The county’s only commercial airport, Hector International, is located in Fargo (North Dakota Aeronautics Commission 2003).

The West Fargo Utility Airport located north of the city is the busiest airport in its category in North Dakota. The airport is owned by the city and operated under an independent airport authority. The airport currently has one runway with 10 hangers and a pilot-controlled airfield lighting system as its only navigational aid (City of West Fargo 2000).

Hector International Airport serves as a primary commercial airport for southeastern North Dakota, northeastern South Dakota, and western Minnesota. The airport is located in the northern portion of Fargo and was established in 1931 with a donation of land by Martin Hector. A passenger terminal was opened in 1986 providing boarding to the all-jet fleet serving the airport using three runways. The number of passengers increased 18.4% between 1990 and 2000, with 234,667 passengers flying into the airport in 2000. Total cargo in tons in 2000 was 54,740, a nearly 600% increase from 1993. The airport authority has projected the number of passengers, tons of cargo, and number of based aircraft will continue to grow over the next 20 years (Fargo Airport Authority 2002).

Road Network

Cass County’s road network includes roads of varying sizes, functions, and conditions built and maintained by several agencies totaling approximately 4,200 miles of roads (Table 2.8, Figure 2.13). The county also has over 500 bridges throughout the county with 262 bridges 20 feet in length or longer, of these nearly 83% of the bridges are considered functionally adequate (Figure 1.20). These roads and bridges combine to supply the internal and external transportation links for people, goods, and services.

Jurisdiction	Total Miles	Percent
Interstate	219.35	5.2%
State	134.97	3.2%
County	661.62	15.8%
Township	2598.26	62%
Municipality	526.72	12.6%

Table 2.8. Break down of Cass County’s road network.

Federal and State

The county's major transportation needs are provided by the Federal Interstate Highways providing east-west as well as north-south routes via Interstate 29 and 94 (Figure 2.13). The intersection of the two highways in Fargo provides citizens and travelers easy access to the metro area and its convenient link to the national road grid makes the area appealing as a distribution point for goods produced in the area. The 130 miles of State Highways provides residents of the county and region high quality transportation routes. These routes provide residents, travelers, and businesses easy access to various regional trade centers.

County Roads

There are over 650 miles of county roads covering the 1,700 square mile area (Figure 2.13). Nearly half (321 miles) are hard surface, consisting mainly asphalt roads with a limited amount of concrete roads, with the other 327 miles remaining gravel. These bridges and roads provide the necessary transportation network needed for farm to market transport and for residents traveling to work, school, shopping and recreation.

The Cass County Highway Department's mission is to provide and maintain an efficient, safe, environmentally sensitive, and cost effective county transportation system to effectively meet citizen's needs for personal mobility and movement of goods consistent with the importance of transportation. The highway department employs 30 full time workers and approximately a dozen seasonal workers to meet maintenance, construction, and design needs of the county road network.

The county highway department has several sources of funding to meet its budgetary needs. The county has the ability to use special assessment districts, but to date has not exercised this option and relied only on a 10 mill levy of county taxes and state and federal funding. Limited funding and protecting the county's current infrastructure investment has prompted the county to use a pavement preservation protocol in determining the timing for maintenance and rehabilitation of county roads.

This philosophy is a change from the traditional reactive maintenance approach to one proactively addressing issues in road conditions while they are still structurally sound. A traditional rehabilitative approach allows the original pavement to deteriorate to a point of fair to poor condition for ride and structural quality. By this point, however, the structural integrity has been stressed to a level requiring more extensive and costly repairs to restore the road quality. Pavement preservation follows a proactive approach aimed at protecting and extending the initial investment and minimizing the disruption caused by major construction projects through use of timely applications of surface treatments (Figure 2.14). A variety of low-cost and frequently applied techniques and application are available depending on the situation, all protecting the existing structural capacity. The end result is a longer lasting road, requiring less extensive maintenance and investment (Davies and Sorenson 2000).

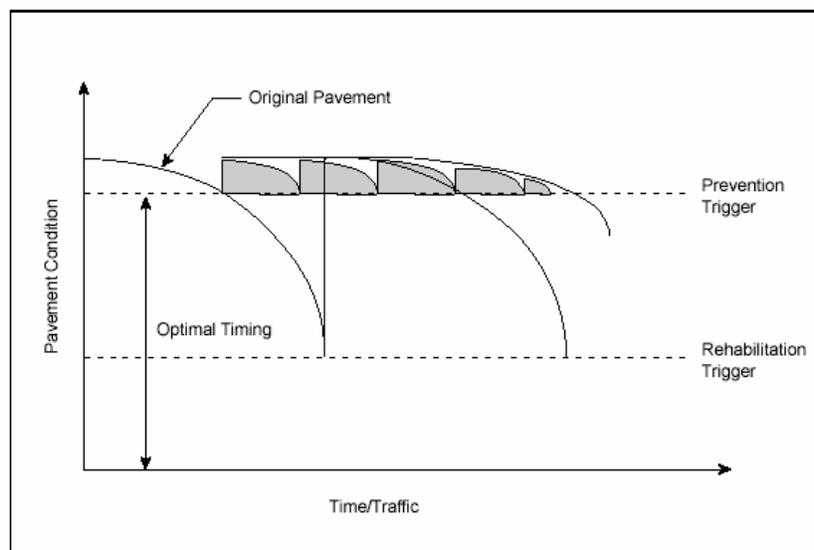


Figure 2.14. The results of effective and timely surface applications on pavement conditions and service life.

The main downside of using preventive maintenance faced by Cass County is a reduction in the amount of funding available for the construction of new roads. Under this philosophy, maintaining the current investment has the highest priority, as a result funding initially is allocated for preservation projects leaving little left for new construction of hard surface roads or expanding existing hard surface roads.

In order to meet the Highway Departments mission of safe and efficient roads requires proper planning of road locations and access points. This is most critical in those areas surrounding the Fargo Metro area because of increased traffic needs and to establish a suitable road network for areas that will one day be urbanized. The metro area uses a hierarchical road network to safely and efficiently distribute the traffic needs of the city's citizens. This system uses an inverse relationship between level of service and land access. The large roads limited access to the surrounding land allows traffic to flow more easily and at greater speeds, where as the local roads mainly provide access to land and as a result their mobility is reduced (Figure 2.15). Table 2.9 provides the general information and definitions for the five road types found in an urban functional classification system.

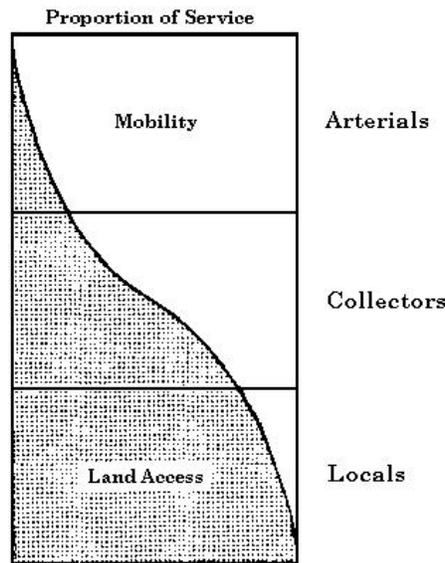


Figure 2.15. Relationship between land access and mobility for the functional classes (FHWA 1989).

Urban Functional Classification System	
Interstate and Freeways	
Interstates and freeways are similar to major arterials in their characteristics with one major exception. Access to adjacent land is prohibited, and vehicle access is limited to specifically designated entrances and exits. The focus of this system is to provide the maximum level of mobility.	
Level of Service (LOS)	This system, ideally, should function at a minimum level-of-service (LOS) providing a stable traffic flow and average running speeds of 55 m.p.h.
Access	Access is allowed only at specifically designated points of entrance and exit. These points of access will be major public streets. Direct access to adjacent land is prohibited on the freeway system.
Major Arterials	
Definition	The system of streets where traffic movement is the primary function.
Character	Major arterials serve the major centers of activity of the urbanized area, the highest traffic volume corridors, the longest trips and the highest proportion of vehicles to the length of road. Trips on this system may be either inter or intra-regional in nature.
Level of Service (LOS)	This system, ideally, should function at a minimum LOS characterized by stable traffic flow and average running speeds equaling 45 m.p.h.
Access	Access should be allowed only at intersections with other public streets, or major driveways carrying volumes approximating intersection streets.
Minor Arterials	
Definition	The system of streets where traffic movement is the primary function, but land access is a secondary function and less controlled than for major arterials.
Character	Minor arterials interconnect with and enhance the major arterial system. This system carries travel of moderate length at a lower level of service than major arterials. Travel is strictly intra-regional in nature. More emphasis is placed on land access with a corresponding drop in travel mobility.
Level of Service (LOS)	This system, ideally, should function at a minimum LOS characterized by stable traffic flow and average running speeds equaling 45 m.p.h.
Access	Ideally, access will be confined to intersecting public streets, major driveways carrying volumes approximating volumes on intersecting streets, and some driveways carrying lower volumes on an individually evaluated basis.
Collectors	
Definition	The system of streets where traffic mobility and land access are of equal importance.
Character	This system provides a bridge between the arterial systems and local streets. Traffic from local streets is collected and transferred to the arterial system.
Level of Service (LOS)	Ideally, this system should function at an LOS providing a stable traffic flow at average running speeds equaling 35 m.p.h. This should be possible even with land access being of equal importance to mobility. In addition, traffic flow may be affected by signals and stop signs at intersections with collectors and arterials.
Access	Land access and travel mobility equally important.
Local Streets	
Definition	The system of streets where land access is the primary function.
Character	This system primarily provides access to individual property and provides service over relatively short distances.
Level of Service (LOS)	This system offers the lowest level of mobility with speeds generally equaling 25 m.ph.
Access	Land access is the greatest focus on this network of roads.

Table 2.9. General characteristics of the FHWA urban classification system (MORPC 2004).

Historically, the section and quarter section lines develop into major and minor arterial as rural areas become urbanized. However, until these areas fully develop the section lines often function more as collectors and local streets, providing the access to the rural farmsteads and subdivisions. The problem faced by the county and the cities absorbing these rural areas is transitioning from a rural to an urban transportation network. While, the collector and local streets are naturally created during the platting and subdivision process the arterials roads require more long term planning so the section and quarter section lines can be transformed into the higher service roads required by urban environments. This long term planning consists of corridor preservation of the section and quarter section lines, limiting access to these roads, and striving to make rural development compatible with the future road system to reduce the disruption to the development as it urbanizes. Neglecting corridor preservation for future roads can cause costly land acquisition for the tax payers and can severely prevent the ability to build the ideal road network.

Township and Municipality

Most township and municipality roads are characterized as having the lowest mobility service but provide the greatest access to land and property. Township roads comprise the largest portion of the county's road network and provide the final stage of transportation between the larger federal, state, and county roads and the rural communities, lands, farms, and homes (Figure 2.13). The vast majority of these roads remain gravel and are usually only paved when upgraded to county roads or adopted by municipalities. The 530 miles of municipality owned roads meet the small scale transportation needs found within the county's cities. The bulk of these roads are paved, with the highest percentage of paved roads found in the larger communities and metro area.

Land Use

Cass County contains over 1,131,000 acres (1,767 miles²) of total land area, covering a nearly square area roughly 44 miles wide by 42 miles high. The county has over 52,000 parcels of land totaling 1,124,000 acres. Four general land use categories will be used to classify land use in the county, listed in ascending order of urbanization: agricultural, rural non-farm, small city, and metropolitan area (Table 2.10, Figure 2.16).

Land use	Acres	Percent	Parcels	Mean Parcel Size Acres
Agriculture	1,047,104	93.1	11,779	88.89
Rural-Non-farm	35,564	3.2	2,678	16.51
Residential	31,595	2.8	2,451	12.89
Commercial	2,760	0.2	167	16.5
Mix	1,209	0.1	60	20.16
Small Cities	14,377	1.3	5,554	2.58
Metropolitan Area	27,706	2.5	32,527	0.85
Total	1,124,753	100.0	52,538	21.4

Table 2.10. Total acreage, parcels, and average parcel size for Cass County's land use.

Cass County County Profile

Land Use

- Metro
- Small City
- Non-farm Residential
- Non farm Mix
- Non-farm Commercial
- Agriculture

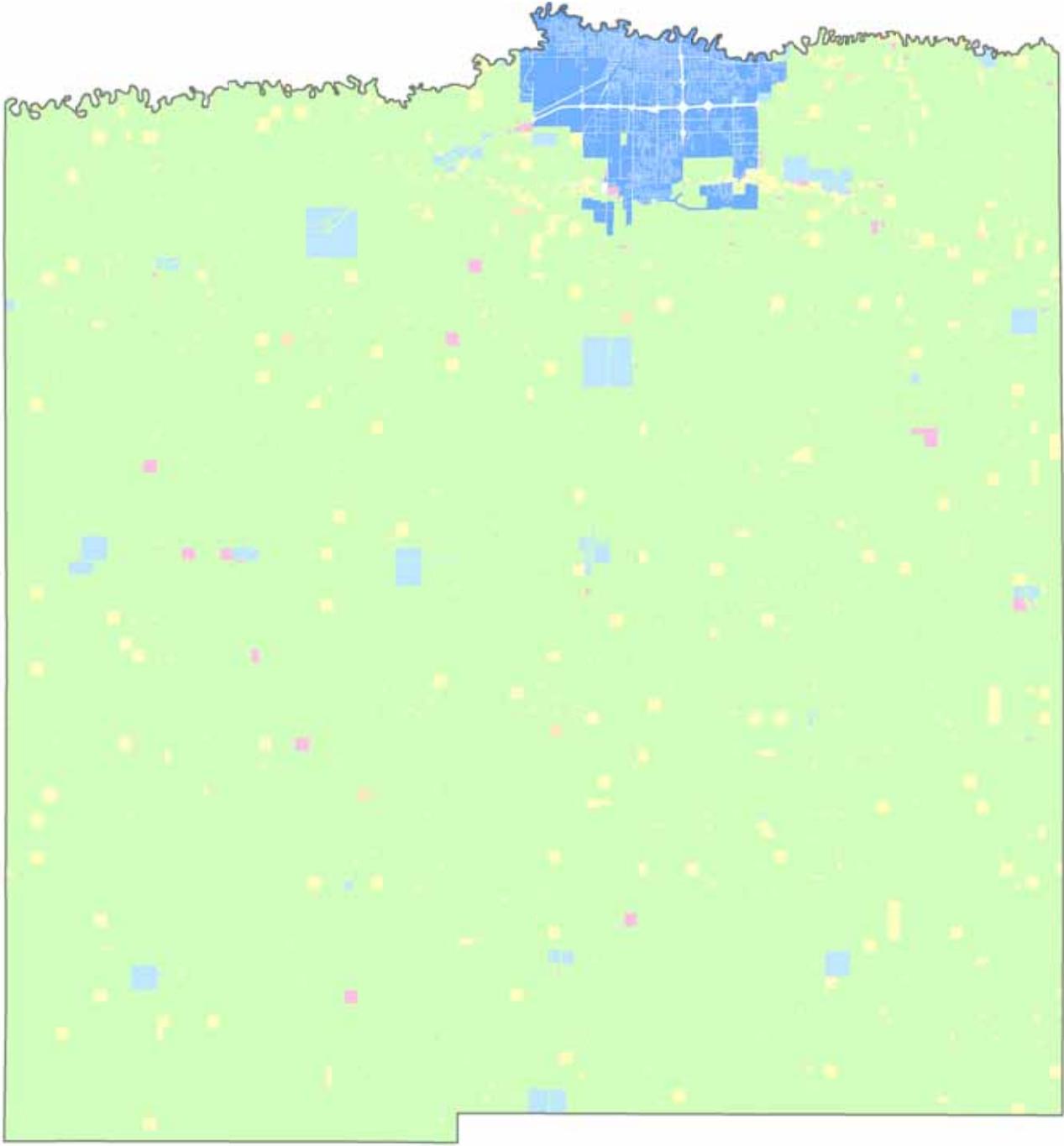
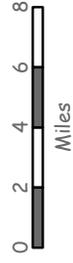


Figure 2.16. Cass County's land use area and location

Agriculture

Cass County began as a center for bonanza farming in the late 19th century because of the areas rich soils (Figure 2.17) deposited from Glacial Lake Agassiz. The majority of land in the county is still used for crop production, specifically soybeans, wheat, and barley, yet farms have dramatically changed from the first settlers. The introduction of new farming technologies and equipment allows larger pieces of land to be farmed more efficiently. These changes have reduced the number of farms in the county, but the average size of farm has nearly tripled since 1890, from 403 to over 1,100 acres (Table 2.11).

	1987	1992	1997	Total Difference	Percent Difference
Total Farms	1,183	1,004	919	-264	-22.3%
Farmland (acres)	1,058,821	1,070,528	1,067,667	-8,846	-0.01%
Average Size (acres)	895	1,066	1,162	+267	+129.4%

Table 2.11. Cass County's inverse relationship between number and size of farms (U.S. Department of Agriculture 1997).

Agricultural land use (and vacant land) has and continues to be the predominate use in Cass County, despite the loss of agriculture lands over the years. For the purposes of this discussion agricultural lands are any parcels having no residential or commercial structure value and outside of all incorporated city limits. Using these criteria, the county has 1,047,104 acres of agricultural lands made up of nearly 12,000 parcels; the 1997 Census of Agriculture calculated 1.067 millions acres of agriculture land in the county. The number of farms in the county has continually declined, while the average size of farms continues to increase (Table 2.11). The types of commodities harvested continue to fluctuate over the years (Table 2.12), while most livestock figures have declined (Table 2.13) (U.S. Department of Agriculture 1997).

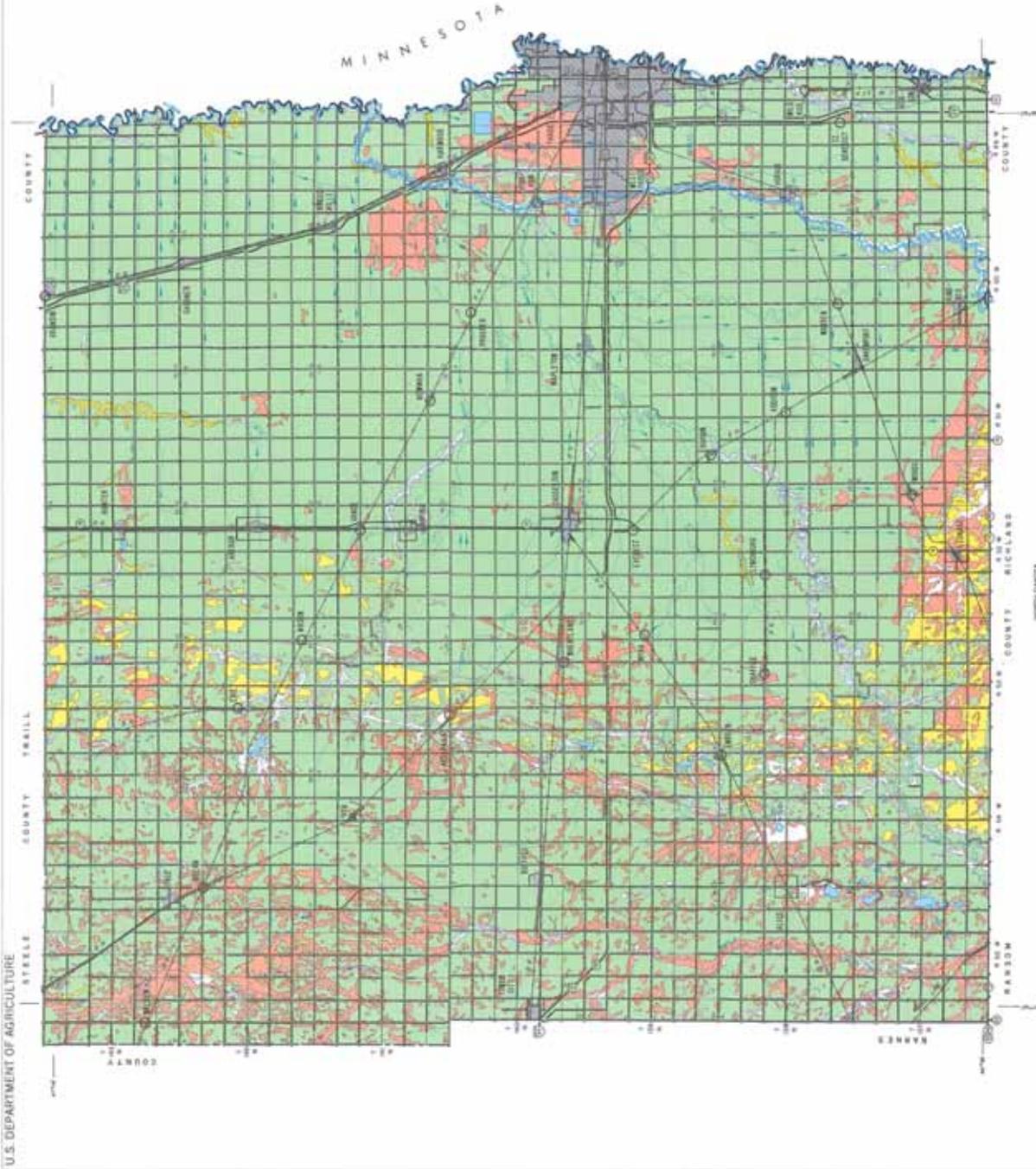


Figure 2.17. Location of Cass County's important farmland (Soil Conservation Service).

Harvested commodities (acres)	1987	1992	1997
Corn, Grain, or seed	66,454	82,088	69,562
Corn, silage, or green chop	3,274	3,400	2,991
Wheat	300,861	410,602	405,205
Barley	158,202	110,384	50,737
Oats	4,177	3,774	1,443
Sunflower seed	36,032	57,704	42,881
Hay-alfalfa	14,514	14,022	12,507

Table 2.12. Total acreage of harvested commodities in Cass County (U.S. Department of Agriculture 1997).

Livestock inventory (number)	1987	1992	1997
Cattle and calves	26,512	20,822	18,476
Beef cows	7,332	6,358	6,599
Milk cows	900	672	500
Hogs and pigs	23,236	32,963	13,380
Sheep and lambs	7,985	7,604	1,789
Broilers and chickens (sold)	1,196	575	1,325

Table 2.13. Total number of livestock in Cass County (U.S. Department of Agriculture 1997).

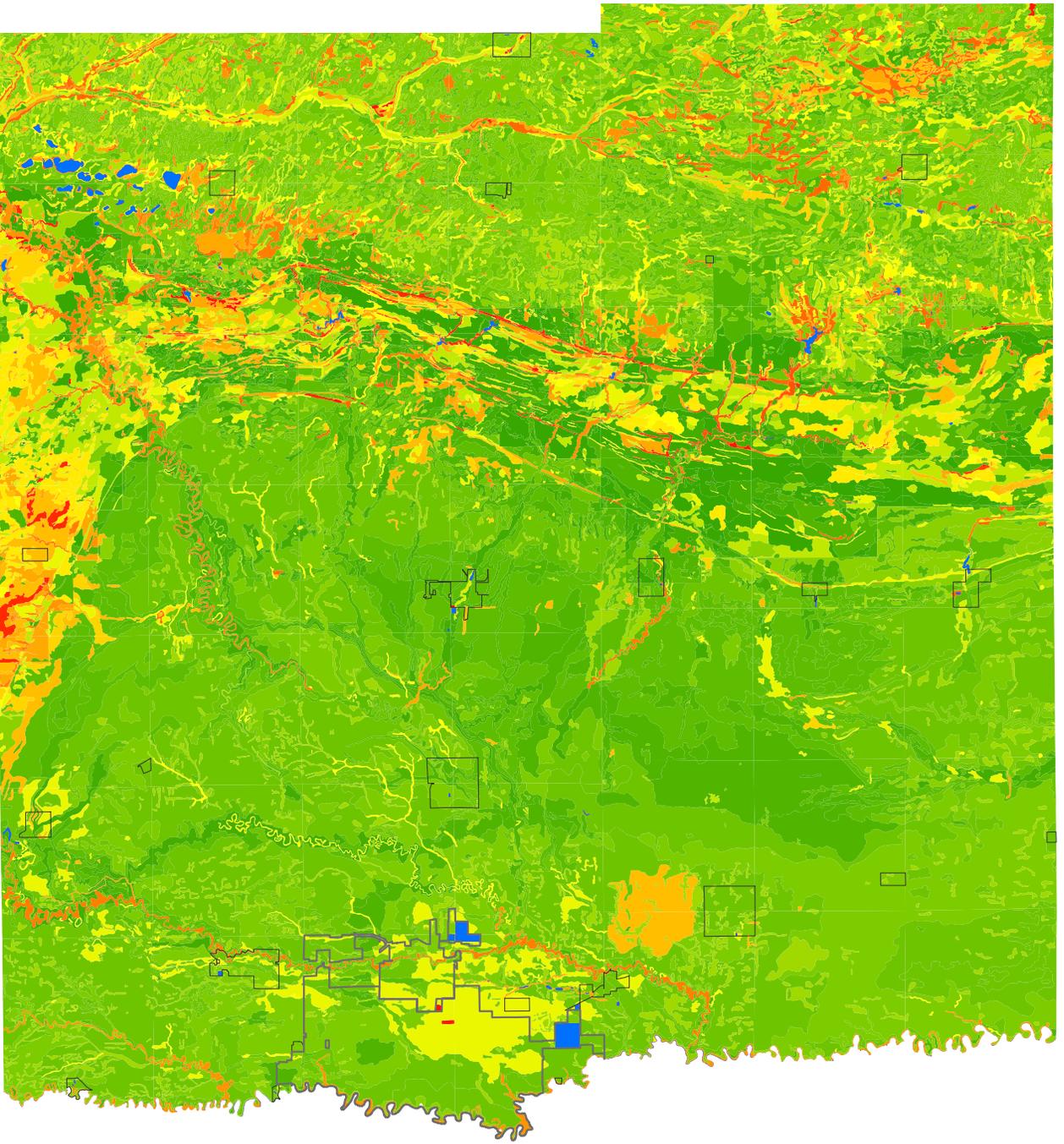
The productivity of the Red River Valley’s soils (Figure 2.18) results in these lands having generally higher values than land outside the valley, but the value has varied over the years as result crop prices and interest rates. Land values surrounding the Fargo/West Fargo metro area have greatly been affected by encroaching development; making subdividing and development of farm land much more profitable than farming. This premature development can result in accelerated development and land use conflicts (Figure 2.19). Ideally, development should progress outward from the urban fringe, but these premature/leap frog developments create gaps between the urbanized city and the new developments. The land found between the urban fringe and the new development will likely continue to be used for agriculture, the result is islands of residential development surrounded by agricultural farmland. Large and loud equipment, chemical spraying, long work hours, dust, odors, increased truck traffic, and other normal farming practices can all cause problems or frustrations for the residents living in these developments. Farmers are also impacted with the increased traffic on what was “rural” roads making the movement of their equipment and product more difficult, trespassing, increased vandalism to equipment and buildings, damage to crops from horses, bikes, people, and motorized vehicles, damage to crops, drain tiles, and ditches from the storm

water run off generated by the developments, needing to change or modify chemical application, nuisance complaints from residents, and increased pressures to sell land to developers. The efficiency of farming is also reduced by the number of these leap frog developments. As farm size has increased over the years so has farm equipment size, these leap frog developments reduce the large tracts of land and also make accessing surrounding lands more difficult, making it the equivalent of mowing a residential lawn with an industrial golf course tractor. In light of this, orderly development restricting leap frog and premature development and promoting smart growth development out from the urban fringe reduces these land use conflicts and also gives the outlying land owners a better time line of future land use changes.

Farm and Ranch Subdivision Surveys

Cass County mailed 150 surveys (Appendix B) with a labeled post paid envelope to establish if farmers and ranchers were negatively impacted by the introduction of rural subdivisions. These targeted surveys were sent to parcels with 20+ acres, within 0.75 miles of all unincorporated 10+ lot subdivisions in Mapleton, Stanley, Pleasant, Harwood, Reed, Raymond, and Barnes townships. These surveys excluded all property having any commercial or residential structures to limit the responses to only farmers and ranchers. The surveys attempted to gauge agricultural landowners' feelings and sentiments towards rural subdivisions and how their introduction has impacted them.

Fifty-two surveys were completed and returned by farm owners/operators, producing a respectable response rate of 34%. The lower response rate could be attributed to the surveys being mailed during the spring planting season and as the result of the surveys mailed to the land owners and not the actual farm operators, resulting in some surveys not reaching the intended recipients. The most frequent complaints about the subdivisions were trash or litter on farmland, crop trampling, and vandalism or theft of property or equipment. Of the respondents owning land both near and far from subdivisions, 55% felt these problems were more common with land near subdivisions. Thirty-four percent of respondents felt the subdivision has created more problems and issues, compared to only 12% who indicated the subdivision has made a better experience.



**Cass County
County Profile**

**Farmland
Productivity**

- Farmland Productivity
- 0 - 20
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100
 - Water

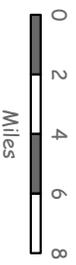


Figure 2.18. Productivity of Cass County's soils (USDA).

FARMING ON THE EDGE

Sprawling Development Threatens America's Best Farmland

North Dakota

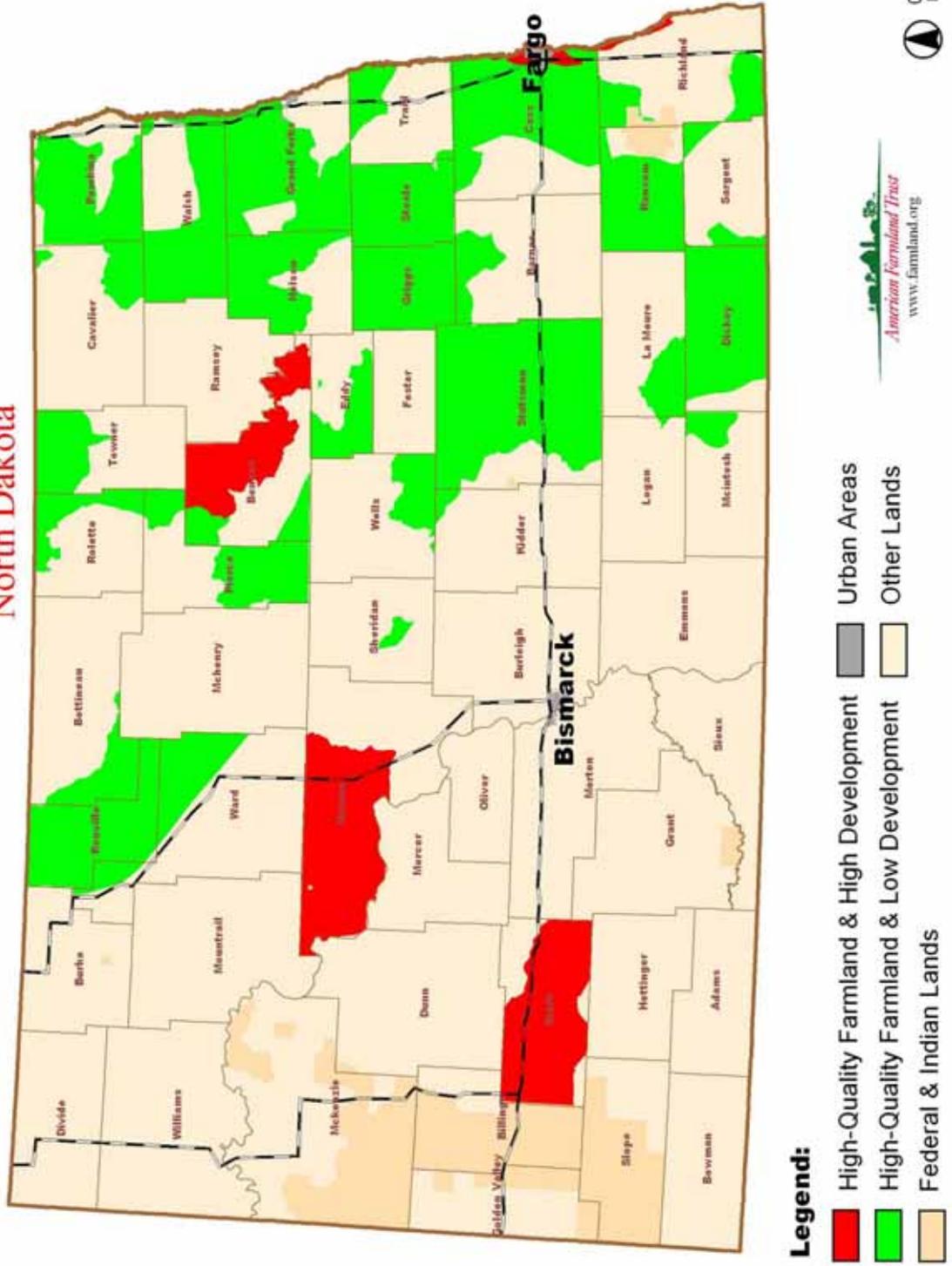


Figure 2.19. Location of farmland impacted by sprawling development (American Farmland Trust).

Rural Non-Farm

Rural non-farm is Cass County's second largest land use with over 35,000 acres. Rural non farm is defined as all parcels outside of all incorporated city limits, which have a residential or commercial structure. While Cass County is the most urbanized of all North Dakota counties, it is also the only county to have an increased number of rural residents between the 1990 and 2000 U.S. Census. The county has witnessed this trend in rural households which usually consist of large lots with limited urban services. The rural areas relatively cheaper lands and looser ordinances allow developers to create large lots which would not be feasible within the metro area and the lower taxes and cheaper land also allow new home owners the luxury of large lots with low density.

Subdivision Services

These type of rural non-farm leap frog developments cause land use conflicts (previously outlined in the agriculture land use section), but also their lack of adequate services can create dissatisfaction and increased costs for the residents. The large rural subdivisions often cater to residents moving from the metro area, but seldom include the same amenities found within the municipalities; gravel roads, open ditches, on-site septic systems, and private wells are often commonplace in these developments. The growing share of these transplanted urban residents maintain attitudes about their new neighborhoods based on their previous established experiences living in an urban area. The result is they quickly become frustrated by the potholes, dust, dirt, and mud from the gravel roads, the standing water in the ditches, the quality and quantity of their well water, and the effectiveness of their on-site sewer system.

Often unbeknownst to these owners is the reality that their subdivision roads are often the property of their homeowners association, making the property owners responsible for the costs of maintaining the roads until they are annexed into a city. These owners feel it should be the county's or township' responsibility to maintain or rebuild the roads to urban standards, not realizing their lower taxes equate to fewer services provide by the county. Investigating taxes of three comparable homes located in City of Fargo (Table

2.14), and City of West Fargo (Table 2.15), and Barnes Township (Table 2.16) shows the disparities between the taxes paid for by rural resident, especially those paid for road maintenance and improvements. The result of lower taxes collected and the county's priority to maintain the current county roads leaves little possibility for maintenance or reconstruction of roads in these rural subdivisions. In the cases where the township do own and maintain the roads their undersized funding does not allow the same level of service found in urban areas. The end result for the residents is either waiting until the properties are annexed into a city and pay the special assessments, create their own assessment district to pay for road improvements, or live with the roads as-is.

OakCreek-Fargo	
Assessed value	\$249,000.00
County (Minus roads/bridges)	\$613.47
County Roads and Bridges	\$114.85
Vector Control District	\$11.21
Soil Conservation District	\$4.59
Garrison Diversion Conservancy District	\$11.21
State Medical School	\$11.21
Fargo School District	\$3,587.85
Southeast Cass Water Resource District	\$56.03
City of Fargo	\$674.99
Fargo Park District	\$366.74
City of Fargo Specials	\$2,351.74
Drains	\$22.41
Total	\$7,826.29
Specials break down	
Paving	\$1,269.13
Signals	\$60.91
Water main	\$205.38
Sewer	\$117.03

Table 2.14. Taxes paid on a \$249,000 home in OakCreek Subdivision-Fargo.

Charleswood-West Fargo	
Assessed value	\$249,100.00
County (Minus roads/bridges)	\$613.75
County Roads and Bridges	\$114.90
Weed Control District	\$26.34
Vector Control District	\$11.21
Soil Conservation District	\$4.60
Garrison Diversion Conservancy District	\$11.21
State Medical School	\$11.21
West Fargo School District #6	\$2,847.56
Southeast Cass Water Resource District	\$56.05
City of West Fargo	\$947.58
West Fargo Park District	\$296.50
City of West Fargo Specials	\$1,960.50
Drains	\$278.45
Total	\$7,179.86
Specials break down	
Paving	\$520.24
Signals	\$74.97
Sewer and Water	\$493.68
Storm Sewer	\$72.62

Table 2.15. Taxes paid on a \$240,100 home in Charleswood-West Fargo.

McMahon Estates-Barnes	
Assessed value	250,000.00
County (Minus roads/bridges)	615.94
County Roads and Bridges	115.31
County Park District	11.25
Weed Control District	26.44
Vector Control District	11.25
Soil Conservation District	4.61
Garrison Diversion Conservancy District	11.25
State Medical School	11.25
West Fargo School District #6	2,857.73
Southeast Cass Water Resource District	56.25
Barnes	131.96
Drains	395.79
Total	4,249.03

Table 2.16. Taxes paid on a \$250,000 home in McMahon Estates Subdivision-Barnes Township.

The lack of slope in the Red River Valley also makes it difficult to achieve proper drainage with use of open ditches. To meet the county standards for slope and ditch grade can require deep and wide ditches. This can make yard maintenance difficult, as well as create an unappealing feature within a subdivision. Proper drainage requires accurate surveying and construction of the ditches, deviating from this can quickly create drainage problems for the residents resulting in standing water. Improper installation of culverts and landscaping and infrequent ditch maintenance by individual lot owners can create drainage issues for the entire subdivision; fixing these problems can not only be costly, but difficult for the entire subdivision to agree to and pay for these costs.

The use of on-site septic systems and private wells can provide initial access to water and sanitary waste disposal, but their use in large subdivisions can create long term problems for the residents. On-site septic systems are only expected to last 20-30 years when properly installed and maintained. Several previous large subdivisions initially using on-site septic systems were required to install a central sewer system following the rapid failure of their septic systems. Similarly, the use of private wells can provide access to potable water, but this water source might not always be the best long term option. The amount of ground water in Cass County is quite limited; using private wells can result in issues with the quality and quantity of water. Expensive and unexpected costs occur when these wells no longer produce adequate water, requiring home owners to pay for the installation of a central water system. The use of both on-site septic and private wells might be sufficient for small-scale rural developments, but the long term use of these systems for large rural development can create dissatisfaction by residents accustomed to urban services, create hardships when they no longer adequately meet the needs of the subdivision, as well as often providing only a short-term solution.

Developments using on-site septic and private wells require the use of large lots needed for the drain fields and wells. However, if the development decides to retrofit the subdivision for urban service these large lots now dramatically increase the costs to the owners by the need to run greater lengths of water and sewer mains through the subdivision. In the cases where the developments are annexed their properly functioning

private sewer and water system is often prematurely replaced with public services. Both scenarios result in large expenses for homeowners when urban services are brought into a rural subdivision previously using private sewer and water systems.

Rural Subdivision Surveys

Cass County mailed 918 surveys to residents of rural subdivisions in the spring of 2004 to gauge their likes and dislikes about their subdivision. These surveys were employed to help determine if the services provided to previously established rural subdivisions were meeting the needs of the county citizens and what changes would improve rural subdivisions.

The surveys (Appendix C) were sent to all properties having a residential structure located in a 10+ lot subdivisions in the unincorporated areas of Mapleton, Stanley, Pleasant, Harwood, Reed, Raymond, and Barnes townships. These criteria resulted in 56 eligible subdivisions, accounting for 91.8% of the county's 10+ lot subdivisions, 92.7% of the county's targeted audience, and 80% of all rural subdivisions residents. This anonymous survey asked recipients to disclose information about their previous residence, the characteristics of their subdivision, urban-type services they miss, their dislikes of the subdivision, and rating of the roads, ditches, and subdivision.

The county received back 568 completed surveys resulting in over a 60% return rate and considering the survey was sent to a high percentage (92.7%) of the targeted audience the county feels confident the results of the survey accurately represents the targeted audience (546 respondents would be required to achieve a 4% confidence value at 99% confidence level). The complete results of the survey can be found in Appendix C, but the most interesting results will be summarized within this section. Roughly 83% of the respondents indicated they previously lived in the FM metro area and the majority of respondents previously residing outside of Cass County lived in a city larger than 15,000 people. While these residents now live in a rural subdivision they will likely maintain attitudes about their new neighborhoods based on their previous established experiences

while living within an urban area. Those residents with paved subdivision are significantly more satisfied with their roads, 87% indicating their roads are good, 11% neutral about roads, and only 1% dissatisfied. In comparison, 43% of residents with gravel roads indicated they were good, 40% were neutral, and 16% indicating the roads were bad. More than 70% of respondents prefer paved roads with 76% indicating they would still prefer paved roads even if meant an increase in their personal expenses. Fifty percent of respondents with open ditches indicated they were good, 38% were neutral, and 11% indicated the ditches were bad.

Impact on County Roads

Despite that Cass County does not pay for or maintain the roads within subdivisions, the county is still impacted by the increased traffic on the county road network generated by these subdivisions. The Upper Great Plains Transportation Institute located at NDSU collaborated on an article, *Rural road financing strategies two new model applied to N.D. counties*, which investigated possible strategies to fund rural roads and bridges for North Dakota counties. Using the average daily traffic (ADT) counts of the county roads and the cost/benefit ratio the report determined an average daily traffic count of 400 should be the threshold used by Cass County to determine when a gravel road should start to be considered for conversion to hard surface (Bitzan *et al.* 1992).

The following hypothetical example illustrates the revenue and transportation costs generated by a rural subdivision using Bitzan *et al.* 1992 findings and county data using the following assumption: the subdivision is located in Stanley township and uses 2003 mill levies for the entire period, the average Cass County gravel road averages 100 ADT, the average household in Cass County generates 10 trips per household based on the national average, converting one mile of gravel road to hard surface averages \$500,000, average hard surface road will need to be overlaid every 20 years, and projected taxes, construction costs, and assessed values ignore inflation rates. Based on these assumptions an average gravel road would only require 30 new homes to increase the ADT from 100 to the 400 ADT thresholds for hard surface conversion. If each of the 30 homes averaged \$250,000 in total assessed value they each would annually generate

\$115.31 for the county road and bridge fund for a total of \$3,459.30. Using this example, a new 30 unit subdivision on a gravel road which increases ADT to 400 would generate \$69,186 for the county road and bridge fund over the 20 year life of the asphalt road, but would require an investment by the county to pave one mile of \$500,000, for a total shortfall of \$430,814. The homes in this subdivision would have to average over \$1.5 million for the generated taxes to pay for the paving of the road. This type of scenario doesn't just apply to paving gravel roads, but also the addition of turn lanes into subdivisions, traffic signals, and widening of existing roads.

There are several solutions to this problem: first, increase taxes to generate more money for the road and bridge fund; second create special assessment districts to pay for the improvements; or finally, require developers to install and pay for needed upgrades to the road system. Increasing taxes would be a solution, but raises the questions why the entire county should pay for road improvements for such a small population benefiting from the project. The county has the ability to create special assessment districts which would tax those benefiting from road improvements, but has chosen not to use this option. The final option would require subdivisions to pay for the needed upgraded to the public road system resulting from the new development. Using this solution, each subdivision potentially increasing the ADT to a specified threshold would require a transportation plan to study the impacts the subdivision would have on the transportation system. The recommendations of the traffic study report and the resulting upgrades would be paid for by the developer to gain approval of the subdivision. For example, if the report recommends a turn lane be installed into the subdivision the costs for building the turn lane would be the responsibility of the developer. The benefits of using this are costs for improvements are paid for by those benefiting the most and the costs would likely be added to the lot prices allowing prospective buyers to budget in the cost initially instead of at a latter point, which is the case of special assessments.

Cass County has witnessed an increase in rural non farm land uses and should expect this trend to continue. The draws for prospective buyers are lower taxes, lower densities, and larger lots then developments found within Fargo/West Fargo. The lower taxes, cheaper

land, and looser restrictions allow developers to develop land more cheaply. The resulting problem is subdivisions lacking urban services while at the same time straining the county and public road network. Requiring large subdivisions to be built to urban standards and pay need infrastructure upgrades would result in more satisfied residents and improvements paid for by those benefiting and necessitating the upgrades.

Metropolitan Area

The metropolitan area is defined as all parcels within the incorporated limits of Fargo and West Fargo. The cities of Fargo and West Fargo account for 85% of Cass County's population, while their area only accounts for 2.5% of the total area, making it the third largest land use. The metropolitan area has the most number of parcels and the smallest average parcel size 0.85 acres.

These two cities have seen some of the highest growth in county, region, and state. Fargo's population grew by 22% between 1990 and 2000 to 90,599 and West Fargo's population increased by over 17% for the same period to 14,940 residents.

Annexation is good method to determine growth as well as overall change from agriculture to developed land. According to the Fargo Planning Department the City of Fargo has annexed approximately 550 acres a year, which is over $\frac{3}{4}$ of a square mile a year. The City of West Fargo has annexed on average approximately 402 acres each year since 2000, which over a half square mile per year. The 2003 Bureau of Reclamation report projected Fargo and West Fargo's 2030 population to be 152,700 and 25,400, respectively, an increase of over 72,000 residents (Bureau of Reclamation 2003).

Small Cities

The final land use, small cities, are all parcels within incorporated limits of Cass County's cities, excluding Fargo and West Fargo. These 25 cities account for the smallest area of land use and for 7% of the county's total population. Over half (14) of these

cities experienced growth in the 2000 census, averaging over 16% increase, while the other 11 on average decreased over 11%.

Some of the fastest growth rates in Cass County's cities are those surrounding the Fargo/West Fargo metro area which serve as bedroom communities for residents who choose to live outside of the metro area, but commute into the cities for work. Horace, Reiles Acres, and Casselton have all experienced high growth over the last 10 years, respectively growing 27.7%, 17.3%, and 13.7% and increasing housing units by 30.5%, 22.2%, and 10% (U.S. Census Bureau).

CHAPTER THREE:

City Profiles

The following chapter provides basic information for the 27 cities found in Cass County (Figure 3.1). Decennial census data for population and housing, population projections, and a map of the political boundaries and man-made and natural features will be provided for each of the cities. Time and space constraints prohibit the profiles from truly capturing the character of each city.

Historical census population and housing data for each city is provided to illustrate the trends occurring for each city. Historical census population dating back to 1920 and historical housing statistics extending dating back to 1970 is provided for each city, however this data might be limited depending on the size of the city and incorporation date.

The historical populations from each city were used to generate 2010, 2020, and 2030 population projections. These projections being the numerical outcome of a set of assumptions made about future trends with consideration to past trends (U.S. Bureau of Census 1977, 3). Thus, the projections are only assumptions of what the population could be if past trends continue into the future. Size of study area, length of projection period, methodology, historic data, special populations, and government policies can all influence projection accuracy; in the case of projections for cities, size and historic data will likely be the biggest challenge to accurate projections. It is generally accepted that population projections for large areas will be more accurate than small areas because changes tend to average out over larger areas. The small size of many of the county's cities can cause inaccuracies in population projections because they are so greatly affected by internal and external changes. The limited historic population data for the county's cities could also affect the projections. Demographic trends are more accurate when based on longer periods of time, as a result of many of Cass County's cities limited

historic data, the past population trends might not accurately represent the current population trends.

It can not be stressed enough that the projections provided for each city only represent what populations would be if past population trends continue into the future. These projections have no ability to account for changes that could occur during the projection period, such as expansion or closing of businesses, expansion or closing of schools, *etc.* With this in mind, the data generated by the projections may provide only limited usefulness and their accuracy should be taken with the proverbial grain of salt.

Nine different models using historic census data was used to determine the projected populations for each of Cass County's 27 cities for 2010, 2020, and 2030. The model having the least error based on the mean absolute percentage error (MAPE) was used for the city's projected population. The historic population data used by the models was limited to only the data representing the current trends of each city. For example, if a city had high population declines in the first half of the century, but the population has stabilized since, then only the data displaying the stabilized trend was inputted into the models.

Cass County City Profiles

Cities

-  City Limits
-  Fargo
-  West Fargo

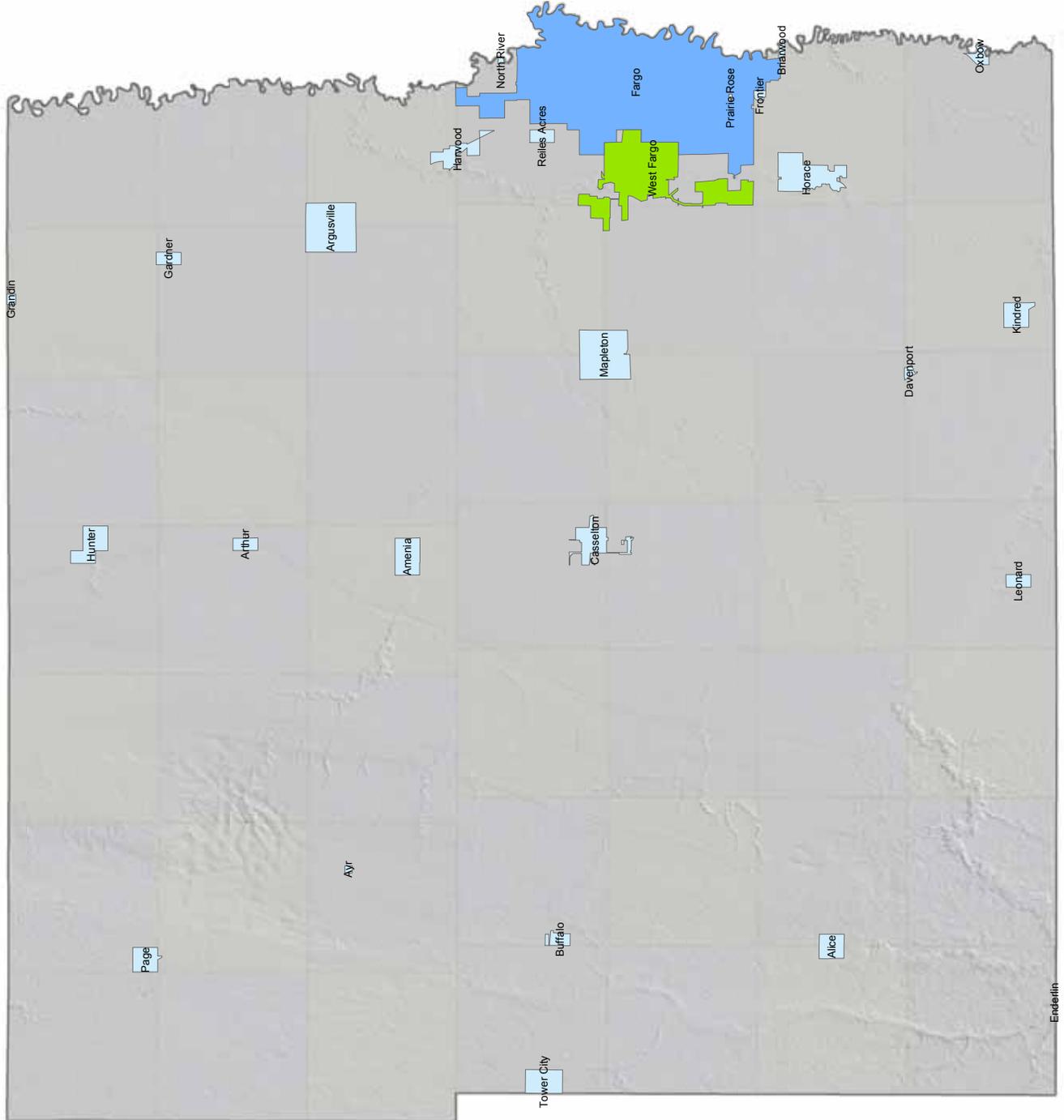
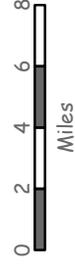


Figure 3.1. Cass County's incorporated cities.

City of Alice

The City of Alice is located in the southwestern portion of Cass County along the western edge of Eldred Township (Figure 3.2). The city located near the intersection of Cass Highway 6 and 38 and is approximately 8 miles south of I-94 at exit 314. The city is north of a collection of smaller lakes, with the closest only one mile south of town. The city is less than one total square mile with a perimeter less than four miles.

Alice had its highest recorded population in 1940 with 181 residents and since this high has declined to less than half this number (Table 3.1). Since 1920 the city has lost 113 residents with a current population of 56. Based on the previous demographic trends from 1930 to 2000 the projected population is expected to continue to decline. Based on these projections the city will lose another 27 residents over the next 30 years. As expected, the city has also witnessed a decrease in housing units with the 2000 census documenting 25 homes within the city (U.S. Bureau of the Census, Decennial Censuses).

Alice	
Population	
1920	N/A
1930	169
1940	181
1950	162
1960	124
1970	83
1980	62
1990	62
2000	56
Rank	19/27
Projection	
<i>2010</i>	42
<i>2020</i>	35
<i>2030</i>	29
<i>Projection Years</i>	1930-2000
Housing	
1970	41
1980	33
1990	30
2000	25
<i>N/A= Not Available</i>	

Table 3.1. Population and housing trends, Alice (U.S. Bureau of the Census, Decennial Censuses).

Cass County City Maps

Alice

- ★ Villages
- Bridges (20'+)
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits
-  City ET
-  Fargo
-  West Fargo
-  West Fargo ET
-  Fargo ET

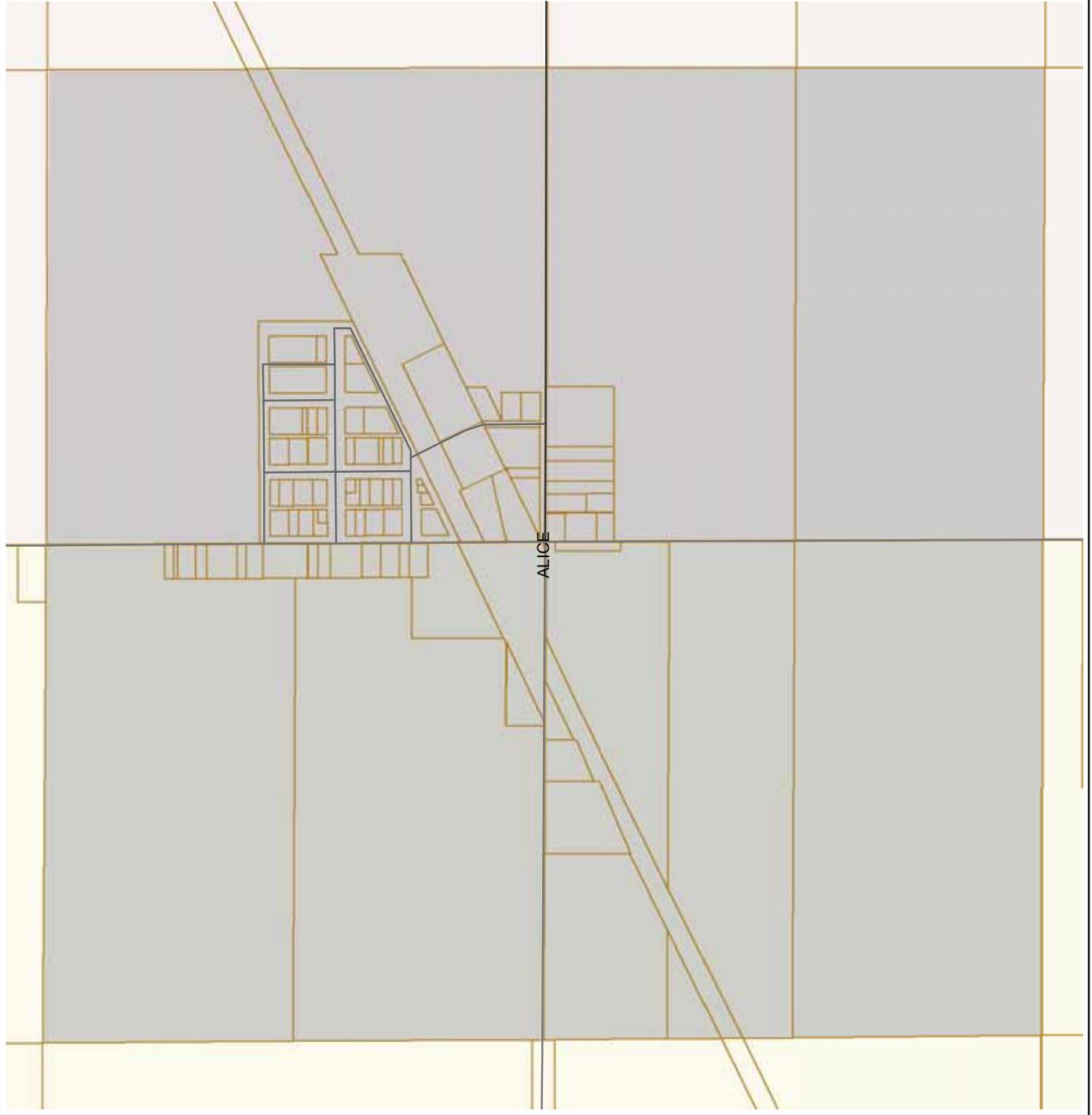
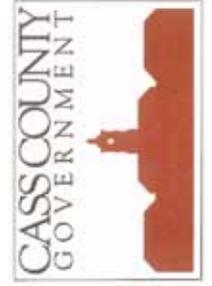


Figure 3.2. City of Alice.

City of Amenia

The City of Amenia is located in north central Cass County along State Highway 18 in Amenia Township. Amenia is approximately nine miles north of Interstate 94 and seven miles north of Casselton (Figure 3.3). The city is almost one and half square miles with a perimeter of nearly five miles. The Rush River is located approximately a half mile north of the city and a lower branch of the Rush River is found a half mile to the southwest of the city. A Burlington Northern/Santa Fe rail line extends off the main line down to the city from the north.

Amenia experienced growth during the 1940s and 1950s, reaching its highest population in the 1950 census with 127 residents (Table 3.2). The city experienced a sharp decrease in population in the 1960s, losing 37 residents. The 1970s and 1990s both had increases in population; the most current census recording 89 residents. Using the demographic trends from 1960 to 2000, the projected populations are expected to slightly decline or stay stable. Following the population trends, the housing figures have fluctuated over the last 40 years, with the 2000 census showing an increase in four homes (U.S. Bureau of Census, Decennial Censuses).

Amenia	
Population	
1920	N/A
1930	90
1940	104
1950	127
1960	117
1970	80
1980	93
1990	82
2000	89
Rank	21/27
Projection	
<i>2010</i>	88
<i>2020</i>	88
<i>2030</i>	87
<i>Projection Years</i>	1960-2000
Housing	
1970	27
1980	39
1990	31
2000	35
<i>N/A= Not Available</i>	

Table 3.2. City of Amenia population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Amenia

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

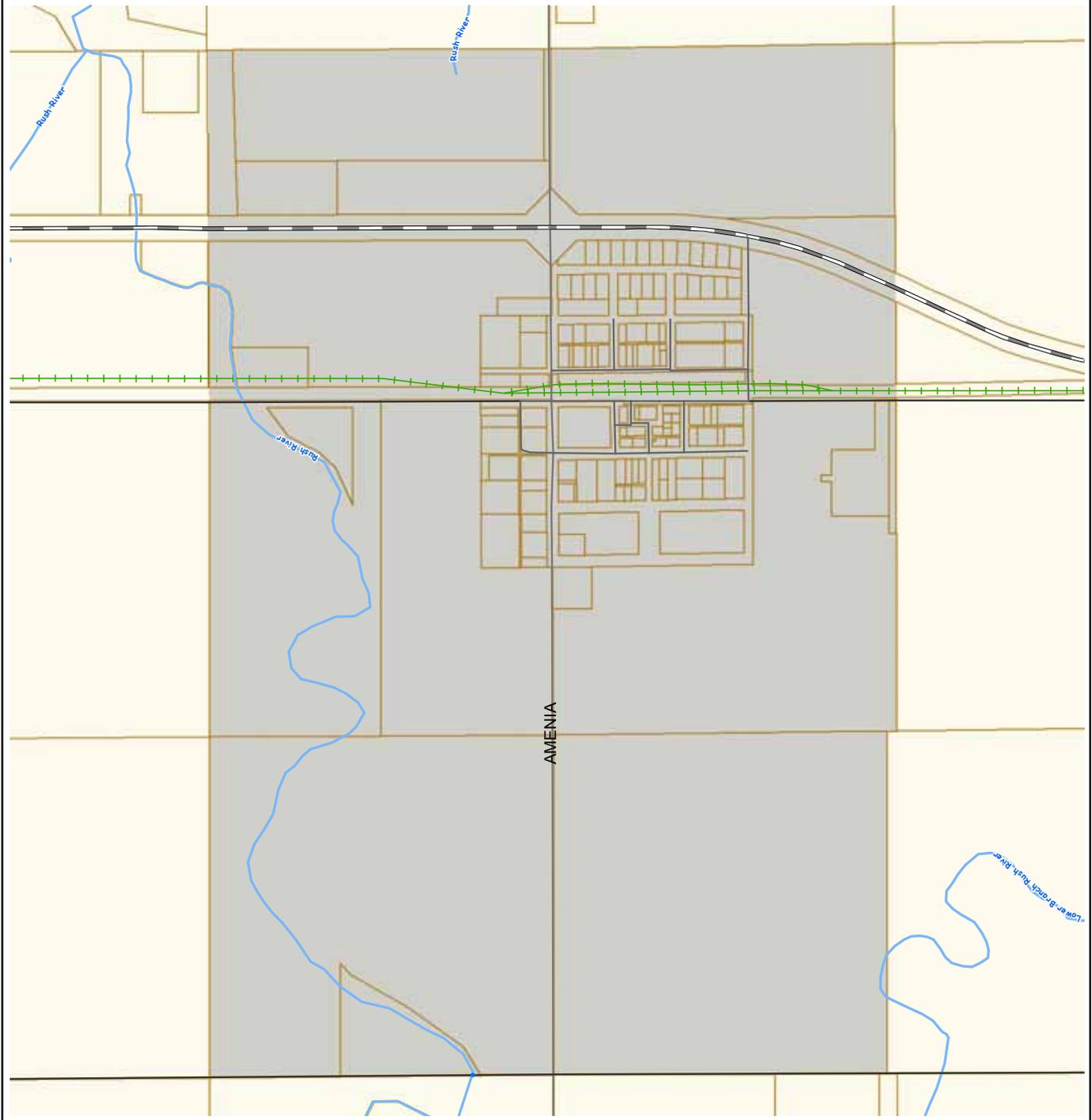


Figure 3.3. City of Amenia.

City of Argusville

Argusville is located in north central Cass County in the northwest corner of Harwood Township along Interstate 29 at exit 79 (Figure 3.4). County Road 81 and County Road 4 both pass through the city, which is four square miles with an eight mile perimeter. A line of Burlington Northern Santa Fe passes through the city following the interstate north and south to the metro area. Besides the central city, Argusville also has a newer subdivision, Leonard’s Way, to the southwest which is providing new residents to the community.

The city’s population has fluctuated over the last century, increasing during the first quarter, then decreasing, and then for the most part increasing during the last 30 years (Table 3.3). The 1990 Census recorded the city’s highest population of 161 residents. Using the population trends from 1960 to 2000, the city is expected to slightly grow over the next 30 years. The housing figures have increased each census dating back to 1970, with a total gain of 25 new homes city (U.S. Bureau of the Census, Decennial Censuses).

Argusville	
Population	
1920	N/A
1930	115
1940	145
1950	126
1960	118
1970	118
1980	147
1990	161
2000	147
Rank	22/27
Projection	
2010	161
2020	164
2030	167
<i>Projection Years</i>	1960-2000
Housing	
1970	40
1980	53
1990	56
2000	65
<i>N/A= Not Available</i>	

Table 3.3. City of Argusville population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Argusville

- ★ Villages
- Bridges (20'+)
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits
-  City ET
-  Fargo
-  West Fargo
-  West Fargo ET
-  Fargo ET

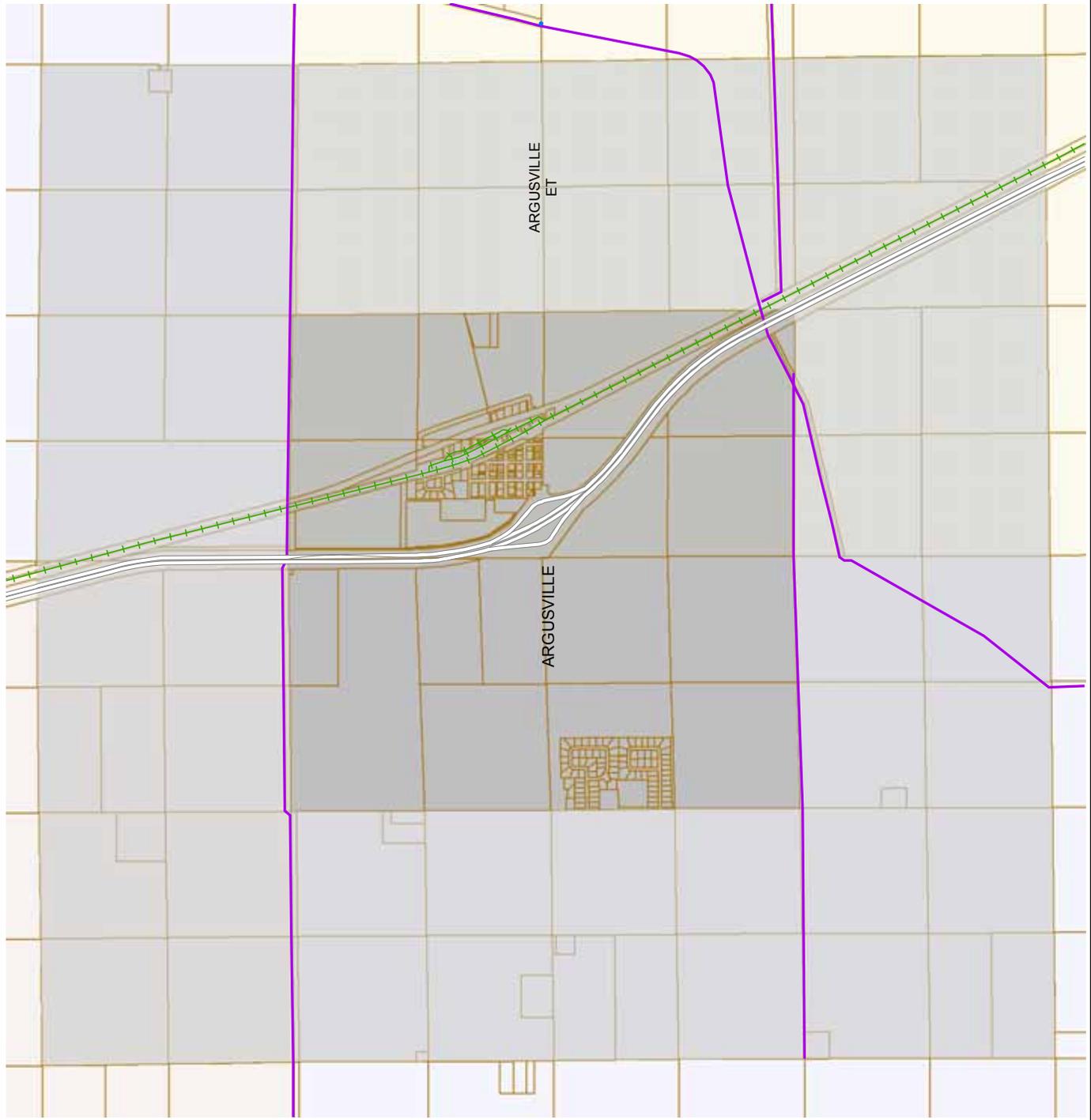
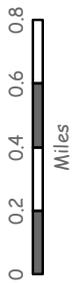


Figure 3.4. City of Argusville.

City of Arthur

The City of Arthur is located near the intersection of State Highway 18 and County Road 34 (Figure 3.5). The city is located between Hunter and Amenia and approximately 17 miles north of Interstate 94. Burling Northern/Santa Fe railroad runs through the city providing the city rail service. The city's total area is slightly greater than a square mile with a perimeter of slightly less than three and half miles.

The City of Arthur's demographic trend over the last century could be classified as stable or slightly increasing (Table 3.4). The 2000 Census population of 402 is an 80 person increase from 1930; however the highest population was recorded in 1980 with 445 residents. Using the demographic trends from 1960, the projected population for Arthur is expected to increase over the next 30 years. Housing over the last 40 years has increased by 43 units and based on the expected population growth one should expect the number of housing units to increase (U.S. Bureau of the Census, Decennial Censuses).

Arthur	
Population	
1920	N/A
1930	322
1940	335
1950	380
1960	325
1970	412
1980	445
1990	400
2000	402
Rank	8/27
Projection	
<i>2010</i>	409
<i>2020</i>	414
<i>2030</i>	418
<i>Projection Years</i>	1960-2000
Housing	
1970	97
1980	130
1990	133
2000	140
<i>N/A= Not Available</i>	

Table 3.4. City of Arthur population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Arthur

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

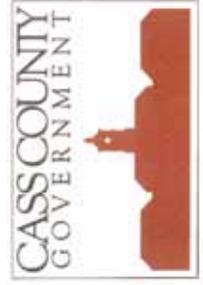


Figure 3.5. City of Arthur.

City of Ayr

The City of Ayr is located a half mile south of the intersection of County Road 4 and County Road 3 in Ayr Township (Figure 3.6). The city is approximately four miles east of State Highway 38 and 11 miles north of Interstate 94. Swan Creek is located less than a half mile to the west of city and a portion of Burlington Northern/Santa Fe runs through the city.

Ayr has had continued population decline and is currently the smallest city in Cass County with a 2000 population of 23 residents (Table 3.5). Based on the demographic trends from 1930 to 2000, the projected populations continue this decline for the next 30 years. Housing in Ayr has declined to 13 units, nearly a 50% loss (U.S. Bureau of the Census, Decennial Censuses).

Ayr	
Population	
1920	N/A
1930	106
1940	107
1950	104
1960	81
1970	48
1980	42
1990	19
2000	23
Rank	26/27
Projection	
<i>2010</i>	16
<i>2020</i>	13
<i>2030</i>	10
<i>Projection Years</i>	1930-2000
Housing	
1970	24
1980	24
1990	14
2000	13
<i>N/A= Not Available</i>	

Table 3.5. City of Ayr population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Ayr

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

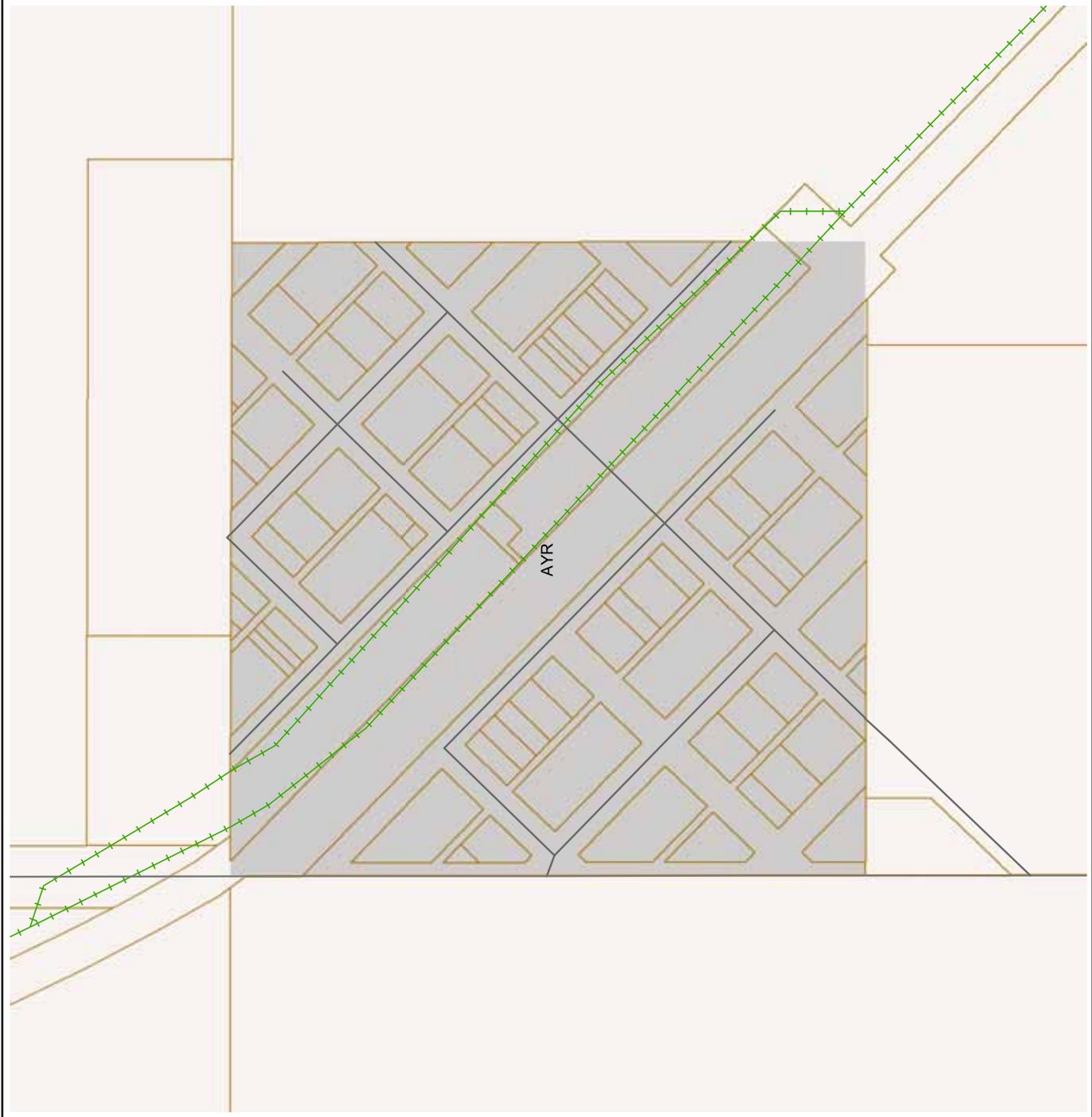
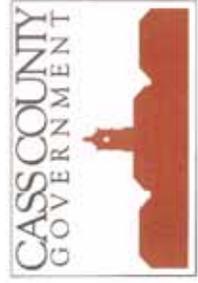


Figure 3.6. City of Ayr.

City of Briarwood

This recently established city (1980s) in Barnes Township is southeast of Fargo to the east of University Drive South/County Road 81 and along the Red River (Figure 3.7). Briarwood is bordered to the east by the Red River and is mostly surrounding by Fargo’s extraterritorial (ET) area, limiting the ability for expansion.

The relatively recent establishment of Briarwood results in limited demographic data for the city (Table 3.6). The available data displays a sharp increase in population in 1990, followed by a slight decrease. Using this limited data, the projection for Briarwood indicates slow growth for the next 30 years. Housing in this city has followed similar growth patterns as population (U.S. Bureau of the Census, Decennial Censuses).

Briarwood Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	47
1990	88
2000	78
Rank	23/27
Projection	
<i>2010</i>	84
<i>2020</i>	86
<i>2030</i>	88
<i>Projection Years</i>	1980-2000
Housing	
1970	N/A
1980	16
1990	27
2000	26
<i>N/A= Not Available</i>	

Table 3.6. City of Briarwood population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Briarwood

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

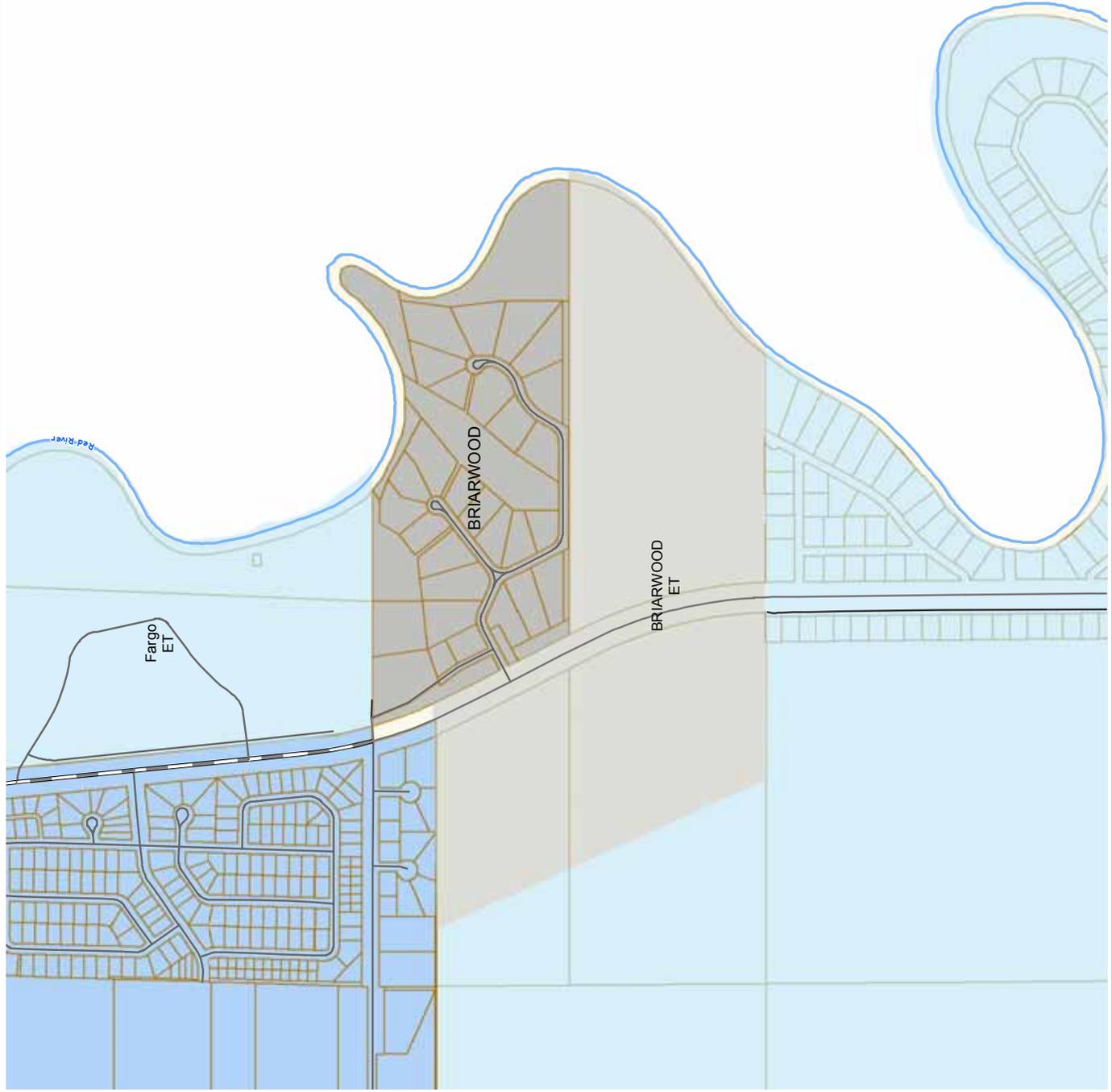


Figure 3.7. City of Briarwood.

City of Buffalo

The City of Buffalo is located at the intersection of State Highway 18 and Cass Highway 10, approximately three miles north of Interstate 94 at exit 314 (Figure 3.8). The city is located within Buffalo Township, having a total area less than a half square mile with a total perimeter roughly four miles. Rail service to the city is provided by Burlington Northern/Santa Fe.

Buffalo's population has risen and fallen over the last century from a high of 268 to low of 209 occurring in the 2000 census (Table 3.7). The 1950s witnessed a drop of 27 residents, but since this point the decrease in population has slowed. Population projection modeling using data from 1960 to 2000 displays a roughly 10 person drop in population every 10 years. Housing in Buffalo increased in the 1970s, but has decreased slightly since this point with the last census recording 105 housing units city (U.S. Bureau of the Census, Decennial Censuses).

Buffalo	
Population	
1920	268
1930	242
1940	245
1950	261
1960	234
1970	241
1980	226
1990	204
2000	209
Rank	17/27
Projection	
<i>2010</i>	201
<i>2020</i>	191
<i>2030</i>	180
<i>Projection Years</i>	1960-2000
Housing	
1970	95
1980	113
1990	108
2000	105
<i>N/A= Not Available</i>	

Table 3.7. City of Buffalo population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Buffalo

- ★ Villages
- Bridges (20'+)
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits
-  City ET
-  Fargo
-  West Fargo
-  West Fargo ET
-  Fargo ET

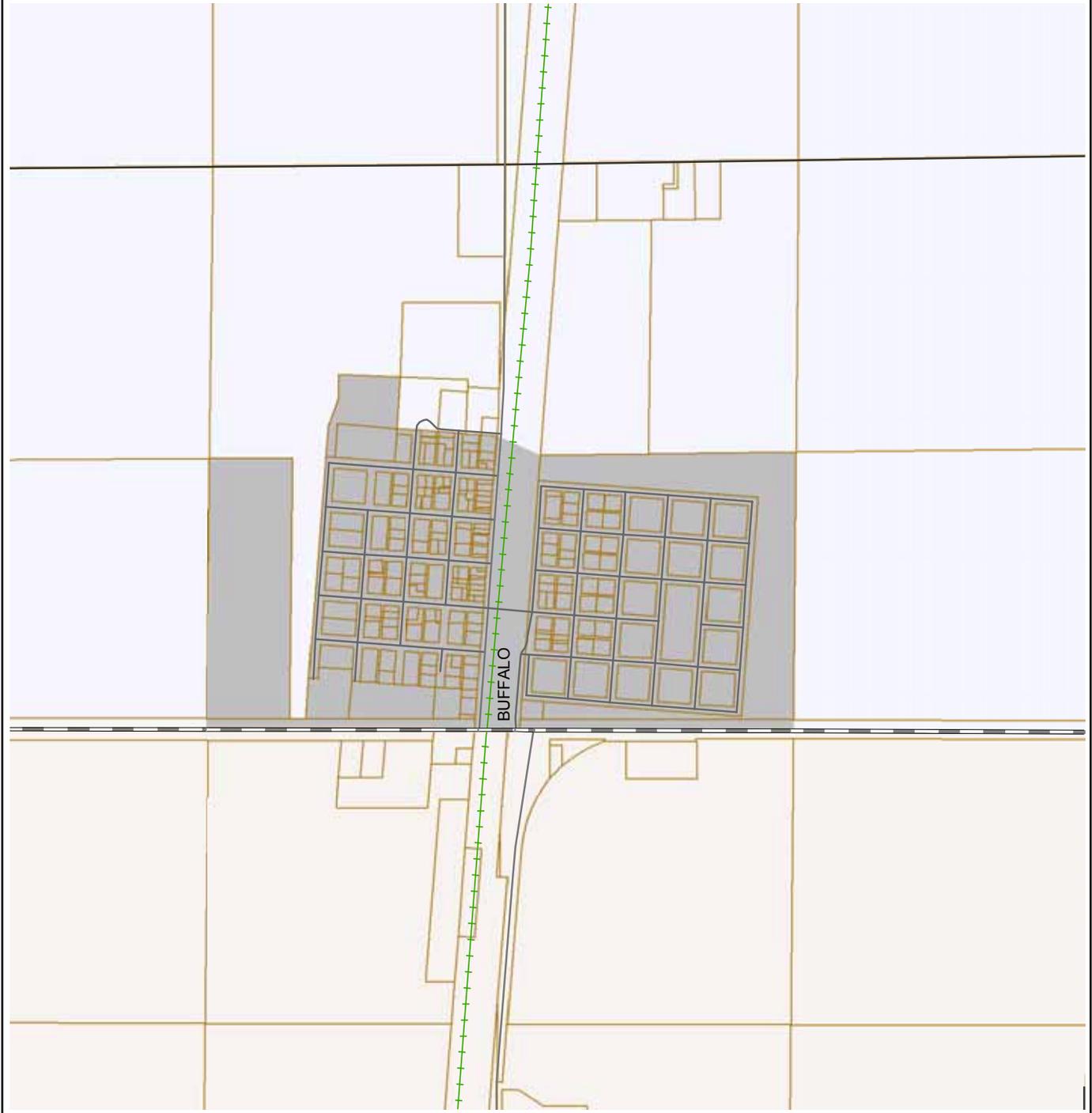


Figure 3.8. City of Buffalo.

City of Casselton

Casselton, Cass County’s third largest city, is located approximately a mile north of Interstate 94 at exit 331 (Figure 3.9). State Highway 18 runs north and south through the city and County Road 10 runs east and west roughly creating the northern limit of the city. The city is nearly 1.25 square miles with nearly an eight mile perimeter. Burlington Northern/Santa Fe has two rails lines serving the city on the western edge of the city and through the middle of the city. The city has several small rivers, including Swan Creek and also a lake is located in the northwest side of town.

Casselton experienced population loss following the 1920 census until 1970 when population began to rebound (Table 3.8). The rebound in population is partially responsible to the city becoming a bedroom community for residents commuting into the metro area. The 2000 census recorded the city’s highest population with 1855 residents and using the recent population trend this number should only increase. The city has also experienced increases in the number of housing units with a total in 2000 of 738. Based on the projected population increase it should be expected housing units will continue to rise (U.S. Bureau of the Census, Decennial Censuses).

Casselton	
Population	
1920	1,538
1930	1,253
1940	1,358
1950	1,373
1960	1,394
1970	1,485
1980	1,661
1990	1,601
2000	1,855
Rank	3/27
Projection	
<i>2010</i>	1,865
<i>2020</i>	1,962
<i>2030</i>	2,064
<i>Projection Years</i>	1940-2000
Housing	
1970	504
1980	675
1990	664
2000	738
<i>N/A= Not Available</i>	

Table 3.8. City of Casselton population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Casselton

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

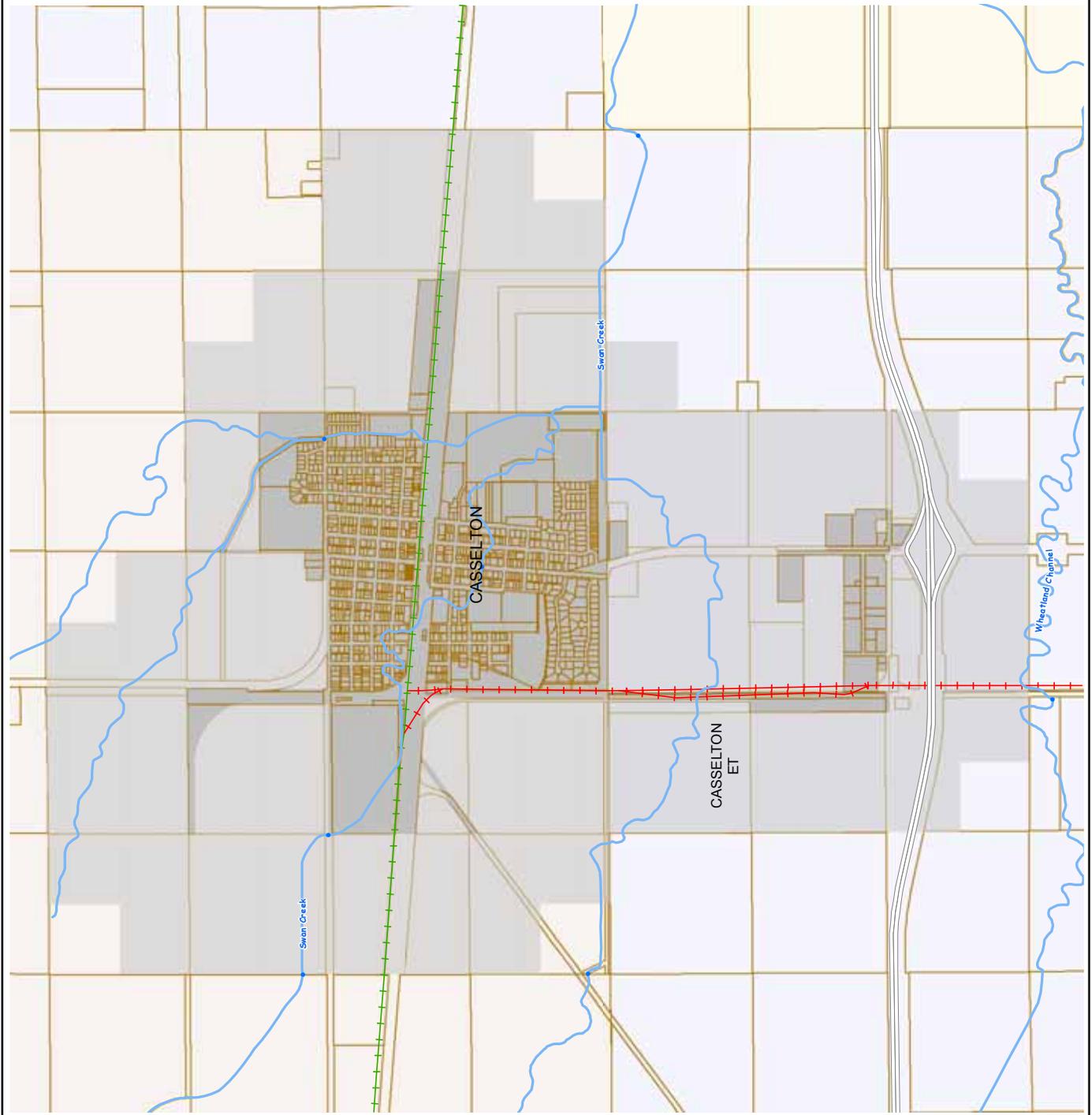
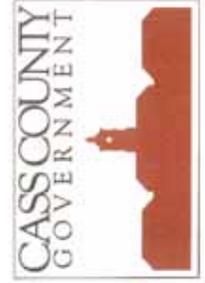
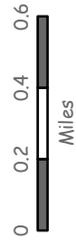


Figure 3.9. City of Casselton.

City of Davenport

Davenport is found in southeast Cass County at the intersection of County Road 16 and County Road 27 in Davenport Township (Figure 3.10). Two Burlington Northern/Santa Fe lines run through the city, roughly creating the eastern and southern boundaries of the city. Davenport is less than a quarter mile total area with a perimeter roughly 1.75 miles in length. The city location results in nearly an equal distance (12 miles) from both Interstate 29 and 94.

Davenport experienced population loss during the middle of the 20th century up to the 1970s when population began to rise (Table 3.9). Since the 1970s the city has gained 147 residents and based on the demographic trends from this period the projected population is expected to continue to rise. As expected, housing units have increased and should continue to increase as the population base of the city expands (U.S. Bureau of the Census, Decennial Censuses).

Davenport Population	
1920	214
1930	205
1940	147
1950	150
1960	143
1970	147
1980	195
1990	218
2000	261
Rank	11/27
Projection	
<i>2010</i>	303
<i>2020</i>	353
<i>2030</i>	410
<i>Projection Years</i>	1960-2000
Housing	
1970	56
1980	77
1990	78
2000	92
<i>N/A= Not Available</i>	

Table 3.9. City of Davenport population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Davenport

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

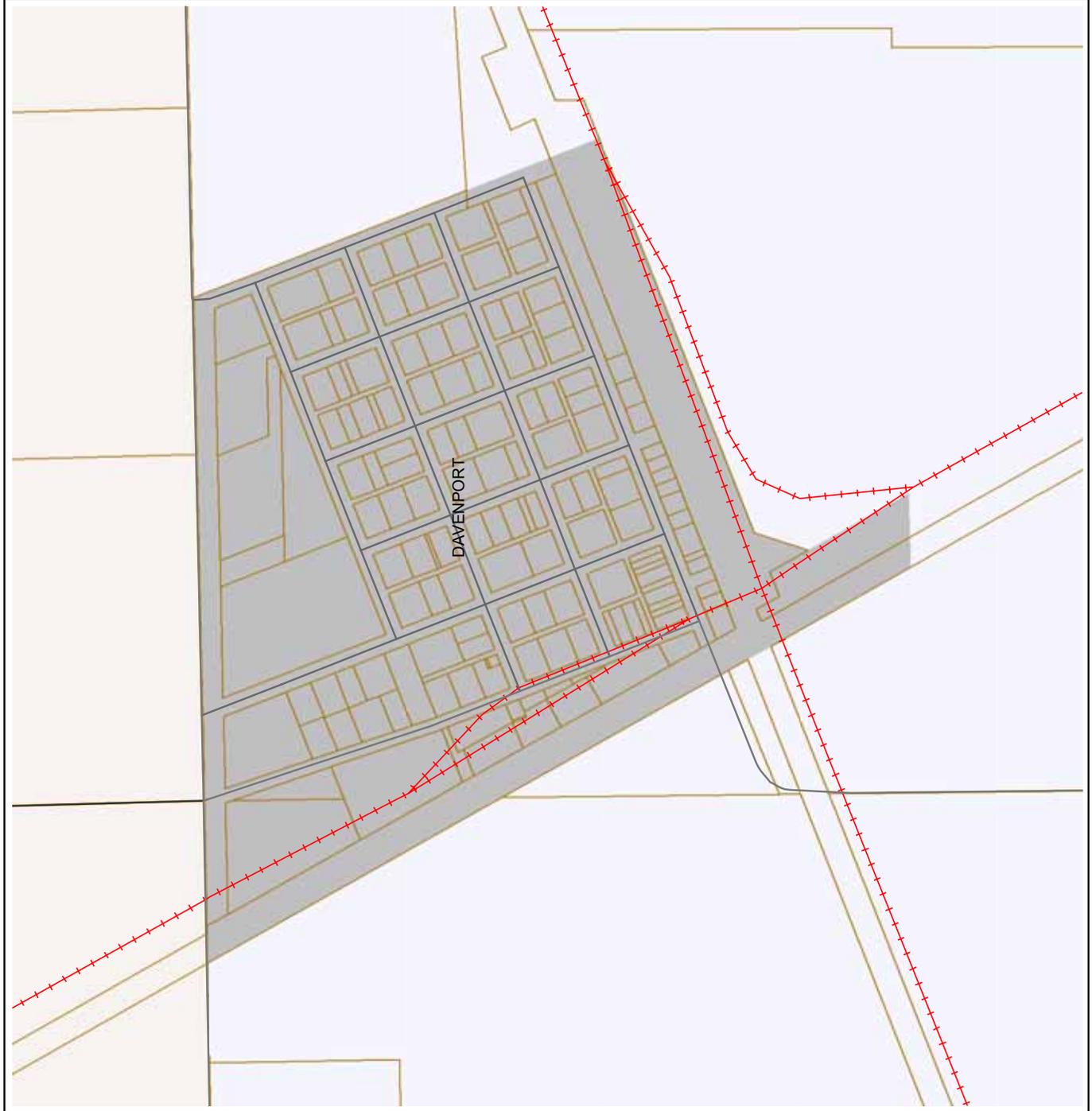
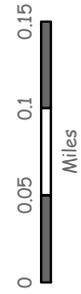


Figure 3.10. City of Davenport.

City of Enderlin

The City of Enderlin is located in Pontiac Township and in the extreme southwest corner of Cass County (Figure 3.11). The city extends across the county border into Ransom County; the vast majority of the city is located outside of Cass County. The portion in Cass County is very small in size with a total area of only 0.015 square miles (9.6 acres) with a total perimeter over half mile. The Maple River runs to the east of the city and a line of the Canadian Pacific Rail Road is found less than a quarter mile to west of the city. The city is also several miles southwest of a collection of small lakes.

The portion of Enderlin in Cass County is very small and has declined over the past 30 years and is currently the smallest city in the county (Table 3.10). The current population is five residents and based on previous trends this number is expected to decrease. The 2000 Census recorded only two housing units in the city, more than a 50% reduction (U.S. Bureau of the Census, Decennial Censuses).

Enderlin	
Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	11
1990	17
2000	5
Rank	27/27
Projection	
2010	3
2020	1
2030	0
<i>Projection Years</i>	1980-2000
Housing	
1970	N/A
1980	5
1990	5
2000	2
<i>N/A= Not Available</i>	

Table 3.10. City of Enderlin population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Enderlin

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

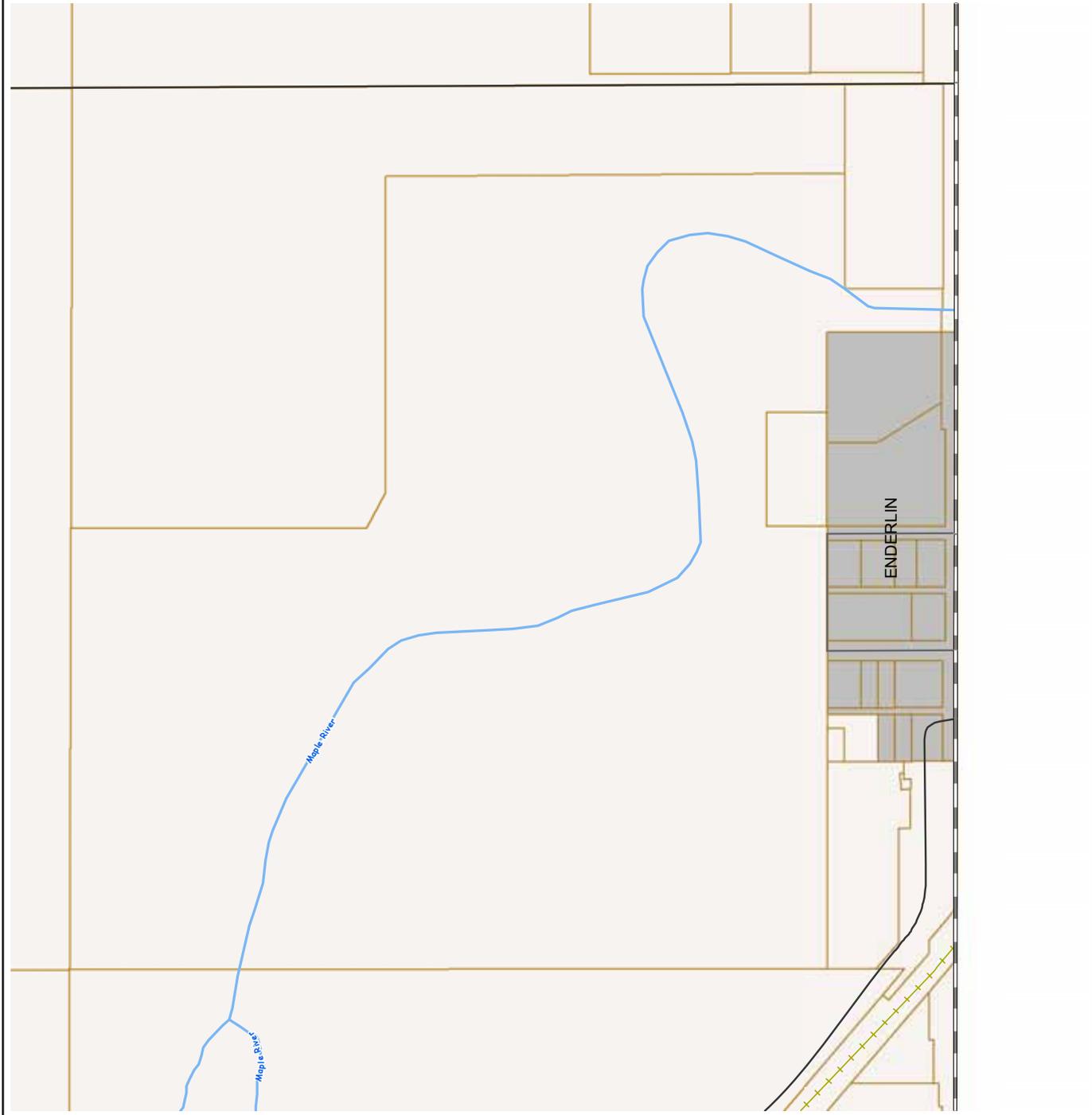
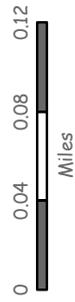


Figure 3.11. City of Enderlin.

City of Fargo

The City of Fargo is located on the extreme eastern border of Cass County along the Red River (Figure 3.12). The city is the county seat and largest city in county and state. The city is accessed by both Interstate 94 and 29 and multiple county roads. Several Burlington Northern/Santa Fe lines merge in the northern portion of the city crossing into Minnesota. Hector International Airport is located in the northern portion of the city and this area is also home to North Dakota State University. The city is roughly 42 square miles and has a perimeter approximately 48 miles long.

The city has experienced growth over the entire century, more than quadrupling in size (Table 3.11). The 2000 census recorded a 22% gain in population from the previous census, nearly 10% greater than the national average. The city's growth is expected to continue and using the trends from the past 30 years the projected 2030 population is nearly 150,000. Fargo's housing has growth nearly proportional to population changes, experiencing a more than doubling of homes from the 1970 to 2000 census (U.S. Bureau of the Census, Decennial Censuses).

Fargo	
Population	
1920	21,961
1930	28,619
1940	32,580
1950	38,256
1960	46,662
1970	53,365
1980	61,383
1990	74,111
2000	90,599
Rank	1/27
Projection	
<i>2010</i>	105,317
<i>2020</i>	124,672
<i>2030</i>	147,585
<i>Projection Years</i>	1980-2000
Housing	
1970	17,562
1980	25,219
1990	31,711
2000	41,200
<i>N/A= Not Available</i>	

Table 3.11. City of Fargo population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Fargo

- ★ Villages
- Bridges (20+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET
- City ET

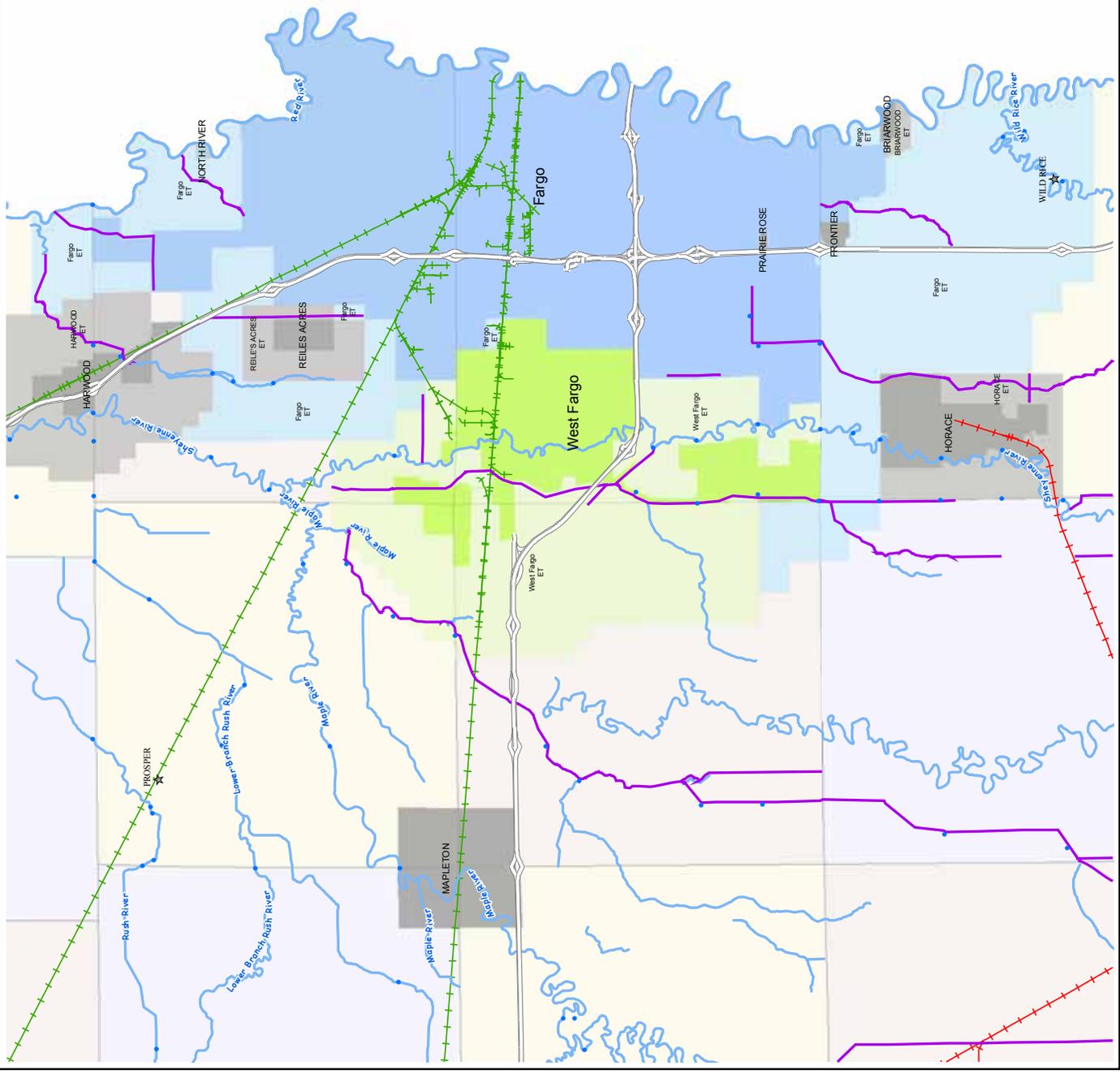
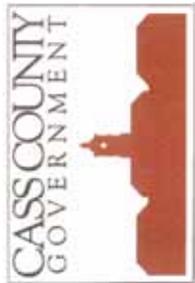
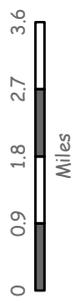


Figure 3.12. City of Fargo.

City of Frontier

The City of Frontier is located along the southern border of Fargo along Interstate 29 at exit 60 (Figure 3.13). Frontiers city limits shares a border to the north and east with Fargo’s city limits and the city limits to the south and west share a border with Fargo’s Extraterritorial (ET) area. As a result Frontier lacks areas to expand beyond their current boundaries limiting physical growth for the city.

Since the incorporation of Frontier in the 1970s the city has experienced a 70% increase in population (Table 3.12). Using this trend the city would be expected to grow substantially over the next 30 years, but because the city only has a few vacant parcels and lacks room to expand this number is not correct. The city will likely fill out during this time and only slightly increase the number of residents. Housing in the city has also grown over the past 30 years and should be expected to increase slightly as the city fills out (U.S. Bureau of the Census, Decennial Censuses).

Frontier Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	160
1990	218
2000	273
Rank	10/27
Projection	
<i>2010</i>	330
<i>2020</i>	386
<i>2030</i>	443
<i>Projection Years</i>	1980-2000
Housing	
1970	N/A
1980	47
1990	57
2000	78
<i>N/A= Not Available</i>	

Table 3.12. City of Frontier population and housing trends (U.S. Bureau of Census, Decennia Censuses).

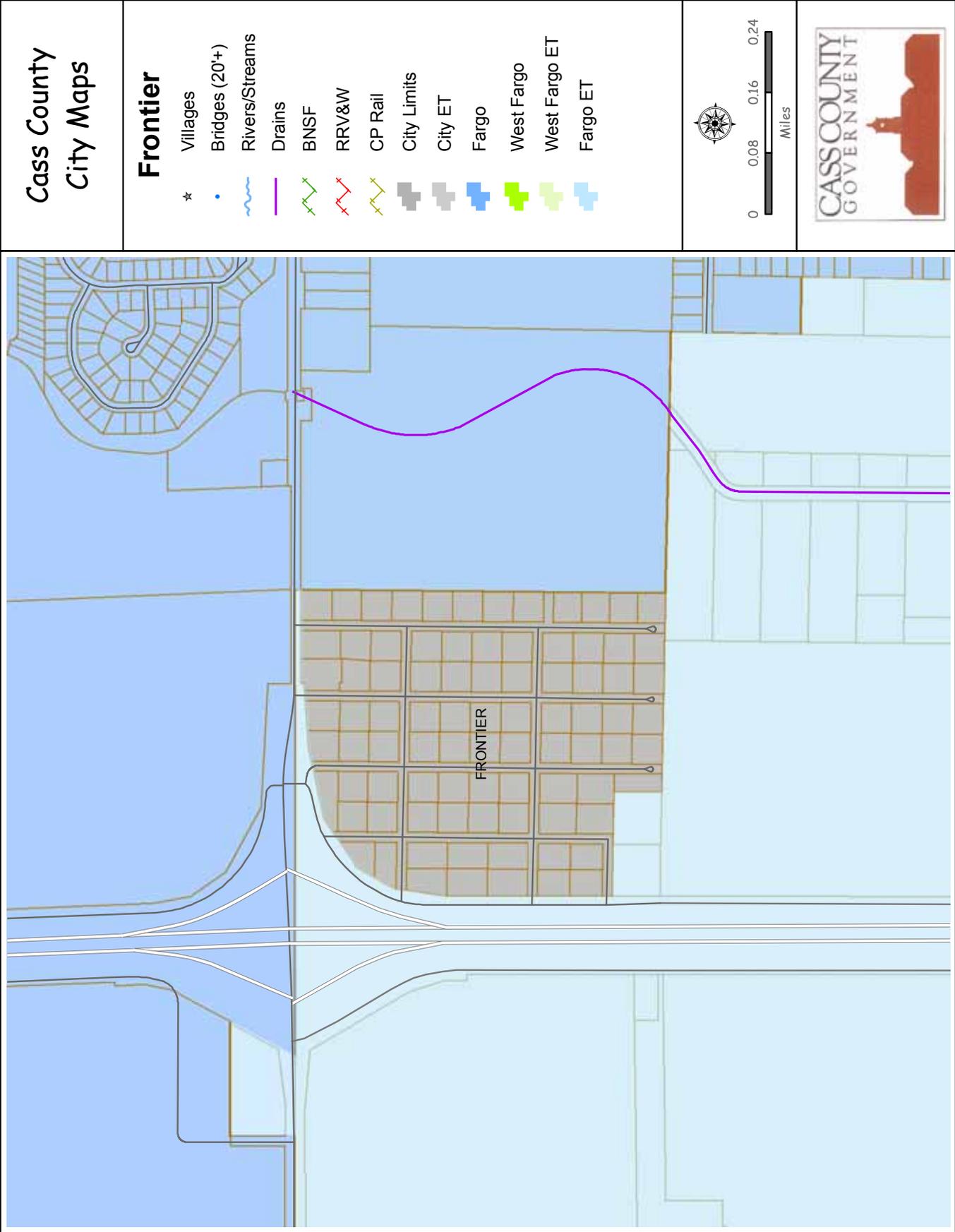


Figure 3.13. City of Frontier.

City of Gardner

The City of Gardner is located in northeast Cass County along Interstate 29 at exit 86 (Figure 3.14). In addition to the interstate, County Roads 81 and 26 provide the major transportation routes to the city. Burlington Northern/Santa Fe provides rail service to the city, providing a north/south route. The total area of Gardner is less than a half square mile with a perimeter approximately three miles.

Gardner experienced its highest population in 1950, but since this point it has declined to the present historic low (Table 3.13). Based on the demographic trends from 1960 to 2000 the population would continue to decline. The 2030 population projection exhibiting a loss of 16 residents from the current population. The city's housing has remained quite constant over the past 40 years, but one could likely expect the number to decrease as population declines (U.S. Bureau of the Census, Decennial Censuses).

Gardner	
Population	
1920	N/A
1930	108
1940	103
1950	136
1960	107
1970	96
1980	94
1990	85
2000	80
Rank	22/27
Projection	
2010	74
2020	69
2030	64
<i>Projection Years</i>	1960-2000
Housing	
1970	42
1980	42
1990	42
2000	39
<i>N/A= Not Available</i>	

Table 3.13. City of Gardner population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Gardner

- ★ Villages
- Bridges (20+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

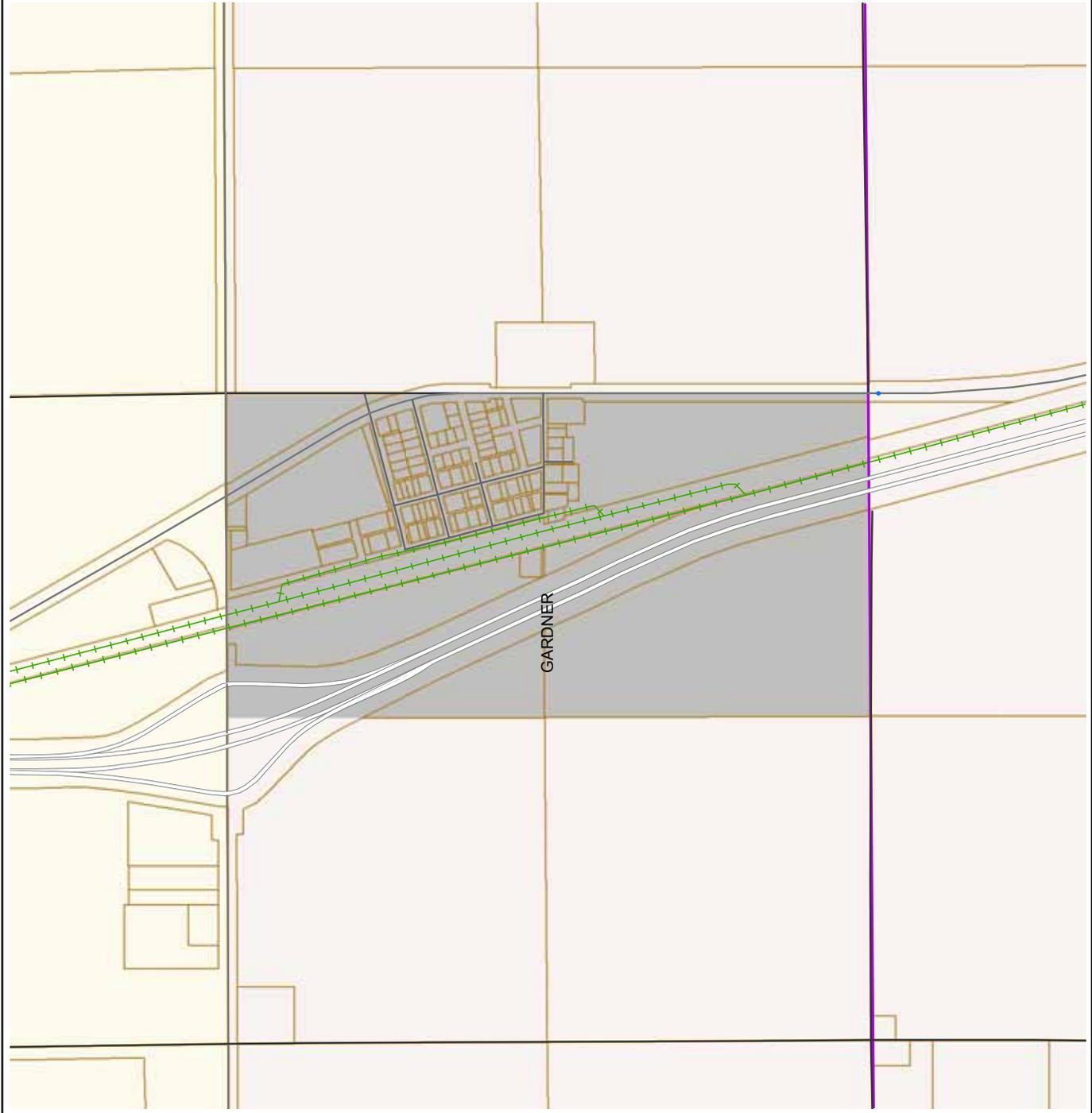
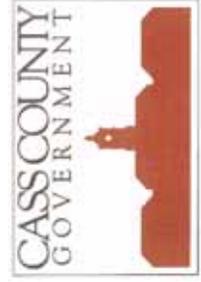


Figure 3.14. City of Gardner.

City of Grandin

Grandin is located in the northeast corner of Cass County along the county’s northern border with Traill County (Figure 3.15). The city is located along Interstate 29 and also has access to County Roads 81 and 11. Grandin is provided rail service from Burlington Northern/Santa Fe line running through the center of the city.

Grandin’s population has fluctuated over the last century, experiencing increases in the 1970s and 1980s, but losing population during the 1990s (Table 3.14). If the demographic trends over the last 40 years continue the city would increase the total population to levels found during the 1980s. Housing in Grandin has increased since the 1960s with 80 units recorded in the 2000 Census (U.S. Bureau of the Census, Decennial Censuses).

Grandin Population	
1920	N/A
1930	172
1940	158
1950	156
1960	147
1970	187
1980	210
1990	213
2000	181
Rank	18/27
Projection	
<i>2010</i>	212
<i>2020</i>	212
<i>2030</i>	213
<i>Projection Years</i>	1960-2000
Housing	
1970	69
1980	78
1990	77
2000	80
<i>N/A= Not Available</i>	

Table 3.14. City of Grandin population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Grandin

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- ✕ BNSF
- ✕ RRV&W
- ✕ CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

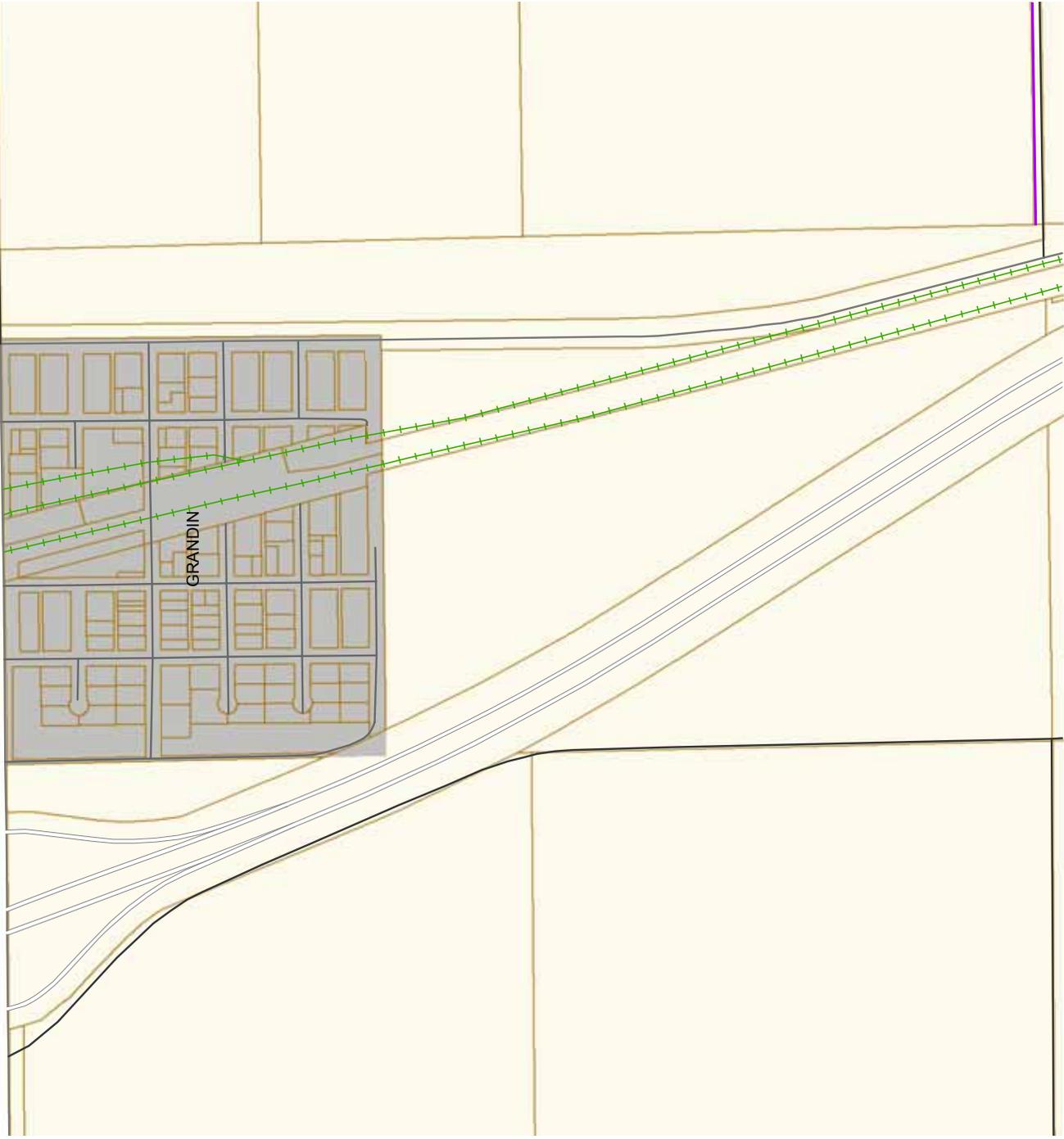
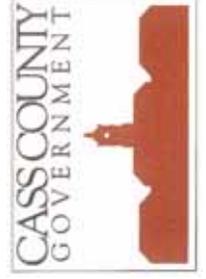
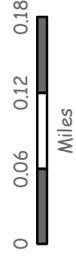


Figure 3.15. City of Grandin.

City of Harwood

The City of Harwood is located along Interstate 29 approximately 3.5 miles north of Fargo (Figure 3.16). The main transportation routes to the city are County Roads 22 and 81 and Interstate 29 which roughly divides the city in half. A Burlington Northern/Santa Fe rail line runs through the city, near its eastern border. The Sheyenne River meanders northward to the west of the city, creating a portion of the western border. County Drain 40 runs through a portion of southern city. The city is a little over a square mile in area and with almost a nine mile perimeter.

During the last 30 years Harwood population has nearly doubled to 607 residents (Table 3.15). The growth experienced is likely related to the proximity of Harwood to Fargo and its ability to provide housing for those wanting to commute into the metro area for work or school. If growth continues at the previous rate, which in all likelihood it could, the city would grow to over 1,000 residents by 2030. Housing in the city has also nearly doubled in the last 20 years and this trend could be expected to continue as the city grows (U.S. Bureau of the Census, Decennial Censuses).

Harwood Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	326
1990	590
2000	607
Rank	6/27
Projection	
<i>2010</i>	748
<i>2020</i>	888
<i>2030</i>	1,029
<i>Projection Years</i>	1980-2000
Housing	
1970	N/A
1980	105
1990	172
2000	201
<i>N/A= Not Available</i>	

Table 3.15. City of Harwood population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Harwood

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

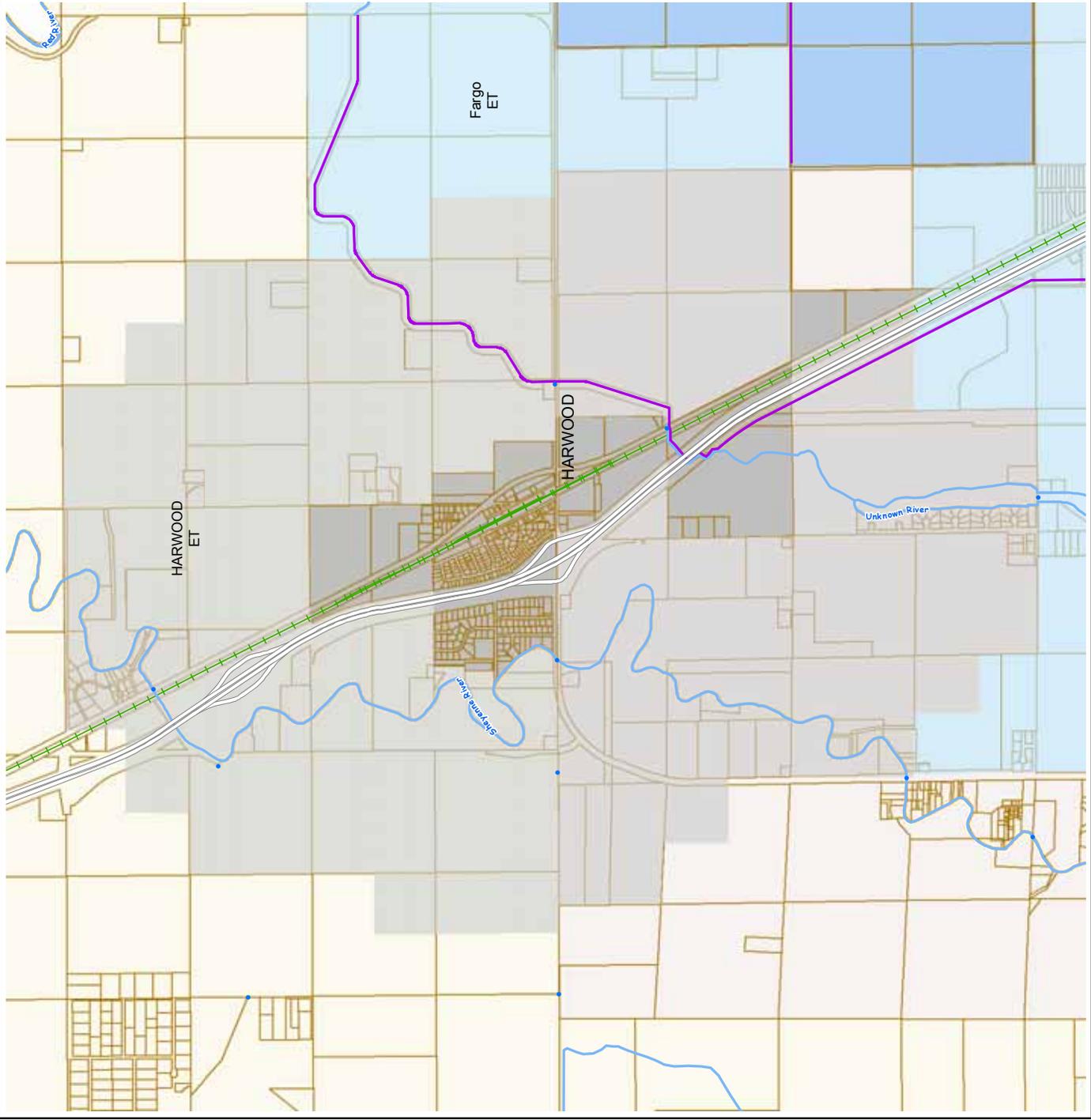
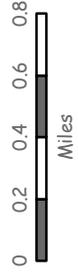


Figure 3.16. City of Harwood.

City of Horace

The City of Horace is located in Stanley Township, approximately one mile south of Fargo and West Fargo and 3.5 miles west of Interstate 29 (Figure 3.17). Horace has experienced significant growth over the last few decades; its close proximity to the metro area has made the land attractive to developers and prospective buyers. County Road 17 and Interstate 29 provide Horace the major connections to the metro area. A section of Red River Valley & Western rail road extends through the city, ending northwest of the city. The Sheyenne River runs to the west of the city, creating a portion of the city's border, and county Drain 40 extends through portions of the eastern city. The 2000 census calculated the city's area slightly less than 2.25 square miles with a 10.5 mile long perimeter.

Horace's close proximity to the metro area has resulted in the city growing 27% between the 1990 and 2000 census, making it Cass County's fourth largest city (Table 3.16). If the demographic trends continue for the city it could expect the population to continue to increase to nearly 1,200 residents by 2030. It is likely the vacant lands surrounding the city will be completely developed in the not too distance future, as a result the city projected population could be much higher depending on how much new land is incorporated into the city. Since 1970 housing units have tripled; a scenario that could likely repeat itself for this growing city (U.S. Bureau of the Census, Decennial Censuses).

Horace	
Population	
1920	N/A
1930	N/A
1940	N/A
1950	190
1960	178
1970	276
1980	494
1990	662
2000	915
Rank	4/27
Projection	
<i>2010</i>	1,036
<i>2020</i>	1,125
<i>2030</i>	1,174
<i>Projection Years</i>	1960-2000
Housing	
1970	80
1980	174
1990	216
2000	311
<i>N/A= Not Available</i>	

Table 2.16. City of Horace population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Horace

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

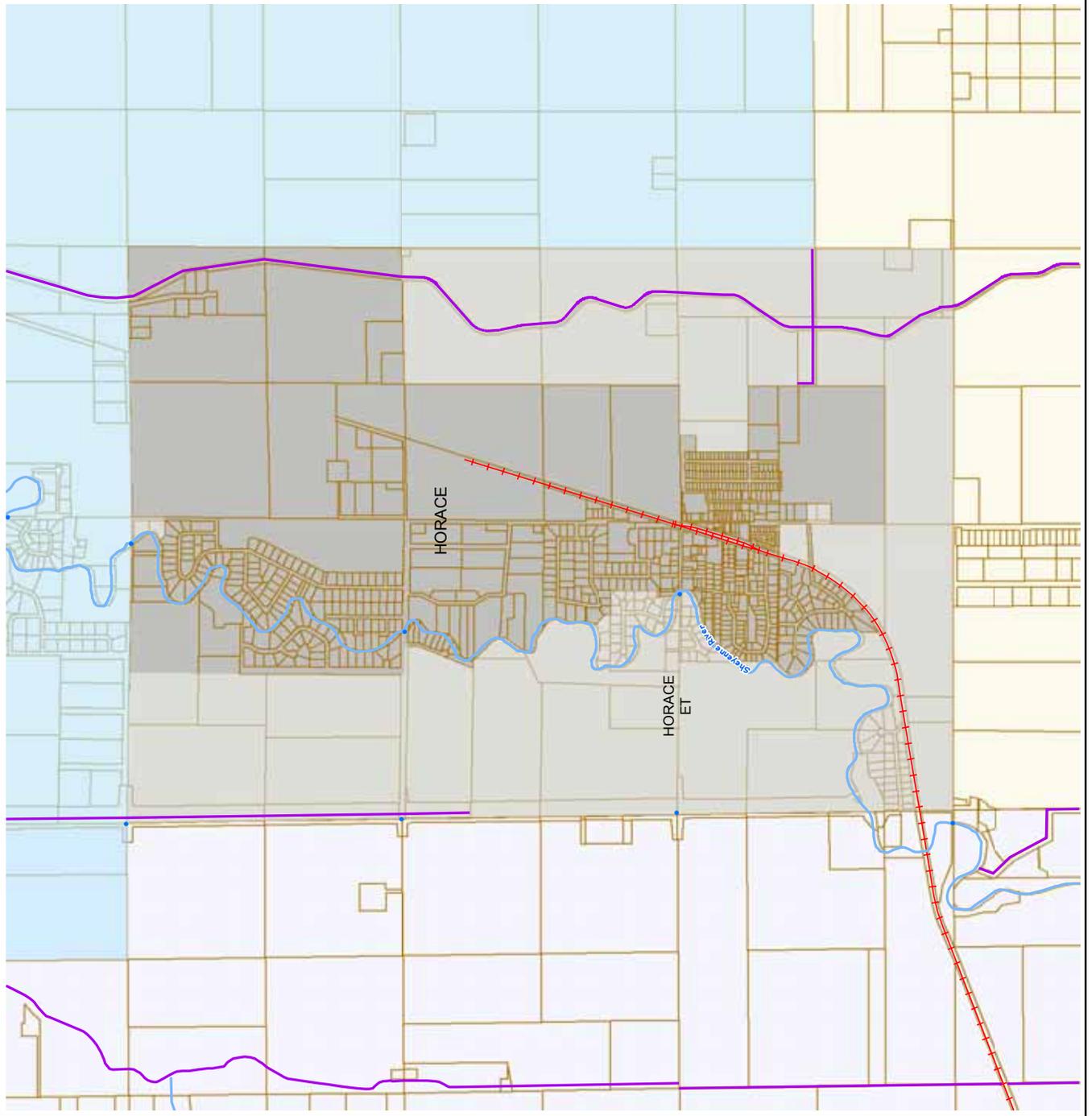


Figure 3.17. City of Horace.

City of Hunter

Hunter is located in northern Cass County along State Highway 18, approximately 22 miles north of Interstate 94 and three miles south of the county border (Figure 3.18). A branch of the Elm River extends through the city and creates Hunter Dam reservoir on the western side of the city. Cass Highway 2 creates a portion of the city’s northern limits and the city also has a line of Burlington Northern/Santa Fe.

Hunter’s population declined through the early portion of the 20th century and then recorded its highest population in 1960, but has been declining since (Table 3.17). If the demographic trends of the last 20 years repeats itself, the town will continue to lose portions of its population. The number of housing units in the city has also declined with the loss of population over the years (U.S. Bureau of the Census, Decennial Censuses). However, while the model projects a declining population the city has actually had an increase of 25 new residents since the 2000 census and an additional three homes during 2004. These recent trends could indicate Hunter’s population could experience a future increase in housing and population, contrary to the models projections.

Hunter Population	
1920	424
1930	406
1940	414
1950	417
1960	446
1970	362
1980	369
1990	341
2000	326
Rank	9/27
Projection	
<i>2010</i>	306
<i>2020</i>	288
<i>2030</i>	271
<i>Projection Years</i>	1980-2000
Housing	
1970	149
1980	174
1990	168
2000	160
<i>N/A= Not Available</i>	

Table 3.17. City of Hunter population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Hunter

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

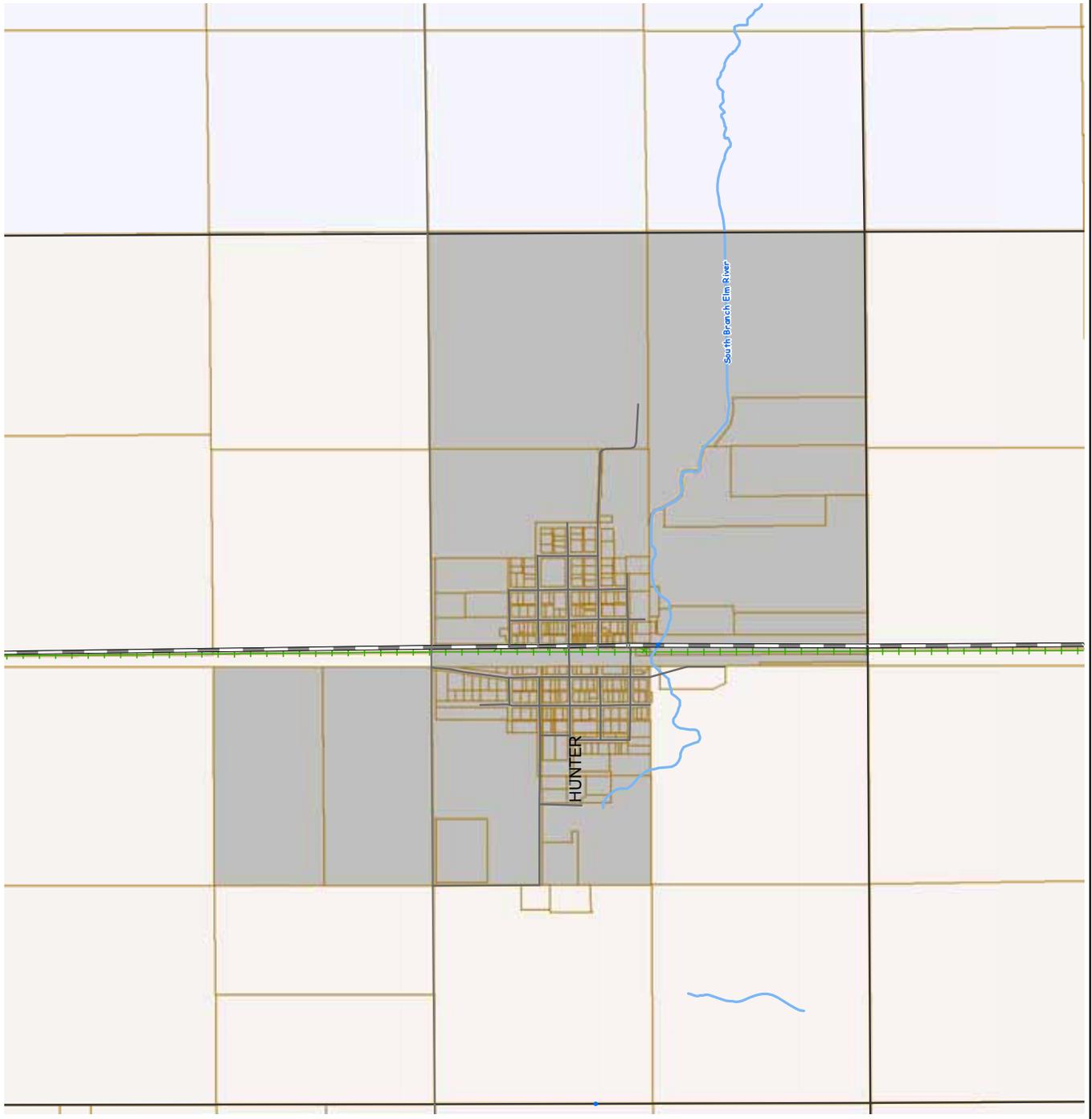
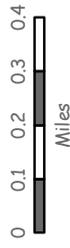


Figure 3.18. City of Hunter.

City of Kindred

Kindred is located in the southeast portion of Cass County along County Road 15 and a mile north of State Highway 46 (Figure 3.19). Kindred is located in Normanna Township and is a mile north of Richland County. The city total area of one square mile is nearly divided in half by a section of Burlington Northern/Santa Fe’s rail line. The city is approximately 8.5 miles west of Interstate 29 and 16 miles south of Interstate 94.

Since 1920 Kindred population has nearly doubled and is currently the county’s fifth largest city (Table 3.18). The 2000 Census population could be expected to grow by nearly 150 residents over the next 30 years if the city’s current growth continues. The cities housing units have increased by 22% over the last 30 and should continue to increase with the addition of new residents (U.S. Bureau of the Census, Decennial Censuses).

Kindred	
Population	
1920	334
1930	429
1940	450
1950	504
1960	580
1970	495
1980	568
1990	569
2000	614
Rank	5/27
Projection	
<i>2010</i>	660
<i>2020</i>	709
<i>2030</i>	762
<i>Projection Years</i>	1970-2000
Housing	
1970	206
1980	258
1990	246
2000	267
<i>N/A= Not Available</i>	

Table 3.18. City of Kindred population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Kindred

- ★ Villages
- Bridges (20'+)
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits
-  City ET
-  Fargo
-  West Fargo
-  West Fargo ET
-  Fargo ET

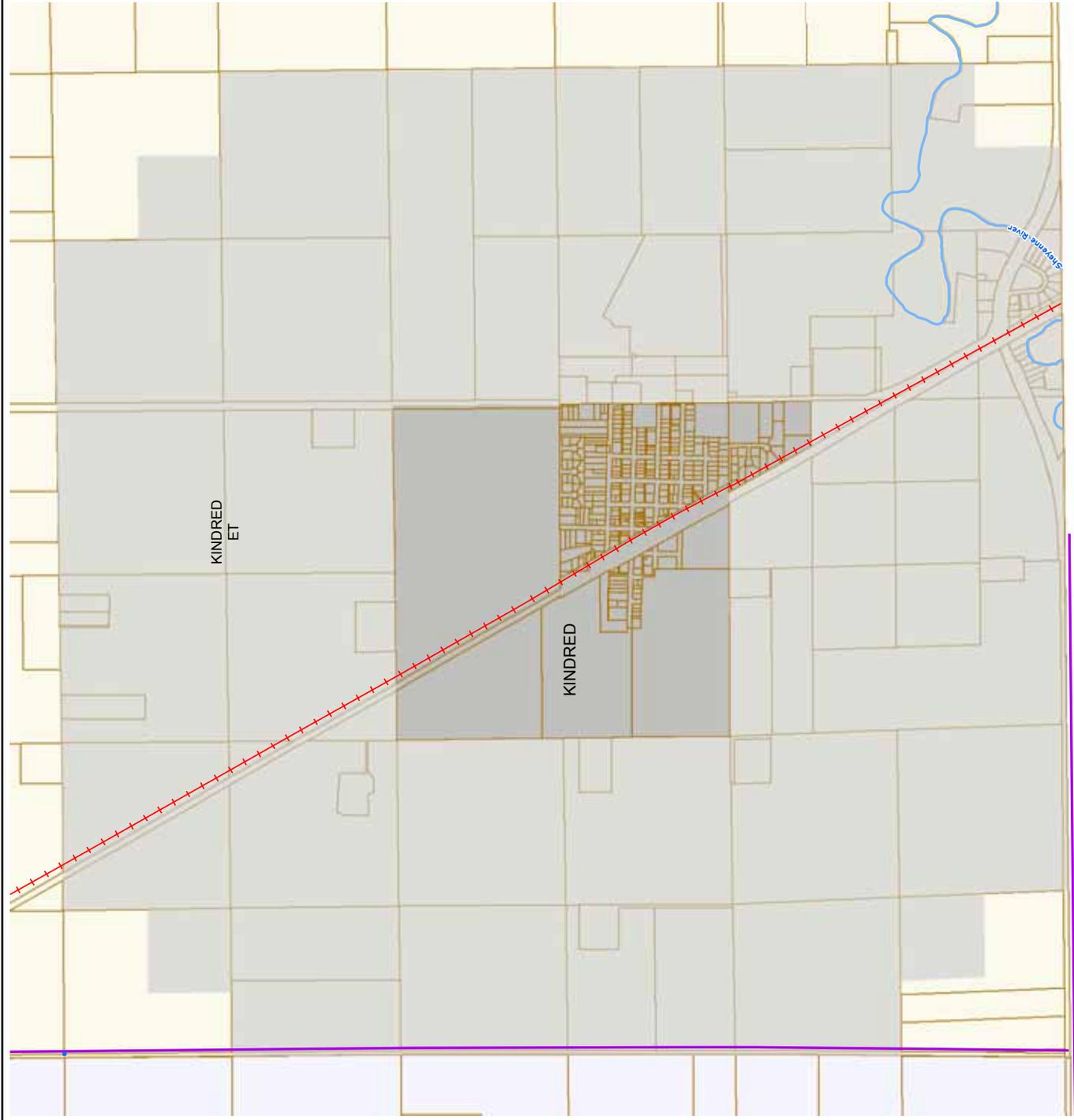
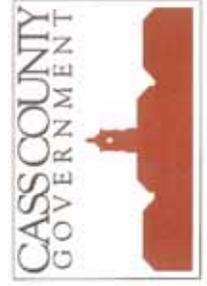
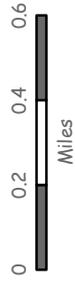


Figure 3.19. City of Kindred.

City of Leonard

Leonard is located along State Highway 18 approximately eight miles south of Interstate 94 and one mile north of county border (Figure 3.20). Leonard is a half square mile in area with a three mile perimeter. A section of Burlington Northern/Santa Fe nearly divides the city into a north and south half.

The city experienced population growth in the 1980 and 1990 census, but the last census indicated the city had lost 55 residents (Table 3.19). Projecting the demographic trends of the past 40 years reveals the city’s population would continue to decrease. However, using a different model with only a slightly higher mean error projects the population to rebound and continue to grow. Further investigation could reveal if the 2000 population loss was an isolated event or one expected to continue, helping project the population more accurately. The number of housing units also experienced the same loss in the 2000 census after increasing the previous 20 years (U.S. Bureau of the Census, Decennial Censuses).

Leonard Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	232
1970	221
1980	289
1990	310
2000	255
Rank	12/27
Projection	
<i>2010</i>	227
<i>2020</i>	189
<i>2030</i>	135
<i>Projection Years</i>	1960-2000
Housing	
1970	91
1980	131
1990	137
2000	124
<i>N/A= Not Available</i>	

Table 3.19. City of Leonard population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Leonard

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET



0 0.075 0.15 0.225 0.3
Miles

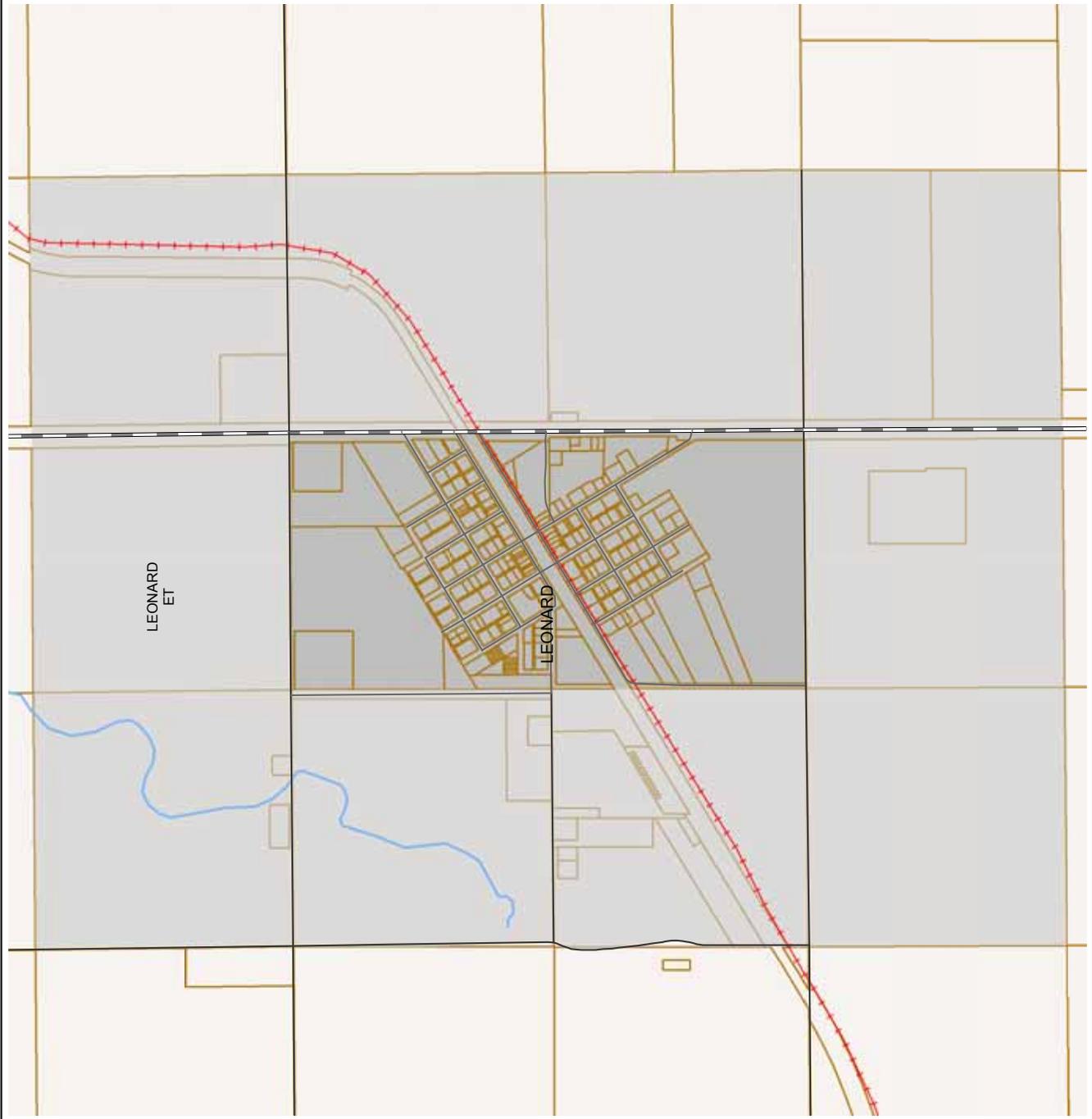
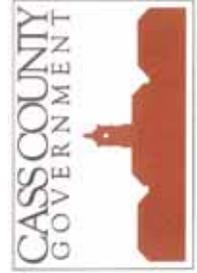


Figure 3.20. City of Leonard.

City of Mapleton

Mapleton is located along Interstate 94 about five miles west of West Fargo (Figure 3.21). The city is four square miles allowing the city to develop the land surrounding the city. Two branches of the Maple River are located in the western portion of the city, running through portions of undeveloped land. County Road 10 and 11 and Interstate 94 provide the major access routes in and out of the city.

Since the 1950s the city has had strong gains in population; however the 2000 Census recorded a loss in population (Table 3.20). Mapleton is currently the seventh largest city in Cass County and its close proximity to the metro area could result in future additions to the population.

Continuation of the population trends from 1970 to 2000 result in the city's population increasing to nearly 1,700 residents by 2030. Housing has followed the same general pattern with increases in housing units except for in 2000 (U.S. Bureau of the Census, Decennial Censuses).

Mapleton	
Population	
1920	198
1930	195
1940	180
1950	169
1960	180
1970	219
1980	306
1990	682
2000	606
Rank	7/27
Projection	
2010	851
2020	1194
2030	1677
Projection Years	1970-2000
Housing	
1970	55
1980	103
1990	203
2000	193
<i>N/A= Not Available</i>	

Table 3.20. City of Mapleton population and housing trends (U.S. Bureau of Census, Decennial Censuses).

Cass County City Maps

Mapleton

- ★ Villages
- Bridges (20'+)
-  Rivers/Streams
-  Drains
-  BNSF
-  RR V&W
-  CP Rail
-  City Limits
-  City ET
-  Fargo
-  West Fargo
-  West Fargo ET
-  Fargo ET

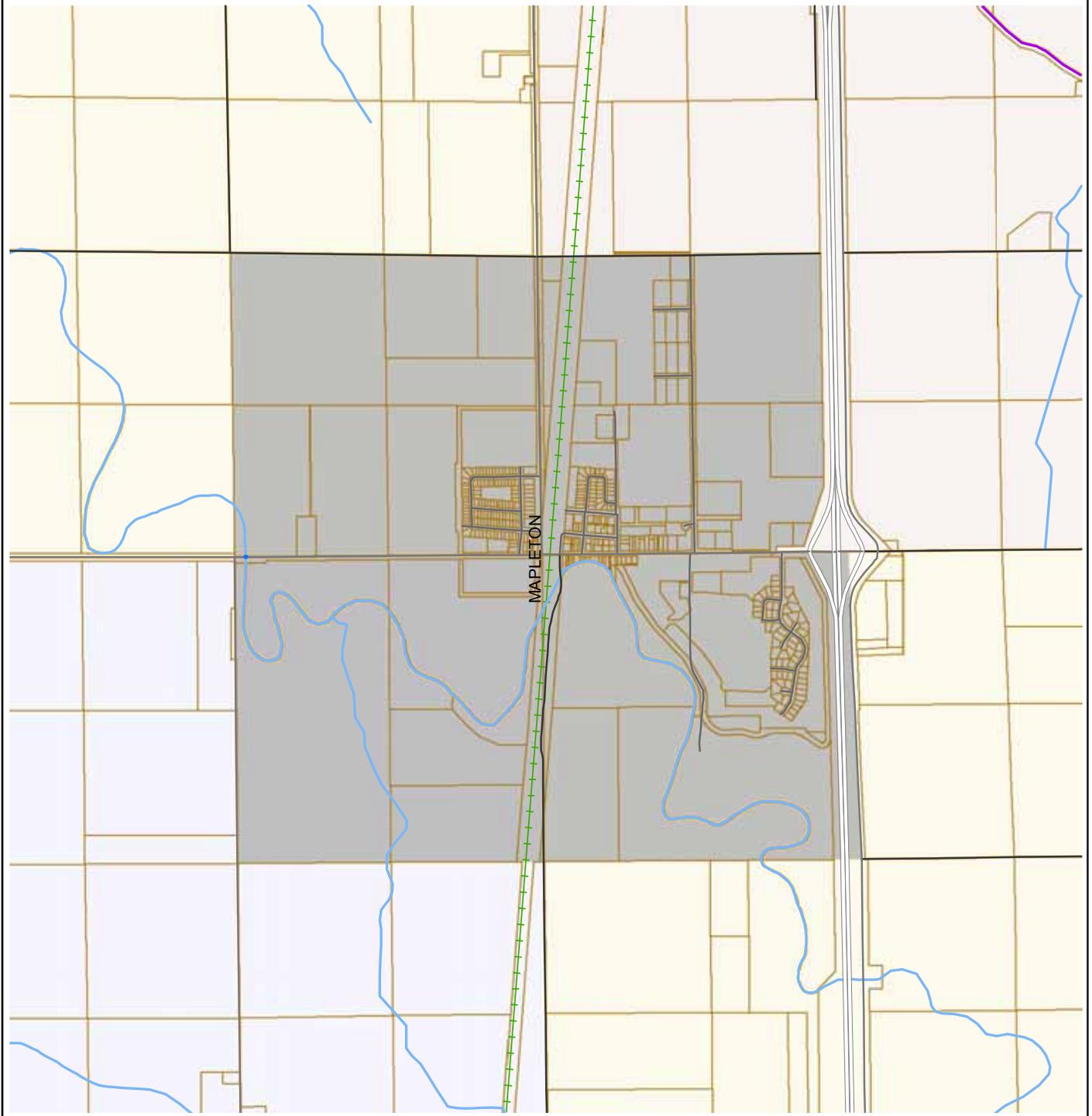
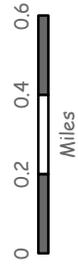


Figure 3.21. City of Mapleton.

City of North River

North River is a small community located along the Red River just to the north of Fargo’s city limits (Figure 3.22). The city is encircled by Fargo’s extraterritorial (ET) area, preventing expansion of the city. The city is currently a half a mile north of Fargo’s city limit with the main transportation route being County Road 31. The city is currently about 40 acres in area with approximately a one mile perimeter.

Since the city’s incorporation in the 1980s the population has remained quite stable (Table 3.21). The lack of new land to expand the city results in any population change to North River will be the result of changes in family size or removal of homes, as expected the stable population is projected to continue. North River’s housing units have remained stable and it should be expected they will remain stable in the future (U.S. Bureau of the Census, Decennial Censuses).

North River	
Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	65
1990	68
2000	65
Rank	25/27
Projection	
2010	65
2020	65
2030	65
<i>Projection Years</i>	1980-2000
Housing	
1970	N/A
1980	20
1990	20
2000	19
<i>N/A= Not Available</i>	

Table 3.21. City of North River population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

North River

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

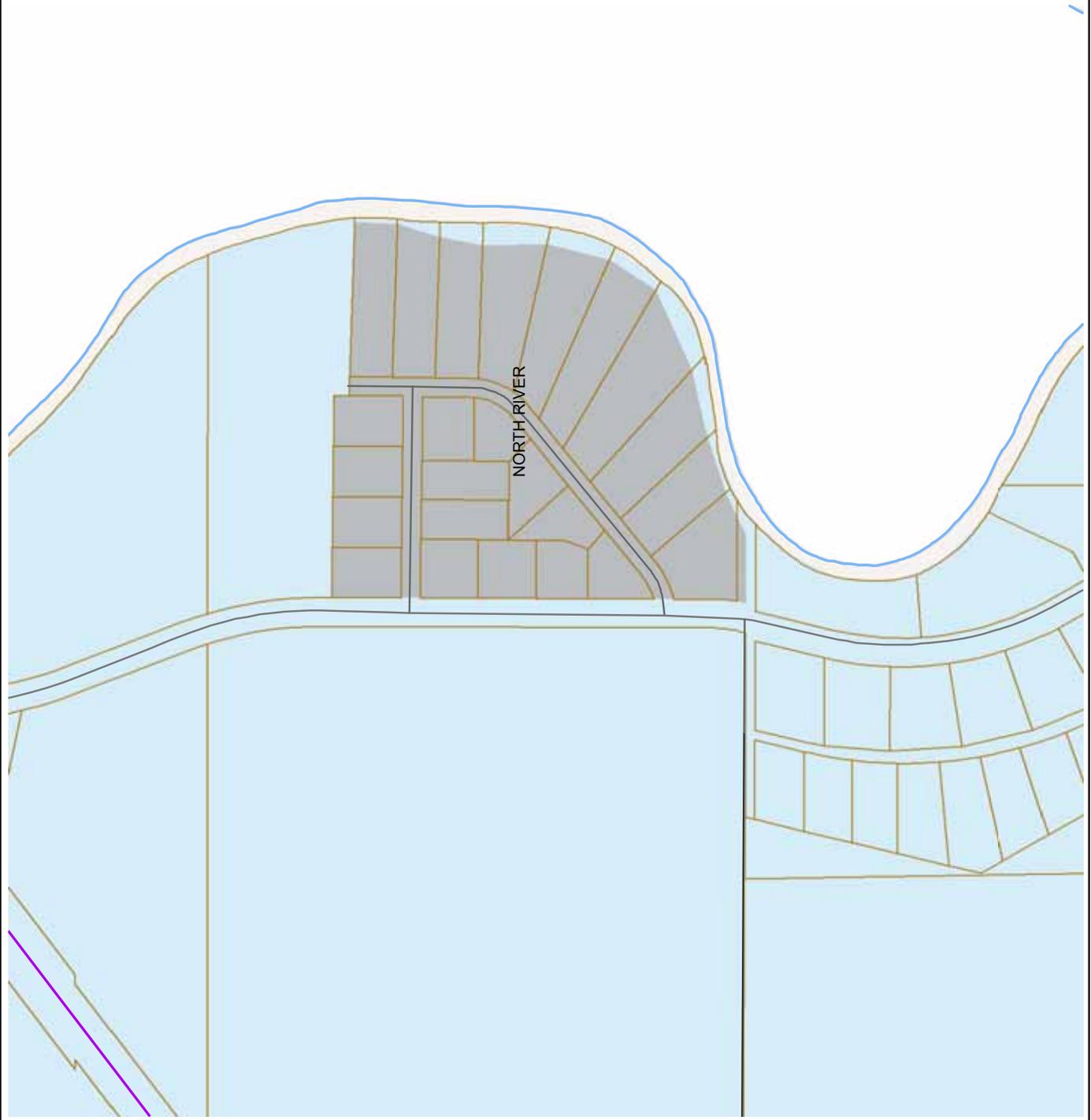
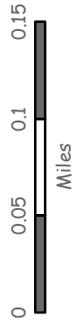


Figure 3.22. City of North River

City of Oxbow

Oxbow is located between County Road 81 and the Red River approximately eight miles south of Fargo (Figure 3.23). The city is built around an 18 hole golf course which was established in the 1990s. The total area of the city is less than a half square mile and has a perimeter of approximately 3.5 miles in length.

The city has doubled in size since the 1990 census to 248 residents (Table 3.22). The city currently still has vacant lots and also has the ability to expand to the south if so desired. The projections for the city show the population continuing to increase to nearly 299 residents by 2030. The city currently has around 50 vacant lots so if these were all to fill out it could be expected the potential population could be closer to 350 residents. Housing units more than doubled between 1990 and 2000 and if the current lots all fill out it would increase the units by another 50 (U.S. Bureau of the Census, Decennial Censuses).

Oxbow Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	N/A
1990	100
2000	248
Rank	15/27
Projection	
<i>2010</i>	286
<i>2020</i>	296
<i>2030</i>	299
<i>Projection Years</i>	1990-2000
Housing	
1970	N/A
1980	N/A
1990	40
2000	84
<i>N/A= Not Available</i>	

Table 3.22. City of Oxbow population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Oxbow

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

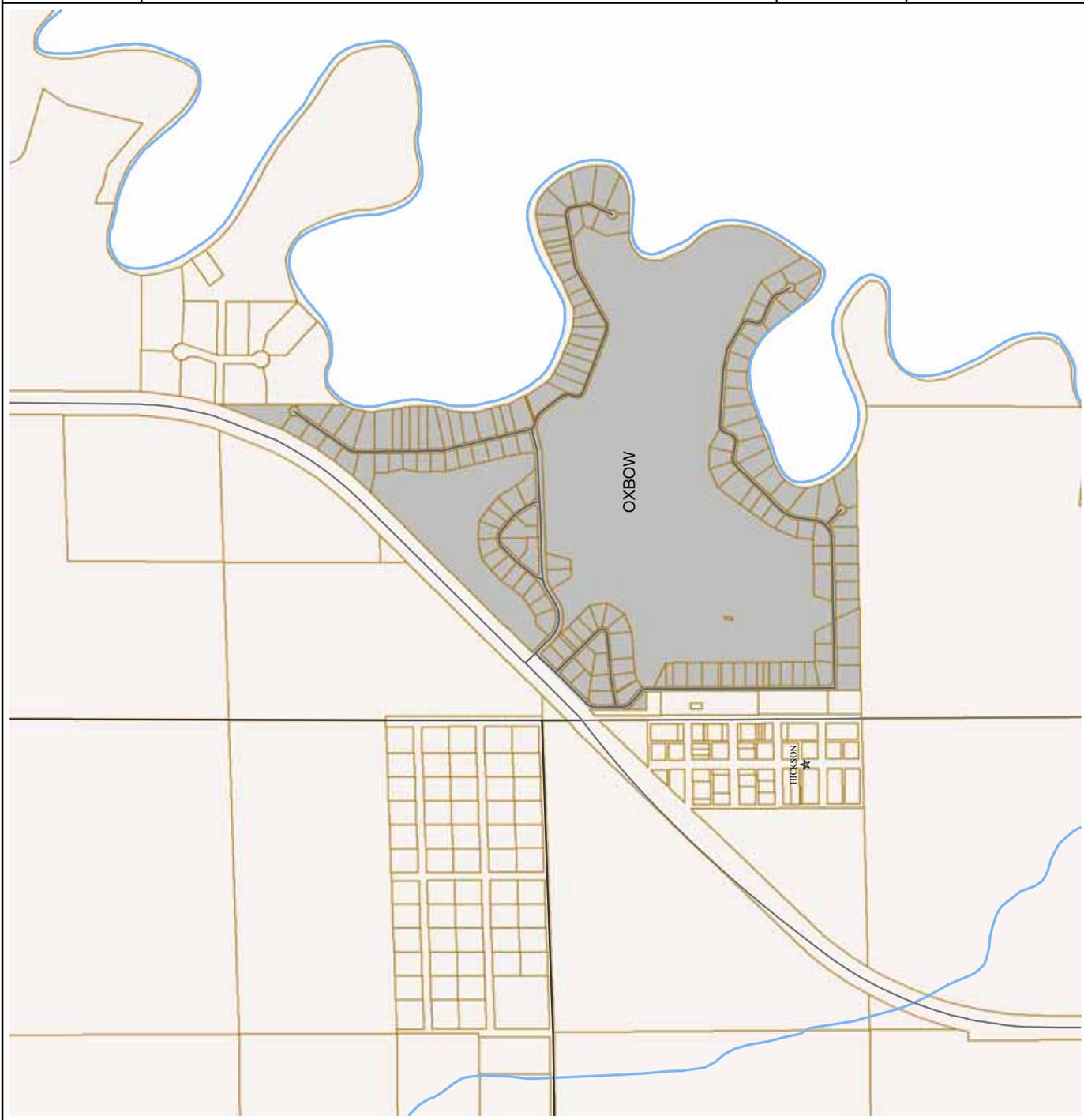
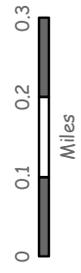


Figure 3.23. City of Oxbow.

City of Page

Page is located in northwest Cass County at the intersection of State Highway 38 and County Road 26 (Figure 3.24). Two Burlington Northern/Santa Fe rail lines pass near Page, one about a mile to the southwest and one directly through the city. A branch of the Elm River and two small lakes are located east of the city.

The population of Page has been in a state of decline for most of the 20th century (Table 3.23). The city's highest population was recorded in 1950, with the current population nearly 50% less. If this trend continues the city's population could drop below 100 in the next 30 years. Housing units decreased in the 2000 census and it could be expected will continue to decrease if the population declines (U.S. Bureau of the Census, Decennial Censuses).

Page Population	
1920	452
1930	443
1940	428
1950	482
1960	432
1970	367
1980	329
1990	266
2000	225
Rank	16/27
Projection	
<i>2010</i>	174
<i>2020</i>	122
<i>2030</i>	71
<i>Projection Years</i>	1980-2000
Housing	
1970	136
1980	156
1990	144
2000	125
<i>N/A= Not Available</i>	

Table 3.23. City of Page population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Page

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

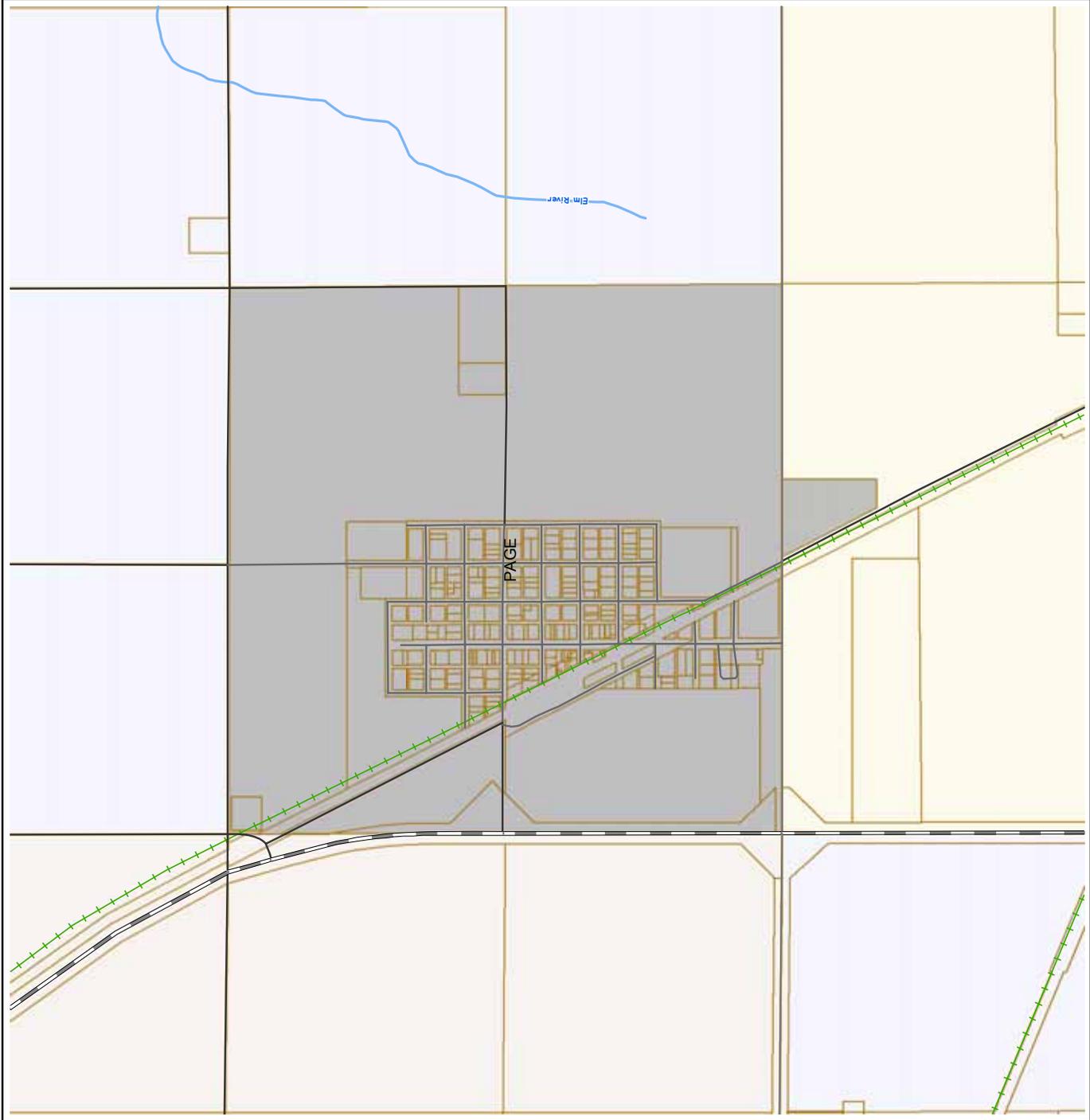


Figure 3.24. City of Page.

City of Prairie Rose

When Prairie Rose became an incorporated city in the 1980s it was still south of Fargo, since this time Fargo has grown around the entire city (Figure 3.25). As result the city boundaries cannot expand and will remain as they currently are found. The city is located at the intersection of Interstate 29 and 40 Ave South. The city is roughly 23 acres and has a perimeter length less than one mile.

During the last 30 years the city’s population has fluctuated, dropping in 1990, but increasing again in 2000 (Table 3.24).

Population projections based on the last 30 years show the population continuing to drop, however the drop in the 1990 census could be the result of family size shrinking as children move out and one could more likely expect population to remain stable. The lots in this city are large enough to allow for lot splits, which could increase the population as new families move into the city. Housing should remain stable because of the lack of expansion areas for the city; expect if the city permits lot splits (U.S. Bureau of the Census, Decennial Censuses).

Prairie Rose	
Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	76
1990	49
2000	68
Rank	24/27
Projection	
2010	65
2020	63
2030	61
<i>Projection Years</i>	1980-2000
Housing	
1970	N/A
1980	20
1990	15
2000	20
<i>N/A= Not Available</i>	

Table 3.24. City of Prairie Rose population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Prairie Rose

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- ✕ BNSF
- ✕ RRV&W
- ✕ CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

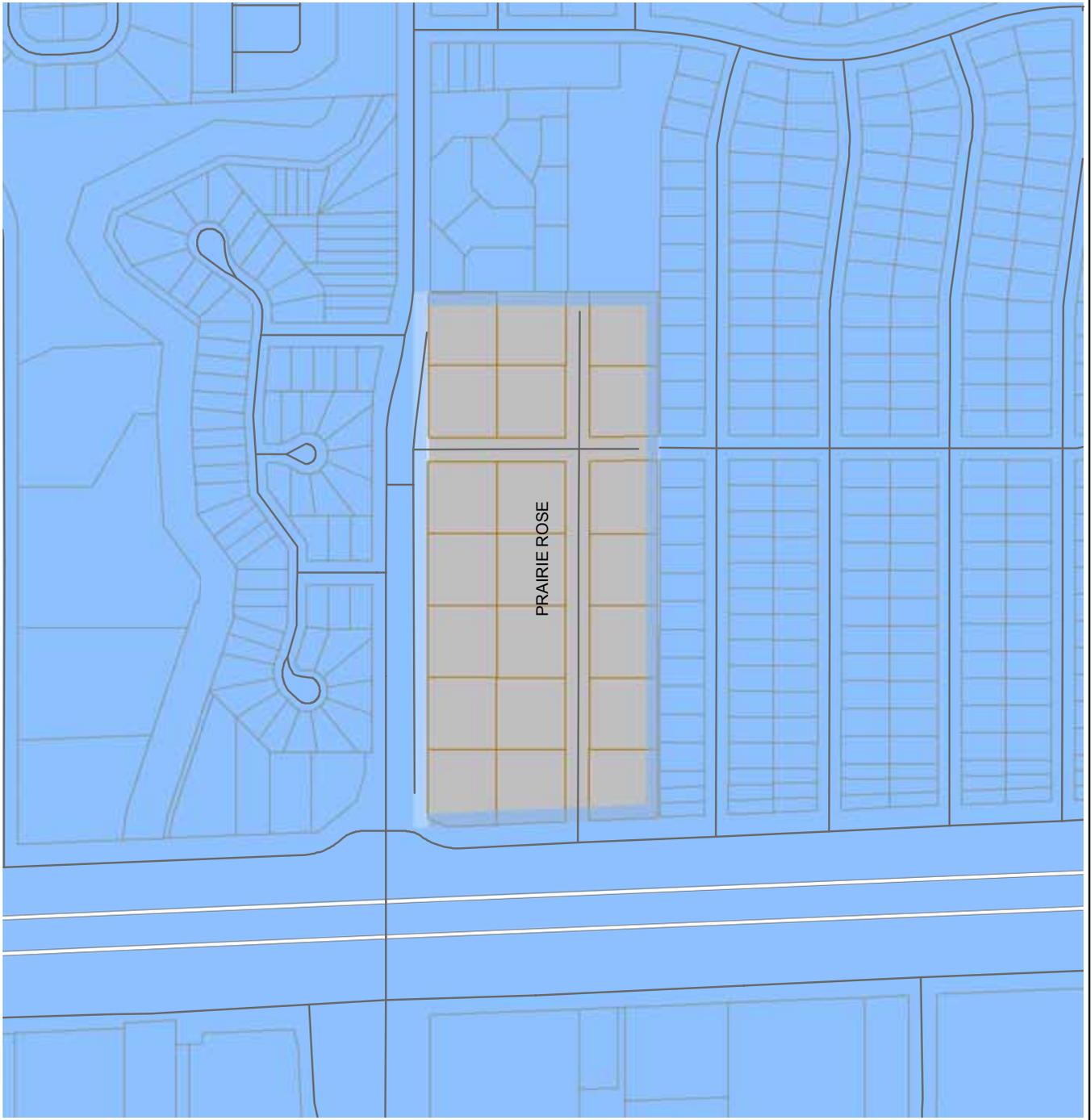


Figure 3.25. City of Prairie Rose

City of Reiles Acres

Reiles Acres is located northwest of Fargo’s on the west side of Interstate 29 (Figure 3.26). County Road 20 creates the current northern border of the city and Drain 40 creates the eastern border. The 2000 Census calculated the city’s area at half square mile with a three mile perimeter. Fargo’s extraterritorial (ET) area does not extend to Reiles Acres current boundaries allowing the city area for future expansion.

Reiles Acres has continued to increase its population since becoming incorporated in the 1980s (Table 3.25). Based on the past trends the projected populations are expected to continue to rise to nearly 400 by 2030. The city currently has roughly 70 vacant lots, if these were all developed the 2030 projection would seem quite feasible and the city still has large tracts of land which could be subdivided for residential development. As expected housing has increased within the city over the last 30 years would continue if the population projections become reality (U.S. Bureau of the Census, Decennial Censuses).

Reiles Acres	
Population	
1920	N/A
1930	N/A
1940	N/A
1950	N/A
1960	N/A
1970	N/A
1980	191
1990	210
2000	254
Rank	13/27
Projection	
<i>2010</i>	293
<i>2020</i>	338
<i>2030</i>	390
<i>Projection Years</i>	1980-2000
Housing	
1970	N/A
1980	51
1990	56
2000	72
<i>N/A= Not Available</i>	

Table 3.25. City of Reiles Acres population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Reiles Acres

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

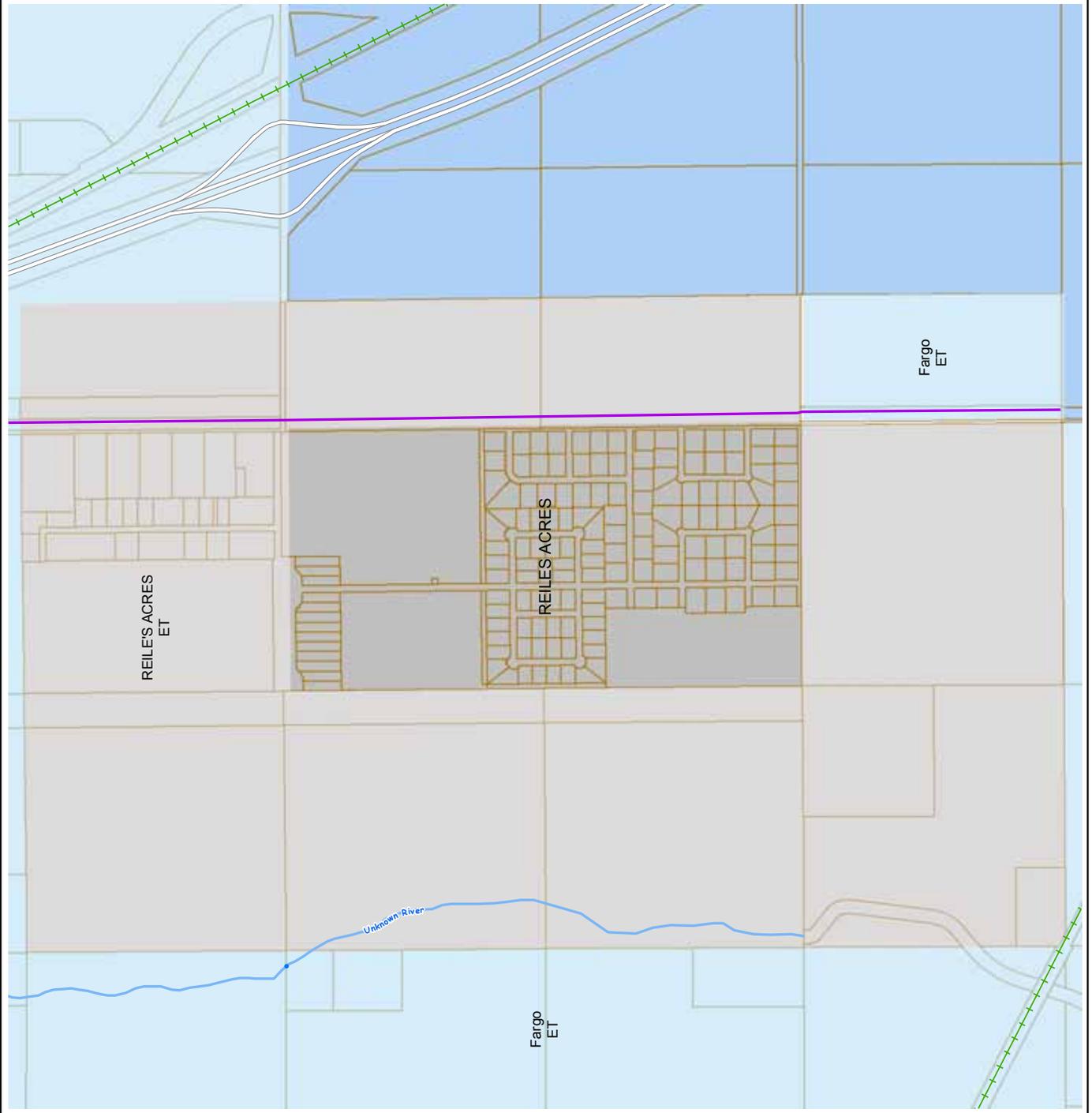


Figure 3.26. City of O Reiles Acres.

Tower City

Tower City is located along Cass County’s western border in Tower Township (Figure 3.27). The city is located near the intersection of Interstate 94 and County Roads 10 and 1. The Maple River runs to the north and east of the city and the city has two small lakes in the east and west side of town. The city is approximately 1.5 square miles with a five mile perimeter.

Tower City’s 2000 population was 252 residents, down nearly 200 residents from 1920 (Table 3.26). The city’s population increased by 19 residents between 1990 and 2000, but the overall trend has been one of decline for the city. Based on the overall past trends the city’s population would decline by roughly 10 residents every decade, but the increase in residents recorded at the last census could suggest the city’s population is rebounding. Housing units increased in 1980 Census, but currently have declined back to totals found in the 1970s (U.S. Bureau of the Census, Decennial Censuses). In recent years the city has experienced new home construction and its proximity to the metro area as well as convenient location near Interstate 94 could result in new growth similar.

Tower City	
Population	
1920	447
1930	435
1940	364
1950	292
1960	300
1970	289
1980	293
1990	233
2000	252
Rank	14/27
Projection	
<i>2010</i>	241
<i>2020</i>	230
<i>2030</i>	220
<i>Projection Years</i>	1970-2000
Housing	
1970	111
1980	140
1990	115
2000	113
<i>N/A= Not Available</i>	

Table 3.26. Tower City population and housing trends (U.S. Bureau of Census, Decennia Censuses).

Cass County City Maps

Tower City

- ★ Villages
- Bridges (20'+)
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- City ET
- Fargo
- West Fargo
- West Fargo ET
- Fargo ET

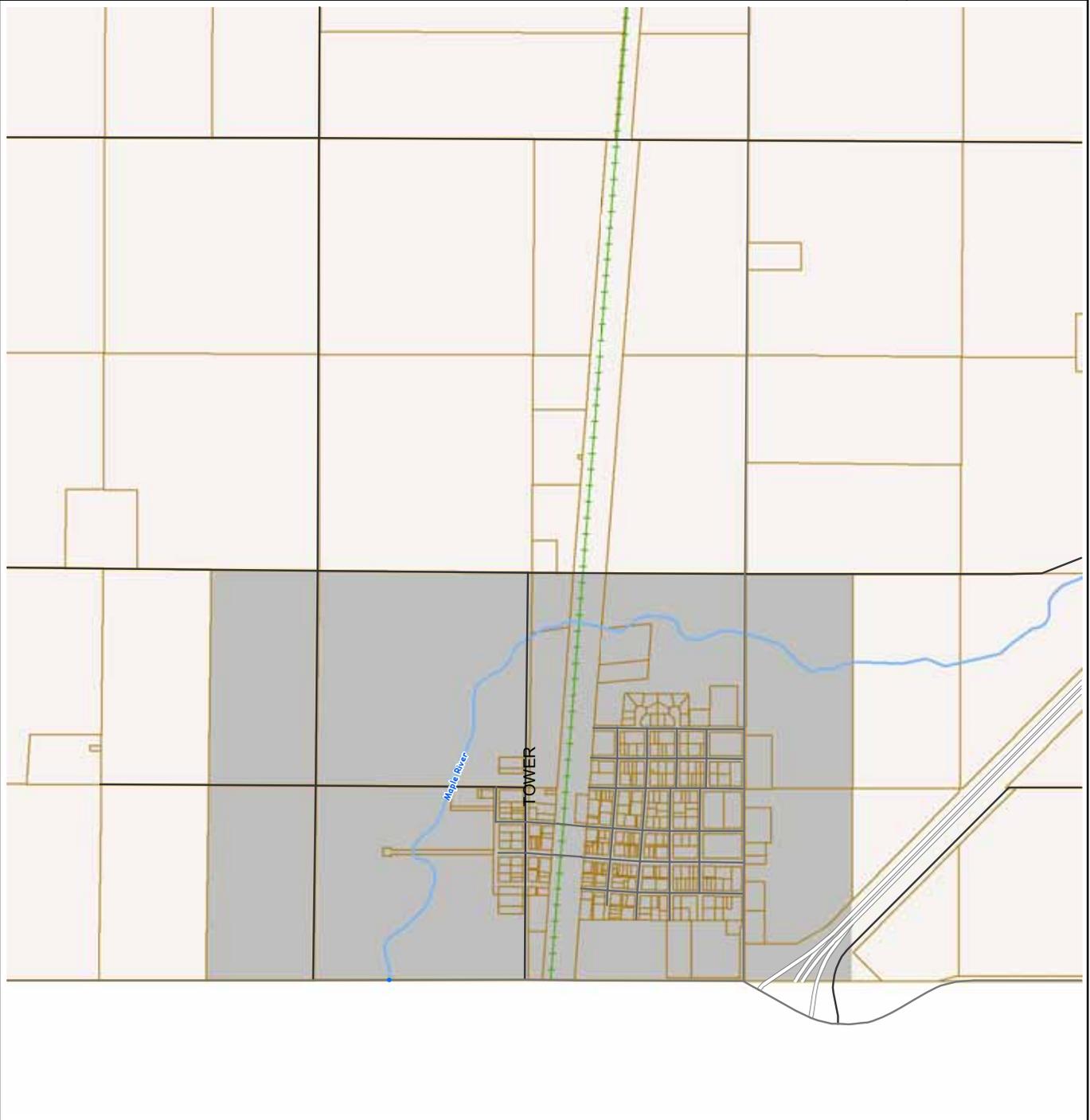
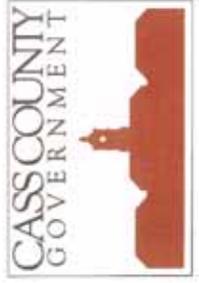


Figure 3.27. Tower City.

City of West Fargo

As the name implies West Fargo is located to the west of Fargo and is the county's second largest city (Figure 3.28). At one point the boundaries between these two cities were clearly recognizable, but now the expansion of the two cities has removed the undeveloped lands between the two. The majority of West Fargo is found north of Interstate 94, but the city is currently growing south of the interstate along County Road 17 towards Horace. According to the 2000 Census, West Fargo had a total area of nearly 10 square miles with a perimeter of 32 miles.

Since its incorporation in the 1940s West Fargo has grown substantially (Table 3.27). West Fargo grew by 21% between 1990 and 2000 and based on the current demographic trends the city's growth will continue. If the trends continue the city could expect to reach 20,000 residents by 2020, which would make it one of the state's largest cities. However, city officials believe this number will likely be reached once the new homes built in 2004 become occupied. The number of housing units in the city has also grown significantly; increasing by more than 70% since its incorporation. The number of units will need to continue to grow to meet the expected growth of the city (U.S. Bureau of the Census, Decennial Censuses).

West Fargo	
Population	
1920	N/A
1930	N/A
1940	707
1950	1,632
1960	3,328
1970	5,161
1980	10,099
1990	12,287
2000	14,940
Rank	2/27
Projection	
<i>2010</i>	18,171
<i>2020</i>	22,102
<i>2030</i>	26,882
<i>Projection Years</i>	1980-2000
Housing	
1970	1,580
1980	3,780
1990	4,574
2000	5,968
<i>N/A= Not Available</i>	

Table 3.27. City of West Fargo population and housing trends (U.S. Bureau of Census, Decennial Censuses).

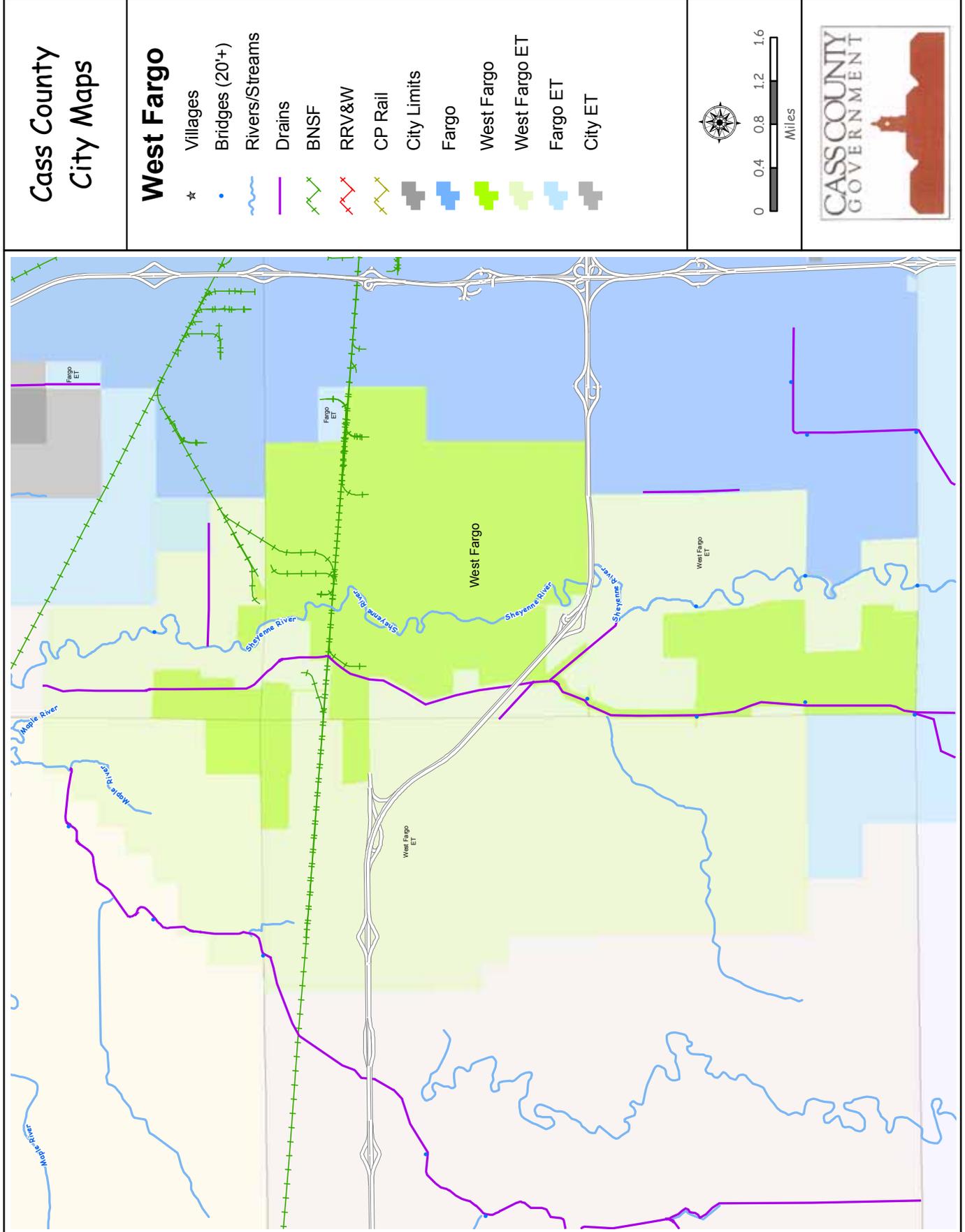


Figure 3.28. City of West Fargo.

CHAPTER FOUR:

Township Profiles

The following chapter will provide basic information for the 49 townships located in Cass County (Figure 4.1). Decennial census data for population and housing, population projections and a map of the political boundaries and the man-made and natural features will be provided for each township (Figures 3.2-3.50).

Historical census population and housing data for each township is provided to display the trends occurring in the townships; population data is provided back to 1970 and housing data is available from 1980 (Table 4.1). This data only accounts for the residents and housing units outside of city incorporated limits, so as cities annex land the townships size shrinks and subsequently often their population and housing numbers are reduced.

The historical populations from each township were used to create population projections for 2010, 2020, and 2030. These projections being the numerical outcome of a set of assumptions made about future trends with consideration to past trends (U.S. Bureau of Census 1977, 3). Thus, the projections are only assumptions of what the population could be if past trends continue into the future. As stated in the previous chapters, size of study area, length of projection period, methodology, historic data, special populations, and government policies can all affect projection accuracy. In the case of townships, historic data will likely have the biggest influence on the accuracy of the township projections. Census data for township populations is only published back to 1970; this short period can make interpreting the historic demographic trends difficult. The trends generated from the short time might not accurately represent the current demographic trend and the short time period does not allow for changes to average out over time. The second biggest influence will likely be changes in the townships area. Annexation and growth of cities effectively reduces the area, residents, and housing units. The reduction in population appears to show a declining population within the township when in

actuality the area is growing and the loss is attributed to rural residents being annexed in a city. This can result in population projection forecasting this “population loss” when in reality the population might remain stable or incur new growth.

When evaluating the townships population projections please bear in mind the projections are based only on historic population trends; trends based on limited data which might not accurately represent the current population changes and which could greatly change in the future. These are only intended to illustrate what could happen and does not imply what the future demographic profiles of the townships will be in 30 years.



Cass County Township Maps

Townships



City Limits

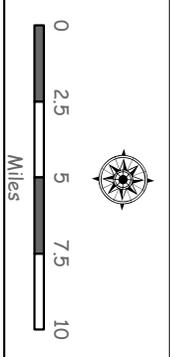


Figure 4.1 Cass County's Townships

	Erie	Everest*	Gardner	Gill	Gunkel	Harmony	Harwood	Highland	Hill	Hoves	Hunter*	Kinyon	Lake	Leonard	Maple River	Mapleton*
Population	185	142	146	140	113	165	436	123	93	106	153	126	78	221	184	217
	1970															
	136	122	114	114	93	110	530	130	76	98	117	119	62	142	155	244
	1980															
	135	126	115	115	72	93	322	144	64	99	95	100	59	121	125	269
	1990															
	134	98	123	104	55	93	291	116	51	82	86	103	47	103	126	251
	2000															
Projection	133	87	120	94	42	86	254	113	42	74	83	96	40	76	126	254
	2010															
	132	77	118	85	32	79	222	109	34	66	81	90	34	60	126	256
	2020															
	131	68	116	77	23	72	194	105	28	58	80	84	28	47	126	257
	2030															
Housing	70	47	45	42	39	46	160	43	33	39	42	44	24	45	60	88
	1980															
	60	50	44	41	26	38	108	49	26	36	39	36	23	44	56	96
	1990															
	61	43	48	39	22	40	104	44	28	31	38	39	19	40	53	88
	2000															
Sq. Miles	36.02	35.26	35.56	36.13	36.23	34.53	31.04	35.85	35.86	35.82	34.38	35.92	36.06	35.46	35.78	34.56

*Change in total area from the 1990 Census

	Addison	Amelia	Arthur	Ayr	Barnes*	Bell	Berlin	Buffalo*	Cassatton*	Clifton	Cornell	Davenport	Dows	Durbin	Eldred	Empire
Population	113	164	120	123	1,221	95	148	148	120	146	100	150	108	128	129	150
	1970															
	103	135	103	96	490	56	147	99	111	113	84	165	93	124	124	150
	1980															
	95	132	71	78	289	52	133	77	111	78	90	131	76	106	115	124
	1990															
	104	112	82	78	525	41	136	79	117	71	60	134	63	92	91	109
	2000															
Projection	103	99	80	62	1,268	31	132	79	116	56	51	129	48	80	78	95
	2010															
	102	87	80	53	2,489	23	129	79	115	44	43	124	33	68	66	82
	2020															
	101	76	79	45	4,194	18	125	79	114	35	36	120	18	56	53	68
	2030															
Housing	40	51	40	34	154	26	47	36	48	41	31	61	38	45	55	54
	1980															
	38	48	33	39	96	19	46	31	36	38	28	56	28	39	51	49
	1990															
	38	42	31	37	173	18	51	31	55	29	25	52	22	39	44	50
	2000															
Sq. Miles	36.05	34.53	34.51	35.95	12.14	35.92	34.01	35.97	34.18	35.44	35.98	35.98	36.03	35.19	35.44	35.85

*Change in total area from the 1990 Census

	Noble		Normanna		Page		Pleasant		Pontiac		Raymond*		Reed*		Rich		Rochester		Rush River		Stanley*		Tower		Walburg		Warren		Watson		Wheatland		Wiser	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980		
Population	129	107	278	331	73	78	326	398	145	140	199	255	655	848	107	108	84	79	177	141	857	1,706	121	69	281	206	160	158	168	138	225	183	97	
	107	99	331	340	59	60	354	354	108	108	284	1,046	81	81	46	46	107	107	1,933	66	66	189	189	133	133	133	123	153	153	93	93	93		
	89	89	339	339	60	60	426	426	100	100	270	1,224	79	79	70	70	107	107	2,296	67	67	175	175	133	133	90	90	147	147	70	70	70	70	
	78	78	359	359	56	56	466	466	88	88	273	1,401	71	71	67	67	90	90	2,776	67	67	156	156	125	125	64	64	128	128	61	61	61	61	
Projection	69	69	380	380	53	53	509	509	78	78	274	1,569	65	65	66	66	76	76	3,255	67	67	146	146	118	118	38	38	111	111	52	52	52	52	
	61	61	400	400	49	49	557	557	69	69	274	1,729	58	58	64	64	65	65	3,735	67	67	138	138	111	111	12	12	96	96	43	43	43	43	
	51	51	110	110	35	35	135	135	52	52	86	285	37	37	32	32	65	65	513	29	29	87	87	54	54	49	49	72	72	38	38	38	38	
	38	38	124	124	26	26	120	120	50	50	91	346	33	33	29	29	48	48	611	26	26	79	79	48	48	46	46	68	68	37	37	37	37	
Housing	35	35	122	122	26	26	156	156	42	42	98	384	31	31	27	27	42	42	769	25	25	74	74	51	51	44	44	62	62	32	32	32	32	
Sq. Miles	31.42	31.42	34.98	34.98	35.82	35.82	37.94	37.94	36.00	36.00	34.48	22.99	36.19	36.09	36.09	36.40	36.40	35.99	34.52	34.52	36.12	36.12	36.10	36.10	36.00	36.00	36.21	36.21	33.75	33.75	33.75	33.75		

*Change in total area from the 1990 Census

Table 4.1. Township historical Census figures and population projections (U.S. Bureau of the Census, Decennial Censuses).

Cass County Township Maps

ADDISON

- ★ Villages
 - Bridges (20'+)
 -  Commercial
 -  General Aviation
 -  Rivers/Streams
 -  Drains
 -  BNSF
 -  RRV&W
 -  CP Rail
 -  City Limits
- Farmland Productivity**
-  0 - 20 Low
 -  21 - 40
 -  41 - 60
 -  61 - 80
 -  81 - 100 High
 -  Water

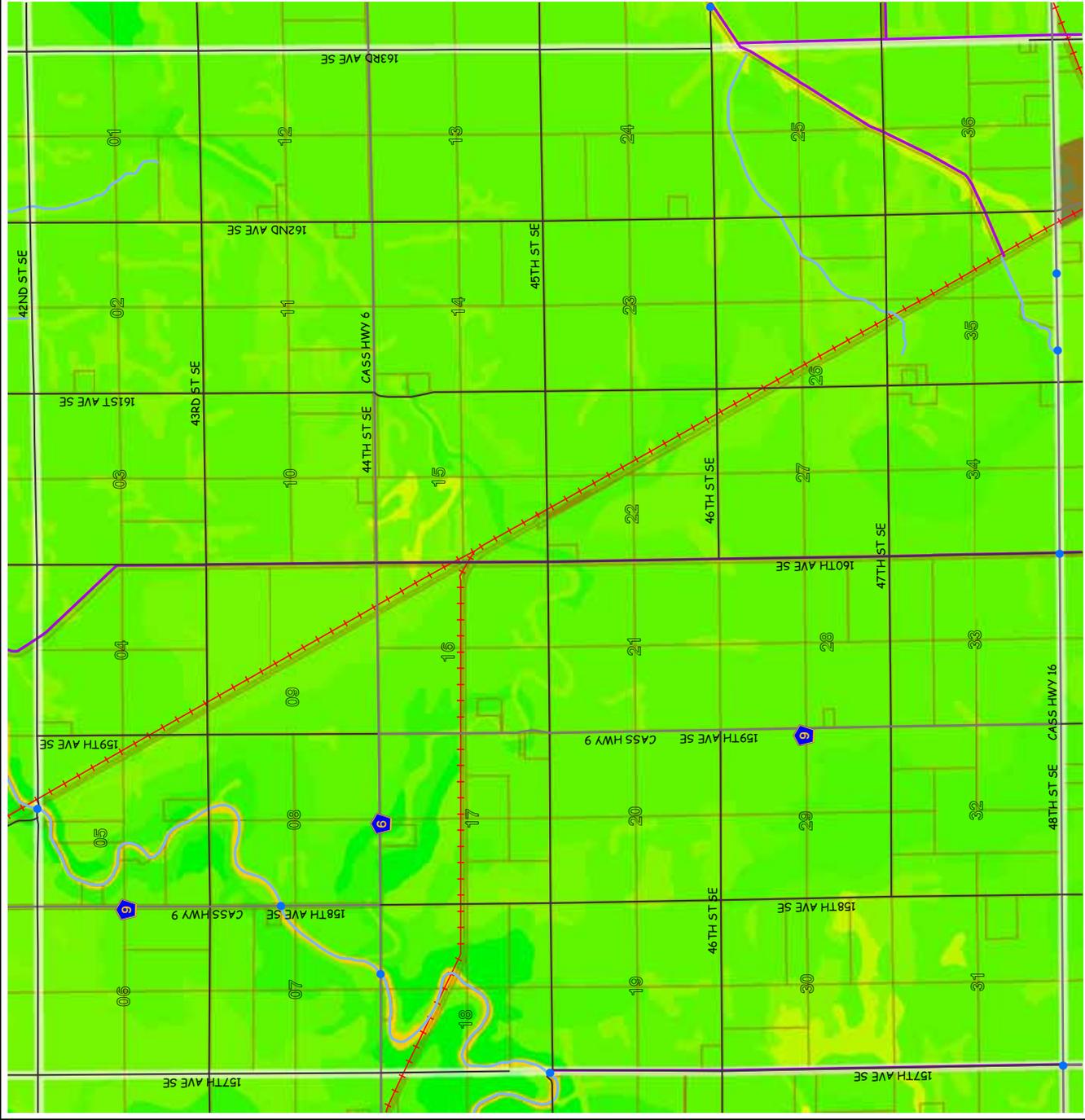
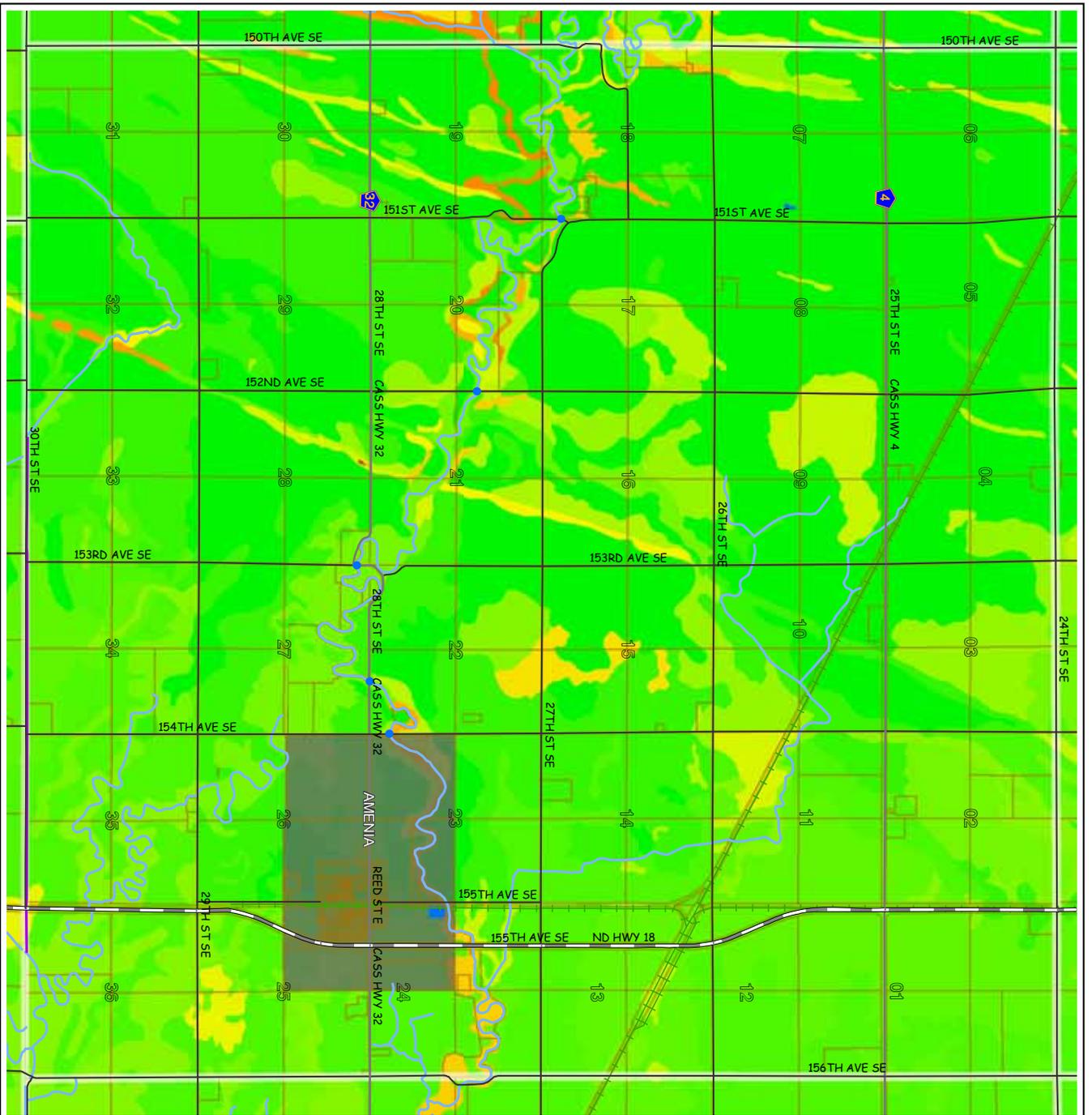


Figure 4.2. Natural and man-made features in Addison Township.



Cass County
Township Maps

AMENIA

- ★ Villages
- Bridges (20'+)
- Commercial

✈ General Aviation

Rivers/Streams

Drains

BNSF

RRV&W

CP Rail

City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

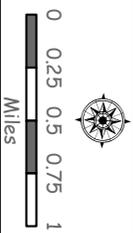


Figure 4.3. Natural and man-made features in Amenia Township.

Cass County Township Maps

ARTHUR

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

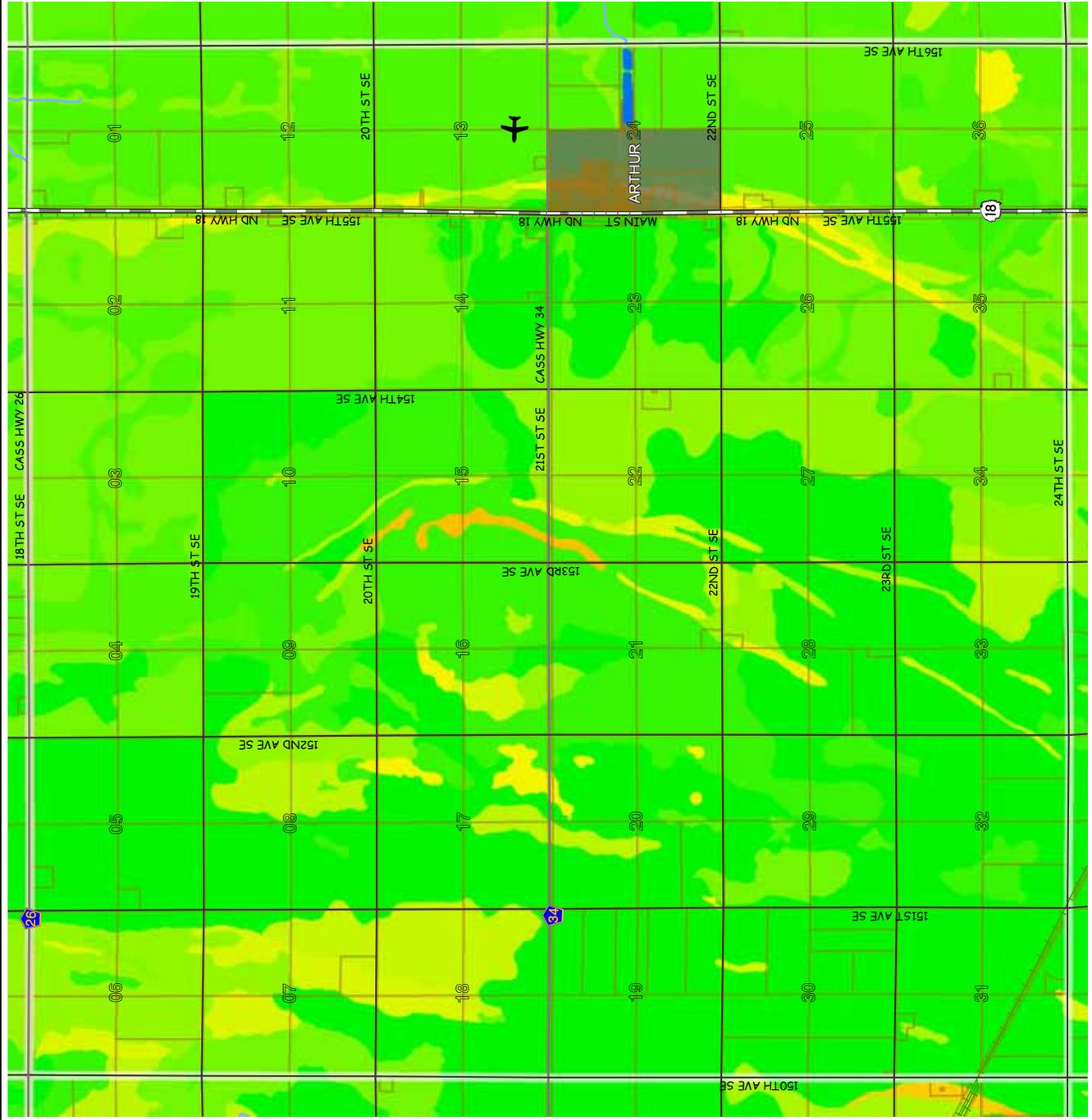
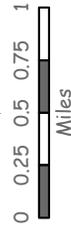
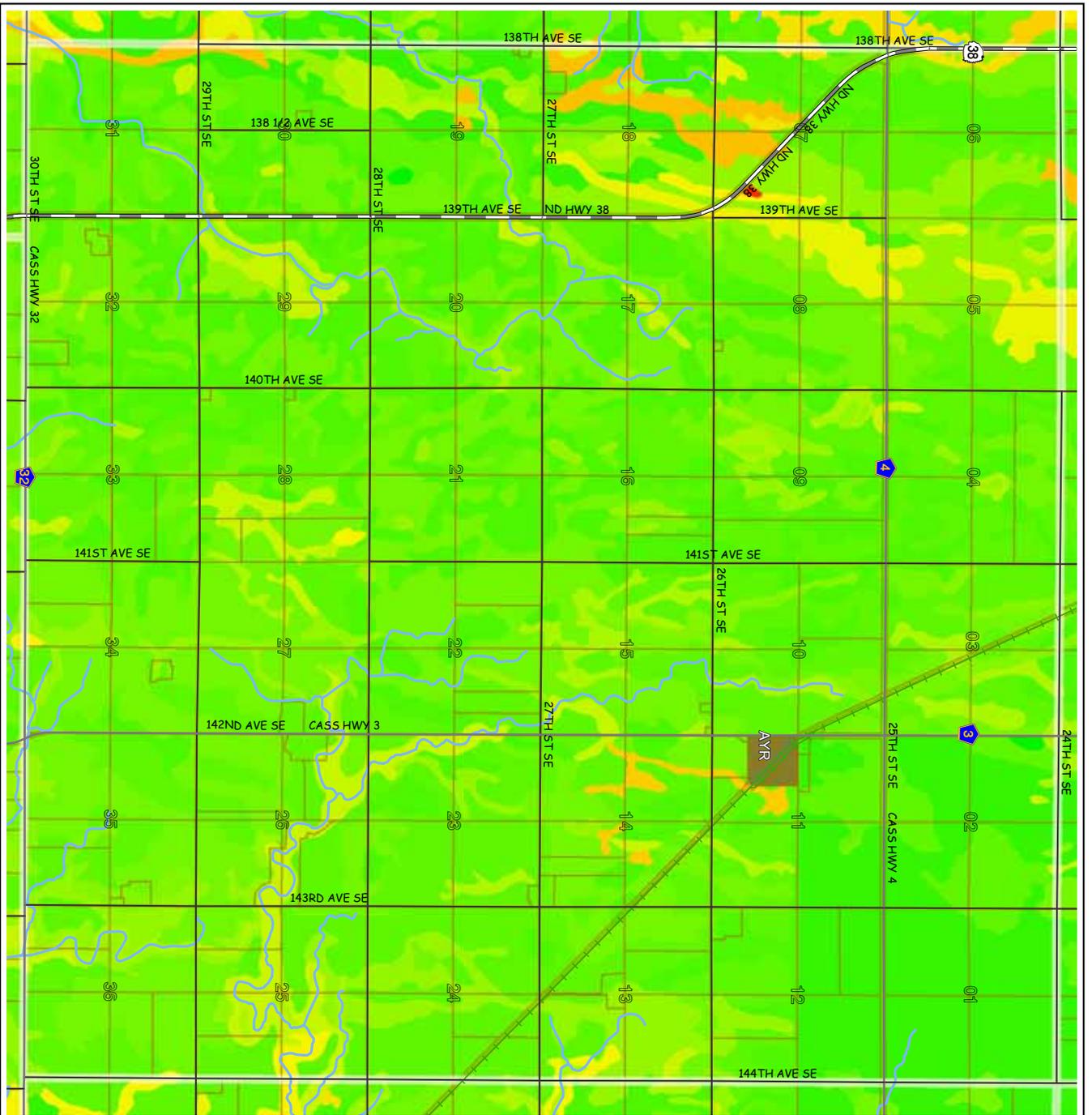


Figure 4.4. Natural and man-made features in Arthur Township.



**Cass County
Township Maps**

AYR

- ★ Villages
- Bridges (20'+)
- Commercial

✈ General Aviation

~ Rivers/Streams

~ Drains

~ BNSF

~ RRV&W

~ CP Rail

■ City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

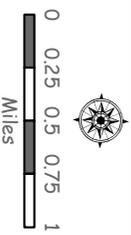


Figure 4.5. Natural and man-made features in Ayr Township.

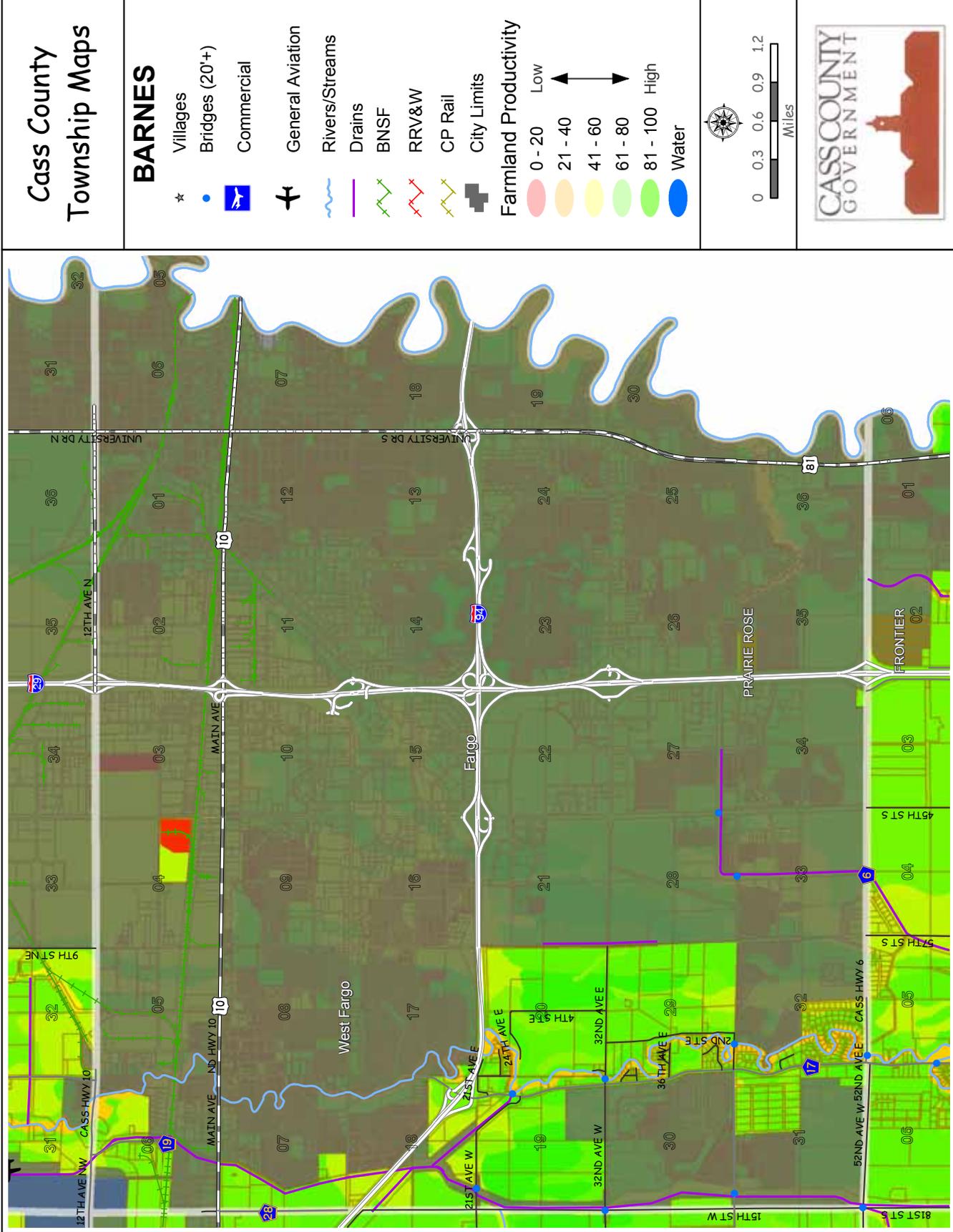
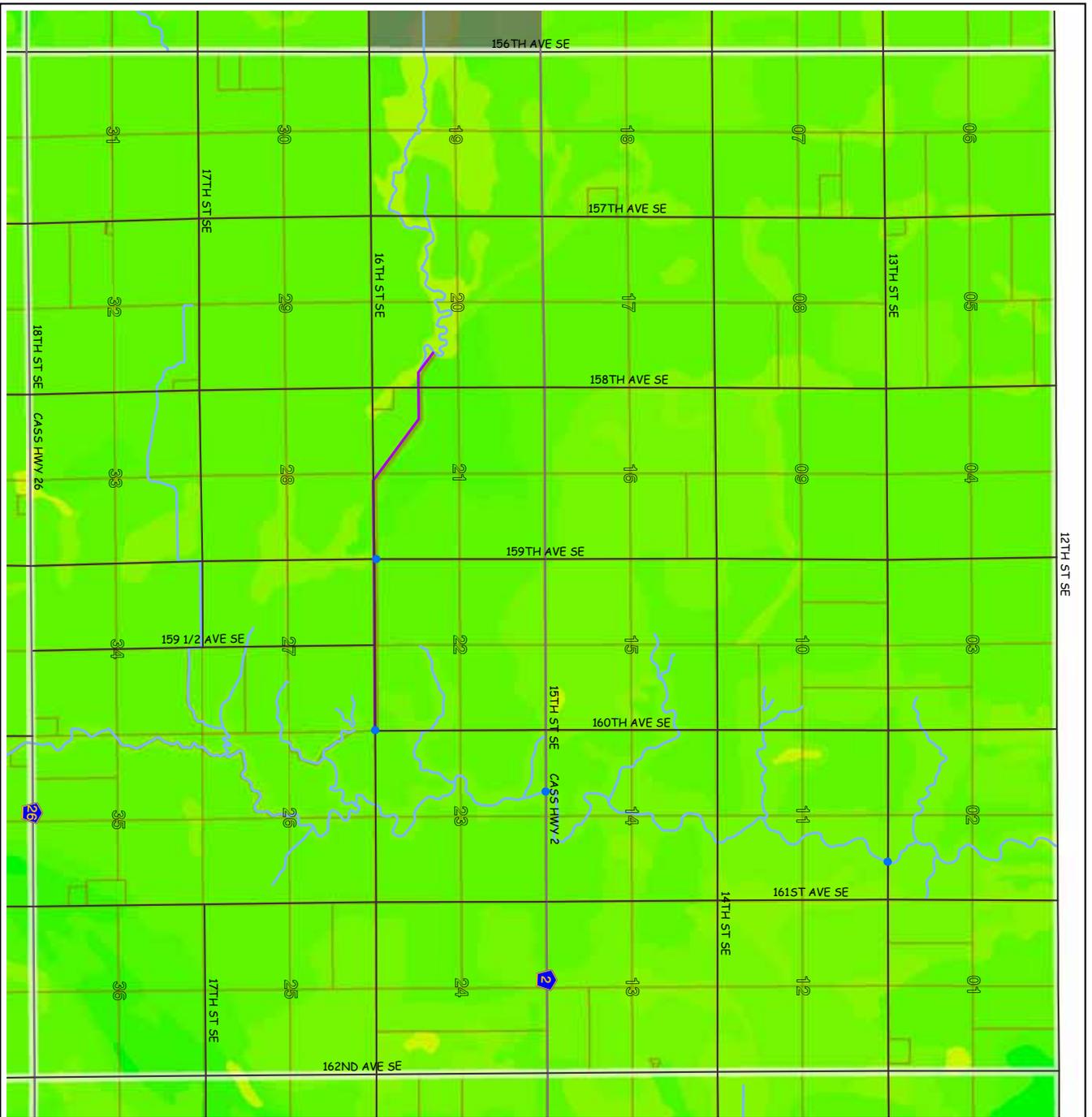


Figure 4.6. Natural and man-made features in Barnes Township.



**Cass County
Township Maps**

BELL

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity**
- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

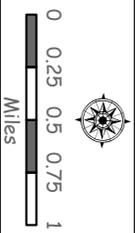


Figure 4.7. Natural and man-made features in Bell Township.

Cass County Township Maps

BERLIN

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

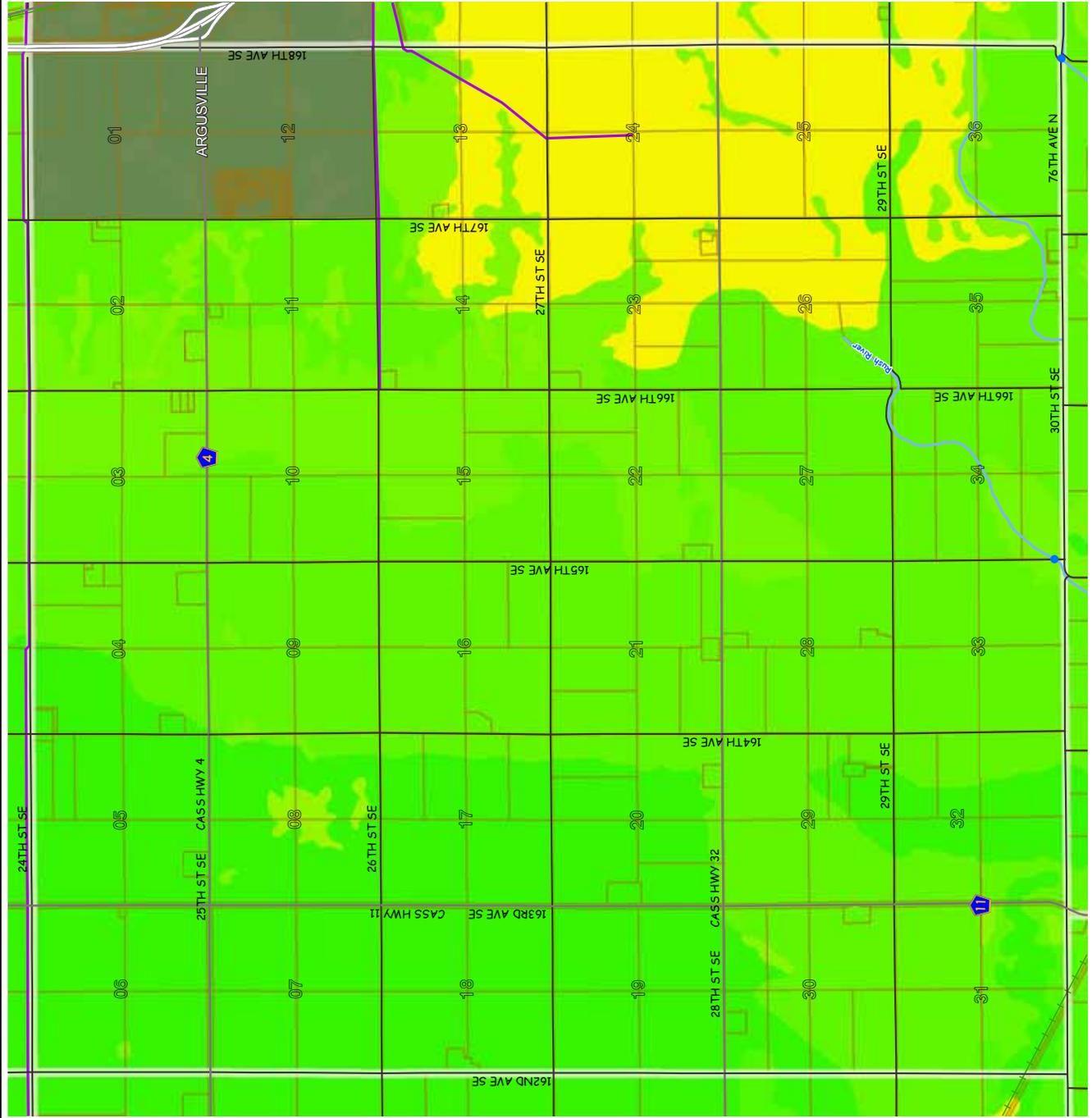
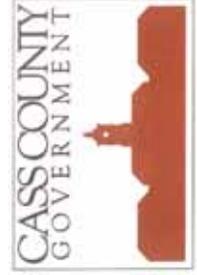
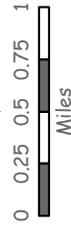
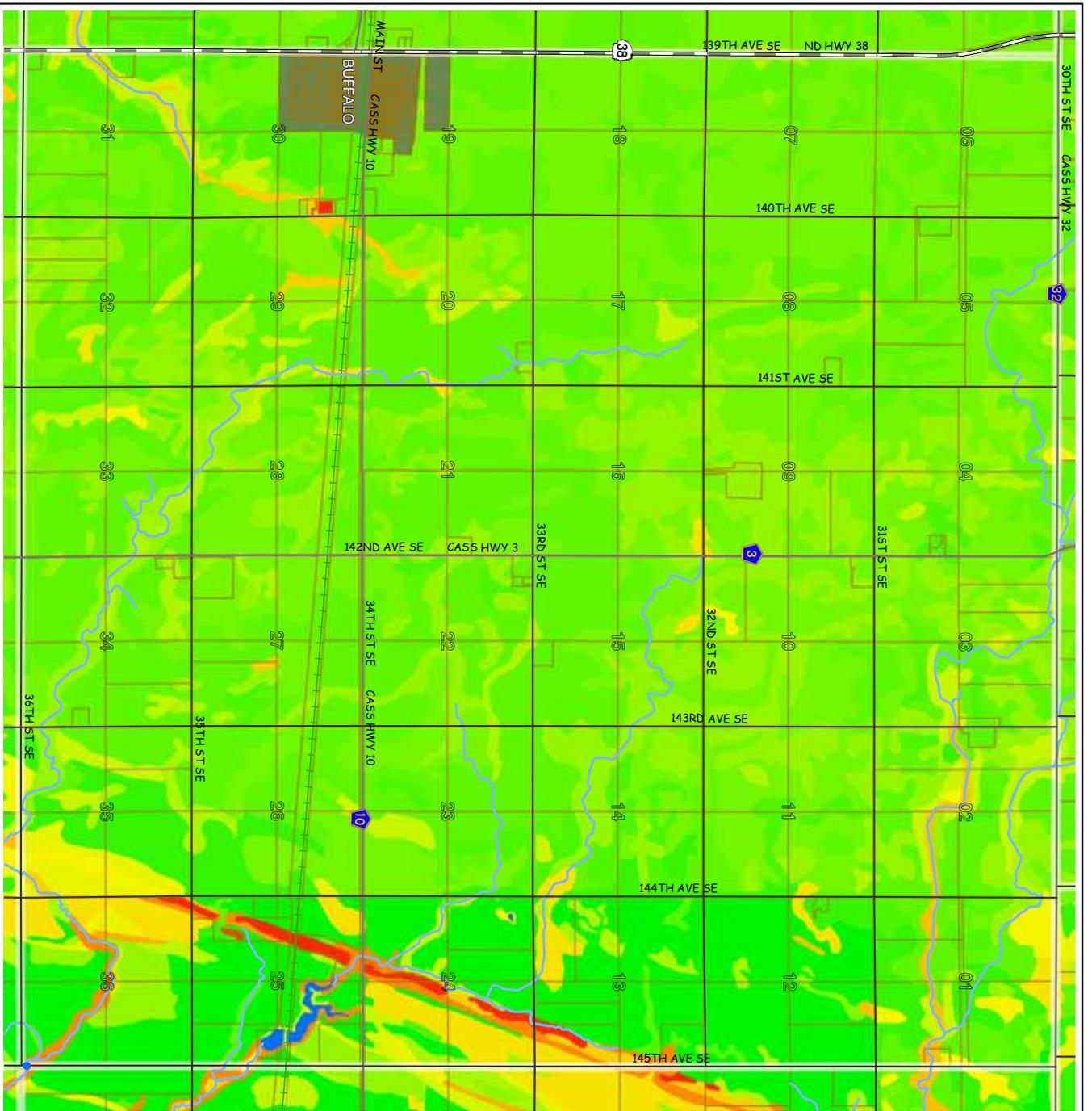


Figure 4.8. Natural and man-made features in Berlin Township.



Cass County Township Maps

BUFFALO

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

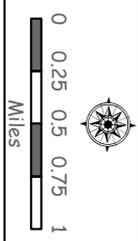


Figure 4.11. Natural and man-made features in Buffalo Township.

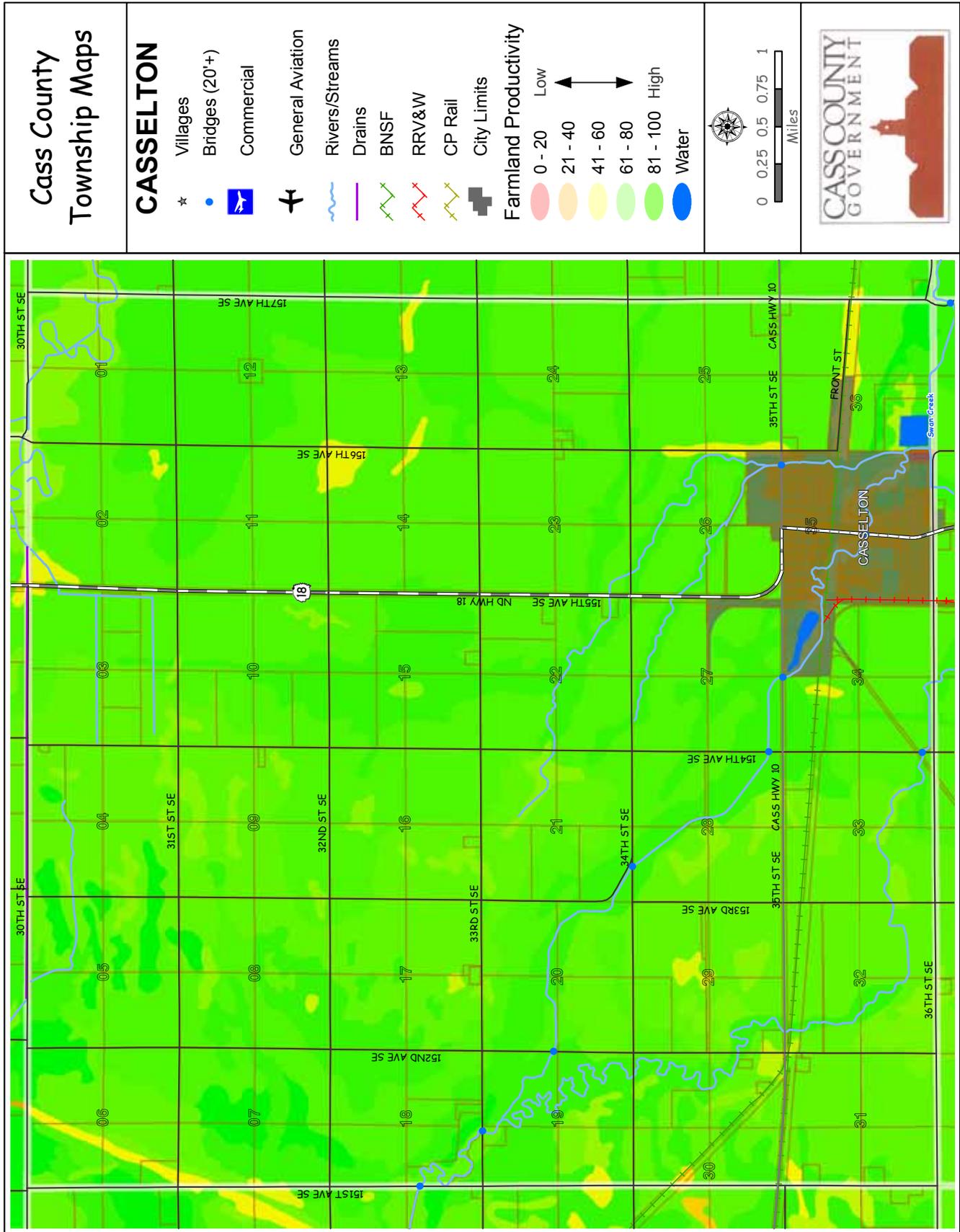
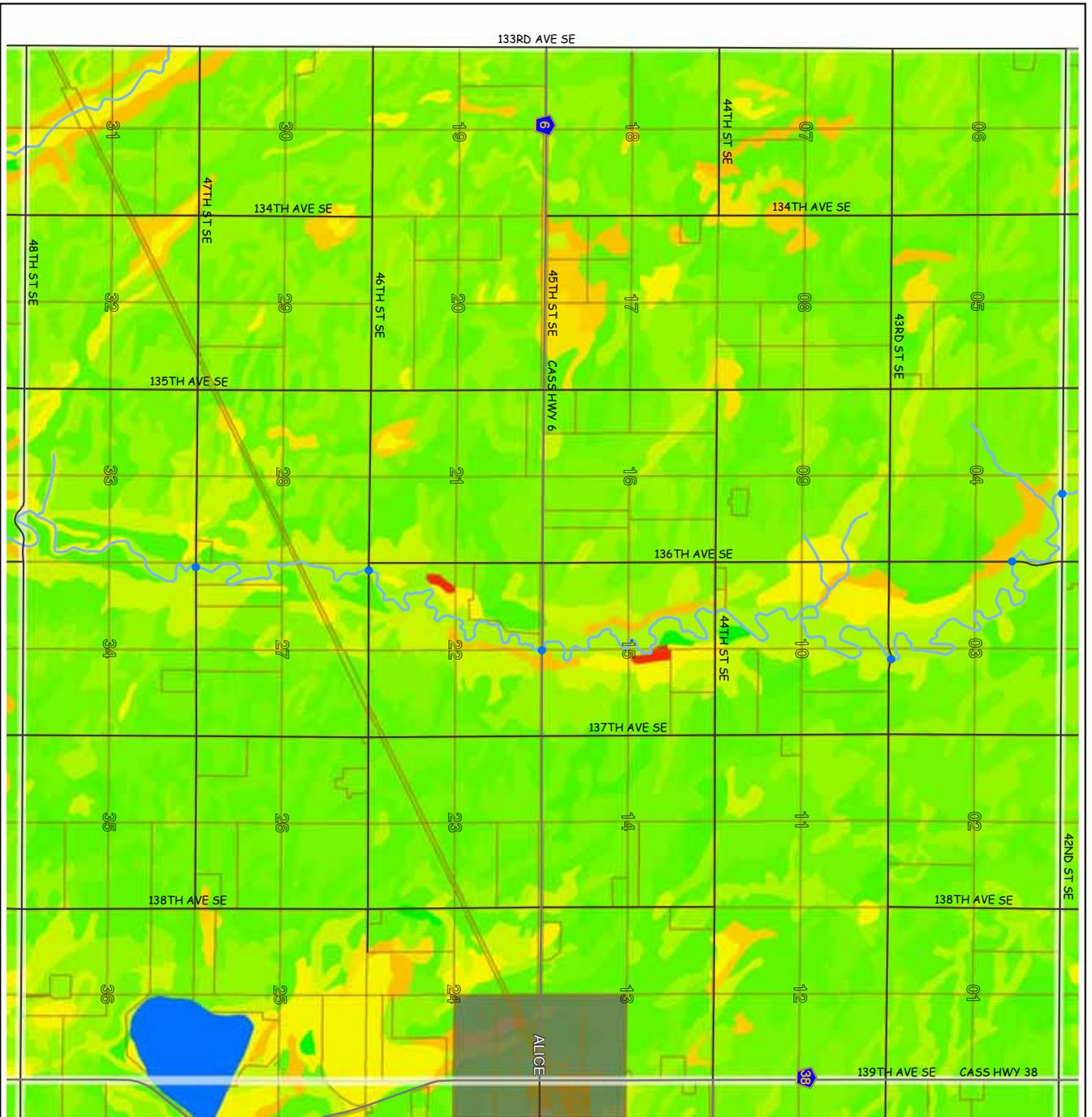


Figure 4.10. Natural and man-made features in Cassellton Township.



Cass County
Township Maps

CLIFTON

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity**
- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

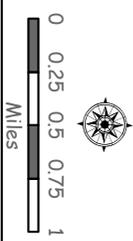


Figure 4.11. Natural and man-made features in Clifton Township.

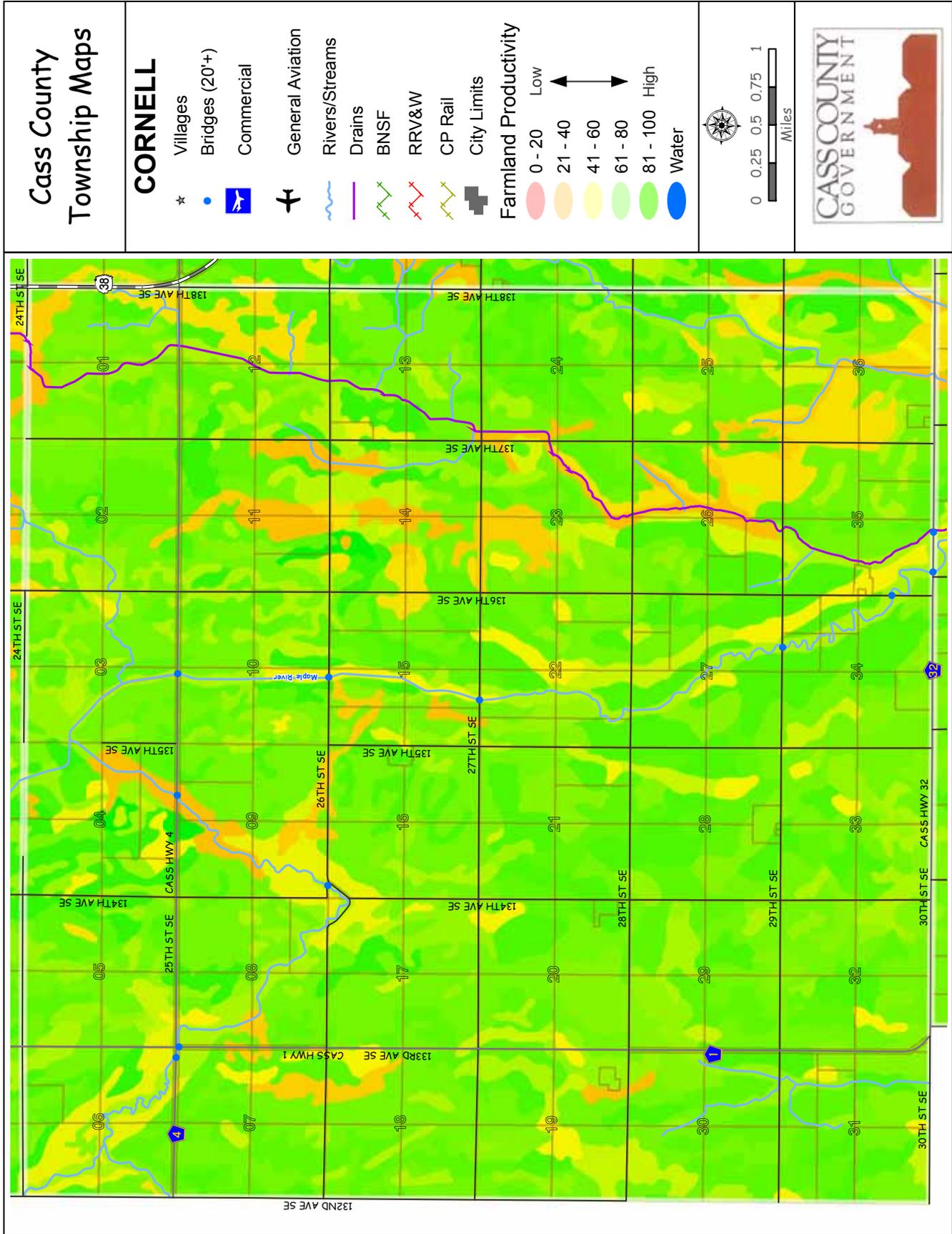


Figure 4.12. Natural and man-made features in Cornell Township.

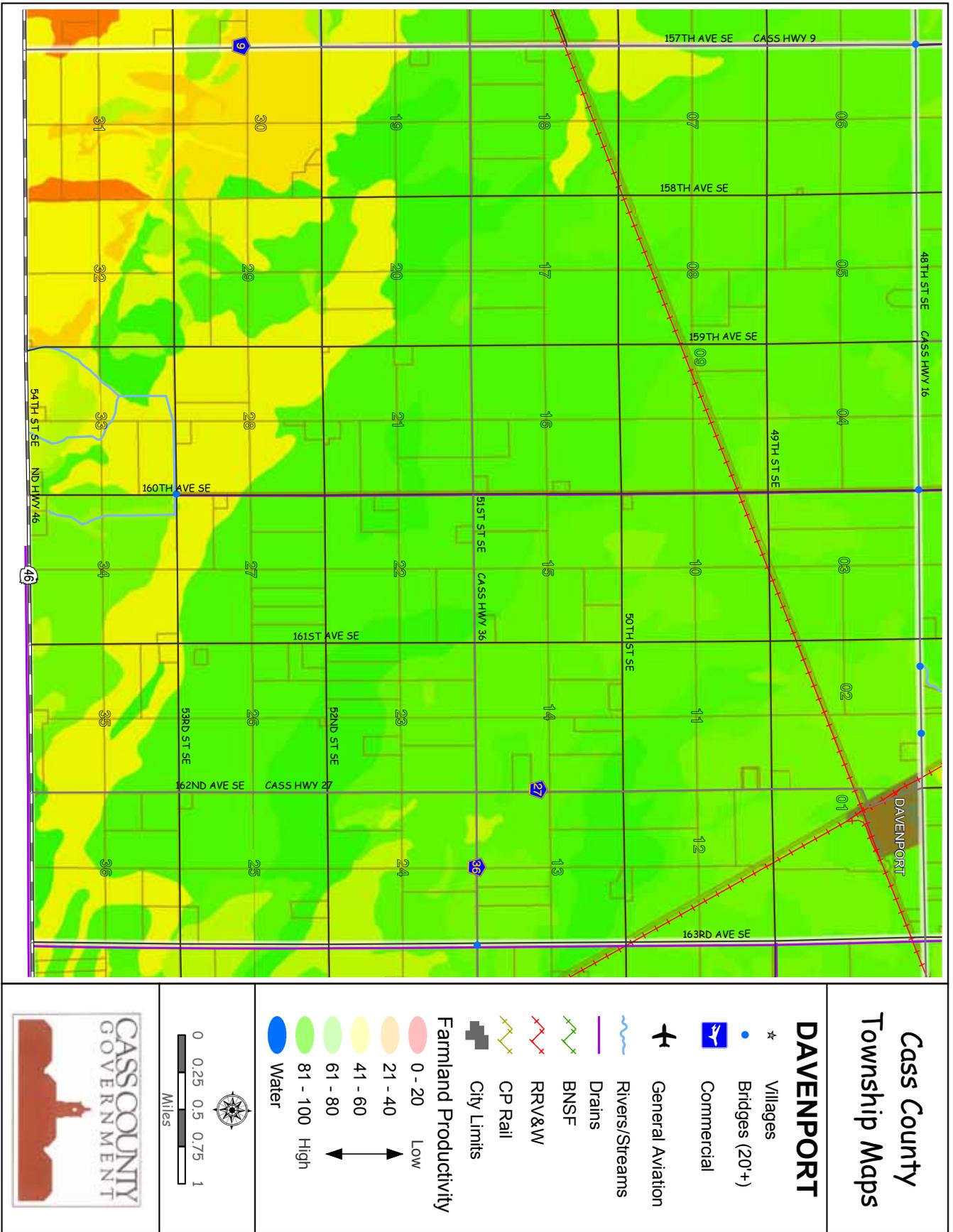


Figure 4.13. Natural and man-made features in Davenport Township.

Cass County Township Maps

DOWS

- ★ Villages
- Bridges (20'+)
- ✈ Commercial
- ✈ General Aviation
- ~ Rivers/Streams
- Drains
- ~ BNSF
- ~ RRV&W
- ~ CP Rail
- City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

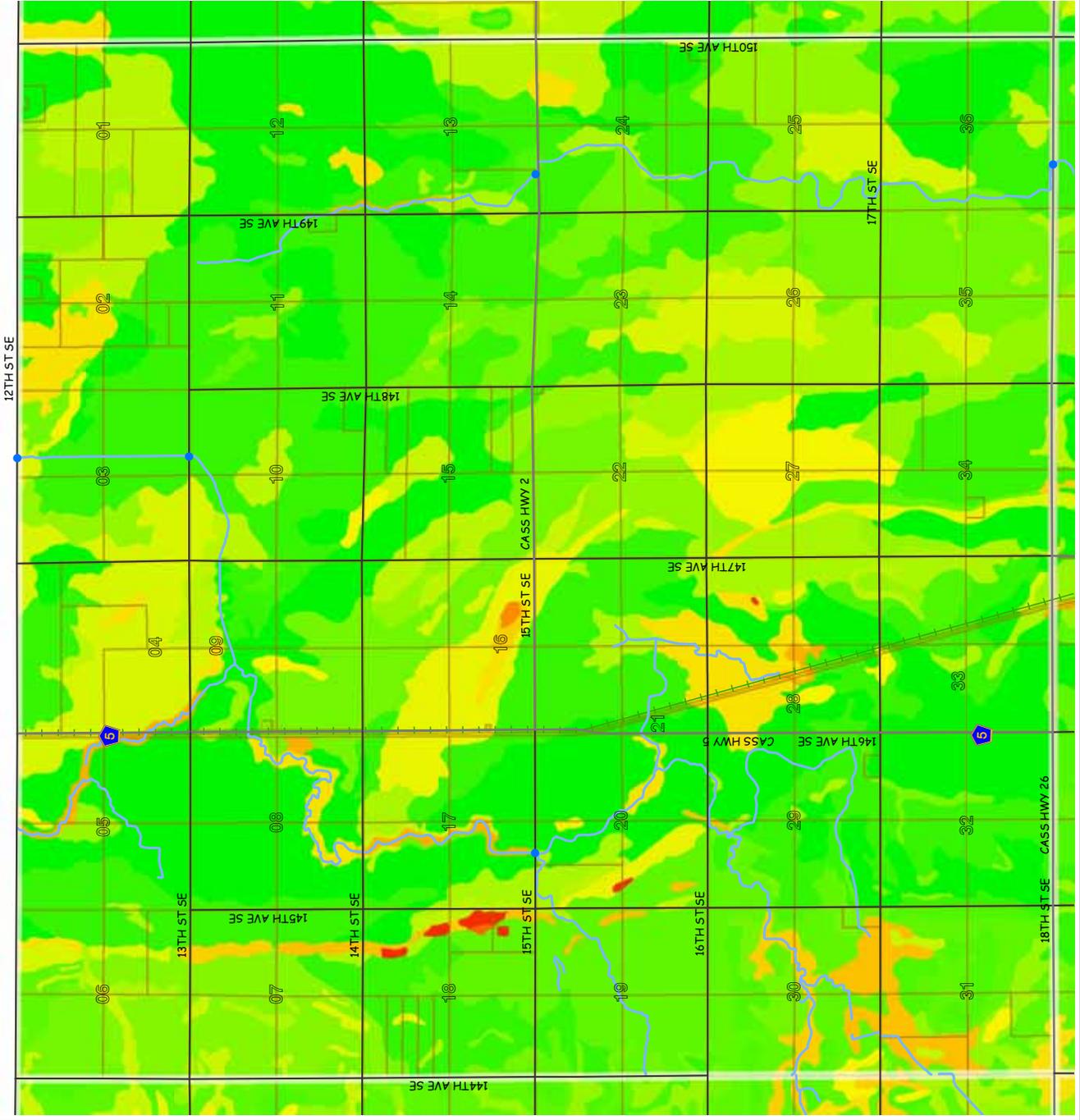
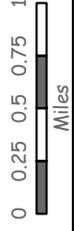
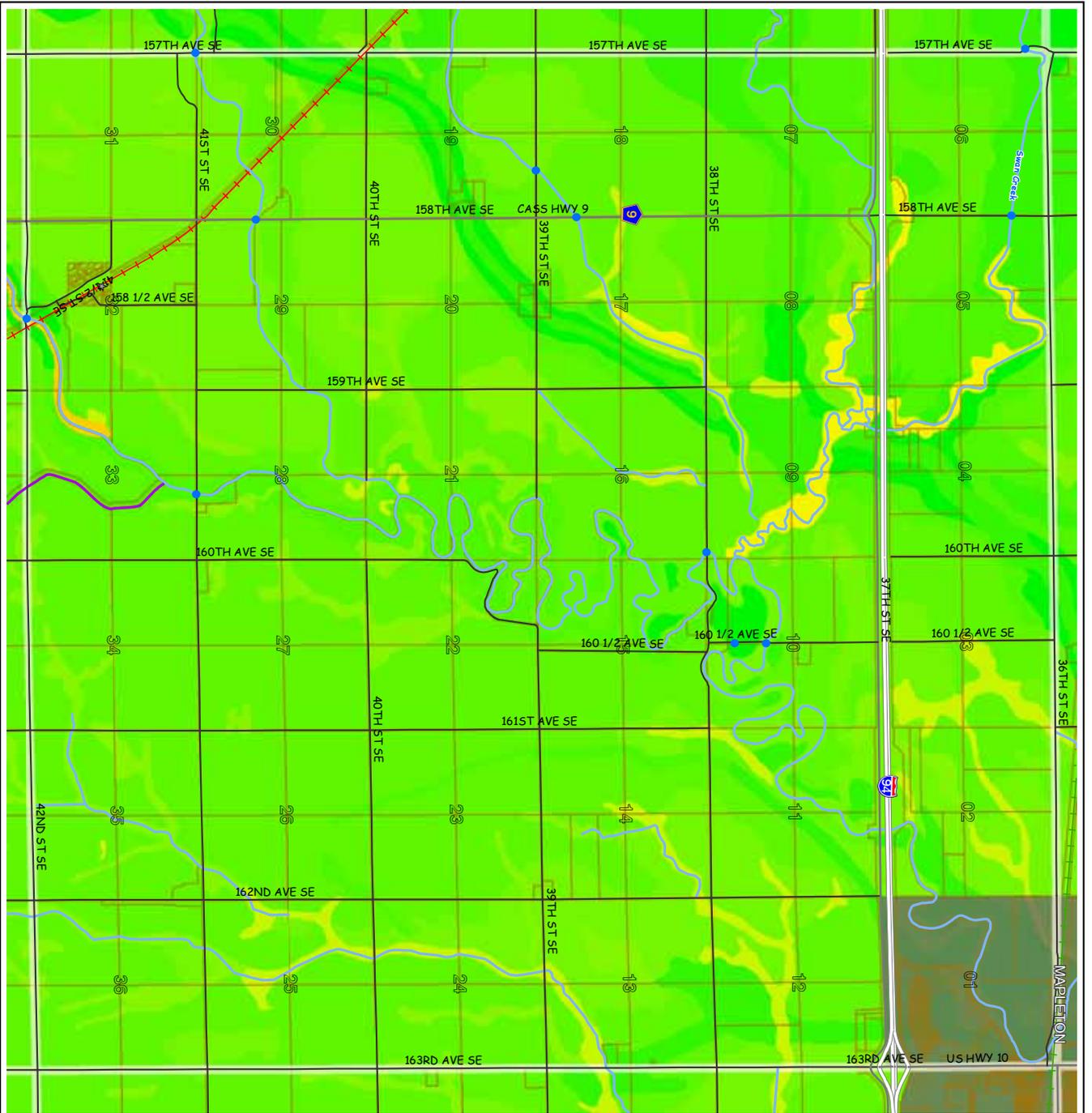


Figure 4.14. Natural and man-made features in Dows Township.



Cass County Township Maps

DURBIN

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

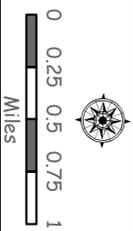


Figure 4.15. Natural and man-made features in Durbin Township.

Cass County Township Maps

ELDRED

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

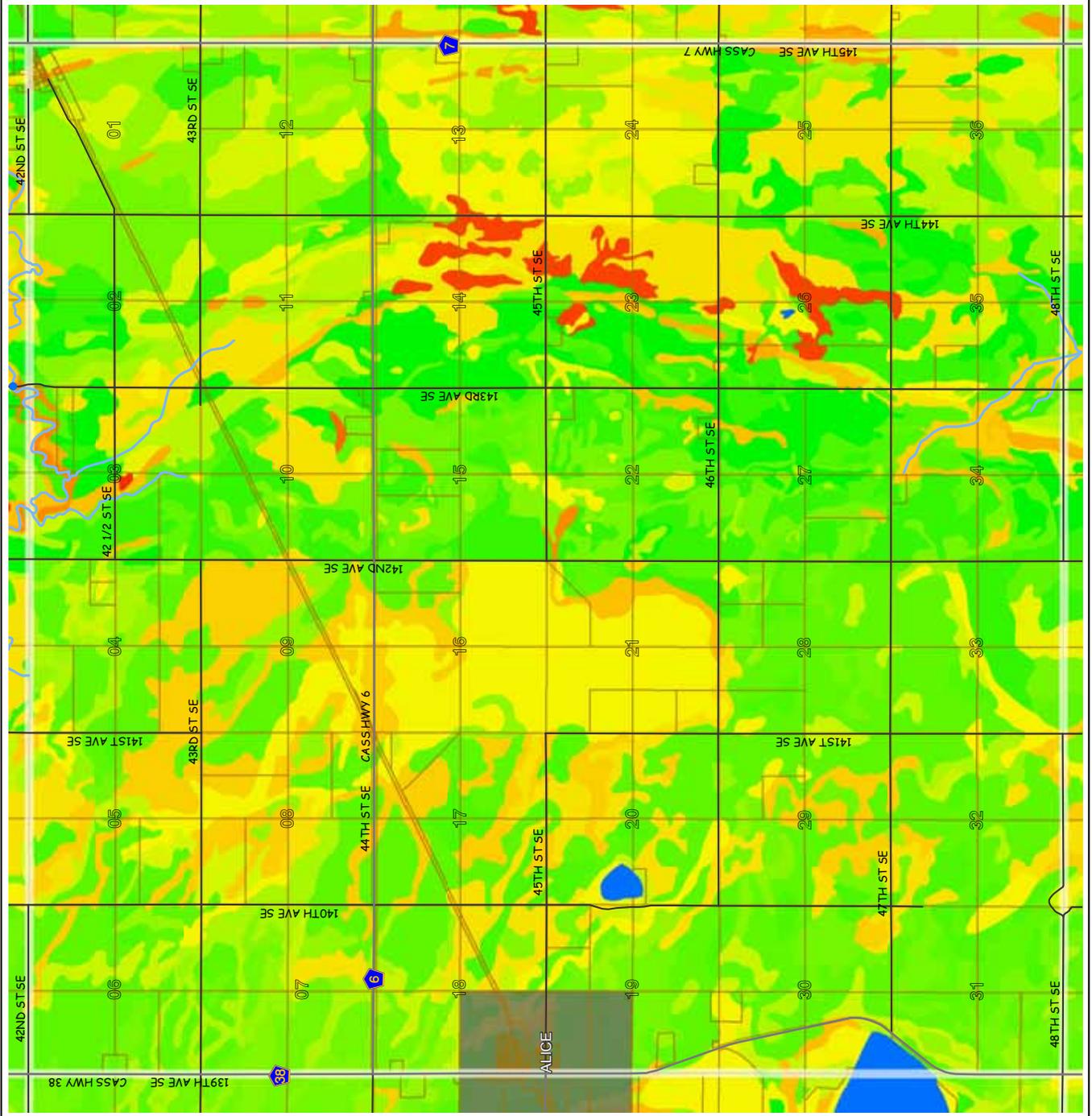
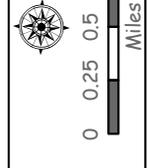
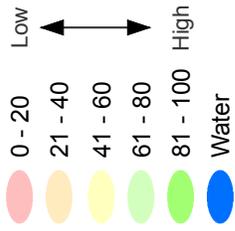
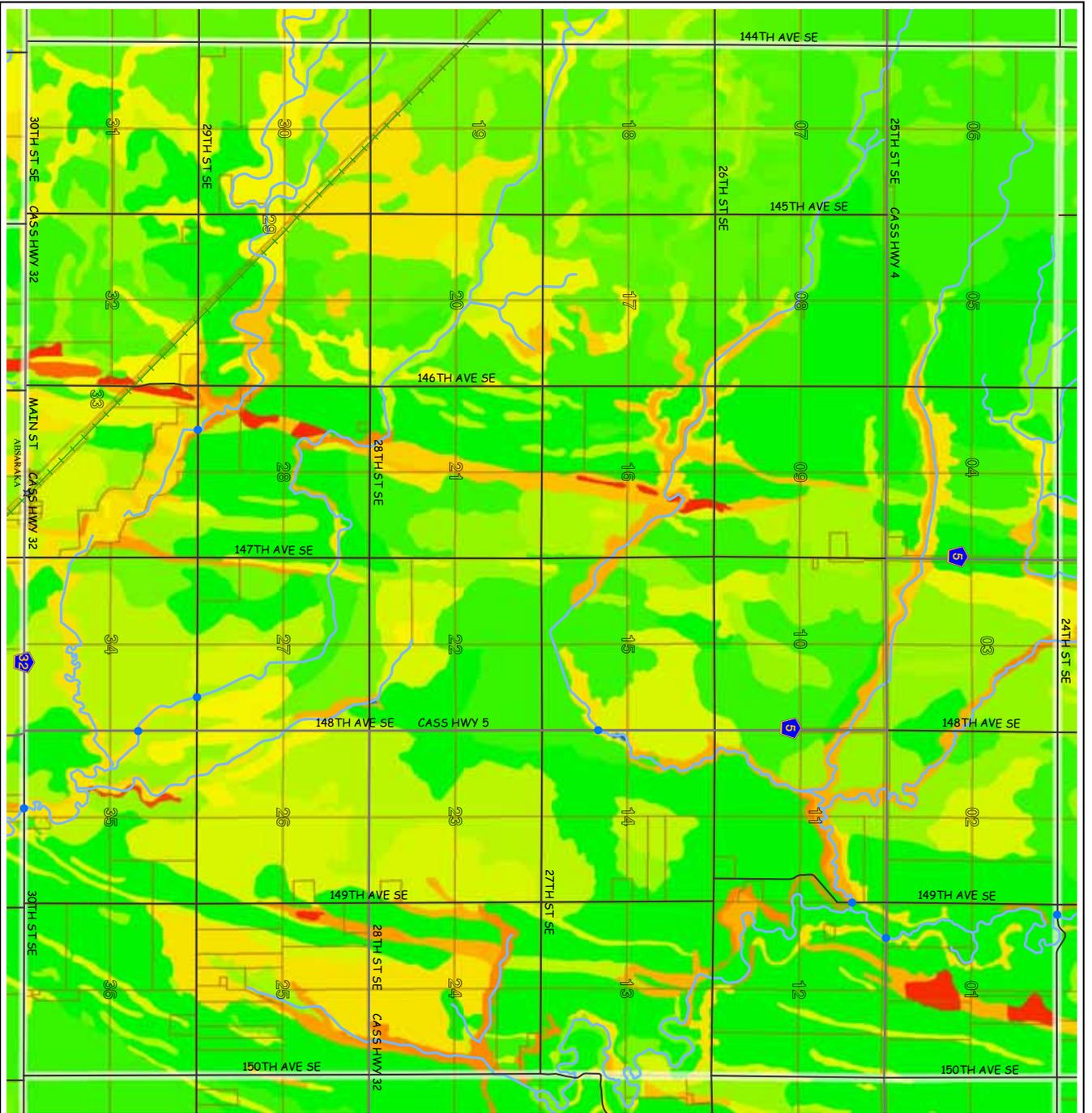


Figure 4.16. Natural and man-made features in Eldred Township.



**Cass County
Township Maps**

EMPIRE

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity**
- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

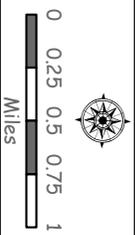


Figure 4.17 Natural and man-made features in Empire Township.

Cass County Township Maps

ERIE

- ★ Villages
- Bridges (20'+)
-  Commercial
-  General Aviation
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits

Farmland Productivity

-  0 - 20 Low
-  21 - 40
-  41 - 60
-  61 - 80
-  81 - 100 High
-  Water

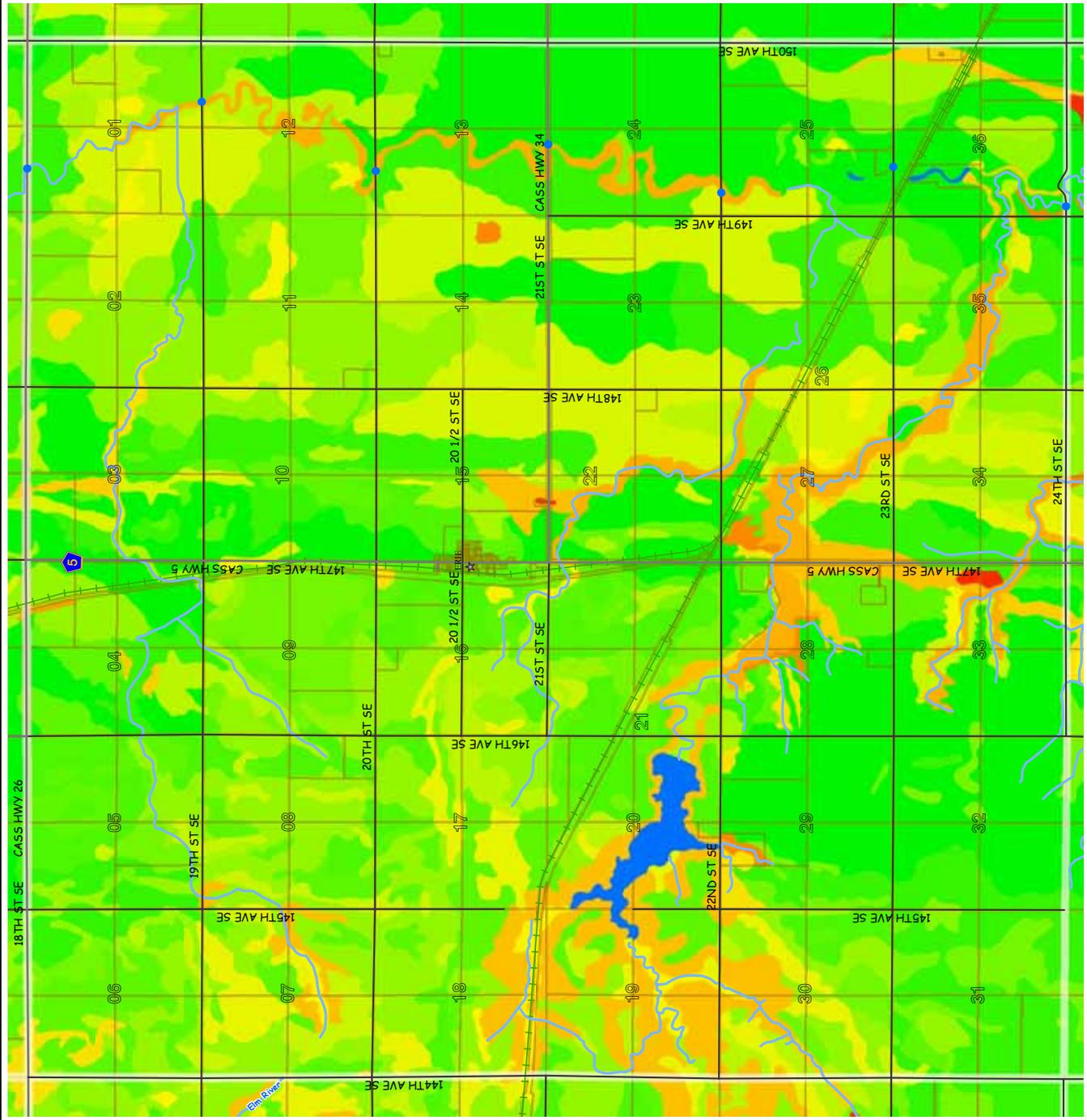
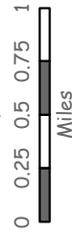
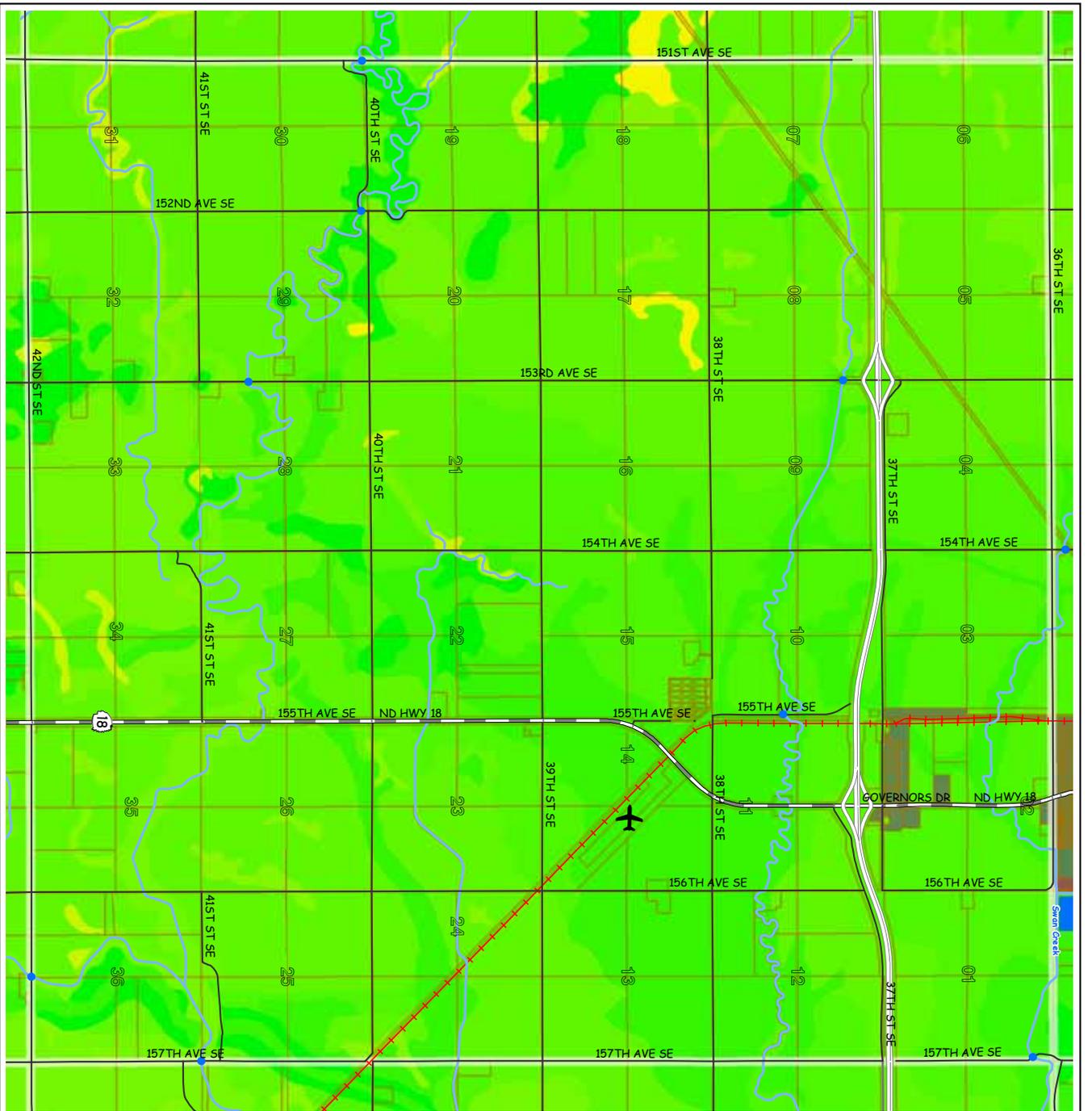


Figure 4.18. Natural and man-made features in Erie Township.



Cass County Township Maps

EVEREST

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity**
- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

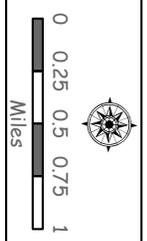


Figure 4.19. Natural and man-made features in Everest Township.

Cass County Township Maps

GARDNER

- ★ Villages
- Bridges (20'+)
-  Commercial
-  General Aviation
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits
- Farmland Productivity**
-  0 - 20 Low
-  21 - 40
-  41 - 60
-  61 - 80
-  81 - 100 High
-  Water

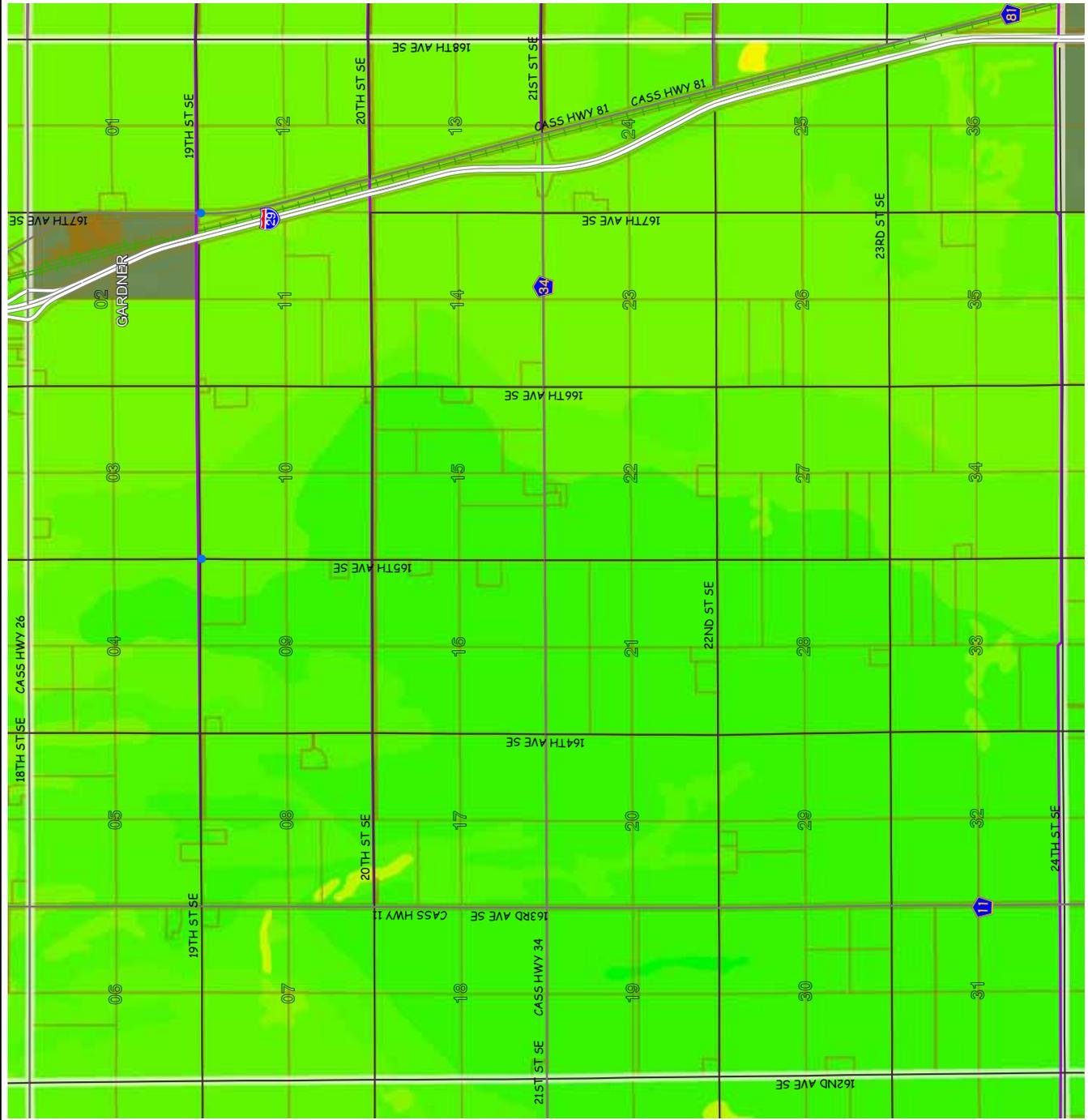
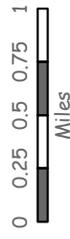
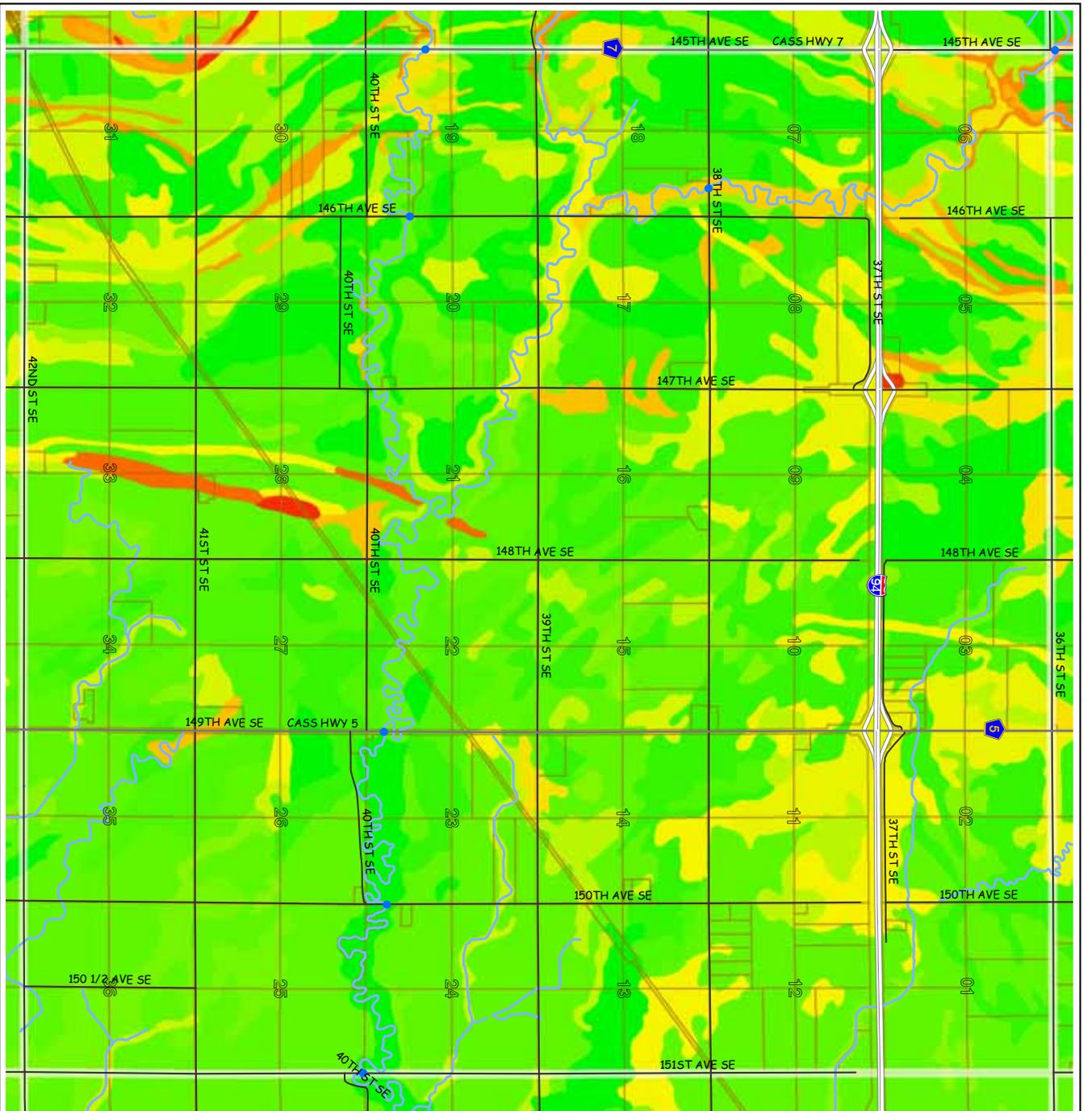


Figure 4.20. Natural and man-made features in Gardner Township.



Cass County Township Maps

GILL

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity**
- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

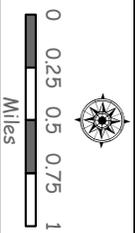


Figure 4.21. Natural and man-made features in Gill Township.

Cass County Township Maps

GUNKEL

- ★ Villages
- Bridges (20+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

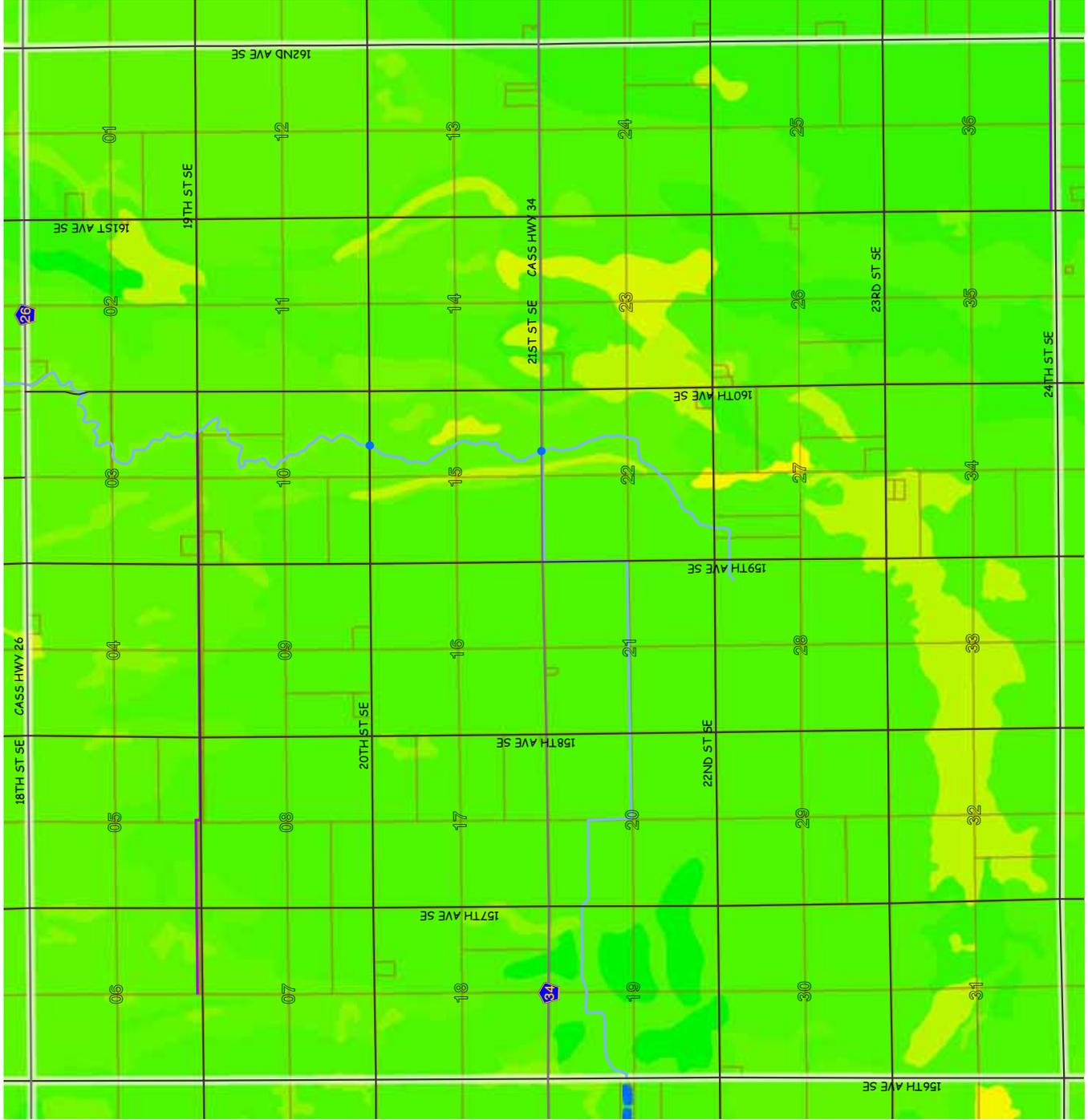
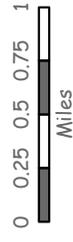
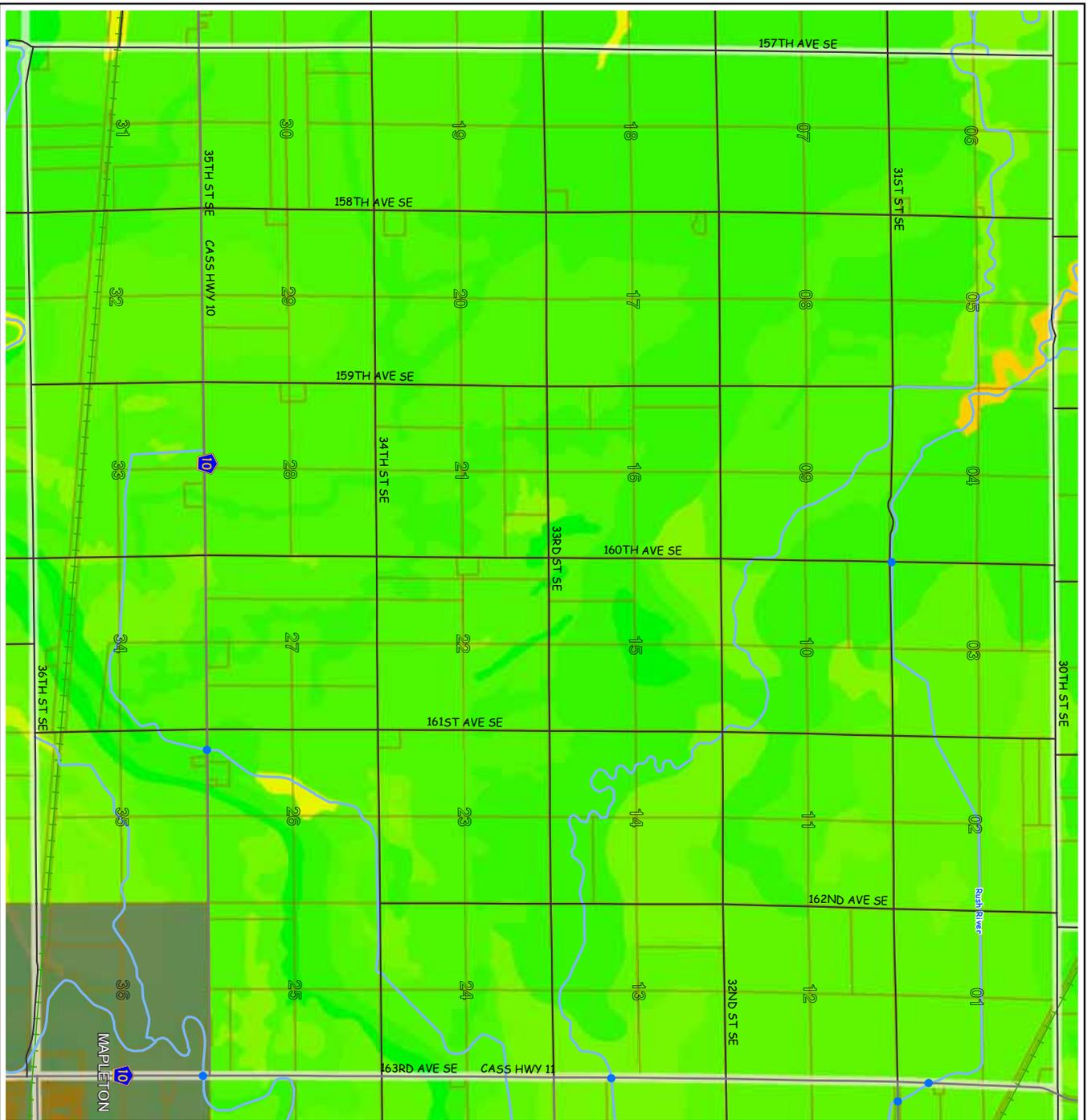


Figure 4.22. Natural and man-made features in Gunkel Township.



**Cass County
Township Maps**

HARMONY

- ★ Villages
- Bridges (20+)
- Commercial

General Aviation

Rivers/Streams

Drains

BNSF

RRV&W

CP Rail

City Limits

Farmland Productivity

- 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

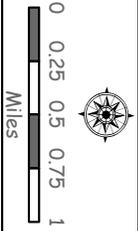


Figure 4.23. Natural and man-made features in Harmony Township.

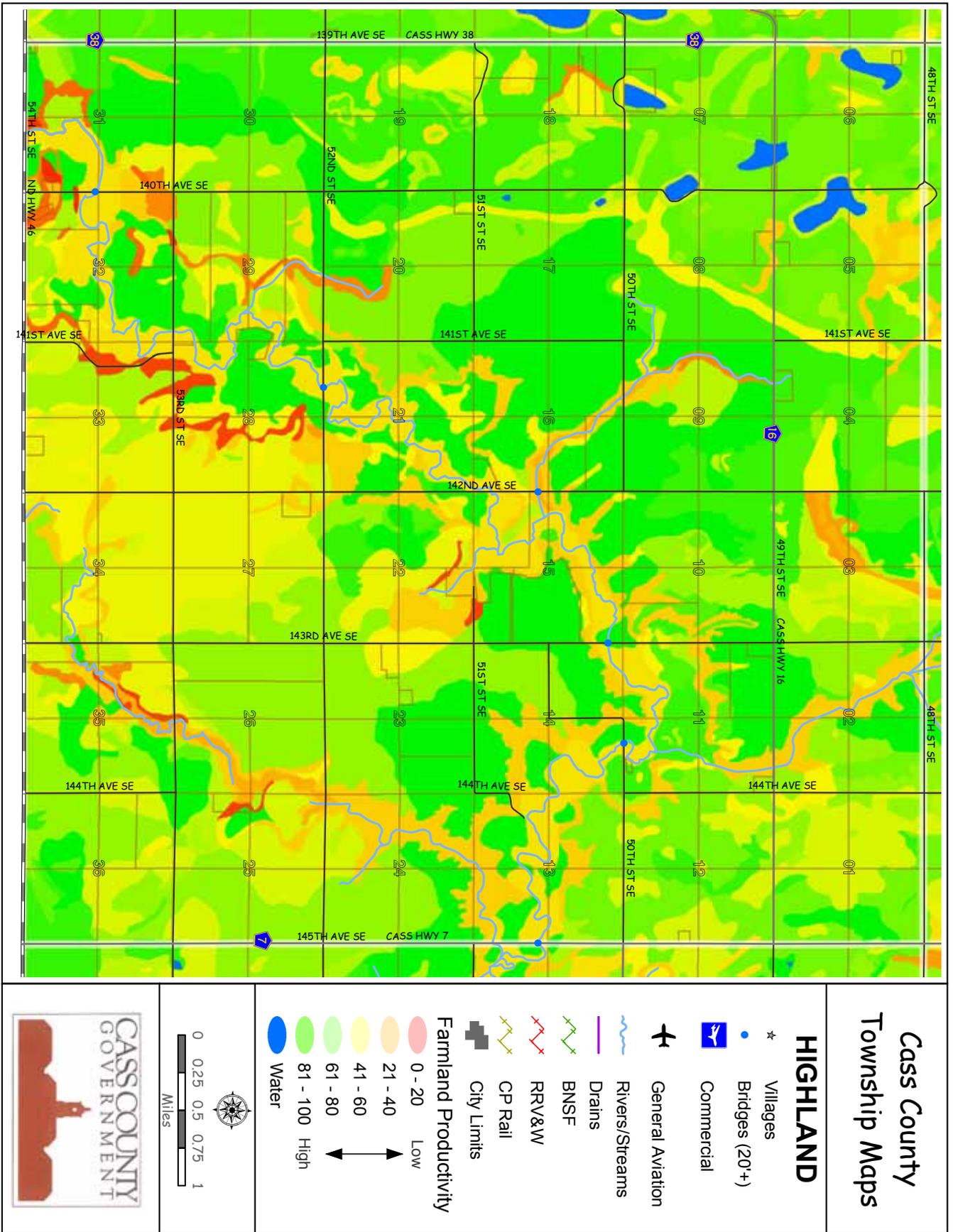


Figure 4.25. Natural and man-made features in Highland Township.

Cass County Township Maps

HILL

- ★ Villages
- Bridges (20+)
- 🏠 Commercial
- ✈ General Aviation
- 🌊 Rivers/Streams
- 📏 Drains
- 🚂 BNSF
- 🚂 RRV&W
- 🚂 CP Rail
- 🏠 City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- 💧 Water

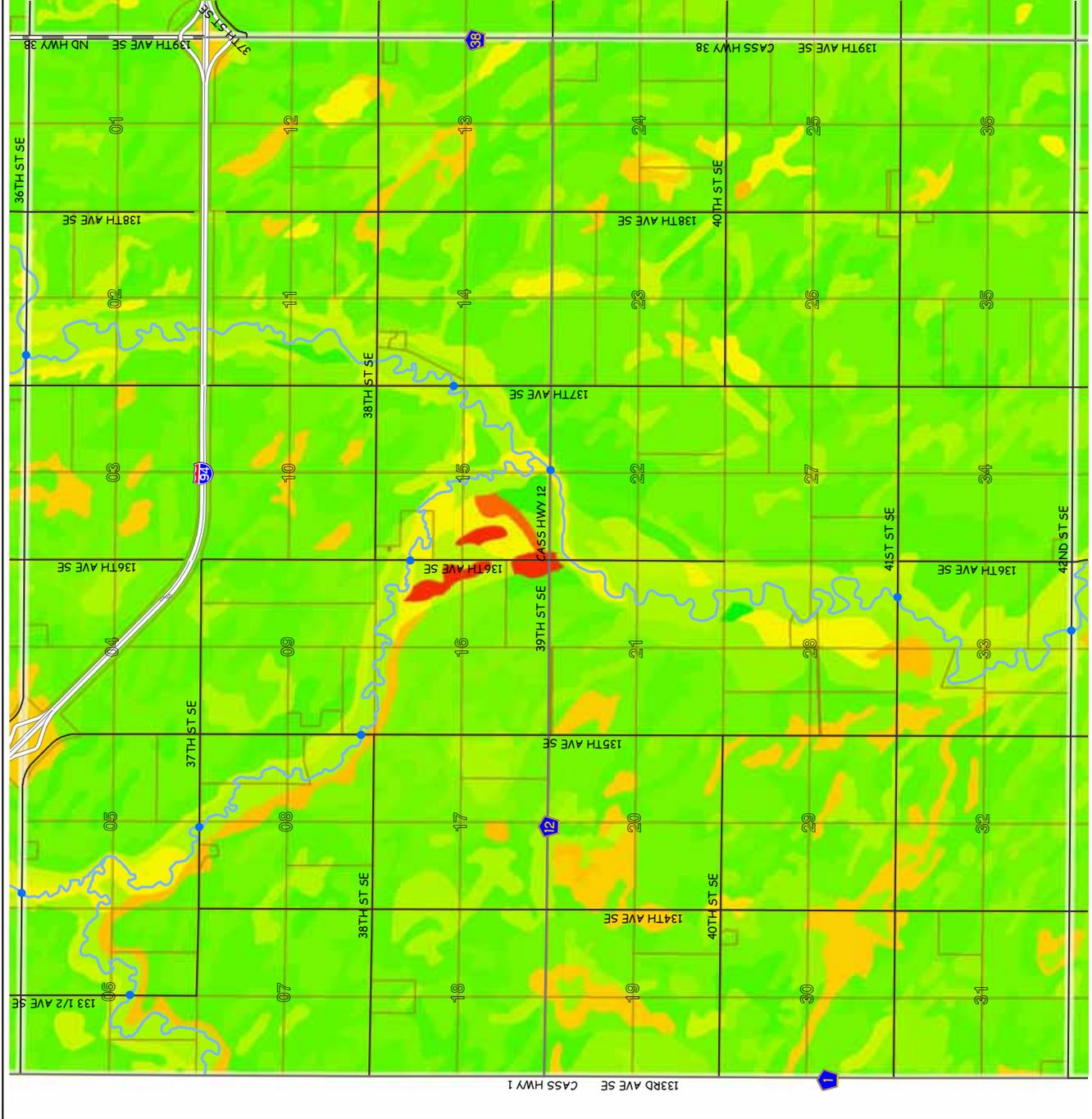
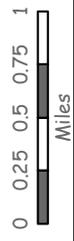
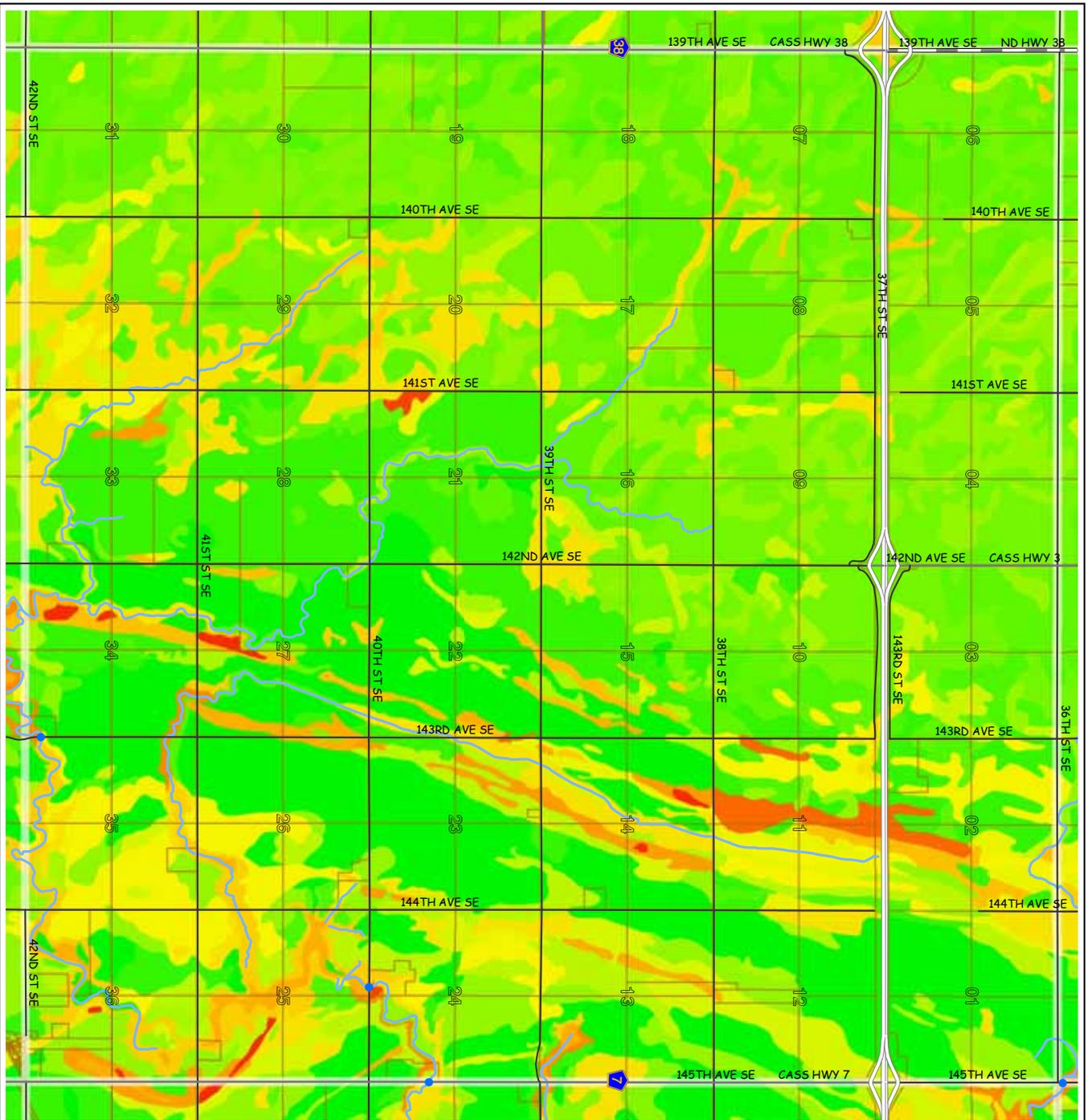


Figure 4.26. Natural and man-made features in Hill Township.



Cass County Township Maps

HOWES

- ★ Villages
- Bridges (20+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

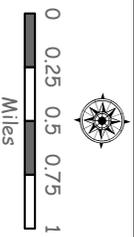


Figure 4.27. Natural and man-made features in Howes Township.

Cass County Township Maps

HUNTER

- ★ Villages
- Bridges (20+)
-  Commercial
-  General Aviation
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits

Farmland Productivity

-  0 - 20 Low
-  21 - 40
-  41 - 60
-  61 - 80
-  81 - 100 High
-  Water

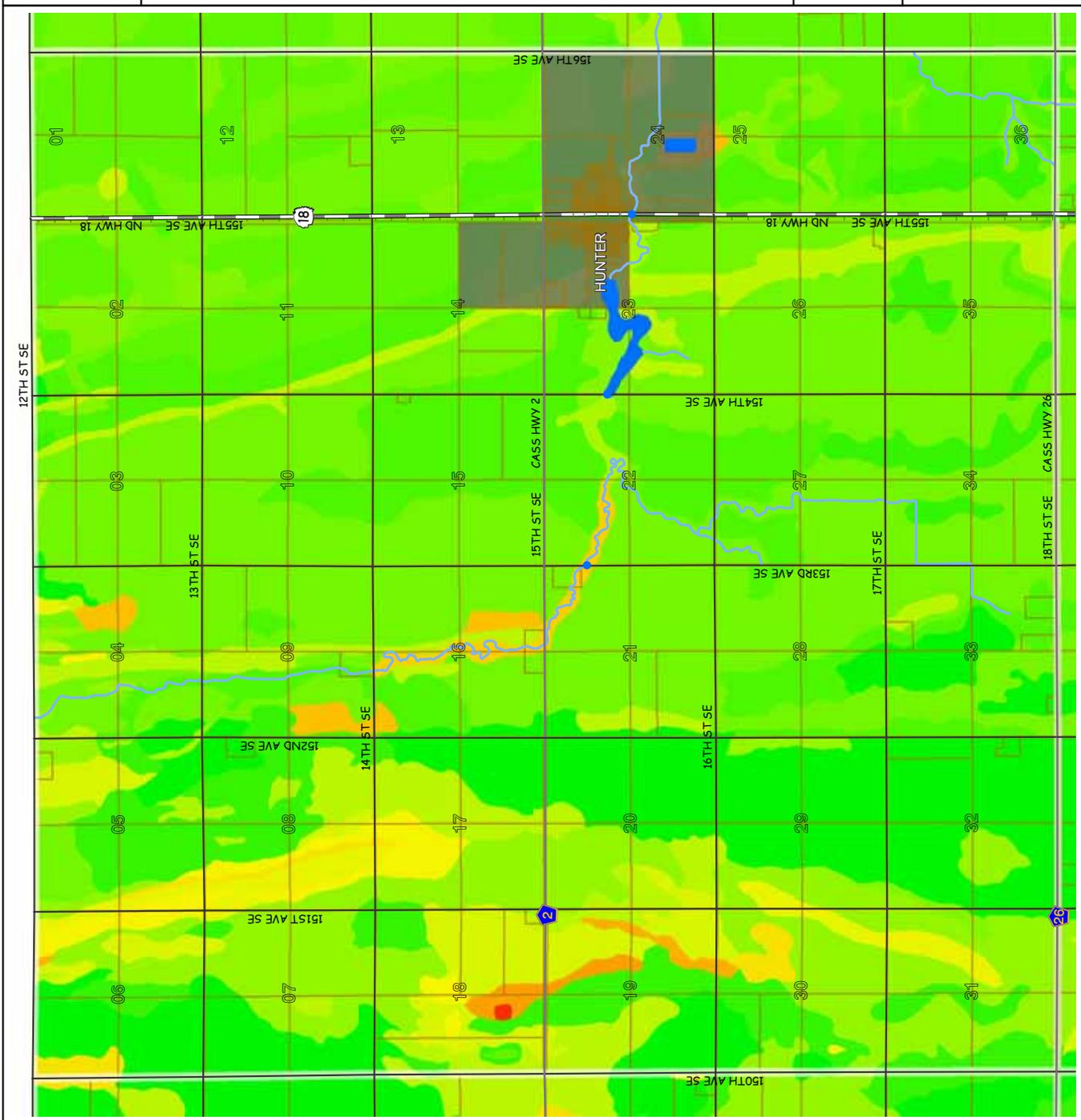
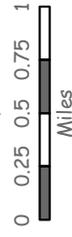
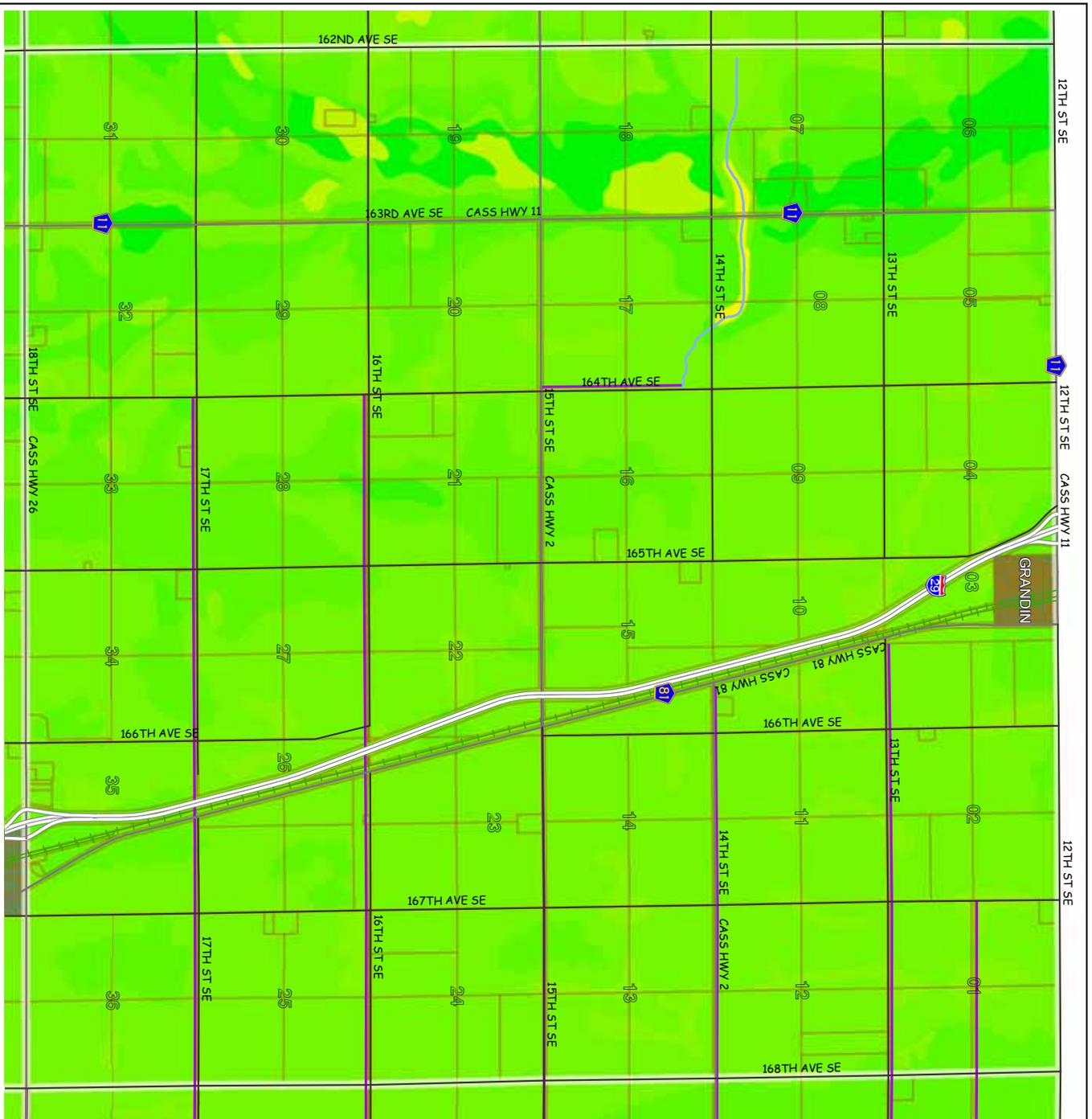


Figure 4.28. Natural and man-made features in Hunter Township.



Cass County Township Maps

KINYON

- ★ Villages
- Bridges (20+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

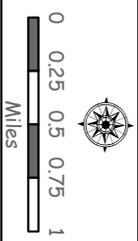
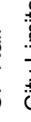
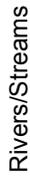
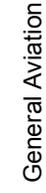


Figure 4.29. Natural and man-made features in Kinyon Township.

Cass County Township Maps

LAKE

- ★ Villages
- Bridges (20'+)
- Commercial



Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

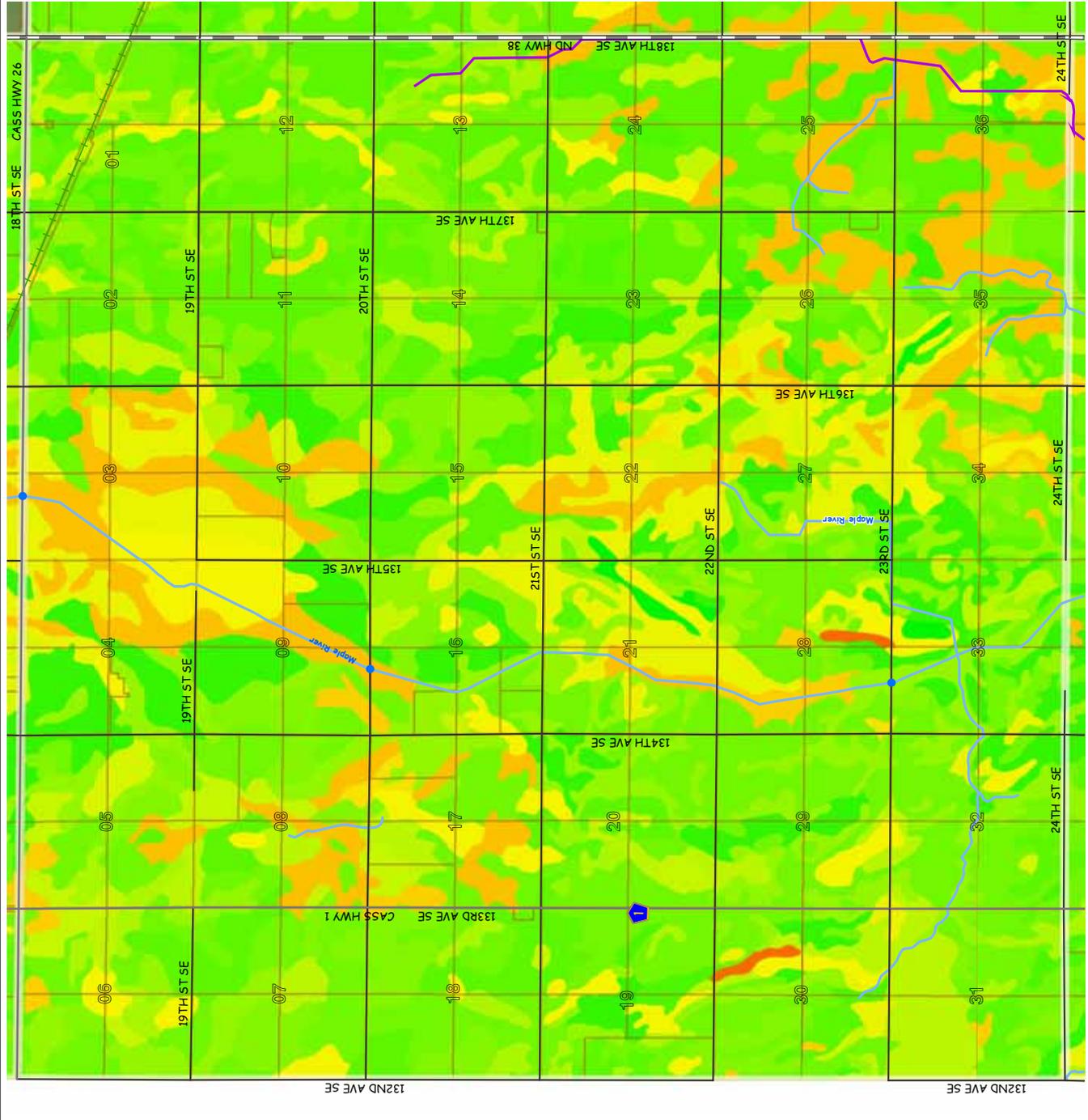
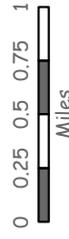
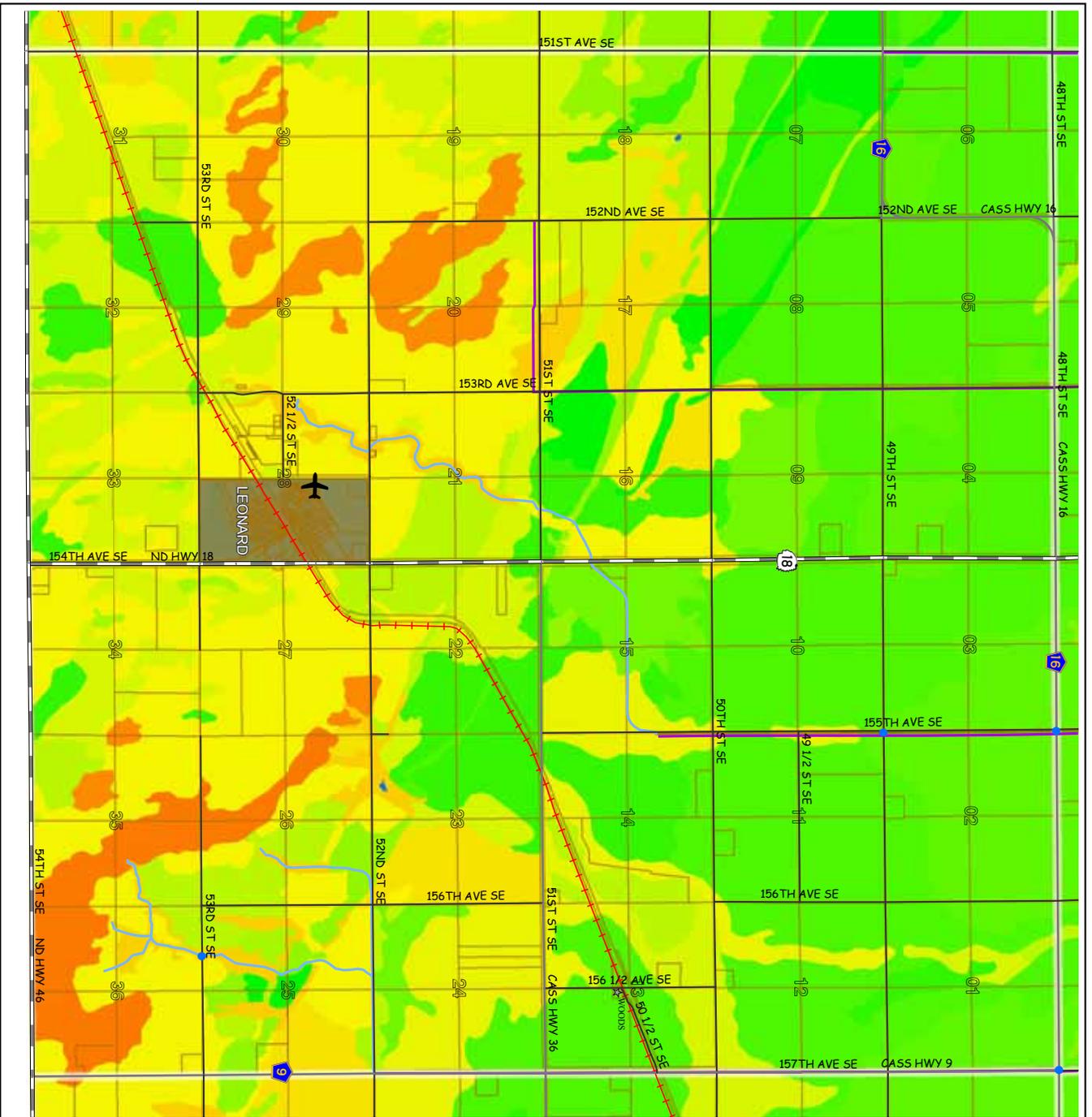


Figure 4.30. Natural and man-made features in Lake Township.



Cass County Township Maps

LEONARD

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity**
- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

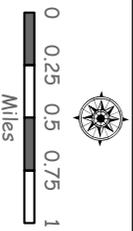


Figure 4.31. Natural and man-made features in Leonard Township.

Cass County Township Maps

MAPLE RIVER

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

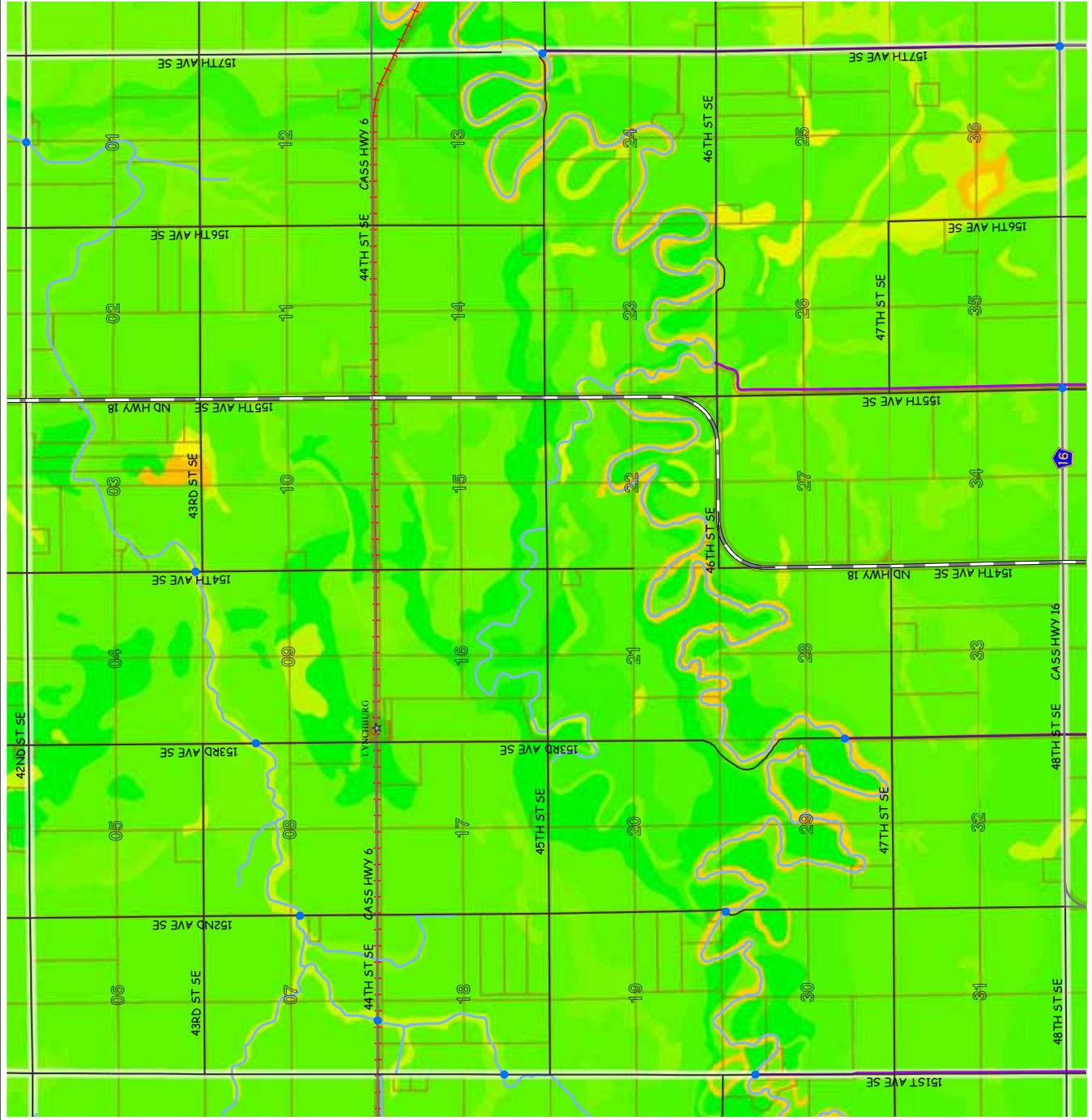
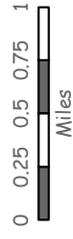
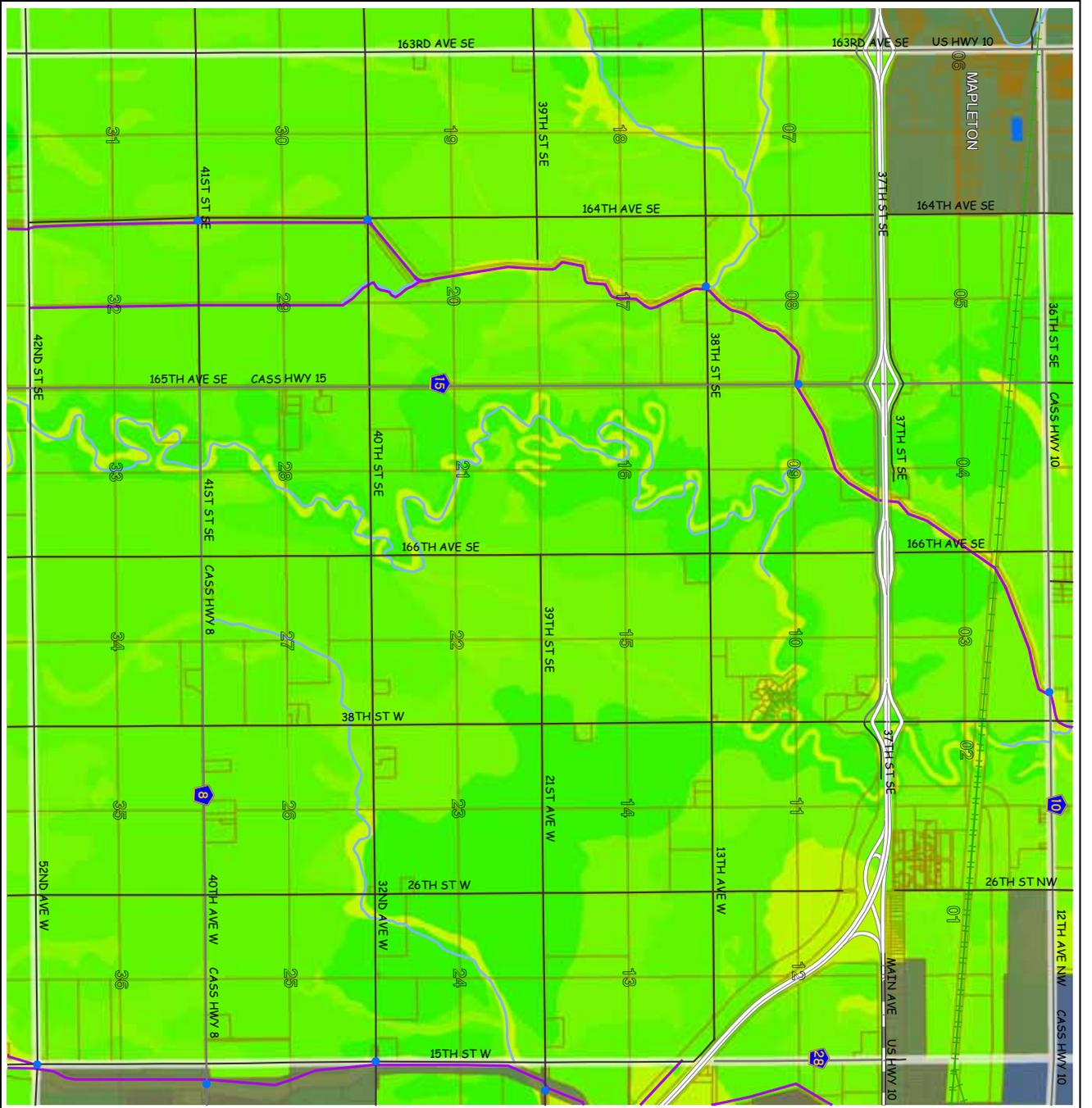


Figure 4.32. Natural and man-made features in Maple River Township.



Cass County Township Maps

MAPLETON

- ★ Villages
- Bridges (20+)
- Commercial

✈ General Aviation

Rivers/Streams

Drains

BNSF

RRV&W

CP Rail

City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

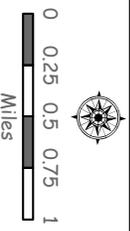


Figure 4.33. Natural and man-made features in Mapleton Township.

Cass County Township Maps

NOBLE

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

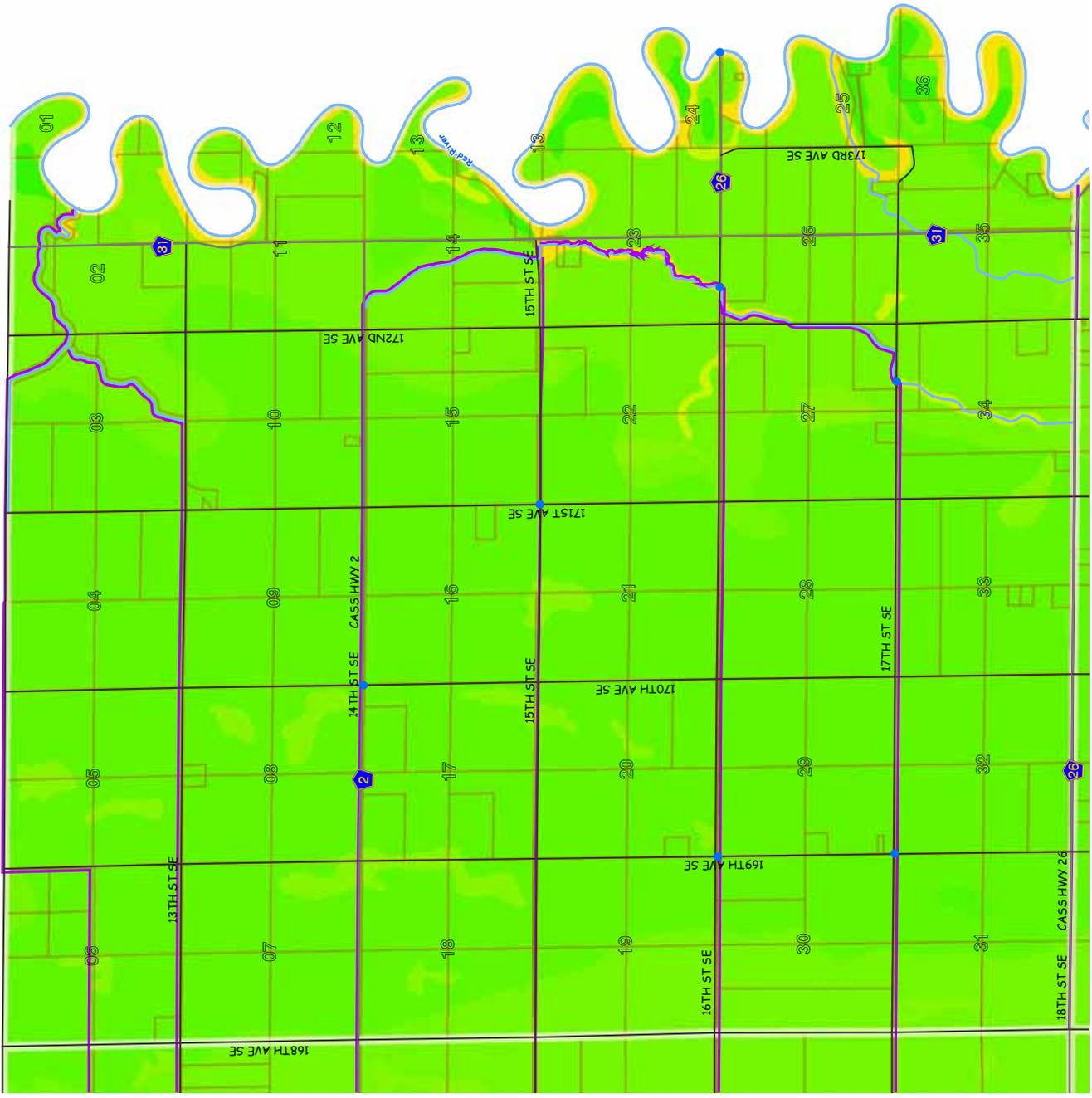
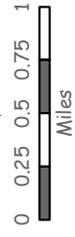
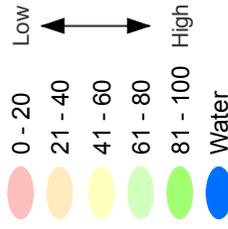
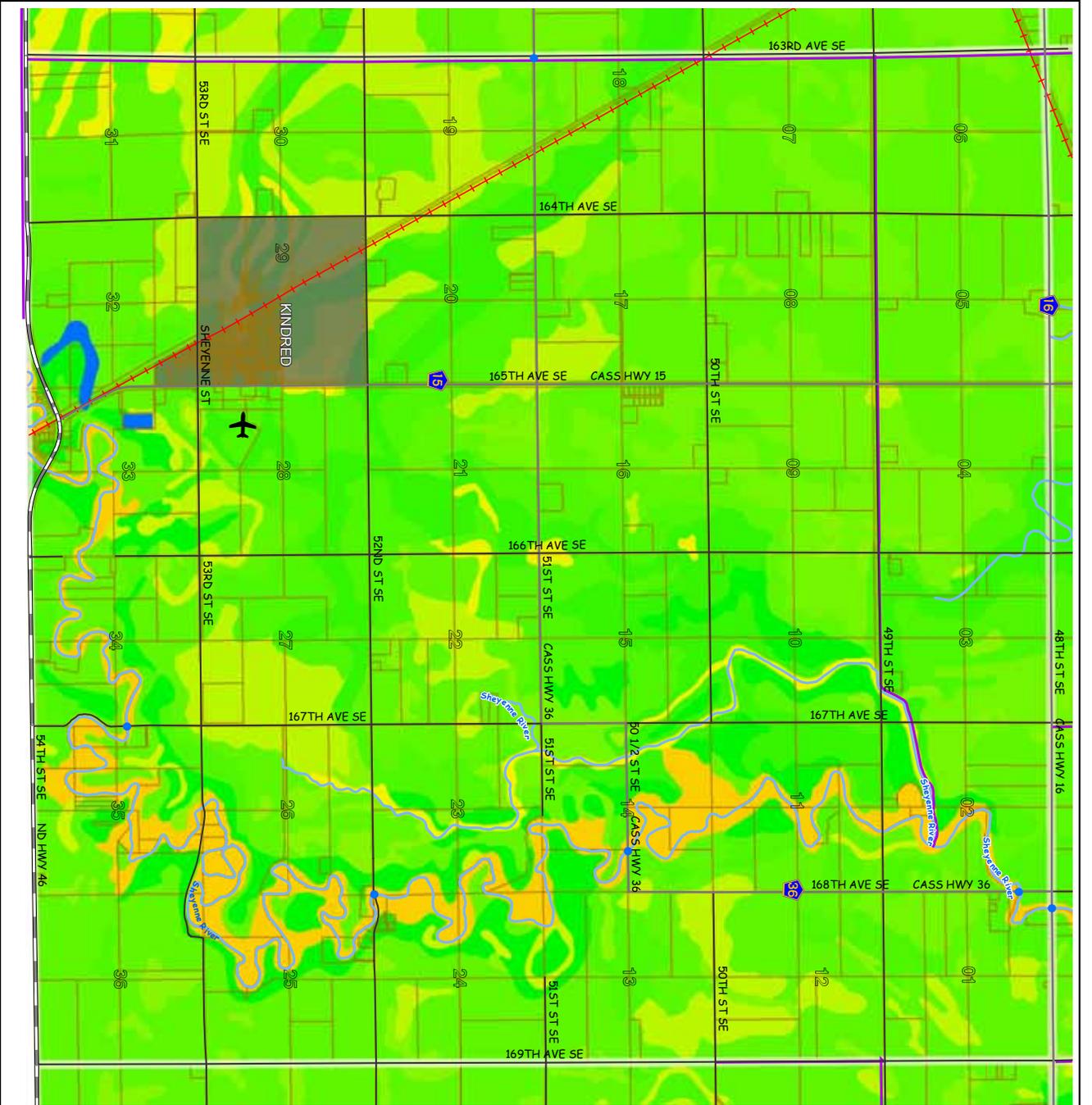


Figure 4.34. Natural and man-made features in Noble Township.



Cass County Township Maps

NORMANNA

- ★ Villages
- Bridges (20'+)
- Commercial

- ✈ General Aviation

- Rivers/Streams

- Drains

- BNSF

- RRV&W

- CP Rail

- City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High

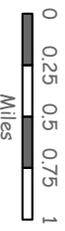


Figure 4.35. Natural and man-made features in Normanna Township.

Cass County Township Maps

PAGE

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

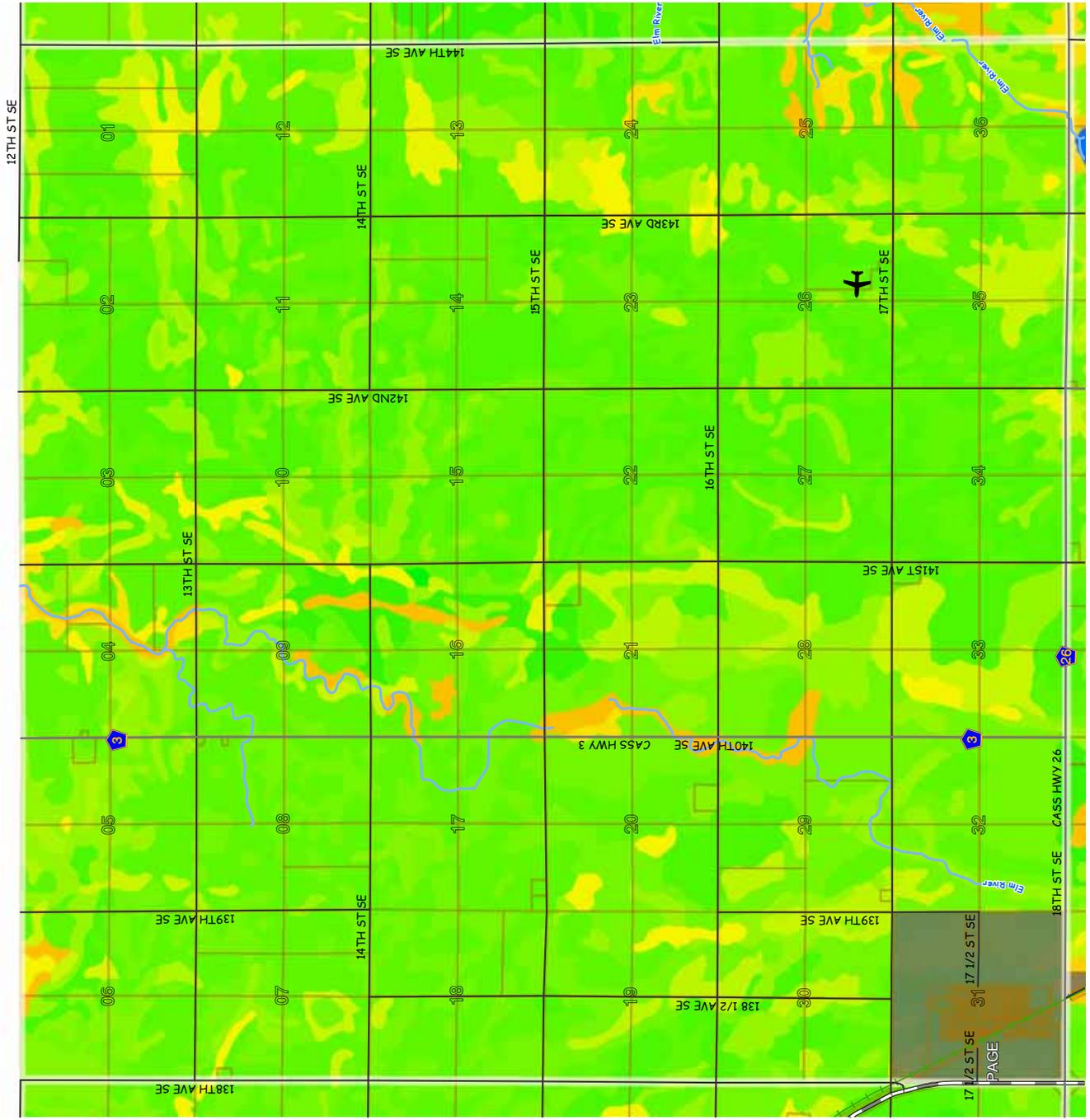
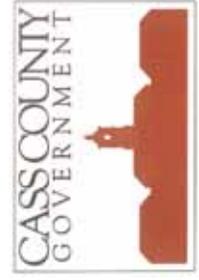
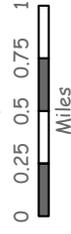
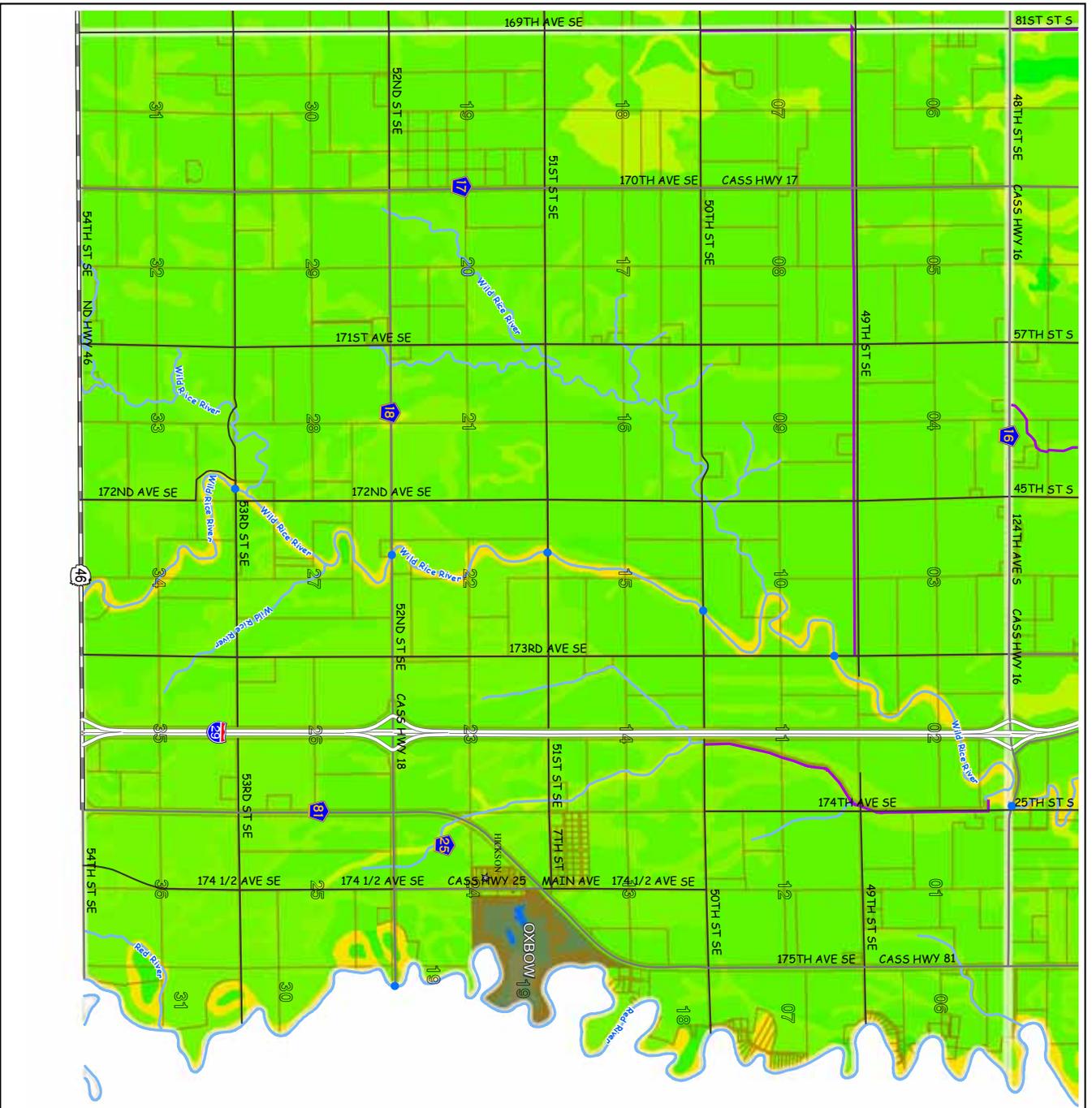


Figure 4.36. Natural and man-made features in Page Township.



Cass County
Township Maps

PLEASANT

- ★ Villages
- Bridges (20'+)
- Commercial

- ✈ General Aviation

- Rivers/Streams

- Drains

- BNSF

- RRV&W

- CP Rail

- City Limits

- Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water

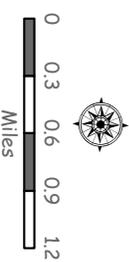


Figure 4.37. Natural and man-made features in Pleasant Township.

Cass County Township Maps

PONTIAC

- ★ Villages
- Bridges (20+)
-  Commercial
-  General Aviation
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits

Farmland Productivity

-  0 - 20 Low
-  21 - 40
-  41 - 60
-  61 - 80
-  81 - 100 High
-  Water

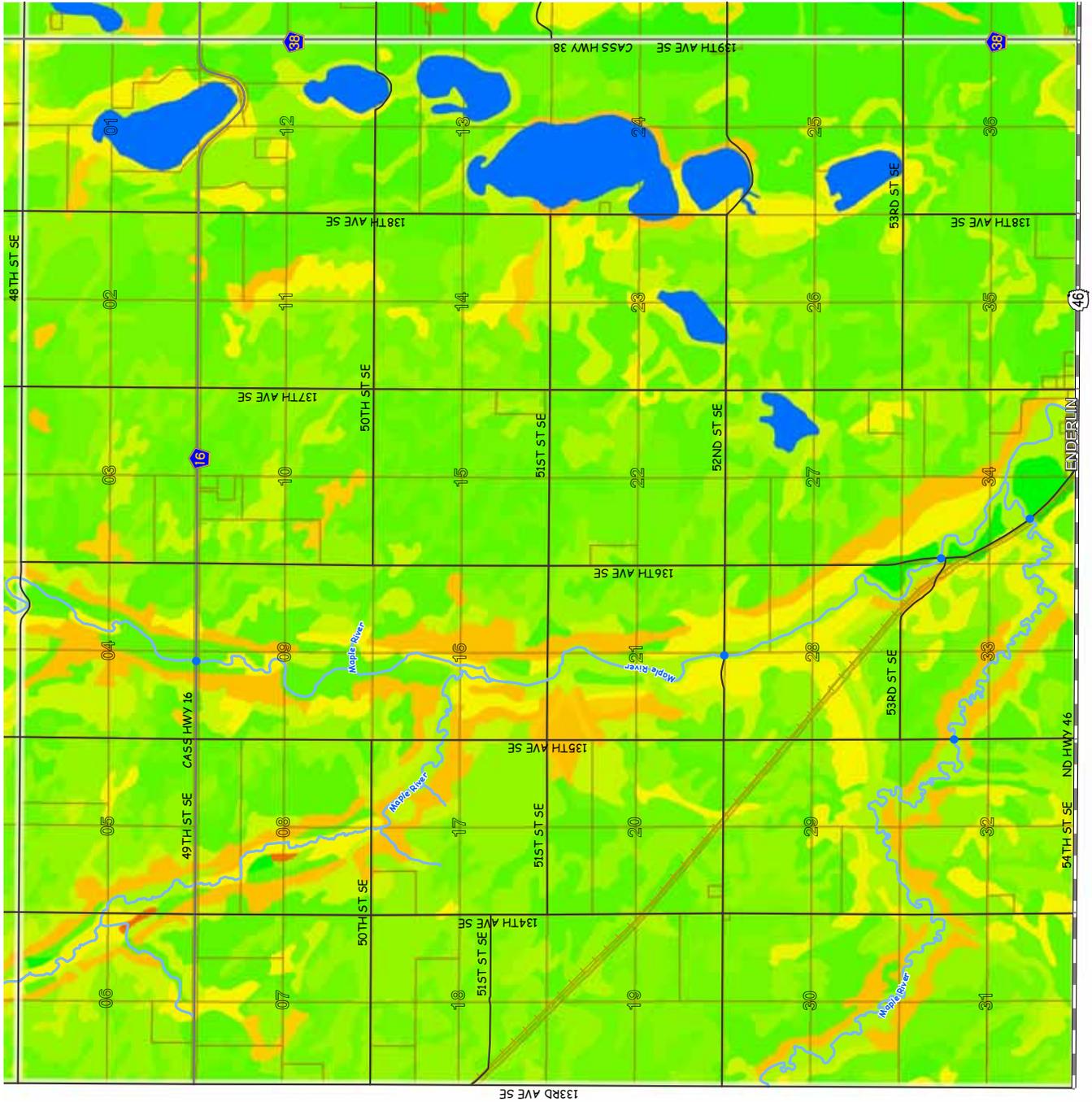
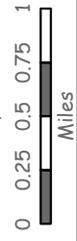
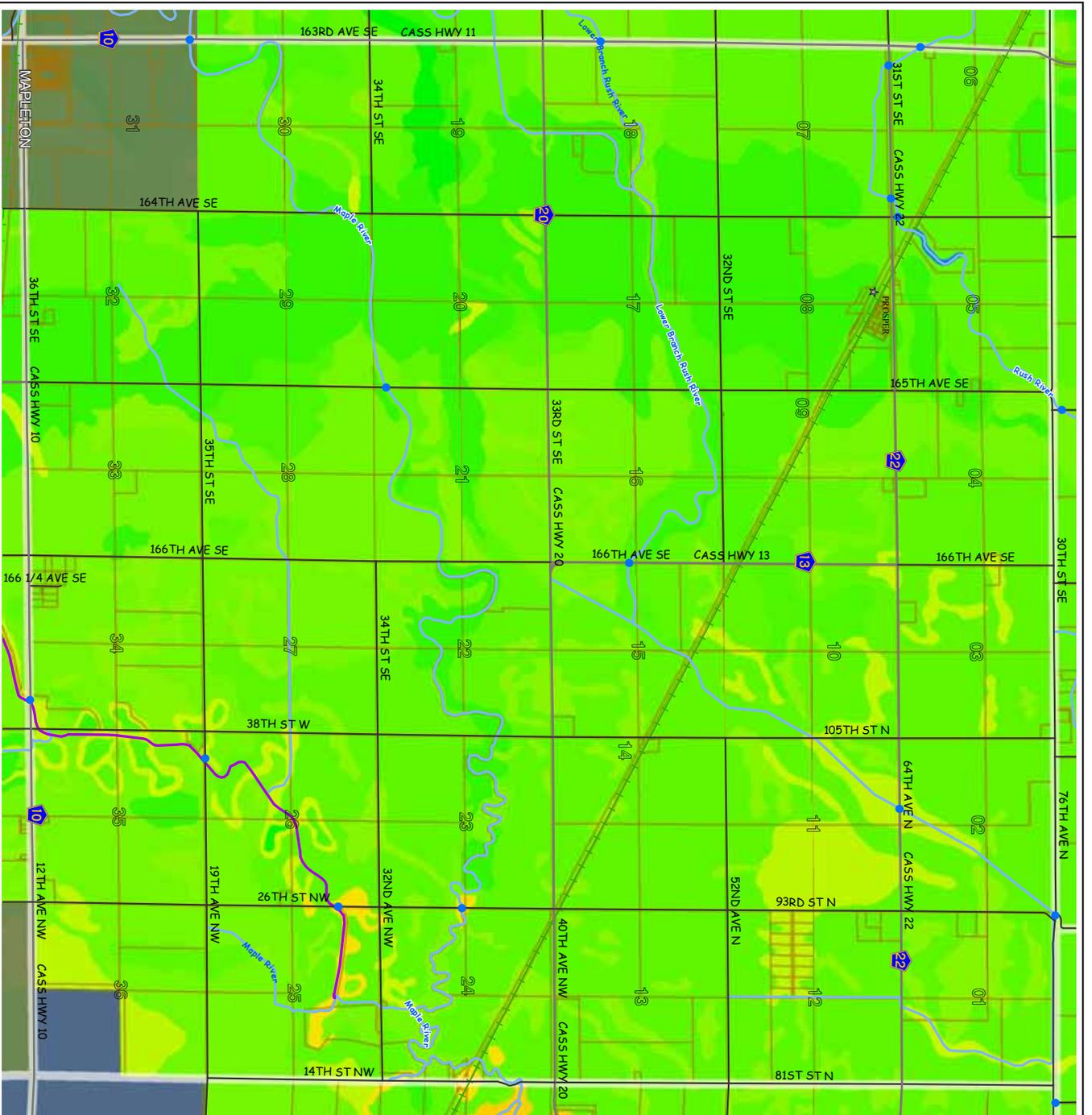


Figure 4.38. Natural and man-made features in Pontiac Township.



Cass County Township Maps

RAYMOND

- ★ Villages
 - Bridges (20+)
 - Commercial
 - General Aviation
 - Rivers/Streams
 - Drains
 - BNSF
 - RRV&W
 - CP Rail
 - City Limits
- Farmland Productivity**
- 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

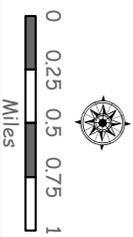


Figure 4.39. Natural and man-made features in Raymond Township

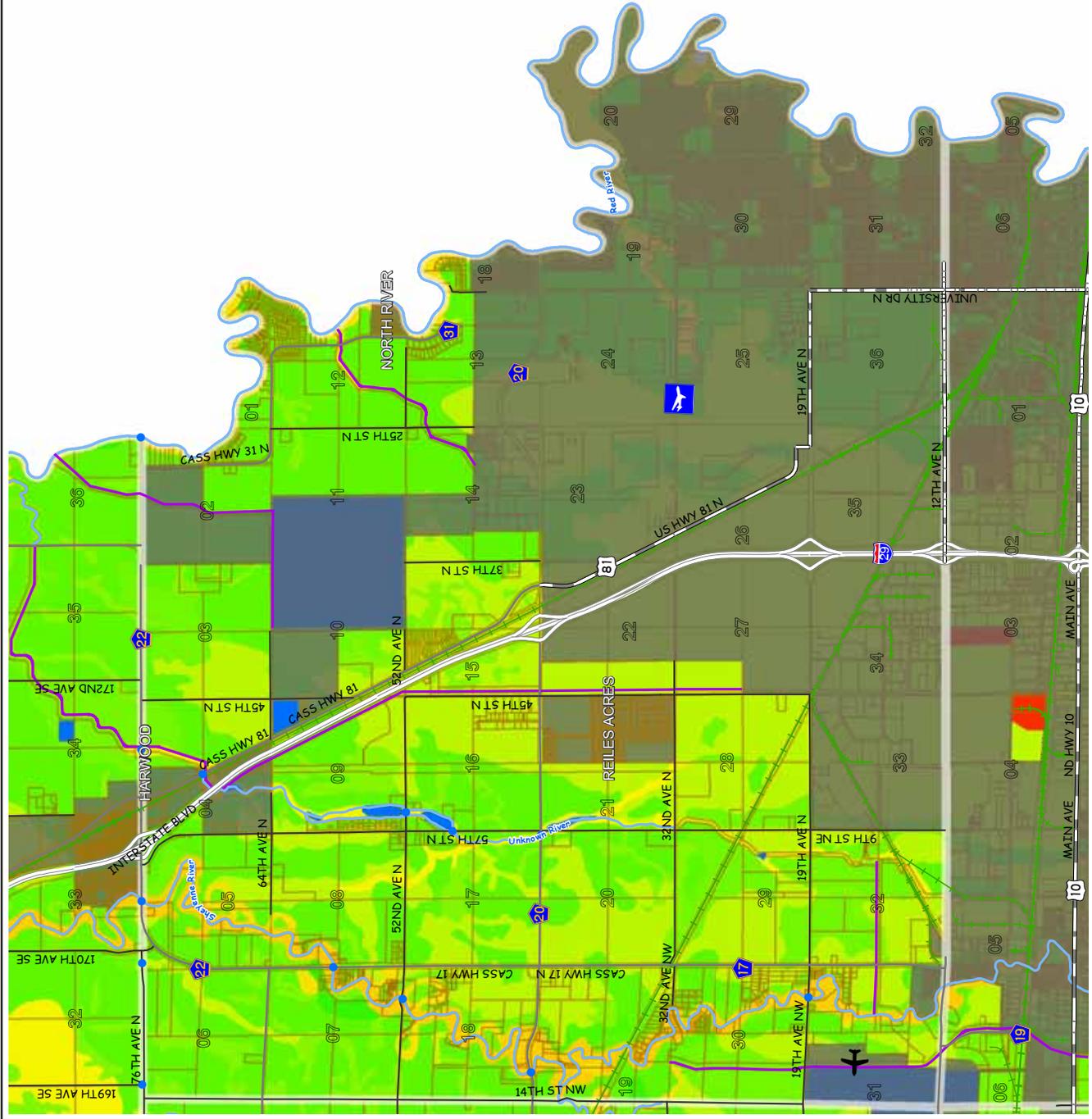
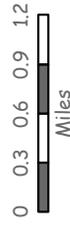
Cass County Township Maps

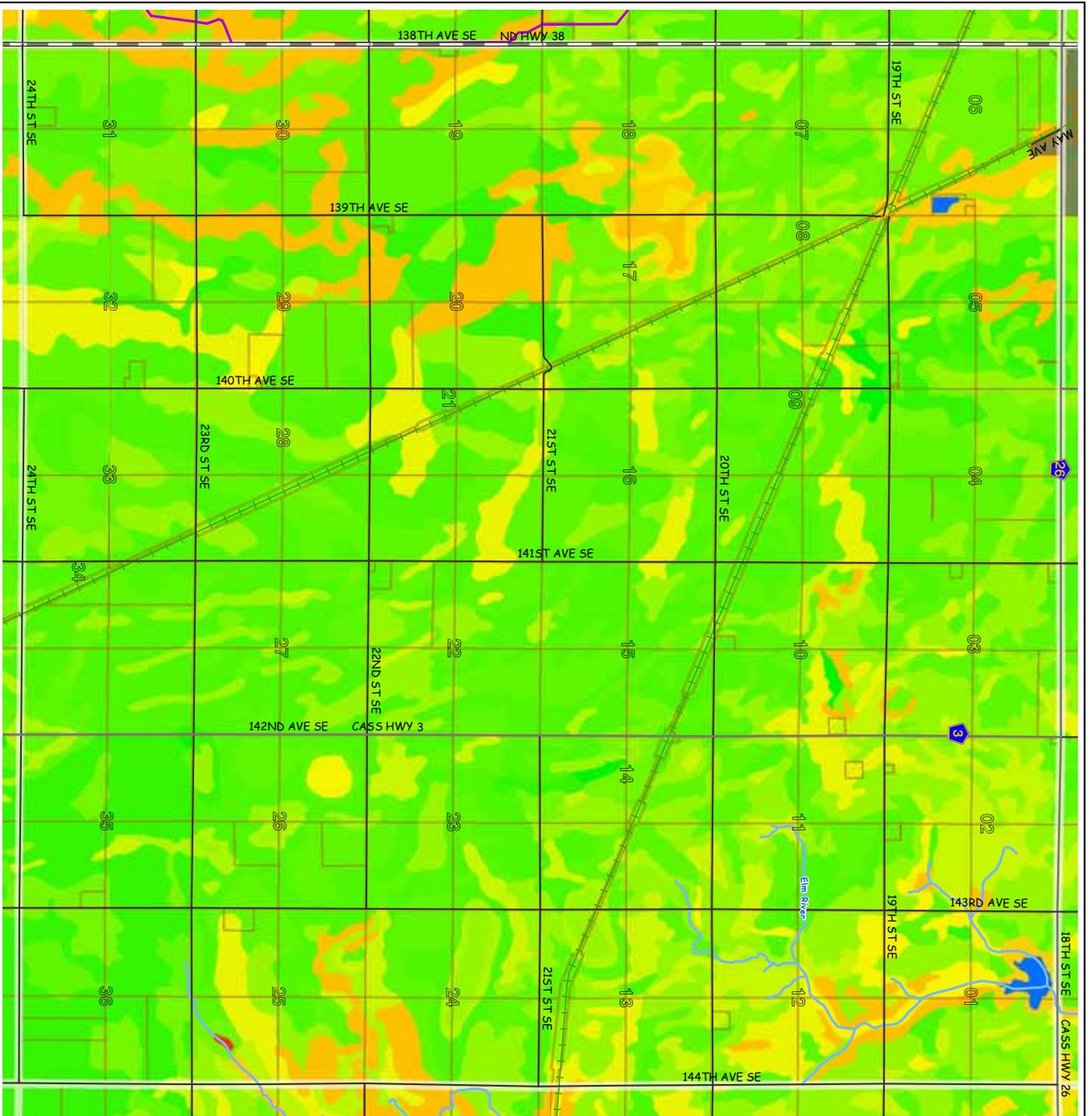
REED

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

- 0 - 20 Low
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100 High
- Water





Cass County Township Maps

RICH

- ★ Villages
- Bridges (20'+)
- Commercial
- ✈ General Aviation
- ~ Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

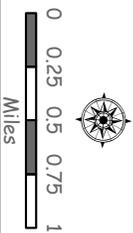


Figure 4.41. Natural and man-made features in Rich Township

Cass County Township Maps

ROCHESTER

- ★ Villages
- Bridges (20'+)
-  Commercial
-  General Aviation
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits

Farmland Productivity

-  0 - 20 Low
-  21 - 40
-  41 - 60
-  61 - 80
-  81 - 100 High
-  Water

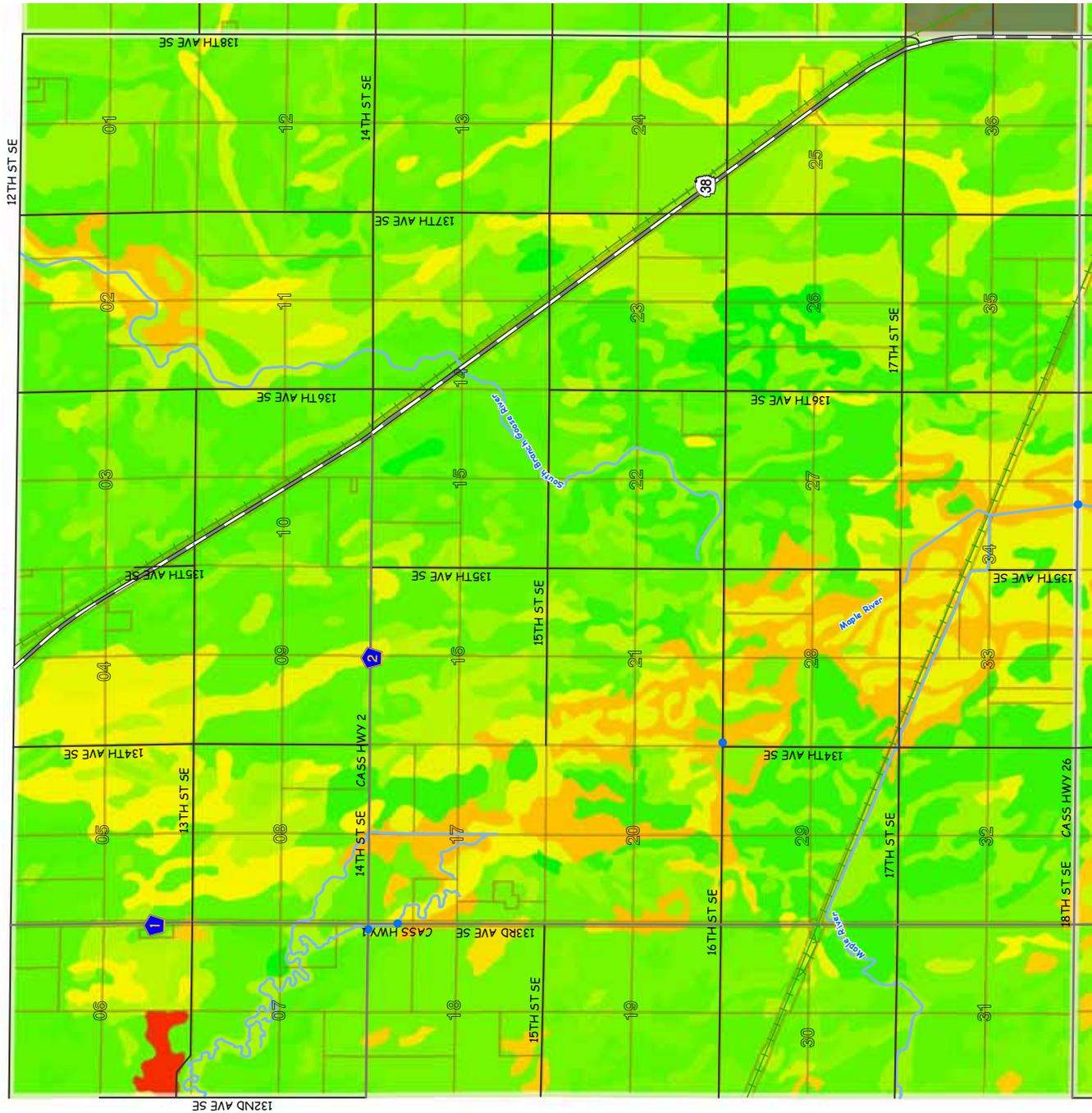
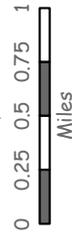
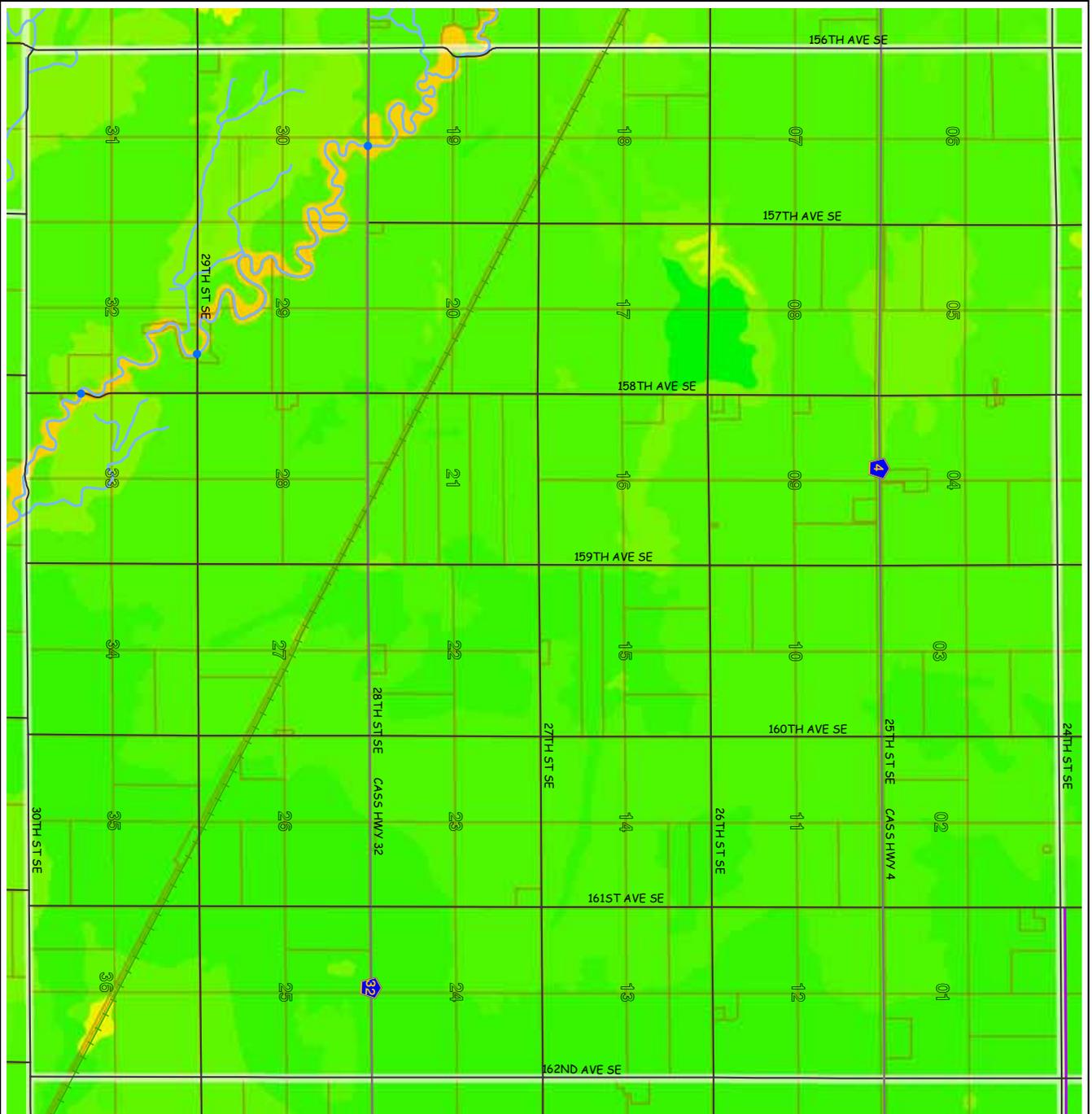


Figure 4.42. Natural and man-made features in Rochester Township.



**Cass County
Township Maps**

RUSH RIVER

- ★ Villages
- Bridges (20'+)
- Commercial

General Aviation

Rivers/Streams

Drains

BNSF

RRV&W

CP Rail

City Limits

Farmland Productivity

0 - 20 Low

21 - 40

41 - 60

61 - 80

81 - 100 High

Water

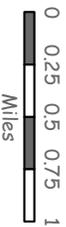


Figure 4.43. Natural and man-made features in Rush River Township.

Cass County Township Maps

STANLEY

- ★ Villages
- Bridges (20'+)
-  Commercial
-  General Aviation
-  Rivers/Streams
-  Drains
-  BNSF
-  RRV&W
-  CP Rail
-  City Limits
- Farmland Productivity**
-  0 - 20 Low
-  21 - 40
-  41 - 60
-  61 - 80
-  81 - 100 High
-  Water

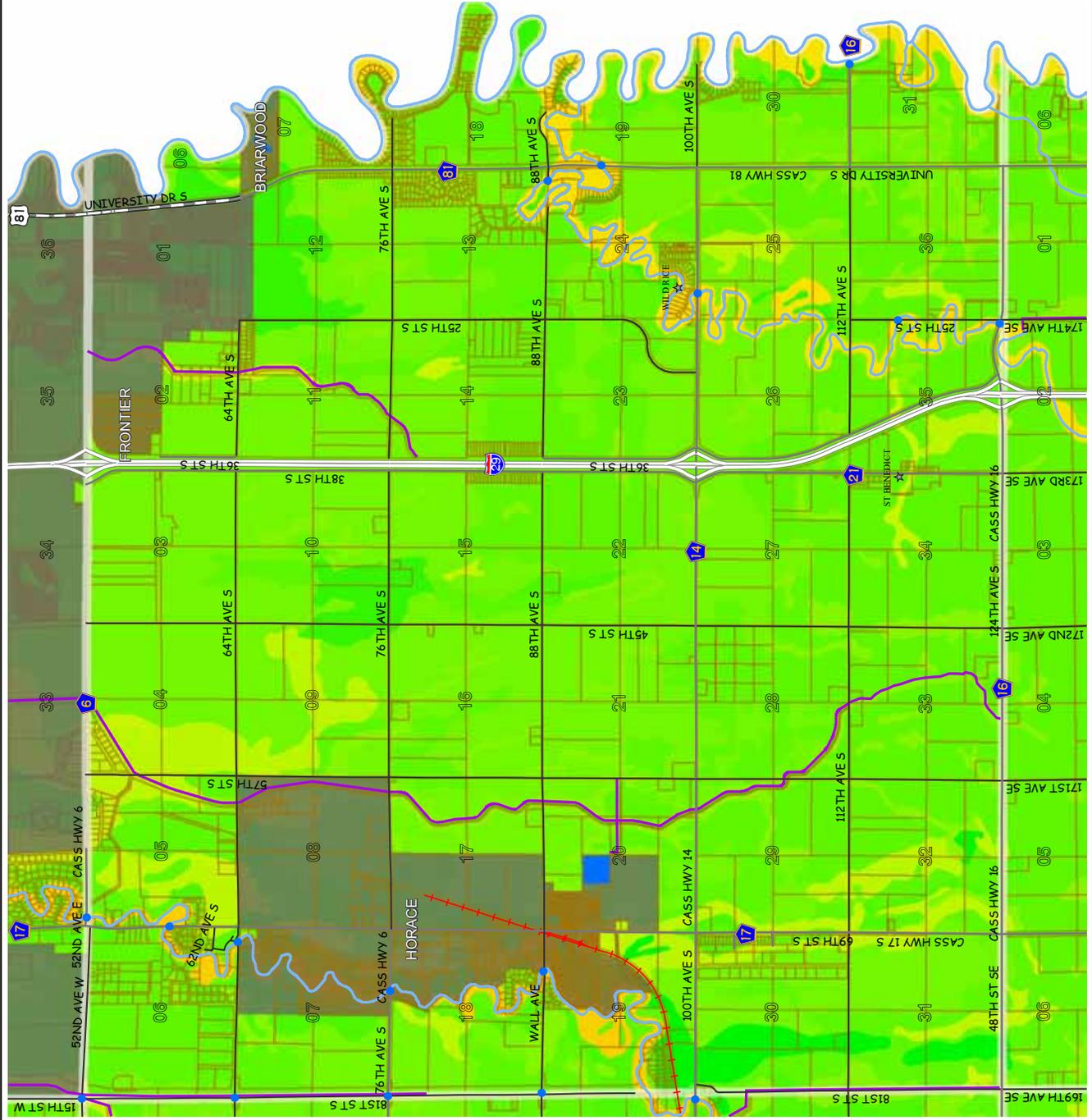
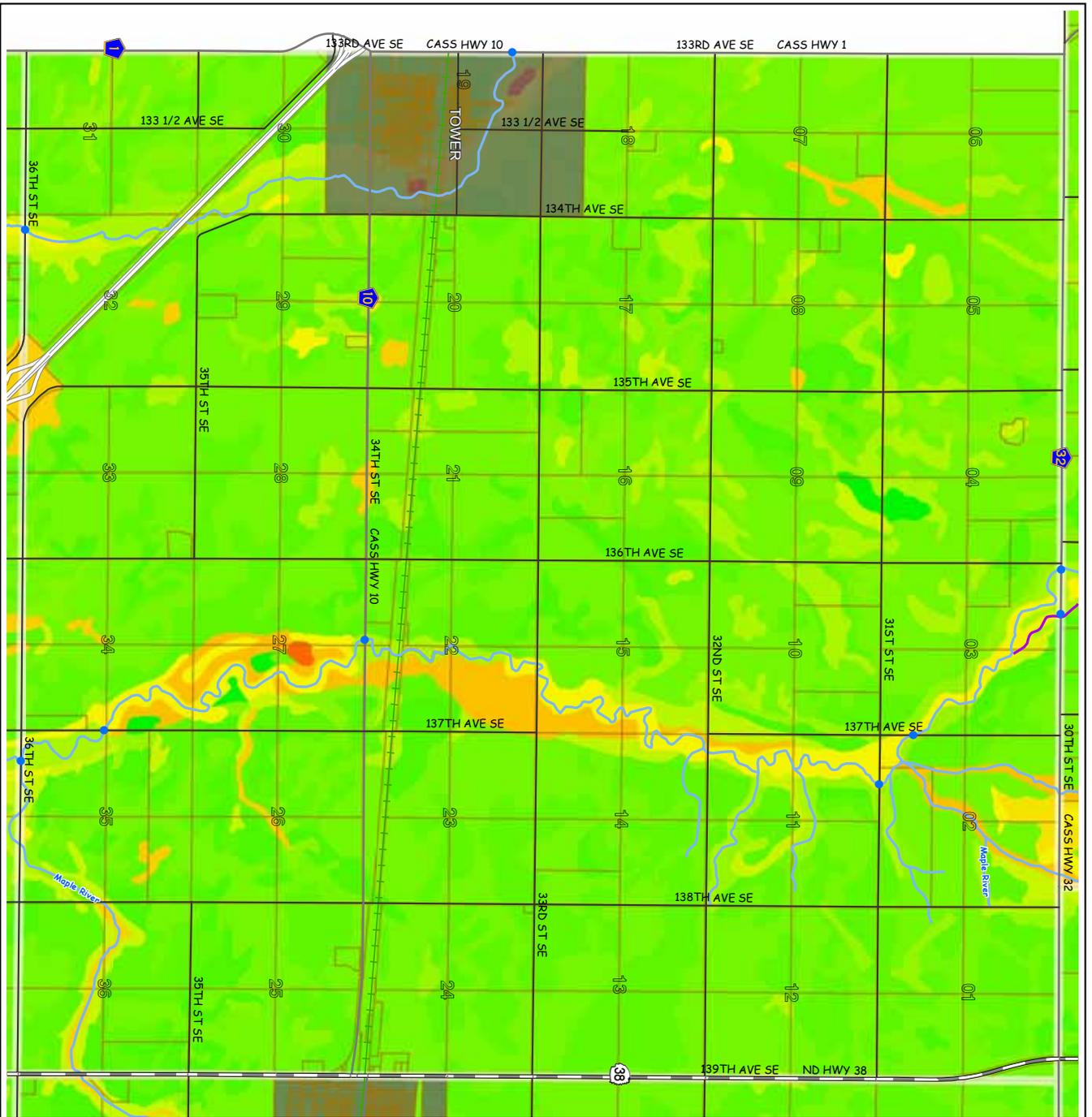


Figure 4.44. Natural and man-made features in Stanley Township.



Cass County
Township Maps

TOWER

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

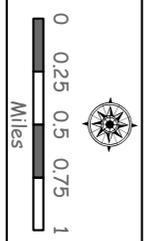


Figure 4.45. Natural and man-made features in Tower Township.

Cass County Township Maps

WALBURG

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

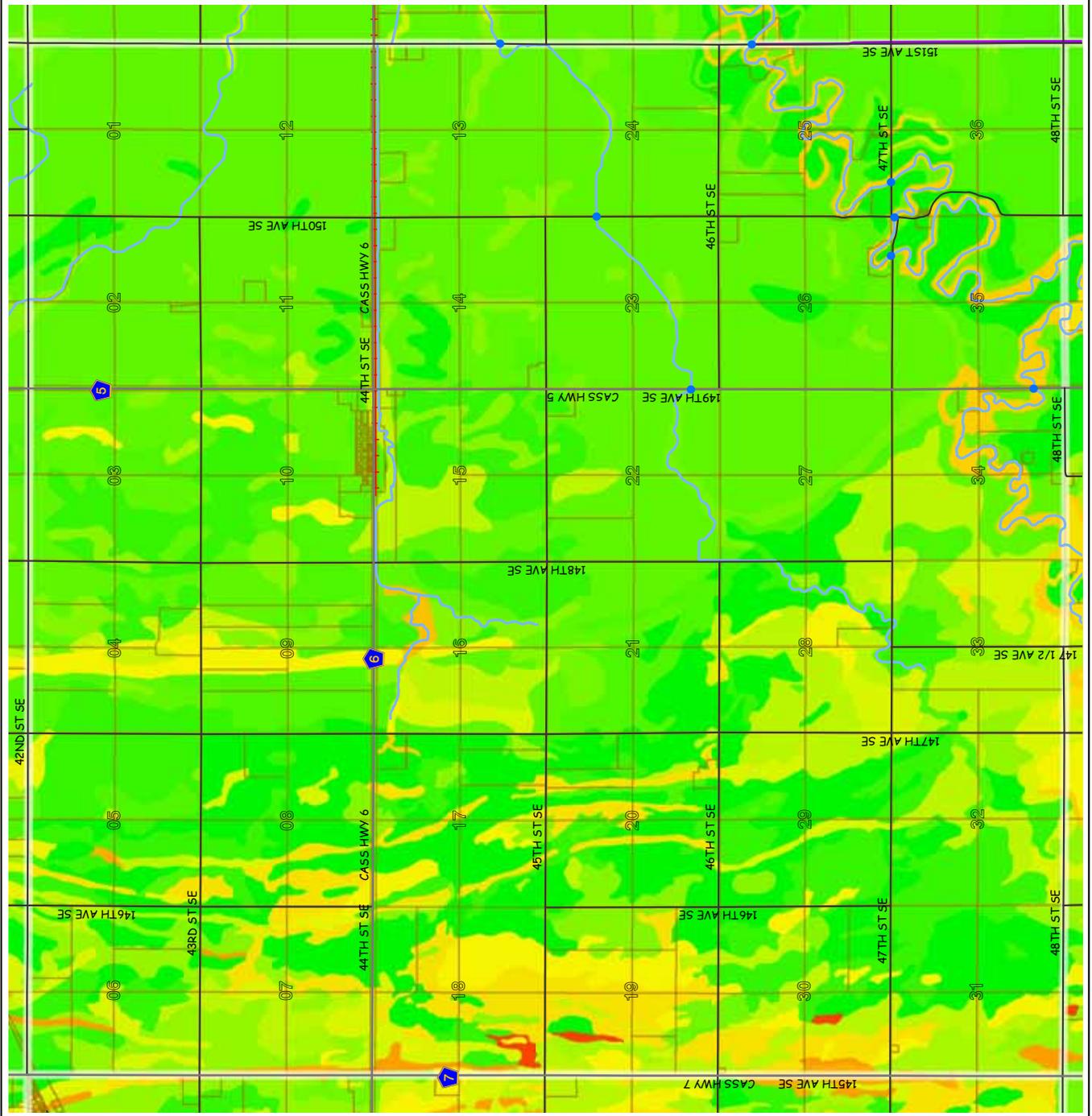
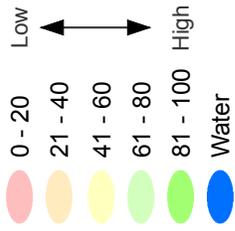
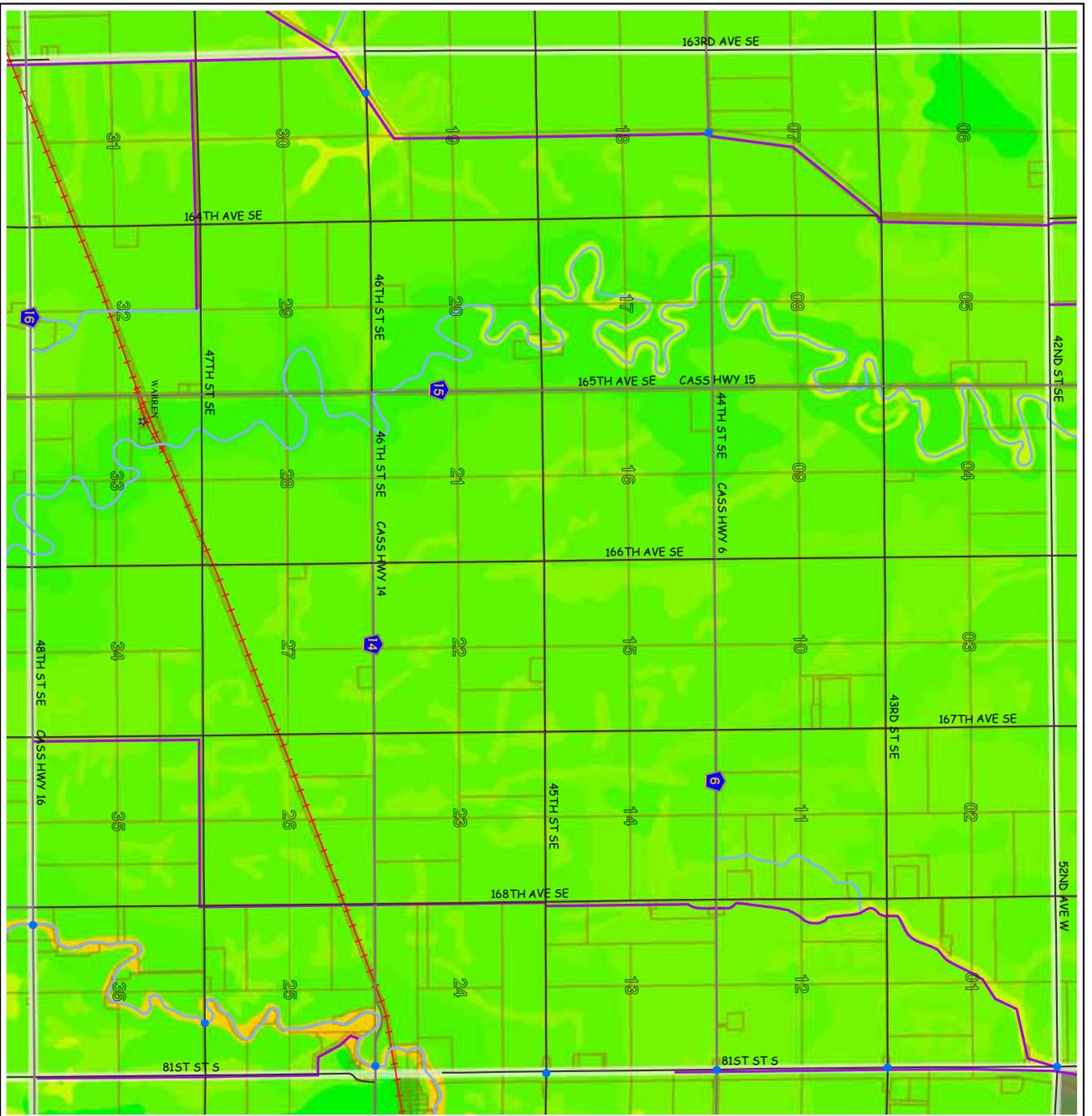


Figure 4.46. Natural and man-made features in Walburg Township.



Cass County Township Maps

WARREN

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits
- Farmland Productivity
 - 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

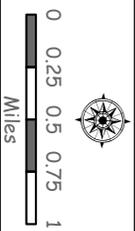


Figure 4.47. Natural and man-made features in Warren Township.

Cass County Township Maps

WATSON

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

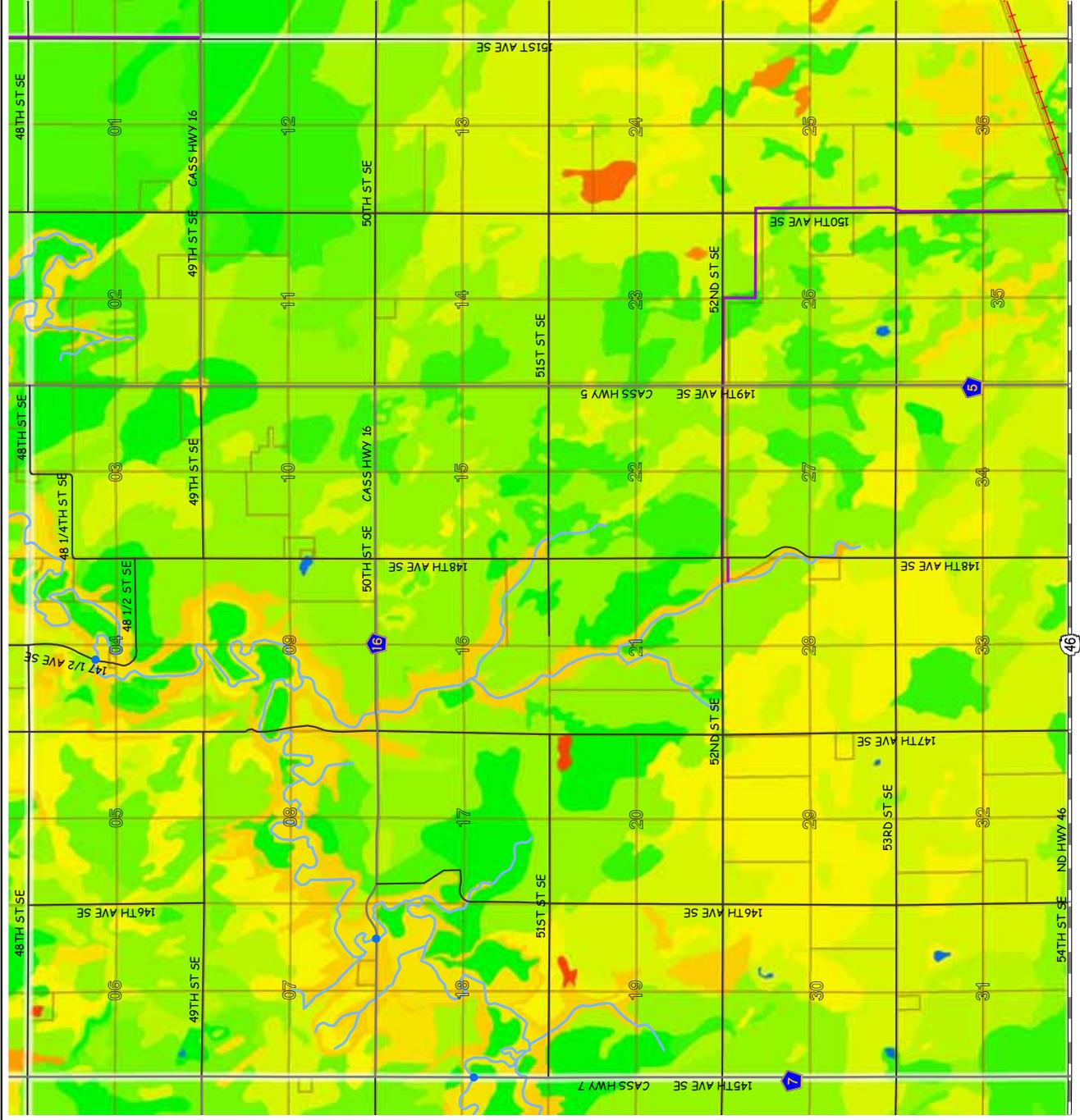
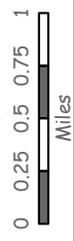
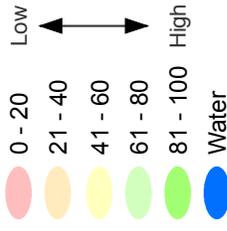
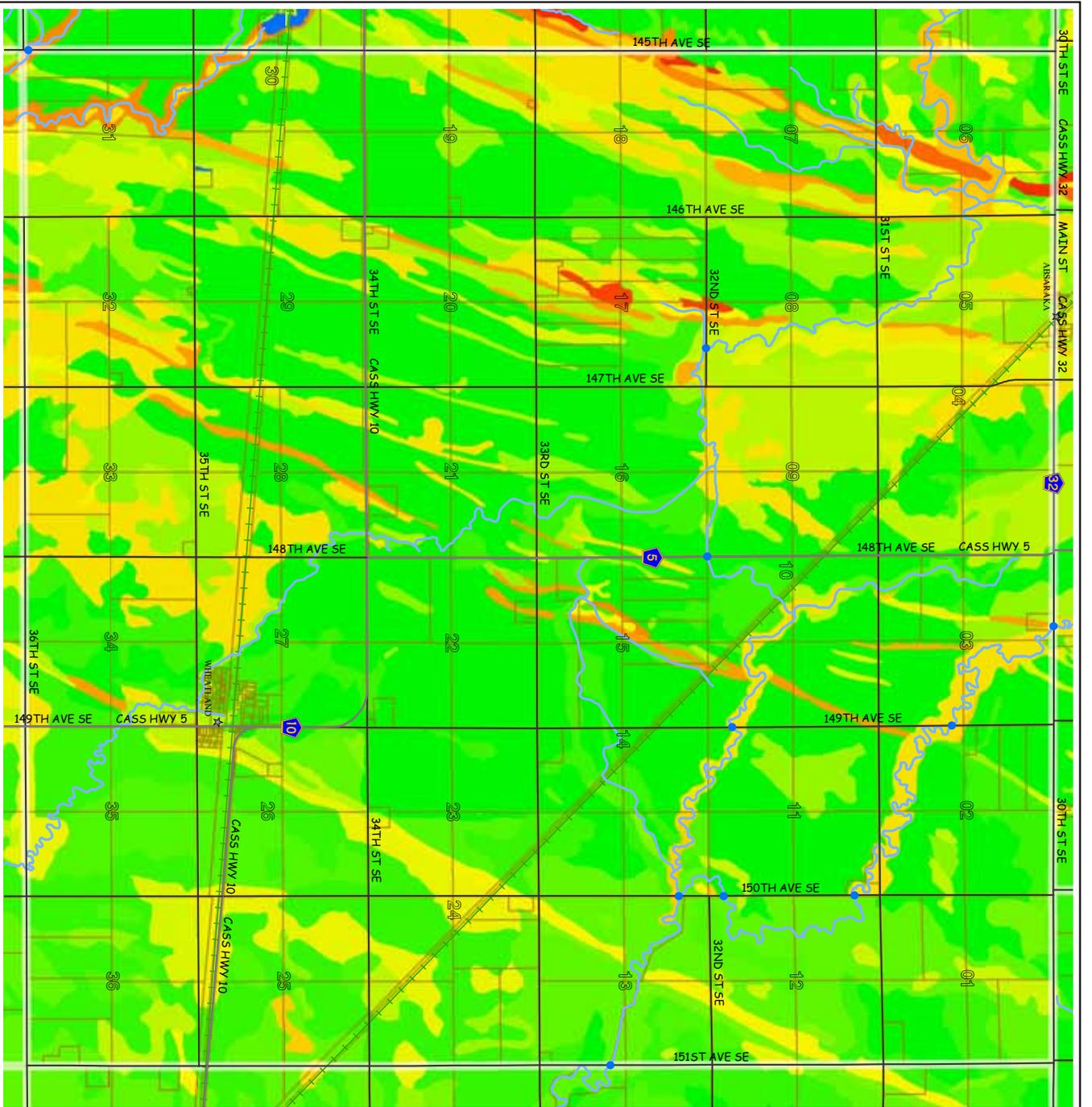


Figure 4.48. Natural and man-made features in Watson Township.



Cass County Township Maps

WHEATLAND

- ★ Villages
 - Bridges (20+)
 - Commercial
 - General Aviation
 - Rivers/Streams
 - Drains
 - BNSF
 - RRV&W
 - CP Rail
 - City Limits
- Farmland Productivity**
- 0 - 20 Low
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 High
- Water

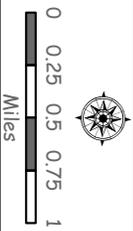


Figure 4.49. Natural and man-made features in Wheatland Township.

Cass County Township Maps

WISER

- ★ Villages
- Bridges (20'+)
- Commercial
- General Aviation
- Rivers/Streams
- Drains
- BNSF
- RRV&W
- CP Rail
- City Limits

Farmland Productivity

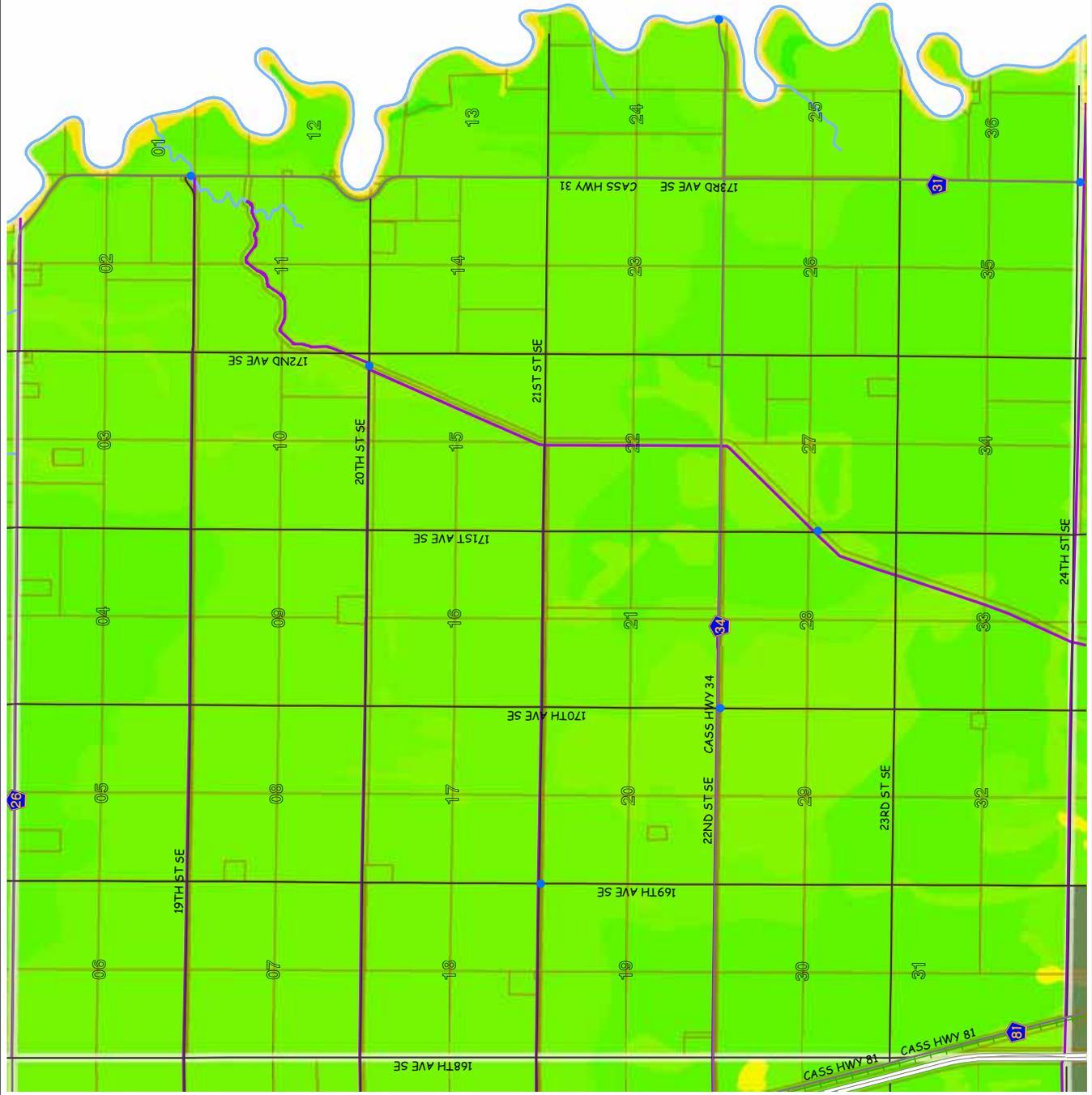
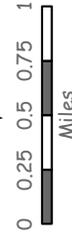
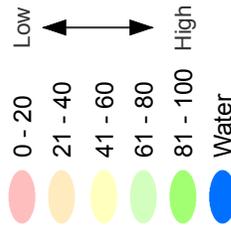


Figure 4.50. Natural and man-made features in Wiser Township.

CHAPTER FIVE:

Current and Emerging Issues

A crucial element in the planning process of the Comprehensive Plan is identifying the current and emerging issues faced by Cass County. The main goal of the Plan is providing the citizens of Cass County a vision of the future growth and development. Accomplishing this requires identification of the issues faced by the county, both at present and those forecasted into the near future. Establishing these issues allows the county to outline the goals, objectives, and policies; providing the specific information for the planning decisions shaping the county's future growth and development.

The Land and Natural Resources

- The soils in Cass County do not allow for indiscriminate development. Wetness, shrink-swell, high seasonal water tables, high or low permeability, frost action, and low soil strength are characteristics of many of the soils.
 - The areas adjacent to rivers are often viewed as desirable for development, but are already naturally prone to slide and bank failures.
 - These characteristics are compounded by the addition of structures, fill, septic systems, watered lawns, and removal of certain vegetation.
- The natural vegetation along rivers and their deep roots help to anchor the river banks.
 - The removal of the natural vegetation compounds the bank stability problems in the county.
 - “Manicured” lawns along the river banks have both short roots and require large amounts of water; both increasing bank stability issues.
- Ground water from aquifers is limited in most areas of the county. For the most part, the aquifers capable of providing water are already being used and can only provide limited amounts of water to new users. The aquifers in the metro area

currently do not have the capacity for many new users and contain a finite amount of water.

- The majority of water for the metro area is provided by the Red and Sheyenne rivers.
 - According to the Bureau of Reclamations Red River Valley Water Needs Assessment, if no action is taken population and industrial growth would result in water supply shortages in the Red River Valley.
 - The Bureau of Reclamation also found that the Red and Sheyenne water users will face shortage without future water augmentation, changes in water management, or changes in water use amount and patterns.
- The water quality of the county's rivers is lower than it potentially could be due to high amounts of sedimentation and pollution from municipal runoff, agriculture runoff, industrial use, and inadequate solid waste disposal.
- According to the National Wetlands Inventory, only 13,500 acres of land are capable of sustaining wetlands (permanent and semi-permanent or seasonal flooding) in the county.
- The Red River's large flood plain, lack of gradient, spring thaw all make the valley prone to spring flooding.
 - The addition of fill and structures both reduces the natural storage area for flooding and impede water flow, both potentially leading to increase flooding.
 - Allowing construction in flood prone areas places residences and property at risk during times of flooding.
- The high productivity of the soils in Cass County has made farming the primary land use outside of the metro area.
 - The productivity of the land is currently not taken into account with proposed development.
- The number of farms and farmland in the county are decreasing while the average size is increasing (U.S. Department of Agriculture 1997).

	1987	1992	1997	1992-1997 Difference	Percent Difference
Total Farms	1,183	1,004	919	-85	-9.25%
Farmland (acres)	1,058,821	1,070,528	1,067,667	-2,861	-0.27%
Average Size (acres)	895	1,066	1,162	+96	+8.26%

Table 5.1. Cass County's inverse relationship between number and size of farms (U.S. Department of Agriculture 1997).

Population

- Cass County's 2000 Census population was 123,138 and the 2003 estimated population was 127,137 residents.
- Population grew by 19.7% between 1990 and 2000 (US Census Bureau 2004).
- Cass County had a net migration increase of 2,246 between 1995 and 2000, compared to a net loss of 25,207 for North Dakota (US Census Bureau 2004).
- Growth is continuing to occur more rapidly in the eastern half of the county.
- Cass County's population is continually becoming more urbanized.

	1990	2000	1990 Percent	2000 Percent
Total	102,874	123,138	100.0%	100.0%
Urban	86,413	106,577	84.0%	86.6%
Rural	16,461	16,561	16.0%	13.4%

Table 5.2. The trends in urban versus rural living in Cass County (US Census Bureau 2004).

- Based on population projections, Cass County's population is expected to increase by 80,000 residents by 2030.

Land Use

- Agricultural (including vacant land) has and continues to be the predominate land use in the county, despite losses in farmland.
 - Prices of agricultural lands surrounding the metro area are greatly influenced by encroaching development.
 - The increased value often makes development more profitable than continuing to farm the land.
 - Agricultural practices can be negatively impacted by premature residential development.
- Rural non-farm is the county's second largest land use.
 - Cass County is the only county in the state to have increased number of rural residents.
 - Cheaper land, lower density development, "rural atmosphere," lower taxes, and less development restrictions have all been factors for this land use's increase.
 - Premature rural non-farm development can lead to land use conflicts with the surrounding agricultural lands.
- The metropolitan area (Fargo and West Fargo) accounts for 85% of the county's population, but only 2% of the land.
 - Fargo and West Fargo respectively annex on average 550 and 400 acres a year.
 - Their annexation often includes previously rural subdivisions; the large lots and rural services often make for a difficult transition into an urban environment.
- Small cities, the final land use, consist of the remaining incorporated cities. Those cities in close proximity to the metro area have experienced growth.

Infrastructure

- Establishing corridor preservation for arterial and collector streets in the surrounding metropolitan area will allow for a properly planned road network serving future developments.
- Premature or leap frog development and their remote proximity from urban areas creates burdens to provide services:
 - Outlying rural subdivisions place added pressures on county's road network. Their increased traffic creates the need for higher capacity roads, turn lanes, signals, etc.; however there lacks a source of funding to provide these needed services.
 - The current county highway budget places greater emphasis on maintaining the current investment in roads, limiting the county's ability to create new hard surface roads or expand existing roads.
 - The increased tax base from these rural subdivisions often does not pay for the added maintenance costs or upgrades to county and township roads.
 - Police, fire, emergency services are required to cover a larger areas and greater distances as result of premature developments.
 - School districts face greater costs in providing busing service to a larger area.
- Subdivision ordinances do not currently require infrastructure improvement plan and documentation of their completion.
 - Water, sewer, electricity, gas lines, phone, cable agreements entered into by the developer demonstrating the installation and completion of these services to the subdivision are currently not required.
- Residents are increasingly driving alone to work and using less car pools and public transportation (US Census Bureau 2004).
 - The growing population and decline in carpooling and transit-use will likely place added pressures on the county's highway system.
 - The average travel time to work in Cass County is 15.7 minutes (Census 2000).

	1990 Total	1990 Percentage	2000 Total	2000 Percentage	Total Difference	Percent Difference
Workers 16 and Older	54,438	100.0	69,743	100.0	15,305	
Drive Alone	42,548	78.2	58,202	83.5	15,654	5.3
In carpools	5,786	10.6	5,584	8.0	-202	-2.6
Using public transportation	576	1.0	256	0.4	-320	-0.6
Using other means	531	1.0	673	1.0	142	0.0
Walked	n/a	n/a	2,663	3.8	n/a	n/a
Worked at home	n/a	n/a	2,365	3.4	n/a	n/a

Table 5.3. Cass County's trends in commuting to work (US Census Bureau 2004)

Subdivisions and Developments

- Cass County's subdivision ordinances are more lenient than the requirements of Fargo and West Fargo. The laxer requirements can make development in the county more appealing and can indirectly promote premature developments away from the urban fringe.
- The rural subdivisions are often marketed and built for residents moving from the metro area. Many of the residents moving into the rural subdivisions maintain attitudes about their new neighborhood based on previous experiences established while living in an urban area.
 - Most rural subdivisions are built with limited services; gravel roads, open ditches, private wells, and on-site septic systems.
 - The dust and mud from the gravel roads, the standing water in the ditches, the quantity and quality of water from wells, and the operation of on-site septic systems can all be subject to conflict and frustration for residents custom to urban services.
 - Many residents are often unaware the roads within the subdivision are private and the maintenance is the responsibility of a home owners association.
 - The townships do not have the resources available for maintenance or creation of subdivision roads equaling those found within municipalities.

- Retrofitting these subdivisions for urban services increases costs and disruption for the residents.
- The large “urban” type rural subdivisions often use “rural” type services, such as private wells and on-site septic systems.
 - On site septic and private wells can work in the short term, but their long term use in large developments often can create problems or dissatisfaction for the residents.
 - The concentration of on-site septic systems and private wells in large developments can decrease the operational lifespan of these services.
 - Often the use of private wells circumvents the requirement for a water management plan administered by the State Water Commission or other entity.
- Rural subdivisions are often built with large lots (5-10 acres), these large lot sizes do not lend themselves to easy adaptation to an urban environment when annexed.
 - The layout to these developments often do not allow for easy resubdivision of the large lots.
 - This type of development does not easily allow for logical location and openings for upgrade and expansion of the road network needed in an urban environment.
 - The large lots sizes increase the specials to property owners when urban services are added for these developments, often requiring homeowners to sell or subdivide their property.
- Leap frog or premature developments have the ability to increase pressures on the surrounding agriculture land uses:
 - Leap frog developments are often completely surrounded by agriculture lands, creating land use conflicts between residential developments and the existing agriculturally lands.
 - Land use conflicts faced by farmers:
 - Nuisance complaints from residential developments.
 - Increased traffic making transportation of equipment and product more challenging.

- Trespassing on land.
- Vandalism and theft of equipment and property.
- Crop damage from residents, horses, bikes, or motorized vehicles.
- The need to modify chemical application near subdivisions.
- Gathering of litter and trash deposited or blown from subdivisions.
- Washing away of seeds, drowning of crops, damage to drain tiles or ditches due to storm water run off from houses, roofs, driveways, and patios.

Land use conflicts faced by residential developments:

- Large and loud equipment
 - Chemical spraying
 - Dust
 - Long hours of farm operations during the harvest and planting
 - Odors
 - Increased truck traffic
- Current subdivision regulations only briefly discuss drainage plans and lack specific requirements and regulations. The current plans do not specifically address the impacts on surrounding agricultural lands and drainage system and currently do not provide assurance that the development will not negatively affect the surround lands crops, drain tile, ditches, drains, and swales.
 - Infrastructure improvements lack specific requirements, regulations, and installation.
 - Current regulations lack specific requirements and regulations for electricity, water, sewer, telephone, cable, etc. improvements, specifications, and installation.
 - The current regulations lack submittal of contracts with these service providers and or installers.
 - Rural subdivision can affect the quality, mobility, and safety of the surrounding public roads.
 - Improvements are often needed at the intersections of new subdivisions and public roads. The costs of these improvements are currently the

responsibility of the county and not those most benefiting from the service.

- Large subdivisions often require turn lanes, traffic signals, or other safety features at intersections to allow for safe and easy entrance and exit from the subdivision.
- These improvements are a necessity created by the subdivision and benefit the residents in the subdivisions the most.
- Rural subdivisions can strain the existing public road system, necessitating the need for conversion of gravel to hard surface, additional lanes, and more frequent maintenance.
 - These improvements are often the direct result of new subdivisions, yet currently these upgrades are not directly assessed to those most benefiting from the improvements.
 - The increase to the tax base and resulting taxes collected by these developments often only contribute a fraction of costs needed for these improvements.
 - Leap frog or premature developments create an increased strain on the public road network, creating larger funding and maintenance requirements to meet the higher traffic demands placed on the roads.
- Areas of the Red River Valley are prone to spring flooding, these same areas are often viewed as prime developable areas because of their location to river views and mature trees.
 - The addition of fill to build up low lying areas allow for development in flood plains, but the built up land reduces the natural and temporary water storage area for flood waters and disrupts the flow of the water, as well as places residents in serious dangers during times of high flood waters.
 - The current subdivision ordinances lack the specific requirements, regulations, and implementation of the flood protection plan.
- Current regulations allow for 10 acres of agricultural land to be subdivided without platting and review by the planning commission, this exception has been abused and used as a loophole for subdividing lots for residential development.

- Regulations currently not required for new subdivisions:
 - Establishment of bike paths allowing for connection to existing, current, and future bike paths.
 - Construction of pedestrian paths/sidewalks.
 - Lighting within or at the entrance of subdivisions.
 - Survey monuments or markers identifying streets and property lines.
 - Floodplain regulations and flood protection plans.
 - Drainage plan requirements, regulations, and specifications.
 - Landscaping
 - Buffer planting to reduce land use conflicts
 - Street trees.
 - Specifications for developments proposed in close proximity to rivers.
 - Specifications for vegetation protection along rivers.
 - Specific guidelines for parks and open space.
 - Historic or cultural surveys.
 - Requirements, regulations, and specifications for improvements to the public roads as result of the development and analysis of the proposed subdivision on the existing road network and future road network.
 - Guidelines to location and preservation of transportation corridors.
 - Lot configuration and requirements.
 - Residential
 - Nonresidential
 - Requirements of non-residential developments:
 - Parking requirements and design standards
 - Street design and standards
 - Detailed easement information
 - Location and restrictions of easements.
 - Pedestrian, utility, storm water, conservation, petroleum.
 - Wetlands
 - Proximity and location to wetlands and necessary regulations.

Housing

- Cass County has 51,315 households in 2000, an increase of 26.8% from the 1990 census (Census 2000).
- In 1990, 3,315 (8.2%) of occupied housing units used septic tanks or cesspools (Census 1990).
 - The use of on-site septic systems dictates the use of large lots, a characteristic not ideal for compact growth or future conversion to central sewer systems and urban environments.
- Cass County's housing units are continuing to be located within urban areas, but the county is still experiencing an increase in the number of rural residents.

	1990	2000	1990 Percent	2000 Percent
Total	42,407	53,790	100.0%	100.0%
Urban	36,291	47,467	85.6%	88.2%
Rural	6,116	6,323	14.4%	11.8%
Rural-Farm	n/a	566	n/a	1.1%
Rural-Non farm	n/a	5,757	n/a	10.7%

Table 5.4. The trends in urban and rural housing units in Cass County (US Census Bureau 2004).

Economy

- Cass County’s unemployment rates (USDA ERS):
 - 1997 – 1.3%
 - 1998 – 1.6%
 - 1999 – 1.8%
 - 2000 – 1.6%
 - 2001 – 1.6%
 - 2002 – 2.4%
- The Fargo/Moorhead community received a third-place ranking by Inc. Magazine for the 50 best small metropolitan cities in America for starting and growing a business.
- Cass County had a -29.6% drop in the number of workers in the agriculture industry between 1990 and 2000, but had an overall growth in all industries of 12,924 workers (22.5%), compared to an 8.1% growth by the state.

	1990 Cass	2000 Cass	1990 ND	2000 ND
Workers 16 and older in labor force	57,561	70,485	313,534	338,982
Agriculture, forestry, and fisheries	1,844	1,298	33,691	25,914
Percent of total	3.2%	1.8%	10.7	7.6

Table 5.5. Number of workers in the agriculture sector in Cass County (US Census Bureau 2004)

CHAPTER SIX:

Goals, Objectives, and Policies

Chapter Five of the Comprehensive Plan established the goals, objectives, and policy guidelines to address the goals and issues faced by Cass County. The product of this chapter will help shape the growth of the county through the creation of policies used to make planning decisions. The following definitions should be used for each goal, objective, and policy guideline:

- | | |
|-------------------|--|
| Goal: | Long-term end toward which programs or activities are directed. Goals are general and include no date of completion. |
| Objective: | A specific, measurable, intermediate end that is achievable, sometimes measurable, and marks progress towards a goal. Objectives are action-orientated statements demonstrating the means to achieve a goal. |
| Policy Guideline: | General principles creating the course of action or way in which programs and activities are coordinated to achieve an identified goal or objective, supporting the action of the objectives. |

Goal One:

To achieve orderly, balanced, and sensible development.

Objective A. Promote compact and orderly development.

- Policy 1. Direct new development to areas already experiencing development.
- Policy 2. Encourage infill development and redevelopment where appropriate.
- Policy 3. Discourage nonfarm development in farming areas.
- Policy 4. Direct large urban type developments to locate in close proximity to the urban areas.
- Policy 5. Prevent premature development.
- Policy 6. Periodically update the county's subdivision ordinances to compliment the local municipalities' ordinances and not encourage sprawl.

Objective B. Prevent incompatible land uses from locating in close proximity to one another.

Policy 1. Protect valuable farmland from premature development.

Policy 2. Create a distinct separation between urban and non urban development.

Policy 3. Prevent large urban type development from locating in rural areas.

Policy 4. Require new development to compliment the surrounding land use.

Objective C. Promote residential development which will more easily convert to an urban environment.

Policy 1. Encourage development whose lots will not become economically infeasible if annexed into a municipality.

Policy 2. Plan subdivisions so logical resubdividing is possible if necessary.

Policy 3. Plan subdivisions so the street network and accesses can be upgraded to meet the needs of an urban environment.

Policy 4. Require orderly annexation agreements in new subdivisions surrounding incorporated areas.

Objective D. Ensure new development will protect the short and long term health, safety, and general welfare of county's citizens from flooding.

Policy 1. Prevent development from occurring in flood prone areas.

Policy 2. Prevent development with the potential need for flood buyouts, flood mitigation, and temporary flood protection.

Policy 3. Prevent development having limited access during times of high water.

Policy 4. Deter development which adversely impacts the flooding potential in the county.

Policy 5. Require new developments near potential flood areas to submit a flood protection plan outlining the risk of flooding and necessary solutions to protect the lives and investments of the county's citizens.

Objective E. Ensure new development will protect the short and long term health, safety, and general welfare of county's citizens from the soil stability problems prone to the county's soils.

Policy 1. Prevent development which will compound the naturally occurring problems with the county's soil stability.

- Policy 2. Deter development with the potential to place financial strain on the county and its citizens as result of soil stability issues.
- Policy 3. Deter development and land uses that will adversely impact or accelerate soil stability.
- Policy 4. Deter the man-made land uses which intensify the naturally occurring soil stability problems.
- Policy 5. Develop regulations preventing development from occurring in areas prone to stability problems, preventing the land uses accelerating the inherent problem, and protecting the river front vegetation helping to stabilize the soils.

Objective F. Properly address the impact of new development on the current and existing drainage systems.

- Policy 1. Require new developments to submit a drainage plan to study the needs of the new development drainage system, its impact on the existing drainage system, and any other information required by the water resource board.
- Policy 2. Require the financial burden of any construction, upgrades, or repairs to the current drainage system needed as result of new development to be placed on the developer and those most benefiting from these required changes.
- Policy 3. Ensure new developments drainage system will provide the needed short and long term service for the county's citizens.
- Policy 4. Ensure new development will not adversely impact current drainage systems.
- Policy 5. Ensure drainage plan will meet the needs of the size, scope, and type of development, preventing those plans only meeting the short terms of a development.
- Policy 6. Prevent development with drainage systems built so as to create current or future financial strain for the county and its citizens to fund the costs to upgrade a deficient drainage system.

Goal Two:

To provide the citizens of Cass County with essential public facilities, services, and infrastructure

Objective A. Ensure new development provides the necessary level of quality services for the county's citizens.

- Policy 1. Require levels of services appropriate for the scale of the development.
- Policy 2. Develop and require minimum levels of service for roads, water, sewer, drainage, storm water drainage, and all other related services and infrastructure.
- Policy 3. Require developers to submit infrastructure plans outlining the time schedule for the installation or upgrade of all necessary services, including the acceptance and approval of such infrastructure plans by the appropriate utility company or entity.
- Policy 4. Require services to meet both the current and future needs of the citizens.
- Policy 5. Restrict the use of services only providing short term benefits to the citizens.
- Policy 6. Require developers to install, or post a financial guarantee for the installation of, all necessary facilities, services, and infrastructure prior to the approval of subdivisions.

Objective B. Prevent new developments from creating an economic strain on the county and the future residents of new developments.

- Policy 1. Require those benefiting the most from services to pay the cost for installation, upgrading, and repairing of such services.
- Policy 2. Prevent development only addressing the short term service, facility, and infrastructure needs of the county's citizens. Services requiring the citizens or government agencies to fund and upgrade service, facility, or infrastructure to meet the actual needs of the citizens.
- Policy 3. Prevent developments creating financial burden and disruption for citizens when development becomes annexed and requires installation of urban services and removal of exiting infrastructure.
- Policy 4. Promote compact development so facilities and services can be provided economically.

Goal Three:

To provide an efficient, safe, environmentally sensitive, and cost effective county transportation system to effectively meet citizen's current and future needs for personal mobility and movement of goods.

Objective A. Prevent new development from placing an economic strain on the county to provide a safe and quality road network.

Policy 1. Require those benefiting the most from roads to pay the cost for installation, upgrading, and repairing of subdivision roads and the public roads providing access to the development.

Policy 2. Prevent development which will have an adverse effect on the public road network.

Objective B. Require new developments roads to meet the transportation and safety needs of the county's citizens during the initial construction of the subdivisions.

Policy 1. Require new development to provide roads meeting both the current and future needs of the county's citizens.

Policy 2. Prevent development requiring the new land owners and residents of subdivisions from having to fund, plan, and organize upgrades to the subdivisions roads to meet their transportation needs or requirements after lots have been sold and homes built.

Policy 3. Require new developments submit and fund a transportation plan to study the transportation and safety needs of the development and the surrounding area.

Policy 4. Require developers to pay for and install any necessary street, traffic signs, or lighting features.

Objective C. Encourage development creating pedestrian friendly design.

Policy 1. Require the safety improvements needed for safe pedestrian interaction with the road network.

Policy 2. Design roads so they compliment the neighborhood environment.

Policy 3. Promote development providing walking and bike paths within the subdivision and connecting to existing or future walking or bike paths.

Policy 4. Promote development using the corridor along the rivers as public greenway to allow for a future recreational trail system.

Objective D. Plan new developments so they more easily convert to a future urban transportation environment

Policy 1. Preserve and establish right-of-way (ROW) that dedicates and dedes the land for the future arterial corridors found along the section and quarter section lines.

Policy 2. Direct development's road network and accesses so they can more easily transition to an urban road network.

Policy 3. Restrict the access points along the future arterial roads and ensure proper location of permitted accesses.

Objective E. Encourage the use of the existing public transit in rural Cass County by all residents of rural Cass County.

Policy 1. Ensure adequate local, state, and federal funding for transit service in rural Cass County by reviewing the existing needs and demands of rural residents on a regular basis.

Policy 2. Work with the Cass County Rural Transit, Metro Area Transit, FM Metro COG, and ND DOT to promote the development of formal and informal "park-n-ride" facilities at key intersections in rural Cass County for use by metro bound commuters.

Policy 3. Work with Cass County Rural Transit, Metro Area Transit, FM Metro COG to promote the development and use of Rideshare and Carpooling Programs in Cass County for the use by metro bound commuters.

Goal Four:

To use and preserve natural resources in an environmentally sound manner

Objective A. Preserve adequate quantity and quality of ground and surface water supplies.

Policy 1. Require new developments to provide adequate quantity and quality of potable water for the citizen's current and future needs.

Policy 2. Promote development providing potable water sources which most efficiently use the resource.

Policy 3. Deter development only meeting the citizen's current or short-term water needs.

Policy 4. Deter development which potentially can create financial burden on citizens for costly upgrades to a deficient water supply.

- Policy 5. Deter development using water sources which would need to be upgraded to meet the urban standards of a municipality upon annexation.
 - Policy 6. Encourage development using ground water resources in the most efficient ways with the greatest long term benefits to the county's citizens and long-range water conservation.
- Objective B. Protect the natural vegetation along rivers for its ability to help stabilize river banks.
- Policy 1. Create a conservation easement protecting the natural and important vegetation along the rivers.
 - Policy 2. Work with the proper agencies to help educate the public about the benefits of certain vegetation along rivers.
 - Policy 3. Create guidelines to help riverfront owners identify the important vegetation.
- Objective C. Protect the county's wetlands.
- Policy 1. Identify the county's wetland areas and use this information during the planning process.
 - Policy 2. Require new development to comply with all local, county, state, and federal laws, regulations, guidelines, and ordinances relating to wetlands.
- Objective D. Protect the county's surface water resources.
- Policy 1. Require new development to prevent any harm, damage, or other adverse impact on the county's lakes, rivers, or streams.
 - Policy 2. Deter developments transferring sedimentation and pollution in the county's surface water systems.
 - Policy 3. Require new developments to meet the standards established by the EPA for storm water pollution protection
- Objective E. Prevent the introduction of sewage and other harmful agents into the county.
- Policy 1. Encourage the use of centralized sewage systems.
 - Policy 2. Continue working with Fargo Cass Public Health to review, design, and inspect new developments sewage systems.
 - Policy 3. Encourage sewage systems meeting the needs for the scope and type of development.

Policy 4. Require developments sewage system to meet the long term needs of the county's citizens.

Policy 5. Deter developments using sewage systems with limited life spans necessitating expensive replacement or upgrades.

Goal Five:

To preserve and maintain Cass County's rural heritage.

Objective A. Protect the county's valuable farmland and agricultural traditions.

Policy 1. Identify Cass County's agriculturally productive lands and use this information during the planning process.

Policy 2. Discourage nonfarm development in farming areas.

Policy 3. Prevent premature large scale urban type development from occurring in the rural portions of the county.

Policy 4. Direct new development to areas already experiencing development.

Policy 5. Create a distinct separation between urban and non urban areas.

Policy 6. Encourage infill development and redevelopment where appropriate.

Policy 7. Direct large urban type developments to locate in close proximity to the urban areas.

Objective B. Protect the rural atmosphere present in the county.

Policy 1. Limit development occurring away from the urban fringes to be small in size and scope so as to reduce its impact on the rural atmosphere and existing land uses.

Policy 2. Promote development complimenting the existing land uses, development, and farming lifestyle.

Policy 3. Encourage infill and redevelopment for large scale developments.

Policy 4. Create a distinct separation between the large scale urban type development and the existing rural farms and homes.

Policy 5. Deter large and premature development in the rural areas of the county.

Policy 6. Support the establishment and use of farm programs and farm protection programs.

- Policy 7. Direct nonfarm developments to areas where development already exists.
- Policy 8. Promote agriculture and its benefit for the entire county.
- Policy 9. Educate the public about the value of the county's soils, farms, and farmland and the consequences of its conversion to nonfarm uses.

Goal Six:

To ensure and maintain public participation in the decision-making influencing the future of Cass County and its citizens.

Objective A. Maintain open lines of communication between the county and all other local entities.

- Policy 1. Distribute planning agendas to the relevant entities.
- Policy 2. The County planner should attend city commission and planning meetings when necessary.
- Policy 3. The County Planner should attend the joint township and city meetings.
- Policy 4. The County Planner should attend relevant local planning lectures and conferences.
- Policy 5. Encourage review and comments by local entities relating to county planning issues.

Objective B. Provide public awareness of planning goals, objectives, and issues.

- Policy 1. Provide the media with copies of all agendas and special meetings.
- Policy 2. Hold public meetings for input on current issues and goals.
- Policy 3. Invite public input on regular and special planning issues.
- Policy 4. Consider and utilize citizen suggestion when making public decisions.
- Policy 5. Require new developments to distribute plans and information to surrounding landowners of proposed developments.
- Policy 6. Use Planning Commission to advise the county on issues of growth and development.

CHAPTER SEVEN:

Implementation

The writing, research, analysis, discussions, meetings, and public input all collectively formed the foundation for the update of Cass County's Comprehensive Plan. However, the effort, time, and money spent developing this Plan will all be meaningless if the Plan is not actually employed to implement the vision developed in the Plan and the Plans goals, objectives, and policies. The following chapter will develop a general work plan outlining the necessary steps to direct the basic activities to implement the Plan.

Step One

Review the Comprehensive Plan and identify the goals, objectives, and polices outlined in the Plan requiring specific activities, actions, or initiatives to update, change, or modify the current ordinances, regulations, or general planning policies. This will require the identification of the proper individual or group to carry out the task as well as the outline the possible actions for each task.

Step Two

Review the county's subdivision ordinances and regulations and identify those areas currently not implementing the goals, objectives, and policies outlined in the Plan. These goals, objectives, and policies should be reflected in the county's subdivision ordinances and the necessary changes made to these ordinances to reflect the changes in the Comprehensive Plan. Also review the subdivision ordinances and modify, replace, update, or remove any regulations contradicting the Plan's goals, objectives, and policies.

Step Three

Hold regular Planning Commission meetings to keep the commissioners informed of all proposed development as well any emerging issues or topics. Maintain open lines of

communication with County Commissioners, citizens, local municipalities, and state and local agencies so issues and ideas can flow freely between these groups.

Step Four

Review and address any concerns or comments the Road Advisory Group has in regards to the impact of development and new development on the county's road network. Also review any updates or changes made to the County's Transportation Plan and make the necessary adjustments to reflect the updates.

Step Five

Review the Comprehensive Plan every year to ensure the Plans goals, objectives, and policies are being implemented. The examination should also include an inventory, review, and analysis of all new or emerging issues.

Step Six

Revise the Plan every five years to reflect any change with the current and emerging issues and any modifications or additions to the goals, objectives, and policies.

Step Seven

Rewrite the Plan every 15 to 20 years or as needed. This complete rewrite should include a complete profile and analysis of the county and a limited review of all townships and incorporated areas, identification of the current and emerging issues, an outline of the goals, objectives, and policies, and the necessary steps and activities to implement the Plan.

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Appendix

A. Cass County Soil Series (U.S. Department of Agriculture 1983, 85-110)

Barnes Series

“The Barnes series consists of deep, well drained, moderately slowly permeable soils on glacial tills plains. The soils formed in medium textured or moderately fine textured glacial till. The slope ranges from 0 to 25 percent” (85).

Buse Series

“The Buse series consists of deep, well drained, moderately slowly permeable soils on glacial till plains. The soils formed in medium textured or moderately fine textured glacial till. The slope ranges from 3 to 35 percent” (87).

Cashel Series

“The Cashel series consists of deep, somewhat poorly drained, moderately slowly permeable soils on flood plains. The soils formed in fine textured alluvium. The slope is 0 to 1 percent” (87).

Colvin Series

“The Colvin series consists of deep, poorly drained, moderately slowly permeable soils on glacial lake plains and in outwash channels. The soils formed in medium textured and moderately fine textured lacustrine sediment and in alluvium. The slope is 0 to 1 percent” (88).

Divide Series

“The Divide series consists of deep, somewhat poorly drained soils that are moderately permeable in the upper part and very rapidly permeable in the lower part. They are on glacial outwash plains and between beach ridges. The soils formed in medium textured material overlying coarse textured glacial outwash sediment. The slope is 0 to 1 percent” (89).

Dovray Series

“The Dorvay series consists of deep, very poorly drained, slowly permeable soils on glacial lake plains. The soils formed in fine textured lacustrine sediment. The slope is 0 to 1 percent” (89).

Embden Series

“The Embden series consists of deep, moderately well drained, moderately rapidly permeable soils on glacial lake plain and glacial outwash plains. The soils formed in medium textured glacial outwash sediment and glacial lake sediment. The slope ranges from 1 to 6 percent” (90).

Emrick Series

“The Emrick series consists of deep, well drained, moderately permeable soils on glacial till plains. The soils formed in medium textured glacial till. The slope ranges from 1 to 6 percent” (90).

Enloe Series

“The Enloe series consists of deep, poorly drained, slowly permeable soils on glacial lake plains. The soils formed in fine textured lacustrine sediment. The slope is 0 to 1 percent” (91).

Esmond Series

“The Esmond series consists of deep, well drained, moderately permeable soils on glacial till plains. The soil formed in medium textured and moderately coarse textured glacial till. The slope ranges from 6 to 15 percent” (92).

Fairdale Series

“The Fairdale series consists of deep, moderately well drained, moderately permeable soils on flood plains. The soils formed in medium textured and moderately coarse textured alluvium. The slope ranges from 1 to 3 percent” (92).

Fairdale Variant

“The Fairdale Variant consists of deep, moderately well drained, slowly permeable soils on flood plains. The soils formed in medium textured alluvium overlying fine textured lacustrine sediment. The slope is 0 to 1 percent” (93).

Fargo Series

“The Fargo series consists of deep, poorly drained, slowly permeable soils, on glacial lake plains. The soils formed in fine textured lacustrine sediment. The slope ranges from 0 to 3 percent” (94).

Galchutt Series

“The Galchutt series consists of deep, somewhat poorly drained, slowly permeable soils on glacial lake plains. The soils formed in medium textured material overlying fine textured lacustrine sediment. The slope is 0 to 1 percent” (95).

Gardena Series

“The Gardena series consists of deep, moderately well drained, moderately permeable soils on glacial lake plains. The soils formed in medium textured lacustrine sediment. The slope ranges from 0 to 3 percent” (95).

Hamerly Series

The Hamerly series consists of deep, somewhat poorly drained, moderately slowly permeable soils on glacial till plains. The soils formed in medium textured glacial till. The slope ranges from 0 to 6 percent” (97).

Hegne Series

“The Hegne Series consists of deep, poorly drained, very slowly permeable soils on glacial lake plains. The soils formed in fine textured lacustrine sediments. The slope is 0 to 1 percent” (97).

Heimdal Series

“The Heimdal series consists of deep, well drained, moderately permeable soils on glacial till plains. The soils formed in medium textured and coarse textured glacial till. The slope ranges from 1 to 15 percent” (98).

LaDelle Series

“The LaDelle series consists of deep, moderately well drained, moderately permeable soils on flood plains. The soils formed in medium textured and moderately fine textured alluvium. The slope is 0 to 1 percent” (98).

Lamoure Series

“The Lamoure series consists of deep, poorly drained, moderately permeable soils on flood plains. The soils formed in medium textured alluvium. The slope is 0 to 1 percent” (99).

Lindaas Series

“The Lindaas series consists of deep, poorly drained, slowly permeable soils on glacial lake plains. The soils formed in medium textured and moderately fine textured lacustrine sediment. The slope is 0 to 1 percent” (99).

Maddock Series

“The Maddock series consists of deep, well drained, rapidly permeable soils on glacial lake and delta plains. The soils formed in coarse textured, water-deposited sediment. The slope ranges from 1 to 6 percent” (100).

Nahon Series

“The Nahon series consists of deep, moderately well drained, very slowly permeable, alkali (sodic) soils on glacial lake plains. The soils formed in moderately fine textured and medium textured lacustrine sediment. The slope ranges from 0 to 2 percent” (100).

Nutley Series

“The Nutley series consists of deep, well drained, slowly permeable soils on glacial lake plains. The soils formed in fine textured and moderately fine textured lacustrine sediment. The slope ranges from 3 to 9 percent” (101).

Overly Series

“The Overly series consists of deep, moderately well drained, moderately slowly permeable soils on glacial lake plains. The soils formed in moderately fine textured lacustrine sediment. The slope range from 0 to 6 percent” (102).

Parnell Series

“The Parnell series consists of deep, very poorly drained, slowly permeable soils on glacial till plains. The soils formed in medium textured and moderately fine textured alluvium from glacial drift. The slope is 0 to 1 percent” (102).

Perella Series

“The Perella series consists of deep, somewhat poorly drained and poorly drained, moderately slowly permeable soils on glacial lake plains. The soils formed in medium and moderately fine textured lacustrine sediments. The slope is 0 to 1 percent” (103).

Rauville Series

“The Rauville series consists of deep, very poorly drained, moderately slowly permeable soils on the flood plains. The soils formed in stratified, moderately fine textured to coarse textured alluvium. The slope is 0 to 1 percent” (103).

Renshaw Series

“The Renshaw series consists of deep, somewhat excessively drained, rapidly permeable soils that are shallow over sand and gravel. They are on glacial outwash plains. The soils formed in medium textured alluvium over sand and gravel. The slope ranges from 1 to 6 percent” (104).

Ryan Series

“The Ryan series consists of deep, poorly drained, very slowly permeable, alkali (sodic) soils on glacial lake plains. The soils formed in fine textured lacustrine sediments. The slope is 0 to 1 percent” (104).

Sioux Series

“The Sioux series consists of deep, excessively drained, rapidly permeable soils that are very shallow over sand and gravel. They are on glacial outwash plains and beach ridges. The soils formed coarse textured glacial outwash. The slope ranges from 1 to 15 percent” (105).

Svea Series

“The Svea series consists of deep, moderately well drained, moderately slowly permeable soils on glacial till plains. The soils formed in medium textured glacial till. The slope is 0 to 6 percent” (105).

Tiffany Series

“The Tiffany series consists of deep, poorly drained, moderately permeable soils on deltas, on glacial lake plains, and on glacial outwash plains. The soils formed in medium textured to coarse textured glacial outwash sediment and lacustrine sediment. The slope is 0 to 1 percent” (106).

Tonka Series

“The Tonka series consists of deep, poorly drained, slowly permeable soils on glacial till plains. The soils formed in local alluvium and medium textured and moderately fine textured glacial till. The slope is 0 to 1 percent” (107).

Vallers Series

“The Vallers series consists of deep, poorly drained, moderately slowly permeable soils on glacial till plains. The soils formed in moderately fine textured and medium textured glacial till. The slope is 0 to 1 percent” (107).

Wahpeton Series

“The Wahpeton series consists of deep, moderately well drained, moderately slowly permeable soils on flood plains and on terraces. The soils formed in fine textured alluvium. The slope is 0 to 1 percent” (108).

Wyard Series

“The Wyard series consists of deep, somewhat poorly drained, moderately permeable soils on glacial till plains. The soils formed in medium textured local alluvium and in glacial till. The slope ranges from 1 to 3 percent” (109).

Wyndmere Series

“The Wyndmere series consists of deep, somewhat poorly drained, moderately rapidly permeable soils on glacial lake plains. The soils formed in moderately coarse textured, coarse textured, and medium textured lacustrine sediments. The slope ranges from 0 to 6 percent” (109).

B. Farm and Ranch Survey Information

Rural Subdivision Survey- Land Owner/Farm Operator

Dear Land Owner or Farm Operator:

Cass County is in the process of updating the county's Comprehensive Plan and will shortly after begin updating the county's Subdivision Ordinances. The Comprehensive Plan can be thought of as the blueprint for the future growth and development of the county and the Subdivision Ordinances are the tools to implement this blueprint or plan. The end goal of updating the comprehensive plan is to create policies which will shape the future development of the county. Public input is crucial element of the Comprehensive Planning process; as a result the county respectfully requests your input regarding your experiences as a land owner/operator in close proximity to rural subdivisions which will be used to help update Cass County's Comprehensive Plan.

This survey is being sent to all land owners within three-quarters of a mile of the rural subdivisions surrounding metro area. The information gathered from the surveys will only be used to help update Cass County's Comprehensive Plan and Subdivision Ordinances. The survey does not require any personal information and any provided will not be published or shared. The county only asks you to answer the questions based on your experiences as a land owner/farm operator surrounding a rural subdivisions. The goal of the survey is to find out how rural subdivisions affect farm land owners/operators in order to determine how the county's subdivision policies could be changed to make rural subdivisions more compatible with the surrounding agricultural land.

Please return the survey in the included post paid envelope. Any questions or comments can be directed to Mike Zimney at (701) 298-2375 or zimney@m@co.cass.nd.us.

1. The rural subdivision in close proximity to your land:
If you do not know the subdivision name please provide the section and township. _____

2. Did you own/rent this land prior to the construction of this subdivision?
 Yes
 No

3. What is your land surrounding the subdivision currently used for?
 Farming
 Ranching
 Vacant
 Other: _____



Questions 3-13 should be answered only in regards to your experiences for your land near the subdivision

3. Experienced trampling of crops (from residents, horses, vehicles, ATVs, etc.)
 No problem
 Slight problem
 Major problem

4. Experienced trash or litter on land from the subdivision
 No problem
 Slight problem
 Major problem

5. Experienced crop losses due to storm water runoff from subdivision
 No problem
 Slight problem
 Major problem

6. Experienced damaged drain tiles or ditches
 No problem
 Slight problem
 Major problem

7. Experienced vandalism of farm fences or buildings
 No problem
 Slight problem
 Major problem

8. Experienced vandalism of farm equipment or vehicles
 No problem
 Slight problem
 Major problem

9. Experienced subdivision residents planting gardens, shrubs, or trees on your land
 No problem
 Slight problem
 Major problem

10. Experienced injury to livestock as result of subdivision's residents or pets
 No problem
 Slight problem
 Major problem

Farmer and Rancher Survey Results			
Question	Sum	Ratio	Percentage
2. Was land owned prior to subdivision			
Yes	38	38/50	76.00%
No	12	12/50	24.00%
3. What is your land used for			
Farming	52	52/52	100%
Ranching	0	0/52	0%
Vacant	0	0/52	0%
4. Experienced crop trampling			
No problem	29	29/50	58.00%
Slight problem	17	17/50	34.00%
Major problem	4	4/50	8.00%
5. Experienced trash or litter on land			
No problem	25	25/50	50.00%
Slight problem	17	17/50	34.00%
Major problem	8	8/50	16.00%
6. Experienced damage due to water runoff			
No problem	44	44/50	88.00%
Slight problem	5	5/50	10.00%
Major problem	1	1/50	2.00%
7. Experienced damaged drain tile or drains			
No problem	42	42/50	84.00%
Slight problem	6	6/50	12.00%
Major problem	2	2/50	4.00%
8. Experienced vandalism of property			
No problem	43	43/50	86.00%
Slight problem	6	6/50	12.00%
Major problem	1	1/50	2.00%
9. Experienced vandalism of equipment			
No problem	39	39/50	78.00%
Slight problem	8	8/50	16.00%
Major problem	3	3/50	6.00%
10. Experienced planting of veg. on land			
No problem	47	47/50	94.00%
Slight problem	3	3/50	6.00%
Major problem	0	0/50	0.00%
11. Experienced injury to livestock			
No problem	48	48/50	96.00%
Slight problem	2	2/50	4.00%
Major problem	0	0/50	0.00%
12. Experienced theft of property			
No problem	37	37/50	74.00%
Slight problem	13	13/50	26.00%
Major problem	0	0/50	0.00%
13. Experienced problems moving equip.			
No problem	35	35/50	70.00%
Slight problem	13	13/50	26.00%
Major problem	2	2/50	4.00%
14. Had to alter chemical spraying			
Yes	16	16/49	32.65%
No	33	33/49	67.35%

15. Received complaints for farming activities			
No	44	44/49	89.80%
Yes	5	5/49	10.20%
If yes, what were the complaints			
Dust	2	2/5	40.00%
Noise from equipment	1	1/5	20.00%
Odors	2	2/5	40.00%
Chemical spraying	0	0/5	0.00%
Long work hours			
16. Own Ag land not near subdivisions			
No	22	22/51	43.14%
Yes	29	29/51	56.86%
If yes, these problems more common near subdivisions			
Yes	15	15/27	55.56%
No	12	12/27	44.44%
17. Check which applies			
Subdivision made for better experience	6	6/50	12.00%
Subdivision made for same experience	27	27/50	54.00%
Subdivision made for worse experience	17	17/50	34.00%

C. Rural Subdivision Survey Information

Rural Subdivision Survey-Residents

Dear Homeowner:

Cass County is in the process of updating the county's Comprehensive Plan and will shortly after begin updating the county's Subdivision Ordinances. The Comprehensive Plan can be thought of as the blueprint for the future growth and development of the county and the Subdivision Ordinances are the tools to implement this blueprint or plan. The end goal of updating the comprehensive plan is to create policies which will shape the future development of the county. Public input is crucial element of the Comprehensive Planning process; as a result the county respectfully requests your input regarding your experiences living in a rural subdivision; input which will be used to help update Cass County's Comprehensive Plan.

This survey is being sent to all the residents living in the rural subdivisions surrounding the West Fargo/Fargo metro area. The information gathered from the surveys will only be used to help update Cass County's Comprehensive Plan and Subdivision Ordinances. The survey does not require any personal information and any provided will not be published or shared. The county only asks you to answer the questions based on your experiences living within your current subdivision. This information will be used to help guide the county's update of the subdivision ordinances to hopefully create the best possible experiences for residents of future rural subdivisions.

Please return the survey in the included post paid envelope. Any questions or comments can be directed to Mike Zimney at (701) 298-2375 or zimneym@co.cass.nd.us

- The Subdivision you currently reside in: _____
- Where did you previously reside:
 - In Cass County
 - Metro Area (Fargo/West Fargo)
 - One of Cass County's other cities
 - A different rural subdivision
 - A rural home not part of a larger rural subdivision
 - Outside of Cass County
 - Large city (100,000+)
 - Medium sized city (15,000-100,000)
 - Smaller city (under 15,000)
 - A rural subdivision
 - A rural home not part of a larger rural subdivision
- Length of time you have lived in your current subdivision:
 - Less than one year
 - One to three years
 - Three to eight years
 - Eight or more years

4. Why did you choose to live in this subdivision (check all that applies)?

- More affordable land
- Larger lots
- More lot or construction options
- Fewer restrictions
- Ability to have horses or other animals
- "Rural" atmosphere
- Lower taxes
- Lower cost of living
- Distance yourself from the Fargo/West Fargo area

5. Check all that applies to your subdivision:

- Roads within subdivision are gravel
- Roads within subdivision are privately owned and maintained
- Don't know
- The township or county roads servicing subdivision are gravel
- Subdivision uses open ditches for storm water
- Subdivision uses an underground storm water system
- Subdivision uses wells
- Subdivision uses rural water
- Subdivision uses city water
- Subdivision uses on-site septic systems
- Subdivision uses a central sanitary sewer system

6. If you at one time lived within an urban area, what aspects do most miss (check all that applies)?

- Paved Roads
- Publicly owned and maintained roads
- Central sanitary sewer system
- Underground storm water system
- Proximity to the metro area
- Sidewalks, bike paths, or walking trails
- Open space and parks
- Street lights
- Street trees
- Closer proximity to Fire, Police, and Emergency services
- Other: _____

7. What aspects of your rural subdivision do dislike?

- Quality of roads within the subdivision
- Quality of public roads servicing the subdivisions
- On site septic systems
- The open ditches
- Truck traffic from farming operations
- Dust/chemical spraying from surrounding farms
- Noise from surrounding farms
- Odors from surrounding farms
- Other: _____



Rural Subdivision Survey Results			
Question	Sum	Ratio	Percentage
2. Location of your previous residence			
Cass County	458	458/579	79.10%
Metro area	376	376/458	82.10%
City	19	19/458	4.15%
Rural subdivision	44	44/458	9.61%
Rural home	14	14/458	3.06%
Outside of Cass County	121	121/579	20.90%
Large city	26	26/121	21.49%
Medium city	42	42/121	38.02
Small city	19	19/121	15.70
Rural subdivision	16	16/121	13.22
Rural home	25	25/121	20.66
3. Length of time in current home			
Less than a year	17	17/563	3.02%
1-3 years	95	95/563	16.87%
3-8 years	171	171/563	30.37%
8+ years	280	280/563	49.73%
4. Reasons for choosing subdivision			
More affordable land	231	231/568	40.67%
Larger lots	506	506/568	89.08%
More lot/construction options	91	91/568	16.02%
Fewer restrictions	254	254/568	44.72%
Ability to have animals	52	52/568	9.15%
“Rural” atmosphere	451	451/568	79.40%
Lower taxes	259	259/568	45.60%
Lower cost of living	99	99/568	17.43%
Distance from metro area	294	294/568	51.76%
5. What features apply to subdivision			
Subdivision roads gravel	292	292/568	51.41%
Road private	274	274/568	48.24%
Don’t know	45	45/568	7.92%
Access roads gravel	173	173/568	30.46%
Open ditches	453	453/568	79.75%
Central storm water	15	15/568	2.64%
Wells	185	185/568	32.57%
Rural water	419	419/568	73.77%
City water	11	11/568	1.94%
On-site septic	380	380/568	66.90%
Central sanitary	138	138/568	24.30%
6. Urban services that are missed			
Paved roads	171	171/568	30.11%
Publicly owned roads	51	51/568	8.98%
Central sanitary	138	138/568	24.30%
Central storm water	15	15/568	2.64%
Proximity to metro area	37	37/568	6.51%
Sidewalks, trails	112	112/568	19.72%
Open space and parks	15	15/568	2.64%
Street trees	23	23/568	4.05%
Street lights	40	40/568	7.04%
Proximity to 911 responders	77	77/568	13.56%

7. Dislikes of your subdivision			
Quality of subdivision roads	136	135/568	23.77%
Quality of access roads	81	81/568	14.26%
On site septic systems	60	60/568	10.56%
Ditches	67	67/568	11.80%
Truck traffic from farms	16	16/568	2.82%
Dust/chemicals from farms	50	50/568	8.80
Noise from farms	2	2/568	0.35%
Odors from farms	13	13/568	2.29%
8. Has access been blocked by floods			
No	193	193/553	34.90%
Yes	360	360/553	65.10%
If yes, did is it a cause for concern			
Yes	70	70/186	37.63%
No	116	116/186	62.37%
9. Would you prefer paved roads			
Yes	222	222/312	71.15%
No	90	90/312	28.85%
Even if increased personal cost			
No	40	40/214	18.69%
Yes	174	174/214	81.31%
Roads paved by developer	56	56/158	35.44%
Roads paved by residents	102	102/158	64.56%
\$0-2000	65	65/156	41.67%
\$2000-4000	57	57/156	36.54%
\$4000-6000	25	25/156	16.03%
\$6000+	9	9/156	5.77%
10. Rate subdivision roads			
Good	363	363/562	64.59%
Neutral	148	148/562	26.33%
Bad	51	51/562	9.07%
11. Rate subdivision ditches			
Good	303	303/542	55.90%
Neutral	186	186/542	34.32%
Bad	53	53/542	9.78%
10. Rate subdivision			
Good	506	506/562	90.03%
Neutral	53	53/562	9.43%
Bad	3	3/562	0.53%