Land Use Report

St. Louis County Comprehensive Land Use Plan

St. Louis County, Minnesota

Prepared by:

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SRF No. 10360

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INTRODUCTION AND TERMINOLOGY

This document is intended to provide a basis for land use mapping and policy in areas of St. Louis County subject to the county's zoning jurisdiction. However, the document also includes the analysis of the entire county and cities separately, as necessary, or where there is not information at a sufficient level of detail to focus solely on the areas of county zoning jurisdiction. The following terms are used throughout this document and are defined as follows:

- **St. Louis County, entire county, or the county**: when these terms are used, they each refer to the county in its entirety, including all cities, townships and unincorporated areas.
- **County zoning jurisdiction**: when this term is used, it refers to only those areas where county zoning requirements apply. It does not include any cities or townships with their own zoning authority.

DEMOGRAPHICS

Within the past 40 years, St. Louis County experienced both population growth and decline at varying rates as evident by Table 1. According to the U.S. Census, the population of the entire county has dropped by approximately 9% since 1970. The significant reason for this population loss can be attributed to the cities' share of the population in the county—most notably in the 1980s the county's cities lost about 10% of their population. The population of the county's zoning jurisdiction has always composed less than 20% of the county's total population. When examined further, the percentage share of the total population within the county's zoning jurisdiction increased marginally versus the percentage of the total population in city jurisdictions. These findings suggest that the cities of the county are experiencing declines in population at faster rates than the county's zoning jurisdiction. While these quantities are indicative of the long-term demographic history for the county, they do not necessarily reflect any recent changes. Therefore, an estimate from 2015 is provided which exposes a continuation of the declining trend in population for the county's zoning jurisdiction at 36,173.

Table 1: Population Change Comparison 1970 to 2015

	St. Louis County		County Zoning Jurisdiction			City Jurisdiction		
Year	Pop.	Percent Change	Pop.	Percent Change	Percent of County	Pop.	Percent Change	Percent of County
1970	220,693	-5	29,830	-	14	165,929	-	75.2
1980	222,229	1	38,392	29	17	158,786	-4	71.5
1990	198,213	-11	34,462	-10	17	143,251	-10	72.3
2000	200,528	1	36,649	6	18	143,133	-0.1	71.4
2010	200,226	-0.2	36,235	-1	18	142,927	-0.1	71.4
2015	*200,506*	*-0.1*	*36,173*	-0.2	18	*142,942*	*<-0.1*	*71.3*
Median*	**200,528**	**-9%**	**36,235**	**3**	**17%**	**143,251**	**-2**	**71.5%**

Source: United States Census Bureau, Decennial Census and ACS Estimates, 1970 to 2015. Note: Italics are ACS estimates.
*Median of census years only.

Another beneficial method to determine population trends of the county is examining changes from the geographic perspective. Figure 1 illustrates the population change by county population sub-regions (or subdivisions as termed by the Census). This figure also helps depict where the county population has declined, remained static, or even increased.

Racial/Ethnicity Composition

The racial composition of St. Louis County as a whole is predominantly White, with Black or African-American, American Indian/Alaskan Native, Asian/Pacific Islander and Hispanic Origin each between 1-2% of the total population. The county's cities have a slightly larger percentage of those identified as White, but have a greater percentage than the county as whole of Black or African-American, American Indian/Alaskan Native, and Asian/Pacific Islander. In comparison to the county's cities and the entire county, the county's zoning jurisdiction has a higher distribution of persons who identify as White and American Indian or Alaskan Native. Refer to Table 2 for race/ethnicity detail in St. Louis County as a whole, in the county's zoning jurisdiction, and in areas of city jurisdiction.

Table 2: Racial/Ethnicity Composition, 2015

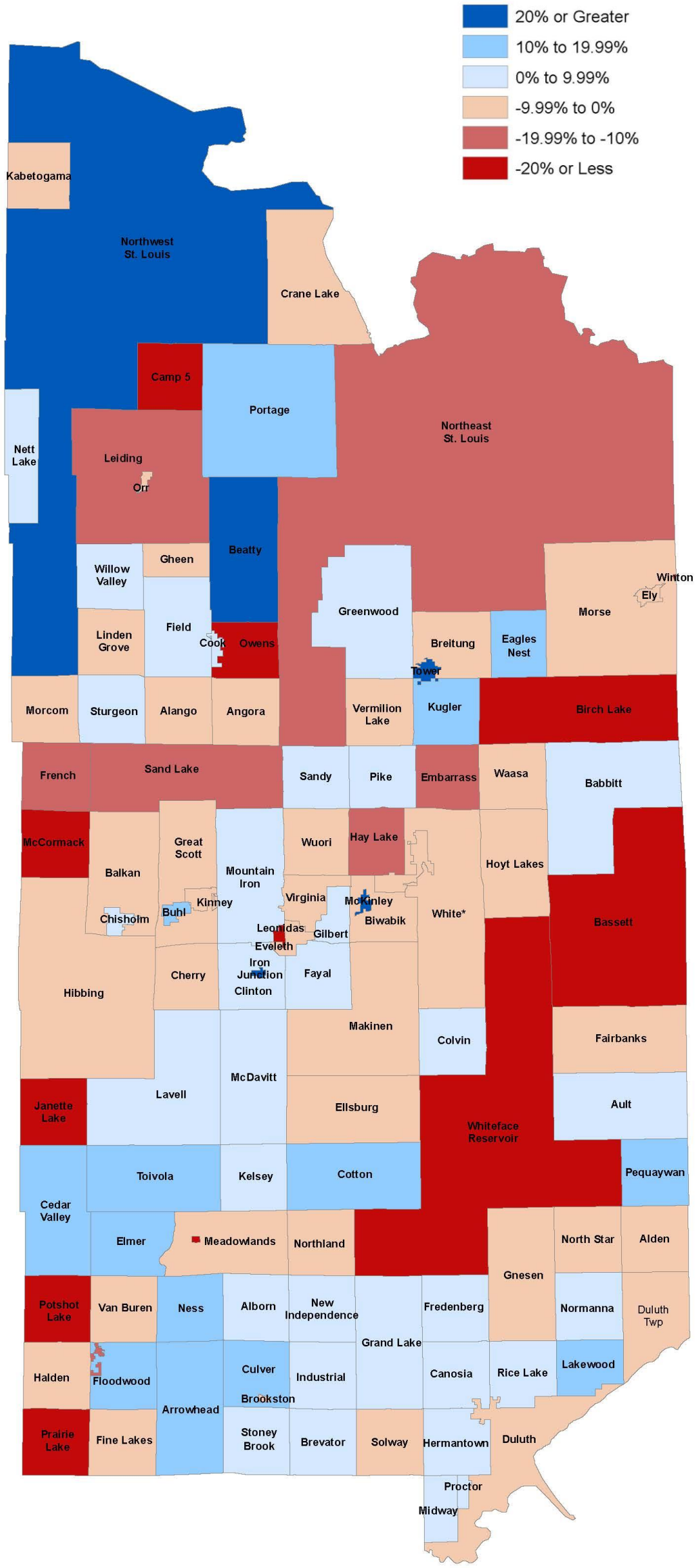
Race*/Ethnicity	St. Louis County	County Zoning Jurisdiction	City Jurisdiction
White	92.6%	95.6%	94.5%
Black or African-American	1.5%	0.6%	3.2%
American Indian/Alaskan Native	1.9%	4.7%	3.0%
Asian/Pacific Islander	1.0%	1.0%	1.6%
Other	2.8%	0.2%	0.1%
Hispanic Origin**	1.4%	1.0%	0.4%

Source: United States Census Bureau, ACS Estimates, 2015. *Race alone or combination of. **Defined as an ethnicity, not a racial category.

Age Distribution

A population pyramid illustrates the distribution of age groups in a population within an area. The graph consists of two back-to-back bar graphs, with the percentage of population plotted on the horizontal axis and the age groups on the vertical axis. The left side of the graphs represent the percentage of males and the right side the number of females in each of the five-year age groups. Data estimates from the U.S. Census was applied in the creation of these pyramids.

Figure 1: County Sub-region Comparison, Population Change between 2010 and 2015



2010-2015 Change by Geographic Area			
Alango Township	-5	Kelsey Township	8
Alborn Township	22	Kinney	0
Alden Township	-19	Kugler Township	31
Angora Township	-7	Lakewood Township	0
Arrowhead Township	23	Lavell Township	5
Ault Township	6	Leiding Township	-49
Aurora	-17	Leonidas	0
Babbitt	42	Linden Grove Township	-2
Balkan Township	-30	Makinen UT	-95
Bassett Township	-21	McCormack Lake UT	-68
Beatty Township	76	McDavitt Township	16
Birch Lake UT	-178	McKinley	0
Biwabik	22	Meadowlands	0
Biwabik Township	-4	Meadowlands Township	-5
Breitung Township	-29	Midway Township	0
Brevator Township	25	Morcom Township	-2
Brookston	-2	Morse Township	-6
Buhl	-11	Mountain Iron	8
Camp 5 Township	-25	NE St. Louis UT3	-41
Canosia Township	0	Ness Township	7
Cedar Valley Township	33	Nett Lake UT	27
Cherry Township	-29	New Independence Township	18
Chisholm	30	Normanna Township	51
Clinton Township	23	North Star Township	-15
Colvin Township	9	Northland Township	-4
Cook	-6	NW St. Louis UT3	177
Cotton Township	51	Orr	68
Crane Lake	-8	Owens Township	-57
Culver Township	30	Pequaywan Township	15
Duluth	-235	Pike Township	18
Duluth Township	0	Portage Township	31
Eagles Nest Township	32	Potshot Lake UT	-41
Ellsburg Township	-8	Prairie Lake Township	-12
Elmer Township	19	Proctor	8
Ely	-56	Rice Lake Township	24
Embarrass Township	-76	Sand Lake UT3	-139
Eveleth	-49	Sandy Township	24
Fairbanks Township	-6	Solway Township	-25
Fayal Township	76	Stoney Brook Township	6
Field Township	30	Sturgeon Township	2
Fine Lakes Township	-2	Toivola Township	26
Floodwood	-7	Tower	-4
Floodwood Township	28	Van Buren Township	-10
Franklin	0	Vermilion Lake Township	-8
Fredenberg Township	75	Virginia	-134
French Township	-58	Waasa Township	-8
Gheen UT	0	White Township	147
Gilbert	-9	Whiteface Reservoir UT	-99
Gnesen Township	0	Willow Valley Township	2
Grand Lake Township	10	Winton	-1
Great Scott Twp	-37	Wuori Township	-23
Greenwood Township5	92		
Halden Township	-2		
Hay Lake UT	-10		
Hermantown	282		
Hibbing	-174		
Hoyt Lakes	-15		
Industrial Township	8		
Iron Junction	0		
Janette Lake UT	-71		
Kabetogema	-7		

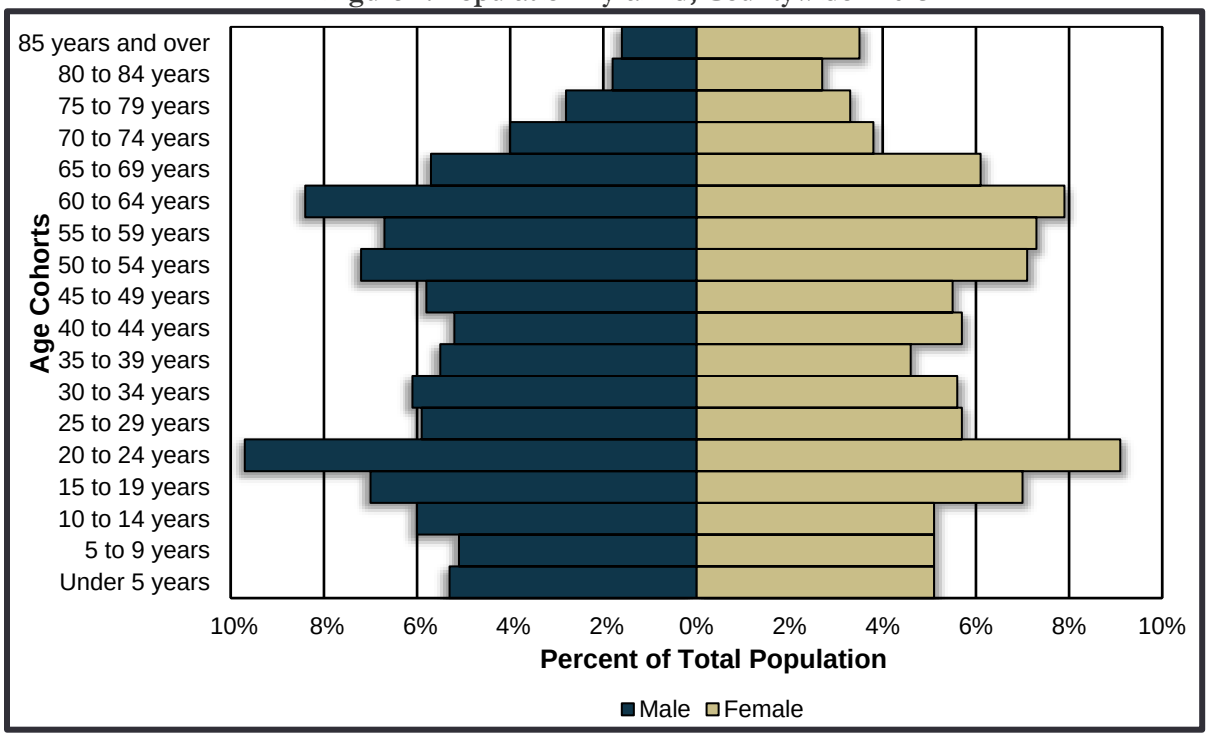
Source: United States Census Bureau, Decennial Census and ACS Estimates, 2010 to 2015.

Countywide, the most noticeable population segments due to significant size include teenager and young adults ages 15 to 24 (i.e., millennials) and a portion of the baby boomers, ages 50 to 64 (refer to Figure 2). The total county population was broken down between areas of county zoning jurisdiction (more rural populations) and the county's cities to provide a deeper understanding of how the two areas differ.

By comparing the population pyramid of the area within the county' zoning jurisdiction to that of the county's cities as shown in Figures 3 and 4, consistencies and inconsistences of population can be identified. For example, the share of population in the age range of 40 to 55 is nearly identical in the county's zoning jurisdiction as in the cities. In comparison, the cities tend to have a greater distribution of children (under 5 to 19) and young adults (20 to 34) than found within the county's zoning jurisdiction.

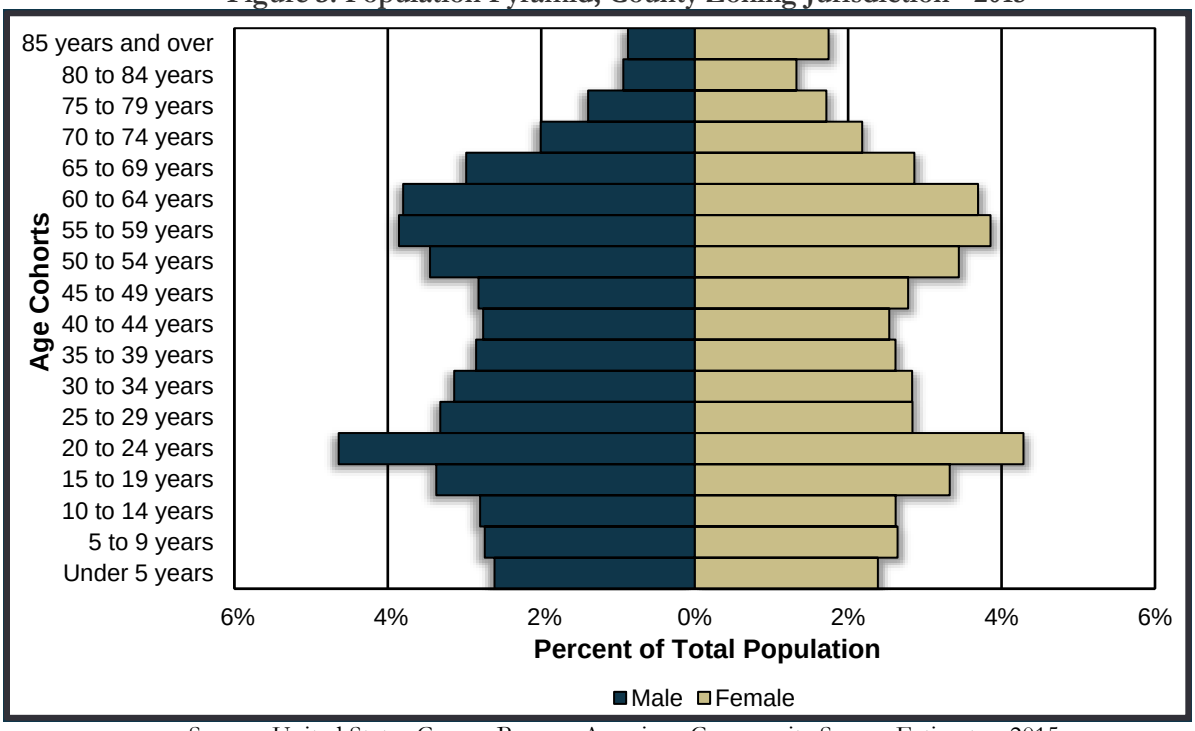
The population pyramid differences show a greater percentage of baby boomers (ages 50-74) in the area of county zoning jurisdiction. This may be due to the ability of baby boomers to afford permanent or second homes in areas of county zoning jurisdiction, potentially including a significant number of retirees not tied to a city for employment purposes. Young adults (ages 20-24) tend to reside in the cities in greater percentages, likely due to their connection to a post-secondary education and employment found in the cities. Families (children under 5 to 19 and young adults 25 to 34) also tend to reside in the cities in greater percentages, likely due to the availability of employment and needed services, such as schools or retail.

Figure 2: Population Pyramid, Countywide - 2015



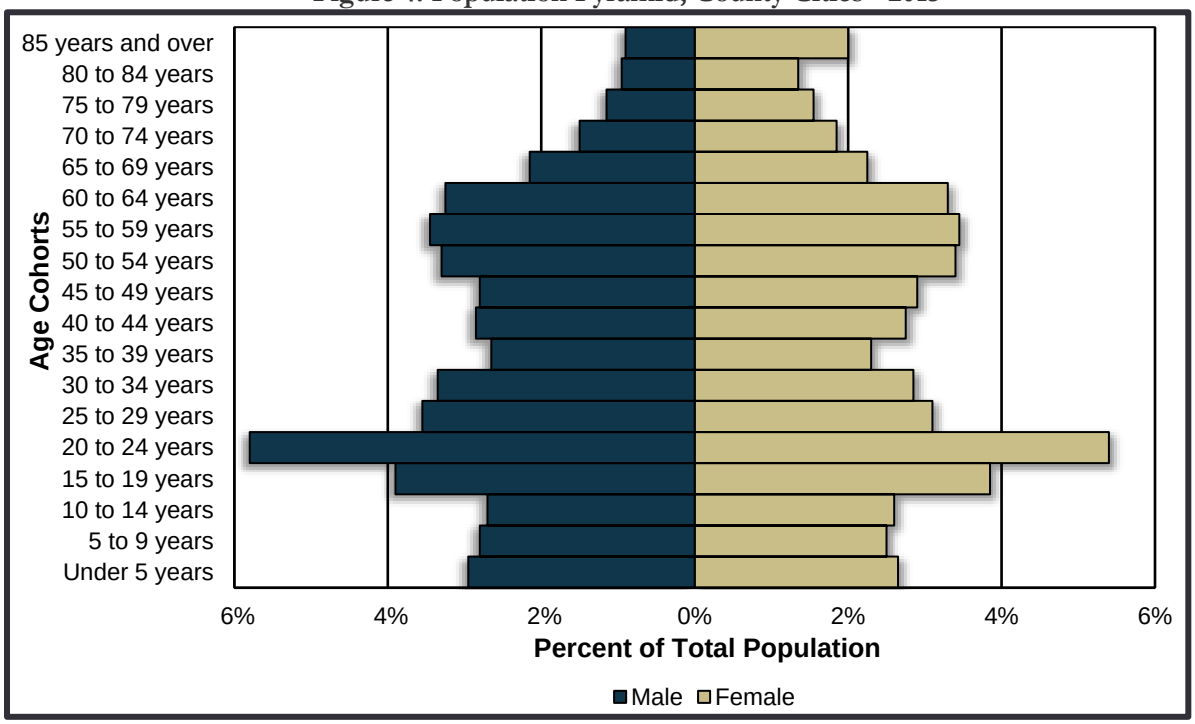
Source: United States Census Bureau, American Community Survey Estimates, 2015.

Figure 3: Population Pyramid, County Zoning Jurisdiction - 2015



Source: United States Census Bureau, American Community Survey Estimates, 2015.

Figure 4: Population Pyramid, County Cities - 2015



Source: United States Census Bureau, American Community Survey Estimates, 2015.

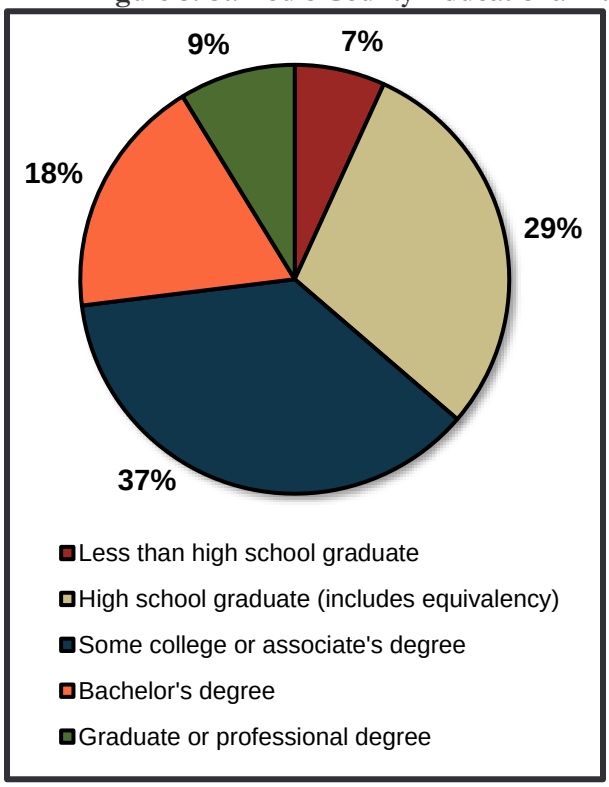
As the county's population ages and migrates, there will be implications on housing, education, and a host of related needs that will result in different land use demands than previously expected. To envision how the county's zoning jurisdiction may appear in 2035, a breakdown of the projected age distribution is provided in the projection section. Potential implications of population change on future land use include the following:

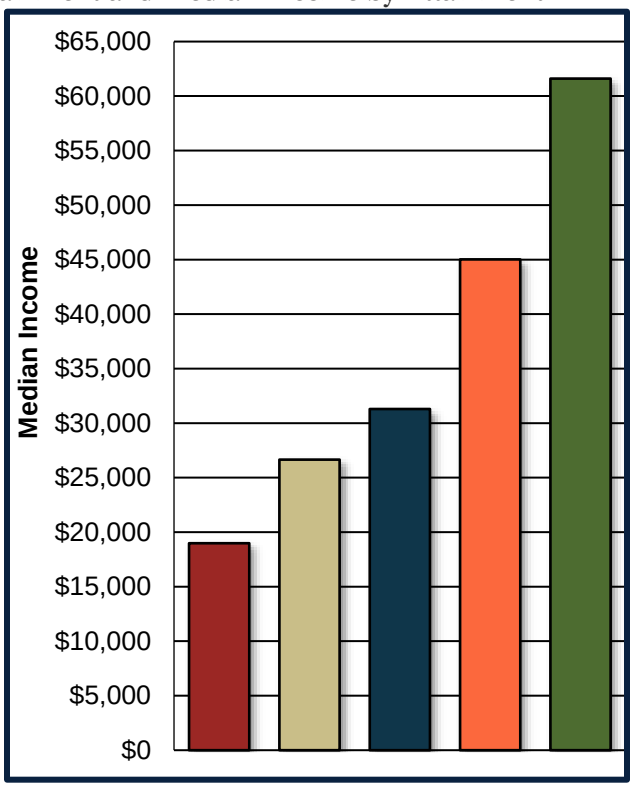
Age Groups	Potential Land Use Implications
Families with small children	▪ The land use demand for this demographic is difficult to project due to economic challenges faced by some of the cities in the Iron Range. The possible improvement in economic opportunities in iron range cities and associated advancements in quality of life factors will likely, in the long term, attract families with small children back to urban areas.
Retirement age/elderly	▪ Demand for smaller residential properties in the form of smaller single family detached homes, attached units, and other single family arrangements with reduced size (smaller living units with less yard and floor area to maintain). ▪ "Retirement age" communities are becoming increasingly popular that include a mix of housing types, usually developed through a PUD (Planned Unit Development) or PAD (Planned Area Development) with an accompanying special land use master plan.

EDUCATION (ENTIRE COUNTY)

Education and income are undeniably linked, and play a significant role in a community's economy (Figure 5). St. Louis County as a whole is moderately competitive in terms of educational attainment and less so in its relationship to income. Roughly 29% of county residents over the age of 25 hold solely a high school diploma, slightly greater than the statewide average of 26%. Approximately 18% of adults over the age of 25 hold at most a bachelor's degree, compared to 23% statewide. When comparing the median income for a person holding only a high school diploma, those within the county make approximately $4,000 less than the state average. For a person holding a bachelor's degree, the median income for the county is approximately $6,300 less than the state average.

Figure 5: St. Louis County Educational Attainment and Median Income by Attainment

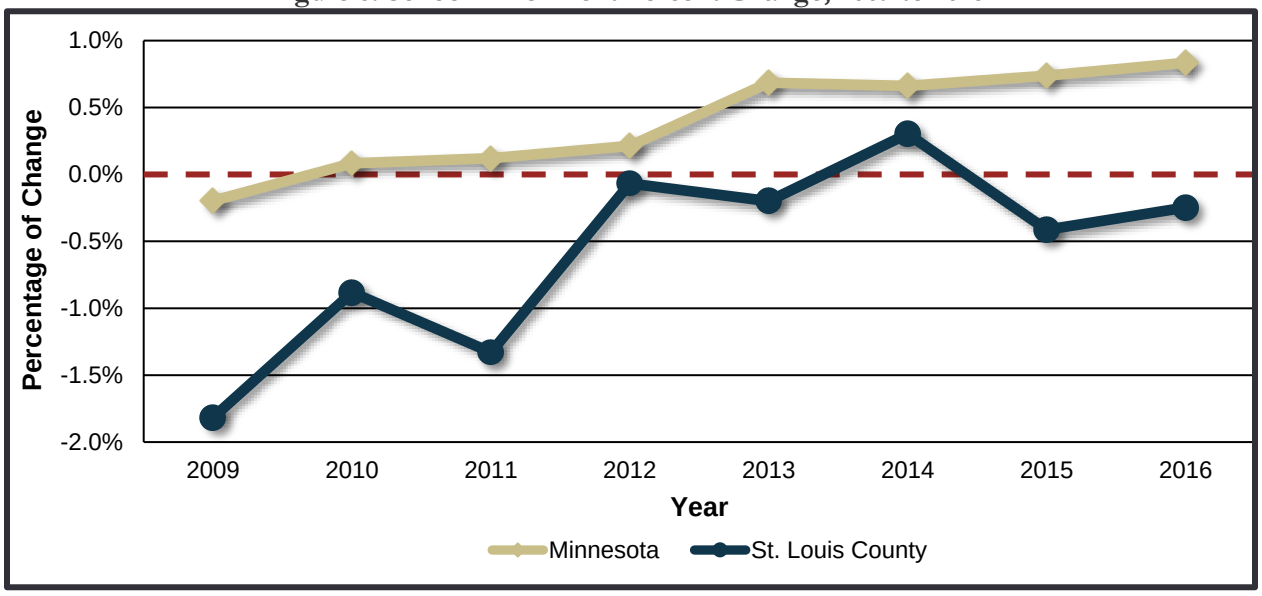




Source: United States Census Bureau, American Community Survey Estimates, 2015.

As expected with the change in population, school enrollment within the county has declined about 0.5% annually since 2009 (Minnesota Department of Education). Figure 6 illustrates the extent of enrollment decline by comparing it to the state. While the county has experienced recent declines in enrollment, its overall trend is comparable to the state (i.e., trending slightly upwards). This finding along with the general demographic trends suggests that while collectively the county is experiencing population decline, families with children are migrating less outside of the county then in recent years.

Figure 6: School Enrollment Percent Change, 2009 to 2016



Source: Minnesota Department of Education, 2009 to 2016.

HEALTH INDICATORS

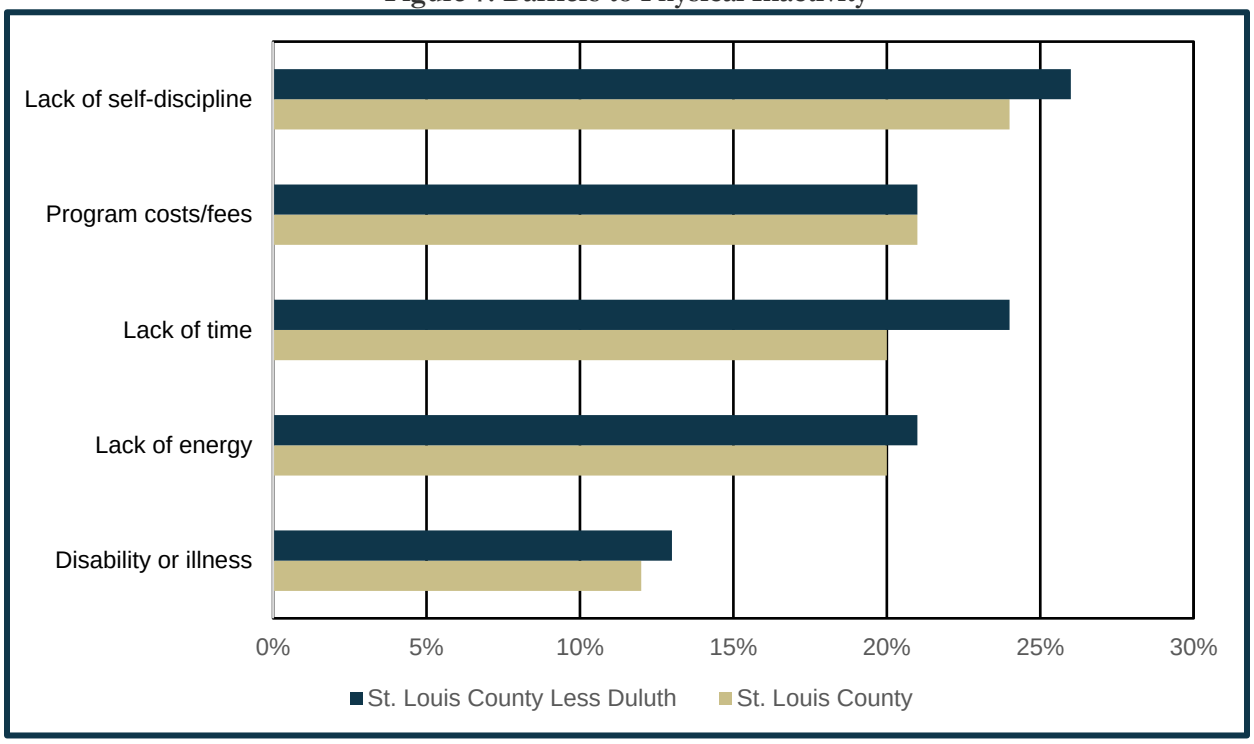
Factors that impact an individual's health are 80% health behaviors, socioeconomic factors, and the physical environment. For this reason, it is important to consider how different elements considered in the comprehensive land use plan affect the public's health. The plan will have a significant impact on future development location, design, transportation issues, economic development, and other issues influenced by land use decisions—all of these issues will have some type of impact to public health by affecting the physical environment in which people live and behave, as well as the economic success of the county.

The county Public Health and Human Service Department, along with a number of regional partners have supported the Bridge to Health Survey for the past several years. The survey helps to draw out priority health areas of need. The most recent survey was conducted in 2015 and includes information for St. Louis County as a whole and the county less Duluth. Detailed information from the survey can be viewed at http://www.bridgetohealthsurvey.org/. The survey highlighted three particular areas that are more directly connected to land use development than others—these areas include obesity, physical inactivity, and access to health foods.

The survey identified the five top barriers to physical activity—these responses differ for the county as a whole versus the county less Duluth (refer to Figure 7). All barriers are indicated as being more of an obstacle outside of Duluth. "Lack of time" as a barrier to physical activity was a more common response for the county less Duluth—drilling down into this survey response may be helpful in understanding whether "lack of time" is influenced by increased commute times, work shifts, or a combination of different factors. Access to health foods is also of greater concern outside of Duluth in the county. Outside of Duluth, 55% of residents in poverty were more likely to worry "often" or "sometimes" that they would run out of food before they had money to buy more—this response drops to 44% when including Duluth. Outside of Duluth, residents in poverty were less likely to report

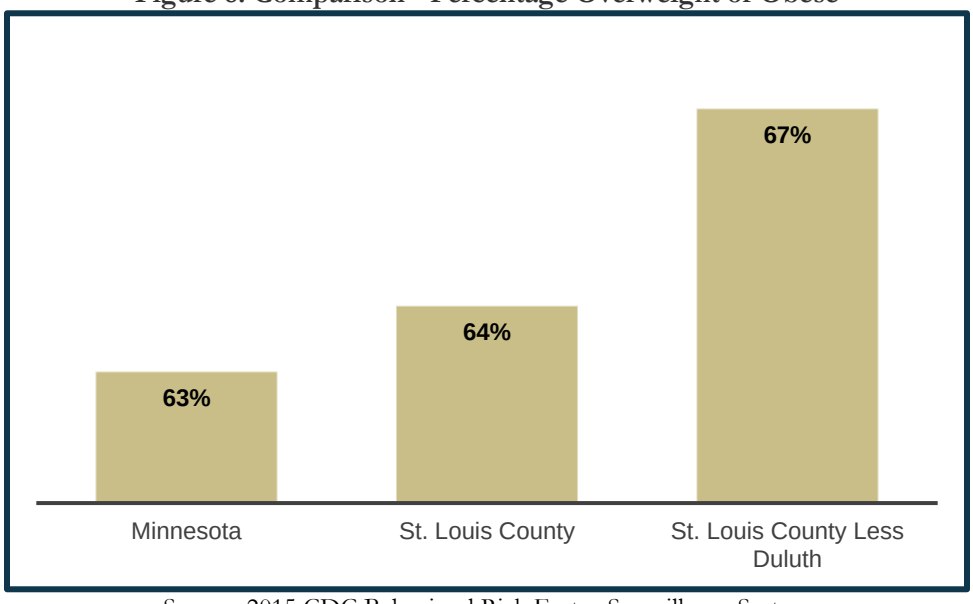
eating five or more servings of fruit and vegetables the previous day compared to those not in poverty—this response was reverse when including Duluth. Obesity is an often-used health indicator. As shown in Figure 8, the percentage of residents overweight or obese is significantly greater in the county outside of Duluth.

Figure 7: Barriers to Physical Inactivity



Source: Bridge to Health Survey, 2015.

Figure 8: Comparison - Percentage Overweight or Obese



Source: 2015 CDC Behavioral Rick Factor Surveillance System

HOUSING CHARACTERISTICS

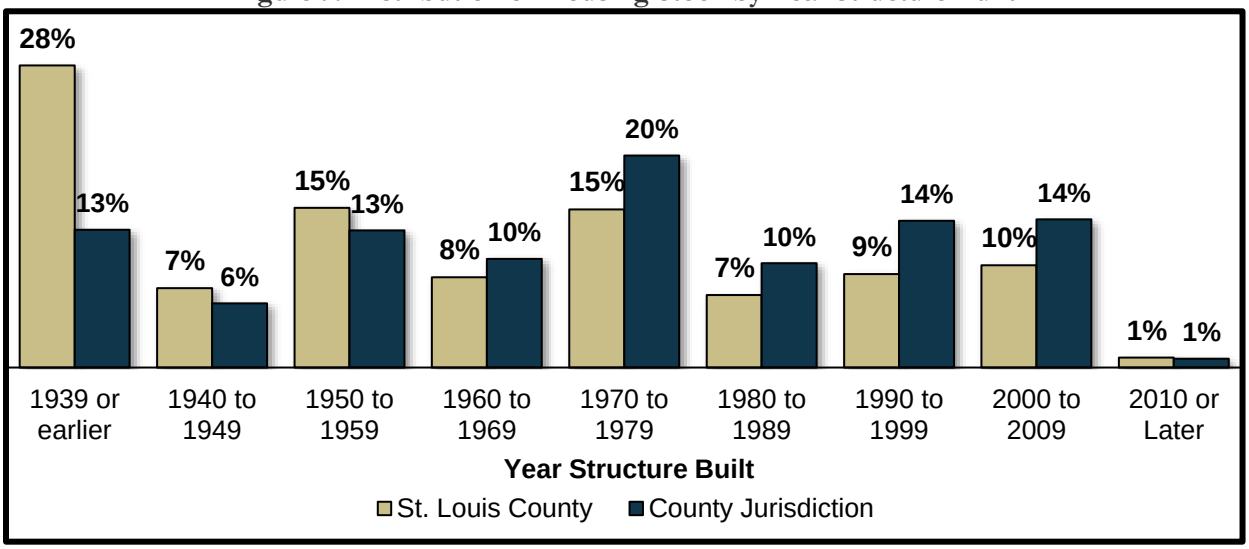
The U.S. Census possesses an extensive library of housing data which can be valuable to the planning process. Some of the most useful data sets include persons per household, housing occupancy, and housing tenure. This data identifies current housing trends in a community by examining housing supply and demand, which can help decision makers with decisions on future development.

U.S. Census data showed that in 2015, there were 103,434 housing units in all of St. Louis County, approximately 19% of which were vacant. The percentage of vacant housing units in the county was significantly higher than the percentage of housing units vacant in 2015 for the state (approximately 10%). For 2015, St. Louis County's housing tenure was 72% owner-occupied and 28% renter-occupied, which is comparable to the state's housing tenure rates at 71% owner-occupied and 29% renter-occupied during the same year. The average persons per household countywide was 2.39 for owner-occupied housing and 1.99 for renter-occupied housing. These countywide averages are noticeably lower than the statewide average (2.6 for owner-occupied housing and 2.23 for renter-occupied housing).

There was a total of 27,636 housing units in St. Louis County's zoning jurisdiction as of 2015 and approximately 41% of these housing units were vacant. The average persons per household in the county's zoning jurisdiction was 2.24 for occupied housing and 2.41 for rental housing. The percentage of housing units vacant is a significant factor that is likely a result of the presence of seasonal residences in the lakeshore areas and other rural parts of the county. In comparison to countywide and state averages, the area of county zoning jurisdiction's higher owner-occupied and lower renter-occupied persons per household statistics also help to confirm the notable presence of seasonal residences.

The distribution of housing stock by the year the structure was built in both St. Louis County (entire county) and in the county's zoning jurisdiction is illustrated in Figure 9. This analysis reveals the majority of housing in the county's zoning jurisdiction was built in the 1970s or before 1940 for the entire county. The second largest group of housing was built between 1990 and 2009 for the county zoning jurisdiction and the 1950s and 1970s for the entire county. Collectively, Figure 9 illustrates that most housing in the county's zoning jurisdiction is newer compared to the entire county, where housing within cities is older.

Figure 9: Distribution of Housing Stock by Year Structure Built

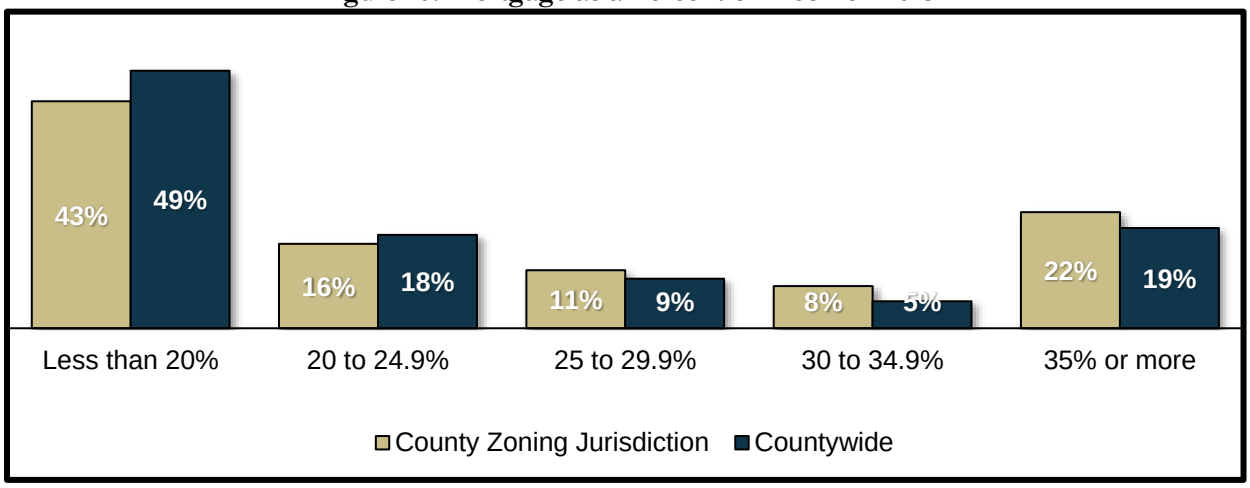


Source: United States Census Bureau, American Community Survey Estimates, 2015.

Housing Affordability

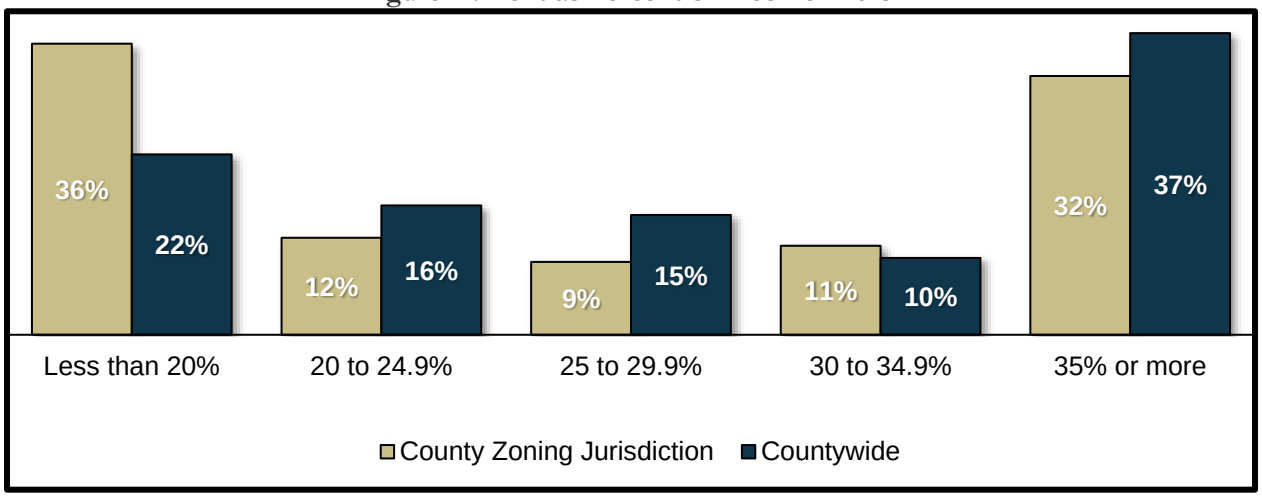
The U.S. Department of Housing and Urban Development (HUD) defines affordable housing as housing which requires less than 30% of a household's income. Those who pay more than 30% of their income for housing are considered *cost burdened* and may have difficulty affording other necessities such as food, clothing, etc. (HUD). As of 2015, over 24% of all housing unit owners and nearly 49% of renters were considered *cost burdened* countywide. Figures 10 and 11 illustrate the distribution of income spent on rent/mortgage countywide and within the county's zoning jurisdiction. These figures show that owners are more cost burdened in the areas of county zoning jurisdiction than those countywide, while renters are less cost burdened countywide. This may indicate the influence of housing affordability challenges in the county's lakeshore communities. Housing affordability within the county's zoning jurisdiction is above average compared to the nation (32% owner and 52% renter cost burdened nationwide), but below average compared to the state (27% owner and 39% renter cost burdened).

Figure 10: Mortgage as a Percent of Income - 2015



Source: United States Census Bureau, American Community Survey Estimates, 2015.

Figure 11: Rent as Percent of Income - 2015



Source: United States Census Bureau, American Community Survey Estimates, 2015.

Housing Location and Place of Employment

Another characteristic of housing that is critical to examine is its relationship to employment. Commuting plays a large role in shaping the built environment and the quality of life in cities and regions. Commuters incur a travel cost (time + fuel) which increases the cost of living. This cost factors into land prices, and is thus an implicit consideration in the locational decisions of employers and households. As evident by Table 3, the majority (68%) of people employed in St. Louis County also live within the county (2014, ACS). While most residents travel less than ten miles to work, a notable portion (almost 1/5) travel more than 50 miles to work. A close examination of the Census OnTheMap application shows that those commuting more than 50 miles are predominantly traveling to Duluth, Virginia, or Hibbing from the northern half of St. Louis County.

Table 3: Commuter Breakdown in St. Louis County, 2014

Employment Residence		
Employed Only	32,752	31.7%
Employed and Live	70,584	68.3%
Total Employment	**103,336**	**100%**

Where Workers are Employed	
Duluth	42.9%
Hibbing	6.7%
Virginia	6.6%
Hermantown	3.4%
Superior	3.2%
All Other Locations	**37.1%**

Jobs by Distance	
Less than 10 Miles	58%
10 to 24 Miles	18%
25 to 50 Miles	6%
>50 Miles	18%

Source: United States Census Bureau, American Community Survey Estimates, 2014.

ECONOMIC CHARACTERISTICS

The U.S. Census Bureau also maintains an extensive archive of economic data which can be valuable in the planning process. Some of the most useful data sets include employment, household wages, and industries. Once aggregated, this data can reveal current economic trends in a community which can help decision makers make judgements on future land use for economic needs. After analyzing the economic estimates of 2015 in greater detail, the results revealed a total employment of 87,679 for the county as a whole and 30,006 for the county's zoning jurisdiction. Of these totals, approximately 9% of employees are derived from basic sector industries countywide, and 15% of the employees within the county's zoning jurisdiction are derived from basic sector industries.

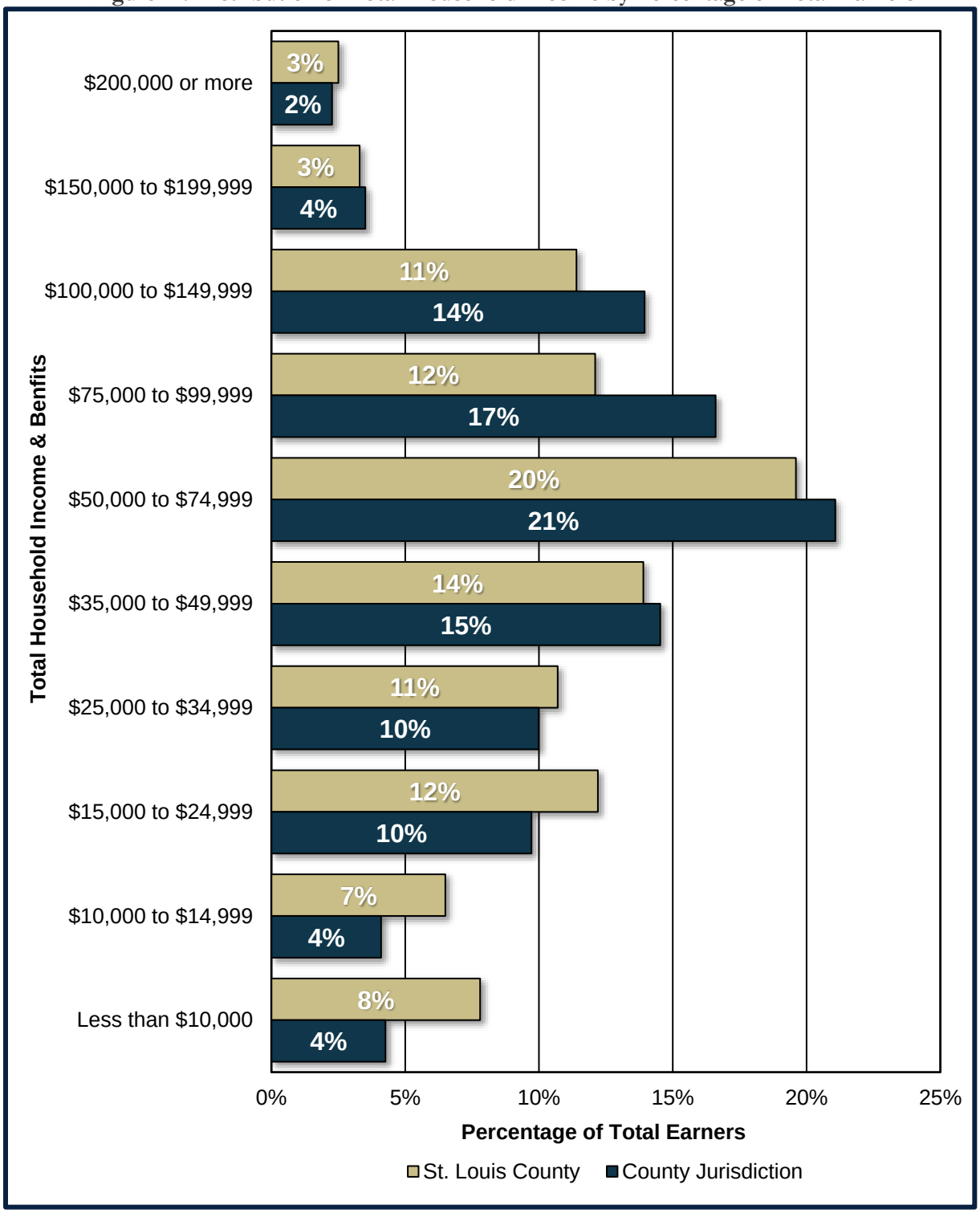
Basic sector industries are firms and parts of firms whose economic activity are dependent on factors external, or factors located outside of the local economy. A higher basic sector ratio within the county's zoning jurisdiction is anticipated due to the significant presence of the mining and timber industries in the area. Since the global economy is highly influential to basic sector industry fluctuations, it is expected that as new data is available the ratio of basic sector jobs is subject to change.

In comparison, the **nonbasic sector** industries are firms or parts of firms whose economic activity are dependently largely on local economic conditions. Some discernible examples of nonbasic sector industries include retail, construction, or local government jobs. For almost all communities, nonbasic sector industries will encompass the principal share of the community's economy as is the case for the entire county (~91%).

Expanding further on the local economy, an outline of income distribution is shown in Figure 12. The median household income within the county's zoning jurisdiction for 2015 was about $54,636; over $6,000 more than for the entire county ($48,331). To illustrate the differences further, Figure 13 exhibits the median household income for each of the county's population sub-regions (or subdivisions as defined by the U.S. Census). The greater percentage of higher income households in areas of county zoning jurisdiction may reflect the following trends:

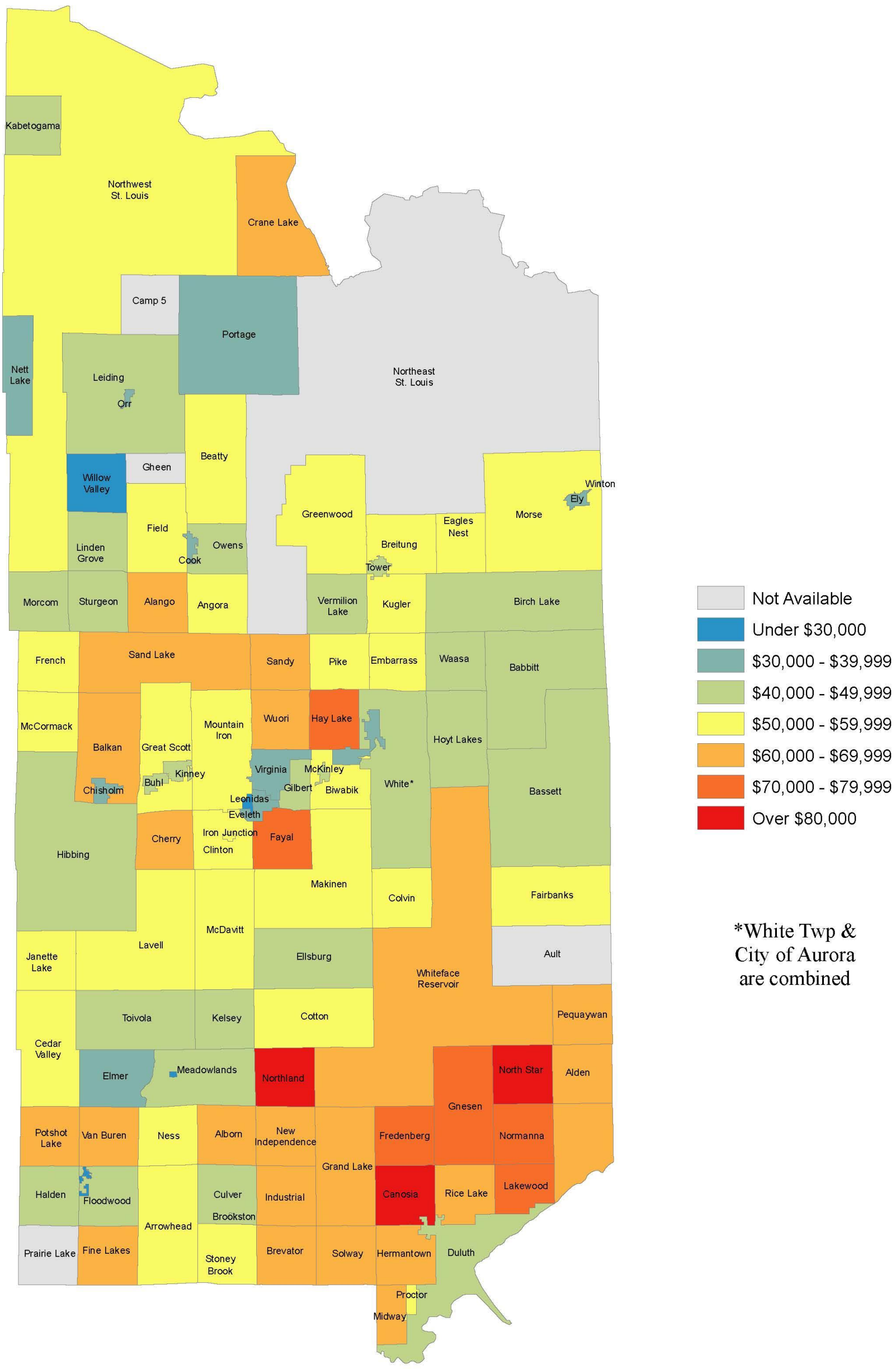
1. Ability of those with a higher income (than the county average) to afford real estate (and likely higher service costs) in lakeshore developments.
2. Those of a lower income tend to reside in the cities where real estate (and service) costs on average are lower than in areas of county zoning jurisdiction or in lakeshore developments.

Figure 12: Distribution of Total Household Income by Percentage of Total Earners



Source: United States Census Bureau, American Community Survey Estimates, 2015.

Figure 13: County Sub-region Comparison – Median Household Income 2015



Source: United States Census Bureau, American Community Survey Estimates, 2015.

Employment

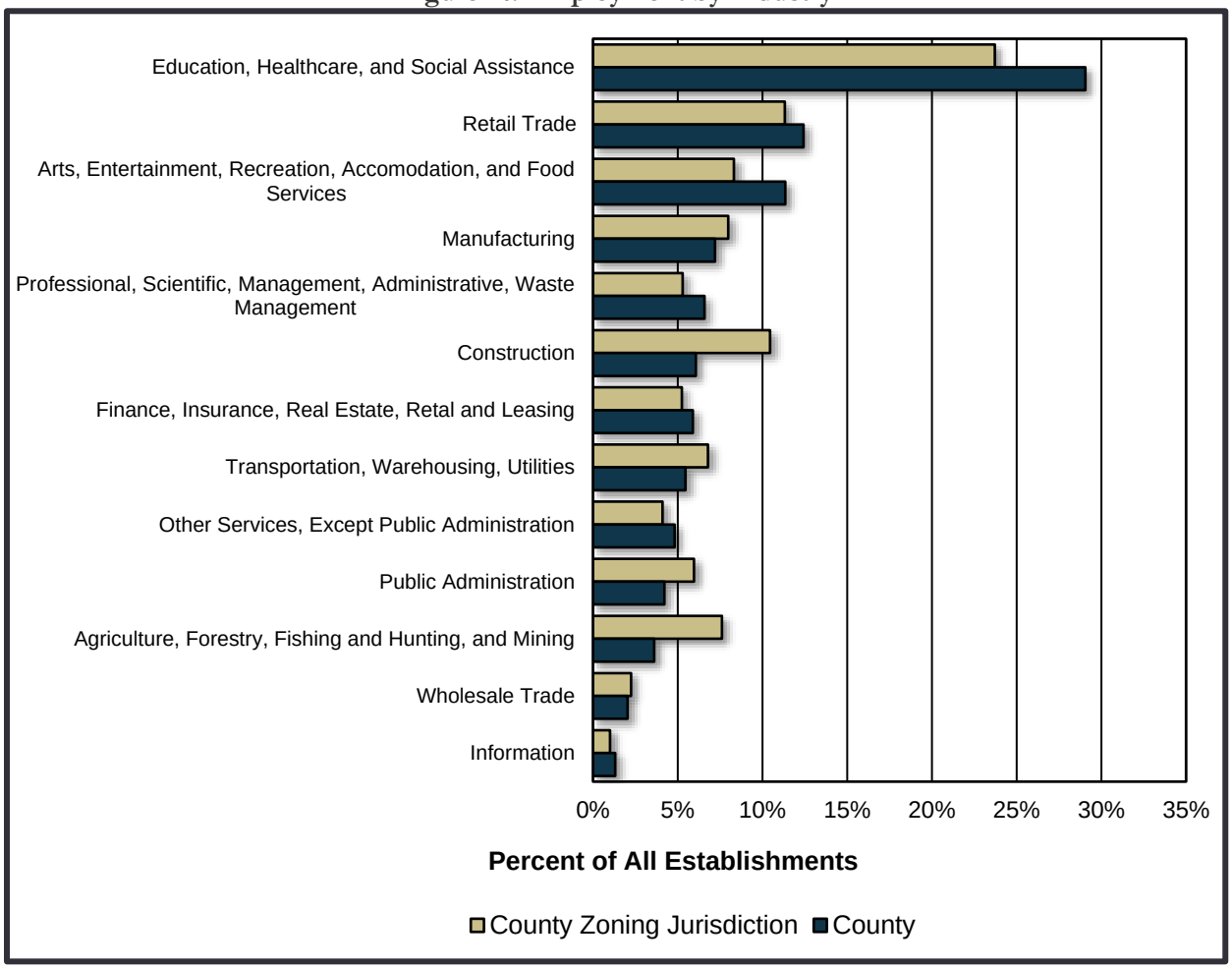
Another economic characteristic that can help identify trends within the county is changes in industries by employment. All industry data was obtained from the U.S. Census Bureau's American Community Survey (ACS) and the Census Business Patterns databases. The ACS provides information down to the level of the county's zoning jurisdiction for employment by industry, but does not provide consistent information for average salary or payroll by industry below the countywide level. The Business Builder databases are provided by direct company organization surveys and should provide more accurate insight into employment conditions than the ACS. As a result of the variation and reliability of the noted datasets, ACS was used to understand employment by industry at both the countywide and county zoning jurisdiction levels, and the Business Builder was used at the lowest level available, countywide, to understand average payroll by industry.

As of 2015, the three largest industries in regards to employment within the entire county were: 1) education, healthcare and social assistance (includes child care, vocational rehabilitation, community housing, and related assistance), 2) retail trade, and 3) arts, entertainment, recreation, accommodation and food services as illustrated in Figure 14. As shown in Table 4, the county's fastest growing industry (by employment) is finance, insurance, real estate, rental and leasing (17%). The industry which has experienced the most decline in the county includes information (-33%). Mining industry information alone was available from the Census Business Patterns databases, and is only available at a countywide level. According to Census Business Patterns data, the mining industry represented roughly 4.3% of the total county workforce (the eighth largest industry in the county). From 2010 to 2015, the industry alone grew by approximately 13%, or by roughly 400 employees.

In 2015, the three largest industries in regards to employment with the county's zoning jurisdiction were: 1) education, healthcare and social assistance (includes child care, vocational rehabilitation, community housing, and related assistance), 2) retail trade, and 3) construction. As shown in Table 4, the county's fastest growing industry (by employment) is wholesale trade (9%). The industry which has experienced the most decline in the county includes information (-39%). Agriculture and forestry are two industries of significant cultural importance in the county's zoning jurisdiction (most rural areas). The percentages for both industries in both the ACS and Business Pattern datasets are very minimal when compared to industries such as mining or education. The likely reason for this is that the Census only recognizes industries that are the primary source of income. For many persons engaged in agriculture and forestry, these industries may not be the primary source of income.

Figure 15 shows the average payroll per employment by industry in 2015—this statistic is a close indicator of salaries by industry. This information is not consistently available below a countywide level, therefore only countywide information has been provided. The top three industries for payroll by employee are mining ($93,194), construction ($72,462), and professional, scientific and technical services ($63,253). A notable difference between payroll by employee and industries with the highest number of employees is that some industries with comparably low payroll by employee statistics are some of the largest employers in the county (including retail trade, accommodation and food services). Further, the two industries with the most growth from 2010 to 2015 are also on the lower half of industries for payroll by employee (including real estate and rental and leasing and arts, entertainment, and recreation). It is likely that this employment data is largely influenced by the annual influx of seasonal residents and its dependence on tourism.

Figure 14: Employment by Industry



Source: U.S. Census American Community Survey, 2015

Table 4: Industry Growth and Decline, 2010-2015

County			County Zoning Jurisdiction	
3 Fastest Growing Industries 2010-2015			3 Fastest Growing Industries 2010-2015	
Finance, Insurance, Real Estate, Rental and Leasing	17%		Wholesale Trade	9%
Other Services, Except Public Administration	12%		Transportation, Warehousing, and Utilities	6%
Manufacturing	11%		Retail Trade	4%
3 Fastest Declining Industries 2010-2015			3 Fastest Declining Industries 2010-2015	
Information	-33%		Information	-39%
Construction	-8%		Arts, Entertainment, Recreation, Accommodation, and Food Services	-8%
Public Administration	-5%		Agriculture, Forestry, Fishing and Hunting, and Mining	-7%

Source: U.S. Census American Community Survey, 2015

Figure 15: Average Payroll per Employee for 2015 (Entire County)

Source: U.S. Census Business Patterns databases, 2015

Mining & Timber

In St. Louis County, mining is typically categorized in two ways—ferrous mining (iron ore) and non-ferrous mining (copper, nickel, lead, and zinc). Current activity is limited to ferrous mining. According to the Census Business Builder as of 2015, 16 mining establishments employed 3,754 people in St. Louis County. While the number of employees that the mining sector directly employs does not rank among the top five employers in St. Louis County, the mining sector does rank as the highest industry for average payroll per employee—$93,194 per employee (Figure 15). The closest industry, construction, is more than $20,000 less per employee. If payroll rates could be maintained at such a level for the mining industry, the expansion of the industry could mean a significant increase in high-paying jobs in the county.

In 2012, the University of Duluth (UMD) produced a report titled The Economic Impact of Ferrous and Non-Ferrous Mining on the State of Minnesota and Arrowhead Region, including Douglas County Wisconsin. The report found, that as of 2012, the entire mining sector contributed $2.1 billion in wages, rents, and profits to the Minnesota state economy. It can be assumed that St. Louis County,

which holds the majority of mining activity in the Arrowhead Region (in the report refers to the counties of Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, and St. Louis) and Douglas County, Wisconsin, contributed at least to the majority of the $2.1 billion impact. Note that the $2.1 billion impact represents the direct value of wages, plus the additional inter-industry spending resulting from the wages, plus additional household spending resulting from these factors. The UMD report also calculated a mining sector employment multiplier of 2.8 for the region, which indicated that for every job created in the mining sector, another 1.8 jobs are created as the indirect and induced effect of the mining sector job. Similarly, for every dollar of wages, rents, interest, and profits paid to mining employees and companies, an additional $0.66 is generated through indirect and induced effects through the state economy.

A 2011 report prepared by the State Department of Natural Resources and UMD (Economic Contribution of Minnesota's Forest Product's Industry) found that there were 40,370 forestry-related jobs throughout Minnesota. Of this total, St. Louis County supported between 101 and 500 jobs. The county was not one of the top ten counties in the state for forestry-related jobs. The main reason for this disparity is due to the lack of forest products manufacturing facilities in the county. Rather, St. Louis County was the main provider of timber in Minnesota, ranking as the number one county in the state (as of 2011) for timber harvest (612,296 cords were harvested in 2011, compared to the number two harvest county, Itasca, with 361,457 cords harvested).

Tourism

For the leisure and hospitality industries, according to the Census Business Builder as of 2015, 650 establishments employed 11,292 people in St. Louis County. The accommodation, food service, arts, entertainment, and recreation industries as provided in Figures 14 and 15 account for the leisure and hospitality industries. Together, these industries employ 13% of the county's employment base. However, these industries are at the bottom of the list for average payroll per employee, at approximately $16,000.

In 2015, the Iron Range Resources and Rehabilitation Board (IRRR) prepared a report titled The Economic Impact of Leisure & Hospitality in IRRR Service Area. The IRRR service area includes the majority of St. Louis County, except for the City of Duluth and other small portions at the southern end of the county. The county's land area makes up the majority or IRRR's service area. The report closely examined the following specific industries associated with tourism:

- performing arts, spectator sports, related industries
- museums, historical sites, similar industries
- amusement, gambling, recreation
- accommodation
- food services, drinking places

The IRRR report found that in 2014 the leisure and hospitality industries in the IRRR service area contributed $493 million in wages, rents, and profits to the region. Note that the $493 million impact represents the direct value of wages, plus the additional inter-industry spending resulting from the wages, plus additional household spending resulting from these factors.

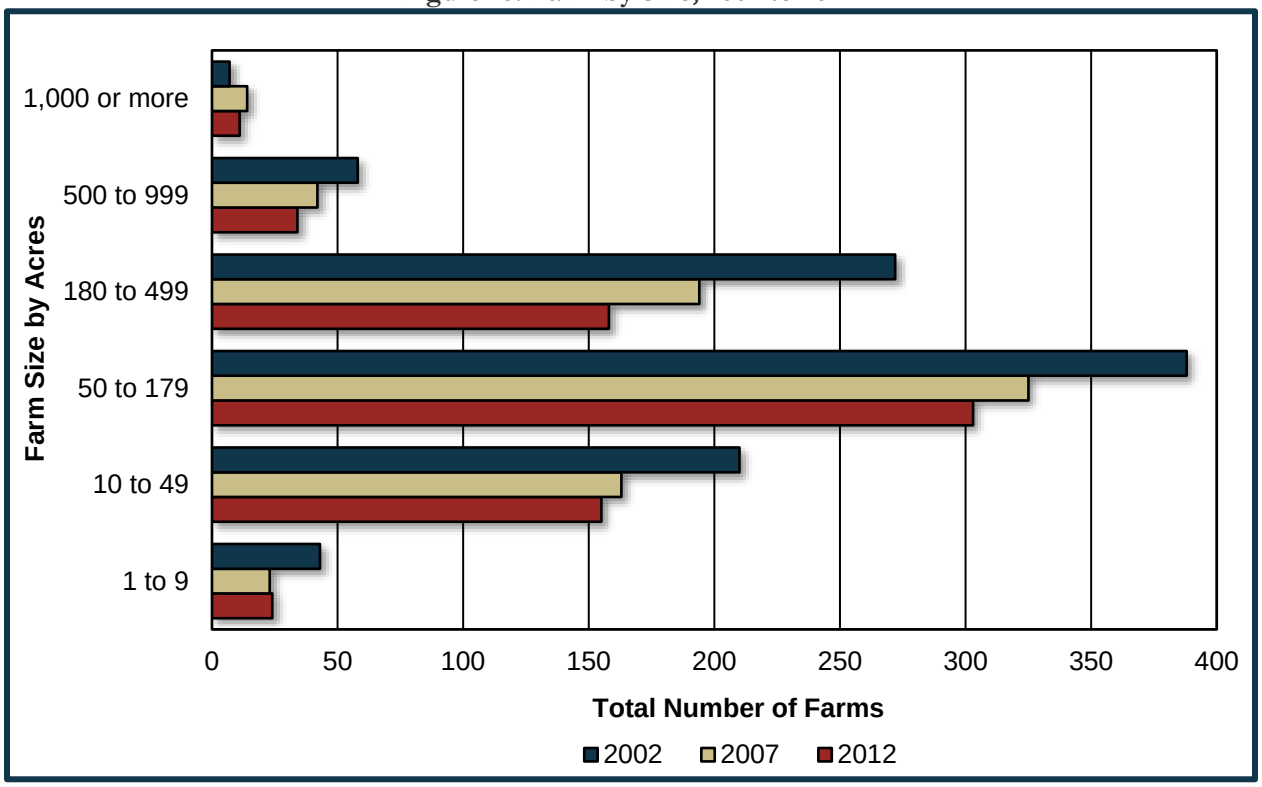
As of 2012, the combination of the leisure and hospitality industries was $515,894,070 in gross sales in the IRRR service area. This represents an increase of $98,627,764 in gross sales from 2003. However, growth in the number of related industry establishments has been slow (1.5%, from 1,293 to 1,313) from 2003 to 2013 in the IRRR service area.

Labor associated with the leisure and hospitality industries has a significantly different composition than labor related to the mining or timber industries. Not all of the jobs can be considered permanent. For example, many food service and accommodation jobs may be seasonal, corresponding to the summer season with lakeshore communities are most occupied. Many of the jobs were also well below the state average annual wage of $47,370 (2014).

Agriculture

According to the 2012 Census of Agriculture, 127,000 acres of land in St. Louis County are in some form of agricultural production, consisting of crops or livestock. Between 2007 and 2012, the total number of farms decreased by approximately 9% and the total number of farmed acres decreased by about 14%. Figure 16 below illustrates the change in farm sizes between 2002 and 2012. From this graphic, there is a clear and consistent decline across almost all farm sizes. Even with a decrease in the total number of farms, the gross market value of agriculture products within the county for 2012 was $17,059,000 up nearly 53% from 2002.

Figure 16: Farm by Size, 2002 to 2012



Source: United States Department of Agriculture, 2002 to 2012.

INFRASTRUCTURE/UTILITIES

St. Louis County is serviced primarily by two electrical providers, Minnesota Power and Lake Country Power. Minnesota Power is based in Duluth and encompasses a variety of generation facilities including coal, biomass, wind, hydro, and natural gas. Lake Country Power is based in Grand Rapids, Mountain Iron, and Kettle River and also encompass a range of generation facilities.

Due to the rural nature of the county, the majority of residents within the county's zoning jurisdiction rely on individual wells and on-site waste water treatment (septic) systems.

In St. Louis County, the siting, installation, maintenance, and removal of septic systems is regulated by the county Environmental Services Department, with regulations stipulated in county Ordinance 61 and the Subsurface Sewage Treatment System Ordinance 61. The average cost of a septic system is $8,000 to $18,000, with the lower end of the price range attributed to good soil conditions for a soil absorption field and an area with a low water table. The higher end of the price range is attributed to poor soil conditions for a soil absorption field and a high-water table (or combination thereof), where soil may need to be imported to create a mound to allow for proper soil absorption.

The siting, installation, maintenance, and sealing of abandoned wells is regulated by the Minnesota Department of Health. The Department issued the Well Owner's Handbook, which contains a comprehensive guide to regulations and general guidance for water wells in the state. State law requires that all wells be tested after installation for harmful constituents. In St. Louis County, the average cost of a well is $8,000.

As of 2017, 82% of all county residents had access to 25 mbps broadband speed (the state broadband speed goal for 2022) and 39% had access to 100 mbps (the state broadband speed goal for 2026). Having access to broadband can be considered a significant factor in attracting residents and businesses to locate in a certain place. With a faster broadband speed, the significance is also increased for potential residents and businesses.

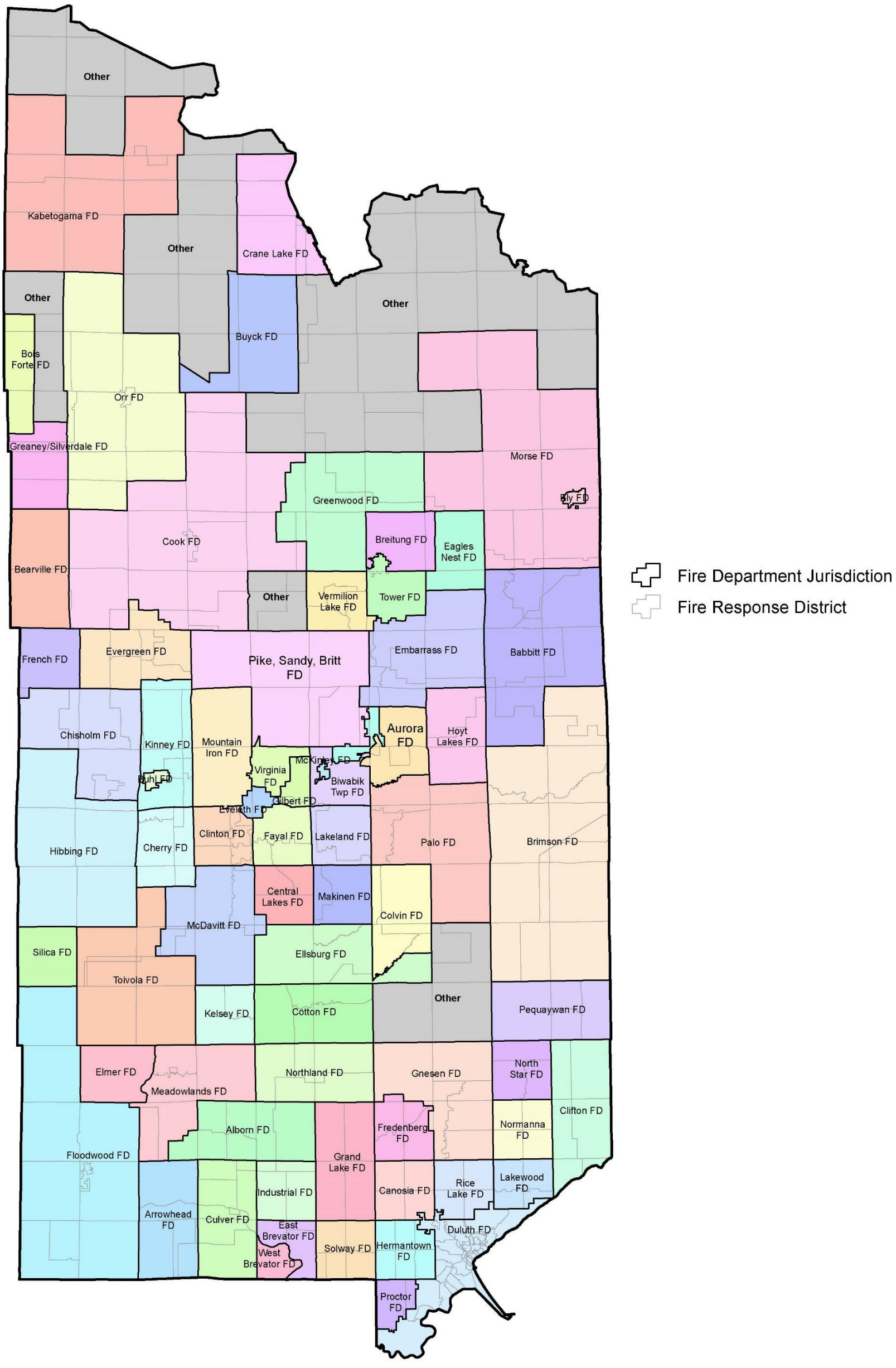
EMERGENCY SERVICES

St. Louis County's emergency services consist of law enforcement, ambulance service, and fire protection. The county's law enforcement is served by the St. Louis County Sheriff's Office. Areas of county zoning jurisdiction are administered by the Sheriff's Department. Some cities contract with the county for law enforcement services. The following cities administer their own law enforcement: Babbitt, Chisholm, Duluth, Ely, Eveleth, Floodwood, Gilbert, Hermantown, Hibbing, Hoyt Lakes, Procter, and Virginia. The Nett Lake and Fond du Lac Reservations administer law enforcement at the reservation level.

The county relies upon an extensive emergency response system that relies upon many fire departments and ambulance agencies. To help organize emergency response operations, there are 495 separate fire and ambulance reporting areas (also called response districts—see Figure 17). Approximately 71 fire departments serve primary fire protection needs in St. Louis County. Most fire departments have a fire hall or station. Some of the smaller fire departments respond from a private residence. Three of the 71 fire departments respond from a bordering county. Three of the 71 fire departments are paid city fire departments and 21 are volunteer fire departments located out of a local city. All other fire departments are located in unincorporated areas and are operated on a volunteer basis. Figure 17 identifies each area for fire department jurisdiction. In total, 19 ambulance agencies operate in the county. Of the 19 agencies, one is private and three are headquartered in neighboring counties.

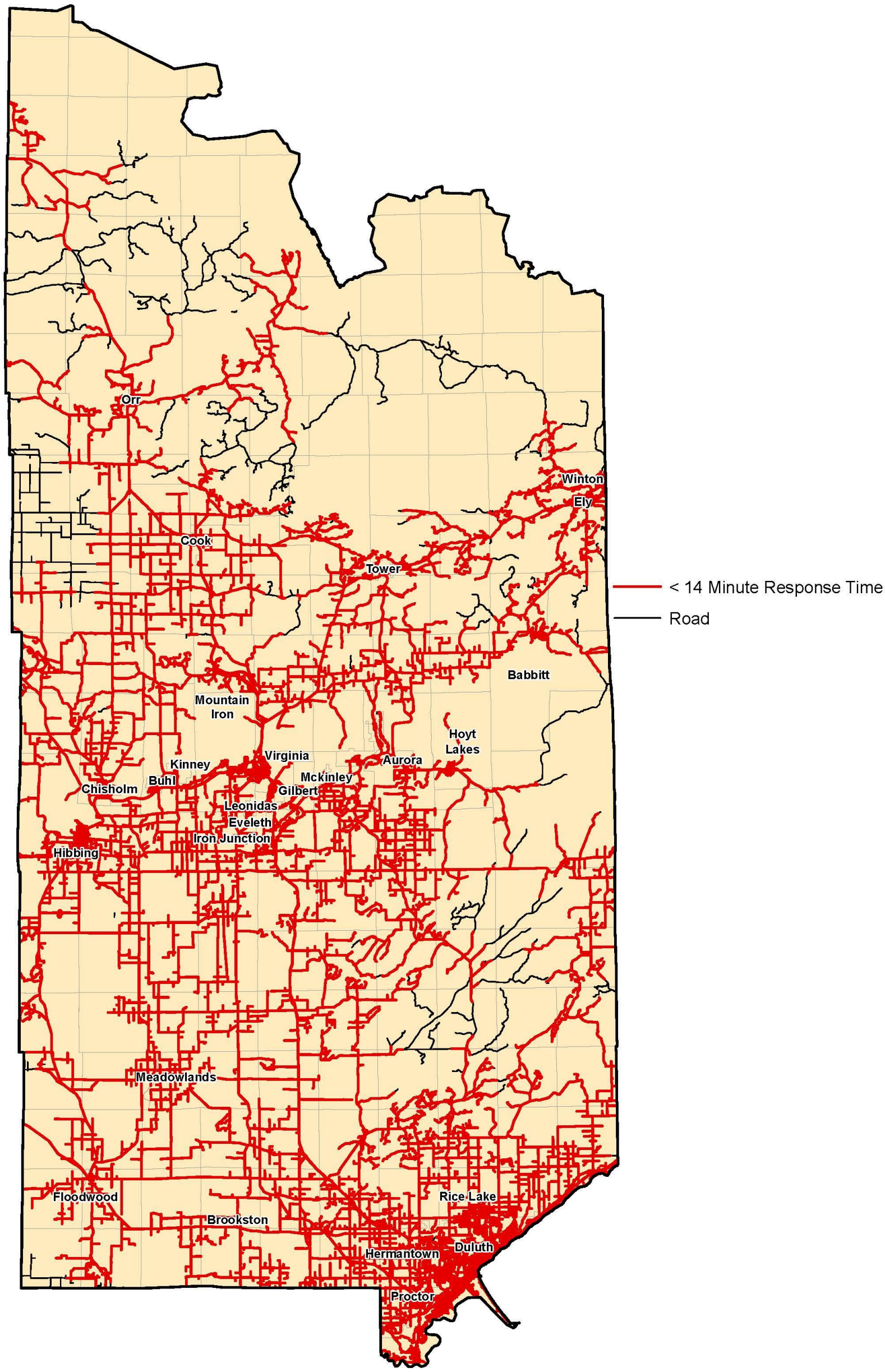
The National Fire Protection Association (NFPA) is a national association that creates and maintains its own fire protection-related standards for use and adoption by local governments. NFPA is commonly accepted throughout the country and focuses on reflecting changing industry needs and evolving technologies. NFPA standard 1720 includes recommended standards for the organization and deployment of fire suppression and emergency medical operations by volunteer fire departments. This standard is especially applicable to areas under county zoning jurisdiction, most of which are protected by volunteer fire departments. For response to structural fires, NFPA 1720 recommends a response time range between six and 14 minutes in rural areas with less than 500 people per square mile. Refer to Figure 18, which shows areas of the county within a 14-minute response time from a fire department.

Figure 17: Fire Department Jurisdiction and County Response Districts



Source: St. Louis County GIS Database, 2017

Figure 18: Areas Within NFPA Standard Response Time



Source: St. Louis County GIS Database, 2017

RECREATION & TOURISM

St. Louis County includes many valuable recreational, natural, and cultural resources that support a growing tourism industry. Figure 19 displays prominent areas of general recreational, natural, and cultural interest. Preserving the integrity of these resources will help build upon the county's tourism and seasonal residential industry. The future land use plan considers land uses adjacent to these resources that support their integrity—depending on the type of resource, this may mean land uses that protect views, preserve native terrain, or provide complimentary commercial services. Recreation and tourism-related resources are outlined below.

Trails

St. Louis County involves numerous trail systems spread across multiple government jurisdictions. By their nature, trails are intended to provide the user with a recreational outlet. Many trails in the county, especially those located on state and federal lands, are also intended to provide the user with a close interaction with nature (i.e., "the outdoors"). The county includes trails that accommodate a variety of different methods of recreational travel, including by foot, horse, bicycle (on and off-road), dog sled, snowmobile, ski, and off-road vehicles. Land uses that strongly restrict development and emphasize open space preservation are ideal for the protection of the integrity of existing trail systems and the development of new trails.

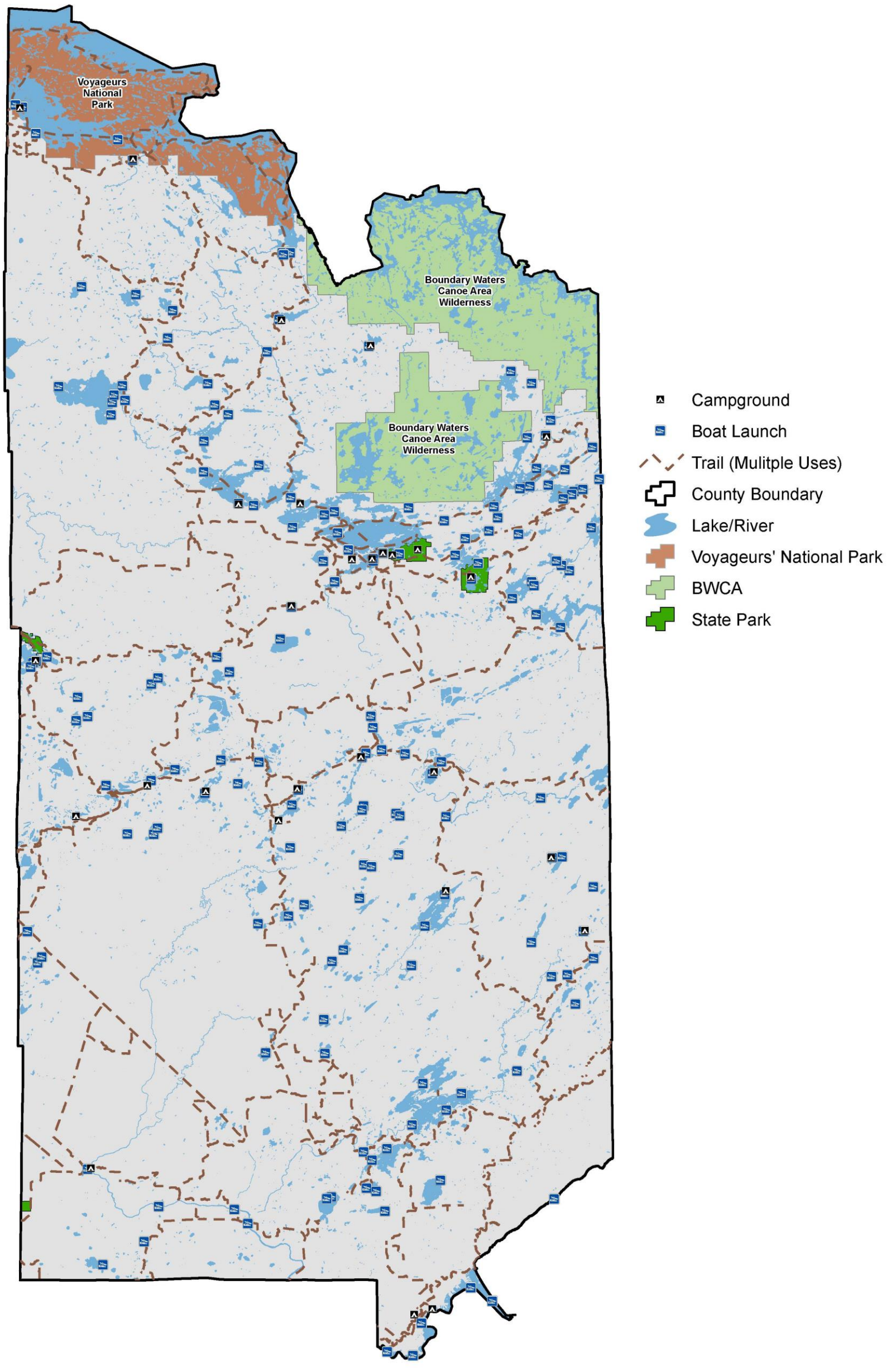
Trail Types

Bicycle: Road biking and mountain biking are both popular in the county. The Mesabi Trail is a popular paved bike trail that spans the central portion of the county from east to west—the trail is a mix of paved trail and on-road segments that follows the Iron Range. The Duluth Lakewalk and the Willard Munger State Trail in the Duluth metro area are also very popular paved paths that accommodate bicycles in addition to foot travel.

Mountain biking in the county is becoming increasingly popular and is allowed on varying surfaces depending on the location—dirt and gravel roads, OHV trails and certain single track (narrow paths similar to footpaths) trails. Single track trails solely designed for mountain bike use are becoming increasingly popular, such as the Lookout Mountain bike trails in the Iron Range. Giants Ridge in Biwabik is another popular mountain biking destination in the Iron Range. The Duluth Traverse Trail is a majority single track mountain bike trail beginning at Jay Cooke State Park southwest of Duluth (in Carlton County) and extending 85 miles northeast through Duluth to the eastern terminus of the city at Lake Superior. The Duluth metro area also includes a number of shorter mountain bike trails, such as those at Hartley Park or Mission Creek, that are heavily used.

Biking in the county is well supported by community groups. Mountain biking groups in particular work with other local groups and local jurisdictions to build and maintain bike routes. Active groups in the community include Iron Range Off-Road Cyclists (IROC) and Cyclists of Gitchee Gumee Shores (COGGS).

Figure 19: Tourism Resources



Source: St. Louis County GIS Database, 2017

Off-road Vehicles: Off-road vehicle trails can be found in abundance in the county. The state Department of Natural Resource (DNR) and U.S. Forest Service websites have information regarding trails in the county and specific use allowed. Many trails allow either one or a mix of the following uses: all-terrain vehicles (ATVs), off-highway motorcycles (OHMs), and off-highway vehicles (OHVs). The county is host to numerous off-road vehicle groups who are integral to trail development and maintenance in many areas.

Snowmobile Trails: Much like off-road vehicle trails, snowmobile trails are also found in abundance county wide, with many providing greater regional connections outside of the county. The DNR website is an excellent resource for snowmobile trails across the county, showing trails that cross state, federal, and private land. Some of the extensive state trails include the Arrowhead, Taconite, and the C.J. Ramstad State Trails. Many additional trails are maintained by local trail organizations. The county is host to numerous snowmobile groups who are integral to trail development and maintenance.

Multiple Use Trails: Many trails are managed for summer use by off-road vehicles, hikers, bicyclists, and/or equestrians. Some of the same trails used in the summer for many (or all) of the above-listed uses are managed in the winter to accommodate snowmobile, cross-country ski, and/or dog sled use in the winter. To accommodate winter use, many trails are groomed by local recreational groups or local agencies with jurisdiction over the trail. Refer to Figure 19 for the location of some of the county's more popular and established multiple use trails.

Grant-in-aid Trail Support: The DNR is responsible for administering a cost-share program for the development and maintenance of several trail types, such as off-road vehicle, cross-country ski, and snowmobile trails. Grants through this program are awarded to the local government sponsor. For decades, this program has supported the development and maintenance of various trail types through the county as the local government sponsor.

Hiking

Hiking opportunities abound throughout the entire county from the Lake Superior Trail in the south to trails in Voyageurs National Park in the north. The county does include trails dedicated to foot travel as opposed to motorized trails (snowmobile or off-road vehicle) or even bike trails. Typically, dedicated footpaths are more easily found in Voyageurs National Park, Boundary Waters Canoe Area Wilderness (BWCAW), local state forest lands, local national forest areas, or local state parks. Many footpaths are actively used for snowshoe travel in the winter.

Boating

Recreational boat use is very popular in the county, especially in areas with a high percentage of lakes and watercourses, such as BWCAW. Most lakes in the county allow motorized boats. However, on watercourses and lakes within BWCAW only non-motorized boating is allowed due to wilderness restrictions imposed by federal law. Many of the county's lakes have established boat access sites. There are 255 boat access sites in the county, including 133 (52%) administered by the DNR, 45 (18%) are administered by the US Forest Service, 21 (8%) are administered by the county, and the remainder (56 or 22%) are administered by townships, cities, the State Department of Transportation (MnDOT), or utility companies.

Camping

In the county, opportunities for camping are primarily found on state and federal lands. However, there are also camping opportunities in the local cities and townships. For example, there are a number of private and municipal campgrounds accessible from the Mesabi Trail in the Iron Range. Other locations with campgrounds managed privately or by the local jurisdiction include Duluth and Lake Vermilion, just to name a couple areas. Similar to most trails, most camping areas are intended to provide the user with a close interaction with nature (i.e., "the outdoors"). Land uses that strongly restrict development and emphasize open space preservation are ideal for the protection of the integrity of existing campgrounds and the development of new campgrounds.

Hunting

Opportunities for hunting throughout the county are numerous. Federal, state, and county tax-forfeited lands all allow for varying degrees of hunting. Many areas used for hunting are best accessed using the county's extensive network of multiple use and multi-season trails. Many of the recreational activities associated with the area's trails, such as off-road vehicle use or hiking, makes hunting possible in many areas of the county. Land uses most conducive to hunting are those that strongly restrict development and emphasize open space preservation.

Popular game in St. Louis County includes white-tailed deer, black bear, grouse, mourning dove, waterfowl, and wild turkey. White-tailed deer are especially numerous and popular in the county—the Boone and Crockett club ranks the county as number one in the state for bucks of record size. Trapping has also been popular throughout the area's history, and made famous by the activity of French trappers in the area beginning in the 18th Century. Animals popular for trapping include beaver, bobcat, coyote, and numerous other fur-bearing animals.

CULTURAL AND HISTORICAL RESOURCES

While cultural and historical resources are numerous throughout the county, their draw relative to other tourism attractions is less significant. Table 5 portrays sites included on the National Register of Historic Places within St. Louis County's zoning jurisdiction.

The area that is now St. Louis County was first known to be settled by the Algonquian-speaking Native American tribes: the Ojibwe (Chippewa), Ottawa, and Potawatomi. Of these three tribes, the Ojibwe remain with reservation and trust lands as the Bois Forte Band of Chippewa and the Fond du Lac Band of Lake Superior Chippewa.

Europeans began to settle in the county in the middle of the 19th Century. The majority of the settlers were from Germany, Norway, Finland, and Sweden. Early settlers primarily came to the county to farm, support the early forestry industry, and to work in the early mines. Many of the historic places identified in Table 5 are connected to the early-settler heritage. A notable site from the latter part of this era is the Lake Vermilion-Soudan Underground Mine State Park, which is a popular tourist attraction.

Table 5: National Register of Historic Places, County Zoning Jurisdiction

Name	Location	Description
Neilmark, Erick and Kristina, Sauna	Highway 21 and 615	Large log bathhouse using traditional Finnish construction techniques in 1930
Seitaniemi, Alex, Barn	8162 Comet Road	Rare two story log building combining dwelling, animal shelter, crop storage 1907-13
Tannttari, Waino, Field Hay Barn	8298 Wilen Road	Special purpose farm outbuilding of traditional Finnish log construction, 1935
Alango School	9076 Highway 25	Large rural school built in 1927
Saint Louis County 4-H Club Camp	4926 Pine Lane	Log lodge and stone amphitheater built in 1934 by CCC and WPA workers
Church of St. Joseph	7897 Elmer Road	Frame church built in 1913 for colony of Austro-Hungarian immigrants
Western Bohemian Fraternal Union Hall	10107 Hall Road	Frame meeting hall for Czech fraternal lodges and events built in 1925
Kettle Falls Hotel	Kettle Channel Voyageurs National Park	Frame hotel built in 1913 on international waterway
Stevens, I W, Lakeside Cottage	Williams Island Namakan Lake, Voyaguers National Park	Seasonal cabin constructed 1932
Levin, Adolph, Cottage	Kabetogama Narrows, Voyaguers National Park	Seasonal cabin constructed in 1937
Fujita, Jun, Cabin	Wendt Island Rainy Lake Voyageur National Park	Recreational frame cabin with logs evoking Japanese country house built 1928-1941
Finnish Apostolic Church	5103 Highway 21	Pioneer Church
LeMoine Building	County Road 74/County Road 905	False front frame store/residence built in 1913
Civilian Conservation Corp Camp S-52	Cusson, Leiding Twp, Highway 53	Building used for Civilian Conservation Corps, constructed 1933
Ingersoll, William, Estate	Ingersoll Island, Sand Point Lake, Voyaguers National Park	1928 estate used for seasonal residence
Kabetogama Ranger Station District	9940 Cedar Lane	Rustic style board and batten and stone complex for ranger built by Civilian Conservation Corps 1933-41
Wirtanen, Eli, Farm	5321 Markham Road	Pioneer Farm
Height of Land Portage	Embarrass, White and Pike Township, County 138	Portage route along continental divide used 1630's to 1870's
Matson, Mike and Mary, Historic Farmstead	Tower, Embarrass Township, Highway 21	Rural Finnish log buildings
Soudan Iron Mine	1379 Stuntz Bay Road	States oldest and deepest underground mine now State Park opened 1884
Bull of the Woods Logging Scow	Hoist Bay Burntside Lake, Road 404	Underwater remains of a paddle wheeled steam powered scow ca. 1893
Archeological Site 21SL35	Voyageurs National Park	Pre-Columbian habitation site
Archeological Site 21SL55	Voyageurs National Park	Campsite used 700 CE - 1500 CE
Archeological Site 21SL141	Voyageurs National Park	Habitation site occupied c. 300 CE - 1900 CE
Archeological Site 21SL73	Voyageurs National Park	Season campsite used 100 BCE-1500 BCE
Archeological Site 21SL82	Voyageurs National Park	Campsite used 3000 BCE- 1900 CE
Bruce Mine Headframe	Chisholm, Highway 169	Steel headframe built 1925-26 for underground mining

Source: St. Louis County GIS Database, 2017

EXISTING LAND USE

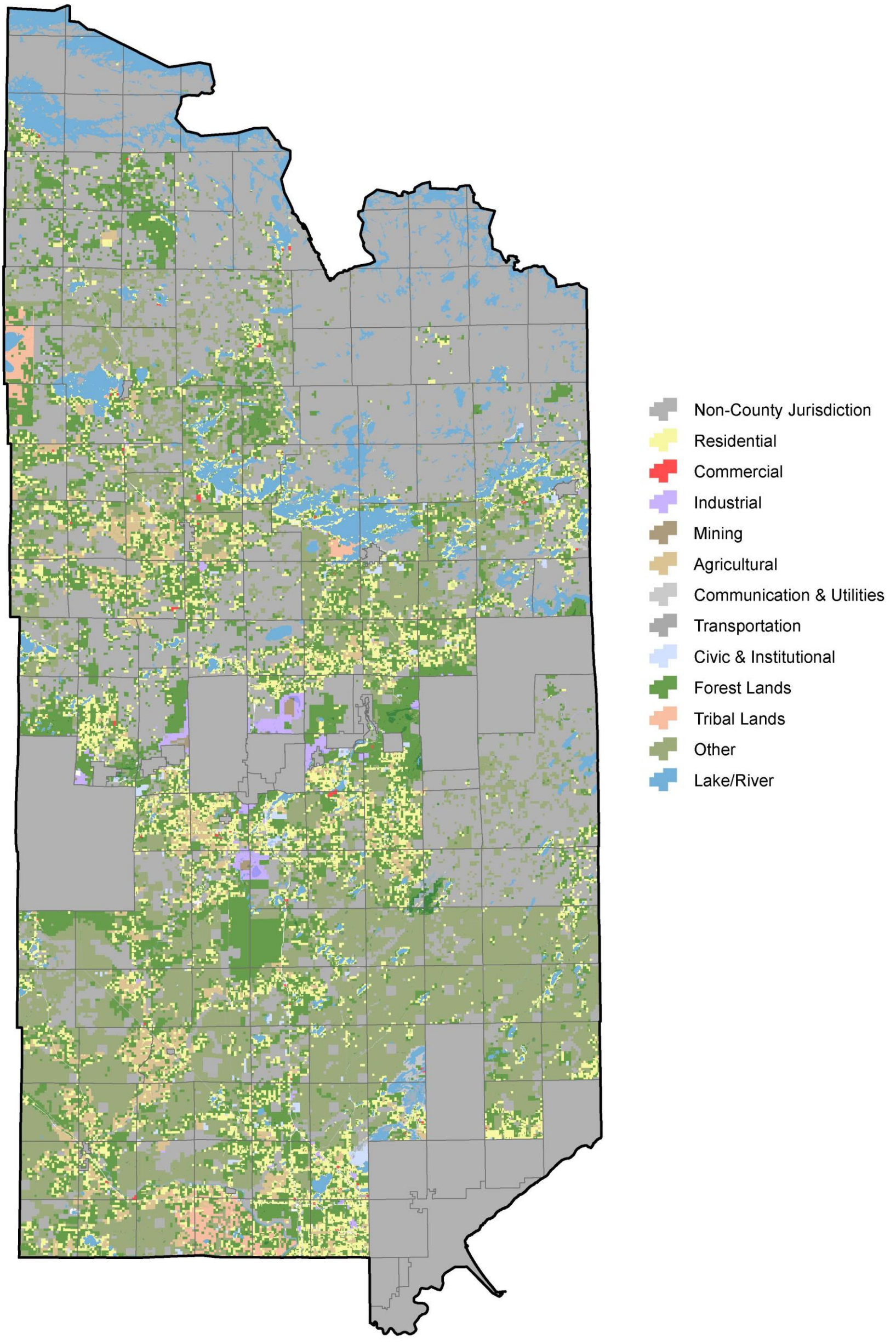
There is currently a total of approximately 3,536,345 acres of land within the county's zoning jurisdiction. The information in this section was developed from county GIS Assessor's property use data. Table 6 outlines the types of existing uses, the amount of acres for each use, and the use distribution for St. Louis County. In addition, a map of existing land use is provided in Figure 20.

Table 6: Existing Land Use Summary – County Zoning Jurisdiction

Existing Use	Existing Acreage	Existing Distribution	Average Parcel Size (acres)
Residential	373,561.8	10.6%	11.6
Commercial	3,728.6	0.1%	7.3
Industrial	25,458.7	0.7%	47.6
Mining	3,030.4	0.1%	39.4
Agricultural	104,107.8	2.9%	48.0
Communication & Utilities	11,364.7	0.3%	28.2
Transportation	5,023.8	0.1%	10.4
Civic & Institutional	27,386.2	0.8%	18.0
Forest Lands	2,079,035.2	58.8%	72.2
Tribal Lands	28,393.6	0.8%	84.5
Other	875,254.5	24.8%	91.0

Source: St. Louis County Assessor & GIS Database, 2017

Figure 20: Existing Land Use – County Zoning Jurisdiction



Source: St. Louis County Assessor & GIS Database, 2017

Undeveloped Platted Land

Approximately 5,044 lots are currently platted in areas of county zoning jurisdiction, yet are undeveloped. The majority of these lots were platted with the intention of residential development. As of 2017, approximately 33% of all lots platted primarily for residential use remained undeveloped and 66% of all lots platted primarily for residential use were developed. These largely undeveloped areas could be recognized for their potential to absorb future growth and moderate the demand for future residential land use. It should be noted that infrastructure servicing the 5,044 undeveloped lots may be limited or absent—some of the undeveloped areas may be represented by "paper lots" that do not have streets, electricity, and other critical infrastructure services.

Mining Areas

Ferrous Minerals

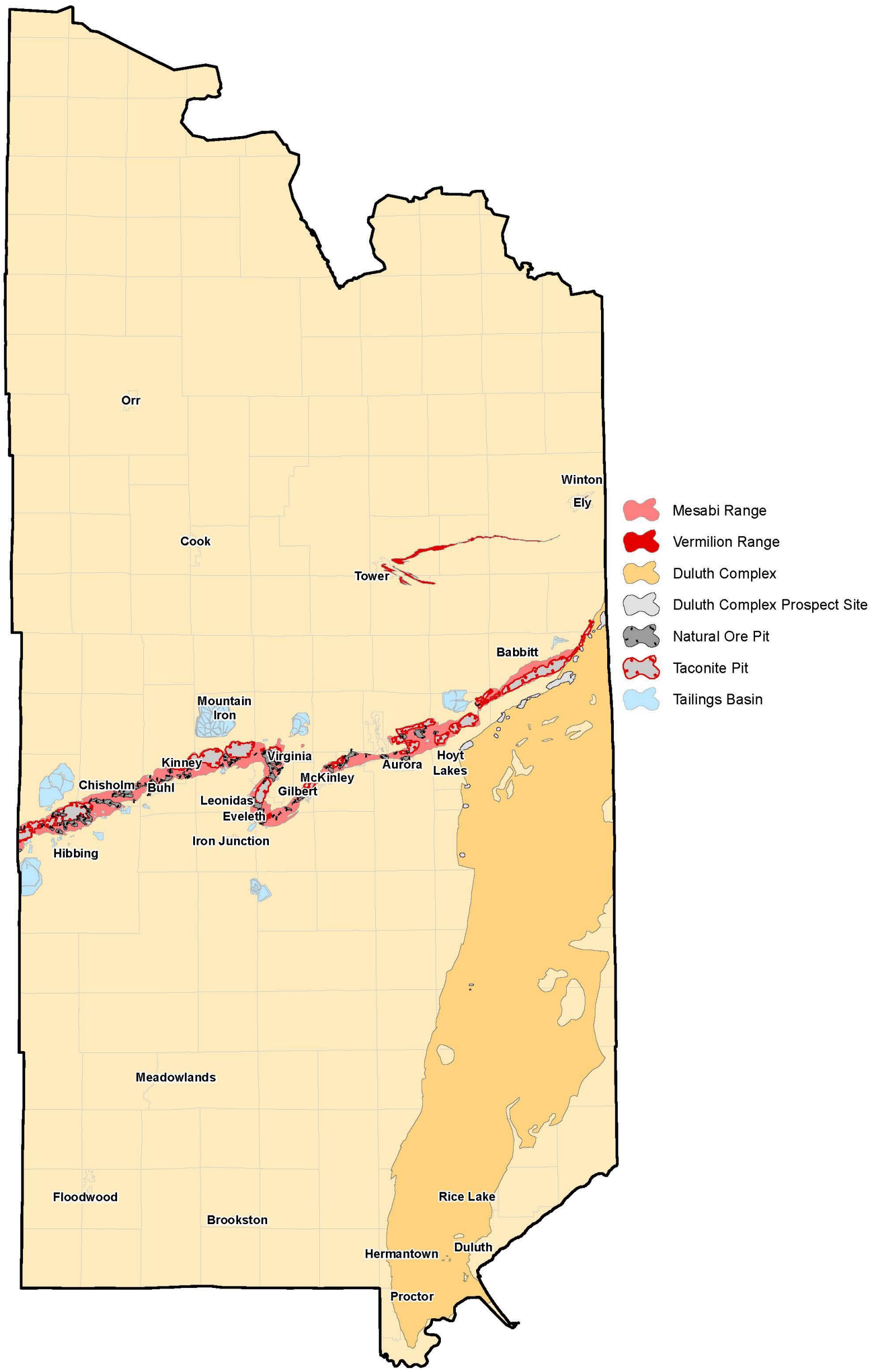
St. Louis County includes the majority of the Mesabi Iron Range, which is currently the largest mining district, in terms of tons mined, in North America. The deposits supply the majority of the iron ore for the blast furnaces used in the country's steel industry. As of 2016, there were six active mining operations producing 29.32 million tons of ferrous (iron-bearing) minerals in the form of taconite (taconite is an iron-bearing sedimentary rock that is commonly found in the Mesabi Iron Range). The taconite is taken from open pit mines, which are located within the Biwabik Iron Formation. There are a number of ancillary activities associated with the open-pit mines that are located outside of the Biwabik Iron Formation, notably including tailings basins (areas where materials left-over from separating out the taconite are placed), taconite plants, scram mining plants (plants that process tailings to extract additional iron), and a railroad network necessary for transportation of mined materials throughout the region.

Nonferrous Minerals

Nonferrous metallic minerals (metallic minerals other than those bearing iron) are also known to exist in commercially-viable quantities in significant portions of St. Louis County, largely within the Duluth Complex. The Duluth Complex is a geologic formation that is known to contain copper, nickel, and a number of precious metals. There currently are no active nonferrous mining operations in the county. However, there are two proposed operations in the county, currently in different stages:

- Polymet Mine and Plant: As of January 2017, a number of permit applications had been submitted and the US Forest Service had approved a land exchange for the project. The proposed mine and processing plants are generally located north of the cities of Aurora and Hoyt Lakes and south/southwest of Babbitt.
- Teck American: As of 2017, the company was in the process of defining a project to be located southeast of Babbitt.
- Twin Metals: As of 2017, Twin Metals Minnesota is a subsidiary of Antofagasta plc, a South American-based copper mining company. The company has interest in an area approximately nine miles southeast of Ely and 11 miles northeast of Babbitt. At this time, no plans or permit applications have been filed. The company remains engaged with the federal government concerning mineral rights.

Figure 21: County Mining and Related Features



Source: St. Louis County GIS Database & MN Department of Natural Resources, 2017

Mining Regulations

The State Department of Natural Resources (DNR) has the authority to permit and regulate the operation and reclamation of mines in St. Louis County. Mines located on federal land are permitted and reclaimed under the authority of the applicable federal agency—in the case of St. Louis County that would be the US Forest Service. In order to begin a mining operation on land not owned by the federal government, a number of permits must be obtained from the DNR, likely including the following permits: Permit to Mine, Water Appropriation Permit, Dam Safety Permit, and a Public Waters Work Permit. Mines subject to DNR permitting are also subject to the Minnesota Environmental Policy Act, involving either an Environmental Assessment Worksheet or Environmental Impact Statement. Projects on federal lands are subject to environmental review through the National Environmental Policy Act. The environmental review and mine permitting processes both require involvement from local agencies, including St. Louis County. Potential impacts to land uses within the county zoning jurisdiction are to be evaluated and mitigated as appropriate through the environmental review process.

Mining & County Land Use

The existing land use map (Figure 21) indicates existing mining areas. Future land use and transportation planning will need to consider the impact of mining on the county. The majority of mining pits are located within municipal boundaries. However, ancillary operations, such as tailings piles, do extend into areas of county zoning jurisdiction.

Gravel Pits

Gravel pits are used extensively throughout the county to support the construction and maintenance of roads and land use development activity. Unless located on state or federal lands, the county is the permitting authority for gravel pits. Two types of pits can be permitted, including "general purpose" and "public works" pits. General purpose pits are permitted through a Conditional Use Permit and typically allow use of the permit until the resource is exhausted. The Conditional Use Permit includes pit reclamation after the cessation of operation. Public Works pits are permitted through a Performance Standard Permit application and allow use of the resource for up to two years, for a specific road project.

EXISTING ZONING

St. Louis County utilizes eight base zoning districts and three overlay districts for the purposes of controlling the use of land and structures in areas of county zoning jurisdiction. Table 7 below outlines each zoning district, the amount of acres currently designated for each district, and the overall distribution of the districts. In addition, a map of existing zoning is provided in Figure 22.

Table 7: Existing Zoning Summary – County Jurisdiction

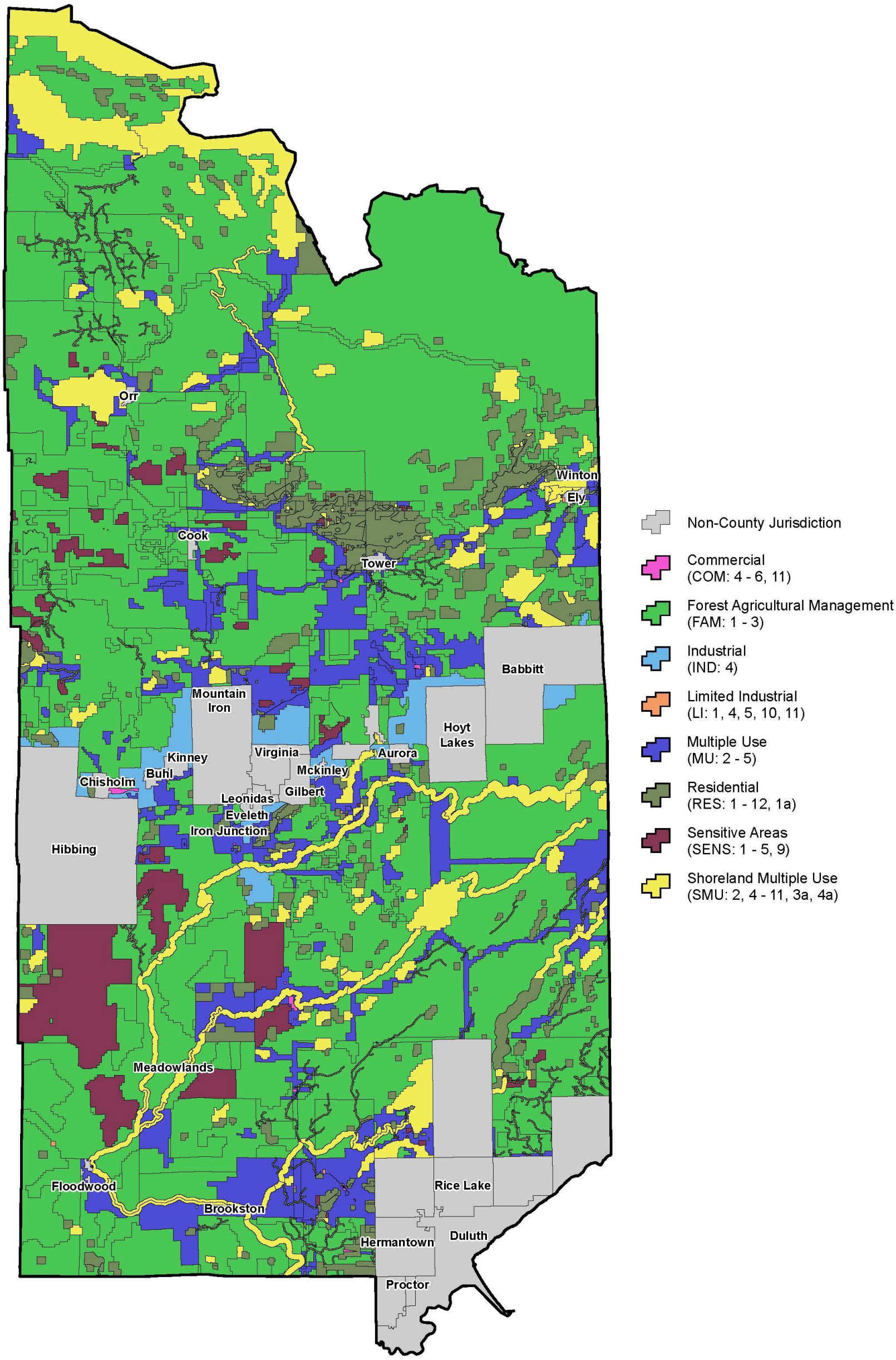
Existing Base District	Existing Acreage	Existing Distribution
Sensitive Areas	168,421	5%
Forest Agricultural Management	2,426,658	64%
Residential	326,958	9%
Shoreland Multiple Use	369,598	10%
Multiple Use	403,866	11%
Commercial	2,091	<1%
Limited Industrial	765	<1%
Industrial	69,740	2%

Source: St. Louis County Department of Planning & Community Development GIS Database, 2017

The three overlay zoning districts include the following:

- Lake Superior Overlay: this district is in use for townships with their own zoning authority along the North Shore of Lake Superior. The district is intended to safeguard residential areas adjacent to the North Shore from intensive commercial development.
- Lakeshore Commercial Overlay: This district includes areas on lakes where water-related commercial activities are located. It is intended to direct commercial uses to appropriate lakes and watercourses in the county.
- Closed Landfills and Dumpsites Overlay: This district places standards for development on areas near closed landfills to protect and provide notice to the public per state statute.

Figure 22: Existing Zoning – County Jurisdiction



Source: St. Louis County Department of Planning & Community Development GIS Database, 2017

TRANSPORTATION

Land use and transportation are intimately related, from the platting process to long-range planning. Roadway system characteristics affect the value of adjacent land, the physical use of space, and actual land use. In industrial districts, roadway geometries must allow trucks and machinery to maneuver. Commercial land value is tied to customer visibility, freight access, and parking, while in residential districts the opposite is true.

Roadway design standards are often codified. For example, right-of-way widths, building setbacks, and acceptable access density all vary based on functional classification. The roadway system should reflect existing and anticipated future travel needs that are rooted in land use. For all of these reasons, effective planning synthesizes transportation and land use considerations. This chapter provides a profile of St. Louis County's existing transportation system. Topics include:

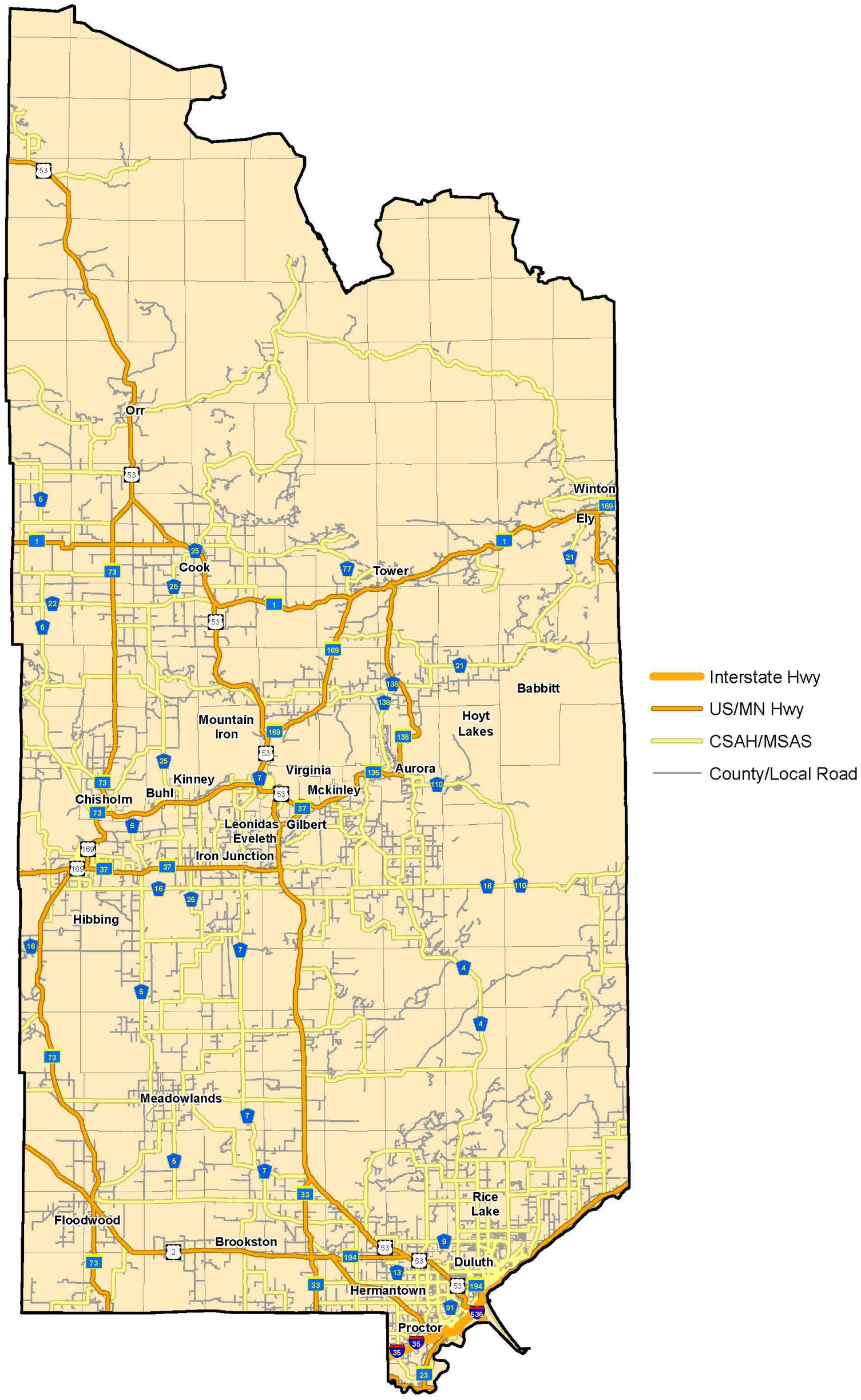
- Jurisdictional classification
- Key corridors and intersections
- Functional classification
- Access and mobility needs
- Existing vehicle volumes and capacity issues
- Crash history
- Commuting trends
- Multi-modal facilities

Jurisdictional Classification

Roadways are classified by ownership. Highway jurisdiction is an important part of transportation planning because it defines the regulatory, maintenance, construction, and financial obligations of each governmental unit. An effective jurisdictional scheme ensures that each roadway is aligned with the jurisdiction which is best suited to maintain it. Jurisdictional classification follows a hierarchical organization, which accounts for the typical traffic volume and purpose of each corridor.

Figure 23 illustrates jurisdictional classification for St. Louis County. The Minnesota Department of Transportation (MnDOT) manages high-volume corridors with large travelsheds, which are intended to facilitate inter-state and regional trips. The county manages intermediate-volume corridors with more limited travelsheds, such as County State-Aid Highways and county roads. Cities within the county operate the majority of roads that are contained within their municipal boundaries; these are intended to facilitate short, local trips. Because multiple systems are represented in the countywide network, counties frequently coordinate with other jurisdictions. Often high-profile, high-benefit projects occur on state-owned corridors and are funded through federal highway dollars.

Figure 23: Existing Jurisdictional Road Classification



Source: St. Louis County Department of Public Works GIS Database, 2017

Functional Classification

The Federal Highway Administration (FHWA) functional classification system defines the function of each roadway in the transportation system. This classification system is used by agencies and planning officials to manage access, traffic operations, building setbacks, and other design-related features of the corridor. There are four general functional classifications:

1. Principal Arterials
2. Minor Arterials
3. Collectors
4. Local Roads

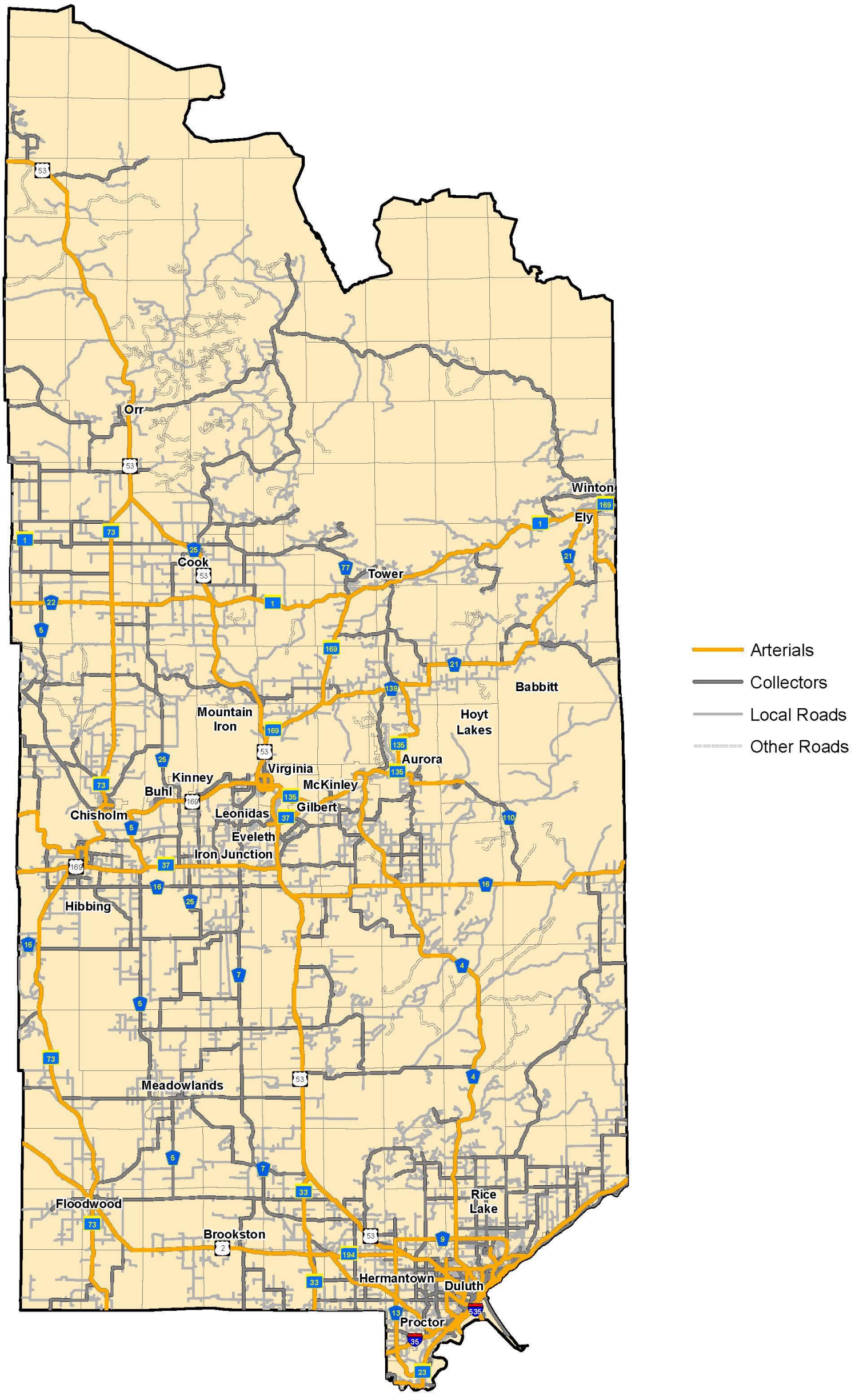
This classification is hierarchical, with each order of roads providing connectivity to similar roads and to roads immediately higher or lower in the hierarchy. For example, collectors funnel traffic from local roads to the arterial system; in many urban settings, direct local connections to the arterial system are discouraged.

A roadway's functional classification is based on a number of factors including:

- General trip characteristics, including length of route and route continuity
- Connection between regional, local, or sub-local population centers of varying sizes
- Balance of corridor access and mobility needs
- Relationship with adjacent land uses
- Eligibility for state and federal funding

Figure 24 shows the regional system of functionally classified roadways.

Figure 24: St. Louis County Roadway Functional Classification



Source: St. Louis County Department of Public Works GIS Database, 2017

Functional Classification Breakdown

The Federal Highway Administration (FHWA) provides guidance to metropolitan, county, and municipal jurisdictions regarding the proportion of total system mileage that should be devoted to each functional type. FHWA further classifies roadways based on urban or rural character. Urban functionally classified roadways are formally considered to be located in municipalities with populations exceeding 5,000. As a result, the vast majority of roads within St. Louis County are considered to be rural. Table 8 compares St. Louis County's system breakdown along with FHWA guidelines. Some variance from FHWA norms is expected given the county's large size.

Table 8: St. Louis County Functional Road Classification

Functional Type	Mileage	Percent	FHWA System Mileage Guidelines	Deviation from FHWA Guidelines
Principal Arterials	422.68	3.8%	3% to 11%	Within Range
Minor Arterials	489.69	4.4%	2% to 6%	Within Range
Major Collectors	745.15	6.8%	8% to 19%	Slightly Low
Minor Collectors	676.85	6.1%	3% to 15%	Within Range
Local Roads	8,717.46	78.9%	62% to 74%	Slightly High
Total	**11,051.83**	**100%**	--	--

Source: St. Louis County Public Works GIS, 2017

Principal Arterial

Principal arterials are intended to provide the highest level of mobility with very limited access, connecting major activity centers and providing a continuous transportation system as they establish connections with other principle arterials. US Highway 53, US Highway 2, US Highway 169, and MN Highway 61 are designated as principle arterials, providing relatively fast east/west and north/south connections with limited access for safety reasons. Principal arterials span approximately 423 miles and encompass nearly 4% of the county's roadways.

Minor Arterial

Minor arterials also emphasize mobility over land access, serving to connect adjacent neighborhoods and the highway system. Major business concentrations and other important traffic generators are usually located along minor arterial roadways. A well-planned and designed system of principal and minor arterials will allow a county's overall road system to function the way it is intended and will discourage through traffic from using residential roads. Volumes on principal and minor arterial roadways are expected to be higher than those on collector or local roadways. Maintaining roadway capacities to accommodate higher volumes on minor arterials will keep volumes on other county roads lower. MN Highways 1, 4, 21, 22, 37, 73, 135, 169, and 200 and County Roads 9, 16, 37, 194 are all designated as minor arterials by the MnDOT. Minor arterials span approximately 490 miles and encompass over 4% of the county's roadways.

Major and Minor Collectors

Collectors are designed to serve shorter trips, providing access from neighborhoods to other collector and arterial roadways. Collectors are expected to carry less traffic than arterials and to provide access to some properties. Major and minor collectors span approximately 1,422 miles and encompass about 13% of the county's roadways.

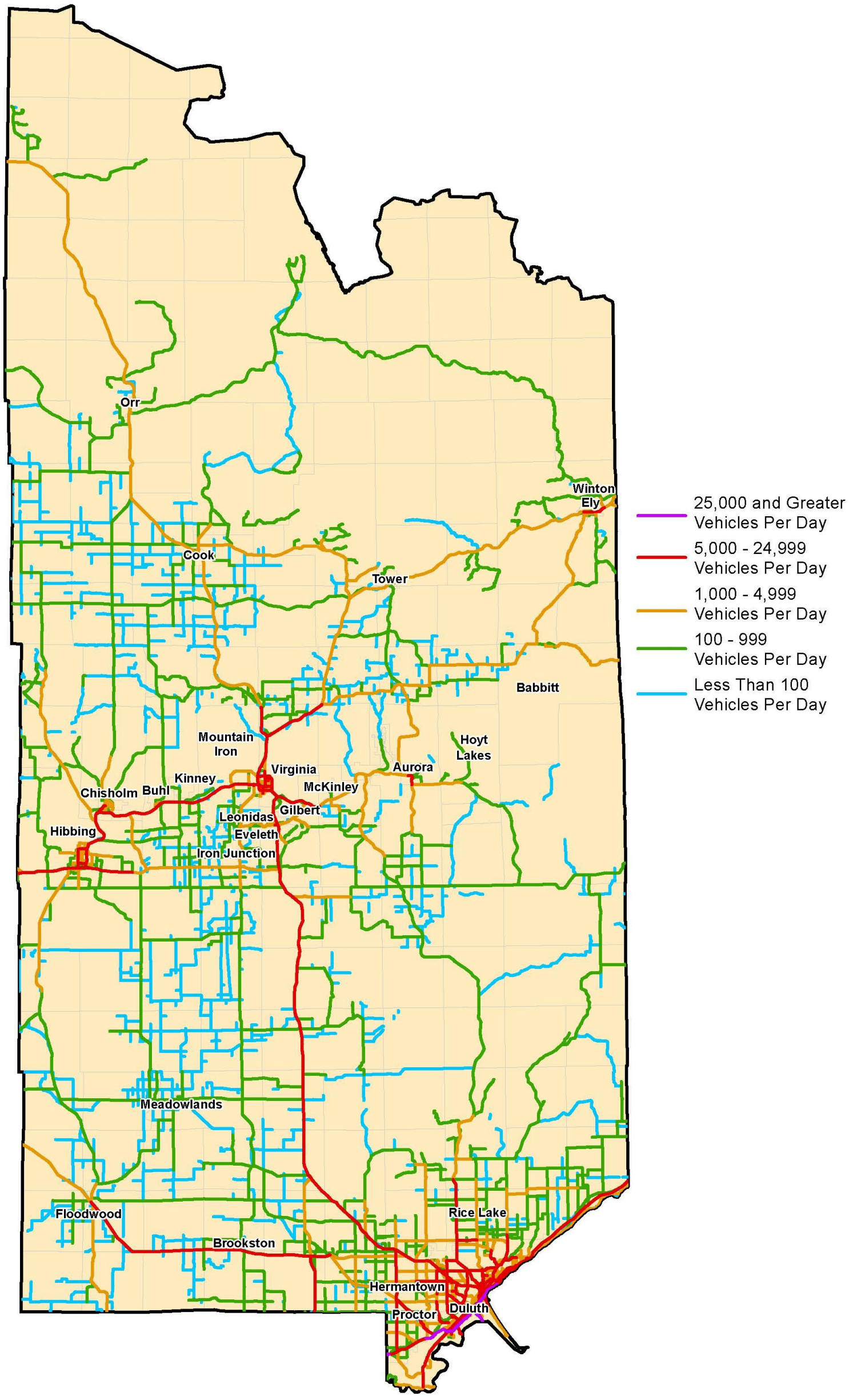
County/Local Road

County and other local roads provide direct access to the properties they serve. They are generally low speed, and designed to discourage through traffic. County and other local roads are the most common in the county expanding approximately 8,717 miles and encompassing about 79% of the county's roadways.

Average Annual Daily Traffic

Average annual daily traffic (AADT) information is provided by the county for locally-administered roads and by MnDOT for roads under state jurisdiction and some major county roads. The roads evaluated include the majority of all collectors and arterials and also include many county/local road segments. As shown in Figure 25, the highest volume routes in the county include the majority of the US route mileage—US 2, US 53, and US 169. The greatest concentration of traffic in the county is in Duluth and the surrounding cities and townships, followed by the Iron Range cities. Traffic volumes can significantly influence adjacent land uses. For example, high traffic volumes can be a nuisance to some land uses, such as parks or residential areas due to noise. Understanding areas with higher traffic volumes can be important in determining the viability of highway-related commercial opportunities, especially near higher-volume intersections.

Figure 25: Recent Average Daily Traffic Levels



Source: Minnesota Department of Transportation, 2017
* Traffic count dates vary, generally taken from 2011-2016

Road System Challenges

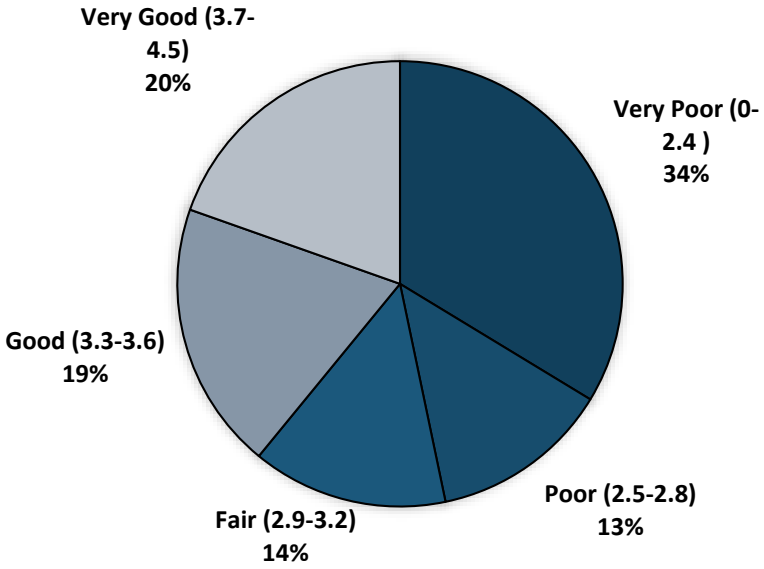
St. Louis County is responsible for 1,378 County State Aid Highway miles, 1,274 county road miles, 315 unorganized township road miles, and 602 bridges with a span or 10 feet or greater—this section pertains to this system. The county's road system is unique when compared to all other Minnesota counties. Due to the county's significant size, road-miles more equivalent to a state must be maintained on a county-sized budget. The below facts further this point:

- 4.5% of the total County State Aid Highway mileage in Minnesota is located in the county
- The county contains 12% of all county road mileage in the state
- The county contains 8% of all county bridges in the state

Paved County Road System

The condition of paved roads varies greatly across the county and overall is a serious challenge (Figure 26). As of 2014, over one-third of all paved roads in the county system (both County Roads and County State Aid Highways) had a "very poor" pavement quality index rating between 0 and 2.4. County paved roads rated "poor" and "very poor" together represented 47% of all paved roads in the county. The historical (2009-2012) weighted average of the pavement quality index for all county paved road mileage has trended downward and is currently at 2.7, which equates to a "poor" rating.

Figure 26: Total Paved Road Miles - 2014 Condition (Pavement Quality Index Status)



Source: St. Louis County Department of Public Works, 2017

County Gravel Road System

The county maintains approximately 1,500 miles of gravel roads, which represents 50% of the entire county road system. Road stabilization is a need, especially for gravel roads with higher average daily traffic counts. Decreases in level of service, dust problems, and unnecessary gravel replacement needs result from a lack of proper gravel road stabilization. Gravel road stabilization can come in the form

of chemical or cement applications to help keep road materials intact longer than under natural conditions.

County Bridges

Bridges are an integral part of the county's transportation system. Bridges provide key connections for commercial transportation, thus helping to facilitate commerce within and without the county. The county Public Works Department recently evaluated the condition of bridges in the county and found the following information:

- 20% of county bridges are rated as deficient
- 14% of county bridges are load posted/restricted
- Four "fracture critical" bridges remain in the county ("fracture critical" is defined by FHWA as steel member in tension whose failure would likely cause partial or complete bridge collapse)

The state is currently pushing an initiative to remove timber bridges. St. Louis County has 143 timber bridges, 43% of which are rated as deficient. A long-term problem is represented by the high number of bridges built in the late 1930s and early 1940s. As these bridges continue to age, they will represent a bubble of replacement or rehabilitation projects.

Roadway Safety

The three-year average for fatal and injury crashes on the county roads, county state aid roads, and urban-area roads has declined from a high of approximately 270 in 2002 to 190 in 2013. In 2012, the State Department of Transportation produced a county Roadway Safety Plan for St. Louis County. The top five emphasis areas from a detailed crash analysis include the following:

- Young driver (under 21)
- Drug and alcohol-related
- Unbelted vehicle occupants
- Road departure crashes
- Intersection crashes

The report identified that road safety projects to improve rural road segments, curves, and intersections represent the greatest opportunity for crash reduction, other than efforts to improve driver behavior (i.e., issues related to young drivers, wearing seat belts, etc.). Specific project opportunities were identified in the report, many of which were carried into the county's Transportation Improvement Plan (see below).

Transportation Sales and Use Tax

In response to the challenges facing the county's road and bridge system, the county adopted a transportation sales and use tax in 2014. The tax is projected to raise an estimated $10.5 million annually. Tax revenue will be used to fund transportation-related projects, of which the county's Transportation Improvement Plan (2014) identifies a need of 154 total projects with a value of over $642 million dollars.

Transit

Arrowhead Transit operates a bus and dial-a-ride service in St. Louis County. The bus system services 19 communities and a scheduled basis throughout the county and also serves communities in Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, and Pine counties. Most communities are served in the morning and the afternoon, Monday through Friday. The dial-a-ride service is operated out of Virginia and operates on a limited basis seven days a week.

Airports

St. Louis County includes nine publicly-administered airports: Range Regional (Chisholm-Hibbing) Airport, Duluth International Airport, Duluth Sky Harbor Airport, Ely Municipal Airport, Eveleth-Virginia Airport, Orr Regional Airport, Cook Municipal Airport, Scotts Seaplane Base, and the Tower Municipal Airport. Recognizing airport locations is significant when dealing with development and future land use due to the impacts airports have on their surrounding environment. In addition to aircraft noise, there are other issues such as safety and environmental impacts to the land uses around airports which need to be considered when addressing land use compatibility. Incompatible uses with airports include residential, schools, and churches while more compatible uses include industrial and commercial.

Railroads

Five different railroads operate in St. Louis County, four of which are freight railroads and one is tourist attraction.

- Canadian National. Rail lines generally extend from the Duluth area to the northern reaches of the county (in route to International Falls and Canada). Lines also serve the Iron Range in connection with north/south service.
- Burlington Northern Santa Fe (BNSF). Rail lines extend from the Duluth area northwest to Itasca County and Hibbing.
- LTV Steel Mining. This line serves east Iron Range facilities and provides a freight connection to Lake Superior in Cook County.
- North Shore Mining. This line serves east Iron Range facilities and provides a freight connection to Lake Superior in Lake County.
- North Shore Scenic Railroad. This line follows the North Shore of Lake Superior from Duluth to Two Harbors. The railroad is a regional tourist attraction and is owned by the St. Louis and Lake County Regional Rail Authorities.

Both Canadian National and BNSF are classified as Class I railroad, which means they are of significant size, with revenues exceeding over $300 million (2004 dollars). These carriers operate across several states and in the case of Canadian National, in both Canada and the United States. All of the other railroads with the county are Class III railroads, which means they have revenues less than $40 million. They are also referred to as short line railroads.

Role of the St. Louis and Lake Counties Regional Rail Authority (RRA)

The RRA was established in 1985 after it was made public that the Duluth, Missabe & Iron Range (DM & IR) Railroad planned to sell the railway line between Two Harbors, Minnesota and Duluth, Minnesota, known as the "Lake Front Line". Reacting to this situation, the St. Louis County Commissioners and Lake County Commissioners signed a joint powers agreement and established themselves as a Regional Railroad Authority (RRA), which is a political subdivision of the State of Minnesota, organized under state statute 398A. The RRA now leases the Lake Front Line for the North Shore Scenic Railroad.

Since 1985, other companies have abandoned rail lines in the county. In an effort to preserve the railroad right-of-way before the lines became sold to private interests, the RRA began pursuing the development of rail-to-trail alignments. The Mesabi Trail (and spur/branch trails) has since been developed through RRA acquisition in this manner. As of 2017, the RRA was in the process of acquiring parts of the abandoned DM & IR Railroad between Embarrass, Tower, and Ely. The RRA is also separately involved in potential abandonments in Duluth with the Canadian National and the Lake Superior & Mississippi Railroad. Many miles of abandoned rail lines currently exist throughout the county and have the potential to serve the county as public use corridors.

POPULATION PROJECTIONS

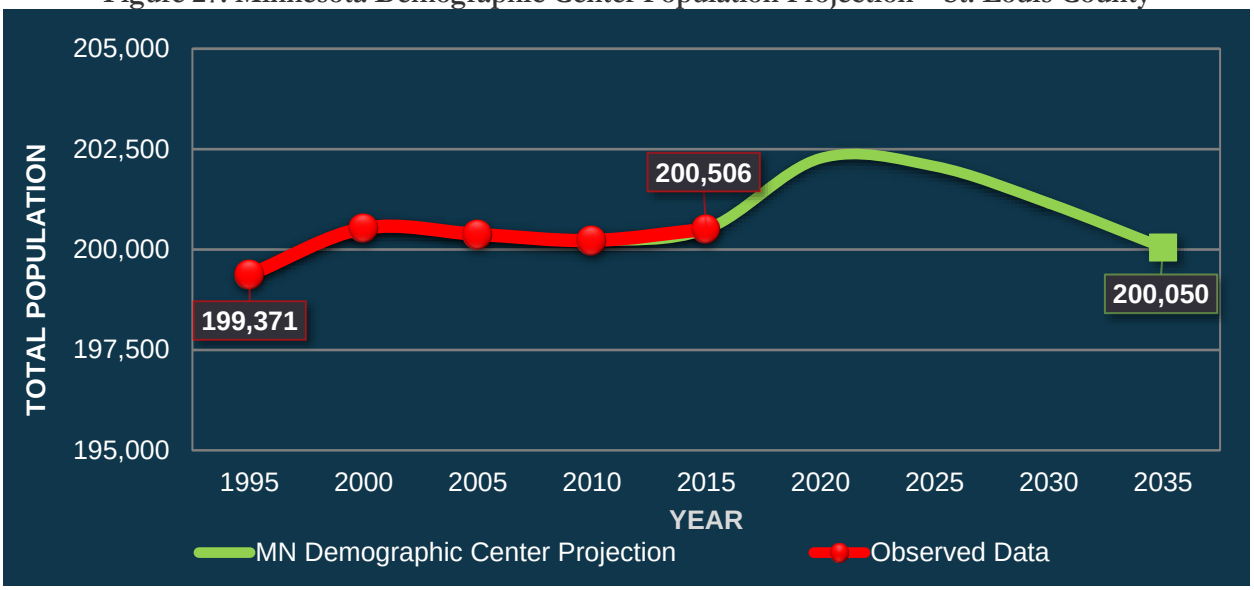
Introduction

A population projection is a conditional statement of what the population is likely to be in the future. Effective planning needs to be based on reasonable expectations of future populations, as there is a greater likelihood that services and facilities will be available at the time and in the place they are most needed. Since the county is a multijurisdictional entity, three different population examinations are provided including 1) St. Louis County (i.e., entire county), 2) the entire county, less Duluth, and 3) areas of county zoning jurisdiction.

St. Louis County

Figure 27 illustrates the population projection conducted by the Minnesota Demographic Center (MDC) in 2017. Between 1995 and 2015, St. Louis County's population grew minimally but primarily remained static. A likely attributing factor for this static population change is the net migration has remained balanced during this period. As illustrated in Figure 27 (Green), MDC's projected population for St. Louis County is just over 200,000. MDC's projection suggests that while increases in population are likely in the near future, in the longer term, the county can expect the static change in population to continue.

Figure 27: Minnesota Demographic Center Population Projection – St. Louis County

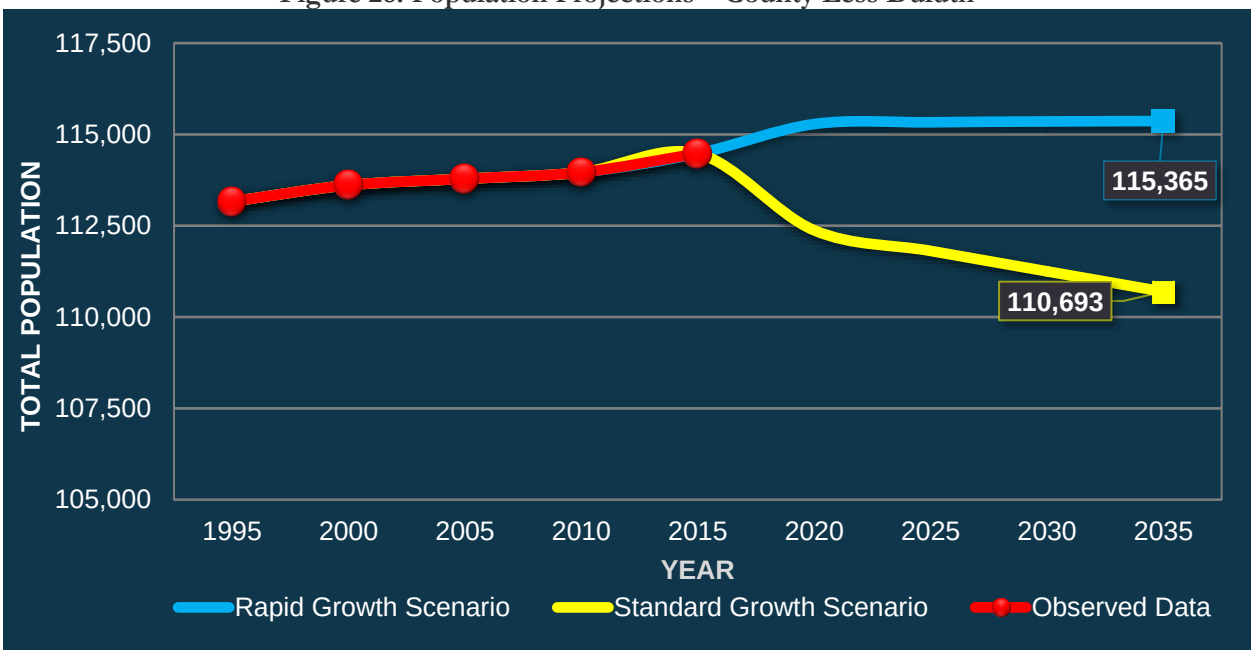


Source: United States Census Bureau, American Community Survey Estimates, 1995 to 2015.

St. Louis County, Less Duluth

As of 2015, Duluth represented approximately 43% of the county's population. To understand how the remaining cities and townships of the county might influence the future population of the county apart from Duluth, projections have prepared for these areas. Both a "rapid" and "standard" scenario have been prepared, which capture both an aggressive outlook (rapid) and the least optimistic outlook (standard) based on historical trends. Overall, the county less Duluth is expected to either grow marginally or begin to slowly lose population. Estimates for 2016 recently received from the Minnesota Demographic indicate a slight loss of population in this area of the county (Figure 28).

Figure 28: Population Projections – County Less Duluth



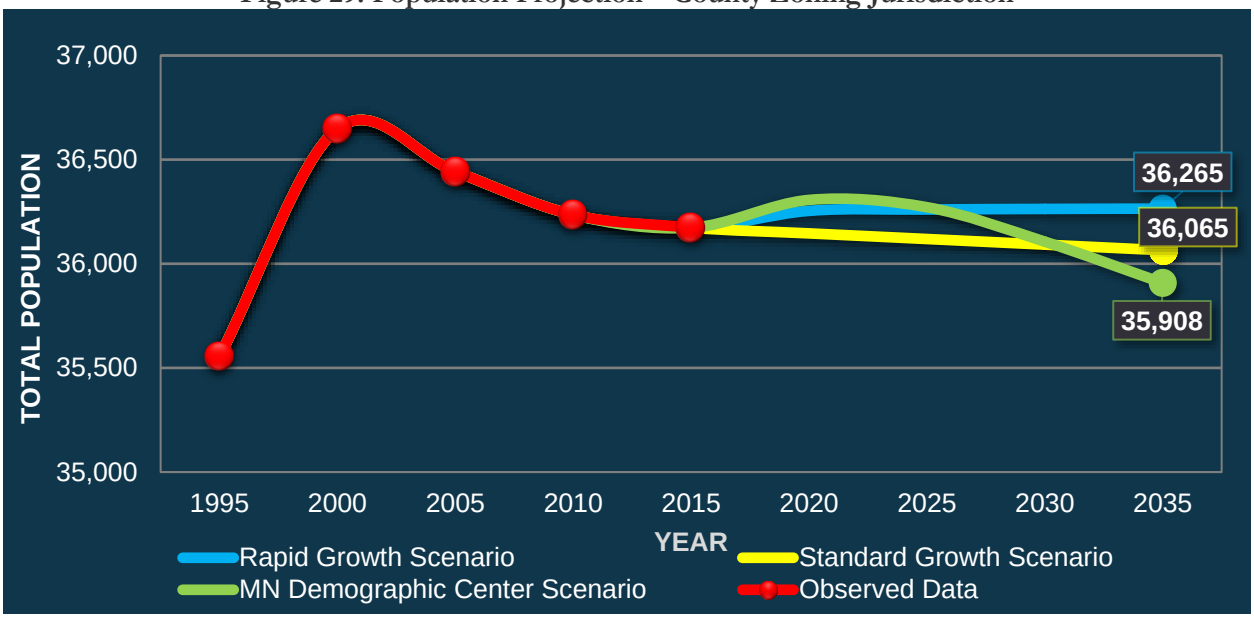
Source: United States Census Bureau, American Community Survey Estimates, 1995 to 2015.

County Zoning Jurisdiction

Figure 29 below provides three population projections including a rapid growth scenario, a standard growth scenario, and a Minnesota Demographic Center (MCD) growth scenario. As a note, the observed and projected populations exclude quantities from incorporated cities and areas not within the county's zoning jurisdiction.

Between 1995 and 2015, the population in the county's zoning jurisdiction grew considerably then declined gradually since 2000. A likely attributing factor for this descent in growth is the net migration has become much lower compared to the period between 1995 and 2000. Using estimates from 2014, the MDC performed a study which included a population projection for St. Louis County. The growth rates defined in this study were extracted and applied to St. Louis County's zoning jurisdiction starting from the observed data. As illustrated in Figure 29 (Green), the projected population for 2035 based on this method is just shy of 36,000 or an overall decline of less than 1%. Due to the sheer size of the county, the diversity of municipalities within the county, and the abundance of rural land and population within the county, this projection may prove below the observed quantity for 2035. As a result, this projection should be considered the minimum population the county can expect throughout the projection horizon based on the information available today.

Figure 29: Population Projection – County Zoning Jurisdiction



Source: United States Census Bureau, American Community Survey Estimates, 1995 to 2015.

In addition to the MDC's expectations, alternative projections were produced to determine the likely range of population change. The first projection is a rapid growth scenario, shown in Figure 29 (Blue), which anticipates a total population of 36,265 (2035). The second projected scenario is a standard growth scenario, as shown in Figure 29 (Yellow), which projects a total population of just over 36,000 (2035). Most recent estimates suggest that the total population for St. Louis County's zoning jurisdiction is just over 36,000. This means based on the findings that St. Louis County's zoning jurisdiction may experience a population change of marginal growth to a decline of almost 1% by 2035.

Implications

Throughout the projection horizon, St. Louis County can expect continued fluctuations of total population. By 2035, the total population of the county is expected to fall just above 200,000. The presence of stabilizing population suggests the county should be cautious in its anticipation of future development. Due to the positive relationship between population and industries such as mining, timber, and seasonal residential, close attention should be placed on industry forecasts. In addition, as more observed data is subsequently released, the county can begin to identify which of the three scenarios is most likely to occur and therefore plan, fund, are prepared accordingly.

HOUSING PROJECTIONS, COUNTY ZONING JURISDICTION

Comparable to a population projection, a housing projection is a conditional statement of how many permanent housing units there are likely to be in the future. As a result, effective planning also needs to be based on reasonable expectations of future housing trends. Proper anticipation of future housing trends increases the likelihood that services and facilities will be available at the time and in the locations that they are needed most. Table 9 outlines the total number of permanent housing units for

2015, the number of units attainable with the county's existing zoning, and the projected number of units for 2045. As a note, the observed and projected quantities exclude incorporated cities and areas not within the county's zoning jurisdiction.

Table 9: Housing Projections – County Zoning Jurisdiction

2015	Attainable	2045 (MDC)	2045 (Standard)	2045 (Rapid)
27,636	280,395	27,511	27,571	27,647

Source: United States Census Bureau, American Community Survey Estimates, 2015.

The area of county jurisdiction is projected to have between 27,511 and 27,977 total housing units by 2045. Of these totals, roughly 20% is considered seasonal residential housing units. Under the rapid growth scenario, the county jurisdiction's population is anticipated to increase by just over a thousand people by 2045. As a result, the housing projection under the rapid growth scenario is expected to increase by approximately 300 units. For the standard and MDC growth scenarios, the population is anticipated to decrease slightly. Consequently, the number of housing units in 2045 is expected to remain about the same.

EMPLOYMENT PROJECTIONS, COUNTY ZONING JURISDICTION

Changes in population and housing stock will directly and indirectly effect future employment numbers and vice versa. Therefore, successful planning also needs to be grounded in reasonable expectation of future economic trends. By properly anticipating future employment trends, there is greater likelihood that services, facilities, and housing will be available at the time and in the locations they are needed most. Table 10 summarizes the total employment for 2015, the attainable employment based on the existing zoning, and the projected employment for 2045. As a note, the observed and projected quantities exclude incorporated cities and areas not within the county's jurisdiction.

Table 10: Employment Projections – County Zoning Jurisdiction

2015	Attainable	2045 (MDC)	2045 (Standard)	2045 (Rapid)
30,006	339,935	29,735	29,865	30,031

Source: United States Census Bureau, County Business Patterns, 2015.

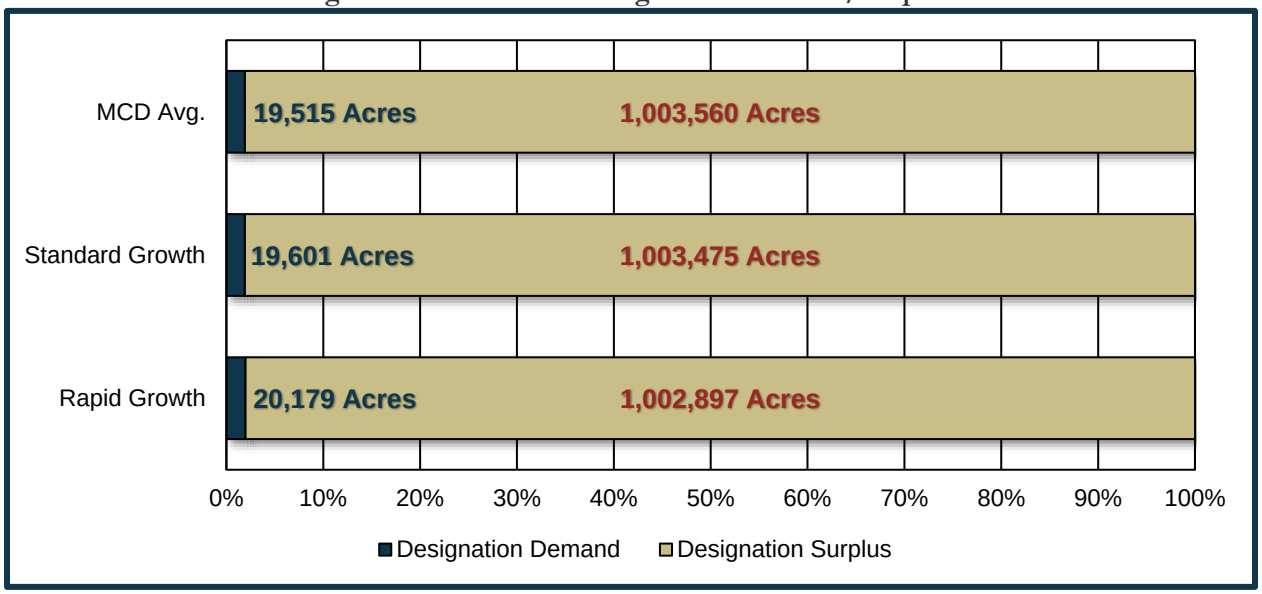
The area of county zoning jurisdiction is projected to have between 29,735 to 30,746 jobs by 2045. Under the rapid growth scenario, the county zoning jurisdiction's population is anticipated to increase by just over a thousand people by 2045. As a result, employment under the rapid growth scenario is expected to increase by approximately 2-1/2% during the projection horizon. For the standard and MDC growth scenarios, the population is anticipated to decrease slightly. Consequently, employment in 2045 is expected to remain about the same or also decline.

LAND USE CAPACITY

With an understanding of projected population, housing, and employment, the following analysis examines land use capacity of the county's zoning jurisdiction based on the existing zoning map. Figure 30 illustrates residential designation demand based on the population projections verses the surplus of land designated for residential uses in the existing zoning map. The existing zoning designates a total of 1,023,076 acres of land for residential purposes, while under the rapid growth scenario only 20,179 acres are needed and for the standard growth scenario only 19,604 are needed. This means the existing zoning map has a surplus of residential designations of about 98%. It is important to note that zoning districts in the county have been applied to areas under private, state, and federal ownership. In addition, zoning districts have also been applied not just to the edges of lakes and watercourses, but over the entire water surfaces.

While residential designation surplus does ensure development flexibility and availability, excessive surplus may lead to development that is not contiguous, but instead sporadic throughout the county. Studies have shown that plans need to comprise of a designation surplus of about 25% in order to fulfill this balance. By completing this analysis, the future land use plan can be shaped to appropriately reflect the expectations of growth while avoiding the potential issues resulting from an excess of land designated for residential development (issues associated with excess land designated could include "leap frog" development patterns that involve higher service costs resulting from more improved road and utility miles, among other issues).

Figure 30: Residential Designation Demand/Surplus

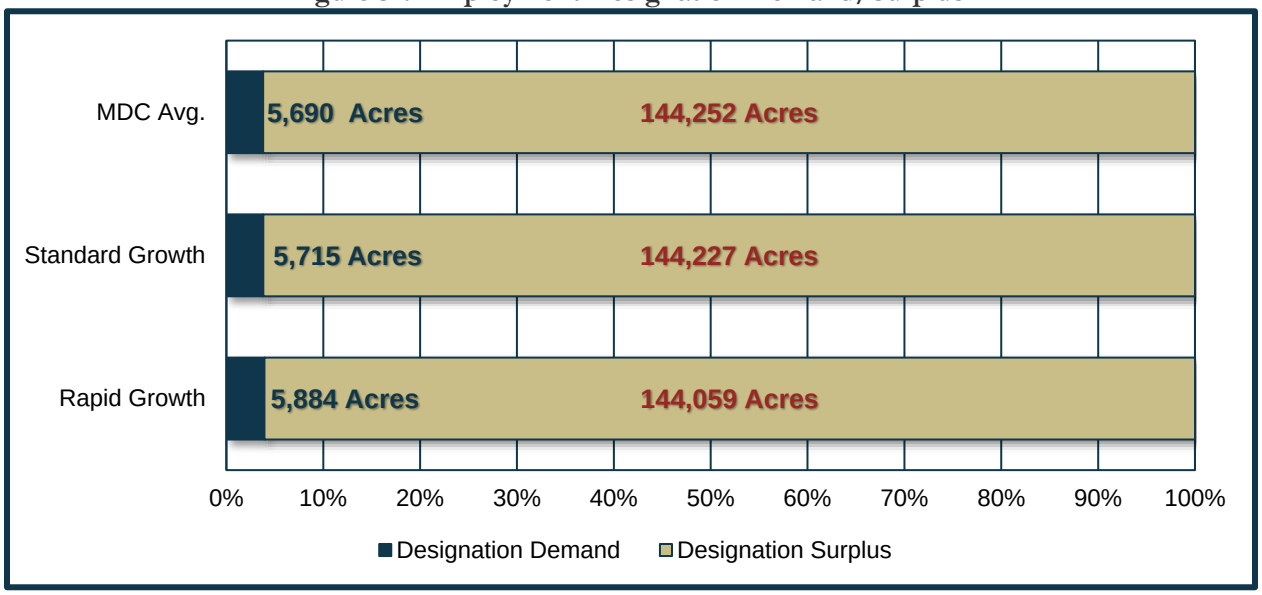


Source: SRF Consulting Group, Inc. analysis of St. Louis County GIS data and ACS/MDC-based projections.

Figure 31 illustrates employment generating (commercial and industrial) designation demand based on the projections verses the surplus of land designated for residential uses in the existing zoning map. The existing zoning designates a total of 149,942 acres of land for employment generating purposes (commercial and industrial), while under the rapid growth scenario only 5,884 acres are needed and

for the standard growth scenario only 5,715 are needed. This means the existing zoning map has a designation surplus for job creating uses by about 96%.

Figure 31: Employment Designation Demand/Surplus



Source: SRF Consulting Group, Inc. analysis of St. Louis County GIS data and ACS/MDC-based projections.

While commercial and industrial designation surpluses also ensure development flexibility and availability, abundant surpluses again may lead to development that is not contiguous and thus sporadic throughout the county. As previously stated, studies have shown that plans need to comprise of a designation surplus of about 25% in order to fulfill this balance. By completing this analysis, the future land use map can be shaped to appropriately reflect the expectations of growth while avoiding the potential issues resulting from an excess of land designated for commercial or industrial development (issues associated with excess land designated could include "leap frog" development patterns that involve higher service costs resulting from more improved road and utility miles, among other issues).

NATURAL RESOURCES

St. Louis County's rich and diverse natural resources strongly affect the comprehensive planning process. Ancient geologic processes formed iron and precious metal deposits in the bedrock. Following the last glaciation 12,000 years ago, a complex landscape of forests, wetlands, lakes, and rivers covered the county, creating habitat for a multitude of wildlife. From wild game and fish, to furs and timber, to iron ore and precious metals, the county's bountiful natural resources have helped sustain generations of Native Americans, European explorers, early settlers, and contemporary residents. Lake Superior, the largest freshwater lake in the world, is a water resource like no other, benefitting shipping/commerce, fisheries, and tourism.

Some of the county's most valued recreational destinations include Lake Superior's North Shore, Voyageurs National Park, the Boundary Waters Canoe Area Wilderness (BWCAW), Superior National Forest, numerous state parks, and countless north woods lakes. The natural and wild character of these areas makes them some of the most popular recreational destinations in the state.

Historical Conditions

Geology, Soils and Major Water Features

The geologic and glacial history of St. Louis County formed the most rugged landscapes in Minnesota, including the highest and lowest elevations in the state (Ojakangas and Matsch 1982). Considerable areas of bedrock were exposed by a series of glaciations events, and glacial deposits resulted in a variety of soils throughout the county. In addition to the deposited mineral soils, much of the county has organic soils, including peats and mucks, which developed from poorly decomposed vegetation in wetlands.

The county's topographic relief, resulting from geologic and glacial processes, causes surface waters to pool and flow in a complex pattern. The county is at a major continental divide, with waters flowing to the Atlantic and Arctic Oceans and the Gulf of Mexico. It encompasses portions of eight major watersheds draining to the Lake Superior Basin, the Rainy River Basin, and the Mississippi River Basin. Major rivers include the St. Louis River (from the Lake County border, arcing southwest and east to Lake Superior), the Little Fork River (flowing west into Koochiching County), the Vermilion River (Lake Vermilion to the northwest), and numerous smaller rivers of the North Shore which flow into Lake Superior. Of the county's 1,000 plus lakes, major natural lakes include Lake Superior, Lake Vermilion, Trout Lake, Lake Kabetogema, Rainy Lake, Pelican Lake, and Burntside Lake. Other large water bodies include Island Lake Reservoir, Boulder Lake Reservoir, Fish Lake Reservoir, and Rice Lake Reservoir, all in the southern portion of the county. Many lakes lie on shallow or exposed bedrock, making them more susceptible to environmental changes compared to lakes formed in deeper soils.

Historical Vegetation & Wildlife

Prior to European settlement (early-mid 1800s), St. Louis County was a complex mosaic of vegetation types (Marschner 1974). A variety of forests dominated the landscape, primarily dominated by conifers and hardwoods, with some areas of aspen. Large portions of the county supported conifer bogs and swamps, especially in the southwestern portion of the county. This range of habitats supported diverse wildlife, including woodland caribou, moose, wolf, lynx, and beaver. Many of the bird, fish, and other wildlife species found currently in the County were also present historically, and many were more abundant than today.

Past Land Uses

Indigenous people have lived in what is now St. Louis County for thousands of years. Their culture thrived on the abundance of natural resources here: wood, copper, game, fish, and wild plants like blueberries, raspberries, and hazelnuts. In the 1600s French explorers and traders arrived in the area later building trading posts to market the furs they trapped. During this time, three Native American tribes (Ojibwe, Dakota, and Chippewa) were in the county.

The discovery of gold around 1865 spurred new exploration, which evolved in the next decades to iron ore mining. The county experienced heavy logging in the early 1900s, which fed the lumber mills of the Great Lakes region but also affected forest composition and shaped the future industries that used the region's forests. Large wildfires were also common at this time. Overharvesting of game and fish became regulated in the early to mid-1900s, and wildfires were brought under control. While conserving natural resources overall, these measures also brought their own challenges, such as poor regeneration of certain tree species and the build-up of excess fire-fuels in some kinds of forests. On the other hand, most fish and wildlife populations are doing well, thanks in part to good management but also the regenerative powers of nature itself.

Existing Conditions and Land Uses

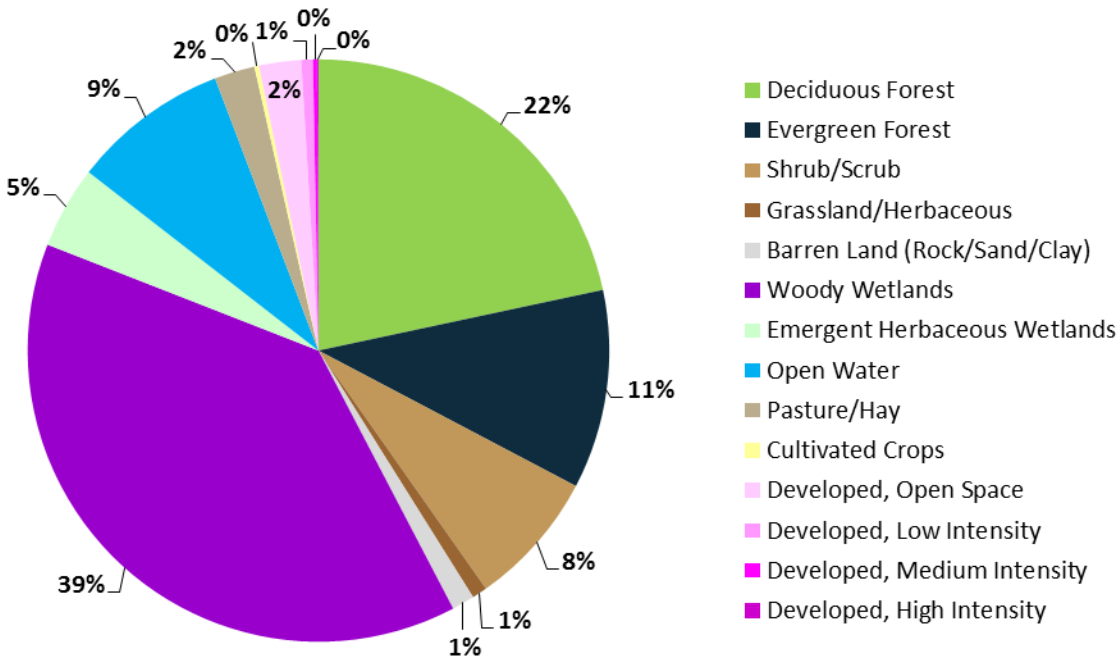
Land Cover

While portions of St. Louis County have changed relatively little over the past two centuries, much of the county has changed noticeably due to development in cities, recreational development (e.g., lakefront homes), and land uses (e.g., logging, mining). Based on the 2011 National Land Cover Database (NLCD, Homer et al 2015), existing land cover of the County is summarized in Table 11 and Figure 32.

Table 11. Existing Land Cover Acres in St. Louis County (based on NLCD 2011)

Land Cover	Acres
Deciduous Forest	778,004
Evergreen Forest	396,736
Shrub/Scrub	270,376
Grassland/Herbaceous	30,471
Barren Land (Rock/Sand/Clay)	45,026
Woody Wetlands	1,386,192
Emergent Herbaceous Wetlands	164,245
Open Water	313,152
Pasture/Hay	80,589
Cultivated Crops	9,105
Developed, Open Space	84,059
Developed, Low Intensity	23,140
Developed, Medium Intensity	8,109
Developed, High Intensity	2,796
Total	***3,592,000***

Figure 32. Existing Land Cover Percentages in St. Louis County (based on NLCD 2011)



Wildlife

By the early 1900s, northeastern Minnesota had lost its woodland caribou population, largely due to hunting and logging of the north woods. Moose, wolf, and lynx, once abundant in northeastern Minnesota, have almost disappeared from the lower 48, including a concerning decline in Minnesota's moose population. Centuries of over-harvest by European trappers, beginning in the 1600s, greatly reduced beaver populations; however, trapping regulations have enabled beaver to return to its former abundance. Many wildlife populations have grown since the early 1900s, when hunting and fishing regulations were put in place, forestry practices began to consider effects on wildlife, and certain environmental contaminants were brought under control. Eagle and osprey populations, for example, have returned to pre-DDT levels and are expanding southward.

Water Resources

St. Louis County is known for its numerous, high-quality lakes. Based on the MnDNR's classification of lakes (General Development, Recreational Development, or Natural Environment), 85% of the county's lakes are classified as Natural Environment (St. Louis County 2015).

The draft 2016 Minnesota Impaired Waters List identifies 179 lakes, 53 sections of rivers/streams, and five beaches as impaired (MPCA 2016). There are a variety of impairment types (e.g., Aquatic Consumption, Aquatic Life, Aquatic Recreation), but many county water bodies are impaired for Aquatic Consumption due to mercury in fish tissue. Mercury pollution is caused primarily by atmospheric deposition of emissions from (often distant) power plants; therefore, St. Louis County has limited control over this pollution source.

Developed Areas

Duluth is the largest city in St. Louis County, with a population of over 86,000. Other major cities in the county include Hibbing and Virginia in the Iron Range, and Hermantown just west of Duluth. Two Anishinaabe Native American reservations are located partially within St. Louis County: the Bois Forte Reservation (south of Voyageurs National Park and Tower/Lake Vermilion) and the Fond du Lac Reservation (west of Duluth).

Much of the land surface in the Iron Range has been altered by mining. While some mines are constructed underground, many are surface mines, including most in the Iron Range. These mines dramatically alter the landscape through excavation and the resulting tailings piles. Many abandoned mines fill in with water, creating artificial lakes.

Nearly all of St. Louis County forests have been logged at least once, and many are under routine management for timber production, usually on a several decade rotation for aspen and fiber products, or on a longer rotation for hardwood lumber. Logging occurs in National, State, and county forests, and is often modified to support the goals of game production, especially deer and ruffed grouse.

Natural Resource Opportunities & Constraints

The demands of society apply pressure on many natural resources. Food, shelter, cars, and technology all require raw materials – nearly all of which come directly or indirectly from nature. This perspective should underpin decisions about development and the use of natural resources. In recent decades, as discussed above with ecosystem services, research has quantified the financial and health benefits of natural areas, clean water, and places to escape urban and suburban lifestyles. Wanting to conserve natural resources for ecosystem services supports the protection of natural areas and healthy working landscapes, such as forestland. Land use decisions, however, always bring different perspectives to the table, which can be challenging to resolve. The best chance to resolve differences before they become politically heated is to do proactive natural resources-based planning, as this Comprehensive Plan hopes to do. With information at hand, there is a better chance to defuse the conflicts and facilitate their resolution.

While uncertainties remain regarding future climate conditions, research and predictive models that closely match past temperature fluctuations suggest that temperature is increasing and forest composition is shifting in northern Minnesota. Red maples (typically a more southern species) have recently increased in abundance in the north woods, and the predicted warming trends (combined with current forest and wildlife management practices) are expected to reduce conifer tree cover, increase wildfires, and result in more open vegetation communities resembling brushlands and savannas. More extreme storms are also predicted to increase forest windthrow, flooding, and catastrophic erosion events, as has been seen in recent events which filled the St. Louis estuary and adjacent Lake Superior with orange-brown sediment from the banks and beds of the St. Louis River and its tributaries.

Natural Areas Framework

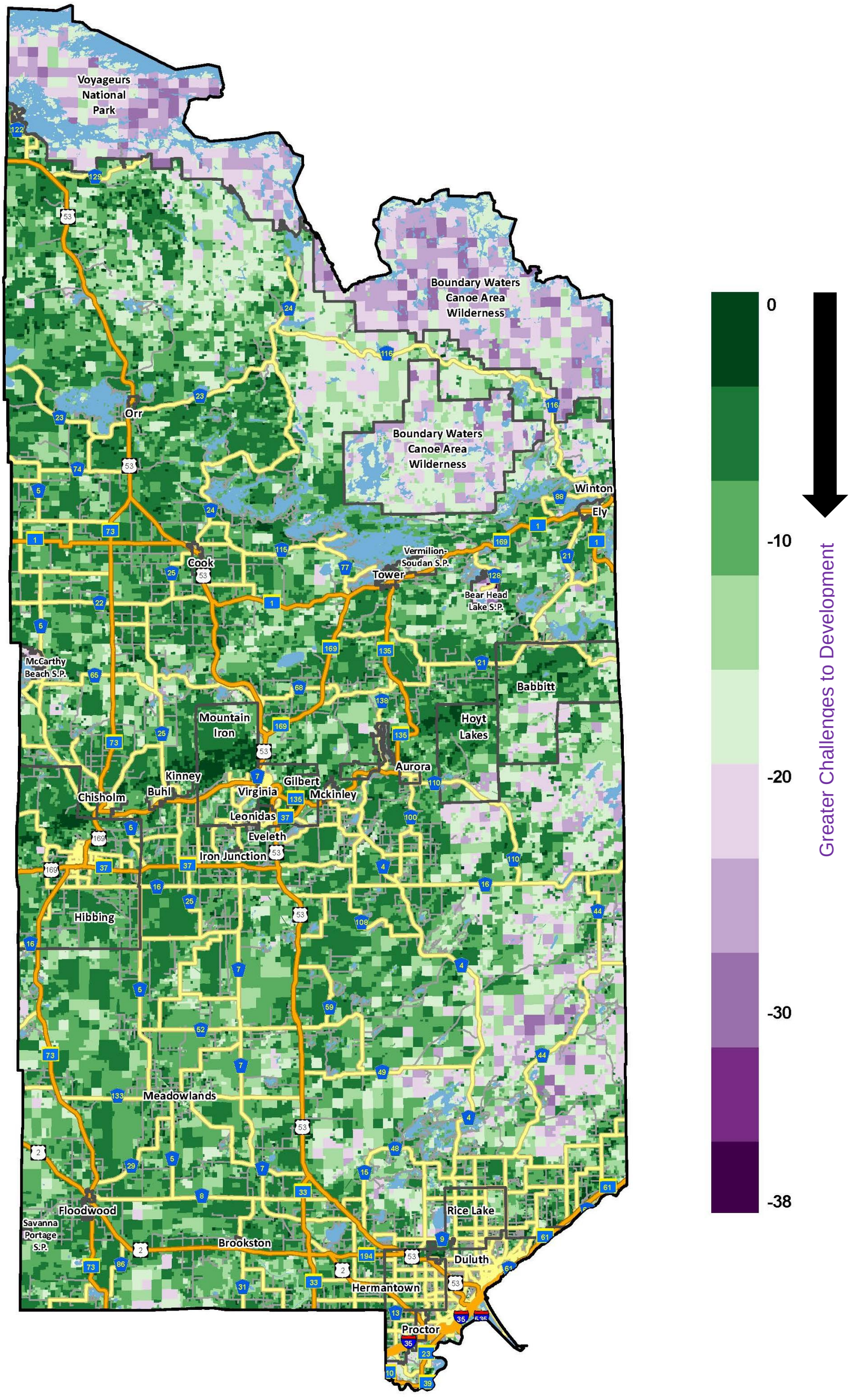
For the St. Louis County Comprehensive Land Use Plan update, a Natural Areas Framework was used to help conserve valuable natural resources while allowing resource development (e.g., mining, logging) and land use development to expand where appropriate. This framework can be used alone to identify core wildlife habitats, vegetation community complexes, sensitive habitat and rare species locations, and ecological corridors warranting protection (i.e., conservation opportunities). The framework can also be used as an "overlay" in conjunction with other future land use scenarios to help identify potential conflicts or "challenges," and to identify opportunities for achieving natural resources protection while benefitting other interests (e.g., recreational development).

The Natural Areas Framework was developed by reviewing existing geographical information system (GIS) mapping data. Pertinent datasets were selected and processed to capture a variety of natural resources as well as outdoor recreation areas that depend on healthy ecosystems and natural areas. An additional area or "buffer" was assigned around some of these features to provide additional protection beyond the actual features themselves. This is important to ensure that the feature continues to function without the intrusion of "edge effects" from surrounding incompatible land uses. Datasets were then scored with regard to their protection status/sensitivity, with "5" representing the most sensitive/protected features and "1" representing less protected features. Additional detail regarding the framework methodology is provided in Appendix A. Table 12 provides a list of the specific datasets used in the framework and to what degree each dataset was scored as a challenge to development.

Table 12: Natural Area Framework Datasets

Category	Degree of Challenge to Development
Boundary Waters Canoe Area Wilderness (BWCAW)	
Voyageurs National Park	
MnDNR National Wetlands Inventory (NWI) Update	
MnDNR Public Waters Inventory (PWI) Basin	
MnDNR PWI Watercourse	
MnDNR Scientific & Natural Area (SNA)	
MnDNR Aquatic Management Area (AMA)	
MnDNR Site of Biological Significance (SBS)	
Old Growth Forest	
MnDNR Native Plant Community (NPC)	
MnDNR Rare Natural Feature (polygons)	
MnDNR State Park	
MnDNR Wildlife Action Network	
MnDNR Wildlife Mgmt Area (WMA)	
Other Streams/Creeks/Ditches	
Wild Rice Lakes	
Campgrounds	
Trails	

Figure 33: Natural Areas Framework Map



Source: St. Louis County GIS, 2017

Core Habitats, Buffers & Connections

Although St. Louis County appears to nearly everyone as continuous green space, in fact the many paved and gravel roads, including smaller forest roads, together with cabins, year-round homes, towns, cities, mined lands, and harvested forests have begun a process of conversion from wild spaces where sensitive species can live for generations, to landscapes with more generalist species that easily fit in with human development.

Generalist wildlife species (crows, starlings, raccoons, etc.) are animals that are common and can tolerate and even thrive in altered and developed lands and waters. These species are typically not a focus of conservation since their populations are usually stable or increasing. In contrast, specialist wildlife species are often rare or have declining populations due to special habitat needs. Many specialist wildlife species require large, diverse and high quality habitat blocks to sustain their numbers. These areas are called interior or core habitats. Protecting and managing core habitats in the county will improve the likelihood that uncommon and declining animal species will persist. The MnDNR's Wildlife Action Plan (revised in 2016) identifies many of these at-risk species, which are called Species of Greatest Conservation Need (SGCN).

Wild plants experience similar incursions, with horticultural and domesticated species widely planted for human goals and moving into wild spaces and displacing the original inhabitants. The southeast Asian reed canary grass, the aggressive hybrid cattail, Russell's hybrid lupine, smooth brome grass, and dozens of other plants useful for stabilization and agriculture, or just attractive to some people, are moving northward, assisted by development practices.

The effect of converting natural areas to developed areas (e.g., cities, mines), with its resulting habitat loss, has been well documented. Less obvious are long-term effects from increasing the amount of habitat edge. Smaller and narrower habitats have more edge than larger, rounder ones. More edge and less interior habitat pose significant threats to wildlife that need interior habitat, and native plant communities are more vulnerable to invasion by aggressive, often undesirable plant species. A variety of scientific papers and other sources have documented how edge effects penetrate into adjacent natural habitat. For instance, birds and other wildlife can be flushed by people walking on trails up to a distance of 150 feet away. Mid-sized predators (raccoon and outdoor house cats) will travel several hundred feet into forests and grasslands to prey on birds, small mammals and other wildlife. Invasive plants move from edges of roads, trails, cabin sites, and towns, where they colonize interior wild areas. Traffic noise, warm and dry air, dust from gravel roads, pesticide drift, and many other damaging influences enter wildlife habitat from their edges.

Management can reduce edge effects. Enlarging existing habitats, eliminating encroachments, and installing and maintaining native vegetative screens and buffers all help. Connecting core habitats allows wildlife to retreat to different, more favorable areas, without being exposed to the hazards of travel. Given St. Louis County's abundance of natural areas, it contains many sensitive vertebrate species. Some of these require corridors of several hundred to thousands of feet in width to move among large habitat cores. Native vegetation can also benefit from connectivity as seed dispersal can be facilitated; however, this becomes a problem when invasive plants take advantage of these connections.

The concepts of core habitats, edge effects and connectivity can be used to help conserve the county's full spectrum of biodiversity. Protecting, connecting and restoring large areas of natural vegetation to minimize fragmentation and edge effects are important to many SGCN in the county.

LAND USE SUITABILITY ANALYSIS

Analysis Overview

The land use suitability analysis is a mapping analysis tool used to help understand how various factors could influence various types of development. For example, factors that both positively and negatively influence the growth of residential development are "layered" (like a multi-layer cake) in a digital mapping program (Geographic Information Systems or GIS) to understand if certain areas have a balance of more negative factors or positive factors influencing residential growth. This approach was applied to the entire county by applying a combination of numerous datasets (or layers) that represent development challenges (factors negatively influencing development) and development opportunities (factors positively influencing development). Because different types of development experience varying degrees of challenges and opportunities, three separate assessments have been performed for the three most basic land uses categories in the county:

Natural Areas: This category includes areas that are largely undisturbed by development or are protected to some degree at a state or federal level. This assessment is explained in greater detail as the "Natural Areas Framework" beginning on page 62.

Moderate Development: This category includes rural county development, typically in the form of residential or commercial development. Lakeshore communities, resorts, large lot-residential, and roadside commercial operations are some of the more prominent examples.

High Intensity Development: This category includes heavy commercial or industrial development in the county. More prominent development types include gravel pits, and other development types closely associated with the mining industry, such as taconite plants, heavy vehicle/machinery repair and supply, and infrastructure supply yards.

Development Challenge Datasets

The challenges to development examined in this analysis are wide-ranging in the potential impact they might have on development. For all three assessments, the majority of datasets incorporated into the analysis are considered challenges to future development rather than an opportunity. The presence of challenges does not mean development will never occur at a specific site, but simply that development is more likely to prioritize other areas so long as they are available and feasible. Overall, some of the constraint datasets identified for the moderate development and high-intensity development assessments are similar, and others are unique to each assessment.

Of the three assessments, the natural area assessment is most unique. This assessment comprises the "Natural Areas Framework" described in greater detail on page 62. It is important to note that the result of the natural areas assessment (or Natural Areas Framework) was applied as an additional feature or overlay in the moderate development and high-intensity development assessments. Incorporating this feature helps to account for applicable challenges to development imposed by the need to avoid sensitive natural areas.

An outline of all the identified development challenge datasets for each assessment is provided in Tables 13 and 14. The tables also provide insight into the degree to which each development challenge dataset was considered in each assessment. Justifications for each dataset are provided in the appendix.

Table 13: Moderate Development Assessment Development Challenge Datasets

Category	Degree of Challenge to Development
Floodway	
Oil/Gas Transmission	
Landfills	
100-yr Floodplain	
Slope >20%	
Mined and Potential Mined Areas	
500-yr Floodplain	
Electric Transmission Lines	
Airport Zones	
Railroads	
Areas without NFPA Standard for Rural Fire Protection	
Wildfire Risk/Potential	

Table 14: High Intensity Development Assessment Development Challenge Datasets

Category	Degree of Challenge to Development
Floodway	
Residential Development	
100-yr Floodplain	
Slope >20%	
500-yr Floodplain	
Airport Zones	
Areas with NFPA Standard for Rural Fire Protection	
Areas Zoned to Allow Residential Development	

Development Opportunity Datasets

The opportunities for development examined in this analysis are identified separately for the moderate development and high-intensity development assessments. The presence of growth opportunities does not guarantee development will occur at a specific site, but simply that development is more likely to prioritize these areas so long as they are available and feasible.

An outline of all the identified development opportunity datasets for each assessment is provided in Tables 15 and 16. The tables also provide insight into the degree to which each opportunity dataset was considered in each assessment. Justifications for each dataset are provided in the appendix.

Table 15: Moderate Development Assessment Development Opportunity Datasets

Category	Degree of Opportunity to Development
Developed Land	
Vacant Platted Lots	
Collector and Arterial Road Segments (Paved)	
Paved Roads	
Slope <20%	
Schools	
Broadband Service/Speed Areas - Served w/high speed	
Broadband Service/Speed Areas - Underserved w/high speed	
Government Land (Federal/State)	

Table 16: High Intensity Development Assessment Development Opportunity Datasets

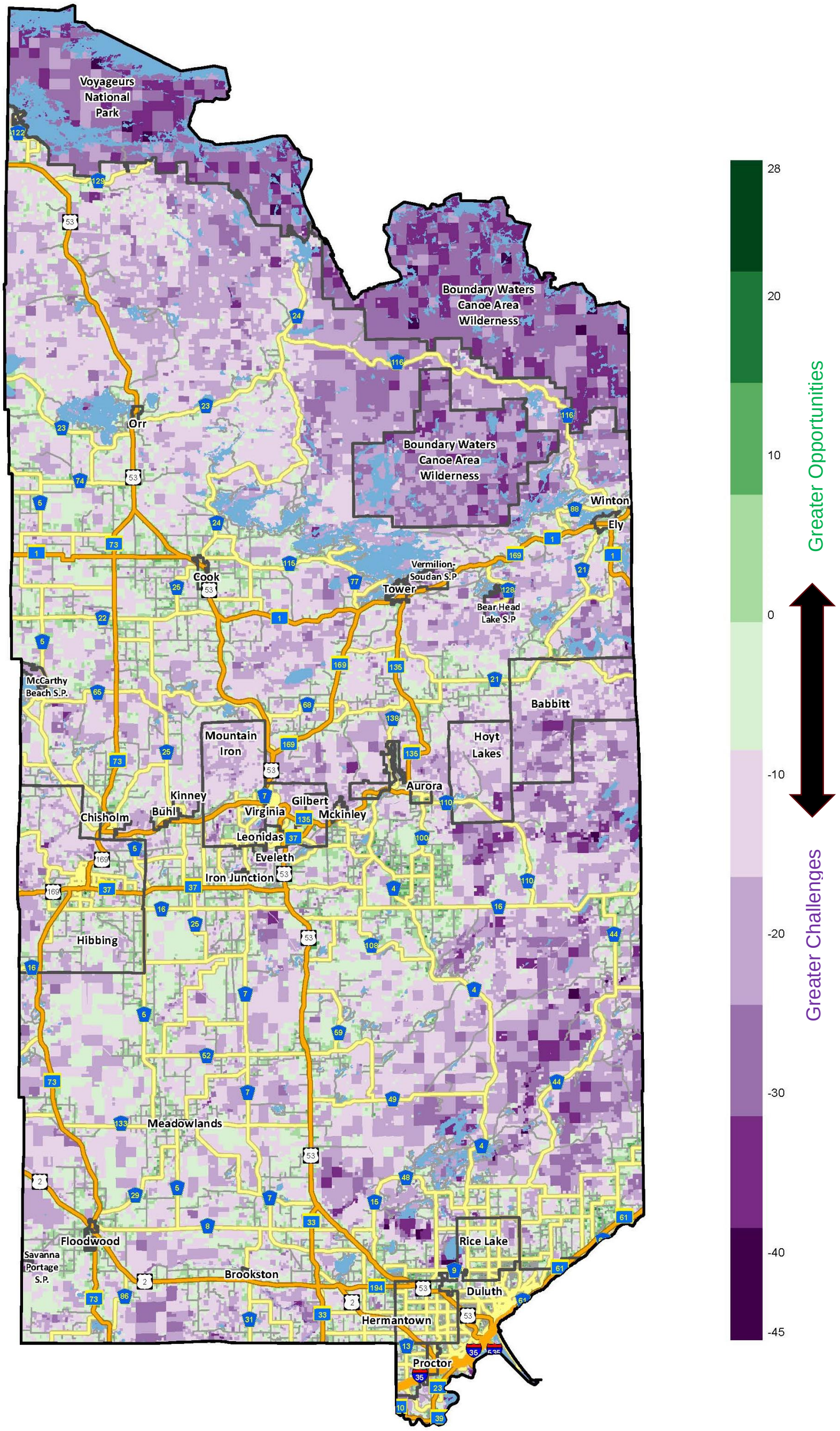
Category	Degree of Opportunity to Development
Roads with 9 ton Year-Round Limits	
Collector and Arterial Road Segments (Paved)	
Railroads	
Electric Transmission Lines (220 KV +)	
Slope <20%	
Broadband Service/Speed Areas - Served w/high speed	
Mined and Potential Mined Areas	
Broadband Service/Speed Areas - Underserved w/high speed	

Purpose and Application of the Land Use Suitability Analysis

The purpose of the land use suitability analysis is to assess existing and projected future conditions of the study area in order to guide the development of a future land use plan. The analysis maps do not necessarily exhibit where future growth should occur, but rather where growth is likely to occur. A land use suitability analysis is merely intended to be an objective interpretation and explanatory documentation of development conditions.

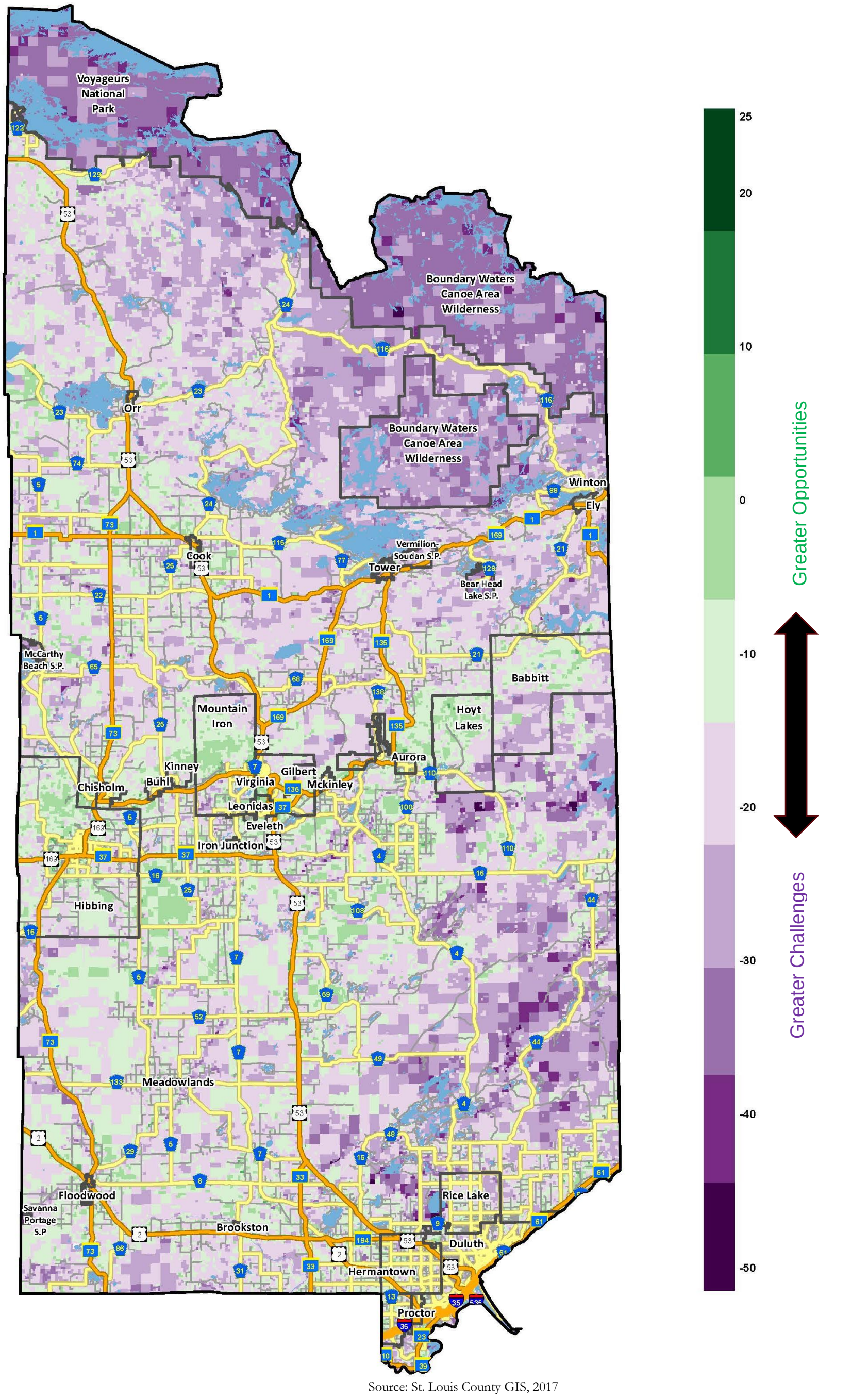
Findings from the land use suitability analysis will inform decision-makers and the public where development is likely to occur in the absence of a clearly defined land use plan. With an understanding of where growth opportunities and challenges can be found within the study area, designations of suitable new development areas and potential land uses can now be determined. The next stage of the plan development process is to obtain feedback from decision-makers, stakeholders, property owners, and the general public to determine if areas identified from the analysis are appropriate for future development. The results of the moderate development and high intensity development assessments are provided in Figures 34 and 35.

Figure 34: Moderate Development Assessment Results



Source: St. Louis County GIS, 2017

Figure 35: High Intensity Development Assessment Results



Source: St. Louis County GIS, 2017

KEY CHALLENGES AND OPPORTUNITIES IN 2035

Maintaining and Enhancing the Vitality of Lakeshore and Rural Residential Communities

The predominant generation in lakeshore and rural residential communities are baby boomers. The majority of these permanent and seasonal residents are likely able to afford extended commutes, higher property costs (and associated taxes), and an increased cost for services. In 2035, ensuring that the younger generations have the ability to afford to live (or visit on a seasonal basis) in lakeshore and other rural areas will be vital.

County Jurisdiction Demographic Snapshot

- ✓ A greater percentage of baby boomers reside in areas of county jurisdiction.
- ✓ A greater percentage of higher income earners reside in areas of county jurisdiction.
- ✓ 18 percent of residents in the county's jurisdiction commute over 50 miles to work.

Implications for Future Land Use

- Explore opportunities to improve housing affordability in rural communities and/or in nearby cities.
- Encourage housing options in lakeshore and rural areas to help baby boomers age in place and to attract younger generations.
- Identify ways to encourage the working population (younger adults) to reside in larger numbers in lakeshore and rural communities or in adjacent cities.
- Identify opportunities to bring additional services to lakeshore and rural communities and/or increase service availability in nearby municipalities.

Working Toward a More Sustainable Rural Economy

Countywide, industries that support the highest paying jobs have much fewer employees than industries with jobs that support an average salary or a salary well below the statewide average. Further, some of the county's leading industries in terms of employment depend on a significant seasonal employment base (e.g., retail trade, accommodation and food services).

Countywide Employment Snapshot

The five industries that support the highest average payroll per employee represent only 16 percent of all jobs in the county. The five industries that support the lowest average payroll per employee represent 35 percent of all jobs in the county.

Implications for Future Land Use

- Increase opportunities to grow industries with higher paying, year-round jobs throughout the county. Instead of focusing on one industry, focus on a mix of industries should be considered. This will ensure that the economy is more sustainable in the long-term in the event that any one industry is negatively impacted by unforeseen factors.
- While many of the jobs related to the tourism industry are below the state average salary and may be seasonal in nature, opportunities to grow the tourism industry should continue to be supported. Tourism brings in tax revenue from outside of the county and may be a considerable factor that attracts people to reside in the county permanently or on a seasonal basis.
- The land use plan should be sensitive to the location of many natural resource assets and should focus on protecting the integrity of such areas through various land use controls. A wide variety of natural resources provide the basis for the county's tourism draw.

Maintaining and Improving Public Infrastructure and Services

St. Louis County and many local jurisdictions all contribute to the maintenance of an extensive emergency response system consisting of fire departments, ambulance agencies, and law enforcement agencies, all supported by a mix of paid employees and volunteers. In rural areas, including many lakeshore communities, emergency response relies heavily upon volunteer fire departments for emergency response. As a whole, the county relies upon the most extensive mileage and one of the most cost-burdened road systems in Minnesota.

Challenged Road System

- ✓ The county contains 12 percent of all county road mileage in Minnesota.
- ✓ 47 percent of all paved roads in the county have a pavement conditions rated as "poor" or "very poor".

Implications for Future Land Use

- In areas of county zoning jurisdiction, carefully consider the impact that the expansion of residential, commercial, and industrial development has upon emergency service availability and response times.
- Avoid over-extending county resources needed to maintain and improve the road system. Carefully consider traffic impacts resulting from new development in areas of county zoning jurisdiction.

Coexistence of Conflicting Land Uses

Especially in areas of county zoning jurisdiction, land is used in a variety of different ways. Many areas have a significant value with sensitive natural resources, other areas may be more prone to commercial or industrial development, and significant areas of residential development exist adjacent to valuable natural resources, such as lakes.

Implications for Future Land Use

- An understanding of areas more appropriate for one type of land use over another must be taken into consideration when considering new land use assignments. For example, areas that may be subject to the expansion of mining activities (and related activities), or impacts from existing mining activity should be protected from encroachment by conflicting residential development.

What is Zoned vs. What is Built

The official zoning map of areas in the county's jurisdiction designates over one million acres of land for residential purposes, only two percent of which is currently developed.

- The consideration of permits to allow gravel pits should take into account the long-term use of the subject land for other uses, such as residential, commercial, and other types of land use.
- Identify areas of "excess", undeveloped residential and other zoning districts that could serve a more appropriate land use and/or areas where new development would place an undue burden on the county road system.

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