

4. RAIL PLANNING CONSIDERATIONS





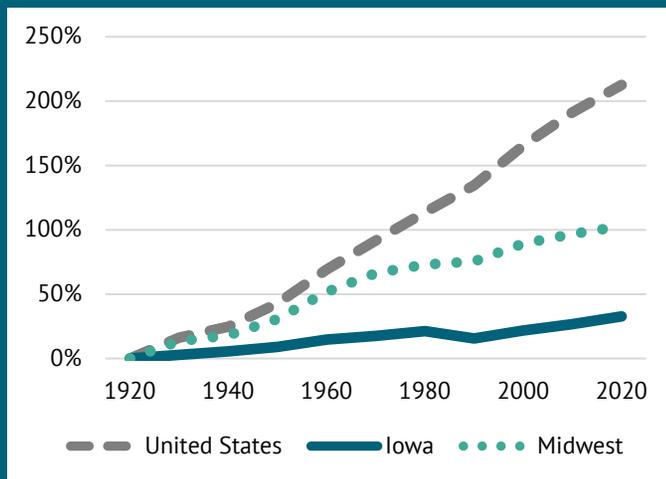
4.1 Trends and Forecasts

Demographic and Economic Trends

Iowa's population is growing at a slow pace

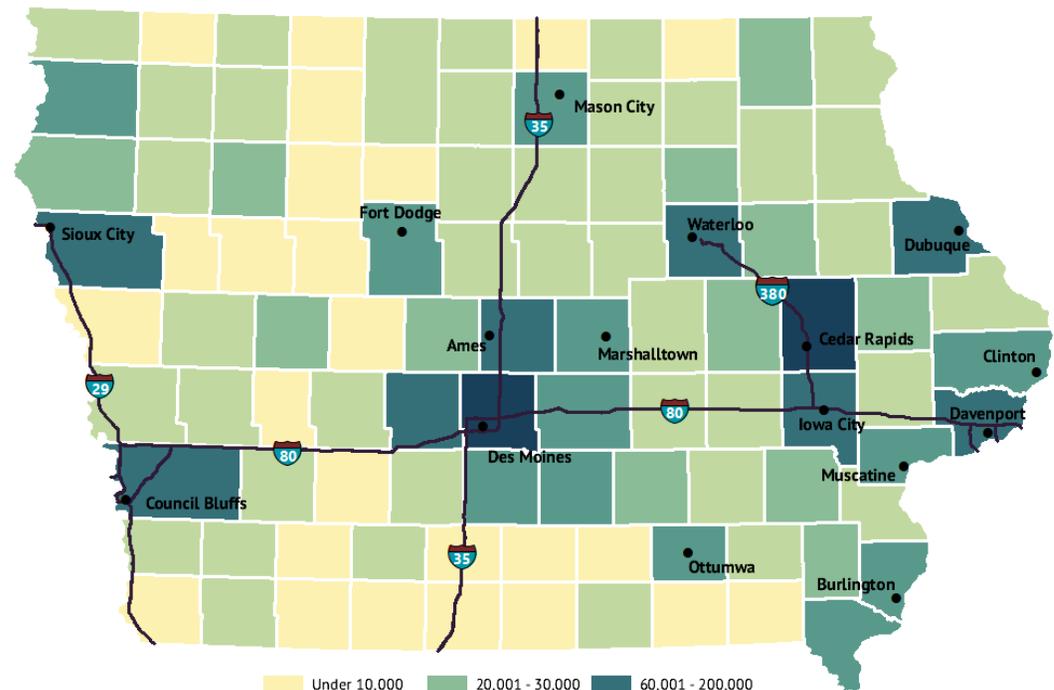
Iowa's population continues to slowly grow over time. Iowa's population growth rate is lower than that of other states in the Midwest and the United States overall, as shown in Figure 4.1. Almost a third of the state's population lives in the larger metropolitan areas, as shown in Figure 4.2. A growing population will require more transportation options such as passenger rail and access to goods that in turn must be moved on Iowa highways or rail lines.

Figure 4.1: Population growth indexed to 1920



Source: U.S. Census Bureau Decennial Censuses

Figure 4.2: Iowa's population by county, 2020



Legend for Figure 4.2: Population by county, 2020

- Under 10,000 (Yellow)
- 10,001 - 20,000 (Light Green)
- 20,001 - 30,000 (Medium Green)
- 30,001 - 60,000 (Dark Green)
- 60,001 - 200,000 (Medium Blue)
- 200,001 - 500,000 (Darkest Blue)

Source: U.S. Census Bureau Decennial Census

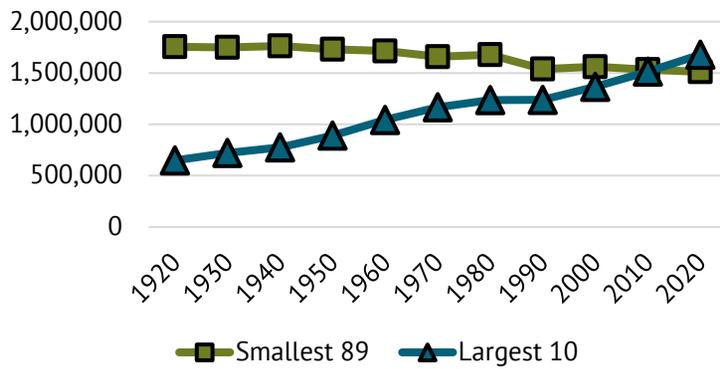
IOWA'S POPULATION

Year	Population
1990	2.8 MILLION
2020	3.2 MILLION
2050	3.4 MILLION

Iowa's urban population is growing

While the population of the state continues to grow steadily, the rate of growth is not felt uniformly. From 1990-2020, Iowa's overall population grew, but almost two thirds of Iowa counties lost population. Furthermore, as of 2011, more Iowans lived in the largest ten counties than the rest of the state for the first time in the state's history, as shown in Figure 4.3. This trend is expected to continue, further concentrating Iowa's population in cities and urban areas. Concentrated urban populations could benefit from increased passenger rail service.

Figure 4.3: Population difference between Iowa's ten largest counties and the other 89 counties



Source: U.S. Census Bureau Decennial Censuses

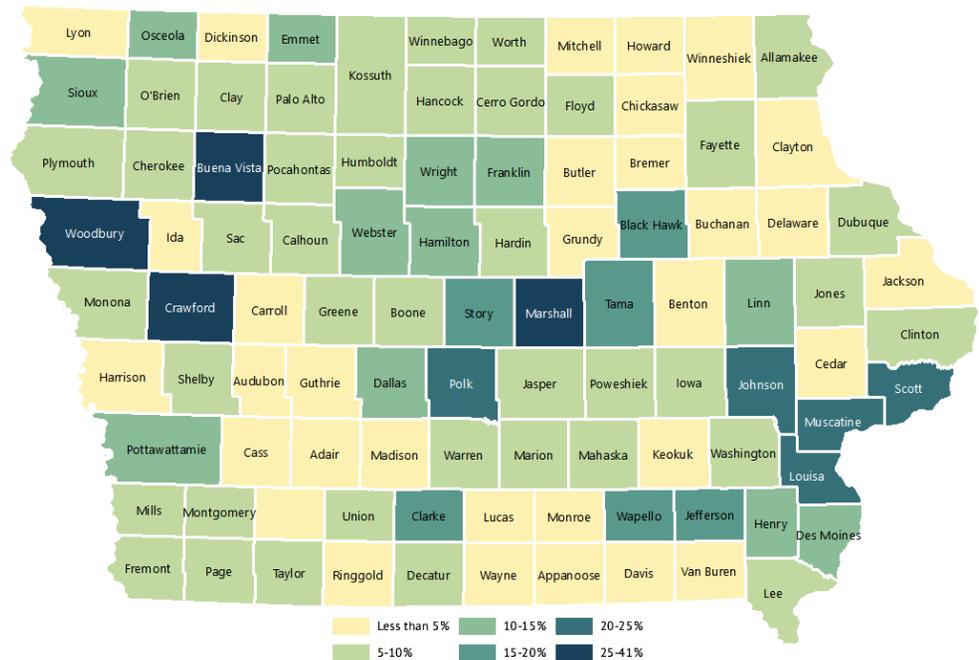
Iowa's ten largest counties by population

1. Polk
2. Linn
3. Scott
4. Johnson
5. Black Hawk
6. Woodbury
7. Dallas
8. Dubuque
9. Story
10. Pottawattamie

Iowa is becoming more diverse

Iowa continues to grow more diverse with increasing numbers of minority individuals choosing to live in the state. In 2020, 17% of the population was non-White race and/or Hispanic or Latino. By 2050, over one in four Iowans are projected to be part of a minority group. Figure 4.4 shows the state's minority population by county.

Figure 4.4: Percent of the population that is a racial minority and/or Hispanic or Latino



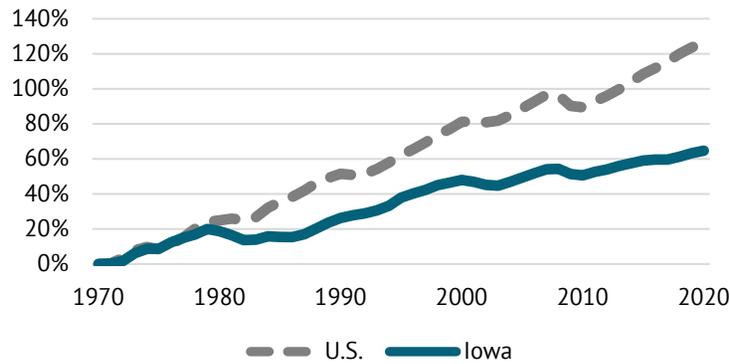
Source: U.S. Census Bureau 2015-2019 American Community Survey Estimates



Iowa's total employment continues to increase

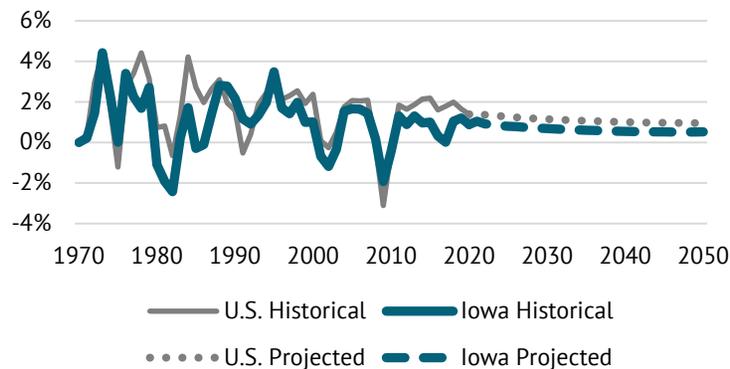
Iowa's employment has grown steadily over time. Figures 4.5 and 4.6 show the magnitude of change for Iowa and the U.S. from 1970-2020, and how jobs in Iowa have increased more slowly than the nation as a whole. The annual change in the number of jobs can vary substantially, though most years have experienced growth. Projected annual increases are generally small, averaging 1.1% per year for the U.S. and 0.6% per year for Iowa. Figure 4.7 shows the location of jobs in Iowa in 2020.

Figure 4.5: Employment growth indexed to 1970



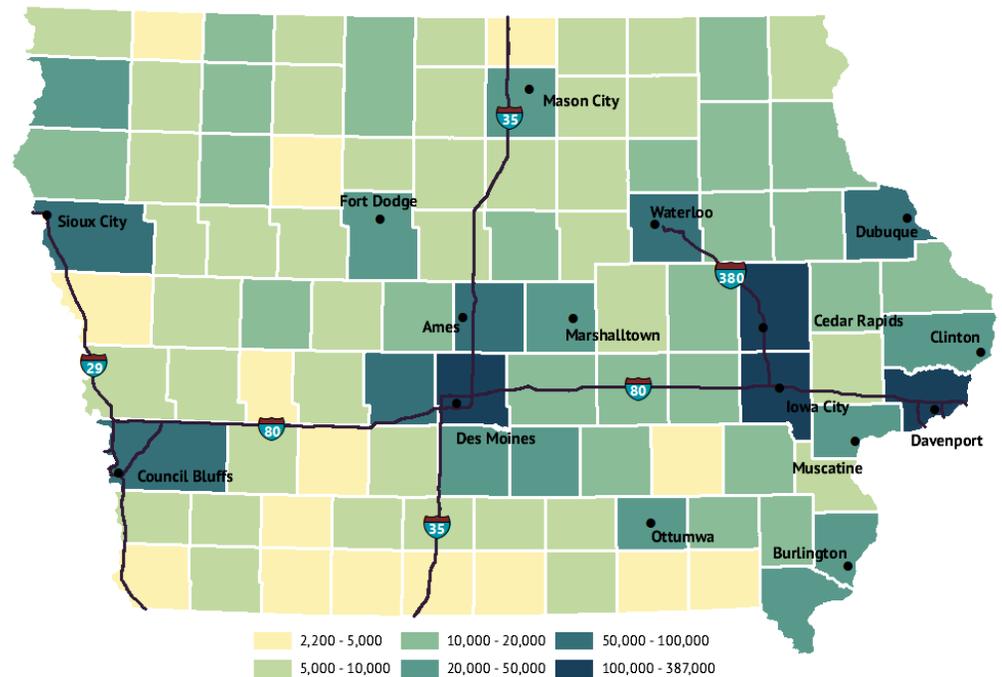
Source: Woods & Pool Economics, Inc.

Figure 4.6: Annual change in number of jobs



Source: Woods & Poole Economics, Inc.

Figure 4.7: Number of jobs per county, 2020

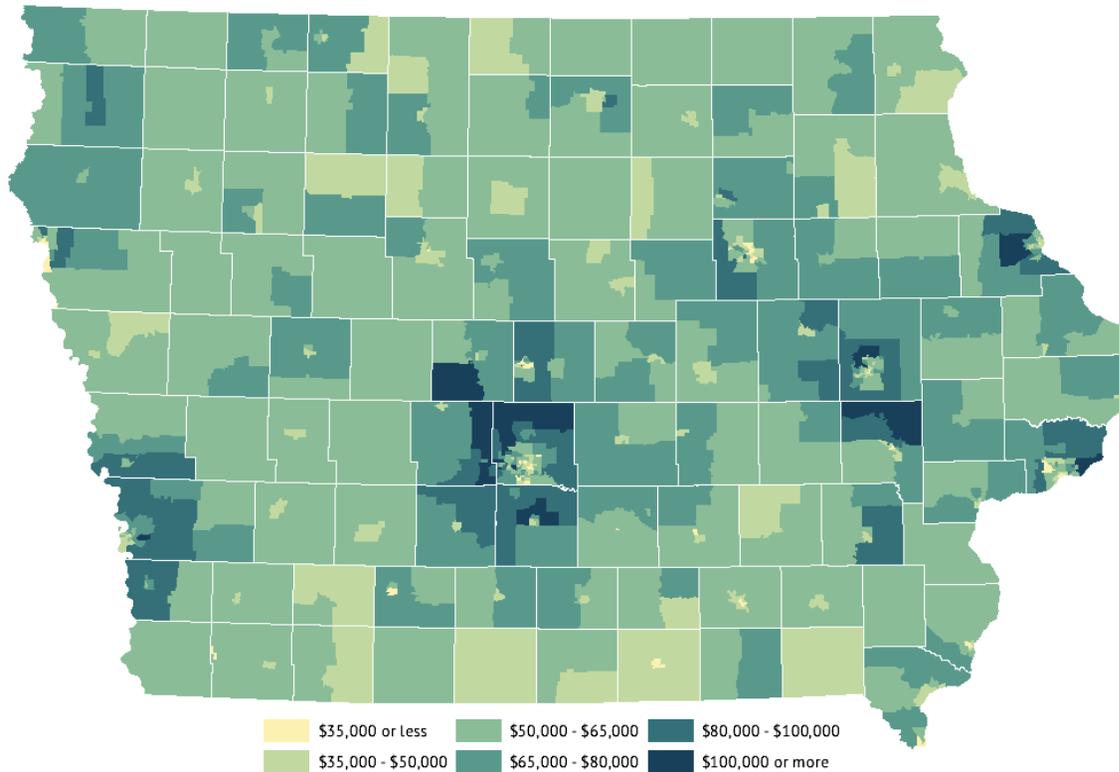


Source: Woods & Poole Economics, Inc.

Iowa's household incomes are increasing, but vary considerably

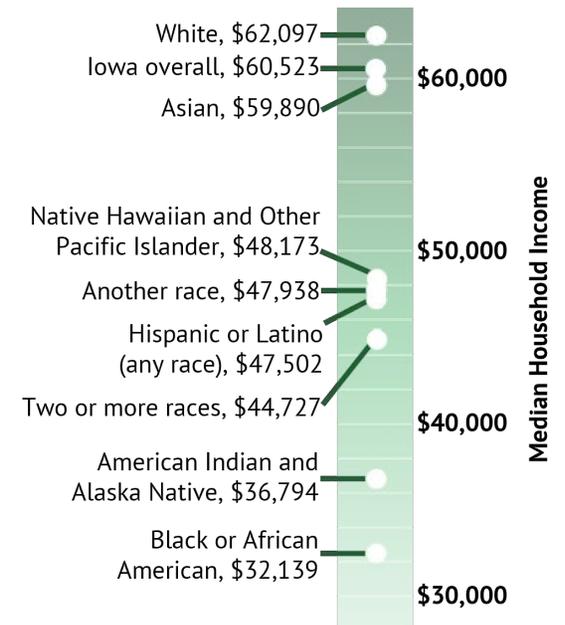
In 2020, Iowa's median household income was \$60,523 which was slightly less than the national household income of \$62,843. While the statewide median household income has been increasing over time, it varies considerably for different areas of the state and for different racial and ethnic groups, as shown in Figures 4.8 and 4.9. In general, the areas with the highest median household income are in or surrounding the state's metropolitan areas, though the core areas of most metropolitan areas tend to have lower median household incomes. Income varies substantially by race and ethnicity, with the median household income for Black households being just over half the median income for White households. Lower income households are more reliant on passenger transportation options.

Figure 4.8: Median household income by census tract



Source: U.S. Census Bureau 2015-2019 American Community Survey Estimates

Figure 4.9: Median household income in Iowa by race and ethnicity



Source: U.S. Census Bureau 2015-2019 American Community Survey Estimates



Iowa's traditional employment sectors have changed

Historically, farming and manufacturing have been two of the primary employment sectors in Iowa. Technological advancements and economic diversification have changed this in recent years, as shown in Figure 4.10. Since 1990, the farm sector has decreased by more than 40,000 jobs, which represents a decline of 33% in total farm employment in Iowa. The number of manufacturing jobs is about the same in 2020 as it was in 1990, but manufacturing's share of jobs has decreased relative to other sectors. Despite these trends, farm and manufacturing jobs remain critical to the state, and account for the largest percentage of jobs in 54 of Iowa's 99 counties (see Figure 4.11). These sectors of the economy also consume and generate a significant amount of freight that is moved via Iowa's rail network, highways, and waterways.

Figure 4.10: Jobs by sector, 1990, 2020, and 2050

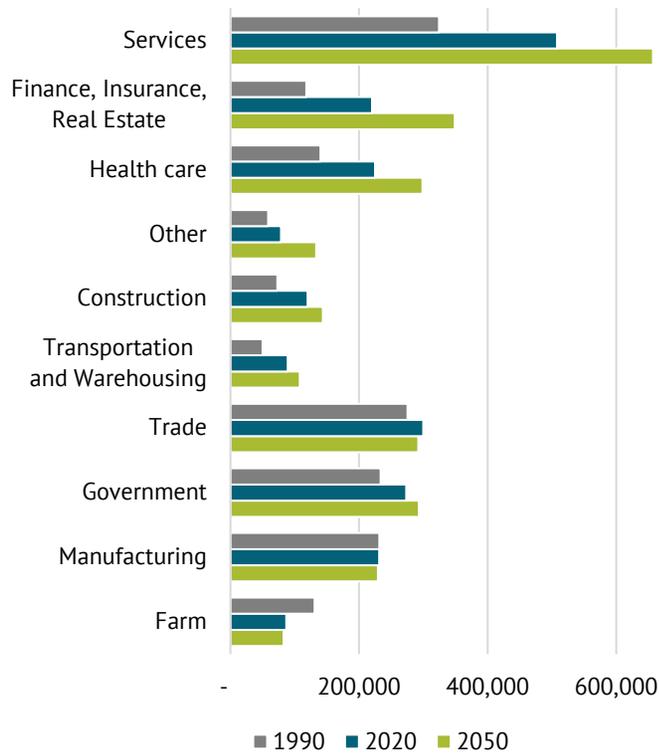
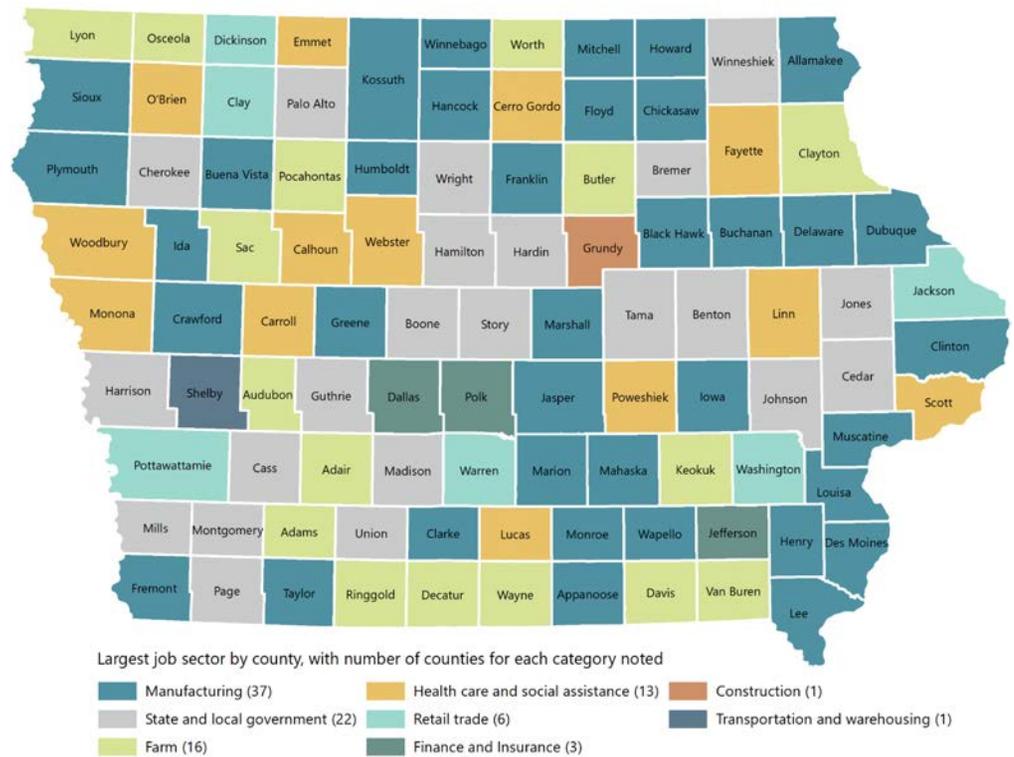


Figure 4.11: Largest job sector by county, 2020



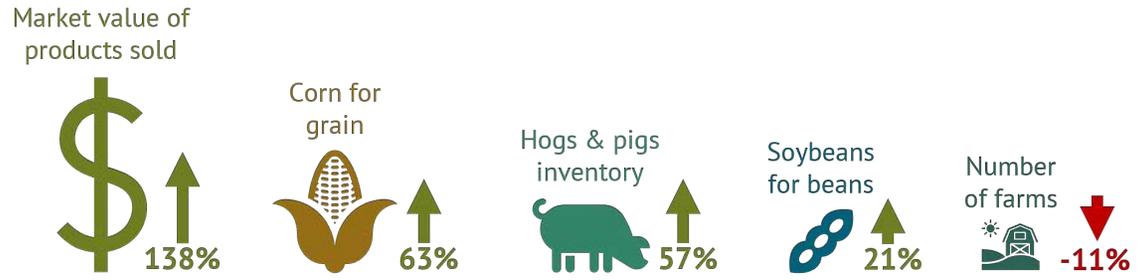
Source: Woods & Poole Economics, Inc.

Source: Woods & Poole Economics, Inc.

Agricultural output continues to be critical to the state

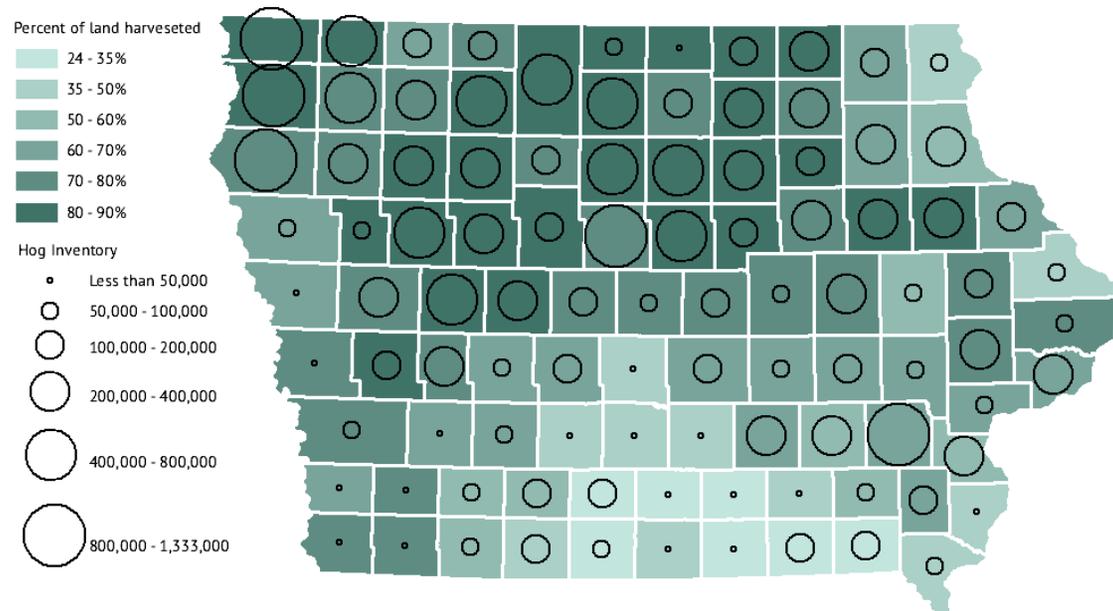
While the farm sector continues to decrease in terms of employment and the number of farms, the value of Iowa's agricultural output continues to increase. In 2017, 86% of Iowa's land area was part of farms, and 68% of the state's land area was harvested cropland. Figure 4.12 shows that during the past couple decades, overall farm output and products such as corn, soybeans, and hogs have increased, while the number of farms has decreased. As shown in Figure 4.13, the patterns of crop and animal production in Iowa reflect the natural geography of the state, with flatter northern Iowa having larger percentages of land used for crops. This also correlates to larger numbers of hog inventories, likely being fed via the area's corn crops, which are also helping to fuel ethanol production. Growth in agricultural output has a corresponding impact on Iowa's transportation systems as products are moved to in-state, interstate, and overseas markets via multiple modes. This highlights the need for sustained investment in the roadway system, rail network, intermodal facilities, and lock and dam infrastructure.

Figure 4.12: Percent change for selected agricultural items, 1997-2017



Source: U.S. Department of Agriculture Census of Agriculture

Figure 4.13: Percent of land harvested and hog inventory by county, 2017



Source: U.S. Department of Agriculture Census of Agriculture



Iowa's gross domestic product continues to increase

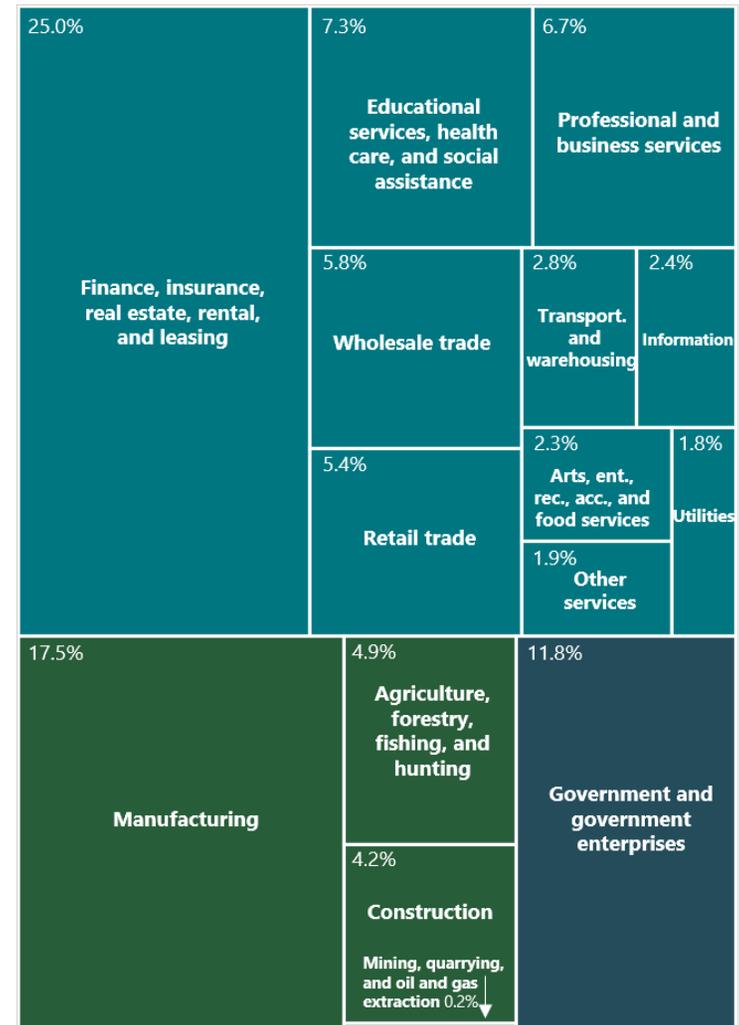
Gross domestic product (GDP) is the total market value of all goods and services produced in the economy. In 2000, Iowa's GDP was \$93 billion; by 2020, Iowa's current-dollar GDP had grown by 107% to \$193 billion and ranked 30th among states. The real-dollar GDP growth during this time, which accounts for inflation by using constant 2012 dollars, was 38.5%, or less than 2% per year. However, as shown in Figure 4.14, some industries have seen significant growth in real GDP since 2000, including agriculture, information, professional and business services, and finance and real estate. The current breakdown of Iowa's GDP is 61% private service-producing, 27% private goods-producing, and 12% government; the proportions by industry are detailed in Figure 4.15. While the goods-producing sectors are forecast to continue to make up a smaller percentage of Iowa jobs over time, they will continue to have significant transportation infrastructure needs related to moving raw materials and finished products.

Figure 4.14: Change in real GDP by industry from 2000-2020

181%	Agriculture, forestry, fishing and hunting
100%	Information
86%	Professional and business services
77%	Finance, insurance, real estate, rental, and leasing
35%	Wholesale trade
29%	Educational services, health care, and social assistance
27%	Manufacturing
21%	Retail trade
11%	Government and government enterprises
9%	Transportation and warehousing
5%	Utilities
-7%	Construction
-17%	Arts, entertainment, recreation, accommodation, and food services
-28%	Other services (except government and government enterprises)
-29%	Mining, quarrying, and oil and gas extraction

Source: U.S. Bureau of Economic Analysis

Figure 4.15: Iowa's 2020 GDP by industry



■ Services-Producing ■ Goods-Producing ■ Government

Source: U.S. Bureau of Economic Analysis

Freight Transportation Trends

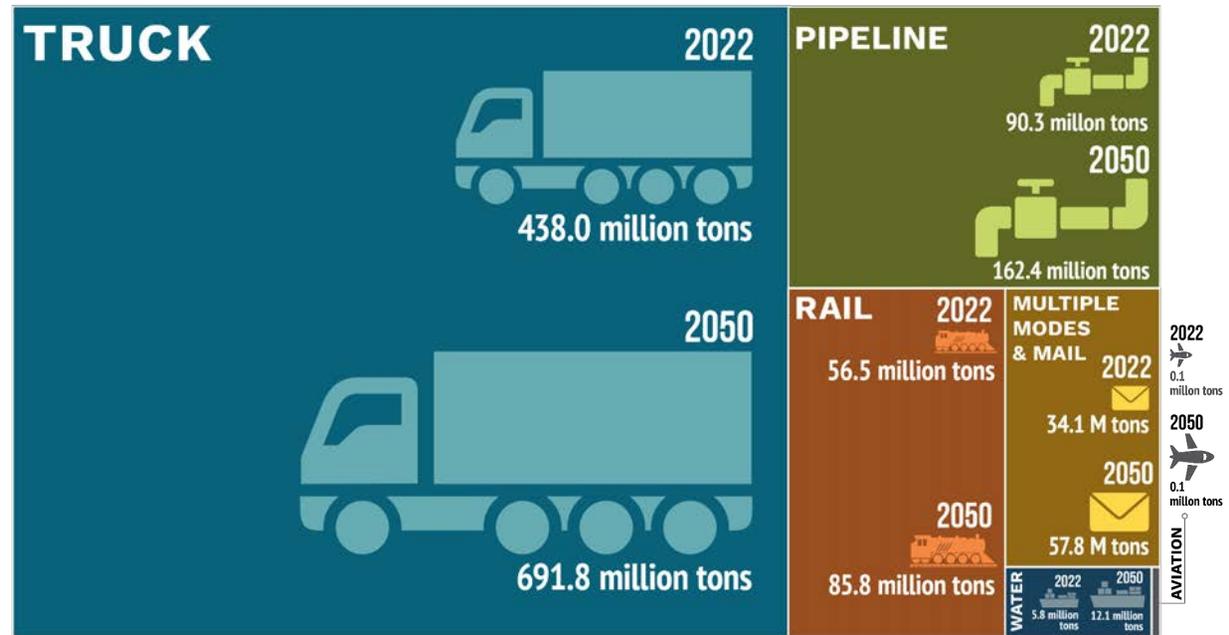
According to the Federal Highway Administration (FHWA) Freight Analysis Framework (FAF), freight tonnage moving in the U.S. will increase by nearly 27% between 2022 and 2050. This will prove to be a sizable challenge for the overall freight transportation system. This growth will be reflected in Iowa and will not uniform across modes.

Iowa's transportation system facilitated the movement of over 624 million tons of freight with an estimated value of \$377 billion in 2022. These figures are expected to grow to over 1 billion tons with a value of over \$745 billion in 2050. Additionally, Iowa is a net exporting state, meaning the state produces and exports more goods than it imports. This is true both in terms of tonnage and value. The gap between Iowa's imports and exports is projected to grow wider from 42 million tons in 2022 to 120 million tons in 2050.

Trucks will remain the dominant mode for freight traffic

Figure 4.16 shows Iowa's freight tonnage by mode in 2022, and the projections for 2050 according to the FHWA FAF. Truck, rail, and pipeline are the top three modes and collectively transport 97% of the tonnage to, from, and within Iowa. These three modes are expected to maintain their prominence through 2050. Over this same period, FHWA FAF projects rail tonnage to increase by 29 million tons or 52%. This increased freight movement will require additional infrastructure and yard capacity to be moved effectively.

Figure 4.16: Projected growth in tonnage of Iowa freight by mode, 2022-2050



Source: FHWA Freight Analysis Framework



Iowa freight movement will continue to serve agriculture

According to the FHWA FAF, the total weight of Iowa freight (freight moved within, exported from, and imported to the state) is expected to grow from 624 million tons in 2022 to over 1 billion tons in 2050. In 2050, agricultural products will continue to be the top freight commodities, as shown in Figure 4.17. Cereal grains (such as corn) and animal products and feed (including eggs) will be the top commodities, along with gravel. According to the same projections, rail freight will move away from commodities such as coal and focus on commodities such as animal feed and cereal grains instead (Figure 4.18).

Figure 4.17: Iowa commodity movements across all modes, 2022 and 2050 (projected)

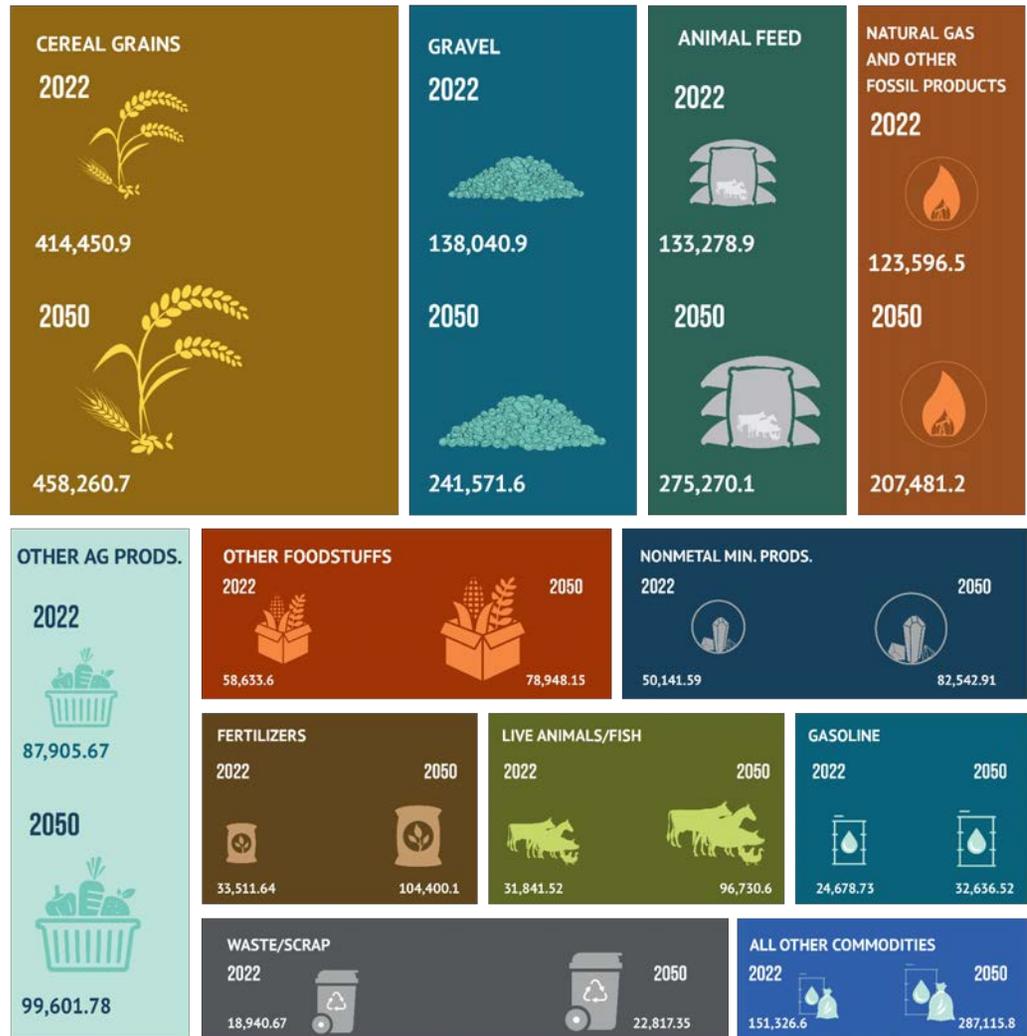
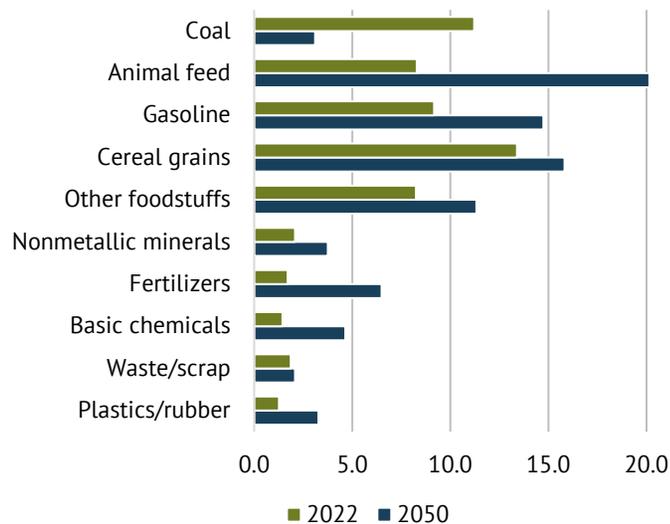


Figure 4.18: Iowa commodity movements by rail in millions of tons, 2022 and 2050 (projected)



Source: FHWA Freight Analysis Framework

Source: FHWA Freight Analysis Framework

Freight Rail Trends

Various types of freight travels across Iowa's rail infrastructure every year, including finished goods, materials, and supplies. Primary freight rail issues are the identification of movements most important to Iowa and the options to facilitate and support these movements. Identifying the importance of, and solutions for, freight rail comprises several perspectives, including volumes (especially compared to capacity), units (carloads), and directional movements.

In this section and Appendix F, current freight rail volumes for year 2022, as reported in the STB Railroad Waybill Sample database, are tabulated by major commodity types to understand freight movements. Additionally, directional rail tonnage forecasts are provided as derived from the FHWA FAF data.

- **Commodity Classification** – The Standard Transportation Commodity Code (STCC) is a seven-digit numeric code, categorized by 40 commodity groupings, based on physical product information used on shipping documents and published/maintained by the AAR. A hierarchical STCC structure allows for data collapsibility, enabling summarization of commodity information.ⁱ Although freight movements are tallied at the seven-digit STCC detail, the information summarized herein is at the aggregated two-digit level.
- **Waybill Sample** – Based on STCC codesⁱⁱ, the Waybill provides detailed most-recently available year 2022 movement data by commodity. It uses a 2% stratified sample by the STB Carload Waybill Sample of carload waybills for all rail traffic submitted by rail carriers that terminate 4,500 or more revenue carloads annually.

- **Freight Analysis Framework (FAF)** – Integrates year 2022 U.S. Census Bureau Commodity Flow Survey (CFS) and additional sources to provide freight movement metrics in terms of tonnage, value, and domestic ton-miles by region of origin and destination, commodity type, and mode for most current year (e.g., 2022 via FAF v5.6.1) and forecasts through 2050 (via FAF v5.6.1). While FAF is not as exhaustive (excludes railcar unit metrics or through state movements) as the Waybill Sample, FAF does provide a means by which to assess future tonnage growth. Note that FAF presents rail ton movement data by two-digit Standard Classification of Transportable Goods (SCTG) code classification, which differs notably from the STCC classification used in the Waybill Sample.ⁱⁱⁱ

Year 2022 Iowa rail movements by direction (outbound, inbound, intrastate, and through) and term (defined as tons and carload units) are derived from the STB Waybill database. Each subsection summarizes rail movements by direction and term, and each identifies the top two-digit STCC commodity movements. Summary data is provided here; supporting comprehensive data is in Appendix F.



Overview

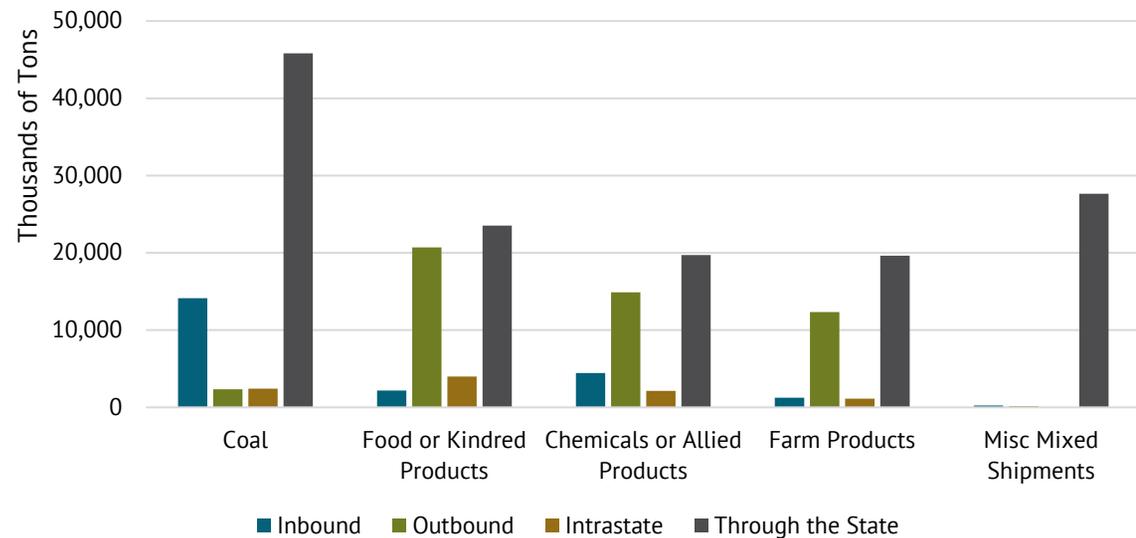
Iowa rail movements in 2022 totaled 273.6 million tons, carried by over 6.0 million carload units, as seen in Table 4.1 and Figure 4.19. Rail movements through Iowa account for 66% of the weight and 84% of the carloads of all rail movements in the state. The five commodity categories included on Figure 4.19 – coal, food or kindred products, chemicals or allied products, farm products, and misc. mixed shipments account for 80% of the total commodity movements by weight and 69% by carloads.

Table 4.1: Rail Movements by Direction, 2022

Direction	Tons Amount	Tons Percent	Units (Carloads) Amount	Units (Carloads) Percent	Tons/Unit Utilization
Outbound	56,027,913	20.5%	589,196	9.8%	95.1
Inbound	26,276,380	9.6%	286,425	4.8%	91.7
Intrastate	10,971,407	4.0%	112,763	1.9%	97.3
Through	180,357,192	65.9%	5,035,151	83.6%	35.8
Total	273,632,892	100.0%	6,023,535	100.0%	45.4

Source: Calculated based on STB Waybill Sample Data for 2022

Figure 4.19: Freight rail movements by top commodity and direction, 2022



Source: FHWA's Freight Analysis Framework



Rail Origins and Destinations

Appendix F presents major outbound and inbound rail tonnages in 2022. The top three origins or destinations and each of their respective top five commodities are included. Tables 4.2 and 4.3 provide a summary of the top origins and destinations for outbound and inbound rail movements.

Table 4.2: Top origins and destinations for outbound rail movements from Iowa, 2022

O/D	Location	Tons	Percent
Iowa Origin County	1. Pottawattamie County	8.1m	14.5%
	2. Clinton County	4.9m	8.8%
	3. Woodbury County	4.3m	7.6%
Destination State	1. Illinois	16.8m	25.0%
	2. Texas	11.9m	17.7%
	3. California	4.8m	7.1%

Source: STB Waybill Sample Data

Table 4.3: Top origins and destinations for inbound rail movements to Iowa, 2022

O/D	Location	Tons	Percent
Origin State	1. Wyoming	14.2m	53.9%
	2. Illinois	1.7m	6.7%
	3. Canada	1.7m	6.4%
Iowa Destination County	1. Wapello County	5.4m	20.7%
	2. Pottawattamie County	4.7m	18.1%
	3. Clinton County	4.0m	15.2%

Source: STB Waybill Sample Data

Freight Forecasts

Rail freight tonnage forecasts for the year 2050 were derived using data from the FHWA FAF: 2022 provisional data (FAFv5.6.1) and 2050 forecasts. While rail freight data is not as exhaustive as the STB Waybill data, the FAF does provide a means by which to assess future tonnage growth. Specifically, total annual growth forecasts by direction (outbound, inbound, intrastate, and through) are derived by comparing FAF tonnage volumes for the year 2022 to 2050.^{iv} Additionally, FHWA FAF data are presented in SCTG commodity terms, and is thus not directly comparable to the Waybill data by commodity.^v However, the directional totals are relatively comparable.

FHWA FAF presents directional rail tonnage for 2022 through the FAF v5.6.1 provisional data; however, the directional coverage excludes through movements because routing of freight movements is not specified. As such, only outbound, inbound, and intrastate movements are comparable with the Waybill data for 2022. Subtotaling the available three directions, the FHWA indicates that 72.4 million tons moved via the Iowa rail system, about 22.3% below that subtotal reported by Waybill. Because of the reporting differences shown in Table 4.4, the forecast growth rates, by direction, from the FAF were applied to the Waybill directional totals to estimate 2050 rail freight, shown in Table 4.5 and Figure 4.20.

Table 4.4: Rail tonnage comparison by source, 2022

Direction	STB Waybill Amount	STB Waybill Percent	FHWA FAFv5.0 Amount	FHWA FAFv5.0 Percent	FAF/STB
Outbound	56,027,913	60.1%	36,097,027	49.8%	64.4%
Inbound	26,276,380	28.2%	28,339,832	39.1%	107.9%
Intrastate	10,971,407	11.8%	7,992,295	11.0%	72.8%
Total	93,275,700	100.0%	72,429,154	100.0%	77.7%

Source: Calculated based on STB Waybill Sample Data for 2022 and FHWA FAF v5.6.1



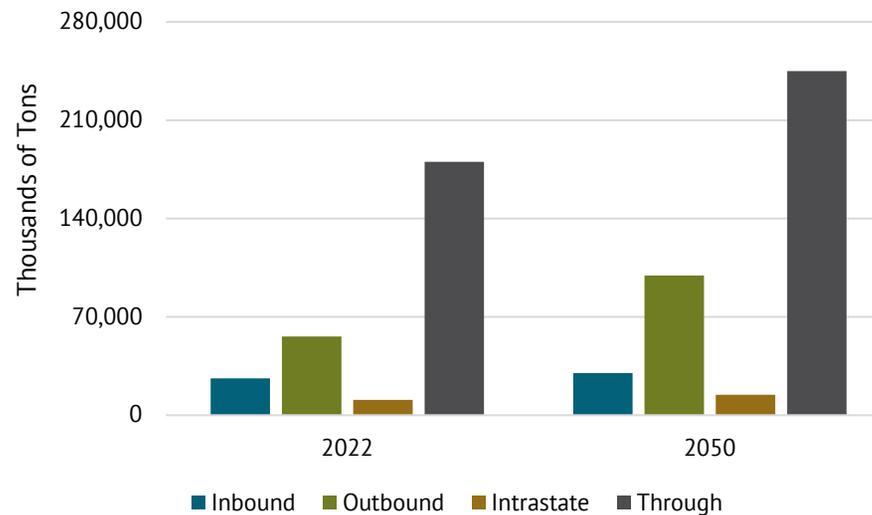
Table 4.5: Rail tonnage forecast summary, 2022-2050

Direction	2022 Amount	2022 Percent	2050 Amount	2050 Percent	Change Percent	Change CAGR
Outbound	56,027,913	20.5%	99,436,241	25.6%	77.5%	2.1%
Inbound	26,276,380	9.6%	29,977,370	7.7%	14.1%	0.5%
Intrastate	10,971,407	4.0%	14,556,026	3.7%	32.7%	1.0%
Through	180,357,192	65.9%	244,999,852	63.0%	35.8%	1.1%
Total	273,632,892	100.0%	388,969,489	100.0%	42.2%	1.3%

Note: CAGR = Compound Annual Growth Rate

Source: Calculated based on STB Waybill Sample Data for 2022 and FHWA FAF v5.6.1

Figure 4.20: Rail tonnage growth by movement, 2022-2050



Source: Calculated based on STB Waybill Sample Data for 2022 and FHWA FAF v5.6.1

Commodity Growth

As noted, the SCTG commodity types reported in the FAF differ from the STCC reported in the Waybill sample, which makes direct comparison difficult. Nonetheless, the change in two-digit level SCTG commodity movements for the available outbound, inbound, and intrastate directions are presented in a table in Appendix F.

Industrial Outlook by Sector

FHWA FAF-derived commodity movements by direction are presented by SCTG code in Appendix F. SCTG codes are also summarized within four overarching industrial categories: Agricultural, Mining and Extraction, Manufacturing, and Other. Note that Alcoholic Beverages, a category that includes ethanol, is included in the Agricultural SCTG code. An overview of the industrial categories is provided in Table 4.6 and Figure 4.21.

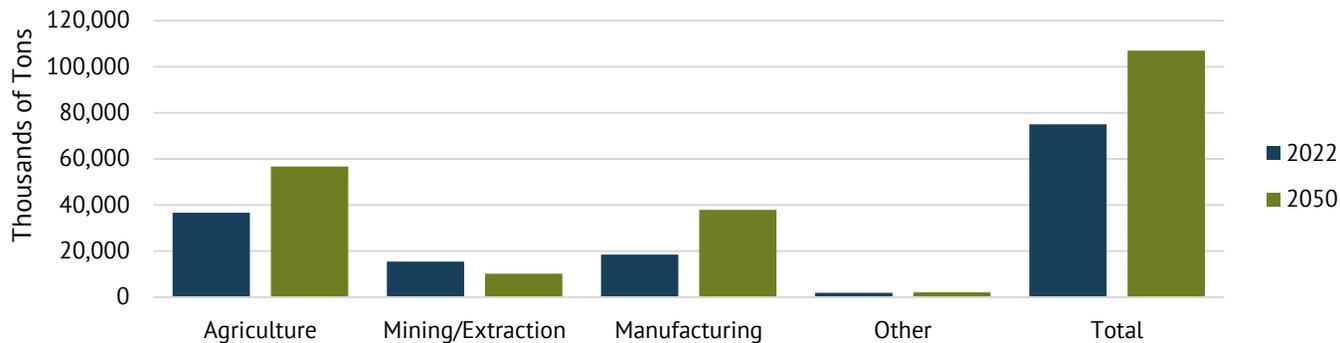
Table 4.6 Rail tons by industrial sector, 2022 and 2050

Industrial Sector	Outbound			Inbound			Intrastate		
	2022	2050	CAGR	2022	2050	CAGR	2022	2050	CAGR
Agricultural	21,708,902 (60.1%)	37,740,072 (58.9%)	2.0%	8,642,982 (30.5%)	11,024,617 (34.1%)	0.9%	6,231,137 (78.0%)	7,913,675 (74.6%)	0.9%
Mining / Extraction	2,213,230 (6.1%)	3,408,822 (5.3%)	1.6%	13,239,566 (46.7%)	6,841,699 (21.2%)	-2.3%	1,835 (0.0%)	2,910 (0.0%)	1.7%
Manufacturing	11,444,093 (31.7%)	21,829,469 (34.1%)	2.3%	5,656,668 (20.0%)	13,785,561 (42.6%)	3.2%	1,417,279 (17.7%)	2,274,620 (21.5%)	1.7%
Other	730,802 (2.0%)	1,085,288 (1.7%)	1.4%	800,616 (2.8%)	679,579 (2.1%)	-0.6%	342,043 (4.3%)	412,362 (3.9%)	0.7%
Total	36,097,027	64,063,652	2.1%	28,339,832	32,331,457	0.5%	7,992,295	10,603,567	1.0%

Note: CAGR = Compound Annual Growth Rate

Source: FHWA Freight Analysis Framework

Figure 4.21: Tonnage projections by industrial sector, 2022-2050



Source: FHWA Freight Analysis Framework



Conclusions

Freight rail movements in Iowa include a wide range of commodities moving in different directions (outbound, inbound, intrastate, and through), measured in different terms (tons and carload units), and with varying geographic origins and destinations. The following summary provides highlights of Iowa freight rail movements and forecasts.

Directional Overview

- **Through** – Through freight movements comprise most directional movements, both in terms of tonnage carload units. With respect to tonnage, the 180.4 million tons constitutes 65.9% of all directional freight rail movement via Iowa. In terms of carload units, the directional proportion attributable to through traffic is even higher, with the 5.0 million carload units representing 83.6% of total directional units.
- **Inbound** – At 26.3 million tons, inbound movements represent 9.6% of directional tonnage, and at 286,400 carload units, 4.8% of all directional carloads.
- **Outbound** – Outbound movements represent the second largest share of directional tonnage at 56.0 million tons (20.5%) and 589,200 carload units (9.8%).
- **Intrastate** – Comparatively insignificant tonnages are moved between counties in Iowa, with 11.0 million tons comprising 4.0% of directional movement and 112,800 carload units comprising 1.9% of directional carload movements.

Notable Commodity Movements

- **Coal** - The major single-commodity movement via Iowa in 2022, accounting for 23.7% of all freight rail tonnage (64.7 million tons); and 9.1% of carload units (546 thousand carload units). Much of this coal freight pertains to through movements, predominantly from Wyoming.

- **Food or Kindred Products** - 50.4 million tons (704 thousand carload units) of food or kindred products traversed the rail network in Iowa in 2022, representing 18.4% of all directional movements in Iowa. Nearly half (20.7 million tons) of all directional movements pertained to outbound movements, given that Iowa is an agriculture-producing state.
- **Chemicals or Allied Products** - 41.2 million tons (489 thousand carload units) of all directional movements pertained to Chemicals or Allied products. The directional breakdown includes 14.9 million tons (149 thousand carload units) attributable to outbound movements, 4.4 million tons (46 thousand carload units) for inbound movements, an allocation of 2.2 million tons (23,000 carload units) to intrastate movements, and finally 19.7 million tons (261,300 carload units) for through movements.
- **Farm Products** - 34.3 million tons of farm products traversed the rail network in Iowa in 403,200 carload units in 2022. Similar to food or kindred products, due to Iowa being an agriculture-producing state, a large share of all directional movements pertained to outbound movements at 12.3 million tons (120 thousand carload units). Through movements comprised an additional 19.6 million tons (259,200 carload units).

Forecasted Movements

Total rail traffic outbound, inbound, within the state, and through will grow 77.5% (2.1% CAGR), 14.1% (0.5% CAGR), 32.7% (1.0% CAGR), and 35.8% (1.1% CAGR), respectively between 2022 and 2050. Including all directional movements, total rail freight in Iowa is forecast to grow 42.2% (1.3% CAGR) from 273.6 million tons in 2022 to 389.0 million tons in 2050. Outbound tonnages are expected to grow at the highest rate. Inbound is expected to experience a slight decline in share of total rail tonnage, primarily due to declining imports of coal. Intrastate traffic is projected to maintain a relatively constant share of total rail tonnage. Through traffic is expected to continue to constitute the majority of all freight on the Iowa rail network.

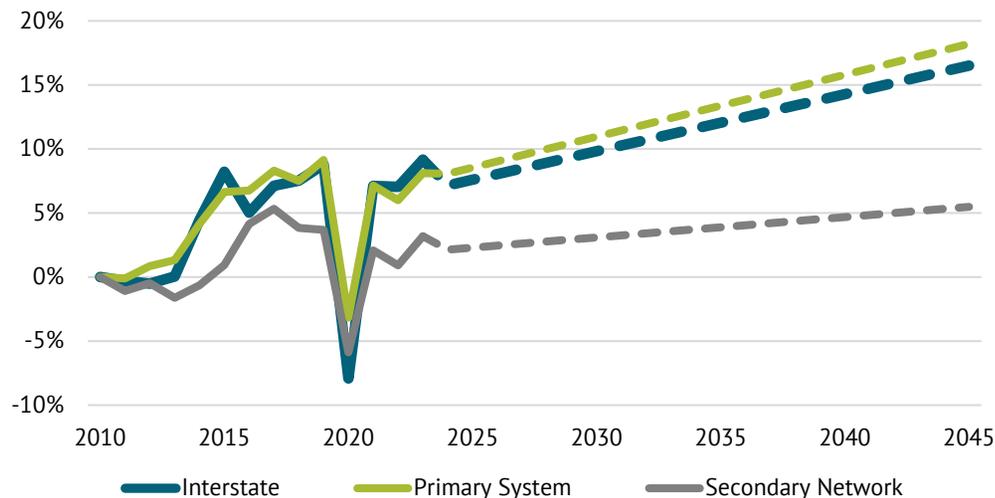
Passenger Transportation Trends

Highway

While Iowa’s primary and secondary roadway network mileage has not grown significantly in recent years, travel along it has. As shown in Figure 4.22, vehicle miles traveled (VMT) have grown steadily since 2010, except for a sharp decline in 2020 due to decreased commute traffic during the COVID-19 pandemic. Traffic is expected to continue to increase in the future, particularly on Iowa’s Interstate and Primary Highway Systems.

Automobile traffic along Iowa’s existing passenger rail routes is projected to increase overall by 2050. Table 4.7 shows the projected daily automobile VMT between zones with stations along the California Zephyr and Southwest Chief Amtrak routes in 2050, as well as the change from 2018 to 2050. While the daily vehicle travel between the Chicago area and several of Iowa’s rural Amtrak stations is projected to decrease, automobile traffic between Chicago and major destinations such as Omaha-Council Bluffs and Kansas City-Overland Park is projected to increase and involve millions of daily VMT, which would likely be utilizing Iowa highways between these destinations. If improvements to the existing passenger routes and/or stations are made, some of that highway traffic could potentially be diverted to passenger rail instead of the roadway network. Additional information about intercity vehicle traffic along proposed passenger routes can be found in Appendix E.

Figure 4.22: Percent change in Vehicle Miles Traveled (VMT) from 2010 to 2045 (projected)



Source: Iowa DOT

Table 4.7: Projected daily vehicle miles traveled (VMT) between Chicago-Naperville, IL and Amtrak station areas in 2050 and percent change from 2018-2050

Route	Station Area	2050 VMT	Change from 2018
California Zephyr	Burlington-Fort Madison	139,627	-14%
	Henry County	29,545	-6%
	Ottumwa	50,693	-11%
	Clarke County	20,836	-3%
	Union County	27,546	-7%
	Omaha-Council Bluffs	3,091,382	+13%
	Lincoln-Beatrice, NE	997,712	+10%
Southwest Chief	Burlington-Fort Madison	139,627	-14%
	Kansas City-Overland Park	13,535,943	+21%

Source: Iowa DOT



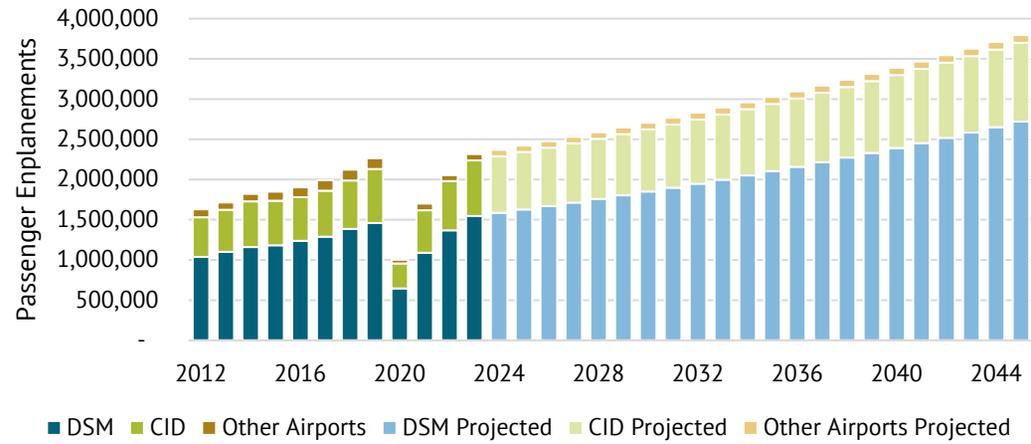
Air Transportation

Airports in Iowa serve varying types of users and levels of demand. Iowa's airport system has extensive geographic coverage, with over 97% of Iowa's population located within 30 minutes of an airport. Commercial service options for Iowa residents are enhanced by several nearby commercial airports in bordering states.

Passenger enplanements at Iowa's eight commercial service airports grew regularly to record levels prior to 2020, as shown in Figure 4.23. Despite a severe dip during the pandemic, passenger operations have recovered and are projected to continue to increase. Over 90% of Iowa's commercial passengers utilize the Des Moines International Airport (DSM) and the Eastern Iowa Airport (CID) in Cedar Rapids. Passenger enplanements are anticipated to continue to increase at an average annual rate of growth of 2.2%.

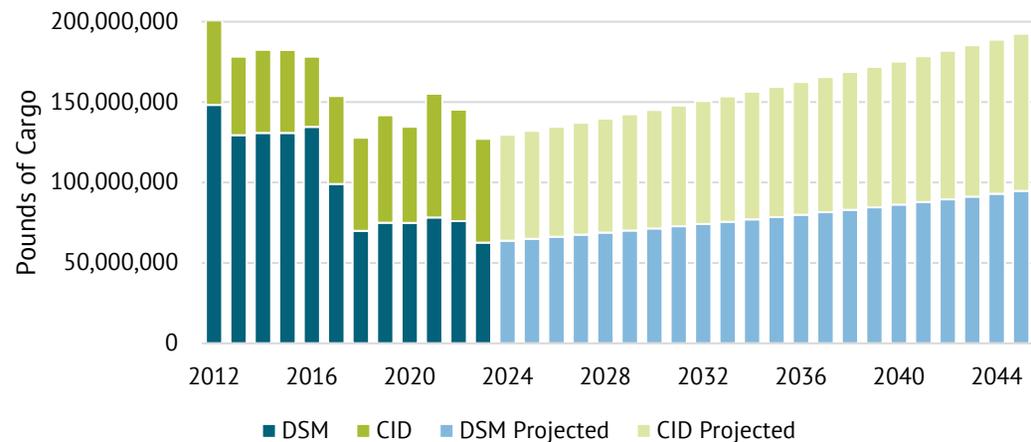
Most reported air freight in Iowa is moved by scheduled commercial air passenger carriers and dedicated air cargo carriers (e.g., UPS and FedEx) at the eight commercial airports. Although most of the airports in the state handle cargo to some extent, over 99% of reported tonnage moves through DSM and CID. To a large degree, the movement of air cargo is contingent upon the business decisions of these private carriers. In recent years, increased fuel expenses and changes in business models have resulted in reduced air freight activity in Iowa, shown in Figure 4.24. However, statewide air cargo is projected to increase at 1.9% per year over time.

Figure 4.23: Passenger enplanements at Iowa's commercial service airports



Source: Federal Aviation Administration (FAA); 2020 Iowa Aviation System Plan

Figure 4.24: Pounds of air cargo transported at Iowa's airports



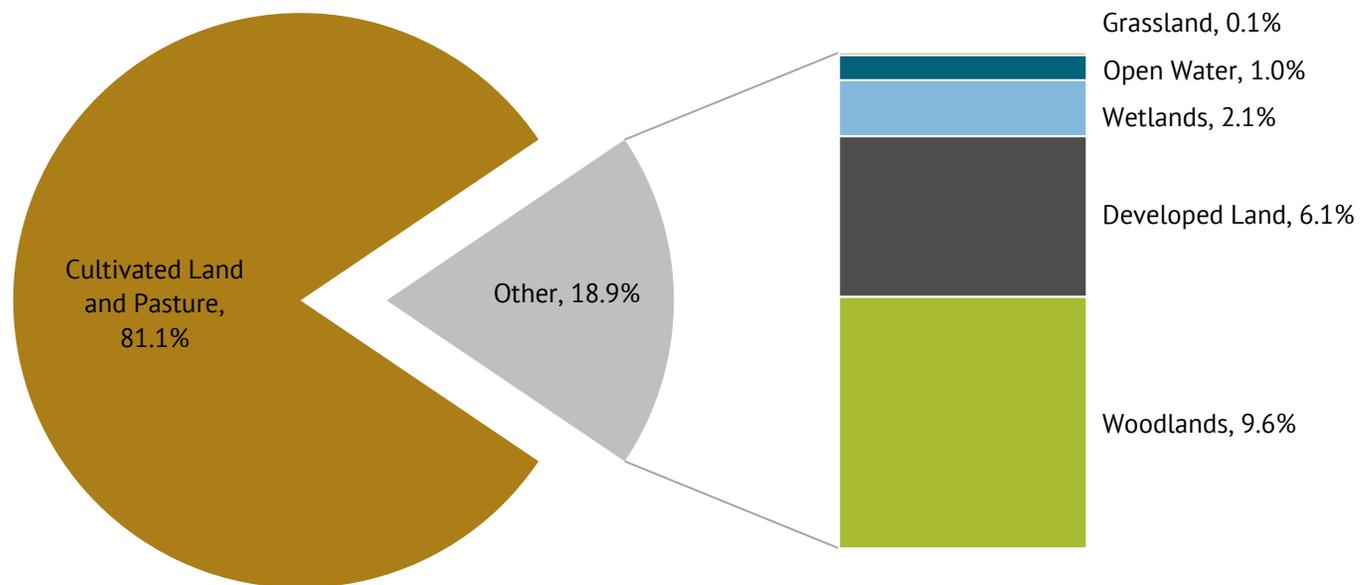
Source: FAA; 2020 Iowa Aviation System Plan

Land Use Trends

Agriculture remains the major land use in the state (National Land Cover Database (NLCD) classifications 81 and 82)). This land use is very dependent on the transportation system to access the fields, transport products for field application, and for deliver commodities to market.

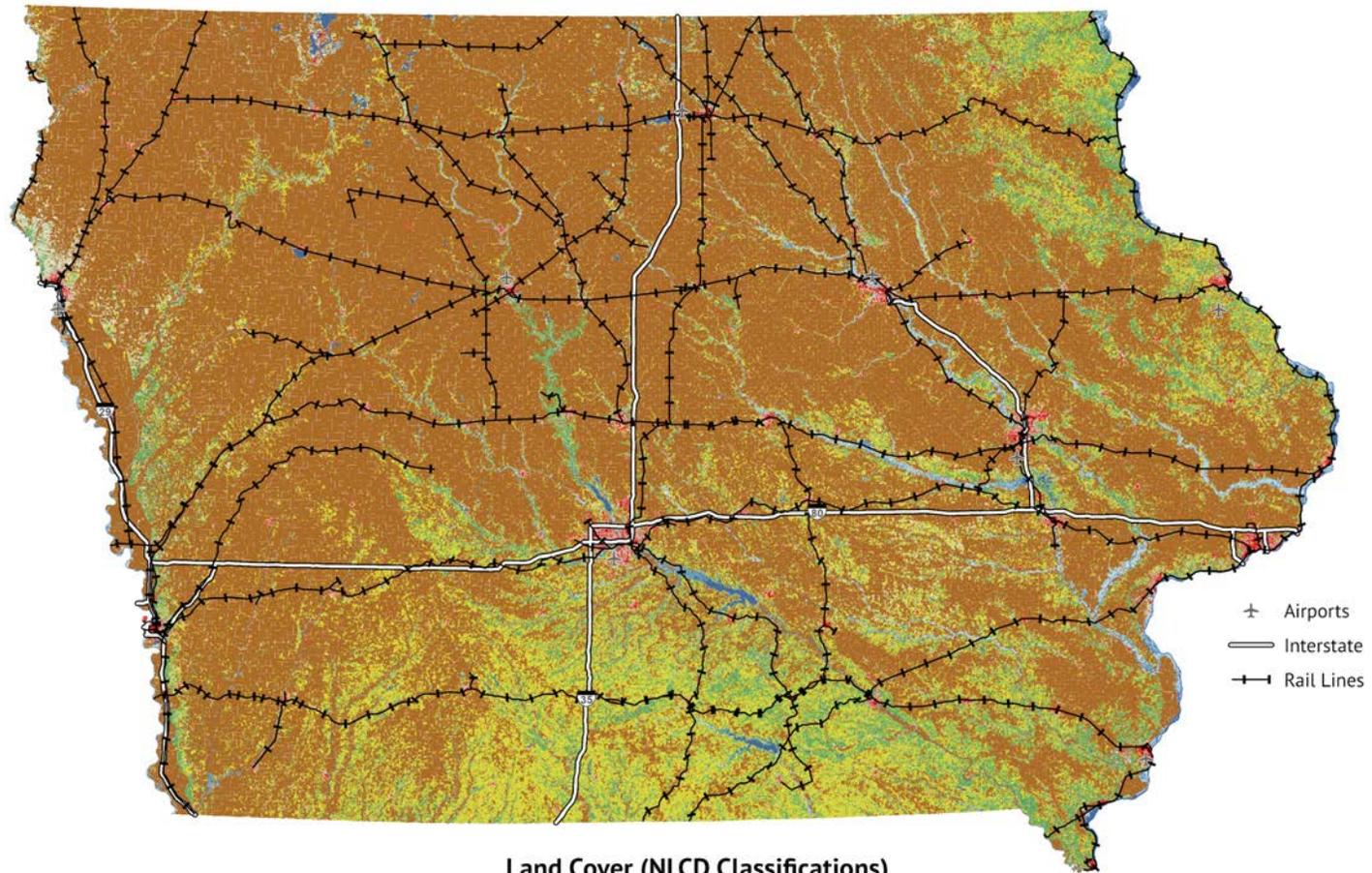
Developed land has grown slightly in the past 20 years, but by less than half a percent of the state's area. Developed urban areas can conflict with rail operations by creating more crossings, trespassing issues, and noise complaints. Figures 4.25 and 4.26 show Iowa's land uses and land cover.

Figure 4.25: Iowa land uses by percentage, 2021



Source: National Land Cover Database

Figure 4.26: Iowa land cover, 2021



- ✚ Airports
- Interstate
- + Rail Lines

Land Cover (NLCD Classifications)

Open Water	Barren Land	Herbaceous
Developed, Open Space	Deciduous Forest	Hay/Pasture
Developed, Low Intensity	Evergreen Forest	Cultivated Crops
Developed, Medium Intensity	Mixed Forest	Woody Wetlands
Developed, High Intensity	Shrub/Scrub	Emergent Herbaceous Wetlands

Source: National Land Cover Database

4.2 Economic and Environmental Benefits of Rail Transportation

Rail has a significant impact on Iowa stemming from the transportation of freight and passengers in and out of the state. As such, this translates to notable economic activity within Iowa that is supported by rail operations and rail transportation services. Moreover, rail is also a more environmentally friendly and safer transportation mode than automobiles and trucks. This section presents the economic impact of rail transportation in Iowa and discusses the various environmental and safety benefits of rail transportation relative to roadway alternatives.

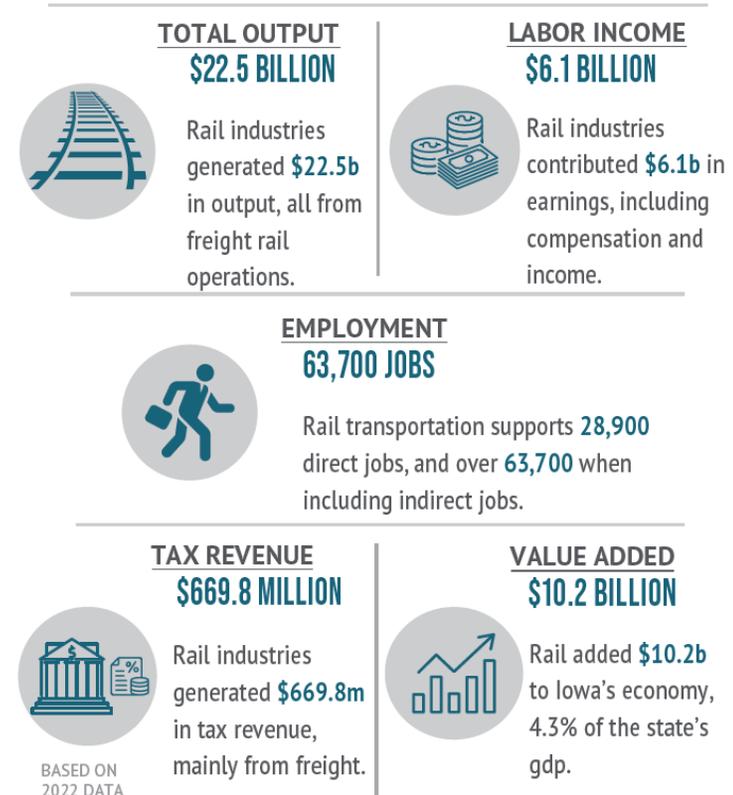
Economic Impact of Rail Transportation

The economic impacts of rail transportation in Iowa in 2022 were estimated using multipliers from IMPLAN economic impact analysis software with input data and assumptions from freight data, value of commodity shipments, and passenger rail operations. Freight data was extracted through the U.S. Surface Transportation Board (STB) Waybill Sample data for shipments focusing on traffic originating in Iowa. This was done to avoid overstating the impact of rail transportation services and rail served industries in Iowa. Meanwhile, the value of commodity shipments, presented in 2022 dollars per ton, were estimated based on freight data for the rail shipments originating in Iowa from the Federal Highway Administration's (FHWA) Freight Analysis Framework (FAF).

Impacts of the rail industry in Iowa considered within this analysis stems from organizations providing freight and passenger transportation services, industries who use freight rail services to trade goods (i.e., shippers of goods or commodities), and visitor expenditures from out-of-state tourists that use passenger rail services.

Impacts were estimated and presented by activity (service provision and rail users), type (direct, indirect, induced, and total), and measure (employment, income, output, value added, and taxes) for 2022 to provide an extensive review of how rail operations in Iowa impacted the State's economy. Overall results are highlighted in Figure 4.27 and Table 4.9.

Figure 4.27: Benefits of rail transportation in Iowa, 2022



Source: Calculated based on STB Waybill Sample Data for 2022, FHWA FAF v5.6.1, and IMPLAN Data



Table 4.9: Economic impacts of rail transportation in Iowa

Impact Metric	Type	Services: Freight	Services: Passenger	Users: Freight	Users: Passenger	Total: Freight	Total: Passenger	Total: All
Output (\$M)	Direct	\$2,745.4	\$10.3	\$12,142.8	\$10.9	\$14,888.2	\$21.1	\$14,909.4
	Total	\$3,841.0	\$14.4	\$18,667.6	\$20.2	\$22,508.6	\$34.6	\$22,543.2
Employment (Jobs)	Direct	2,938	11	25,875	107	28,813	118	28,931
	Total	8,566	32	54,938	164	63,504	196	63,700
Employment Income (\$M)	Direct	\$435.3	\$1.2	\$1,993.3	\$7.5	\$2,428.6	\$8.7	\$2,437.4
	Total	\$766.0	\$2.5	\$5,343.6	\$10.6	\$6,109.7	\$13.0	\$6,122.7
Value Added (\$M)	Direct	\$1,828.4	\$6.8	\$4,432.9	\$6.6	\$6,261.3	\$13.5	\$6,274.8
	Total	\$2,431.7	\$9.1	\$7,706.4	\$11.8	\$10,138.1	\$20.9	\$10,159.0
Taxes (\$M)	Direct	\$40.2	\$0.15	\$334.4	\$0.4	\$374.6	\$0.55	\$375.2
	Total	\$97.5	\$0.37	\$571.1	\$0.8	\$668.6	\$1.2	\$669.8

Note: All monetary values are in millions of 2022 dollars.

Source: Calculated based on STB Waybill Sample Data for 2022, FHWA FAF v5.6.1, and IMPLAN Data

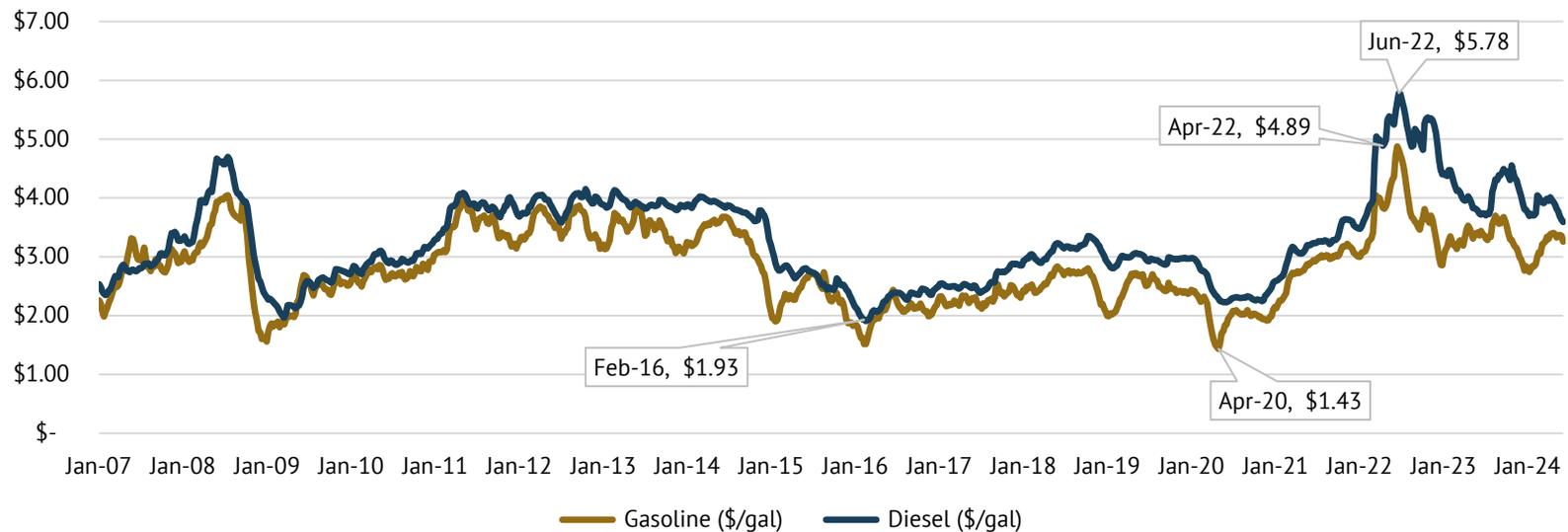
A full description of the methodology, data sources, and detailed economic impact analysis results can be found in Appendix G.

Environmental Benefits of Rail Transportation

In 2023, passenger rail ridership totaled 40,132 passengers^{vi} and in 2022, freight rail moved 273.6 million tons of goods in Iowa. If not for rail, these passengers and goods would likely be transported over the roadways resulting in additional highway congestion. Not only does access to rail transportation reduce highway congestion, but rail is known to be more efficient when transporting both freight and passengers. Both the reduction in highway congestion and the added efficiency from rail transportation is expected to generate environmental benefits.

Gasoline and diesel are both used for transporting people and commodities, and higher prices may indicate a higher demand for rail transportation. The prices of gasoline and diesel have experienced wide fluctuations since 2008, as shown in Figure 4.28. Prices in the Midwest for both commodities peaked in 2022 at \$4.89 per gallon of gas and \$5.78 per gallon of diesel. Prices have decreased since then but have not returned to pre-pandemic levels.

Figure 4.28: Gasoline and diesel prices in the Midwest



Source: U.S. Energy Information Administration



Freight Rail Efficiency

Based on existing technologies and transportation modes, rail is considered the most fuel-efficient approach to transport goods over land. According to the American Association of Railroads (AAR), not only can one train move nearly 500 tons on a gallon of fuel, one train can carry the freight of hundreds of trucks.^{vii} Additionally, AAR indicates freight railroads are, on average, three to four times more fuel efficient than trucks and moving freight by rail instead of trucks is expected to translate to a reduction in greenhouse gas (GHG) emissions by up to 75%.^{viii} The efficiency is reflected in the 2020 national data, where freight rail only represented 6.0% of the GHG emissions related to freight transportation, while transporting almost 29.0% of the total freight.^{ix}

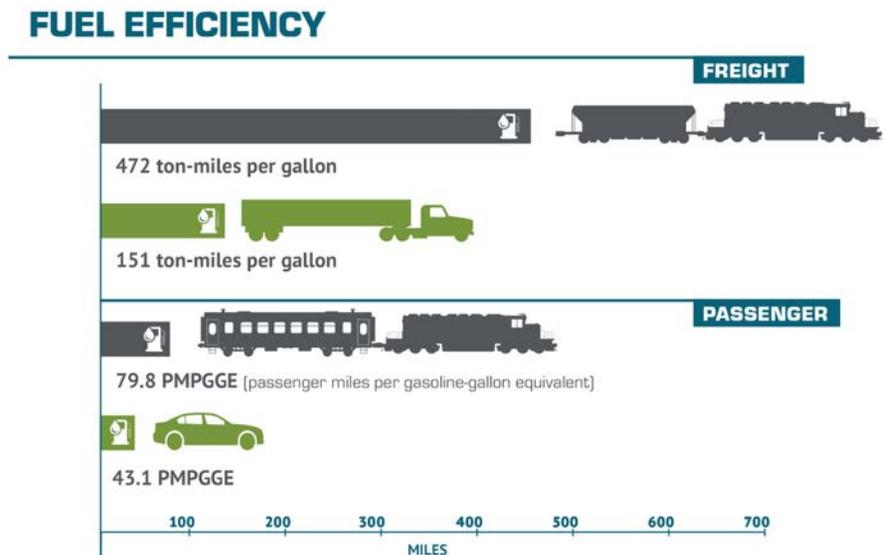
The efficiency of rail relative to truck is not new. A 2022 study from Texas A&M Transportation Institute comparing domestic freight transportation modes highlighted that while freight trucks have been improving in terms of metric tons of GHG emissions produced per ton-mile transported from 2005 (171.9 metric tons GHG per ton-mile) to 2019 (140.7 metric tons GHG per ton-mile), it is still significantly more environmentally damaging than rail, which only produced 21.6 metric tons of GHG per ton-mile transported in 2019.^x Additionally, the study also indicated that, in 2019, freight trucks had a fuel efficiency of 151 ton-miles per gallon, which was more than three times less efficient than freight rail (472 ton-miles per gallon).^{xi} This is illustrated in Figure 4.29.

Passenger Rail Efficiency

As of 2023, Amtrak operates four trains per day in Iowa, as part of their two long-distance passenger rail services, the California Zephyr (between Chicago, Illinois, and San Francisco Bay Area, California, via Burlington, Ottumwa, Osceola, and Creston, Iowa) and Southwest Chief (between Chicago, Illinois, and Los Angeles, California, via Fort Madison, Iowa). There is currently no intercity corridor service or commuter rail service provided in the state.

Similar to freight rail, passenger rail in Iowa alleviates roadway congestion by providing users with a transportation alternative to passenger vehicles. In addition to reducing roadway congestion, which has a direct correlation with transportation emissions, passenger rail is also a more efficient mode for transporting passengers. In particular, the U.S Department of Energy and the Oak Ridge National Laboratory indicated that intercity rail moves 79.8 passenger-miles per gasoline gallon equivalent (GGE), while passenger vehicles only move 43.1 passenger miles per GGE.^{xii} This is illustrated in Figure 4.29.

Figure 4.29: Comparative fuel efficiency between rail and highway vehicles for carrying passengers and freight



Source: National Waterways Foundation and U.S. Department of Energy

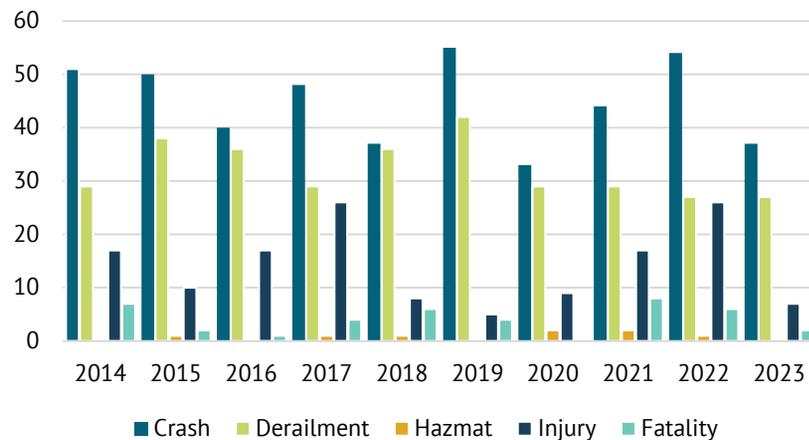
4.3 Rail Service Needs and Opportunities

Key Issue: Safety

Figure 4.30 provides an inventory of railroad safety in Iowa from 2014-2023, detailing patterns of rail accidents and incidents, including types of accidents, individuals affected, and causes.

During these ten years, there were 449 crashes between highway and railroad traffic, 322 train derailments, and 8 hazardous materials (HAZMAT) incidents, with a relatively consistent number occurring each year. A total of 142 injuries and 81 fatalities resulted from those crashes and derailments, with varying trends by year.

Figure 4.30: Iowa railroad safety statistics 2014-2023



Source: FRA Office of Safety Analysis

Iowa DOT's Rail Section within the Modal Transportation Bureau manages rail safety, overseeing railroad coordination operations, track safety inspections, and the grade crossing safety program.

Infrastructure Inspections

Railroad safety hinges on infrastructure and equipment condition. Regular maintenance is key in preventing major incidents like derailments. Ensuring employees are well-trained and adhere to safety protocols is crucial for safe train operations and track upkeep.

The Federal Railroad Administration (FRA) uses inspectors across five key areas to enforce federal safety standards – track, operating practices, motive power and equipment, signal and train control, and hazardous materials. In Iowa, inspectors from each area scrutinize railroad operations and infrastructure for compliance with these standards. Deviations prompt issuance of violations and civil penalties, with standards differing based on track classification.

Iowa DOT has employed two full-time track inspectors certified and licensed by FRA. They work alongside federal inspectors to visually inspect railroad tracks across the state, ensuring safety and compliance with regulations. Railroads comply with FRA guidelines through regular track inspections by dedicated inspectors to ensure safety. Collaboration among railroads, employees, suppliers, customers, and policymakers drives innovation in safety technologies and practices. National programs for highway-rail crossings, hazardous materials transport, positive train control, and remote locomotives highlight these efforts.

Operation Lifesaver

Iowa Operation Lifesaver, launched in 1972, promotes safety at highway-rail crossings and prevents rail trespassing through educational programs. It educates drivers and pedestrians on safe track practices, enforces traffic laws for crossing signals and trespassing, and supports engineering research to improve railroad crossing safety. Iowa DOT works closely with Operation Lifesaver through a designated liaison.



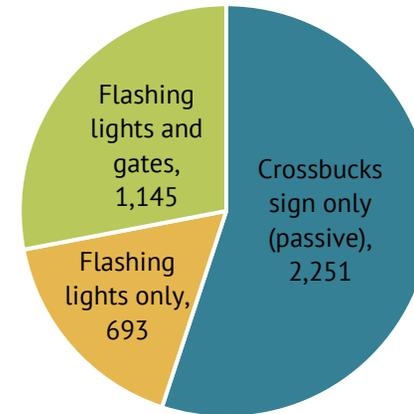
Grade-Crossing Safety

According to FRA, there are a total of 4,089 public at-grade highway-rail crossings in Iowa. In addition, 773 crossings are grade-separated. The state's public at-grade crossings feature a variety of grade-crossing warning devices. Figure 4.31 shows the various types of warning devices and the number of crossings equipped with them. Slightly less than half of all public at-grade crossings in the state have active warning devices such as gates and flashing lights, while more than half of crossings have passive warning devices (e.g., cross bucks signs) or no warning systems. Many of the crossings with passive warning systems have low volumes of roadway traffic and are rural in nature.

In addition to public at-grade crossings, there are around 2,300 private crossings throughout the state. Iowa DOT does not have jurisdiction over private crossings. Table 4.10 shows the number of highway-rail grade crossing incidents, fatalities, and injuries reported at all public at-grade crossings from 2014-2023.

The trend in total rail incidents in Iowa increased during this time, while the number of associated deaths and injuries has decreased. The first half of the decade saw an average of 39 total incidents, 3.6 fatalities, and 11 injuries, while the most recent five-year period saw averages of 39.6 total incidents, 2.6 fatalities, and 9.8 injuries.

Figure 4.31: Types of warning devices at Iowa public at-grade crossings



Source: FRA Office of Safety Analysis

Table 4.10: Highway-rail incidents in Iowa, 2014-2023

Rail Injury Type	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Incidents	45	43	35	41	31	48	25	40	50	35
Included Deaths	6	1	2	3	6	2	0	4	5	2
Included Injuries	12	8	10	17	8	5	8	12	17	7
Property Damage Only	27	34	23	21	17	41	17	24	28	26

Source: FRA Office of Safety Analysis

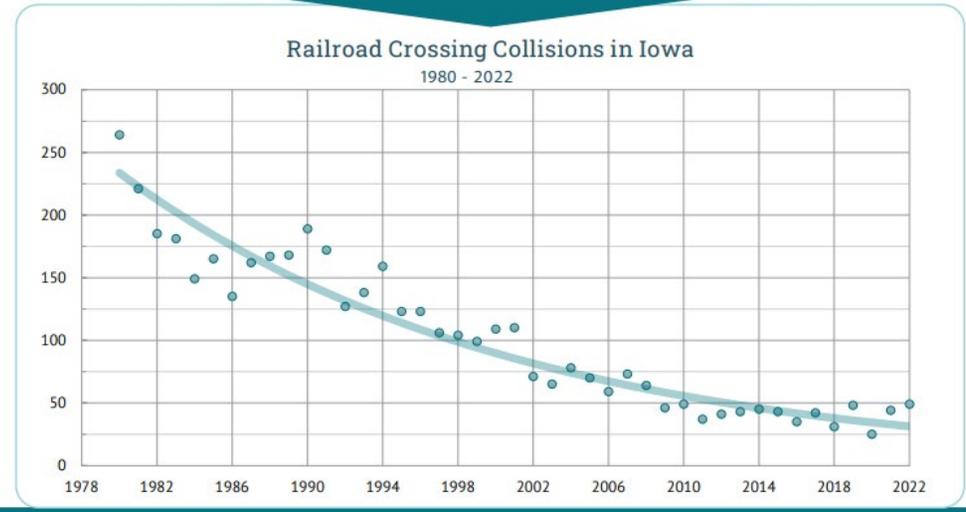
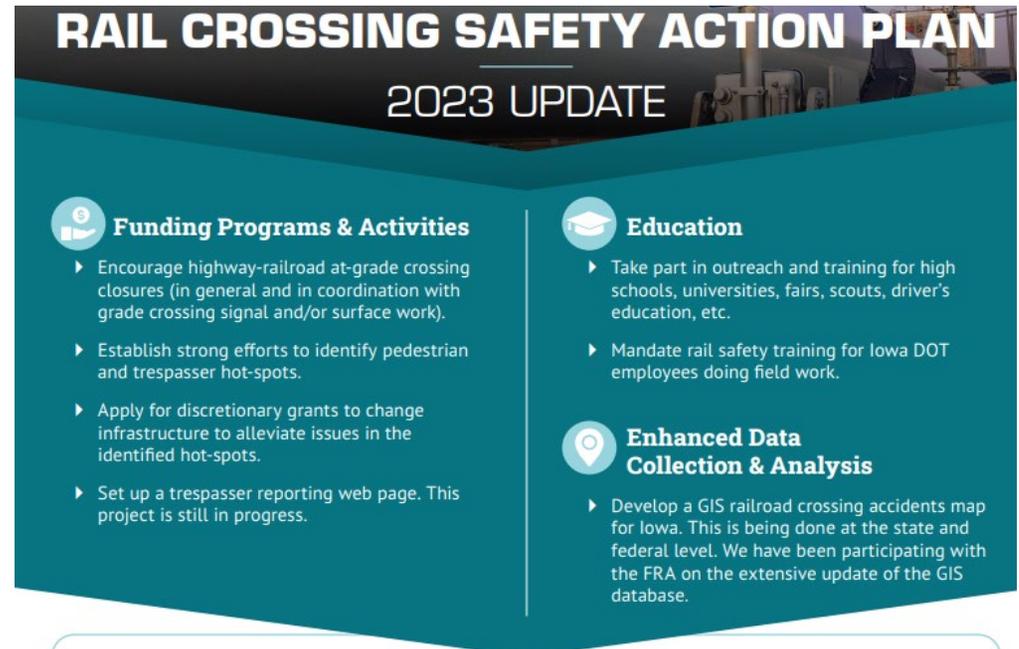
Rail Crossing Safety Action Plan

On December 14, 2020, FRA mandated 40 states and the District of Columbia to develop and implement highway-rail grade crossing action plans, as outlined in Federal Register Volume 5, Issue 240. Additionally, ten states, including those compliant with the Rail Safety Improvement Act of 2008, were required to update their plans and report progress to the FRA. Iowa DOT revised its Safety Action Plan, which was approved by the FRA on February 11, 2022. Currently, Iowa DOT is actively executing the initiatives outlined in the approved plan. The plan will be reviewed at least annually and modified as necessary; the latest update is shown in Figure 4.32.

Short-term goals and objectives include the funding and encouragement of grade crossing closures in coordination with specific characteristics of each locations signal or surface condition. Iowa DOT is also involved in efforts related to state and federal financing. This can involve loans and grants for construction and maintenance of track, maintenance and safety improvements at highway-rail crossings, and developing new spur tracks to support economic development.



Figure 4.32: Rail Crossing Safety Action Plan 2023 Update



Source: Iowa DOT

Hazardous Materials

An example of the potential danger of hazardous materials (hazmat) occurred on February 3, 2023, when a Norfolk Southern train carrying hazardous materials derailed in East Palestine, Ohio. Railroad personnel responding to the site decided to conduct a controlled release and burn of one of the cars containing vinyl chloride, a chemical used to create PVC, in order to prevent an explosion. This incident sparked a national discussion on the transport of hazmat by rail and the risk they pose to communities.

The transport of hazardous materials is regulated by the FRA and the Pipeline and Hazardous Materials Safety Administration (PHMSA). Class I railroads have additional resources and personnel that can be dispatched quickly to supplement local response to hazardous materials rail incidents outside of public emergency response. Figure 4.33 illustrates the routes designated for hazmat transportation throughout the state of Iowa. Table 4.11 displays the number of accidents involving rail cars carrying hazardous materials in Iowa from 2014-2023. These incidents included one near Graettinger, Iowa, in 2017, which resulted in the derailment of several cars carrying ethanol.

Material/ethanol derailment near Graettinger, IA



Table 4.11: Rail incidents involving hazardous materials (hazmat) in Iowa (2014-2023)

Rail Incidents	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cars Carrying Hazmat	7,674	7,903	5,704	6,535	6,482	7,520	7,062	7,341	6,137	6,270
Hazmat Cars Damaged or Derailed	799	650	565	674	591	749	673	601	646	667
Cars Releasing Hazmat	26	60	20	37	34	27	27	24	45	34

Note: The table only shows incidents related to cars carrying hazmat; this is out of roughly six million rail cars moving to, from, within, or through the state in a given year.

Source: FRA Office of Safety Analysis

Figure 4.33: Iowa hazmat routes



Source: Iowa DOT



Crude Oil and Biofuels Rail Transportation Study

In April 2016, Iowa DOT published the Iowa Crude Oil and Biofuels Rail Transportation Study to aid state, local, and tribal governments in assessing risks, vulnerabilities, and readiness concerning incidents with crude oil and biofuels transported by rail. The study analyzed geographic, administrative, and operational aspects to identify programs, capabilities, and potential risks. It used desktop research, interviews, surveys, a Stakeholder Steering Committee (SSC), and workshops to assess existing procedures, legislation, risks, and vulnerabilities. The SSC, including representatives from Iowa railroads, ethanol producers, government bodies, and emergency responders, collaborated to formulate recommendations and an action plan to enhance readiness and response capabilities.



The study also included a Risk and Vulnerability Assessment (RVA) that analyzed current routes and volumes of bulk crude oil and ethanol transportation. The RVA was systematically developed on a county-by-county basis by considering past incidents such as derailments, spills, and fires, evaluating the likelihood of future incidents, identifying critical public safety and environmental risks, and assessing potential consequences. These findings were utilized to determine an overall aggregate risk value.

The study findings were used to pinpoint specific issues and develop recommendations for policy adjustments, improved planning, training programs, communication strategies, and other measures to mitigate risks and vulnerabilities. Recommendations were informed by input from stakeholders, Iowa DOT, and Iowa Homeland Security and Emergency Management (HSEMD). Improvement actions were guided by several key principles.

- Prioritizing stakeholder cooperation and voluntary initiatives over new legislative regulations.
- Ensuring proposed improvements are practical, achievable, and pertinent.
- Aligning changes with existing commercial, economic, regulatory, and technological frameworks.
- Implementing measurable improvements to gauge effectiveness.
- Exploring potential applicability to other hazardous commodities transported via rail in Iowa, where feasible.

Positive Train Control (PTC)

PTC is a set of technologies that prevent the most serious human error incidents. It is designed to prevent train-to-train collisions or derailments caused by excessive speed, unauthorized train movement onto sections of track where maintenance activities are taking place, and movement of a train through a track switch left in the wrong position. These technologies are designed to automatically stop a train before certain accidents. PTC systems determine the precise location, direction, and speed of trains, warn train operators of potential problems, and safely bring the train to a stop if the operator does not act.

Mandated by Congress as part of the Rail Safety Improvement Act of 2008 (RSIA), PTC has been an unprecedented technological undertaking requiring each railroad to develop a system comprised of hundreds of thousands of components that must work across an interconnected network of freight, passenger, and commuter railroads.

PTC is fully implemented and operates network-wide on 100% of Class I PTC route miles. This technology also provides the foundation for future rail safety innovations.

Remote Control Locomotives (RCL)

For more than 20 years, freight railroads have successfully used RCL technology – also known as Remote Control Operations (RCO) – to enhance the safety and efficiency of locomotive operations within railyards. Widely accepted throughout the industry, RCL has proven to be as safe or safer than conventional methods in facilitating yard operations. All RCO employees are FRA-certified and receive specialized training in remote operations. Operators must comply with safety standards and operating rules equivalent to conventional locomotive engineers. FRA regulations require that ground employees maintain a line of sight where they can observe the track ahead or create specified zones where only one RCL can operate at a time. Additionally, RCOs continually undergo testing and training, including tri-annual recertification and an annual “check ride” by a supervisor.

Railroads primarily use RCL technology in yards for essential tasks like building trains. For example, when the RCO, who can be positioned anywhere along the length of cars, wants a train backed up 40 feet, they can reverse the locomotive and stop it at a given point, instead of having to communicate directions multiple times with another employee over a radio. By controlling the locomotive from a safe distance, RCL significantly reduces the risk of accidents and injuries while improving efficiency through optimized train movements. One or two RCOs stationed near the train or on the locomotive itself use transmitters called Operator Control Units (OCUs) to communicate with and operate the RCL. The operator can remotely control locomotive movements within the rail yard or industrial facility, including acceleration, deceleration, direction, and other functions necessary for shunting, coupling, and uncoupling cars.

Remote control systems often incorporate several safety features to prevent mistakes and accidents. These include the following.

- **Man Down:** OCUs include a “man down” feature that will stop the locomotive and broadcast an emergency radio message if the operator trips or falls down.
- **Vigilance Test:** OCUs also have a vigilance feature that detects a lack of activity on the part of the operator and will bring the locomotive to a stop (after an audible warning) if the operator does not operate a button to indicate they are actively engaged in the operation.
- **Registration:** Before being used, the OCUs are digitally registered to the assigned locomotive to ensure the operators are only controlling their intended locomotive.



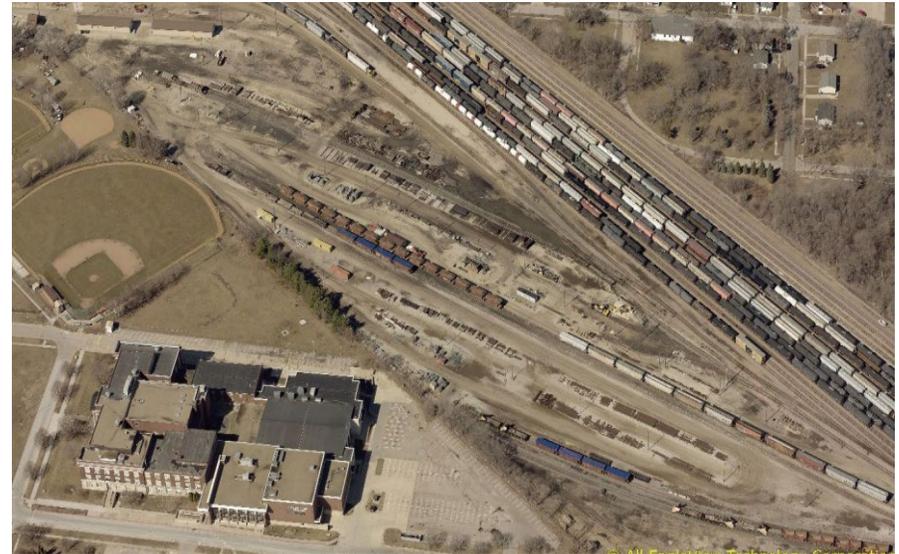
Key Issue: Community Continuity and Safety

As urban areas expand and average train lengths become longer, railroads can be viewed as a nuisance to local communities that are divided by busy rail corridors. These divisions also result in increased railroad crossing incidents between trains and cars, or trains and pedestrians.

Concerns of blocked crossings and trespassing incidents is a focus of Iowa DOT and operating railroads. Iowa DOT is pursuing funding from the newly created discretionary Rail Crossing Elimination (RCE) program for a highway/railroad grade crossing on U.S. 75 in Merrill, Iowa. This is a major freight corridor recognized for both highway and rail movements in the state.

Iowa DOT supports efforts to reduce incidents at railroad crossings and to increase community continuity. Recently, the City of Waterloo was awarded \$750,000 from U.S. DOT through the Reconnecting Communities and Neighborhoods grant program for the Downtown Waterloo Railyard Relocation and Railroad Crossing Improvement Study. The study will focus on the Canadian National (CN) railyard, the rail lines leading into the yard, associated at-grade railroad crossings, and their effects on the surrounding neighborhoods. The planning study would address noise and air pollution, safety concerns, and the aesthetics of industrial facilities. The current railyard creates numerous environmental burdens on a disadvantaged community and is a major source of air pollution. The area is in the top percentile in the state for asthma, persons with disabilities, people of color, low income, unemployment rate, and low life expectancy. Blocked rail crossings in the corridor prevent students from getting to school if they reside on the opposite side of the tracks.

Aerial photo showing proximity of railyard to East High School in Waterloo



Source: City of Waterloo and INRCOG Grant Application

Key Issue: Hazardous Materials (hazmat)

For rail security in Iowa, the Iowa Homeland Security and Emergency Management Department (HSEMD) focuses primarily on hazardous materials events stemming from rail accidents. Activities include:

- Local Emergency Planning Commissions (LEPCs)
- Hazardous Materials Planning, ESF-10 Hazmat, Local and State
- Hazardous Materials Emergency Preparedness (HMEP) Grant
- High-Hazard Flammable Train (HHFT) Reports

Local Emergency Planning Commissions (LEPCs)

LEPCs are groups from various disciplines that are organized to inform the public, enhance preparedness, and increase readiness to respond to a hazardous materials event in Iowa. Typical members of an LEPC include the local emergency management administrator (EMA), fire, police, paramedics, elected officials, hospitals and public health officials, media, handlers and producers of hazardous materials, and anyone else interested in improved awareness and preparedness for hazardous materials events. LEPCs can cover a single county or multiple counties. They are required to update their membership and their hazardous materials plans annually.

Iowa HSEMD maintains records of LEPC membership, helps to update the LEPC handbook, and provides plan review, training opportunities, and exercise support to LEPCs. HSEMD also holds an annual meeting with state-level stakeholders to ensure awareness of hazardous materials response activities statewide.

Hazardous Materials Planning, ESF-10 Hazmat, Local and State

Iowa HSEMD maintains the State Response Plan and ensures local response planning is accomplished by local EMAs. Response planning is in the Emergency Support Function (ESF) format, and ESF-10 covers hazardous materials or hazmat.

Local EMAs are required to update ESF-10 Hazmat annually. ESF-10 focuses on fixed facilities within their county that store hazardous materials above a certain threshold and on transportation of hazardous materials, primarily by rail and road.

ESF-10 must identify facilities and transportation routes, response entity capabilities, current contact information for fixed facilities, and contact information for any entity in the vicinity of a fixed facility or transportation route that may contribute to a hazardous materials response, such as a school, daycare, or assisted living facility. HSEMD provides minimum planning standards for all ESFs, including ESF-10. HSEMD reviews local ESF-10s annually to ensure compliance. LEPCs are required to assist in updating ESF-10s annually. HSEMD also maintains the state ESF-10 and updates it annually.

Hazardous Materials Emergency Preparedness (HMEP) Grant

HMEP is a grant from the U.S. DOT that HSEMD administers. HMEP funds focus on hazardous materials transportation events. These funds can be used to train personnel, conduct exercises, update plans, conduct commodity flow studies, or support the grant recipient in preparedness to respond to a transportation hazmat event. To access HMEP funds, an entity must be an active member of an LEPC, and the funding must be used to address a hazardous materials event in the transportation sector.

High-Hazard Flammable Train (HHFT) Reports

Rail carriers generate HHFT reports. These reports are required when a rail carrier has a train that includes hazardous materials with a higher risk of causing a fire if an incident occurs. HHFT reports are sent to HSEMD and shared with state and local partners such as Iowa DOT, the Iowa Department of Natural Resources, local EMAs, and LEPC chairs along the HHFT route. HSEMD also maintains a database of these reports.



Key Issue: Chokepoints

Chokepoints exist throughout Iowa's railroad network, constraining railroad operating capacity, efficiency, velocity, and safety, as well as freight mobility. Typical chokepoints in the state include the following and are highlighted on Figure 4.34.

Operational and Infrastructure

Limitations in infrastructure and trackage rights reduce the efficiency of railroad operations in some areas. Trains may spend more time idling while waiting for an interchange to be clear or there might be insufficient capacity to accommodate current or future train volumes.

Timber Trestle Bridges (Wagon Bridges)

These bridges are typically older structures built in the late 19th or early 20th century in rural locations that restrict the types of rail cars that can pass under them because of vertical and horizontal limitations. These bridges are typically the responsibility of local jurisdictions (typically counties) that lack the resources to replace them. Most Iowa timber trestle bridges are found in the southern portion of the state.

Flood Prone Areas

Many areas in the state are prone to semi-frequent flooding that limits the operations of railroads. In addition to preventing the movement of trains, floodwaters can also damage rail infrastructure.

Swing Span Bridges

Several bridges along the Mississippi River owned by the railroads must swing open to allow barge traffic to move beneath them. This can create delays for trains crossing them during peak seasons.

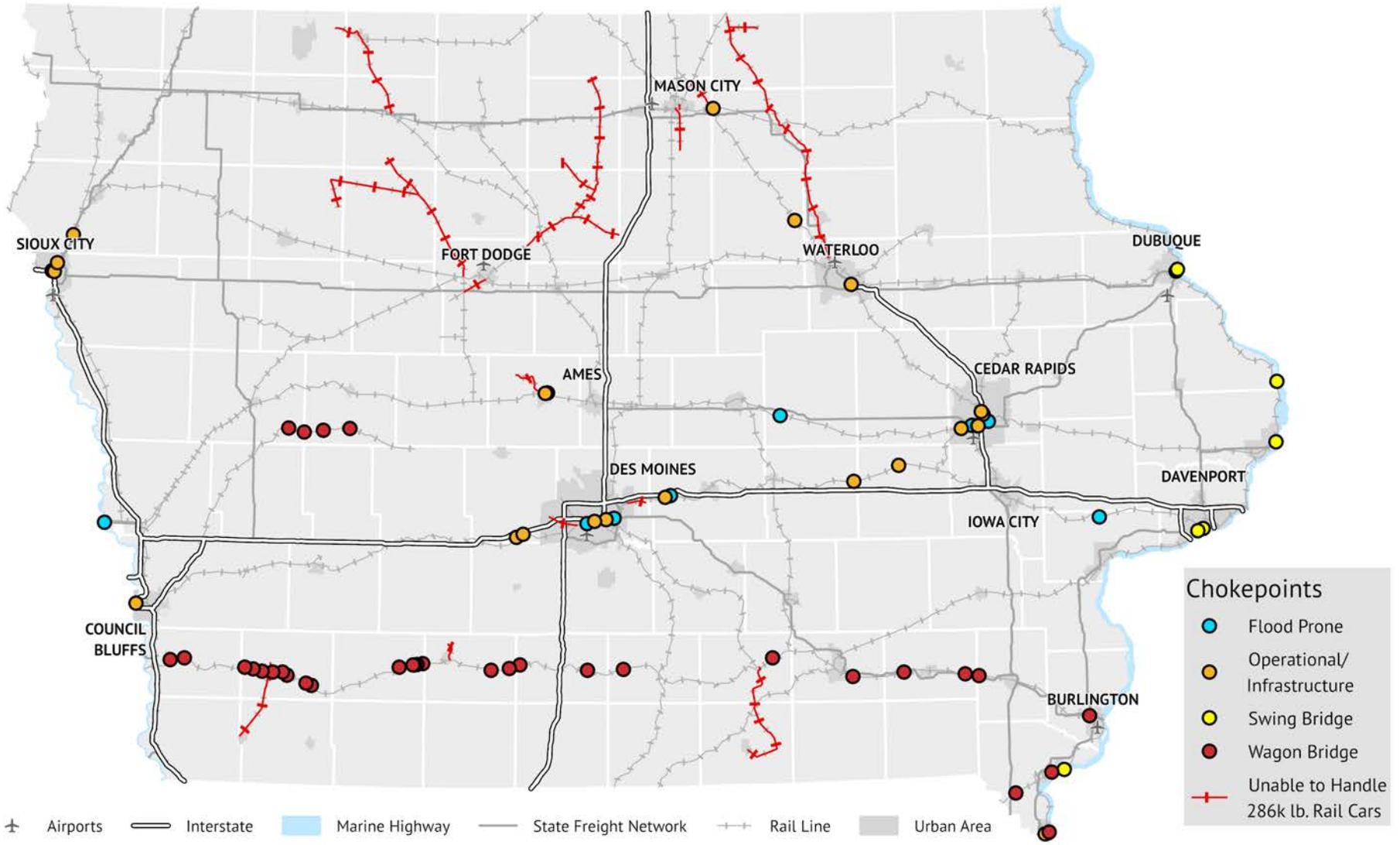
286,000-Pound Railcar and Track Weight

Railcars with a maximum gross weight of 286,000 lbs. is the industry standard for railroad transportation. The ability to handle maximum carloads of 286,000 lbs. is of importance to manufacturers of large commodities, such as wind turbines, that may consider locating along rail lines in Iowa.

Montgomery County Wagon Bridge on L Ave near Red Oak, Iowa



Figure 4.34: Iowa rail chokepoints, including rail lines incapable of handling 286,000 lb. railcar weights



Source: Iowa DOT, Class I, Class II, and Class III Railroads

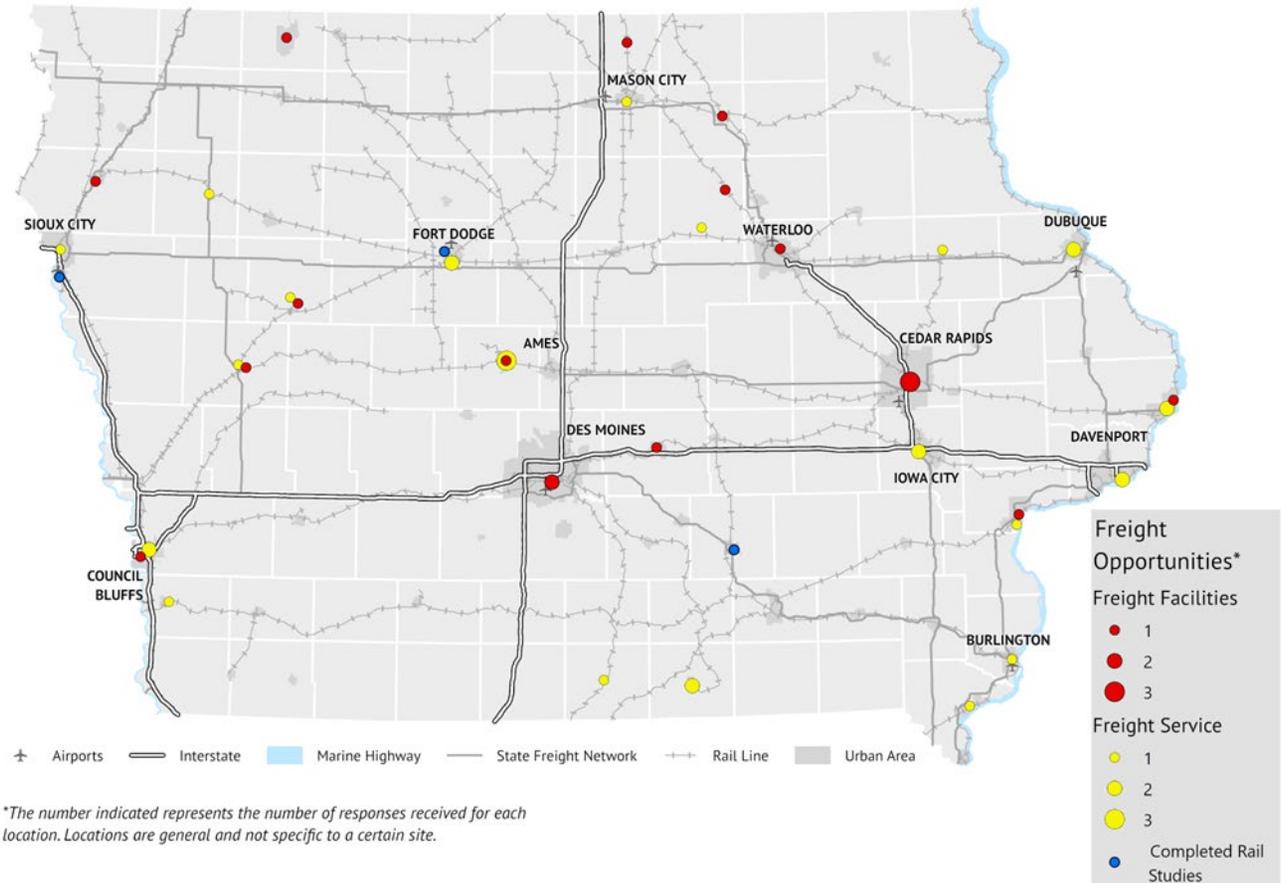


Key Issue: Freight Opportunities and Growth Limitations

Discussions with operating railroads in Iowa show a fluid planning of capital improvements and investments into their respective networks. The greatest area of investment can be seen in through new transload facilities and logistical park development. There is a growing need to increase railroad access to provide new shipper connections and transload facilities with access to the freight network. Iowa Economic Development has identified eleven development ready areas as part of Iowa's Certified Sites program.

Figure 4.35 represents locations identified by railroad representatives as growth opportunities in both freight service and freight facilities. More information about engagement with rail stakeholders can be found in Chapter 6.

Figure 4.35: Railroad opportunities identified by stakeholders



Source: Iowa DOT Stakeholder Rail Opportunity Mapping Exercise

Key Issue: Passenger Rail Service

As metropolitan areas throughout Iowa continue to grow, the need to consider a diverse network of passenger transportation options that will accommodate this growth will continue to be a factor. Given freight railroads' existing and projected traffic volumes, rail line capacity likely will loom large as an issue for new passenger rail service implementation. Passenger rail sponsors will need to engage the freight railroads in analysis of the infrastructure improvements required to assure fluid and reliable freight and passenger operations in shared-use corridors.

Potential for commuter, intercity, and multimodal lines to provide connectivity and passenger rail services may exist in several areas of the state, as discussed in Chapter 2. These include the following.

- New intercity service
 - Studied routes
 - Chicago to Council Bluffs-Omaha
 - Chicago to Dubuque
 - Conceptual routes
 - Dubuque to Sioux City
 - Twin Cities to Des Moines
 - Twin Cities to Kansas City
 - Twin Cities to Sioux City
- New commuter rail service
 - Cedar Rapids to Iowa City
 - Des Moines area
 - Council Bluffs to Omaha

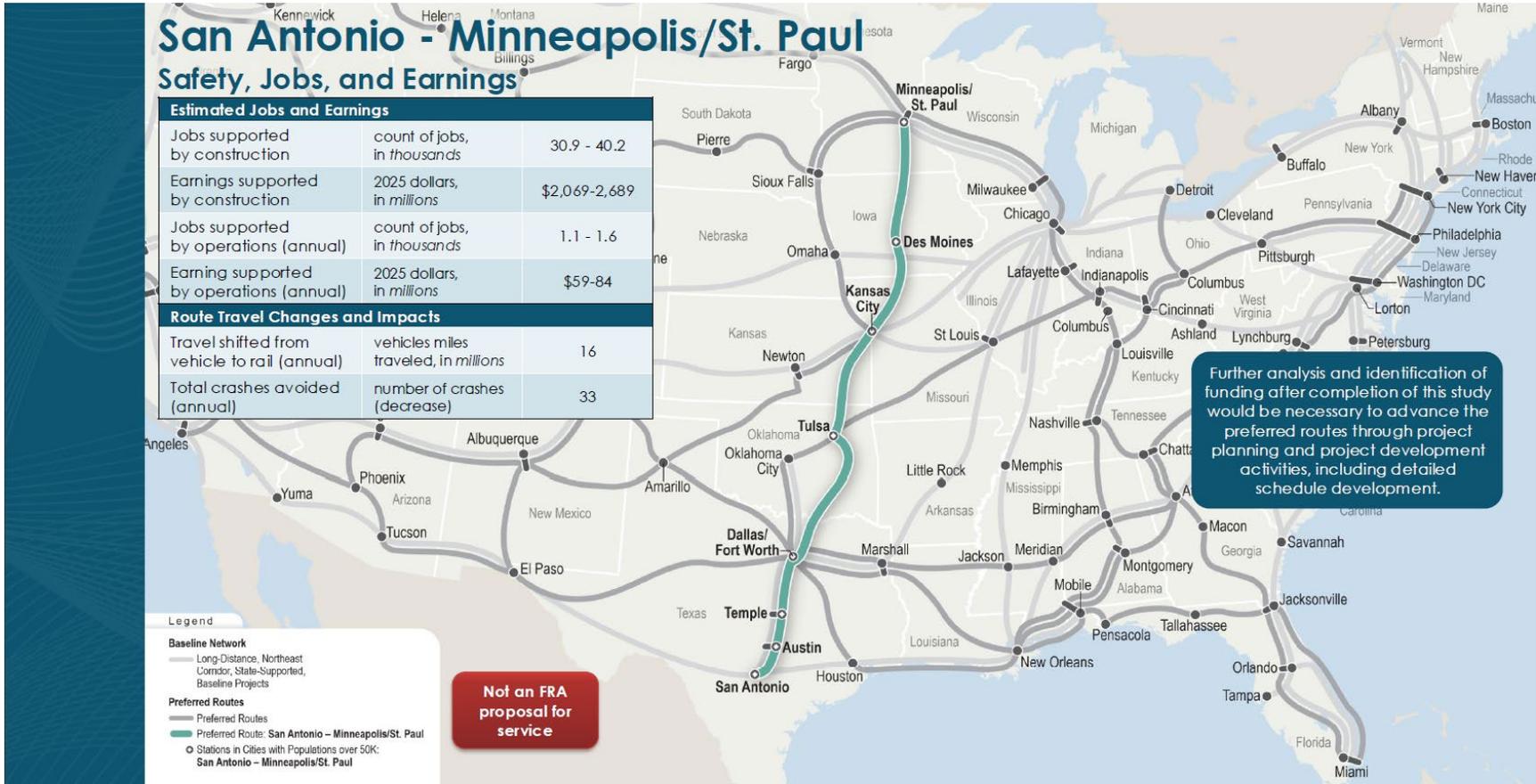
An Amtrak interline rail concept (coordinating with intercity bus providers) could also be a type of rail service to explore in Iowa. This could help couple new or existing Amtrak service with intercity bus companies such as Burlington Trailways and Jefferson Lines, which serve several of these interstate and intrastate markets today.

The FRA is conducting an Amtrak Daily Long-Distance Service Study to evaluate the restoration of daily long-distance intercity rail passenger service and the potential for new Amtrak long-distance routes. This study will ultimately create a long-term vision for long-distance passenger rail service and identify capital projects and funding needed to implement that vision. The two long distance route alternatives that would benefit Iowa are shown in Figures 4.36 and 4.37.

Each potential opportunity for enhancing existing service or adding new service comes with considerable investment needs for planning, development, and operation. Rail funding sources often have unpredictable grant cycles, making it challenging to align rail development with state programmed resources. Recent discussion of allocating federal formula funding to each state is of growing interest and supported by Iowa. Designated funds could allow improvement projects to be programmed on a routine cycle, increasing the likelihood of expanding passenger rail service in Iowa.

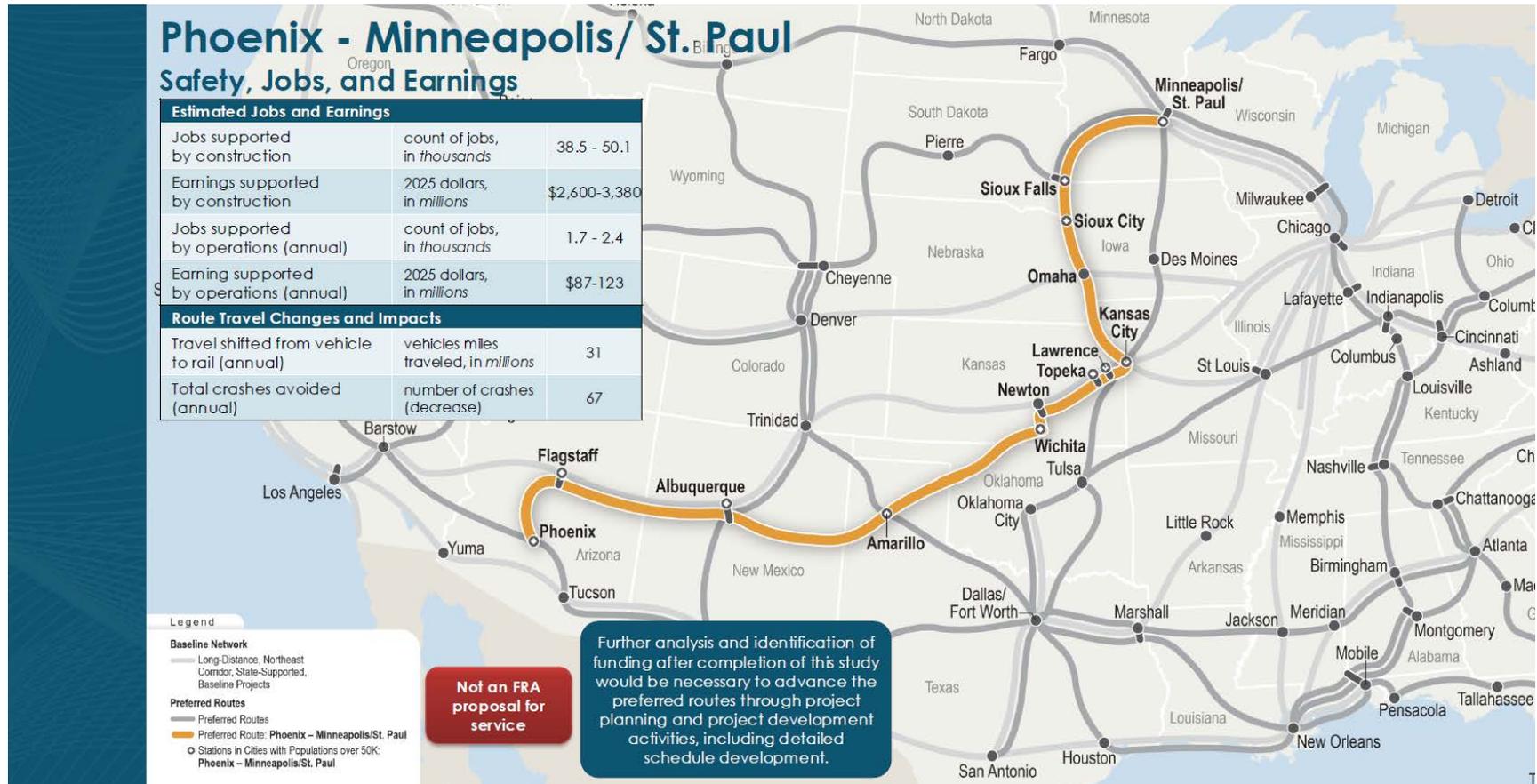


Figure 4.36: FRA Long Distance Route Alternative San Antonio -Minneapolis/St. Paul



Source: FRA Long Distance Service Study Alternative Route Options

Figure 4.37: FRA Long Distance Route Alternative Phoenix-Minneapolis/St. Paul





Chapter Endnotes

ⁱ For example, '01' represents 'Farm Products', '011' identifies 'Field Crops', '0112' indicates 'Raw Cotton', etc., narrowing in specificity to a seven-digit level.

ⁱⁱ STB WAYBILL designates freight rail movements via two STCC conventions: one includes the 49xxxxx (HAZMAT-related) and 50xxxxx (bulk movements) STCC designations; the alternative translates those HAZMAT- and bulk-related movements into actual product STCC. Summary data herein pertains to the non-HAZMAT/non-bulk STCC convention.

ⁱⁱⁱ STCC is a detailed 7-digit numeric code with about 750 product classifications, published/maintained by the Association of American Railroads (AAR), that are generally collapsed for analysis purposes into 4-digit or 2-digit summaries. Conversely, STCG is based on the Harmonized Commodity Description and Coding System product classifications tailored for transportation modes. The 5-digit SCTG comprises over 1,100 product classifications; however, FAF only provides information at the 2-digit summary level. Unfortunately, collapsibility between the two conventions differs due to the overarching needs of the organizations that developed them. While STCC is railroad-based commodity classification system, STCG is a broader-based multimodal classification system for all modes. So, developed for different purposes and modal use, STCC and STCG are different tools used for different purposes, which happened to overlap on quantification of rail movements. Most notably for Iowa products is the difference in classification of ethanol between STCC (Chemical and Allied Products) and STCG (Alcoholic Beverages).

^{iv} Since FAF does not provide specific through-state movement data, total tonnage growth for the United States was used based on an FHWA study that results in a 1.1% annual growth rate through 2050. [Freight Analysis Framework Commodity Flow Forecast Study \(FAF Version 5\): Final Forecasting Results \(dot.gov\)](#)

^v While useful for aggregate directional comparisons, commodity code variance between the two sources (STCC-Transearch versus STCG-FAF) can present complications when/if broken down by commodity groups due to variances between sub-group composite commodities.

^{vi} Amtrak Fact Sheet. Fiscal Year 2023. State of Iowa.

^{vii} Association of American Railroads. MSTRS Spring Meeting: The North American Rail Industry. May 11, 2023. Accessed: October 2024.

^{viii} Ibid.

^{ix} Freight rail greenhouse gas emissions data obtained from U.S. Department of Transportation's Freight Transportation Energy Use & Environmental Impacts (accessed October 2024), while freight rail volume data obtained from the U.S. Department of Transportation Bureau of Transportation Statistics' Freight Activity in the United State: 1993, 1997, 2022, 2012, and 2017 (accessed: October 2024).

^x Texas A&M Transportation Institute. A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001 – 2019. January 2022. Accessed: October 2024.

^{xi} Ibid.

^{xii} Oak Ridge National Laboratory, Transportation Energy Data Book 40. 2022. Table 2.13 Average Per-Passenger Fuel Economy by Travel Mode. October 2022.