State of Ohio Rail Plan

January 2019

OHIO RAIL DEVELOPMENT COMMISSION

Contents

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Appendices (bound separately)

Abbreviations

ABS	Automatic Block Signaling
ADA	Americans with Disabilities Act
BEA	Bureau of Economic Analysis
BHJ	Brooke Hancock Jefferson Metropolitan Planning Commission
BUILD	Better Utilizing Investments in Leveraging Development Program
CMAQ	Congestion Mitigation and Air Quality
CTC	Centralized traffic control
DTC	Direct Traffic Control
EDA	Economic Development Administration
EIA	Energy Information Administration
EIS	Environmental Impact Statement
FAST	Fixing America's Surface Transportation
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
GDP	Gross Domestic Product
INFRA	Infrastructure for Rebuilding America
KYOVA	Kentucky-Ohio-West Virginia Interstate Planning Commission
MIPRC	Midwest Interstate Passenger Rail Commission
MORPC	Mid-Ohio Regional Planning Commission
MPO	Metropolitan Planning Organization
MWRRI	Midwest Regional Rail Initiative
MWRRP	Midwest Regional Rail Plan
NEPA	National Environmental Policy Act
NIPRA	Northeast Indiana Passenger Rail Association
NOACA	Northeast Ohio Areawide Coordinating Agency
NS	Norfolk Southern Railway
OHOL	Ohio Operation Lifesaver
OKI	Ohio-Kentucky-Indiana Regional Council of Governments
ORDC	Ohio Rail Development Commission
PRIIA	Passenger Rail Investment and Improvement Act
PTC	Positive Train Control
PUCO	Public Utilities Commission of Ohio
RRIF	Railroad Rehabilitation and Improvement Financing
RTPO	Regional Transportation Planning Organization
STB	Surface Transportation Board
TIGER	Transportation Investment Generating Economic Recovery
TMACOG	Toledo Metropolitan Area Council of Governments
TWC	Track Warrant Control
VMT	Vehicle-Miles Traveled

Executive Summary

Purpose of the State of Ohio Rail Plan

This 2018 *State of Ohio Rail Plan* (Rail Plan) is an update of the 2010 *Ohio Statewide Rail Plan* (2010 Rail Plan). The Rail Plan complies with the requirements of the Passenger Rail Investment and Improvement Act, which the U.S. Congress passed in 2008, as well as the subsequent more detailed State Rail Plan Guidance (Guidance) issued by the Federal Railroad Administration (FRA) in 2013. Beyond fulfilling the federal mandate, this Rail Plan helps position Ohio for future federal grant opportunities. The Rail Plan has also provided an opportunity to identify issues, opportunities, and needs associated with the Ohio rail system to inform potential future investments and policies.

Per requirements of the FRA Guidance, the Rail Plan consists of six chapters:

- *Chapter 1 – The Role of Rail in Statewide Transportation* discusses the role of rail in Ohio's multimodal transportation system and how public agencies in the state are organized to support rail.
- *Chapter 2 – Ohio's Existing Rail System* provides an overview of Ohio's rail system and trends that impact the system.
- *Chapter 3 – Proposed Passenger Rail Issues, Opportunities, Improvements and Investments* identifies passenger rail issues, opportunities, and improvements that stakeholders have put forward.
- *Chapter 4 – Proposed Freight Rail Issues, Opportunities, Improvements and Investments* discusses freight rail issues, opportunities, and potential improvements.
- *Chapter 5 – Ohio's Rail Service and Investment Program* describes vision, goals, and objectives for the rail system, rail needs that have been identified to address the vision, goals, and objectives, needs identified by stakeholders, and potential projects to sponsor for federal grant applications.
- *Chapter 6 – Coordination and Review* indicates how stakeholders were involved in the development of this Rail Plan and how the Rail Plan was coordinated with other planning efforts.

The findings of the Rail Plan follow.

Ohio Has an Extensive Rail Network that Is Closely Integrated with the State's Economy.

At 5,187 miles, Ohio's network of active rail lines is the fourth most extensive in the nation, behind that of Texas, Illinois, and California. Because Ohio is geographically much smaller than either Texas or California, its rail network is more concentrated. Rail infrastructure (unlike highway infrastructure) is often sold or abandoned if its use does not justify costs to maintain and operate. If Ohio businesses did not use the rail network, it would not be as extensive. The high mileage of rail lines in Ohio reflects the close integration of rail with

Ohio's economy. Including the impact of employee spending and spending across industries, the freight rail industry contributes $2.8 billion to Ohio's economy annually.

Prominent within Ohio's economy are industries that rely on rail. For example, manufacturing's total share of employment within Ohio is 46 percent higher than in other parts of the country. Within manufacturing, top sectors are 1) steel manufacturing; 2) chemical manufacturing; 3) food and beverage manufacturing; and 4) motor vehicle manufacturing. Each of these sectors is a heavy user of rail. Ohio ranks eighth in the nation for corn production and ninth in the nation for soybean production. Ohio is eleventh in coal production.

The Association of American Railroads ranks states by originating and terminating rail tonnages by commodity. Ohio is ranked among the top 10 states in *originating* tonnage of coal; farm products; crushed stone, sand, and gravel; intermodal; food products; metallic ores; primary metal products; and waste/scrap. Ohio is also ranked among the top 10 in *terminating* tonnage of coal; chemicals; intermodal; crushed stone, sand, and gravel; food products; metallic ores; and waste and scrap.

Rail service in Ohio competes more closely with trucking than in other parts of the country. Nationwide, railroads have focused on markets where economics of railroad transportation are more favorable than that of trucking. Rail transportation costs less than trucks for delivering large shipments and shipping long distances. The average length of rail haul nationwide increased from 843 miles in 2000 to 1,033 miles in 2017.[1] The share of rail shipments with over 60 carloads shipped at once increased from 45 percent in 2000 to 55 percent in 2013.[2] Railroads focus on these high volume, long distance markets while trucks dominate shorter haul, lower volume transportation markets.

However, whereas the average rail shipment distance nationwide is 1,033 miles, the average shipment distance to or from Ohio is estimated to be 619 miles.[3] Less than 25 percent of the ton-miles originating or terminating in Ohio (compared to 55 percent nationwide) are in shipments of over 60 carloads. Because the average length of haul is shorter and the average number of carloads per shipment is fewer, railroads shipping to and from Ohio compete more closely with trucking than elsewhere, all else being equal.

Two freight railroad companies—CSX Transportation and Norfolk Southern Railway—operate 59 percent of the Ohio rail network. Most of the remaining rail network is operated by local and regional freight railroads (railroads with annual revenues less than $447.6 million).[4]

[1] Association of American Railroads, *Railroad Ten-Year Trends*.

[2] AASHTO, *AASHTO Freight Rail Study Support Services*, August 2018.

[3] Because the STB Waybill Sample is a sample of waybills and not rail shipments, it understates average length of haul, since multiple waybills may carry a single rail move. To account for this, an adjustment was applied to increase estimated Ohio average length of haul by the ratio by which the STB Waybill Sample nationally undercounts average lengths of haul.

[4] The federal government and tourist railroads also operate several segments of the Ohio rail network.

Figure ES-1. Ohio Rail Network

Source: Ohio DOT GIS file, WSP USA analysis

Although Most of the Rail Network in Ohio is Owned by Private Freight Railroads, the Public Sector Still Plays an Important Role.

Of the 5,188 miles of active rail lines in Ohio, ownership is as follows:

- 4,589 miles owned by freight railroads
- 210 miles owned by the State of Ohio
- 282 miles owned by county or municipal governments or port authorities
- 77 miles owned by the federal government
- 30 miles owned by tourist railroads

Rail lines owned by state and local governments were generally acquired when these rail lines were threatened with abandonment. They are now operated by freight railroads.

In addition to owning rail lines, the public sector supports the rail network in Ohio in a number of ways, such as helping to secure funding for rail infrastructure projects. Of the 36 rail-related funding applications for projects in Ohio that have been submitted for federal multimodal grants since 2009, 15 were submitted by the State of Ohio, 11 by county or municipal governments, nine by independent government entities like port authorities, and one by a regional planning organization. These included applications for the following multimodal grant programs: Transportation Investment Generating Economic Recovery (TIGER), Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies (FASTLANE), and Infrastructure for Rebuilding America (INFRA) discretionary grant programs. State, local, and regional planning organizations also provide planning for rail projects.

The Public Utilities Commission of Ohio (PUCO) has regulatory oversight over Ohio's railroad industry through the independent enforcement of state and federal railroad regulations. PUCO employs 14 rail inspectors, maintains Ohio's highway/rail grade crossing database, and administers grade crossing funds.

The Ohio Rail Development Commission's (ORDC) mission is to plan, promote, and implement the improved movement of goods and people faster and safer on a rail transportation network that connects Ohio to the nation and the world. ORDC provides grants, loans, and other assistance, supporting Ohio's rail network through the following:

- Assist economic development projects in gaining rail access.
- Invest in projects that improve the rail network.
- Provide technical expertise for projects involving railroads.
- Help communities who own railroads to investigate rail issues impacting Ohio.

In fiscal years 2017 and 2018, ORDC approved $5.9 million in grant funds and lent $790,000 to railroads, shippers, local governments, port authorities for freight rail projects. Expected outcomes of approved projects follow:

- Jobs created: 950
- Jobs retained: 1,850
- Jobs supported: 7,500
- Total jobs affected: 10,300
- Private-sector investment: $1.2 billion
- Other public-sector investment: $73 million

In addition to these development activities, ORDC uses federal highway dollars to fund highway/rail crossing safety improvements throughout the state. Working with PUCO, in FY 2018, ORDC administered 58 projects at 67 grade crossings. The improvements included 60 active warning device installation or upgrade projects; two roadway geometry improvements; four grade-crossing eliminations; a statewide preemption planning project; an inventory/database upgrade project; and participation in a bridge (railroad under) project.

Local Communities Have Been Active in Passenger Rail Planning.

Amtrak serves Ohio via three long-distance (defined as over 750 miles) routes—the Capitol Limited, the Cardinal, and the Lake Shore Limited (Figure 1-1). Due to the scheduling of connecting trains in Chicago, these trains pass through Ohio at night. In Federal Fiscal Year 2017 (ending September 30, 2017), 149,013 people got on or off Amtrak trains in Ohio. Of these, 53,528 got on or off trains in Cleveland while 56,275 got on or off of trains in Toledo—collectively 74 percent of Ohio's Amtrak ridership.

If any new passenger rail services were to be sponsored by the State of Ohio, the state would be required to fund operating costs in excess of ticketing and other train revenues, as well as capital costs and allocated overhead (costs that are not directly attributable to a single service). If the new service was initiated on an existing, privately owned rail line, the State of Ohio would need to negotiate and reach agreement with the freight railroad owners for the new service. The State of Ohio would need to pay for passenger rail service infrastructure improvements, not only to meet desired service levels

but also to provide incremental capacity for the new service to avoid interfering with freight operations. Since most rail lines in Ohio are privately owned, this negotiation would be required for most alternatives.

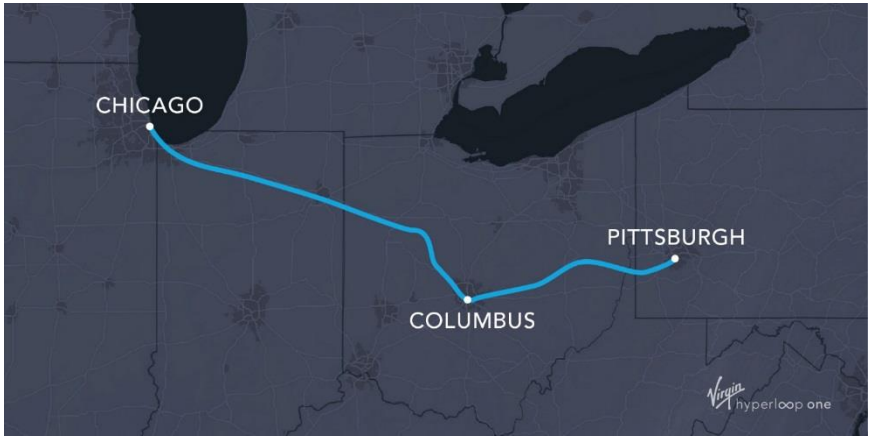
Figure ES-2. Amtrak Routes and Stations within 30 Miles of Ohio

Source: National Transportation Atlas Database, 2017; WSP analysis

During the late 1990s through 2009, Ohio conducted a number of passenger rail studies. Even though some of these studies included environmental work to comply with the requirements of the National Environmental Policy Act (NEPA), the findings are now outdated. Were Ohio to revisit any of these initiatives, any previously completed NEPA work would need to be redone.

Two current initiatives—one by the Northern Indiana Passenger Rail Association (NIPRA) and another by the Mid-Ohio Regional Planning Commission (MORPC)—complement each other. With funding from local governments in Ohio and Indiana, NIPRA is completing work to provide input to an environmental review process under NEPA for passenger rail service between Gary, Indiana, and Lima. MORPC is conducting analogous NEPA work for passenger rail service between Lima and Pittsburgh, Pennsylvania, through Columbus (Figure ES-3).

Figure ES-3. Proposed Rapid-Speed Transportation Initiative Study Corridor



Source: Mid-Ohio Regional Planning Commission, 2017

MORPC and another metropolitan planning organization, the Northeast Ohio Areawide Coordinating Agency (NOACA), are also studying the feasibility of hyperloop technology. The hyperloop concept involves freight or passenger pods traveling at extremely high speeds within sealed vacuum tubes. MORPC is evaluating hyperloop technology for a corridor between Chicago, Columbus, and Pittsburgh, while NOACA is investigating the feasibility of a hyperloop between Chicago and Cleveland.

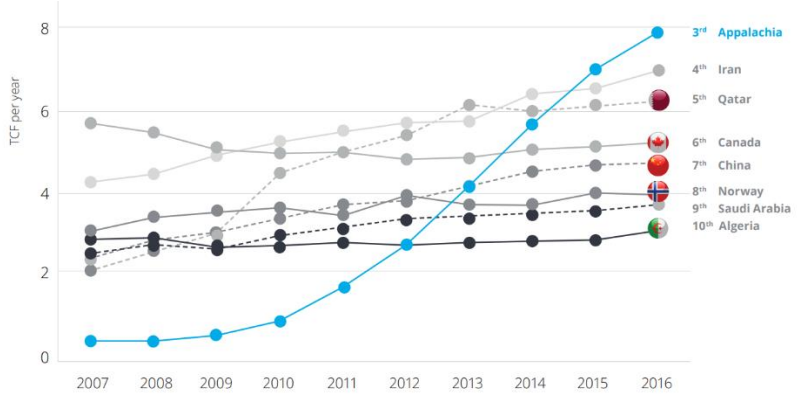
In addition, feasibility studies and environmental work for new passenger rail service and passenger rail station improvements on existing passenger rail routes have been proposed or are underway in Cincinnati, Cleveland, Elyria, Oxford, Bryan, Mentor, Sandusky Ravenna, and Toledo.

The Public Sector Can Help Take Advantage of New Rail-Related Opportunities.

The needs of Ohio's rail network are constantly changing with shifts in rail markets. The primary responsibility for responding to those changes lies with the private sector, but the public sector can also help ensure that the State of Ohio takes full advantages of opportunities presented.

One example relates to natural gas production made possible by hydraulic fracturing technology. Eastern Ohio, along with Pennsylvania and West Virginia (Appalachia), within the space of several years have collectively become one of the largest natural gas producing areas in the world (Figure 4-3).

Figure ES-4. Appalachia's Ranking among Natural Gas Producers



Source: Deloitte Consulting

Opportunities exist to take maximum advantage of the production of natural gas and byproducts in Ohio by keeping associated value-added activities within the area. Much of the infrastructure needed to take advantage of these opportunities is not rail-related, including gathering lines, processing plants, pipelines, storage facilities, and fueling stations. However, rail plays an important role. Retaining value-added activities in the area not only supports the local economy but is also more efficient. For example, a local manufacturer near Steubenville sources plastic resin pellets from the Gulf Coast.[5] Given that the raw materials that can be used to make plastic resins are produced locally, if the plastic resin pellets could be locally sourced, shipping costs would be reduced, and the manufacturer could produce at lower cost.

ORDC was awarded a $16.5 million 2018 Infrastructure for Rebuilding America (INFRA) grant for a $31.8 million project to

[5] From discussion with Brooke Hancock Jefferson MPO.

rehabilitate 30 miles of Norfolk Southern Railway line in Jefferson and Belmont Counties. This project supports opportunities for manufacturing natural gas byproducts. Stakeholders mentioned other needs in the area as well, such as rail infrastructure to support a proposed natural gas byproduct hub.

Changes in the steel industry also create opportunities. For example, Cleveland-Cliffs, Inc. is building a $700 million hot-briquetted iron production facility in Toledo at the port. The facility will convert iron ore to metallic iron for use as feedstock at steel mills that previously relied solely on pig iron and scrap steel as feedstock. This facility will use both the maritime and rail capacity at the Port of Toledo. ORDC has provided financial support to improve rail access to the facility.

Over the years Ohio has supported numerous opportunities to add to and improve the efficiency of rail intermodal services to and from the state. During the completion of the 2010 Rail Plan, the Heartland Corridor project to clear obstructions in to allow double-stack intermodal trains to operate on the Norfolk Southern rail line between Chicago and the Port of Virginia was underway. The State of Ohio was also working with Norfolk Southern to clear the route between Columbus and Cincinnati for double-stack operations. These projects have since been completed and have enabled intermodal services that would not have otherwise been possible.

At the time of the 2010 Rail Plan, the CSX National Gateway Corridor project to clear obstructions to allow double-stack trains on the CSX rail line between Ohio and Washington, DC, between Baltimore, MD, and North Carolina, and between Wilmington and Charlotte, NC, had also been started. As of late 2018, CSX has nearly completed a new tunnel in Washington, DC, which will be the last of 61 projects to complete the National Gateway Corridor project.

With 12 terminals, Ohio has the third highest number of intermodal terminals in the country behind Illinois and Texas. Intermodal services to and from Ohio support retail and manufacturing and contribute to Ohio's $15.5 billion logistics industry. Intermodal service in and through Ohio removes truck traffic from Ohio's highway system, thus reducing congestion, pavement damage, emissions, and improving safety.

New intermodal opportunities continue to present themselves. A new intermodal terminal, the Central Ohio Intermodal Center, is opening in Jeffersonville off I-71 southeast of Dayton and southwest of Columbus. The new terminal will provide service for international containers between Jeffersonville and Vancouver, BC.

The project will provide intermodal options to shippers in western and central Ohio as well as a competitive entrant into Ohio's intermodal markets with the Canadian Pacific Railway/Genesee & Wyoming, Inc. service (Figure ES-5). The new terminal will enable local farmers to load containers with identity preserved soybeans for export to Asia. To bring double-stack trains to and from the terminal, several vertical obstructions must be cleared in the Springfield area, and ORDC is assisting with a project to do so. Genesee & Wyoming, Inc. also intends to improve speeds along the rail lines on which the service will rely.

Figure ES-5. Canadian Pacific/Genesee & Wyoming Service to Jeffersonville

Sources: Canadian Pacific

Access to the Rail Network Is Important to Ohio Economic Development.

Stakeholders consulted for this Rail Plan view rail as valuable to economic development. Some were concerned about a lack of rail-served industrial sites. Rail access can be an important differentiator in marketing industrial sites. Fifteen projects to provide rail access to industrial sites were identified by stakeholders during outreach efforts.

JobsOhio has completed an innovative initiative, SiteOhio, to identify marketable industrial sites within the state. The initiative consisted of an in-depth review and analysis of sites submitted by local communities throughout the state. Sites authenticated through this initiative are considered ready for immediate development with a guarantee that all utilities are on site with adequate capacities, due diligence studies are complete, and the site is free of incompatible uses. While not a requirement, authentication of rail access is a component of the screening process and is recognized as a critical element to attract specific industries.

ORDC funds or finances projects that build rail access to Ohio businesses. Projects are completed as partnerships, where the shipper funds part of the cost of rail access and ORDC funds or finances another portion of the project. Other project partners may fund or finance another portion of the project. ORDC selects projects that will yield public benefits and enable the State of Ohio to leverage private investment.

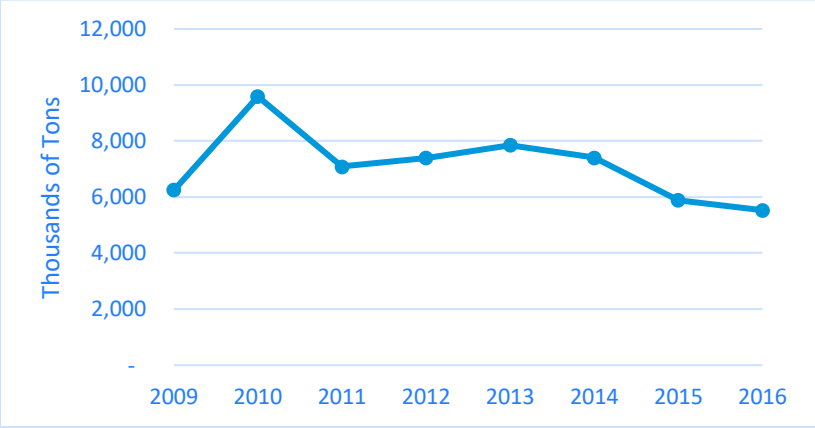
For shippers that do not have direct rail access to their locations, transload facilities can serve as alternate points of access to the rail network. Local railroads surveyed for this Rail Plan put forward seven potential transload facilities with an estimated construction cost of $19.7 million. Similar to other freight rail development projects, ORDC has financially supported the development of transload facilities with demonstrated public benefits.

Rates and Service Levels Are of Primary Concern to Ohio Rail Shippers.

In preparing this Rail Plan, the project team met with the membership of two shipper groups and heard individually from 23 rail shippers through an online survey. The dominant concerns of these shippers relate to rail rates and service. At a meeting, agricultural shippers were harshly critical of their rail rates and service. According to meeting attendees, the increase in rail rates and the reduction of rail service has in some cases made agricultural shipments by rail

uneconomical. Agriculture shippers avoid railroad transportation by selling crops to local food, feed, and ethanol processors rather than shipping by rail out of state. Whether this supply chain reconfiguration is in fact the cause, the tonnage of agricultural commodities shipped from Ohio fell by 10 percent between 2009 and 2016. Recent trends in agricultural shipments from Ohio are shown in Figure ES-6.

Figure ES-6. Tonnage of Farm Products Originating in Ohio



Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads

Other shippers were concerned about rates and service as well.

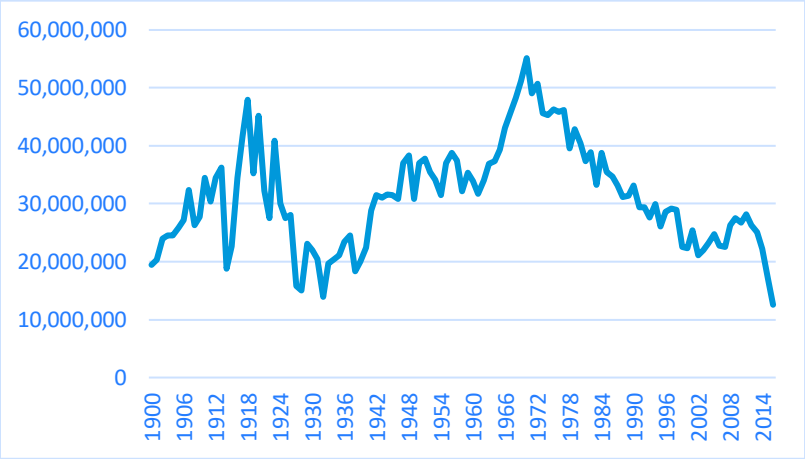
State agencies such as ORDC do not have jurisdiction over rail rates or service. However, competition could provide railroads with an incentive against raising rates or lowering service. It is possible to promote competition by looking for cost-effective opportunities for new connections, supporting industrial locations or multimodal facilities that are served by multiple railroads, or providing support for local and regional railroads that can interchange with multiple Class I railroads.

Abandoned, Underutilized Rail Assets Represent Lost Opportunities.

While shipments of some commodities to and from Ohio have increased, others have declined, causing rail assets to be underutilized or abandoned. Coal remains the highest tonnage commodity to be shipped to, from, and within Ohio by rail, but Ohio's 2016 coal production was less than a quarter of the state's peak coal production in 1970 (Figure ES-7). Furthermore, Ohio's coal production has not remained in the same place with mines being developed and abandoned stretching back into the early 19th century. Southeastern Ohio is dotted with underutilized or abandoned rail lines that used to serve these mines. The ownership of some of these abandoned rail corridors is unknown, which makes it difficult to repurpose the corridors or land. While most of these corridors would unlikely be used for rail transportation again, they could be repurposed as recreation trails, or the land could be used for other purposes.

Shipments of coal terminating in Ohio fell by over half between 2008 and 2016. Further declines are likely, since four coal-fired power plants in Ohio are expected to be decommissioned or converted to natural gas by 2030. The reduction in demand for coal has and will create the potential for rail lines that previously served those plants to be underutilized. Other customers could be affected if the loss of coal traffic has a materially adverse economic effect on operation of the line.

Figure ES-7. Ohio Coal Production in Tons (1900 – 2016)



Sources: U.S. Geological Survey, U.S. Energy Information Administration

Shifts in steel markets have also caused some rail lines either to be underutilized or to require modification before repurposing. Ohio is the second largest steel-producing state second only to Indiana, with steel as the third highest volume commodity shipped to/from Ohio. About half of Ohio's steel production capacity is from basic oxygen process furnaces (integrated) steel mills, while half is from electric arc furnaces (minimills). At one time, a much higher portion of Ohio's steel came from integrated steel mills, and the locations of steel production have shifted. The shift away from integrated steel mills has caused rail assets to be underutilized, such as the underutilized iron ore and metallurgical coal docks at the Port of Toledo. Other rail assets need to be configured, such as rail yards on the Ohio River that were originally built to serve non-extant steel mills but that could now support the energy industry.

Highway/Rail Crossings Continue to Create Mobility and Safety Concerns.

Ohio has the fourth largest number of highway/rail grade crossings in the country behind Texas, Illinois, and California. As of 2018, 5,737 at-grade vehicular public crossings are located in Ohio, of which 58 percent have flashing lights and roadway gates, 32 percent have passive systems such as crossbucks, and 10 percent have flashing lights.

Safety at highway/rail grade crossings has generally improved over the past 20 years as shown in Table ES-1.

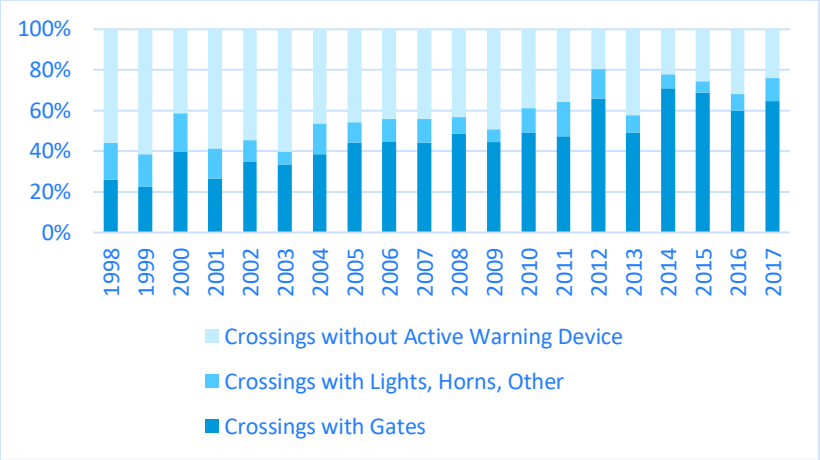
Table ES-1. Average Annual Fatalities, Injuries, Crashes at Ohio Highway/Rail Grade Crossings

Statistic	1998 - 2007	2008 - 2017
Fatalities	16	8
Injuries	42	27
Total Number of Crashes	138	78

Sources: Federal Railroad Administration Safety Database

However, a source of frustration has been the frequency of accidents at gated crossings. As the most dangerous unprotected crossings have been improved with gates and lights, the share of accidents at crossings without active warning devices has declined, while the share of accidents at gated crossings has increased. As shown in Figure ES-8, most accidents occurred at highway/rail grade crossings without train-activated warning devices (gates, lights or other). Now, most accidents occur at gated crossings.

Figure ES-8. Percentage of Accidents at Highway/Rail Grade Crossings by Warning Device Type



Source: Federal Railroad Administration Safety Database

ORDC has addressed this trend by expanding its crossing improvement program to include modifications to crossings that are already equipped with lights and gates. Nine projects were programmed under this new initiative in FY 2018.

Stakeholders consulted for this Rail Plan were concerned about highway/rail grade crossings blocked by trains for extended periods of time. These create not only a nuisance but also dangerous situations, such as when impatient pedestrians crawl through or under parked trains or when the movements of emergency vehicles are restricted by blocked crossings.

Which measure is appropriate to address blocked crossings depends on multiple factors, but a first step is to understand why trains are blocking a crossing. Trains may block crossings as they wait to access rail lines from passing sidings, as they switch railcars into and out of yards or industrial locations, or as they change crews. Trains may also block crossings due to operational problems such as equipment malfunctions or train crews reaching their hours of service deadlines. The most complete solutions to blocked crossings are to grade separate or move the rail line, but to do so is costly and often infeasible. Other possible solutions include railroad operating changes so that railroads move operations such as switching cars, changing crews, and holding trains that would otherwise block crossings to locations without busy crossings, or infrastructure/operational changes that remove the need for trains to stop. Communities can also implement solutions that enable them to better manage blocked crossings, such as planning developments and emergency services so that no portion of the community is blocked from emergency services, shifting traffic away from crossings that are often blocked, or providing communication systems that notify emergency responders and drivers of blocked crossings.

In some cases, grade-separated crossings cause problems as well, such as where railroad overpasses do not have adequate clearance for tractor semi-trailers to pass underneath. Trucks often become stuck under overpasses, and truck access to some areas may be inconvenient due to limited/insufficient crossings.

Of 123 Rail Infrastructure Projects Identified by Stakeholders, 66 Could Be Considered for a Federal Grant.

This Rail Plan used the following approaches to gain input from stakeholders and members of the general public:

- **In person meetings**. Meetings were held with Ohio Association of Regional Councils, Ohio Railroad Association, Ohio

Agriculture Business Association, four port authorities, nine MPOs, and two port terminal operators.

- **Conference calls or phone interviews**. Conference calls or phone interviews were held with the Ohio Aggregate and Industrial Minerals Association, two port authorities, and one port terminal operator.
- **Survey/information requests**. Surveys and information requests were sent to Norfolk Southern, CSX, Amtrak, and each local or regional railroad operator in Ohio. Responses were received from Norfolk Southern, CSX, and 17 local/regional railroads.
- **Online survey**. A link to an online survey was posted to the ORDC website between January 2018 and June 2018. A total of 341 responses were received.
- **ORDC Policy Committee meetings**. ORDC's Policy Committee meets every other month. Committee meetings are open to the public. Meetings in November 2017 and January 2018 were devoted to this Rail Plan.

Based upon feedback from stakeholders, a review of MPO long-range transportation plans, and prior meetings between ORDC and local/regional railroads, a list of 123 projects was developed (Table ES-2).

Table ES-2. Number and Costs of Projects by Project Category

Category	All Projects	Projects with Cost Estimates	Cost of Projects with Estimates ($2018)
Bridge rehabilitation – bring railroad bridges to modern standards and a state of good repair	3	3	$2,000,000
Grade separation – grade separate rail and highway rights-of-way	15	11	$169,904,000
Industrial access – build rail sidings or spurs to industrial locations	15	5	$9,541,000
Passenger rail – improve existing infrastructure or build new infrastructure to improve passenger service	16	11	$1,023,923,000
Rail capacity – improve rail yards or rail lines to expand capacity	16	12	$100,393,000
Rail connection – establish or improve connections between rail lines	4	4	$65,248,000
Rail rehabilitation - bring rail lines to modern standards and a state of good repair	28	21	$42,298,000
Road clearance – raise the level of rail overpasses to tractor/semi-trailers to pass underneath	10	6	$88,925,000
Other – create rail bypass, new rail line, preserve right-of-way, build new bridge, improve crossing	8	4	$300,650,000
Transload or intermodal – improve or construct new transload or intermodal terminal	8	8	$39,434,000
Grand Total	**123**	**84**	**$1,842,816,000**

ORDC has sponsored rail projects for competitive federal discretionary grant programs, including Better Utilizing Investments in Leveraging Development Program (BUILD, formerly TIGER) and INFRA (formerly FASTLANE). In order to be ready for future federal grant opportunities, ORDC staff have reviewed the projects in Table ES-2 and selected a subset that as of 2018/2019 could be considered for sponsorship for a federal grant application. No attempt has been

made to assess the likely public benefits of these projects. Rather, projects have been reviewed solely based on their readiness. To be considered for sponsorship for a federal grant application, projects must meet the following criteria:

- The size of the projects and amount of likely requested funding is consistent with past federal discretionary grant programs. The project will likely fit the eligibility and criteria of federal discretionary grant programs and will be consistent with ORDC's mission.
- If sponsored by an MPO, the project will be fiscally constrained[6] and will have funding for one or more phases of the project committed in the Statewide Transportation Improvement Program/or the MPO's Transportation Improvement Program. Some idea of funding will be necessary for the project to advance.
- The project will be either sponsored by the asset owner (railroad or other owner of the rail line or structure) or the asset owner has endorsed the project. There will be a funding estimate for the project.

Additionally, ORDC recognizes that stakeholders may have expended funds on planning studies for projects where funding estimates for future phases, either additional planning or actual construction, are unknown. Potential future phases of such projects will be considered for potential sponsorship for a federal grant application if there is a reasonable understanding of the technical challenges involved in completing that phase. Because these projects lack cost estimates for the potential future phase(s), asterisks appear next to the project categories in Table ES-3.

While ORDC may sponsor listed projects for a competitive grant application, inclusion in Table ES-3 does not imply a commitment on ORDC's part to do so. ORDC also reserves the right to submit projects not on the list of projects if the proposed project meets its goals and objectives.

[6] The MPO believes that the project can be implemented using committed, available, or reasonably available revenue sources.

Table ES-3. Projects to be Considered for Federal Competitive Grant Applications

Category	All Projects	Projects with Cost Estimates	Cost of Projects with Estimates ($2018)
Bridge rehabilitation – bring railroad bridges to modern standards and a state of good repair	2	2	$2,000,000
Grade separation – grade separate rail and highway rights-of-way	8	8	$122,444,000
Industrial access – build rail sidings or spurs to industrial locations	5	4*	$5,130,000
Passenger rail – improve existing infrastructure or build new infrastructure to improve passenger service	5	2*	$2,373,000
OfRail capacity – improve rail yards or rail lines to expand capacity	11	11	$51,413,000
Rail connection – establish or improve connections between rail lines	3	3	$3,498,000
Rail rehabilitation - bring rail lines to modern standards and a state of good repair	21	21	$42,298,000
Road clearance – raise the level of rail overpasses to	1	1	$12,841,000
Other – create rail bypass, new rail line, preserve right-of-way, build new bridge, improve crossing	2	2	$32,065,000
Transload or intermodal – improve or construct new transload or intermodal terminal	8	8	$39,434,000
Grand Total	**66**	**62**	**$313,496,000**

* Funds have been invested in certain projects, but the cost of future phases is unknown.

1. Role of Rail in Statewide Transportation

1.1 PURPOSE AND INTRODUCTION

This 2018 *State of Ohio Rail Plan* (this Rail Plan) is an update of the 2010 *Ohio Statewide Rail Plan* (2010 Rail Plan). In addition to fulfilling a federal requirement, this Rail Plan represents an opportunity to engage rail stakeholders and the general public in a dialogue regarding the State of Ohio's rail priorities and to position Ohio for future federal rail funding opportunities. This Rail Plan will help to provide direction to guide future rail investments.

The 2010 Rail Plan was completed to comply with the requirements of the Passenger Rail Investment and Improvement Act (PRIIA), which the U.S. Congress passed in 2008. PRIIA established the requirement that states complete state rail plans at regular intervals and specified the minimum expected content.

This Rail Plan similarly meets the requirements of PRIIA, but also adheres to the more detailed State Rail Plan Guidance (Guidance) put forward by the Federal Railroad Administration (FRA) in 2013. Per the FRA Guidance, this Rail Plan consists of the following chapters:

- *Chapter 1 – The Role of Rail in Statewide Transportation* discusses the current and future role of rail in Ohio's multimodal transportation system. It also describes how Ohio is organized to provide political, legal, and financial support to rail development.
- *Chapter 2 – Ohio's Existing Rail System* provides an overview and inventory of Ohio's existing rail system and describes trends that will affect the Ohio rail system.
- *Chapter 3 – Proposed Passenger Rail Issues, Opportunities, Improvements and Investments* identifies issues and opportunities stakeholders have put forward regarding passenger rail services in Ohio and investments and improvements that have been proposed.
- *Chapter 4 – Proposed Freight Rail Issues, Opportunities, Improvements and Investments* discusses issues and opportunities associated with Ohio's freight rail system and identifies potential freight rail investments and improvements.
- *Chapter 5 – Ohio's Rail Service and Investment Program* describes the State of Ohio's long-term vision for rail service and its role in Ohio's multimodal transportation system. The chapter describes projects that could forward the vision as well as the benefits of completing these projects. The chapter also compares the funding and financing required to complete projects to estimates of funding and financing that could be available.
- *Chapter 6 – Coordination and Review* indicates how stakeholders were involved in the development of this Rail Plan.

1.2 OHIO'S GOALS FOR THE MULTIMODAL TRANSPORTATION SYSTEM

Vision, goals, and objectives specific to rail will be included later in this Rail Plan and will be consistent with the overall multimodal goals as articulated in *Access Ohio 2045*, the State of Ohio's most recent long-range transportation plan. Relevant *Access Ohio 2045* goals are as follows:

- **Safety.** Reduce fatalities and serious injuries; maintain and enhance transportation security; support effective response to and recovery from natural disasters and other emergencies
- **Preservation**. Maintain transportation assets in a state of good repair
- **Efficiency and Reliability.** Increase the efficiency and reliability of moving people and freight; improve the efficiency of connections between modes.
- **Mobility and Accessibility.** Support increased public transportation and other mobility services; support increased alternatives for individuals who lack access to or are unable to use a motor vehicle
- **Economic Competitiveness.** Support increased access to jobs; support increased freight mobility and supply chain efficiency; support improved access by residents and visitors to attractions
- **Quality of Lif**e. Support community visions through transportation choices; support public health through transportation choices
- **Environmental Stewardship.** Reduce air quality emissions related to transportation; avoid, minimize or mitigate impacts of transportation on built and natural environments

1.3 ROLE OF RAIL IN OHIO'S TRANSPORTATION SYSTEM

The level of importance of rail to Ohio's transportation system is reflected by the concentration of rail lines within the state. According to the Association of American Railroads, more rail mileage is in Ohio than in all but three states—Texas, Illinois, and California. Because Ohio is geographically much smaller than either Texas or California, its rail network is more concentrated. Rail (unlike highway infrastructure) is often sold off or abandoned if its use does not justify costs to maintain and operate. If Ohio businesses did not use the rail network, it would not be as extensive. The high mileage of rail lines in Ohio reflects the close integration of rail with Ohio's economy. Table 1-1 compares rail's modal share to and from Ohio with that of the overall United States.

Table 1-1. Rail Modal Share in Ohio and the Overall United States, 2015

	Rail's Overall Share of Tonnage Shipped	Rail Share of Tonnage Shipped > 500 miles
Ohio	12%	27%
United States	10%	36%

Rail shipments to and from Ohio are of a more varied set of commodities than what is shipped nationwide. Across the country, 46 percent of freight tonnage shipped by rail is coal or grain, whereas these commodities are 36 percent of freight tonnage that originates or terminates in Ohio. Rail is used for delivering and originating a broad

range of industrial products, raw materials, and finished goods to and from Ohio.

Table 1-2. Rail Modal Share by Commodity and Mileage Range to and from Ohio, 2015

Commodity	Rail Tons	0 – 99 Miles	100 – 249 Miles	250 – 499 Miles	500 – 999 Miles	1,000 + Miles	Overall
Coal	27,702,000	32%	72%	29%	99%	100%	39%
Metals and Metal Products	13,690,000	13%	33%	7%	12%	20%	18%
Chemicals and Fertilizers	13,045,000	2%	10%	41%	31%	42%	28%
Agricultural Products	12,304,000	2%	4%	17%	80%	16%	21%
Crude and Petroleum Prods.	7,721,000	3%	0%	6%	26%	10%	4%
Waste/Scrap	7,095,000	15%	9%	17%	31%	34%	16%
Stone, Sand, Gravel, other Non-metallic Mineral Prods.	6,522,000	1%	4%	9%	21%	29%	4%
Food and Feed	6,013,000	0%	6%	14%	14%	19%	9%
Plastics and Rubber	3,704,000	0%	8%	7%	13%	53%	18%
Metallic Ores	2,795,000	0%	91%	51%	13%	96%	30%
Logs, Paper, Wood Products	2,284,000	0%	7%	8%	17%	30%	8%
Vehicles, Transportation Equipment	990,000	0%	1%	5%	11%	12%	5%
Other	699,000	0%	1%	1%	3%	4%	1%
Total	**104,564,000**	**6%**	**8%**	**14%**	**26%**	**28%**	**12%**

Source: Freight Analysis Framework-4

Table 1-2 illustrates the rail share by commodity for goods coming to or leaving Ohio. For example, for coal, 100 percent of coal shipments to or from Ohio over 1,000 miles went by rail, while 42 percent of chemical and fertilizer shipments to or from Ohio over 1000 miles went by rail. It is likely that Table 1-2 understates rail's role in Ohio, since it reflects only freight that moves by a single mode. Ohio is home to 12 intermodal container facilities and ports, and numerous truck/rail transload facilities. Multimodal movements through these facilities rely on rail for a portion of each move.

Amtrak serves Ohio via three long-distance (defined as over 750 miles) routes—the Capitol Limited, the Cardinal, and the Lake Shore Limited (Table 1-3). The Cardinal crosses the Ohio River at Cincinnati and serves stations on the Kentucky side of the river, but is accessible to residents of southern Ohio.

Amtrak trains serving Ohio are timed to arrive in Chicago during the morning and leave Chicago in the late afternoon or evening to facilitate transfers during the day in Chicago. Because locations in Ohio are four- to eight-hour train rides from Chicago, the Chicago schedule causes trains to pass through Ohio at night.

Passenger rail carries a relatively small portion of Ohio travelers. For example, the Ohio statewide travel demand model estimates that

93 million long-distance (defined as over 50 miles) auto trips were taken in 2010. The same year, 144,800 people got onto or off Amtrak trains in Ohio. The number of Ohioans who used train travel in 2010 was about 0.16 percent of the number of people who drove for long-distance trips.

Table 1-3. Amtrak Routes in Ohio

Item	Capitol Limited	Cardinal	Lake Shore Limited
Ohio Stations	Alliance, Cleveland, Elyria, Sandusky, Toledo	Cincinnati	Cleveland, Elyria, Sandusky, Toledo, Bryan
End Points	Chicago, IL – Washington, DC	Chicago, IL – New York, NY	Chicago, IL – New York, NY/ Boston, MA
Frequency (each direction)	Daily	3 days per week	Daily
Arrival time at first/last stations in Ohio – north and west	1:39 AM – 5:08 AM	1:31 AM	3:27 AM – 7:05 AM
Arrival time at first and last stations in Ohio – south and east	11:49 PM – 3:05 AM	3:27 AM	1:40 AM – 5:50 AM

Source: Amtrak

Ohio residents can access not only the Amtrak stations listed in Table 1-3, but also stations in neighboring states, including the following:

- Erie, PA
- Waterloo and Connersville, IN
- Ashland, Maysville, South Shore-South Portsmouth, KY
- Huntington, WV

Figure 1-1 displays Amtrak routes through Ohio and Amtrak stations within 30 miles of Ohio's borders.

Figure 1-1. Amtrak Routes and Stations within 30 Miles of Ohio

Source: National Transportation Atlas Database, 2017; WSP analysis

As shown in Table 1-4, the U.S. Census 2015 American Community Survey 5-year data estimates that 2,583,911 Ohio residents live in a census block group within a 10-mile radius of an Amtrak station, and 6,474,955 residents live within 30 miles of an Amtrak station. These numbers represent 22.3 percent and 55.9 percent of the statewide population, respectively.

Table 1-4. Percentage of Ohio Population within 10 and 30 Mile Radius of Amtrak Station

Radius of Station	Population	Percentage of State Population

10 miles	2,583,911	22.3%
30 miles	6,474,955	55.9%

Source: 2015 American Community Survey; WSP Analysis

1.4 INSTITUTIONAL GOVERNANCE STRUCTURE OF RAIL PROGRAMS IN OHIO

Public-sector organizations at both the statewide and local levels in Ohio provide political, legal, and financial support to rail development.

1.4.1 Ohio Rail Development Commission

Statutory authority to conduct rail planning in Ohio is assigned to the Ohio Rail Development Commission (ORDC), an independent agency of the Ohio Department of Transportation, per Chapter 4981 of the Ohio Revised Code. For the purposes of this Rail Plan, ORDC will serve as the State Transportation Authority responsible for preparing, maintaining, coordinating, and administering the plan. ORDC will also serve as the State Rail Plan Approval Authority, which will have responsibility to review and approve the plan.

ORDC was formed in 1994 to combine all of Ohio's non-regulatory rail programs in one agency. ORDC's mission is to plan, promote, and implement the improved movement of goods and people faster and safer on a rail transportation network that connects Ohio to the nation and the world. ORDC provides grants, loans, and other assistance to:

- Assist job- and investment-generating development projects in obtaining rail access as a part of Ohio's overall business attraction/retention efforts.
- Invest in strategic rail projects that remove bottlenecks, increase velocity, or otherwise improve the rail infrastructure of rail lines in Ohio.
- Provide technical expertise when needed for any project involving a railroad.
- Help communities who own railroads manage those railroads when asked.
- Investigate various rail issues affecting Ohio, both positive and negative.

In addition to these development activities, ORDC uses federal highway dollars to fund highway/rail crossing safety improvements throughout the state.

Most rail infrastructure in Ohio is privately owned. However, ORDC is permitted to acquire, construct, enlarge, improve, equip, and to sell, lease, exchange, or otherwise dispose of property, structures, equipment, and facilities for rail transportation. ORDC owns several rail lines. ORDC leases these lines to railroads to operate rail service.

ORDC comprises a 15-member board, including four non-voting members from the Ohio General Assembly. Seven commissioners are appointed by the governor and one each by the President of the Ohio Senate and the Speaker of the Ohio House of Representatives. The Directors of the Ohio Department of Transportation and the Ohio Development Services Agency serve as ex-officio members.

1.4.2 Public Utilities Commission of Ohio

The Public Utilities Commission of Ohio (PUCO) provides regulatory oversight of Ohio's railroad industry through the independent

enforcement of state and federal railroad regulations. These regulations can be found in title 49 of the Ohio Revised Code and in 49 CFR parts 179-299. The PUCO employs 14 railroad inspectors who are certified in one of the FRA's five inspection disciplines as guided by the FRA State Safety Participation Program. The PUCO inspectors work with federal authorities on enforcement and incident investigations closely. In addition to federal inspections and investigations the PUCO Rail Inspectors formally investigate citizen railroad complaints, at-grade crossing accidents, derailments and motorist or railroad worker fatalities through state jurisdiction. They also assist in the review, approval and monitoring of grade-crossing upgrades, track and structure clearance variances, exemptions and all requested protection device change requests on behalf of the Commission.

The PUCO maintains the State of Ohio's crossing database, and the field inspectors audit crossing data annually as part of routine crossing inspections. Internally, the PUCO administers the state grade-crossing protection program and aids in the diagnostic process for "Section 130" funds with the ORDC. Finally, the PUCO maintains comprehensive rail accident records and uses them to publish an annual grade-crossing statistics report.

1.4.3 Other State Agencies

The following state agencies do not specifically administer rail programs; however, rail is relevant to the work they do:

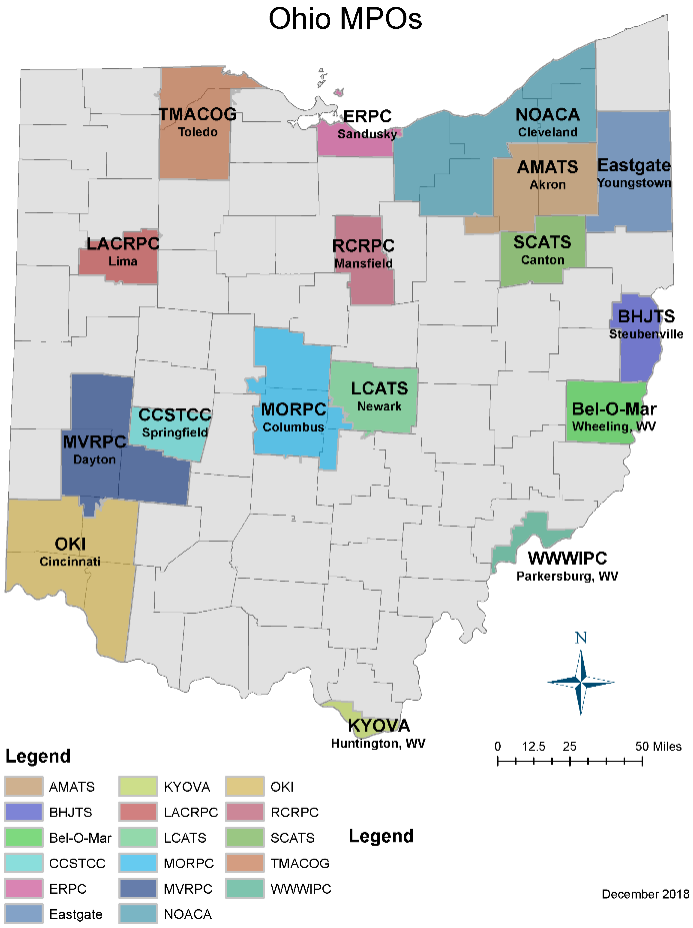
- The Ohio Department of Transportation Division of Planning's Statewide Planning and Research office is responsible for multimodal planning efforts. The rail components of these plans are coordinated with ORDC. Recent multimodal plans include the *Transport Ohio Statewide Freight Plan*, *Access Ohio 2045*, and the *Ohio Maritime Strategy*. ORDC also coordinates with the office to implement the State Highway Safety Plan, which emphasizes the reduction of highway grade-crossing crashes.
- The Ohio Development Services Agency works with JobsOhio, a statewide non-profit development agency, to offer businesses comprehensive packages of financial and technical assistance resources for job creation and retention. Rail infrastructure can provide an incentive for businesses to locate, remain, or grow their presence in Ohio.

1.4.4 Metropolitan Planning Organizations

Federal transportation legislation requires that a metropolitan planning organization (MPO) be designated for each urbanized area with a population of more than 50,000 people in order to carry out metropolitan transportation planning functions as a condition of federal aid. Ohio has 17 U.S. Department of Transportation designated MPOs (Figure 1-2 and Table 1-5). Six of Ohio's MPOs—Ohio-Kentucky-Indiana Regional Council of Governments (OKI), Toledo Metropolitan Area Council of Governments (TMACOG), Kentucky-Ohio-West Virginia (KYOVA) Interstate Planning Commission, Brooke Hancock Jefferson Metropolitan Planning Commission (BHJ), Belomar Regional Council, and Wood-Washington-Wirt Interstate Planning Commission (WWW) — include jurisdictions in Ohio and neighboring states. MPOs are organized by agreement between the governor and local governments that together represent at least 75 percent of the area covered. Freight

rail, passenger rail, highway/rail crossing issues and improvements can feature into MPO planning efforts.

Figure 1-2. Metropolitan Planning Organizations in Ohio



Source: *ODOT Statewide Planning & Research*

Table 1-5. List of Metropolitan Planning Organizations in Ohio

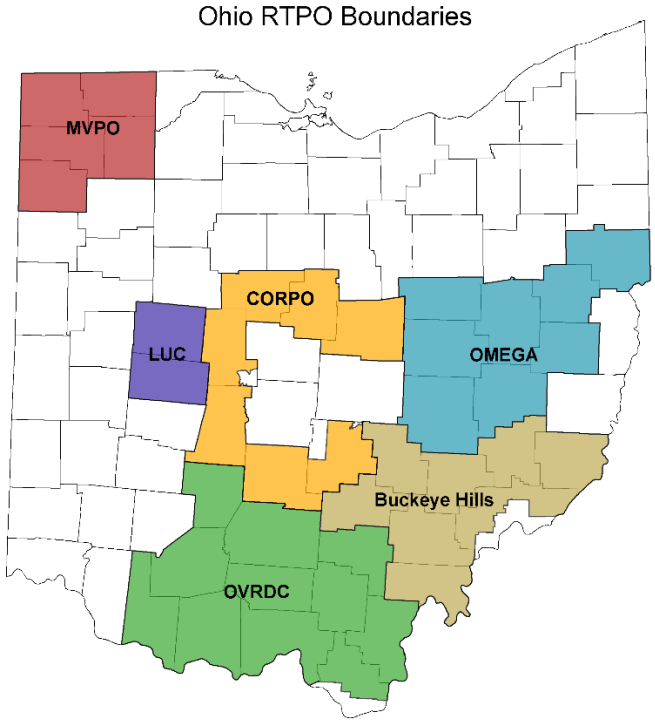
Metropolitan Area	MPO Acronym	MPO Name
Akron	AMATS	Akron Metropolitan Area Transportation Study
Canton	SCATS	Stark County Area Transportation Study
Cincinnati	OKI	Ohio-Kentucky-Indiana Regional Council of Governments
Cleveland	NOACA	Northeast Ohio Areawide Coordinating Agency
Columbus	MORPC	Mid-Ohio Regional Planning Commission
Dayton	MVRPC	Miami Valley Regional Planning Commission
Huntington, WV	KYOVA	KYOVA Interstate Planning Commission
Lima	LACRPC	Lima-Allen County Regional Planning Commission
Mansfield	RCRPC	Richland County Regional Planning Commission
Newark	LCATS	Licking County Planning Commission
Parkersburg, WV	WWW	Wood-Washington-Wirt Interstate Planning Commission
Sandusky	ERPC	Erie Regional Planning Commission
Springfield	CCSTCC	Coordinating Committee and Board of County Commissioners of Clark County
Steubenville-Weirton, WV	BHJ	Brooke Hancock Jefferson Metropolitan Planning Commission
Toledo	TMACOG	Toledo Metropolitan Area Council of Governments
Wheeling, WV	Belomar	Belomar Regional Council
Youngstown	Eastgate	Eastgate Regional Council of Governments

1.4.5 Regional Transportation Planning Organizations

Ohio's Regional Transportation Planning Organization (RTPO) Program is focused on building transportation expertise to provide transportation planning products and services to nonmetropolitan regions of Ohio. The RTPO Program was initiated in July 2013, with five regional planning agencies establishing transportation planning programs, covering 34 Ohio counties. In July 2016, the Central Ohio Rural Planning Organization—a sixth central Ohio region RTPO—was established, which covers an additional seven counties. Each RTPO was initially charged with engaging their member communities in developing a transportation plan and a public engagement process for their region. In 2017, the original five RTPOs developed Regional Transportation Improvement Programs for their regions. Planning activities for some RTPOs have included rail. RTPOs are the following and are displayed in Figure 1-3:

- Central Ohio Rural Planning Organization (CORPO)
- Buckeye Hills Hocking Valley Regional Development District (Buckeye Hills)
- Logan Union Champaign Regional Planning Commission (LUC)
- Maumee Valley Planning Organization (MVPO)
- Ohio Mid-Eastern Governments Association (OMEGA)
- Ohio Valley Regional Development Commission (OVRDC)

Figure 1-3. Regional Transportation Planning Organizations in Ohio



1.4.6 Port Authorities

Ohio is home to 59 port authorities. These are political subdivisions of counties or municipalities, or some combination thereof. They are authorized by Ohio Revised Code Chapter 4582. Port authorities facilitate economic development activity, capital investment, and job creation and retention in Ohio. Port authorities can construct facilities, issue bonds, make loans, and sell or buy real and personal property. Some port authorities in Ohio have been active in promoting and investing in rail infrastructure in areas under their jurisdictions. Port authorities submitted about half of the Ohio rail-

related grant applications under the Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant Program between 2009 and 2016. Figure 1-4 is a map of port authorities in Ohio, and Table 1-6 is a list of port authorities.

Figure 1-4. Port Authorities in Ohio

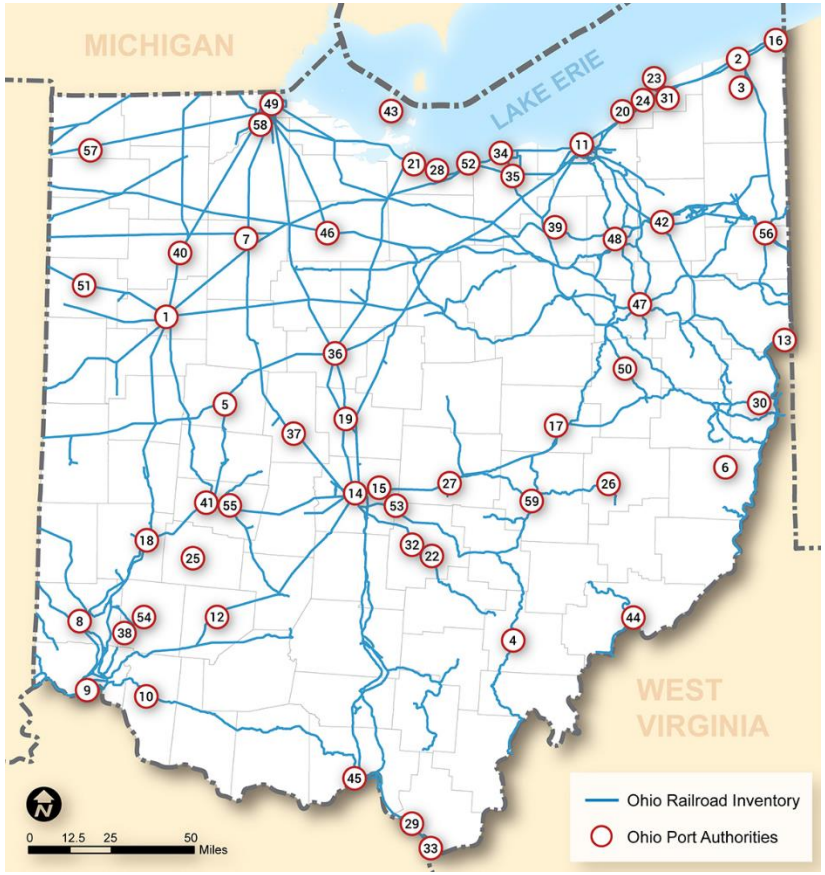


Table 1-6. Port Authorities

Number and Port Authority	Number and Port Authority
1 Port Authority of Allen County	31 Lake County Ohio Port
2 Ashtabula City Port Authority	32 Lancaster Port Authority
3 Ashtabula County Port Authority	33 Lawrence County Port Authority
4 Athens County Port Authority	34 City of Lorain Port Authority
5 Bellefontaine Finance and Development Authority	35 Lorain County Port Authority
6 Belmont County Port Authority	36 Marion Port Authority
7 Blanchard Valley Port Authority	37 Marysville-Union County Port Authority
8 Butler County Port Authority	38 Mason Port Authority
9 Port of Greater Cincinnati Development Authority	39 Medina County Port Authority
10 Clermont County Port Authority	40 Northwest Ohio Port Authority
11 Cleveland-Cuyahoga County Port Authority	41 Port Authority of Springfield, Ohio
12 Clinton County Port Authority	42 Portage County Port Authority
13 Columbiana County Port Authority	43 Put-In-Bay Township Port Authority
14 Columbus-Franklin County Finance Authority	44 Southeastern Ohio Port Authority
15 Columbus Regional Airport Authority	45 Southern Ohio Port Authority
16 Conneaut Port Authority	46 Sandusky County, Seneca County/City of Tiffin Port Authority
17 Coshocton Port Authority	47 Stark County Port Authority
18 Dayton-Montgomery County Port Authority	48 Development Finance Authority of Summit County
19 Delaware County Finance Authority	49 Toledo-Lucas County Port Authority
20 Port Authority of Eastlake Ohio	50 Economic Development and Finance Alliance of Tuscarawas County
21 Erie County Port Authority	51 Van Wert County Port Authority
22 Fairfield County Port Authority	52 Vermilion City Port Authority
23 Fairport Harbor Port Authority	53 Violet Township Port Authority
24 Greater Mentor Port Authority	54 Warren County Port Authority
25 Greene County Port Authority	55 West Central Ohio Port Authority
26 Guernsey County Port Authority	56 Western Reserve Port Authority
27 Heath-Newark-Licking County Port Authority	57 Williams County Port Authority
28 Huron Port Authority	58 Wood County Port Authority
29 Ironton City Port Authority	59 Zanesville-Muskingum County Port Authority
30 Jefferson County Port Authority	

1.5 STATE'S AUTHORITY

ORDC has the authority to grant, loan, or enter into public/private partnership financing per its enabling legislation. Overall, during the past five years, ORDC's budget has averaged $20.7 million annually. Total funding has been relatively stable over the five-year period, varying from a high of $21.2 million in fiscal year 2016 to a low of $20.0 million in 2014. ORDC's grade-crossing safety and roadway project coordination budget has averaged about $15.2 million annually and is funded through the federal Railway-Highway Crossing (Section 130) Program and other federal sources. Available funding for freight programs (both grants and loans) has been about $5.5 million per year in state funds. The value of freight rail grants that ORDC has approved over the past five years has averaged $2.9 million per year. Over the past five years, the annual value of freight rail loans that ORDC has approved has averaged $1.1 million per year. State funding for ORDC does not come from a dedicated revenue source. Rather, funding is appropriated by the Ohio legislature on a biennial budget cycle.

1.6 FREIGHT AND PASSENGER RAIL SERVICES, INITIATIVES AND PLANS

Work on safety improvements and on freight rail is ongoing. For freight projects, during fiscal years 2017 and 2018, ORDC approved $5.9 million in grant funds and lent $790,000 for freight rail projects. Expected outcomes of approved projects follow:

- Jobs created: 950
- Jobs retained: 1,850
- Jobs supported: 7,500
- Total jobs impacted: 10,300
- Private sector investment: $1.2 billion
- Other public-sector investment: $73 million

Safety programs are ongoing as well. ORDC typically receives $15 million in federal funding for crossing safety per year, of which $8 million is from the Railway-Highway Crossing (Section 130) Program and $7 million is allocated from Ohio's Highway Safety Improvement Program. In FY 2018, ORDC administered 58 projects at 67 grade crossings. The improvements included 60 active warning device installation or upgrade projects, two roadway geometry improvements, four grade-crossing eliminations, a statewide preemption planning project, an inventory/database upgrade project and participation in a bridge (railroad under) project.

Local jurisdictions are sponsoring several passenger rail initiatives including pre-environmental work to assess the potential for passenger rail service between Chicago and Pittsburgh by way of Lima and Columbus. The Mid-Ohio Regional Planning Commission (MORPC) and Northeast Ohio Areawide Coordinating Agency (NOACA) are assessing the feasibility of hyperloop technology (sealed tubes in which pods of freight or passengers travel at extremely high speeds with minimal air resistance or friction). MORPC's study is investigating hyperloop service between Chicago, Columbus, and Pittsburgh, while NOACA's study is looking at a hyperloop service between Cleveland and Chicago.

2. Ohio's Existing Rail System

2.1 DESCRIPTION AND INVENTORY

2.1.1 Existing Rail Lines

At 5,188 miles, Ohio's network of active rail lines is the fourth most extensive in the nation, behind that of Texas, Illinois, and California. Most of Ohio's rail network is owned by private freight railroad companies. The following own Ohio's rail network:

- 4,589 miles owned by freight railroads
- 210 miles owned by the State of Ohio
- 282 miles owned by county or municipal governments or port authorities
- 77 miles owned by the federal government
- 30 miles owned by tourist railroads

Nearly all the active rail line segments owned by the state or local governments are operated by freight railroads. In addition to the active rail lines above, the State of Ohio and local governments own several segments of inactive rail line being held for future use, including 15 miles owned by ORDC in Perry and Muskingum Counties, 31 miles owned by Akron Metro Regional Transit Authority in Summit and Stark Counties, and 11 miles owned by a private company in Guernsey County.

Freight railroads are categorized by U.S. Surface Transportation Board (STB) based on revenue thresholds. The thresholds are adjusted each year to account for inflation using 1991 as a base year. Adjusting for inflation, the following are the 2018 thresholds:

- Class I Railroads: annual operating revenue in excess of $447.6 million
- Class II Railroads: annual operating revenue between $35.8 million and $447.6 million
- Class III Railroads: annual operating revenue less than $35.8 million

The Association of American Railroads uses a similar but slightly different definition:

- Class I Railroads: Same threshold as the STB
- Regional Railroads (Class II): Same thresholds as the STB, but the railroad must also operate at least 350 route miles, or the railroad has annual operating revenue between $71.6 million and $447.6 million regardless of mileage
- Local railroads (Class III): Not Class I railroads or Regionals. Local railroads are further divided into local line haul carriers and switching carriers. Switching carriers primarily provide switching (sorting railcars onto and off of industrial tracks)

Three Class I railroads operate rail lines in Ohio: the Canadian National Railway, CSX Transportation, Inc., and Norfolk Southern Corporation. They collectively operate 60 percent of the route miles in Ohio.

Only a single railroad in Ohio meets the Association of American Railroads' definition of regional railroad, the Wheeling & Lake Erie Railway Company, which operates over 392 miles or 8 percent of the trackage in Ohio. A total of 34 local railroads operate in the state. They operate 32 percent of the route miles as shown in Table 2-1. In many cases, railroads in Ohio operate over each other's lines through trackage rights agreements, the miles of which are not included in Table 2-1.

Table 2-1. Miles Operated by Type of Freight Railroad

Type of Railroad	Miles Operated	Percentage of Total
Class I	3,040	60%
Regional	392	8%
Local	1,649	32%
Total	**5,081**	**100%**

Many of the local railroads in the state are owned by short line holding companies. Several of the largest include the following:

- Genesee & Wyoming, Inc. owns 10 local railroads in Ohio, operating over 853 miles or 17 percent of state rail mileage
- R.J. Corman operates 165 miles of rail line in Ohio
- Watco Companies, LLC owns two railroads operating 121 miles
- Indiana Boxcar Corporation owns two railroads that operate 51 miles
- OmniTRAX owns two companies that operate 30 miles

Figure 2-1 displays Ohio's rail network operating company.

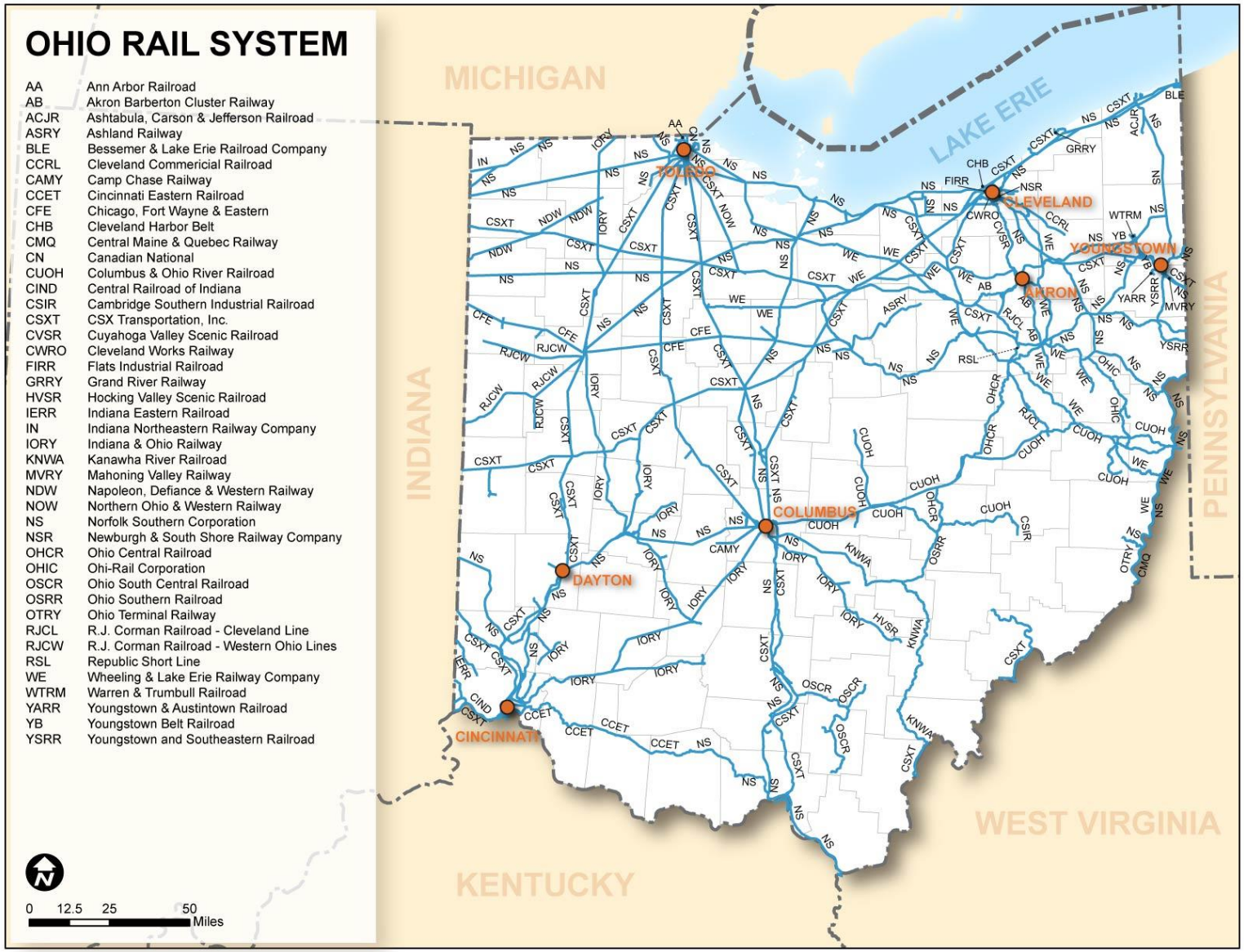
Class I Railroads

As mentioned previously, three Class I railroads operate in Ohio. Class I railroads serve as gateways, connecting Ohio to different parts of the country. Because the average rail move nationwide is over 1,000 miles, most rail moves involve at least one Class I railroad. Canadian National's network within Ohio has the smallest footprint consisting of several miles across the border from Michigan to Toledo, Ohio, and from Pennsylvania to Conneaut, Ohio. As shown in Table 2-2, Norfolk Southern and CSX have a much more sizeable presence in the state, operating 1,632 and 1,404 route miles within Ohio, respectively. In addition to operating rail lines directly, these carriers also lease rail lines to short line and regional railroads. A fourth Class I railroad, Canadian Pacific, has trackage rights that extend 30 miles into Ohio but does not own or lease any rail lines within the state.

Table 2-2. Class I Rail Mileage in Ohio

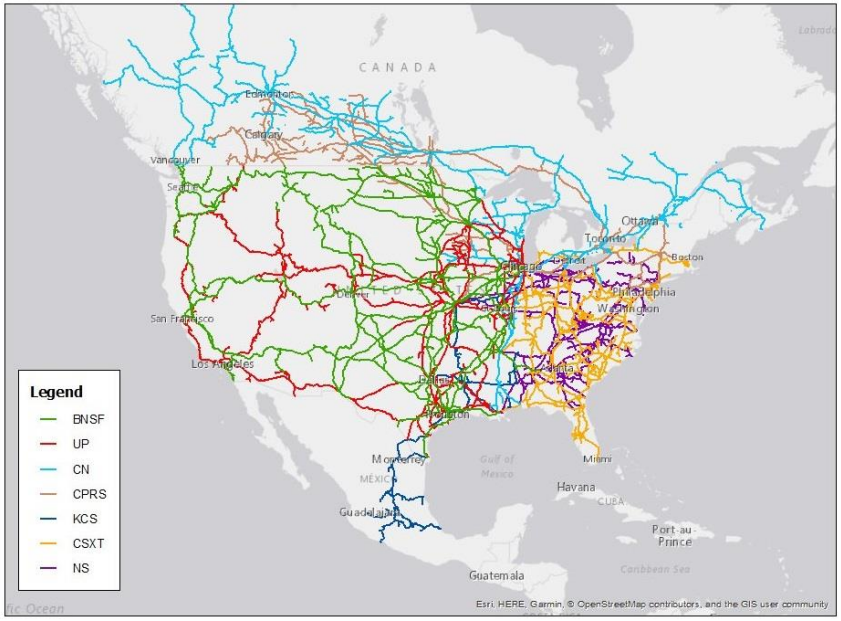
Class I Railroads	Miles Leased	Miles Owned	Miles Owned, Not Operated	Miles Operated	Trackage Rights
Canadian National Railway		4		4	
Canadian Pacific Railway					30
CSX Transportation, Inc.	148	1,256	173	1,404	462
Norfolk Southern Corporation	10	1,622	251	1,632	389
Total	**158**	**2,882**	**424**	**3,040**	**881**

Figure 2-1. Ohio Rail Network by Operator



CSX and Norfolk Southern represent the eastern half of the "big four" Class I railroads. While the Union Pacific Railroad and the BNSF Railway serve the western portion of the United States, CSX and Norfolk Southern serve the eastern United States (Figure 2-2). The remaining Class I railroads—Kansas City Southern, Canadian National, and Canadian Pacific—have smaller networks in the United States and serve specific corridors.

Figure 2-2. North American Class I Railroads



CSX operates in 23 states, employs 20,256 people (as of October 2018), and utilizes 3,921 locomotives, and earned $11.4 billion in operating revenues in 2017. Norfolk Southern Railway operates in 22 states, employs 26,309 people (as of October 2018), utilizes 4,155 locomotives and earned $10.5 billion in operating revenues in 2017. Summaries of Norfolk Southern and CSX rail lines in Ohio can be found in Appendix A to this Rail Plan.

Regional Railroad

The Wheeling & Lake Erie Railway Company operates over 840 miles of track in Ohio, West Virginia, Pennsylvania, and Maryland. The company has connections with three Class I railroads and interchanges with 16 regional and short-line railroads. The railroad moves 140,000 freight carloads per year. A summary of the Wheeling & Lake Erie Railway lines can be found in Appendix A.

Local Railroads

Thirty-four local railroads, or "short lines" operate in Ohio. In many cases, these railroads were created following bankruptcies or as spin offs of larger Class I railroads permitted by rail industry deregulation. Following the Staggers Act of 1980, railroads gained the legal right to shed unprofitable rail lines. Major railroads marketed unproductive branches to short line operators. These railroads were able to provide service on the formerly unprofitable rail lines because they have lower cost structures. Local railroads provide "first mile" and "last mile" connections to railroad customers. They are important for economic development within the state. It is frequently much less costly to locate industrial sites on short lines, rather than build the necessary track infrastructure required by Class I railroads to locate on busy mainlines. Some short lines also can interchange with multiple Class I carriers, providing wider shipping options. Without long-haul freight, local railroads must focus on local service to survive and grow, so they often maintain a relatively strong focus on customers, large and small. Table 2-3 provides mileage by local railroad in Ohio. Appendix A includes more detailed information on these railroads.

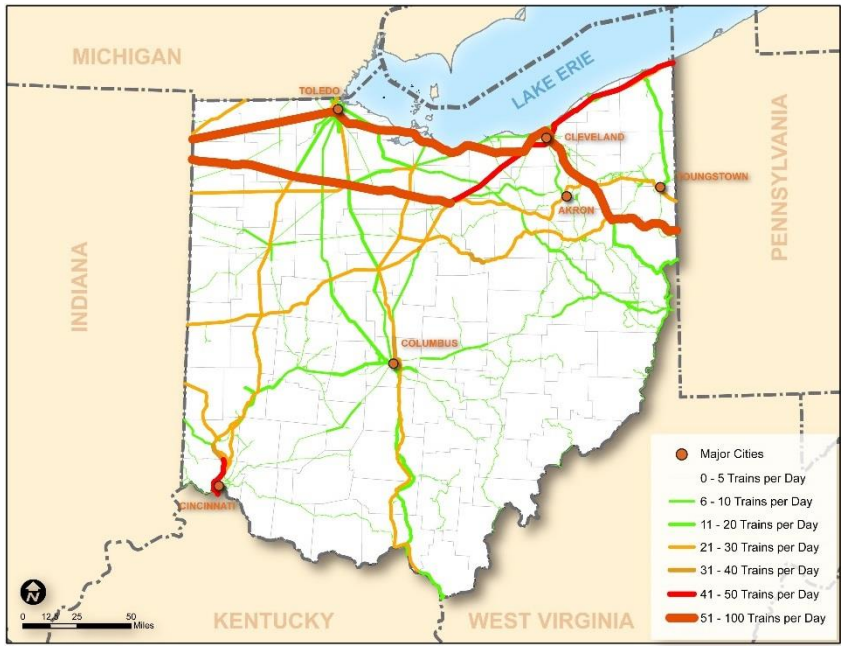
Table 2-3. Local Railroad Mileage in Ohio

Abbreviation	Railroad Name	Mileage
AA	Ann Arbor Railroad	5
AB	Akron Barberton Cluster Railway	43
ACJR	Ashtabula, Carson & Jefferson Railroad	6
ASRY	Ashland Railway	65
CCRL	Cleveland Commercial Railroad	33
CAMY	Camp Chase Railway	19
CCET	Cincinnati Eastern Railroad	69
CFE	Chicago, Fort Wayne & Eastern	123
CHB	Cleveland Harbor Belt	2
CUOH	Columbus & Ohio River Railroad	218
CIND	Central Railroad of Indiana	21
CWRO	Cleveland Works Railway	10
FIRR	Flats Industrial Railroad	3
GRRY	Grand River Railway	3
IERR	Indiana Eastern Railroad	14
IN	Indiana Northeastern Railway Company	11
IORY	Indiana & Ohio Railway	324
KNWA	Kanawha River Railroad	116
MVRY	Mahoning Valley Railway	6
NDW	Napoleon, Defiance & Western Railway	49
NOW	Northern Ohio & Western Railroad	25
NSR	Newburgh & South Shore Railway Company	5
OHCR	Ohio Central Railroad	74
OHIC	Ohio-Rail Corporation	44
OSCR	Ohio South Central Railroad	64
OSRR	Ohio Southern Railroad	48
OTRY/CMQ	Ohio Terminal Rwy. / Central Maine & Quebec Rwy. (different RRs operating over same track)	13
RJCL/RJCW	R.J. Corman Railroad	165
RSL	Republic Short Line	1
WTRM	Warren & Trumbull Railroad	4
YARR	Youngstown & Austintown Railroad	5
YB	Youngstown Belt Railroad	31
YSRR	Youngstown and Southeastern Railroad	32
	Total	**1,649**

Use of Ohio Rail Lines

Railroads in Ohio adjust the capacity of rail lines to match their use and traffic levels across their systems. Rail lines with very high use are built and maintained to accommodate that level of traffic, whereas rail lines with less traffic are not as heavily built or maintained. Figure 2-3 displays trains per day on rail lines in Ohio. Both CSX and Norfolk Southern have their highest-density east-west lines in the northern part of the state, with other significant north-south corridors linking to other parts of their systems south of Ohio.

Figure 2-3. Trains per Day of Ohio Rail Lines



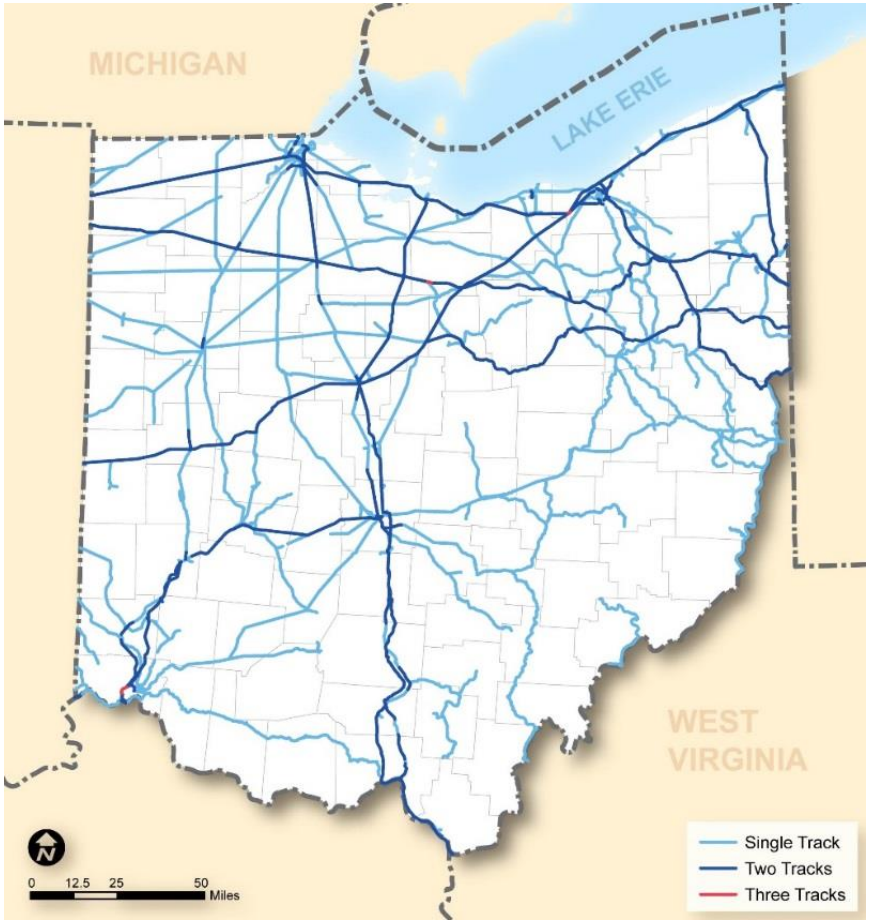
Source: WSP Analysis of PUCO Crossing Database, input from ORDC Staff

Capacity of Ohio Rail Lines

A number of factors influence the amount of traffic that rail lines can accommodate:

- **Number of tracks.** Most rail lines in Ohio consist of only a single track, with trains passing each other using passing sidings. However, high-density rail lines have two tracks, and for short segments, three or four tracks. Figure 2-4 displays the number of tracks of rail lines in Ohio.

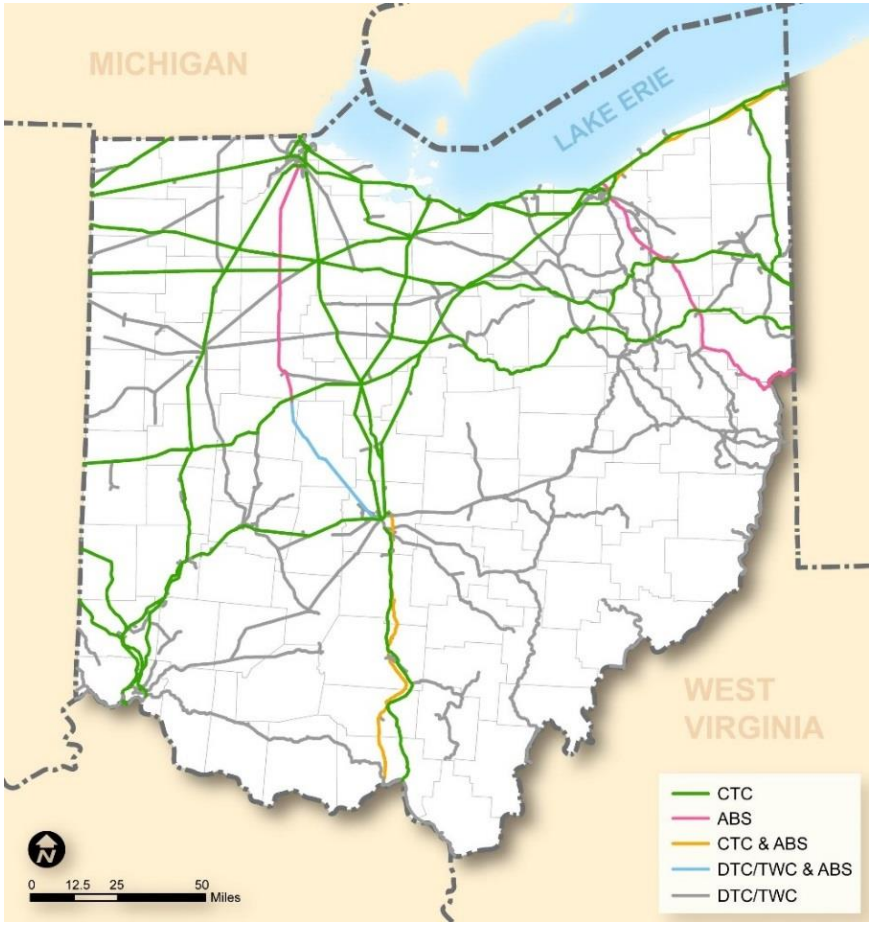
Figure 2-4. Number of Tracks of Rail Lines in Ohio



Sources: 2010 Rail Plan, Survey of Railroads

- **Dispatch control system.** The highest-density rail lines are dispatched using centralized traffic control (CTC) whereby electric circuits in the tracks monitor the locations of trains. Railroad dispatchers at remote locations can manage train movements, controlling both signals and switches. For medium-density rail lines, the Automatic Block Signaling (ABS) system uses electronic circuits to monitor train locations. Signals indicate when sections of track or "blocks" are occupied by a train ahead. Unlike CTC, ABS cannot be controlled by a remote dispatcher. Rail lines without lineside signal systems are considered "dark" territory, and do not have electronic control systems. On these lines, train crews must obtain permission or warrants by radio, phone, or electronic transmission from a dispatcher before entering a section of track. Figure 2-5 displays the signaling system used by rail lines in Ohio. The most commonly used systems in dark territory are Track Warrant Control (TWC) and Direct Traffic Control (DTC).

Figure 2-5. Signaling System of Rail Lines in Ohio



Source: Survey of Railroads

- **Speed of trains.** The FRA has established track classifications that dictate the maximum allowable speed of tracks. Classifications are assigned based on roadbed, track geometry, track structure, maintenance, and inspection. The following FRA track classes are used in freight operations:
  - *Excepted Track*. This track is usually considered to be in a poor state of repair. Only freight trains are permitted to operate on excepted track, no passenger trains. Maximum speed is 10 mph, and rail lines' ability to handle hazardous materials is limited. Track owners designate track as excepted from federal requirements but in return adopt the restrictions that this entails. Federal regulations specify the exception process.
  - *Class 1 Track*. 10 mph for freight, and 15 mph for passenger trains
  - *Class 2 Track*. 25 mph for freight, and 30 mph for passenger
  - *Class 3 Track*. 40 mph for freight, and 60 mph for passenger
  - *Class 4 Track and above*. At least 60 mph for freight and 80 mph for passenger

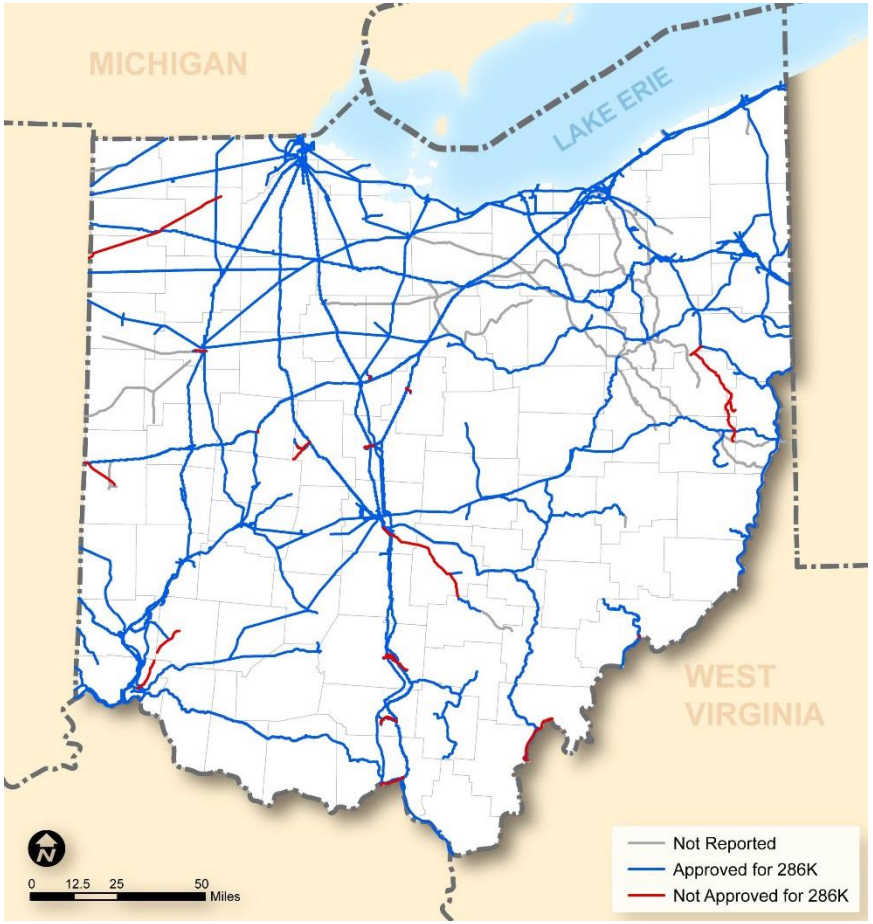
FRA track classification of Ohio rail lines is detailed in Appendix A.

It is important to note that other factors limit the volume of freight that railroads can carry beyond rail line capacity. These include yard capacity (acreage, number of tracks, storage slots), crew capacity (available train crews, yard crews, maintenance crews), and equipment capacity (locomotives, railcars, containers/trailers). Furthermore, other factors influence rail line capacity beyond those listed above, including the topography, the mix of trains, the size and spacing of passing sidings for single-track segments, and crossovers for double-track segments.

Limitations of Rail Lines in Ohio

Rail line capacity relates not only to the number of trains per day that rail lines can accommodate, but also the parameters of railcars that can use those lines. In the late 1990s, the Class I rail industry established an industry standard that rail lines should be able to accommodate railcars of up to 286,000 pounds gross weight. Unfortunately, not all rail lines in Ohio can accommodate the industry standard railcars but can accommodate lighter railcars, typically with a maximum weight of 263,000 pounds. Figure 2-6 characterizes rail lines in Ohio by their ability to accommodate 286,000-pound railcars.

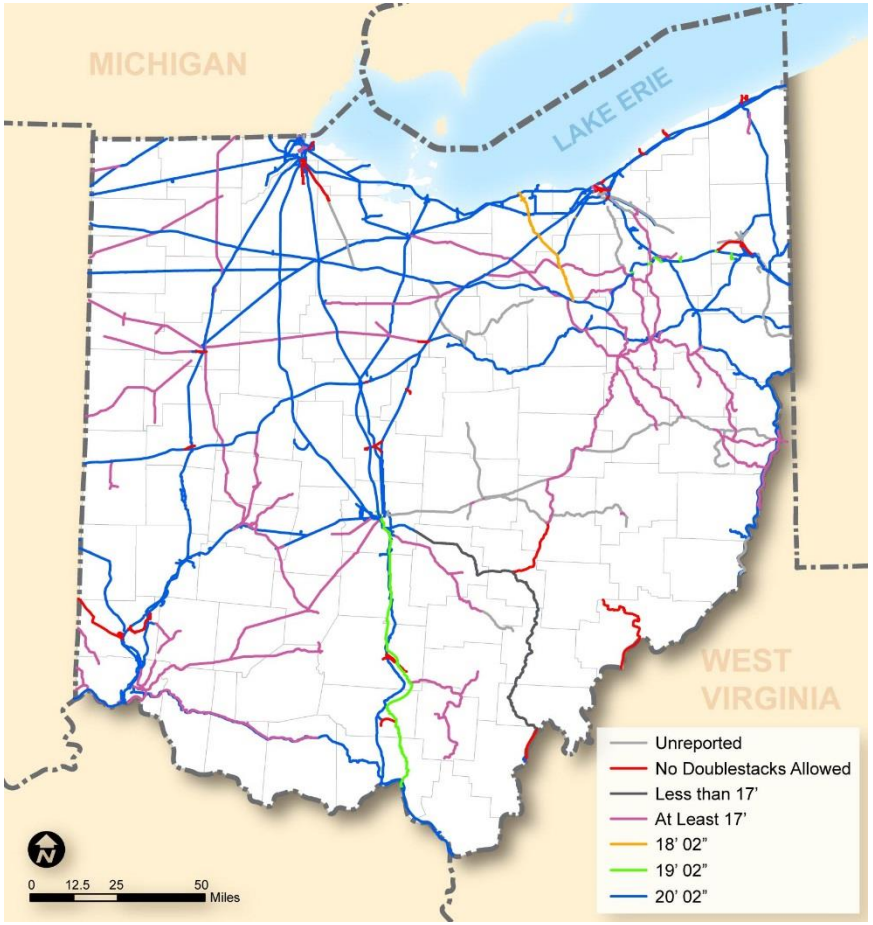
Figure 2-6. Ability of Ohio Rail Lines to Accommodate 286,000-Pound Railcars



Source: Survey of Railroads

When Ohio rail lines were constructed, most rail equipment was no taller than 15.5 feet above the rails. Now, hi-cube boxcars are 17 feet above the rails, while certain double-stack intermodal cars and multilevel automotive flat cars are 20 feet 2 inches above the rails. Figure 2-7 displays rail lines in Ohio by their ability to accommodate high-clearance railcars. The data underlying the map is based on questionnaires to railroads operating in the state. Regional and local railroads were asked only whether their lines can accommodate 17 feet or higher railcars and thereby accommodate hi-cube boxcars. Questionnaires to Class I railroads focused on whether they could accommodate low-cube double-stack railcars (18 feet 2 inches), mixed double-stack railcars (19 feet 2 inches), or hi-cube double-stack cars (20 feet 2 inches).

Figure 2-7. Height Restrictions of Ohio Rail Lines



Source: Survey of Railroads

Strategic Rail Corridor Network Lines in Ohio

To ensure the nation's rail network can support defense emergencies, the U.S. Department of Defense designated the Strategic Rail Corridor Network (STRACNET), which consists of 38,800 miles of rail lines important to national defense, serving 193 military installations whose mission requires rail service. The STRACNET connects installations to predominantly maritime ports of embarkation. Mainlines and connectors must be able to support the movement of heavy and/or oversized equipment for movement within the United States or to ports for ocean transport in support of missions abroad. Several STRACNET lines and connectors are located in Ohio (Figure 2-8).

Figure 2-8. Strategic Rail Corridor Network in Ohio

Source: National Transportation Atlas Database

Abandoned, Inactive, and Railbanked Lines in Ohio

As with other states, the rail network in Ohio was once much more extensive in route mileage than it is today. U.S. rail mileage peaked between 1910 and 1920, although the U.S. rail network carries as much or more tonnage now than it ever did. According to the Ohio History Connection, total Ohio rail mileage in 1910 was over 9,500 compared to 5,188 miles today. When rail lines cease to be active, several alternatives are possible:

- **Inactive status.** A railroad may file with the STB to place the rail line on inactive status. In this case, the rail line is still part of the rail network but no longer served by regular freight service. Since the STB filings listed in the 2010 *Ohio Statewide Rail Plan* (the most recent on the list had an effective date of 6/29/2008), railroads in Ohio have received permission from the STB to place 12.9 miles on inactive status, including 5.4 miles in Henry County, 1.8 miles in Lucas County, and 5.7 miles in Hamilton County.
- **Abandonment.** Under an abandonment, a railroad gains permission from the STB to discontinue service and sell a rail line. Unless a buyer purchases the right-of-way in its entirety, the rail line's right-of-way ceases to exist. Selling a right-of-way in its entirety for non-railroad purposes is difficult because portions of the right-of-way often operate over easements. In this case, because the railroad never owned the land over which it operated and because rail line easements are contingent on continued rail service, portions of the right-of-way revert to adjacent property owners after abandonment.
- **Railbanking/Interim Trail Use.** Railbanking was established in 1983 under the National Trails System Act. Under agreements between railroad companies and trail agencies, the latter use out-of-service rail corridors as recreational trails until a railroad might need the corridor again. Railbanked lines use the same easements as active rail lines. Railbanking occurs during the abandonment process after the railroad files its notification of intent to abandon a rail line but before the effective date of the abandonment. While theoretically railbanked lines could be placed back into rail service, doing so can be a challenge once a recreational trail has been established on a railroad right-of-way or once noncompatible land uses have developed adjacent to the railbanked corridor.

The 2010 *Ohio Statewide Rail Plan* lists abandonments that had occurred over the previous 10-year period, with the effective date of the first abandonment being October 27, 1999, and the last abandonment being July 29, 2008. Between that time and August 2018, 22 miles have been abandoned or railbanked in Ohio (Table 2-4). Other proposed abandonments are in process. For example, CSX filed to abandon 13.9 miles in Trumbull County near Newton Falls. A Notice of Interim Trail Use was filed. The effective date of the interim trail use is expected to be early 2019. Norfolk Southern filed to abandon 5.5 miles in Aurora in Portage County in 2017. As of late 2018 the STB requires additional environmental analysis before the abandonment can be consummated.

Table 2-4. Abandonments/Interim Trail Use (July 2008 – August 2018)

Railroad	Effective Date	Description	STB Docket No.	Abandonment/ Interim Trail Use
Norfolk Southern	9/7/2016	Abandoned 4.1 miles between CT 3.7 and CT 7.8 in Hamilton County	AB-290 (Sub-No. 381X)	Abandonment
CSX	4/15/2016	Abandoned 2.07 miles between BEK 2.24 and BEK 4.31 in Cincinnati, Hamilton County	AB-55 (Sub-No. 754X)	Abandonment
Norfolk Southern	1/11/2016	Abandoned 1.0 mile between XK 299.3 and XK 300.3 in Toledo, Lucas County	AB-290 (Sub-No. 337X)	Abandonment
Norfolk Southern	1/11/2016	Abandoned 2.82 miles between TW 0.00 and TW 2.82	AB-290 (Sub-No. 290X)	Abandonment
CSX	11/1/2011	Sold 1.58 miles between CO 12.73 and CO 14.31 near Gould in Lucas County	AB-55 (Sub-No. 471X)	Interim Trail Use
CSX	11/1/2011	Sold 4.15 miles between CTT 5.0 in Temperance and CTT 9.15 in Vulcan, Lucas County	AB-55 (Sub-No. 696X)	Interim Trail Use
CSX	11/1/2011	Sold 0.28 mile between CO 14.31 and CO 14.59 and 1.79 miles between CO 14.59 and CO 16.38 in Toledo, Lucas County	AB-55 (Sub-No. 501X)	Interim Trail Use
CSX	9/1/2011	Abandoned 0.21 mile between QTA 24.95 and QTA 25.16 in Kenton, Hardin County	AB-55 (Sub-No. 707X)	Abandonment
ABCR	3/9/2009	Abandoned 4.14 miles in Summit County	AB-494	Abandonment

2.1.2 Existing Multimodal Freight Rail Network

Business supply chains, especially large ones, often do not rely on a single mode of transportation for product delivery. Rather, shippers benefit from the advantages of using multiple transportation modes for a single shipment. For example, rail transportation can be a cost-effective mode for shipping large quantities of products over long distances. Meanwhile, trucking offers flexibility, where shippers can use motor carrier service at almost any location served by a road. By connecting the two modes at a transload facility (non-containerized traffic) or intermodal terminal (containers and trailers), shippers benefit from both the flexibility of trucking and the lower cost and/or higher capacity of rail. Multimodal options are available to companies in Ohio. Some facilities are dedicated to specific commodities, while others are more general:

- **Intermodal terminals.** In rail parlance, "intermodal" generally refers to unitized cargo in containers or trailers. With 12 intermodal facilities in the state, Ohio has the third highest number of intermodal terminals in the country behind Illinois and Texas. Ohio's intermodal terminals are listed in Table 2-5, shown in Figure 2-9, and are described in more detail in Appendix A.

Table 2-5. List of Intermodal Terminals in Ohio

Number	Terminal
1	NW Ohio Intermodal Terminal
2	Collinwood
3	Buckeye Yard
4	Queensgate
5	Marion Intermodal Center
6	Marysville
7	Rickenbacker
8	Maple Heights
9	Gest Street
10	Sharonville Intermodal Terminal
11	Toledo Airline Junction Intermodal Terminal
12	Central Ohio Intermodal Center

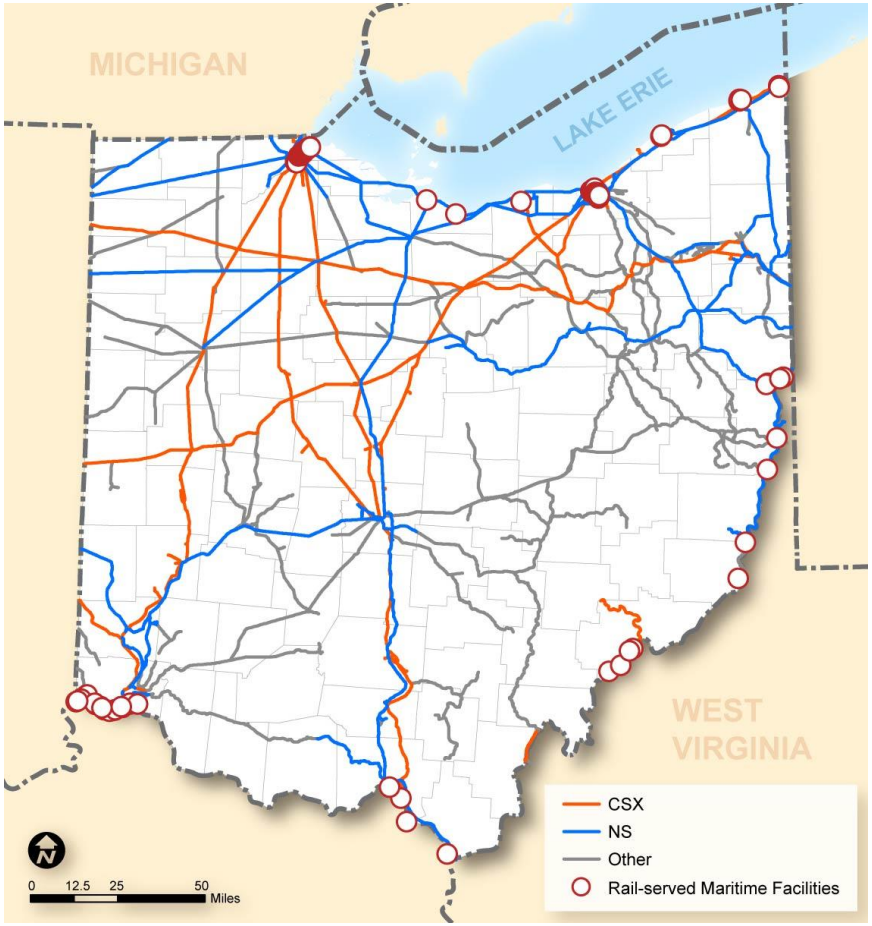
Source: Rail Carrier Websites

Figure 2-9. Intermodal Terminals in Ohio

Source: Rail Carrier Websites

- **Maritime facilities.** Rail serves a number of port facilities on Lake Erie and the Ohio River. In some cases, product is moved by both rail and water. For example, iron ore and coke move by combined rail/marine transportation to Ohio steel mills. In other cases, rail and water transportation are not necessarily used together. Rather, they complement each other, providing port tenants with multiple transportation options. Rail-served marine facilities are shown in Figure 2-10. Ohio's rail-served maritime facilities are particularly clustered in Toledo, Cleveland, and Cincinnati. These facilities are further detailed in Appendix A.

Figure 2-10. Marine Facilities Served by Ohio Rail



Source: Ohio Maritime Study, WSP Analysis

- **Transload facilities.** The term "transload" within the rail industry refers to a broad range of facilities that are not used as intermodal container/trailer transfer terminals but are used to transfer freight between truck and rail. The most common classifications follow:
  - Bulk transload, which includes the handling of dry bulk commodities such as plastic pellets, sand, gravel; or wet bulk commodities, such as chemical or petroleum products
  - Dimensional loads, which include the handling of lumber, panel, structural steel, plastic or steel pipe and rail
  - Warehouse with railcar spots for transferring paper, consumer goods, food, beverages
  - Team tracks sidings where goods can be moved directly between trucks and railcars.

  A review of railroad websites and a questionnaire submitted for this Rail Plan to railroads has identified 104 transload facilities. It is likely that additional transload facilities operated by third parties are also located in the state. Transload facilities are profiled in Appendix A.
- **Automotive ramps.** Because of the automotive assembly plants located in Ohio, automotive ramps in the state are primarily used for loading rather than unloading finished vehicles. These are profiled in Appendix A. The automotive industry uses rail-to-ship automobiles to/from import/export locations as well as for domestic distribution.
- **Grain elevators.** Although rail-served grain elevators could be termed "transload facilities," they are generally categorized separately. Unit loading facilities load entire trainloads of grain whereas smaller facilities or "country elevators" load small numbers of railcars at a time.

2.1.3 Passenger Rail Services in Ohio

Intercity passenger rail service in Ohio is provided by Amtrak, which began operations in 1971. While established as a for-profit corporation, Amtrak has required federal grants and loans to sustain operations since its inception. Congress and the U.S. Department of Transportation oversee Amtrak's stewardship of federal funds through grant agreements and appropriations provisions. Amtrak also receives support for short-distance (under 750 miles) corridor routes through funding from individual states or groups of states. No short-distance corridors in Ohio currently require state funding.

In Ohio, Amtrak trains operate over rail lines owned and operated by private freight railroads. The Rail Passenger Service Act of 1970, which established Amtrak, provides Amtrak with rights on host railroads with "preference over freight transportation in using a rail line, junction, or crossing." In practice, rail volumes and differences in dispatch among the host railroads impact Amtrak train performance.

As discussed in Section 1.3, three intercity passenger rail routes serve Ohio:

- Lake Shore Limited (Chicago-Cleveland-Buffalo-New York/Boston)
- Capitol Limited (Chicago- Cleveland-Pittsburgh-Washington)
- Cardinal (Chicago-Indianapolis-Cincinnati-Washington, DC/New York)

To expand Amtrak's service offerings beyond markets served directly by Amtrak train stations, Amtrak has coordinated Thruway Bus Service connecting routes, which are buses operated by Greyhound Lines whose

schedules facilitate connections with Amtrak trains. Thruway Bus Service in Ohio includes the following:

- Amtrak's Capitol Limited service at **Toledo** station connects to bus service to Detroit and Lansing
- The **Cincinnati** station is served by a daily bus that connects to Chicago via Indianapolis.

Daily buses connect Columbus and the Dayton area to Amtrak's Capitol Limited service at Pittsburgh.

Passenger Rail Stations

Ohio's seven intercity passenger rail stations are each different. Some comprise platforms with simple shelters, while others comprise large buildings with ticket offices and baggage facilities. Only three of the stations are staffed—Toledo, Cincinnati, and Cleveland. Descriptions of each station are provided in Table 2-6.

Under the Americans with Disabilities Act (ADA) of 1990, Amtrak is required to have all stations under its responsibility readily accessible and usable by individuals with disabilities, including those in wheelchairs. Facilities include station structures, platforms, and parking lots. Ohio's seven stations are accessible and have accessible parking. However, only the Toledo and Cincinnati stations are listed on Amtrak schedules as being fully accessible (i.e., "no barriers between station and train"), because of raised platforms, which are at the same height as the floor of the rail cars.

Table 2-6. Intercity Passenger Rail Stations in Ohio

Features	Bryan	Toledo	Sandusky	Elyria
Owner	Amtrak (facility); City of Bryan and Amtrak (parking lot); Norfolk Southern Railway (platform and tracks)	Toledo-Lucas County Transit Authority	City of Sandusky (facility and parking lot); Norfolk Southern Railway (platform and tracks)	Amtrak (facility); Norfolk Southern Railway (parking lot, platform and tracks)
Address	Paige and Lynn Street Bryan, OH 43506	415 Emerald Avenue Martin Luther King, Jr. Plaza Toledo, OH 43604	1200 North Depot Street at Shelby Street Sandusky, OH 44870	410 East River Street Elyria, OH 44035
Served by	Lake Shore Limited	Lake Shore Limited Capitol Limited	Lake Shore Limited Capitol Limited	Lake Shore Limited Capitol Limited
Service Frequency	Lake Shore Limited: twice per day	Lake Shore Ltd: twice per day Capitol Ltd: twice per day	Lake Shore Ltd: twice per day Capitol Ltd: twice per day	Lake Shore Ltd: twice per day Capitol Ltd: twice per day
Station Location	Rural (small town)	Urban	Urban	Urban
Shelter	Utilitarian one-story concrete and glass enclosure	Martin Luther King Jr. Plaza, a multi-story building built in 1950	Station building	Utilitarian open glass and steel shelter
Americans with Disabilities Act	Station wheelchair accessible, not all station facilities accessible	Fully wheelchair accessible	Station wheelchair accessible, not all station facilities accessible	Station wheelchair accessible, not all station facilities accessible
Depot Hours	Open during train stops: Daily, 1:30-2:30 AM Daily, 6:30-8:00 AM	Ticketing/baggage open: Midnight-1:30 PM, and 10:30 PM-Midnight Station building open to the public additional hours.	N/A	Not applicable (station is unstaffed; shelter has no doors)
Baggage service	Unstaffed; no baggage service	Checked baggage service	Unstaffed; no baggage service	Unstaffed; no baggage service
Restrooms	No restrooms	Accessible restrooms	Accessible restrooms	No restrooms
Ticketing	No ticketing	Ticketing	No ticketing	No ticketing
Shared Uses	No shared use	Intercity bus, restaurant, transit buses, offices.	Local transit buses stop on premises; transit offices in the building.	No shared use
Parking	Dedicated short- and long-term parking is available at the station	Dedicated short- and long-term parking is available at the station	Dedicated short- and long-term parking is available at the station	Dedicated short- and long-term parking is available at the station
Transit Connections*	N/A	Local bus services	Sandusky Transit System transit bus service at the station	Local bus services: 1/4 mile from Lorain County Transit Route 51 (EMH Medical Center stop); half-mile from Route 52.

Sources: Amtrak, Great American Stations website, Wikipedia site for Sandusky Station, downloaded in February and March 2018

* Note that while local transit may reach some stations, in most cases transit service is not available during the times that Amtrak trains are in the stations.

Table 2-6. Intercity Passenger Rail Stations in Ohio (continued)

Features	Cleveland	Alliance	Cincinnati
Owner	City of Cleveland (facility and parking lot); Norfolk Southern Railway (platform and tracks)	Pennsylvania Lines, LLC (facility and parking lot); Norfolk Southern Railway (platform and tracks)	City of Cincinnati (facility and parking lot); CSXT (platform and tracks)
Address	200 Cleveland Memorial Shoreway Cleveland, OH 44114	820 East Main Street Alliance, OH 44601	1301 Western Avenue Cincinnati, OH 45203
Served by	Lake Shore Limited & Capitol Limited	Capitol Limited	Cardinal
Service Frequency	Lake Shore Ltd: twice per day Capitol Ltd: twice per day	Capitol Limited: Twice per day	Cardinal: twice per day, three days per week
Station Location	Urban	Urban	Urban
Shelter	Station Building	Enclosed waiting area	Large historic station building
American with Disabilities Act	Station wheelchair accessible, not all station facilities accessible	Station wheelchair accessible, not all station facilities accessible	Fully wheelchair accessible (via wheelchair lift)
Depot Hours	Fridays, Midnight-2:30 AM; All other days, Midnight-7:00 AM	N/A	Waiting area hours: Monday, Midnight-6:30 AM Tuesday, 11:00 PM-Midnight All other days: Midnight-6:30 AM and 11:00 PM-Midnight The station building is open to the public additional hours.**
Baggage service	Checked baggage service	No baggage service	Checked baggage service
Restrooms	Accessible restrooms	No restrooms	Accessible restrooms
Ticketing	Ticketing	No ticketing	Ticketing
Shared Uses	No shared use	No shared use	Museum & restaurants
Parking	No short-term parking. Long-term parking available.	Dedicated short- and long-term parking is available at the station	Dedicated short- and long-term parking is available at the station
Transit Connections*	Located ¼ mile from Waterfront Line (light-rail transit) station; Waterfront Line stops at Amtrak station on request. Transit bus service nearby.	Local bus transit service (Amtrak station is a half-mile from the Phyllis Byers Alliance Transit Center)	Transit bus stops at station

Sources: Amtrak and Great American Stations website, downloaded in February and March 2018

* Note that while local transit may reach some stations, in most cases transit service is not available during the times that Amtrak trains are in the stations.

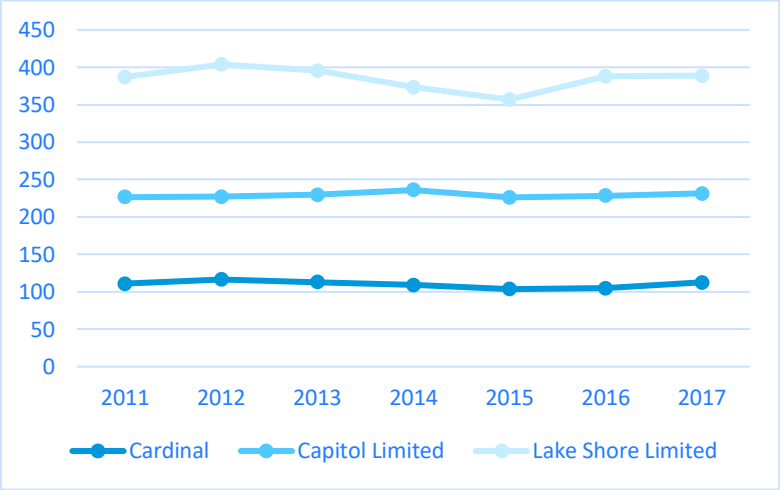
** Cincinnati Union Terminal is undergoing restoration work; expected to be completed in 2018. Amtrak service is still available, other building uses are closed.

Passenger Rail Ridership and Performance

Intercity Passenger Rail Ridership and Performance

As shown in Figure 2-11, national ridership trends on each of the three long-distance lines that serve Ohio have been relatively flat.

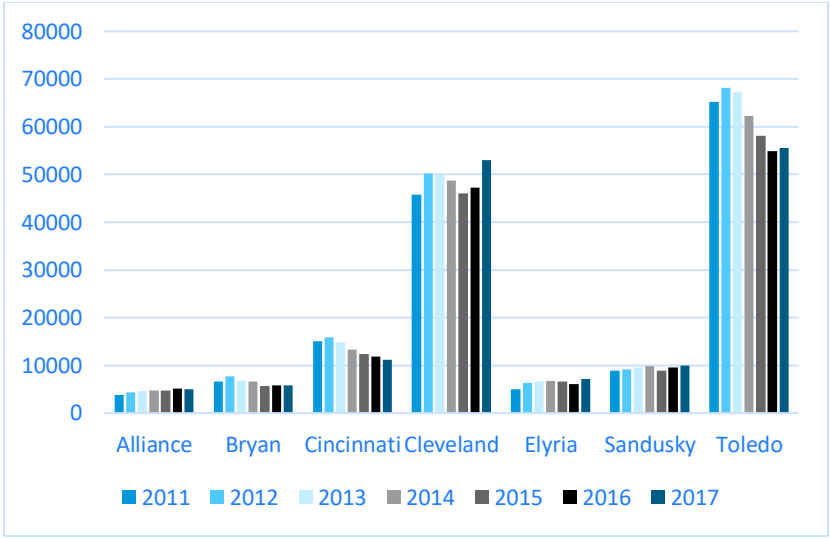
Figure 2-11. National Ridership Trends on the Three Routes Serving Ohio



Source: Rail Passengers Association

Ridership trends by individual station are provided in Figure 2-12, which shows the number of riders that boarded or got off trains at the seven Ohio intercity stations. Toledo is Ohio's busiest station, followed by Cleveland. In addition to Ohio-based ridership, 278,081 riders passed through Ohio in 2017 (boarding and alighting outside the state).[1] According to Amtrak, its services carried 26,535,992 passenger-miles in Ohio in federal fiscal year 2016 (the 12 months ended September 30, 2016).[2] Riders passing through Toledo and Cincinnati stations have declined since 2011, while Cleveland saw an uptick in 2017, as did Elyria and Sandusky.

Figure 2-12. Annual Boardings and Alightings at Ohio Amtrak Stations



Source: Rail Passengers Association

Section 207 of PRIIA requires that Amtrak and the FRA jointly develop route-specific performance measures and associated targets in order to provide Amtrak and government agencies with an indication of where improvements are required. Not all metrics are specific to Amtrak routes, and not all information is available, but the most recently available performance metrics that are both applicable to Amtrak routes and available are shown in Table 2-7. Areas where standards were not met are in red.

[1] National Association of Rail Passengers *Fact Sheet: Amtrak in Ohio* for 2017.

[2] Amtrak's Contributions to Ohio factsheet for 2016.

Table 2-7. PRIIA Section 207 Amtrak Performance Metrics for Quarter Ending September 2017

	Performance Metric	PRIIA Standard	Cardinal	Capitol Limited	Lakeshore Limited
Financial	Change in percentage of fully allocated operating cost covered by passenger revenue (last 8 quarters)	Increase from prior	Prior: 33%, Current: 33%, Change: 0%	Prior: 43%, Current: 44%, Change: 1%	Prior: 40%, Current: 43%, Change: 3%
	Passenger-miles per train-mile (last 8 quarters)	Increase from Prior	Prior: 119, Current: 110, Change: 0	Prior: 184, Current: 183, Change: -1	Prior: 199, Current: 203, Change: 4
On-Time Performance	Change in effective speed from FY 2008 baseline (mph)	>=0	1..2	0.3	-1
	Endpoint on-time performance	80%	40.5%	44.6%	39.4%
	All-station on-time performance	80%	41.8%	41.0%	38.7%
	Host-railroad delay minutes per 10,000 train-miles	900	1,309 (BBrRR), 1,507 (CSX), 1,541 (NS)	1,044 (CSX), 1,932 (NS)	1,251 (CSX), 3,679 (MBTA), |1,578 (MNRR), 2,151 (NS)
	Amtrak responsible delay minutes per 10,000 train-miles	325	488	354	447
Customer Service Index	Overall Service	82	64	76	67
	Amtrak Personnel	80	74	85	77
	Information Given	80	62	66	58
	On-Board Comfort	80	51	68	52
	On-Board Cleanliness	80	71	75	68
	On-Board Food Service	80	54	67	56

Source: *Metrics and Standards for Intercity Passenger Rail Service* PRIIA Section 207 Website (https://www.fra.dot.gov/eLib/Details/L02875)

As shown, most of the financial metrics were met. Most of the on-time performance were not met, nor were most of the customer satisfaction metrics.

Financial Performance

Two metrics are used to track financial performance. One reflects the percentage of fully allocated operating costs covered by passenger-related revenue. This statistic reflects the extent to which Amtrak routes pay for themselves. The performance standard is year-over-year improvement. For the period reviewed, the performance of the Cardinal stayed constant, but the Capitol Limited and the Lakeshore Limited improved.

The other financial metric is passenger-miles per train-mile. This reflects the load factor of Amtrak trains (i.e. how many people are on a train at any given time). The standard is also year-over-year improvement. If load factors improve, routes are considered to have met the standard. The Cardinal and the Lakeshore Limited met the standard, but the Capitol Limited did not.

Service—On-Time Performance

Three measures of on-time performance are tracked:

- **Change in effective speed from FY 2008 baseline:** This metric indicates how passenger train speeds have changed over the last six years, in miles per hour. The Cardinal and the Lakeshore Limited met the standard, but the Capitol Limited did not.
- **Endpoint on-time performance:** This metric indicates the percentage of on-time arrivals at endpoints of each route, where "on-time" is defined as within 15 minutes from the schedule, depending on the length of the route. No routes met the standard.
- **Station on-time performance:** This metric indicates the percentage of on-time arrivals at all stations, where "on-time" is defined as less 15 minutes. No routes met this standard.

Service—Train Delays

Another way to measure how well the train service meets the expectations of customers is to measure delay. Train delay is reported by cause and responsibility, based on delay minutes per 10,000 train-miles. This metric is calculated for the following two operational segments and causes:

- **Host-responsible delays by host railroad:** This metric measures the amount of delay per train travel that occurred on each host railroad, caused by the host railroad. Every host-railroad-caused delays above the standard.
- **Amtrak responsible delays:** This metric measures the amount of delay per train travel that can be attributed to Amtrak. The standard for this metric was set at 325 minutes. For each route, the standard was not met.

Customer Service

The final set of performance measures relate to customer satisfaction as measured in surveys. Customers were asked whether they were "very satisfied" with five different service characteristics. In most cases, these standards were not met.

Excursion/Tourist Railroads

Ohio is home to a number of tourist railroads. Passengers ride these trains not for transportation but rather for the experience of riding the train. Some tourist trains operate over the tracks of other railroads, while others operate over rail lines that they own. Tourist railroads are not always "railroads" per the strict definition of the STB, in that they do not always connect to the broader rail network and in most cases, they do not provide "common carrier" freight service upon customer request.

However, tourist railroads can play an important role in the local economy. They provide an attraction that supports the state's tourist industry. Tourist railroad passengers support local economies and spend money in these areas.

Tourist railroads also support rail corridor preservation. Because they often rely on volunteers, and their revenues are not freight-dependent, these operations can maintain and continue rail operations on rail lines that would not otherwise be viable. The tourist railroads in Ohio are listed below:

- **Cuyahoga Valley Scenic Railroad** operates over 51 miles between Independence and Akron through the Cuyahoga Valley National Park. The National Park Service owns the rail and right-of-way within the national park.
- The **Dennison Depot** sponsors seasonal excursions on the Columbus and Ohio River Railroad out of Dennison.
- **Hocking Valley Scenic Railway** is non-profit, volunteer-operated and operates over 12 miles of track dedicated to the tourist operation.
- The **Lebanon, Mason & Monroe Railroad** operates over 16 miles between Lebanon and Mason and Monroe. Each segment (Lebanon – Hageman Junction, Hageman Junction – Mason, Hageman Junction – Monroe) is also used by the Indiana & Ohio Railway for freight operations. The segment between Lebanon and Hageman Junction is owned by the City of Lebanon, while the Indiana & Ohio Railway owns the other two segments. Most excursion trips are between Lebanon and Hageman Junction.
- The **Lorain & West Virginia Railway** is owned and operated by the Lake Shore Railway Association, a non-profit that acquired

7.8 miles of this formerly abandoned line in 1991. Operations began in 1993 on six miles of rehabilitated line.

- **Zanesville & Western Scenic Railroad** is a non-profit organization that leases 15 miles of track in Perry County from the State of Ohio. Currently, the organization operates excursion trains over a mile of restored track.

2.1.4 Public Funding and Financing

The funding and financing of rail service depends on the type of service and the type of railroad providing the service. Historically, rail service was provided by private companies which funded and financed all operating expenses and capital costs. Currently, freight railroads pay for all operating expenses and most of their capital expenses through their own revenues. For Class I railroads, public funding or financing helps to support capital projects only under specific circumstances, where the public sector seeks to provide an incentive for railroads to provide or improve services beyond what would have otherwise been possible. Class II and Class III railroads, by contrast, have more limited resources to invest in their systems and rely more heavily on public funding and financing for capital investments. For example, the nation's largest Class II/III holding company, Genesee & Wyoming, Inc., indicated in its 2016 annual report to shareholders that the company expects that about 24 percent of North American subsidiary railroads' capital budgets would be publicly funded in 2017.[3]

The public sector also supports projects that help shippers and port authorities improve their access to the rail network, as well as projects that improve safety. Similar to projects where railroads are beneficiaries, the public benefits of these projects must exceed public investment.

Amtrak services in Ohio are funded in part by passenger ticket revenues. However, these services are also supported by federal appropriations, assisting with both operating and relevant capital expenditures.

Rail-related public assistance is provided in two forms: grant assistance and financing assistance, which includes loans and loan guarantees. These are discussed in separate sections below.

State Funding/Financing

ORDC's funding is intended to promote economic development opportunities through effective rail service and to mitigate grade-crossing safety concerns that arise. As mentioned in Section 1.5, Ohio makes state funding available for freight rail projects through the ORDC. The average ORDC grant is about $180,000, while loans are between $200,000 and $750,000.

State spending on freight rail projects leverages private and other investments in Ohio. For example, during fiscal years 2017 and 2018, ORDC approved $5.9 million in grant funds and lent $790,000 for freight rail projects. Expected outcomes of approved projects follow:

- Jobs created: 950
- Jobs retained: 1,850
- Jobs supported: 7,500

[3] http://ir.gwrr.com/sites/genesee.investorhq.businesswire.com/files/doc_library/file/Bookmarked_FINAL_2016_Annual_Report_text_pages_and_10K.PDF

- Total jobs impacted: 10,300
- Private-sector investment: $1.2 billion
- Other public-sector investment: $73 million

In fiscal years 2018 and 2019, $2 million per year in state funding is available for freight grants. This amount is a significant decrease from the $3.5 million available in fiscal year 2015 and is partially funded with expenditures from the Rail Development Fund. The Rail Development Fund's primary purpose is to serve as a revolving loan fund and to support the ORDC's operating expenses, so it cannot serve as a sustainable long-term source of grant funding.

To place Ohio's rail funding into context, it is useful to consider how neighboring states fund rail. Several neighboring states have established freight rail programs. Pennsylvania's Freight Rail Assistance Program awarded $32 million for 27 freight rail projects in 2017. The Indiana Industrial Rail Service Fund provides about $2.7 million in grant funding per year. In FY 2017, Michigan approved $3.2 million in funding through its Freight Economic Development Program, as well as $2.6 million in loans through its Michigan Rail Loan Assistance Program. No priority is given to state-owned rail lines in ORDC's freight rail program. Some neighboring states dedicate funds to capital maintenance of state-owned rail lines. Michigan invests $1 million in its state-owned rail lines per year. West Virginia invested $1.9 million to support its state-owned rail assets in fiscal year 2017. Ohio does not fund state-supported passenger rail as do some neighboring states. Indiana provide $3 million per year to support the Hoosier State service; Michigan, $18.7 million to support the Blue Water, Pere Marquette, and Wolverine in 2017; Pennsylvania, $14 million to support the Keystone and Pennsylvanian service.

While not specific to rail, JobsOhio programs offer an array of business tax incentives, corporate tax credits, and economic development programs for companies creating new jobs and investment in Ohio. Rail components of projects receiving JobsOhio assistance can be eligible for funding as well.

Local Funding/Financing

Various municipalities and local governmental entities have supported rail transportation in a number of ways. Several local governments own rail lines. For example, Champaign, Clark, and Fayette Counties formed the West Central Ohio Port Authority to preserve and provide continued service on 94 miles of railroad track in these three counties, as well as in Madison County. The City of Lebanon owns a section of track that is used for freight by the Indiana & Ohio Railway and by the Lebanon, Mason, & Monroe Railroad for passenger excursions. Within Ohio, multimodal transfer facilities are sometimes owned by municipalities, such as Toledo-Lucas County Port Authority, which is owned by the City of Toledo and Lucas County. Local governments frequently provide development incentives to attract jobs and investment. They also provide matching funds for state and federal grants.

Federal Grant Funding Sources

With the exception of Railway-Highway Crossing (Section 130) Program funds and other federal safety programs, there is no continuous federal funding program allocated to states for rail projects. However, rail is eligible for some federal competitive grant programs and highway freight funding programs. Below is a list of programs and projects Ohio has utilized for rail infrastructure projects.

Railway-Highway Crossing (Section 130) Program

The ORDC administers Ohio's federal aid Railway-Highway Crossing (Section 130) Program, which is authorized by United States Code Title 23, Section 130. The goal of this fund, commonly referred to as Section 130, is to reduce the crash risk at public rail/highway grade crossings.

ORDC spent $15.1 million in Section 130 and other safety funds in FY 2016, which it used for 73 grade crossing projects. The approved 2016-2019 Statewide Transportation Improvement Program assumes an average of $16 million annually for this program.

Better Utilizing Investments in Leveraging Development (BUILD)

The U.S. Department of Transportation's BUILD (formerly Transportation Investment Generating Economic Recovery [TIGER]) program has emerged as an important source of federal funding for rail projects. BUILD is a highly competitive grant program that provides funding for road, rail, transit, bike/ pedestrian, and port projects that support economic competitiveness, state of good repair, quality of life, sustainability, and safety. The 2017 TIGER solicitation was funded at $500 million. In 2018, the amount made available has been increased to $1.5 billion. Since the program started in 2009 to 2017, approximately 21 percent of TIGER funding went to freight rail projects.

Past projects have ranged in size and scope from under $10 million for rural shortline rehabilitation projects to $100 million to address freight rail congestion in the Chicago area. In Ohio, two rail-related projects have been funded by TIGER grants since the program began in 2009:

- 2009 – $98 million to create double-stack capacity along CSXT's MD-WV-PA-OH National Gateway rail corridor
- 2012 – $16.1 million for the Pickaway East-West Connector Road improving the connection between the Rickenbacker intermodal facility to US23, including two rail grade separations

Demand for TIGER funding exceeds available funds, with an average of only 7 percent of applications being awarded each year.

Fixing America's Surface Transportation Act (FAST Act)

The most recent transportation authorization bill, the 2015 FAST Act, included several new rail programs.

- **National Highway Freight Program (FAST Act section 1116; 23 USC 167) –** Up to 10 percent of a state's apportionment of the National Highway Freight Program can be spent on rail, port, and intermodal projects. This program is otherwise focused on highway projects and is funded at $1.1 to $1.5 billion annually for FY 2016 - FY 2020. In Ohio, $1.0 million per fiscal year has been allocated to fund freight rail projects.
- **Infrastructure for Rebuilding America (INFRA) Grant Program –** INFRA is a grant program established by the FAST Act to provide funding for Nationally Significant Freight and Highway Projects. INFRA is a competitive grant program similar to TIGER, but is focused specifically on freight: highway, rail and intermodal projects of regional or national significance.

  Funding for INFRA (formerly FASTLANE) was authorized under the FAST Act for $4.5 billion FY 2016 - 2020. A minimum 40 percent

match is required, some of which may be met with other federal funds (up to a maximum of 80 percent federal funds).

As with TIGER/BUILD, INFRA is oversubscribed, with 212 applications requesting a total of $9.8 billion in the first year of the program (FY 2016), during which 18 grantees received $768 million in awards.[4] Approximately 40 percent was for rail-related projects. Within Ohio, a $5.7 million grant was received for the Evans Avenue railroad grade separation in Akron in FY 2017, and in FY 2018, a $16.3 million grant was received to improve 30 miles of rail line along the Ohio River in Jefferson and Belmont Counties.

- **Other FAST ACT Competitive Grant Programs –** The FAST Act authorized $2.2 billion over five years (FY 2016-2020) for several new FRA competitive grant programs. The Consolidated Rail Infrastructure Safety & Improvements (CRISI) program is intended to fund projects that improve the safety, efficiency, and/or reliability of intercity passenger and freight rail systems and was funded at $68 million in FY 2017 and $318 million in FY 2018. In addition, $204 million in FY 2017 and $48 million in FY 2018 was made available for projects to deploy positive train control (PTC) technology. The Federal-State Partnership for State of Good Repair Grant Program is intended to repair, replace, or rehabilitate rail assets to improve intercity passenger rail and is funded at $272 million for FY 2017 and FY 2018.

Railroad Safety Infrastructure Improvement Grant

In FY2016, Congress appropriated $25 million for the Rail Safety Infrastructure Improvements Grant program to improve the safety of rail infrastructure. A total of 23 projects received awards, including $600,000 to rehabilitate the Ohio South Central Railroad's 9.3-mile-long "Hamden to Red Diamond" line in Vinton County.

Economic Development Administration (EDA) Grants

The U.S. EDA grant and loan assistance programs to support local organizations with economic development, focusing on economically distressed communities.[5] Two of these EDA grant programs provide funding for rail-related technical assistance, planning, and infrastructure.

In 2012, the EDA awarded about $3 million to construct a rail spur and switches to connect the Point Industrial Park in Lawrence County to the Norfolk Southern Heartland Corridor.

Federal Highway Administration's Congestion Mitigation and Air Quality (CMAQ)

The CMAQ program provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide or particulate matter (nonattainment areas), and for former nonattainment areas that are now in compliance (so-called "maintenance" areas). Currently, 39 Ohio counties[6] are nonattainment or maintenance areas and are eligible to receive CMAQ funding for projects that reduce vehicular emissions.

The FAST Act apportioned $2.3 billion–$2.5 billion per year for this program from FY 2016 through FY 2020. Examples of CMAQ-funded

[4] http://transportation.house.gov/uploadedfiles/fastlane_project_awards_7.1.pdf

[5] For additional detail, see the EDA website: https://www.eda.gov/programs/eda-programs/

[6] Table of counties and pollutants: https://www3.epa.gov/airquality/greenbook/anayo_oh.html

freight rail projects include intermodal facilities, diesel engine retrofits, idle-reduction projects in rail yards, and rail track rehabilitation. Since 2009, ORDC has administered nearly $17 million in CMAQ grants, leveraging over $5 million of private investment in air quality improvement in Ohio. These projects include 138 alternate power source units, 12 locomotive replacements or repowers, 1 material handler replacement, and 2 infrastructure improvements.

2.1.5 Federal Financing Programs

Federal credit assistance can be in the form of loan guarantees, or could be direct loans with favorable terms, including low-interest rates, long payback periods, and/or payment schedules that don't begin until after construction is completed. These financing alternatives can help to bridge the gap between projects costs and project-related revenues, with minimal impact on public budgets.

Railroad Rehabilitation and Improvement Financing (RRIF)

The FRA's RRIF program provides direct loans and loan guarantees to finance development of railroad infrastructure. The program is capitalized up to $35 billion, with $7 billion reserved for projects benefiting non-Class I railroads. Currently this program is undersubscribed, with only $5.4 billion in outstanding loans. Of these, $3.1 billion of loans are to Amtrak, another $1.5 billion of loans is for transit and other local government agencies, while most of the remaining loans have been to Class II and III railroads. A long approval period (averaging 9 months just to approve the application as complete[7]) and the costs of applying have been identified as reasons for the program's underutilization.

RRIF was re-authorized under the FAST Act in December 2015, which expanded RRIF to expand the scope of eligible projects, shorten review times, and provide more transparency in the process.

Transportation Infrastructure Finance and Innovation Act (TIFIA)

TIFIA is a broad-based credit program, providing federal credit assistance via secured loans, loan guarantees, and lines of credit to a wide range of surface transportation projects, including highway, transit, intercity passenger rail, some types of freight rail, intermodal freight transfer facilities, and port terminals.

TIFIA leverages federal dollars by facilitating private participation in transportation projects and encouraging innovative financing mechanisms that help advance projects more quickly. The FAST Act continues this program, with funding of $275 million to $300 million per year through 2020.

[7] https://www.oig.dot.gov/sites/default/files/RRIF%20final.pdf; see also http://usa.streetsblog.org/2011/02/18/in-age-of-s%C2%ADpending-cuts-why-are-billions-of-federal-rail-dollars-going-unused/

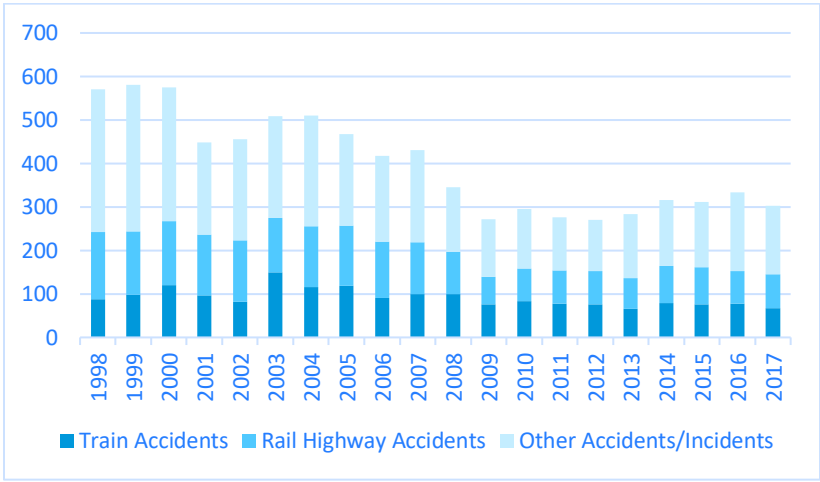
2.1.6 *Safety Improvements*

Safety Trends

The safety of Ohio's rail network has generally improved over the past two decades. Figure 2-13 displays FRA reported accidents/incidents associated with rail over the past 20 years. These are defined as follows:

- Train accidents are collisions, derailments of trains or other equipment that cause damage to railroad equipment, track or structures. These declined from an average of 106 per year between 1998 and 2007 to an average of 78 per year between 2008 and 2017.
- Highway/rail accidents are collisions where trains hit or are struck by cars, bicycles, or pedestrians at highway/rail grade crossings. The frequency of these accidents decreased from 138 per year between 1998 and 2007 to 78 per year between 2008 and 2017.
- Other accidents/incidents do not fit into the first two categories. Railroad employees are required to report any work-related injuries or sickness, which are categorized as "other accidents/incidents." Situations where trespassers, railroad employees or contractors are struck by trains also fall into the "other" category. The other accidents/incidents declined from an average of 252 occurrences per year between 1998 and 2007 to 144 per year between 2008 and 2017.

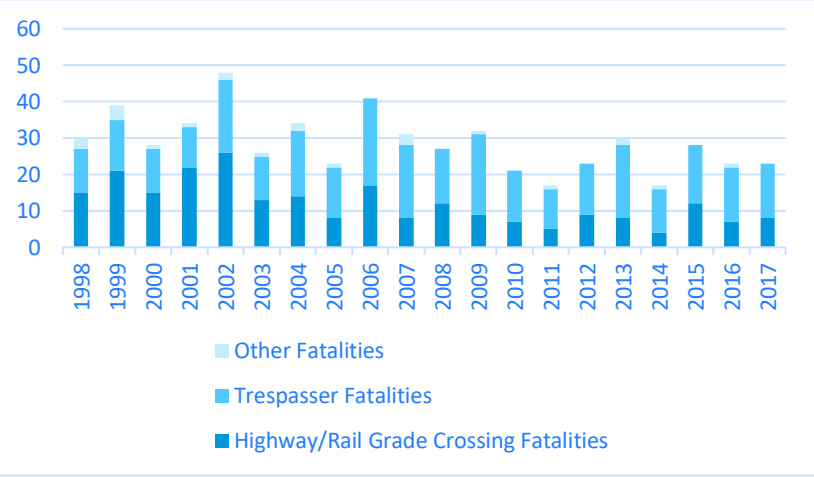
Figure 2-13. Rail-Related Accidents and Incidents in Ohio (20-Year Trend)



Source: FRA Safety Database

Most fatalities associated with Ohio's rail network were the result of either a collision at a highway/rail grade crossing or a trespasser on railroad right-of-way struck by a train. As shown in Figure 2-14, fatalities at grade crossings have generally declined over the past 20 years, but trespasser fatalities have not.

Figure 2-14. Rail-Related Fatalities in Ohio (20-Year Trend)



Source: FRA Safety Database

Geography of Ohio's Rail Safety Risks

Risks associated with trespassing incidents tend to be greatest in areas with high population density and busy rail corridors. The counties with the most trespasser fatalities or injuries over the past 20 years were Franklin (Columbus), Butler (north of Cincinnati), Cuyahoga (Cleveland), and Hamilton (Cincinnati). Risks associated with rail/highway grade crossings relate generally to the number of crossings and traffic volumes on those crossings in terms of trains and vehicles, but other parameters influence risk, and the counties with the most high-volume crossings are not necessarily the counties with the highest frequency of crashes. Butler, Wood (south of Toledo), Seneca, Lucas (Toledo), Lorain (west of Cleveland) are the counties with the most highway/rail grade-crossing crashes over the past 20 years.

Ohio Highway/Rail Grade Crossings

As of 2018, there were 5,737 at-grade vehicular public crossings of which 58 percent have lights and gates, 32 percent have passive systems such as crossbucks, and 10 percent have flashing lights.

Ohio has experienced some variation in crash numbers in the last five years. There were eight grade-crossing fatalities in 2017, up from six in 2016. A source of frustration is the number of crashes that occur at crossings with active warning devices. Six of the fatalities in 2017 were at crossings equipped with lights and gates and most crashes (82 percent) occurred at crossings with active devices. ORDC addresses this trend by expanding its formula program to include crossings that are already equipped with lights and gates. Nine projects were programmed under this new initiative in FY 2018.

Efforts to Improve Safety

When discussing efforts to improve rail safety, organizations often refer to the three "E"s.

- **Education.** The vast majority of rail-related fatalities are avoidable and are the result of risky behavior. Motorists ignore warning devices at highway/rail grade crossings or individuals trespass on railroad property. Education aims to change behavior by informing the public about the risks of railroad track and highway/rail grade crossings.
- **Enforcement.** Laws that govern rail safety are in place to keep people safe at designated crossing areas and away from private railroad property. Other laws and regulations ensure that railroad equipment, procedures, infrastructure and maintenance practices are safe. Enforcement ensures that laws and regulations are being followed.
- **Engineering.** Engineering is the designing and building of physical infrastructure improvements that reduce hazards.

Education

Ohio Operation Lifesaver (OHOL) is a free public service education program dedicated to preventing and reducing fatalities and injuries at highway/rail grade crossings and along railroad rights-of-way. OHOL provides rail safety presentations and makes safety information available throughout the state. ORDC and PUCO both sit on the OHOL Board and have active Operation Lifesaver Authorized Volunteers on staff. ORDC and PUCO collaboration and assistance varies based on OHOL needs. In addition to OHOL, some railroads sponsor safety education events and training programs in schools and communities.

Enforcement

Some railroads maintain their own police departments of certified state law enforcement officers that have primary jurisdiction over crimes committed against the railroad, including trespassing on railroad rights-of-way. Local law enforcement agencies also enforce laws against trespassing and illegal behavior at highway/rail grade crossings.

PUCO is the state's rail regulatory agency and employs 14 railroad inspectors who monitor grade crossings, inspect railroad tracks and equipment, investigate all grade crossing incidents, and administer Ohio's grade crossing database. Ohio inspectors are certified by the FRA through the State Safety Participation Program and annually conduct over 5,700 grade-crossing inspections. In addition to their standard inspection work, these individuals also respond to the concerns of the public such as complaints concerning rough crossings, drainage, bridge debris, and overgrown weeds and vegetation that can obstruct sight at railroad crossings as well as investigate crashes/derailments and assist in the review and approval of grade crossing upgrades and improvements. Beyond highway/rail grade crossings, PUCO inspectors conduct the following periodic federal inspections to ensure compliance with state and/or federal safety standards:

- Handling of hazardous material
- Condition and maintenance of railroad cars and locomotives
- Operating practices including train/engine employee hours of service, certification, training, and qualifications
- Working condition of highway/rail crossing warning systems
- Condition and maintenance of railroad tracks

Engineering

Much of the State of Ohio's efforts to improve safety are in the area of infrastructure improvements at highway/rail grade crossings. These efforts have contributed to the improvements shown in Figure 2-13 and Figure 2-14.

ORDC typically receives $15 million in federal funding per year for grade-crossing safety, of which $8 million is from the Railway-Highway Crossing (Section 130) Program and $7 million is allocated from Ohio's Highway Safety Improvement Program. In FY 2018, ORDC administered 58 projects at 67 grade crossings. The improvements included 60 active warning device installation or upgrade projects, two roadway geometry improvements, four grade-crossing eliminations, a statewide preemption planning project, an inventory/database upgrade project, and participation in a bridge (railroad under) project.

ORDC has four major warning device programs based on type of project and method of project identification:

- The **Formula-Based Upgrade Program** is based on a calculation of the most hazardous crossings that is generated periodically, usually twice per year, by the PUCO. Fifteen projects were advanced in this program in FY 2018. Crossings included in this program had previously been ungated crossings.

  In FY 2017, ORDC expanded the formula program to include crossings with lights and gates that still rank extremely high in the hazard ranking. Nine projects were selected under the expanded scope in FY 2018.

- The **Corridor-Based Upgrade Program** provides a framework systematically considering, identifying, and prioritizing projects that have public safety benefits at multiple grade crossings along a railroad corridor. Sixteen projects were advanced in this program in FY 2018.

- The **Constituent-Identified Upgrade Program** considers project referrals from sources including county grade-crossing task forces, county engineers, local government, Ohio Department of Transportation districts, railroads, advocacy groups, members of the public and makes selections based on hazard rankings, extenuating conditions, and funding availability. Fifteen projects were advanced in this program in FY 2018.

- The **Preemption Program** upgrades warning devices and traffic signals to establish appropriate traffic signal preemption when a train approaches a crossing that has a traffic signal in close proximity. These upgrades improve safety by reducing the potential for a vehicle driver to be trapped on the tracks by queuing traffic when a train is approaching the crossing. Two new projects and the statewide preemption planning project were advanced under this program in FY 2018.

PUCO administers $1.2 million per year of the state-funded **Grade Crossing Protection Fund**. For crossings not selected for federal funding, the fund allows local communities to share the cost of installing safety devices with the state and the railroad. Communities using this fund are required to pay 25 to 65 percent of the cost of the project, while railroads are required to pay 10 percent plus ongoing maintenance. Communities submit applications for state funding, and funding is allocated based on a formula measuring the seriousness of the hazard plus other special conditions at the crossing.

The PUCO also administers the **Supplemental Assistance Program,** which is used to fund passive warning device improvements such as rumble strips, illumination, improved signage, and vegetation cutbacks at crossings that do not currently have active warning devices. Up to $5,000 is available per project.

Ohio's **Consolidation Program** seeks to close redundant crossings, consistent with the FRA's 1991 goal to close 25 percent of highway/rail grade crossings. When a local community agrees to permanently close a grade crossing, in exchange the state works to secure federal, state, and railroad funds to implement safety improvements along the same corridor such as lights and gates, upgraded crossing surfaces, signage and illuminations or financial contributions to grade separations. Potential closure projects are identified by a variety of sources, and once identified teams evaluate the project and negotiate the level of participation for the local highway authority and railroad.

2.1.7 Rail's Economic and Environmental Impacts

Freight Rail Economic Impacts

The rail industry in Ohio plays a critical role supporting the state's economy. The analysis in this section relies on 2015 data by the United States Bureau of Economic Analysis (BEA), and uses the following measures of economic impact:

- **Employment** represents the number of full- and part-time jobs.
- **Earnings** include wage and salary disbursements to employees, supplements to wages and salaries, and owners' income.
- **Value Added/Gross Domestic Product (GDP)** includes employee compensation; taxes on production and imports, minus subsidies; and gross operating surplus. It is the difference between the total output/sales and the intermediate inputs required to produce the output.

Freight railroads employ over 7,000 people in Ohio resulting in annual earnings of $850 million. The rail transportation industry generates $1.6 billion in GDP within Ohio.[8]

In addition to the direct impact of the rail transportation industry, the industry has ripple effects throughout the economy due to its spending on supplier industries (known as indirect effects), and via the spending of income earned by employees of the rail industry and its suppliers on household goods and services (known as induced effects). These indirect and induced effects contribute an additional $510 million in GDP and over 16,500 jobs to Ohio's economy. Total direct, indirect, and induced effects associated with the rail transportation industry are summarized in Table 2-8. Indirect and induced effects are calculated using the BEA's Regional Input-Output Modeling System (RIMS II) multipliers.

Table 2-8. Economic Contribution of Rail Transportation Industry

Economic Indicator	Direct	Indirect	Induced	Total
Employment	7,372	5,842	10,730	23,944
Earnings ($M)	$853	$114	$379	$1,346
GDP ($M)	$1,600	$510	$722	$2,832

Source: WSP analysis of Bureau of Economic Analysis data

Rail's importance to Ohio is not due just to the employment and spending of railroads and railroad employees within the state, but also because many

[8] Bureau of Economic Analysis, 2015

Ohio industries depend on rail to serve their customers. Rail transportation's contribution to customer industries' component of the Ohio GDP is $2.6 billion – almost 60 percent higher than the rail industry's direct GDP. Approximately 24,000 employees of other industries can be attributed to railroads' presence in Ohio, resulting in employee earnings of $1.6 billion. If rail service were not available, rail users could switch to other modes of transportation, but these other modes could be costlier. Without sufficient rail access, companies could also choose to relocate to other locations.

Table 2-9 summarizes rail's economic contributions via rail transportation users, and the total contribution of the industry including both rail users and the rail industry itself.

Table 2-9. Economic Contributions of Rail in Ohio

Economic Indicator	Rail Transportation Users	Rail Transportation Industry	Total Contribution
Employment	23,666	23,944	47,610
Earnings ($B)	$1.6	$1.3	$2.9
GDP ($B)	$2.6	$2.8	$5.4

Source: WSP analysis of Bureau of Economic Analysis data

National input-output tables from the BEA are used to derive the amount of rail transportation used by each industry per dollar of each industry's intermediate output. These ratios are then multiplied by Ohio's GDP per industry to calculate the portion of each industry's GDP that can be attributed to the rail industry.

For each industry, ratios of GDP to employment and to earnings are generated using 2015 BEA data on employment, earnings, and GDP by industry in Ohio. These ratios are then applied to the rail-dependent portion of each industry's GDP to calculate the rail-dependent employment and earnings.

Some industries have a particularly high reliance on rail; Table 2-10 shows the nine rail user industries with the highest portion of GDP attributable to the rail transportation industry.

Table 2-10. Top 10 Rail-Dependent Industry Sectors

Industry	Percentage of GDP Attributable to Rail	Value of GDP Attributable to Rail ($M)
Primary metals	8.24%	$166
Non-metallic mineral products	5.23%	$121
Paper products	4.24%	$42
Mining, except oil and gas	3.30%	$72
Wood products	2.76%	$9
Food and beverage and tobacco products	2.25%	$114
Truck transportation	2.24%	$133
Plastics and rubber products	2.20%	$69
Farms	1.79%	$32

Source: WSP analysis of Bureau of Economic Analysis data

Freight Rail Environmental Impacts

Freight rail provides an alternative to truck transportation. As such rail reduces highway maintenance and congestion, and generally produces fewer negative externalities than trucking. One useful exercise to assess the benefits of rail transportation is to consider a scenario whereby rail service deteriorated to such an extent that all traffic that could shift to trucks did shift to truck. Some commodities moving certain distances would be unlikely to ever be transported by truck because the cost of trucking would be excessive. An analysis was performed on the same data that appears in Table 1-2 but the analysis specifically examined rail's modal share relative to trucking instead of rail's share of all modes as in the case

of Table 1-2. It is assumed that if rail's modal share of combined truck and rail tonnage is over 80 percent, this traffic is not truck-competitive. The following meet this criteria:

- Coal over 100 miles
- Grain over 500 miles
- Metallic ore all distances shipped
- Petroleum products over 1,000 miles

The remaining rail traffic that travels to, from, or within Ohio is considered to be truck-competitive. If rail service deteriorates dramatically, trucking would provide a reasonable alternative. The FAF-4 database estimates total ton-miles associated with truck-competitive rail traffic to, from, and within Ohio to be 32.9 billion. This includes mileage both in Ohio and outside of the state. Assuming an average truck payload of 20.7 tons,[9] this corresponds to 1.6 billion truck vehicle-miles travelled (VMT) avoided per year. Railroad routes between two locations are usually more circuitous than highway routes used by trucks. Accounting for the more direct path that trucks travel, the avoided VMT due to rail service is estimated to be 1.3 billion.[10]

Table 2-11 summarizes the annual nationwide fuel consumption, emissions, safety, congestion, and avoided pavement damage benefits of Ohio shippers using rail instead of trucks.

Table 2-11. Benefits to the U.S. of Ohio Shippers and Receivers Using Rail

Benefit Category	Highway Parameter	Rail Parameter	Net Benefit of Using Rail
Reduced Fuel Consumption 1/	147 ton-miles per/gallon	479 ton-miles/gallon	119 million gallons
Reduced Emissions 2/			
CO_2	22 lbs per gallon	22 lbs per gallon	1,191,784 metric tons
NOx	8.098 grams/VMT	114.0 grams/gallon	2,986 metric tons
PM10	0.309 grams/VMT	2.90 grams/gallon	214 metric tons
VOC	0.877 grams/VMT	4.84 grams/gallon	839 metric tons
Reduced Frequency of Crashes 3/			
Fatalities	1.13/billion ton-miles	0.359/billion ton-miles	19 fatalities
Injuries	22.1/billion ton-miles	4.54/billion ton-miles	462 injuries
Property Damage Only (PDO)	77.1/billion ton-miles	1.24/billion ton-miles	2,091 PDO accidents
Reduced Highway Damage and Congestion 4/			
Pavement Damage	$0.15/VMT	N/A	197,402,671 ($2015)
Congestion	$0.05/VMT	N/A	$66,780,335 ($2015)

Source: 1/ For trucking: U.S. Energy Information Administration (EIA) 2018 Annual Energy Outlook; for rail: Association of American Railroads; 2017 fuel consumption values both rail and truck.
2/ CO_2 emission rate from the EIA. For rail: emissions rates from U.S. EPA; for trucking: emissions rates from WSP analysis of EPA MOVES model; 2017 emission rates both rail and truck.
3/ For rail: crash rates from 2015 FRA data; for truck: crash rates from Federal Motor Carrier Safety Administration Large Truck and Bus Crash Facts 2013.
4/ Highway damage and congestion from Federal Highway Administration Addendum to the 1997 Federal Highway Cost Allocation Study, indexed for inflation. Assumes 90 percent rural miles 10 percent urban, 60 percent 80-kip trucks, 40 percent 60-kip trucks.

The emissions savings include reductions in CO_2 which contributes to global warming and several additional pollutants that can harm human health and property. Particulate matter (PM10) can harm lungs and cause

[9] U.S. Federal Highway Administration, *Quick Response Freight Manual II*, September 2007, Table 4.20.

[10] WSP analysis of FAF-3

atmospheric haze. Nitrous Oxides (NOx) contribute to respiratory ailments and acid rain. Volatile organic compounds (VOCs) are harmful to human health as well.

Passenger Rail Impacts

Passenger rail provides economic impacts and benefits to Ohio as well, albeit on a smaller scale due to the lower number of passenger trains serving Ohio. According to Amtrak, the company employed 48 Ohio residents and paid $3.8 million to Amtrak employees living in Ohio during FY 2017 (ended September 2017).[11] In FY 2016, Amtrak purchased over $24 million in goods and services from Ohio's economy.[12] Intercity passenger rail is less fuel-intensive than highway transportation. The U.S. Department of Energy's *Transportation Energy Data Book, Edition 36* estimates that in 2015 the average British thermal units (Btu) per passenger-mile of Amtrak trains was 1,663 compared to the average Btu per passenger-mile of 3,034 for passenger cars. With less fuel consumption, passenger rail generates fewer greenhouse gases.

Community Impacts

Rail transportation benefits Ohio communities by supporting local economies, promoting trade linkages between those communities and the nation and the world. Rail also removes vehicles from roadways. However, in some areas there is a need to remove conflicts between railroad operations and other land uses.

Some stakeholders consulted for this Rail Plan raised concerns over highway/rail grade crossings blocked for extended periods of time. Other municipalities would like to redevelop sections of town as residential developments but the horns of trains approaching highway/rail grade crossings make such redevelopment difficult. It is important that freight rail be considered in zoning and planning decisions, and that potential conflicts be anticipated in advance.[13] An example would be a crossing where a grade separation was never contemplated. However, the crossing becomes progressively more problematic as roadway traffic grows and the crossing is occupied during peak times.

In some communities, low-clearance underpasses below rail lines cause trucks to be stuck and hinder economic development on that corridor. The underpasses in many cases were built decades ago, and while they might have met the community's needs when built, they no longer do so. To expand the vertical and/or horizontal clearance of underpasses is often costly and requires agreement and coordination with the railroad.

2.2 TRENDS AND FORECASTS

2.2.1 Demographic and Economic Growth Factors

The growth of freight and passenger rail in Ohio will be driven by economic and demographic factors, including increases in gross state product, personal income, population, and employment, as well as industry composition. A well-performing rail transportation system in Ohio can improve the competitiveness of key industries in the state and increase the state's attractiveness to both businesses and residents, driving future economic and population growth.

[11] Amtrak Fact Sheet, Fiscal Year 2017, State of Ohio.
[12] Amtrak, Amtrak's Contributions to Ohio.
[13] For example, HUD provides resources to communities on railroad noise abatement in their Noise Guidebook: https://www.hudexchange.info/resource/313/hud-noise-guidebook/

This section will discuss past and future key economic and demographic trends to provide some insight into future growth of the rail transportation system in Ohio.

Gross Domestic Product

GDP within Ohio—a measure of overall economic activity within the state—increased from $485 billion (2009$) in 2000 to $552 billion (2009$) in 2016, an overall growth rate of 14 percent, compared to 33 percent nationally.[14] The state was hit particularly hard by the Great Recession but has since significantly recovered. While GDP growth in Ohio lagged behind that of the United States each year from 2003 to 2009, growth was generally consistent with that of the United States between 2010 and 2016. Figure 2-15 displays cumulative real GDP growth for Ohio and the United States between 2000 and 2016.

Figure 2-15. Ohio vs. United States Cumulative Real GDP Growth (2000-2016)

Source: U.S. Bureau of Economic Analysis

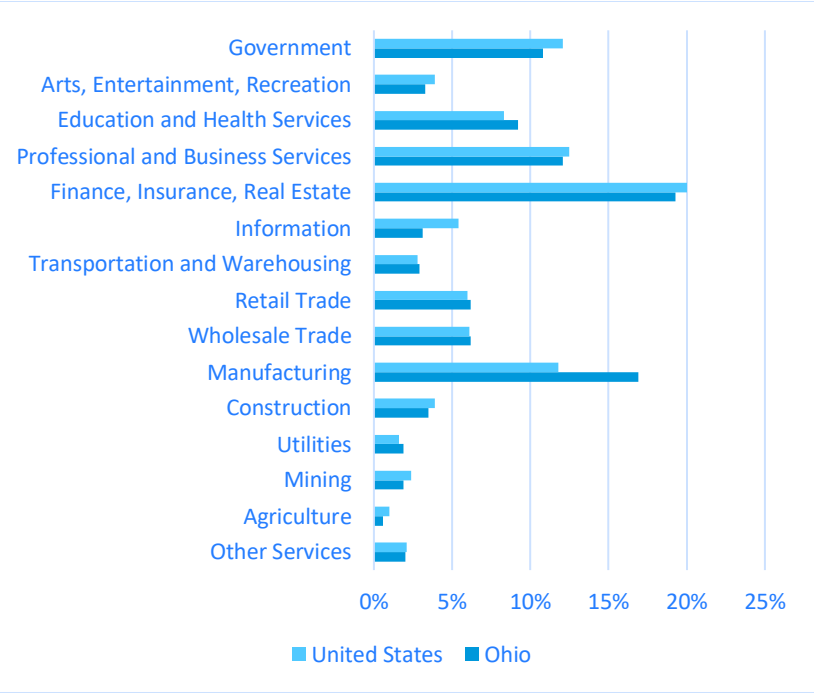
Ohio's largest supersector in terms of GDP is finance, insurance, and real estate, which contributes to 19.3 percent of state GDP.[15] Manufacturing contributes to 16.9 percent of GDP in Ohio, making it the second biggest sector. Manufacturing is more concentrated in Ohio compared to the country overall, since only 11.8 percent of economic output nationally comes from manufacturing. Manufacturing in Ohio tends to be focused on metals, metal products, machinery, and motor vehicles.

[14] U.S. Bureau of Economic Analysis

[15] U.S. Bureau of Economic Analysis, Real GDP by State (Chained 2009$)

With the exception of manufacturing, the sector breakdown for GDP in Ohio is similar to that of the United States (Figure 2-16).

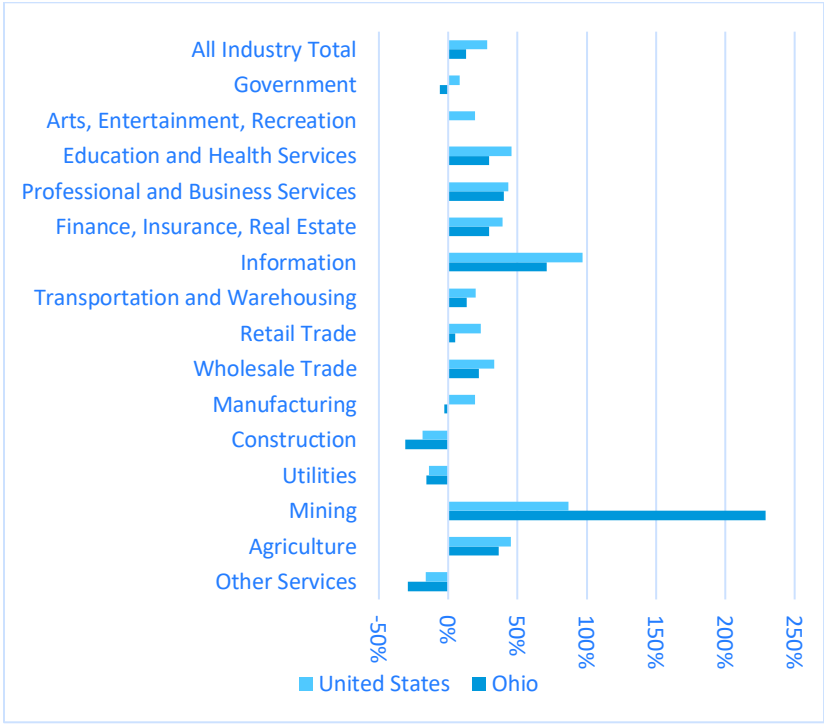
Figure 2-16. Ohio vs. United States Sectors by Share of Real GDP



Source: U.S. Bureau of Economic Analysis, Real GDP by State (Chained 2009$)

Between 2000 and 2015, Ohio's fastest growing sector measured by GDP was mining, which grew 229 percent in real terms during this period, compared to only 87 percent nationally. The mining sector includes oil and gas extraction, which has grown in Ohio due to shale gas production. Information and professional & business services sectors also exhibited strong growth of over 40 percent during this period, compared to the all-industry average of 13 percent. Four sectors – manufacturing, construction, utilities, and government – each saw negative growth between 2000 and 2015. Figure 2-17 displays real GDP growth by sector between 2000 and 2015 for Ohio and the United States.

Figure 2-17. Ohio vs. United States Real GDP Growth by Sector (2000-2015)



Source: U.S. Bureau of Economic Analysis, Real GDP by State (Chained 2009$)

Income

In 2016, Ohio's per capita personal income was $44,593, 9.5 percent lower than the U.S. per capita personal income figure of $49,255.[16] Over

[16] U.S. Bureau of Economic Analysis, *State Per Capita Personal Income*

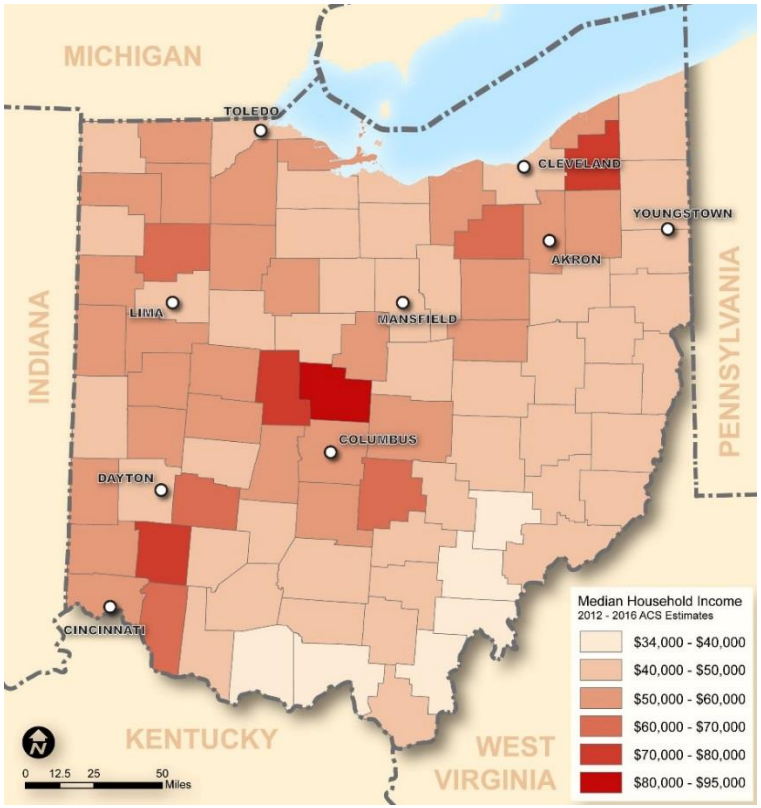
the last 10 years, personal income in Ohio has grown at an average annual compound growth rate of 2.4 percent, roughly level with the nationwide average of 2.5 percent. Figure 2-18 displays per capita personal income in Ohio and nationally between 2000 and 2016.

Figure 2-18. Ohio vs. United States Per Capita Personal Income

Source: U.S. Bureau of Economic Analysis, Per Capita Personal Income in Ohio, Personal Income per Capita [A792RCOA052NBEA], retrieved from Federal Reserve Economic Data, Federal Reserve Bank of St. Louis

Delaware County, a suburban county just north of Columbus, has the highest median household income in the state, estimated at $94,234 (2016$) according to the 2012-2016 American Community Survey 5-Year Estimates.[17] This is 86 percent higher than the state median of $50,674. Other counties with high median household incomes include Warren County ($76,200), Geauga County ($74,165), and Union County ($71,282). These are suburban counties located near the cities of Cincinnati, Cleveland, and Columbus, respectively (Figure 2-19).

Figure 2-19. Median Household Income by County



Source: U.S. Bureau of Economic Analysis, State Per Capita Personal Income

Population

Ohio's population has grown slowly in recent years, with much of the state facing a population decline. Between 2000 and 2010, its population

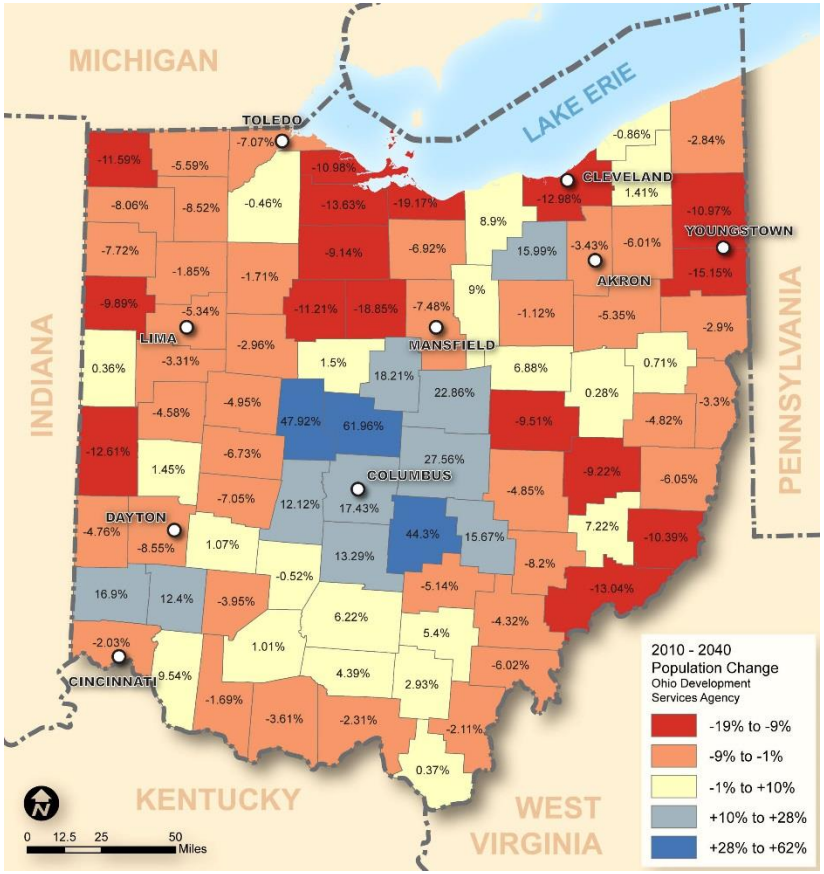
[17] U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, *Median Income in the Past 12 Months (In 2016 $)*

grew 1.6 percent, compared to the nationwide average of 9.7 percent.[18] According to the 2012-2016 ACS 5-Year Estimates, Ohio's population averaged 11.59 million between 2012 and 2019. Despite the slow growth, Ohio remains the nation's 7th most populous state.

Ohio's Development Services Agency estimates that slow growth will continue over the next few decades. In its 2010-2040 forecasts, the agency expects Ohio's population to reach 11.62 million by 2030 and 11.68 million by 2040.[19]

However, parts of the state are expected to see strong population growth during this period. Delaware County is projected to grow 62 percent between 2010 and 2040. Franklin County – Ohio's second most populous and home to Columbus – is forecast to grow 17 percent. In general, the strongest projected growth in the state is expected to occur in the Columbus metropolitan area, while Cincinnati and Cleveland are expected to see slight declines in population (Figure 2-20.

Figure 2-20. Projected Population Growth by County



Source: Ohio Development Services Agency

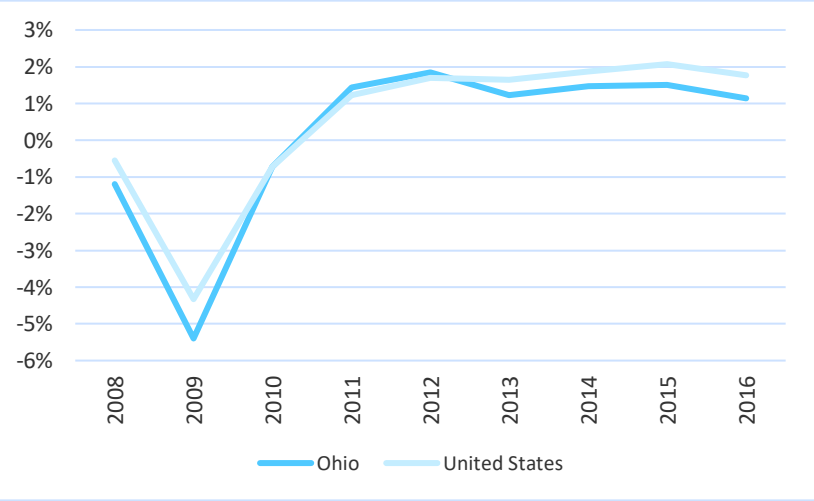
[18] U.S. Census Bureau, Population Distribution and Change, 2000-2010

[19] Ohio Development Services Agency, *2010 to 2040* Projected *Population for Ohio Countie)s*

Employment

According to the U.S. Bureau of Labor Statistics, total nonfarm employment in Ohio stands at 5.5 million as of November 2017, just above its pre-recession peak and over 10 percent higher than its recession low.[20] Figure 2-21 displays year-over-year employment growth for Ohio and the United States from 2008 to 2016. Employment in Ohio saw a sharper decline than the overall United States during the recession and has grown at a slightly slower pace since then.

Figure 2-21. Ohio vs. United States Year-over-Year Employment Growth.



Source: U.S. Bureau of Labor Statistics

Ohio's industry sectors with the highest share of employment are trade, transportation, and utilities (18.38 percent); education & health services (17.18 percent); and government (13.87 percent).[21]

Certain industries have a substantially stronger presence in Ohio than in the rest of the country. The share of total employment represented by the manufacturing sector in Ohio, for instance, is 46 percent higher than in the nation overall. Mining and information sectors, on the other hand, are underrepresented in Ohio compared to the United States. Table 2-12 shows each major sector's location quotient, defined as the relative concentration of employment in Ohio compared to the concentration in the United States. For example, the share of total employment represented by construction in Ohio is 82 percent of its share in the nation overall.[22]

Table 2-12. Ohio vs. United States Sector Location Quotient (April 2017)

Sector	Location Quotient
Manufacturing	1.46
Education & Health Services	1.09
Trade, Transportation, and Utilities	0.98
Other Services	0.98
Financial Activities	0.96
Leisure & Hospitality	0.95
Professional & Business Services	0.93
Government	0.91
Construction	0.82
Information	0.70
Mining & Logging	0.41

Source: U.S. Bureau of Labor Statistics, Economy at a Glance & Current Employment Statistics (National)

[20] U.S. Bureau of Labor Statistics, *Economy at a Glance*
[21] U.S. Bureau of Labor Statistics, *Economy at a Glance*
[22] U.S. Bureau of Labor Statistics, Economy at a Glance & Current Employment Statistics – CES (National)

The Ohio Department of Job and Family Services, in its long-term employment projections, estimates that Ohio will add around 300,000 jobs between 2014 and 2024 (a 5.3 percent increase).[23] Approximately half of these new jobs will be in the health care and social assistance sector, employment in which is projected to grow by 18.7 percent during this period. Construction; professional and technical services; and administrative and waste services are also expected to grow faster than overall employment.

Employment is forecast to decline in several sectors between 2014 and 2024. Manufacturing employment is projected to fall by 28,000 (-4.2 percent) during this period—the biggest decline among all sectors. Government, information, utilities, and agriculture sectors are also expected to face declines in employment.

2.2.2 Freight Demand and Growth

As shown in Table 2-13, 61 percent of rail freight handled by the Ohio rail network passes between origins and destinations outside of the state (overhead). Nevertheless, Ohio is also one of the largest states for originating and terminating rail tonnage in the nation. Ohio consumes more rail freight than it generates, receiving about five million more tons per year (inbound) than it delivers to other states (outbound). In addition, less freight passes between origins/destinations within the state than moves out of state, with 21 million tons of intrastate freight traffic.

Table 2-13. Rail Tonnage by Direction 2016

Direction	Tons	Percentage of Total
Inbound	48,086,117	17%
Intrastate	21,272,617	7%
Outbound	42,780,777	15%
Overhead	177,387,918	61%
Total	**289,527,429**	**100%**

Sources: 2016 Surface Transportation Board Carload Waybill Sample

Commodities that Originate or Terminate by Rail in Ohio

As shown in Figure 2-22, coal has the highest originating and terminating rail tonnage in Ohio, followed by petroleum products for outbound shipments and chemical products for inbound shipments. In terms of overall tonnage to or from Ohio, coal is followed by chemicals and metal.

Figure 2-22. Top Commodities Originating or Terminating in Ohio by Rail (2016 Tons)

Commodity Type	Inbound	Intrastate	Outbound	Total with Endpoint in Ohio
Coal	10,385,608	8,088,981	798,743	**19,273,332**
Chemicals	7,006,929	697,800	3,615,835	**11,320,564**
Metal	5,192,411	656,848	4,919,634	**10,768,893**
Non-metallic Minerals	1,944,915	6,057,098	2,699,724	**10,701,737**
Petroleum Products	2,108,094	2,414,681	6,105,679	**10,628,454**
Mixed Shipments	4,233,120		4,185,080	**8,418,200**
Waste or Scrap	4,954,684	439,724	1,852,320	**7,246,728**
Metallic Ores	Withheld	Withheld	Withheld	**7,071,833**
Food Products	3,401,516	168,048	3,350,512	**6,920,076**
Farm Products	457,843	160,576	5,371,250	**5,989,669**
Other	6,512,689	776,328	6,511,008	**13,800,025**
Grand Total	**48,086,117**	**21,272,617**	**42,780,777**	**112,139,511**

Source: 2016 Surface Transportation Board Carload Waybill Sample

[23] Ohio Department of Job and Family Services, Bureau of Labor Market Information, December 2016

Certain counties in particular originate or terminate large volumes of rail freight. Butler, Belmont, Lucas, Hamilton, and Scioto Counties are major counties for both originating and terminating rail traffic. The nature of rail freight to and from these top counties is as follows:

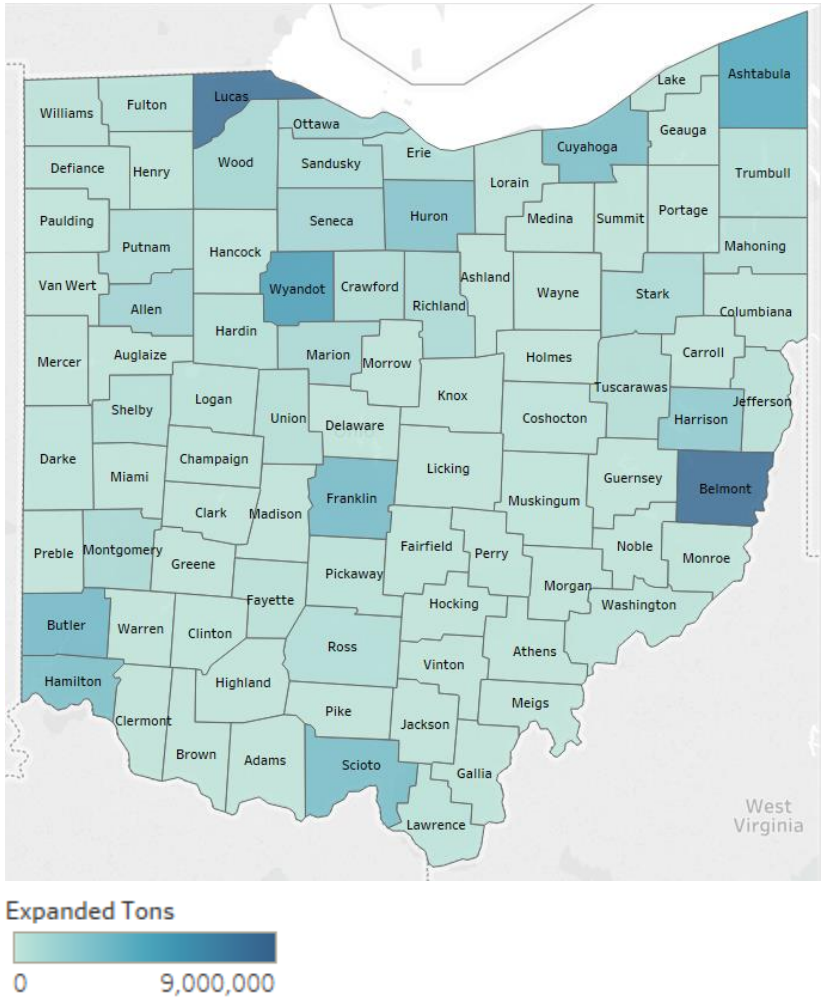
- **Butler County.** Much of the rail traffic is associated with steel manufacturing within the county.
- **Belmont County.** Most rail traffic consists of short-distance coal movements.
- **Lucas County**. Some of this freight is associated with the Port of Toledo. Other traffic relates to automotive, chemical manufacturing and oil refining.
- **Hamilton County.** Consists of a broad variety of freight shipped to, from, and through Cincinnati, with food being the largest single commodity type.
- **Scioto County.** Shipments to and from Scioto County are primarily coal and petroleum products.

Wyandot and Ashtabula counties are top counties for originating rail traffic while Franklin and Cuyahoga counties are top counties for terminating rail traffic. The nature of rail freight is as follows:

- **Wyandot County.** Wyandot County is a major source of non-metallic minerals.
- **Ashtabula County.** Much of the originating rail traffic is from port facilities, including iron ore and non-metallic minerals.
- **Franklin County.** A range of commodities terminate in Franklin County (Columbus) by rail, but the highest volume category is intermodal.
- **Cuyahoga County.** A range of commodities terminate in Cuyahoga County (Cleveland) by rail, but the highest volume categories are intermodal and non-metallic minerals.

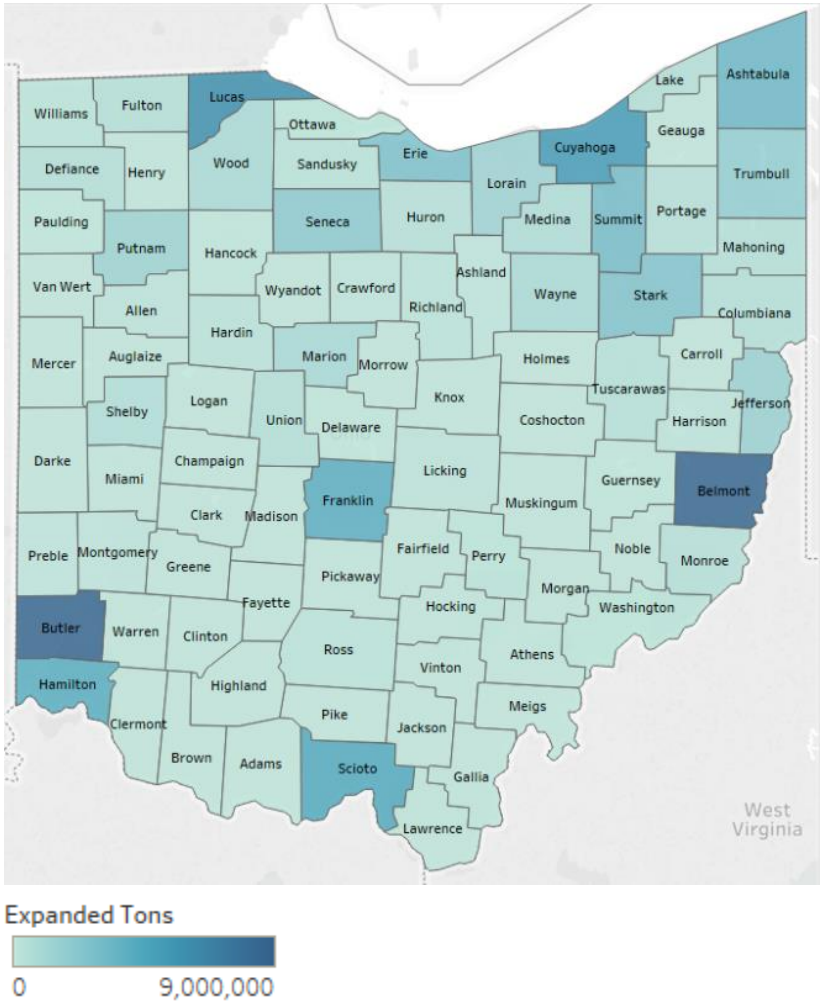
Figure 2-23 and Figure 2-24 illustrate originating and terminating freight flow patterns respectively by county within Ohio.

Figure 2-23. Originating Freight Rail Tonnage by County (2015)



Source: 2015 Surface Transportation Board Carload Waybill Sample

Figure 2-24. Terminating Freight Rail Tonnage by County, 2015



Sources 2015 Surface Transportation Board Carload Waybill Sample

Top Ohio Rail Commodities

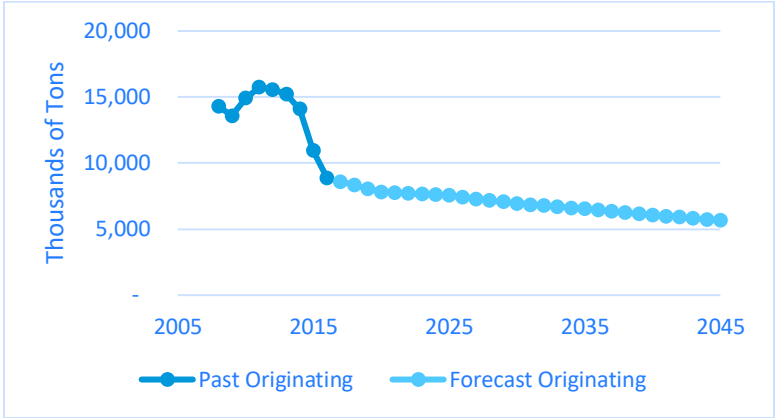
The following section provides details regarding the flows of several top commodities shipped by rail to and from Ohio, the specific nature of the commodities shipped, top origins and destinations, and outlook for rail shipments in the future.

COAL

Coal is the highest volume product shipped by rail both to and from Ohio. Most coal shipped from Ohio originates in the eastern portion of the state. Of the coal originating by rail in Ohio, 91 percent is shipped to other locations in the state, with the rest being shipped to Pennsylvania and Indiana. The top states that ship coal to Ohio are West Virginia, Pennsylvania and Kentucky.

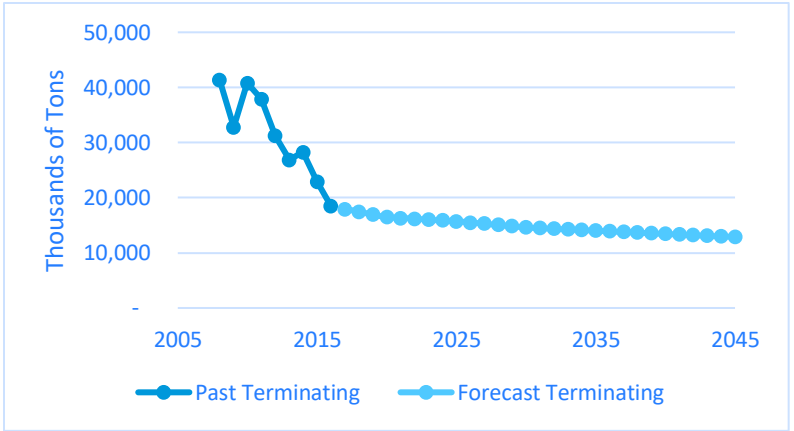
Figure 2-25 and Figure 2-26 illustrate the past and forecast originating and terminating trends of coal shipments in Ohio. Because of technological improvements in natural gas extraction, natural gas prices have fallen significantly. Renewable sources such as wind and solar have also become more cost-effective. This has made coal relatively less competitive as a fuel for electric power generation and reduced coal production/consumption. Proposed government regulations introduce additional uncertainty into future investments in coal-fired power generation. Forecasts by the Federal Highway Administration Freight Analysis Framework – 4 (FAF-4) predict continued declines in coal volumes both originating and terminating by rail in Ohio. This is roughly consistent with trends by the U.S. Energy Information Administration (EIA).[24]

Figure 2-25. Rail Tonnage of Coal Originating in Ohio



Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

Figure 2-26. Rail Tonnage of Coal Terminating in Ohio



Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

[24] Energy Information Administration, Annual Energy Outlook, 2018.

METAL

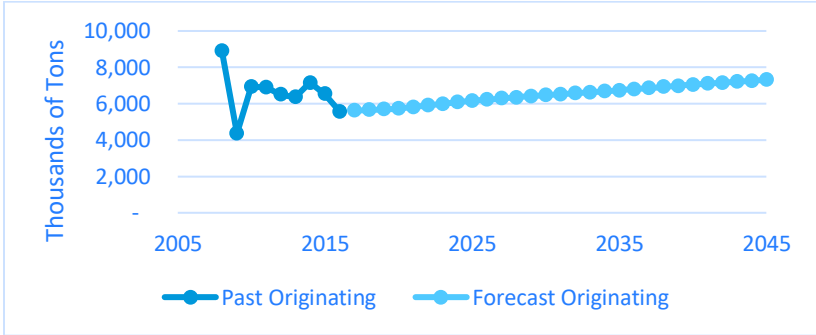
Metal is a major product shipped both to and from Ohio by rail. Iron and steel sheets or strips are the primary type of metal freight originating and terminating in Ohio, with about half the production in Butler County in southwest Ohio. Of the total originating metal freight, 12 percent is shipped intrastate, with destinations along the southwestern borders of Ohio.

The top recipient of Ohio iron and steel products shipped by rail is Indiana. Other major recipients are Michigan, Texas, Kentucky, and New York. Almost half of the consumption of metal delivered by rail from other states is concentrated in Butler County, with the rest spread evenly throughout the state. Indiana is the top producer of metal products shipped via rail to Ohio, while Kentucky is another major shipper of this commodity.

Ohio is home to both basic oxygen process (integrated) steel mills and electric arc steel mills (minimills). Integrated steel mills are located in Middletown and Cleveland. Minimills are in multiple locations throughout the state. The two types of mills use rail differently. Integrated steel mills receive iron ore, limestone, and coke, often by rail, as well as use rail-to-ship finished steel. Minimills primarily rely on scrap metal as a feedstock. Rail is often used to deliver scrap to these mills, as well as for shipping finished products from these locations. Steel production in United States has shifted toward minimills in recent years. For example, in 1992, 62 percent of U.S. steel was produced by integrated steel mills, and only 38 percent was produced at minimills.[25] In 2016, 67 percent of steel was produced at minimills and only 33 percent was produced at integrated steel mills.

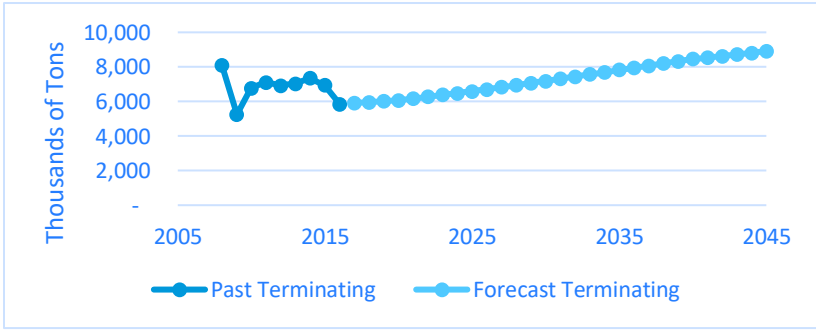
Steel shipments by rail to and from Ohio declined significantly during the Great Recession and have only partially recovered (Figure 2-27). Steel shipments to Ohio are forecasts to grow by 1.5 percent per year to 2045, while steel shipments from Ohio are forecast to grow 0.9 percent per year.

Figure 2-27. Rail Tonnage of Primary Metals Originating in Ohio



Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

Figure 2-28. Rail Tonnage of Primary Metals Terminating in Ohio



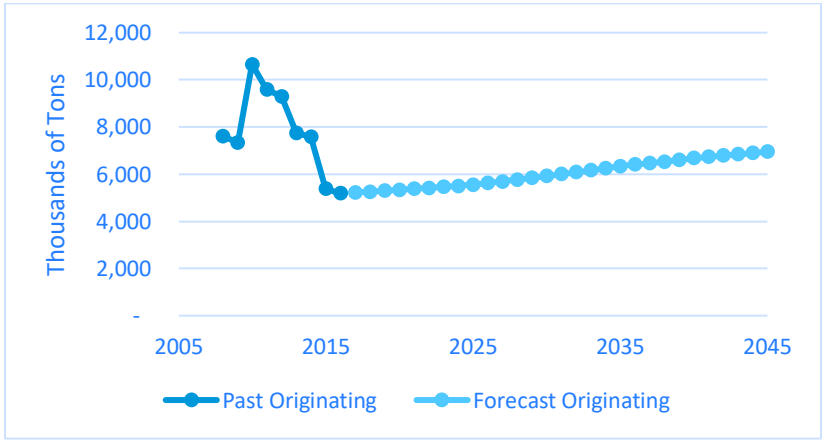
Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

[25] Ohio Research Office, Advanced Manufacturing: Ohio Iron and Steel Industry, December 2017.

METALLIC ORES

Metallic ores are primarily shipped from Ohio by rail, although Ohio also receives about 1.4 million tons of metallic ores by rail from Indiana. The vast majority of these ores are shipped from port facilities in Ashtabula and Lucas counties in northern Ohio. Most metallic ore shipments are iron ore. Most ores shipped by rail within Ohio are shipped to a steel mill in Middletown. Pennsylvania and Kentucky are also major recipients of iron ore through Ohio ports. Metallic ore shipments have declined since 2008 as a result of several integrated steel mill closings. Metallic ore shipments by rail are forecast to grow by one percent per year to 2045, although this continued growth is contingent on integrated steel mills remaining in operation.

Figure 2-29. Rail Tonnage of Metallic Ores Originating in Ohio

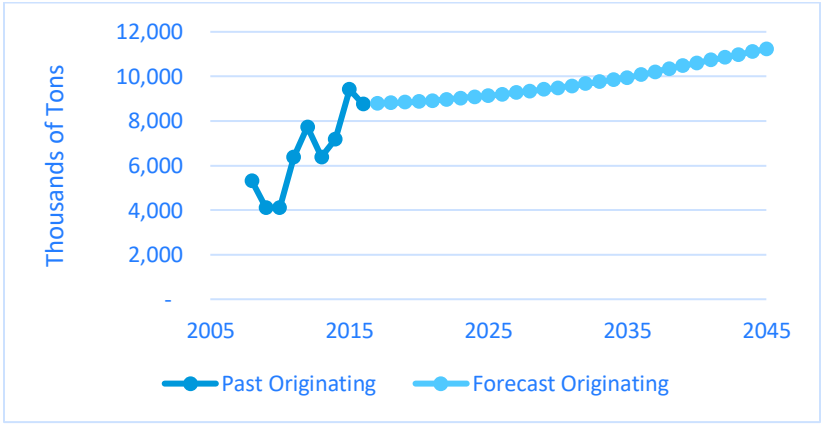


Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

NON-METALLIC MINERALS

Non-metallic minerals are primarily shipped by rail within Ohio, with 69 percent of originating shipments being intrastate and the remaining 31 percent shipped to other states. Ninety-three percent of these minerals is composed of broken or crushed stone and is produced or shipped from Wyandot, Ashtabula, Cuyahoga and Ottawa Counties in north and north-central Ohio. Cuyahoga and Summit Counties are the primary intrastate destinations of these minerals, while Pennsylvania is the other major recipient. Non-metallic mineral shipments have grown significantly since 2009. Some of this growth may represent a recovery from the Great Recession, but the growth in non-metallic mineral traffic may also reflect deliveries associated with shale energy development. Non-metallic mineral shipments are forecast to grow 0.8 percent per year to 2045.

Figure 2-30. Rail Tonnage of Non-Metallic Minerals Originating in Ohio



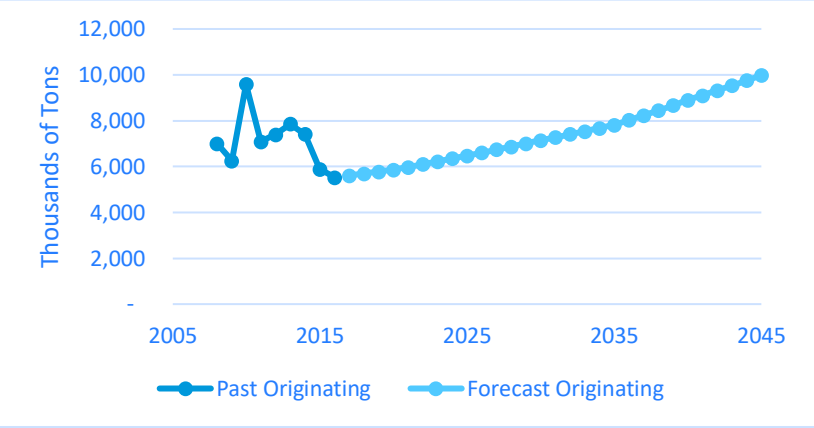
Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

FARM PRODUCTS

About 92 percent of the agriculture tonnage shipped by rail from Ohio is corn or soybeans. Agriculture is shipped from 38 counties in Ohio, with

the largest volumes from counties in the western half of the state. Southeastern states, including North Carolina, Georgia, South Carolina, and Virginia, are the largest recipients of Ohio agriculture. Pennsylvania also receives a significant volume of Ohio agriculture by rail. Ohio farm product shipments by rail are forecast to grow by two percent per year to 2045.

Figure 2-31. Rail Tonnage of Farm Products Originating in Ohio

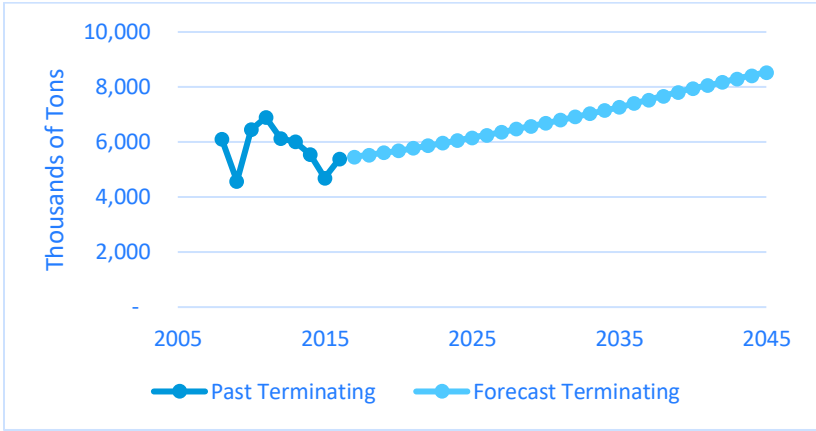


Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

Waste and Scrap

Ohio both ships and receives metal scrap by rail, which is then used as input for steel mills. Ohio shipped about 1.5 million tons of metal scrap by rail in 2015 to other states and received about two million tons by rail. Indiana is the largest recipient of metallic scrap from Ohio, and Lucas County is the largest source of metallic scrap. Ohio also receives general waste for disposal. Seneca County is the largest recipient. Waste and scrap shipments to Ohio are forecast to grow by 1.8 percent per year.

Figure 2-32. Rail Tonnage of Waste and Scrap Terminating in Ohio



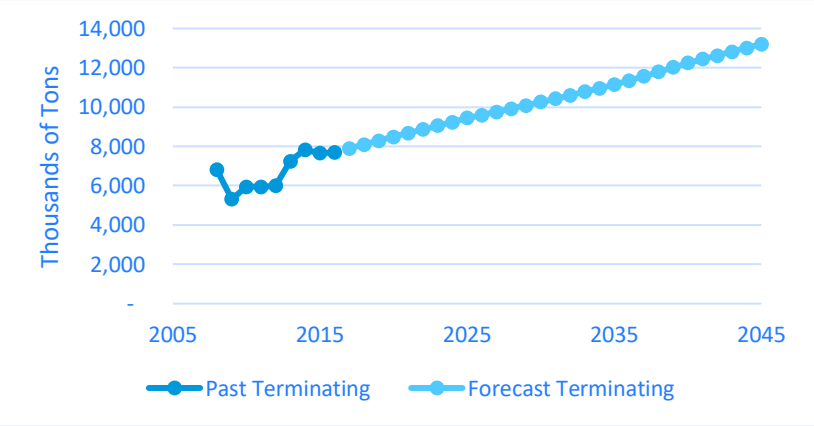
Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

Chemical Products

After coal, chemical products are the biggest inbound commodities shipped to Ohio. There are three primary categories of chemical product commodities shipped: 1) potassium or sodium or other inorganic compounds, 2) industrial organic chemicals, and 3) plastic materials or synthetic fibers, resins and rubbers.

About a quarter of these products are shipped from Illinois, with the rest incoming from across the country. The termination of these products is spread across Ohio, with Lucas County being the largest recipient at about a quarter of the tonnage shipped. Chemical shipments by rail to Ohio are forecast to grow by 2 percent per year (Figure 2-33).

Figure 2-33. Rail Tonnage of Chemical Products Terminating in Ohio



Sources: Surface Transportation Board Carload Waybill Sample, Association of American Railroads, Federal Highway Administration Freight Analysis Framework-4 forecast

Long-Term Sources of Uncertainty

The forecasts displayed in this section were developed assuming U.S. macroeconomic trends and assuming that freight markets will be influenced by macroeconomic trends in a manner similar to what occurred in the past.

However, unforeseen developments may occur. One recent example of an unforeseen development has been hydraulic fracturing technology and extraction of oil and gas from shale deposits. This has significantly impacted rail traffic and would not have been predicted. In the future, other dynamics could change the behavior of freight markets. For example, if concerns over global warming increase, this could further decrease expected shipments of coal and reduce shipments related to natural gas exploration.

Intermodal Freight

As shown in Table 2-14, about three-quarters of all intermodal freight on the Ohio rail network passes through the state between locations outside of Ohio. Ohio generates more tonnage of intermodal freight than it receives. The top eight counties by intermodal freight volume are (in order) Franklin (Columbus), Cuyahoga (Cleveland), Hamilton (Cincinnati), Marion and Lucas (Toledo), Erie (Sandusky), Wood (North Baltimore), and Union (Marysville).

Table 2-14. Intermodal Freight Flow by Direction by Expanded Carloads (2016)

Direction	Carloads	Percentage of Total
Intrastate	5,400	0.1%
Originating	537,360	13.1%
Overhead	3,068,180	74.8%
Terminating	488,596	11.9%
Grand Total	**4,099,536**	**100.0%**

Sources: 2016 Surface Transportation Board Carload Waybill Sample

Illinois is by far the largest origin/destination or gateway of Ohio intermodal shipments, accounting for nearly half of intermodal freight volume to/from Ohio. Some of these moves ultimately originate or terminate in Illinois, but other rail moves are passing through the Chicago gateway to/from points further west. Other major partners include New Jersey, Virginia, and Florida. A summary of the top 5 intermodal partner volumes for Ohio is provided in Table 2-15.

Table 2-15. Top Intermodal Freight Partners to Ohio

Origin State	Destination State	Intermodal Units
Illinois	Ohio	288,720
Ohio	Illinois	186,760
Ohio	New Jersey	64,920
New Jersey	Ohio	69,796
Virginia	Ohio	56,000
Ohio	Virginia	129,040

Sources: 2016 Surface Transportation Board Carload Waybill Sample

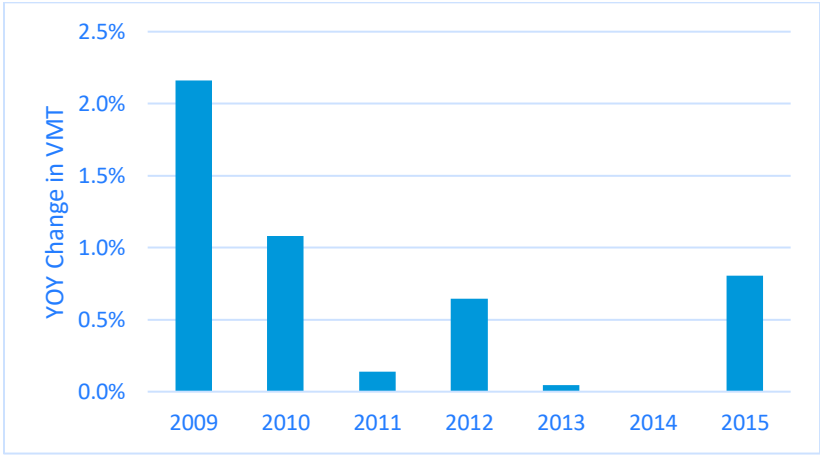
Average Length of Haul

An analysis of the 2016 STB Waybill Sample indicates that the average length of haul for shipment tonnage originating or terminating by rail in Ohio is 619 miles.[26] By contrast, the average length of haul nationally is 1,008 miles. The cost of rail is more competitive relative to trucking over longer distances, so all else being equal, rail service in Ohio competes more closely with truck service than in other parts of the country.

2.2.3 Passenger Travel Demand and Growth

As measured by vehicle miles traveled (VMT), demand for passenger travel in Ohio has grown since 2008, after a minor downturn during the Great Recession. According to the Federal Highway Administration, 113.7 billion vehicle miles were traveled in the state in 2015, a 5.3 percent increase from its recession low of 108.0 billion in 2008.[27] Figure 2-34 displays year-over-year VMT change in Ohio from 2009 to 2015.

Figure 2-34. Vehicle-Miles Traveled Year-over-Year Change in Ohio



[26] Because the STB Waybill Sample is a sample of waybills and not rail moves, it understates average length of haul, since multiple waybills may carry a single rail move. To account for this, an adjustment was applied to increase estimated Ohio average length of haul by the ratio by which the STB Waybill Sample nationally undercounts average lengths of haul.

[27] Federal Highway Administration, Office of Highway Policy Information, *U.S. Highway Statistics: Vehicle Miles Traveled*

Source: Federal Highway Administration, Office of Highway Policy Information, U.S. Highway Statistics: Vehicle Miles Traveled

The Ohio statewide travel demand model forecasts that the total number of passenger trips will increase by 4 percent between 2010 and 2040 or 0.1 percent per year.

2.2.4 Fuel Cost Trends

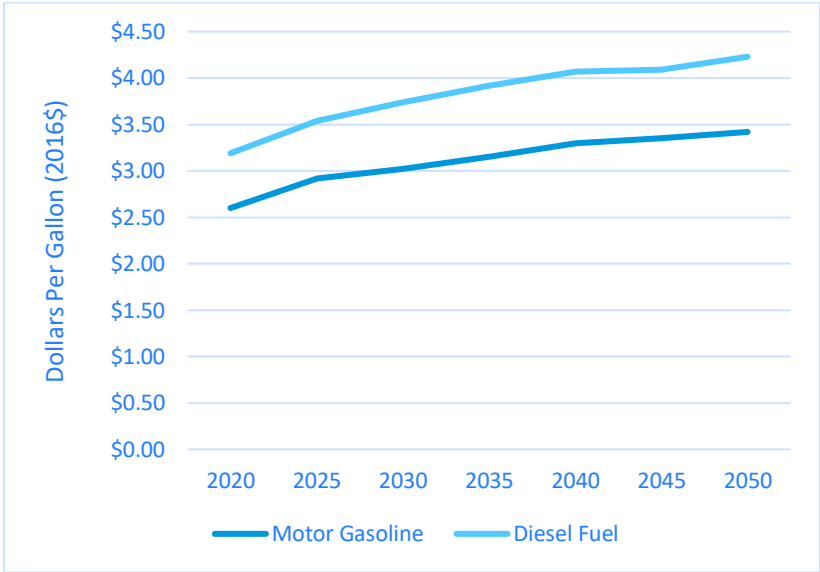
Retail gasoline prices dropped over 50 percent from a June 2014 high of $3.69 per gallon to a February 2016 low of $1.76 per gallon due to several supply and demand factors, including increased North American production and demand slowdown in China. As of December 2017, average prices nationwide were $2.48 per gallon, according to the EIA. Near-term projections from EIA predict gasoline prices hovering between $2.40 and $2.70 per gallon between 2018 and the end of 2019.[28]

Retail diesel prices have followed trends similar to gasoline, dropping 50 percent from a March 2014 high of $4.00 per gallon to a February 2016 low of $2.00 per gallon. Prices increased to $2.91 per gallon as of December 2017. EIA's short-term forecast projects retail diesel prices to remain steady through the end of 2019.

According to EIA's *Annual Energy Outlook 2017* publication, both motor gasoline and diesel fuel prices are expected to increase at an average annual compound growth rate of 0.9 percent per year (in real terms) between 2020 and 2050. In 2050, motor gasoline prices are expected to reach $3.42 per gallon, while diesel will be $4.23 per gallon (Figure 2-35).[29]

Increases in future fuel costs will increase the marginal cost of highway transportation relative to rail due to the greater fuel intensity of automobiles and trucks. The projected real increase in gas and diesel, all else being equal, could potentially boost rail demand in Ohio.

Figure 2-35. Motor Gasoline and Diesel Fuel Price Forecast



Source: U.S. Energy Information Administration, Annual Energy Outlook 2017 – Table: Petroleum and Other Liquids Prices

[28] U.S. Energy Information Administration, *Short-Term Energy Outlook*

[29] U.S. Energy Information Administration, Annual Energy Outlook 2017 – Table: Petroleum and Other Liquids Prices

2.2.5 Rail Congestion Trends

One proxy for measuring railroad congestion is network velocity (total train-miles divided by total train hours). According to the Association of American Railroads' Railroad Ten-Year Trends 2005-2014, national network velocity – average distance per hour for trains to operate between origin and destination, including stops – fluctuated between 17.5 and 21.5 freight train-miles per train-hour during this period. Network velocity dropped in 2014 due to high freight demand that year, but overall, there has been no consistent trend upward or downward.

Table 2-16. Network Velocity

Year	Network Velocity (Freight Train-Miles per Train-Hour)
2005	18.6
2006	18.4
2007	19.2
2008	19.5
2009	21.3
2010	20.2
2011	19.2
2012	20.6
2013	19.7
2014	17.6
2015	19.4

Source: Association of American Railroads, Railroad Ten-Year Trends

2.2.6 Highway and Airport Congestion Trends

Air travel in Ohio is serviced by three medium-sized primary hubs – each carrying between 0.25 and 1 percent of total U.S. annual passenger boardings[30] These are located in the metropolitan areas of Cleveland, Columbus, and Cincinnati.

Airport on-time percentages can serve as a proxy for airport congestion, since congestion increases flight delays. Flights are on time if they arrive or depart gates within 15 minutes of scheduled arrival or departure times. At Cleveland-Hopkins International Airport—the busiest airport in the state with around 3,200 departures per month—85.1 percent of arrivals and 86.4 percent of departures were on-time in September 2017.[31]

Figures were similar for John Glenn Columbus International Airport, where 86.0 percent of arrivals and 85.7 percent of departures were on time. Cincinnati/Northern Kentucky International Airport had the best on-time performance of three airports with 87.8 percent of arrivals and 88.5 percent of departures on time.

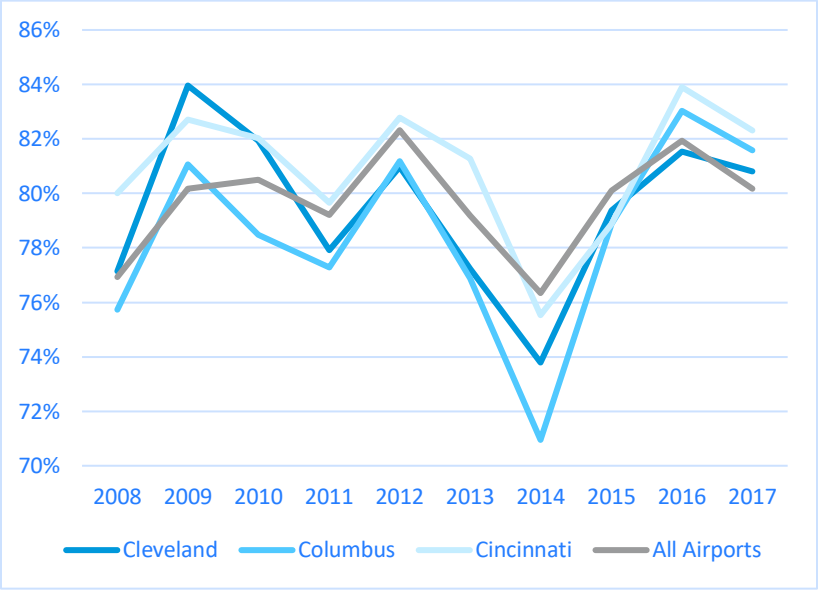
The annual on-time performance of arrivals and departures at these three airports has fluctuated between 70 and 90 percent from 2008 to 2017 with no clear trend across time (Figure 2-36 and Figure 2-37). This is about in line with national performance during this period.[32]

[30] Federal Aviation Administration. Calendar Year 2016 Revenue Enplanements at Commercial Service Airports

[31] U.S. Department of Transportation, *Air Travel Consumer Report*. November 2017. Pgs. 21-25

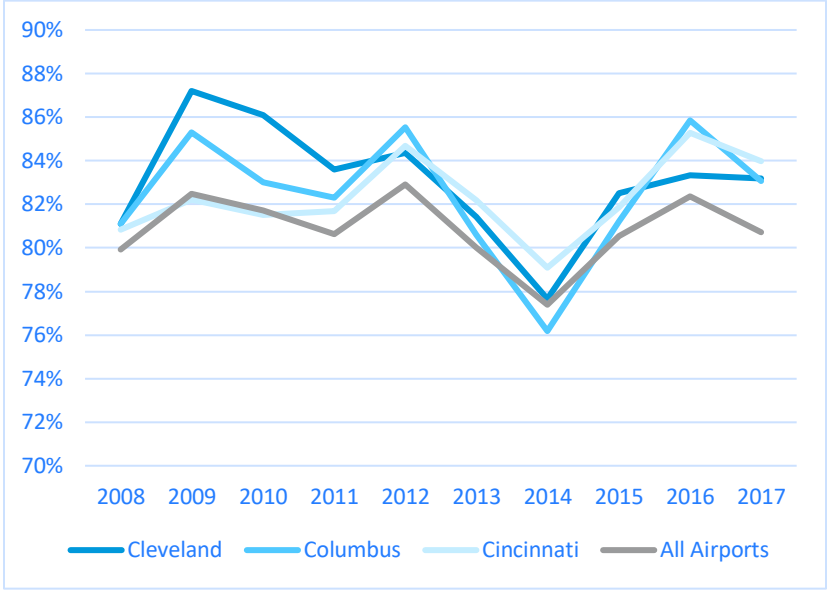
[32] U.S. Department of Transportation: Bureau of Transportation Statistics. *On-Time Performance – Flight Delays at a Glance (January to November)*

Figure 2-36. On-Time Arrivals: Major Ohio Airports vs. All Airports



Source: U.S. Department of Transportation: Bureau of Transportation Statistics. On-Time Performance – Flight Delays at a Glance (January to November)

Figure 2-37. On-Time Departures: Major Ohio Airports vs. All Airports

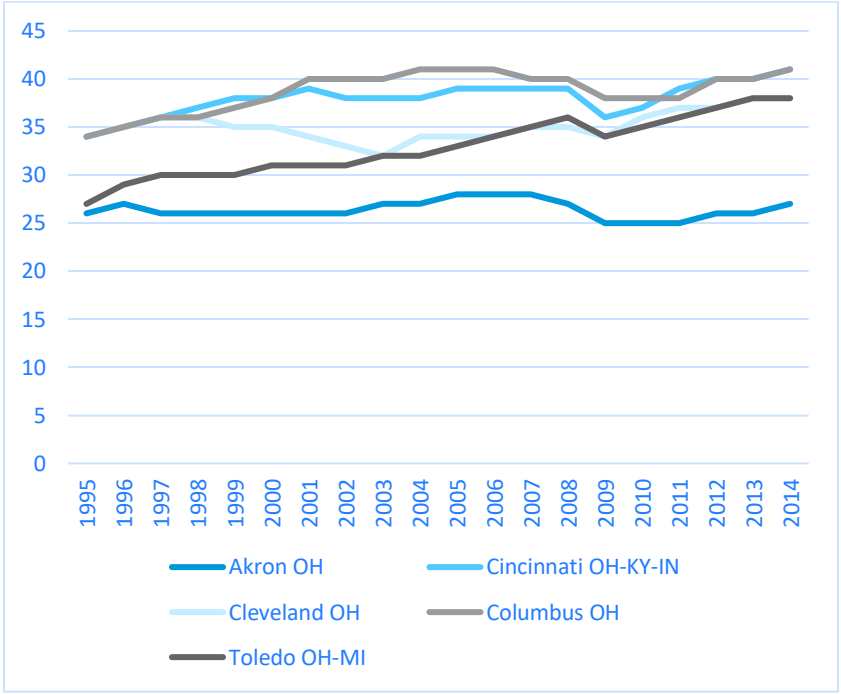


Source: U.S. Department of Transportation: Bureau of Transportation Statistics. On-Time Performance – Flight Delays at a Glance (January to November)

On Amtrak's Northeast Corridor between Boston and Washington, DC, air travel and intercity passenger rail compete, so that Amtrak carries more passengers between New York City and Washington, DC, or between New York City and Boston than do airlines. Therefore, Amtrak reduces airport congestion by providing an alternative to flying. While at some future date passenger rail may relieve airport congestion in Ohio, currently Amtrak services in the state tend to serve different markets and be of different magnitudes in terms of ridership.

Rail can help to alleviate roadway congestion by diverting freight and people from trucks and automobiles on busy roadways during peak travel times. As indicated by trends in the average annual hours of delay per commuter in Figure 2-38, congestion trends in Ohio's major metropolitan areas over the past twenty years have been mixed. Levels of delay in Akron and Cleveland have been relatively flat, have grown moderately in Columbus, Cincinnati, and have grown more significantly in Toledo.

Figure 2-38. Average Annual Hours of Delay per Auto Commuter



Source: Texas Transportation Institute, 2015 Urban Mobility Scorecard.

2.2.7 Land Use Trends

Land use can impact rail transportation in several ways:

- Changes in land use can create conflicts, such as when formerly industrial or agricultural areas become residential. Freight rail activities can be loud and disruptive to adjoining residential areas. Changes in land use can potentially increase or decrease the usage of highway/rail crossings, shifting the infrastructure needs of those crossings.
- Changes in railroad operating practices can disrupt communities and adjoining properties. Longer train lengths can and do create additional congestion points and bottlenecks on the system, resulting in delayed service to customers, idling and stopped trains, and blocked crossings.

A study by Ohio State University notes that in general, population in Ohio has been slowly moving from low-density rural areas to urban and suburban areas. This may to some degree be due to shifts in agriculture where fewer workers are needed to tend larger farms. While in many other parts of the nation, central cities are gaining in population, Ohio's urban cores are becoming less dense. As shown in Figure 2-20, most of the counties that contain Ohio's largest cities are expected to lose population, with Franklin County (of which Columbus is the seat) being the exception. As suburban areas gain population both at the expense of center cities and at the expense of rural areas, this trend has the potential to shift formerly rural areas to suburban. Rail lines that had previously passed through low-density rural areas may now pass through higher-density suburban areas, which could create conflicts.

3. Proposed Passenger Rail Improvements and Investments

3.1 BACKGROUND

Passenger rail service in Ohio is provided by Amtrak long-distance trains, which are funded by Amtrak. The existing model for new passenger rail service in Ohio would require the State of Ohio to pay operating subsidies as well as capital costs and allocated overhead (administrative costs that are not directly attributable to a single service). If the new service were initiated on an existing, privately owned rail line, the State of Ohio would need to negotiate and reach agreement with the freight railroad owners and pay for infrastructure improvements to provide incremental capacity for the new service to avoid interfering with freight operations, plus any improvements to upgrade the line to desired passenger rail level of service. Since most rail lines in Ohio are privately owned, this type of negotiation would be required in most cases.

Some of Ohio's neighboring states have such programs and actively support passenger rail services, such as Indiana's support for the Amtrak *Hoosier State* service, Michigan's support for the *Wolverine, Pere Marquette,* and *Blue Water* services, and Pennsylvania's support for the *Keystone* and *Pennsylvanian* service. There are no comparable efforts planned or budgeted in Ohio.

3.2 PAST STUDIES

During the late 1990s through 2009, Ohio conducted a number of passenger rail studies. Even though some of these studies included environmental work to comply with the requirements of the National Environmental Policy Act (NEPA), the findings are now outdated. Were Ohio to revisit any of these initiatives, any previously completed NEPA work would need to be redone. Since 2000, there have been three passenger rail studies initiated by the State of Ohio: 3C Quick Start Passenger Rail Service; the Ohio Hub; and Midwest Regional Rail Initiative (MWRRI).

3.2.1 3C Quick Start Passenger Rail Service

Current state law requires that the state first consider the rail corridor connecting Cleveland, Columbus, and Cincinnati (3C). This is a corridor that last had passenger rail service in 1971. Feasibility studies completed in the 1990s and early 2000s suggested 3C to be a priority route.

In 2010, the FRA announced that it would grant $400 million in American Recovery and Reinvestment Act funds to implement passenger rail service on the 3C corridor. The intention of the 3C program was to initiate conventional intercity passenger rail service and then later to upgrade the route to provide faster service. Initially, trains would operate at peak speeds of 79 miles per hour, although practical limitations of the route would limit the initial schedule to an

average of 39 miles per hour, according to a feasibility study produced by Amtrak in 2009.[1] At the time work concluded, it was unclear whether federal funding would be adequate to cover the capital cost of initiating the new service, since negotiations with host freight railroads had not been completed. In addition, the state would need to provide an estimated $17 million per year for operating and maintenance subsidies.

The project progressed through an environmental review process. An Environmental Assessment examined numerous alternative routes. Through a multi-tier screening process, a preferred corridor was recommended that served Dayton in addition to Columbus, Cleveland, and Cincinnati. The Environmental Assessment was completed and submitted by Ohio Department of Transportation and Ohio Rail Development Commission in October 2010.

Development of the project ended in late 2010 and the American Recovery and Reinvestment Act funding was withdrawn. Figure 3-1 shows the proposed 3C corridor.

Figure 3-1. 3C Corridor Preferred Alternative, 2010

Source; 3C Quick Start Passenger Rail Environmental Assessment, October 2010

[1] Amtrak, Feasibility Report on Proposed Amtrak Service Cleveland-Columbus-Cincinnati, September 15, 2009.

3.2.2 Ohio Hub Study

Prior to the 3C Initiative, the Ohio Hub Study, a cooperative effort led by the State of Ohio that included neighboring states, Amtrak, and Via Rail (the national passenger rail system in Canada), was the state's priority passenger rail planning effort. Initiated in 2002 the Ohio Hub Study was designed to determine the feasibility of a passenger rail system connecting Ohio's major cities and other metropolitan areas near Ohio. The study was conducted in coordination with the Midwest Regional Rail Initiative Study and completed in 2007.

The Ohio Hub network as envisioned in 2007 is shown in Figure 3-2.

Figure 3-2. Proposed Ohio Hub Study Network (2007)

Source: 3C Quick Start Passenger Rail Environmental Assessment, October 2010

3.2.3 Midwest Regional Rail Initiative (MWRRI)

The MWRRI began in 1996 and involved nine Midwest states (Indiana, Illinois, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin), as well as the Federal Railroad Administration (FRA). The MWRRI envisioned a 3,000-mile passenger rail network anchored by Chicago. The MWRRI sought to increase service and cut travel times by 30 to 50 percent. Trains would travel at speeds of up to 110 miles per hour on primary routes and 80 to 90 miles per hour on secondary routes. Given that rail transit times and frequency would make rail service competitive against bus or automobile travel, planners forecast 9.3 million annual trips by 2025. Some elements envisioned under the MWRRI have been completed, such as upgrades to the rail corridor between Chicago, Illinois, and St. Louis, Missouri, and the upgrade of the line between Porter, Indiana, and Kalamazoo, Michigan. The MWRRI network as proposed is displayed in Figure 3-3.

Figure 3-3. Midwest Regional Rail Initiative Network

Source: Midwest Regional Rail Initiative

3.3 MIDWEST REGIONAL RAIL PLANNING STUDY

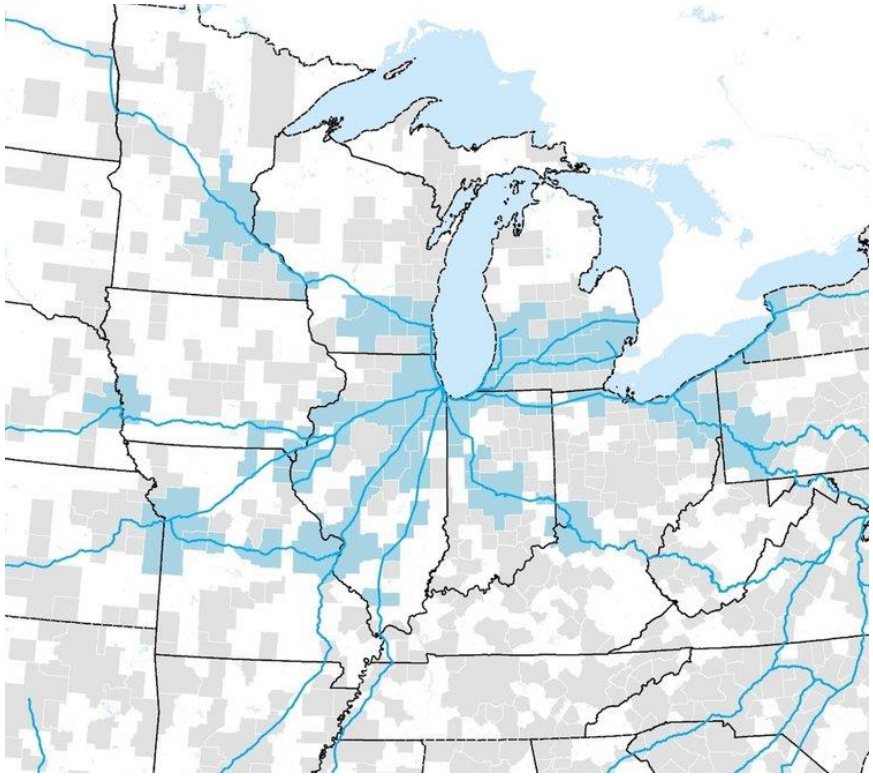
The Midwest Regional Rail Plan (MWRRP) Study is the third in a national series of regional rail planning studies led by the FRA. Other studies have been completed in the Southwest and the Southeast. FRA's intention is to combine these regional studies into an overall national rail plan. The studies are intended to provide guidance to states in developing regional passenger rail networks.

The study participants are Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The MWRRP Study is designed to provide a 40-year (to 2055) network, service, finance, and governance strategy for the development of regional passenger rail.

The planning process included input from a 40+ member Stakeholder Planning Group, which included state departments of transportation and metropolitan planning organizations (MPOs), railroads, rail operator, transit agencies and the Midwest Interstate Passenger Rail Commission (MIPRC). MIPRC was created by compact agreement in 2000 and consists of nine member states (Indiana, Illinois, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota and Wisconsin). From Ohio, additional stakeholder representatives included Ohio Rail Development Commission and the City of Lima.

The analysis methodology for the study is based on CONNECT—the **CON**ceptual **NE**twork **C**onnections **T**ool, which provides order-of-magnitude ridership, revenue, and cost estimates. The technical analysis resulted in a high-level prioritization of Midwest rail corridors as part of an overall national rail network. Figure 3-4 shows current Amtrak intercity lines in the study area, along with the CONNECT statistical analysis areas (in blue). The statistical analysis areas represent population centers from which potential ridership can be drawn.

Figure 3-4. Existing Midwest Amtrak Network and CONNECT Statistical Analysis Areas



Source: www.midwestrailplan.org

3.3.1 Corridors

Completion and release of the MWRRP Study is anticipated in 2018. It envisions different tiers of service:

- Core Express: over 125 mph on dedicated tracks
- Regional: 90-125 mph on dedicated and shared tracks
- Emerging: up to 90 mph on shared tracks
- Independent/Small Market/Future: local and/or regional significance; could be advanced by another entity including a state, MPO, or other organization

As shown in Table 3-1, the final draft network includes seven corridors that involve Ohio.

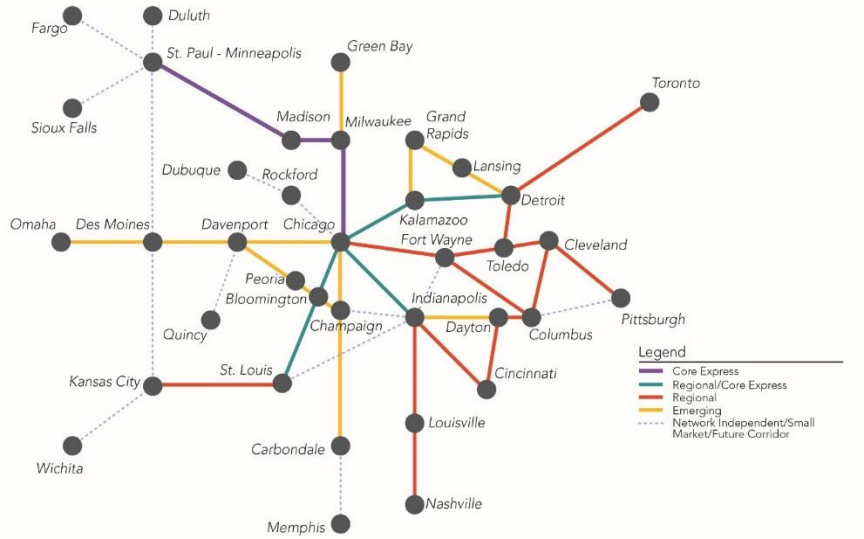
Table 3-1. Draft Midwest Regional Rail Plan Study Ohio Corridors

Corridor	Service Tier	Route Miles	Corridor Ridership
Indianapolis-Cincinnati	Regional	110	1.8 m
Indianapolis-Columbus	Emerging	202	1.0 m
3C: Cincinnati-Columbus-Cleveland	Regional	297	3.1 m
Columbus-Chicago	Regional	316	1.9 m
Detroit-Cleveland	Regional	233	2.8 m
Cleveland-Pittsburgh	Regional	170	3.2 m
Cleveland-Chicago	Regional	373	2.4 m
	Total	**1,701**	**16.2 m**

Source: www.midwestrailplan.org

Figure 3-5 illustrates the relationship of these seven corridors with the overall draft rail network. Together, these corridors comprise 12.2 million of the estimated 43-54 million annual linked trips in the Midwest network (23-28 percent).

Figure 3-5. Midwest Regional Rail Plan Study Corridor Relationship



An additional corridor—between Columbus and Pittsburgh—was identified as a Network Independent/Small Market/Future Corridor. Ridership estimates were not as high as other corridors, but the Columbus-Pittsburgh corridor exhibited regional significance and was identified as a potential future corridor.

3.4 LOCALLY SPONSORED RAIL PLANNING EFFORTS

Although as of 2018 the State of Ohio is not investigating new passenger rail services, local entities have sponsored several planning initiatives.

3.4.1 Northern Indiana/Ohio Passenger Rail Initiative

Developed under the auspices of the Northern Indiana Passenger Rail Association (NIPRA), a feasibility study of a northern Indiana/Ohio rail corridor was completed in 2013. In 2015, agencies representing nine cities between Chicago and Columbus entered into a Memorandum of Understanding to create the Northern Indiana/Ohio Passenger Rail Initiative.

The NIPRA effort has focused on a passenger line connecting Chicago and Columbus via Lima and Fort Wayne, Indiana (Figure 3-6). This corridor was identified as part of the Ohio Hub plan. In 2016, NIPRA through the City of Fort Wayne received approval from FRA to conduct pre-NEPA work on the segment between Lima and Tolleston (Gary) Indiana. NIPRA raised $350,000 from entities along the corridor including the City of Lima. This work includes the following:

- Route Alternatives Analysis Report
- Purpose and Need Report
- Public Involvement Plan
- Service Alternatives Analysis Report

This environmental work serves as an alternative to a Tier I Environmental Impact Statement (EIS). Because most of the infrastructure work would be within a preexisting rail right-of-way, a full Tier I EIS would not be necessary. The next step would be to enter the formal NEPA process, conduct outreach, and begin more detailed analysis of the route for the next stage of the NEPA procedure.

Figure 3-6. Proposed Northeast Indiana Passenger Rail Association Chicago-Columbus Corridor

Source: www.niprarail.org

The route of the proposed passenger service would be on rail lines owned by CSX, and project sponsors would need to reach an agreement with CSX to access and improve these rail lines for the project to be feasible.

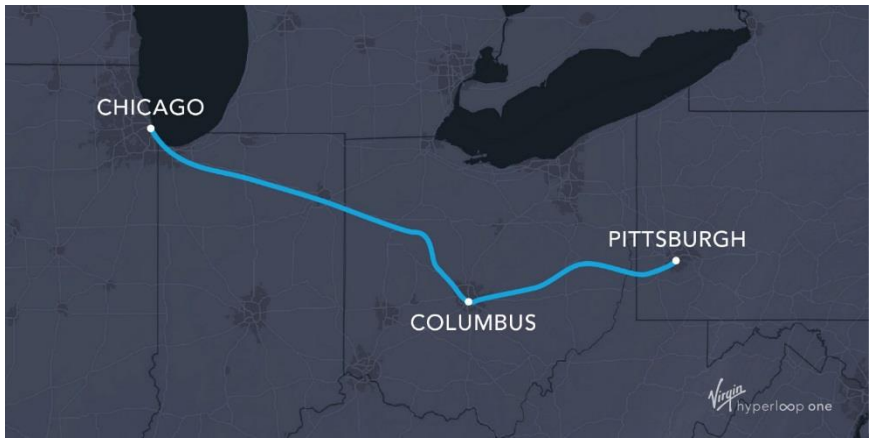
3.4.2 Rapid-Speed Transportation Initiative

In 2018, the Mid-Ohio Regional Planning Commission (MORPC) announced that it will undertake a Rapid-Speed Transportation Initiative to analyze the feasibility of passenger rail in the Chicago-Columbus-Pittsburgh corridor. The study is included in the regional long-range transportation plan.[2] This corridor was identified as part of the Ohio Hub plan. The Chicago-Columbus segment, via Lima and Fort Wayne, is generally the same as the corridor currently being analyzed by NIPRA. The design of the Rapid-Speed Transportation Initiative is intended to complement and incorporate the NIPRA effort. The effort will consider two different technologies:

- **Passenger Rail**. The study will include content for a future Tier I EIS for a passenger rail corridor between Lima and Pittsburgh via Columbus. This will complement work done by NIPRA for the segment between Tolleston (Gary) and Lima. The Cities of Lima, Kenton, and Marysville as well as Union County have contributed funding for this EIS,
- **Hyperloop**. Hyperloop technology, which is currently in the initial stage of development, would involve freight or passenger pods travelling at extremely high speeds within sealed vacuum tubes. MORPC is partnering with Virgin Hyperloop One, a private company that is currently in the process of developing a proprietary hyperloop technology. In 2016, MORPC organized the signatories of the initiative as Midwest Connect to submit a proposal for Virgin Hyperloop One's Global Challenge. In 2017, MORPC was selected one of ten finalists. The proposed Rapid-Speed Transportation Initiative corridor is shown in Figure 3-7.

[2] Mid-Ohio Regional Planning Commission, 2016-2049 Columbus Area Metropolitan Transportation Plan

Figure 3-7. Proposed Rapid-Speed Transportation Initiative Study Corridor



Source: Mid-Ohio Regional Planning Commission, 2017

3.4.3 Great Lakes Hyperloop Feasibility Study

The Northeast Ohio Areawide Coordinating Agency (NOACA) is completing a project to assess the technical and financial feasibility of a hyperloop between Chicago and the Cleveland area. NOACA is partnering with Hyperloop Transportation Technologies (HTT), a private company that is developing a hyperloop technology, to complete this $1.2 million feasibility study. The study is expected to be complete by spring of 2019.

3.4.4 Toledo – Detroit Passenger Rail Feasibility

The City of Toledo and Toledo Metropolitan Area Council of Governments are completing a study to assess the feasibility of a passenger rail link between Toledo and the Detroit area. The study will examine potential connections from Toledo to Detroit Metropolitan Wayne County Airport and the cities of Detroit and Ann Arbor.

3.5 STATION IMPROVEMENTS

Amtrak owns station facilities in Bryan and Elyria while most of the remaining station facilities in Ohio are municipally owned. For most stations in Ohio, the host railroad owns the station platform and tracks. Station improvement projects tend to be initiated by local governments, as described below.

- **Cincinnati:** Cincinnati Union Terminal is being restored. Current improvements include renovation of the waiting area and ticket office. A study by the City of Cincinnati and Amtrak have identified a need for a new station track and wider platform to improve rail operations in the area.
- **Cleveland:** The City of Cleveland Planning Commission has initiated an effort to replace the city's existing Amtrak station with an intermodal transportation center that would co-locate Amtrak, Greyhound, and regional bus and rail services near downtown Cleveland's lakefront. The feasibility study was funded with a Transportation for Livable Cities Initiative grant from the Northeast Ohio Areawide Coordinating Agency. The project is included in the region's long- range transportation plan.[3]
- **Elyria:** Lorain County is working with Amtrak and Norfolk Southern to provide design services and has committed funding for infrastructure improvements that would allow Amtrak to

[3] Northeast Ohio Area Coordinating Council (NOACA) AIM Forward 2040 Long Range Transportation Plan

serve the restored New York Central station, replacing the existing Lorain County Transportation and Community Center, currently served by Amtrak.

- **Oxford:** At the request of the City of Oxford and Miami University, Amtrak analyzed the potential addition of a stop on the Cardinal route in Oxford. As a result, Amtrak gave approval for the city and university to proceed with site selection and identification of funding for construction of a station, platform, and related components. Amtrak will remain uncommitted to adding a stop until site selection and funding are completed. The City of Oxford and Miami University have each pledged $350,000 to the potential station's construction. The Oxford multimodal station facility project is included the region's long-range transportation plan.[4] It would also include a passenger and operations facility for the Butler County Regional Transit Authority. In 2018, this transit facility was awarded $2.6 million in federal funding via the Competitive Bus Grant program.
- **Sandusky:** The Amtrak station in Sandusky has recently undergone more than $75,000 in improvements including ADA improvements, structural repairs, and security system installation. These improvements were funded with city and state transit funds.
- **Toledo:** Using funds from a variety of sources, the Toledo-Lucas County Port Authority is improving passenger facilities at Toledo's Martin Luther King Jr. Plaza. The improvements will bring the station to a state of good repair and will consolidate the number of platforms, since the station has more platforms than are necessary.

[4] Ohio Kentucky Indiana Regional Council of Governments (OKI) *2040 Regional Transportation Plan*

4. Freight Rail Issues and Opportunities, Proposed Improvements

A number of issues and opportunities have been uncovered during the preparation of this Rail Plan, that were identified through consultation with stakeholders, review of information on the condition of Ohio's rail lines, and an assessment of trends that currently or will affect Ohio's rail network. In many cases, investments and improvements have been put forward to address the issues and opportunities. Several topics will be discussed:

- Ohio's rail network needs to change to meet the needs of Ohio's changing industrial base.
- Rail maintains an important role for economic development in Ohio.
- Due to unique characteristics of rail service in Ohio, rail usage within the state is particularly sensitive to fluctuations in rail rates and service.
- Ohio continues to be an intermodal hub, and the intermodal network continues to change.
- Demand exists for more access to the Ohio rail network, as well as more connections within the rail network.
- Local railroads in Ohio continue to face challenges.
- Continued efforts are needed to address safety and quality of life issues related to modal conflicts.

4.1 OHIO'S CHANGING INDUSTRIAL BASE

4.1.1 Ohio's Changing Steel Industry

Ohio's rail network was built to serve an economy that was in many ways different from today's. For example, Ohio's steel industry traditionally relied on rail transportation for raw material inputs, movements between steel plants for intermediate steps of the steel manufacturing process, and delivery of finished steel products. Ohio remains the nation's second-largest steel producer behind Indiana, and the steel industry continues to be a major user of rail in the state. Figure 4-1 displays the location of steel production facilities in Ohio. Of these, AK Steel in Middletown and ArcelorMittal in Cleveland are basic oxygen process furnaces (integrated) steel mills. Most of the rest are electric arc furnaces (minimills).

The technology and location of Ohio steel mills has changed. In the past, more integrated steel mills operated in Ohio and were concentrated in areas where steel production has since fallen. For example, two of the largest steel mills in the nation used to be located in Youngstown, which have since closed. Similarly, the Upper Ohio River was once a major steel manufacturing center, but mills have closed both in Ohio and on the West Virginia side of the river.

Figure 4-1. Map of Notable Ohio Steel Establishments (Employing over 400)

Source: Office of Research, Ohio Development Services Agency

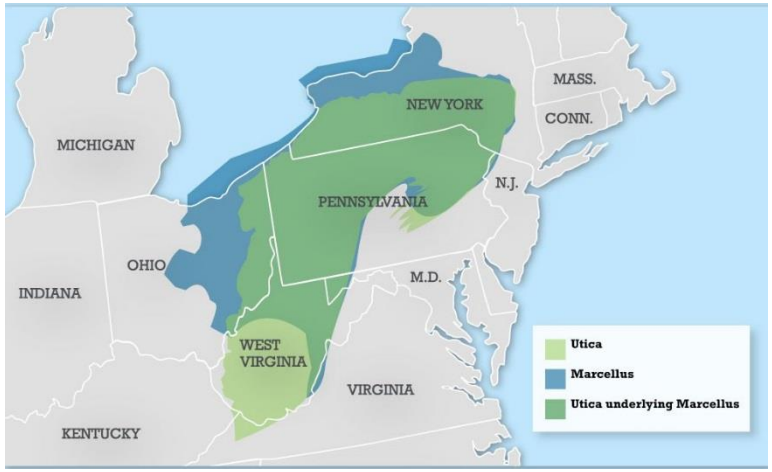
From the perspective of Ohio's rail network, these shifts have caused some rail assets to be underutilized while new needs have been created elsewhere. One of the largest terminals at the Port of Toledo is the CSX Toledo Docks. One dock handles metallurgical coal, while another handles iron ore, important inputs to integrated steel mills. These docks continue to serve the AK Steel plant in Middletown but are nevertheless underutilized, since they were originally constructed to serve a larger number of integrated steel mills. The overcapacity is a potential lost opportunity.

At the same time, other assets are being redeveloped and utilized for the current needs of Ohio's economy. Cleveland-Cliffs, Inc. is building a hot-briquetted iron production facility in Toledo at the port. Hot briquets are a relatively new technology. The plant will provide feedstock for electric arc furnaces. Hot briquets are a supplement to pig iron and scrap steel, the traditional feedstock for electric arc furnace mills. The process converts iron ore to metallic iron. This facility will utilize both the water and rail capacity at the Port of Toledo, and Ohio ORDC has provided financial support to improve the rail access to the facility.

4.1.2 Ohio's Petrochemical Opportunities

With improvements in gas drilling technology, natural gas extraction in the Appalachian region has increased dramatically. Natural gas is extracted from shale rock formations, including the Marcellus and Utica formations shown in Figure 4-2. Most production has been in Pennsylvania, West Virginia, and Ohio.

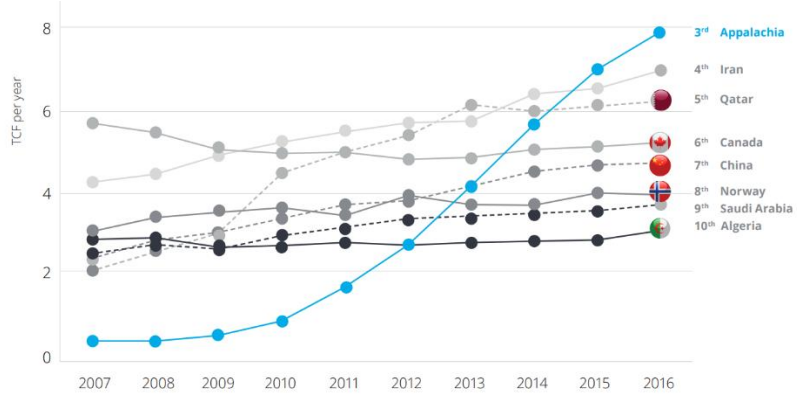
Figure 4-2. Location of Utica and Marcellus Formations



Source: Marcellus Shale Coalition

To place the growth of the region's natural gas production into perspective (Figure 4-3), if the region were a country, its production would be ranked third in the world above countries such as Iran and Qatar.

Figure 4-3. Appalachia's Ranking among Natural Gas Producers



Source: Deloitte Consulting

Natural gas (methane) is generally transported by pipeline, but the inputs to natural gas extraction are often shipped by rail. Typically, a shale well requires 30 rail carloads of inbound well-service materials (e.g., pipe, sand, aggregates and lubricants) and can produce more than 20 rail carloads of outbound materials (e.g., drill cuttings, brine water, natural gas liquids, and crude). Furthermore, much of the gas extracted in Ohio is "wet gas," which includes natural gas liquids such as ethane and butane that may be shipped by rail.

An opportunity exists for the region to develop a petrochemical industry in eastern Ohio around natural gas and its byproducts. Ethane, for example, can be converted to ethylene, which is a feedstock for plastics. It is important to regional economic development to keep value-added processing in the area rather than shipping natural gas and its byproducts elsewhere for processing. For example, the Gulf Coast around Texas and Louisiana similarly has seen a boom in shale gas production. However, because of the existing resin manufacturing base in the Gulf Coast region, resin manufacturing capacity in this region has grown dramatically over the past several years with billions of dollars of investment. As of late 2018, the Port of New Orleans reports record-breaking exports of plastic resins.

Infrastructure is needed to keep value-added processing within the Appalachian region. Much of this infrastructure is not rail-related, including gathering lines, processing plants, pipelines, storage facilities, and fueling stations. However, rail also plays an important role. Retaining value-added activities in the area not only supports the local economy but is also more efficient. For example, a local manufacturer near Steubenville sources plastic pellets from the Gulf

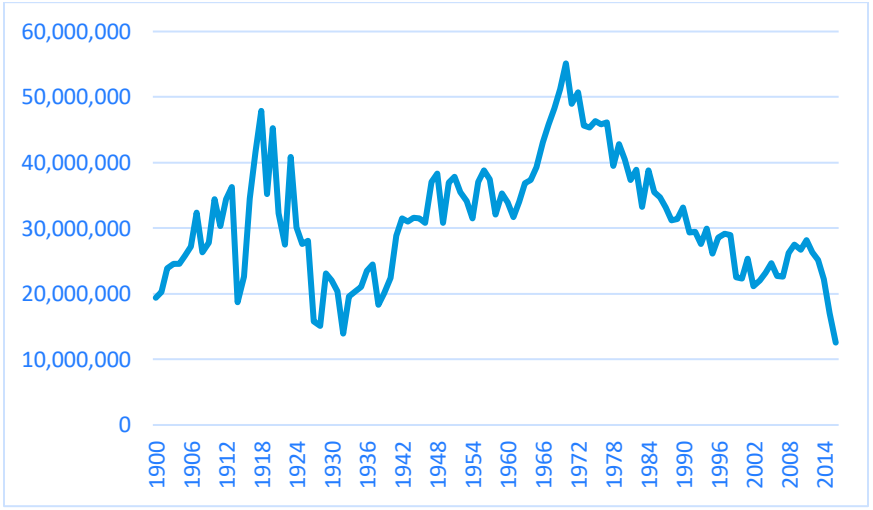
Coast.[1] If the plastic pellets could be locally sourced, shipping costs would be reduced, and the manufacturer could produce at lower cost.

Rail infrastructure on the Ohio River near the shale gas production area of eastern Ohio was designed to support the steel industry. It must be modified to support energy-related opportunities or other rail traffic. ORDC was awarded a $16.5 million 2018 Infrastructure for Rebuilding America (INFRA) grant to rehabilitate 30 miles of Norfolk Southern Railway line in Jefferson and Belmont Counties, which has a total cost of $31.8 million. The project, which also includes improvements to rail yards at Mingo Junction and Martins Ferry, is a necessary improvement to support a proposed $10 billion ethane cracker plant along the Ohio River 120 miles west of Columbus. Stakeholders noted that rail would also be a component of a planned shale hub near Steubenville, which would store and distribute ethane.

4.1.3 Addressing Changes in Coal Markets

Coal is an important commodity to Ohio's rail network. As discussed in Page 2-44, as of 2016 coal remained the top commodity for both traffic originating from and terminating in Ohio. Much of this traffic is intrastate with 42 percent of coal tonnage shipped by rail terminating in Ohio being shipped from sources within the state. However, as shown in Figure 4-4, Ohio's 2016 coal production was less than a quarter of the state's peak coal production in 1970. Furthermore, Ohio's coal production has not remained in the same place. Throughout the history of Ohio's coal industry, stretching back into the early 19th century, mines have been developed and then abandoned. Abandoned coal mines are so common in areas such as eastern Guernsey County, that they hamper economic development, since developable properties are literally undermined.[2] Since many of these mines were once served by rail, southwestern Ohio is also dotted with underutilized or abandoned rail lines. In addition to the decline in Ohio's coal production, coal consumption in Ohio has also declined (Figure 4-4). Shipments of coal terminating in Ohio fell by over half between 2008 and 2016. This too has created underutilized rail lines that formerly served Ohio power plants.

Figure 4-4. Ohio Coal Production in Tons (1900 – 2016)



Sources: U.S. Geological Survey, U.S. Energy Information Administration

The Buckeye Hills Regional Council, which serves eight counties in southeastern Ohio, reported that abandoned rail corridors are a major

[1] From discussion with Brooke Hancock Jefferson MPO.

[2] Because the location of mines is uncertain, test bores must be dug, which adds cost. If a location is undermined, a mine must be filled with slurry or a building must be built on caissons, either of which is expensive.

issue in the region due to uncertainty of ownership. Within southeastern Ohio, Perry County in particular has a high number of abandoned corridors. Frequently, it is unclear who owns the properties, and local governments would like to initiate an effort to identify ownership. Sometimes, the best use of these rights-of-way may be as recreational trails. Southeast Ohio has a strong tourist industry, and the additional trails could support this. Before corridors can be converted, ownership must be established.

The presence of abandoned and underutilized rail lines points to a need to develop a policy and/or guidance to help define actions to address disposition of the lines. This could provide guidance in determining the following:

- The ownership of abandoned rail corridors
- The best use of an underutilized corridor, whether that be as any of the following:
  - Preservation as a rail corridor
  - Conversion to a recreational trail
  - Repurposing as something other than a corridor
  - Some other function such as a utility corridor.

4.2 IMPORTANCE OF RAIL TO ECONOMIC DEVELOPMENT IN OHIO

During stakeholder outreach conducted for this Rail Plan, rail transportation was consistently viewed by stakeholders as valuable to economic development. Numerous stakeholders were concerned about a lack of rail-served industrial sites. Rail access can be an important differentiator in marketing industrial sites to potential companies that might move into an area. Economic development officials consulted for this Rail Plan were interested in having rail sidings or spurs installed at industrial sites located near rail lines. Fifteen projects to provide rail access to industrial sites were identified.

JobsOhio has completed an innovative initiative (SiteOhio) to identify marketable industrial sites within the state. The initiative consisted of an in-depth review and analysis of sites submitted by local communities throughout the state. Sites authenticated through this initiative are considered ready for immediate development with a guarantee that all utilities are on site with adequate capacities, due diligence studies are complete, and the site is free of incompatible uses. While not a requirement, rail authentication is a component of the screening process and recognized as a critical element to attract specific industries.

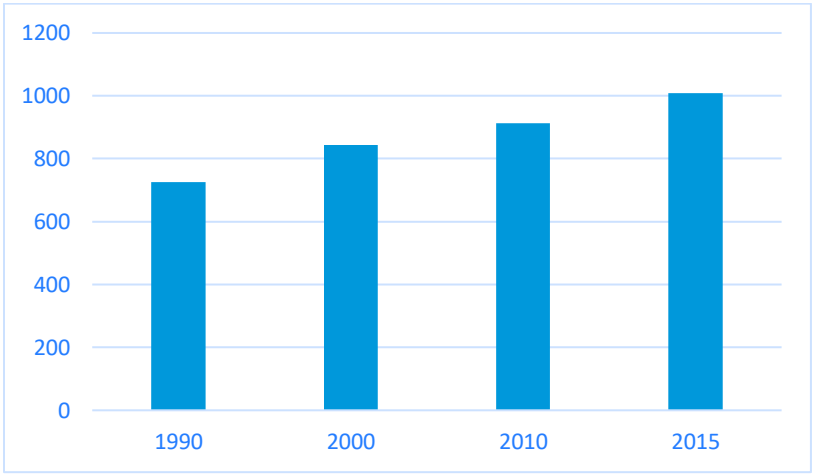
Additionally, railroads in the state often employ dedicated staff to facilitate industrial development projects and work with local, regional, and state economic development professionals on these projects.

4.3 SENSITIVITY OF OHIO SHIPPERS TO RAIL RATES AND SERVICE

Nationwide over the past 20 years, railroad transportation has become increasingly specialized, serving markets that are distinct and different from those served by truck transportation. Railroads have focused on markets where the economics of railroad transportation are more favorable than trucking. Some costs of railroad transportation are fixed and do not vary with trip distance or shipment volume. In general, the relative economics of railroad transportation improve with shipment distances and shipment sizes. It is usually much more efficient on a cost-per-ton-mile basis to ship trainload shipments (unit trains) than individual carloads or blocks of carloads and it is less costly per mile to use rail to ship long distances than short distances.

Average shipment distances in the United States have increased steadily with the average length of haul growing (Figure 4-5).

Figure 4-5. Average Nationwide Rail Haul Distance (Miles)



Source: Association of American Railroads

At the same time, shipment sizes have increased. As evidence of this, the share of ton-miles in shipments of over 60 carloads (excluding intermodal) increased from 45 percent in 2000 to 55 percent in 2013.[3]

As mentioned on page 2-49, the average haul distance for shipments to and from Ohio is estimated to be 619 miles compared to 1,008 miles nationwide. Less than a quarter of the ton-miles originating or terminating in Ohio are in shipments of over 60 carloads compared to over half nationwide. Rail is used for shipping a wide variety of commodities to/from Ohio, not just products such as coal, grain, or petroleum, which typically exhibit longer haul distances and larger shipment sizes. Because of the relatively short shipment distances and small shipments in Ohio, trucking competes more heavily with

[3] Association of American State Highway Officials, 2018 Freight Rail Bottom Line Report.

railroad transportation in Ohio than in other parts of the United States. When rail costs rise or rail service falters, the attractiveness of rail as an alternative to trucking quickly deteriorates. Likewise, changes in the regulatory framework can impact competition between all freight transportation modes.

While average railroad revenue per ton-mile dropped significantly between the passage of the Staggers Act in 1980 and its low point in 2002, nationwide, revenue per ton-mile has steadily moved upward since 2002. Between 2002 and 2016, average revenue per ton-mile increased by 36 percent in constant dollars. If revenue per ton-mile serves as a proxy for rail rates and rail rates to Ohio shippers follow national trends, this has been a major price increase for shippers to absorb, particularly in Ohio where rail competes closely with truck transportation.

Agricultural producers sometimes have little flexibility in their ability to absorb increases in rail rates. Shipment costs must be less than the difference in price received for crops at a destination compared to its origin. During one stakeholder meeting, agricultural producers stated that some agriculture shippers are avoiding railroad transportation by selling crops to local food, feed, and ethanol processors rather than shipping by rail out of state. Whether this supply chain reconfiguration is in fact the cause or not, the tonnage of agricultural commodities shipped from Ohio fell by 10 percent between 2009 and 2016.

An aggregates shipper reported that shipment transit times had increased threefold at one point, causing the shipper to reduce rail volumes by half. Transit times have improved somewhat for this aggregates shipper but are nevertheless double, and rail shipment volume are down 15 percent from what they were before the service problems started.

State agencies such as ORDC do not have jurisdiction over rail rates or service. However, competition may help to mitigate price increases and deteriorating service. It is possible to promote competition by looking for cost-effective opportunities for new connections, supporting industrial locations or multimodal facilities that are served by multiple railroads, or providing support for local and regional railroads that can interchange with multiple Class I railroads.

4.4 OHIO'S STATUS AS AN INTERMODAL HUB AND CHANGES TO THE INTERMODAL NETWORK

Intermodal rail service has been a success story for Ohio. With 12 terminals, Ohio is the state with the third highest number of intermodal terminals in the country behind Illinois and Texas. Intermodal services to and from Ohio support retail and manufacturing and contribute to Ohio's $15.5 billion logistics industry. Intermodal service in and through Ohio removes truck traffic from Ohio's highway system, thus reducing congestion, pavement damage, and emissions, and improving safety. Ohio's intermodal network is continually evolving. The most recent changes are described in the following sections.

4.4.1 Heartland Corridor and National Gateway Corridor

During the completion of the *2010 Ohio Statewide Rail Plan*, the Heartland Corridor project to clear obstructions to allow double-stack intermodal trains to operate on the Norfolk Southern rail line between Chicago and the Port of Virginia was underway. The State of Ohio was also working with Norfolk Southern to clear the route between

Columbus and Cincinnati for double-stack operations. These projects have since been completed and have enabled intermodal services that would not have otherwise been possible.

At the time of the *2010 Ohio Statewide Rail Plan*, the CSX National Gateway Corridor project to clear obstructions to allow double-stack trains on the CSX rail line between Ohio and Washington, DC, between Baltimore, MD, and North Carolina, and between Wilmington and Charlotte, NC, had also been started. As of late 2018, CSX has completed a new tunnel in Washington, DC, which is the last of 61 projects to complete the National Gateway Corridor project.

The northwest end of the National Gateway Corridor is anchored with the NW Ohio Intermodal Terminal in North Baltimore, Ohio (Figure 4-6). Originally, the facility was intended to serve as a hub for a new intermodal hub-and-spoke operating model similar to the system used by the airline industry. Traditionally, intermodal service is point-to-point with trains operating directly between origins and destinations, occasionally with cars picked up or dropped off at smaller terminals along the route.

Figure 4-6. NW Ohio Intermodal Terminal

However, in late 2017, CSX announced that it would no longer be developing the hub-and-spoke system. In 2018 industry watchers report that North Baltimore is nevertheless fully utilized for local intermodal traffic and "block swapping." Under the block swapping role, intermodal traffic interchanges with western railroads in Chicago, as well as other locations, and is sorted at North Baltimore for movement to/from other parts of the CSX system. In late 2018, CSX announced a new haulage agreement with BNSF Railway to improve western access to the Ohio region whereby CSX would haul complete BNSF trains between Chicago and North Baltimore for processing at North Baltimore. CSX also announced new service to and from the Port of New York and New Jersey.

4.4.2 Jeffersonville Intermodal Facility

A new intermodal terminal, the Central Ohio Intermodal Center, is opening in Jeffersonville off I-71 southeast of Dayton and southwest of Columbus. The new terminal will provide international intermodal service between Jeffersonville and Vancouver, British Columbia. It is

made possible by a cooperative agreement between Canadian Pacific Railway, Indiana & Ohio Railway, and Bluegrass Farms. Containers from Asia will travel on the Canadian Pacific Railway between Vancouver and Chicago, transfer to the Chicago, Fort Wayne & Eastern Railroad in Chicago, and transfer to the Indiana & Ohio Railway in Lima, and then be offloaded at the Bluegrass Farms terminal in Jeffersonville.

Figure 4-7. Canadian Pacific/Indiana & Ohio Railway Service to Jeffersonville

Sources: Canadian Pacific

The project will provide new intermodal options to shippers in western and central Ohio. Traditionally, intermodal service to the Dayton area was provided through terminals in Columbus or Cincinnati, but the new terminal will be closer, requiring a shorter truck move. All other intermodal services in Ohio are provided by either Norfolk Southern or CSX. Canadian Pacific is a new entrant into the Ohio intermodal market, and the Canadian Pacific Railway/Indiana & Ohio Railway service could introduce a new competitive element to intermodal service offerings in the state. The terminal also provides export opportunities. Many containers arrive from Asia into the United States, then are unloaded and returned to Asia empty. Bluegrass Farms specializes in identity preserved,[4] food-grade soybeans. With the new facility, containers can be reloaded with identity preserved soybeans and returned to Asia full rather than empty.

To operate double-stack trains on the Indiana & Ohio Railway, several vertical obstructions must be cleared in the Springfield area. ORDC is assisting with a project to do so. The Chicago, Fort Wayne & Eastern Railroad. and the Indiana & Ohio Railway also intend to improve speeds along their rail lines on which the service will rely so that the route will be rated to 40 miles per hour.

4.5 DEMAND FOR ADDITIONAL RAIL ACCESS AND CONNECTIVITY

4.5.1 Access

Through outreach for this Rail Plan, stakeholders have identified needs for additional access to the rail network. As mentioned in Section 4.2, economic development official put forward projects to add rail access

[4] Identity preserved soybeans are kept separate from other soybeans during the storing and shipping process so that unique characteristics of these particular soybeans are not lost through comingling.

to industrial locations, including new sidings and spurs. Local railroads surveyed for this Rail Plan recommended additional projects to either improve existing access to customers or add new access to industrial locations.

Accessing the rail network is more costly and difficult in areas served by high-density mainlines instead of a low-density branch lines or local railroads. For example, an industrial park is under development in Lorain. While the development is adjacent to a Norfolk Southern Railway mainline, it is uncertain if the park will be rail-served due to the cost and difficulty of providing access.[5]

For shippers that do not have direct rail access to their locations, transload facilities can serve as alternate points of access to the rail network. Local railroads surveyed for this Rail Plan put forward seven potential transload facilities with an estimated construction cost of $19.7 million. Similar to other freight rail development projects, ORDC has financially supported the development of transload facilities with demonstrated public benefits.

4.5.2 Connectivity

Rail lines cross each other at many locations around Ohio. However, there are fewer locations where rail traffic can move from one line or railroad to another. Additionally, because many of these connections were put in place years ago, the connections are often not optimized for rail traffic needs. Railroads and other stakeholders surveyed for this Rail Plan have identified four projects to improve interchanges between railroads with an estimated cost of $59.5 million.

4.6 CHALLENGES TO OHIO'S LOCAL RAILROADS

A challenge for many of the local railroads in Ohio and nationally is to maintain their infrastructure in a state of good repair. Local railroads have fewer financial resources than Class I railroads. Data published by the Association of American Railroads suggests that the average revenue per route mile operated by a local or regional railroad is about one-eighth that of a Class I railroad.[6] In a survey of local and regional railroads in Ohio conducted for this Rail Plan, respondents reported 244 miles of Federal Railroad Administration (FRA) Class Excepted track, which is track in poor condition that typically does not meet the minimum standards of the FRA track classification system. Bridges are also an issue. Some bridges have reached or are nearing the end of their useful life or cannot accommodate industry standard 286,000-pound capacity rail cars. Several local railroads have warned that bridges on their lines are approaching the ends of their useful lives, and that they are in danger of closing lines unless bridges can be rehabilitated.

In addition, local railroads reported that 147 miles of track cannot accommodate industry standard 286,000-pound capacity railcars. Some of these miles are among the 244 miles of FRA Class Excepted track, but others are FRA Class 1 track or better, which are nevertheless unable to accommodate 286,000-pound railcars. In addition to track, bridges can also limit the capacity of railcars that a

[5] Ohio Department of Transportation, Ohio Maritime Study, Working Paper 5 – Options for Enhancing Use of Ohio's Maritime Transportation System, November 2017.

[6] Route mileage and revenue data from the Association of American Railroads, *Railroad 10 year Trends2005 – 2014*, 2012 Industry Overview, page 9.

rail line can accommodate. The inability to handle heavier rail cars places shippers on these lines at a disadvantage. The rates that shippers pay per railcar are often the same regardless of railcar size. Because 263,000-pound railcars typically hold around 10 percent less freight than 286,000-pound railcars, shippers pay the same amount but are restricted to ship less per railcar. The limitation affects not only the portion of the rail move on the local railroad's line, but the entire rail move. Thus, the local railroad becomes a bottleneck. The problem will worsen as smaller capacity railcars are retired, and shippers must pay extra for high-capacity railcars that cannot be fully loaded due to weight restrictions.

Some local railroads in Ohio operate over rail lines owned by others, such as Class I railroads, local governments, or the State of Ohio. The dynamics of who decides or who has the incentive to upgrade a line will depend upon the terms of a lease agreement. Twenty-eight track/bridge rehabilitation and upgrade projects worth over $42.3 million were put forward based on a survey of local railroads in this Rail Plan. Additional needs were mentioned by a local government owner of rail lines.

Another issue for local railroads in Ohio is the federal requirement to install positive train control (PTC). Local railroads are generally exempt from the requirement to install PTC on their own rail lines. However, in some cases, these railroads must operate over Class I rail lines for efficient interchange that will be equipped with PTC. The Class I host railroad may require that a short line accessing their track have locomotives equipped with PTC. The difficulty with PTC implementation for local railroads is twofold. First, local railroads' locomotives are often at least 25 years old and not designed to accommodate modern electronics such as for PTC. Second, companies must also have the relevant "back office" infrastructure to communicate with Class I PTC systems. Given the small operating budgets of local railroads, these costs can be prohibitive. Several local railroads have expressed significant concern over the impact of PTC, indicating that the requirement may force them to curtail operations.

4.7 CONTINUED EFFORTS TO REDUCE MODAL CONFLICTS

4.7.1 Highway/Rail Crossing Safety Issues

Ohio is a crossroads state with extensive transportation infrastructure that features a dense network of railroads. Within the state are approximately 5,000 miles of active rail in the state as well as approximately 127,000 miles of roadway, resulting in a large number of public crossings. As of 2017 approximately 5,800 at-grade vehicular public crossings were located in Ohio of which 58 percent have lights and gates, 32 percent have passive systems such as crossbucks, and 10 percent have flashing lights.

Ohio has experienced some variation in crash numbers in the last five years. Eight grade-crossing fatalities occurred in 2017, up from six in 2016. A source of frustration is the number of crashes that occur at crossings with active warning devices. Six of the fatalities in 2017 were at crossings equipped with lights and gates, and most crashes (82 percent) occurred at crossings with active devices. ORDC has addressed this trend by expanding its formula program to include crossings that are already equipped with lights and gates. Nine projects were programmed under this new initiative.

In recent years, grade-crossing safety projects have increased in complexity and present greater challenges, particularly in urban areas. ORDC continues to seek ways to address these challenges through planning initiatives and cooperation with railroads and local entities.

4.7.2 Blocked Crossings

Stakeholders consulted for this Rail Plan expressed concern about highway/rail grade crossings that are blocked by trains for extended periods of time. These can create hazards, such as a crossing in Lima that causes traffic to back up near a ramp to an interstate highway. At blocked crossings with significant pedestrian traffic at multiple locations across Ohio, pedestrians have been seen climbing through trains. Some communities are concerned about emergency vehicles being blocked by trains at crossings for long periods of time. Monroe Township in Butler/Warren Counties for example, is spending $7 million on a new firehouse to make sure that the community can respond to an emergency when a train is blocking access from the main fire station. Stakeholders feel that the problem has become worse recently with operational changes to the Class 1 railroads such as increased length of trains. Beyond safety concerns, blocked crossings can also harm quality of life for residents and the economic development opportunities for affected communities. For example, Ohio Department of Transportation is progressing a project on State Route 309 in Marion County. In this instance, the trains accessing the facility block trucks accessing the same facility.

Grade separation of roadways and rail lines is a guaranteed way to eliminate blocked crossings. In 1999, Ohio began the Rail Grade Separation Program in response to increased train traffic on certain lines in the state due to Conrail splitting their operations between CSX and Norfolk Southern. This program provided $200 million in funds for grade separation projects. These funds are now exhausted. A neighboring state, Indiana, recently announced the availability of over $121 million in matching funds for their Local Trax program. This program was developed in partnership with railroads operating in the state and is intended to fund grade crossing safety projects, including grade separations. Grade separations are a comprehensive solution to blocked crossing issues but are often difficult to implement because of cost and disruption to adjacent property. Several alternative strategies are being considered in Ohio:

- **Public notification of blocked crossings.** Communities are experimenting with using technological solutions to notify drivers of blocked crossings before reaching the crossing so that drivers can consider alternate routes where possible. These efforts range from customized software solutions to stationary cameras with YouTube channels.
- **Reduction in redundant crossings.** In some areas of the state, crossing blockages occur at crossings where trains use passing sidings or are stopped for crew changes. One initiative is to identify mitigation measures that would eliminate the need for the crossing, thus providing railroads the capacity to perform their necessary operations.

ORDC is working with the railroads to determine if improvements to track infrastructure—such as power switches on sidings, extending sidings, upgraded signaling or other such improvements—could increase rail network fluidity and reduce the amount of time crossings are blocked.

4.7.3 Other Crossing Issues

Some stakeholders complained about humped crossings. Humped crossings can be problematic for buses, as well for agricultural equipment that may need to be moved on roadways.

Rough crossings are frequent subjects of complaint for the traveling public. In 2015, ORDC and ODOT partnered on a pilot program to address rough crossing concerns. The program, which was limited to ODOT-maintained roadways, expended nearly $1 million to repair and rebuild rough crossings throughout the state. These funds were provided on a 50-50 railroad/state matching basis with railroads guaranteeing the condition of the surface for 10 years. While the pilot program has ended, it has provided a framework for ODOT to partner with railroads on roadway improvement projects involving grade crossings.

4.7.4 Movable Rail Bridges

For the Port of Toledo, modal conflicts are limited to not only those between rail and roadway users but also conflicts between rail and marine vessels. Several movable rail bridges on the Maumee River routinely become stuck in a closed position, halting maritime traffic to/from much of the Port of Toledo until the problem is resolved.

4.7.5 Non-Compatible Railroad Assets

One area of concern multiple stakeholders identified was the non-compatibility of existing rail assets within the context of the communities' needs. Many examples were provided, but most focused on rail overpasses and train noise. Some rail overpasses are too low for all tractor semi-trailers to clear. In Lima, on average one tractor semi-trailer becomes stuck per month under the same overpass. Inexperienced drivers follow GPS navigation to the underpass. According to local officials at Lima, height restrictions of rail overpasses hinder economic development in this corridor, which is zoned for commercial use. Other jurisdictions reported rail overpasses with inadequate clearances as well. As with Lima, alternate crossings are less than optimal for the community's purposes. Further discussion of this issue appears in Section 2.1.7 under the Community Impacts section.

In other instances, the land use surrounding the rail asset has changed, bringing rail crossings into conflict with the new development around the crossing. Several stakeholders mentioned the need for quiet zones. For example, the former Hercules Engine Factory in Canton is being redeveloped as a residential apartment building, but the building is located next to a crossing where trains are required to sound their horns. This was not a problem when the building was a factory but is problematic when the building is used for residential apartments. With quiet zones, railroads are asked to cease routine sounding of horns when approaching crossings within a specific area. In exchange, communities are required to mitigate the additional risks from trains no longer sounding their horns. These include the introduction of safety countermeasures at each grade crossing in the area. Traditional grade crossing safety funds are not eligible for quiet zones unless the creation of a quiet zone includes the closure of at least one highway/rail grade crossing. Communities in Ohio often struggle with the costs associated with the safety improvements required to implement quiet zones.

5. Rail Service and Investment Program

5.1 VISION, GOALS, AND OBJECTIVES

In advance of the January 16, 2018 commission meeting, Ohio Rail Development Commission (ORDC) commissioners were presented with the opportunity to consider the vision, mission, goals, and objectives as adopted on November 11, 2010 and determine if these still accurately represented the State of Ohio's rail-related vision. The commissioners confirmed that ORDC's vision and mission as well as its corresponding goals and objectives would remain unchanged.

5.1.1 Vision Statement

ORDC's vision is for Ohio to have the best rail system in the world. ORDC will implement programs and policies that foster a globally integrated, safe, reliable rail system, that creates and retains jobs, and maximizes the public benefit to Ohio's communities and industries.

5.1.2 Mission

ORDC's mission (adopted in 1994) is to plan, promote, and implement the improved movement of goods and people faster and safer on a rail transportation network connecting Ohio to the nation and world. The mission is to be accomplished through a coordinated freight and passenger rail system that is an integral part of a seamless intermodal transportation network that contributes to Ohio's quality of life and economic development.

5.1.3 Goals and Objectives

The following goals and objectives support the vision statement and mission. Goals clarify the mission and vision, while objectives provide guidance as to the actions and policies that will support each goal.

Goal: Economic Development

Support a fully integrated, well-managed transportation system that drives business growth, prosperity, job creation and retention.

OBJECTIVES

- Preserve and enhance existing rail lines and corridors.
- Provide rail access to retain existing and attract new businesses.
- Provide Ohio's communities and industries with transportation options, connectivity and opportunities.

Goal: Funding

Secure funding for rail projects supporting a transportation network that provides a public benefit to Ohioans.

OBJECTIVES

- Identify the public benefit of all rail projects.
- Identify financial resources for rail projects and programs.

Goal: Safety

Work with railroads, the Public Utilities Commission of Ohio and the Ohio Department of Transportation to maintain a safe rail system.

OBJECTIVES

- Increase number of locations with warning devices.
- Increase number of at-grade crossings closed.
- Reduce derailments.

Goal: Environmental Benefits

Support sustainable rail programs and projects that enhance Ohio's environment.

OBJECTIVE

- Improve environmental quality, especially in terms of air quality

Goal: Balanced Transportation Policy

Increase support for rail

OBJECTIVES

- Educate and inform Ohio citizens and decision-makers about the public and private benefits of rail.

Goal: Efficient Railways

In a partnership with the private railroads, create a fast, frequent and reliable rail network that connects Ohio to the national transportation system.

OBJECTIVES

- Improve on-time performance.
- Preserve, maintain, expand and modernize Ohio's rail system, including main lines and branch lines.
- Preserve existing track and rail rights-of-way for future use.
- Improve access to global and domestic markets through seamless intermodal connectivity.
- Provide improved transportation choices for Ohio communities and industries.

5.2 PROGRAM COORDINATION

The rail-related strategies included in *Access Ohio 2040* and *Access Ohio 2045*, the state's most recently completed multimodal long-range transportation plans, were reviewed in preparing this Rail Plan.

Multistate perspectives were also incorporated into this Rail Plan. Ohio has included input to this Rail Plan from multistate planning organizations, such as from the six metropolitan planning organizations that cross Ohio's borders into neighboring states. Ohio is participating in the Federal Railroad Administration's Midwest Regional Rail Planning Study.

5.3 RAIL AGENCIES

No state rail agency organizational, policy, or legislative changes are anticipated at this time, nor are new programs.

5.4 PROGRAM EFFECTS

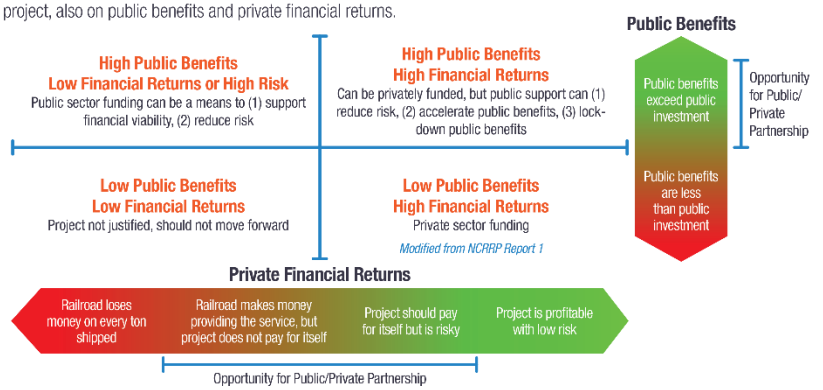
ORDC evaluates projects through the lens of the goals outlined in Section 5.1. By determining which goals a project accomplishes, and the magnitude of a project's impacts on the goals, ORDC can determine the qualitative value to the state of completing a particular project, and how a project may compare to any other project in the pipeline. The more benefits a project creates, the higher the priority of a given project. Since ORDC has a limited budget and cannot progress every project, projects can then be ordered to determine which projects should be funded and at what level.

ORDC funding and financing focuses on projects that would not have been possible without public-sector involvement and projects that would not have been adequately funded by the railroads alone or not funded at all. These are projects with significant public benefits but with financial returns would not attract enough stand-alone private investment.

The public sector plays an important role developing rail projects. Railroads will invest in infrastructure and other assets when a project is expected to produce targeted financial returns at an acceptable level of risk. Public investment in railroad assets can improve those financial returns whether as a sole investor or ideally through a financial partnership with the railroad. Opportunities for these public/private partnerships lie where public benefits are significant and where the private sector railroad partner would earn its required financial return on the service that a project makes possible but either would not be able to recoup the cost of the initial investment or would incur unacceptable levels of risk of not being able to do so without the public contribution. Figure 5-1 illustrates this concept by a matrix that includes public benefits on the vertical axis and private returns on the horizontal axis.

Figure 5-1. Role of Public Investment Depending on Public Benefits and Private Returns

Whether public sector involvement in a freight rail project is justified depends not only on the type of railroad and the type of project, also on public benefits and private financial returns.



Source: AASHTO Freight Rail Study, 2018

5.5 FREIGHT AND PASSENGER ELEMENT

Due to the way rail projects in Ohio are funded and State of Ohio policies, ORDC typically addresses opportunities to further the State of Ohio's rail vision, goals, and objectives as those opportunities arise, rather than according to a long-term plan. Freight rail and crossing projects are funded on a rolling basis.

Given this practice, a useful role of this Rail Plan is to propose projects that the agency may consider sponsoring for a federal grant. ORDC has sponsored rail projects for competitive federal discretionary grant programs, including BUILD (formerly TIGER) and INFRA (formerly FASTLANE). The agency could also consider FRA-administered programs from the Fixing America's Surface

Transportation (FAST) Act, such as Consolidated Rail Infrastructure and Safety Improvements (CRISI) grants.

When Notices of Funding Opportunity for discretionary grant programs have been issued in the past, the State of Ohio has solicited stakeholders for any potential projects that could be candidates for a grant. This Rail Plan will assist in these efforts by providing a pool of potential projects in advance of the release of Notices of Funding Opportunity rather than the current reactive approach. These are presented not as a long-range investment plan, but rather a short-range pool of projects to consider. Because needs identified in this Rail Plan are a snapshot of needs in one given year, new projects could be added to this Rail Plan as conditions change.

The 123 projects listed in Appendix B to be considered for federal discretionary grant applications are drawn from a list of needs that have been identified during the preparation of this Rail Plan. Of these, 84 have cost estimates, the sum of which is approximately $1.84 billion. Projects are summarized by category in Table 5-1.

Projects were identified through the following process:

- Review of MPO long-range transportation plans
- Meetings with MPO representatives and port authorities
- Survey of local and regional railroads
- Meetings between ORDC local and regional railroads

Table 5-1. Number and Costs of Projects by Project Category

Category	All Projects	Projects with Cost Estimates	Cost of Projects with Estimates
Bridge rehabilitation – bring railroad bridges to modern standards and a state of good repair	3	3	$2,000,000
Grade separation – grade separate rail and highway rights-of-way	15	11	$169,904,000
Industrial access – build rail sidings or spurs to industrial locations	15	5	$9,541,000
Passenger rail – improve existing infrastructure or build new infrastructure to improve passenger service	16	11	$1,023,923,000
Rail capacity – improve rail yards or rail lines to expand capacity	16	12	$100,393,000
Rail connection – establish or improve connections between rail lines	4	4	$65,248,000
Rail rehabilitation - bring rail lines to modern standards and a state of good repair	28	21	$42,298,000
Road clearance – raise the level of rail overpasses to	10	6	$88,925,000
Other – create rail bypass, new rail line, preserve right-of-way, build new bridge, improve crossing	8	4	$300,650,000
Transload or intermodal – improve or construct new transload or intermodal terminal	8	8	$39,434,000
Grand Total	**123**	**84**	**$1,842,816,000**

ORDC staff have reviewed these projects and selected a subset that as of 2018/2019 could be considered for a federal grant. No attempt has been made to assess the likely public benefits of these projects and relative merits as described in Section 5.4. Rather, projects have been reviewed solely based on their readiness. To be included in a federal grant application, projects must meet the following criteria:

- The size of projects and size of likely requested funding would be consistent with past federal discretionary grant programs. The project would likely fit the eligibility and criteria of federal discretionary grant programs and would be consistent with ORDC's mission.
- If sponsored by an MPO, the project is fiscally constrained[1], has funding for one or more phase of the project committed in the Statewide Transportation Improvement Program or the MPO's Transportation Improvement Program. There is some idea of funding necessary for the project to advance.
- The project is either sponsored by the asset owner (railroad or other owner of the rail line or structure), or the asset owner has endorsed the project. There is a funding estimate for the project.

Additionally, ORDC recognizes that stakeholders may have expended funds on planning studies for projects where funding estimates for future phases, either additional planning or actual construction, are unknown. Potential future phases of such projects will be considered for potential sponsorship for a federal grant application if there is reasonable understanding of the technical challenges involved in completing that phase. Table 5-2 summarizes the subset of projects that appear to be ready for consideration for a federal grant application. Because these projects lack cost estimates for the potential future phase(s), asterisks appear next to the project categories. These projects are also listed in Appendix C.

Table 5-2. Projects to be Considered for Federal Competitive Grant Applications

Category	All Projects	Projects with Cost Estimates	Cost of Projects with Estimates ($2018)
Bridge rehabilitation – bring railroad bridges to modern standards and a state of good repair	2	2	$2,000,000
Grade separation – grade separate rail and highway rights-of-way	8	8	$122,444,000
Industrial access – build rail sidings or spurs to industrial locations	5	4*	$5,130,000
Passenger rail – improve existing infrastructure or build new infrastructure to improve passenger service	5	2*	$2,373,000
Rail capacity – improve rail yards or rail lines to expand capacity	11	11	$51,413,000
Rail connection – establish or improve connections between rail lines	3	3	$3,498,000
Rail rehabilitation - bring rail lines to modern standards and a state of good repair	21	21	$42,298,000
Road clearance – raise the level of rail overpasses to allow tractor/semi-trailers to pass underneath	1	1	$12,841,000
Other – create rail bypass, new rail line, preserve right-of-way, build new bridge, improve crossing	2	2	$32,065,000
Transload or intermodal – improve or construct new transload or intermodal terminal	8	8	$39,434,000
Grand Total	**66**	**62**	**$313,496,000**

* Funds have been invested in certain projects, but the cost of future phases is unknown.

While ORDC may sponsor listed projects for a competitive grant application, inclusion in Table 5-2 does not imply a commitment on

[1] The MPO believes that the project can be implemented using committed, available, or reasonably available revenue sources.

ORDC's part to do so. ORDC also reserves the right to submit projects not on the list of projects if the proposed project meets its goals and objectives. Furthermore, sponsoring a project for a competitive grant application does not guarantee that a project will be funded. Since the first round of the TIGER Infrastructure Grant program in 2009 through early 2018, 36 applications for 25 rail projects in Ohio (including grade separations) have been submitted for federal competitive multimodal grant programs, including TIGER, FASTLANE, and INFRA. These were submitted by a range of applicants, including state agencies, local governments, port authorities, and regional planning organizations. Total funding requested was $758 million. Some of the projects that did not receive a grant are included in Table 5-2. Grant applications resulted in four rail-related awards in Ohio worth $136 million:

- $98 million for the CSX National Gateway Corridor project in 2009
- $16 million for improved access to the Rickenbacker intermodal facility in 2012
- $6 million for a grade separation in Akron in 2017
- $16 million for improvements to the Norfolk Southern Ohio River Line in 2018.

Between 2009 and early 2018, ORDC has submitted six applications for five projects, of which two have been funded.

5.6 RAIL STUDIES AND REPORTS

Planned and/or ongoing rail and rail-related transportation system studies and reports include the following:

- **Highway Safety Improvement Program Report** is prepared annually for the Federal Highway Administration to report on the use of federal grade-crossing safety funding and outcomes of funded projects. This report is completed by ORDC staff.
- **Ohio Railroad Safety Plan** outlines the state's six objectives for improving railroad safety and highlighting programs dedicated to this purpose. The 2011 plan was updated and submitted to the FRA in early 2018. This report is completed by ORDC and PUCO staff.
- **Rail Crossing Pilot Study** is being undertaken by ORDC and ODOT to develop options for assessing highway/rail crossings along corridors with mobility challenges for highway and railroad users. Additionally, the study will investigate options to address chronically blocked crossings with relatively low-cost highway and/or railroad capital improvements.

6. Coordination and Review

Numerous stakeholders were involved in preparing this Rail Plan, and their input has been fundamental to its preparation.

6.1 APPROACH TO PUBLIC AND AGENCY PARTICIPATION

Stakeholder and public input for the Rail Plan focused on complementing, integrating, and filling any gaps in developing this Rail Plan. The stakeholder involvement fostered a dialogue between Ohio Rail Development Commission (ORDC), the public, and key stakeholders.

6.1.1 Approach to Stakeholder Participation

An important early step in the stakeholder outreach effort was to develop a database of stakeholder contacts. The database consisted of the types of stakeholders as displayed in Table 6-1.

Table 6-1. Stakeholders in Stakeholder Contact Database

.	Number of Contacts
Academics	4
Advocacy Groups	28
Economic Development Groups	35
Government Agencies	11
Port Authorities	28
Railroads	52
Regional Councils and MPOs	26
Shipper Groups	21
Shipper Companies	198

A different outreach approach was adopted for each type of stakeholder as shown in Table 6-2. Outreach activities focused on in-person and phone discussions with key stakeholder groups. Meetings generally began with the project team describing the purpose of this Rail Plan and the need for input. The project team then solicited input. In some cases, discussion was general, but in other cases, if stakeholders had difficulty identifying rail-related issues and opportunities, the project team would review potential issues and opportunities. These included crossing/safety issues, land use, short line/rail preservation, rail system access, passenger rail issues, opportunities related to economic development, or potential usage of rail to reduce highway traffic volumes. Records were kept of all meetings, interviews, conference calls.

Table 6-2. Outreach Approach by Type of Stakeholder

Type of Stakeholder	Outreach Approach
Academics	Academics were contacted by phone and invited to give feedback for the rail plan.
Advocacy Groups	All Aboard Ohio gave feedback at an ORDC Policy Commission meeting. Otherwise, advocacy groups were contacted as appropriate.
Economic Development Groups	JobsOhio was contacted for input to the rail plan. Emails were sent to all other economic development groups on the list inviting them to take part in an interview or to complete online survey.
Government	Government officials were involved in the rail plan as appropriate.
Port Authorities	Nine port authorities were identified as being particularly concerned with rail. These nine were contacted by phone and invited to meet with the project team. The remaining port authorities were sent an email inviting them to speak with the project team or complete the online survey. Meetings were held with the West Central Ohio Port Authority, the Toledo-Lucas County Port Authority, Cambridge-Guernsey County Community Improvement Corp, Coshocton Port Authority in April 2018. Conference calls were held with the Marion Port Authority and the Heath-Newark-Licking County Port Authority in April 2018.
Railroads	Meeting was held with the Ohio Railroad Association in December 2017. Surveys/information requests in fillable Adobe Acrobat format were sent to all local and regional railroads operating in Ohio. Customized questionnaires were sent to Norfolk Southern, CSX, and Amtrak. Follow up calls and emails encouraged railroads to respond. Responses were received from Norfolk Southern, CSX, and 17 local/regional railroads.
Regional Councils and MPOs	A presentation was given at Ohio Association of Regional Councils meeting in February 2018. Each MPO was invited to meet with project team. The project team met with Lima-Allen County Regional Planning Commission, Buckeye Hills Regional Council, Brooke Hancock Jefferson MPO, Miami Valley Regional Planning Council, Toledo Metropolitan Council of Governments, Stark County Regional Planning Commission, Ohio Mid-Eastern Governments Association, Northeast Ohio Areawide Coordinating Agency, Mid-Ohio Regional Planning Commission in April and May 2018. The project team also presented at Ohio-Kentucky-Indiana Regional Council of Governments Coordinating Committee in February 2018.
Shipper Groups	All shipper groups were sent an email inviting them to meet with the project team. Meeting was held with Ohio Agriculture Business Association membership at an ORDC conference room in February 2018. Conference call was held with representatives of Ohio Aggregate and Industrial Minerals Association in June 2018.
Shipper Companies	Emails or hard copy letters were sent to all shipper companies, depending on whether email addresses or physical addresses were available for each contact. The letters/messages invited each o take part in an interview with project team member or to complete an online survey. The project team met with two port terminal operators in April 2018 and conducted a phone interview with another in March 2018. Twenty-three shipper responses were received on the online survey.

6.1.2 Approach to General Public Participation

ORDC sought input from the general public (as opposed to stakeholders, who have a specific role in the rail network) for this Rail Plan by two means:

- **Online survey.** A link to an online survey was posted to the ORDC website between January 2018 and June 2018. A total of 341 responses were received. The results of the online survey are summarized in Appendix D.
- **ORDC Policy Committee meetings.** ORDC's Policy Committee meets every other month. Committee meetings are open to the public. Meetings in November 2017 and January 2018 were devoted to this Rail Plan. Stakeholders have used these meetings to provide input to this Rail Plan. A representative of the Ohio Rail Association provided input at the November 2017 meeting. Representatives from All Aboard Ohio, the City of Cincinnati, the Mid-Ohio Regional Planning Commission, and several members of the general public provided input at the January 2018 meeting.

6.2 COORDINATION WITH NEIGHBORING STATES

Three MPOs that cross the Ohio border were consulted in preparing this Rail Plan, including the Brooke Hancock Jefferson MPO, the Toledo

Metropolitan Council of Governments, and the Ohio-Kentucky-Indiana Regional Council of Governments. Consulted railroads operate across borders as well. These stakeholders raised a number of cross-border issues such as how rail can support energy-related opportunities in the Appalachian region and how rail can support the automotive industry in Ohio/Michigan.

Additionally, local organizations are coordinating passenger rail planning efforts, such as Mid-Ohio Regional Planning Commission (MORPC) coordinating its Lima/Pittsburgh passenger rail planning with Northeast Indiana Passenger Rail Association's Gary, Indiana, to Lima pre-environmental work.

6.3 ISSUES RAISED

Stakeholders raised issues and opportunities during this Rail Plan's preparation. Many of these issues were discussed in Chapters 3 and 4 and are summarized by subject area in the following sections.

6.3.1 Rail Corridor Preservation, Reactivation, Rail Service Preservation

- Stakeholders are concerned about rail line abandonments, including rail lines that have been abandoned and threats of future abandonments.
- Comments were received about reactivating specific corridors. For example, local economic development officials would like to restore service on the Cambridge Southern Railroad.
- Local interest exists for reactivating the Panhandle route to Pittsburgh. This is now a bike path, and local officials recognize the challenges of reactivation.
- Local planners are concerned that bike enthusiasts would like to build a bike path adjacent to Norfolk Southern line near Steubenville.
- Some stakeholders were concerned about keeping underutilized rail lines open. Rail usage is cyclical, and these rail lines may be needed in the future, even if hardly used today. One example is the West Central Ohio Port Authority, which seeks to keep its lines open even if some have low levels of freight. Another shipper is concerned about the viability of the local railroad that serves its location since the shipper is the only customer on the line, and freight volumes would not pay for needed improvements.
- While some stakeholders are concerned about preserving rail corridors, others wish to repurpose abandoned corridors. Stakeholders in southeastern Ohio would like to repurpose abandoned rail corridors but are not able to determine ownership of those lines. Some corridors could be used as recreational trails, boosting the local tourist industry.
- The City of Dayton is trying to buy an inactive line to build a bike path next to it. Toledo is similarly looking to acquire an inactive rail line.

6.3.2 Industrial Access

- Numerous stakeholders identified sites that would benefit from rail access. Some of these would only require a siding on lightly used branch lines. Others would require more extensive rail infrastructure to serve.
- Developable rail-served sites would benefit from non-rail infrastructure. For example, one economic development official is marketing a site with good rail access but feels that the site needed better roadway access. In Coshocton, a potential rail-served site is

near a water treatment plant, which would be beneficial for certain shippers.

- A local railroad contends that an important role for ORDC is to educate economic development officials about the dynamics of building industrial access. Local economic development officials do not always understand that it is much less costly to build a spur to an industrial site from a local railroad than to a site on a busy Class I mainline.
- Multiple stakeholders worry about the availability of rail-served industrial sites.

6.3.3 Traffic Opportunities

- Multiple stakeholders mentioned energy-/chemical-related opportunities.
- Multiple stakeholders mentioned intermodal traffic as a growth opportunity.

6.3.4 Regulatory Issues

- Concerns were raised about the impact of positive train control on rail in Ohio. One concern is the initial investment and ongoing cost in equipment and administration required for local railroads to access Class I rail assets. There is also concern that the cost of installing positive train controlled-enabled switches on Class I mainlines may drive some shippers to local railroads.
- Multiple stakeholders expressed concern about Class I railroads' market power, especially in areas served by only a single railroad.

6.3.5 Rail Rate and Service Issues

- Some shippers complained about railroad company communications with shippers. For example, late arrivals without communication result in additional staffing costs for the shipper. One shipper complained that a railroad suspended service for rail line maintenance with little notice. This was during peak season and was highly disruptive.
- Agricultural shippers claimed that increases in rail rates and service deterioration have made rail service so unattractive that these shippers are changing their supply chains to avoid using railroad transportation. For example, grain is being diverted to local use rather than being shipped by rail out of state. Also, increases in rail rates have made barge service competitive in cases where it had previously not been.
- In many cases, shippers own their own railcars. Slow rail service costs shippers money by requiring them to lease/own more cars to meet the same demand.
- A number of local railroads believe that Class I pricing has reduced their level of business. One local railroad contends that Class I railroads are not pricing short-haul traffic in such a way that it can compete with trucking.
- In some areas, railroads do not face competition, but they serve shippers in highly competitive markets. This creates problems when railroads raise rates and shippers cannot absorb these costs because they sell their products at prices fixed by the competitive markets.
- Although the Port of Toledo is served by multiple railroads, only a single railroad serves each facility. According to local stakeholders, it would be better if multiple railroads could serve these facilities.

- A number of stakeholders complain about Class I service issues related to changes in operational strategies, including representatives of local railroads, shippers, and other individuals.

6.3.6 Funding

- An MPO stresses showing a united front when applying for federal grants.
- Railroads and other stakeholders suggest higher levels of funding for rail in Ohio.
- Several stakeholders recommend a tax credit for railroad investments, analogous to the 45G Tax Credit (also known as the Railroad Track Maintenance Tax Credit) on the national level.

6.3.7 Crossing Issues

- Rail industry representatives believe that not all crossings are necessary and recommend that the State of Ohio continue to look for places to close crossings.
- The Lima-Allen County Regional Planning Commission is concerned about safety at a crossing where traffic backs up to interstate on-/off-ramps.
- Multiple stakeholders point to situations where trains stop and block crossings for extended periods of time and pedestrians climb through the train—a dangerous situation.
- Some stakeholders note cars blocking crossings with no locomotive.
- Multiple jurisdictions are concerned about emergency vehicles being able to serve areas when trains block crossings.
- Crossing issues can fluctuate as rail and highway traffic change. For example, new industrial developments in Marion drive the need for grade separations.
- Residents complain about crossings and noise associated with rail operations. The North Baltimore terminal was one example.
- According to stakeholders from one city, trains pass through each day at noon. This is inconvenient because it is a time of peak activity.
- Some stakeholders complain of rough crossings.
- One local stakeholder indicated that crossing signs remain in place for an inactive rail line. Motorists still must stop even though no trains use the line.
- Stakeholders would like to establish quiet zones and are interested in wayside horns as an alternative to locomotive horns.
- One stakeholder is concerned about the placement of speed limit signs and crossing crossbucks. Passing a speed limit sign almost immediately followed by a crossbuck gives motorists conflicting messages.

6.3.8 Railroad Overpasses

- Representatives in multiple jurisdictions are concerned with trucks getting stuck under low rail overpasses. The inability of trucks to gain easy access to certain areas is thought to hinder economic development.

6.3.9 Rail Line Improvements

- Regional planners are concerned about the condition of rail bridges in Lima, Cleveland, and Toledo.
- Some of the movable bridges over the Maumee River in Toledo are old and become stuck in the closed position, blocking marine traffic.

- There is a need to improve rail lines along the Ohio River in eastern Ohio in order to better serve the energy/chemical industry, according to a regional stakeholder. One issue may limit improvements is topography. Existing yards are hemmed in by hills.
- Shippers describe issues with current railroad that is unable to accommodate 286,000-pound railcars. The shipper owns high-capacity railcars and must light load railcars by 15 percent but still pays the same rates.
- A shipper is concerned over the serving railroad's infrastructure. Several derailments occurred, which were highly disruptive.
- A local railroad feels that the cost of railroad construction is such that local railroads turn away from growth opportunities rather than pay these high costs.
- Local railroad feels that its biggest limiting factor is capacity, both in terms of train size and weight.
- A Class I railroad mentions Cincinnati as a bottleneck.

6.3.10 Multimodal Connectivity

- A proposal exists to create a new intermodal terminal—analogous to the facility in Jeffersonville discussed in Section 4.4.2—which would operate through the partnership of a short-line rail operator, a Class I railroad, and a transload operator. In addition to importing goods, the facility would load containers with soybeans for export to Asia.
- Stakeholders in the Dayton area had intended to sponsor an intermodal terminal near the airport but did not do so because of local opposition.
- According to local stakeholders, several of the port terminals operated by CSX at the Port of Toledo are underutilized. The port would prefer that the unused capacity be used for a different purpose.
- A local railroad official believes that truck driver shortages are creating demand for intermodal and other multimodal transportation options.

6.3.11 Passenger Rail

- All Aboard Ohio stresses that neighboring states have invested in passenger rail, and emphasizes that what is important is not a speed goal, but consistent on-time, daylight service.
- Many supporters of rail service to Columbus have made their opinions known during outreach for this Rail Plan.
- One stakeholder points to the state-owned lines and potential CSX line sales as possible opportunities for passenger rail. Also mentioned is the preference of millennials and aging baby boomers for non-automobile transportation options.
- Northeast Ohio Areawide Coordinating Agency would like to advance a Toledo-Cleveland-Detroit Corridor Study for both freight and passenger uses.
- Members of the rail industry are concerned about having to assist with passenger rail studies that are unfunded, and they doubt would ever be implemented.
- Stakeholders are highly critical of Ohio's train stations, which many see as needing improvement.
- According to local stakeholders, the Toledo train station was built for more passengers than it handles today. It is expensive to maintain the large building.

- There is interest from local stakeholders in establishing a rail service between the Akron-Canton Airport and the Football Hall of Fame in Canton.
- Representatives from Tuscarawas County would like to see new excursion train service established in the area.

6.3.12 Other Quality of Life Issues

- There is concern from local stakeholders about the maintenance of rail property. For example, a local railroad dumps old ties and other debris on an inactive rail line. It is an eyesore for the city in which it is located.
- According to regional stakeholders, trash trains from out of state stop in the area around Steubenville and cause a bad smell.
- MORPC notes that changing land uses around rail lines create conflicts. There is a need for setbacks and buffers.

6.4 COORDINATION WITH OTHER PLANNING EFFORTS

This Rail Plan has been coordinated and will provide input to other statewide planning efforts. Information from Ohio's freight plan is being included in this Rail Plan, which in turn will be used as input to the Transport Ohio and *Access Ohio* updates. Other efforts that feed into this Rail Plan are the State Safety Plan and the Ohio Maritime Strategy. ORDC staff also reviewed MPO long-range transportation plans in preparing this Rail Plan and identified rail-related projects as included in Appendix B.