



INDIANA

MULTIMODAL FREIGHT PLAN UPDATE 2018



prepared for
INDOT

prepared by
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with
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Introduction



INDIANA FREIGHT AT-A-GLANCE

In 1937 Indiana adopted the official state motto of, “Crossroads of America.” What began as an allusion to the many highways crisscrossing the State has taken on greater meaning in the 80 years since. While the State ranks first in the U.S. with 13 pass-through interstates, it also maintains important freight connectivity through railroads, waterways, and airways. In addition, the central location of the State means that 75 percent of U.S. and Canadian populations live within a day’s truck trip of Indiana. Additional highlights are shown below.

Infrastructure:

- 97,553 public roadway miles (19th in the U.S.)¹
 - » 11,175 state highway miles (22nd in the U.S.)
- 19,017 road bridges (12th in the U.S.)²
 - » 5,484 state highway bridges (21st in the U.S.)
- 4,075 railroad miles (9th in the U.S.)³
 - » 41 freight railroads (3rd in the U.S.)
- 350 inland waterway miles (24th in the U.S.)
 - » 3 public water ports, 67 private water terminals
- 405 public and private airports (9th in the U.S.)
 - » 3 cargo airports

Freight Traffic:

- 79 billion vehicle miles traveled⁴
- 7.5 million carloads, and 328 million tons of rail freight (2014)⁵
- 66 million tons of waterborne freight (2015)⁶
- 5 billion lbs of landed air cargo (Indianapolis, Fort Wayne, South Bend airports)⁷

¹ Federal Highway Administration, Highway Performance Management System, 2015.

² Federal Highway Administration, National Bridge Inventory, 2016.

³ Indiana Department of Transportation, State Rail Plan, 2017.

⁴ U.S. Department of Transportation, State Transportation Statistics, 2015.

⁵ Surface Transportation Board, Waybill Sample, 2014.

⁶ U.S. Army Corps of Engineers, Navigation Data Center, 2015.

⁷ Federal Aviation Administration, Air Carrier Activity Information System, 2016.



2015 Goods Movement



MODE	TONS (1,000S)	%	VALUE (M\$)	%	VALUE/TON
TRUCK	99,214	64%	\$207,879	85%	\$2,095
RAIL	46,950	30%	\$17,689	7%	\$377
WATER	8,298	5%	\$1,313	1%	\$158
AIR	118	0%	\$18,406	8%	\$155,983
GRAND TOTAL	154,580	100%	\$245,288	100%	\$1,587



MODE	TONS (1,000S)	%	VALUE (M\$)	%	VALUE/TON
TRUCK	106,128	74%	\$219,344	84%	\$2,067
RAIL	27,261	19%	\$21,584	8%	\$792
WATER	8,962	6%	\$1,765	1%	\$197
AIR	119	0%	\$18,552	7%	\$155,899
GRAND TOTAL	142,470	100%	\$261,243	100%	\$1,834



MODE	TONS (1,000S)	%	VALUE (M\$)	%	VALUE/TON
TRUCK	209,378	92%	\$139,826	97%	\$668
RAIL	15,050	7%	\$3,506	2%	\$233
WATER	2,342	1%	\$57	0%	\$24
AIR	2	0%	\$121	0%	\$60,500
GRAND TOTAL	226,772	100%	\$143,510	100%	\$633



MODE	TONS (1,000S)	%	VALUE (M\$)	%	VALUE/TON
TRUCK	414,720	79%	\$567,049	87%	\$1,367
RAIL	89,261	17%	\$42,779	7%	\$479
WATER	19,602	4%	\$3,135	0%	\$160
AIR	239	0%	\$37,079	6%	\$155,142
GRAND TOTAL	523,822	100%	\$650,041	100%	\$1,241

Source: Freight Analysis Framework Version 4.

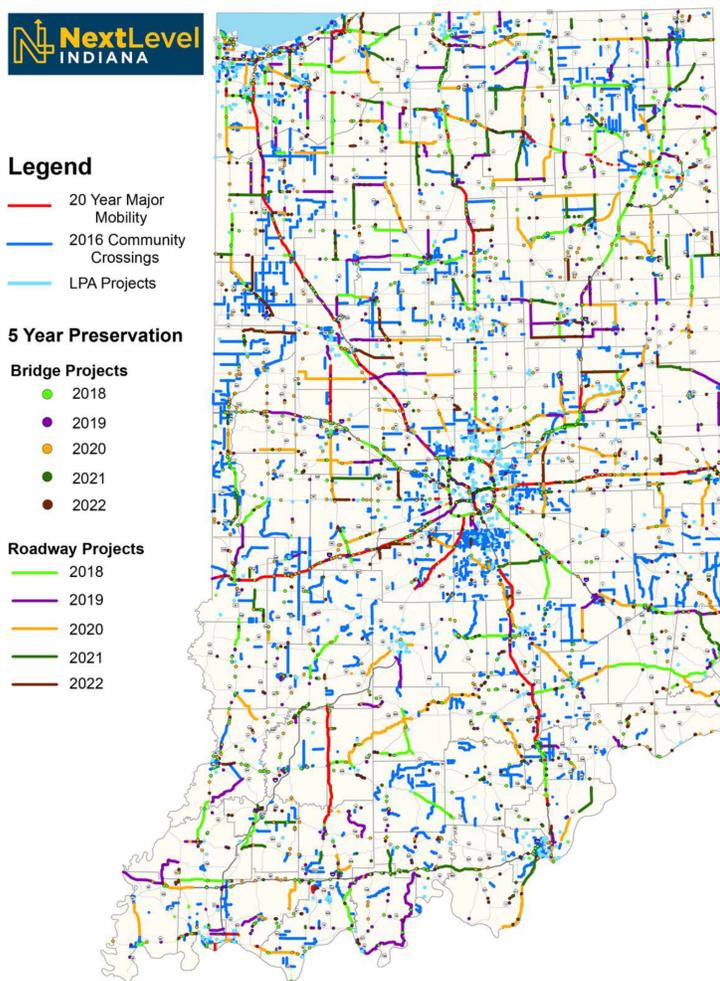
Note: INDOT recognizes a discrepancy between some FAF4 totals and those gathered by specific modal agencies, such as the US Army Corps of Engineers Navigation Data Center. FAF incorporates multiple raw data sources into its model to derive broad trends in commodity flows and supply chains. FAF4 methodologies often differ from raw data collection in how freight and cargo is defined, how it is geographically attributed, and also how trips are characterized. For policy-making purposes, this plan defers to modal calculations and ratios derived from FAF analysis.



INDOT 2018 – THE NEXT LEVEL

During its 2017 legislative session, the Indiana General Assembly adopted the Next Level Trust Fund to address a number of key Indiana transportation needs. The targeted approach is aimed at: great customer service, economic competitiveness, road and bridge maintenance, and workforce development. The bill, HEA 1002, also provides funding for a local road and bridge matching grant fund. This matching funding source will enable local governments to meet more of their transportation and infrastructure needs with their available funding.

A press release from the Governor's Office said of the bipartisan passage of HEA 1002, "Indiana has a fully-funded plan to operate, maintain and improve every state road and bridge – a fact almost no other state can claim." The bill also appropriates a substantial amount toward the local road and bridge matching grant fund; beginning at 14.286% and rising to 21.429% after fiscal year 2019. In addition, the Governor added, "Our transportation network of roads and bridges plays a major part in Indiana's success story both now and in the future... With a fully-funded plan in place for the next 20 years, Hoosiers can rest assured that Indiana will remain the Crossroads of America for generations to come. I thank our lawmakers for their committed leadership to make this possible, and I commend INDOT for working hard to identify key projects so that we could be ready to roll with this five-year plan so quickly." Additional details are shown in Appendix E.



5-year investment total: \$5,112,851,378

Investment by year:

2018	\$1,031,965,168
2019	\$971,149,402
2020	\$971,103,013
2021	\$984,877,408
2022	\$1,153,756,387

5-year impact

- 122 lane miles added
- 9,628 lane miles resurfaced
- 1,295 bridges rehabbed or replaced



Figure 1. Next Level Investment Plan





INDIANA 2018 MULTIMODAL FREIGHT PLAN UPDATE

This document serves as an update of the 2014 Indiana Multimodal Freight and Mobility Plan. In coordination with broad INDOT goals, the goals of the freight plan update build on the 2014 freight plan and drill down into specific areas directly impacting the movement of goods on Indiana's highways, railroads, waterways, and air cargo system. They are as follows:

1. Identify opportunities to improve and maintain Indiana's transportation infrastructure, supporting the safe, efficient movement of freight through the State;
2. Reduce bottlenecks to improve the reliability and efficiency of freight movement, leading to less congestion, fewer infrastructure repairs, and lower emissions;
3. Promote better connectivity between all modes of freight transportation, including Indiana's water ports, highway, rail, and airports;
4. Develop and implement transportation networks that support direct truck and rail access, waterborne freight expansion, and air cargo expansion, leading to the improvement and establishment of multimodal and intermodal service facilities.

The following chapters of this document identify current conditions on each of the major freight modes, estimate current and future goods movement trends, identify economic trends and opportunities, and prescribe specific action items for future state support of efficient freight movement in Indiana.

PURPOSE OF THE PLAN

On December 4, 2015, President Obama signed into law Public Law 114-94, the Fixing America's Surface Transportation Act (FAST Act). The FAST Act funds surface transportation programs – including, but not limited to, Federal-aid highways – at over \$305 billion for fiscal years



(FY) 2016 through 2020. The FAST Act builds on the changes made by the Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012. The Acts created several provisions to make the Federal surface transportation program more streamlined, performance-based, and multimodal, and to address challenges facing the U.S. transportation system, including improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery.

One of the important features of the Act was to require State Freight Plans for National Highway Freight Program eligibility. Specifically, to receive funding under the National Highway Freight Program (23 U.S.C. 167), the FAST Act requires each State to develop a State freight plan, which must comprehensively address the State's freight planning activities and investments (both immediate and long-range). A State may develop its freight plan either separately from, or incorporated within, its statewide strategic long-range transportation plan required by 23 U.S.C. 135. Among other requirements, a State freight plan must:

- ✓ Cover a five-year forecast period;
- ✓ Be fiscally constrained;
- ✓ Include a "freight investment plan" with a list of priority projects; and
- ✓ Describe how the State will invest and match its National Highway Freight Program funds.

The State must update its freight plan at least every five years, and may update its freight investment plan more frequently than the overall freight plan. [49 U.S.C. 70202(e)]

The Indiana Department of Transportation (INDOT) most recently completed a state freight plan update in 2014, and the purpose of this document is to update the effort and create a FAST Act-compliant Multimodal Freight Plan Update. In addition to content from the 2014 Multimodal Freight and Mobility Plan, the 2017 Multimodal Freight and Mobility Plan (MFMP) plan also incorporates relevant content from several other statewide planning documents, including:

- 2012 Indiana State Aviation System Plan (ISASP).
- 2017 State Rail Plan.
- 2013-2035 Future Transportation Needs Report.
- 2014 Joint Transportation Research Program Report, Impact of HEA-1481 on Indiana's Highway Revenue Generation, Asset Degradation, Modal Distribution, and Economic Development and Competitiveness.

Table 1 displays FAST Act State Freight Plan requirements and their respective locations within the document.

Table 1. Freight Plan Reference Guide

FAST ACT – FREIGHT PLAN CONTENT REQUIREMENT	LOCATION(S) AND DESCRIPTION
Identification of significant statewide needs and issues	Chapter 4, Pages 39-49 Chapter 5, Pages 56-59
Description of freight policies, strategies, and performance measures that will guide freight-related transportation investment decisions	Chapter 6, Pages 61-67
Critical multimodal rural freight facilities	Chapter 7, Page 69
Critical rural and urban freight corridors	Chapter 7, Pages 70-71
Link to national multimodal freight policy and highway freight program goals	Chapters 6, Pages 61-62
Description of innovative technologies and operational strategies (including ITS) that improve the safety and efficiency of freight movements	Chapter 8, Pages 77-91
A description of improvements to reduce roadway deterioration by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles)	Chapter 8, Pages 78-81
Inventory of facilities with freight mobility issues and a description of the strategies the State is employing to address the freight mobility issues	Chapter 4, Pages 39-49 Chapter 5, Pages 51-55
Description of significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay	Chapter 7, Pages 69-75
Freight investment plan that includes a list of priority projects and describes investment and matching funds	Chapter 7, Pages 72-75
Consultation with the State freight advisory committee, if applicable	Chapter 7, Page 72-75



Indiana's Freight Story

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OVERVIEW

The Indiana freight network is a robust multimodal system comprised of highway, railroad, port and waterway, and air cargo facilities, as well as intermodal connections between each. The official State motto is "The Crossroads of America," and while that pre-dates the complex transportation system of today, Indiana remains well-positioned with efficient access to 75 percent of United States and Canadian populations. This section provides an overview of Indiana's freight infrastructure, shown in Figure 2. More detailed analysis of each follows.



Indiana Gateway Project in Northwest Indiana

Highlights

6th largest cargo airport in the nation at Indianapolis International Airport.

3rd in total freight railroads with 42.

9th among all states for railroad mileage with 4,273 miles.

9th in the nation in rail tons originated with 56.2 million tons.

Network of more than 680 commercial and general aviation airports.

12th in the nation in total foreign and domestic waterborne shipping with 61 million tons.

Source: Conexus Indiana.



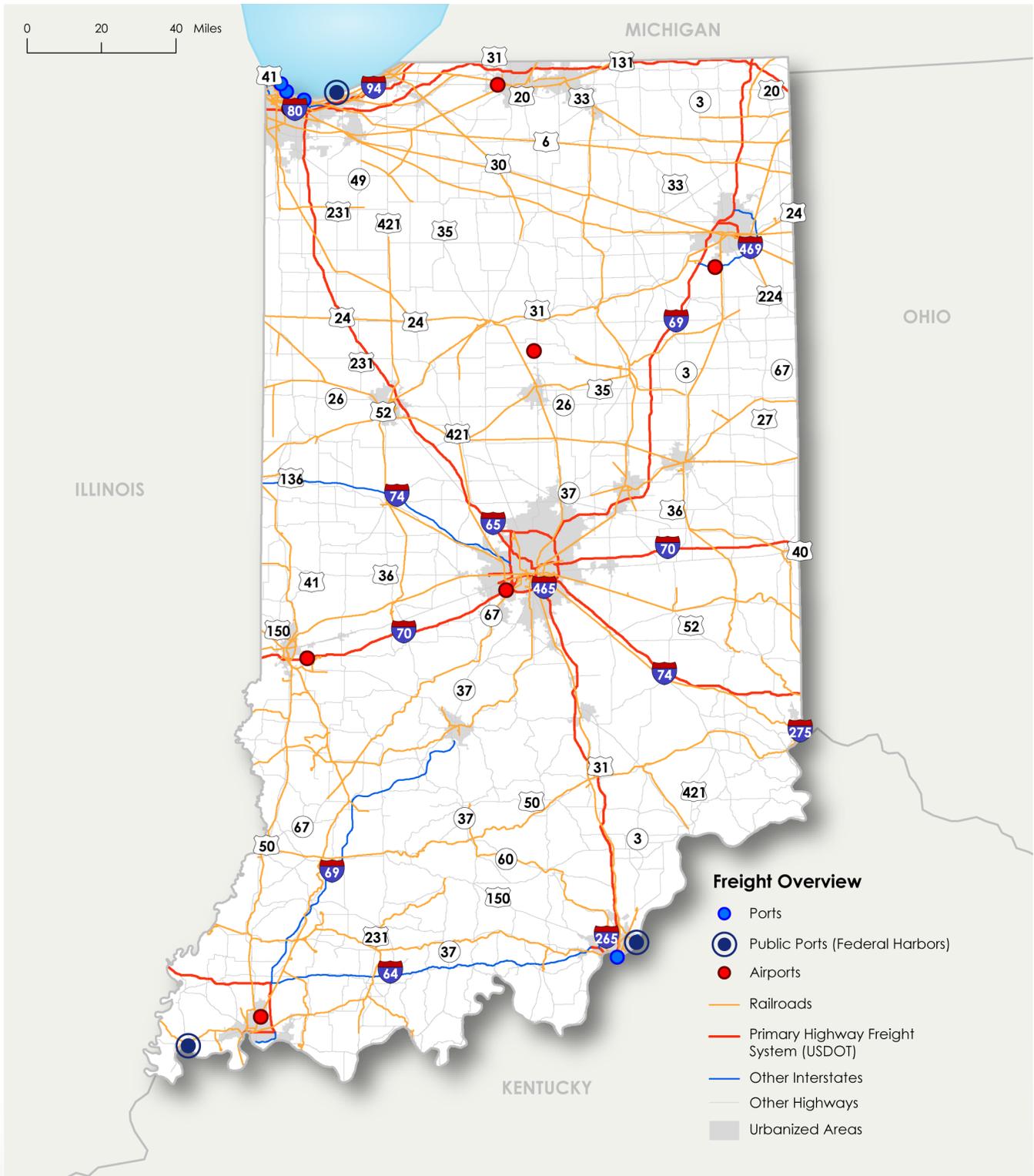


Figure 2. Indiana's Freight System



INDIANA'S HIGHWAYS

The highway network is the largest component of Indiana's freight network in terms of amount of infrastructure, tonnage shipped, and value shipped. The highway freight network provides first and last mile connections to other modes in addition to supporting many of Indiana's key industries.

Key Highway Commodities

Trucks traveling on Indiana's highways carry a wide variety of commodities. As shown in Figure 3, the top 10 truck commodities carry 66 percent of the tons to, from, and within Indiana and 69 percent of the value. Gravel, base metals, and cereal grains are the top three commodities carried by truck by tonnage. Motorized vehicles, mixed freight, and base metals are the top three commodities by value that are transported by truck.

Infrastructure

The Indiana highway system comprises more than 97,000 centerline miles. The Indiana Department of Transportation (INDOT) owns approximately 12 percent of this mileage (11,838 miles).⁸ In addition to the mainlines and frontage road mileage in the State, over 700 miles of publicly-owned ramps must be maintained.

For the purpose of freight and mobility planning for state-owned roadway facilities, INDOT has historically used a corridor hierarchy system based on connectivity, purpose, and the National Highway System (NHS) that consists of the following categories:

⁸ Highway Pavement Management System (HPMS), 2015.

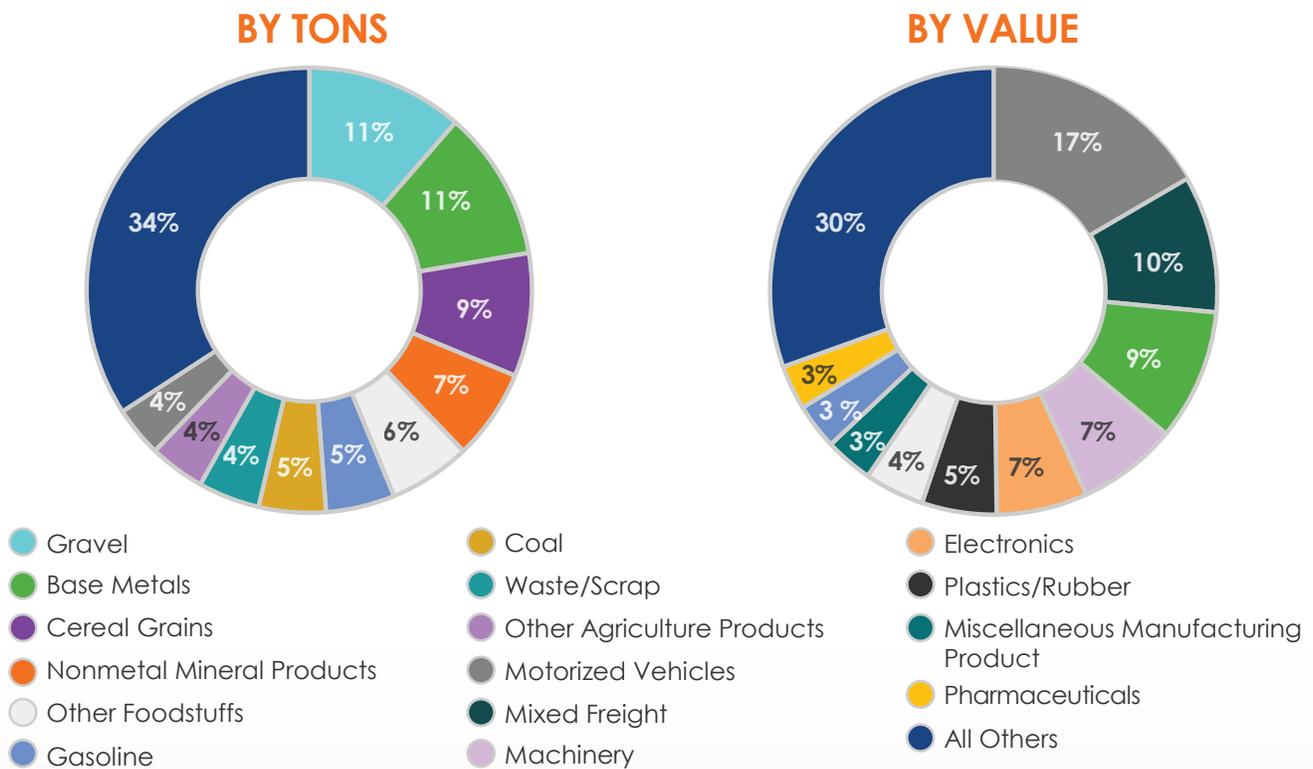
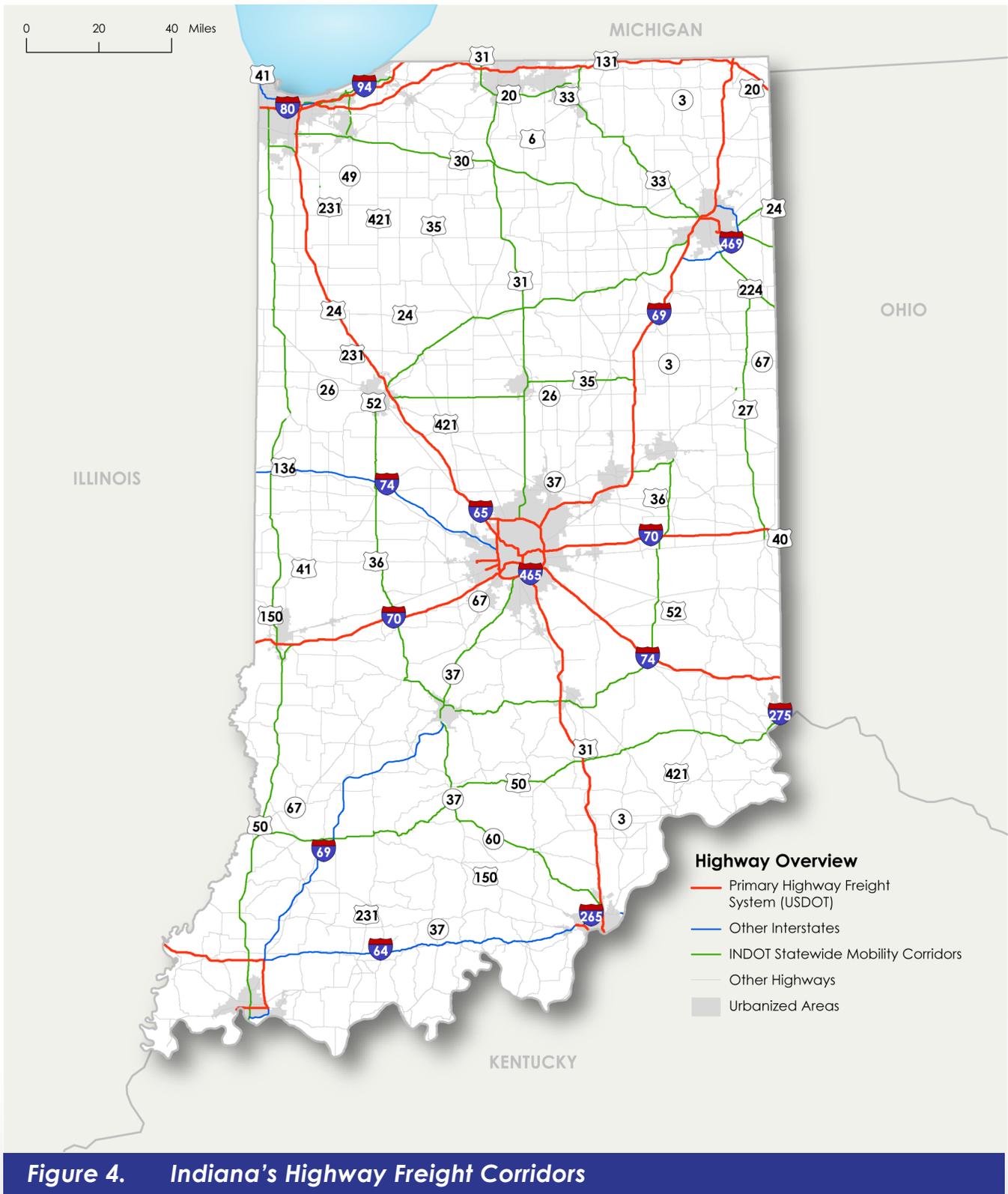


Figure 3. Top Truck Commodities in Indiana, 2015

Note: The industries associated with these commodities are shown in Appendix A.
 Source: Federal Highway Administration, Freight Analysis Framework Version 4.3, 2017.





- **Interstates;**
- **Principal Arterial Network** – Non-interstate roadways which provide access between an arterial route and a major port, airport, public transportation facility or other intermodal transportation facility;
- **The Strategic Highway Network (STRAHNET)** – High-ways important to U.S. strategic defense, including access connector routes between major military installations and the STRAHNET; and,
- **Intermodal Connectors** – Roads that connect National Highway System (NHS, see below) routes to intermodal transportation facilities: ports, international border crossings, airports, public transportation and transit centers, interstate bus terminals, and rail yards.

INDOT uses a corridor hierarchy system for statewide prioritization of needs. This hierarchy system has three levels led by roads that are part of the NHS.

- **Statewide Mobility Corridors** – These corridors are the top-end of the highway system and are meant to provide mobility across the State. They provide

safe, high-speed connections for long-distance trips between the metropolitan areas of Indiana and to those of surrounding states. They are the freight arteries of the State, and thus, are vital for economic development. INDOT has as a strategic goal to directly connect metropolitan areas of 25,000 in population or greater with a set of free flowing, high quality corridors.

- **Regional Corridors** – These corridors are the middle tier of the highway system and are meant to provide mobility within regions of the State. They provide safe, high-speed connections for medium-distance trips between smaller cities and towns.
- **Subregional Corridors** – These corridors make up the remainder of INDOT's highway system. They are used for safe, lower speed, short-distances trips. They provide access between local land uses and the rest of the State network.

This framework resulted in the network of freight corridors shown in Figure 4.

INDIANA'S RAILROADS

INDOT updated its State Rail Plan in 2017.⁹ The purpose of the plan was to summarize the existing conditions, needs and opportunities of the Indiana rail system and to engage stakeholders and the general public in a dialogue regarding the State's rail network.

Indiana's central location lends itself to a competitive rail system. Highlights are shown in the box.¹⁰

⁹ <http://www.in.gov/indot/2394.htm>.

¹⁰ Association of American Railroads, State Rankings, https://www.aar.org/Style%20Library/railroads_and_states/dist/data/pdf/State%20rankings.pdf.

Highlights

- 3rd in the number of freight railroads
- 9th in total rail mileage
- 9th in tonnage originated
- 9th in tonnage carried
- 4th in carloads carried
- 9th in rail employment and wages
- 7th in coal tons originated and 6th in coal tons terminated
- 6th in food product tons originated
- 1st in primary metal products originated and terminated



Key Railroad Commodities

Rail in Indiana carries mostly bulk, low-value commodities; other cargo includes automobiles and containerized cargo. As shown in Figure 5, the top 10 rail commodities comprise 90 percent of the tons to, from and within Indiana and 82 percent of the value. Coal, base metals, and cereal grains are the top three commodities carried by rail by ton-nage, with coal alone accounting for 38 percent of the ton-nage. Base metals, motorized vehicles, and machinery are the top three commodities by value that are transported by rail and account for 51 percent of the value.

Infrastructure

Indiana is third nationally in number of railroads and ninth in terms of railroad tonnage. Railroads are privately owned but have a direct impact on publicly owned infrastructure, such as highways, and on economic activity in the State. The Indiana rail network consists of 4,134 route miles, 2,457 of which are operated on by Class I railroads, predominantly CSX Transportation (CSXT) and Norfolk Southern (NS). The Canadian National Railroad (CN) also has operations in northern Indiana. The remaining short line railroad miles are operated by 40 port authority, regional, local, and switching and terminal railroads. Figure 6 shows Indiana's railroad system.

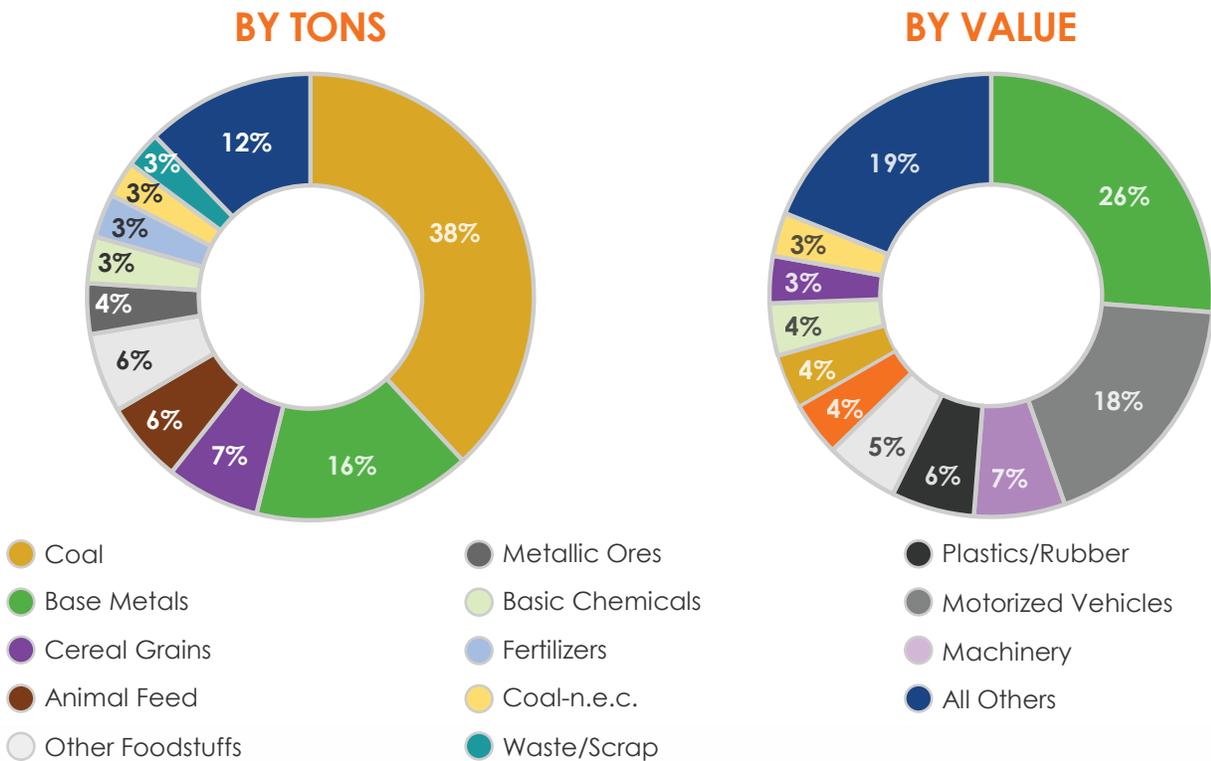


Figure 5. Top Rail Commodities in Indiana, 2015

Source: Federal Highway Administration, Freight Analysis Framework Version 4.3, 2017.

Note: The industries associated with these commodities are shown in Appendix A.



INDIANA RAIL SYSTEM MAP

- AMTK Amtrak
- BLRR Bee Line RR
- BFT Big Four Terminal Railroad
- CAPA City of Auburn Port Authority
- CEIW Central Indiana & Western RR
- CERA Central Railroad Company of Indianapolis RR
- CFER Chicago, Ft. Wayne & Eastern RR
- CIND Central Railroad Company of Indiana
- CKIN Chesapeake and Indiana Railroad
- CMPA City of Madison Port Authority RR
- CN Canadian National RR
- CNC C & NC RR
- CSSB Chicago, Southshore, & South Bend RR
- CSX CSX RR
- DCR Dubois County RR
- EVWE Evansville Western Railroad
- EWR Elkhart & Western Railway
- FLWB French Lick Scenic Railway
- GDLK Grand Elk Railroad
- GRW Gary Railway Company
- HCE HC Railroad
- HHPA Hoosier Heritage Port Authority
- HOS Hoosier Southern RR
- IERR Indiana Eastern Railroad
- IHBR Indiana Harbor Belt
- IN Indiana Northeastern RR
- INCR Indian Creek RR
- INOH Indiana & Ohio RR
- INRD Indiana Rail Road Company
- ISRR Indiana Southern RR
- ISW Indiana Southwestern Railway
- KBS Kankakee, Beaverville, & Southern RR
- KR Kokomo Rail
- KTR Kendallville Terminal RR
- LIRC Louisville & Indiana RR
- LORL Lucas Rail Lines dba LNA&C
- MGR MG Railroad
- MSO Michigan Southern Railroad
- NS Norfolk Southern RR
- OVR Ohio Valley Railroad
- PrivO Private Industry
- SIND Southern Indiana Railway
- TPW Toledo, Peoria, & Western Railway
- VVR Vermilion Valley Railroad
- WC Wabash Central RR
- WSR Winamac Southern RR
- WVRR Whitewater Valley RR

- Class I Railroads*
- Class II Railroads
- Class III Railroads
- City

*Based on Annual Revenue:
 Class I: $\geq \$457.9M$
 Class II: $< \$457.9M$ & $> \$36.6M$
 Class III: $\leq \$36.6M$

0 10 20
 Miles



Figure 6. Railroads in Indiana

Source: 2017 Indiana State Rail Plan. <http://www.in.gov/indot/2394.htm>.



Highlights

- 12th nationally in total foreign and domestic waterborne shipping, which is focused on the Ohio River and Lake Michigan
- Ohio River – 385 miles of border with two public ports operated by Ports of Indiana
- Lake Michigan – 43 miles of border with one public port operated by the Ports of Indiana

Source: BTS, AAPA, Ports of Indiana, USACE.

INDIANA'S WATERWAYS

Indiana moved over 61 million tons of freight through its waterways in 2016, through Lake Michigan and the Ohio River. The State ranks 11th among U.S. states in terms of tonnage by water and 3rd within the Great Lakes Region (behind Illinois and Ohio). About two thirds of Indiana's waterborne tonnage is inbound, 30 percent outbound, and less than 4 percent intrastate. Most waterborne movements in Indiana are domestic (97%) with a small share of foreign (3%) and intrastate movements (4%).¹¹

Table 2. Indiana Waterborne Tonnage, 2015 (Units of 1000 Tons)

DIRECTION	DOMESTIC	FOREIGN	TOTAL
Inbound	38,731	1,829	40,560
Outbound	18,585	0	18,585
Intrastate	2,171	0	2,171
Total	59,487	1,829	61,316

Source: <http://www.navigationdatacenter.us/wcsc/statetnm16.htm>.

Indiana has access to two of the busiest inland shipping channels in the world through its 400 miles of coastline along Ohio River and Lake Michigan, which create a robust maritime economy that generates an economic impact of \$21 billion per year and supports 155,000 jobs. Indiana ranks 11th in the nation in waterborne shipping, but much of this freight transportation is not well connected to other transportation systems, specifically the interstate system. National initiatives focusing on developing “Marine Highways” and multimodal freight corridors are being designed to improve these critical connections.

¹¹ BTS, AAPA, Ports of Indiana, USACE.



Key Water Commodities

Domestic water transportation (either in barges on the Ohio River or ships on Lake Michigan) in Indiana carries mostly bulk, low-value commodities. As shown in Figure 7, the top 10 water commodities account for 99 percent of the tons to, from, and within Indiana, and 92 percent of the value. Gravel, cereal grains, and non-metallic minerals (e.g., cement) are the top three commodities carried by water by tonnage, and they account for 80 percent of total tonnage. Cereal grains, crude petroleum, and other agricultural products (e.g., nuts and oils) are the top three commodities by value that are transported by water, and they account for 52 percent of the value. In addition, large volumes of iron ore and commodities related to steelmaking are transported to, from, and through Northwest Indiana.

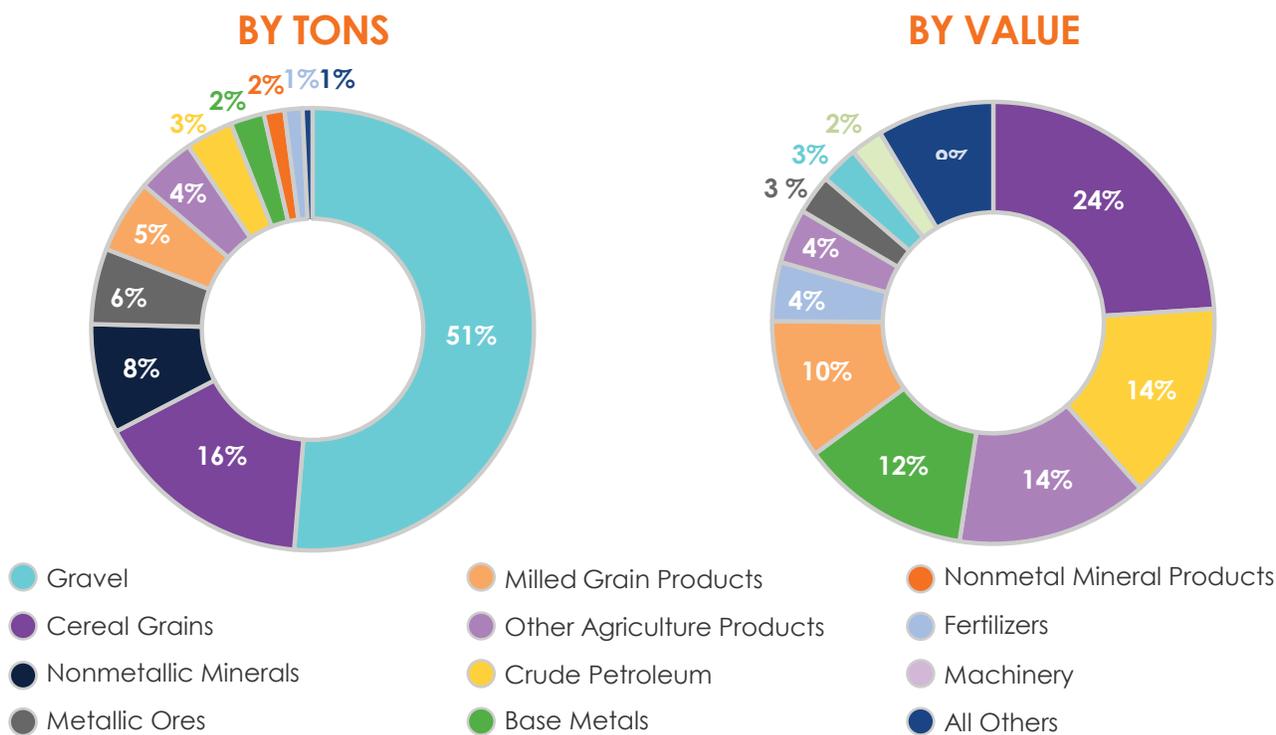


Figure 7. Top Water Commodities in Indiana, 2015

Source: Federal Highway Administration, Freight Analysis Framework Version 4.3, 2017.

Note: The industries associated with these commodities are shown in Appendix A.



Infrastructure

With Lake Michigan at its north and the Ohio River at its south, Indiana ports are conveniently reachable from points throughout the Great Lakes, the Mississippi River Valley, the Gulf of Mexico, and along the Atlantic Ocean. The Ohio River is maintained at a depth of 9 feet, does not freeze, and can ship cargo year-round. The Great Lakes are maintained at a depth of 27 feet and have a nine-month shipping season.



Figure 8. Great Lakes Ports in Indiana

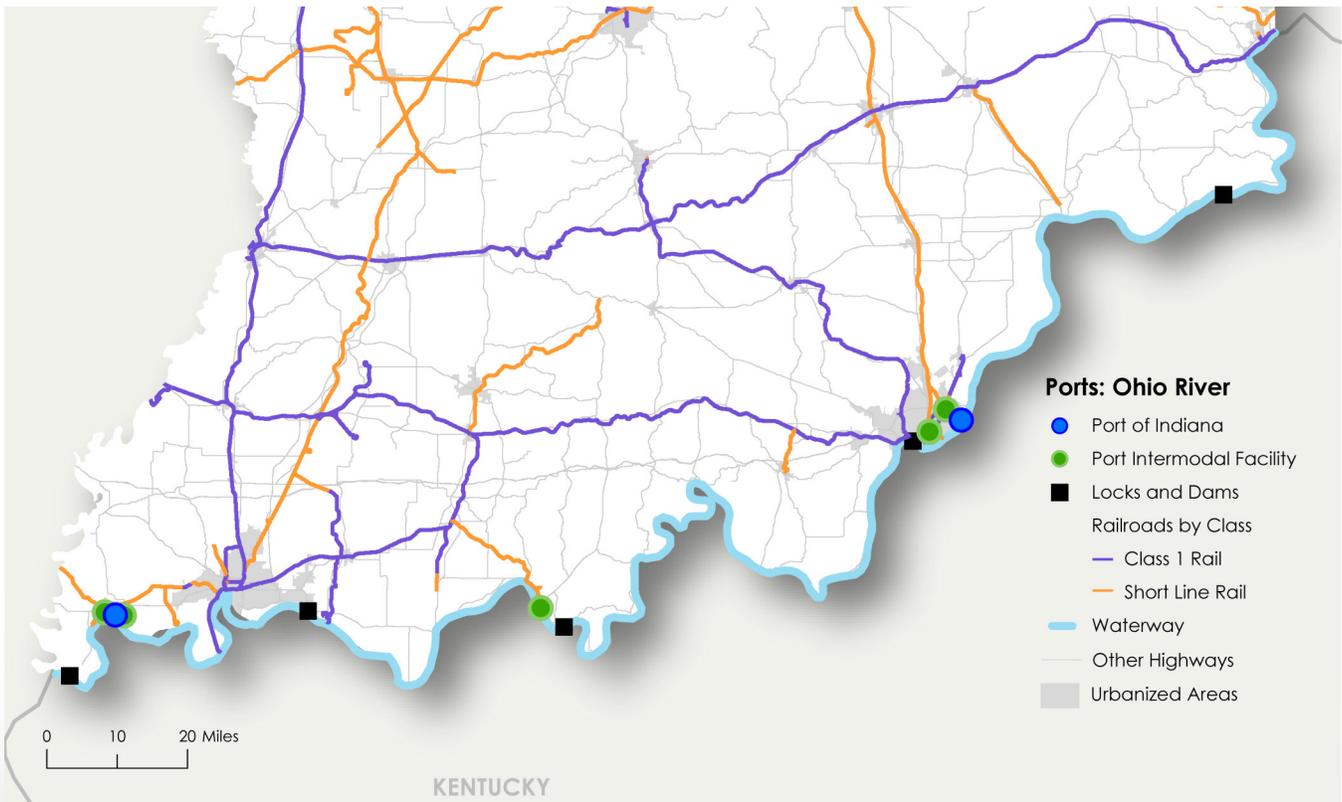


Figure 9. Ohio River Ports in Indiana



The Ports of Indiana, established by IC 8-10, operates three public marine ports, described below:

- Port of Indiana – Burns Harbor** is located on Lake Michigan in Portage, Indiana and is 18 nautical miles from Chicago.¹² The largest commodities processed at this port are steel, iron, and grain. The facility also handles substantial volumes of chemicals, fertilizers, limestone, coal, and heavy lift cargo. This port handles barges traversing the Inland Waterway System via the Illinois Waterway, bulk carriers traveling throughout the Great Lakes, and ocean vessels crossing the Atlantic via the St. Lawrence Seaway. The port facility has 30 on-site tenants and covers nearly 600 acres. It is served by four railroads, including one Class I railroad (NS). Indiana SR 249 connects the port directly to I-94, less than a mile away.
- Port of Indiana – Mount Vernon**, also on the Ohio River, is located approximately 15 miles west of Evansville, Indiana. The facility covers nearly 1,200 acres, has nine on-site tenants, and offers substantial growth potential. The port also offers year-round access to the Gulf of Mexico. The largest commodities traveling out of the port are coal and grain, and the largest incoming commodity is fertilizer. Cement and minerals are among the other commodities passing through this port. An ethanol plant on-site has the potential to greatly increase freight activity at the port. Rail service is available for five class I railroads, while the nearest limited access highway is I-69 in Evansville. Other highway access improvements were recently studied as part of INDOT's Transportation Asset Management Plan.¹³ The best performer of options tested, was an upgraded North-South connection along SR 69 to I-64.
- Port of Indiana – Jeffersonville** is located on the Ohio River, directly across the river from the city of Louisville, Kentucky. This rapidly growing facility includes an on-site "steel campus" where numerous value-added steel production activities occur. There are more than 25 on-site tenants, and it is adjacent to the River Ridge Commerce Center. River Ridge comprises 6,000 developable acres designated for industrial and office park use. The port also has over 300 acres of available, undeveloped land. The port primarily handles steel products, grain, and fertilizers. It is directly served by MG Rail, CSX and the Louisville and Indiana Railroad, as well as an on-site switching railroad.

A fourth public port has been proposed along the Ohio River in southeastern Indiana. The Ports of Indiana have entered an agreement to begin study on a 725-acre potential site in Lawrenceburg and Aurora. A decision on the purchase of the site is expected by the end of 2018.¹⁴ In addition to Indiana's public port system, there are numerous other port facilities throughout the State, most of them privately owned. The Federally designated ports of Indiana Harbor, Gary, and Buffington are complemented by Federal harbors comprised of many small private and local ports. These ports primarily serve the steel industry of northwest Indiana. Together with the three public Ports of Indiana, these six facilities handle nearly two-thirds of all waterborne freight in Indiana. Table 3 lists the rank, total tonnage, and domestic and freight tonnage for Indiana's five largest Federally-designated ports.

¹² Ports of Indiana. <http://www.portsofindiana.com/burns-harbor/global-markets/>.

¹³ <https://www.in.gov/indot/3231.htm>.

¹⁴ <https://calendar.in.gov/site/gov/event/indiana-eyes-lawrenceburgaurora-site-for-potential-fourth-port/>.



Table 3. Tonnage at Principal Ports¹⁵, 2015

PORT NAME	Rank	TOTAL	DOMESTIC	FOREIGN	IMPORTS	EXPORTS
Indiana Harbor, IN	47	11,617,126	11,363,107	254,019	254,019	0
Burns Waterway Harbor, IN	56	8,949,771	7,455,189	1,494,582	1,494,582	0
Mount Vernon, IN	59	8,375,192	8,375,192	0	0	0
Gary, IN	64	7,825,034	7,797,830	27,204	27,204	0
Buffington, IN	115	1,812,052	1,577,053	234,999	234,999	0

Source: <http://www.navigationdatacenter.us/data/datappor.htm>.

Highlights

Two of the top 100 cargo airports in the U.S.: Indianapolis International (7th) and Fort Wayne International (92nd)

Three top 100 cargo airports adjacent to Indiana: Louisville International (3rd), Chicago O'Hare (6th), and Cincinnati/Northern KY (9th)

Four Commercial service airports: Indianapolis International, South Bend International, Fort Wayne International, and Evansville Regional

INDIANA'S AIR CARGO SYSTEM

Indiana has three cargo service airports, defined by the Federal Aviation Administration as airports with landed weight of cargo-only aircraft totaling more than 100 million pounds per year: Indianapolis International (IND), Fort Wayne International (FWA), and South Bend International (SBN). Indianapolis International is the largest cargo airport in the State with over 5 billion lbs. of landed cargo in 2015 and 2016, and it was ranked the seventh largest cargo airport in the country. Table 4 lists the rank, landed weight, and percent change from 2015 to 2016 for Indiana's three cargo airports.

Table 4. Tonnage at Cargo Airports, 2016

Airport Name	National Rank	2016 Landed Weight (tons)	2015 Landed Weight (tons)	Percent Change
Indianapolis International	7	2,664,594	2,662,369	0.08%
Fort Wayne International	92	99,308	96,813	2.58%
South Bend International	119	52,633	50,166	4.92%

Source: https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats.

Key Air Commodities

Although air freight represents less than 0.1 percent of the State's freight traffic by weight, the Freight Analysis Framework Version 4 (FAF4) reports that it carries over 2 percent by value. This statistic represents the typical market for air freight, which primarily transports goods that are lighter weight, less bulky, higher value, and more time-sensitive. An example of this is the biotechnology industry, a major user of air freight services.

¹⁵ U.S. Army Corps of Engineers designated ports.



As shown in Figure 8, the top 10 air commodities carry 89 percent of the tons to, from and within Indiana, and 98 percent of the value. Electronics, pharmaceuticals, and plastics and rubber are the top three commodities carried by air by tonnage and account for 54 percent of the tonnage. Pharmaceuticals, electronics, and basic chemicals are the top three commodities by value that are transported by air and amount to 75 percent of the value.

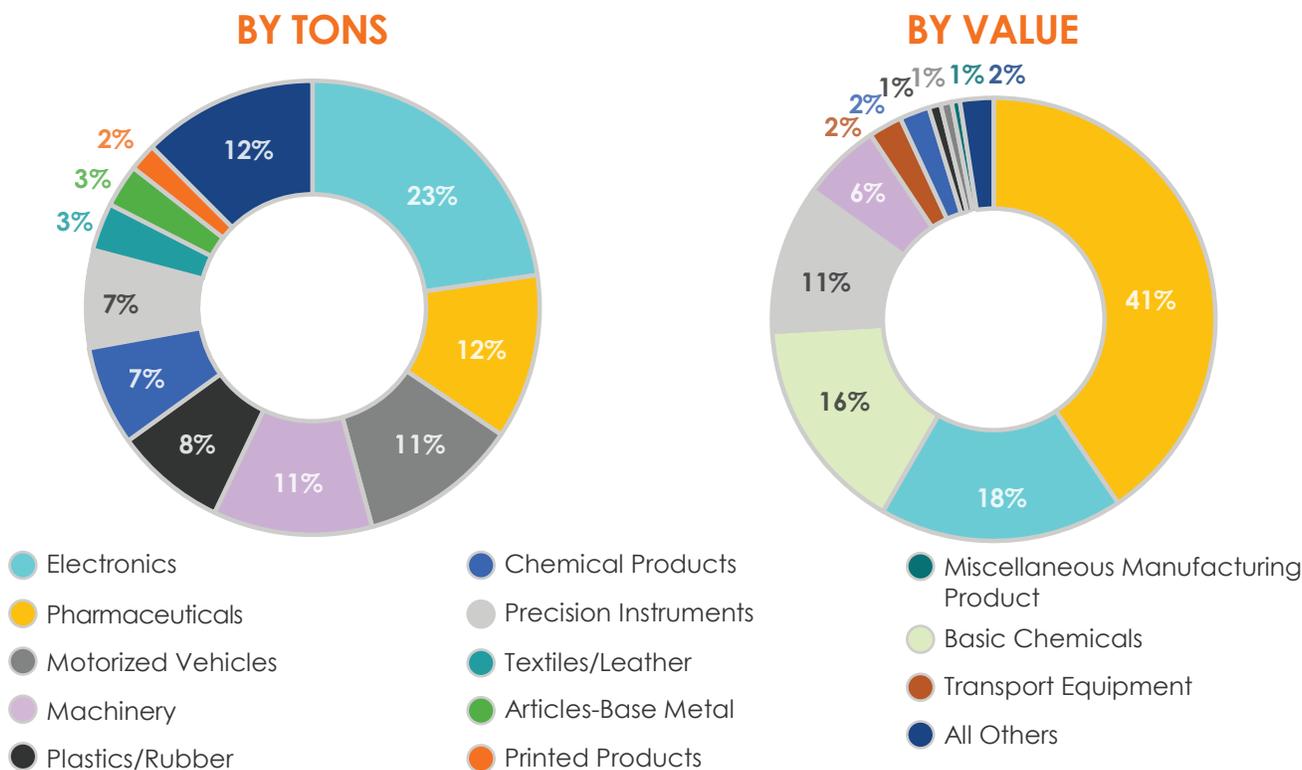


Figure 10. Top Air Commodities in Indiana, 2015

Note: The industries associated with these commodities are shown in Appendix A.

Infrastructure

In Indiana, 7 airports each handled at least one ton of air cargo, and five of these had volumes of 100 tons or greater: Indianapolis, Fort Wayne, South Bend, Evansville, and Gary. Additionally, Grissom Air Reserve Base is of strategic importance to the state due to its role in national defense and its local economic impact of more than \$100 million.¹⁶ Terre Haute Regional Airport has a state-designated Airport Development Zone and a Federally granted Foreign Trade Zone, making it attractive to freight development. These seven airports are shown in Figure 11. Indianapolis International Airport is by far the most significant airport in Indiana for air freight, handling over 1 million tons of combined inbound and outbound freight annually. A high concentration of air cargo activity in close proximity to Indianapolis, and the world's second largest FedEx facility at that airport, have contributed to Indianapolis' ranking among top U.S. airports for freight. Federal Express operates 76 gates and occupies over 500 acres at the airport, employing around 5,000 people, with continued plans for expansion. Integrated express carriers FedEx and UPS have determined that centralized locations such as Memphis, Louisville, and Indianapolis are prime sites for streamlining operations in the U.S. and internationally.

¹⁶ <https://biopharmguy.com/links/state-in-all-geo.php>.



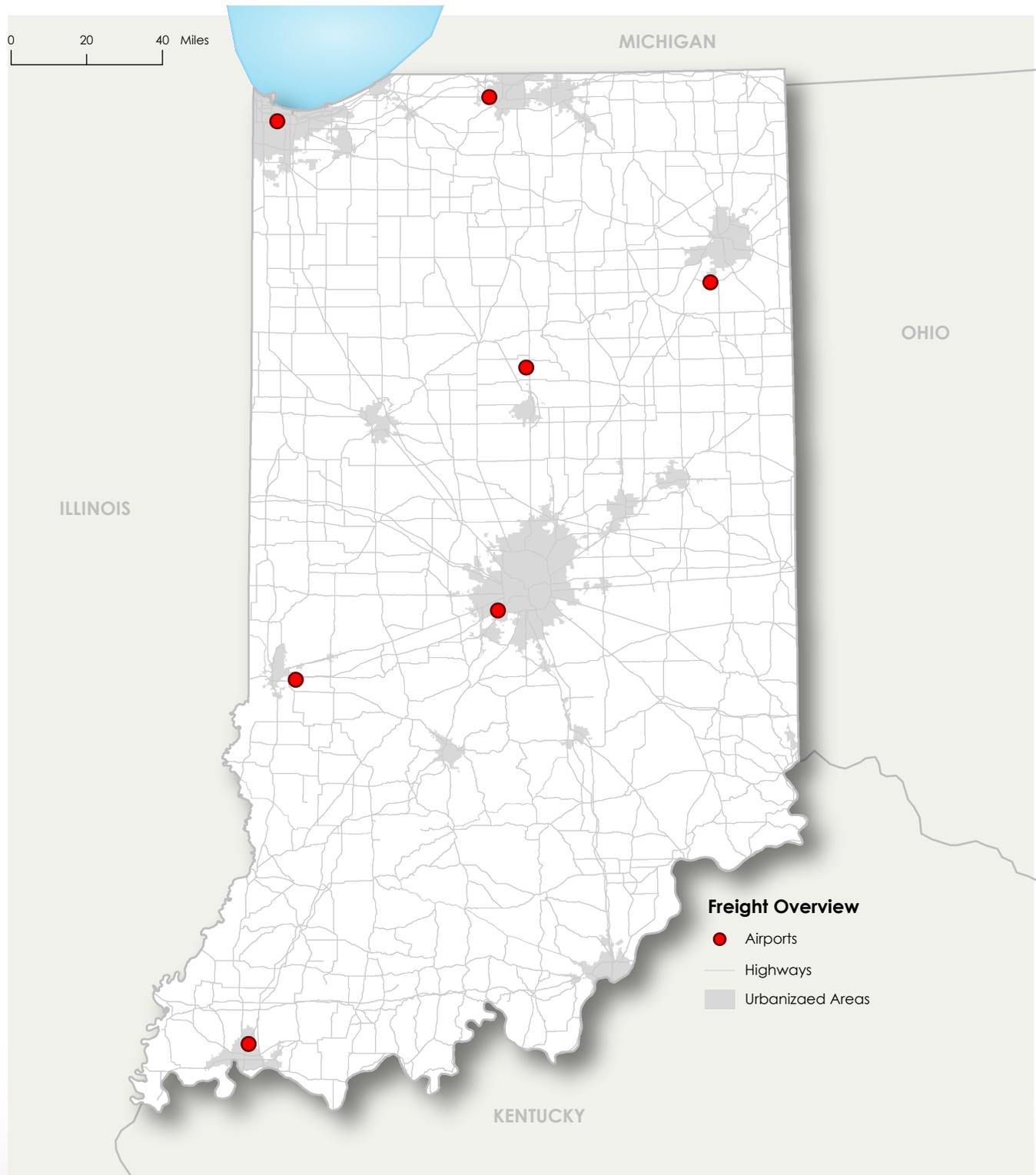


Figure 11. Indiana Air Freight Infrastructure



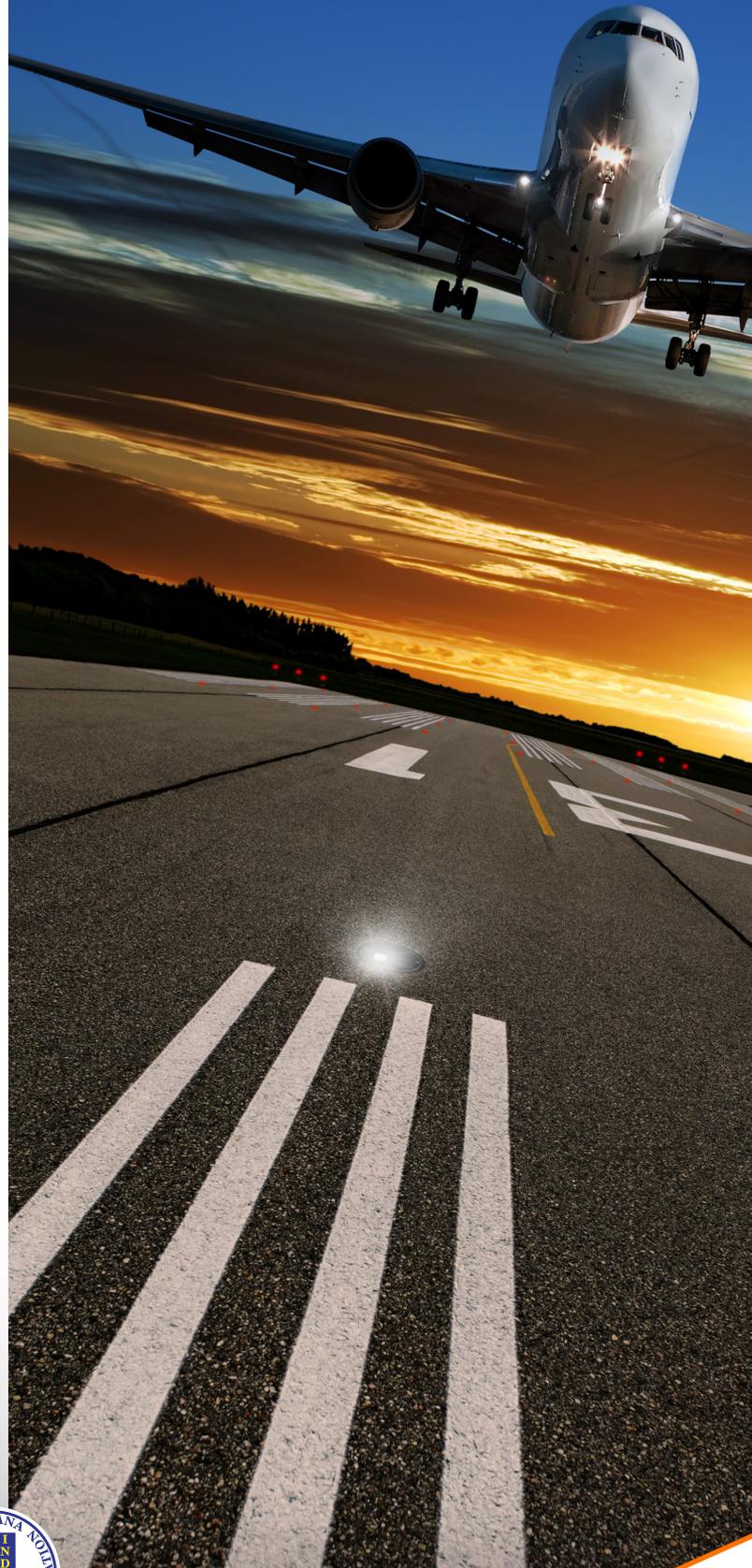
In 2012 an updated Indiana State Aviation System Plan (ISASP) was completed. It serves as the planning framework for the coming years. It covers system goals, airport roles in the overall system, minimum service level requirements and forecasts, as well as documenting the economic benefits of the system to Indiana.

Indiana has more than 450 private-use airports and 115 public-use airports. Of the public-use airports, 69 are considered of statewide importance and are therefore included in the Indiana ISASP. The Indiana aviation system has been continuously developed over the years using Federal, state and local funds, and it provides statewide access for business, tourism and recreation.

At present, four primary (includes hub and non-hub) airports provide commercial passenger service. These include; Indianapolis International Airport, Fort Wayne-Allen County Airport, South Bend Airport, and Evansville Regional Airport.

Another seven airports serve as reliever airports to those larger commercial airports. The balance of the 69 airports covered by the ISASP is 57 general aviation airports.

Indianapolis International Airport serves as the #2 hub for FedEx after Memphis. This reflects the advantage Indianapolis has being in a strategic Midwest location. In addition there are two other airports with 11,200 feet or more of runway – Fort Wayne and the Grissom Air Reserve Base. However, Indiana trails other regional states in its share of state transportation/warehousing gross domestic product. Indiana has excess air shipping capacity and generally the ability to expand its airports. This means Indiana airports have potential to act as reliever airports to other Midwest airports. Indiana has strong university aviation programs to support its air industry.



Freight Mobility and Industry



ECONOMIC CONTEXT

Nearly 1.5 million Indiana residents are employed at a freight producing or freight consuming business. Typically these businesses are classified by the North American Industry Classification System (NAICS) at the 2-digit level between 11 and 49. Table 5 displays employment for each of these sectors below.

While transportation and warehousing, wholesale trade, and retail each represent important segments of the State's economy, the manufacturing sector represents 13% of overall employment in the State.

Table 5. Indiana Employment by Sector

NAICS 2-DIGIT CODE	SECTOR DESCRIPTION	EMPLOYEES	PERCENTAGE OF WORKFORCE
11	Agriculture, Forestry, Fishing and Hunting	20,601	0.6%
21	Mining	5,670	0.2%
22	Utilities	15,494	0.4%
23	Construction	199,410	5.6%
31-33	Manufacturing	471,007	13.1%
42	Wholesale Trade	180,708	5.0%
44-45	Retail Trade	449,485	12.5%
48-49	Transportation and Warehousing	97,559	2.7%
51-99	All Other Sectors	2,144,663	59.8%
	Total	3,584,597	100.0%

Source: InfoUSA establishment data and Cambridge Systematics analysis, 2016.

Additional manufacturing statistics along with Indiana's rank among U.S. states are shown in Table 6. Indiana is first in percent of GSP from manufacturing and in percent of employment from manufacturing.

Table 6. Indiana Statewide Manufacturing Summary

MEASURE	METRIC	RANK IN U.S.
Percent of Statewide GSP from Manufacturing	29.45%	1 st
Percent of Statewide Employment from Manufacturing	17.06%	1 st
Total Statewide Manufacturing Output	\$93.6B	6 th
Total Statewide Manufacturing Export Value	\$33.1B	10 th
Total Manufacturing Firms	7,190	12 th
Average Manufacturing Annual Wage	\$72,256	17 th

Source: Harvard University, Institute for Strategy and Competitiveness; MIT Sloan School of Management; Temple University, Fox School of Business; US Economic Development Administration, Regional Innovation Acceleration Network; US Cluster Mapping Project; Global Logistics Development Partners; IHS Global Automotive; Moody's.

This section further explores the correlation between manufacturing and the freight transportation system by highlighting key sub-sectors, including: advanced materials, biomedical supplies, chemicals, fabricated metals, food production, and transportation equipment. Each of the subsectors are described in detail on the following pages.



Advanced Materials in Indiana

ADVANCED MATERIALS

Sector Subcategories	Interlocking Supply Chains
<ul style="list-style-type: none"> • Plastics • Lightweighting metals • Glass • Steel • Composites • Rubber • Chemicals 	<ul style="list-style-type: none"> • Construction products • Marine equipment • Aerospace and defense • Electronics • Wind energy • Oil and gas • ICT
Major Concentrations in Indiana	Major U.S. Concentrations
Indianapolis, Bloomington, Fort Wayne, Evansville, Gary	Michigan, California, Utah, Washington, Arizona, Tennessee, Texas, Georgia, North Carolina, Colorado
Product Movement	Key Supply Chain Connections
<p>By truck – small and mid-sized medium-value (and some higher-value) products</p> <p>By air – outbound high-value carbon fiber products</p> <p>By ocean/truck – outbound large-dimension products, some inbound feedstocks</p> <p>By rail – inbound feedstock</p>	<p>Global: China, Japan, UK, Spain, France, Germany</p> <p>United States/Canada: Texas, California, Ohio, Louisiana, Washington, Georgia, South Carolina, Ohio, Michigan, British Columbia, Alberta</p>

The global advanced materials market is very large and expanding rapidly. Fueled by the development of new technologies, the market in the U.S. is currently being driven by the aerospace and automotive markets while the Asia Pacific region is the fastest growing market. The demand for advanced materials will continue to grow as the sector is expected to transform the overall manufacturing industry in the coming years, especially in the maritime equipment, consumer products/appliances and industrial machinery sectors.

These materials will have a profound impact on the way manufacturers make most products. Next generation materials science is becoming an essential 'tool' allowing designs to be optimized to reduce waste; products to be made as light as possible; inventories of spare

parts to be reduced; greater flexibility in the location of manufacturing; products to be personalized to consumers, and consumers to make some of their own products through 3D manufacturing.

There are opportunities for growth not just in the development and production of materials themselves but in their application and deployment. For example, new joining technologies, tools, and modeling software are often required to enable a new material to be used effectively.

In fact, advanced materials often disrupt entire supply chains which opens up new opportunities for companies from chemical manufacturers to system integrators across whole industries. Continuously emerging technologies and advancements in product development will keep demand in this industry at a very high level.

Key Issues

- Rapid change in materials and software.
- Possible displacement of existing industries.
- May require additional workforce training.



Figure 12 shows the relative amount of employment in the advanced materials sub-sector in Indiana.

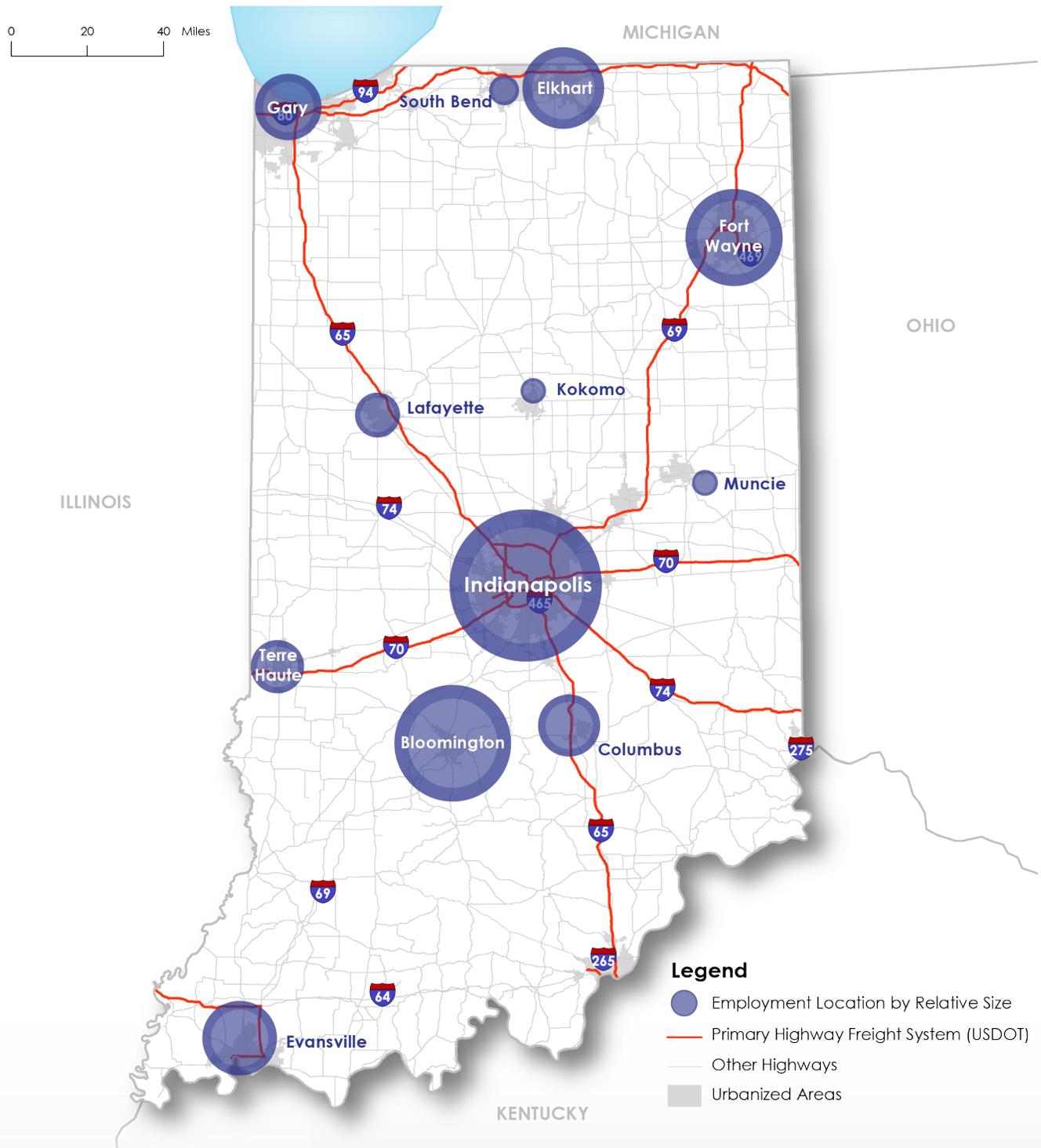


Figure 12. Advanced Materials Employment Centers in Indiana



Biomedical Sector in Indiana

BIOMEDICAL	
Sector Subcategories	Interlocking Supply Chains
<ul style="list-style-type: none"> • Biopharmaceuticals • Medical devices and products 	<ul style="list-style-type: none"> • Electronics • Precious metals • Plastics – advanced materials • Photonics • Biopharma • Chemicals
Major Concentrations in Indiana	Major U.S. Concentrations
Indianapolis, Bloomington, Fort Wayne, Gary	<p>Biopharma: California, New York, New Jersey, Pennsylvania, North Carolina (Indiana #11)</p> <p>Medical Devices and Products: California, Indiana, Florida, New York, Minnesota (Indiana #2)</p>
Product Movement	Key Supply Chain Connections
<p>By truck – many input products and some finished products</p> <p>By air – finished high value-products; requires high-touch, security, temperature controls; overseas shipments require some air, some domestic</p> <p>By ocean/truck – some raw feedstock products from overseas</p>	<p>Global: India, China, France, UK, Switzerland, Germany</p> <p>United States: California, New Jersey, North Carolina, Illinois, Michigan, Texas, Pennsylvania, Massachusetts</p>

The biomedical sector covers a wide range of materials, technologies, and skills used to advance health and wellness. Products in this sector include medical applications of electronics, robotics, biochemical engineering, as well as traditional manufacturing. Important products include:

- **Medical Devices:** In order to continue its consistent market growth, the medical device industry must adapt to constant changes in the medical landscape. The demand for more advanced, more personalized treatment; increased availability of healthcare; and an aging population are pushing the market and expanding technologies. These advancements require accelerated design and production to get products to market quickly, efficiently, and cost-effectively.

» The U.S. is home to many of the world's leading medical device manufacturers employing over 400,000 people. The majority of the 7,000 U.S. medical device manufacturers are export-oriented, small to medium enterprises (SME) and the three largest markets for medical devices are the U.S., Japan, and Germany.

- **Pharmaceuticals:** The U.S. pharmaceutical industry is facing a challenging business environment and slowing growth. It is a mature market and the major growth drivers are the aging population and chronic diseases. At the same time, global markets are booming. Pharmaceutical firms are having to reinvent their business models to deal with the changes in the U.S. healthcare system and the constantly evolving regulatory and political landscape.
- **Biotechnology:** This is the engine of innovation in the biomedical sector. It receives the bulk of investment and research dollars and is the drug discovery pipeline.
- **Dental Products:** The dental industry was severely affected by the recession and is just recovering. Long term the market will continue to grow based on awareness of oral health issues, dental cosmetics treatment, products that reduce discomfort, and technological advances in procedures. The growing international market presents great opportunity.
- **Cosmetics:** The market will continue to grow based on demand for skin care and antiaging products. Factors such as increasing customer awareness and disposable income will contribute significantly to the growth.
- **Nutraceuticals:** The market is highly saturated and regulated. Pharmacies, drugstores, and online sales are the major distribution channels.

Key Issues

- Products may require time- and temperature-sensitive shipping.
- On-going investment in research and development is critical.
- Workforce requires a range of educational attainment and disciplines.



Figure 13 shows the relative amount of employment in the biomedical sub-sector in Indiana.

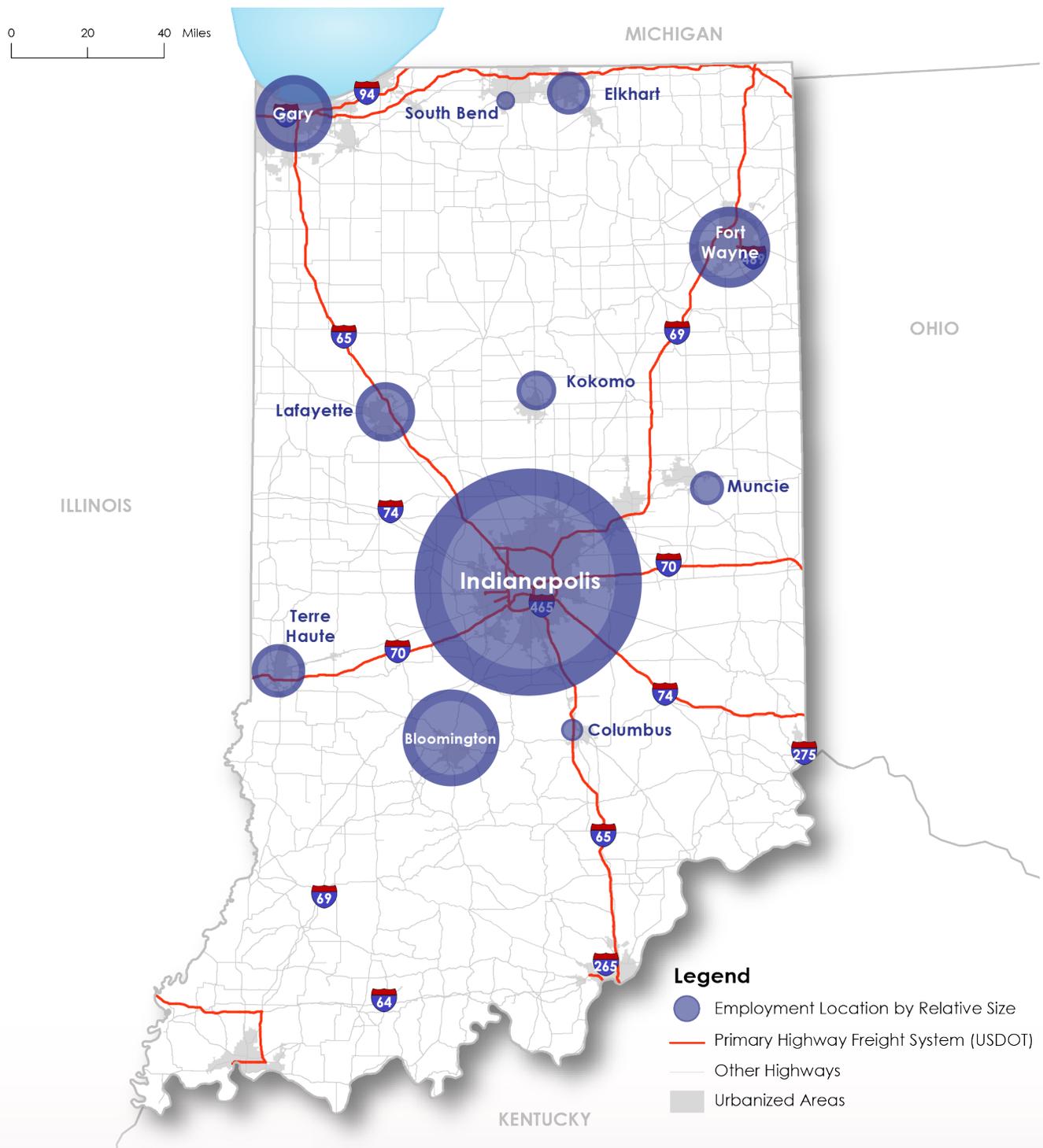


Figure 13. Biomedical Employment Centers in Indiana



Chemicals in Indiana

CHEMICALS AND ALLIED PRODUCT MANUFACTURING

Sector Subcategories	Interlocking Supply Chains
<ul style="list-style-type: none"> Basic Chemicals: organic and inorganics, plastic resins, dyes and pigments Specialty Chemicals: adhesives and sealants, water treatment chemicals, plastic additives, catalysts and coatings Agricultural Chemicals: important role in the farm economy and the food processing sector Consumer Products: soaps, detergents, cleaners, toiletries and cosmetics 	<ul style="list-style-type: none"> Automotive Electronics/Smart phones Medical devices and supplies Renewable energy and energy efficiency Lithium batteries Pharmaceuticals Kitchen appliances
Major Concentrations in Indiana	Major U.S. Concentrations
Indianapolis, Evansville, Fort Wayne, Bloomington, Elkhart	<p>United States: Texas, California, Louisiana, Kentucky, Illinois, Ohio, Indiana 7th</p> <p>Global: France, Germany, Russia, China, Japan, UK, Italy, India, Brazil</p>
Product Movement	Key Supply Chain Connections
<p>By truck - Small-volume packaged chemical products; the most common mode of transport for industrial gases and consumer products and has increasingly been used for bulk shipments of intermediate chemicals.</p> <p>By Rail - Generally shipped in tank cars (liquids and liquefied gases), hopper cars (dry commodities), and some boxcars (dry bulk or packaged chemical products).</p> <p>By air - Small volumes of consumer products are shipped via air transportation and courier service</p> <p>By ocean/truck - Primarily used for commodity chemicals, such as basic and intermediate organic chemicals, basic inorganic chemicals, and fertilizers.</p>	<p>Global: China, Japan, UK, France, Germany</p> <p>United States: Texas, California, Louisiana, Kentucky, Illinois, Ohio, Indiana</p>

The U.S. chemical industry continues to be an important global leader, accounting for 15% of the world's chemical shipments (by sales) and is positioned for growth over the next decade. Because of the abundance of energy resources in the U.S., the chemical industry has become among the lowest cost global producers of several important building block

chemicals. Since 2010, more than \$185B in new chemical investment has been announced, and half of those investments have been completed or currently under construction. A second wave of investment is expected through the early 2020s as more global companies will produce for the U.S. market. The strength of the industry and its resurgence is reflected by the fact that the sector accounted for 48% of all manufacturing construction spend in 2016, outpacing even transportation and healthcare.

As the industry expands, more high-paying chemical industry jobs will be created. The average job in the chemical industry pays nearly \$94,000, almost 50% more than the manufacturing average. In addition, the industry supports a vast supply chain and creates economic activity in the communities where they are located. For every job in chemical manufacturing, six more jobs are created elsewhere in the economy.

The U.S. chemical industry competes in a global context, and its share of international markets is increasing in unique and differentiated products, in which it enjoys distinct technological advantages. Canada represents the largest single national market for U.S. chemical exports while Mexico represents the second-largest national export market. U.S. chemical exports to Mexico have grown substantially since 1994, when the North American Free Trade Agreement (NAFTA) went into effect. Other large markets for U.S. chemical exports include Western Europe, Latin America, China, and Japan.

Key Issues

- Outlook for overall global economic growth.

United States' policies:

- Trade agreements with key chemical consuming countries.
- Environmental regulations concerning air quality, safe operating standards, clean-up.
- Liability issues.
- Growth of the industry is outpacing the ability of the logistics/transportation industry to move the product in the U.S.



Figure 14 shows the relative amount of employment in the chemicals sub-sector in Indiana.

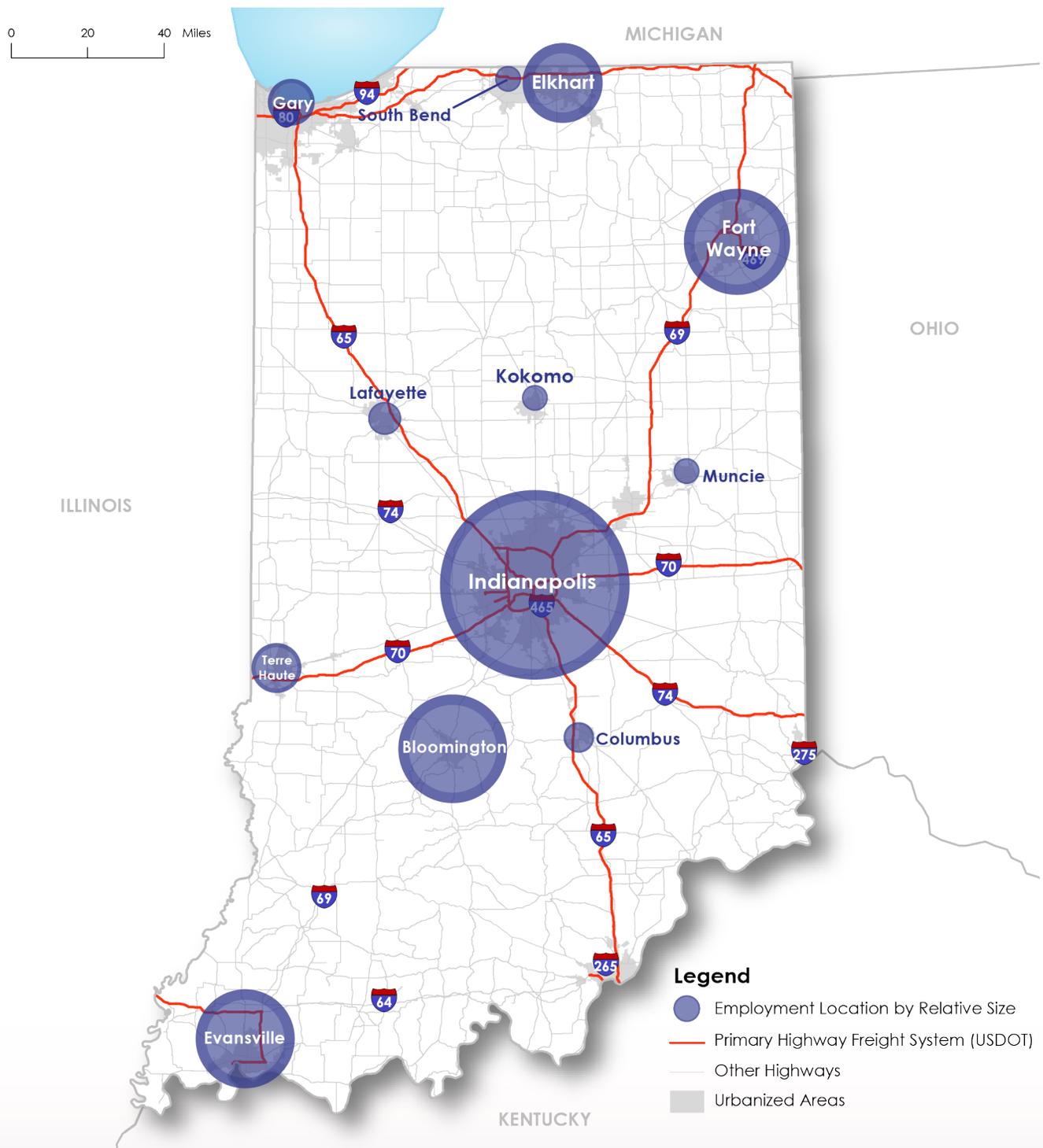


Figure 14. Chemicals Employment Centers in Indiana



Fabricated Metals in Indiana

METAL MANUFACTURING AND FABRICATION

Sector Subcategories	Interlocking Supply Chains
<ul style="list-style-type: none"> • Cutlery and hand tools manufacturing • Architectural and structural metals manufacturing • Hardware manufacturing • Spring and wire manufacturing • Screw, nut, and bolt manufacturing • Forging and stamping • Boiler, Tank, and Shipping Container Manufacturing • Hardware Manufacturing • Coating, Engraving, Heat Treating, and Allied Activities 	<ul style="list-style-type: none"> • Automotive • Aerospace • Construction • Energy
Major Concentrations in Indiana	Major U.S. Concentrations
Bloomington, Indianapolis, Elkhart, and Gary	United States: Illinois, Wisconsin, Michigan, Minnesota, Tennessee, Indiana Global: Japan, China, India, Southeast Asia, UK and France
Product Movement	Key Supply Chain Connections
By ocean/truck – raw feedstock products both domestic and international	Global: UK, France, Germany, Netherlands United States: California, Wisconsin, New York, Georgia, Texas, Iowa, Illinois

Metal fabrication is the process of building machines and structures from raw metal materials. The process includes cutting, burning, welding, machining, forming, and assembly to create the final product. Metal fabrication projects include everything from hand railings to heavy equipment and machinery.

In 2015, the global metal fabrication market was valued at \$16.4B, and a recent report from Transparency Market Research (TMR) predicts it will expand at a compound annual growth rate of 3% to reach \$21.4B by 2024.

Since the economic rebound after the last recession, metal fabrication has become a strong and intense business that continues to recalibrate itself and flourish.

Current adjustments include a shift from relying on a few large projects to maintain a yearly profit to attempting to maintain steady sales volumes by diversifying and continuing to follow the success of previous years.

The metal fabrication industry is highly cyclical and depends on industries such as auto, aerospace, construction, and energy. The global market for metal fabrication is fueled by continued investments in electric furnace and metals processing, growing aluminum consumption, the reshoring of manufacturing practices in the automotive industry, recovery in nonresidential investments, and growing aerospace demand.

The industry is learning to balance capacity with a variety of customers who have a spectrum of demands that are driven by a changing economy. As machinery becomes more sophisticated, the ability to maintain a constant level of capital and profit is improving. Although forecasting can be difficult in a business dependent on the economic fortune of its customers, the consensus remains that those who can keep up with rapidly changing demands while still maintaining a high output capacity will elbow into a position of maximized profits. The volatility of the market has required the industry to streamline production practices and focus on the ability to reliably produce high-capacity output for many varied customer requests.

Key Issues

- Fluctuating markets, cyclical industries and the need for sophisticated equipment define the market environment for metal fabrication companies.
- The growing popularity of 3-D metal printing poses a major threat to the development of the metal fabrication market. The technology has gained extensive usage in the aerospace, automotive, and marine sectors, which is viewed as a hindrance to the trajectory of the metal fabrication market.
- Accessing capital.
- Transportation industry supply chain is fueling the metal fabrication market in Indiana.



Figure 15 shows the relative amount of employment in the fabricated metals sub-sector in Indiana.

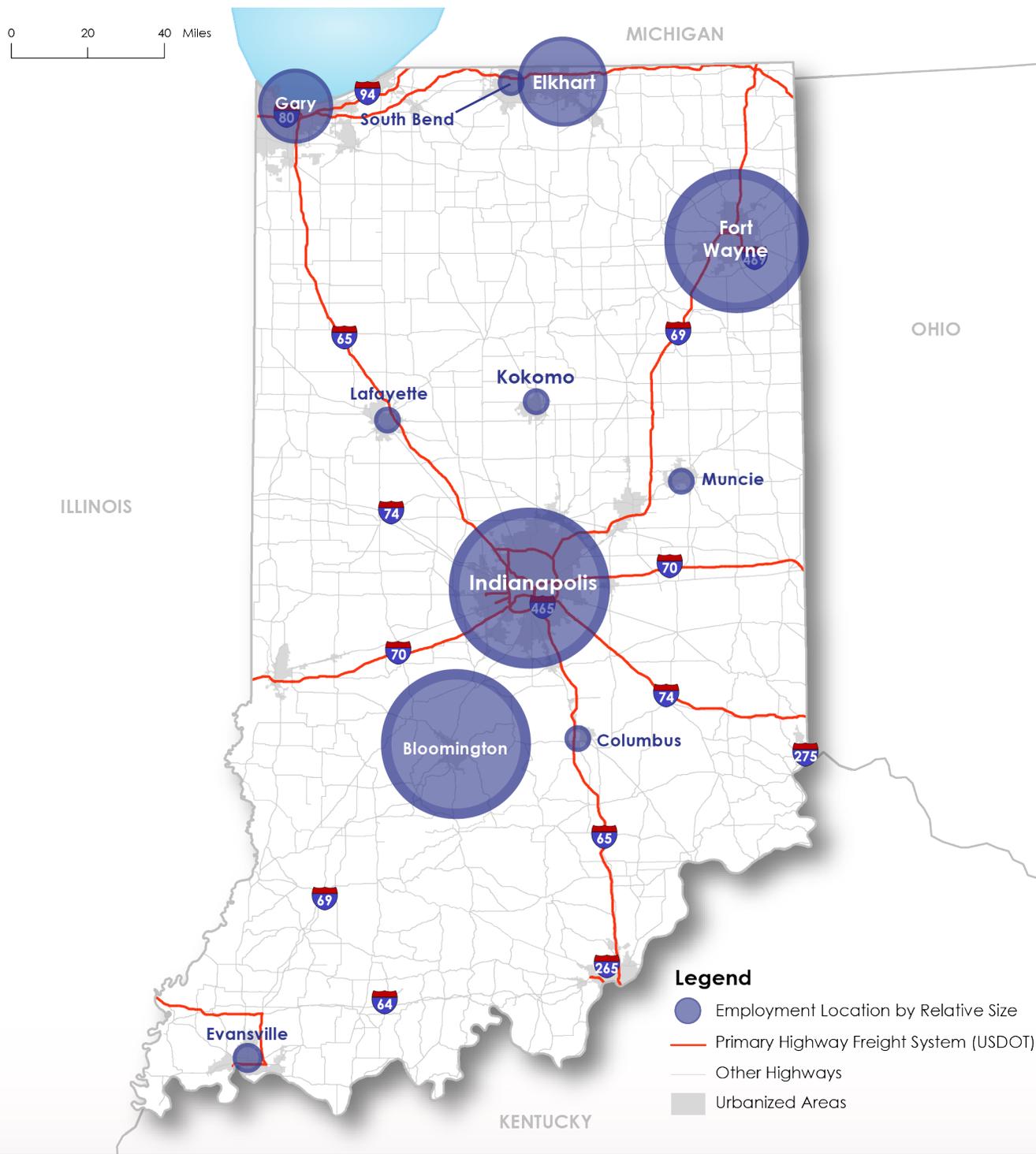


Figure 15. Fabricated Metals Employment Centers in Indiana



Food Production in Indiana

FOOD PROCESSING AND MANUFACTURING

Sector Subcategories	Interlocking Supply Chains
<ul style="list-style-type: none"> Specialty foods, Baked Foods, Dairy Products, Packaged Fruit and Vegetables, Beverages, Candy and Chocolate, Animal Foods, Wine, Milling and Refined Cereals and Oilseeds, Coffee and Tea, Sugar 	<ul style="list-style-type: none"> Industrial equipment, paper and packaging, biopharma/life sciences
Major Concentrations in Indiana	Major U.S. Concentrations
Indianapolis, Greensburg, Richmond, Frankfort, Jefferson County	United States: California, Illinois, Texas, Pennsylvania, Ohio, Wisconsin, Minnesota Global: Dispersed
Product Movement	Key Supply Chain Connections
By truck – truck is the primary mode from growing field, to secondary production and into national distribution system By rail – Bulk rail in the second largest tonnage mode, both refrigerated and unrefrigerated By air – not normally used unless highly perishable By inland water system to ocean – inbound raw ingredients, outbound in quantity to overseas markets	Global: UK, France, Germany, Netherlands United States: California, Wisconsin, New York, Georgia, Texas, Iowa, Illinois

The structure of the global food industry is changing and evolving as food suppliers, manufacturers, and retailers adjust to meet the needs of consumers, who increasingly demand a wider variety of higher quality products. Having first-hand knowledge of consumer preferences and purchase habits, food retailers are positioned to transmit this information upstream to other segments of the supply chain.

In the quest to meet consumer demands for variety, affordability, safety, and quality, the food retail sector is evolving and generating innovative sale formats. In addition to the popular supermarket format, hypermarkets, discounters, convenience stores, and combined gasoline and grocery outlets have emerged in recent years.

Global food retail sales are about \$4T annually, with supermarkets/hypermarkets accounting for the largest share of sales. Most of the leading global retailers are U.S. and European firms, as large multinational retailers expand their presence in developing countries and small retail firms increasingly account for a smaller share of total food sales. The top 15 global supermarket companies account for more than 30% of world supermarket sales. Similar to retailers, food manufacturers are reorienting their business strategies in response to consumer signals transmitted via retailers. Two common strategies are geographic expansion in developing countries and a greater emphasis on product category management. Together, the top 50 food manufacturers' share of global packaged food retail sales account for less than 20%.

Driven by innovation and competition from private retail brands, food manufacturers are focusing on specific product lines where they have inherent advantages. There is greater emphasis on “category management” and “focused growth” compared with the product portfolio diversification strategies of the past. Therefore, while manufacturer concentration is not the case at the global level for total packaged food sales, firm concentration may exist in specific product lines and regional markets. Firm concentration is particularly evident for those products where the manufacturer’s brands are otherwise popular, such as in soup, breakfast cereal, and baby food.

From a macro perspective, consumer spending is expected to rise very little, and some companies may face serious challenges as competition and new product introductions has the effect of market saturation in some areas. Moody’s has cited that general cost cutting and plant rationalization will improve companies’ profitability and cash flows. In 2017, product innovation has evolved toward renovation, which will include upgrading packaging, ingredients, flavoring, and labeling.



Moody's identified numerous global packaged goods companies with positive outlooks, including Proctor & Gamble and Unilever, but they have indicated concern about other mainstay firms, such as Kellogg because of no significant growth for its U.S. cereal business as performance in U.S. snacks is mixed. Some companies such as TreeHouse Foods and Private Brands, are facing operating and IT system integration challenges.

Merger and acquisition activity is likely to be sluggish in 2017 in the food sector, but a number of large players such as Tyson Foods, Kraft Heinz, Pinnacle Foods, and Mondelez International are considering strategic acquisitions.

Key Issues

In the U.S. a range of issues are weighing on the food production industry, including:

- Various regulations being targeted for repeal or significant decrease in enforcement, such as menu labeling.
- FDA and state funding for certain regulatory programs may be reduced substantially.
- Repeal of right-to-know laws such as GMO labeling.
- Accessing capital for new production facilities.



Figure 16 shows the relative amount of employment in the food production sub-sector in Indiana.

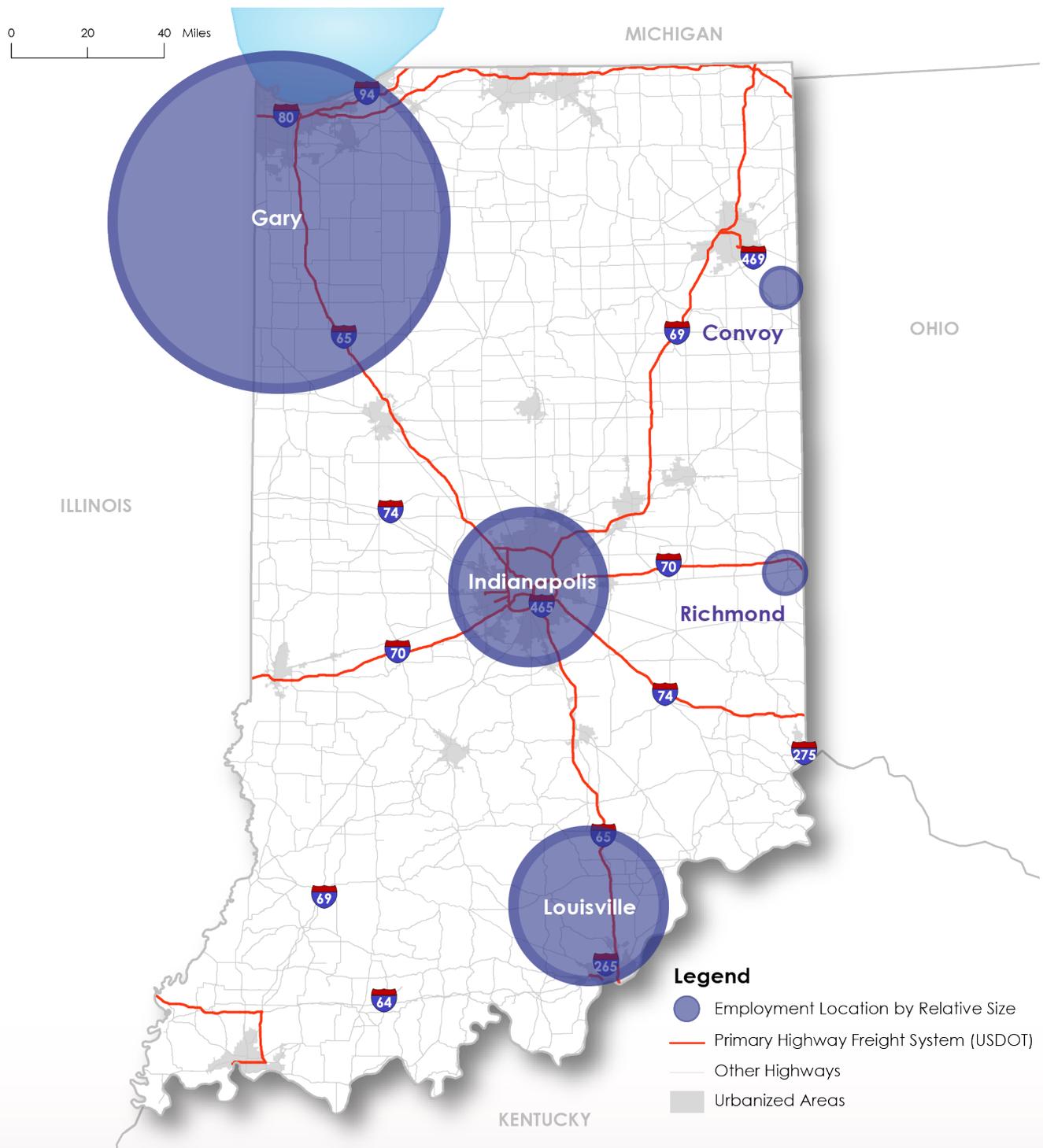


Figure 16. Food Production Employment Centers in Indiana



Transportation Equipment in Indiana

TRANSPORTATION EQUIPMENT	
Sector Subcategories	Interlocking Supply Chains
<ul style="list-style-type: none"> • Military vehicles and tanks • Motor Vehicles • Engine and Engine Parts • Automotive Parts 	<ul style="list-style-type: none"> • Steel • Electronics • Plastics – advanced materials • Glass • Rubber
Major Concentrations in Indiana	Major U.S. Concentrations
Elkhart, Indianapolis, Fort Wayne, Bloomington	<p>United States: Michigan, Ohio, Indiana, Kentucky, Tennessee, Illinois, South Carolina, Alabama, California, Texas</p> <p>Global: Japan, Korea, China, Germany, France, UK, Poland, Czech, Spain, Italy, India, Mexico</p>
Product Movement	Key Supply Chain Connections
By truck – many input products and some finished products	Global: Japan, China, India, Germany, Mexico
By air – finished high value-products (overseas); requires high-touch, security	United States: Michigan, Ohio, Tennessee, Missouri, California, Illinois, Texas
By ocean/truck – some raw feedstock products from overseas	
By rail – Both finished products and component parts	

Motor Vehicles and Motor Vehicle Parts

The last several years have been exceptional for the auto sector. Sales in the U.S. saw record highs in 2015 and 2016, while China and Europe sales have caught up. According to IHS Automotive, global auto sales for 2017 are estimated at around 93.5M units. Also, automakers are benefiting from an increase in sales of higher margin vehicles, such as SUVs and light trucks, due to low fuel prices. But while growth expectations will continue to increase with the world's population, the auto sector's rate of growth will begin to flatten out, and in many geographies, have reversed from the record growth of the past few years.

The auto sector is currently facing several opportunities as well as challenges. While low fuel prices, attractive financing options, and impressive vehicle launches have driven sales, slowing sales growth in the U.S., rising auto loan defaults, and high levels of safety recalls are

acting as dampeners. Another factor is the maturation of many emerging markets. The growth in these countries from families with no automobiles to having one or more has fueled the surge in sales over the last couple of decades. This same phenomenon occurred in Europe and the United States in the early 20th century.

The main innovation areas that are driving the auto industry are connectivity, autonomy, and propulsion. Each of these factors on their own would be a disruptive influence on the industry, but taken together they are transforming the industry into a technology-driven sector. This is not just affecting the original equipment manufacturers but the suppliers as well. Traditional suppliers are searching for ways to adapt, while new suppliers are rapidly entering the supply chain.

These disruptive influences will also have an effect on governments. The long term success of these new technologies is dependent upon the ability and commitment by governments to invest in the infrastructure needed to support the application of these new technologies.

Recreational Vehicles (RV)

RVs include automobiles or trailers designed or modified for recreation or pleasure activities such as vacations and camping, both on and off highways. RVs include features such as sleeping, kitchen, and bathroom facilities for use during travel and camping. RVs are subject to the same registration and licensing as other automobiles and may have to abide by specific laws.

The RV industry had another excellent year in 2016 as wholesale shipments were reported up 15.1% over 2015 and the highest total in 10 years. This strong performance continued the longest period of sustained growth for the RV industry, which is now at seven years.

Indiana substantially benefits from the health of this industry as 81% of all recreational vehicles in North America are produced in the State and forecasts indicate that this sustained growth will continue for the next several years. Over time, the issues that are transforming the automobile space are projected to transform the RV area as well.



Engines and Engine Parts

Over the past few years, strong growth in the commercial aerospace market has dramatically impacted the entire supply chain of the aircraft industry. However, in 2016, the market experienced softness in orders which is expected to continue through 2017. Despite this forecasted slowing, both Boeing and Airbus report significant backlogs for the next 10 years, and demand for engines will remain strong. Currently, the aerospace market is driven by demand for new and advanced aircrafts due to network expansion by the passenger airlines combined with rising demand for single-aisle (narrow body) aircrafts.

The single-aisle or narrow body aircrafts and large, wide-body aircrafts are expected to emerge as key segments which will drive the demand for commercial aircraft market. The demand for a particular aircraft type depends on the duration/length of travel which is classified as short haul or long haul. Narrow body aircrafts are preferred by low cost carriers (LCC) that operate on short routes with high traffic for budget travelers. These routes often connect domestic locations in a given country.

In 2016, regional jets propelled with turbofan engines used for short haul travel recorded the highest percentage revenue contribution of the different types of aircrafts. This was primarily due to rise in domestic travel across countries such as Canada, U.S., and Mexico.

Jet engines used to power an aircraft are classified as turbofan and turboprop engines. Of these, the market for turbofan engines that offer better efficiency and speed at higher altitudes is expected to record steady growth as compared to turboprop engines. Furthermore, development of fuel-efficient engines has resulted in replacement of currently in-use jet engines.

Emerging Trends in the Aero Engine Market Include:

- Use of second-generation biofuels.
- Lower maintenance costs.
- Design and development of fuel-efficient and light-weight aero engines.
- Titanium, nickel, and steel materials in aero engine design with an increasing use of composites.
- The production of jet engines for the aerospace industry is concentrated in the U.S., Europe, and Canada with just a few corporate players, but production of some engine components has moved to Mexico and China.

Key Issues

- Rising costs of manufacturing autos.
- Safety and environmental regulations.
- Cost of technology applications.
- Strong jet engine demand is good for the Indiana economy.



Figure 17 shows the relative amount of employment in the transportation equipment sub-sector in Indiana.

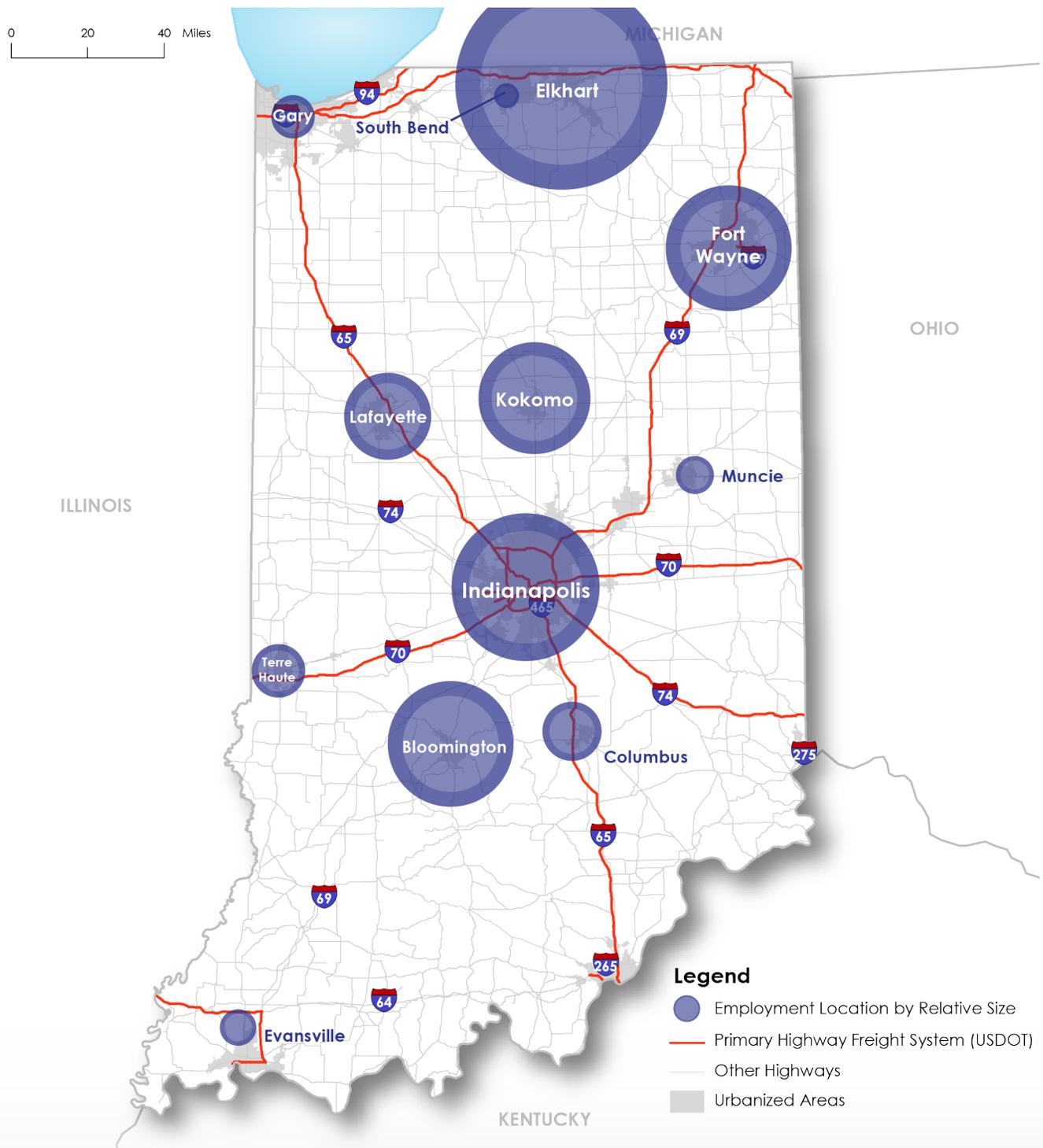


Figure 17. Transportation Equipment Employment Centers in Indiana



Challenges

CURRENT CONDITIONS AND PERFORMANCE

The demand for freight services has greatly expanded due to shifts in the economy and rapid growth in international trade. On the positive side, Indiana has a trade surplus and is a basic producer of commodities. However, Indiana faces a major challenge in that demand is increasing faster than capacity, impacting all modes. Consequently, trucking is picking up most of the unmet demand for freight rail, creating greater burdens on the highway networks. Trucking firms are facing challenges in meeting the growing demand because of driver workforce shortages. Higher levels of truck traffic have implications on traffic congestion and on the durability of highways and bridges. Shifting more freight to other travel modes will have a positive impact on traffic congestion and required highway maintenance.

Highway System Performance

Travel demand modeling using the Indiana Statewide Travel Demand Model (which includes a sophisticated freight/commodity flow model) was conducted to identify freight bottlenecks and to generate highway freight performance measures. Modeled freight volumes from 2010 and 2035 are shown in Figure 18 and Figure 19 respectively. Network assumptions for the future include committed projects such as all of Major Moves, Ohio River Bridges, etc., so that benefits of those projects will be embedded in the baseline forecasts.

Highway freight performance is summarized for a base year 2010 (Figure 18) and 2035 (Figure 19).¹⁷ As expected,

¹⁷ Note: 2010 and 2035 reflect the data available for the current INDOT statewide travel demand model. The model is currently being updated, and more recent data are not available at time of publication.

Highlights

11,838 miles of INDOT-Owned Roads

- 89.1% in Excellent, Good, Satisfactory, or Fair condition
- 10.9% in Poor condition

5,717 INDOT Road Bridges

- INDOT bridges: 5,717
- 3.8% structurally deficient
- 9.2% functionally obsolete

major truck volumes occur in the Indianapolis metro area, as well as corridors between Indiana population centers and neighboring states. Each of the Interstates serve as key freight corridors for freight originating, terminating, and passing through the State. By 2035, freight traffic is also expected to increase substantially on state routes and U.S. Highways with growth along key freight corridors in the State.



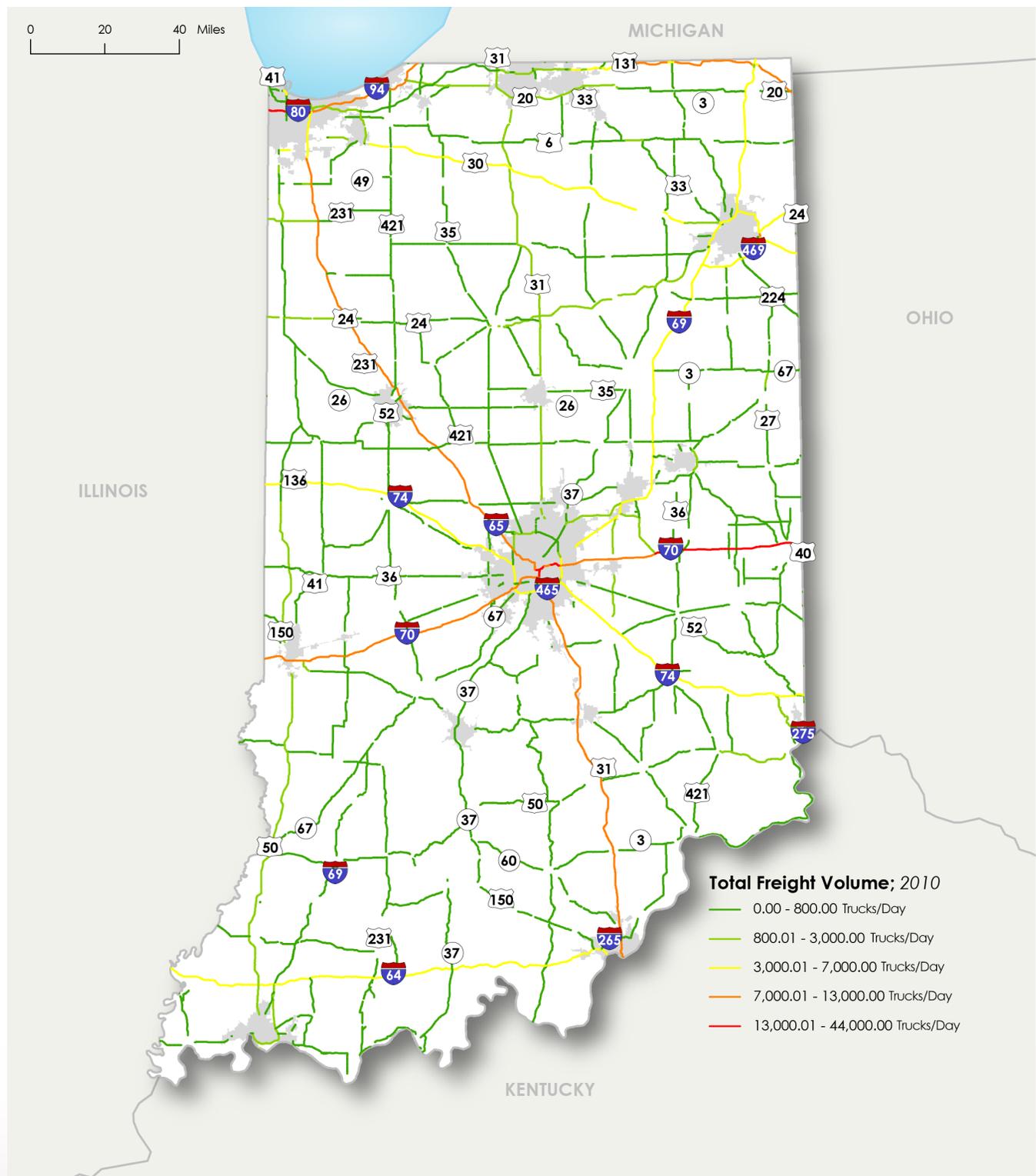


Figure 18. Daily Truck Traffic, 2010



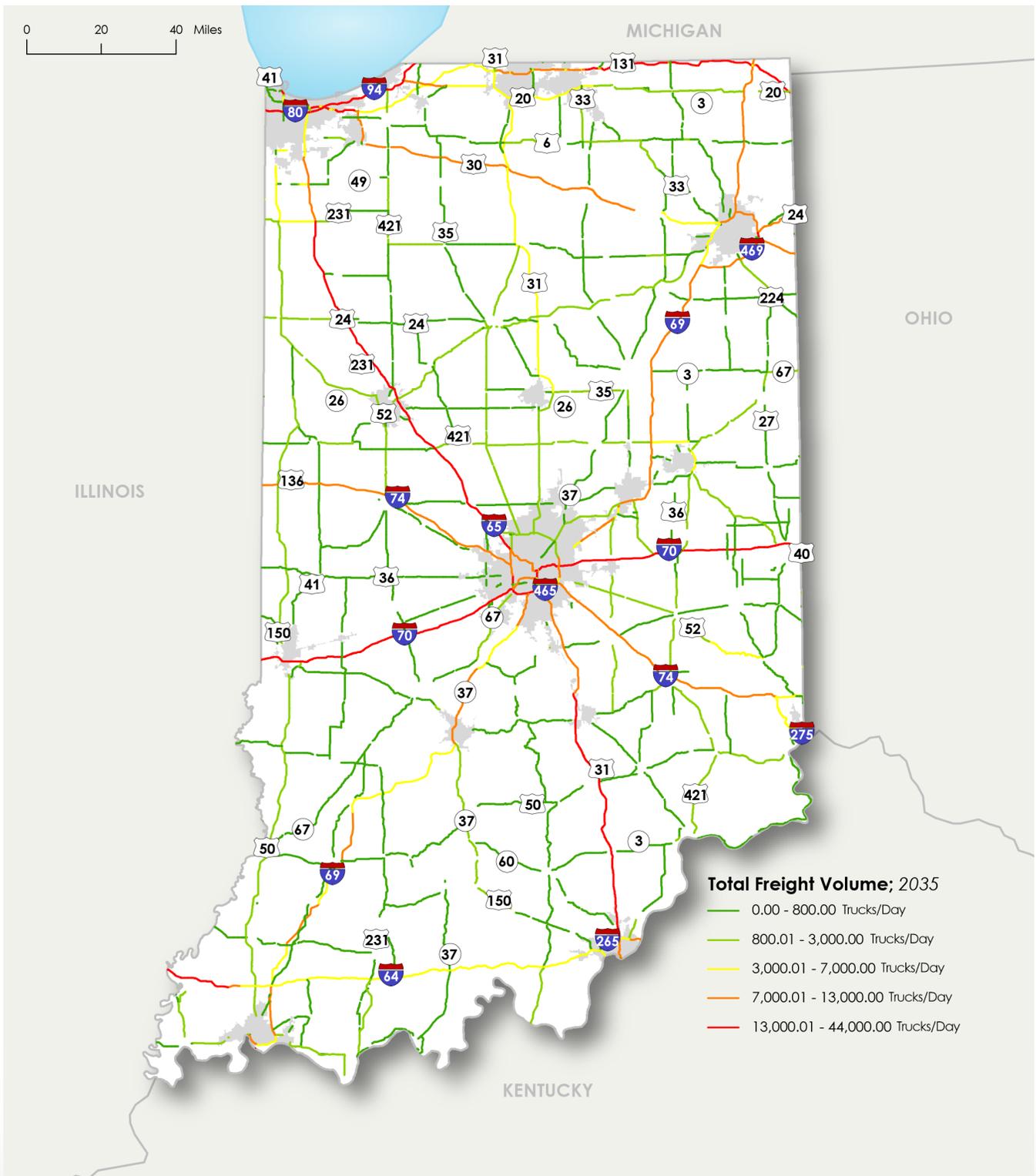


Figure 19. Projected Daily Truck Traffic, 2035



INDIANA HIGHWAY CONDITIONS AND ISSUES

Pavement and bridge conditions are a key indicator of the state of repair on the highway network. INDOT maintains a state of good repair on its roadways with excellent pavement condition on 88 percent of its roadways, 4 percent in satisfactory condition, and 8 percent in poor condition. Figure 20 shows the pavement conditions throughout the State. While most roadways are in fair or better condition, clusters of poor roadway conditions exist near ports and urbanized areas, as well as along some rural corridors.

The roadway bridges owned and maintained by INDOT are generally better prepared for freight demands compared to statewide bridge conditions. A structurally deficient bridge has elements that need to be monitored or repaired. This designation does not mean that the bridge is likely to collapse or is unsafe; however, identifying minor issues is important to monitor the health of Indiana's infrastructure. Four percent of INDOT's bridges are structurally deficient, compared to 8 percent of all bridges in the State. A functionally obsolete bridge is one that does not meet current design standards. For example, the bridge may have narrower lanes, lower clearance, or outdated flood management. Nine percent of INDOT's bridges are functionally obsolete, compared to 12 percent across the State.

INDOT is in the process of upgrading its oversize-overweight permitting system and will be examining the relationship between NHFN and NHS routes along with high-volume truck routes, including overweight truck routes, with bridge load rating restrictions. The current system does not track route information in a way that supports detailed load and route analysis. The new system will include a bridge loading review process, for example:

- All vehicles over 80,000lbs GVW will be evaluated for bridge impact, providing better infrastructure protection.
- Vehicles over 80,000lbs that meet axle weight limits will be analyzed using a custom automated tool that incorporates Indiana Bridge Rating Database (BRADIN) data to identify bridges where additional safety measures such as slow-downs are needed, and where an alternative route is needed.
- Vehicles with GVW 200,000lbs or greater will continue to be analyzed by an engineer.



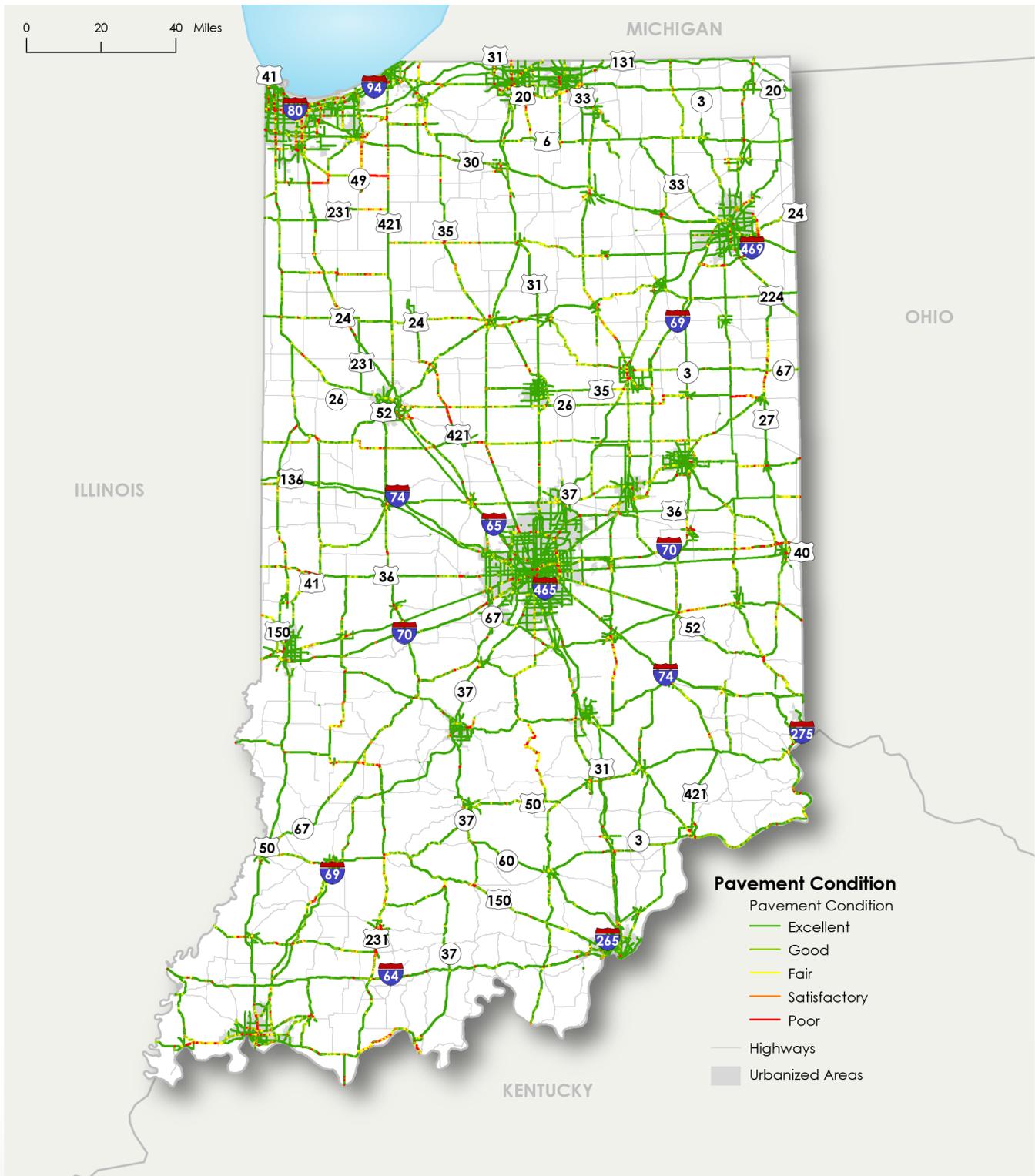


Figure 20. Indiana Pavement Conditions

Source: Federal Highway Administration, Highway Performance Management System, 2015.



Highway Bottlenecks

Generally, freight bottlenecks are a larger issue for Indiana than pavement and bridge condition. Highway freight bottlenecks are locations with constraints that cause a significant impact on freight mobility and reliability, such as recurring congestion, design limitations, or operating restrictions. Bottlenecks commonly occur at locations where the number of lanes is reduced, at interchanges, at on or off ramps, or on narrow segments. Delays specific to trucks may occur due to tight curves, steep grades, size or weight restrictions, or hazardous materials restrictions. Bottlenecks were identified in an iterative process, using both stakeholder input and data analysis. Speed deficit data analysis, comparing traffic speeds during morning and evening peaks against the free-flow speed, were used to validate bottleneck locations. Methodology and results of the speed deficit data analysis are in Appendix G. The resulting bottlenecks include interstates, U.S. highways, and state roads, as shown in Table 7.

Table 7. Key Highway Bottlenecks

ROAD	DISTRICT	COUNTIES	FROM	TO
I-465	Greenfield	Marion	71st St	86th St
I-465	Greenfield	Marion	Arlington Ave	Meridian St
I-465	Greenfield	Marion	Mann Road	I-70
I-465 (including I-865 modification)	Greenfield	Marion	86th St	US 31
I-64 EB	Seymour	Clark	SR 64	Ohio River
I-65	Crawfordsville	Boone, Clinton, Tippecanoe	SR 32	SR 38
I-65	Greenfield	Marion	I-65/70 N junction	Fall Creek
I-65	Greenfield	Marion	Fall Creek	38th Street
I-65	Seymour	Bartholomew, Shelby, Johnson	SR 58	SR 44
I-65 (including I-465 modification)	Greenfield	Marion	Thompson Road	Raymond St
I-65/70 S junction	Greenfield	Marion	Raymond St	Vermont St
I-69	Greenfield	Marion	I-465	
I-70	Greenfield	Hancock	Mount Comfort Rd	SR 9
I-70	Greenfield	Marion	I-65/70 N junction	I-465 east leg
I-70	Greenfield	Marion	Belmont Ave	Madison Ave
I-80/94	LaPorte	Lake	IL state line	I-65
SR 39	Crawfordsville	Hendricks	I-70	I-70
SR 49	LaPorte	Porter	I-80/90	I-94
SR 62/Lloyd Exp	Vincennes	Vanderburgh	Fulton Avenue	Posey Co line
SR 66/Lloyd Exp	Vincennes	Vanderburgh	U.S. 41	I-69
U.S. 20	Fort Wayne	Elkhart	SR 15	SR 13
U.S. 20	LaPorte	LaPorte	SR 2 west junction	I-94
U.S. 30	LaPorte and Fort Wayne	Porter, LaPorte, Starke, Marshall, Kosciusko, Whitley, Allen	SR 49	I-69
U.S. 30	LaPorte	Lake	IL State Line	U.S. 41
U.S. 30	LaPorte	LaPorte	SR 2 west junction	SR 49
U.S. 31	Seymour	Johnson	Main St	Israel Lane
U.S. 40	Crawfordsville	Hendricks	Ronald Reagan Pkwy	
U.S. 40	Crawfordsville	Vigo	U.S. 40/SR 46	
U.S. 41	LaPorte	Lake	I-80/94	I-90
U.S. 41	Vincennes	Vanderburgh	Ohio River Bridge	
U.S. 50	Seymour	Dearborn	SR 56	I-275

Oversize/Overweight Network

Size and weight restrictions exist to manage safety risk and infrastructure deterioration on the highway network. Realistically, some cargo cannot reasonably be divided into smaller loads, such as wind turbine blades or steel coils. Oversize or overweight freight may be specifically permitted or prohibited on certain corridors, limiting potential



delivery locations. Roadways with permanent restrictions are shown in Figure 21. Currently, these restrictions do not cause freight detours on the NHS, NHFN, or high-volume truck corridors. In addition, none of the permanent restrictions are caused by pavement conditions, while there are a limited number that are due to bridge load ratings. Restrictions are placed by the districts, who submit, score, and rank mobility projects. OSOW restrictions are one input to the decision-making process.

INDOT and local partners have identified an opportunity to build and designate a heavy haul corridor connecting River Ridge Commerce Center in Jeffersonville with the Port of Indiana in Jeffersonville. The \$22 million project will provide a direct link between the two locations and will allow oversized loads to access River Ridge. The heavy haul corridor will open the potential for further economic development, such as auto, steel, or appliance manufacturers moving into River Ridge, all of which would benefit from direct river access. The project is a collaborative effort funded by:

- INDOT.
- City of Jeffersonville.
- Clark County.
- River Ridge Development Authority.
- Port of Indiana-Jeffersonville.
- United States Department of Transportation TIGER Grant.

INDIANA RAILROAD ISSUES

Similar to other states in the U.S., the two primary freight railroad issues are: state of good repair and rail network access. In addition, safety is an overarching goal for railroads and public agencies alike. Indiana currently has 5,693 public railroad-at grade highway crossings (5th highest in the U.S.) and an active railroad grade crossing fund program, however, there were 119 public crossing incidents in 2014 and 106 in 2016. While the incidents have decreased, Indiana ranks third in the U.S. for public crossing incidents in 2016, behind Texas and California.

State of Good Repair

According to the 2017 Indiana State Rail Plan Update, a number of miles of track and bridges in the State cannot accommodate 286,000 pound railcars, the current standard maximum car weight. The plan states that, "Three hundred and forty-five miles of the Indiana rail network cannot accommodate these heavy railcars, which limits the efficiency and competitiveness of these rail lines. Either shippers on these lines must use smaller railcars or they must short-load their railcars. At least 120 bridges in Indiana cannot accommodate 286,000 pound railcars." Figure 22 displays 286,000 rail car capacity on Indiana's rail network.¹⁸

¹⁸ <http://www.in.gov/indot/2394.htm>.



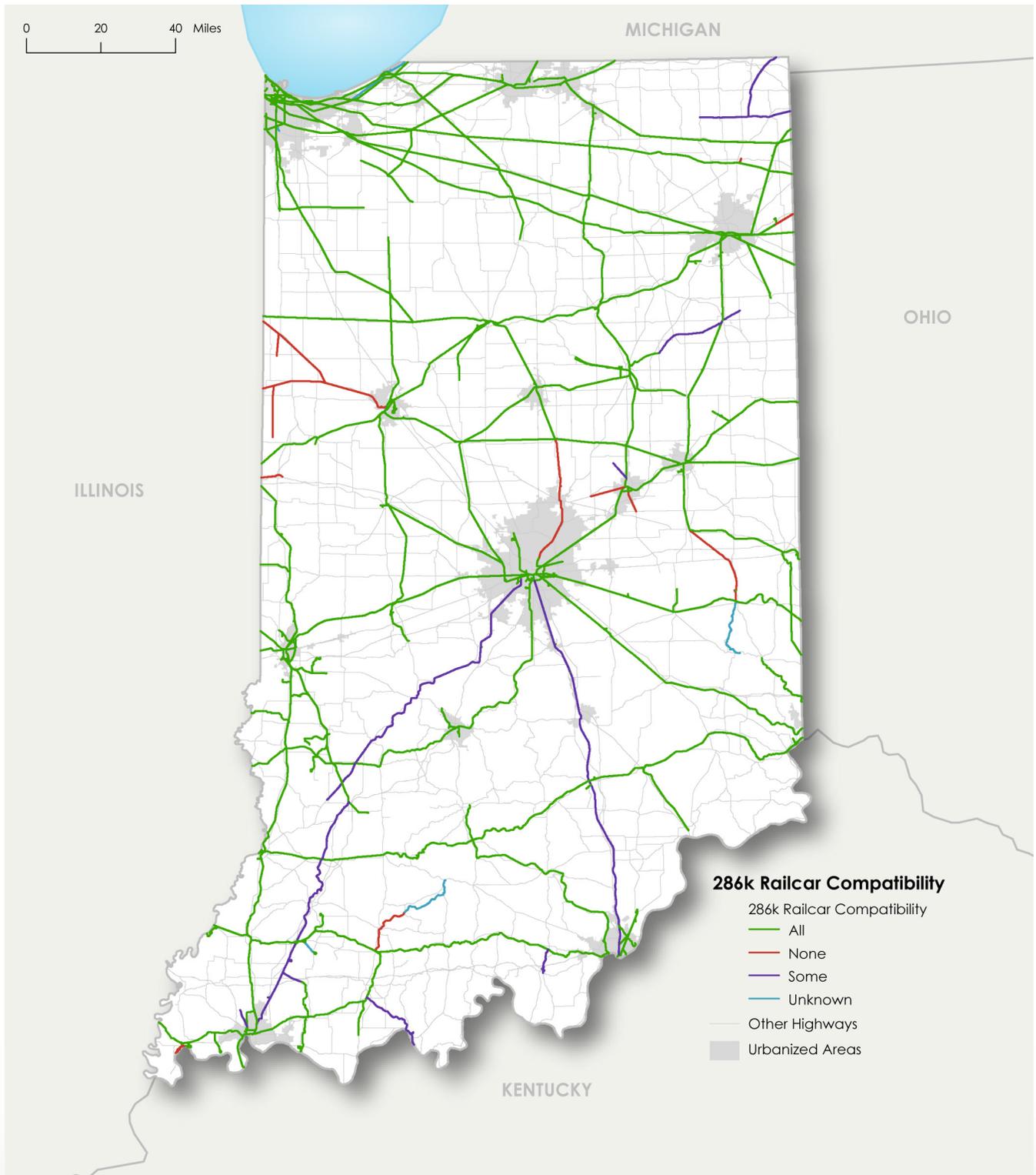


Figure 22. Rail Car Capacity

Source: <http://www.in.gov/indot/2394.htm>.



Rail Network Access

Rail network access refers to the ability of shippers and businesses to access rail services. The state rail plan notes this is typically accomplished through:

- Spur or siding connecting directly to the shipper's location.
- Shared spur or siding, such as into an industrial park.
- Intermodal terminals, which facilitate transfer of containers or trailers between truck and rail.
- Transload facilities (including team tracks) which facilitate transfer of non-containerized freight between truck and rail.
- Rail-served marine ports, which facilitate transfer between rail and maritime or truck modes.

The plan goes on to note that, "INDOT, the Indiana Economic Development Corporation (IEDC), Ports of Indiana (POI) and other organizations are continually seeking to improve rail access. Between 2012 and 2016, the IEDC invested about \$4.3 million in industrial access projects, either for spurs to individual businesses or for access to rail-served industrial parks. During the same period of time \$2.4 million of Industrial Rail Service Fund (IRSF) funds or 18 percent of the total IRSF funds available were similarly applied to industrial access improvement projects."¹⁹

INDIANA WATERWAY ISSUES

Maritime transportation faces many challenges on the Great Lakes and Inland Waterways System, including aging infrastructure, dredging requirements, inefficient multimodal connections, as well as disconnected systemwide planning and oversight.

While the ports themselves have ample capacity for expansion, access to the ports has been identified as an issue that may hinder future growth. Each port is served by only a single Class I railroad, and the Mount Vernon port in particular is also constrained by inadequate direct highway access.

Accessibility/Connectivity

Highway access to many of Indiana's port facilities were designated as NHS intermodal freight connectors. Terminals and ports along the Ohio River in southwest Indiana are accessible to I-275 via U.S. 50. Segments of U.S. 50 in this area currently range from Level of Service (LOS) A through D, while in the future some segments are expected to operate at LOS F. The ramp connecting I-275 with U.S. 50 and Belleview Avenue is estimated at LOS F currently.

SR 62 connects the Port of Indiana – Mount Vernon with SR 69. These facilities are expected to continue operating at LOS A through 2035.

Several local and private port facilities exist in Evansville, all of them linked by SR 62. SR 62 ranges from LOS A to F currently, with conditions expected to degrade on more segments in the future. Ray Becker Parkway is expected to remain at LOS A through 2035 as is an upgraded Fulton Avenue.

The Perry County Port Authority port facilities in Tell City are considered an intermodal facility of statewide significance. SR 66 and SR 37 range from LOS A to D now and in 2035, though most segments operate at LOS C.

Two Federal harbors, Buffington Harbor and Indiana Harbor, as well as the Port of Indiana – Burns Harbor, are located in the Chicago region, directly adjacent to the city of Chicago, and access roads and highways suffer

¹⁹ <http://www.in.gov/indot/2394.htm>.



from daily urban congestion. Cline Avenue, the main arterial adjacent to the two harbors, operates between LOS A and LOS D, depending on the segment. In 2035 some segments are expected to degrade to LOS B through E.

INDIANA AIR CARGO SYSTEM ISSUES

Indiana has more than 450 private-use airports and 115 public-use airports. Of the public-use airports, 69 are considered of statewide importance and are therefore included in the Indiana ISASP. The Indiana aviation system has been continuously developed over the years using Federal, state and local funds, and it provides statewide access for business, tourism and recreation.

At present, five primary (includes hub and non-hub) airports provide commercial passenger service. These include; Indianapolis International Airport, Fort Wayne-Allen County Airport, South Bend Airport, and Evansville Regional Airport.

Another seven airports serve as reliever airports to those larger commercial airports. The balance of the 69 airports covered by the ISASP is 57 general aviation airports.

Air Cargo Accessibility

Highway access roads to Indianapolis International Airport were designated as NHS intermodal freight connectors of national significance. The old Airport Expressway served as the main access point to the Indianapolis International Airport prior to the opening of the new passenger terminal in late 2008 and is still an active gateway to the FedEx freight operation at the airport. At that time, this roadway was operating at LOS A, and it is expected to continue to operate at an acceptable level of service into the future. The new primary passenger access point to the Indianapolis International Airport is located off of I-70 on the west side of the airport. U.S. 40 also connects Indianapolis International Airport with I-465. Several segments of U.S. 40 between I-465 and the Ronald Reagan Parkway have peak period congestion at LOS F. More segments of U.S. 40 near the airport are expected to become congested by 2035.

Fort Wayne International Airport is another cargo airport of national significance. It can be accessed from I-69 and I-469 via a variety of roads, including Indianapolis Road, Airport Expressway, and Bluffton Road. These roads, as well as the neighboring interstates, are expected to continue to operate at LOS A or B through 2035.

INDOT CUSTOMER FEEDBACK

As part of the planning process, an interactive map was distributed to MPOs throughout the state to gather comments regarding how the system is performing. A full list is included in Appendix B, while highlights are as follows:

- Development of industrial and logistics parks throughout the state is increasing the truck traffic on most interstates (and routes to/from) and several US highways. This is expected to increase, especially along I-65, I-70, US 30 and US 31.
- US 30 and US 31 experience high truck traffic volume and would benefit from treatments for free flow conversion.
- I-65 and I-70 experience frequent congestion statewide.
- I-465, I-65, and I-70 in and around Indianapolis experience significant recurring congestion during peak hours.
- Vertical bridge clearances remain an issue throughout the state, mostly on non-interstates.
- A number of frequently-used state and US highways run through cities and towns, causing traffic safety issues and physical clearance issues.



Trends



POPULATION TRENDS

The ability for a state to attract large businesses, such as warehouses and distribution centers which rely upon thousands of employees at a time, is largely dependent upon the labor force available. While part of this workforce availability is related to factors such as education, experience, and skill sets, none of these are possible without actual people to educate and train. This section focuses on the current and forecasted population of the State of Indiana and the impacts this will have on future workforces and business retention and attraction.

Indiana's population was estimated at just over 6.6 million people in 2015, slightly higher than the 2010 estimate of just under 6.5 million. Between 2010 and 2015, Indiana's population grew at a slower rate than the U.S. as a whole. Population growth in Indiana during this period was approximately 0.4 percent annually, while the national growth rate was 0.7 percent annually. Population estimates in 2015 also fell short of forecasts from the Indiana Business Research Center made in 2012, indicating that growth is not keeping up with expectations or is possibly slowing.

Figure 23 illustrates the anticipated population forecasted to 2040. Between 2015 and 2040, annual growth is expected to be just under 0.4 percent, on pace with what occurred between 2010 and 2015. If population continues at this rate, the population of the State would be just over 7.3 million in 2040. However, lower than anticipated growth into 2015 indicates that it is likely that the population will not reach this level of growth without a shift in Indiana's net migration patterns. If slowing or stagnant population growth occurs, Indiana may not have the workforce necessary to meet demand for freight-oriented commerce or attract future development.

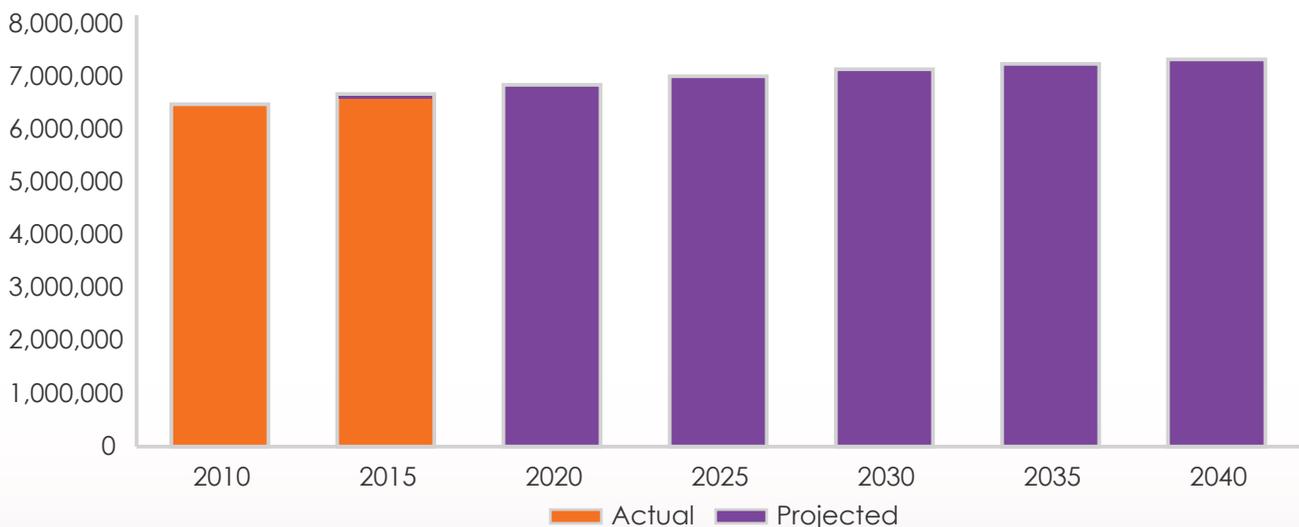


Figure 23. Statewide Population Forecast

Source: Indiana Business Research Center, 2012.



While the population has already undercut the forecasts, that does not discount the value that these forecasts can offer. In particular, an understanding of where in the State persons are attracted to is important in order to assess future needs pertaining to infrastructure, housing, schools, and more. Figure 24 shows the estimated population between 2010 and 2040. While many counties remain in the same relative range of populations, one shift that can be observed is a reduction in population in more rural areas and an increase in population in more urban areas such as Indianapolis and the counties near the Chicago region along I-90. This trend signals that more of the State's workforce will be concentrated in fewer locations in the State.

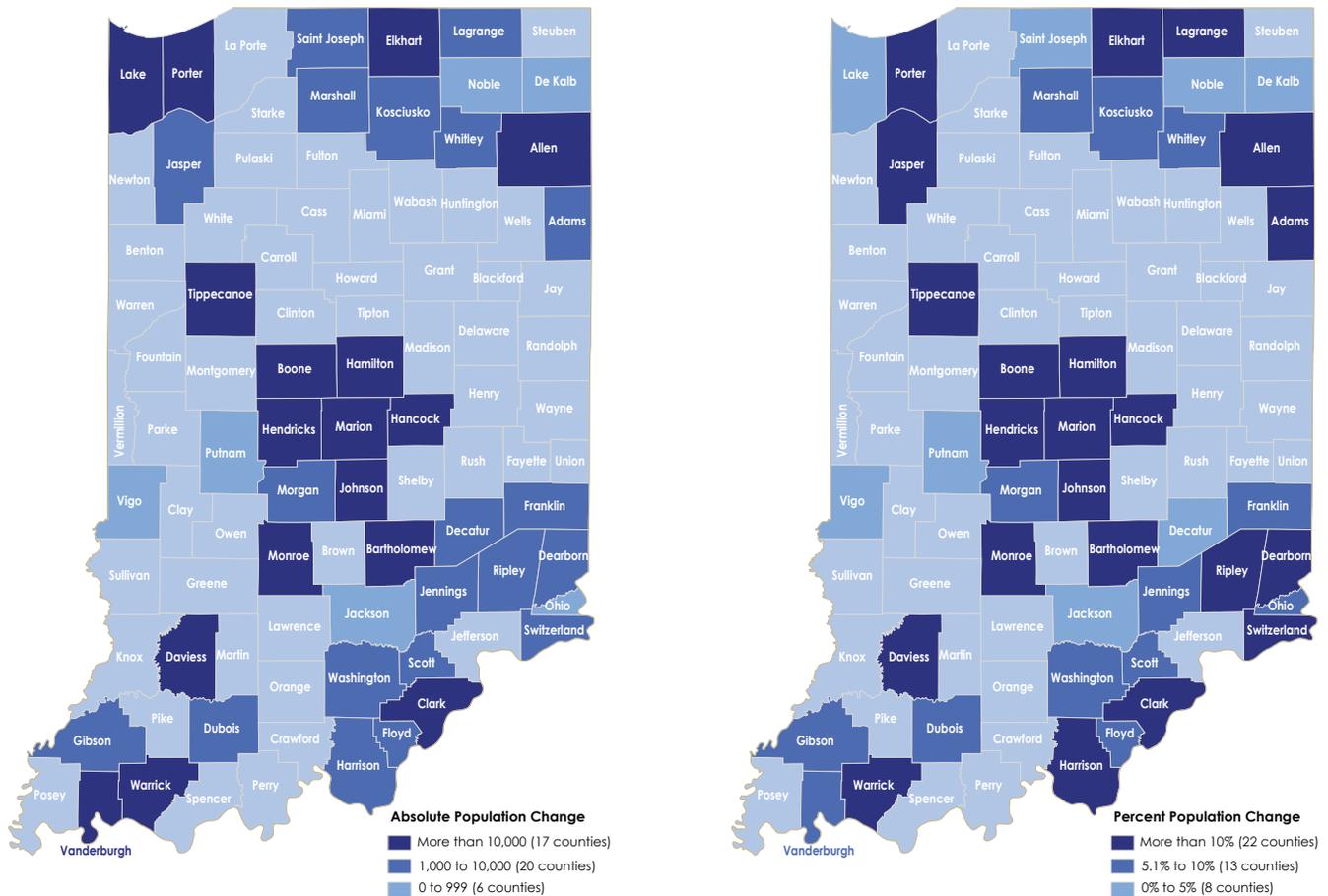


Figure 24. Change in Population by County, 2010-2040

Source: Indiana Business Research Center, 2012.

Figure 24 also shows the percent change of each county. Over one quarter of the State's population growth is attributed to Hamilton County near Indianapolis. Marion and Hendricks counties, also in the Indianapolis region, experience the second and third largest population growths. Combined, these three counties account for over 50 percent of the total net increase in the State's population. Proportionate to the current population, this is tremendous growth. The total growth for Hamilton County is anticipated to be 81 percent while that of Hendricks (the second highest percent growth) is 68 percent. The remainder of the top five counties for total growth based on percentage are Boone, Hancock, and Johnson Counties.



On the opposite end of the spectrum are those counties which will lose a large part of their populations. Blackford County, while appearing to only lose a small number of residents at 3,387 over the 30 years, is actually anticipated to lose 27 percent of their population based off of 2010 values. Other counties losing 15 percent or more of their population over this timeframe include Wabash (15 percent), Rush (17 percent), Fayette (17 percent), and Posey (18 percent). These decreases in population can make it difficult for a county or region to position itself for the introduction of a large employer if the labor force is not available. Similarly, a loss in population also decreases the tax base which can have a ripple effect on other aspects such as local education and transportation spending.

At the same time that populations are either remaining stagnant or growing slowly, the age of the population continues to rise. The estimates provided by the Indiana Business Research Center broke down these population trends by age group which allows for an understanding of the available workforce in the coming years. The percent share of the population broken down by age group is shown in Figure 25. In particular, one of the most significant shifts is in the 65+ age group. This group goes from a mere 13 percent of the population in 2010 up to 21 percent in 2040. While aging is a natural component of life, the rapid growth of this group surpasses the anticipated population gains, resulting in a smaller percent of the population participating in or preparing for the workforce.

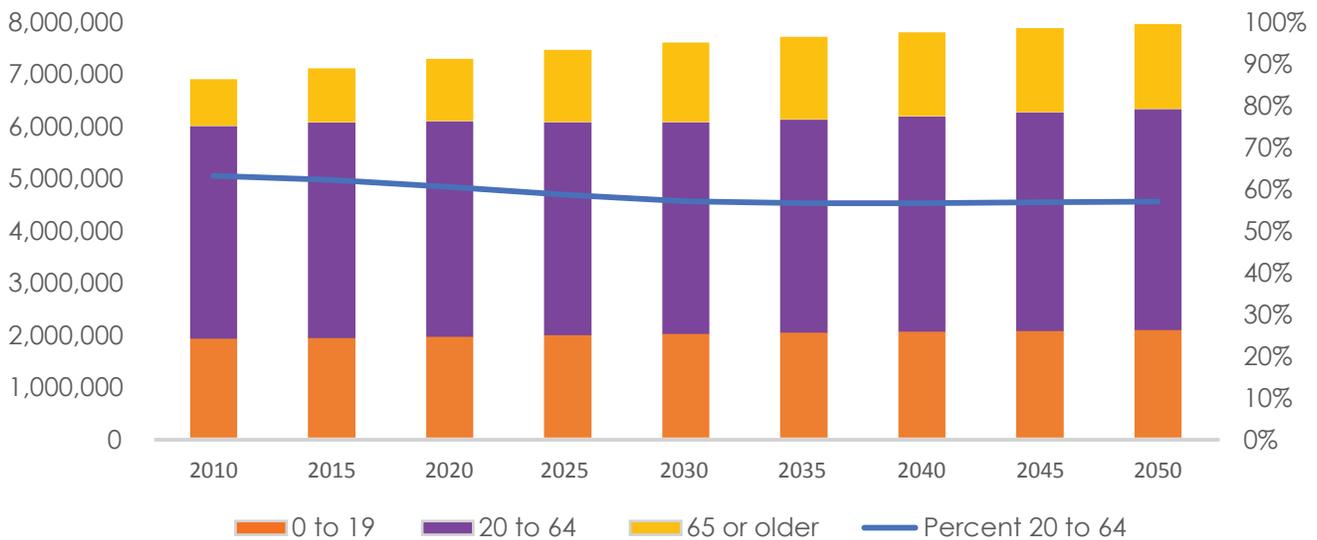


Figure 25. Statewide Workforce Estimates

Source: Indiana Business Research Center, 2012.

Population forecasts for 2015 were made in 2012. However, population estimates conducted in 2015 showed that actual growth differed from projected growth. While forecasts are not perfectly accurate, in this case they afford the opportunity to examine the areas which have grown faster than anticipated, as well as those that have grown slower than anticipated. Table 8 shows the top five counties which have the largest overall difference in their estimates both positively and negatively. The largest positive difference is found in Marion County which grew by an extra 11,045 persons than what was anticipated, or 1.2 percent higher than the estimates. Similarly, Tippecanoe, Bartholomew, Boone, and Jackson each had several thousand more residents than anticipated, or over 2 percent higher than the estimates.



This suggests that these counties have been much better at attracting residents than others. On the opposite end, the counties which did not meet their population estimates were off by much more. These counties ranged from 3,717 persons in Hancock County to 14,363 persons below in Lake County." As some of the larger counties in the State, these lower populations are not quite as profound as if they had been experienced in smaller counties.

Table 8. 2015 Population Forecast Compared to 2015 Census Estimate, by Net Difference

COUNTY	2015 FORECAST	2015 CENSUS ESTIMATE	NET DIFFERENCE	PERCENT DIFFERENCE
Marion	927,975	939,020	11,045	1.2%
Tippecanoe	182,205	185,826	3,621	2.0%
Bartholomew	79,194	81,162	1,968	2.5%
Boone	61,621	63,344	1,723	2.8%
Jackson	43,059	44,069	1,010	2.3%
Indiana State	6,677,751	6,619,680	-58,071	-0.9%
Hancock	76,237	72,520	-3,717	-4.9%
Porter	172,563	167,688	-4,875	-2.8%
Hendricks	164,961	158,192	-6,769	-4.1%
Hamilton	318,449	309,697	-8,752	-2.7%
Lake	502,228	487,865	-14,363	-2.9%

Source: U.S. Census Bureau, Indiana Business Research Center.

Table 8 shows the top counties which exceeded or missed their population forecasts by the net persons and percent difference. The majority of those exceeding their forecasts percentage-wise are the same as those that exceeded them by the net difference shown in Table 9. However, for those that missed their forecast, the majority are different from those previously highlighted. Based on percentage, the lower estimates are much more profound in lesser populated counties such as Switzerland and Ohio which are 7.1 percent and 6.7 percent below what was forecasted. This information, while merely interesting at a glance, affords the opportunity to learn from the counties on the ends of the spectrum. For those that have seen higher than anticipated growth, others can model themselves off of their tactics in order to experience similar growth, if that is the desired effect.

Table 9. 2015 Population Forecast Compared to 2015 Census Estimate, by Percent Difference

COUNTY	2015 FORECAST	2015 CENSUS ESTIMATE	NET DIFFERENCE	PERCENT DIFFERENCE
Boone	61,621	63,344	1,723	2.8%
Bartholomew	79,194	81,162	1,968	2.5%
Jackson	43,059	44,069	1,010	2.3%
Tippecanoe	182,205	185,826	3,621	2.0%
LaGrange	38,253	38,809	556	1.5%
Indiana State	6,677,751	6,619,680	-58,071	-0.9%
Dearborn	51,927	49,455	-2,472	-4.8%
Hancock	76,237	72,520	-3,717	-4.9%
Union	7,583	7,182	-401	-5.3%
Ohio	6,367	5,938	-429	-6.7%
Switzerland	11,332	10,524	-808	-7.1%

Source: U.S. Census Bureau, Indiana Business Research Center.



These population trends and forecasts are a reflection of what is anticipated to occur in the coming years. However, workforce strains are already occurring in the present. Based on the Bureau of Labor Statistics (BLS), Indiana's unemployment rate is already at 4.1 percent as of February 2017,²⁰ well below the 4.7 percent unemployment rate in the United States as whole. While this is a positive sign for residents that the majority of those who want to work have employment, this also makes it difficult for employers to find suitable candidates.

Freight and freight-dependent industries require a range of skill levels to produce and distribute their products. For example, a manufacturing firm may require workers with a four-year degree or higher, such as automation or equipment engineers, to design and optimize its operations. The same firm requires middle-skill workers, those with a two-year degree or specialized training, to operate and maintain equipment and processes. The National Skills Coalition examines the market for middle-skills jobs, which account for 58 percent of all jobs in the State of Indiana as of 2015. Middle-skill workers, on the other hand, only make up 47 percent of the State's workers²¹ which signifies a very large gap in what is needed versus what is available. A rise in substance abuse also limits the number of eligible employees for a given firm.²² These factors limit not only the freight community but other employers as well, which hinders the ability of Indiana to grow to its full potential.

²⁰ <https://data.bls.gov/timeseries/LASST1800000000000003>.

²¹ <http://www.nationalskillscoalition.org/resources/publications/2017-middle-skills-fact-sheets/file/Indiana-MiddleSkills.pdf>.

²² https://www.nytimes.com/2016/05/18/business/hiring-hurdle-finding-workers-who-can-pass-a-drug-test.html?_r=0.



FREIGHT FLOWS

Freight Growth Projections

Freight growth in Indiana is projected to maintain similar ratios across truck, rail, water, and air by 2045. A notable trend emerges in the growth of value of the freight. Inbound (+48%), Outbound (+48%), and Internal (+33%) all represent significant growth from 2015 to 2045. By tonnage, growth is moderate: Inbound (+29%), Outbound (+37%), and Internal (+27%). Freight moving through the State of Indiana also impacts the condition and performance of the freight network. However, its impact on the State's economy is less significant than goods originating in or destined for Indiana. A summary of modal freight projections are shown in the following three tables.

Table 10. Indiana Inbound Freight by Mode, 2045

MODE	TONS (1,000S)	%	TOTAL M\$	%	VALUE/TON
Truck	152,259	70%	\$351,146	75%	\$2,306
Rail	55,641	25%	\$38,350	8%	\$689
Water	10,744	5%	\$2,751	1%	\$256
Air	405	0%	\$75,064	16%	\$185,343
Grand Total	219,049	100%	\$467,311	100%	\$2,133

Source: Freight Analysis Framework Version 4.

Table 11. Indiana Outbound Freight by Mode, 2045

MODE	TONS (1,000S)	%	TOTAL M\$	%	VALUE/TON
Truck	172,059	76%	\$384,166	76%	\$2,233
Rail	43,153	19%	\$41,286	8%	\$957
Water	11,426	5%	\$1,881	0%	\$165
Air	445	0%	\$75,668	15%	\$170,040
Grand Total	227,083	100%	\$503,541	100%	\$2,217

Source: Freight Analysis Framework Version 4.

Table 12. Indiana Internal Freight by Mode, 2045

MODE	TONS (1,000S)	%	TOTAL M\$	%	VALUE/TON
Truck	293,044	94%	\$209,955	97%	\$716
Rail	14,549	5%	\$5,060	2%	\$348
Water	3,621	1%	\$82	0%	\$23
Air	6	0%	\$530	0%	\$88,333
Grand Total	311,220	100%	\$215,628	100%	\$693

Source: Freight Analysis Framework Version 4.

Freight Flows by County

Chapter 1 detailed the freight inventory and assets within Indiana and the types of commodities utilizing each mode. This did not, however, yield an understanding of where within the state goods are going to or coming from. FAF traditionally only allows for a high-level understanding of this information, typically limited to urban areas and then the remainder of the State. In the case of Indiana, this would only permit detailed information for the regions near Chicago, Indianapolis, and Fort Wayne. To break this information down to a county level, a disaggregation method developed by Cambridge Systematics was utilized.



Figure 26 displays the results of this disaggregation at the county level for both 2015 and 2045 tonnages. The highest volumes statewide in 2015 are found in Lake County, due to industrial activity in Gary, the proximity of Chicago, and a larger metropolitan population which will consume more goods (and thus have higher inbound volumes of commodities). Marion County falls into second place, again due to a more densely populated area. Population is not the only driver of commodity volumes but does contribute to a higher consumption rate. Significant freight infrastructure in these regions also contributes to attracting freight, which is more clearly seen in the county with the third highest tonnage – Elkhart County. While smaller in population (about one-fourth the size of Indianapolis), Elkhart County contains significant freight infrastructure, such as the Norfolk Southern Auto Terminal, which results in the higher volumes seen here.

Moving forward into 2045, these three counties will continue to be the top origins and destinations of goods. However, nearly every county statewide will see some amount of growth in the overall amount of goods moved. Understanding and preparing for this growth will better position Indiana to utilize available resources to make appropriate investment decisions to ensure the safety, reliability, and overall performance of the transportation network.

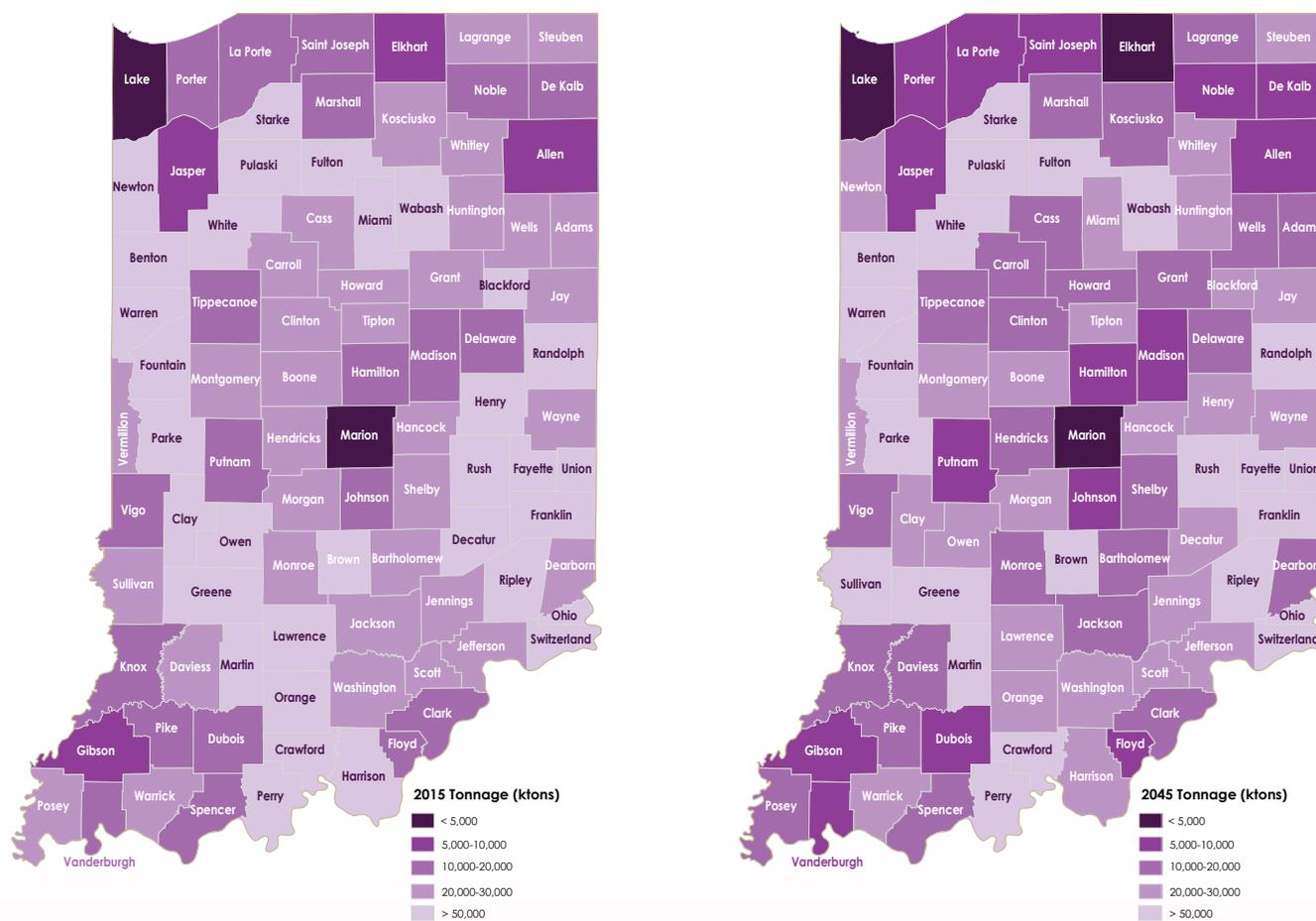
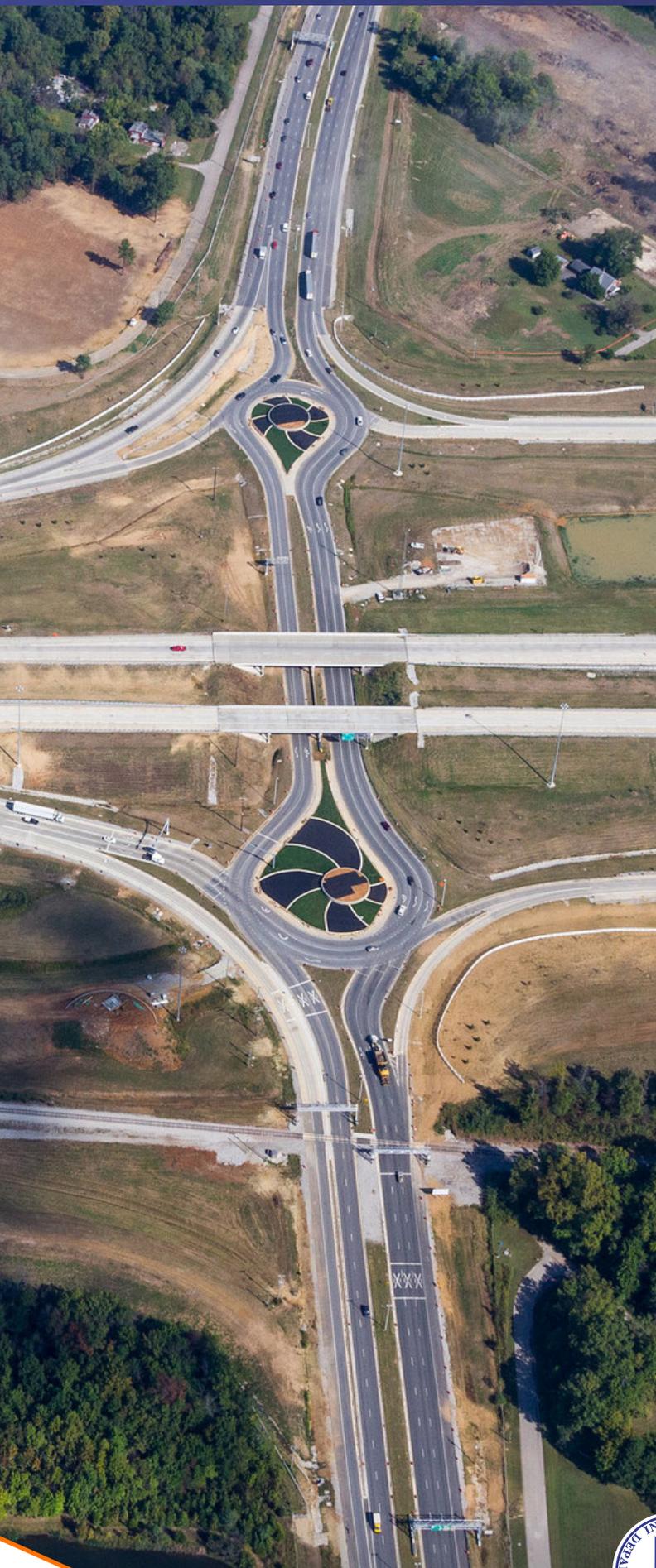


Figure 26. Origin and Destination Tonnage by County, 2015 and 2045





As mentioned, *nearly every county will see some growth in freight volumes.* Figure 27 shows that the exceptions to this are Spencer, Pike, and Sullivan Counties. While this decrease is not ideal and may signify a loss of some industry in these counties, the overall drop in tonnage for each is no more than 10 percent, or about 1,360 ktons. On the opposite end of the spectrum once again lies Lake, Marion, and Elkhart counties. These three counties will see the most overall growth and maintain their positions as the top three counties by overall volume.

While the overall volume of each of these counties may be higher than other regions, many areas in the State are anticipated to see growth rates of over 50 percent. By percentage, Marshall, Blackford, and Perry Counties are anticipated to see the highest growth rates. While the total tonnage growth is relatively smaller compared to the largest counties (growth of 1,233 ktons to 7,103 ktons here versus 48,882 ktons in Lake County), a high percentage indicates above average growth. High growth in freight commodities can signify an increase in jobs and economic prosperity in more rural regions such as these. Each of these counties is well positioned for growth based on the following connectivity:

- **Marshall County** – Seven state roads and three U.S. highways within the county as well as four railroad companies with active lines.²³
- **Blackford County** – Within 10 miles of three interchanges on I-69, traversed by State Roads 3, 18, and 26, and served by two railroads (Norfolk Southern and Central Railroad Company of Indianapolis/Genesee & Wyoming).²⁴

²³ <http://www.marshallcountyedc.org/targeted-industries/transportation-warehousing>.

²⁴ <http://www.blackfordindiana.com/location/>.



- **Perry County** – Access to I-64 in northern portion of county and Ohio River to the south with rail service provided by the Perry County Port Authority.

Many other counties throughout the State sport similar critical connections via multiple modes which contributes to the growth seen throughout the State.

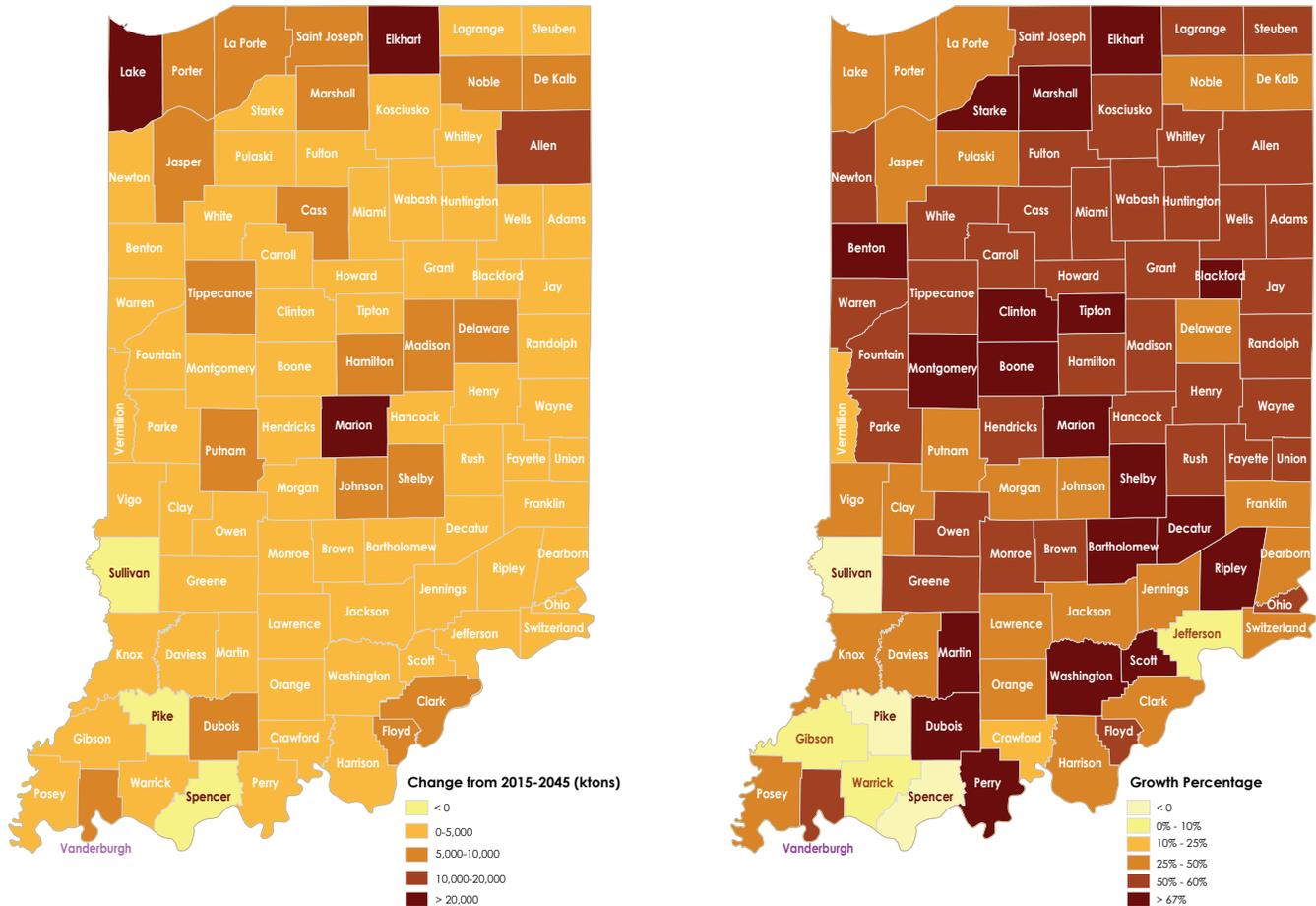


Figure 27. Change in Origin and Destination Tonnage by County, 2015-2045



Indiana's Plan Moving Forward



FREIGHT PERFORMANCE MEASURES

In order to use public funding in the most effective way, INDOT has identified goals and performance measures to ensure that projects, programs, and policies advance the freight transportation system in a way meaningful to its public and private stakeholders. Performance-based planning allows INDOT to track how its existing assets are performing and changing. Performance measures can also be used to evaluate whether a potential investment will advance a public goal.

National and State Freight Goals

Identifying meaningful performance measures starts with setting goals for how the network should perform. Under the Fixing America's Surface Transportation (FAST) Act, the evaluation of various transportation improvement strategies will need to consider each strategy's effect on the chosen performance measures and strategic goals. National Freight Policy Goals include:

- Improve the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness;
- Reduce congestion on the freight transportation system;
- Improve the safety, security, and resilience of the freight transportation system;
- Improve the state of good repair of the freight transportation system;
- Use advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system; and
- Reduce adverse environmental and community impacts of the freight transportation system.

Similarly, INDOT has identified five goals that will direct how it invests in the State's infrastructure. Current NHFP funds are not sufficient to address all freight mobility needs, so other highway funding will be used for projects that improve freight mobility. The following goals will guide INDOT's investment in freight infrastructure projects:

- **Economic Impact** – Cultivate a strong and diverse economy by growing Indiana as a magnet for jobs.
- **Capacity to Meet Demand** – Reduce bottlenecks to improve the reliability and efficiency of freight movement, leading to less congestion, fewer infrastructure repairs, and lower emissions.
- **Multimodal Integration and Synergy** – Develop and implement transportation networks that support direct truck and rail access, waterborne freight expansion, and air cargo expansion, leading to the improvement and establishment of multimodal and intermodal service facilities.
- **Access to National and International Markets** – Support better connectivity between all modes of freight transportation, including between Indiana's water ports and highway and rail modes.



- **Quality of Life** – Identify opportunities to improve and maintain Indiana's transportation infrastructure, supporting the safe movement of freight through the State.

The goals set at the national and state level are related and complementary. Figure 28 shows the relationship between INDOT's goals and national goals for freight performance.

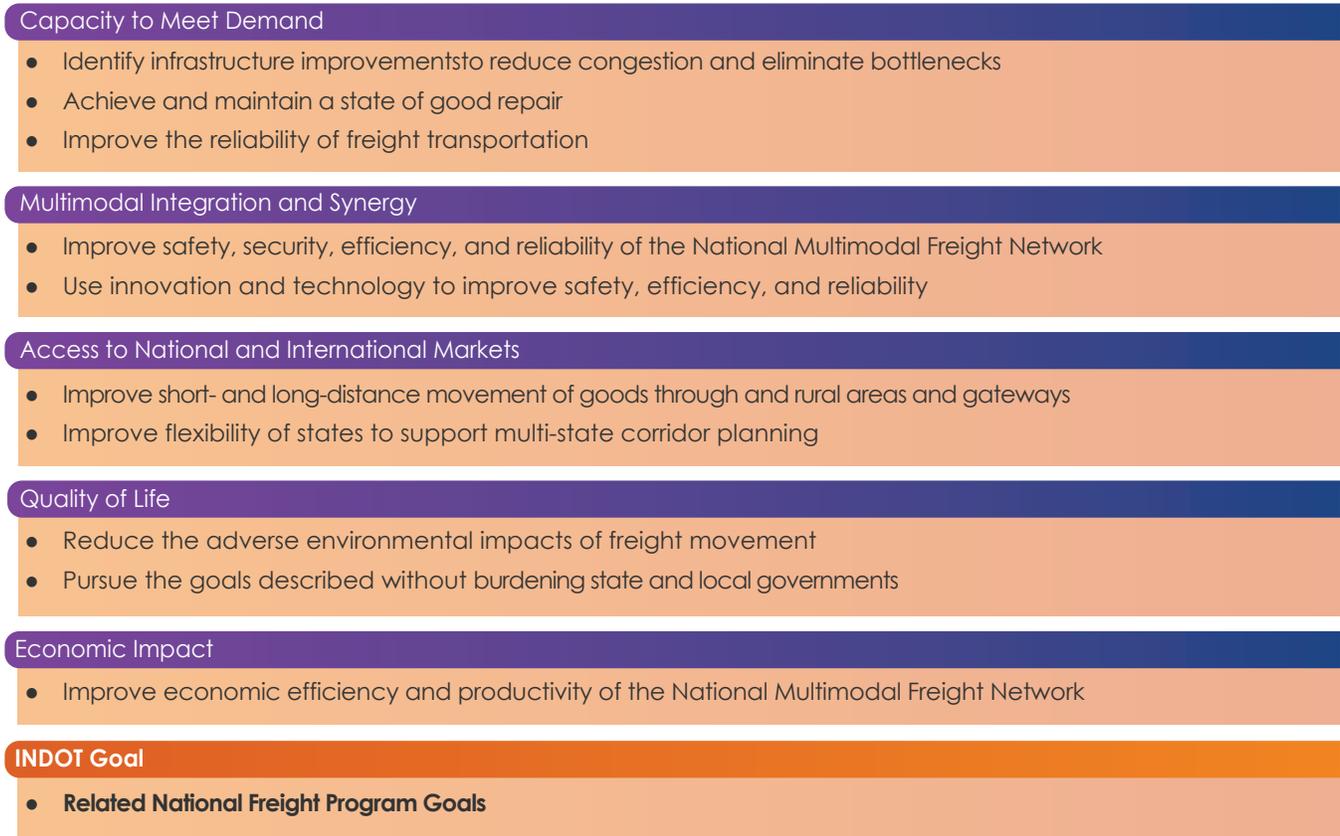


Figure 28. INDOT and National Goals

NATIONAL AND STATE FREIGHT PERFORMANCE MEASURES

Performance measures must be specific and measurable to be useful in directing investments. The performance measures presented in this plan are designed to be useful for signaling when changes are warranted for strategies and priorities (e.g., in long-range plan updates and in development of capital, maintenance, and operation program budgets).

The FAST Act identified only one freight-specific performance measure: Truck Travel Time Reliability. The Truck Travel Time Reliability Index (TTTR) is a ratio of congested travel times to normal travel times on a segment of the roadway. The National Performance Measure Research Dataset (NPMRDS) provides the data required to calculate median and high (95th percentile) travel times at five different times of day. The TTTR is reported as a single number for State's segments of the National Highway Freight Network.

While TTTR is the only Federally required freight performance measure, this plan has identified at least one potential performance measure for each of INDOT's goals. These quantified measures have potential to be integrated



into the planning process and project selection process by INDOT. Performance measures were chosen such that they can be meaningful to decision-makers, stakeholders, political leaders and the general public. Specific performance measures INDOT may use to assess the suitability of the State’s freight transportation system to maintain and grow the economy are listed in Table 13.

These performance measures could also serve as the basis for target-setting with respect to what various programs will accomplish. The target-setting and monitoring processes accounts for the fact that many performance measures reflect not only results of actions taken by an agency, but external factors as well (e.g., traffic volumes and environmental conditions).

Table 13. Potential Freight Performance Measures

INDOT GOAL	PERFORMANCE MEASURES	NEED OR ISSUE ADDRESSED
Economic Impact	<ul style="list-style-type: none"> • Percent growth in jobs in freight-intensive industries • Percent growth in export value (domestic or foreign) 	<ul style="list-style-type: none"> • Increase local economic benefit from freight industries
Capacity to Meet Demand	<ul style="list-style-type: none"> • Percent of lane-miles at level of service C or better • Reduction in hours of truck delay • Improvement in Truck Travel Time Reliability Index 	<ul style="list-style-type: none"> • Increase ability of infrastructure to meet demand • Reduce congestion and air quality impacts of freight • Improve system’s ability to meet demand from shippers
Multimodal Integration and Synergy	<ul style="list-style-type: none"> • Percent of intermodal connectors with “fair” or better pavement conditions • Number of intermodal or multimodal projects completed 	<ul style="list-style-type: none"> • Address issues on first and last mile connections between modes • Track investment in multimodal integration
Access to National and International Markets	<ul style="list-style-type: none"> • Hours of delay on roadways within 5 miles of ports and cargo airports 	<ul style="list-style-type: none"> • Improve highway access to trading partners
Quality of Life	<ul style="list-style-type: none"> • Reduction in truck-involved crashes • Reduction in truck-involved fatal crashes • Removal of rail/highway grade crossings 	<ul style="list-style-type: none"> • Improve safety for the traveling public • Eliminate loss of life on Indiana’s roadways • Improve safety and reliability for the traveling public

At present INDOT is committing to two of the above goals to guide and measure freight investments. Truck Travel Time Reliability (TTTR) is required by FHWA TPM Rule and described below. Detailed safety statistics are currently maintained by INDOT, though not necessarily queried for freight-related analytics, also described below.

Capacity to Meet Demand: Truck Travel Time Reliability

Travel time reliability is an indicator of the highway system’s ability to consistently meet demand for travel. Reliability is particularly important for freight transportation because shippers must schedule routes and drivers to meet customer schedules. A less reliable system results in higher costs as shippers have to include a buffer to ensure on-time delivery. This is increasingly relevant as trends towards just-in-time delivery and lower inventories potentially tighten delivery windows.

The TTTR index is a measure of how much additional time shippers must plan for in order to arrive on time 95 percent of the time. FHWA defines TTTI as “the consistency or dependability in travel times, as measured from day-to-day and/or across different times of day”. Federal performance measures require states to report the worst TTTR Index across five times of day. Figure 29 shows the TTTR Index on Indiana roadways. The least reliable segments tend to be in urbanized



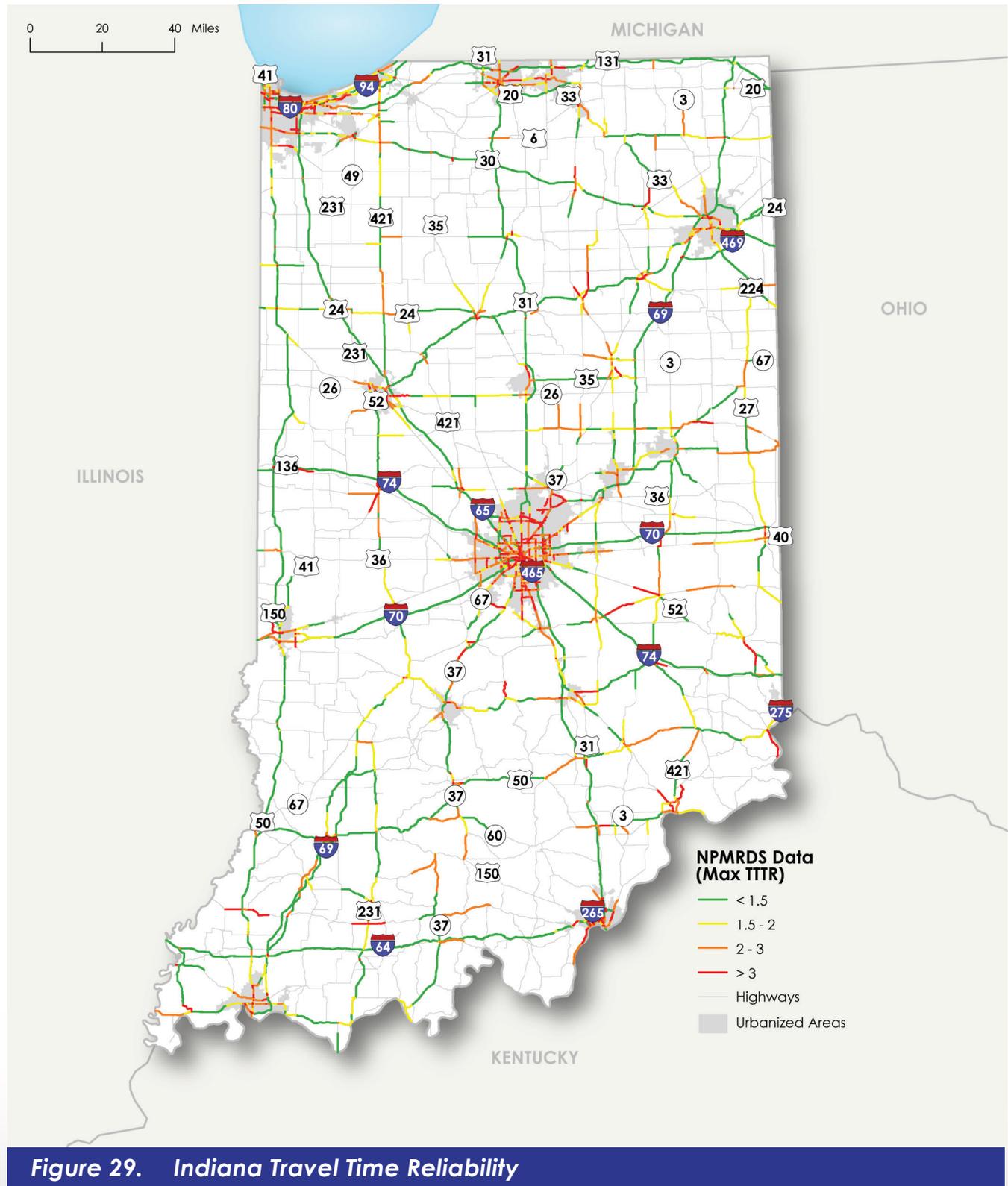


Figure 29. Indiana Travel Time Reliability

Source: National Performance Management Research Dataset, 2017



areas or near the intersection of two highways. However, there are at least moderate reliability issues in many parts of the state. Interstate highways and U.S. highways between urbanized areas tend to be more reliable because additional lanes minimize the impact of crashes and other causes of delay. Additional NPMRDS analysis was performed by INDOT using the Regional Integrated Transportation Information System (RITIS) to better understand speed deficits between free flow speed (how fast trucks wish to travel) and peak hour speeds (what speed trucks are actually able to travel) at 27 locations throughout the State. Detailed results and graphs are shown in Appendix G.

Quality of Life: Safety

One measure of freight safety on Indiana's roadways is the number of truck-involved traffic fatalities. While each crash may have unique factors such as roadways conditions or driver behavior, identifying areas where fatalities occur most often can help direct investment in safety improvements. Statewide rates can serve as an overall indicator of progress in safety advancement.

Over the last 20 years, Indiana has kept pace with national improvement in the number of fatal crashes (decrease of 15 percent in 2015 compared to 1994) as well as in the rate of fatal crashes per mile of travel (decrease of 35 percent in 2015 compared to 1994). Indiana's rate of fatal crashes was consistently lower than the national rate during that period and was ranked 21st in lowest fatality rates among states and Washington, D.C. in 2015. Table 14 lists the overall crash rate and the truck-involved crash rate in Indiana for the three most recent years available. The number of truck-involved crashes in the state increased in 2014 and then decreased again in 2015. The reverse is true for the overall crash rate in Indiana which, along with the national average, dipped in 2014 before returning to higher levels in 2015.

Table 14. Fatalities and Truck-Involved Fatalities in Indiana, 2013-2015

YEAR	ALL	TRUCK-INVOLVED	ALL PER 100 MM VMT (NATIONAL)	TRUCK-INVOLVED PER 100MM TRUCK VMT
2013	784	117	1.00 (1.10)	Not available
2014	745	128	0.94 (1.08)	1.35
2015	821	117	1.04 (1.13)	1.17

Source: National Highway Traffic Safety Administration, Fatality Analysis Reporting System; Truck VMT from INDOT Traffic Data.

Figure 30 and Figure 31 show the location of truck-involved fatalities in Indiana between 2013 and 2015. Interstate highways are commonly the locations with the most truck-related fatalities, and these are also the locations with the most truck traffic and highest speeds. Some locations with high crash incidence are:

- I-65 for about 30 miles south of Lake Michigan.
- I-65 for about 15 miles north of Lafayette.
- I-70 near Terre Haute and in west Indianapolis.
- I-70 near the Indiana/Ohio state line.
- US 20 between South Bend and Angola.
- US 30 near Plymouth and Warsaw.
- SR 32 between I-65 and I-74.



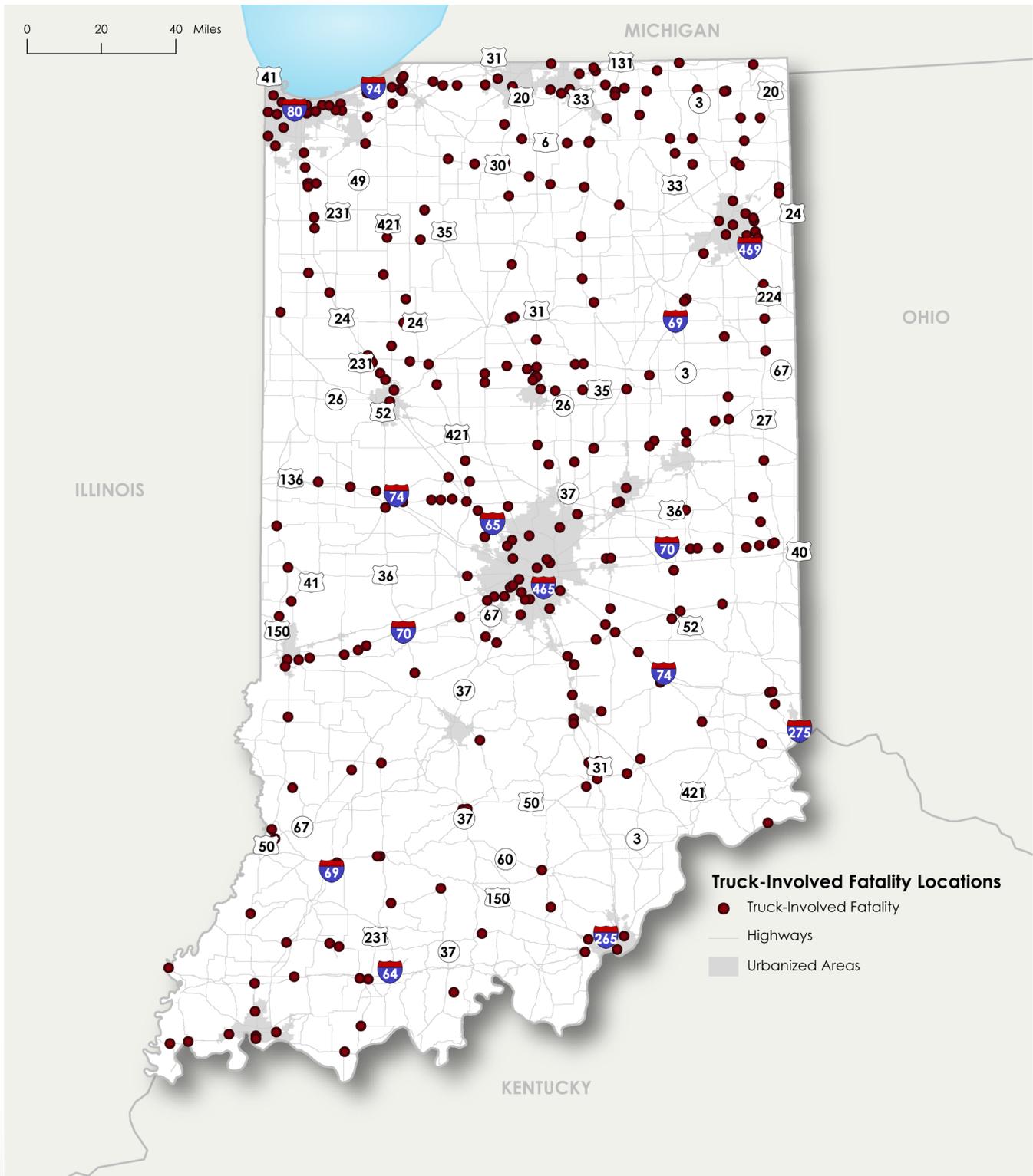


Figure 30. Truck Involved Fatalities, 2013-2015

Source: National Highway Traffic Safety Administration, Fatality Analysis Reporting System.



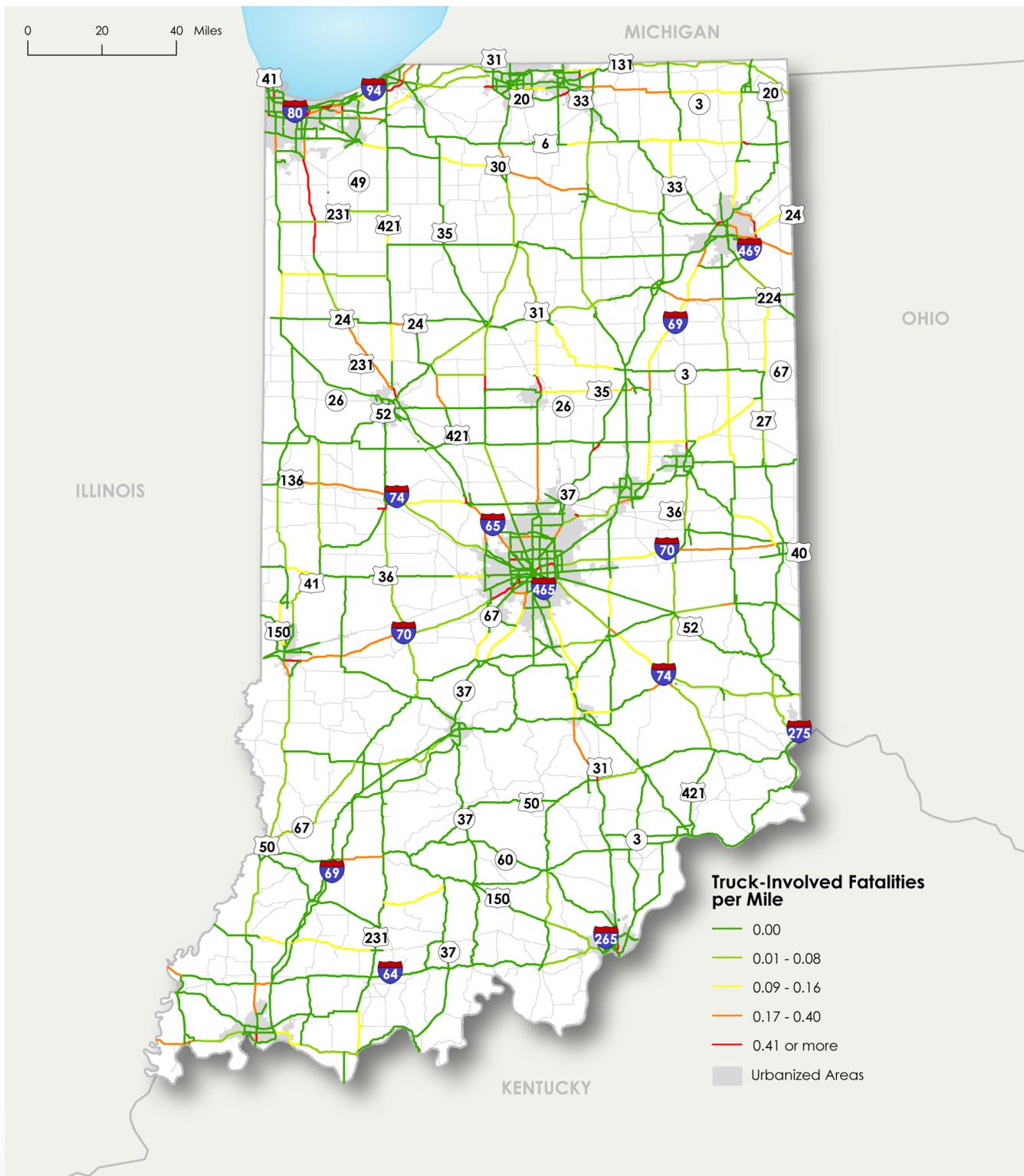


Figure 31. Truck-Involved Fatalities per Mile, 2013-2015

Source: National Highway Traffic Safety Administration, Fatality Analysis Reporting System.



Freight Investment Plan



To provide funding for significant freight projects, the FAST Act established the National Highway Freight Program (NHFP), which allocates a total of \$6.2 billion to States between 2016 and 2020. Funding is focused on improving freight performance on the National Highway Freight Network (NHFN). The NHFN is comprised of the following subsystems of roadway:²⁵

- **Primary Highway Freight System (PHFS):** This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. The network consists of 41,518 centerlines miles, including 37,436 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads.
 - » **Indiana PHFS:** 953.98 Miles
- **Other Interstate portions not on the PHFS:** These highways consist of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 9,511 centerline miles of Interstate, nationwide, and will fluctuate with additions and deletions to the Interstate Highway System.
 - » **Indiana Other Interstate:** 233.19 Miles
- **Critical Rural Freight Corridors (CRFC):** These are public roads not in an urbanized area which provide access and connection to the PHFS and the Interstates with other important ports, public transportation facilities, or other intermodal freight facilities. Candidate corridors are shown in Figure 32. INDOT has not chosen to designate any freight corridors to date. More information about CRFC selection criteria and a table of candidate segments can be found in Appendix C.
 - » **Indiana CRFCs:** 194.25 Miles
- **Critical Urban Freight Corridors (CUFC):** These are public roads in urbanized areas which provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities. Candidates for CUFCs are shown in Figure 33. More information about CUFC selection criteria and a table of candidate segments can be found in Appendix D.
 - » **Indiana CUFCs:** 97.13 Miles

INDOT has not chosen to designate CRFCs or CUFCs to date, however the planning effort included analysis to identify candidate corridors. More than half of the freight traveling on Indiana highways is passing through on one of PHFS interstates. These interstates experience heavy truck volumes, and therefore any project that improves interstate condition also improves freight mobility. Current freight mobility needs on the existing PHFS significantly exceed the available NHFP funds. INDOT may choose to designate CRFCs and/or CUFCs in the future to enable NHFP funds to be spent on critical projects not currently on the PHFS. As part of this freight plan, INDOT completed an initial analysis of potential routes for future CRFC (Figure 32)/CUFC (Figure 33) designation. The results of that initial analysis for CRFCs are in Appendix C, and for CUFCs are in Appendix D.

²⁵ <https://ops.fhwa.dot.gov/freight/infrastructure/nfn/index.htm>.



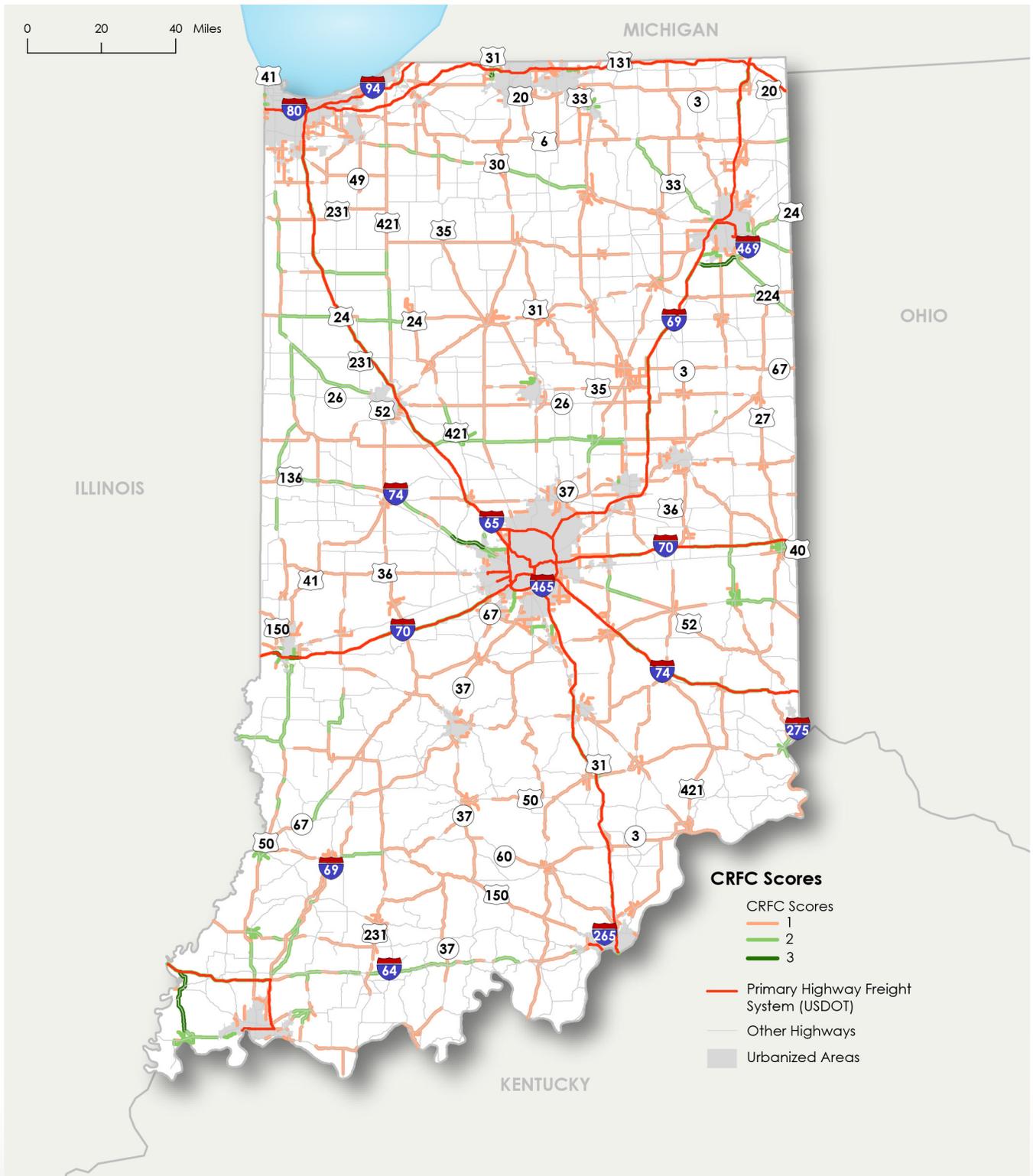
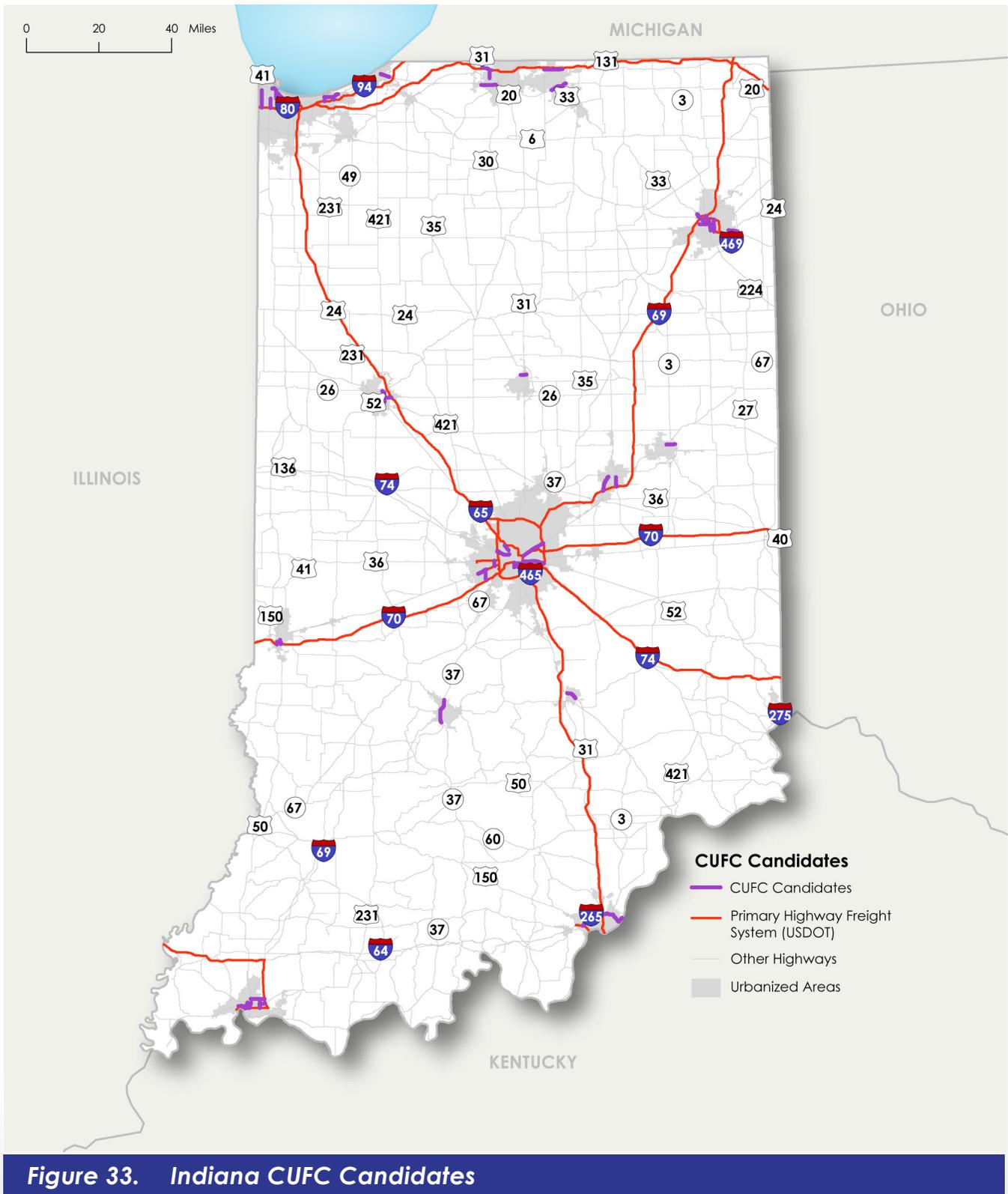


Figure 32. Indiana CRFC Candidates





Indiana is classified as a high mileage State, which means that its PHFS mileage is greater than (or equal to) 2 percent of the total PHFS in all States. High mileage States may obligate funds for projects on the PHFS, the CRFC, and the CUFC. Table 15 displays NHFP funding allocation for 2016-2020 for Indiana, and all States.

Table 15. Indiana NHFP FAST Act Apportionments

	FISCAL YEAR				
	2016	2017	2018	2019	2020
Indiana	\$27,826,482	\$26,616,635	\$29,036,329	\$32,665,871	\$36,295,412
National Total	\$1,140,250,003	\$1,090,673,914	\$1,189,826,092	\$1,338,554,353	\$1,487,282,615

Source: FHWA "FAST Act" Funding Tables: <https://www.fhwa.dot.gov/fastact/funding.cfm>.

Table 16. Proposed FAST Act Freight Funded Projects

FISCAL YEAR	DES	PROJECT DESCRIPTION	COSTS			
			NHFP FUNDS	OTHER FEDERAL FUNDS	STATE FUNDS	TOTAL
2016	Various	See Appendix F	\$27,726,709	\$104,288,910	\$67,877,827	\$199,893,446
2017	1005681	Bridge deck replacement and widening on I-65 over the Wabash River	\$980,433	\$1,246,077	\$13,512,776	\$15,739,286
	0501212	I-65, Pavement rehab and Added Travel Lanes using as "Advance Construction" (AC)	AC	\$39,168,780	\$21,633,794	\$148,140,976
2018			\$25,636,202			AC conv in 2018
			\$29,036,329			AC conv in 2018
2019			\$32,665,871			AC conv in 2018
2020	1400075	Interchange modification on I-69 at I-465	\$26,816,228	\$3,750,000	\$3,229,581	\$33,795,809
	1400076	Added travel lanes on I-465 at I-69	\$9,479,184	\$7,788,653	\$1,919,760	\$19,187,599
Total			\$152,340,956	\$156,207,320	\$108,173,738	\$416,722,016

INDOT's freight investment plan, summarized in Table 16, uses National Highway Freight Program (NHFP) funding to address numerous small projects in its first year (fiscal year 2016) and focuses investment on larger interstate improvements in the following years. This strategy includes \$215 million for bridge repair and maintenance, small structure replacement, and pavement projects to improve safety and mobility throughout the State in its first year. INDOT will use less than half of its fiscal year 2017 NHFP funding to partially fund a bridge deck replacement and widening on I-65 over the Wabash River. This project will use \$15.7 million of Federal and State funding. Most of Indiana's NHFP funding during fiscal years 2017-2019 will be used to partially fund added travel lanes on I-65 over approximately 14 centerline miles between US 50 and State Road 58. The Federal and State funding for this project sums to nearly \$150 million. Approximately \$980,000 from the fiscal year 2017 allocation is being used to replace the bridge deck and widen the I-65 bridge over the Wabash River near Lafayette; total project cost will be more than \$15 million. Two additional interstate projects with a total cost of \$53 million will be partially funded by the NHFP in fiscal year 2020. These projects will address significant recurring congestion at the interchange at I-465 and



I-69, northeast of Indianapolis. The high volume of both freight and passenger traffic at this interchange results in a bottleneck that produces long backups on both highways during the morning and afternoon peaks. The two projects involve modifying the interchange and adding travel lanes to ease congestion and improve mobility.

Indiana has not designated a formal Freight Advisory Committee (FAC) as described under 49 USC 70201. In lieu of a formal FAC, INDOT's Freight Office communicates regularly with the Conexus Indiana Logistics Council (CILC), the Ports of Indiana, other modal offices within INDOT, and the State's MPOs. CILC is "...a statewide partnership of logistics executives and stakeholders working together to implement strategic initiatives around infrastructure, innovation, public policy, and workforce development needs."²⁶ In addition to the statewide council, six regional logistics councils work to identify and address needs regionally and locally. CILC provides invaluable assistance and private sector input to all of INDOT's planning initiatives. Additional outreach and input was solicited from a select group of representative businesses across a few sectors for a combination of in-person and telephone interviews. The nature of these discussions was to better understand how they currently use the freight system, how they might use the system in the foreseeable future, and strengths and weaknesses of the state's freight system. Sectors included: pharmaceutical, aerospace manufacturing, automotive, carriers, IND Airport, and development entities. MPO outreach was gathered by distributing an online map tool with instructions for Districts and MPOs to point out specific freight challenges and opportunities in their jurisdictions.

The following list is a selection of projects identified by Conexus Indiana Logistics Council (CILC) as important to highway freight movement in Indiana.

²⁶ Conexus Indiana Logistics Council,
<https://conexusindiana.com/logistics/>.





Projects in-progress or in the five-year program:

- North Vernon Bypass, between US 50 and State Road 3. This project is currently underway, and will relieve freight and passenger vehicle congestion through the City of North Vernon. Estimated cost for the entire project \$33.8 million.
- Construction of the Boonville Bypass is currently underway. This new roadway connecting State Road 61 north of Boonville to State Road 62 west of Boonville will move freight traffic out of town and relieve congestion. Estimated cost for the entire project is \$17.3 million.
- Interchange modification at I-65 and State Road 267, to accommodate increased freight traffic at the logistics facilities located near the interchange (including Amazon). This project is in the current 5-year program with an estimated \$46.6 million total cost.
- Interchange improvement at I-70 and State Road 39, to accommodate increased traffic and relieve congestion due to business and residential development in the area. This project is in the current 5-year program and is associated with an added travel lanes project on I-70.

Projects needed, not yet programmed (no funding identified):

- I-69, Section 6 between Martinsville and Indianapolis is the final link in the new interstate between Indianapolis and Evansville. While INDOT has committed to completing this project, total cost and funding sources have not been identified. Environmental study of this project is underway. A Record of Decision from the Federal Highway Administration is expected in 2018, allowing the project to proceed.
- Ohio River Crossing bridge on I-69, between Evansville and Henderson, Kentucky. This project supports the completion of the I-69 corridor and provides needed mobility across the Ohio River. Indiana and Kentucky are currently cooperating on a study that has identified three alternative routes, with the preferred alternative expected to be identified in Fall 2018. This project will serve two major freight corridors in Indiana – I-69 and US 41 – improving traffic flow and connectivity between the States. While INDOT has committed to completing this project, total costs and funding sources have not been identified.
- Widen I-65 to minimum of six lanes from I-90 to the Kentucky State Line. I-65 is a heavily-traveled freight and passenger corridor, and experiences significant congestion. Estimated cost \$2 billion.
- Widen I-69 to a minimum of six lanes from Indianapolis north to State Road 332. I-69 is a heavily-traveled freight and passenger corridor, and experiences significant congestion. Estimated cost \$310 million.
- Widen I-70 to a minimum of six lanes from the Illinois State Line to the Ohio State Line. I-70 is a heavily traveled freight and passenger corridor and experiences significant congestion. Estimated cost \$1.43 billion.



Opportunities



The 2014 State Freight Plan included extensive stakeholder outreach in order to identify key strengths, weaknesses, opportunities, and threats across the modes (Table 17). Most of these issues are still relevant for the 2017 update, particularly related to the highlighted modal weaknesses below. For the 2018 update, outreach included engagement with public stakeholders along with targeted industry discussions. MPOs and district staff provided input on facilities and areas with freight mobility issues via interactive GIS maps. The Ports of Indiana, Indianapolis International Airport Authority, and INDOT modal experts also provided information for and review of the freight plan. Lastly, communities, businesses, and economic development professionals throughout the State participated in meetings to discuss supply chain issues and how they pertain to the Indiana freight network. While the outreach for this update was not as extensive as the 2014 plan, the input helped supplement data analysis efforts and provided practical implications of freight concerns. The focus of this chapter is to build upon known weaknesses and identify key freight-related opportunities. Potential steps INDOT and partner agencies can take to capitalize on opportunities are also listed.

Table 17. Summary of 2014 Freight Plan Outreach Identified Weaknesses

	√ = yes x = no * = partially
HIGHWAY	APPLICABLE IN 2017?
Bottlenecks or traffic congestion – North-west Indiana; South Bend to Indianapolis; Indianapolis; and Jeffersonville/New Albany	√
No Interstate access to Southwest Indiana	√
No Interstate/highway access to Southwest Indiana Port	√
Lack of adequate capacity on Indiana's Interstate highway	√
Federal/state user of gas taxes for other general Federal/state revenue needs	√
Lower truck weight limits compared to surrounding States	√
Lack of Federal/state funding	√
RAILROAD	APPLICABLE IN 2017?
Primarily pass through State for rail intermodal	√
Reliant on Chicago intermodal rail service	√
Lack of large volume intermodal facilities	*
Limited railroad access to ports	√
Lack of private investment compared to surrounding States	√
Lack of "ownership" by public entities on rail freight movement	√
Lack of Federal/state funding	√



√ = yes x = no * = partially

WATERWAY	APPLICABLE IN 2017?
Decaying lock infrastructure on Great Lakes; Ohio & Mississippi rivers	√
Dredging issues for ports and waterways on Great Lakes; Ohio & Mississippi rivers	√
Limited area for disposal of dredged material from Lake Michigan	√
Limited railroad access to ports	√
Lack of "ownership" by public entities of waterborne shipping	√
Lack of Federal/state funding	√
Lack of public and legislator understanding of importance of locks infrastructure	√
AIR CARGO	APPLICABLE IN 2017?
7 th of 8 compared to Midwest/Great Lakes Region States in air transport as a share of State transportation/warehousing GDP	√
Indiana airports have minimal international/domestic business; other than the domestic cargo shipping at Indianapolis Airport	√
Bottlenecks due to airport congestion at Chicago O'Hare Airport	√
Reliant on Chicago O'Hare Airport for international/domestic air cargo	*
Lack of "ownership" by public entities on air cargo movement	*
Lack of Federal/state funding	*

Source: 2014 Multimodal Freight and Mobility Plan, Chapter 3.

TARGETED INDUSTRY ASSESSMENT AND BUSINESS STRATEGY

Summary

Freight mobility, trade, and logistics are essential elements of Indiana's economic success, not only for fulfilling the growing demand for goods, commodities, and services in Indiana, but also for driving the State's economic development and competitiveness. The importance of freight as a driving force for maintaining and creating jobs and fueling economic development has increasingly been recognized by local, State, and Federal transportation programs in the United States and is referred to as logistics-enabled economic development. This type of economic development is about developing an ecosystem that supports the movement of freight across the State by lowering cost, reducing risk and time, and at the same time promoting job creation.

Competitiveness and sustainability of the manufacturing sector are essential to ensure job growth and economic prosperity in Indiana. Currently there is a renewed national interest in advancing U.S. leadership in manufacturing, and this creates an opportunity for States to take bold initiatives in revitalization of the manufacturing sector.

In reviewing five of the strongest industry manufacturing subsectors in Indiana, it is abundantly clear that the State has experienced deep declines in the manufacturing sector during the years 1998 to 2015, but it is most pronounced in the number of jobs lost in the transportation sector at 48,200 and the metal manufacturing and fabrication sector at 33,411. There are more gradual declines in other industries such as biopharmaceuticals, plastics, and chemicals.



However, despite these declines:

- Manufacturing generates the largest industry contributions of wages in Indiana which is a key demonstration of the value of the industry.
- Multiple subsectors of manufacturing led by the transportation sector continue to generate high levels of employment. The recreational vehicle/motor home industry is growing very rapidly and currently employs over 38,000 people. Indiana's medical devices industry is second in the nation in jobs.

The State of Indiana's economic future is strongly dependent on manufacturing. To ensure that the total manufacturing sector continues to contribute to the State's economic prosperity, it is critical to identify all of the subsectors and understand their characteristics and the trends that are shaping their future. After this assessment, policies and programs can be enacted which will support and grow the key industries and as well as identify new industries.

Potential INDOT Action Items:

- Evaluation of Indiana's manufacturing sector, its position within the existing and emerging domestic and international supply and distribution chains, and its most promising opportunities.
- Evaluation of multimodal transportation investments from an economic development and job creation perspective with a return on investment analysis for the State of Indiana.
- Educate state and local transportation professionals, as well as elected officials, on the specific needs of the freight industry and the industries being served.
- Form a sustainable coalition among other Indiana organizations for multimodal freight and logistics enabled economic development.
- Clearly state in transportation planning documents the connections between transportation and economic development.

ADVANCED PERFORMANCE MEASUREMENT AND TARGETING TO MEASURE PROGRESS

Summary

Many States are transitioning toward a performance-based planning paradigm that helps rank and measure effectiveness of transportation projects. As discussed in Chapter 6, there are a number of possible metrics that could indicate progress toward State goals across: Economic Impact, Capacity to Meet Demand, Multimodal Integration & Synergy, Access to National and International Markets, and Quality of Life. In addition, The Blue Ribbon Panel on Transportation Infrastructure, comprised of transportation, business, and government leaders throughout Indiana, released a 2014 report that offered 25 recommendations pertaining to priority projects in the State. For each project the panel proposed performance metrics across each category. For freight project purposes, Indiana maintains and has access to a number of current data sources to expand freight performance measure activity.



Potential INDOT Action Items

- Explore performance measures to evaluate and measure success of INDOT investments. For example, effective performance measures could be applied to recent INDOT-supported investments such as River Ridge Commerce Center in Southern Indiana.
- Implement freight transportation performance measures outlined in Chapter 6.
- Consider multidisciplinary committee within INDOT to discuss data availability, accuracy, and ownership. Also evaluate relative merits of possible performance measures for use within specific modal offices.

EVALUATE OVERSIZE-OVERWEIGHT TRUCK MOVEMENTS, PROGRAM, AND PERMITTING

Summary

To travel legally, commercial vehicles must fall within several dimensions and weight requirements. The State has an active Extra Heavy Duty Highway network (the northwest portion of this network is shown in Figure 34), and a system for evaluating permit applications on these and other state highways throughout the State. Oversize and overweight (OSOW) vehicles have perpetual mobility issues when navigating to first and last-mile locations and are often delayed by issues ranging from operational and enforcement restrictions to geometric and roadway-related complications. While OSOW vehicles do not represent a large volume of truck flows they do support several specific industries in the State and provide critical connections for project cargo and commodities to, from, and through the State. Indiana Department of Revenue, Motor Carrier Services administers the oversize/overweight permitting program. The current permit management system is more than 10 years old, with no automated routing or analysis capability and very limited reporting ability. Approximately half of all permit applications are manually processed. The system does not provide information in a way that allows us to identify what traveled over a given portion of infrastructure. INDOT is in the process of procuring a modern OSOW permitting system, with automated, GIS-based routing, ability to perform bridge and pavement analysis, automated restriction and clearance checks, etc. Benefits will include: much quicker service, improved ability to appropriately route OSOW loads to minimize infrastructure impacts, and data to help us understand OSOW movement in Indiana.

Potential INDOT Action Items

- Identify best practices and industry trends impacting Indiana oversize-overweight movements, and target best options for Indiana moving forward.
- Re-evaluate extra heavy duty highways to ensure they continue to be relevant and meet demand.
- Examine opportunities to expand heavy-haul corridors to attract economic development, particularly in connection to rail and port facilities.
- Examine permanent restrictions and hindrance to industries that are impacted by restrictions. Evaluate if the restriction negatively impacts current OSOW routes and prioritize investments.
- Evaluate OSOW permitting demand, procedures, objectives, and harmonization with adjacent states.
- Evaluate the impact of OSOW vehicles on Indiana's roadways and adjust fees accordingly to proactively manage OSOW routes.



INDIANA EXTRA HEAVY DUTY HIGHWAYS

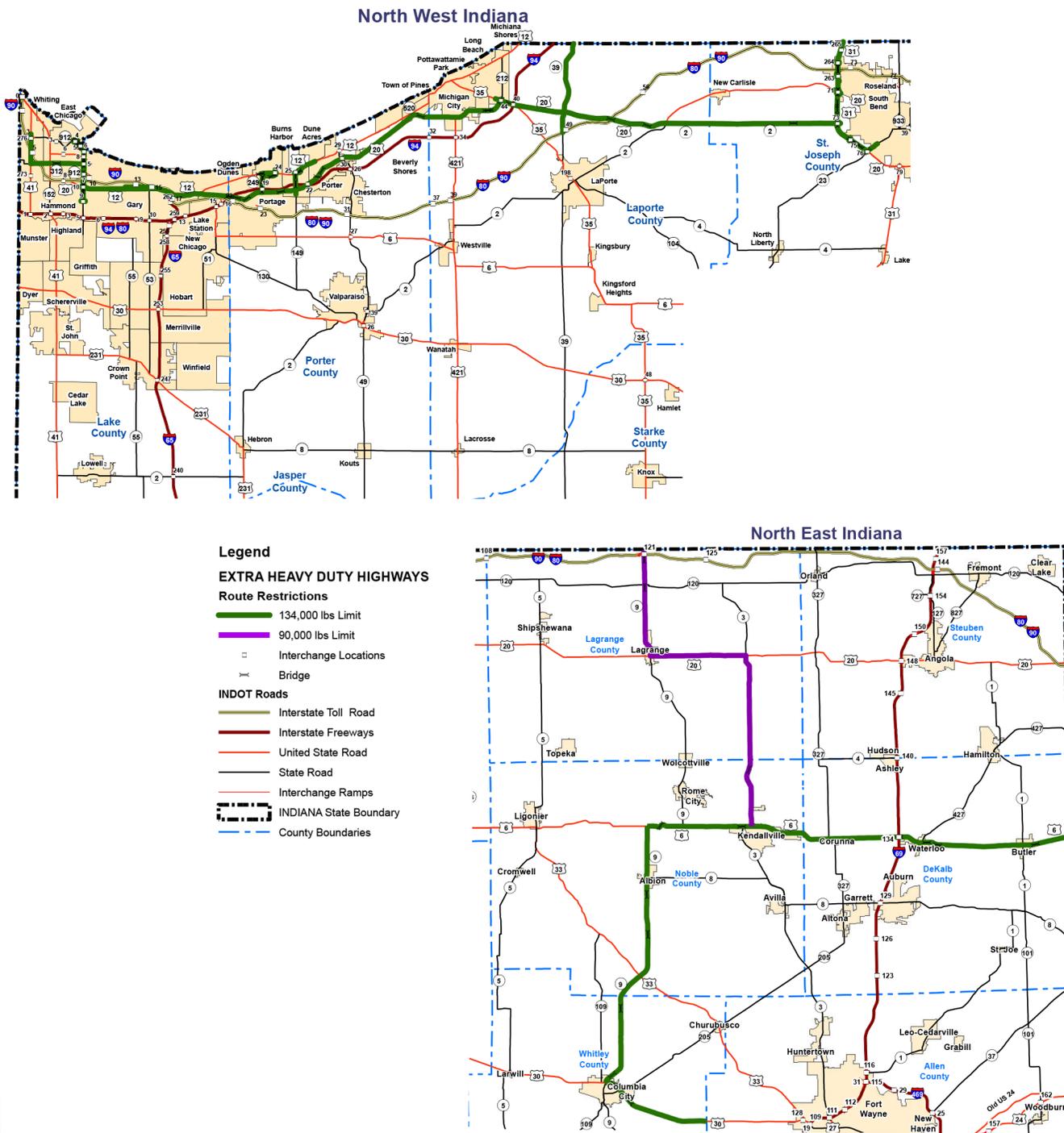


Figure 34. Extra Heavy Duty Highways



IDENTIFY AND EXPAND RAIL-SERVED OPPORTUNITIES IN INDIANA

Summary

Indiana has a robust railroad system of over 4,000 miles, placing it ninth among other States. Indiana provides multimodal connectivity to national and global markets via short line and Class I rail providers, the inland waterways via the Ohio River, and the Great Lakes (Figure 35). Intermodal facilities are organized into the following categories:

- Intermodal Terminals (container on flatcar).
- Automotive Ramps.
- Transload Facilities.
- Grain Elevators and other Agricultural Facilities.
- Port Locations.

Rail-served intermodal facilities serve as a critical component to the freight supply chain of many commodities, though much of container intermodal traffic passes through the State to hubs in adjacent States.

Potential INDOT Action Items

- Continue working with Indiana Economic Development Corporation (IEDC), Ports of Indiana (POI) and other organizations to explore ways to improve rail access.
- Further evaluate Indiana's "Position within Logistics and Supply Chain Networks": proximity issues with Chicago and also with other terminals, such as the CSX North Baltimore, OH, and the NS Rickenbacker in Columbus, OH. Determine how Indiana shippers compete in these lanes and whether the State can play an active role in promoting or expanding Indiana businesses.
- Determine the needs of shippers, how they use the freight rail system, and how the State can leverage investments and relationships to create new opportunities.



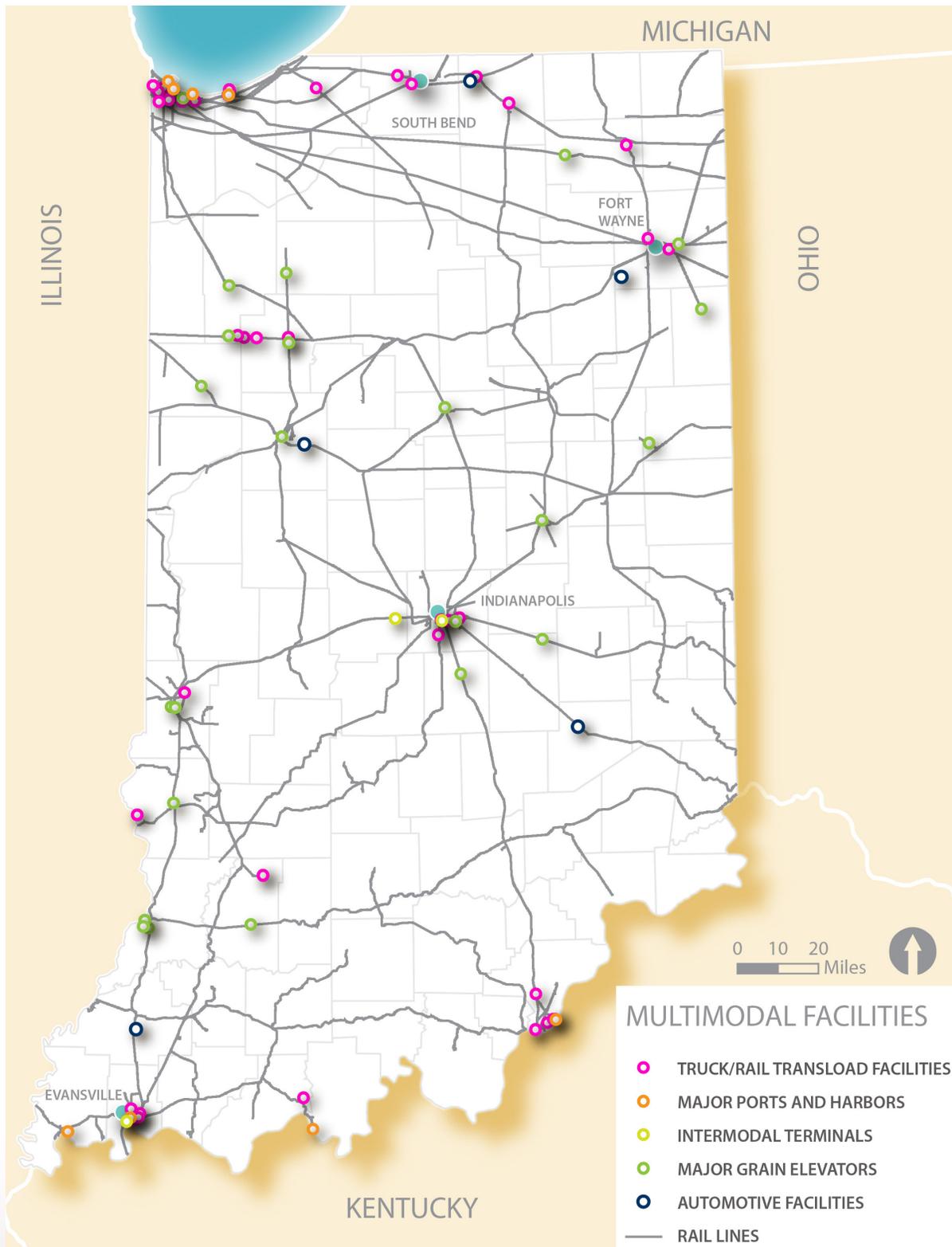


Figure 35. Rail-Served Multimodal Facilities in Indiana

Source: 2017 Indiana State Rail Plan. <http://www.in.gov/indot/2394.htm>.



IDENTIFY AND EXPAND WATERWAY FREIGHT OPPORTUNITIES IN INDIANA

Summary

Indiana is uniquely positioned to handle Great Lakes cargo as well as Ohio River barge traffic. In calendar year 2015, the ports handled 66.2 million tons (20.1 million shipped, 43.7 million tons received, 2.4 million tons intrastate). The State's waterway system not only provides an efficient means of freight transportation, but is also critical to many of the State's industries, including steel, minerals, fertilizer, heavy/oversize cargo, coal, and several agricultural products. There are significant opportunities for Indiana to further leverage its maritime industry connections to improve its freight transportation network and generate economic benefits.

The Ports of Indiana has increased cargo shipments by nearly 50 percent over recent years and is continuing to look at additional expansion options. There is a significant opportunity for Indiana to continue to expand cargo shipments through all of its Ohio River and Lake Michigan facilities, which would drive increased economic returns for the state, create additional jobs and reduce shipping costs for local companies. The Ports of Indiana has recently secured two federal grants that are supporting major expansions at multiple ports. These grants were awarded based on immediate needs for improvements at the state's ports to create new infrastructure that will be able to efficiently handle future cargo growth. Indiana has a unique competitive advantage by being located on two inland waterways – the Great Lakes and Inland Waterway System – and can leverage these freight arteries to drive long-term economic growth.

Indiana's three state ports generally have ample capacity for increasing shipments, but they have a limited number of acres available for future maritime economic development. In fact, 80 percent of the original land that was purchased to build the ports has been developed. The Ports of Indiana has been addressing this challenge by using retained earnings to purchase additional land at all three of the ports, as well as evaluating new sites for future expansions. An opportunity that should be further explored in Indiana is the development of large multimodal sites that would not be directly adjacent to the ports but could be connected to the docks by rail or heavy-haul roads. These "satellite" expansions would allow the port facilities to continue to attract freight-related developments and utilize existing capacity at the current port terminals. Additional maritime projects that were identified as freight priorities for Indiana by the Blue Ribbon Panel for Transportation Infrastructure included ongoing dredging at the Port of Indiana-Burns Harbor and improved rail service to all of Indiana's ports.

Currently each of the three public ports has development opportunities. A summary of assets for freight development at or around each of the current established port facilities follows.



Port of Indiana – Burns Harbor. As shown in Figure 37, a limited amount of developable land is currently available at the port at Burns Harbor. The largest site is 57 acres and consists of 1,000 feet of dock wall on the West Harbor and beach frontage on Lake Michigan. The next largest site is 16 acres. Fourteen additional sites are available at Burns Harbor, ranging in size from 1 to 6 acres. Several sites have direct rail access. Available land around or adjacent to the existing port is limited.

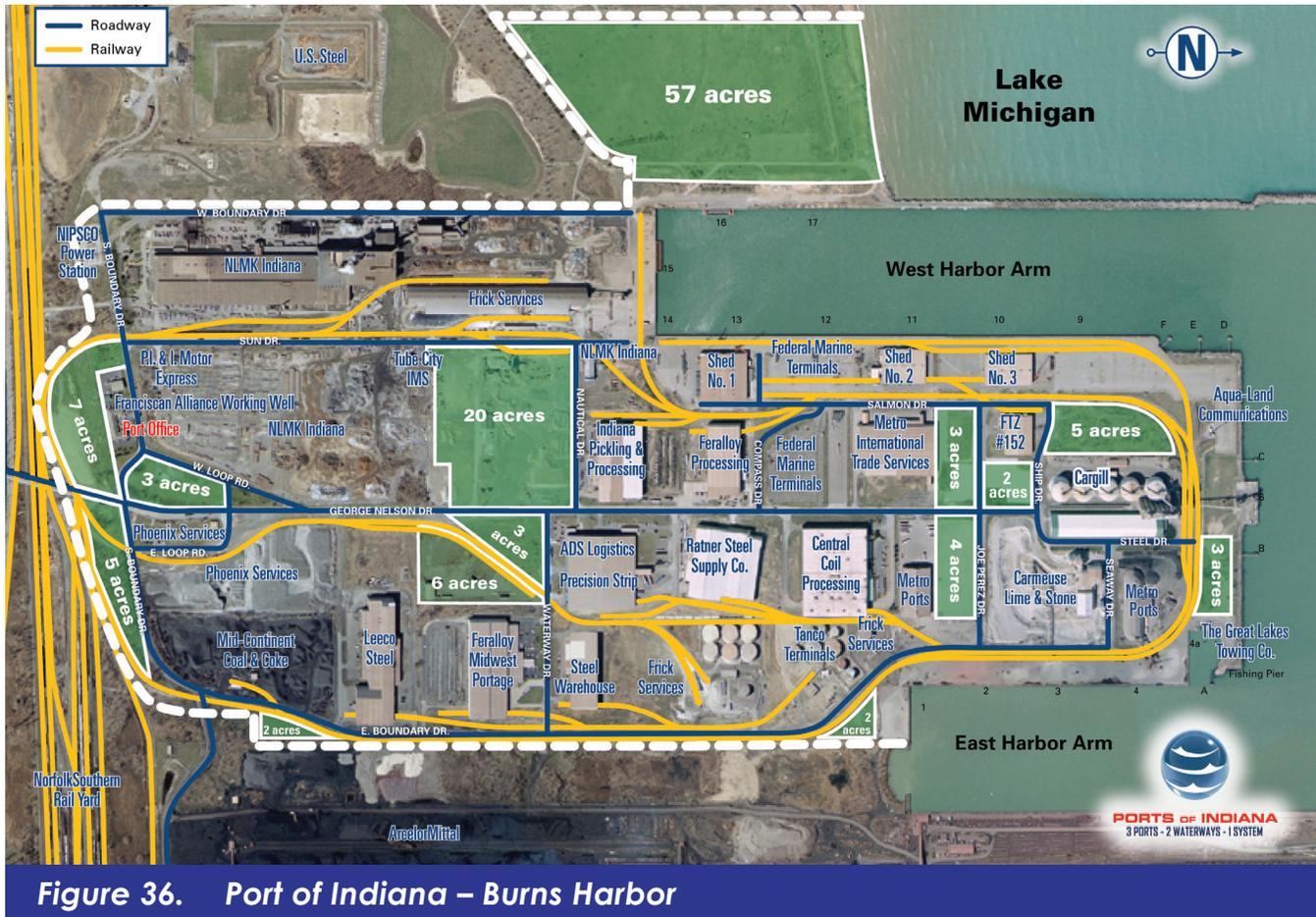


Figure 36. Port of Indiana – Burns Harbor

Port of Indiana-Burns Harbor is constrained by a single 2-lane bridge entrance that handles all port traffic in and out of the facility, including heavy-haul loads using the Extra Heavy Duty Highway connecting the Northwest Indiana steel mills to auto manufacturers in Michigan. The development of a second bridge entrance was identified by the Blue Ribbon Panel on Transportation Infrastructure as one of the top 11 priorities for the state and it was identified by the Department of Homeland Security as one of the state's most critical pieces of infrastructure because it transits 10 rail tracks, including Class I mainlines and the SouthShore commuter track, and is the only access point for the state's deep-water port. Currently, all traffic going in/out of the port crosses this two-lane bridge that is in need of repair, and any failure of this structure would require evacuation of all port traffic through a working steel mill.



Port of Indiana – Jeffersonville. As shown in Figure 38, a considerable amount of developable land is currently available at the port at Jeffersonville. The largest site is 140 acres and includes significant rail frontage. The next largest sites are 55 acres and 43 acres, but rail frontage on these sites is more limited. Ten additional sites are available at Jeffersonville, ranging in size from 3 to 14 acres. Several sites have direct rail access. A limited number of parcels in the port vicinity may be available for development in the future, but they are currently used for agricultural purposes. The areas around or adjacent to the port site are becoming increasingly developed; the port may soon be landlocked. The eastside Ohio River Bridge and related I-265 connections will provide a more integrated connection to a larger string of belt highways encircling Jeffersonville, Clarksville, and Louisville, Kentucky. INDOT is also partnered with the port in the development of a heavy haul roadway. In addition the port will benefit from recently completed INDOT/KYTC bridge and roadway projects on the Ohio River: The \$2.5 billion project package will increase connectivity and efficiency for users of Jeffersonville facilities.

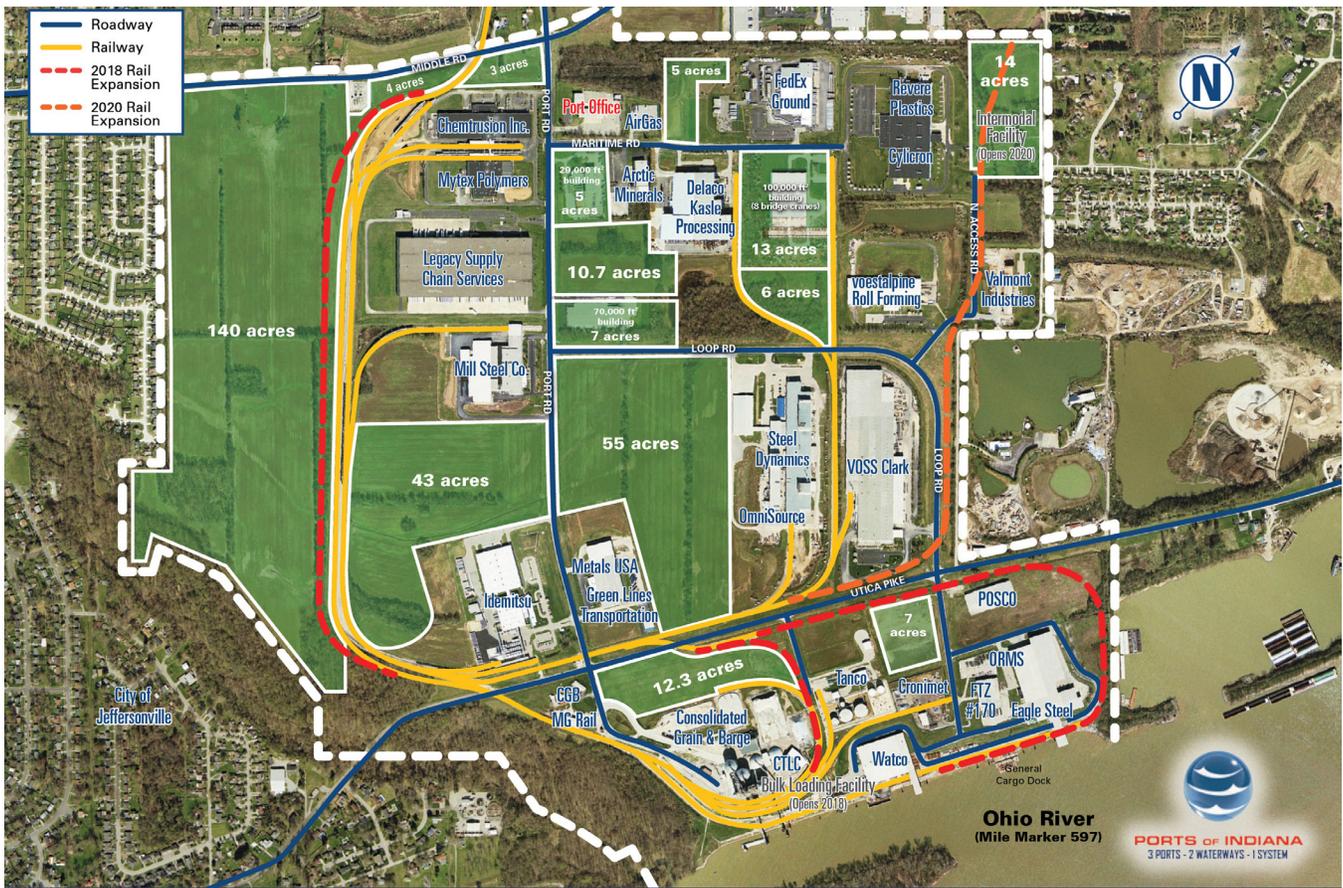


Figure 37. Port of Indiana – Jeffersonville

Port of Indiana-Jeffersonville is currently constrained because of its interstate access. A planned heavy-haul connection has been delayed and new roundabouts on the existing route are causing problems for trucks going to and from the port, including truck rollovers and semis diverting to city streets to avoid roundabouts.



Port of Indiana – Mount Vernon. As shown in Figure 39, a considerable amount of developable land is currently available at the port at Mount Vernon. The largest site is 544 acres and consists of significant rail frontage. It is also situated at the 500-year flood elevation, which denotes a resilient and long-term viable location for businesses. The next largest sites are 66 acres with limited rail access and 25 acres with no current access, but can easily be connected. Eleven additional sites are available at Mount Vernon, ranging in size from 1 to 10 acres.

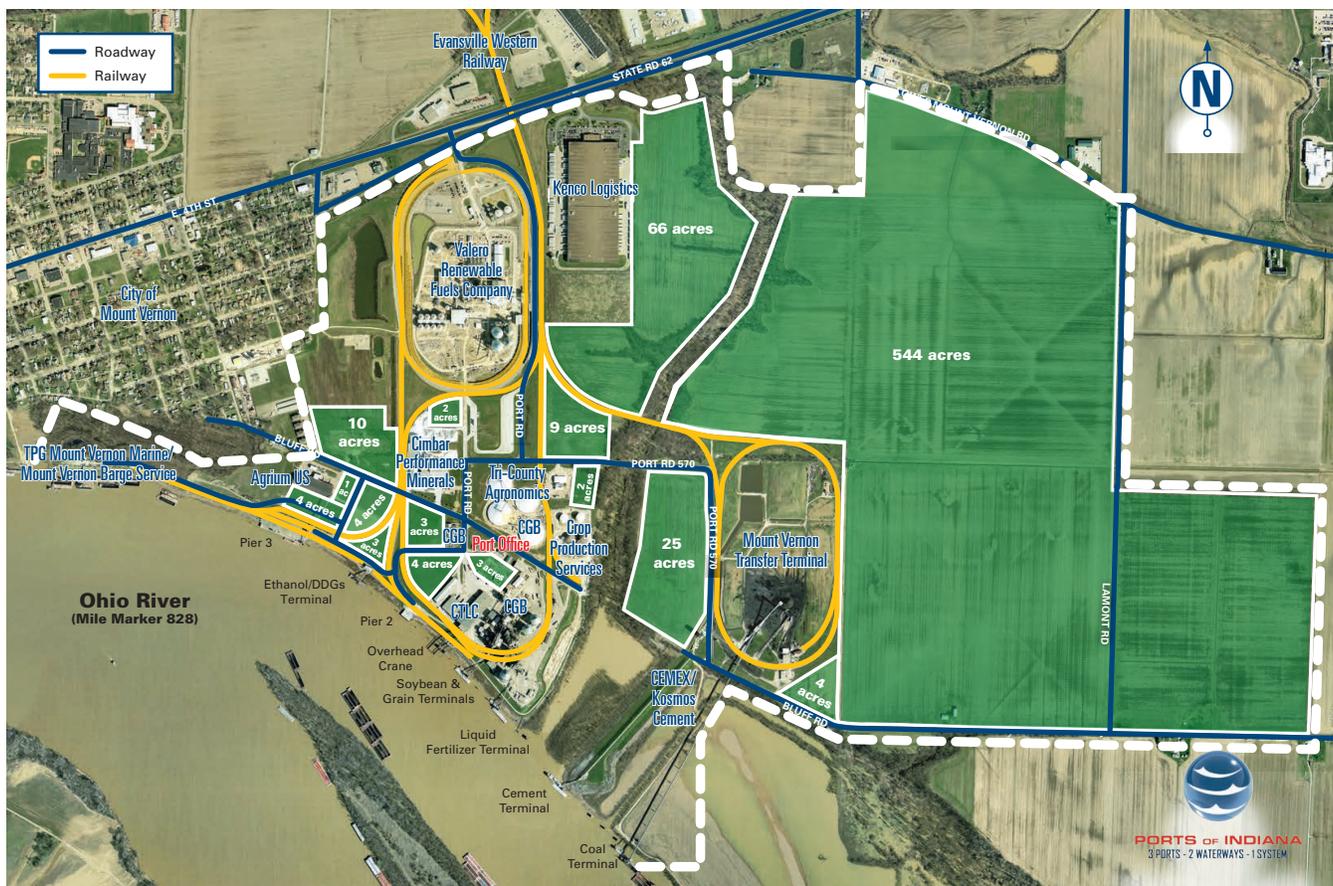


Figure 38. Port of Indiana – Mount Vernon

Port of Indiana-Mount Vernon is constrained because it does not have a direct interstate connection and trucks must traverse several miles of traffic lights and city traffic through Evansville before reaching I-69. This is the state's largest port in acreage, shipments and available land. The Blue Ribbon Panel on Transportation Infrastructure identified improved highway connections as one of the state's top 8 priorities, and removing stoplights from the Evansville "Expressway" was scored as having one of the highest potential economic impacts of all projects.

Potential INDOT Action Items

- Evaluate throughput and capacity for state routes and critical connectors to/from each water port facility.
- Collaborate with Ports of Indiana, IEDC, and local economic development agencies to identify areas where INDOT could support water port expansion capabilities and business recruitment.
- Identify and help market land around current and potential maritime hubs.
- Pursue designation of connectors to the state's three ports as part of the National Multimodal Freight Network.
- Collaborate with Ports of Indiana to explore multimodal projects throughout Indiana.



IDENTIFY AND EXPAND AIR CARGO OPPORTUNITIES IN INDIANA

Summary

Indiana has 450 airports throughout the State, with three of those handling substantial air cargo. In 2016 Indianapolis International Airport landed 5.3 billion lbs. (7th in the U.S.), Fort Wayne International Airport landed 198.6 million lbs. (92nd), and South Bend International Airport landed 100 million lbs. (119th). Despite the considerable amount of cargo landed, there is still capacity at or adjacent to multiple airports throughout the State.

Key air cargo conditions and opportunities are included below:

Fort Wayne International Airport, Fort Wayne, Indiana

Fort Wayne International Airport's (FWA) is within a two-hour flight or one-day drive of the major cities such as Chicago, Detroit, Cleveland, Toledo, Cincinnati, Indianapolis, Dayton, Louisville and Columbus. It ranks 92nd in the U.S. in cargo landed weight. FWA provides operators an 11,891-foot by 150-foot CAT II ILS runway. It is part of BizFTZ (#182) Foreign Trade Zone and has U.S. customs service. FWA has ready interstate access to I-69 and I-469. FWA has two cargo carriers that handle approximately 22 million pounds of cargo via FedEx and UPS. There are two areas available for development at FWA which are the Air Trade Center and Kelley Commerce Aero Centr . The Air Trade Center is a 450 acre site zoned for heavy industrial and aviation-related enterprises. The Kelley Commerce Aero Centr  is a 109 acre site zoned for light industrial, non-aviation and aviation uses. It has shovel ready sites.

South Bend International Airport, South Bend, Indiana

The South Bend International Airport (SBN) is a multi-modal facility providing air, rail, and bus and cargo service. It has rail connectivity to downtown Chicago. It ranks 116th in the U.S. in all-cargo landed weight. SBN's primary runway is 8,412 feet long and 150 feet wide. In 2017, U.S. customs facilities opened at SBN and it is part of Foreign Trade Zone #125. SBN supports regular operations by FedEx and UPS as well as unscheduled cargo operations. It is located   mile from I-80/90 and US 31. Blackthorn Corporate Park is located just north of SBN and the airport has land available in the southwest portion of the airport with utility access that is available for development. SBN is part of the Airport Development Area TIF district that also encompasses the Blackthorn Corporate Park.

Indianapolis International Airport (IND), Indianapolis, Indiana

IND houses the second largest FedEx Express operation with room to expand. It also accommodates Cargolux that offers international temperature sensitive services several days a week. IND is ranked as the seventh in the U.S. (based on 2015 all-cargo landed weights) and as the twenty-first internationally largest cargo facility. IND is a part of the INzone Foreign Trade Zone (#72) and has available U.S. customs service. Its two parallel runways, 11,200 feet and 10,000 feet with CAT III instrument landing system (ILS), can accommodate any commercial aircraft including nonstop flights to Asia. IND has 300,000 square feet of temperature controlled air cargo facilities with approximately 50 acres of apron allowing largest aircraft such as the 747-8F to easily maneuver and taxi right up to the facility. Over one million tons of time and temperature sensitive cargo are handled annual at IND. IND cargo services can accommodate any size of shipments at a low cost with less congestion. Located in the nation's heartland, 75% of all U.S. businesses are within a one-day drive of IND. IND currently has approximately 170 acres of space divided into several leasing sites that have easy access to highway connections such as I-70, I-465, and I-65 as well as to



other major roadways. IND is actively working on development and has IND AeroVision, a group of local governmental entities, which works cooperatively on land use and economic development within eight miles of IND to actively develop land around the airport.

Gary/Chicago International Airport (GYG), Gary, Indiana

GYG is located approximately twenty-five miles from downtown Chicago with highway connections to I-90, I-80/94, I-65, the Chicago Skyway, the Dan Ryan Expressway, and Lake Shore Drive. GYG also has convenient multimodal connections and easy access surface transportation via rail and Port of Indiana-Burns Harbor. Gary/Chicago International Airport is part of the Foreign Trade Zone #152. In 2015, GYG has completed the extension of their primary runway to 8,859 feet long and 150 feet wide with a CAT I ILS allowing GYG to better accommodate various passenger and cargo jet aircraft. GYG is operated by the Aviation Facilities Company, which is focusing on developing the airport.

Grissom Air Force Base/Grissom Aeroplex (GUS), Peru, Indiana

GUS is available to civilian users under a joint use agreement. GUS is centrally located along U.S. 31, which is being upgraded to be a freeway grade arterial including a bypass around Kokomo and to the south of South Bend. GUS offers uncongested airspace to its users and has the longest runway in the State of Indiana at 12,500 feet long and 200 feet wide with a CAT I. Operated by the Miami County Economic Development Authority and located on GUS, the Grissom Aeroplex has 850 acres with the existing buildings from 3,000 to 129,000 square feet. With an onsite fixed base operator, Grissom Aeroplex is ready and able to handle all aviation business needs. GUS is part of the INzone Foreign Trade Zone (#72), as well as a Tax Incremental Financial (TIF) District and Enterprise District.

Potential INDOT Action Items

- Evaluate throughput and capacity for state routes and critical connectors to/from each airport facility.
- Collaborate with IEDC and local economic development agencies to identify areas where INDOT could support air cargo expansion capabilities and business recruitment.
- Promote technology-oriented development.



SUPPORT AND ENHANCE RURAL CONNECTIVITY WITH NHFN

Summary

While Indiana has several major urban areas, there are also 14.7 million acres of farm operations. The rural areas of the State have a diverse and productive array of livestock, milk, and crop facilities situated in all regions of the State. Major crops include: corn, soybeans, hay, tomatoes, sweet corn, mint, pumpkins, beans, and several fruits. Livestock includes beef cattle, goats, sheep, hogs, and turkey. Supply chains for each of these products include significant connectivity for production and distribution, which is largely handled by commercial vehicles. An agricultural overview of Indiana is included in the appendix.

Potential INDOT Action Items

- Explore connectivity between state networks and major rural corridors.
- Identify major agricultural production clusters throughout the State, and characterize equipment types and transportation needs.
- Coordinate with Indiana Farm Bureau on logistics needs.
- Investigate detailed supply chain patterns for each major agricultural commodity and evaluate how the State can support and expand opportunities.

ALIGN WORKFORCE TRAINING AVAILABILITY AND NEEDS

Summary

Current industry demand for qualified employees that are involved in freight-related industries far exceed the supply. This is a common lament among most states with strong economies. As noted earlier, nearly one million of Indiana's six million residents are involved in the production or distribution of goods. There are a total of 39 campuses throughout Indiana ranging from two-year to four-year programs, along with a longtime USDOT-sponsored University Transportation Center housed at Purdue University, NEXTRANS.

Potential INDOT Action Items

- Collaborate with CONEXUS, trade groups, and to identify incongruences between qualified employees and Indiana manufacturing, transportation, and logistics business needs.
- Coordinate with colleges and Universities of Indiana to evaluate current offerings, student employment surveys, and common/requested skillsets.



EXPLORE INNOVATIVE HIGHWAY FUNDING OPPORTUNITIES

Summary

Indiana, similar to other States, has freight and transportation-related projects that greatly exceed traditional funding mechanisms. Historically, state and local highway formula funds are the primary source for roadway maintenance and improvements while modal offices administer a variety of state and Federal loan and grant programs. However, 2017 legislation called for a detailed exploration of tolling feasibility on I-64, I-69, I-74, I-94, I-65, and I-70 in Indiana. The Traffic and Revenue Analysis and an Economic Impact Analysis (EIA) was delivered in fall of 2017, and a strategic plan is due in late 2018. Objectives of the feasibility study included:

- Additional highway construction spending made possible by tolling (i.e., widening of I-65 and I-70 to a minimum of 6 lanes).
- Additional spending required to implement the tolling program (e.g., construction of tolling gantries, transaction costs).
- Changes in production costs resulting from toll payments and from changes in business transportation costs (e.g., travel time, vehicle operating costs, accident costs) due to highway widening and traffic diversion.
- Changes in consumer spending resulting from toll payments and from changes in household transportation costs (e.g., vehicle operating costs).
- Potential reductions in fuel taxes (or increases in general government expenditures) made possible by tolling.

Potential INDOT Action Items

- Evaluate freight considerations and opportunities for tolling for the State's key industries and economic drivers.
- Include freight stakeholder input as the strategic plan is developed.
- Explore opportunities for freight efficiencies if tolling is pursued. This can include operational and physical improvements.



EXPAND FREIGHT TECHNOLOGY AND OPERATIONAL STRATEGIES

Summary

INDOT has supported a range of strategies and research efforts to support and promote freight technology and operational advancement. Several recent examples are described below, along with links for additional information.

INDOT has implemented a program to monitor and provide real time traffic and travel conditions which meets the requirements of the Real-Time System Management Information Program (RTSMIP) in 23 CFR 511. *The real-time traveler information benefits all travelers, including the freight industry.* The real-time traveler information provides truckers with information on construction activities that close lanes, traffic incidents, road weather observations and travel times in Indiana's three largest metro areas (Indianapolis, NW Indiana, and Louisville).

INDOT RTSMIP branded as TrafficWise. TrafficWise provides a *Truckers' Info* page as one of the traveler information web tools. The report provides real time information specifically targeted at freight carriers. Restrictions related to permitting are posted as well as information about road restrictions and closures due to weather. The Truckers' Report information complements the other TrafficWise websites.²⁷

INDOT is also implementing a **Truck Parking Information Management System**. This system is part of a \$25 million TIGER Grant that will provide truckers with information on availability of parking spaces in Indiana's rest areas and in surrounding Midwestern states. TPIMS will track the number of available parking spaces at upcoming rest areas and weigh stations and inform truckers via interstate signs, TrafficWise, and a future mobile app. This system will be operational in September 2018, and will enhance safety by helping truckers to efficiently plan trips and stay in compliance in Federal hours of service rules.²⁸

Other Strategies

INDOT uses **ITS technology** to manage signalized arterials. Signalized arterials represent a substantial component of the highway transportation network in the United States. The National Transportation Operations Coalition (NTOC) in their 2007 Traffic Signal Report Card noted that nationally 5 to 10 percent of all traffic delay is caused by improper traffic signal timings along major roadways. INDOT is a lead developer and implementer of Automated Traffic Signal Performance Measures (ATSPM). ATSPMs modernize traffic signal management by providing high-resolution data to support objectives and performance-based maintenance and operations strategies that improve safety and efficiency while cutting congestion and cost. The reduction in delay due to implementing ATSPMs benefits freight movement on Indiana's non-Interstate state highways.

INDOT's Traffic Management Division continues to strive toward implement technology to improve operations and safety. INDOT regularly invests in research as part of the **Joint Transportation Research Program** with Purdue University. Recent highlights include:

²⁷ <https://indot.carsprogram.org/>.

²⁸ <http://pws.trafficwise.org/pws/>.



- SPR-4205: Connected Vehicle Corridor Deployment and Performance Measures for Assessment.
- SPR-4226: Cost-Effectiveness of Converting Signalized Arterials to Free-Flow Facilities.
- SPR-4167: Synthesis of Autonomous Vehicle Legislation.
- SPR-4218: Performance of Right Turn Lane Designs at Intersections.
- SPR-4228: Developing a Business Ecosystem around Autonomous Vehicle Infrastructure in Indiana.
- SPR-4017: Implementation of Weigh in Motion Data Quality Control and Real Time Dashboard Development.

Additional project information is available at: <https://engineering.purdue.edu/JTRP/projects>.

INDOT also is supporting regional and national research related to **Connected and Automated Vehicle (CAV)** implementation. INDOT has committed to participate the NTOC challenge to transportation infrastructure owners and operators to cooperate together to achieve deployment of Vehicle to Infrastructure (V2I) infrastructure. The "SPaT Challenge" is the deployment of Signal Phase and Timing (SPaT) broadcasts using Dedicated Short Range Communication (DSRC) between signal infrastructure and vehicles DSRC equipment. SPaT deployment locations in Indiana include:

- Merrillville – 8 intersections on US 30 and west of I-65.
- West Lafayette – 2 intersections on US 231/US 52.
- Greenwood – 6 intersections on US 31 and I-65 ramps.

Additional information is available at: <https://transportationops.org/spatchallenge>.

Potential INDOT Action Items

- Continue to explore technology-based opportunities and actively measure success and effectiveness of current strategies.
- Consider regular benchmarking technology research and application from a sample of other state DOTs.
- Monitor potential industry partnerships with shippers and carriers to leverage public and private data analysis and capabilities.



