Region XII Transportation Affiliation Long Range Transportation Plan





2022-2050





Section 1: Background



Introduction

Region XII considered the following transportation planning factors and goals during the development of the 2023 Region XII Long Range Transportation Plan. The transportation planning factors are as follows:

- i. Support the economic vitality of the area, especially by enabling global competitiveness, productivity, and efficiency;
- ii. Increase the safety of the transportation system for motorized and non-motorized users;
- iii. Increase the security of the transportation system for motorized and non-motorized users;
- iv. Increase accessibility and mobility of people and freight;
- v. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- vi. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- vii. Promote efficient system management and operation;
- viii. Emphasize the preservation of the existing transportation system;
- ix. Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
- x. Enhance travel and tourism.

Aging infrastructure combined with finite resources, increase construction costs, and increased demands on the transportation system create significant challenges to reach the desired transportation planning goals for the region. Roads and bridges are deteriorating at a faster rate due to increased volumes of freight and heavy agricultural equipment and a significant number of bridges in the region require repair or replacement as they are load weight restricted. The increasing age of the population presents the need for additional transit service. Multimodal facilities are needed to enhance the flow of freight between modes. There is a demand for bicycle facilities, trails, and sidewalks to improve the walking and bicycling opportunities for recreation and safe routes to schools. Preservation of existing facilities has become the main focus in the region.

CHAPTER 1: Demographics

Regional Population

With an estimated regional population of 72,167 in 2020, the population accounts for approximately 2.26 percent of the state's 3.19 million people. Locally, over half the population resides in Carroll and Crawford Counties, with the complete 2020 population breakdown in Figure 1.1.

Population decline has been an issue in the region since the mid-1900s as families have become smaller, agricultural professions have become more efficient, and education and employment opportunities have attracted many families to larger labor markets, a well-documented trend popularly dubbed "brain drain."







Figure 1.2 shows Census Bureau population estimates between 1969 and 2020 for the region. With over 92,000 people in 1969, the number dropped to 72,167 by 2020. Over the same period, the population of Iowa slowly increased, from 2.8 million to over 3.19 million.

Since 2015, the region's population has decreased by an estimated 919 people, or approximately 2.1 percent, while the state population increased overall by 2.5 percent. Since 2015, only Carroll County saw **REGION XII COUNCIL OF GOVERNMENTS** | Long Range Transportation Plan an increase in population out of all six counties. Figure 1.3 outlines the county population changes since 2015.



It is important to note the regional population decline is almost entirely within the white population, which has declined over seven percent since 1990, dropping from 78,486 to 72,706 at the 2020 Census counts. The white population still makes up approximately 89.5 percent of the entire region. The growing populations are within minority groups, especially people of Hispanic or Latino heritage, which is a growing cohort in nearly all member counties. Hispanic and Latino people were nearly nonexistent in the area as recently as 1990, but the population has continued to increase rapidly, although their migration has not been widespread across the region, as nearly 80 percent reside in Crawford County. Greene County claims to have the second highest population of the area. However, it is less than three percent of the entire county's population. A visual breakdown of this information, as well as individual county race statistics are available in the appendix.

Regional Population Age

The age of the region's population is an important consideration as Region XII continues to age at a faster rate than the state, a trend that is common across rural parts of Iowa. Iowa, like many other Midwestern states also features proportionally older populations than the country as a whole. To the counties within the region, this is a threat

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The data indicates that the 45-64 age group is proportionally larger than the State of Iowa, while the 25-44 age range lags behind the state. Region XII also has a higher proportion of individuals over the age of 65 than the rest of Iowa. The pre-school and school-age children are closely tied with the overall state average, while the dip in the 18–24-year-old age range could be expected as there are not any four-year learning institutions in the region, forcing many people in that age range to move elsewhere to pursue four-year degrees. Figure 1.4 on page 3 shows the average age by county compared to the region, state, and nation.



Figure 1.5: Persons per Square Mile, 2010-2020

Persons per Square Mile

Almost as important to the region as total population is the number of people per square mile. Figure 1.5 above shows the average number of persons per square mile for each individual county as well as the region as a whole compared to the State of Iowa. In 2020, Region XII averaged 20.8 persons per square mile. This number is down from 2015 where the region averaged 21.06 persons per square mile. From 2015 to 2020, three of Region XII's counties had a decrease in the average number of persons per square mile, with Audubon, Crawford, and Carroll County increasing, while Iowa experienced an increase over the same period.

Evaluating the number of persons per square mile is relevant because lower density can cause an increase of costs in almost all aspects of life. The amount of time it takes for emergency personnel to reach a home is increased which increases the cost to the patient. Having a population which is spread out limits the amount of fixed route transportation providers can offer at a reasonable cost to the users.

With decreased persons per square mile comes an increased number of miles of road needed for people to get to their place of employment and to the services in which they need.

Population Changes

When looking at population change, it is important to not only look at the numbers, but also the birth and death rates as a region may have a high out-migration, but an equally high birth rate. The region's migration numbers are important in determining the cause of the region's population changes. Table 1.1 shows the movement of people throughout the region. All but one county in the region experienced an out-migration of people in the 5-year span. During this period, the region experienced an out-migration of 1,307 people. Carroll County was the only one to experience a natural increase from 2015 to 2020 but did not have large enough increases to create a positive net migration.

				Number of	Number of		Net
	2015	2020	Population	Births	Deaths	Natural	Population
	Population	Population	Change	(2015-2020)	(2015-2020)	Increase/Decrease	Change
Audubon							
County	5,869	5,674	-195	308	402	-94	-289
Carroll County	20,629	20,760	131	1,244	1,194	50	181
Crawford							
County	17,252	16,525	-727	1,131	846	285	-442
Greene County	9,027	8,771	-256	511	605	-94	-350
Guthrie County	10,676	10,623	-53	569	615	-46	-99
Sac County	10,021	9,814	-207	656	692	-36	-243
Region XII	73,474	72,167	-1,307	4,419	4,354	65	-1,242

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CHAPTER 2: Economic Conditions

Income

Median household incomes of those living in the region are slightly lower than the state as a whole. The average median household income for the region (\$58,176) is \$3,210 less than the State's average, which is \$61,386. Out of the region's six counties, Guthrie County had the highest average median household income at \$58,158. Figure 1.6 below breaks down the average median household incomes and average per-capita incomes for each individual county in the region from 2016-2020.

There is some variation from county to county in terms of per capita income with the lowest average being \$29,132 in Audubon County and the highest average during the time period being in Guthrie County at \$33,818.

The region's economy relies heavily on household income levels. Higher incomes mean households have more expendable income to spend on various goods and services which are offered throughout the region.



Figure 1.6: Median Household Income and Per Capita Personal Income Averages

Industry

The region's cities and communities primarily serve as agricultural service and retail trade centers. Manufacturing, although a smaller industry within the region, can be found within a large number of the region's communities along with educational and health care service providers. Over 95% of the region's land is agricultural land devoted to raising livestock or crops. This percentage has slightly decreased from 2011 when over 97% of the region's land was farmland.

Since 1987, there has been a decrease in the total number of farms within the region. In 1987, there were 6,452 farms within Region XII's service area. From 1987 to 2012, this number fell by 1,342 to 5,110. As the number of farms within the region declines the average size of the farms increases. In 1987, the average farm size was 321 acres and over the next 25 years, the average size continued to grow. In 2012, the regional average farm size 417 acres and in 2017 increased to 426 acres. Figures 1.7, 1.8, and 1.9 below show the increase in size and the decrease in number of farms. In 2017, 2,100,995 acres of land in the Region XII service area was devoted to farmland which is a 2% decrease from 2,141,234 in 2007. From 1997 to 2017, the region saw an overall loss of farmland.





Figure 1.8: Average Size of Regional Farms



Figure 1.9: Land in Farms, in Acres



Some of the region's cities have recently experienced larger declines in population due to the fact that they are more reliant on the agricultural sector than other cities throughout the region. Cities throughout the region which have found ways to diversify their economy have noticed more stable populations than those which rely primarily on one industry.

The region's vast amount of agricultural land has allowed the region to branch out into different uses of corn and soybeans. Ethanol production continues to be important to the region as well as the state. There are currently ethanol plants in Coon Rapids (Guthrie County), Denison (Crawford County), Menlo (Guthrie County), and Grand Junction (Greene County). There are biodiesel processing plants in Ralston (Carroll County) and Wall Lake (Sac County). Map 1.1 shows the locations of these facilities.



Map 1.1: Ethanol and Biodiesel Facility Locations

The industry with the most employees within the region continues to be educational services, health care, and social assistance with approximately 20%, a slight decrease from 2015 (22.93%). Manufacturing (19%) is the second industry in the region based on number of employees. Although

agriculture is the dominant industry in terms of number of farms, in terms of employees, it is third in the region. The biggest difference between Region XII's employment and the State of Iowa's is the percentage employed in agriculture, forestry, fishing and hunting, and mining. Region XII has over 6% more of the population employed in this industry than the state. Figure 1.10 further supports that the region is dominated by agriculture and the industries that support agriculture.

The regional population continues to change. Younger generations continue to leave to pursue higher education and other professional opportunities. Creating changes within the types of industries located within the region as well as technological advances could lead to larger percentages of the younger population to return to the region and work in the previously underrepresented industries. A larger percentage of positions which require specialized degrees or an increase in the number of high school graduates willing to work in the trade fields would help create a more diversified economy regionally.

Laborshed

The regional laborshed contracted during the recession, entering a low of just over 57,300 in 2020. This is only a slight decrease from 2017 when the laborshed numbers reached just above 57,600. The high unemployment rate as a result of the COVID-19 Pandemic forced downward pressure on the labor force of the region which would have led to the increase in unemployment rates since 2019.

Figure 1.10: Percent Employed by Industry, 2016-2020 2015



Population Employed by Industry 2016-2020 ACS 5-Year estimates

Figure 1.11 graphs how the rate of workforce participants compared to the county population in total. While unemployment is counted as non-participating, it is only a small fraction of the non-participating population, which is primarily older residents and children not yet of working age. The sum of participants and non-participants is the county population. Each of the six counties in the region has a labor force participation rate of over 80%. The national labor force participation rate in 2017 fluctuated between 62-63% placing the region above the U.S. average. Table 1.2 below shows the top ten leading regional employers. This represents the wide range of employment options across various industries.

Figure 1.11: Region XII Labor Force Participation Rate, 2013-2017



Table 1.2: 2020 Regional Leading Employers

1	Smithfield/Farmland Foods Crawford County	1,650
2	Farner-Bocken Corporation (Distribution) Carroll County	1000
3	St. Anthony Regional Hospital Carroll County	700
4	AMVC (<i>Livestock Production</i>) Audubon County	700
5	Pella Corporation -Carroll Operation Carroll County	620
6	American Home Shield (<i>Insurance</i>) Carroll County	450
7	New Hope (<i>Care Facility)</i> Carroll County	320
8	Carroll Community School District Carroll County	285
9	The Graphic Edge (<i>Manufacturing)</i> Carroll County	230
10	Greene County Medical Center Greene County	296

Unemployment

Unemployment is the number of the civilian, non-institutionalized population sixteen years or older who do not have a paid job, but are looking for one. The unemployment rate is the percentage of the labor force that is unemployed. Figure 1.12 shows the unemployment rate for each individual county in the region compared to the State of Iowa and United States from 2017 to 2020.

Since 2017, Region XII has consistently had a lower unemployment rate than both Iowa and the United States. The region's low unemployment rate shows the efficient use of economic resources. Low unemployment rates can also help reduce social costs. Government programs which can provide financial assistance to people in need are funded by the taxpayers. When more people rely on these programs (high unemployment rates), the more funds are required to assist the people who need the program. This leads to money having to being redirected from other government programs, or an increase in public debt. Map 1.2 on the next page shows the unemployment rate for each county in Iowa. Counties within the Region XII service area have a lower comprehensive rate than many other counties in the surrounding area.



Figure 1.12: Unemployment Rates, 2017-2020



Map 1.2: Average Annual Unemployment Rate by County, April 2020

Commuting/Travel Time

Alternatives to the single occupancy vehicle commute are becoming increasingly important. Decreasing the number of vehicles on the road reduces the strain put on the roadways reducing the amount of funds necessary to keep them in good condition. Because of this, carpooling, transit, walking or bicycling are becoming more important options. According to the 2016-2020 American Community Survey estimates, over 88% of the workers within Region XII drove alone to and from work on a daily basis. This number is slightly higher than Iowa's 80.6% and the United States 76.4%. Less than one percent of the region's population takes public transportation to work. This could be caused by the regional transit system not having set routes and being more of a demand-based system. The complete breakdown is shown in Figure 1.13. Another factor important in evaluating transportation means and commutes is travel time to work, which is broken down in Figure 1.14 on page 14.

There are a number of residents of each county that travel to other counties throughout the region. Table 1.3 on page 14 shows a complete breakdown of residents who reside in each individual county and where they work. As expected, the largest number of residents live and work within the same 13 REGION XII COUNCIL OF GOVERNMENTS | Long Range Transportation Plan county. Carroll County has the largest intake of residents from other counties for employment and Crawford County has the second highest with Guthrie County having the lowest amount.



Figure 1.13: Means of Transportation to Work, 2016-2020

Figure 1.14: Travel Time to Work, 2016-2020



Table 1.3: Commuting Patterns, 2020

Commute to \rightarrow	Audubon	Carroll	Crawford	Greene	Guthrie	Sac	All Other
Residents of $oldsymbol{ u}$	County	County	County	County	County	County	Locations
Audubon County	1,065	145	50	0	50	0	574
Carroll County	272	6,408	545	326	172	391	3,013
Crawford County	0	276	4,374	0	0	79	2,376
Greene County	0	193	26	1,727	146	0	1,090
Guthrie County	42	87	0	73	1,580	0	1,267
Sac County	0	135	102	0	0	1,769	1,018

Vehicle Availability in Occupied Housing Units 45.00% 40.00% 35.00% 30.00% 25.00% 20.00% 15.00% 10.00% 5.00% 0.00% Audubon Carroll Crawford Sac Greene Guthrie No vehicles available One vehicle available Two Vehicles Available Three or more vehicles available

Figure 1.15: Vehicle Availability, 2016-2020

Within the region, almost five percent of households do not have a vehicle available. A number of these households may be senior citizens who do not work. Households with two vehicles available were the largest cohort making up just under 38% of all households within the region followed by households with three or more vehicles available (31%).

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Iowa's housing stock is significantly older than the national average. This is primarily the result of the state having grown much slower than the nation. The population change for the United States from 2000 to 2010 was 9.7%. This is compared to Iowa's 4.1%. Only ten states had a smaller growth rate than the State of Iowa over this period. One important and critical comparison is the percentage of housing that was built before 1940. About 37% of Region XII's housing stock fits into that category, which is higher than both the State of Iowa and the United States' averages. Most importantly, Iowa strongly lags behind the nation in the number of housing units built since the 1980s. Only 11.6% of Iowa's housing stock was built after 1979, compared to the United States' percentage of 44.2%. Region XII's is even lower, with only 21% of its housing stock built after 1979. Accordingly, Iowa and Region XII's housing stock has age-based issues. Older homes in areas showing little or no growth, such as Region XII, generally show more structural deterioration, were constructed using less stringent building codes

and standards, and display issues associated with a lack of energy efficiency. Figure 1.16 shows when the housing units were constructed compared to the State of Iowa and the U.S.



Figure 1.16: Age of Housing Stock, 2016-2020





10,157,803

11,520,685



When discussing housing, it is not only important to look at when the unit was constructed, but also the type of household and housing occupancy. If a community is trying to attract families, it would be good for the community to already have a larger percentage of family households. Figure 1.17 shows households by type in Region XII compared to both the State of Iowa and the United States.



Figure 1.17: Household Types, 2016-2020



A community need to look at the number of vacancies, as well as understand the reason behind the vacancies to address any issues it may have. There is a need to see if vacancies are due circumstances such as senior citizens moving to a retirement home, or if units are vacant due to homes being rundown and no one wanting to occupy them. While it is necessary to have some vacancies to attract new residents, too many can be a deterrent. Region XII's homeowner vacancy rate (regional average-1.85%) and percentage of owner occupied housing (regional average-76%) is greater than the State of Iowa's by 0.5% and 5%, respectively. With Region XII's higher than average owner occupied housing, it shows that people prefer to own homes and that there may be a greater supply of renting units available than the demand. Table 1.4 shows more details about housing occupancy for Region XII.

	Total	Percentage Occupied Housing	Percentage Vacant Housing	Percentage Owner- Occupied	Percentage Renter- Occupied	Homeowner Vacancy Rate*	Renter Vacancy Rate**
Audubon	2,820	89%	11%	75%	25%	2.00%	8.10%
Carroll	9,494	92%	8%	76%	24%	2.50%	9.10%
Crawford	6,880	90%	10%	69%	31%	2.10%	3.20%
Greene	4,333	88%	12%	73%	27%	0.80%	2.90%
Guthrie	5,778	77%	23%	81%	19%	1.60%	13.90%
Sac	5,162	81%	19%	79%	21%	2.10%	3.60%
Iowa	1,407,819	90%	10%	71%	29%	1.30%	6.50%
U.S.	138,432,751	88%	22%	64%	36%	1.40%	5.80%

Table 1.4: Housing Occupancy

*The homeowner vacancy rate is the proportion of the homeowner inventory that is vacant "for sale." It is computed by dividing the total number of vacant units "for sale only" by the sum of owner-occupied units, vacant units that are "for sale only," and vacant units that have been sold but not yet occupied; and then multiplying by 100.

**The rental vacancy rate is the proportion of the rental inventory that is vacant "for rent." It is computed by dividing the total number of vacant units "for rent" by the sum of the renter-occupied units, vacant units that are "for rent," and vacant units that have been rented but not yet occupied; and then multiplying by 100.

Not only is it important to have housing units available for new residents to purchase, it is important for them to be affordable. Affordable homes are necessary to attract and retain employees. Workers prefer short commute times and are more likely to live in the community or county that they work in if they perceive the housing to be affordable. Figure 1.18 shows the value of owner-occupied housing units for Region XII compared to the State of Iowa and the United States. The largest percentage of housing units within the region are valued between \$50,000 and \$99,999, this is also true across each individual county. This highlights the affordability of the housing stock in the Region XII, making it an attractive living environment for individuals of all ages and income levels.



Figure 1.18: Housing Values, 2016-2020

CHAPTER 3: Projections

Projections

Projecting accurate future populations is a very difficult task. There are many different methods and formulas that can be used to project an area's population. In addition, there are many variables to take into account when projecting populations. These variables often change without advanced warning. For that reason, projections should not be heavily relied on. Population projections are simply tools that are used to guide the future of an area. Woods and Poole is a credible data provider that produces projections for populations across the country. The projections are based on current data including birth rates, death rates, and in-and-out migration. Table 1.5 shows the Woods and Poole population projections for the region, state, and country. The projections are based on current data including birth rates, death rates, and in-and-out migration. Over the next 20 years, it is anticipated that the region will experience a slight decrease in population, approximately 359 individuals. This decrease amounts to <1% of the region's population. During the same time frame, the state of Iowa is expected to grow by nearly 4%.

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2025	2030	2035	2040	

Table 1.5: Population Projections

	2025	2030	2035	2040	2050
Region XII	72,656	72,423	72,201	72,000	71,641
lowa	3,249,751	3,328,308	3,407,575	3,487,942	3,558,261
U.S.	357,582,283	373,944,193	390,399,060	406,994,373	423,536,716



Figure 1.19: Audubon County Age Group Distribution

Figure 1.20: Carroll County Age Group Distribution











Figure 1.21: Greene County Age Group Distribution







Based on the historical data used to predict future trends, Audubon County will continue to lose population, especially in the 45-64 age group. It is estimated that Audubon County will lose 143 residents in this particular age group by 2050, with few to replace them. Carroll County is expected to experience somewhat of a roller-coaster in future population estimates. It is estimated that Carroll County will lose 455 residents 65 and over, but expects to pick up residents in the 25-44 age group. During the same time, Carroll County is expected to lose over 143 residents in the 45-64 age group. Although the 25-44 age group is expected to grow, this does not make up for the decrease in people of the 45-64 age group expected to leave, taking their work experience with them. The decrease in population in the 65 and over age group will potentially decrease the demand on medical and transit services.

Crawford County is expected to grow in all age groups except for the 65 and over category. The three other age groups are expected to grow by approximately the same amount between approximately 250-750 residents. The 65 and over age group is expected to decline by <1% of the population. It is not surprising that Crawford County will continue to experience growth in the future as it was the only county in the region that continues to experience higher birth rates than death rates. Crawford County has the region's largest employer as part of its manufacturing cluster, and is able to attract workers throughout the area.

Both Greene and Guthrie Counties are expected to lose population in both the 0-24 and 65 and over age groups. Greene County is expected to lose approximately 300 residents in the 65 and over age group and gain less 40 residents in the 45-64 age group. Like Greene County, Guthrie County is expected to lose a large number of people. Guthrie County is expected to gain 519 people in the 25-44 age range but is not enough to cover the number of people leaving in the other age groups. Around 57 residents will move into the 65 and over range creating the same impacts other counties see on the medical and transit services. Sac County is expected to experience a growth in the 0-24 age group. The increase of almost 300 in this age group will not outnumber the decline of over 500 in the other three age groups.

All six counties within the Region XII service area are expected to lose population in the 45-64 age range. The only counties which have a large enough influx of residents in the 25-44 age group to cover the losses are Crawford County and Guthrie County. The other five counties will struggle with finding replacement workers. It is critical to the region to either find a way to retain the 45-64 age group, or attract younger workers to cover the decrease in population. There will be an overall increase in the population aged 65 and over which makes it important for individual counties and the region to prepare for a rise in demand for services to serve this age group.

It is interesting that even though the counties' total population is expected to decrease, except for Crawford and Guthrie Counties, the total employment in the region is expected to increase. Table 1.6 on the next page shows the Woods and Poole employment projections for the counties.

	2030	2040	2050
Audubon	3,841	3,936	4,015
Carroll	20,020	22,149	24,466
Crawford	13,940	15,673	17,485
Greene	5,709	5,912	6,001
Guthrie	5,497	5,723	5,838
Sac	5,717	5,773	5,796
Region XII	54,724	59,166	61,579

Table 1.6: Employment Projections

With the region's overall projected population increase of over 2,000 residents by 2050, there will be an increase in the workforce as well. The population increase will cause a demand for more employment opportunities, which will likely spur economic development in the region. Overall employment is expected to increase, but farm employment is projected to decrease regionally. Table 1.7 shows the projected farm employment for the region.

	2030	2040	2050
Audubon	511	460	416
Carroll	861	779	705
Crawford	592	493	403
Greene	529	450	379
Guthrie	693	604	519
Sac	591	485	396
Region XII	3,777	3,271	2,812

Table 1.7: Farm Employment Projections

Based on past trends, it is not surprising that farm employment will continue to decrease. The counties within the region have been diversifying their industries, creating less reliance on agriculture as there was in the past. Over 9% of the region's population is still employed in the agriculture, forestry, fishing and hunting and mining field. This is over double of the state's average of 4.1%. Although farm employment is projected to decrease, the size of farms is expected to continue to increase as efficiency of equipment requires less manual labor. Only 29% of the region's farms hire labor outside the family.

Past trends help determine where the future may lead, but the future is extremely unpredictable. Many factors change over time, which changes the future projections. If one of the region's large employers were to close or experience a large dislocation, the population and employment projections would most likely be lower than what is currently predicted. Alternatively is a large employer moves to the region, an entrepreneur creates a successful business, or marketing the region begins to pay its dividends, the population and employment numbers would most likely be higher than the current projections. These projections are useful to see where the region will be in the future based on past trends, but the projections are not a guarantee and should not be heavily relied upon.

Section 2: Environment



Introduction

Region XII consists of six counties in west central Iowa. These six counties span over an area of 2,227,722 acres or 3,481 square miles. The region is primarily an agricultural area with over 97% of the total land consisting of farmland. The northern part of the region is primarily flat terrain that is used for farmland. South of U.S. Highway 30, the terrain becomes more rolling. This land is also used for farming, but conservation practices such as no-till and terracing are evident and necessary, as soil erosion is a concern. Due to the rolling terrain, more land is pasture due to the difficulty using machinery. As a result, this also leaves more wooded and natural areas.

CHAPTER 4: Trails, Parks, Preserves, & Wildlife

State Parks/Wildlife Areas

The following State Parks and Wildlife areas are located within Region XII: Blackhawk State Park, Sac County near Lake View Springbrook State Park, Guthrie County near Guthrie Center Spring Lake State Park, Greene County near Jefferson Swan Lake State Park, Carroll County near Carroll

Map 2.1 on the next page shows the state parks and preserves located within Region XII. Black Hawk State Park was established in 1935 on 86 acres. Black Hawk Lake is 957 acres and adjoins to the state park. Black Hawk Lake is the southern-most glacier-formed lake in Iowa. Black Hawk State Park offers many activities including 4 open picnic shelters, 128 campsites, swimming, boating, fishing, and the "Stubb" Severson Nature Trail.

Springbrook State Park was established in 1926 and consists of 930 acres. It has two picnic shelters, 120 campsites, multi-use trails, swimming, boating, fishing, and hunting. It is filled with wildlife including deer, red and gray fox, coyotes, raccoons, beavers, muskrats, wild turkeys, and many species of birds.

Spring Lake State Park is a 240-acre park that includes a 50-acre lake. This state park includes 126 electrical campsites, 2 shower houses, a historic, indoor skating rink, shelter houses, a playground, a swimming beach, and basketball courts. The park also features 2.2 miles of asphalt roads that can be utilized for a number of recreational activities.

Swan Lake State Park is a 510-acre multi-use area. The park is home to Swan Lake which is a 110-acre lake. The Iowa Department of Natural Resources acquired the land in 1933 and in 1959, the DNR gave authority to the Carroll County Conservation Board to maintain and develop the park. The park has water, electric and full-hookup campsites available for RV's with over 100 total campsites available. The campground has tent campsites as well. Other amenities within the park include shower houses, a concession stand, a gift shop, shelter houses, dump station, paddle boat and canoe rentals, 4 miles of multi-use trails, animal exhibits, and the conservation education center. The park is home to a large variety of wildlife.



Map 2.1: Region XII County Parks, State Parks, and Preserves

State Preserves

Legislation in 1965 created the Iowa State Preserves System to identify and preserve portions of Iowa's natural historical heritage and to maintain preserved lands in their natural condition as best possible. There are five categories of preserves in Iowa: Natural, Geological, Archaeological, Historical, and Scenic. There are 95 parcels that have been dedicated into the Preserves System. These preserves range from less than 1 acre to 845 acres, and incorporate a total area of almost 10,000 acres in Iowa (IADNR). Some sites are owned by individuals or private conservation organizations, others are owned by cities and counties, many are owned by the State of Iowa.

Region XII has one preserve located within its boundaries. Sheeder Prairie State Preserve is a 25-acre tallgrass prairie located in Guthrie County, five miles west of Guthrie Center. Sheeder Prairie was 24

dedicated as a biological preserve in 1968 and contains over 200 plant species and 69 species of birds. The Sheeder Prairie State Preserve is managed by the Iowa Department of Natural Resources Saylorville Wildlife Unit in Boone, Iowa.

Wildlife Management Areas (WMAs)

The number of acres that the DNR's Wildlife Bureau manages continues to rise. In 2010, 356,000 acres were in WMAs and today, 390,000 acres are in WMAs and are available for public recreational use. These areas are managed to provide habitat for Iowa's native wildlife species and those species that migrate through the state. Developing and restoring wildlife habitat to ensure that wildlife species have a safe place to breed, rest, and feed is the primary management objective. Wildlife dependent recreational activities are allowed to enable residents and non-residents to enjoy these wildlife species. The following (WMAs) are located in Region XII:

Artesian Lake, Carroll County near Lanesboro Bays Branch, Guthrie County near Panora Black Hawk Marsh, Sac County near Carnarvon Burrow's Pond, Sac County near Nemaha Dunbar Slough, Green County near Ralston Elk Grove, Guthrie County near Coon Rapids Finn Pond, Greene County near Jefferson Goose Lake, Greene County near Jefferson Jana Recreation Area, Sac County near Jefferson Kiowa Marsh, Sac County near Early Lakin Slough, Guthrie County near Yale Lennon Mills, Guthrie County near Panora Marlowe Ray, Guthrie County near Panora McCord Pond, Guthrie County near Bayard Middle Raccoon River (PWA), Guthrie County near Panora North Raccoon River, Greene County near Jefferson Rippey Access, Greene County near Rippey Sac City Access, Sac County near Sac City Sac City Wetland Complex, Sac County near Sac City Schrader, Crawford County near Vail Sheeder Prairie, Guthrie County near Guthrie Center Snake Creek Marsh, Greene County near Rippey Sorenson, Carroll County near Lake City Springbrook, Guthrie County near Guthrie Center Tomahawk Marsh, Sac County near Sac City White Horse Access, Sac County near Lake View

County Parks

In 1955, the Iowa State Legislature passed a law allowing counties to establish county conservation boards to create more recreational opportunities for the residents of the state. Conservation boards are local natural resource management and outdoor recreation agencies whose responsibilities are stated in Iowa Code 350.1: "acquire, develop, maintain, and make available to the inhabitants of the county, public museums, parks, preserves, parkways, playgrounds, recreational centers, county forests, wildlife and other conservation areas, and to promote and preserve the health and general welfare of the people, to encourage the orderly development and conservation of natural resources, and to cultivate good citizenship by providing adequate programs of public recreation." County conservation boards have been created in all of Iowa's ninety-nine counties. There are fifty county parks located within Region XII and a list of the county parks can be found in the appendix.

CHAPTER 5: Water

Iowa has 71,665 miles of streams and river and more than 161,000 acres of lakes, ponds, and wetlands, making it seem rich in water resources. However, less than one percent of the state's land area is covered with water. Therefore, it is vital that this resource be protected from pollution and available for Iowans to use for drinking water, recreation, and industries (Iowa's Water and Land Legacy).

Currently, Iowa has generally good quality surface waters and ground waters. However, threats to the quality of both do exist, and small portions of the state's waters have serious pollution problems. Protecting public health, safety, well-being, and quality of life by protecting the state's natural environment is the main goal of the Environmental Protection Division of the Iowa Department of Natural Resources (IADNR). The IADNR strives to ensure that "All Iowans have surface waters that are fishable and swimmable to their fullest extent practicable, safe drinking water, groundwater that is free from harmful contaminates, protection from adverse effects of floods, and water resources that are put to their best beneficial uses." The IADNR manages water quality through the implementation of the state's Water Quality Standards, which can be found in Chapter 61 of the Iowa Administrative Code (IAC).

Rivers

The region is drained by four primary river systems: the Raccoon River, the Boyer River, the East Nishnabotna River, and the West Nishnabotna River. The Missouri-Mississippi Divide runs through central Sac County and western Carroll and Audubon Counties, resulting in half of the drainage running to the Missouri River on the western border of Iowa and the other half to the Mississippi River on the eastern border of Iowa.

The Raccoon River and its tributaries are the largest of the region's river systems. The river flows for much of its length as three steams: The North Raccoon, The Middle Raccoon, and the South Raccoon. The North Raccoon River is the longest of the three at 196 miles and flows through Sac, Calhoun, Carroll, Greene, and Dallas Counties. The Middle Raccoon River flows through Carroll, Guthrie, and Dallas Counties. The Middle Raccoon River flows into the South Raccoon River south of Redfield and the North and South Raccoon Rivers join in Dallas County before emptying into the Des Moines River. The Boyer River is 118 miles long and flows through Buena Vista, Sac, Crawford, Harrison, and Pottawattamie Counties and empties into the Mississippi River. The Nishnabotna River is 136 miles long and flows for much of its length as two parallel streams. The East Nishnabotna River flows through Carroll, Audubon, Cass, Pottawattamie, Montgomery, Page, and Fremont Counties. The West Nishnabotna River flows through Carroll, Crawford, Shelby, Pottawattamie, Mills, and Fremont Counties. The two rivers merge in southwestern Fremont County before flowing into the Missouri River.

Although there are numerous rivers and tributaries that run through the region and provide an economic and cultural asset to the region, there are no rivers formally designed as wild and scenic by the Wild and Scenic Rivers Act. Map 2.2 shows the region's major rivers, tributaries, and lakes.



Watersheds

A watershed is the area of land that drains into a lake or stream. Water traveling over the surface or through groundwater may pick up contaminants like sediment, chemicals, and waste and deposit them in a body of water. Watersheds come in all sizes; they can cover entire states and regions, like the Mississippi River watershed, or they can be as small as a few city blocks or farm fields. Careful management of watersheds is an effective way of protecting property from flood damage, controlling erosion, and preserving wildlife (IADNR). There are several watersheds in Region XII. Table 2.1 on the next page shows the watersheds that run through each county and Map 2.3 shows the locations of these watersheds.



Watershed	Audubon	Carroll	Crawford	Greene	Guthrie	Sac
Big Papillion-Mosquito			X			
Blackbird-Soldier			X			х
Boyer		Х	X			х
East Nishnabotna	x	Х			Х	
West Nishnabotna	x	Х	X			
Lake Red Rock					х	
Maple			Х			х
Middle Des Moines				Х		
North Raccoon		Х		Х	Х	X
South Raccoon	x	X		X	X	X

Table 2.1: Region XII Watersheds by County

Wetlands & Riparian Areas

Wetlands and riparian areas are integral parts of watersheds that function within landscapes. Wetlands and riparian areas typically occur as natural buffers between uplands and adjacent water bodies. The loss of these systems would allow more pollutants to enter water bodies. Wetlands and riparian areas are often interconnected and provide many of the same functions. Figure 2.1 illustrates the general relationship between wetlands, uplands, riparian areas, and a stream channel. Identifying the exact boundaries of wetlands or riparian areas is less critical than identifying the area of concern. For instance, even those riparian areas that fall outside the wetland boundaries provide many of the same important water quality functions that wetlands provide.

The Clean Water Act defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Basically, wetlands are the link between the land and the water, making them very important features of a watershed. Wetlands provide ecological, economic, and social benefits. They provide habitat for plants and animals, absorb and slow floodwaters, recharge groundwater, absorb excess nutrients, sediment, and other pollutants before they reach rivers, lakes, and other water bodies, and provide recreational and wildlife viewing opportunities for millions of people.



Figure 2.1: Relationship between Wetlands, Riparian Areas, Uplands and a Stream Channel Approximately four million acres of land in Iowa were once considered wetlands. In a 100-year period, from 1850-1950, Iowa lost about ninety percent (or 3.6 million acres) of its wetlands and only one percent of Iowa's prairie marshes remain. Nationally, about fifty-four percent of wetlands have been destroyed. The federal government recognized that the mass destruction of wetlands could not continue. They instituted a "no net loss" policy under Section 404 of the Federal Water Pollution Control Act stating that a new wetland must be created or restored for every wetland destroyed. The no-net-loss of wetlands is a short-term goal, with a long-term goal of achieving a net gain of wetlands (Iowa Wetlands).

There are eight recognized wetlands in the region:

- Artesian Lake, located in Carroll County, is just over 28 acres. Artesian Lake is located 4 miles southeast of Lanesboro. The Artesian Lake Wildlife Management Area is two-thirds marsh and one-third timber, making it an excellent place for waterfowl.
- Dunbar Slough, located 5 miles south of Ralston in Greene County, is 1,500 acres. It consists of a marsh and prairie wildlife habitat and is listed as one of the "top observable wildlife areas" by the Department of Natural Resources. Dunbar Slough also features unique artesian wells and an eco-lab facility.
- Snake Creek Marsh consists of 126.6 acres. Pheasant, waterfowl, rabbit, and dove can be found within the WMA.
- Bays Branch, located 4.5 miles southeast of Yale in Guthrie County, is 260.5 acres. Bays Branch WMA lies approximately 1.5 miles east of the Raccoon River Valley Trail. Pheasant, waterfowl, rabbit, quail, and dove can be found in this WMA.
- McCord Pond is located within the McCord Pond Wildlife Management Area. This WMA is half marsh, half upland; pheasant, waterfowl, and dove can be found within its borders.
- Black Hawk, located 7 miles northeast of Wall Lake in Sac County, is 417.4 acres. The Sauk Rail Trail runs through Black Hawk Marsh Wildlife Area. This WMA is half upland, one-fourth marsh, and one-fourth timber. Deer, pheasant, waterfowl, and dove can be seen in this WMA.
- Kiowa Marsh, located 2.5 miles east of Early in Sac County, is 55 acres. Kiowa Marsh feeds into the North Raccoon River Basin. Ducks Unlimited and the DNR restored the marsh in 2010.
- Tomahawk Marsh, located 4 miles north of Lake View in Sac County, is 151.4 acres. Tomahawk Marsh is located within the Tomahawk WMA. This WMA is half marsh, half upland; pheasant, waterfowl, and dove can be found here. Map 2.4 displays the wetlands and protected waterways in Region XII.
Map 2.4: Region XII Wetland Inventory and Protected Waterways



A riparian area is an area of streamside vegetation including the stream bank and adjoining floodplain or bottomland. Riparian areas absorb and detain floodwaters, trap and redistribute sediment, filter chemicals and other pollutants that might otherwise contaminate nearby water bodies, and are home to an abundance of animal and plant life. Current estimates of riparian areas range from 38 million to 121 million acres nationally. Although the available data is highly variable, it is clear that riparian areas constitute a small fraction of total land area in the United States, probably less than five percent. Only during the last decade have riparian areas begun to receive legal recognition as places requiring special attention. The degree of protection, the focus and spatial coverage of laws and programs are highly variable and are usually an indirect consequence of other objectives, such as water-quality protection or habitat management. The future success of water quality, threatened and endangered species, flood damage and management of federal public lands depends on the restoration of wetland and riparian areas.

Floodplains

In recent decades, West Central Iowa has been reminded several times about the importance of flood hazard mitigation. For instance, torrential rainfall in 1993 caused flooding along the Upper Iowa, Iowa, and Des Moines Rivers. The ensuing flood damaged many cities in the region and caused Audubon, Carroll, Crawford, Greene, Guthrie, and Sac Counties to be declared Federal Disaster Areas. In response to continued flooding the Iowa Department of Natural Resources (IADNR), Federal Emergency Management Agency (FEMA), and Iowa Flood Center have cooperated in the creation of new comprehensive flood maps for Iowa's cities and counties. Until now, Iowa has never had comprehensive and accurate flood maps. The standard maps show boundaries of flood events that have a 1% (100-year flood event) and .2% (500-year flood event) annual chance of occurring. These maps cannot be used for flood insurance purposes until FEMA and floodplain consultants develop the work maps so they can be published as Flood Insurance Rate Maps (FIRMS). As work maps and later FIRMS become available, individuals and local governments can use that information to better determine risks and to protect their properties. As of June 2022, FIRMS and work maps have been published for all six counties in the Region XII service area.

Aquifers

An aquifer is a body of saturated rock through which water can easily move. Aquifers must be both permeable and porous and include rock types such as sandstone, conglomerate, fractured limestone and unconsolidated sand and gravel. The amount of water in storage in the aquifer can vary from season to season and year to year. Ground water may flow through an aquifer at a rate of fifty feet per year or fifty inches per century, depending on the permeability. Aquifers are natural filters that trap sediment and other particles (like bacteria) and provide natural purification of the ground water flowing through them.

The water supply in the region is found in the Cretaceous (Dakota) and Mississippi Aquifers. The Cretaceous aquifer is used primarily in northwestern Iowa and southwestern Minnesota. This aquifer is the youngest and shallowest of the bedrock aquifers in Iowa. The aquifer consists of thick to thin, discontinuous sandstone beds overlain in places by limestone and shale beds that confine the aquifer. Water from the Cretaceous aquifer can be characterized as a calcium magnesium sulfate type, meaning the water typically is very hard. The aquifer is extensively pumped to supply domestic, small-community, and agricultural needs. About half of the water withdrawn is used for agricultural purposes; public supply use accounted for thirty percent; and domestic and commercial uses accounted for another fourteen percent. Only seven percent was used for industrial, mining, or thermoelectric-power purposes (IADNR: Iowa Geological & Water Supply; USGS).

The Mississippian aquifer is present in about sixty percent of Iowa and in the Lower Peninsula of Michigan. The aquifer consists mainly of limestone and dolomite in Iowa and is overlain either by Pennsylvanian or younger rocks that confine the aquifer and restrict ground-water circulation. The aquifer has wide ranges of thickness, from a narrow sliver to about 600 feet. In Iowa, water in the Mississippian aquifer meets recommended drinking water standards for public supply in only a few areas. Over seventy percent of the water withdrawn is used for agricultural purposes; public supply, and

domestic and commercial use each accounted for just over eleven percent; and industrial, mining and thermoelectric-power accounted for about six percent (IADNR: Iowa Geological & Water Supply; USGS).

Impaired Waters

Lakes and stretches of streams and rivers in Iowa have specific designations, based on what they are used for, such as recreation, drinking water, or maintaining a healthy population of fish and other aquatic life. Iowa must report on its progress in meeting water quality goals to the U.S. Environmental Protection Agency every two years. "If the water quality in the stream or lake prevents it from fully meeting its designated use, it does not meet Iowa's water quality standards and is considered "impaired." This is named after section 303(d) of the federal Clean Water Act and means that the stream or lake needs a water quality improvement plan written (also known by a technical name, Total Maximum Daily Load, or TMDL)" (IADNR).

In the 2022 draft report, Iowa had 597 impaired waters, with Region XII having thirteen listings for impaired waters. The thirteen impaired waters can be found in Table 2.2. Once the US EPA approves a water quality improvement plan, the body of water is moved off the 303(d) list. Even though the water body is no longer on the 303(d) list, it is still considered impaired until an assessment shows that it meets water quality standards. There have been three water quality improvement plans approved for the region. In 2022, a TMDL was done for Yellow Smoke Lake in Crawford County, in 2020 a TMDL was completed for Swan Lake in Carroll County, and a TMDL for Black Hawk Lake in Sac County was completed in 2016.

County	Water Body Name	Cause of 303(d) listing	TMDL Priority
Audubon/ Guthrie county line to Carroll	Brushy Creek	Biological: fish kill, ammonia/ Low DO	Tier IV
Audubon	Troublesome Creek	Biological: IBI	Tier IV
Carroll	Marrowbone Creek	Biological: IBI	Tier IV
Carroll	Marrowbone Creek	Organic Enrichment/ Low DO	Tier IV
Carroll	Elk Run	Biological: fish kill, ammonia	Tier IV
Carroll	Purgatory Creek	Biological: fish kill, caused by pesticides	Tier IV
Carroll	Swan Lake pH		Tier IV
Carroll/ Crawford County line	West Nishnabotna River	Biological: IBI	Tier IV
Crawford	Boyer River	Indicator Bacteria	Tier III
Crawford	Yellow Smoke Lake	Fish Consumption Advisory: Mercury	Tier IV
Guthrie	Springbrook Lake	Indicator Bacteria	Tier II
Sac	Black Hawk Lake	Indicator Bacteria	Tier II
Sac	North Raccoon River	Biological: IBI	Tier IV

Table 2.2: Region XII Impaired Waters

*DO= Dissolved Oxygen *IBI= Index of Biotic Integrity

Source: Iowa's 2022 Integrated Report, Iowa DNR

"The majority of impairments in Iowa are minor" (John Olson, IADNR specialist on water quality assessments). These serve as warnings to problems that need to be addressed before they become severe. Water bodies can become impaired because of high level of pollutants, like nutrients, sediment or chemicals. Biological impairments are some of the most common impairments in Iowa streams. In lakes, most impairments are due to turbidity (cloudy water), algae growth and excess nutrients. Table 2.3 shows the top five causes of impairments in rivers/streams, lakes, and wetlands in Iowa.

Rank	Cause Name	Number Affected
	Rivers/Streams	
1	Bacteria	378
2	Biological	126
3	Fish Kill	94
4	Mercury (in fish)	30
5	Low Dissolved Oxygen	21
	Lakes and Wetland	ls
1	Algae	64
2	рН	53
3	Turbidity	38
4	Bacteria	19
5	Siltation	18

Table 2.3: Top Causes of Impairment in Iowa

CHAPTER 6: Air Quality

Air quality affects everyone everywhere. Poor air quality can have major effects on the health of individuals. Region XII is mostly rural, which tends to promote better air quality than heavily populated areas. Health standards are being strengthened due to mounting evidence that humans and the environment are impacted by pollution more than previously believed. Every voluntary action to reduce pollution keeps our communities' air cleaner, which in turn contributes to a healthier place to live, both economically and environmentally. The Clean Air Act regulates six common air pollutants: particle pollution (particulate matter), ground-level ozone, carbon monoxide (CO), sulfur oxides, nitrogen oxides, and lead. These are called "criteria" air pollutants because the EPA sets human health-based and environmentally-based criteria for setting limits on the amount of these pollutants that are permissible in the air. Ozone and particle pollution pose the most widespread health threats.

Some criteria pollutants may be found to have a contributing factor from mobile sources or transportation in certain situations. Specifically Carbon Monoxide (CO), and different sizes of particulate matter like PM 2.5 and PM10. However, there are no non-attainment or maintenance areas in the Region XII transportation affiliation or in the State of Iowa that exceed the established thresholds for these pollutants.

If an area is in danger of exceeding the EPA's standards for certain criteria pollutants there are some preventative measures related to transportation emissions that could be implemented. If a location is found to be sampling high for large particulate matter or dust and there are dirt roads in the area, paving those roads, or applying a dust palliative before the dusty season should be considered.

Ozone

Ozone occurs in two layers of the atmosphere. The layer closest to the Earth's surface is the troposphere. Here, ground level or "bad" ozone is an air pollutant that is harmful to breathe and it damages crops, trees, and other vegetation. Six miles up is the second layer of atmosphere called the stratosphere. The stratosphere or "good" ozone layer extends upward from about six to thirty miles and protects life on Earth from the sun's harmful ultraviolet (UV) rays. Ozone is formed during a photochemical reaction, meaning several common airborne pollutants react with sunlight to form another pollutant called ozone. Ideal conditions for ozone formation require warm, windless days with bright sunlight found during the summer and early fall. During these conditions, volatile organic compounds (VOCs) react with nitrogen oxides (NOx), also called "ozone precursors" to form ozone. Volatile organic fumes come from evaporation of gasoline, paint, solvents, consumer products, varnishes, and industry chemicals. Nitrogen oxides come from high-temperature combustion found in exhaust from auto and truck engines, boilers, utilities, and other sources. That concentration of these precursor gases, the volume of air to dilute and mix, the temperature and intensity of ultraviolet light affect this process. Both urban and rural areas of the state are subject to elevated ozone levels as winds carry emissions hundreds of miles from their original sources.

Breathing ground-level ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. Ozone also can reduce lung function and inflame the lining of the lungs. Repeated exposure may permanently scar lung tissue. Healthy people also experience difficulty breathing when exposed to ozone pollution. Since ozone forms in hot weather, anyone who spends time outdoors in the summer may be affected, particularly children, outdoor workers, and people exercising.

Ozone also damages vegetation and ecosystems by inhibiting the ability of plants to open the microscope pores on their leaves to breathe. It interferes with the photosynthesis process by reducing the amount of carbon dioxide the plants can process and release as oxygen. By weakening sensitive vegetation, ozone makes plants more susceptible to disease, pests, and environmental stresses. Ground-level ozone has been shown to reduce crop yields. In Iowa, ambient levels of ozone may reduce soybean production by fifteen to twenty percent (US EPA; IADNR).

PM 2.5

Fine particles, known specifically as Particulate Matter 2.5 are about the size of a red blood cell. So small, they bypass the body's normal protections and may lodge in the lungs, causing scarring and decreased lung function. Fine particles may also pass into the blood stream and contribute to plaque buildup in arteries, increase the risk for, and effects of, heart disease, and enter the organs and the nervous system, including the brain. Numerous scientific studies have linked particle pollution exposure to a variety of health problems, including, but not limited to:

- Respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing
- Decreased lung function
- Aggravated asthma
- Development of chronic bronchitis
- Irregular heartbeat
- Heart attacks
- Premature death

PM 2.5 is generated by all types of combustion: motor vehicles, power plants, wood burning, wild fires, dust, and some industrial processes. Most fine particle pollution is formed when organic compounds, nitrogen oxides, ammonia, and sulfur dioxide react in the atmosphere to form secondary PM 2.5. The DNR helps industries and other permitted pollution emitters with strategies to reduce their emissions. Still, areas of Iowa have teetered on the edge of exceeding the Environmental Protection Agency's attainment standard for PM 2.5 since it was strengthened in December 2006.

The Ambient Air Quality division of the University of Iowa State Hygienic Laboratory works in conjunction with the IADNR, the EPA and the local programs in Polk and Linn Counties to preserve the air quality of the state. They collect air-monitoring data, quality assure the results and then report the data to the public. The EPA sets federal monitoring requirements. Currently there are twelve ozone monitors and eighteen PM 2.5 monitors in the State of Iowa. The nearest monitoring sites to Region XII

are located in Woodbury and Harrison Counties. The monitor at Sioux City in Woodbury County measures PM 2.5, while the monitor at Pisgah in Harrison County monitors ozone levels. The EPA is proposing to change federal rules regarding ozone network design. If these changes occur, there could be seven more ozone monitors added to the State of Iowa (US EPA; IADNR).

CHAPTER 7: Historical and Archaeological Resources

The National Register of Historic Places is the official list of the nation's historic places worthy of preservation. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

Iowa has nominated over 2,400 properties to the National Register of Historic Places, including historic districts containing over 6,000 individual buildings. There are numerous districts, sites, buildings, structures, and objects located within Region XII listed in the National Register of Historic Places. Map 2.5 displays the locations of the historic sites in the region. There are also photos of several of the historic places.



Map 2.5: National Register of Historic Places in Region XII

CHAPTER 8: Threatened and Endangered Species

Congress recognized that endangered and threatened species of wildlife and plants "are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." The purpose of the Endangered Species Act (ESA) is to protect and recover declining species and the ecosystems upon which they spread. The Federal Endangered Species Act of 1973 describes two categories of declining species of plants and animals that need the Act's protections-- endangered species which are "any species that is in danger of extinction throughout all or a significant portion of its range" and threatened species which are "any species that is likely to become an endangered species within the foreseeable future."

The ESA protects endangered and threatened species and their habitats by prohibiting the "take" of listed animals and the interstate or international trade in listed plants and animals. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Listed plants are not protected from take, although it is illegal to collect or maliciously harm them on federal land (US Fish & Wildlife Service).

The U.S. Fish & Wildlife Service is the principal federal partner responsible for administering the ESA. They recover and conserve the nation's imperiled species by fostering partnerships, employing scientific excellence, and developing a workforce of conservation leaders. Their two major goals are to protect endangered and threatened species, and pursue their recovery; and conserve candidate species and species-at-risk so that listing under the ESA is not necessary. Table 2.4 below shows which species are threatened or endangered within the Region XII service area.

Group	Name	ame Located	
Flowering Plants	Prairie bush-clover (<i>Lespedeza leptostachya</i>)	Dry to mesic prairies with gravelly soil	Threatened
Flowering Plants	Western prairie fringed Orchid (Platanthera praeclara)	Wet prairies and sedge meadows	Threatened
Fish	Topeka Shiner (Notropis Topeka (=tristis))	Prairie streams and rivers	Endangered
Mammal	Indiana Bat (Myotis sodalist)	Caves, mines; small stream corridors with well-developed riparian woods, upland forests	Endangered

Table 2.4: Threatened and Endangered Species in Region

CHAPTER 9: Land Use

Land Use planning and regulations were considered as part of this planning process through referencing existing county and city comprehensive plans and informal consultation with local elected officials and staff that serve on various COG and RPA boards and committees. Land use is controlled by local governments and has important influences on transportation. Envisioned land use patterns for residential areas, business districts, industrial parks, transportation facilities, and public facilities and services are necessary to help maximize efficient use of the land and minimize conflicts between uses. Although it is sometimes difficult to differentiate which is the cause and which is the effect, land use and transportation certainly exist in a reciprocal relationship. In some cases, a land use develops in a certain location because of a transportation link that is already in place; in other cases, new transportation links are constructed to serve already existing land uses to create accessibility that is more efficient. Whichever the cause, transit can help bridge the spatial divide between land uses. Predominantly rural counties, like the six counties in Region XII, are not usually troubled with urban aspects of the land use regulations identified in the Iowa Code 335.5 Regulations:

The regulations shall be made in accordance with a comprehensive plan and designed to preserve the availability of agricultural land; to consider the protection of soil from wind and water erosion; to encourage efficient urban development patterns; to lessen congestion in the street or highway; to secure safety from fire, flood, panic, and other dangers; to protect health and the general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of population; to promote the conservation of energy resources; to promote reasonable access to solar energy; and to facilitate the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements. However, provision of this section relating to the objectives of energy conservation and access to solar energy shall not be constructed as voiding any zoning regulation existing on July 1, 1981, or to require zoning in a county that did not have zoning prior to July 1. 1981.

The regulations shall be made with reasonable consideration, among other things, as to the character of the area of the district and the peculiar suitability of such area for particular uses, and with a view to conserving the value of buildings and encouraging the most appropriate use of land throughout such county.

Issues such as overcrowding, traffic congestion, and adequate light and air are non-issues in Region XII because the counties are not faced with any of these problems and will likely stay that way for years to come. However, some issues are very relevant to the region. Concerns of farmland preservation, safety from fire, flood, panic and other dangers, and protection of soil from wind and water erosion are key issues.

Farming and agricultural land is the single largest land use classification within the region. The percentage varies from 80% in Guthrie County to 96% in Carroll County, with most of the counties falling in the 94-95% range. It is important that farmland in the region is preserved due to the high Corn

Suitability Ratings (CSR). The CSR index procedure was developed in Iowa to rate each different kind of soil for its potential row-crop productivity. Factors that go into a CSR include the physical characteristics of the land and the climate. The main physical characteristic is the slope. Slope gradient and slope length affect potential erosion rates, water infiltration, and ease and efficiency of machine operation. Greene County has one of the highest CSRs in the state. This highlights the value of the agricultural land within the Region XII service area. Land use professionals typically suggest not developing land with a CSR of 70 or higher because the land is better suited for raising crops. This is important to take into consideration when planning for future transportation system improvements.

One of the main land use issues is development adjacent to the corporate limits. New growth typically occurs at the periphery of communities before infill sites are considered. Peripheral growth should only occur when the demand for land within a community exceeds the available developable land. Sporadic, unplanned development presents a large, costly barrier for a community to incorporate new areas. Smart land use will result in communities saving money in providing and maintaining city services and more importantly, farmland will be preserved.

CHAPTER 10: Environmental Mitigation

Primarily City, County, and State construction projects have followed present alignments and have focused on system maintenance and preservation. Environmental mitigation activities have been limited or not required. Although this is true, each of the counties in the RPA have adopted Hazard Mitigation Plans and Emergency Response Plans to aid in lessening the effects of a natural or man-made disaster on the transportation system. Each county updates their hazard mitigation plan every 5-years. The majority of the cities in the region also have FEMA approved Hazard Mitigation Plans adopted. Mitigation activities commonly included flood plain management regulations, structure relocations, and flood-proofing on existing infrastructure.

Planning and Environment Linkages (PEL)

PEL represents a collaborative and integrated approach to transportation decision making and considers environmental, community, and economic goals early in the transportation planning process, when there is an opportunity to make decisions at a regional scale. The information, analysis, and products developed during planning are carried forward into project development to inform the environmental review process.

Planning Studies

Transportation agencies can conduct planning studies at the corridor level that integrate NEPA analyses. To meet NEPA requirements, the study must involve interested state, local, Tribal, and Federal agencies as well as the public.

Project Development and Environmental Review

NEPA provides a systematic approach for identifying, avoiding, minimizing, or mitigating impacts. Activities conducted in planning should support decision making in project development. For instance, the identification of transportation deficiencies and needs, as well as problems, can support identification of a project's purpose and need. Identification of solutions in planning will lead to a project concept, which becomes the basis for alternatives that are explored in project development and environmental review.

CHAPTER 10: Environmental Justice

According to the Federal Highway Administration (FHWA), Environmental Justice means: "identifying and addressing disproportionately high and adverse effects of the agency's programs, policies, and activities on minority populations and low-income populations to achieve an equitable distribution of benefits and burdens". Environmental Justice is important because it helps to ensure full and fair participation by potentially affected communities in every phase of the transportation decision-making process. This concept is used to describe the disproportionate environmental and social hardships that disadvantaged groups bear. Environmental justice is supposed to avoid the use of federal funds for projects, programs, or other activities that generate unequal or biased adverse impacts on minority or low-income populations. The goal is to improve the unequal and negative impacts of growth and development such as crime, noise, and pollution; and aims to ensure equitable access to opportunities such as clean air and water, education, jobs, and transportation. This effort is consistent with Title VI of the 1964 Civil Rights Acts and is supported by the U.S. Department of Transportation (USDOT) as an important part of the planning process.

Identification

Identifying existing minority and low income populations is an essential step in Region XII's strategy to mitigate issues of environmental injustice. In accordance with the DOT and FWHA, Region XII references the poverty guidelines provided by the Department of Health and Human Services. Table 2.5 represents the poverty guidelines per household size.

Household Size	Poverty Guideline
1	\$14,580
2	\$19,720
3	\$24,860
4	\$30,000
5	\$35,140
6	\$40,280
7	\$45,420
8	\$50,560

Table 2.5: U.S. Federal Poverty Guidelines 2023

Public Participation

Environmental justice should be considered throughout all transportation planning phases and public participation outreach efforts. A portion of the district's program aim to ensure those that have historically received unfair treatment are brought to the forefront and served first. A significant portion

of these programs fall into the district's transportation sectors. This includes the development of the Long-Range Transportation Plan (LRTP), the Transportation Improvement Program (TIP), and work programs such as the Transportation Planning Work Program (TPWP). By involving socially disadvantaged groups (e.g., minority and low-income) in the public participation process, the needs of these groups can be identified and evaluated to guide transportation investment and ensure impacts are distributed as evenly as possible. Most commonly, communities within the region hold public hearings for projects in which federal funds are received to guarantee that all residents are thoroughly informed and that there is fair treatment at every step of the process.

Mitigation

In compliance with these regulations and the National Environmental Policy Act (NEPA) process, projects receiving federal aid have been reviewed to determine if the project will have an adverse impact on minority or low-income populations. In the event that there are adverse impacts on either of these groups, projects are required to identify mitigation actions to minimize these impacts. Region XII employs the following strategy provided by the US DOT to ensure that underrepresented communities within the region are not disproportionately impacted by projects and hazards throughout the region:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on EJ populations;
- To ensure the full and fair participation by all potentially affected communities in transportation decision-making processes; and
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations.

Section 3: Existing Transportation System

Chapter 11: Roadways Chapter 12: Bridges Chapter 13: Transit Services Chapter 14: Rail Chapter 15: Aviation Chapter 16: Trails Chapter 17: Pipelines Chapter 18: Intermodal Facilities

INTRODUCTION

Region XII's transportation network is one of the most important factors affecting economic growth. Quality transportation facilities allow goods and commodities to be shipped in or out of communities within the region. This section contains an inventory of the current transportation systems within the region. Examining the condition, use and performance of the Multi-modal Transportation System in the region will allow us to analyze how the system is currently functioning. This analysis will also identify where potential enhancements or opportunities for expansion would most benefit the area, which will be explored later in the document. Roads, bridges, transit, rail, airports, trails, pipelines, and intermodal facilities make up the region's transit system. This inventory creates a benchmark for today and will assist with future decision-making by informing the agency of current issues while identifying current and future needs.

CHAPTER 11: ROADWAYS

The predominant transportation system throughout the region are highways and roads. The movement of people and goods require an efficient roadway network from point A to point B. All modes of transportation, including air, rail, trails, and transit systems require the use of higways and roads. This chapter describes the region's roadway systems in terms of fuctional classifications, secondary roadway systems, average annual daily traffic, pavement conditions, and safety.

Functional Classification

Federal Functional Classification (FFC) is the process by which streets and highways are grouped into classes by what type of service they provide. Roadways provide two basic service types: land access and mobility. The key to planning efficient roadway systems is finding the appropriate balance between accessibility and mobility. Figure 3.1 displays the relationship between mobility and accessibility for the different roadway classifications. Urban and rural areas have fundamentally different characteristics in density and types of land use, density of street and highway networks, nature of travel patterns, and the way which all these elements are related. The different roads in each type of system are evaluated and classified according to different criteria due to the different characteristics. Roads can be classified as principal arterial, minor arterial (urban), collector (urban) minor arterial (rural), major collector (rural), minor collector (rural), and local roads.

A principal arterial is the highest functionally classified road type. Principal arterial roads are broken further down into three categories (interstate, expressway/freeway and other principal arterial) within urban areas and two categories (interstate and other principal arterial) within rural areas. The primary purpose of principal arterials is to move people and goods rapidly over long distances. These roads are high capacity, high-speed roads with restricted access. Minor arterials connect with principal arterials. These roads within urban areas are utilized for inter-community trips of moderate length. The primary use of minor arterial roads is mobility, like principal arterial roads, but can provide more access points and more land access than the principal arterial roads can.

Figure 3.1: Mobility vs. Access



Proportion of Service

Map 3.1: Federal Functional Classification



Collectors channel trips between local street systems and arterials. Collectors serve as a balance between mobility and land access, between arterials and local roads. Parking and direct driveway access Collectors channel trips between local street systems and arterials. Collectors serve as a balance between mobility and land access, between arterials and local roads. Parking and direct driveway access to the street is typically allowed on collectors. These roads are usually wider, have higher capacity, and permit somewhat higher speeds than the local street network.

Local roads primarily provide local land access with the shortest distances and the least amount of traffic. A local road provides access to abutting land with little or no through movement. Local roads provide direct access to individual homes and farms.

Federal Functional Classification (FFC) is important for determining a roadway's eligibility for federal funds to be used for construction and maintenance. The lowest FFC classification is a collector, and in urban areas, roadways classified as collector or greater are eligible for federal funds. In rural areas, roadways must be classified as a major collector or greater to be eligible for federal funds. Local roads in urban and rural locations are not eligible for federal funds. Map 3.1 on page 43 shows the federal functional classification for roadways within Region XII.

Region XII's Major Roadways

There are no interstates located within Region XII's service area, but the southern portion of Audubon and Guthrie Counties are located near Interstate 80, which runs east-to-west providing quick routes to Des Moines and Omaha. The location of Interstate 80 allows for businesses within the region to ship their goods across the country. Although there is no interstate within the region, there are four principal arterials spread throughout the six counties. US 30 travels east/west from Greene County to Crawford



County passing through Jefferson, Carroll, and Denison. Outside of the region, US 30 crosses the entire state, creating a major transportation link from the northern portions of the Omaha metro to Interstate 35. US 20 serves the northern part of the region running east/west through Sac County. This four-lane expressway connects Sioux City to Chicago. US 71 is a major north/south route throughout the region. It runs through Audubon, Carroll, and Sac Counties through the cities of Audubon and Carroll. US 59 travels through Denison, bisecting Crawford County north-to-south.

Several state highways within the region are classified as minor arterials. State Highway 44 is a major east/west highway, which runs through Audubon and Guthrie Counties connecting to the northern side of the Des Moines metro area. Commuters into Des Moines, especially Panora residents, make this route popular. A popular north-to-south route is IA-25. It is located on the eastern edge of the region running through Scranton and south through Guthrie Center. Another popular route to the Des Moines metro is State Highway 141, which runs through Crawford, Carroll, and Guthrie Counties. Highway 4 through Jefferson is a major north to south route within the eastern part of the region. Map 3.2 on page 44 shows the major highway within the region.

Rural System

Rural road systems are made up of principal arterials, minor arterials, collectors, and local roads. Rural principal arterials provide statewide and interstate travel with high travel speeds and limited access. Minor arterials link cities, larger towns, and other major traffic generators to provide inter-state and inter-county travel. At the rural level, collectors are broken into major collectors and minor collectors.

	Other					
	Principal	Minor	Major	Minor		
	Arterial	Arterial	Collector	Collector	Local	Total
Audubon	26.03	21.49	119.21	157.29	512.12	836.14
Carroll	51.55	30.68	176.60	200.73	761.27	1220.83
Crawford	57.91	54.46	148.23	234.97	928.97	1424.54
Greene	36.55	39.60	157.16	192.27	708.65	1134.23
Guthrie	6.63	78.00	130.87	175.22	721.71	1112.43
Sac	64.89	33.28	159.69	184.17	773.99	1216.03
Region XII	243 56	257 52	891 77	1144 65	4406 71	6944 21
(total Numbers)	2-3.30	237.32	051.77	1144.05	4400.71	0544.21

Table 3.1: Region XII Rural Road Mileage

Urban System

Major collectors provide service to any county seat not on an arterial route, to the larger towns, and other traffic generators of county importance not directly served by the higher systems. Minor collectors provide service to the remaining smaller communities and take some traffic off the local roads. Local roads primarily provide access to adjacent land over relatively short distances. Table 3.1 shows the FCC mileage for rural roads within Region XII.

Urban areas, as defined by the U.S. Census, has a population of at least 5,000 residents. Within the Region XII service area, there are two urban areas: Carroll and Denison. Principal arterials, minor arterials, collectors, and local roads comprise urban systems. Urban principal arterials primarily provide continuity from the rural principal arterials for through traffic and between major centers within the urban area. Urban minor arterials provide intra-community travel and do not penetrate neighborhoods. Urban collectors provide land access and traffic circulation within neighborhoods, commercial, and industrial areas. Urban local raods provide access to abutting land. Table 3.2 shows the FFC urban mileage for Region XII. Region XII does not contain any interstates but does boast a four-lane US 20.

Table 3.2: Region XII Urban Road Mileage

	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Total
Region XII All Cities	28.79	37.56	71.06	21.67	441.20	600.27

Secondary Road System

While interstates and highways in Iowa make up the primary road network, major/minor arterials and collectors form the secondary road system that connects primary roads to local roads. Over 90% of the region's roadways are secondary roads. Secondary roads and their maintenance are under the county's jurisdiction. Approximately 34% of the region's secondary roads are farm-to-market routes, which means they provide service for short-distance traffic.

Secondary roads within the region can be surfaced five different ways. Almost 12% of the region's roads are earth roads; the other 94% have some type of surfacing. The different types of surfacing on secondary roads are gravel, bituminous, asphalt, and PCC. The cost of installing and maintenance is greatly determined by the surface type. Roads are constructed with life cycles calculated into their design. Climate, construction materials, traffic volume, and weight of the vehicles that utilize the road influence a road's lifecycle. Most roads are constructed with a 15-20 year life span, with restoration or rehabilitation adding an additional 10-20 years of life. Figure 3.2 breaks down the region's secondary roads by surface type.

Figure 3.2: Secondary Road Surface Types



Average Annual Daily Traffic (AADT)

Traffic volume is measured as Average Annual Daily Traffic or AADT. AADT is measured by the average number of vehicles per day on any given road segment over a one-year period. This is useful because it gives engineers and planners a picture of what traffic utilizes a particular road. A higher AADT means that a large number of vehicles daily utilizes the road. This information is used to determine areas that experience more wear and need improvement to maintain a level of service that the existing/projected traffic requires. AADT can be used in conjunction with crash information to determine segments and intersections that may have safety issues.

The Iowa Department of Transportation measures the AADT of one quarter of the state's roads per year. The DOT's measurements are available at the state, regional, and local levels for planning and implementing transportation improvements. The highest rural traffic within the region is on US 30 traveling between Carroll, Crawford, and Greene Counties. The AADT on US 30 in these counties ranges from 3,170-8,000. Other road with notable AADTs are US 71 (3,750), IA Highway 141 through Guthrie County (1,950) and US 20 through Sac County (5,770).

An important aspect of a road's AADT is what type of vehicles are making the trips. A highway located near a shipping facility will have a higher amount of truck trips than a county highway connecting two rural cities. Heavier vehicles take a toll on roadways faster than cars do. Knowing which roads have high truck traffic is beneficial when planning maintenance work. A service the Iowa Department of Transportation provides is separating out large truck traffic trips. The large truck traffic includes the trips that trucks with 6-tire and 3 axle singe unit trucks, buses, and all multiple unit trucks. The heaviest truck traffic within the region is on US 30 in Carroll and Crawford Counties. US 71 also has a large amount of truck traffic between Auburn and IA Highway 141. Total AADT for individual counties can be found on maps 3.3-3.8.



Map 3.4: Carroll County AADT, 2020



Map 3.5: Crawford County AADT, 2020



Map 3.6: Greene County AADT, 2020



Map 3.7: Guthrie County AADT, 2020



Map 3.8: Sac County AADT, 2020



Pavement Conditions

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) required that a pavement management system be used for all highways, streets, and roads eligible for federal funds. Since that time through new manifestations of federal law, the State of Iowa worked towards developing a statewide Pavement Management System (PMS) and in 1999, the Iowa Pavement Management Program (IPMP) was implemented. The IPMP covers 23,5000 of roads operated under three levels of government (state, county, and city). The IPMP collects data on a two-year cycle. The program aimst to support the management information, tools and training for project and network-level activities, and to develop and maintain a Geographic Information System (GIS) pavement management database to support local governmental agencies and the Iowa Department of Transportation pavement management efforts. IPMP promotes optimal, cost effective decisions on highway maintenance, rehabilitation and reconstruction, using accurate past and projected pavement conditions. IPMP focuses on local transportation agencies and provides these agencies with:

- 1. An objective and consistent planning tool to support development of regional and statewide transportation improvement plans;
- 2. Information on pavement conditions for individual pavement sections;
- 3. Raw pavement distress data from the automated distress collection equipment;
- 4. Inventory and history information on roadways;
- 5. Training on pavement management software and principles; and,
- 6. Video logging of roadways.

The IPMP information is available to local governments and engineers utilize the data to determine road maintenance and reconstruction needs. Table 3.3 shows the Pavement Condition Index (PCI) value and its respective category. The latest data collection for state routes in Region XII was completed in 2020.

	Descriptive
PCI Value	Category
1-27	Very Poor
28-45	Poor
46-62	Fair
63-78	Good
79-100	Excellent

Table 3.3: PCI Values

Safety

Safety is a major concern no matter what road classification within the Region. Crashes are often complex and the result of a number of factors. Contributing factors can include a road's design; pavement conditions (rain, snow, or ice), a vehicles condition (bald tires, steering malfunction, lights out, or no brakes), a driver's behavior (speeding or inattentiveness) as well as the driver's condition (alcohol use, age-related conditions, or physical impairment). The driver's behavior and condition factors are the primary cause in over two-thirds of vehicle accidents and a contributing factor in over 95% of all crashes.

From 2017-2021, 37% of all traffic fatalities in Iowa were caused by impaired (alcohol or drug related) driving where the driver had a BAC greater than or equal to .08, an additional 11% of the fatalities were caused by speeding. From 2017-2021, Region XII had 47 traffic fatalities, of those, 34% were caused by impaired (alcohol or drug related) driving. Speeding was the cause of 6% of the region's traffic fatalities.



Figure 3.3: Alcohol Impaired Fatalities 2017-2021

Figure 3.4: Speeding-Related Fatalities 2017-2021



	2017	2018	2019	2020	Total
Audubon	56	79	65	77	277
Carroll	265	229	237	206	937
Crawford	275	232	262	189	958
Greene	144	160	141	124	569
Guthrie	134	127	128	134	523
Sac	179	157	131	157	624
Region XII	1,053	984	964	887	3888

Table 3.4: Total Crashes by County

From 2017-2020, Region XII had 47 fatalities. As shown in the data, the traffic fatalities caused by alcohol impairment peaked in 2020 at 44% and was the lowest in 2019 at 22%. During the 5-year period, the region's percentage of alcohol-impaired fatalities fluctuated between approximately 20%-40% while the State of Iowa's percentage fluctuated between 35%-40%. Region XII's percentage of speeding-related facilities seems to decline one year, and the next rise with an ending upward trend from 2019-2020. There is little relation between the causes of fatalities in the region compared to the state. Both jurisdictions have their own trends, which does not relate to the others, which could be because Region XII is mostly rural, while the state has larger areas of urban populations.

Table 3.5:	Crash	Severity	2010-2014
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	Audubon	Carroll	Crawford	Greene	Guthrie	Sac
Fatality	7	8	11	8	5	9
Serious Injury	17	33	42	29	22	28
Minor Injury	46	201	138	96	97	120
Possible/Unknown Injury	51	190	223	90	93	100
Property Damage Only	239	816	842	559	483	574

*The totals of tables 3.4 & 3.5 will not match because crashes with multiple injuries were counted as more than one in table 3.5.

There were 3,888 crashes in the Region XII service area from 2017-2020. Crawford County had the highest number of fatalities during the five-year span (14), but Sac County's percentage of fatalities was the highest at 14% of all crashes in the county. Over half of the region's fatalities happened on one of the region's major roadways. Map 3.9 shows the location of traffic accidents and fatalities.

Map 3.9: Region XII Crash Locations



CHAPTER 12: BRIDGES

Bridges are an important aspect of the region's transportation system. The many bridges within the region allow traffic to cross depressions, lakes, rivers, streams, and valleys. There are also instances within the region that bridges provide grade-separated crossings of roads and rail lines. Aside from vehicular traffic bridges, there are bridges built specifically for pedestrians, cyclists, and trains. According to the Iowa Department of Transportation, a bridge is a structure that spans over twenty feet; smaller spans are typically accomplished with culverts.

According to information from the US Department of Transportation, the State of Iowa is ranked 7th in the nation with 23,799 bridges. The Iowa Department of Transportation manages 4,195 of the state's bridges. This leaves the remaining 19,604 bridges to be managed by counties, cities, and various other organizations. Counties manage 94% of the bridges that are not maintained by the state. Within Region XII, the counties and municipalities are responsible for 1,411 bridges. Bridges are inspected on a one-or two-year cycle to determine the bridge's sufficiency rating. The sufficiency rating reflects the bridge's ability to remain in service and continue to perform its role. Rail brides are not included in this section of the plan as they are privately owned and maintained by the rail companies.

Bridge Conditions

Structural condition of a bridge is evaluated based on a statewide system known as the Bridge Sufficiency Rating System. This system provides a standard evaluation of a roadway bridge's condition based upon a number of categories. Each county in Iowa is responsible for evaluating all of its bridge structures and updating the sufficiency rating every two years. The information provided by each county is used to prioritize structures for future funding and improvements.

There are four categories used to determine a bridge's sufficiency rating. The Bridge Sufficiency Rating System uses the structural adequacy and safety; serviceability and functional obsolescence; essentially for public use; and special reductions to determine the bridge rating. These four categories are shown below.

- 1) Structural Adequacy and Safety (55% max)
 - -Superstructure
 - -Culverts
 - -Substructure
 - -Inventory Rating
- 2) Serviceability and Functional Obsolescence (30% max)
 - -Lanes on Structure
 - -Average Daily Traffic
 - -Approach Roadway Width
 - -Structure Type
 - -Bridge Roadway Width
 - -Vertical Clearance over Deck
 - -Deck Condition

- -Structural Evaluation -Deck Geometry -Under Clearances -Waterway Adequacy -Approach Roadway Alignment -STRAHNET Highway Designation
- 3) Essentially for Public Use (15% max)
 -Detour Length
 -STRAHNET Highway Designation
 -Average Daily Traffic
- 4) Special Reduction (13% max) -Detour Length -Main Structure Type -Traffic Safety Features

A score is compiled based on each of the categories listed above. The score is then converted into a percentage based upon the value within the range allowable for each specific category. The full definition of how the score is determined is spelled out in the Federal Highway Administration's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. Sufficiency ratings range from 0-100. Bridges with a sufficiency rating of zero are completely insufficient and bridges with a rating of 100 are completely sufficient. A "good" ranking means the bridge has a rating of 81-100, a rating of 51-80 is "fair," and a ranking from 0-50 is "poor." Bridges ranked "poor" should be monitored closely for further deterioration and given higher priority for repair or rehabilitation if they are located on high traffic routes. A bridge with a "poor" ranking and low traffic volume could be maintained using alternate methods, such as abutment stabilization or load posting.

The region's bridges are in adequate condition with 81% of the bridges having a sufficiency rating of 51 or above. Approximately 36% of the region's bridges are ranked "good," and 45% are ranked "fair." Table 3.6 shows the number of bridges in each ranking category for each county within Region XII in 2016. Map 3.10 shows the location of the region's bridges which are ranked "poor."

	Good	Fair	Poor	Total
Audubon	67	96	47	210
Carroll	114	119	14	247
Crawford	123	153	23	299
Greene	61	95	12	168
Guthrie	64	106	93	263
Sac	81	71	72	224
Total	510	640	261	1411

Table 3.6: Region XII Bridge Conditions

Bridges ranked "poor" are usually considered to be structurally deficient or functionally obsolete. Bridges are considered structurally deficient if significant load carrying elements are found to be in poor condition due to deterioration, or the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing extensive traffic interruptions. These bridges usually require significant maintenance and repair to remain in service. A functionally obsolete bridge is a bridge that was built to the standards of the time it was built, but does not meet today's standards. These bridges are mostly likely not able to accommodate current traffic demands due to increased speeds, volumes, and weights. Functionally obsolete bridges are not necessarily unsafe, and posted weight signs can be used to extend the bridge's life.



Map 3.10: Region XII Poor Condition Bridges

Bridge Rehabilitation and Replacement

Bridges experience a natural aging process that is caused by the environment, use, materials, as well as other factors. Many bridges in Iowa are decades old, but continue to serve the public due to routine maintenance and rehabilitation as needed. To ensure that bridges are providing safe travel, they are to be inspected on a two-year cycle according to the Nation Bridge Inspection Standards (NBIS) regulations. If a bridge is found to be in "poor" or "deteriorating" condition, it may need to be inspected on a yearly basis to ensure that it does not deteriorate quickly and cause a public safety concern.

Ultimately, the State of Iowa is responsible for the inspection of all public highway bridges within the state except those owned federally or tribally. The state delegates inspection policies, procedures, and other requirements of the standards to the local jurisdictions. Bridge inspections are performed by a qualified engineer. Some counties have this engineer on staff while others have to contract the work out to a different organization. The engineer gives each bridge within the county a sufficiency rating after evaluation and then reports this information to the state. This data is then reported to the FWHA for evaluation. The FWHA will then provide a list of bridges to the state of bridges which are eligible for replacement or rehabilitation. Any bridge maintained by the Iowa Department of Transportation that has a sufficiency rating of 50 or below is eligible for replacement. If a bridge has a sufficiency rating of 51 or above which needs rehabilitation may be eligible if a life-cycle analysis indicates it is more cost-effective to replace the bridge rather than rehabilitate.

Sufficiency ratings as well as traffic counts are used to determine the bridges within the county or region, which are in the most need of attention. Traffic volume is a major factor when determining the life expectancy of a bridge. Urban bridges or those on high traffic routes require higher levels of engineering or maintenance than those on rural roads with little traffic to remain functional. Bridges are identified then programmed into the county's five-year plan and into the TIP/STIP based upon need for repair and available funding. Once programmed, the bridges are available to have federal funds used in addition to the local funds in their rehabilitation and repair. Table 3.7 shows the 33 bridges included Region XII's TIP for FY2023-2026 by county and project year.

	FY 2023	FY 2024	FY 2025	FY 2026	Total
Audubon	0	0	0	1	1
Carroll	1	1	0	1	3
Crawford	1	1	1	1	4
Greene	0	2	0	0	2
Guthrie	4	8	0	2	14
Sac	4	3	2	0	9
Total	10	15	3	5	33

Table 3.7: Bridge Projects in Region XII's FY23-26 TIP

Historic Bridges

Project Background

In 1994, The Iowa Department of Transportation in cooperation with the Federal Highway Administration and State Historic Preservation office started to create a complete inventory of the state, county, and city historic roadway bridges constructed prior to 1942. After completing the inventory up to 1942, the range of dates was expanded to include bridges built up to 1970. This inventory is intended to be used as a planning tool for state and local agency officials as they perform bridge maintenance, rehabilitation, and replacement projects. People who are interested in the history of Iowa's bridges also utilize this inventory. In 1994 when the first inventory was completed, there were approximately 9,000 bridges reviewed for the historic inventory and about 10,000 are considered in the present inventory. Since the time the inventory was taken, some bridges have been moved, burned, or destroyed by floods or fire.

Selection Criteria

The National Park Service's National Register of Historic Places (NRHP) developed the criteria used to evaluate a bridge's historical significance. The three criteria in some detail are:

- 1. <u>Criterion A</u> is associated with having made a significant contribution to the broad patterns of history. In a liberal interpretation, most bridges older than 50 years could qualify under this criterion as an element of Iowa's transportation system. To exercise a degree of discrimination under Criterion A, bridges need to have been important in the settlement and development of a geographically definable area.
- 2. Structures important under <u>Criterion B</u> have an association with lives of significant people in history. Important bridge designers have created a few of Iowa's significant bridges.
- 3. <u>Criterion C</u> embodies the distinctive characteristics of a type, period, or method of construction. Most bridges that qualify for the NRHP fit in this category. The bridges evaluated under Criterion C paid particular attention to identifying aspects of the bridges that make them stand out among their group (i.e., earliest/oldest example of type, longest span, longest total length, unusual structural or architectural detailing, etc.).

Region XII's Historic Bridges

Carroll County

The Iowa State Legislature passed the Brockway Act in 1913 in response to poor road and bridge contracting practices. The plans submitted to Carroll County in 1913 represented the prototypes for ISHC's pony trusses. These spans are technologically significant because they represent on the state's prototypical X-Series standards. Since their completion in 1913, these bridges have carried vehicular traffic with only minor maintenance related repairs.

Carroll County					
Bridge Name	Location	Year Built	Physical Status	Length	Width
Storm Creek Bridge I	4.3 miles E of Carroll	1913	Replaced in 2003	64 ft.	15.6 ft.
Storm Creek Bridge II	4 miles NE of Carroll	1913	Remains in use	57 ft.	15.5 ft.
Robin Avenue Bridge	5.5 miles E of Carroll	1913	Remains in use	46 ft.	15.8 ft.
Orange Avenue Bridge	1 mile W of Lidderdale	1913	Remains in use	46 ft.	15.7 ft.
Kittyhawk Avenue Bridge	3.1 miles SW of Carroll	1913	Moved in 2005	52 ft.	15.7 ft.
Quail Avenue Bridge	4.5 miles SE of Carroll	1913	Moved in 2003 to	27 ft	15.8 ft.
			Carroll Veterans Park	57 IL.	

Table 3.8: Historic Bridges within Region XII

Crawford County

During World War II, the War Department developed a "Priorities Critical List" of materials, which were essential to the war effort. Steel was used in almost every piece of war material, so the construction of steel bridges became problematic for Iowa. In response, most counties reverted to timber construction for their small-scale bridges, and timber pile bridges outnumbered all other types by the 1940s. Crawford County relied on timber construction until heavy flooding in May 1945 that washed out 27 bridges and culverts. The board of supervisors resolved to build new bridges using emergency funds, which utilized steel superstructures purchased from the Des Moines Steel Company as replacement spans. These bridges are good examples of wartime bridge construction within the State of Iowa. With the exception of the Yellow Smoke Park Bridge, these bridges remain in unaltered condition.

Crawford County					
Bridge Name	Location	Year Built	Physical Status	Length	Width
Yellow Smoke Park Bridge	Yellow Smoke Park, Denison	1945	Remains in use	-	-
East Soldier River Bridge	2.5 miles SW of Charter Oak	1945	Remains in use	134 ft.	17.7 ft.
Buck Grove Bridge	SE corner of Buck Grove	1945	Remains in use	70 ft.	15.3 ft.
Nishnabotna River Bridge I	3.4 miles NE of Manilla	1945	Remains in use	97 ft.	18 ft.
Nishnabotna River Bridge II	2.3 miles SW of Manilla	1945	Remains in use	118 ft.	18 ft.
Beaver Creek Bridge	4.5 miles NW of Schleswig	1946	Remains in use	135 ft.	17.7 ft.

Greene County

The Little Beaver Creek Bridge is located on the historical Lincoln Highway. In 1912 Carl Fisher began boosting what he called the Coast-to-Coast Rock Highway that extended from New York to San Francisco. This road was soon renamed the Lincoln Highway and in 1913, the Lincoln Highway Association was formed. Using existing section-line roads and county-built river crossings, it zigzagged across central Iowa on its way between Clinton on the Mississippi River and Council Bluffs on the Missouri River. The Little Beaver Creek Bridge was listed on the NRHP as a contributing part of the Lincoln Highway.

Greene County					
Bridge Name	Location	Year Built	Physical Status	Length	Width
Little Beaver Creek Bridge	2.5 miles E & 1 mile N of Grand Junction	1915	Remains in use	21 ft.	21.6 ft.

CHAPTER 13: Transit Services

Public transportation enhances local rural economic growth by increasing the customer base for a range of services. The availability of transportation services increases the ability of human service agencies to serve individuals on public assistance and transport low-income residents to jobs, training opportunities and other support services. Vulnerable population have a higher need for public transportation as their options for personal mobility are on average more limited. The primary transit provider for the Region XII service area is Western Iowa Transit (WIT). WIT is operated by Region XII Council of Governments and offers demand responsive public transportation services to all residents within the service area. WIT also contracts with many agencies for specific services, including Job Corps in Denison, area nursing homes and care centers, and Head Start. In many smaller communities with both longer distances between built-up areas and low population densities, transit can help bridge the spatial divide between people and jobs, services, and training opportunities.



Map 3.11: WIT Locations

Location of Services

The central office, maintenance facility, and vehicle storage area for Western Iowa Transit are all centrally located in Carroll, Carroll County. The facility, built in 1994 and updated in 2009, is in good condition. The original facility was originally 11,000 sq. ft. with 6,900 sq. ft. utilized as a shop, wash bay, and vehicle storage. The remaining square footage was utilized for administrative offices. In WIT Headquarters- Carroll



2000, a 1,800 sq. ft. addition was constructed to house the local assistance staff, administrative staff, 64 REGION XII COUNCIL OF GOVERNMENTS | Long Range Transportation Plan and storage, and in 2009 large additions were made to the office and vehicle storage portions of the building. This project allowed WIT to expand its maintenance facilities and the use of a training room for drivers. Western Iowa Transit has storage facilities in Denison (Crawford County) and Jefferson (Greene County). The Denison facility is 5,600 sq. ft. and was built in 2000. The facility is used for vehicle storage and contains a small office and a small storage area. Thirteen units are housed and dispatched from the Denison office. The newest Western Iowa Transit facility is located in Jefferson. Completed in 2003, the Jefferson facility is 5,600 sq. ft. and is primarily used for vehicle storage but like Denison, has an office and storage. Ten units are housed and dispatched from the Jefferson facility. Map 3.11 on page 61 shows the location of the central office as well as the satellite facilities and individual busses.

Fleet Availability

Western Iowa Transit operates 60 vehicles for public transit service including one vehicle for maintenance and service. Table 3.9 illustrates number of vehicles by type. Within the WIT fleet, all 24 light-duty busses, 20 mini vans, and all 9 MV-1s are ADA accessible. To operate this fleet of 60, WIT is staffed by one full-time transit director, one full-time transit assistant, one full-time office assitant, one full-time service manager, 18 full-time drivers, and 9 part-time drivers.

Vehicle Type	Number of Vehicles	
Light Duty Bus	24	
Medium Duty Bus	3	
Passenger Vans	3	
Mini Vans	20	
MV-1s	9	
Service Vehicle	1	
Total	60	

Table 3.9: Vehicle Inventory

Types of Existing Services

The public transit offered through Western Iowa Transit is a "direct-response" service. There are two kinds of direct services provided; demand-response service and contract service. Demand-response service is provided to riders on an as-needed basis. Riders are encouraged to call 24-hours in advance to ensure availability of transit services. Every attempt will be made to fulfill requests for service within the 24-hour window. Rides can be scheduled by contacting the offices in Carroll, Denison, and Jefferson. The option is available to schedule a ride on line. Door to door transportation is primarily used by people with disabilities, elderly, and school children. Contract service is provided to agencies or organizations, primarily human service organizations, which need transit service as a part of their business.
Fare Structures

In-town service is currently \$7.00 for a one-way ride and \$14.00 for a round trip. There is a \$7.00 charge added for each individual stop. Out of town service and other services are quoted on a per-trip basis. Special trips and group outing trips are based on a "time and mileage" cost.

Clients

Western Iowa Transit currently provides direct service to a number of agencies within the region. Current contracts include 7 agencies serving clients with disabilities, 4 care centers and nursing homes (WIT provides on-demand service to 10 additional care centers and nursing homes- no contract), 2 agencies serving children, 10 school districts serving clients with special needs, and 3 employee shuttle services. WIT also provides 3 different services to seniors and individuals with disabilities. This includes partnerships with three cab companies in Carroll and one in Denison to assist with the transportation needs of "ambulatory" senior citizens and people with disabilities.

Region XII's six counties are notably rural with a large percentage of smaller cities surrounded by even smaller rural communities. One of the biggest challenges WIT is faced with is the population disbursement. The small populations widely spread add to costs for fuel and maintenance on vehicles and also creates a great demand for management and coordination of the transit routes. It is more efficient to transport three to four people at a time for both the rider and transit provider.

In recent years, there have been some development of service trends. There has been an increase in the number of clients with disabilities utilizing WIT in response to the service for Medicaid and waiver clients. Due to the introduction of the Career Link service which provides transportation to and from employment or job training, general public ridership has been increasing. There has been a decrease in the number of senior riders due to changing demographics within the region as well as the growth of assisted living centers. As the region's population ages, more assisted living facilities are being constructed, and services are changing such as in-home meal delivery instead of congregate meals. Over the recent past, there has been a decline in the number of children riding. The reduction and/or elimination of head start routes has led to this decline as the children are now riding on the regular school busses. Trips are trending to single and low-passenger type trips. WIT is adapting by adding more fuel efficient vehicles including MV-1s and mini-vans.

Trips, Mileage, and Rides

In 2017, WIT provided 173,824. In 2018, that number decreased to 154,864. The downward trend continues from 2019 to 2021 as the ridership goes from 160,887 in 2019 to 93,216 in 2021.

This overall downward trend in services is most likely attributed to the aging population in the region. A significant portion of WIT clients are elderly and may have changing needs for services and time elapses. The reduction in rides can be attributed to several factors. Since 2017, the number of assisted living facilities within the region has increased, reducing the number of senior citizens living throughout the community. Some of these facilities have their own transportation and provide meals for their residents reducing the number of rides WIT provides to appointments and congregate meals.

Following this, in 2019 and 2020, the COVID-19 pandemic took effect, requiring many citizens to quarantine or reduce interactions with the public. Factors affecting ridership in 2021 are a continuum of the previous years. The population in the region continues to age and economic issues have cause prices to go up, increasing the cost of travel. This negatively affected the need for travel throughout the region, causing the total rides to drop.



Figure 3.5: Western Iowa Transit Ridership Ridership

Table 3.10: El	derly and	Disabled	Rides
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	Disabled Rides	Percent of Total	Elderly Rides	Percent of Total	Total Rides
FY 2017	95,745	55%	28,789	17%	173,824
FY 2018	80,768	52%	31,390	20%	154,864
FY 2019	79,023	49%	31,661	20%	160,887
FY 2020	52,968	42%	23,926	19%	125,661
FY 2021	35,183	38%	18,665	20%	93,216

Table 3.10 breaks down WIT's rides by elderly and disabled rides. Elderly riders and riders with disabilities account for over approximately 60-70% of the trips WIT provides, as previously mentioned. Although elderly and disabled rider still make up a significant portion of the clients, the percentage has steadily decreased in the past five years due to an increase of nursing homes in the region.

Revenue miles do not include travel to and from storage facilities and deadhead travel. Vehicle miles refers that a vehicle travels from the time it pulls out from the garage to go into revenue service to the time it pulls in from revenue service. Despite decreased ridership numbers, vehicle and revenue miles continue to increase as the service changes and trips become longer. Since 2017, the transit system's revenue miles have decreased, with a five year high of 1,346,759 miles in 2017 and a low of 845,267 in 2021.

	Vehicle Miles	Revenue Miles
FY 2017	1,346,759	1,247,473
FY 2018	1,267,601	1,154,688
FY 2019	1,302,512	1,100,181
FY 2020	1,000,691	820,624
FY 2021	845,267	673,633

Table 3.11: Vehicle and Revenue Miles

Future ridership levels will dictate a need for the number of vehicles needed to provide the high-quality service currently provided by WIT. High mileage trips have increased and will likely continue to do so as WIT provides transportation for clients to go to and from regional health centers and continues to provide service to Job Corps in Denison. High mileage trips not only generate more miles (both revenue and non-revenue) but they require additional time, increasing both vehicle and driver hours.

Medicaid type trips generated the largest amount of revenue miles, generating 283,810 miles in 2016. Medicaid has now surpassed Job Corps as the leading revenue miles generator. Job Corps of Denison generated the second largest amount of revenue miles generating 194,520 miles in 2016. Job Corps trips are generally long-distance trips, transporting clients from across the state as well to and from Omaha and Kansas City.

Costs/Revenues

WIT generates revenue from a variety of sources and has numerous expenses related to the operations and administration of the regional public transit system. Figure 3.6 illustrates the overall operation expenses for Western Iowa Transit and the various sources of revenue. In 2017, Western Iowa Transit had operational expenses totaling \$2,268,992. The system's expenses increased by 11% in 2019 totaling \$2,534,094. Expenses peaked in 2019, decreasing to \$2,183,194 in 2021- a reduction of 4%.

The decrease in operating expenses could be attributed to fluctuation in gas prices, or a reduction in maintenance costs and trip lengths due to the decrease in total rides. To offset operating costs, WIT received \$878,728 in passenger revenue, \$5,238,100 in contract revenue, \$281,984 in other revenue, and \$354,508 from local governments from 2017-2021. These funds leveraged \$2,165,346 in STA funds and \$5,307,597 in FTA funds for operations. In the previous 5 years, the transit system has not experienced a year where expenses were higher than revenues.



Figure 3.6: WIT Revenues and Expenses

Figure 3.7: Cost per Ride



One of the most important factors when looking at the systems overall efficiency and effectiveness. Figure 3.7 on page 66 shows WIT's cost per ride from 2017-2021. Since 2017, the number of rides the transit system has provided has decreased while the operational fluctuated. The combination costs are fixed such as insurance and administration; increasing the number of rides and having multiple riders would lower the overall cost per ride, but due to the overall decrease in percentage of riders, the system's cost per ride has increased.

Transit Needs

As part of the Region XII Passenger Transportation Development Plan (PTDP) process, a passenger survey was conducted to obtain input from the users of the system to help evaluate how the regional transit system functions. During the spring/summer of 2020, WIT drivers distributed surveys to transit riders. WIT received 104 responses from the distributed surveys. Table 3.12 shows the breakdown of responses by county.

	Responses	Percent of Responses
Audubon	11	10.6%
Carroll	17	16.4%
Crawford	38	36.5%
Greene	14	13.5%
Guthrie	13	12.5%
Sac	11	10.6%

Table 3.12:	Rider	Responses	by	County
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Figure 3.8: Reason for Ride



Approximately 45% of the respondents to the survey noted that they utilize WIT for medical appointments. There were 12 students (~12% of respondents) who rode WIT to get to and/or from school. Along with medical and school rides, approximately 35% of respondents utilized services for employment, 2% for shopping, and 7% utilized services for other reasons (meals, entertainment, Dayhab).

The survey responses are used to analyze the transit system overall. From the response it was determined that 37% of users utilize the transit system daily, and another 19% use it on a weekly basis. Approximately 94% of the riders thought that their ride was affordable and 87% thought that the condition of the transit vehicle was in excellent condition. 98% of people surveyed thought their driver was friendly and courteous. All but two respondents thought that their drive was safe, and some answers stated that the driver went above and beyond to make sure they had a good experience. There was only one respondent that were not picked up at their scheduled time.

While Western Iowa Transit aims to always provide the highest quality service to residents, there are some unmet needs that the agency continues to work towards meeting. These unmet needs identified

and discussed during a meeting of the Transit Roundtable XII (TRXII) Committee. The committee is comprised of representatives from Elderbridge Agency on Aging, RSVP, New Hope Village, Partnership 4 Families (Empowerment agency serving, Audubon, Carroll, Greene, and Guthrie Counties), and Region XII COG staff. Along with unmet needs, the committee identified there are existing service needs, expanded service needs, and fleet needs for WIT. The needs are further discussed over the next few pages.

Affordability/Funding

The most common need for existing service is affordability and funding. Transportation is expensive, whether it is personal or through a provider. Fuel costs are considerably higher than they were in previous years, and they continue to fluctuate due to natural disasters and the global economy. Insurance costs also factor into the cost equation. Vehicle repair, maintenance and replacement costs all factor into the rising cost of transportation, as the fleet needs to be properly maintained and replaced as deemed necessary. Funding for transportation systems continues to be limited, affecting the most important piece of the passenger transportation system, the passenger. WIT strives to make its services as affordable as possible for its users. According to the 2020 passenger survey, 94% of users thought that their trip was affordable. As operating costs continue to increase, some of the cost may need to be passed on to the rider or more federal/state/local funding will be needed. In order to alleviate hardships with affordability and funding, Region XII plans to pursue external funding sources and donations to keep up with the cost of operations while minimizing fees for riders.

Drivers

Drivers are a vital element in the transportation industry as they are entrusted with getting passengers to their destination safely. Safe driving, congeniality, physical work transporting wheelchair bound riders, and timeliness are expectations of WIT drivers. It is becoming increasingly difficult to find drivers due to these high expectations, licensing requirements, various hours, and training requirements. WIT aims to employ quality drivers who meet the agency's high expectations. The 2017 passenger survey showed: 98% of the respondents thought their driver was courteous and friendly; 87% stated their driver's appearance was excellent; 98% felt that their driver provided a safe ride; and 70% said their driver assisted them getting on and off the vehicle. Region XII continues to aggressively pursue applicants for the driver position. Not only does this allow operations to continue but it provides a job source for individuals in the region.

Equipment Needs

Replacing vehicles within the fleet takes thinking ahead and planning for the unexpected. The average cost for transit vehicles that WIT utilizes is shown in Table 3.13. The Federal Replacement Schedule states that transit vehicles can be replaced on a 4 year/100,000 mile or 7 year/200,000 mile basis, WIT typically runs its vehicles for at least 8 years and closer to 300,000 miles before replacing them. Depending on funding, WIT purchases an average of 5 units per year. These units are placed throughout the region depending on vehicle and service needs. Even though WIT runs its vehicles longer than the Federal Replacement Schedule, the vehicles are well maintained. In the 2020 passenger survey, over 87% of respondents stated that the condition of the transit vehicle was excellent and the other 13% felt

that it was in fair condition. To maintain the integrity of equipment and vehicles, Region XII closely monitors a replacement schedule for equipment while pursuing funds for future replacements.

Vehicle	Cost	Federal Replacement Schedule
Non-ADA Standard Minivan	\$36,700	4 year/ 100,000 miles
Conversion Van (MV-1)	\$53,000	4 year/ 100,000 miles
Non-ADA Standard Van	\$37,700	4 year/ 100,000 miles
Light Duty Bus (158"-176")	\$85,150	4 year/ 100,000 miles
Medium Duty Bus	\$92,000	7 year/ 200,000 miles

Table 3.13: Western Towa Transit Vehicle Replacement Schedu

After Hours Service

Expanded service hours has been noted as a need. Evening and weekend services are provided on an as-needed or as-available service by WIT. The taxi companies within the region typically operate until 5:00 p.m. during the week and run limited hours on Saturday and Sunday. For WIT, and most likely the taxi companies, after hours and evening services are complicated due to the small number of rides that can be provided combined with the high cost of having a vehicle and driver available. In order to provide clients with the availability of after-hours service, Region XII plan to pursue the necessary funding to account for this type of expense. It is important that WIT provides a wide range of services for residents while keeping fees at a minimum.

Availability of Service

Public transit is available to everyone, and WIT has made efforts to promote their services to all residents. Increasing the visibility of the system through marketing continues to be an important effort. While WIT continues to promote its services, it is important that the taxi services do as well. The taxis can be found by searching the internet, but not everyone has access to the internet, and may not know that a taxi option is available. Region XII plans to continue to market services in local news sources and online.

Quality of Live Activities and Needs

Recreational outings, shopping trips, and social trips are important parts of everyone's lives and even more so for those residing in assisted living, nursing homes, and other facilities. WIT provides these types of trips occasionally for care centers and care facilities on an as-needed basis. Some centers throughout the region have purchased vehicles to provide these trips for their own clients, but the majority utilize WIT. Region XII provides these important services to residents for a reasonable cost. The Agency plans to continue to actively pursue clients for regular outings to keep group prices lowered.

Scheduling

WIT is a demand-response system that prefers a 24-hour notice to accommodate appointments but can schedule up until the appointment. The advance notice is necessary to meet the needs of daily routes/rides and occasional requests for service. Late cancels, last minute requests, and no-shows make scheduling more difficult. Immediate service can be provided by the taxi companies. WIT encourages the use of taxis for immediate services through the taxi subsidies provided for elderly and handicapped taxi ticket program. Region XII employs diligent staff to ensure that scheduling is updated and accurate, but will encourage this use of taxi companies for immediate service. This is due to the nature of the transit services and strict time management.

Connection to Intercity Bus Network

Burlington Trailways, Greyhound Line, Jefferson Lines, and Megabus run scheduled services throughout the state, although not through the Region XII service area. Other public transit agencies throughout the state have partnered with these inter-city bus services to provide connector service, increasing ridership for both entities. All these lines have depots/stops in Des Moines, and a few have depots in Omaha. Although these locations are not within the WIT service area, they are close, and WIT does provide service to and from these nodes. Region XII plans to continue to maintain these routes to regional bus networks. This is essential for connectivity within the region, state, and nation.

Fleet Needs

The lack of capital replacement funds forces WIT to use existing equipment for long periods of time. Typically, WIT uses vehicles for at least 8 years and close to 300,000 miles. These units are designed to have a useful life of 4 years and/or 100,000 miles. WIT's fleet is able to maintain their fleet with routine maintenance. WIT typically has the need to replace six to eight vehicles per year depending upon availability of federal grant funds and matching local funds. Region XII plans to continue to actively pursue grant funding for vehicle replacements. This is necessary to keep the cost of maintenance as well as service costs down.

CHAPTER 14: Rail

Railroads are a vital part of Iowa's overall transportation system. Iowa's railroads move both freight and passengers safely and efficiently. Corn, soybeans, chemicals, vehicles, wood, paper products, minerals, ore, coal, and biofuel are all moved across rail lines. Iowa's economy partly relies on efficient transportation through rail. Maintaining and improving the state's rail service requires proactive partnerships between public and private organizations including but not limited to private rail carriers, rail shippers, passengers, the Iowa DOT, local governments, and state and federal agencies.

Railroad Companies within the Region XII Service Area

There are 18 freight railroad companies that operate approximately 3,851 miles of track within Iowa. There are six of the eighteen railroads (BNSF, Canadian National, Canadian Pacific, Kansas City Southern, Norfolk Southern, and UP) that are Class 1 railroads which means that they are some of the largest freight-hauling railroads and span the North American continent. These five railroads operate over 85% of the state's total route miles, including much of Iowa's grain gathering network. Since Region XII is centrally located in the western part of the state, it lies at the crossroads of rail traffic through Iowa. There are four rail lines that serve Region XII: the Burlington Northern Santa Fe (BNSF); Canadian National (CN); Iowa Interstate Railroad (IAIS); and, Union Pacific (UP). The routes these railroads take throughout the region can be found on Map 3.12.

BNSF

BNSF is one of the largest railroad companies in the United States with over 32,500 miles of tracks, 631 of which are in Iowa. Within the region, BNSF lines run through part of Carroll, Crawford, and Guthrie Counties. In 201, there were 16 trains that traveled through those three counties over a 24-hour period, with half occurring during the day. On average, 7,800 vehicles within Region XII crossed BNSF's tracks daily, with approximately 6% of those being trucks.

Canadian National (CN)

In Iowa, the Canadian National operates as the Cedar River Railroad and the Chicago Central and Pacific Railroad. Within Region XII, CN operates as the Chicago Central and Pacific Railroad. This rail line runs through Crawford and Sac Counties. In Iowa, CN owns/leases/services 605 miles of track. In a days' time in 2016, CN had five trains go through the two Region XII counties with most of them happening at night. There is an average of 15,980 vehicles that cross CN's railroads daily, and over 8% of those vehicles are trucks.

Iowa Interstate Railroad (IAIS)

The Iowa Interstate Railroad is one of the few regional railroads that connects all of the Class I railroad systems (BNSF, UP, CN, etc.) at multiple locations. This railroad runs from Council Bluffs through Des Moines, Iowa City, and Davenport, Iowa; then continues on to Chicago and Peoria, Illinois. Within Region XII, the IAIS runs through southern Guthrie County. On average, five trains travel this route per day. Within Iowa, IAIS operates on 306 miles of track. In 2016, 6% of the 3,785 vehicles that crossed IAIS tracks on a daily basis were trucks.

Union Pacific (UP)

The Union Pacific Railroad spans the region from east to west running through Carroll, Crawford, and Greene Counties. In Iowa, UP owns and operates on 1,291 miles of track spanning the length and width of the state. There are 61 trains which run through the region on a daily basis, with half being during the day and half at night. An average of 49,578 vehicles cross UP tracks daily, and of that number nearly 7% are trucks.





Current Trends

The Iowa Department of Transportation (IDOT) recently updated the *Iowa State Rail Plan*. This plan guides the department in its activities that promote access to rail transportation, improve the freight railroad transportation system, expand passenger rail services, and promote improved safety on both the rail system and where the rail system meets with people and other transportation modes.

Since 1855, railroads have served Iowa. Main line railroad mileage peaked in Iowa in 1914 at 10,018 miles. Ever since then, Iowa's rail system has been decreasing in size. Today, there are 3,825 miles of railroad routes that are owned by 18 railroads and two non-operating railroad owners. Some of the trends that are affecting the state's rail system are included in the following paragraph.

There has been a decrease in the total number of rail miles throughout the state, which, after analysis, will not limit the number of trips on some of the state's largest lines. Passenger trips, on average, have been increasing, and are estimated to continue to increase. As roadways conitnue to become congested, more businesses are switching to intermodal transportation, increasing the overall length and size of the trains. On certail class rail lines, railcars can now have a maximum gross weight of 286,000 lbs. allowing them to ship more at one time. Utilizing the country's natural resources (i.e. coal) would have significant benefits for Iowa, as the coal mined in the west would travel over the state's rail network en route to markets. Recently, there has been some push to enhance the railroad access to spur economic development, employment and income in the state. There has also been a need to recude the number of bottlenecks within the state to increase capacity, efficiency, velocity, and safety.

At the most recent counts in 2016, Region XII had an average of 87 trains traveling through different parts of the area during a day's time. AADT counts show that on average, over 77,000 vehicles cross the tracks on a daily basis. The number of train-vehicle accidents continue to decline even though, the amount of rail and vehicle traffic continues to increase due to federal regulations and improved warning systems.

Freight

Iowa's privately owned and operated rail system is a vital part of the state's transportation system. Carroll, Crawford, Greene, and Sac Counties are well served by rail freight carries; Guthrie County has limited service to the southern and northwestern parts of the county; and Audubon County currently has no rail service. UP serves Carroll, Crawford, and Greene Counties and is part of a major transportation network connecting the eastern and western United States. This line has heavy rail traffic transporting resources from Wyoming and the west coast to Chicago.

Railroads are classified as Class I railroads, short line and regional railroads, switching and terminal railroads, and passenger railroads. According to the Association of American Railroads, Class I railroads have annual revenues exceeding \$453 million and account for 69% of the industry's mileage, 90% of its employees, and 94% of its freight revenue. Short line and regional railroads account for 31% of the United States' freight rail mileage and 10% of the employees. These lines range from small operators handling a few carloads a month to a multi-state operators close to Class I size. These railroads often feed traffic to Class I rails and receive traffic from Class I railroads for final delivery. Switching and terminal railroads most often perform pick-up and delivery services within a port or industrial area, or move traffic between other railroads. Passenger railroads often operate on freight owned railways. Approximately 70% of the miles that Amtrak trains travel are on tracks owned by freight railroads.

In Iowa, there are 18 different freight rail companies that operate on 3,825 miles of track. In terms of total rail miles, Iowa ranks eleventh in the country. Of the 18 rail companies, five are Class I, operating throughout the United States. The state's Class I railroads operate over 85% of the state's route miles. The remaining 12 railroads are considered short line and regional railroads. Table 3.14 shows the railroad classes by operator in Iowa

Table 3.14: Railroad Class

Class I	Short Line/Regional		
BNSF Railway*	Appanoose County Community Railroad	D & W Railroad	
Canadian Pacific Railway Ltd.	Boone & Scenic Valley Railroad	Dakota, Minnesota & Eastern Railroad	
CN*	Burlington Junction Railway	Iowa Interstate Railroad Ltd.*	
Norfolk Southern	CBEC Railway	lowa Northern Railway Co.	
Kansas City Southern	Cedar Rapids and Iowa City Railway Co.	Iowa River Railroad	
Union Pacific Railroad*	Cedar River Railroad Co.	lowa Traction Railway Co.	
	Chicago, Central & Pacific Railroad	Keokuk Junction Railroad Co.	
	D & I Railroad Co.	North Central Iowa Rail Corridor LLC	

*operates in Region XII, Iowa has three railroads owned by Canadian companies- CN owns Cedar River Railroad and Chicago & Pacific Railroad; Canadian Pacific owns Dakota, Minnesota & Eastern Railroad.



Figure 3.9: Rail and Semi Comparison

When comparing trains and semis, trains are more efficient and can carry more cargo in one trip. In 2015, the railroads within the United States moved one ton of freight an average of 473 miles on one gallon of fuel, which is like going from Des Moines to Indianapolis on one gallon of gas. One rail car is equivalent to 4.4 large semis. It would have taken approximately 19.8 million additional trucks to handle the 357.2 million tons of freight that originated in, terminated in, or moved through Iowa by rail in 2014.

In 2016, over 60 million tons of rail tons originated in Iowa. Food and farm were the two largest commodities originating in Iowa with food making up 23.8 million tons and farm accounting for 15.6 million tons. In 2016, 33 million tons of goods terminated in Iowa. Coal, chemicals, and farm goods were the major imports during the year. In 2020, just over 60 million tons of freight originated in Iowa, and nearly 28 million tons were terminated. Figure 3.10 shows the trends of commodities that originated and terminated in Iowa.





Passenger

Passenger rail service continues to be limited in Iowa with two rail lines located in the southern portion of the state. The two Amtrak lines that serve Iowa are the California Zephyr and the Southern Chief. The California Zephyr runs from Chicago to Oakland, California and has five stops in Iowa. The line utilizes the BNSF rail line and stops in Burlington, Mount Pleasant, Ottumwa, Osceola, and Creston in Iowa. Map 3.13 shows the location of the passenger rail line within the State of Iowa. The closest passenger station for Region XII residents is in Creston or Omaha, Nebraska.

Map 3.13: Iowa Passenger Rail Route



Figure 3.11 shows the Amtrak ridership in Iowa since 2010. Ridership decreased from 68,205 in 2010 to 57,151 in 2012, a decrease of 16%, which many account to the Missouri River flooding. The flooding canceled nearly one hundred trains. Since that decrease, the general trend of passenger train ridership in Iowa until 2016 when it reached 61,247. In Fiscal Year 2017, Amtrak served 60,858 riders who originated from Iowa Stations. In 2019, ridership decreased by approximately 15% to 51,499. Growth in business travel, Wi-Fi service and effective marketing campaigns have boosted Amtrak ridership, but decrease in travel due to the COVID-19 pandemic has affected travel and ridership across the state and nation. In 2020, Amtrak employed seven Iowans.



Figure 3.11: Amtrak Ridership in Iowa

(Source: Amtrak, Iowa DOT)

Safety

Rail accidents of all kinds, including derailments and track and/or equipment failures, have decreased over time. More importantly, accidents involving vehicles and trains have decreased. Rail traffic and automobile traffic continues to increase, which means that the overall safety of railroads in improving. Tables 3.15 and 3.16 breaks down both the train accidents by county and the number of highway-rail incidents by county from 2016-2020. There were 5 total train accidents and 9 total highway-rail incidents within the region from 2016-2020. No accidents occurred in Audubon County, as there are no rail lines that serve it. Guthrie and Sac Counties experienced no train accidents during the timeframe, but both individually experienced 3 highway-rail incidents.

	2016	2017	2018	2019	2020
Audubon	0	0	0	0	0
Carroll	1	0	1	1	0
Crawford	1	0	0	0	0
Greene	0	0	0	1	0
Guthrie	0	0	0	0	0
Sac	0	0	0	0	0
Region XII	2	0	1	2	0

Table 3.15: Train Accidents by County 2016-2020

Table 3.16: Highway-Rail Incidents by County 2016-2020

	2016	2017	2018	2019	2020
Audubon	0	0	0	0	0
Carroll	1	0	0	1	0
Crawford	0	0	1	0	0
Greene	0	0	0	0	0
Guthrie	0	0	0	2	1
Sac	1	0	0	2	0
Region XII	2	0	1	5	1

Future of Rail Transportation

The 2021 Iowa State Rail Plan, as stated earlier, is intended to guide the Iowa DOT its activities to promote access to rail transportation, help to improve the freight railroad transportation system, expand passenger rail service, and promote improved safety both on the rail system and where the rail system interacts with people and other transportation modes.

The plan identifies current and emergent issues that affect the state's rail system. A large portion of the issues that affect the state affect Region XII. Identified issues should be addressed over the next decade in order to continue to meet the state's transportation needs. Iowa's rail vision includes enhancing the safety and securing of the rail system; maintaining the rail infrastructure; providing access and connectivity; improving efficiency; ensuring economic competitiveness and development; and, sustaining the environment.

CHAPTER 15: Aviation

As companies expand into new and expanded markets, the use of air travel is becoming more important. Local airports create opportunities for businesses that are headquartered in other states to locate within the region. There are six airports located within Region XII. They are located in Audubon, Carroll, Denison, Guthrie Center-Panora, Jefferson, and Sac City. None of these airports offer commercial service, which means that they do not provide scheduled services to transport or commuter aircraft. Those services are offered within a reasonable distance in Fort Dodge, Sioux City, Omaha, and Des Moines.

All of Iowa's airports are important to the state's transportation network and economy. The airports are part of the state's multi-modal transportation network, which helps keep Iowa competitive in the national and global economy by supporting agriculture, commercial, and industrial operations. The most recent study of airport's effect on Iowa's economy was completed in 2022. This study found that airports contributed nearly \$6.4 billion to Iowa's economy, support more than 41,000 jobs and generate approximately \$124 million dollars in tax revenue. Table 3.17 shows the aviation usage from 2010 and projections for 2030. These numbers are from the most State of Iowa's Aviation System Plan.

	2010	2030 Projection
Aircraft takeoffs and landings	940,360	1,203,399
Based aircraft at public airports	2,809	3,603
Boarding commercial airline passengers	1,567,611	3,150,526

Table 3.17: Statewide Aviation Demand

Airport Classifications

There are a number of different types of airports within Iowa to serve the needs of users. In Iowa, there are five airport categories: Local Service, Basic Service, General Service, Enhanced Service, and Commercial Service. Each system is defined by a set of criteria based upon currently levels of infrastructure and services. Classification criteria vary since airports with more enhanced facilities and services support the needs of a greater variety of aviation users.

Local Service Airports

Local Service airports support local aviation activity with little or no airport services. Criteria:

- Turf runways
- Airports that do not have the infrastructure or services to fill the Basic Service role

Basic Service Airports

These airports have runways of 3,000 feet or greater with facilities and services customized to meet local aviation demands. These airports should be able to handle and support primarily single engine aircraft. Criteria:

- 3,000 feet or longer paved runway
- Availability of aircraft fuel

• Some availability of airport of Fixed Base Operator (FBO) personnel or on-call personnel twenty-four hours a day

General Service Airports

General service airports have runways that are at least 4,000 feet in length with facilities and services customized to support most general aviation activity, including small to mid-sized business jets. These airports serve as an asset to a community's economy. Criteria:

- 4,000 foot or longer paved runway
- Based services such as aircraft maintenance and repair, flight training, rental aircraft, and aircraft charter operations
- Staffing during regular business hours

Enhanced Service Airports

These airports have runways 5,000 feet or greater in length with facilities and services that accommodate a full range of general aviation activity, including most business jets. These airports serve business aviation and are regional transportation and economic centers. Criteria:

- 5,000 foot or longer paved runway
- Airport Reference Code (ARC) of C-II or greater
- Full-time staffing during regular business weekday and weekend hours
- Availability of based services such as aircraft maintenance and repair, flight training, rental aircraft, and aircraft charter operations
- Availability of airport or FBO staffing 24 hours a day
- Availability of jet fuel
- Installation of on-airport automated surface observing systems (ASOS) or automated weather observing systems (AWOS) weather equipment

Commercial Service Airports

Commercial service airports support some level of commercial airline service and have the infrastructure and services available to support a full range of general aviation activity. These facilities meet most needs of the aviation system and serve as essential transportation and economic centers. Criteria:

- Infrastructure and services capable of meeting the requirements of most aircrafts
- Offer scheduled commercial airline service

Region XII Airports

Within Iowa, there are eight Commercial, fifteen Enhanced, thirty-one General, nineteen Basic, and forty-four Local airports within the state. Region XII has one enhanced airport, one general service airport, two basic service airports, and two local service airports. Map 3.14 shows the region's airports.



Map 3.14: Public Aviation Airports

Audubon County Airport

The Audubon County Airport is owned and operated by the Audubon County Airport Authority. The authority was created in 1988 by Audubon County and the City of Audubon. The airport is located less than one mile from the city's southern limit. The Audubon County Airport is a Local Service Airport, as it does not have regular staffing or twenty-four hour on-call staffing assistance. Since the airport meets the infrastructure requirements for a Basic Service airport, the Audubon County Airport Authority is recommended to provide at least on-call staff to routinely check the airport, with contact information provided if assistance is needed. For improvements to be made from 2011-2030, approximately \$2.5 million dollars is needed.

The *Iowa Aviation System plan* which spans from 2010-2030 estimates that by 2030, the Audubon County Airport will grow by one based aircraft to six. The five current based aircrafts are single engine. During that same period, the number of operations is expected to increase 16% to 1,500 yearly operations.

According to the *Iowa Aviation System plan,* the following needs have been identified:

- -Maintain airfield to at least A-1 design standards
- -Maintain at least 50-foot runway width
- -Maintain at least a visual approach
- -Maintain lighted wind indicator
- -Continue to post and update after-hours contact information
- -Develop and annually update a security plan

Type of Taxiway System	Connector
Lighted Wind Indicator	Yes
Rotating Beacon	No
Weather Reporting Equipment	AWOS
Apron Aircraft Tie-Down Locations	9
Total Hangar Parking Spaces	10
Length	3,640 feet
Width	60 feet
PCI Rating	47
Fuel Types	100LL
24-Hour Fueling Available	Yes

Table 3.18: Audubon County Airport Information

Security Plan	No
Emergency Response Plan	No
Weekday/Weekend Hours of Personnel	None
Posted After-Hours Contact Information	Yes
Aircraft Maintenance & Repair	None
Food & Beverage	No
Pilot Area	Yes
Restrooms	2
Total Airport-Related Employment	5
Total Economic Output	\$403,900

Arthur N. Neu Airport

The Arthur N. Neu Airport was established at its current location approximately five miles southeast of Carroll's central business district. This airport is classified as an Enhanced Service airport which serves business aviation and is a regional transportation and economic center in the state. For developmental needs from 2011-2030, \$1,070,000. Other potential projects to enhance the airport include runway rehabilitation, replacement of AWOS equipment, acquisition of snow removal equipment, reconstruction of the entrance drive, runway pavement maintenance, expansion of the terminal apron, construction of a t-hangar, and expanding the hangar taxiway at an additional cost of \$2,081,922.

This airport has grown to be one of the busiest in Western Iowa with approximately 700 landings per month. There are two paved and lighted runways, one with registered instrument approach and a non-directional beacon. The Airport Commission manages the airport operations and is a five-member commission that is appointed by the Carroll City Council for terms of six years.

The *Iowa Aviation System plan* estimates that the airport will grow from twenty-three based aircrafts to twenty-nine based aircrafts in 2030. The airport's hangar currently has space for twenty-four aircrafts, so to expand to the estimates in the plan, the hangar would need to be expanded. The operations out of the airport were expected to grow to 7,250 in 2030. In 2017, the operations have surpassed the estimates and yearly operations have reached 8,400. The airport is currently base to nineteen single-engine, three multi-engine, one helicopter, and one ultralight aircrafts.

According to the *Iowa Aviation System plan*, the following needs have been identified for the Arthur N. Neu Airport:

-Maintain airfield to at least C-II design standards

-Maintain runway length to at least 5,000 feet

-Maintain 100-foot runway width

-Maintain full parallel taxiway

-Work towards gaining a vertically guided approach

-Maintain MIRL runway lighting

- -Maintain MITL taxiway lighting
- -Maintain a VGSI on both runway ends
- -Maintain rotating beacon
- -Maintain lighted wind indicator
- -Install at least one RCO
- -Maintain crosswind runway
- -Continue to provide overnight storage for itinerant business aircraft
- -Continue to provide storage for all based aircraft
- -Maintain apron size to park 100% of average daily transients
- -Maintain terminal building
- -Maintain paved entry and parking lot
- -Continue to provide 100LL and Jet A fuel with twenty-four-hour availability
- -Continue to maintain staffing during standard business hours and after-hours on-call

-Provide staffing during standard business hours and after hours on-call

- -Continue to provide a courtesy car and/or car rental availability
- -Continue to provide at least vending services
- -Continue to post and update after hours contact information
- -Continue to provide a method to access the internet
- -Continue to provide restrooms
- -Continue to maintain a pilot area
- -Continue to maintain and update security plan annually
- -Continue to provide timely snow removal
- -Provide based rental aircraft
- -Continue to provide flight training
- -Continue to offer based aircraft maintenance and repair
- -Continue to offer based aircraft charter
- -Continue to provide weather reporting and flight planning capabilities

Type of Taxiway System	Full Parallel
Lighted Wind Indicator	Yes
Rotating Beacon	Yes
Weather Reporting Equipment	AWOS
Apron Aircraft Tie-Down Locations	13
Total Hangar Parking Spaces	24
Length	Runway 13/31: 5,500 ft.
	Runway 03/21: 3,300 ft.
Width	Runway 13/31: 100 ft.
width	Runway 03/21: 360 ft.
DCI Dating	Runway 13/31: 88
	Runway 03/21: 100
Fuel Types	Jet A & 100LL
24-Hour Fueling Available	Yes

Table 3.19: Arthur N. Neu Airport Information

Security Plan	Yes
Emergency Response Plan	Νο
Weekday/Weekend Hours of Personnel	7am-7pm
Posted After-Hours Contact Information	Yes
Aircraft Maintenance & Repair	Based
Food & Beverage	Yes
Pilot Area	Yes
Restrooms	2
Total Airport-Related Employment	19.5
Total Economic Output	\$1,849,800

Denison Municipal Airport

The Denison Municipal Airport is publicly owned and operated by the City of Denison. The airport is located approximately two miles southwest of Denison's central business district. This airport, which serves as a community economic asset, is identified as a General Service airport. The developmental needs of the airport, which includes the development of an Airport Layout Plan update, will cost approximately \$1,000,000 until 2030. Other potential projects for the airport include, rehabilitation of the runway, replacement of AWOS equipment, land acquisition for runway 18/36, construction of a six unit t-hangar, paving and lighting partial parallel taxiway, installation of credit card facilities, installation of approach lighting, grading and draining the terminal area, and the expansion of the terminal apron which could cost over \$5 million more.

The Denison Municipal Airport currently has ten based aircrafts, nine are single engine airplanes, and one is a multi-engine airplane. The *Iowa Aviation System plan* estimated that the airport's number of operations would increase to 5,250 in 2030. In 2015, the operations at the Denison Municipal Airport reached over 8,000, surpassing the plan's estimates.

According to the *Iowa Aviation System plan,* the following needs have been identified for the Denison Municipal Airport:

- -Maintain airfield to B-II design
- -Maintain runway length to at least 4,000 feet
- -Maintain at least seventy-five foot runway width
- -Maintain turnarounds to meet standards at both runway ends
- -Maintain at least a non-precision approach
- -Maintain MIRL runway lighting
- -Maintain MITL taxiway lighting
- -Maintain VGSI on both runway ends
- -Maintain REILs on both runway ends
- -Maintain rotating beacon
- -Maintain lighted wind indicator
- -Maintain runway orientation to achieve 95% wind coverage
- -Continue to provide storage for all based aircraft
- -Continue to provide overnight storage for itinerant business aircraft
- -Maintain apron size to park 100% of average daily transients
- -Maintain terminal building
- -Maintain paved entry road and parking lot
- -Continue to provide at least 100LL fuel
- -Continue to maintain staffing during standard business hours and after hours on-call
- -Continue to provide a courtesy car and/or rental car availability
- -Continue to provide at least vending services
- -Continue to post and update after hours contact information
- -Continue to provide a method to access the internet
- -Continue to provide restrooms

-Continue to maintain a pilot area

- -Develop a security plan and update annually
- -Provide based rental aircraft
- -Continue to provide flight training
- -Provide based aircraft maintenance and repair
- -Continue to offer a method to aircraft charter
- -Continue to provide weather reporting and flight planning capabilities

Type of Taxiway System	Connector
Lighted Wind Indicator	Yes
Rotating Beacon	Yes
Weather Reporting Equipment	AWOS
Apron Aircraft Tie-Down Locations	7
Total Hangar Parking Spaces	26
Length	Runway 12/30: 5,000 ft. Runway 06/24: 1,780 ft. Runway 18/36: 2,025 ft.
Width	Runway 12/30: 105 ft. Runway 06/24: 175 ft. Runway 18/36: 105 ft.
PCI Rating	Runway 12/30: 86 Runway 06/24: turf Runway 18/36: turf
Fuel Types	Jet A & 100LL
24-Hour Fueling Available	No

Table 3.20: Denison Municipal Airport Information

Security Plan	No
Emergency Response Plan	Yes
Weekday/Weekend Hours of	8 AM - 5 PM
Personnel	
Posted After-Hours Contact	Voc
Information	Tes
Aircraft Maintenance & Repair	On-call
Food & Beverage	Yes
Pilot Area	Yes
Restrooms	2
Total Airport-Related	6.5
Employment	0.0
Total Economic Output	\$576,700

Jefferson Municipal Airport

The Jefferson Municipal Airport at the Don Monthei Airfield is publicly owned and operated by the City of Jefferson. The airport is located two miles east of Jefferson and is identified as a Basic Service airport. Funding needed to acquire land for Runway 32 protection zone, acquire land for runway extension, relocate a county road, extend Runway 32, and install AWOS totals over \$2.8 million dollars.

There currently are twenty based aircrafts at the airport including sixteen single engine airplanes, one multi-engine airplane, and three ultralights. The anticipated operation numbers were 7,000 per year by 2030, and currently the airport experiences 5,720 operations per year.

According to the *Iowa Aviation System plan*, the following needs have been identified for the Jefferson Municipal Airport:

- -Maintain airfield to at least B-1 or below design standards
- -Maintain runway length to at least 3,000 feet
- -Maintain at least sixty-foot runway width
- -Maintain exit taxiways as needed
- -Maintain at least a visual approach
- -Maintain at least LIRL runway lighting
- -Maintain rotating beacon
- -Maintain lighted wind indicator
- -Continue to provide storage for all based aircraft
- -Maintain apron size to park at least 50% of average daily transients
- -Maintain at least a waiting area
- -Continue to provide at least 100LL fuel
- -Continue to provide at least on-call staffing
- -Continue to post and update after hours contact information
- -Continue to provide restrooms
- -Continue to maintain and update security plan annually
- -Continue to provide snow removal
- -Provide a method to offer flight training
- -Provide a method to aircraft charter

Type of Taxiway System	Connector
Lighted Wind Indicator	Yes
Rotating Beacon	Yes
Weather Reporting Equipment	None
Apron Aircraft Tie-Down Locations	8
Total Hangar Parking Spaces	35
Length	Runway 14/30: 3,198 ft. Runway 17/35: 2,203 ft.
Width	Runway 14/30: 75 ft. Runway 17/35: 150 ft.
PCI Rating	Runway 14/30: 89 Runway 17/35: turf
Fuel Types	100LL
24-Hour Fueling Available	No

Security Plan	Yes
Emergency Response Plan	No
Weekday/Weekend Hours of Personnel	24 hours
Posted After-Hours Contact Information	Yes
Aircraft Maintenance & Repair	Based
Food & Beverage	Yes
Pilot Area	Yes
Restrooms	2
Total Airport-Related Employment	12
Total Economic Output	\$606,100

Guthrie County Regional Airport

The Guthrie County Regional Airport is owned and operated by the Guthrie County Regional Airport Authority. The Authority has membership from Guthrie County, and the cities of Guthrie Center, Yale, and Panora. This Local Service airport is located approximately three miles east of Guthrie Center. The airport is classified as Local Service because it has no regular staffing or twenty-four hour on-call staffing assistance available. Since the airport meets the Basic Service infrastructure requirements, it is suggested that the Guthrie County Regional Airport Authority provides at least on-call staff with the responsibility to routinely check the airport, with a posted 24/7 contact for assistance. Major rehab for Runway 18/36, major taxiway rehabilitation, and major rehabilitation are the developmental needs of the airport, and will cost an estimated \$2.1 million

The *Iowa Aviation System plan* estimates that the number of based aircrafts will grow to nineteen in 2030 from fifteen in 2011. Currently, there are sixteen based aircrafts at the airport with thirteen single engine airplanes and three multi-engine airplanes. The airport currently serves 2,756 operations a year and expects that number to grow to 4,750 in 2030.

According to the *Iowa Aviation System plan,* the following needs have been identified for the Guthrie County Regional Airport:

- -Maintain airfield to at least A-1 design standards
- -Maintain at least fifty-foot runway width
- -Maintain at least a visual approach
- -Maintain lighted wind indicator
- -Continue to post and update after hours contact information
- -Continue to maintain and update security plan annually

Type of Taxiway System	Connector
Lighted Wind Indicator	Yes
Rotating Beacon	Yes
Weather Reporting Equipment	None
Apron Aircraft Tie-Down Locations	6
Total Hangar Parking Spaces	16
Length	3,400 ft.
Width	60 ft.
PCI Rating	65
Fuel Types	100LL
24-Hour Fueling Available	Yes

Table 3.22: Guthrie County Regional Airport Information

Security Plan	Yes
Emergency Response Plan	No
Weekday/Weekend Hours of Personnel	On-call
Posted After-Hours Contact Information	Yes
Aircraft Maintenance & Repair	None
Food & Beverage	No
Pilot Area	Yes
Restrooms	1
Total Airport-Related Employment	3
Total Economic Output	\$180,100

Sac City Municipal Airport

The Sac City Municipal Airport is publicly owned and operated by the City of Sac City. This Basic Service airport is located three miles south of Sac City. From 2011-2030 the developmental needs of this airport include an update to the layout plan which would cost approximately \$80,000. There are other potential projects including installing VGSI equipment, installing PAPI system, acquiring snow removal equipment, and installing REILs, costing an additional \$1 million.

There are nine single engine aircrafts that are based at the Sac City Municipal Airport. From 2011-2030, the airports activity is expected to rise from 2,500 to 3,250 operations a year.

According to the *Iowa Aviation System plan,* the following needs have been identified for the Sac City Municipal Airport:

- -Maintain airfield to at least B-1 or below design standards
- -Maintain runway length to at least 3,000 feet
- -Maintain at least sixty-foot runway width
- -Maintain exit taxiways as needed
- -Maintain at least a visual approach
- -Maintain at least LIRL runway lighting
- -Maintain rotating beacon
- -Maintain lighted wind indicator
- -Continue to provide storage for all based aircraft
- -Maintain apron size to park at least 50% of average daily transients
- -Maintain at least a waiting area
- -Continue to provide at least 100LL fuel
- -Continue to provide at least on-call staffing
- -Continue to post and update after hours contact information
- -Continue to provide restrooms
- -Continue to maintain and update security plan annually
- -Continue to provide snow removal
- -Continue to provide flight training
- -Provide a method to charter aircraft

Type of Taxiway System	Connector
Lighted Wind Indicator	Yes
Rotating Beacon	Yes
Weather Reporting Equipment	None
Apron Aircraft Tie-Down Locations	2
Total Hangar Parking Spaces	19
Length	Runway 18/36: 4,100 ft.
	Runway 14/32: 2,330 ft.
Width	Runway 18/36: 75 ft.
Width	Runway 14/32: 60 ft.
PCI Pating	Runway 18/36: 95
r Ci Natilig	Runway 14/32: 99
Fuel Types	100 LL
24-Hour Fueling Available	Yes

Security Plan	Yes
Emergency Response Plan	Yes
Weekday/Weekend Hours of Personnel	On-call
Posted After-Hours Contact Information	Yes
Aircraft Maintenance & Repair	None
Food & Beverage	Yes
Pilot Area	Yes
Restrooms	1
Total Airport-Related	5
Total Economic Output	\$297,000

CHAPTER 16: Trails

For many years, highway development has been the focus of the nation's surface transportation program. Highways offer a number of mobility benefits, but increasing concerns about air quality, open space, and traffic congestion has led Congress, and the nation, to view transportation as more than just highways. Trail planning and development have been able to be considered on the same level as other transportation mode after the passing of the Intermodal Surface Transportation Efficiency Act (ISTEA) and its successors. These acts have created the opportunity for trail projects to receive funding from new sources at both the state and federal levels. The Iowa DOT continues to add and edit guidelines for trail development both on and off roads. The state's most recent plan which addresses trail development was adopted in December of 2018 and develops a list of priorities to expand the trails system between and within cities, help state and local agencies to put the plan in place, and align Iowa with national best practices including national guidelines for trail development.

Regional Trail Network

Within Region XII, there are two trails that are part of a larger statewide trail network- the American Discovery Trail and the Iowa Great Lakes Trail. The American Discovery Trail is over 6,800 miles long and crosses 15 states. It is the nation's only coast-to-coast, non-motorized recreational trail. There are 512 miles of trails in Iowa that are a part of the ADT. The Raccoon River Valley Trail and the T-Bone Trail are the trails within the region that are a part of the ADT. The Sauk Rail Trail which runs from Swan Lake in Carroll County to Black Hawk Lake in Sac County is a part of the planned Iowa Great Lakes Trail.



Map 3.15: Region XII Recreational Trails

Raccoon River Valley Trail

The Raccoon River Valley Trail is an 89-mile long-paved trail that runs along the branches of the Raccoon River. This trail travels through Jefferson, Cooper, Herndon, Yale, Panora, Linden, Redfield, Adel, and Waukee in Greene, Guthrie, and Dallas Counties. The trail is built on the former right-of-way of a railroad built in the 1870s and 1880s to connect the City of Des Moines to the Iowa Great Lakes Region in the northwest part of the state. In 1987, the Central Iowa Energy Cooperative purchased the right-of-way from the Chicago & Northwestern Railway Company. The trail opened in 1989 with the completion of the first section. In 2007, a "North Loop" of the RRVT was built along a former Union Pacific Railroad right-of-way. It is estimated that more than 125,000 people per year use the RRVT and that number is expected to continue to increase. There is a fee of \$2.00/person per day or \$10.00/person per year which is used to assist with the trail maintenance and improvements; children 17 and under are free.

T-Bone Trail

The T-Bone trail is a 21-mile paved trail that runs from the City of Audubon into Cass County. This trail begins in Audubon, continues through Hamlin, Exira, Brayton, and ends in rural Cass County. The trail is located on the former right-of-way of the Rock Island Railroad, which was abandoned in the 1990s. The trail was purchased with assistance from the Iowa National Heritage Foundation and is named for the T-Bone event that originated in the 1950s in Audubon. There are no user fees for the T-Bone trail.

Sauk Rail Trail

The Sauk Rail Trail is a 33-mile concrete or asphalt multi-use trail that runs through Carroll and Sac Counties. It was the first trail in the state to connect two state parks. The trail begins in Lake View near Blackhawk State Park and winds through Sac and Carroll Counties, ending in Swan Lake State Park south of Carroll. The trail passes through Carnarvon, Breda, and Maple River. A large portion of the trail follows an abandoned rail line from Maple River Junction to Carnarvon. Fees to use the Sauk Rail Trail are \$1.00/person per day or \$15.00/person per year, which are used to upkeep the trail and make improvements.

County Trails

There are a number of trails within Region XII that are contained within local parks and small communities. Although a large number of these trails are not on the state's radar, these short, local trails are important to the communities in which they serve. These shorter trails are practical due to the costs to construct and maintain regional trails, as well as the amount of use on the trails. Table 3.24 lists the county trails within the region.

Table 3.24: Region XII County Trails

Facility Name	Location	County	Surface Type	Mileage
Aquatic Life Trail	Springbrook State Park	Guthrie	Dirt	.5 mile
Black Hawk Trail	Black Hawk Lake	Sac	Concrete	3 miles
Blue Grass Park Trail	Audubon	Audubon	Asphalt	.4 mile
Cabin Trail	Springbrook State Park	Guthrie	Dirt	.1 mile
Churdan City Trail	Churdan	Greene	Asphalt	.3 mile
Daubendiek Park Trail	Jefferson	Greene	Asphalt	.7 mile
Fire Trail	Springbrook State Park	Guthrie	Dirt	1.2 miles
Great Western Park Trail	Southwest of Manning	Carroll	Asphalt	.9 mile
Lake Trail	Springbrook State Park	Guthrie	Dirt	1.4 miles
Memorial Park Trail	Kiron	Crawford	Concrete	.6 mile
Odebolt Memorial Walk	Odebolt	Sac	Concrete	.5 mile
Picnic Area Trail	Springbrook State Park	Guthrie	Dirt	.3 mile
Prairie Pond Trail	Springbrook State Park	Guthrie	Dirt	.1 mile
Range Trail	Springbrook State Park	Guthrie	Dirt	.3 mile
River Trail	Springbrook State Park	Guthrie	Dirt	.4 mile
Riverside Park Trail	Coon Rapids	Carroll	Asphalt	3 miles
Shelter Trail	Springbrook State Park	Guthrie	Dirt	.2 mile
Tank Trail	Springbrook State Park	Guthrie	Dirt	.4 mile
Timber Loop Trail	Springbrook State Park	Guthrie	Dirt	.8 mile
Tower Trail	Springbrook State Park	Guthrie	Dirt	.4 mile
Wheels to Heels Trail	Yellowsmoke County Park to Denison	Crawford	Concrete	4 miles
Whiterock Conservancy Trails	Whiterock Conservancy	Guthrie	Natural	25 miles

Trail Counts

In 2020, Region XII conducted trail counts on the Raccoon River Valley Trail, the Sauk Rail Trail, the T-Bone Trail, and the Wheels to Heels Trail. The recreational trail volumes depicted in table 3.25 are derived from data obtained using Trafx G3 Infrared Trail Counters. The Trafx Infrared Trail Counter is designed to count general traffic on trails and paths. Using a small, high-quality infrared scope mounted on a tree, sign post or bridge and pointed towards the trail, the Trafx Infrared Trail Counter detects and counts the infrared signature associated with warm, moving objects. The data collected from these trail counts will help inform planning decisions for both Region XII and for cities within the region. There is an emphasis on enhancing the trail system to increase opportunities for recreation and safe routes to school. Recording trail usage across the region will show which trails are most widely used and the volume of visitors per day. This will be helpful in achieving greater walkability and connectivity for residents. Table 3.25 shows the count locations, total counts, days of collection, and the average number of users per day.

		Total	Days of	Average Trail
Trail	Count Location	Count	Collection	Users Per day
Raccoon River Valley Trail	20 yards SE of PJ's in Panora	5,028	120	42
Raccoon River Valley Trail	1 mi. S of Jefferson Depot on Graffiti Bridge	4,479	120	38
Sauk Rail Trail	SE Swan Lake State Park	10,895	141	78
Sauk Rail Trail	1/2 mi. N of Breda	1,804	141	13
Sauk Rail Trail	S of Harrison and Vine St. in Lake View	4,504	141	32
T-Bone Trail	S of 215th St.	2,364	132	18
Wheels to Heels Trail	Bridge E of swimming area at Yellowsmoke Park	11,745	124	95

Table 3.25: Region XII Trail Counts, 2020

CHAPTER 17: Pipelines

Oil and natural gas provide energy for industrial processes, electricity generation, transportation, and residential use. Almost one hundred percent of the natural gas and about sixty-six percent of the tonmiles of oil and refined petroleum products consumed in the United States are safely and efficiently transported by hazardous liquid and gas transmission pipelines. The most feasible way to transport the large amounts of hazardous liquids and gasses is through pipelines, eliminating a large amount of traffic which would be necessary if pipelines were not utilized. There are pipelines in all fifty states and many are constructed in sparsely populated rural areas. In some areas, community growth has turned the once rural lands into urban and suburban locations with residential, commercial and industrial development.

Pipeline Operators

There are fifty-seven pipeline operators in Iowa operating 33,302.39 miles of pipelines carrying natural gas and hazardous liquids such as gasoline and jet fuel. Table 3.26 breaks down Iowa's pipeline mileage by commodity and table 3.27 shows the breakdown by county in Region XII. The lines within Region XII include large-diameter lines carrying energy products to population centers and small lines that may deliver natural gas to businesses and households. In 2016, 0.39 miles of the Dakota Access Pipeline was constructed in Sac County. According to the Pipeline and Hazardous Materials Safety Administration's (PHMSA) National Pipeline Mapping System (NPMS), ten pipeline operators exist in Region XII:

- -Alliant Energy-Interstate Power and Light Co.
- Light CO.
- -Bakken Pipeline -Black Hills Energy
- -City of Wall Lake
- -Enterprise Products Operating, LLC

- -Louis Dreyfus Commodities
- -Magellan Ammonia Pipeline, LP
- -Manning Natural Gas Company
- -MidAmerican Energy Company
- -Northern Natural Gas Company
- -Platinum Ethanol, LLC

Table 3.26: Iowa's Transmission Miles

Pipeline Type	Miles			
Hazardous Liquid	4,399			
Gas Transmission	8,333			
Gas Distribution/Service	33,302.39			
Total:	46,034			
	Gas Miles	Liquid Miles	Total Miles	Percent of State Total
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Audubon	82.14	0.00	82.14	0.65%
Carroll	36.91	22.75	59.66	0.47%
Crawford	22.57	28.31	50.88	0.40%
Greene	103.94	22.89	126.83	1.00%
Guthrie	179.87	0.00	179.87	1.41%
Sac	64.44	14.61	78.66	0.62%
Region XII	489.88	88.55	578.04	4.54%

Table 3.27: Transmission Miles by County

Pipeline Safety

Pipelines are relatively safe for transporting energy products. These lines can ruptures, which poses serious safety concerns. The Office of Pipeline Safety within the US Department of Transportation is the primary federal agency responsible for ensuring that pipelines are safe, reliable, and environmentally sound. There are federal regulations that govern pipeline safety, and many states have additional and/or more stringent pipeline regulations to ensure the safety of their residents.

Since 2010, there has been only one significant pipeline incident that occurred in Region XII. On November 15, 2010 near Early, the Magellan Ammonia Pipeline had a material/welding/equipment failure that released over eight barrels of HVL or other flammable or other toxic fluid, which is gas at ambient conditions. This spill resulted in over \$67,000 in property damage, but resulted in no fatalities or injuries.

Looking towards the future of pipelines in the region, the Summit Carbon Pipeline as proposed would cross Crawford and Greene Counties. It is unknown whether this pipeline will be constructed.

CHAPTER 18: Intermodal Facilities

An intermodal facility is one that connects and accommodates different modes of transportation. Generally, these facilities involve the shipment of containers and trailers by rail, truck, barge or ship. Railroads, trucks, and barges are generally in competition with each other over the shipment of goods and intermodal facilities require these modes to cooperate. The use of intermodal transportation is expected to increase.

Railroad intermodal traffic at the national level has been one of the leading revenue growth areas for the railroad industry. Although this has been an area of national growth, a number of rail intermodal facilities in Iowa have closed. Many of the Iowa facilities were inexpensive, trailer loading ramps that were inefficient and was the response to the railroad industry's desire to concentrate intermodal freight at hub locations. Hub locations reduce the total handling cost per unit and receive more frequent rail service, but have a higher cost of drayage and time lost with longer over-the-road movements. According to the 2022 Iowa Freight Plan, the closest intermodal facilities to Region XII are in Council Bluffs, Omaha, Minneapolis, and Kansas City.



Section 4: Regional Transportation Analysis

Chapter 19: Key Regional Transportation Needs and Issues

REGION XII COUNCIL OF GOVERNMENTS | Long Range Transportation Plan

Introduction

Key regional transportation needs and issues identified by Region XII were derived from consultation and discussion with the following groups:

- Region XII Technical Advisory Committee (TAC)
- Region XII Policy Council
- Transit Roundtable XII Committee
- Region XII Bike-Ped Roundtable
- Region XII County Transportation Stakeholders
- Region XII Partner Agencies

Input from these individuals and groups was based upon review of the most recent inventory and analysis of the current transportation system in the region. These needs and issues that have been identified will help to inform future planning decisions as well as projects.

CHAPTER 19: Key Regional Transportation Needs and Issues

Key Findings of the long-range transportation plan include:

Roads:

- Maintenance of the existing regional highway network is a priority.
- Many of the roads fall under the jurisdiction of counties and obtaining funding to maintain these roads is a major issue.
- A large number of the region's roads are in good condition, and keeping them in good condition is important, as poor road conditions lead to increased maintenance costs, safety concerns, increased vehicle damage, and decreased travel speeds.

Safety:

- Safety within the region is a priority, and the total number of crashes and the number of alcohol impaired fatalities have decreased by 34% since 2014.
- Incorporating cost-effective safety measures during the design of rehabilitation or reconstruction projects should be implemented whenever possible.

Bridges:

- 18% of the region's bridges are in poor condition, funding to rehabilitate these bridges and maintain the good bridges is vital.
- There are 13 historic bridges within the Region XII service area; those in Greene and Carroll County dating from the 1910s and those in Crawford County being built post-WWII. Maintaining these bridges is important, but costly.

Transit:

- Western Iowa Transit (WIT) is the main public transit provider for the region.
- As transportation needs within the region continue to change, it is important that WIT is able to accommodate those changes through adapting the fleet and personnel.
- Maintaining a quality fleet through replacement and scheduled maintenance is becoming more expensive as costs of new vehicles and repairs is rising at unprecedented rates.
- Transportation funding at the state and federal level is critical to WIT. The funding at both of these levels has decreased and a further decrease in funding would limit the transportation that the state's systems can offer its residents.
- As the region's population continues to age, it is important that new transportation options be evaluated.

Rail:

- The region's rail system transports a large amount of freight through and to and from the region.
- Iowa's rail traffic has seen considerable growth over the past five years, and is expected to continue to grow.
- There are four rail companies that operate within the region: BNSF, Canadian National, Iowa Interstate Railroad, and Union Pacific of which, three are Class 1 (there are 5 total Class 1 railroads in Iowa) making it difficult to initiate rail projects as these railroads are national and smaller regions, like Region XII, are not on their radar
- Since 2017 there have been sixteen rail accidents which is a decline from the previous years as warning systems and other safety measures are designed and implemented, this number will continue to fall.

Aviation:

- There are six local airports within the Region XII service area
- Passenger service is not offered within the region, so travelers travel to go Des Moines, Omaha, or Sioux City
- Airports that require staffing changes to be reclassified as a larger airport should consider those changes. The Audubon County Airport and the Guthrie County airport are the two airports should consider reclassifying.
- The 2020-2040 Iowa Aviation System Plan lays out development and maintenance needs for each of the six regional airports. State and federal funds should be identified to implement these improvements.

Trails:

- There are three trails of statewide significance within the region: the Raccoon River Valley Trail, the Sauk Rail Trail, and the T-Bone Trail
- Expanding and maintaining the region's trail system is dependent on funding, and more funding is needed to complete the trail plans

 The connection and expansion is not only limited by funding, but railroad right-of-ways are being reverted back to adjacent property owners and not in the public rail banks for public use.

Pipelines:

 There have been very few pipeline incidents within the region, but as hazardous liquids and gasses continue to pass through the region, safety improvements should be made where applicable



Section 5: Analysis of Transportation Problems and Opportunities



Chapter 20: Region XII Transportation Survey Chapter 21: SWOT Analysis Chapter 22: Stakeholder Consultation and Partner Agency Input

REGION XII COUNCIL OF GOVERNMENTS | Long Range Transportation Plan

CHAPTER 20: Region XII Transportation Survey

One method used to gather public input was the online transportation survey. The Region XII Long Range Transportation survey was distributed to over 2,000 Region XII COG elected officials, staff, stakeholders and partners via email in August and September 2022. The survey was also posted on the COGs social media pages. One hundred seventy-one responses were collected. These results were summarized and then analyzed by COG staff, the RPA TAC Committee, and the Region XII Policy Council. The results of these surveys were used to evaluate future project investments and priority areas. There were 173 responses to the eighteen questions within the survey. The goal of this survey was to allow residents of the area the chance to voice their opinion on the importance of transportation options and where future funding should be geared.

	Responses	Percent
Audubon County	5	3%
Carroll County	97	57%
Crawford County	16	9%
Greene County	12	7%
Guthrie County	16	9%
Sac County	12	7%
Outside the region	13	8%

Table	5.1:	Where	do y	ou live)	?
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Table 5.2: What is your gender?

	Responses	Percent
Male	76	45%
Female	93	55%

Table J.J. Wildlib your aye	Table	5.3:	What	is your	age?
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	Responses	Percent
19 or under	0	0 %
20-29	16	4.60%
30-39	48	13.79%
40-49	65	18.68%
50-59	109	31.32%
60-64	50	14.37%
65-74	44	12.64%
75 or over	15	4.31%

Figure 5.1: Do you or anyone in your family suffer from disabilities?



Table 5.4: What is your household income?

	Responses	Percent
\$9,999 or under	1	0.58%
\$10,000 to \$19,999	2	1.17%
\$20,000 to \$29,999	6	3.51%
\$30,000 to \$39,999	9	5.26%
\$40,000 to \$49,999	13	7.60%
\$50,000 to \$59,999	8	4.68%
\$60,000 to \$69,999	12	7.02%
\$70,000 to \$79,999	17	9.94%
\$80,000 to \$89,999	13	7.60%
\$90,000 to \$99,999	18	10.53%
\$100,000 to \$249,999	56	32.75%
Over \$250,000	3	1.75%
Prefer not to respond	13	7.60%

The previous five figures show that the survey reached a wide variety of residents throughout the region. Over half (57%) of the respondents lived in Carroll County with Crawford and Guthrie County residents were the second largest cohort both making up 9% of the responses. Female respondents surpassed male respondents by 17 responses (10%). The survey gathered responses from all age cohorts with the 50-59 cohort responding at the highest percentage (31%). Approximately 19% of respondents suffer from disabilities, this is important to take into consideration as WIT provides ADA accessible transportation. 33% of responders lived in a household where the household income was between \$100,000 and \$249,999. Having this wide variety of respondents allows the survey to capture a better overall view on transportation issues.

		*		
	Very Important	Important	Somewhat Important	Not Important
Highways/Streets	87.02%	12.21%	0.76%	0.00%
Public Transit	16.28%	21.71%	21.71%	40.31%
Recreational Trails	35.88%	30.53%	14.50%	19.08%
Railroad	11.63%	28.68%	21.71%	37.98%
Intercity Bus	7.03%	7.03%	15.63%	70.31%
Air	13.08%	24.62%	23.85%	38.46%

Table 5.5: How important are each of the following modes of transportation to youand/or your business?

Table 5.6: What changes to the transportation system in Western Iowa do you feel would improve your mobility?

	Ranking
Better maintenance of existing street and highways	1 (most improve)
Improved/additional public transit service	5
New or 4-lane streets and highways	2
Additional recreational trails/bicycle lanes	3
Park-and-ride lots	8
Inter-city bus connections	9 (least improve)
More sidewalks	4
Interstate passenger rail service (Amtrak)	7
Airport infrastructure improvements	6

Within the region, highways and streets are the most important mode of transportation (87.02%) according to the survey respondents followed by recreational trails (35.88%) and public transportation (16.28%). Only 11.63% of respondents felt that rail transportation was very important. This could be due to the fact that most of the rail traffic simply passes through the region and doesn't originate or terminate here. Rail access for local businesses has been identified as an area for improvement. In table

46, better maintenance of existing streets and highways was felt that it would improve the mobility of people throughout the region the most and was the most important. New or 4-lane streets and highways were the second highest ranked as these road would provide a more efficient route for worker to travel to and from work in different cities. The region's recreational trails are utilized by some for their daily commute, mostly within the cities, but are mostly used for recreational activities such as biking, hiking, or running and are an important amenity to a large number of area residents.

	Most	% of	Least	% of
	Important	Respondents	Important	Respondents
Better maintenance of existing street and highways	49	45.79%	0	0.00%
Better enforcement of traffic laws	4	4.26%	4	4.26%
Increased maintenance of bridges	9	8.11%	0	0.00%
Additional sidewalks	10	9.52%	4	3.81%
Better notification about construction zones	1	1.00%	3	3.00%
More pedestrian crossing signals at intersections	2	2.17%	3	3.26%
Improved railroad crossings	4	4.04%	1	1.01%
Lower speed limits	1	1.06%	26	27.66%
Wider and/or paved shoulders on highways	15	14.42%	0	0.00%
Bike lanes on streets and highways	6	6.25%	8	8.33%
Air infrastructure improvements	2	2.04%	40	40.82%
Center/shoulder rumble strips	5	5.32%	4	4.26%
Additional turn lanes	5	5.10%	3	3.06%

Table 5.7: What improvements to the transportation system do you feel would improve your safety?

Better maintenance of existing streets and highways was recognized as the improvement that would make the most improvement to safety as nearly 46% people responded that it was the most important. The improvement of highways and streets allows people to focus more on the other vehicles and on the road and less on the condition of the road they are driving upon. Lower speed limits and air better notification about construction zones were ranked as the two least important improvements that should be made.

	Most	% of	Least	% of
	Important	Respondents	Important	Respondents
Better connection among different	o	7 60%	10	0.62%
types of transportation (i.e. truck, rail, air)	0	7.09%	10	9.02%
Better maintenance of streets and highways	49	42.98%	1	0.88%
A change/shift in the amount of	2	1 0 4 9/	1 5	14 569/
goods shipped by truck, rail and air	2	1.94%	15	14.50%
New or wider streets and 4-lane highways	46	41.82%	1	0.91%
Intermodal facility	2	2.00%	28	28.00%
Interchanges at major intersections	3	2.88%	11	10.58%
Rail park/community rail facility	7	6.73%	30	28.85%

Table 5.8: What improvements to the transportation system do you feel would improve the delivery of goods/commodities and strengthen our economy?

*Some percentages may differ due to the fact that some categories were skipped.

The highest percentage of respondents felt that better maintenance of streets and highways would strengthen the region's economy. This can be attributed to the large amount of truck traffic in the area due to industries. High truck traffic requires more routine maintenance of streets and roadways which can be costly. The second highest percentage of respondents noted that they felt widening roads and creating a 4-lane highway would strengthen the region's economy. Many businesses want to locate where they have access to a 4-lane highway, and currently within the region, US 20 in northern Sac County, is the only 4-lane highway in the region. Better maintenance of streets and highways was also a high priority as it would lead to increased travel speeds, reduced delays, and decreased maintenance on vehicles.

Table 5.9: Keeping in mind that transportation funds are limited, please rank the following modes of travel according to priority you feel they should be given in funding decisions.

	Highest	% of	Lowest	% of
	Priority	Respondents	Priority	Respondents
Maintaining existing streets and highways	68	56.20%	0	0.00%
Public bus service	6	5.71%	7	6.67%
New or wider streets and 4-lane highways	27	24.11%	1	0.89%
Sidewalks	4	3.57%	6	5.36%
Regional bicycle facilities/trails	8	7.34%	7	6.42%
Air	3	2.80%	53	49.53%
Interstate passenger rail service (Amtrak)	3	2.91%	19	18.45%
Carpools/vanpools	2	1.94%	6	5.83%

Maintaining the existing streets and highways (56% of respondents) is felt to be the transportation item that should be given a priority when making decisions, followed by new or wider streets and 4-lane highways (24% of respondents). The two modes which should receive little consideration, according to the survey responses, are air (2.80%) carpools/vanpools (1.94%). The people within the region rely heavily on the road network to get from place to place, so it correlates that respondents would want the roads to be in good condition, making their trips faster and smoother.



Approximately 24% of the respondents do not know if the public transit system meets the needs of the area, which is not surprising considering in the questions before, the public transit service was not recognized as a priority. Of those people who are familiar with the public transit service, 15% felt that it is adequate and meets the needs of the residents, 13% feel that the service could be better marketed, and 17% feel that increased hours of service would be beneficial.

	Very	Moderately	Somewhat	Not
	Important	Important	Important	Important
Completing sidewalks	47	47	15	16
Crosswalk safety	45	47	22	10
Bike lanes and paved shoulders	30	45	31	19
Additional trails to schools and employment	53	31	22	18
Overlay or repair of existing trails	52	37	20	16
New recreational trail construction	40	33	28	24
Trail or pedestrian route signage	22	37	42	24
Water trails	10	25	26	64

Table 5.10: With regards to bicycle/pedestrian accommodations and recreational trails, howimportant are the following to you?

Figure 5.3: How would you rate the quality and quantity of bicycle/pedestrian accommodations and recreational trails in the region?



Bicycle/pedestrian within the region is important to the residents. Additional trails to school and employment (43%) and overlay or repair of existing trails (42%) are two of the most important items with regards to bicycle/pedestrian accommodations and recreational trails. Completing sidewalks (38%) and crosswalk safety (37%) were also determined to have high importance, ranking just below the top two categories. Over 50% of the survey responses showed that the trails and bike/pedestrian accommodations are in good condition and 36% showed that they are in fair condition.

 Table 5.11: The Region XII Long Range Transportation Plan will guide transportation decisions at the regional level for the next 25 years. How important are the following modes of transportation for this document to consider?

	Very Important	Moderately Important	Somewhat Important	Not Important
Ongoing maintenance and preservation of streets and highways	102	16	0	0
Safety and traffic flow improvements	53	47	13	4
Recreational trails and increased on- road accommodations	37	33	33	14
Adding additional lanes (4-lanes)	59	31	19	8
Airport improvements	7	22	46	40
Expanding public transit service	25	44	30	17
Water trail development and promotion	9	21	32	54
Commuter routes	15	51	28	23

Table 5.12: Considering all modes of transportation (highway, air, rail, transit, and trails) how would you rate the current quality of the overall transportation system in the Region XII area?

Excellent	9
Good	131
Fair	112
Poor	7
Very Poor	2



CHAPTER 21: SWOT Analysis

In a SWOT analysis, the strengths and weaknesses are considered internal factors, over which one can exhibit some control. The opportunities and threats are considered external factors over which one has no control. Based on these definitions, the region should build on its strengths, curb its weaknesses, maximize its opportunities, and overcome its threats. The SWOT was completed in 2022 with members of the Region XII TAC, Transit Roundtable XII Committee, Region XII Bike-Ped Roundtable and participants at the Region XII County Transportation Stakeholders meetings participating. The strengths, weaknesses, opportunities, and threats were developed through discussions and surveys.

Strengths

- Dense network of roadways to support the Agricultural economy
- Good access from the West, busses available and drivers
- Decent number of county roads. Secondary roads are better than in many regions, Solid state highways, Trails
- Unused railroads as potential somatic transportation (paths, trails, sidewalks, shared use paths/trails, etc.) to increase connectivity we already have the right of way
- Highway 20; Sauk Rail trail; solid & functional airports
- Bike trails, transportation to appointments, personal car/trucks/motorcycles, walking, school bus system
- Well maintained vehicles, friendly competent staff
- Reasonable amount of hard surface roads and rail access
- Raccoon River Valley Trail
- Good network of state and county paved roads in satisfactory condition, Major railroads.
 Regional transport busses
- We have railways to the north of us in Carroll County and the interstate system to the south of us
- Nice trail systems in some parts. Coon Rapids single track trail
- Several airports
- Western Iowa Transit
- Several main arteries in good shape--30, 141, 71, 44
- Pretty extensive county road system (some counties maintained better than others, but still good number of non-gravel roads)
- Multiple transmission lines, gas pipelines, and upgraded poles
- Rail--UP is ok, but doesn't stop much, BNSF is an asset
- Nice water trail system (Raccoon)
- Rail in the southern part of the region, south counties close to I-80; completion of four lane US
 20 in the northern part, adequate airports, Region XII has the transit system under control

Weaknesses

- There are many bridges that need to be repaired or replaced system wide, the 2 lane Hwy 30 corridor with its outdated geometry and capacity congestion issues in some areas
- Access from the South and East is not available from Region XII
- Lack of 4-lane
- No larger airports (i.e. Fort Dodge)
- Trails not as connected as some regions
- Somatic Transportation, or walkability, is a concern, especially for our disabled and poorer community members, or those that do not have vehicle transportation
- Funding
- State highways and hard-surface county roads in need of re-surfacing
- Secondary roads and bridges suffer from lack of funding
- Road maintenance in general and the fact that Iowa is #1 in the nation with the most deficient bridges with our region having it's share
- Maintenance on state highway--band aids instead of real repairs.
- Many sub-standard bridges
- Trains go through area but not used for transportation
- Highway 30 is only a two-lane highway/Congestion on some segments of Highway 30.
- Lack of 4-lane access in most areas--both East West and North-South
- Car pooling
- Sidewalk upkeep
- Low unemployment rate/finding staff
- Most systems are being reduced through closure of non-critical roads and bridges
- I can't remember the last time an aggregate road was upgraded to a hard surface road
- Railroad siding availability
- Amtrak system would be nice
- Narrow roads--both county and some state
- Mileage and age of transit fleet
- Lack regional trail systems in some areas
- Energy transportation counts, we lack redundant gas, only three lines that tap into one main serve the entire region and the ability to get more gas is limited by only one supplier

Opportunities

- Consideration of significant improvements to Hwy 59 from Denison south to Interstate 80
- More routes available from the East or South
- Trails
- Four lane Highway 30 with a requirement within our region for IDOT to include shared use paths/trails along all new, reconstruction, and resurfacing projects on the State's Highway systems - and local as well
- More funding
- 4-lane Highway 30
- Growing need for services /ability to expand services
- Improvements to HWY 44
- Six lane interstate system
- Expanding paved trail system to unserved parts of the region
- Gravel grinder trail routes-determining, promoting, and maintaining gravel bike tourism opportunities.
- Expand/better promote Western Iowa Transit
- Increase public transit expenditures
- More regional interaction
- Gas expansion--either through pipeline or trucked (Liquefied Natural Gas)
- Expansion on the BNSF (potential rail park)
- Use water trails (existing and expanding) to promote more regional tourism
- Trail connectivity with road construction
- Grant Park to Auburn Trail
- Autonomous vehicles

Threats

- Declining purchasing power of available revenues, increased allowable loads on the roadways resulting in accelerated deterioration
- Competition from DART in Des Moines
- Lack of funding; aging systems
- Lack of funding availability, land acquisitions for Somatic Transportation, Des Moines and the State Legislature
- Funding is a major challenge
- State's propensity to focus road funds in larger populated areas
- Farm equipment is so heavy, all upgrades have to be very costly and substantial
- Safety
- Larger loads and larger equipment today and more traffic just make the highways more dangerous at particular times during the day
- Large number of bridges
- State legislature focusing more money on Eastern Iowa than Western Iowa
- Increased truck traffic
- Lack of DOT Commissioners in western Iowa

- AG property tax structure
- Regulations
- State government involvement in transportation funding

Future Projects and Transportation Investments

- Four lane expansion of the Hwy 30 corridor; complete reconstruction of the Hwy 30/59/141 intersections in Denison
- More bus routes available through Region XII
- Trails
- Bridges
- Transportation linking the major communities
- Funding
- Maintenance on current roadways
- Bridge repair
- Highway 30 4-lane
- Connect trails into one large regional trail system
- Transportation for preschool programs
- Regional trail investments
- Bikes and farm equipment have no business sharing the same roadway
- Expand water trail system
- Develop natural gas redundancy
- Railroads are a key to transporting many goods in a short distance of time and unfortunately, we have no railroad systems left down here in Audubon County, which I think would be nice for a lot of the local grain elevators and other local businesses
- Create rail industrial park
- Iowa 39
- Sac County N28 increased AADT and trucks
- M54 connection to US 20
- Removal of US 30 traffic lights in Carroll
- Improve rail crossings and overpasses
- 2nd Railroad overpass in Carroll
- Panora water trail and ripple dam
- Better access to natural area tourism
- Trail connection to Lake Panorama
- Lennon Mill Park Trail
- New windsock at the airport
- Fix Highway 141 correctly
- 4-lane in the region
- North 16th Street or Rolf Ave hard surfaced from Sac City limits to the new US 20 for industry
- Rail improvements in southern part of region
- Trail maintenance and resurfacing of T-Bone Trail
- T-Bone Trail connection to Atlantic

Conclusion

The information found in this section is used when creating actionable steps for the life of this plan. Without community support and/or funding, there would be no changes to the region's transportation plan. Recognizing the needs of the region and taking the appropriate action steps helps keep the region moving forward. This plan's action plan is laid out in the next section and addresses the needs of all modes of transportation within the region.

CHAPTER 22: Stakeholder Consultation and Partner Agency Input

Several Federal, State, Tribal, and local government agencies were notified when the draft LRTP document was available for review. Feedback on topics relevant to an agency's specific field of expertise was requested. Agencies notified and consulted during the development of the LRTP include the following:

- Audubon County Conservation
- Carroll County Conservation
- Crawford County Conservation
- Greene County Conservation
- Guthrie County Conservation
- Sac County Conservation
- Audubon County Airport Authority
- Carroll Airport Commission
- Denison Municipal Airport Commission
- Guthrie County Regional Airport Commission
- Jefferson Municipal Airport Commission
- Sac City Municipal Airport Commission
- Iowa Department of Agriculture and Land Stewardship
- Iowa Department on Aging
- Iowa Department for the Blind
- Iowa Department of Cultural Affairs
- Iowa Department of Education
- Iowa Department of Human Rights
- Iowa Department of Human Services
- Iowa Department of Natural Resources
- Iowa Department of Public Health
- Iowa Department of Public Safety
- Iowa Department of Transportation, Systems Planning Bureau
- Iowa Department of Transportation, District 3
- Iowa Department of Veterans' Affairs
- Iowa Economic Development Authority
- Iowa Homeland Security and Emergency Management
- Western Iowa Transit
- Iowa Tourism Board
- Iowa Utilities Board
- Iowa Workforce Development
- Office of the State Archaeologist
- Sac & Fox Tribe of the Mississippi

- State Historical Society of Iowa
- Transit Roundtable XII Committee
- U.S. Army Corps of Engineers, Rock Island District
- U.S. Environmental Protection Agency, Region 7
- U.S. Department of Agriculture Natural Resources Conservation Service
- U.S. Department of the Interior Bureau of Indian Affairs, Midwest Regional Office
- U.S. Fish and Wildlife Service, Illinois-Iowa Field Office
- Western Iowa Advantage Regional Economic Development Group

Section 6: Implementing the Plan



CHAPTER 22: Public Involvement Process and Results

The following section illustrates the timeline showing the public input process utilized in the development and review of this plan.

Region XII Transportation Survey

Summer-Fall 2022

A public input survey regarding regional transportation issues was completed in September 2022 to identify public sentiment on transportation issues and projects.

SWOT Analysis

Summer-Fall 2022

A Strengths, Weaknesses, Opportunities and Threats analysis was completed in 2022. Members of the Region XII TAC, Transit Roundtable XII Committee, Region XII Bike-Ped Roundtable and participants at the Region XII County Transportation Stakeholders meetings participated in this analysis.

Stakeholder Consultation and Partner Agency Input

Summer-Fall 2022

To assist with further review and consultation regarding the LRTP draft, several Federal, State, Tribal, and local government agencies were notified of the release of the draft plan and feedback was requested based on the expertise of the agency.

Public Comment Period

November 8 – December 8, 2022

Comments were received during the public comment period. The availability of the draft plan was publicized through local media, Region XII COG's website, Region XII COG's newsletter, and Region XII COG's social media outlets. A summary of the public comments made regarding this plan can be found at the end of this chapter.

TAC and Policy Council Plan Adoption

Pending

CHAPTER 23: Revision and Approval Process

All revision requests will be submitted electronically to the Iowa DOT Office of Systems Planning and the agency's District Planner. If all necessary information is provided, the request will then be forwarded to the FHWA and FTA for review and any necessary approvals.

Revision requests shall, at a minimum, include:

- > A resolution or meeting minutes showing the revision's approval.
- > Budget summary table with changes highlighted/noted if applicable.
- > Modified section(s) of the plan's elements with changes highlighted/noted.
- Revisions where FHWA/FTA is the designated approving agency shall require written approval by FHWA/FTA prior to commencement of activity, purchasing of equipment, or request for reimbursement.
- Revisions where the Iowa DOT Office of Systems Planning is the designated approving agency shall require written approval by the Iowa DOT Office of Systems Planning prior to commencement of activity or request for reimbursement.
- > Revisions by the RPA shall be approved by the Policy Board or Executive Board.
- > Notification by the approving agency will be in writing.

CHAPTER 24: Short Term Transportation Improvements

The Implementation Plan includes specific projects identified to address the identified key regional transportation needs and issues. This section contains detailed projects for the first 5-years of the Long Range Transportation Plan. Projects must meet the necessary funding requirements and must meet the fiscal constraints of the respective transportation-funding program.

Road and Bridge Projects

Project Description	Project Sponsor	Total Project Cost	Funding	Federal Fiscal
			Source(s)	Funding Year
Thomas Street Bridge	Casey	\$675,000	City Bridge Fund	2023
Walnut Street Bridge	Odebolt	\$500,000	City Bridge Fund	2023
BR41-13W Contract Bridge Replacement	Crawford County	\$1,375,000	Highway Bridge Program (HBP)	2023
G9 TRUSS BRIDGE	Carroll County	\$500,000	Highway Bridge Program (HBP)	2023
240th Street Seely Creek Bridge Replacement	Guthrie County	\$500,000	Highway Bridge Program (HBP)	2023
Luna Ave Small Creek Bridge Replacement	Guthrie County	\$400,000	Highway Bridge Program (HBP)	2023
F24 Small Creek Bridge Replacement	Guthrie County	\$625,000	Highway Bridge Program (HBP)	2023
175th St Bridge Replacement	Guthrie County	\$400,000	Highway Bridge Program (HBP)	2023
CO-0109	Sac County	\$160,000	Highway Bridge Program (HBP)	2023
JA-3230	Sac County	\$315,000	Highway Bridge Program (HBP)	2023
BV-3660	Sac County	\$280,000	Highway Bridge Program (HBP)	2023
US30: Rocky Run Creek Bridge Replacement	lowa Department of Transportation	\$2,340,000	Highway Bridge Program (HBP)	2023
IA39: Porter Creek Culvert Replacement	lowa Department of Transportation	\$976,000	Highway Bridge Program (HBP)	2023
IA144: East Buttrick Creek Culvert Replacement	lowa Department of Transportation	\$1,285,000	Highway Bridge Program (HBP)	2023
US30: East Boyer River Bridge Rehabilitation	lowa Department of Transportation	\$1,577,000	Highway Bridge Program (HBP)	2023
US30: IA 25to IA 4 Pavement Rehab	Iowa Department of Transportation	\$7,000,000	National Highway Performance Program (NHPP)	2023

Project Description	Project Sponsor	Total Project Cost	Funding	Federal Fiscal
			Source(s)	Funding Year
US59: Over Coon Creek ROW	Iowa Department	\$5,000	Primary Road	2023
	of Transportation		Fund (PRF)	
E-57 HMA Overlay	Greene County	\$2,910,000	Surface	2023
			Transportation	
			Block Grant	
			(STBG)	
F32 Resurfacing/Rehab	Audubon County	\$4,200,000	Surface	2023
			Transportation	
			Block Grant	
			(STBG)	
Region XII Transportation Planning	RPA 12	\$200,000	Surface	2023
			Transportation	
			Block Grant	
			(STBG)	
Transit Facility Security	RPA 12	\$4,020	Surface	2023
Improvements			Transportation	
			Block Grant	
			(STBG)	
IA471: Over Ditch N of D36	Iowa Department	\$335,000	Bridge	2024
	of Transportation		Replacement	
			Fund (BRF)	
P-14 Bridge	Greene County	\$2,500,000	Highway Bridge	2024
			Program (HBP)	
Snake Creek Bridge	Greene County	\$350,000	Highway Bridge	2024
Replacement/Culvert			Program (HBP)	
BR47-30 Contract Bridge	Crawford County	\$1,100,000	Highway Bridge	2024
Replacement			Program (HBP)	
P7	Carroll County	\$180,000	Highway Bridge	2024
			Program (HBP)	
Jackson 127	Guthrie County	\$400.000	Highway Bridge	2024
		+,	Program (HBP)	
Thompson 71A	Guthrie County	\$1,500,000	Highway Bridge	2024
		+ - , ,	Program (HBP)	
Union 292	Guthrie County	\$500.000	Highway Bridge	2024
	,		Program (HBP)	-
ED-0290	Sac County	\$200.000	Highway Bridge	2024
			Program (HBP)	-
WL-0780	Sac County	\$350,000	Highway Bridge	2024
	,		Program (HBP)	
Sauk Rail Trail Rehabilitation	Sac County	\$250,000	Regional	2024
	Conservation		Transportation	
	Board		Alternatives	
			Program	
N28 Reconstruction	Sac County	\$6,000,000	Surface	2024
			Transportation	
			Block Grant	
			(STBG)	

US30: Over Boyer River	Iowa Department	\$1,665,000	Bridge	2025
	of Transportation		Replacement	
			Fund (BRF)	
US30: Over Storm Creek	Iowa Department	\$2,087,000	Bridge	2025
	of Transportation		Replacement	
			Fund (BRF)	
US71: Over Stream N of F65	Iowa Department	\$1.698.000	Bridge	2025
	of Transportation	<i>+_,</i> ,	Replacement	
	or manoportation		Fund (BRF)	
LISSO: Over E Soldier Piver	Jowa Department	\$807.000	Bridge	2025
	of Transportation	JOJ1,000	Bonlacomont	2025
		6742.000		2025
IA25: Over Brushy Creek	Iowa Department	\$742,000	Bridge	2025
	of Transportation		Replacement	
			Fund (BRF)	
BR 51-21N Contract Bridge	Crawford County	\$650,000	Highway Bridge	2025
Replacement			Program (HBP)	
LE-1504	Sac County	\$600.000	Highway Bridge	2025
		1 /	Program (HBP)	
01/ 2527		ć1 500 000		2025
CV-3527	Sac County	\$1,500,000	Highway Bridge	2025
			Program (HBP)	
US30: Over Boyer River	Iowa Department	\$4,342,000	Bridge	2026
	of Transportation		Replacement	
			Fund (BRF)	
IA39: Over Otter Creek	Iowa Department	\$1,597,000	Bridge	2026
	of Transportation		Replacement	
			Fund (BRF)	
US71: Over Stream N of I80	Iowa Department	\$795,000	Bridge	2026
	of Transportation		Replacement	
			Fund (BRF)	
US30: Over Buttricks Creek	Iowa Department	\$5.000	Bridge	2026
	of Transportation	1 - /	Replacement	
			Fund (BRF)	
0A-8 Bridge Penlacement	Audubon County	\$400.000	Highway Bridge	2026
OA-8 Bridge Replacement	Addubon County	\$400,000	Drogram (HPD)	2020
			Program (HBP)	
J9/Handlos Bridge	Carroll County	\$950,000	Highway Bridge	2026
			Program (HBP)	
12th Street Reconstruction	Carroll	\$2,800,000	Surface	2026
			Transportation	
			Block Grant	
			(STBG)	
Main Street and East Broadway	Denison	\$700,000	Surface	2026
, Rehabilitation		. ,	Transportation	
			Block Grant	
			(STBG)	
151 HMA Overlay South of Charter	Crawford County	<u> </u>	Surface	2026
		ŶŨ,2ĴŬ,ŬŬŬ	Transportation	2020
Uak				
			(SIRG)	

Transit Projects

Project Description	Project Sponsor	Total Project Cost	Funding	Federal Fiscal
			Source(s)	Funding Year
Conversion Van	Region XII COG	\$60,420	Federal	2023
			Aid/Local	
Light Duty Bus (176" wb)	Region XII COG	\$102,000	Federal	2023
			Aid/Local	
Light Duty Bus (176" wb)	Region XII COG	\$102,000	Federal	2023
			Aid/Local	
Light Duty Bus (176" wb)	Region XII COG	\$102,000	Federal	2023
			Aid/Local	
Light Duty Bus (176" wb)	Region XII COG	\$102,000	Federal	2023
		4.00.100	Aid/Local	
Conversion Van	Region XII COG	Ş60,420	Federal	2023
		452,122	Aid/Local	
Conversion Van	Region XII COG	\$60,420	Federal	2023
		464.050	Aid/Local	2024
VSS	Region XII COG	\$64,950	Federal	2024
		¢60,420	AId/Local	2024
Conversion van	Region XII COG	\$60,420	Federal	2024
Conversion Ven		¢c0.420	AId/Local	2024
Conversion van	Region XII COG	\$60,420	Federal	2024
Light Duty Duc (176" wh)	Degion VII COC	¢102.000	Alu/Local	2024
LIGHT DUTY BUS (170 WD)	Region All COG	\$102,000	Aid/Local	2024
Light Duty Rus (176" wh)	Pegion XII COG	\$102,000	Federal	2024
	Region XII COO	\$102,000		2024
VSS	Region XII COG	\$64 950	Federal	2025
100	Region XII COO	ŶŨŦ,550	Aid/Local	2025
Conversion Van	Region XII COG	\$60,420	Federal	2025
		<i>\$66)</i> 120	Aid/Local	2020
Conversion Van	Region XII COG	\$60.420	Federal	2025
		<i>, ,</i>	Aid/Local	
Conversion Van	Region XII COG	\$60,420	Federal	2025
	U U	. ,	Aid/Local	
Light Duty Bus (176" wb)	Region XII COG	\$102,000	Federal	2025
			Aid/Local	
VSS	Region XII COG	\$64,950	Federal	2026
	_		Aid/Local	
VSS	Region XII COG	\$64,950	Federal	2026
			Aid/Local	
VSS	Region XII COG	\$64,950	Federal	2026
			Aid/Local	
VSS	Region XII COG	\$64,950	Federal	2026
			Aid/Local	
VSS	Region XII COG	\$64,950	Federal	2026
			Aid/Local	

Rail Projects

Project Description	Project Sponsor	Total Project Cost	Funding Source(s)	Federal Fiscal Funding Year
Linwood Avenue 190734X	Greene County	\$375,000	Federal Aid/Local	2023

Trail Projects

Project Description	Project Sponsor	Total Project Cost	Funding Source(s)	Federal Fiscal Funding Year
Safe Routes to School Trail	City of Denison	\$400,000	Transportation Alternatives Program (TAP)	2023
Stuart Safe Routes to School	Stuart	\$270,000	Transportation Alternatives Program (TAP)	2023
Wall Lake Trail Connection	Wall Lake	\$250,000	Transportation Alternatives Program (TAP)	2023

Aviation Projects

Project Description R	Project Sponsor	Total Project Cost	Funding	Federal Fiscal
roject Description	r toject sponsor	Total Troject Cost	Source(s)	Funding Year
Apron Major Rehabilitation	Auduban County		Federal and State	
	Audubon County Airport	\$289,000	Air Improvement	2023-2030
			Program/Local	
Taxiway Major Rehabilitation	Audulaan County		Federal and State	
	Audubon County	\$103,000	Air Improvement	2023-2030
	Airport		Program/Local	
Reconstruct Runway 14/32	Audubon County		Federal & State	
		\$2,000,000	Air Improvement	2023-2030
	Airport		Program/Local	
Install approach lighting system	iem	\$170,000	Federal and State	
Runway 13/31	Carroll Airport		Air Improvement	2023-2030
			Program/Local	
	Denison Municipal Airport	\$633,500	Federal and State	
Construct Box Hangar			Air Improvement	2023
			Program/Local	
	Donison		Federal and State	
Extend Taxilane for New Hangar	Demison Municipal Airport	\$147,600	Air Improvement	2023
	Wullicipal All port		Program/Local	
	Cuthria County		Federal and State	
Rehabilitate Runway 18/36	Airport	\$1,600,000	Air Improvement	2023-2030
	Airport		Program/Local	
Taxiway and Apron Rehabilitation	Cuthria County		Federal and State	
	Airport	\$650,000	Air Improvement	2023-2030
	Airport		Program/Local	

Construct Hangar	Jefferson Airport	\$500,000	Federal and State Air Improvement Program/Local	2023-2030
Install AWOS Weather Observing System	Jefferson Airport	\$150,000	Federal and State Air Improvement Program/Local	2023-2030
Install Visual Guidance Slope Indicator	Sac City Municipal Airport	\$120,000	Federal and State Air Improvement Program/Local	2023-2030
Install Precision Approach Path Indicator	Sac City Municipal Airport	\$60,000	Federal and State Air Improvement Program/Local	2023-2030
Construct Hangar	Sac City Municipal Airport	\$700,000	Federal and State Air Improvement Program/Local	2023-2030

The following chart shows the historically STBG and TAP fund investments in the region.



Figure 6.1: STBG and TAP Funding 2012-2023

The following table shows the projected STBG and TAP fund projections for the region through 2050.



Figure 6.2: STBG and TAP Project Investments 2023-2050

The figure below illustrates the forecasted operations and maintenance investment on the Federal Aid System from 2023-2050. This investment was projected using the base year 2023 with a 4% increase annually.



Figure 6.3: Forecasted Operations and Maintenance Expenditures on Federal Aid System

The figure below illustrates the non-Federal Aid Revenue for the road and street system in the region from 2023-2050. This investment was projected using the base year 2023 with a 4% increase annually.



Figure 6.4: Forecasted Non-Federal Aid Revenue

The following figure illustrates the historical operations and maintenance investments on the Federal Aid System in the region from 2012-2023. The investments are calculated from city and county annual reports as submitted and summarized by IDOT.



Figure 6.5: Historical Operations and Maintenance Investments on the Federal Aid System

CHAPTER 25: Long Term Transportation Improvements

The Long Range Transportation Plan includes an investment strategy for long term projects in years 6-26 of the planning period. Investment strategies were developed as part of the input received through the Region XII Transportation Survey, SWOT Analysis and input from County Transportation Stakeholders. Other investments strategies were given considerations bases upon demographic and economic trends and movement of people and goods. Projects undertaken with public funds should occur only after a justification for such expenditure. This justification should be done so that it is appropriate in scope to the project and expenditure, taking into consideration the greater public benefit, findings of this plan, emergency needs, and trends or events not foreseen in the planning process.

Roads

- Continue on-going rehabilitation of existing highways, secondary roads and city streets to improve the condition of the existing transportation system.
- Construct new roadways necessary to promote economic development opportunities to support job creation and value-added manufacturing/processing operations throughout the region.
- Expand major highway corridors in the region to improve traffic flow, traffic safety and more efficiently move goods and people.
- Target investments aimed to reduce fatalities and major injuries.
- Rehabilitate and preserve existing bridge structures.

Transit

- Replace aging public transit vehicles.
- Increase public transit ridership by expanding existing public transit services.
- Maintain and expand public transit facilities.
- Expand commuter vanpool service in the region.

Trail

- Develop trails close to population areas to increase quality of life in communities.
- Construct trails or bike/pedestrian facilities that will increase safety.

Rail

- Improve highway-rail-crossing safety.
- Construct rail spurs to promote economic development and business expansion projects.
- Preserve historic rail facilities in the region.

Aviation

- Maintain airport facilities to provide for quality and safe air service.
- Expand runways and aviation vertical infrastructure facilities.

Waterways

- Support the development and expansion of the water trail network in the region.

CHAPTER 26: Funding the Plan

A combination of federal, state and local dollars fund a wide variety of transportation programs in Iowa. These funding programs pay for a wide array of transportation improvements and operations for all modes. Examples include: highway construction, highway maintenance, aviation, waterways, railroads, trails, and transit activities.

Project Selection

Surface Transportation Block Grant Projects are selected for funding based on roadway condition, traffic volume, percentage of truck traffic, cost per mile, and vehicle miles traveled, safety issues, and economic and community benefit. Regional Transportation Alternatives projects are selected for funding based upon community benefit, economic development impact, sustainability, readiness to proceed and amount of local matching funds. County Transportation Stakeholder Committees review and comment on both regional STBG and Transportation Alternatives applications. These public comments are summarized and utilized by the TAC as part of the project selection process. The Region XII TAC informally selects projects based on the aforementioned criteria.

Bridge projects are submitted by the individual counties and by the IDOT. Each county selects bridge projects for funding based on bridge sufficiency ratings, traffic volume, connectivity and access to property.

Funding Programs

Most federal funds returned to state and local governments come from modal trust funds. These trust funds are made up of a variety of federal user fees. These trust funds include: Highway Trust Fund, Aviation Trust Fund, and the multi-year surface transportation act Fixing America's Surface Transportation Act (FAST Act). Federal General Fund dollars also provide a portion of the funds necessary to adequately fund these trust funds and their programs. Most federal funds are distributed to state and local agencies based on formulas.

State user fees and general fund revenues provide funding for several state and local transportation programs including: Road Use Tax Fund, Farm to Market Fund, TIME-21 and State Transit Assistance and State Recreational Trails program. Many of these funds are allocated to county and city governments and transit agencies based on formulas.

The following provides a description of transportation funding sources available to enhance and maintain the regional transportation network. A listing of public funding sources and application requirements can be found in the Iowa DOT Funding Guide. It should be noted that many of the surface transportation programs will be affected with the implementation of the FAST Act and its successors.
Aviation

Federal Airport Improvement Program (AIP)

Funding for airport improvements and airport planning. Public agencies owning public-use airports in the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems are eligible to request funds.

State Airport Improvement Program

Funding for publicly owned airports in Iowa for airport development, emergency operational repairs and pavement maintenance.

Airport Vertical Infrastructure Program

State funding for publicly owned commercial service and general aviation airports for improvements to vertical infrastructure.

Highways & Bridges

Highway Bridge Program

Federal funding available to agencies with public road jurisdiction for the replacement or rehabilitation of structurally deficient or obsolete public roadway bridges.

Iowa Clean Air Attainment Program (ICAAP)

Funds roadway, transit, or trail projects or programs that help maintain Iowa's clean air quality by reducing transportation related emissions. Eligible roadway projects must be on a federal-aid system, which includes all federal functional class routes except local and rural minor collectors. The State, a county or a city may sponsor as an applicant or may co-sponsor for private, non-profit organizations and individuals.

Surface Transportation Block Grant Program (STBG)

Federal funding for any road or bridge project on the federal aid system (excluding local and minor collectors). Any agency with public road jurisdiction, public transit responsibilities, or transportation planning responsibilities is eligible to apply for STBG funding. Application and approval is handled by Region XII COG (RPA XII).

County and City Bridge Construction Fund

State funds for the replacement or rehabilitation of obsolete or deficient public roadway bridges in cities or counties.

Revitalize Iowa's Sound Economy (RISE)

Funding available to Iowa counties and cities to promote economic development in Iowa through construction or improvements of roads and streets.

Innovative Bridge Research and Deployment Program

Funding for the demonstration and application of innovative material technology in the construction of bridges and other structures.

High Risk Rural Roads (HRRR) Program

Federal funding to Iowa Counties for safety improvements on rural roads (paved roads, classified as rural major, rural minor or rural local roads) with a fatal and major injury crash rate above the statewide average or likely to experience an increase in traffic volume that will lead to a crash rate in excess of the statewide average.

Rail

Local governments typically have little control over any railroads for improvements. Local projects are generally limited to railroad crossing or warning device improvements, projects designed to promote economic development or make improvements to historic rail depots.

State Grade Crossing Surface Repair Fund

Allocates \$900,000 annually from Iowa's Road Use Tax Fund to assist railroads, cities, and counties to repair railroad crossings. The railroads and the responsible roadway jurisdiction each pay 20% of the cost and the program covers the remaining 60%.

State Grade Crossing Safety Program

Assists in railroad crossing signals maintenance through an annual \$700,000 appropriation from Iowa's Road Use Tax Fund.

Federal Railway-Highway Crossing Safety Fund

Offers assistance for improvements to railroad crossings for safety. The program can be used for projects that "install new crossing signal devices, upgrade existing signals, improve crossing surfaces, and provide low-cost improvements, such as increased sight distance, widened crossings, increased signal lens size, or crossing closures."

Railroad Revolving Loan and Grant Program (RRLGP)

Provides funds for projects that promote economic development, job growth, and preservation/improvement of the rail transportation system. The program distributes funds as either loans or grants; however, grants are limited to 50% of the total program funds available.

Railroad Rehabilitation and Improvement Financing (RRIF)

RRIF is a credit assistance program to assist railroads with refinancing, line acquisition, track rehabilitation, or development of new intermodal facilities.

Railroad Rehabilitation and Improvement Financing Program

This program provides direct loans and loan guarantees to acquire, improve or rehabilitate intermodal or rail equipment or facilities; refinance outstanding debt; or develop new intermodal or railroad facilities.

Trails & Enhancements

State Recreational Trails Program

This program provides funds for public recreation trails. State agencies, counties or cities and non-profit organizations are eligible to apply for funding. Sponsors must provide a 25% match, guarantee the maintenance of the trail for 20 years, and projects must be a part of a local, area- wide, regional, or statewide trail plan.

Federal Recreational Trails Program

This program provides funds to maintain motorized and non-motorized trails and trail-related projects. Public agencies, non-profit organizations, and private organizations can request funding through this program; however, private organizations must have a public agency as a co-sponsor. Sponsors must provide a 20% match and guarantee the maintenance of the trail for 20 years.

Federal Transportation Alternatives Program (TA/TAP)

This program aims to provide funds for the enhancement or preservation activities of transportation related projects including trails, bikeways, historical, archeological, safe routes to schools, scenic byways, and environmental. Region XII COG (RPA XII) receives an annual allocation of enhancement funding for regional projects as well.

Iowa Clean Air Attainment Program (ICAAP)

Funds roadway, transit, or trail projects or programs that help maintain Iowa's clean air quality by reducing transportation related emissions. Eligible roadway projects must be on a federal-aid system, which includes all federal functional class routes except local and rural minor collectors. The State, a county, or a city may sponsor as an applicant or may co-sponsor for private, non-profit organizations, and individuals. Transit systems may apply directly.

Iowa DOT/DNR Fund

Any tax-levying body may seek funding for roadside beautification of primary system corridors with woody-type plant materials.

Living Roadway Trust Fund

Implements Integrated Roadside Vegetation Management programs (IRVM) on city, county or state rights of way or areas adjacent to traveled roadways. Individual applicants must have written support from the agency responsible for maintaining the right of way in which the project is proposed. Either the county engineer or the county conservation board must sponsor county projects.

Pedestrian Curb Ramp Construction

This program assist cities in complying with the Americans with Disabilities Act on primary roads.

Transit

State Transit Assistance

Local transit agencies (public or private not-for-profit) may apply for assistance for transit operations, capital improvements, and planning activities.

Capital Grants Program (Section 5309)

Local transit agencies (public or private not for-profit) may apply for assistance for capital improvements, including bus/bus facility replacement or expansions, fixed route modernization and New Starts.

Elderly Individuals and Individuals with Disabilities Program (Section 5310)

This program provides federal funding for support of transit activities in rural and urban areas and to support transit activities providing service to elderly persons and persons with disabilities.

Non-Urbanized Area Formula Program (Section 5311)

This program provides capital and operating assistance for rural and small urban transit systems

Surface Transportation Block Grant Program (STBG)

STP provides flexible spending funding that may be used for transit capital projects.

CHAPTER 27: Future Regional Transportation Planning Activities

The Region XII Long Range Transportation Plan (LRTP) will be updated every 5 years with reviews occurring on an annual basis. Other transportation planning activities that will occur to supplement the Region XII LRTP include an update to the Region XII Public Participation Plan. The Public Participation Plan outlines the public involvement process for transportation planning activities. This plan is dated and needs to be updated to correspond to current practices for gathering public input and participation. The need for a detailed regional trail plan is also real. While several trails exist in the region, currently there is not a coordinated plan to link these trails together, identify regional trail priorities, or provide any funding scenarios. Coordinated passenger transportation planning as part of the Region XII Passenger Transportation Planning process will also continue and seek to improve efficiency in public transit operations.

Plans will be completed by Region XII COG staff members with guidance an input from the Region XII TAC, the Transit Roundtable XII Committee, and the Region XII Bike-Ped Roundtable members. Public participation will be sought as part of all Region XII transportation planning activities and all plans will be approved by the Region XII Policy Council.

The current schedule for consideration of planning documents is as follows:

Plan	Last Update	Next Update	Periodic Review
Long Range Transportation Plan	2023	2028	Annually in May
Public Participation Plan		2023	As needed
Passenger Transportation Plan	2021	2025	Annually in May
Transportation Planning Work Program	2023	2024	N/A
Regional Trails Plan	1995	2025	As needed



Appendix

REGION XII COUNCIL OF GOVERNMENTS | Long Range Transportation Plan Appendix

Area	2016	2017	2018	2019	2020
Audubon	1,954	1,929	1,892	1,898	2,053
Brayton	114	113	111	110	143
Exira	787	780	767	769	787
Gray	59	58	57	57	61
Kimballton	288	282	279	280	291

Audubon County Population by City, 2016-2020

Carroll County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Arcadia	474	487	502	520	525
Breda	477	477	475	476	500
Carroll	9,904	9,880	9,812	9,833	10,321
Coon Rapids	1,264	1,257	1,246	1,232	1,300
Dedham	258	258	258	256	224
Glidden	1,118	1,114	1,103	1,106	1,151
Halbur	246	249	251	256	243
Lanesboro	113	112	109	109	119
Lidderdale	174	173	172	171	166
Manning	1,456	1,431	1,425	1,422	1,455
Ralston	74	74	71	71	76
Templeton	342	338	335	334	352
Willey	100	99	98	98	73

Crawford County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Arion	109	109	109	107	97
Aspinwall	39	39	40	39	33
Buck Grove	42	42	42	41	34
Charter					
Oak	491	489	489	478	535
Deloit	260	260	259	255	250
Denison	8,395	8,395	8,406	8,244	8,373
Dow City	502	504	508	497	485
Kiron	271	271	272	266	267
Manilla	770	764	766	746	775
Ricketts	138	138	138	135	109
Schleswig	875	877	878	857	830
Vail	427	425	426	417	396
Westside	294	295	295	289	285

Area	2016	2017	2018	2019	2020
Churdan	371	369	368	364	365
Dana	69	69	69	68	38
Grand Junction	788	783	784	773	725
Jefferson	4,160	4,146	4,148	4,102	4,182
Paton	231	230	230	230	221
Rippey	279	277	278	273	220
Scranton	534	530	528	524	511

Greene County Population by City, 2016-2020

Guthrie County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Bagley	289	289	288	286	233
Bayard	457	455	455	451	405
Casey	395	393	397	393	368
Guthrie Center	1,506	1,501	1,501	1,494	1,593
Jamaica	217	217	217	218	195
Menlo	346	348	348	347	345
Panora	1,069	1,071	1,071	1,067	1,091
Stuart	951	980	1,001	996	1,059
Yale	238	238	240	239	267

Sac County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Auburn	306	308	306	305	265
Early	524	521	517	515	587
Lake View	1,091	1,086	1,077	1,084	1,113
Lytton	255	255	251	251	242
Nemaha	82	81	81	81	66
Odebolt	957	954	946	943	994
Sac City	2,100	2,093	2,074	2,068	2,063
Schaller	735	734	726	723	729
Wall Lake	766	765	760	769	755

	2016	2018	2020
Audubon	12.7	12.3	12.8
Carroll	35.7	35.4	36.4
Crawford	23.9	23.9	23.11
Greene	15.8	15.7	15.4
Guthrie	17.9	18.1	17.9
Sac	17	16.8	17
Region XII	20.9	20.8	20.8
Iowa	55.7	56	56.7

Persons per Square Mile, 2016, 2018, 2020





















Persons of Hispanic or Latino Origin by County, 2016-2020

Persons of Hispanic or Latino Origin, 2016-2020

Region XII	6476
lowa	215,986

County Park List

- 1. Littlefield Recreation Area, Audubon County near Exira
- 2. T-Bone Recreational Trail-Audubon Trailhead, Audubon County near Audubon
- 3. T-Bone Recreational Trail-Brayton Trailhead, Audubon County near Brayton
- 4. T-Bone Recreational Trail-Exira Trailhead, Audubon County near Exira
- 5. T-Bone Recreational Trail-Hamlin Trailhead, Audubon County near Hamlin
- 6. Bennett Access, Carroll County near Glidden
- 7. Coon Rapids Riverside Park, Carroll County near Coon Rapids
- 8. Daniel Davis Timber, Carroll County near Dedham
- 9. Great Western Park, Carroll County near Manning
- 10. Hazel Brush Wildlife Area, Carroll County near Carroll
- 11. Merritt Access, Carroll County near Glidden
- 12. Richey Access, Carroll County near Ralston
- 13. Adams Landing, Crawford County near Boyer
- 14. Ahart Rudd Natural Resource Area, Crawford County near Dow City
- 15. Andersen Prairie, Crawford County near Manilla
- 16. Arion Access, Crawford County near Arion
- 17. Buck Grove Cemetery Prairie, Crawford County near Dow City
- 18. Crawford County Fairgrounds Public Access, Crawford County near Denison
- 19. Dow House Historical Site, Crawford County near Dow City
- 20. Hanover Wildlife Area, Crawford County near Charter Oak
- 21. King Cemetery, Crawford County near Vail
- 22. Meyer Prairie, Crawford County near Ricketts
- 23. Milwaukee Road Habitat Prairie, Crawford County near Denison
- 24. Nelson Park, Crawford County near Dow City
- 25. Newcom Dale Riggleman Natural Resource Area, Crawford County near Deloit
- 26. Newcom Prairie, Crawford County near Boyer
- 27. Old Catholic Cemetery, Crawford County near Denison
- 28. Otter Creek Nature Area, Crawford County near Deloit
- 29. Thul Woodland, Crawford County near Ricketts
- 30. Vail Cemetery, Crawford County near Vail
- 31. Willow Cemetery, Crawford County near Charter Oak
- 32. Yellow Smoke Park, Crawford County near Denison
- 33. Adkins Bridge Access, Greene County near Jefferson
- 34. Bristol Wildlife Area, Greene County near Jefferson
- 35. Brown Bridge Access, Greene County near Scranton
- 36. Henderson Park, Greene County near Jefferson
- 37. Hobart Wildlife Area, Greene County near Scranton
- 38. Horseshoe Bend Wildlife Area, Greene County near Scranton
- 39. Hyde Park, Greene County near Scranton
- 40. McMahon Access, Greene County near Scranton
- 41. Pound Pits Wildlife Area, Greene County near Grand Junction
- 42. Raccoon River Valley Trail, Greene County near Jefferson
- 43. Rippey Railroad Right-of-Way, Greene County near Rippey
- 44. Scheuerman Prairie, Greene County near Jefferson
- 45. Seven Hills Park, Greene County near Jefferson

- 46. Spring Lake Park, Greene County near Jefferson
- 47. Squirrel Hollow Park, Greene County near Jefferson
- 48. Squirrel Hollow Wildlife Area, Greene County near Jefferson
- 49. Waters Wildlife Area, Greene County near Jefferson
- 50. Willow Wildlife Area, Greene County near Coon Rapids

RESOLUTION APPROVING A LONG-RANGE TRANSPORTATION PLAN FOR RPA 12

WHEREAS, Region XII Council of Governments (COG) is the designated planning entity for Regional Planning Affiliation (RPA) 12 and therefore responsible for managing all aspects of planning for the RPA; and,

WHEREAS, included among the responsibilities of the RPA is the production and approval of a Long-Range Transportation Plan (LRTP), and,

WHEREAS, the COG has undertaken data gathering, conducted public surveys, received advisory committee recommendations, and sought opinions from various constituent groups in the creation of the LRTP, and,

WHEREAS, the COG produced a draft document that has been presented to the public through meetings in each county, made available on the COG's website, promoted through the use of traditional and social media, and finally was the subject of a public hearing.

BE IT RESOLVED by the Region XII COG Policy Council that:

1. The 2022-2050 RPA12 Long-Range Transportation Plan is hereby adopted and shall be submitted to the Iowa Department of Transportation.

PASSED AND APPROVED this 6th day of April, 2023.

Chairman Jøhn N

Rick Thompson, Secretary



Appendix

REGION XII COUNCIL OF GOVERNMENTS | Long Range Transportation Plan Appendix

Area	2016	2017	2018	2019	2020
Audubon	1,954	1,929	1,892	1,898	2,053
Brayton	114	113	111	110	143
Exira	787	780	767	769	787
Gray	59	58	57	57	61
Kimballton	288	282	279	280	291

Audubon County Population by City, 2016-2020

Carroll County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Arcadia	474	487	502	520	525
Breda	477	477	475	476	500
Carroll	9,904	9,880	9,812	9,833	10,321
Coon Rapids	1,264	1,257	1,246	1,232	1,300
Dedham	258	258	258	256	224
Glidden	1,118	1,114	1,103	1,106	1,151
Halbur	246	249	251	256	243
Lanesboro	113	112	109	109	119
Lidderdale	174	173	172	171	166
Manning	1,456	1,431	1,425	1,422	1,455
Ralston	74	74	71	71	76
Templeton	342	338	335	334	352
Willey	100	99	98	98	73

Crawford County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Arion	109	109	109	107	97
Aspinwall	39	39	40	39	33
Buck Grove	42	42	42	41	34
Charter					
Oak	491	489	489	478	535
Deloit	260	260	259	255	250
Denison	8,395	8,395	8,406	8,244	8,373
Dow City	502	504	508	497	485
Kiron	271	271	272	266	267
Manilla	770	764	766	746	775
Ricketts	138	138	138	135	109
Schleswig	875	877	878	857	830
Vail	427	425	426	417	396
Westside	294	295	295	289	285

Area	2016	2017	2018	2019	2020
Churdan	371	369	368	364	365
Dana	69	69	69	68	38
Grand Junction	788	783	784	773	725
Jefferson	4,160	4,146	4,148	4,102	4,182
Paton	231	230	230	230	221
Rippey	279	277	278	273	220
Scranton	534	530	528	524	511

Greene County Population by City, 2016-2020

Guthrie County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Bagley	289	289	288	286	233
Bayard	457	455	455	451	405
Casey	395	393	397	393	368
Guthrie Center	1,506	1,501	1,501	1,494	1,593
Jamaica	217	217	217	218	195
Menlo	346	348	348	347	345
Panora	1,069	1,071	1,071	1,067	1,091
Stuart	951	980	1,001	996	1,059
Yale	238	238	240	239	267

Sac County Population by City, 2016-2020

Area	2016	2017	2018	2019	2020
Auburn	306	308	306	305	265
Early	524	521	517	515	587
Lake View	1,091	1,086	1,077	1,084	1,113
Lytton	255	255	251	251	242
Nemaha	82	81	81	81	66
Odebolt	957	954	946	943	994
Sac City	2,100	2,093	2,074	2,068	2,063
Schaller	735	734	726	723	729
Wall Lake	766	765	760	769	755

	2016	2018	2020
Audubon	12.7	12.3	12.8
Carroll	35.7	35.4	36.4
Crawford	23.9	23.9	23.11
Greene	15.8	15.7	15.4
Guthrie	17.9	18.1	17.9
Sac	17	16.8	17
Region XII	20.9	20.8	20.8
Iowa	55.7	56	56.7

Persons per Square Mile, 2016, 2018, 2020





















Persons of Hispanic or Latino Origin by County, 2016-2020

Persons of Hispanic or Latino Origin, 2016-2020

Region XII	6476
lowa	215,986

County Park List

- 1. Littlefield Recreation Area, Audubon County near Exira
- 2. T-Bone Recreational Trail-Audubon Trailhead, Audubon County near Audubon
- 3. T-Bone Recreational Trail-Brayton Trailhead, Audubon County near Brayton
- 4. T-Bone Recreational Trail-Exira Trailhead, Audubon County near Exira
- 5. T-Bone Recreational Trail-Hamlin Trailhead, Audubon County near Hamlin
- 6. Bennett Access, Carroll County near Glidden
- 7. Coon Rapids Riverside Park, Carroll County near Coon Rapids
- 8. Daniel Davis Timber, Carroll County near Dedham
- 9. Great Western Park, Carroll County near Manning
- 10. Hazel Brush Wildlife Area, Carroll County near Carroll
- 11. Merritt Access, Carroll County near Glidden
- 12. Richey Access, Carroll County near Ralston
- 13. Adams Landing, Crawford County near Boyer
- 14. Ahart Rudd Natural Resource Area, Crawford County near Dow City
- 15. Andersen Prairie, Crawford County near Manilla
- 16. Arion Access, Crawford County near Arion
- 17. Buck Grove Cemetery Prairie, Crawford County near Dow City
- 18. Crawford County Fairgrounds Public Access, Crawford County near Denison
- 19. Dow House Historical Site, Crawford County near Dow City
- 20. Hanover Wildlife Area, Crawford County near Charter Oak
- 21. King Cemetery, Crawford County near Vail
- 22. Meyer Prairie, Crawford County near Ricketts
- 23. Milwaukee Road Habitat Prairie, Crawford County near Denison
- 24. Nelson Park, Crawford County near Dow City
- 25. Newcom Dale Riggleman Natural Resource Area, Crawford County near Deloit
- 26. Newcom Prairie, Crawford County near Boyer
- 27. Old Catholic Cemetery, Crawford County near Denison
- 28. Otter Creek Nature Area, Crawford County near Deloit
- 29. Thul Woodland, Crawford County near Ricketts
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