

## 4. Measuring our system condition

### 4.1 Aviation



Iowa's air transportation system plays a critical role in the economic development of the state and the quality of life for Iowans. Airports are key transportation centers and economic catalysts, moving people and goods quickly and efficiently. With over one million annual aircraft operations conducted at 109 publicly-owned airports, more than 2,600 based aircraft, and 5,600 licensed pilots, the aviation system provides a valuable

transportation mode to meet the needs of businesses, residents, and visitors.

Iowa's commercial service and general aviation airports provide access to the many different types of aviation system users. More than 1.4 million people are boarded (enplanements) on commercial aircraft and nearly 98,000 tons of cargo are shipped from Iowa's eight commercial service airports each year. General aviation users, including agriculture, business, charter, flight instruction, law enforcement, medical transport, and recreational activities, account for nearly one million operations annually.

#### Iowa's airports

Airports in Iowa serve varying types of users and levels of demand. An airport's role in the aviation system depends on the aviation demand and type of facilities and services provided. As such, airports are categorized by one of five roles that are defined by a set of related criteria (see [Figure 4.1](#)). Facility and service targets have been determined for each airport role that will ensure that the system is able to meet the needs of users.

**Commercial service:** Airports that provide regularly-scheduled commercial airline service and have the infrastructure and services to support a full range of general aviation activity. Eight Iowa airports meet these criteria.

**Enhanced Service:** Airports with a 5,000-foot or greater paved runway that have facilities and services to support most general aviation aircraft, including business jets, and have weather observation equipment. Enhanced service airports serve business aviation and are regional transportation centers. Fifteen Iowa airports meet these criteria.

**General Service:** Airports with a 4,000-foot or greater paved runway that have facilities and services to support twin- and single-engine general aviation aircraft, as well as some business jets. General Service airports are important economic assets for their communities. Thirty-one Iowa airports meet these criteria.

**Basic Service:** Airports with a 3,000-foot or greater paved runway that have facilities and services to support single-engine aircraft, as well as some smaller twin-engine aircraft, and provide fuel. Nineteen Iowa airports meet these criteria.

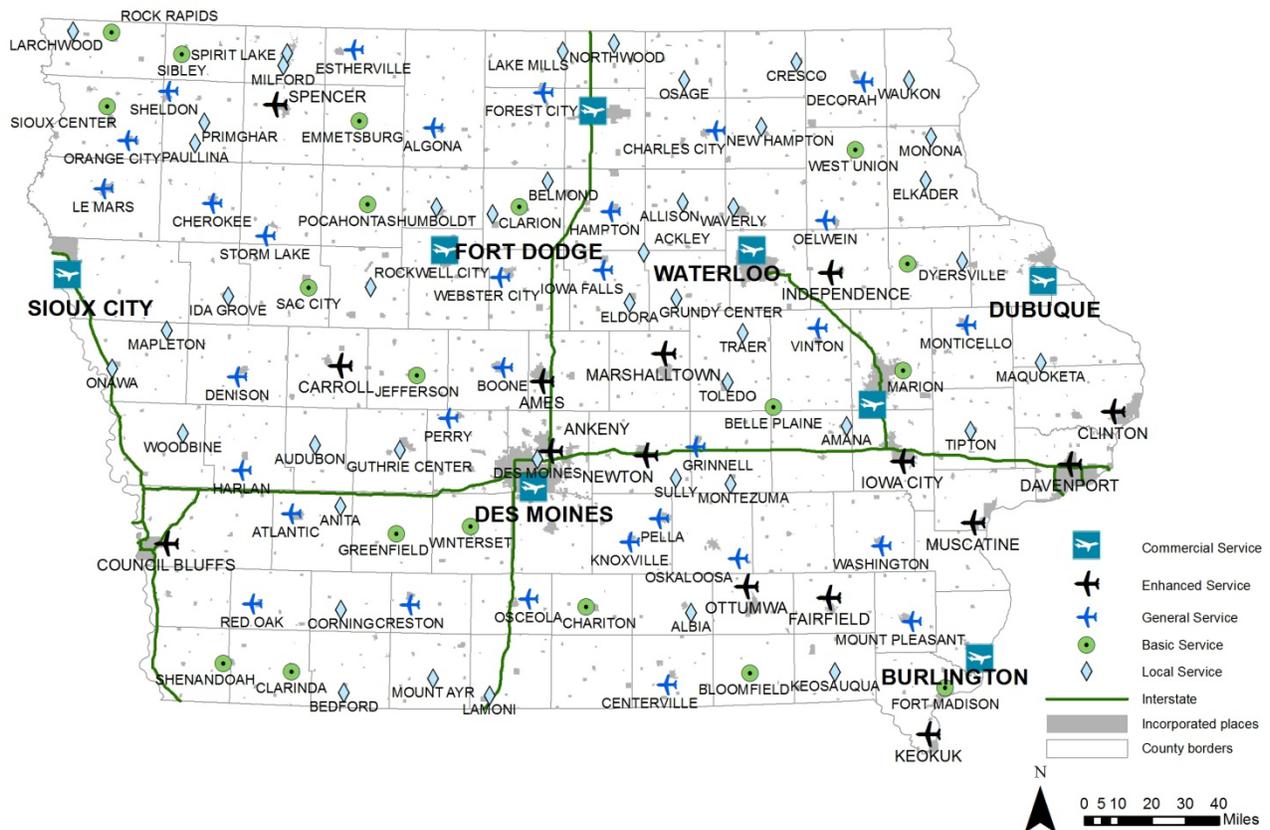
**Local Service:** Airports with runways less than 3,000 feet, many of which are turf runways, and have little or no airport services. Forty-four Iowa airports, which do not meet the criteria for any other roles, fall into this category.

### Impact of aviation on Iowa's economy

In 2009, a study was completed by the Iowa DOT's Office of Aviation that documented the impact of Iowa's aviation system on the state's economy. The 2009 *Uses and Benefits of Aviation in Iowa* report found that aviation supports more than 47,000 jobs statewide and has a \$5.4 billion impact on Iowa's economy. It was estimated that Iowa's aviation system also contributes approximately \$12.8 billion to increased business productivity, and \$214 million to increased agricultural productivity.



Figure 4.1: Iowa Airports by Role



Source: Iowa DOT, Office of Aviation

### Highlights of Iowa's aviation system

Iowa's aviation system plays a key role in moving people and goods both in and out of state. Highlights of this system include:

- Supports our growing economy through current and expanding air freight service in Iowa.
- Is essential to business recruitment and retention for communities and economic development groups.
- Provides essential business and recreational travel needs.
- Supports many vital functions, including emergency response, that improve the quality of life for Iowa's residents.
- Seventy-one percent of Iowa's population lives within 30 minutes of a commercial or enhanced service airport.
- Ninety-nine percent of Iowa's population lives within 120 minutes of a commercial or enhanced service airport.

- Seventy-eight percent of Iowa’s employers are located within 30 minutes of a commercial or enhanced service airport.

### Current trends

In the last decade, the aviation industry has experienced volatility related to security, the economy, the cost of aircraft operation, and changes in aircraft and navigational options. Declines in enplanements and cargo transport reflect the economic downturn and higher fuel costs. The decline in cargo transported by air is also the result of cargo security changes that have limited the volume of freight transported on passenger flights.

Despite these recent trends, forecasts indicate that passenger traffic will experience modest annual increases of three percent during the next 20 years. Over the same period, general aviation activity is expected to increase in both based aircraft and operations. An increase in business aviation will influence the facilities and services needed at airports, and additional enhanced service airports may be needed. Another segment of aviation experiencing growing activity is agricultural aviation. Finally, light sport aircraft is expected to provide a more affordable alternative to the private pilot, both in terms of time needed to acquire a license and cost of aircraft.

Additional trends that will be monitored for potential impacts to the Iowa aviation system include the transition to GPS navigation, the potential change from the use of leaded to non-leaded fuel, the use of unmanned aerial vehicles (UAV), and the influence of sustainability on the aviation industry.

### Aviation system goals and performance

As part of the 2010 Iowa Aviation System Plan (IASP), the Iowa DOT Office of Aviation, with input from the aviation industry, identified six goals for the aviation system that highlight key areas and provide a framework to guide future development and preservation of the system. These goals address the following areas:

- **Safety and security:** Provide a safe and secure system of airports.
- **Infrastructure and user support:** Provide an airport system that meets current and future user needs.
- **Accessibility:** Provide a system of airports that is adequately accessible from both the ground and the air.
- **Economic support:** Support economic development through the airport transportation system.
- **Planning:** Establish local planning to guide the development and operation of airports in Iowa.

- **Education and outreach:** Provide local aviation education opportunities that promote understanding, safety, utilization, and career development.

Objectives for each goal were evaluated to measure how well the system is meeting the established goals. To view this evaluation and other contents of the IASP, please visit:

<http://www.iowadot.gov/aviation/studiesreports/systemplanreports.html>.

### Key Issues

The IASP is a guide for aviation stakeholders to ensure that the aviation system is able to meet the needs of users over the next 20 years. The plan includes recommendations for airport sponsors, the Iowa DOT, and the Federal Aviation Administration that address the following issues:

- Approach obstruction mitigation is needed to improve the percent of primary runways with clear approaches.
- Height zoning is needed to encourage compatible land use around airports.
- Continuation of Aviation Weather Observing Stations maintenance and operation is needed for pilot safety and weather information dissemination.
- Strategic planning is needed for airport sponsors to incorporate business and local concerns in airport planning.
- Increased funding is needed to improve the percent of airports meeting recommended facility targets for their respective role.
- Recommended service targets should be met to provide services adequate to meet user needs.
- Air service changes should be monitored to identify potential impacts to communities in Iowa.
- Continued safety initiatives are needed, including wildlife mitigation, pilot safety programs, pavement marking, and maintenance.



## 4.2 Bicycle and pedestrian

Bicycling and walking are important in the daily lives of Iowans. Bicycle and pedestrian facilities range from urban sidewalks and street crosswalks to specialized multiuse trails designed primarily for recreation. Federal and state legislation have placed an increased focus on bicycling and walking. Iowa has one of the most extensive rural paved highway systems available for bicyclists.



### Iowa's trail vision

Iowa Trails 2000, a plan that has provided a framework for the implementation of trail initiatives throughout the state, proposed a 4,908-mile trail network for Iowa. This network is shown on the Statewide Trails Vision map in [Figure 4.2](#). The mileage in this vision represented a considerable increase over the 3,000 miles set forth in the 1990 plan. In addition, it should be noted that there have been many miles of trails constructed that are not represented on this map.

The Iowa DOT divides the state's trail system into state, regional, and local level trail facilities. This helps to prioritize trail development and other bicycle and pedestrian investment actions in the future.

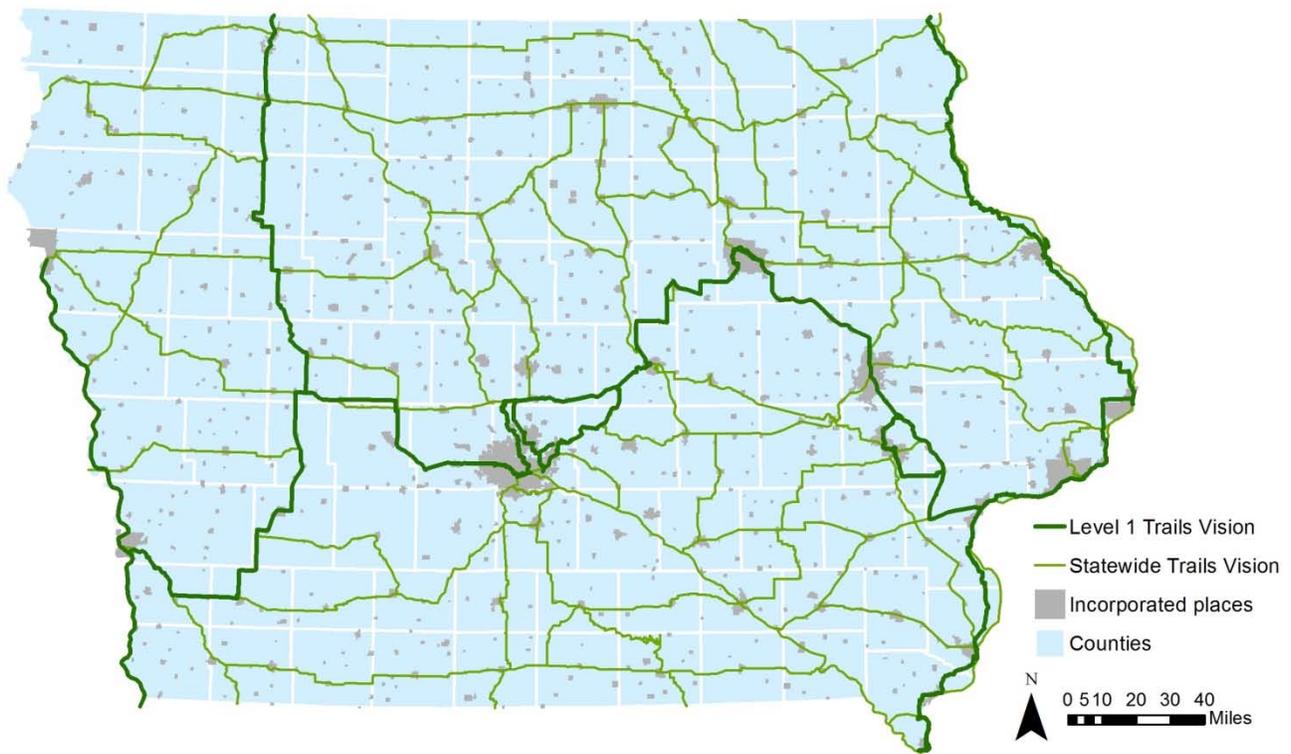
**Level 1 - Trails of Statewide Significance:** These trails, which are a subset of the larger Statewide Trails Vision network, are part of Iowa's primary trail corridor network and are a priority of the Iowa DOT. Completing these trail corridors will result in the expansion and improvement of a statewide network of safe and convenient routes for bicycle transportation and tourism, including access to and through many of the state's urban areas. Iowa's Level 1 trails include:

- American Discovery Trail
- Central Iowa Loop
- Iowa Great Lakes Connection
- Lewis and Clark Trail
- Mississippi River Trail

**Level 2 – Trails of Regional Significance:** Level 2 trails are identified as trails that either connect to a Level 1 trail and are at least 10 miles in length or are part of an existing or programmed trail network of at least 25 miles in length. These trails result in significant economic impacts to the state by providing for longer rides and attracting more out-of-state visitors.

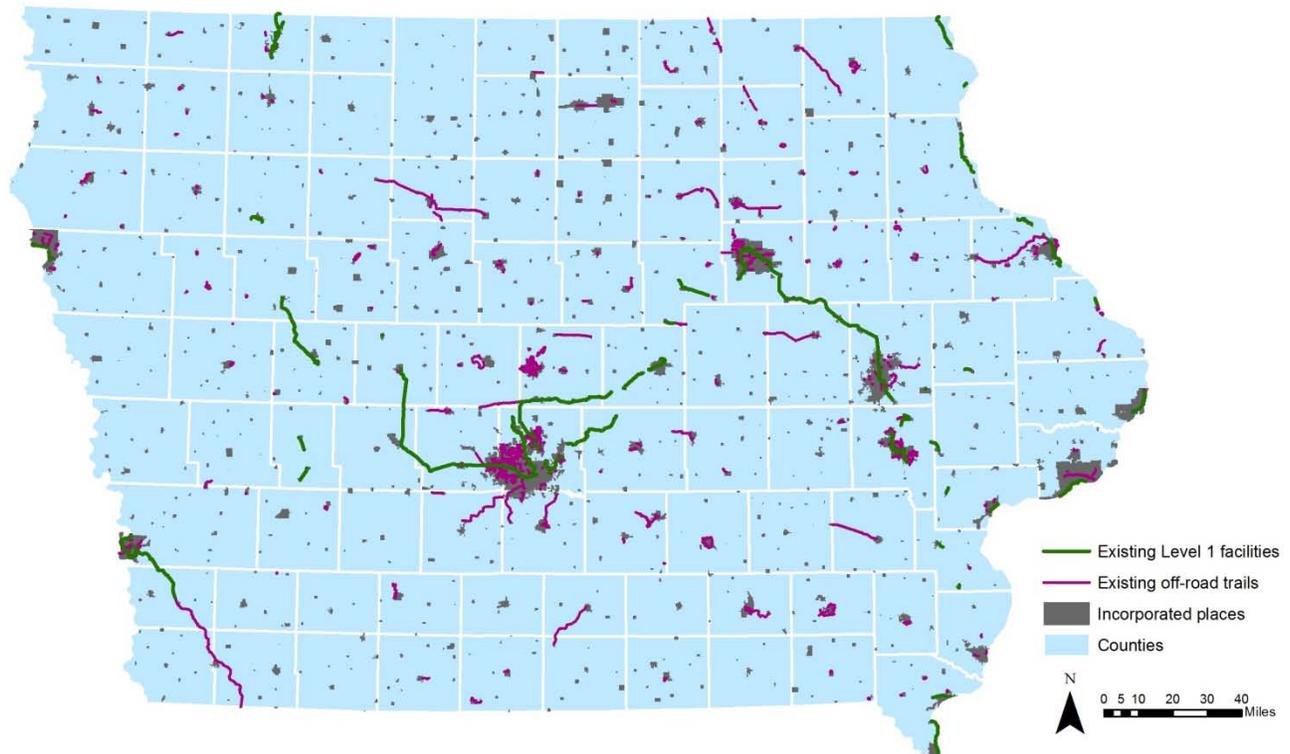
**Level 3 - Trails of Local Significance:** These trails are shorter in length, and are located in communities and counties across Iowa. Level 3 trails typically do not draw visitors from afar, but are very important in providing a better quality of life and improved mobility for many Iowa communities.

**Figure 4.2: Statewide Trails Vision**



Source: Iowa DOT

Figure 4.3: Iowa's existing trail network



Source: Iowa DOT

## Types of facilities

There are currently more than 2,200 miles of bicycle and pedestrian facilities in Iowa. Of this, approximately 1,600 miles are off-road, multi-use trails (see [Figure 4.3](#)). The remaining miles consist of several different types of on-road facilities, such as bicycle lanes, paved shoulders, and widened sidewalks. Existing bicycle and pedestrian facilities in Iowa include:

**Bicycle Lane:** A portion of the roadway that is designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. Bicycle lanes should always be one-way facilities carrying bicycle traffic in the same direction as adjacent motor vehicle traffic, and they should not be placed between parking spaces and the curb. Bicycle lanes offer a channelizing effect on motor vehicles and bicycles.

**Path:** A bikeway and/or walkway that is physically separated from motorized vehicular traffic by an open space or barrier, and either within the highway right-of-way or within an independent right-of-way.

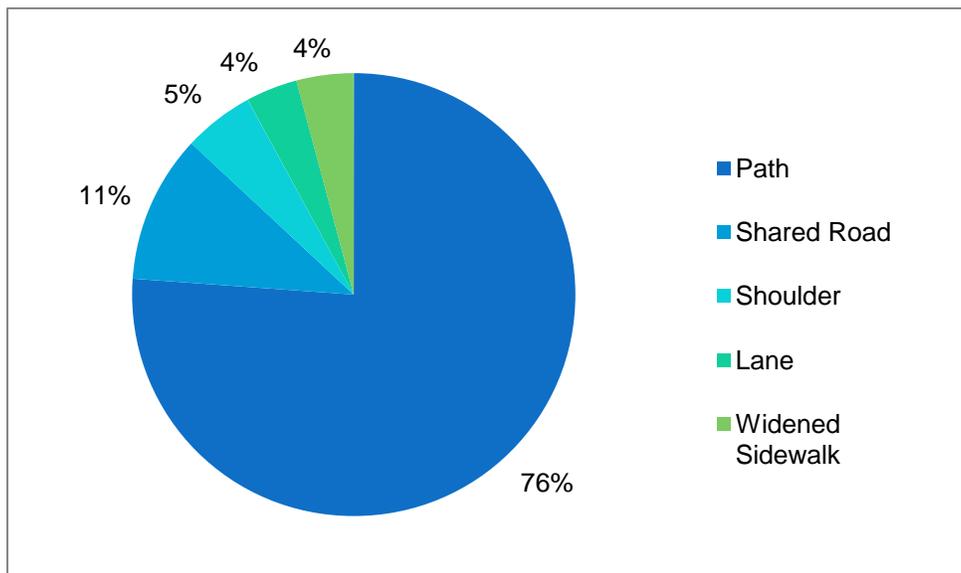
**Sharrow:** Pavement markings that are placed in the roadway lane, indicating that motorists should expect to see and share the road with bicyclists.

**Shoulder:** A paved portion of the roadway to the right of the white edge stripe. Paved shoulders are particularly practical for bicycle accommodation improvements in rural areas. Bicycle traffic on a paved shoulder will typically be one-directional with the flow of traffic; therefore both shoulders will be paved when providing accommodation for bicyclists.

**Sidewalk:** Usually four to five feet wide, sidewalks accommodate pedestrian travel.

**Widened sidewalk:** Accommodates more pedestrian traffic than a traditional sidewalk, and is typically at least six feet wide.

**Figure 4.4:** Iowa Bicycle and Pedestrian Facilities by Type



Source: Iowa DOT

### Impact of bicycle and pedestrian facilities on Iowa's economy

A study was completed in the fall of 2011 by the University of Northern Iowa (UNI) to look at the economic and health impacts of bicycling in Iowa. The report, *Economic and Health Benefits of Bicycling in Iowa*, estimated that commuter cyclist spending generates \$51,965,317 annually in direct and indirect impacts to the State of Iowa, assuming that each commuter spends on average \$1,160 per year on bicycle-related activities. Recreational riders, assumed to spend about \$1,208 per travel party on bicycle-related activities in Iowa, were estimated to generate \$364,864,202 annually in direct and indirect benefits.

Another significant contribution to the state’s economy through bicycling is the Register’s Annual Great Bicycle Ride Across Iowa (RAGBRAI). This weeklong bicycle ride across the state garners international attention every summer, and more than 275,000 riders from all over the world have participated in RAGBRAI since the ride began in 1973. According to the UNI study, total direct spending in Iowa for RAGBRAI is estimated at \$16,908,642 annually.

In addition to attracting tourists, bicycle and pedestrian facilities are increasingly more important to the recruitment and retention of Iowa businesses and their employees. Many communities have found that properties located adjacent to trails often increase in value, generating greater overall revenue for the community. Overall, walking and biking trails improve the quality of life for Iowa’s citizens, providing an essential option for Iowans to get to work, school, and other destinations.

### Highlights of Iowa’s bicycle and pedestrian facilities

- Integration of pedestrian, bicycle, and transit needs with vehicular movements is improving.
- Trail use is increasing.
- Bicycle helmet use is rising.
- Businesses have identified trails as an aid in recruitment.
- Demand for urban sidewalks has increased.
- Rising public attention for healthy lifestyles has caused an increase in bicycling and walking, including children traveling to and from schools.

### Current trends

As trail usage increases, many of Iowa’s communities are seeing increasing economic and social benefits of bicycle and pedestrian facilities. For example, a 1998 survey of users of the Raccoon River Valley Trail in Dallas County identified five positive impacts of the trail: availability of recreational opportunities, a positive image for Dallas County, increased visitation, community pride, and improvements to the local economy.

However, despite rising demand for new bicycle and pedestrian facilities in Iowa, there is limited funding for expansion. Additionally, ongoing maintenance needs on the



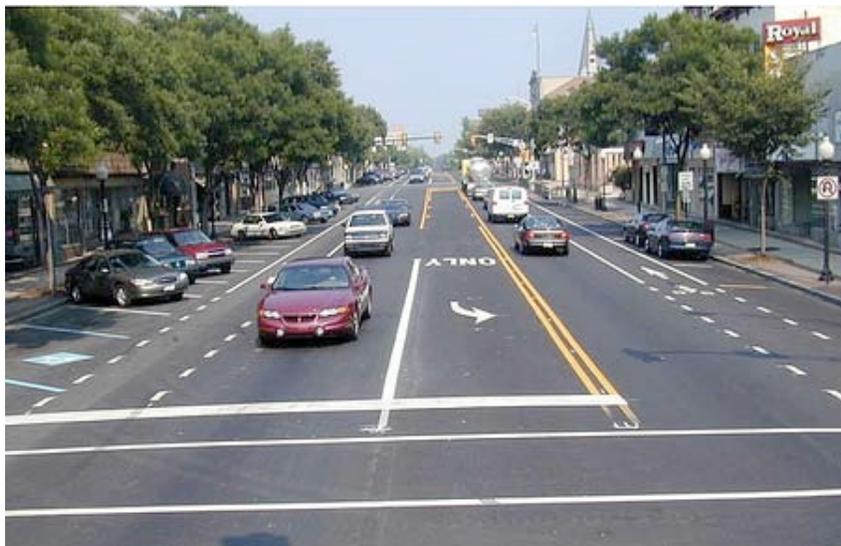
existing system often go unfunded as well. Taking into consideration these constraints, there has been a growing effort to stretch the available funds by coordinating trail projects and creating well-connected trail networks.

In some cities and regions in Iowa, there has been a push to better accommodate more modes of transportation on the existing and future roadway system. These “complete streets,” as defined by the National Complete Streets Coalition, are “designed and operated to enable safe access for all users.” Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities must be able to safely move along and across a complete street. Elements of a complete street may include bicycle lanes, widened sidewalks, special bus lanes, median islands, roundabouts, and more.

In Iowa, Complete Streets policies or resolutions have been adopted in Cascade, Des Moines, Dubuque, Iowa City, Johnson County, and by the Bi-State Regional Commission in the Quad Cities. For bicyclists and pedestrians, these policies help ensure that all road users are considered in the development and redevelopment of Iowa’s roadways. **Figure 4.5** shows an example of a complete street project in Postville, Pennsylvania.

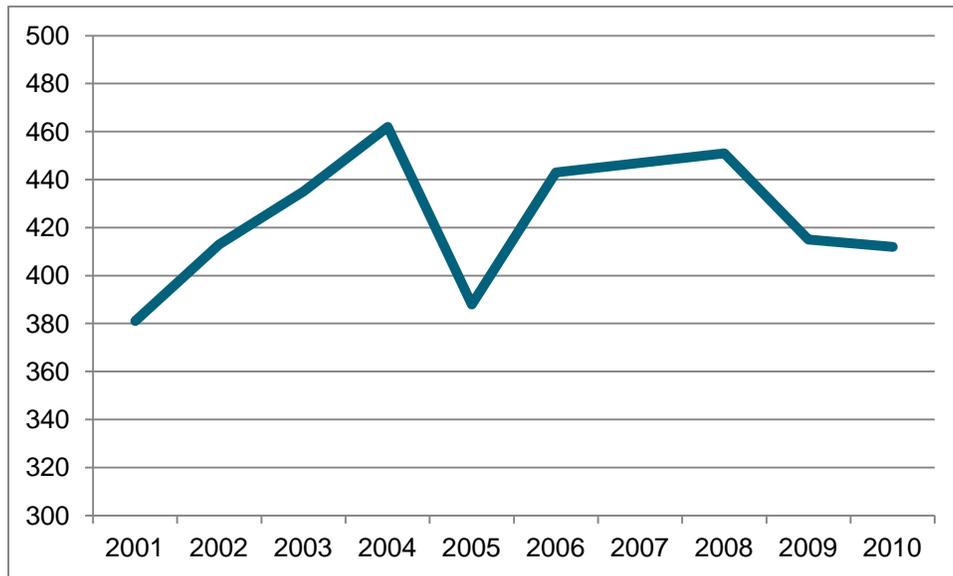
As bicycle and pedestrian travel increases in Iowa, the continuing need to educate all users on proper usage and safety is important. From 2001 to 2010, there were a total of 53 fatalities in Iowa from cyclist-related crashes. **Figure 4.6** charts the total number of cyclist-related crashes on Iowa’s roads from 2001 to 2010.

**Figure 4.5:** Complete Street, Postville, PA



Source: National Complete Streets Coalition

Figure 4.6: Cyclist-Related Crashes in Iowa



Source: Iowa DOT

### Key issues

- Additional funding is needed for system expansion and maintenance.
- Many communities are not bicycle and pedestrian-friendly, which could be addressed through the expansion of Complete Streets policies at the local and state level.
- Infrastructure improvements are needed to address deficiencies and ongoing maintenance problems.
- Bicycle and pedestrian fatalities and injuries are too prevalent.
- Improved coordination and cooperation is needed to better connect Iowa's trail systems.
- The Level 1 trail system is not well-connected in many areas as half of the system remains undeveloped.
- Additional education is needed, including safety programs for bicyclists and pedestrians and training on the health benefits of bicycling and walking.



## 4.3 Highway



Highways are the backbone of Iowa's transportation system and provide service to all areas of the state. Iowa's roadways range from six-lane interstates, four-lane divided facilities, and multi-lane urban streets to paved secondary roads, gravel roads, and municipal streets. Iowa's bridges provide crossings of thousands of streams, rivers, railroads, and trails. These bridges range from ten-foot structures to multi-

span major river crossings. This combination of roadways and bridge structures has created an extremely accessible network that provides a high level of mobility.

### Iowa's highway system

Iowa is uniquely positioned at the crossroads of two major interstate highways: I-80 and I-35. As shown in [Table 4.1](#), the state's public roadway system is comprised of over 114,000 miles with approximately 25,000 bridge structures. While the size of the state's roadway system has not increased considerably in recent years, the infrastructure burden remains significant. As was mentioned in the previous chapter, Iowa ranks fifth nationally in number of bridges and 13<sup>th</sup> in miles of roadway, yet the state ranks just 38<sup>th</sup> in population density according to the 2010 Census.

**Table 4.1: Summary of Iowa Public Roadway System, 2010**

	Mileage	% of Total Mileage	Total VMT (millions)	% of Total VMT	Large Truck VMT (millions)	% of Total Large Truck VMT
Primary	9,400.77	8.2%	19,463	61.6%	2,449	92.2%
Secondary	89,866.00	78.7%	5,296	16.8%	183	6.9%
Municipal	14,886.80	13.0%	6,820	21.6%	23	0.9%
<b>Total</b>	<b>114,153.56</b>		<b>31,579</b>		<b>2,655</b>	

Source: Iowa DOT

According to the Iowa Code, Iowa's primary system (see [Figure 4.7](#)) is defined as "those roads and streets both inside and outside the boundaries of municipalities which are under Iowa DOT jurisdiction."

This system, which makes up 9,400 miles of the 114,000-mile public system, is divided into five classifications according to priority. These include the following:

1. **Interstate:** Comprised of 782 center line miles, the interstate highway system provides connections to the national transportation network and major metropolitan areas.
2. **Commercial and Industrial Network (CIN):** Comprised of 2,391 center line miles, the CIN provides connections for Iowa cities with over 20,000 population to major metropolitan areas, and was identified by the state legislature to enhance opportunities for the development and diversification of the state's economy.
3. Other Primary Highways comprise the remaining 5,712 miles, and include the following routes:
4. **Area Development:** Provide connections for cities with over 5,000 population to the CIN and major commercial and industrial centers.
5. **Access Routes:** Provide connections for cities with over 1,000 population to employment, shopping, health care, and education facilities.
6. **Local Service:** Provide connections for cities with under 1,000 population to local commercial and public service.

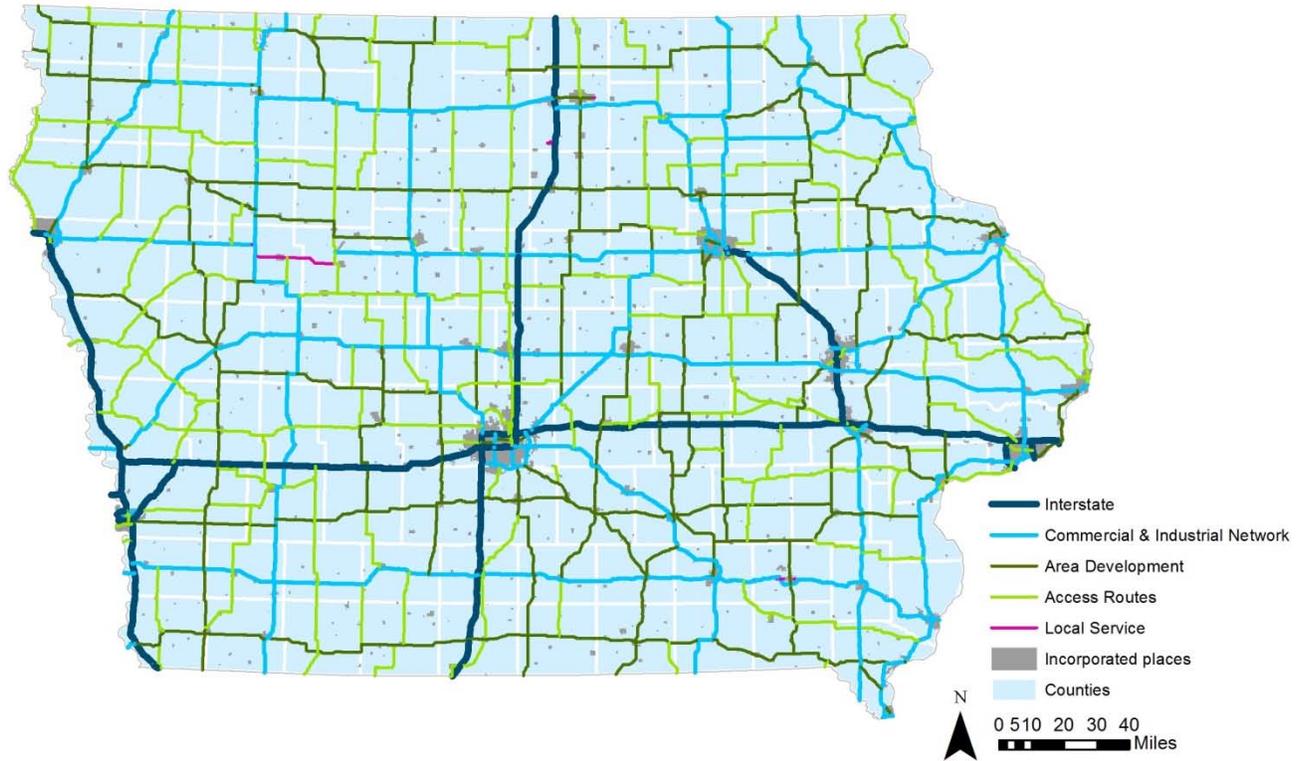
### Impact of highway transportation on Iowa's economy

While it is difficult to assign a dollar figure to the far-reaching economic impacts of Iowa's highway system, the system is clearly the key link in connecting all modes of transportation and is the fuel for the state's economic engine. Construction projects lead to immediate job opportunities for workers representing a wide variety of professions. Businesses and industries locate near the highway network due to the ease of travel for both people and goods, bringing with them new jobs and increased tax revenues. On a regional level, highways can help reduce economic disadvantages by increasing connectivity and transportation efficiency. The highway system also supports the state's growing biofuels and wind energy industries, which are critical to Iowa's economic competitiveness.

### Highlights of Iowa's highway system

- Motor vehicles travel over 30 billion miles on Iowa's public roads each year.
- Moves over 360 million tons of freight annually.
- The weighted average daily traffic on the Interstate Highway System in municipal areas is more than double that in rural areas.
- Includes approximately 216,300 acres of roadside right-of-way that is maintained by the state.
- Iowa DOT maintenance crews plow approximately 24,500 lane miles with each winter storm event, nearly equivalent to one trip around the earth.

Figure 4.7: Iowa's Primary Highways, 2010



Source: Iowa DOT

### Current Trends

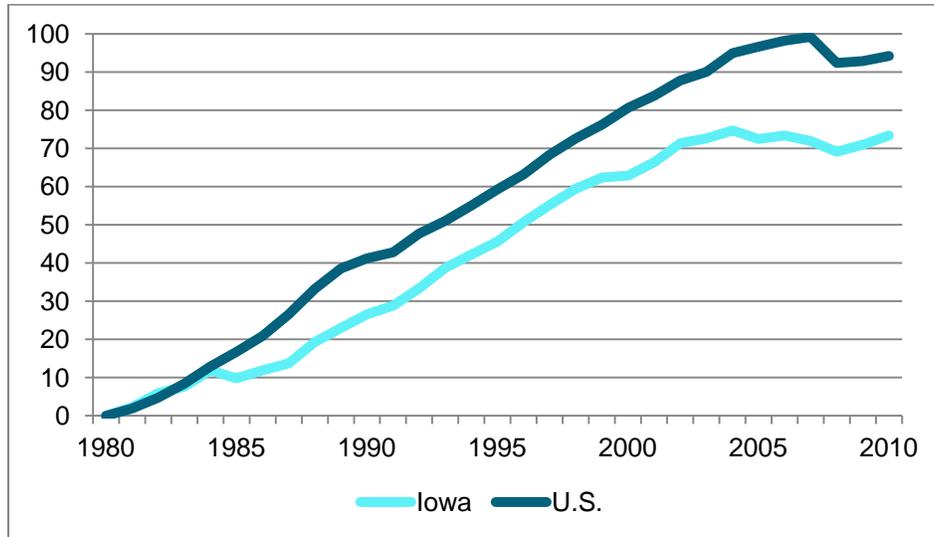
Following some recent declines due to a variety of economic factors, statewide travel is again trending upward (see Figure 4.8). Iowans are commuting longer distances and more goods are moving through the state by truck. While traffic continues to increase, crash statistics have remained relatively steady or declined in most cases.

While safety may be trending in a positive direction, the same cannot be said for the condition of Iowa's public roadway system. Pavement conditions, which are measured using the Pavement Condition Index (PCI), are deteriorating across the primary system (see Figure 4.9), and a significant percentage of this system is rated below the Iowa DOT-established PCI "cutoffs" that represent an acceptable pavement condition (see Figure 4.10).

Approximately one-quarter of Iowa's primary system also fails to meet a sufficiency rating considered tolerable or above. These ratings are derived from Iowa DOT records of traffic, crashes, pavement condition, and pavement geometrics. In addition, the percentage of bridge structures that are

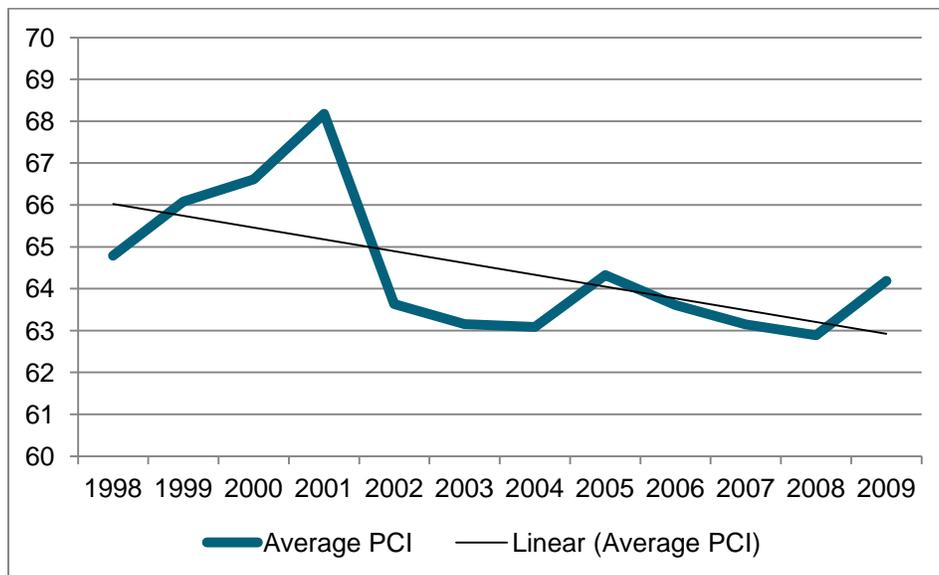
considered structurally deficient is on the rise (see [Figure 4.11](#)). A 2011 report by Transportation for America, *The Fix We're In For: The State of Our Nation's Bridges*, found that Iowa had the third-highest percentage of structurally deficient bridges in the nation at 21.7 percent. If these trends continue, travelers will experience additional congestion, delays, and safety-related hazards that result from increasing traffic volumes on an obsolete system.

**Figure 4.8: Percent Change in Traffic, Base Year 1980**



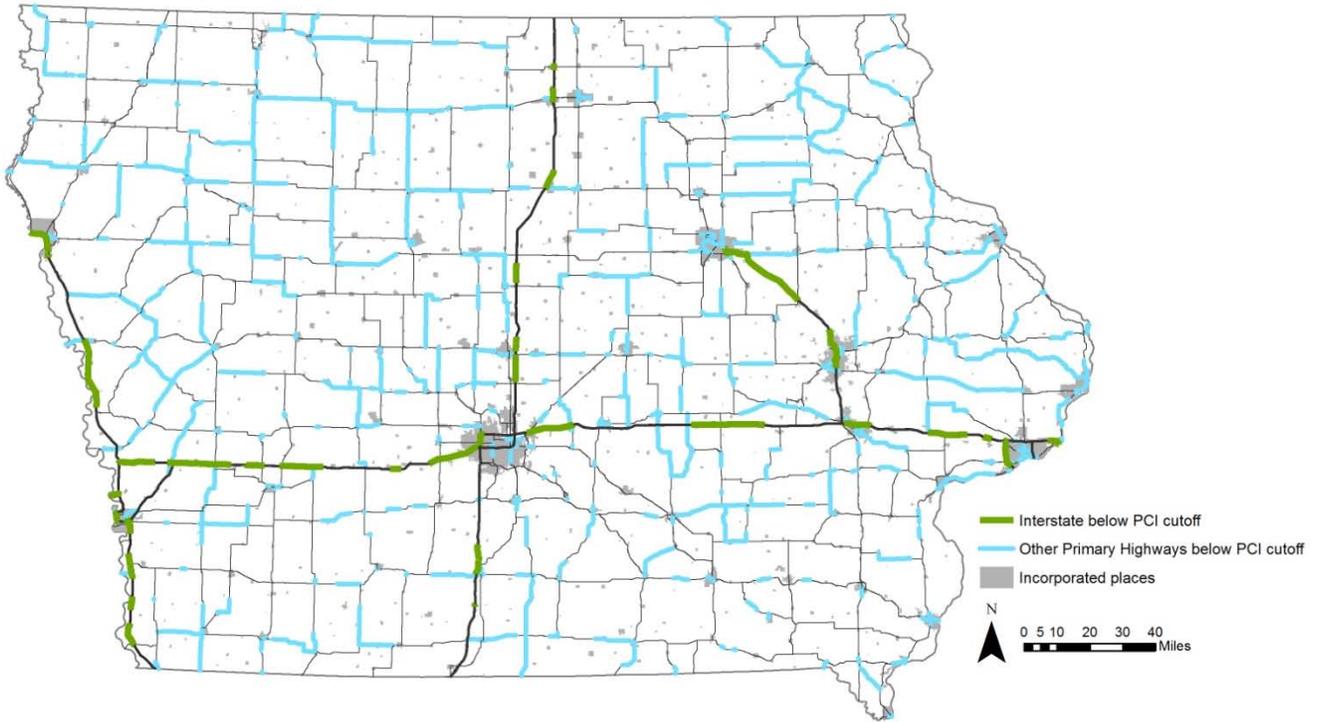
Source: Iowa DOT

**Figure 4.9: Average PCI Rating, Primary System**



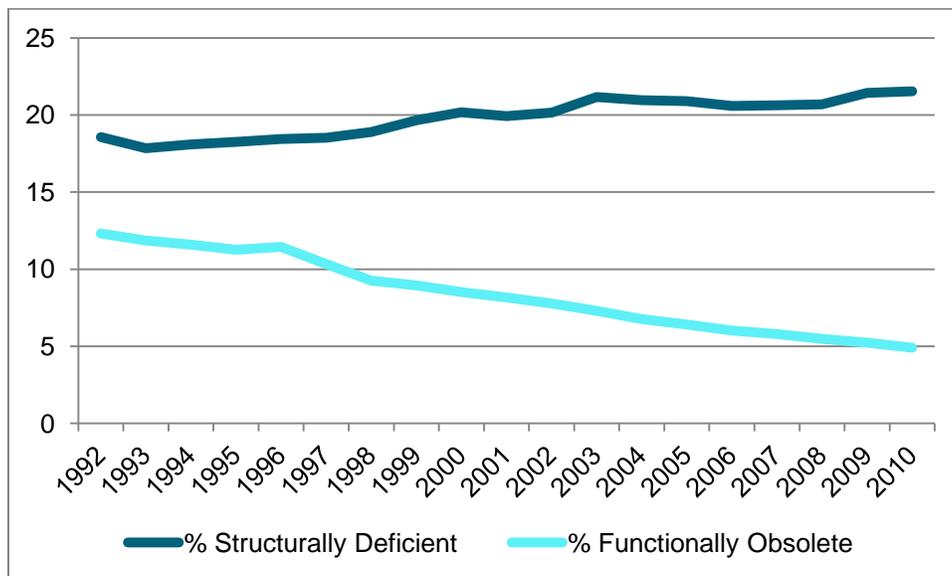
Source: Iowa DOT

Figure 4.10: Primary System Segments Below PCI Cutoff, 2009



Source: Iowa DOT

Figure 4.11: Percent of Bridge Structures Considered Structurally Deficient or Functionally Obsolete



Source: Iowa DOT

### Key issues

- Additional funding is needed to maintain acceptable condition ratings for roadways and bridge structures.
- Many high-cost bridge structures have major deficiencies.
- Urban and commuter route congestion is growing.
- Rural and urban interstate congestion is more prevalent.
- Safety needs exist on the system.
- Additional on-road accommodations are needed for bicycle and pedestrian trips.



## 4.4 Public transit

Iowa's public transit system provides many benefits to its citizens, fulfilling a key alternative transportation role. In general, the transit market in Iowa includes commuters, elderly residents, low-income residents, college students, disabled residents, and youth. However, especially in metropolitan areas, people are increasingly making the choice to ride public transit for economic, practical, or environmental reasons.



### Iowa's public transit services

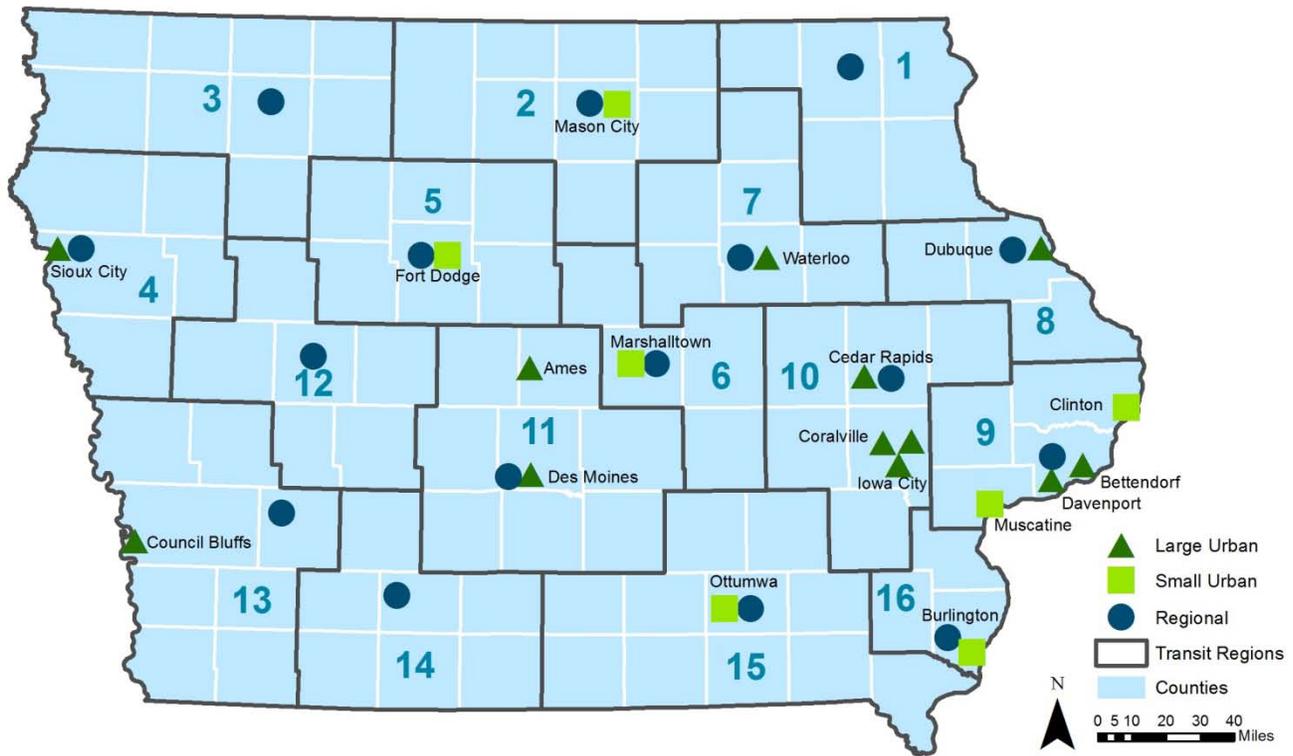
Iowa is served by 12 large urban, seven small urban, 16 regional, and four intercity transportation bus services. Large urban systems provide service for metropolitan areas with a population of 50,000 or greater, and account for approximately 81 percent of total transit ridership in Iowa. Small urban systems are located in communities of 20,000 to 50,000 people. The 16 regional transit systems support all 99 counties in Iowa. The state's transit system also includes vanpools, carpools, bus charter companies, and taxis that allow travel within Iowa between urban areas or regions as well as connections to destinations across the country. A map of Iowa's large urban, small urban, and regional transit systems is shown in [Figure 4.12](#).

### Impact of public transit services on Iowa's economy

Public transit services positively impact Iowa's economy. Transit ridership reduces fuel consumption and demand, as well as costs for passenger, business, and commuter trips. Additionally, public transportation services provide transit-dependent workers with reliable and essential access to employment opportunities.

Availability of public transit services in all 99 Iowa counties also enables the elderly, who are no longer able to drive but in good health otherwise, to remain in their own homes longer. This increases their quality of life and reduces assisted living or nursing home costs.

Figure 4.12: Large Urban, Small Urban, and Regional Transit Systems



Source: Iowa DOT, Office of Public Transit

### Highlights of Iowa’s public transit services

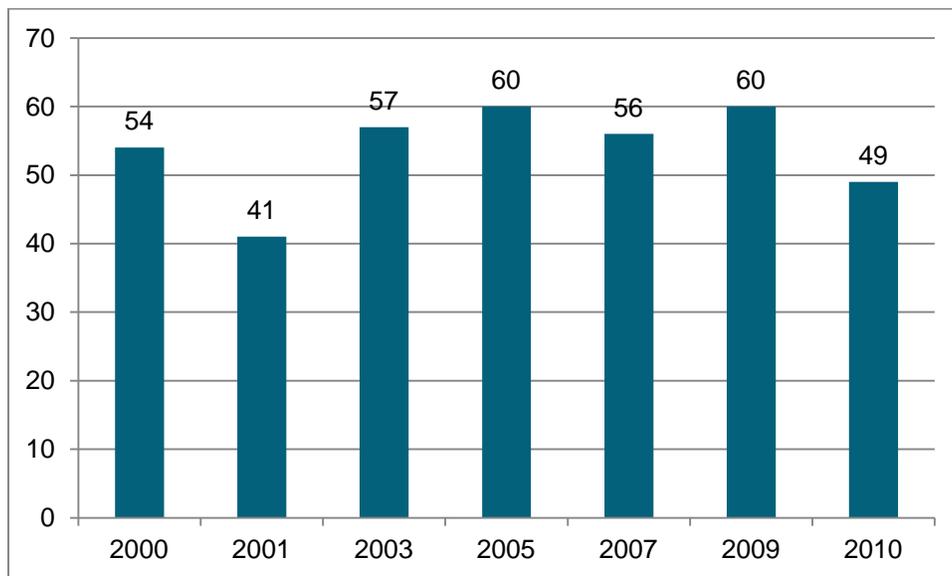
Iowa’s transit systems reduce automobile dependence and have many mobility and quality of life benefits. Some highlights of Iowa’s public transit systems include:

- Serves all 99 counties and 947 cities.
- Vital to the quality of life for all citizens by providing access to community services as well as making communities stronger and more vibrant.
- Provides over 21.2 million rides annually from large urban systems, 3.4 million rides from regional systems, and 1.6 million rides from small urban systems.
- Provides access to work, school, medical, retail, and community resources that utilize connections between modes.
- Allows individuals to maintain independence.
- Provides commuters and others with choice of transportation.

## Current trends

In recent years, operation and maintenance costs for transit services in Iowa have been increasing much faster than revenues. Consequently, it has been difficult to pay for necessary improvements such as facility upgrades, bus replacements, and fleet expansions. Approximately 49 percent of Iowa's public transit vehicles are currently over the age threshold for replacement. That percentage topped 60 percent as recently as 2009 (see [Figure 4.13](#)). The infusion of American Recovery and Reinvestment Act of 2009 funding for bus replacements aided greatly in reducing the fleet age. However, with close to 50 percent of Iowa's buses at or over their replacement age threshold, a great need still remains. According to the National Transit Database, for Reporting Year 2009, Iowa ranked second in the nation for oldest large urban bus fleet with an average age of 10.2 years. Only Nebraska's large urban systems ranked higher with an average bus fleet age of 10.4 years.

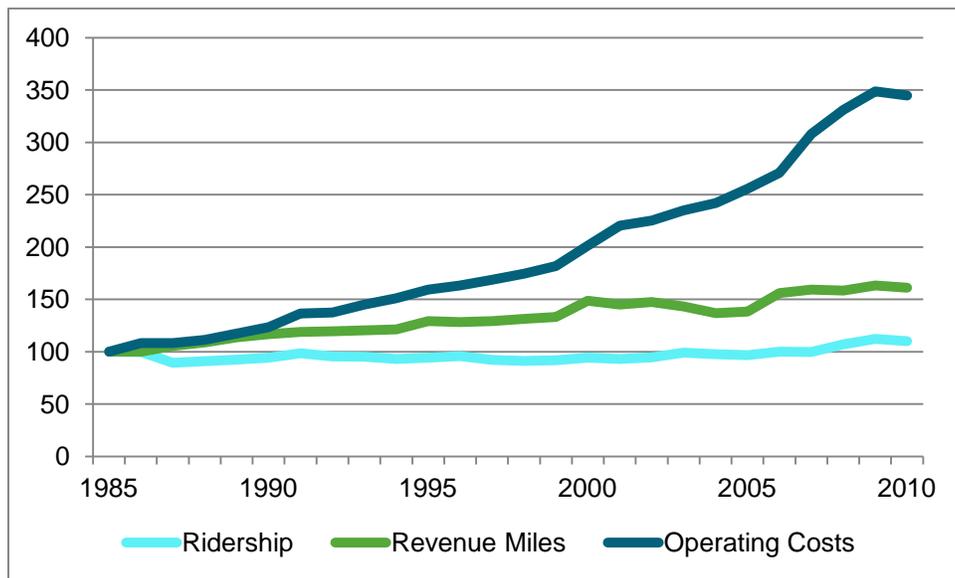
**Figure 4.13: Percentage of Transit Vehicles Over FTA Age Threshold**



Source: Iowa DOT, Office of Public Transit

From 1985 through 2010, transit ridership in Iowa has grown from 23.8 million annual rides to 26.2 million annual rides, with the largest increase in 2008 and 2009 being fueled by the sudden, dramatic increase in gasoline prices. Ridership is likely to increase in the future as Iowa's population base continues to age and as more people embrace environmentally-friendly transportation options. Trends in transit operations are illustrated in [Figure 4.14](#).

Figure 4.14: Trend in Transit Operations Index (1985 = 100)



Source: Iowa DOT, Office of Public Transit

According to the 2009 *Statewide Passenger Transportation Funding Study*, there is currently public demand for additional transit services in Iowa. These service needs include additional off-peak hours, greater frequency between trips, weekend services, expanded service areas, more intercity connections, increased coordination between adjacent transit systems and with human service agencies, consideration of new public transportation modes (rail), and increased marketing and education of passenger transportation services.

According to the study, to close the “baseline” demand gap (by increasing fixed route frequency to 30 minutes, expanding daily fixed-route service to 11 p.m. weekdays, and expanding daily regional demand-response trips by 90 percent), an additional \$125 million per year would be required. To close the “choice” demand gap (by increasing fixed-route frequency to 15 minutes, expanding daily fixed route service to 11 p.m. weekdays, expanding daily regional demand-response trips by 90 percent, and expanding large urban Sunday service to 8 hours a day), an additional \$350 million annually would be needed.

The 2008 *Iowa Statewide Transit Facility Needs Analysis* showed that Iowa’s public transit systems are in need of 186,000 square feet of maintenance space, 14,000 square feet of operations area needs, and 660,000 square feet of indoor vehicle storage space. These facility needs come with a construction cost estimate of \$74.5 million in 2008 dollars.

Other notable trends include increasing coordination between transit providers and health and human service agencies (especially through the Passenger Transportation Planning process), more employment outside of core business hours, increasing awareness of the transportation needs of Iowa's working poor, and a heightened emphasis on security needs.

### Transit system goals

The Iowa DOT Office of Public Transit identified goals specific to the transit system to guide future expansion and preservation of the system. These goals, which align with the system-wide goals identified in Chapter 5 of the Plan, include the following:

- Maintain a statewide fleet not more than 20 percent over its federal useful life.
- Provide indoor storage for all transit vehicles in Iowa.
- Improve safety of transit passengers and drivers through the use of new technologies and a public education process.
- Improve security of transit vehicles and facilities through the use of fencing and surveillance technologies.
- Provide public transit service to all areas and residents of the state a minimum of one day per week.
- Maintain an average cost-per-ride increase of less than 6.0 percent per year over the next 30 years.



## Key Issues

- Additional operational and capital funding is needed.
- The public is generally reluctant to use transit services.
- Transit ridership cost per trip is increasing.
- Seamless transfers are needed between the 35 transit systems and intercity bus service.
- Older buses require more maintenance and repairs.
- More coordination is needed between transit systems, human service organizations, and school districts.
- Expanded transit services, including additional hours and weekend service, are needed.
- Indoor bus parking facilities are needed.



## 4.5 Rail

Railroads are a vital part of Iowa's overall transportation system, helping to move both freight and passengers safely and efficiently. Iowa has an extensive rail transportation system which transports goods throughout Iowa, the United States, and to foreign markets. The ability of rail transportation to haul large volumes of freight in a safe, energy-efficient, and environmentally-sound manner is a major factor in Iowa's economy. In addition to freight rail



transportation, Iowa has two passenger rail routes which stop at a total of six locations daily.

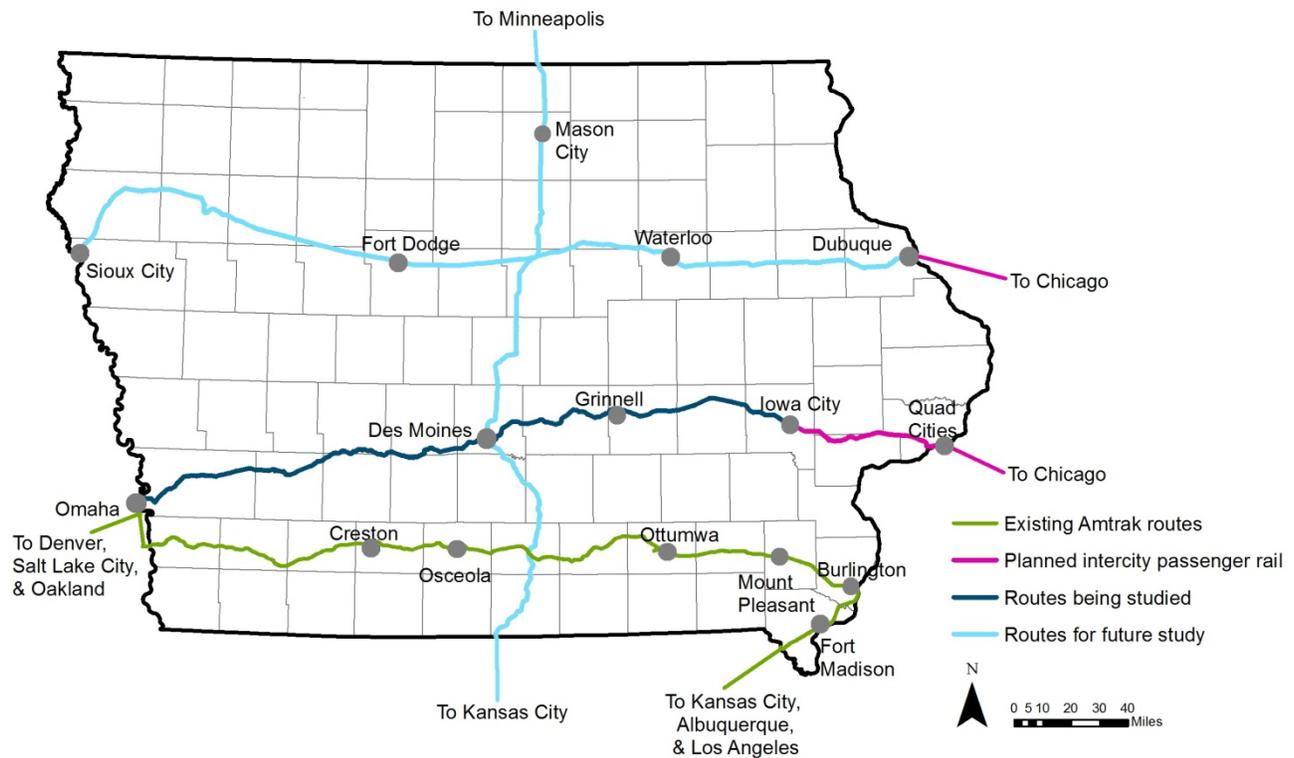
### Iowa's rail system

Iowa's freight rail system, which has shrunk over time due to abandonments, consists of 3,947 miles of track. The network is owned by 18 private, for-profit railroad companies, five of which are major national and international companies operating throughout much of the United States. These companies finance the vast majority of all rail infrastructure maintenance and improvement, providing a significant public benefit with limited public investment. While rail accounts for only three percent of Iowa's 130,000-mile freight system, it carries nearly 13 percent of the state's freight tonnage. Most of Iowa's rail shipments consist of bulk commodities, such as grain, grain products, coal, biofuels, and fertilizers.

Amtrak provides two long-distance passenger rail routes through southern Iowa: the California Zephyr from Chicago, Illinois to Oakland, California and the Southwestern Chief from Chicago, Illinois to Los Angeles, California. Together these two lines provide daily service in each direction with a total of six stops in southern Iowa (see [Figure 4.15](#)). Over the past few years, ridership on these lines has increased slightly with about 60,000 to 70,000 riders in Iowa each year.

While these two lines are a tremendous asset for the state, there is concern that most of Iowa's largest communities do not have convenient passenger rail connections to Chicago, Omaha, Minneapolis, and Kansas City. The Iowa DOT's 10-Year Strategic Passenger Rail Plan envisions a network that provides service connecting Iowans to major cities, regional destinations, and many other communities not typically served by commercial air or current passenger rail. The immediate goal in the first phase of this vision is to achieve passenger rail service from Iowa City (via the Quad Cities) to Chicago, as well as Dubuque to Chicago, with later phases exploring further expansion.

Figure 4.15: Passenger Rail Service in Iowa



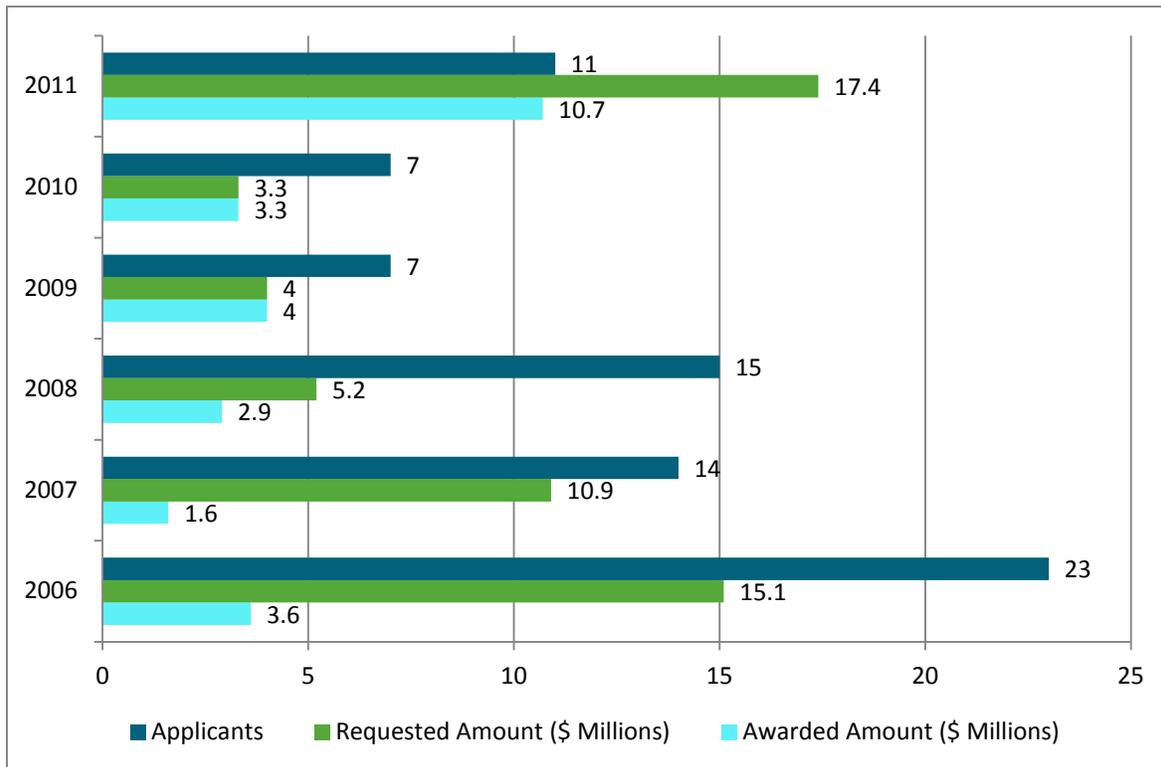
Source: Iowa DOT

### Impact of rail transportation on Iowa's economy

Iowa's rail industry employs over 4,000 workers and accounts for \$277 million in wages and benefits. In 2009, railroad operation in Iowa contributed an estimated \$408 million to Iowa's economy to maintain and improve their rail infrastructure. Without efficient railroad transportation, the state's economy would suffer greatly. Railroads are critical for many of Iowa's freight commodities, including corn, soybeans, chemicals, motor vehicles and other equipment, wood and paper products, minerals and ores, coal, and biofuels. The railroad's ability to haul large volumes over long distances at low costs will continue to be a major factor in moving freight and improving the economy of Iowa.

The Iowa DOT supports economic growth through rail transportation with the Railroad Revolving Loan and Grant Program (RRLGP). The RRLGP (see Figure 4.16) provides assistance to improve rail facilities that will spur economic development and job growth and provide assistance to railroads for the preservation and improvement of the railroad transportation system. Both grants and loans are available and are awarded based on competitive applications.

Figure 4.16: Demand for RRLGP Assistance



Source: Iowa DOT, Office of Rail Transportation

In an economy that is greatly impacted by rising oil prices, passenger rail offers an energy-efficient and cost-effective alternative to automobile and air travel and can connect businesses and individuals in cities across the Midwest. Passenger rail contributes significantly to economic growth and can strengthen a state's manufacturing, service, and tourism industries. Along with economic benefits, passenger rail also provides environmental benefits, including reduced air pollutant emissions, fewer land use requirements, and fewer habitat and water resource disturbances.

### Highlights of Iowa's Rail System

- Iowa's railroads serve 90 of 99 counties and nearly half of Iowa's 947 cities.
- One train can carry the load of approximately 400 trucks.
- Each ton-mile of freight moved by rail rather than highway reduces greenhouse gas emissions by two-thirds or more.
- Railroads move a ton of freight an average of 484 miles for each gallon of fuel consumed – close to four times as far as it could be moved by truck.
- Served by two Amtrak long-distance routes, the California Zephyr and the Southwest Chief.

### Current trends

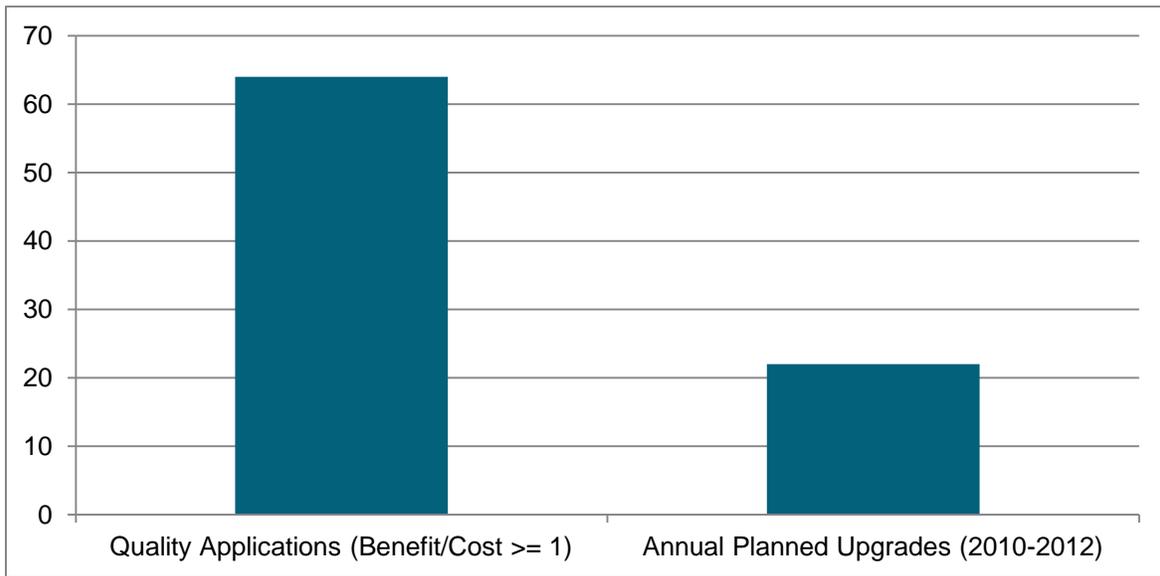
Recent growth in freight demand has impacted rail service and equipment needs, yet a variety of issues, including financial constraints, have limited the ability to expand capacity. Manufacturers of other commodities, including wind turbines, are looking to locate along rail lines in Iowa. These developments may also result in increased freight traffic in some parts of Iowa and may lead to changes in the infrastructure needed. As a result of this growing demand and changes in the rail freight industry, rail cars are growing in size and trains are getting longer. Improvements are necessary to meet these capacity needs as nearly 20 percent of Iowa's rail miles are not able to carry the industry-standard 286,000-pound cars.

Safety on Iowa's railroad system appears to be improving as the state is seeing fewer train derailments and highway-railroad grade crossing crashes, despite growth in both rail and highway traffic. However, although Iowa continues to improve its highway railroad crossings, the number of crossings funded for safety and surface improvements each year lags far behind the number of crossing improvement applications (see [Figures 4.17 and 4.18](#)).

Effective August 27, 2010, Iowa was one of ten states that were required by the Federal Railroad Administration to write a five-year highway/rail grade crossing safety action plan. This plan must focus on crossings with multiple crashes or those that are "at risk" and identify specific solutions, including closure and consolidation of at-grade crossings. The Iowa DOT anticipates approval of this plan within the one-year deadline with an implementation period between calendar years 2012 and 2016.

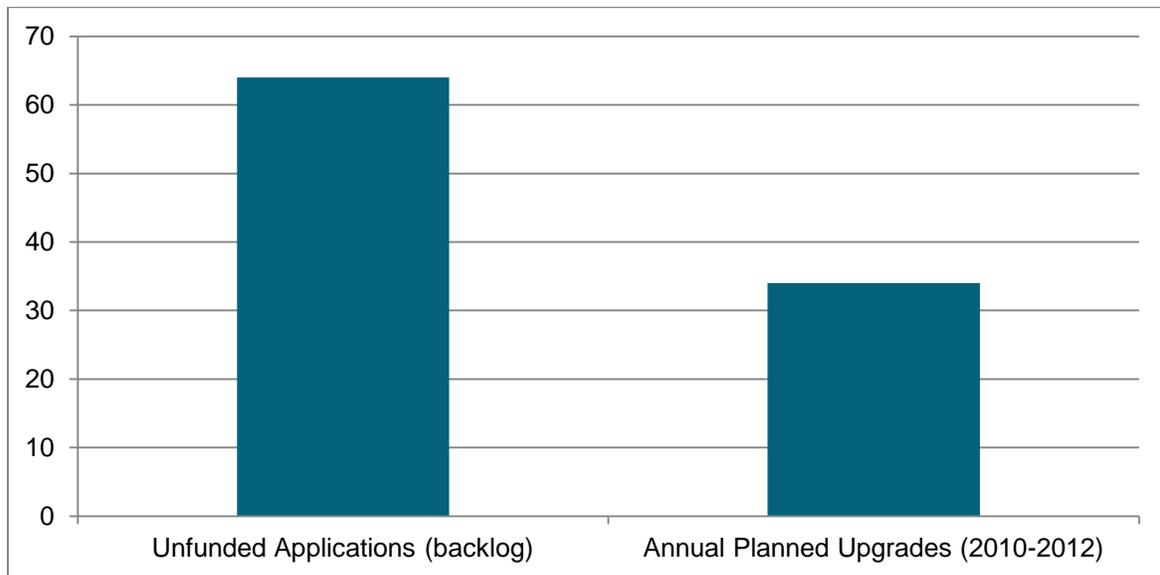


Figure 4.17: Crossing Safety Program



Source: Iowa DOT, Office of Rail Transportation

Figure 4.18: Crossing Surface Program



Source: Iowa DOT, Office of Rail Transportation

## Key issues

- Additional funding is needed to support necessary capital expenditures.
- Additional rail capacity is needed to meet future demand.
- Additional rail spurs are needed to accommodate businesses and industries wanting to locate or expand in Iowa.
- Safety concerns related to rail infrastructure and highway-railroad crossings persist.
- Rail passenger service is limited, with no service to Iowa's larger population centers.
- Growing highway and rail traffic is increasing delays and conflicts.
- Branch line improvements are needed to handle heavier rail cars.



## 4.6 Water

Iowa's waterway system plays a key role in moving grain and bulk commodities to and from Iowa. This system provides Iowans a gateway to an extensive inland-waterway network that has access to international ports. While the Iowa DOT does not directly invest in this system, the department does have an advisory role with representation on the Upper Mississippi River Basin Association and the Missouri River Association of States and Tribes.



The U.S. Army Corps of Engineers maintains and improves the rivers as well as the locks and dams which allow safe and secure navigation for freight movement and recreational activities. To achieve a 9-foot channel in the upper Mississippi River, the construction of a system of navigation locks and dams was authorized in 1930. Dams are built on rivers to hold back water and form deeper navigation pools, allowing river vessels to use a series of locks to 'step' up or down the river from one water level to another.

Water transport fills an important role in freight movement as it has the ability to carry the most weight while offering the lowest shipping cost per ton of commodity. Although they rely on truck and rail to deliver goods, private barge terminals on the Mississippi and Missouri Rivers are a key part of grain and commodity movement for products moving into and out of Iowa. The Iowa DOT maintains a River Barge Terminal Directory which contains key information about these private terminals. The directory can be accessed at the following web address: <http://www.iowadot.gov/barge.htm>.

### Impact of waterway systems on Iowa's economy

The Mississippi River and Missouri River waterway systems create a substantial impact on Iowa's economy. Some of the areas that are impacted by or directly related to these waterways include commercial navigation, recreation, tourism, energy production, commodity transfer, manufacturing, and mineral resources. In 2009, nearly 11 million tons of commodities (mostly grain, coal, and fertilizer) moved to, from, and within Iowa by water. Grain comprised the largest quantity of this tonnage, followed by coal.

Iowa borders 312 miles of the upper Mississippi River. This area is a vital segment of the Inland Waterway System, providing an economic transportation link from the upper Midwest to the lower Mississippi Valley and the Gulf of Mexico. An economic profile study for the Upper Mississippi River system illustrated this impact, concluding that this river system contributes \$145 billion in revenue to businesses in the corridor, with approximately 870,000 jobs associated with this economic activity. Iowa counties account for much of this corridor, which runs from Minneapolis/St. Paul, Minnesota to the southern points of Missouri and Illinois.

### Highlights of Iowa's waterway system

- Iowa is the only state in the nation bordered by two navigable rivers, the Mississippi and Missouri.
- All but one of the main locks located along Iowa's Mississippi River border have a 110-foot by 600-foot chamber (see [Table 4.2](#)). A 15-barge tow must double-lock, which takes about 90 minutes.
- The 1200-foot lock at Keokuk can accommodate an entire barge tow, which significantly reduces the locking time.
- Keokuk is the northernmost port on the Mississippi River that is open to barge traffic throughout the winter.
- One barge carries the equivalent of 13.4 jumbo train hopper cars or 58 large semi-trucks.
- Water transport is more energy-efficient than both rail and truck movements.

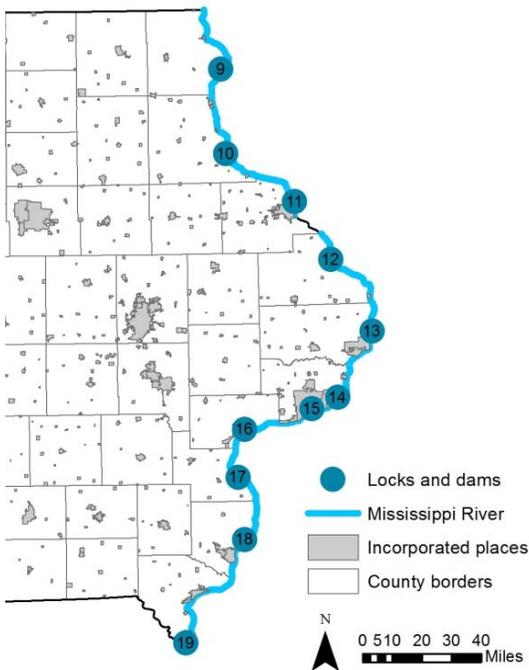


Table 4.2: Iowa Mississippi River Locks Summary

Lock	Location	Chamber	River/ Mile	Year Open	Length (feet)	Width (feet)	Owner/ Operator	Gatetype
19	Keokuk, IA	MAIN	364.3	1957	1200	110	Corps	Vertical
18	Gladstone, IL	MAIN	410.5	1937	600	110	Corps	Miter
17	New Boston, IL	MAIN	437.1	1939	600	110	Corps	Miter
16	Muscatine, IA	MAIN	457.2	1937	600	110	Corps	Miter
15	Rock Island, IL	MAIN	482.9	1934	600	110	Corps	Miter
15	Rock Island, IL	AUX 1	482.9	1934	360	110	Corps	Miter
14	LeClaire, IA	AUX 1	493	1939	320	80	Corps	Miter
14	LeClaire, IA	MAIN	493	1922	600	110	Corps	Miter
13	Clinton, IA	MAIN	522.5	1938	600	110	Corps	Miter
12	Bellevue, IA	MAIN	556.7	1939	600	110	Corps	Miter
11	Dubuque, IA	MAIN	583	1937	600	110	Corps	Miter
10	Guttenberg, IA	MAIN	615.1	1936	600	110	Corps	Miter
9	Harpers Ferry, IA	MAIN	647.9	1938	600	110	Corps	Miter

Source: Iowa DOT

Figure 4.19: Lock and dam locations

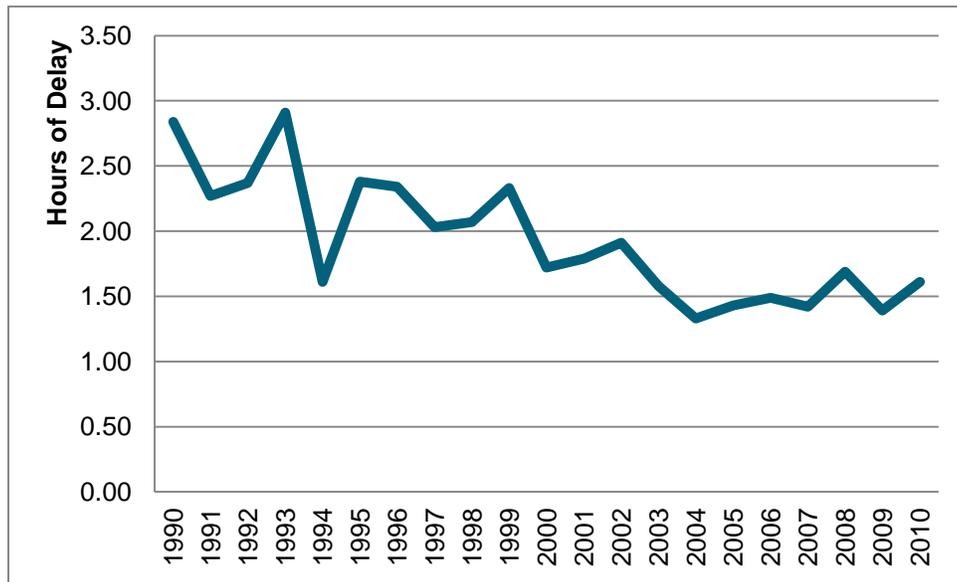


Source: Iowa DOT

### Current trends

Iowa’s locks and dams continue to get older. With most of the Mississippi River locks along Iowa’s border having been constructed in the late 1930s, most of these structures have surpassed 70 years of age. The average delay at the locks along Iowa’s border is approximately 1.5 hours (see Figure 4.20) and demand for shipping on the Mississippi River has remained stable. While demand on the Mississippi River has held strong, the Missouri River has experienced a continual drop in freight tonnages.

Figure 4.20: Average Delays for Iowa Mississippi River Locks



Source: Iowa DOT

**Key Issues**

- Capacity improvements are needed on the Mississippi River.
- Flows on the Missouri River are limited in their ability to enable freight movements.
- Additional funding is needed.



## 4.7 Intermodalism

According to 23 CFR 450.214(a), “The long-range statewide transportation plan shall consider and include, as applicable, elements **and connections between** public transportation, non-motorized modes, rail, commercial motor vehicle, waterway, and aviation facilities...” The connections referred to in this regulation are the basis for intermodalism.

The terms ‘intermodal’ and ‘multimodal’ are often used interchangeably, yet they can have entirely different meanings. The previous sections in this chapter have highlighted the multimodal aspects of Iowa’s transportation system. The focus has been on the different modal options that could be utilized to move people or goods from one place to another. Intermodalism, however, focuses on how two or more of these modes can connect at what typically amounts to a transfer point. To put it another way, multimodal options provide the links in the transportation system, while intermodal connections are the nodes.

The Iowa DOT understands the importance of these connections, specifically as they relate to each of the goals identified in the Plan, and supports a number of funding options that can be used to finance intermodal projects. **Figure 4.21** on the following page highlights some examples of intermodal facilities commonly found in the state of Iowa.



Figure 4.21: Intermodal Facilities

