



WISCONSIN FREIGHT ADVISORY COMMITTEE'S  
INTERMODAL SUBCOMMITTEE FINAL REPORT

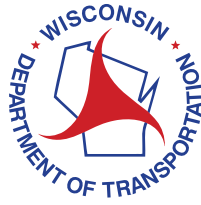
# Overview of Intermodal Freight in Wisconsin

MARCH 2019





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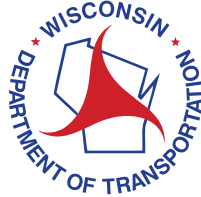
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# WISCONSIN FREIGHT ADVISORY COMMITTEE

## Intermodal Subcommittee



**March 2019**

**Dear Transportation Partner:**

We are pleased to announce that a partnership between the Wisconsin Department of Transportation (WisDOT), Wisconsin Manufacturers & Commerce (WMC), and numerous organizations in the public, private, and non-profit sectors has taken a significant step in implementing the Wisconsin State Freight Plan by completing a report that addresses intermodal shipping to and from Wisconsin.

The goal of the Freight Advisory Committee's Intermodal Subcommittee was to: *"Identify current and future opportunities and challenges to connect Wisconsin industries to world markets through the increased efficiency of containerized shipping."*

Freight movement is critical to Wisconsin's economic competitiveness at regional, national, and global scales. With consistent volume growth of 5–6 percent annually over two decades, intermodal shipping is an increasingly important part of the global movement of freight. Use of intermodal shipping can create efficiencies, reduce transportation costs, and be a key factor for sustained economic growth and development.

Completion of this report was a collaborative effort and the product of extensive coordination among members of the Intermodal Subcommittee, as well as outreach to stakeholder groups throughout the state. We want to personally thank all the individuals and organizations who provided recommendations and data for use within the report.

We are excited about the opportunities this report highlights, and hope that it contributes to fostering a thriving economy that supports business success and a high quality of life for all Wisconsin residents.

A handwritten signature in black ink that reads 'David M. Simon'.

**David M. Simon**

Wisconsin Department of Transportation

A handwritten signature in black ink that reads 'Corydon Fish'.

**Corydon Fish**

Wisconsin Manufacturers & Commerce



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## EXECUTIVE SUMMARY

Throughout 2018, representatives from Wisconsin public sector agencies, universities, non-profit organizations, and private sector firms gathered to form the Wisconsin Freight Advisory Committee's Intermodal Subcommittee.

### PURPOSE OF THE REPORT

The goal of the Subcommittee was to:

***Identify current and future opportunities and challenges to connect Wisconsin industries to world markets through the increased efficiency of containerized shipping.***

### WHAT IS "INTERMODAL"?

The Intermodal Association of North America (IANA) defines "intermodal" as:

***"the movement of cargo in shipping containers or trailers by more than one mode of transportation."***

This definition focuses on the universal component of intermodal freight movement: the container itself. Intermodal freight is moved globally in reusable containers of standard sizes (usually 40' or 20' in length), and across North America in longer standardized containers (usually 53' in length). Global trade by container is rising between five and six percent per year, with more than half of the largest ports in Asia.

### INTRODUCTION TO CONTAINERIZED FREIGHT

North America's busiest container ports are at Los Angeles-Long Beach, New York-New Jersey, Savannah, Seattle-Tacoma, and Vancouver. North American intermodal traffic rose by almost five percent in 2017 after falling slightly in 2016; traffic has grown by 50 percent since 2009. Five of the seven Class I railroads (BNSF, Norfolk Southern [NS], Union Pacific [UP], CSX, Canadian National [CN]) each moved more than 2 million containers in 2017. Data from 2018 indicates container trade even higher than projections, nearing a seven percent growth rate. One trend for international trade is the transloading of international containers at gateway ports into domestic containers; this trend may limit access to international containers for Wisconsin's exporters. Many of the top exports for the U.S. are grown or manufactured in Wisconsin, and comprise a large portion of the state's economy.

### METRICS USED TO MEASURE INTERMODAL FREIGHT ACTIVITY

Data-driven decision-making informs freight transportation providers on opportunities to modify operational functions that can increase efficiency and lower operating costs. A number of direct measurements and indices are used to measure the performance of the intermodal freight sector. While some of these measurements are public, many others are private and/or proprietary. Efficiency can be tracked with train velocity and dwell time at terminals. Volume measurements can be by weight or by container, and can be aggregated by country or across North America.

Indices have been developed to track global container demand and availability, using spot prices as a proxy for demand. Most of these indicators have shown price increases in late 2017 and throughout 2018 for both international and domestic container moves, indicating limited container availability and/or higher demand. These transportation price increases can make delivered goods costs higher for Wisconsin's importers, and can make Wisconsin's exports less competitive on a global market.

## SERVICE AREAS FOR CONTAINERIZED INTERMODAL FREIGHT

The trade lane between Asia and North America has the greatest Twenty-Foot Equivalent (TEU) volumes of any global trade lanes; large volumes of containers also move between Asia and North Europe; between Asia and the Mediterranean; and between North Europe and North America. More than 57 percent of imports to the U.S. originate in Northeast Asia; another 11 percent of imports originate in Southeast Asia, while North Europe accounts for almost ten percent of imports. Nearly 23 million TEU of containerized freight was brought into the U.S. in 2017, an increase of almost six percent from 2016. By comparison, the volume of U.S. exports shipped by container in 2017 was just over half that of imports, at 12.5 million TEU. Northeast Asia was the destination for 39 percent of those exports, with North Europe (over 11 percent), South Asia (over 10 percent), and the Caribbean (over 8 percent) as other major destinations for exports.

## INTERMODAL EQUIPMENT INVENTORY

Millions of pieces of equipment are integral to the operation of intermodal freight transportation. Globally, almost 33 million TEU of container capacity exists for international transportation, handled by almost 5,200 maritime vessels. Most of these containers are owned and managed by the liner services. The movement of maritime containers inland limits their ocean service; as such, the liner services attempt to minimize these movements. This paradigm presents a challenge for Wisconsin exporters who desire access to export containers. Across North America, more than 250,000 domestic intermodal containers, 650,000 chassis, and 135,000 rail cars comprise the rail and drayage segments of intermodal freight. After a long period of decline, a renewed interest in the use of trailer-on-flat-car (TOFC) shipping appears to be related to shortages in capacity from the trucking sector and to growth in package delivery services.

## GROUND FACILITIES

Coastal port facilities are critical exchange points between maritime and ground transportation. The largest ports have the capability of unloading the largest vessels and move the containers off-site for further activity. The largest West Coast ports (Los Angeles-Long Beach, Seattle-Tacoma, Oakland, and Vancouver) and the largest East Coast ports (New York-New Jersey, Savannah, and Norfolk) remain attractive as destinations due to the degree of infrastructure invested in their operations as well as the established operations that bring containers through these ports quickly and efficiently. The economies of scale also make these ports as attractive or more attractive than ports with shorter distances to and from overseas locations.

## KEY ENTITIES INVOLVED IN MOVEMENT OF INTERMODAL FREIGHT

Intermodal freight transportation operations are conducted and managed by numerous private, for-profit businesses. Communication and collaboration are core roles for all the entities involved in intermodal transportation, both internationally and domestically. With the exception of drayage, ownership of transportation operations is generally concentrated. More than 60 percent of the market share of international maritime container movement is performed by six companies; almost all of the domestic intermodal freight rail transportation is provided by the seven Class I railroads. Truck drayage, by contrast, has more than 7,000 companies that offer truck movement of containers. IANA establishes cooperative agreements for the sector's operations. Global trade and transport is assisted by ocean transportation intermediaries; some may have equipment, while others are focused on ensuring the proper custody, transfers, permits, and payment terms for shipping are in place. Domestically, freight



brokers help shippers to find transportation capacity for non-routine circumstances, while third-party logistics firms work to identify long-term supply chain improvements, and also provide other value-added services. Federal, state, and local governments play substantial roles with taxation, regulation, facility planning and development, and ownership.

## RECENT HISTORY OF INTERMODAL OPERATIONS IN WISCONSIN

The intermodal operations that Wisconsin Central, Ltd. (WCL) conducted in Green Bay, Neenah, and Stevens Point during the 1990's and early 2000's are still viewed by many shippers as the standard of service to customers in northeastern Wisconsin. While Green Bay had ample traffic, Stevens Point was unable to build a sustainable cargo base, and Neenah suffered from proximity to options in Green Bay, Milwaukee, and Chicago. WCL faced challenges with Class I interchange in Chicago, delaying shipments for customers and removing many incentives to use intermodal. A lack of trade balance (with more outbound loads than inbound loads) and limited access to rail cars further reduced the efficiency and potential of WCL's intermodal operations. CN's purchase of WCL in 2001 placed greater focus on the long-distance international market, and contributed to that company's decision to close all of WCL's public terminals.

The Port of Milwaukee's arrangement with Canadian Pacific (CP) benefitted shippers by providing consistent international import/export access to both coasts, with trains from Montreal and Vancouver. Corporate restructuring that emphasized use of Chicago facilities, coupled with container imbalances and a decline in traffic at Milwaukee in 2011, were factors that contributed to the closing of the Milwaukee intermodal terminal in 2012. Both Milwaukee and Green Bay remain active, vital ports for bulk and breakbulk shipping.

## CURRENT INTERMODAL OPERATIONS SUPPORTING WISCONSIN

Wisconsin's two active intermodal freight terminals perform important functions for the regions they serve, albeit with limited volumes and capacity for expansion. Chippewa Falls has allowed one major Wisconsin business, Menards, the ability to import large volumes of merchandise at lower costs, due to the yard's proximity to the company's large distribution center. The empty containers have enabled the region's bulk agriculture operations to gain access to overseas markets, providing (until recently) a stable, predictable demand and price for their products. The Arcadia terminal operates in a similar manner, with Ashley Furniture as the beneficiary of the access to containerized freight imports, and bulk agriculture leading a small set of export commodities.

From a statewide perspective, these locations have limited potential. Both facilities are in the western part of the state, more than 100 miles each way from the largest concentrations of state manufacturing activity (in the eastern portion of the state). Ashley's private ownership and management of its Arcadia location excludes other importers, and establishes rules that limits interest from exporters. Arcadia is also several miles from any Interstate Highway access. Chippewa Falls' narrow footprint, limited equipment, and constrained storage capacity also dissuades additional importers and exporters.

For the businesses in eastern Wisconsin that rely on containerized shipping, drayage to and from the Chicago and Joliet yards has become the essential supply chain link, especially since the closing of CP's terminal at the Port of Milwaukee in 2012. Several container yards in eastern Wisconsin offer limited availability of international containers. The concentration of container yards in the Chicago and Joliet

areas challenges Wisconsin's shippers to find in-state availability of containers from preferred liner services and to gain sufficient container capacity for large-volume exporters.

The proximity of Wisconsin to the Chicago and Joliet area intermodal terminals presents both opportunities and challenges to shippers in southeastern Wisconsin. Chicago is the closest location where the six largest North American Class I railroads come together. Further, an estimated 46 percent of all intermodal containers cross through the Chicago area;<sup>1</sup> this concentration of activity provides a competitive market for shipping options. However, congestion has long been a problem with rail and truck movement into, through, and out of the Chicago region. Competition for drayage drivers willing to travel to and from Wisconsin (and the costs of such drayage, especially for shippers north of Milwaukee) minimizes or negates any cost advantages of rail quotes from the Chicago yards. The rapid development of Will County into a freight nexus adds more challenges to Wisconsin businesses, with at least one additional hour of drive time each way above the transit times to and from Chicago. The supportive warehousing infrastructure surrounding the major Chicago and Will County terminals also gives advantages to operations in those regions.

Operations in Minnesota, by comparison, are developing more gradually. BNSF has addressed its immediate capacity challenges by utilizing remote yards for container and trailer storage; CP's Shoreham Yard has yet to reach capacity. The Duluth terminal's attractiveness includes the value-added services of Duluth Cargo Connect through its Lake Superior Warehousing operations. While this location has the benefit of being adjacent to the main CN corridor between the Canadian West Coast ports at Vancouver and Prince Rupert and Chicago (with additional connectivity to New Orleans, Montreal, and Halifax), it is unclear what the maximum inbound demand for this locations will be, and whether that will provide sufficient container capacity for outbound traffic.

## LINER SERVICE AND DRAYAGE PRICING

Imported goods originating in Asia and destined for the U.S. Midwest pay a premium cost, as attested to by examining inbound rates across the Chicago area terminals. This reflects the desire of the liner services that own the containers to maximize their use in maritime transportation, and a challenge to cost-effective international container service for Wisconsin-based companies. By comparison, exports from the Chicago terminals are priced at a discount to encourage the expedited return of these containers to maritime service. This pricing is a direct factor in the use of containers for grain exports, and in the proliferation of grain transloading facilities at and near the major Chicago/Joliet yards.

Import rates for China to East Coast ports are becoming competitive with West Coast ports due to the new Panama Canal vessel capacity, coupled with increased port capacity and lower labor rates at East Coast ports. Railroads have also made investments to allow double-stacked containers to be delivered into mid-America. For example, one rate quote had a 40' container priced less for delivery from China to Chicago ramps via the East Coast than via the West Coast. Importers and exporters from Wisconsin may find new competitive pricing opportunities as the East Coast ports increase volumes and efficiencies.

Drayage charges to northern Wisconsin are at present almost twice the rates for moves to southern Wisconsin. These charges reduce the competitiveness of importers and exporters from that area of the

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<sup>1</sup> <https://www.theherald-news.com/2016/08/19/regional-planners-get-up-close-look-at-will-county-trucks/a5asrjn/>

state. Daytime drayage to and from Chicago also faces higher tolling rates, which can exceed \$60 per load each way.

## TRADE LANES FOR INTERMODAL SERVICE TO WISCONSIN

Shippers face an ever-changing marketplace for container pricing to and from Wisconsin. The dynamics of the liner company pricing changes and surcharges are made more variable through changes in drayage rates, chassis fees, and more. By comparison, the global and continental trade lanes are more enduring, with large volumes of containerized freight passing through the Chicago region. New trade lanes have developed through North American Free Trade Agreement (NAFTA)-supported commerce, with several north-south corridors emerging, along with a Great Lakes-St. Lawrence Seaway Corridor. The expanded Panama Canal compelled East Coast ports to make improvements to their capacities; the results of those improvements are now being seen with increased import containers moving from East Coast ports to Midwestern destinations.

## WISCONSIN MANUFACTURERS & COMMERCE BUSINESS SURVEY

As a key part of the Subcommittee's efforts, Wisconsin Manufacturers & Commerce (WMC) conducted a business survey throughout August and September 2018. The intent of the survey was to get an idea of:

- the volume of containers being moved into and out of Wisconsin
- the origin/destination of containers outside Wisconsin (identified as the North American coast of entry for imports/coast of departure for exports; or one of ten North American regions for continental movements)
- the Wisconsin ZIP code inbound containers were destined for (imports), or outbound containers originated from (exports)

Businesses were asked to provide data from 2017 and to project new shipping that would occur by 2023. This report refers to these data sets as "Current", "Future", and then a sum of the two sets, "Projected".

A significant marketing effort, led by WMC and the Wisconsin Department of Transportation, took place both in the lead up to the survey and throughout the period the survey was open. Regional and local economic development groups, local government officials, and numerous business forums were informed of the survey's existence and purpose. Both the Intermodal Subcommittee and Wisconsin Freight Advisory Committee were asked to utilize their organizations' contact lists to spread awareness as well.

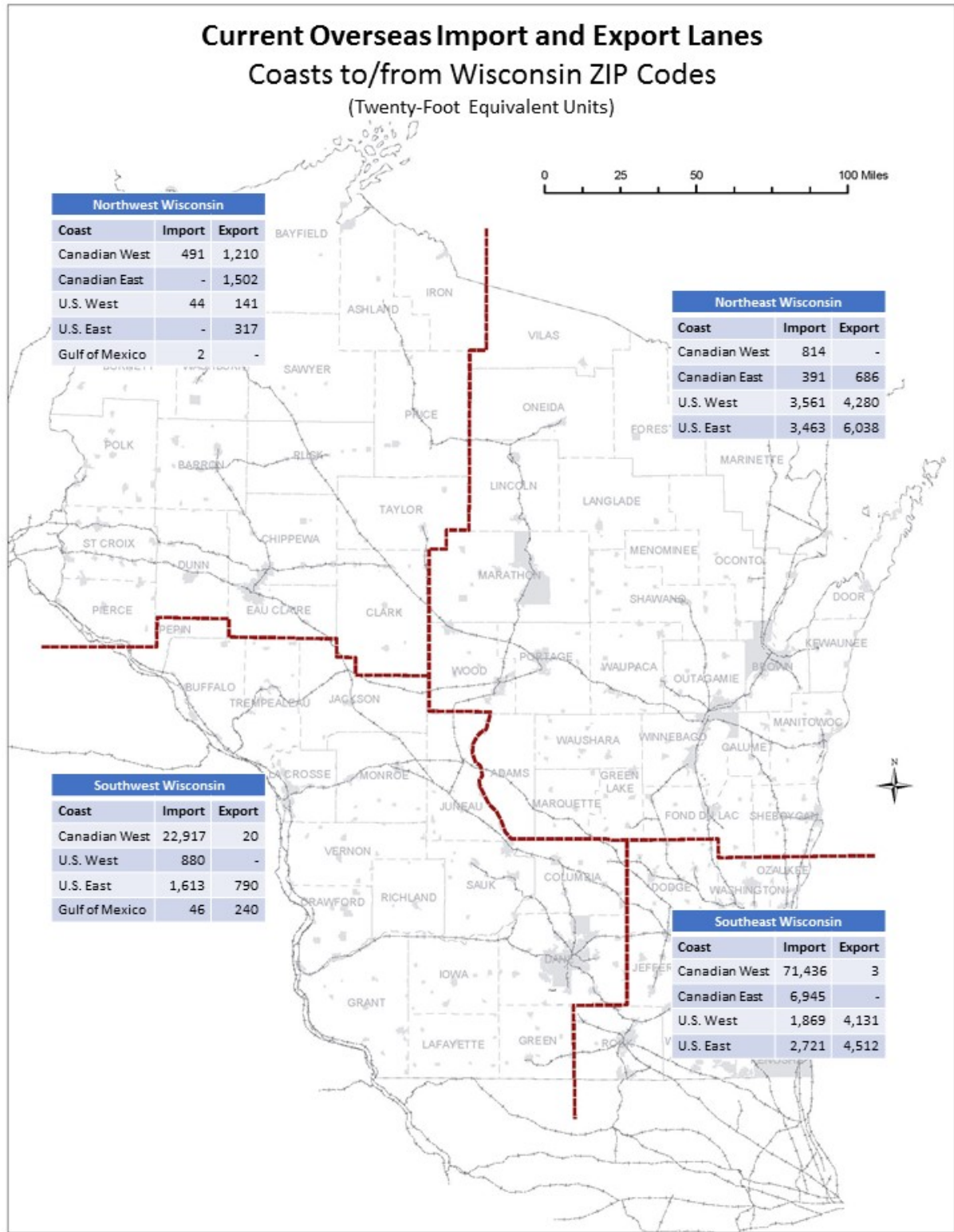
Over 120 companies responded to the survey. Responses allowed for heat maps to be created, reflecting the data for the "Current", "Future", and "Projected" timeframes. The responses were also analyzed to determine the balance of containers moving to/from Wisconsin from/to North American coasts or regions.

The survey responses indicated a large volumes of international containers arrive at Wisconsin destinations via the Canadian West Coast, with the greatest concentrations in Southeastern Wisconsin (more than 71,000 current TEU imports) and Southwestern Wisconsin (almost 23,000 TEU imports). Almost 7,000 TEU destined for Southeastern Wisconsin arrive via the Canadian East Coast. Based on

survey results, however, international exports on these lanes are miniscule. The reasons why containers are not reloaded in Wisconsin for matchback are unknown, but may include contracts with the container owners and/or drayage companies to return the emptied containers to the Chicago yards immediately, rather than allow them to be directly reused for Wisconsin-originating exports. Another potential reason is the existing contracts for Wisconsin's exporters favor use of U.S. rather than Canadian ports. Based on the survey results, most exports from the state originate in Northeastern Wisconsin or Southeastern Wisconsin, and are exported via the U.S. East Coast or the U.S. West Coast.

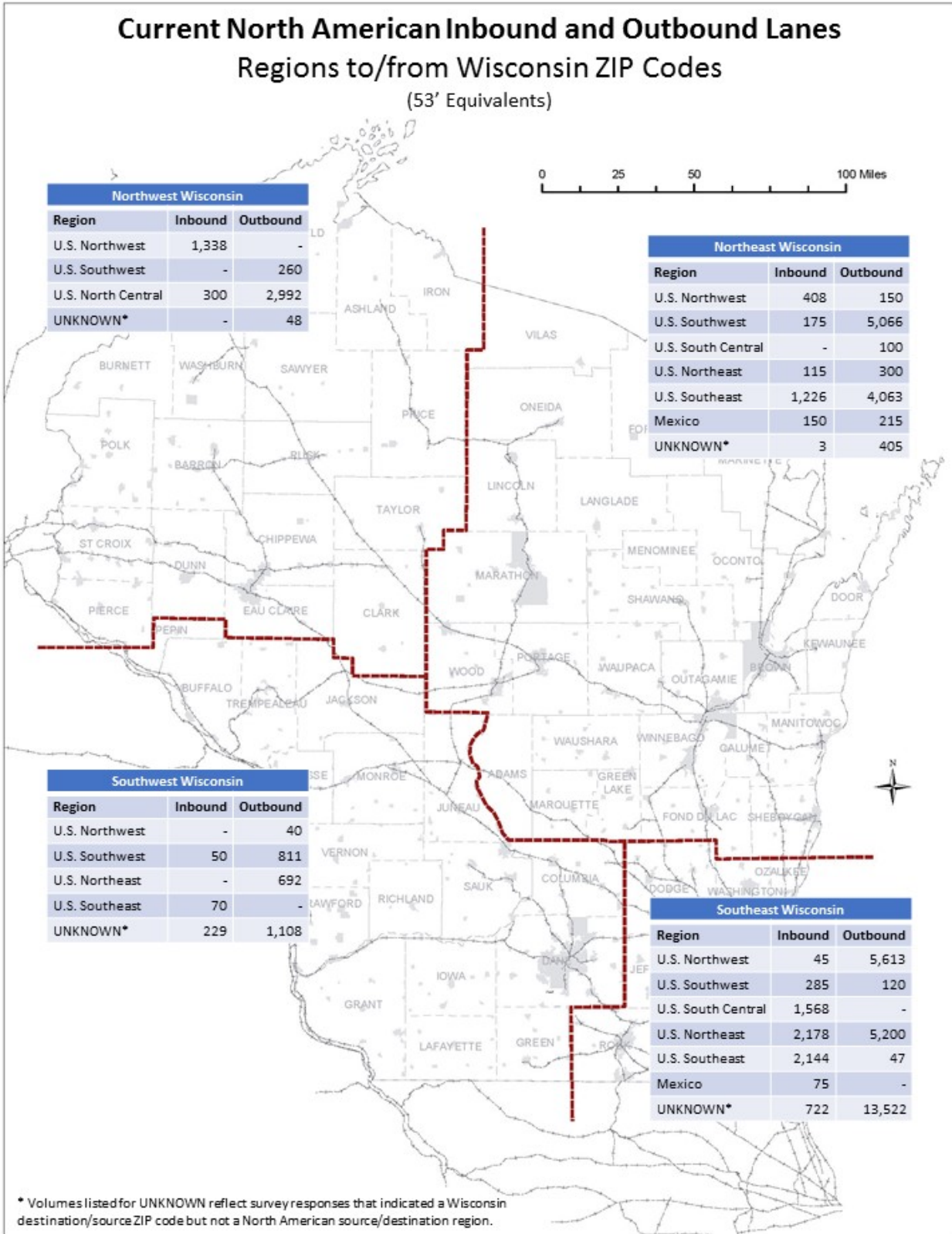
For domestic containers (53'), the survey results showed the volume of outbound shipments far outnumbered the inbound shipments in each of the four quadrants used in the survey. Outbound volumes are relatively strong for Northeastern Wisconsin shippers sending products to the U.S. Southwest and U.S. Southeast. For Southeastern Wisconsin shippers, the top destinations are the U.S. Northwest and U.S. Northeast. More than 13,000 containers outbound from Southeastern Wisconsin did not have a destination identified by the survey participants. Graphics 1 and 2 show the results of the survey for inbound and outbound international and domestic container volumes.

Graphic 1: Import/Export Lanes for Overseas International Containers, in TEU by Quadrant (Source: WMC Survey).





**Graphic 2: Inbound/Outbound Lanes for Domestic/North American Containers, in 53' Equivalents by Quadrant**  
 (Source: WMC Survey).



## DEVELOPMENTS IN INTERMODAL OPERATIONS THAT COULD AFFECT WISCONSIN

The containerized shipping sector is in a constant state of evolution and change. Numerous operators and factors have influenced the sector's development, and will continue to define the intermodal marketplace. Additional factors are emerging that may also shape the future form and availability of intermodal operations in Wisconsin.

This section summarizes the potential developments, by operational area, that are most likely to shape the future form and function of intermodal freight transportation in Wisconsin.

### INTERNATIONAL MARITIME

Wisconsin's importers and exporters have multiple liner companies to choose for their needs. Alliances have helped smooth out operations by allowing allied liner companies to position containers on each other's vessels, shifting spikes to vessels with available capacity. Liner services may continue to merge and consolidate operations in ways that affect the ability of Wisconsin importers and exporters to have shipments performed in a timely and cost-effective means. After several years of low rates, shippers are facing higher rates, especially for spot shipments. Wisconsin's exporters currently benefit from reduced costs for containerized export to Asian ports, but that advantage could change with changes in trade policies and/or consumer demand.

The International Maritime Organization's rule to reduce sulfur emissions, which takes effect in 2020, will require vessel operators to use more expensive fuels or install pollution-capturing systems. These efforts are expected to add up to \$15 billion or more per year in operational costs to liner service companies. Many companies are already passing along these costs to shippers through surcharges.

The 2016 opening of the expanded Panama Canal has already altered trade flows to North America, as East Coast and Gulf Coast ports receive more large vessels and containers from Asia. This shift could provide Wisconsin's importers and exporters additional cost-competitive options for liner services and rail transportation. The Chinese Belt and Road Initiative also has the potential to reshape supply chains on a global scale. New product sources and trade lanes are being established as restrictions on exports of recyclables and changes to tariffs and trade agreements take effect.

Vessel security and safety at sea is becoming a greater concern, as threats from improperly-labeled cargoes increases risks.

Average and maximum vessel sizes are becoming larger, encouraged in part by the expansion of the Panama Canal. The expanded Canal opened in 2016 and now allows limited passage of vessels with capacities of more than 14,000 TEU. Liner services are ordering more capacity than they are scrapping, slowly increasing overall maritime capacity at rates that match or slightly trail the growth in demand. Maritime containers are made available by liner services or by leasing companies. Container availability is limited by the terms of use and return that the container owner establishes. For Wisconsin shippers, terms of use often require inefficient drayage of empty containers to and from the Chicago area's terminals and container yards.

### DOMESTIC MARITIME

The U.S. DOT's Maritime Administration has established the America's Marine Highway Program to encourage the development of freight services and facilities along several designated waterborne

corridors. Wisconsin sits between two of those corridors: M-35 (along the Mississippi River) and M-90 (through the Great Lakes, including the Ports of Superior, Milwaukee, and Green Bay). Short-sea shipping of containers, along the western shore of Lake Michigan and across the lake between Milwaukee and Muskegon, has been proposed and/or studied.

One current container operation exists on the Great Lakes, between Cleveland, Ohio and Antwerp, Belgium. One container service also exists on the Mississippi River, connecting Memphis, Baton Rouge, and New Orleans. At least one proposal exists for container vessel services on the Mississippi River to reach St. Louis; lock size and winter season closure may limit the potential for services further north.

## COASTAL PORTS

North American coastal ports in both Canada and the United States have witnessed investments in the billions of dollars over the past decade. The West Coast ports have made investments to address landside capacity and throughput, especially with vessel-to-rail connections. Los Angeles-Long Beach continues to move most of its containers inland through drayage, but proposals are being evaluated for direct rail container movements between the ports and the Inland Empire region. East Coast ports have seen vessel sizes and terminal volumes increase with the opening of the expanded Panama Canal. Dredging operations have been consistently implemented at these ports to allow larger vessels. The Port Authority of New York and New Jersey conducted a \$1.6 billion project to raise the Bayonne Bridge roadway by 65 feet, providing vessel clearance of 215 feet. This has increased the maximum vessel capacities at the port's terminals from 9,500 TEU to more than 14,000 TEU. To manage limited on-site storage capacity, coastal ports have implemented several strategies, including transloading of maritime containers to domestic containers and use of technology for coordinating container drayage.

## INLAND PORTS

Inland ports typically operate as "relief valves" for capacity-constrained coastal ports. Some facilities are directly tied to coastal ports, as in South Carolina and Georgia. This connection allows the coastal ports to move containers by rail to locations closer to consumer markets, thereby reducing drayage mileage and cost. Most inland ports have robust warehousing and distribution operations adjacent to the port facility, and routinely offer dedicated services to primary customers.

In Chicago and other large cities, newer warehouses are being built near intermodal yards to serve the emerging parcel delivery and same-day delivery "Amazon" model. Higher-value imports are routinely transloaded at coastal ports into domestic containers, where capacity is available.

Transloading of agricultural products into containers for export is a frequent operation for inland ports in the Midwest, but depends on the availability of sufficient maritime containers for export. Local roads are critical to first- and last-mile drayage movements at inland ports; major projects have been built to address congestion and access.

Technology that supports improved container visibility and coordination is being instituted across the intermodal sector, but large volumes of containers are returned empty to overseas destinations.

## RAILROADS

Rail system management has become an acute concern at times over the past decade, often in relation to winter weather. Federal rules have been established to monitor several operational metrics for the

Class I companies and the Chicago interchange. Wisconsin's rail service is directly affected by disruptions to Chicago's operations.

Intermodal freight volumes have grown due to mode shifts from trucks and marketplace demand. At points in 2018, railroads lacked the capacity to accept additional intermodal container loads. Mega-projects such as the Chicago Region Environmental and Transportation Efficiency (CREATE) program are addressing capacity constraints and inefficiencies while improving safety and allowing for volumes to grow in the future.

Corporate restructuring will continue to impact intermodal operations, including the availability of service, the location of open terminals, and the speed and cost of deliveries. The closing of the intermodal terminal at the Port of Milwaukee in 2012 followed a corporate restructuring by Canadian Pacific.

Class I railroads routinely collaborate with each other on operational strategies of mutual benefit. The Class Is also have partnered with some short lines to extend intermodal service to several locations in the Midwest. There may be opportunities to apply some of the successful strategies from these operations to opportunities in Wisconsin. Elsewhere in surrounding states, potential new intermodal terminals have been proposed, but face financial and customer demand challenges.

Temperature-controlled intermodal container service is a growing sector in North America, with promise for Wisconsin's food industry exporters.

## TRUCKING AND DRAYAGE

The trucking sector is challenged by growing freight demand and shortages of qualified drivers. Delays at intermodal terminals for drayage drivers are often tied to chassis availability challenges. Chassis ownership and management remains a problem, as in cases where the liner services dictate the equipment to use for drayage.

Electronic logging devices (ELDs) have led to some productivity losses; one-day drives have been reduced to less than 450 miles. For Wisconsin, this places many parts of the state outside of a one-day round-trip to the Chicago and Joliet yards, especially when delays are factored into hours-of-service. Compliance with the hours-of-service rules have improved between 2017 and 2018.

The Federal Highway Administration (FHWA) has established guidance for bridge projects over roads to provide sufficient vertical clearance for double-stack intermodal trains; this guidance is echoed in WisDOT's Facilities Development Manual. The federal government has also designated several corridors as Intermodal Connectors, and has encouraged states to establish critical urban and rural freight corridors.

## GLOBAL, REGIONAL, AND LOCAL FACTORS

Global demand drives trade, and recent changes in trade policies have disrupted supply chains. China discontinued accepting scrap imports in 2018; paper and plastics for recycling have been diverted to other Southeast Asian nations. Some of those countries have now put in place their own limitations. Additional container repositioning is required by these changes.

With the exception of a setback during the Great Recession, global trade grew steadily since the 1980's, facilitated by favorable trade agreements. Wisconsin's primary trading partners are Canada and Mexico.

There is limited movement of containerized freight for Wisconsin exports to these countries, at least as is currently measured. About 29 percent of exports to China are containerized.

Of all Wisconsin's exported goods, about 17.4 percent by value are containerized. Machinery/electrical, foodstuffs, wood and lumber, animals and animal products, plastic and rubber, and metals are among the most traded containerized exports by value.

Trade disputes with China and subsequent tariffs have reduced the total U.S. soybean exports to China by 45 percent in 2018. The Chinese market accounted for \$12 billion in sales in 2017.

## TECHNOLOGY

E-tailing and consumer demand have intertwined to remake the consumer market. Technology is also being applied to tracking and monitoring containers, both in-transit and within intermodal terminals. Other services integrate the entire intermodal freight operation, including drayage, permits, and financial responsibility.

Freight matching services are still in their infancy, but have promise to improve efficiency through better load-matching for containers. Although pilot operations have been conducted, a timeline for autonomous freight operations is still speculative.

Safety and security are intermodal transportation concerns, as witnessed by crippling cyberattacks of liner services Maersk and COSCO. Technology has improved efficiency for cross-border inspections and approvals of containerized freight at Canadian-U.S. gateway rail crossings.

## POTENTIAL OPTIONS FOR IMPROVING INTERMODAL DEVELOPMENT IN WISCONSIN

The Intermodal Subcommittee discussed numerous ways that Wisconsin could be made more attractive for intermodal facility development and operations. Those concepts included the leadership roles for government (both state and local) and for the private sector. Many suggestions emphasized the need for collaboration between all entities to identify opportunities and create solutions to the current challenges for the state's intermodal users.

While none of the concepts should be regarded as commitments by a specific government or private sector entity, some of the suggested ideas included:

- State government could provide assistance on federal grant applications
- State government could serve as a repository for data, and promote data-sharing
- State government could partner with local governments and the private sector on marketing and coordination
- Local governments could target improvements to first-/last-mile road connections at potential intermodal facility locations
- Local governments could designate Tax Increment Financing districts to incentivize development
- Local governments could coordinate regionally, especially for grant applications
- The private sector could provide due diligence of intermodal business demand and coordinate findings with the public sector
- The private sector could clarify and confirm site selection needs for an intermodal facility



- The private sector could continue quantifying business demand from private sector importers and exporters

## CONCLUSION

This report presents a realistic appraisal of the current status of intermodal shipping in Wisconsin, and of future opportunities and challenges for Wisconsin-based shippers. The volume of containerized shipments to and from Wisconsin indicates a strong and sustained demand by the state's businesses for use of intermodal freight. Many businesses seek enhanced opportunities to access the efficiencies inherent in containerized freight shipping, including decreased shipping costs, greater predictability of delivery times, and reduced roadway congestion. Looking forward, Wisconsin's public and private sector partners will need to overcome existing geographic and market factors before containerized freight services will be improved, especially in the eastern part of the state. Among the critical factors that intermodal service providers will need to expand options are growth in business demand for containerized freight service, coupled with long-term commitments by shippers. Railroads, regional and state economic development agencies, the business community, local governments, maritime liner services, trucking companies, real estate development companies, and others will need to collaborate to optimize the potential for any new facility development.

## PURPOSE OF THE REPORT

As stated in the Executive Summary, the goal of the Subcommittee was to:

***Identify current and future opportunities and challenges to connect Wisconsin industries to world markets through the increased efficiency of containerized shipping.***

This statement reflects the scope of this report, which uses data compiled through a survey of current and potential intermodal freight customers to assess the potential for additional service to be added in Wisconsin. Should more intermodal shipping opportunities be offered, Wisconsin businesses could benefit through lower transportation costs, thereby enhancing access to import and export markets. The report examines the factors that determine the viability of intermodal operations, identifies the facilities in and near Wisconsin, and discusses the factors that will shape the potential for any future facility to be developed in the state. This report is intended to help the private sector, in collaboration with local and state governments, to further examine the viability of intermodal freight facility operations at specific locations within the state.



## ORIGIN AND CONTRIBUTIONS OF THE SUBCOMMITTEE

The important role of intermodal freight transportation – defined as the use of a container for transporting goods between two locations, using one or more modes in the process – has been recognized by the Wisconsin Department of Transportation (WisDOT) for several decades. The 1995 Translinks 21 plan recommended funding improvements for road and rail freight access to rail, harbor, and airport intermodal facilities.<sup>2</sup> The *Connections 2030 Statewide Long-Range Transportation Plan* included the policy recommendation to “[i]dentify opportunities for improved intermodal shipping in Wisconsin.”<sup>3</sup>

The *Wisconsin Rail Plan 2030* identified roles for WisDOT, relative to containerized intermodal freight. Those roles included collection and analysis of data that provides an understanding of freight markets in Wisconsin, and freight’s regional, national, and international role in the global economy. In addition,

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<sup>2</sup> Translinks 21, Page 85.

<sup>3</sup> Connections 2030, Page 7-30.

WisDOT committed to continue to monitor changes in international trade flows, to work with communities impacted by dramatic changes in train frequencies, and to encourage dialogue with major rail carriers and Wisconsin business interests to leverage container backhaul capacity for improved Wisconsin export access to foreign markets.<sup>4</sup>

Wisconsin's freight transportation policies have been enhanced through guidance from the 42-member Freight Advisory Committee (FAC), established at the 2014 Governor's Freight Industry Summit. The role of the FAC is to help inform WisDOT on issues that impact freight mobility and to provide a voice for the freight sector on the development of freight-related policies, processes, and projects.<sup>5</sup> Attendees at the first FAC meeting discussed the challenges to intermodal freight transportation in Wisconsin, and offered suggestions on how to address those challenges.<sup>6</sup>

Development of the first Wisconsin State Freight Plan (SFP) was among the most important projects guided by the FAC, which reviewed drafts of the SFP and offered suggestions for improvement. One recommendation by the FAC, rated by FAC members as most beneficial to Wisconsin and most conducive to joint WisDOT/FAC action (among new WisDOT policies in the SFP), was for WisDOT to articulate a policy specific to intermodal freight. This adopted policy states that WisDOT will "[w]ork with stakeholders to develop an intermodal strategy for Wisconsin."<sup>7</sup> This helped catalyze the creation of the Intermodal Subcommittee.

The Subcommittee met eight times in 2018 between March and October. During this period, members discussed how Wisconsin's geographic location and economic sectors affected the potential for new and/or improved intermodal service, what the outcomes of the Subcommittee should be (relative to the goal statement), and what background information should be gathered to quantify the potential for intermodal service in Wisconsin. The Subcommittee also shaped the content of this report directly through contributions of data and other source material, review of and revisions to the draft outline of this report, and recommendations on the structure and content of the survey for businesses using or interested in intermodal freight service. Further, the Subcommittee helped raise awareness of the survey, helped distribute the survey, and offered suggestions for how the state's potential for intermodal development could be improved.<sup>8</sup>

The draft report was presented to the FAC at the November 15, 2018 meeting in Madison.

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<sup>4</sup> Wisconsin State Rail Plan 2030, Page 5-27.

<sup>5</sup> Wisconsin State Freight Plan, Page 21.

<sup>6</sup> Ibid., Page 299.

<sup>7</sup> Ibid., Page 298.

<sup>8</sup> <https://wisconsindot.gov/Pages/doing-bus/freight/inter-sub.aspx>

## INTRODUCTION TO CONTAINERIZED FREIGHT

This report addresses issues and opportunities specific to containerized intermodal freight, as practiced globally and domestically by numerous transportation and logistics entities. While some of the findings of the report may also be applied to more generalized freight movement, it is important to understand the distinctions and limitations within the realm of containerized shipping, as they define what opportunities may exist for Wisconsin’s businesses, now and in the future.

### WHAT IS “INTERMODAL”?

The Intermodal Association of North America (IANA) defines intermodal as:

***“the movement of cargo in shipping containers or trailers by more than one mode of transportation.”***

This definition focuses on the universal component of intermodal freight movement: the container itself.

### INTERMODAL VS TRANSLOAD/MULTI-MODAL

The term “intermodal” has also been applied to other situations, such as the movement of passengers between two or more means of travel. Within freight, terms such as “multi-modal” and “transloading” have similar uses; however, these terms apply to bulk or packaged items being transferred between equipment, or between movable equipment and a stationary facility. The key difference between intermodal and transloading or multi-modal is intermodal’s use of standardized shipping containers or trailers. Therefore, these terms should not be used interchangeably.

### CONTAINER CONFIGURATIONS

#### *International*

For global maritime trade, the standard exterior container dimensions are 40’ or 20’ in length; some older containers are 45’ in length. The 20’ container size has been adopted as the basis for container volume measurement, with the abbreviation of “twenty-foot equivalent unit” into the metric “TEU”. The standard container

*Image 1: 40-foot International Containers (Source: Journal of Commerce).*



exterior height is 8'6", with "high-cube" configurations at 9'6".<sup>9</sup>

Empty container weights range from about 5,000 pounds for a dry (non-refrigerated) 20' container, to 8,500 pounds for a dry 40' container, to more than 11,000 pounds for a refrigerated 40' container. Therefore, to meet the Federal Bridge Formula and state weight restrictions (80,000 pounds maximum for truck tractor, chassis, container, and cargo combined), maximum cargo weights for imported contents generally range between 36,000 pounds and 44,000 pounds.<sup>10</sup> Containers that are moved by rail and vessel only can be loaded to the container's maximum capacity; these payload numbers are painted on each container in legal service. For 20' dry containers, the maximum payloads range from approximately 55,000 to 66,000 pounds; for 40' dry containers, the maximum payload are 58,000 to 63,000 pounds. This yields a maximum container gross weight of over 67,000 pounds. Refrigerated loads have lower payload capacities. Most shipping companies establish their own gross weight limits for containers being shipped internationally.<sup>11, 12, 13</sup>

*Image 2: 20-foot International Intermodal Containers (Source: Direct Drive Logistics).*



Standards for containers were initially set in 1961 by the International Organization for Standardization (ISO),<sup>14</sup> with fittings and other standards approved through the International Convention for Safe Containers (CSC) in 1972, and amended since.<sup>15</sup> The ISO has also maintained a uniform container numbering system for identification and tracking purposes. This numbering system, called the BIC Code (named after *Bureau International des Containers et*

*du Transport Intermodal*, the French organization that first established the system in 1933), identifies the owner (in a three-letter prefix), the equipment type ("U" for container, "Z" for trailer/chassis, or "J" for detachable container-related equipment), a six-digit code number, and a final "check" digit to confirm accuracy when entering data.<sup>16</sup>

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<sup>9</sup> [http://www.worldshipping.org/about-the-industry/containers?sm\\_au=iVV50jbnD46FHWrM](http://www.worldshipping.org/about-the-industry/containers?sm_au=iVV50jbnD46FHWrM)

<sup>10</sup> <https://www.msc.com/getattachment/bc98e173-2968-4d9d-89ab-2ee64ce2e4e2/635696106572130000>

<sup>11</sup> <http://www.dsv.com/sea-freight/sea-container-description/dry-container>

<sup>12</sup> <http://containersolutions.net/specifications/>

<sup>13</sup> [https://www.hapag-](https://www.hapag-loyd.com/content/dam/website/downloads/press_and_media/publications/15211_Container_Specification_engl_Gesamt_web.pdf)

[loyd.com/content/dam/website/downloads/press\\_and\\_media/publications/15211\\_Container\\_Specification\\_engl\\_Gesamt\\_web.pdf](https://www.hapag-loyd.com/content/dam/website/downloads/press_and_media/publications/15211_Container_Specification_engl_Gesamt_web.pdf)

<sup>14</sup> <http://www.worldshipping.org/about-the-industry/containers>

<sup>15</sup> [http://www.worldshipping.org/industry-issues/safety/MSC\\_1-Circ\\_1497\\_-\\_CTU\\_Code\\_Jan\\_2015.pdf](http://www.worldshipping.org/industry-issues/safety/MSC_1-Circ_1497_-_CTU_Code_Jan_2015.pdf)

<sup>16</sup> [https://www.iso.org/files/live/sites/isoorg/files/news/magazine/ISO%20Focus+%20\(2010-2013\)/en/2011/ISO%20Focus+,%20April%202011.pdf](https://www.iso.org/files/live/sites/isoorg/files/news/magazine/ISO%20Focus+%20(2010-2013)/en/2011/ISO%20Focus+,%20April%202011.pdf)



### Domestic/North American

For domestic movement, most containers are constructed to 53' exterior lengths.<sup>17</sup> For trailers, 53' is also the standard length, although some states limit trailer length to 48' for non-designated highways.<sup>18</sup> Configurations with "double-bottom" or "pup" (tandem) trailers are legal on Interstate Highways and the National Network for two trailers at 28'; some states allow longer tandem configurations with trailer lengths to 48'. Widths are standardized at 8'6".<sup>19</sup>

Payload capacities for 53' dry containers are in the range of 56,000 to 57,000 pounds.<sup>20, 21</sup> Containerized loads that are moved by rail fit into two classifications: container-on-flat-car (COFC) or trailer-on-flat-car (TOFC).<sup>22</sup>

Image 3: 53-foot Domestic Containers (Source: Trains.com).

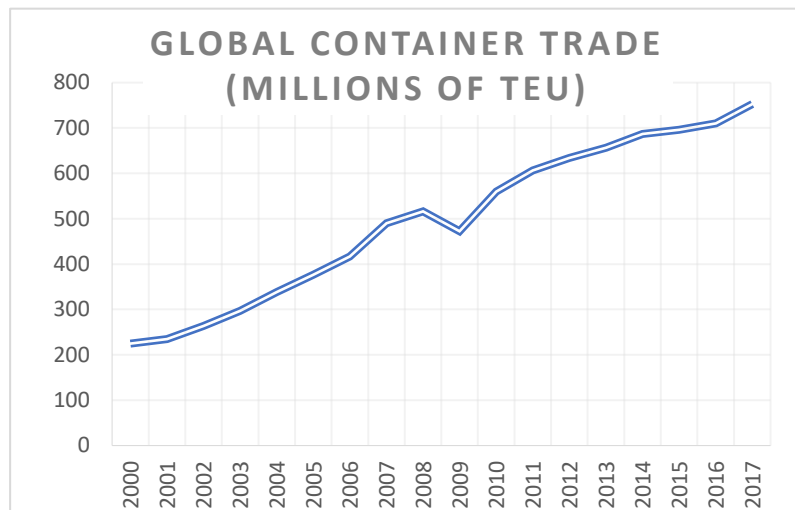


## SCALE AND GROWTH OF INTERMODAL SHIPPING

### INTERNATIONAL

The growth of international trade via containerized shipments has been substantial, with volumes rising almost every year. Containerized global trade freight volumes nearly doubled between 2005 and 2015, according to the investment firm CBRE, increasing from 382 million TEU to 684 million TEU.<sup>23</sup> As shown in Chart 1, the World Bank measured a similar growth trend, with TEU volumes rising from 225 million in 2000 to more than 753 million in

Chart 1: Global Container Trade, 2000-2017 (Source: World Bank).



<sup>17</sup> <https://www.chrobinson.com/en-us/en-us/-/media/ChRobinson/Documents/Intermodal/IntermodalEquipmentReferenceGuide2014.pdf>

<sup>18</sup> <https://www.bigtruckguide.com/semi-trailer-length/>

<sup>19</sup> <http://www.trucking.org/ATA%20Docs/What%20We%20Do/Trucking%20Issues/Documents/Highway%20Infrastructure%20and%20Funding/Report%20to%20Congress%20on%20the%20Compilation%20of%20Size%20and%20Weight%20Laws.pdf>

<sup>20</sup> <http://containertech.com/container-sales/53ft-high-cube-container-domestic/>

<sup>21</sup> <https://www.cimcintermodalequipment.com/53ft-domestic-shipping-container/>

<sup>22</sup> <https://blog.intekfreight-logistics.com/top-10-terms-used-in-domestic-intermodal-shipping>

<sup>23</sup> <http://www.cirrelt.ca/DocumentsTravail/CIRRELT-2017-60.pdf>



2017.<sup>24</sup> For 2017, the world's 110 largest ports saw an increase of 6.1 percent from 2016 to 2017, with these ports handling 600 million TEU in 2017.<sup>25</sup>

Most of the top 25 ports for container volume (as measured by throughput) are located in Asia. Based on data provided by the United Nations Conference on Trade and Development (UNCTAD), Los Angeles (at number 18), Long Beach (22), and New York (23) are the only North American ports to rise to that top tier. Table 1, on the following page, identifies all top 25 ports, as of 2016, by throughput.<sup>26</sup>

*Table 1: Global Top 25 Container Ports, 2016 (Source: UNCTAD).*

Port	Country	2016 Throughput (TEU)	2015-16 Change (%)
Shanghai	China	37,135,000	1.6
Singapore	Singapore	30,930,000	-0.1
Shenzhen	China	23,980,000	-0.9
Ningbo	China	21,565,000	4.7
Hong Kong	Hong Kong (China)	19,580,000	-2.7
Busan	Republic of Korea	19,378,000	0.4
Guangzhou	China	18,859,000	8.0
Qingdao	China	18,050,000	3.3
Dubai	United Arab Emirates	14,772,000	-5.3
Tianjin	China	14,523,000	2.9
Port Kelang	Malaysia	13,167,000	10.7
Rotterdam	Netherlands	12,385,000	1.2
Kaohsiung	Taiwan Prov. Of China	10,460,000	1.9
Antwerp	Belgium	10,037,000	4.0
Xiamen	China	9,614,000	4.7
Dalian	China	9,584,000	1.4
Hamburg	Germany	8,900,000	0.8
Los Angeles	United States	8,857,000	8.5
Tanjung Pelepas	Malaysia	8,029,000	-8.8
Cat Lai	Viet Nam	7,547,000	10.0
Laem Chabang	Thailand	7,227,000	6.0
Long Beach	United States	6,775,000	-5.8
New York	United States	6,250,000	-1.9
Yingkou	China	6,087,000	2.8
Colombo	Sri Lanka	5,735,000	10.6

<sup>24</sup> <https://data.worldbank.org/indicator/is.shp.good.tu>

<sup>25</sup> <https://worldmaritimenews.com/archives/248756/alphaliner-total-volume-at-worlds-busiest-ports-rises-in-2017/>

<sup>26</sup> [https://unctad.org/en/PublicationsLibrary/rmt2017\\_en.pdf](https://unctad.org/en/PublicationsLibrary/rmt2017_en.pdf)

Global container trade for 2018 and beyond includes growth projections in the range of five percent per year, according to multiple sources. IHS Markit forecasts that in 2018, global container trade will grow by 4.9 percent,<sup>27</sup> while Hapag-Lloyd forecasts a global increase in container shipping volume between 4.8 percent and 5.1 percent from 2018 through 2021.<sup>28</sup>

*Image 4: Ports of Los Angeles and Long Beach (Source: Commerce.gov).*



UNCTAD's Seaborne trade development forecasts project a 5.0 percent growth rate between 2017 and 2022; UNCTAD also cites forecasts by Maritime Strategies International (4.5 percent each year in 2018 and 2019); Clarkson's Research Services (5.1 percent in 2018); and Lloyd's List Intelligence (4.6 percent growth rate between 2017 and 2026).<sup>29</sup>

## NORTH AMERICAN PORTS

The World Bank data on containerized trade growth documents substantial growth in volumes at seaports for all three North American countries between 2000 and 2017. Container port traffic, as measured in TEU, grew from 28,300,000 to 51,425,466 in the United States (an increase of 81.7 percent); from 2,927,942 to 6,298,590 in Canada (115.1 percent); and from 1,315,701 to 6,305,000 in Mexico (379.2 percent). Combined, the North American volume almost doubled in that period, rising 96.7 percent to 64,029,056.<sup>30</sup>

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<sup>27</sup> [https://www.joc.com/maritime-news/ships-shipbuilding/surge-mega-ship-capacity-hit-water-2018\\_20171110.html](https://www.joc.com/maritime-news/ships-shipbuilding/surge-mega-ship-capacity-hit-water-2018_20171110.html)

<sup>28</sup> <https://www.hellenicshippingnews.com/outlook-2018-shipping-on-course-for-recovery-analysts/>

<sup>29</sup> [https://unctad.org/en/PublicationsLibrary/rmt2017\\_en.pdf](https://unctad.org/en/PublicationsLibrary/rmt2017_en.pdf)

<sup>30</sup> <https://data.worldbank.org/indicator/IS.SHP.GOOD.TU?locations=US-CA-MX>

**Table 2: North American Top 25 Container Ports, 2017 (Source: World Bank).**

North American Seaport	Coast	2017 Throughput (TEU)	2016-17 Change (%)
Los Angeles, CA	Pacific	9,343,193	5.5
Long Beach, CA	Pacific	7,544,511	11.4
Port of New York / New Jersey	Atlantic	6,710,817	7.4
Savannah, GA	Atlantic	4,046,216	11.0
Northwest Seaport Alliance (Seattle-Tacoma)	Pacific	3,669,615	1.5
Vancouver, B.C. (Canada)	Pacific	3,257,172	11.2
Port of Virginia (Norfolk-Hampton Roads-Newport News)	Atlantic	2,841,018	7.0
Manzanillo, Colima (Mexico)	Pacific	2,830,370	9.8
Houston, TX	Gulf	2,459,107	12.7
Oakland, CA	Pacific	2,419,549	2.1
Charleston, SC	Atlantic	2,177,550	9.1
Montreal, QC (Canada)	Atlantic	1,537,669	6.2
Lazaro Cardenas, Michoacán (Mexico)	Pacific	1,149,079	3.0
Veracruz, Veracruz (Mexico)	Gulf	1,117,304	15.7
Port Everglades (Ft. Lauderdale, FL)	Atlantic	1,076,912	3.8
Miami, FL	Atlantic	1,047,304	1.6
Jacksonville, FL	Atlantic	1,033,068	6.7
Baltimore, MD	Atlantic	962,484	10.6
Prince Rupert, B.C. (Canada)	Pacific	933,978	26.8
Altamira, Tamaulipas (Mexico)	Gulf	724,063	15.2
Halifax, N.S. (Canada)	Atlantic	559,914	16.5
New Orleans, LA	Gulf	532,597	2.0
Wilmington, DE	Atlantic	355,000	2.9
Mobile, AL	Gulf	318,889	35.7
Wilmington, NC	Atlantic	290,000	4.7

Much of the data used to rank the ports and intermodal rail operations in North America is proprietary. Where data is available, metrics vary; they may include container/TEU throughput, containers/TEU unloaded, throughput tonnage, and import tonnage. Available data may only be for the United States, or only for U.S.-based railroads. For the purposes of this report, the North American data is most relevant. Two of the four Class I railroads serving Wisconsin are Canadian-based; the two intermodal facilities in the state (and the closest one in an adjacent state) are served by Canadian National (CN). CN's Pacific Coast terminals – in Vancouver and Prince Rupert – are the terminals most directly tied to the state's current intermodal operations.

Across North America, the recent trends for growth in containerized trade were consistent across all metrics in 2017. The TEU throughput for North American seaports rose by 8.1 percent in 2017. Several ports in the top 25 saw growth in volumes of more than 10 percent, driven in great part by laden imports. Prince Rupert, a critical port for Canadian National's intermodal operations, saw an increase of

26.8 percent in 2017. Table 2, on the previous page, identifies the top 25 North American ports by throughput for 2017.<sup>31</sup>

For imports from Asia to the United States, the largest gateways have continued their dominance in market share. Based on data from PIERS (Port Import/Export Reporting Service), a product of IHS Markit, the first half of 2018 saw the combined ports of Los Angeles and Long Beach with a 49.1 percent market share of containerized Asian imports. When adding the market shares for New York-New Jersey (11 percent), Savannah (8.7 percent), and Seattle-Tacoma (7.5 percent), these five port facilities accounted for more than three-fourths of the U.S. container imports from Asia. Growth rates for Asian container imports at the next tier of ports is strong, however, with five-year growth rates at Houston (149 percent), Charleston (83.6 percent), and Norfolk (53 percent) all demonstrating rapid expansion.<sup>32</sup>

### NORTH AMERICAN RAIL INTERMODAL

The Intermodal Association of North America (IANA) data for 2017 shows that the North American intermodal sector rebounded from a decline of 2.1 percent in 2016.<sup>33</sup> For the year, overall volumes rose by 4.7 percent from 2016, to almost 18 million containers or trailers. The fourth quarter of 2017 was noted for significant strength in TOFC traffic, with an increase of 12.2 percent over the fourth quarter of 2016. Table 3 compares the annual volumes between 2016 and 2017 for the three intermodal equipment types, as well as total intermodal volumes.<sup>34</sup>

*Table 3: North American Intermodal Volumes by Equipment Type, 2016-17 (Source: Progressive Railroading/IANA).*

Equipment Category	2017 Volumes	2016 Volumes	% Change
International (ISO) Containers	9,067,555	8,541,538	6.2
Domestic Containers	7,561,472	7,361,097	2.7
Trailers (TOFC)	1,306,280	1,228,279	6.4
Total	17,935,309	17,130,924	4.7

<sup>31</sup> <https://seekingalpha.com/article/4147941-top-north-america-container-traffic-finishes-high-note-2017>

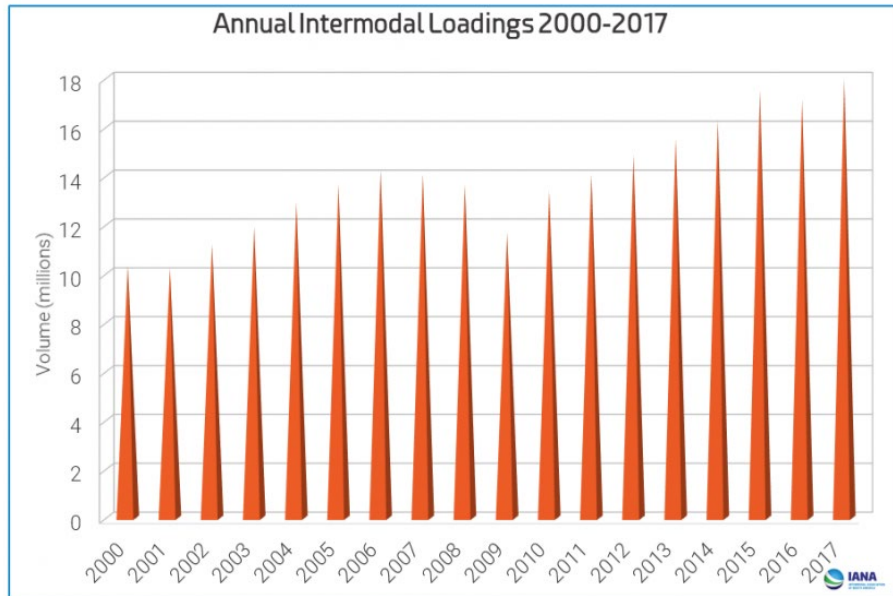
<sup>32</sup> [https://www.joc.com/port-news/us-ports/port-los-angeles/top-us-port-gateways-expand-share-asian-imports\\_20180831.html](https://www.joc.com/port-news/us-ports/port-los-angeles/top-us-port-gateways-expand-share-asian-imports_20180831.html)

<sup>33</sup> [https://www.logisticsmgmt.com/article/total\\_2016\\_intermodal\\_volumes\\_are\\_down\\_annually](https://www.logisticsmgmt.com/article/total_2016_intermodal_volumes_are_down_annually)

<sup>34</sup> <https://www.progressiverailroading.com/intermodal/news/IANA-Healthy-international-container-traffic-drove-intermodal-volume-gain-in-2017--53847>

Charts 2 and 3, from IANA, show the growth of intermodal freight shipping. Chart 2 shows annual intermodal loadings for the 2000-2017 period. During that period, loadings rose by about 40 percent from 2000 to 2006, before declining about 20 percent through the 2009 recession. Since then, growth has been steadily upward (save for 2016), growing by almost 50 percent. The average annual growth rate for container traffic in North America since 1990 is 5.3 percent.<sup>35</sup>

**Chart 2: Annual Intermodal Loadings, 2000-2017 (Source: IANA).**



**Chart 3: 2014-2018 Monthly Intermodal Volume Totals (Source: IANA).**

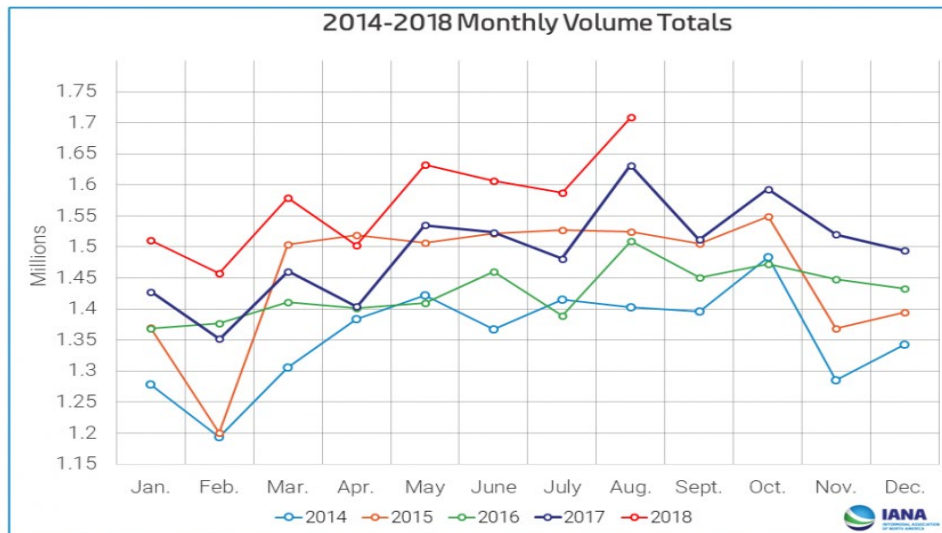


Chart 3 shows monthly container volumes in the 2014-2018 period. This chart shows that on a month-to-month basis, combined North American intermodal volumes have set new records for each month in 2018 through August, save for April.<sup>36</sup>

On the rail side, the Association of American Railroads (AAR) reported similar data for 2017, although the AAR does not combine North American data for the intermodal category in its news releases. For the U.S. railroads, 2017 saw a 3.9 percent increase in combined intermodal container/trailer traffic, to 14,011,834.<sup>37</sup> AAR’s intermodal “fact sheet” uses 2016 data to give a broader picture of the value of

<sup>35</sup> <http://www.cirrelt.ca/DocumentsTravail/CIRRELT-2017-60.pdf>

<sup>36</sup> <https://intermodal.org/resource-center/data-statistics>

<sup>37</sup> [http://www.scmr.com/article/2017\\_u.s.\\_rail\\_carload\\_and\\_intermodal\\_volumes\\_post\\_annual\\_gains](http://www.scmr.com/article/2017_u.s._rail_carload_and_intermodal_volumes_post_annual_gains)

intermodal rail service: in 2016, the U.S. Class I railroads originated eight million intermodal units (amounting to 28.9 percent of total carloads), carrying 119 million tons (7.9 percent of total tonnage) and earning gross revenue of \$8.8 billion (13.5 percent of total gross revenue). Combined with terminating loads (and including the Canadian Class I railroads), North American railroads handled 15.3 million intermodal containers and 1.5 million trailers in 2016.<sup>38</sup>

Intermodal containers are a large component of rail traffic for most of the Class I railroads; according to one source, five of the seven companies listed in Table 4 each carried more than two million containers on their system in 2017. The container volumes cited in Table 4 are higher than those from other sources; this is likely in part due to some “double-counting” of containers interchanged between railroads. Of note, Canadian National, the railroad servicing both Wisconsin intermodal facilities, reported more than 16 percent growth in intermodal traffic. Much of this increase can likely be attributed to the expansion of facilities at the Fairview Terminal in Prince Rupert, B.C.

*Table 4: Container Units Carried by Railroad, 2017 (Source: Seeking Alpha / Class I Weekly Container Units Carried).*

Class I Railroad	2017 Volumes	% Change From 2016
BNSF	4,676,091	6.0
Norfolk Southern	3,674,459	4.5
Union Pacific	3,565,499	0.9
CSX	2,712,860	2.4
Canadian National	2,512,281	16.3
Kansas City Southern	958,864	2.5
Canadian Pacific	940,300	1.7

The Class I railroads each have different splits of intermodal traffic volumes between international (ISO) and domestic containers. BNSF and Union Pacific each reported an approximate 50/50 split. Norfolk Southern reported nearly 60 percent of intermodal traffic was international containers. By contrast, CSX data had 60 percent of intermodal traffic as domestic containers.<sup>39</sup> Canadian National reported 63 to 66 percent of intermodal traffic was international containers for 2016 and 2017.<sup>40</sup>

Of note, merchandise imports to many of the largest ports are being unloaded from the marine/ISO containers and transloaded into 53’ domestic intermodal containers for the final rail/truck deliveries in North America. From 2011 through 2016, the percentage of imported containers at Los Angeles and Long Beach being transloaded rose from 52 percent to 58 percent. Factors that have been cited as drivers for transloading include the increase in vessel size and the rapid rise of e-commerce. Over time, this trend may challenge inland exporters (such as those in Wisconsin) to find empty international containers for exported products.<sup>41</sup> Other advantages to transloading include operational streamlining, as in general, the contents of three marine containers can be consolidated into two domestic

<sup>38</sup> <https://www.aar.org/wp-content/uploads/2018/03/AAR-Intermodal-Issue.pdf>

<sup>39</sup> <https://seekingalpha.com/article/4147941-top-north-america-container-traffic-finishes-high-note-2017>

<sup>40</sup> <https://www.cn.ca/-/media/Files/Investors/Investor-Annual-Report-Archive/English/2017-CN-Annual-Report.pdf?la=en&hash=1F45656A4F0E9BCFB81488CD524CA27C87B21C5E>

<sup>41</sup> [https://www.joc.com/port-news/us-ports/us-transloading-growth-reshaping-cargo-routing\\_20170303.html](https://www.joc.com/port-news/us-ports/us-transloading-growth-reshaping-cargo-routing_20170303.html)



containers. The sorting of loads at the point of landing can also better position the imported goods towards their intended destinations, whether inland or in the markets closest to the port location. Further, overweight containers can be emptied to allow for legal-weight movement of contents.<sup>42</sup> However, transloading does introduce potential disadvantages. These include labor costs, potential damage to contents in the transfer process, increased threat of theft, and potential delivery delays.<sup>43</sup> More discussion of port and warehouse management, including future challenges, is in the “Developments in Intermodal Operations” section of this report.

Across North America, the first two quarters of 2018 saw growth in both international and domestic loadings. IANA reported that overall, container volumes in the second quarter of 2018 rose by 6.2 percent from the second quarter of 2017. For the quarter, international market activity rose 4.8 percent, while domestic activity grew by 7.7 percent. In the first quarter of 2018, combined loadings were up 7.2 percent over the previous year.<sup>44</sup>

As of September 2018, the intermodal sector was outpacing virtually all the growth projections made earlier in the year, with overall volumes up 6.8 percent for the first seven months of the year. Separating categories, international container volumes were up by six percent through July; one of the factors seen as driving this expansion

*Image 5: TOFC Trailer Lift (Source: BNSF).*

was shippers seeking to move cargo in advance of tariffs, or to avoid peak-season congestion delays. Domestic container shipping volumes were up 6.1 percent, while TOFC traffic was up by 16.3 percent. Of these trailers, short trailer (48’ or less) volumes were up 8.3 percent, attributed to the growth in e-commerce and the use



of these trailers by major parcel delivery services. For trailers at 53’, those volumes have risen by 19.8 percent in the first seven months of 2018; observers attribute that large growth to the use of TOFC in place of domestic COFC, especially where domestic containers are difficult to find.<sup>45</sup>

Per IANA, globally, 95% of all manufactured goods at one point are moved in a container. The North American intermodal market is the largest in the world, amounting to a market value of \$40 billion. It

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<sup>42</sup> <https://schneider.com/knowledge-hub/whitepaper/transloading-inland-bound-freight>

<sup>43</sup> Comments by Subcommittee member Larry Krueger, Lake States Lumber Association.

<sup>44</sup> <https://www.ajot.com/premium/ajot-continuing-intermodal-gains-seen-by-executives-of-class-i-rail-firms>

<sup>45</sup> [https://www.americanshipper.com/Main/News/Intermodal\\_analyst\\_2018\\_is\\_heck\\_of\\_a\\_year\\_72534.aspx?source=Related](https://www.americanshipper.com/Main/News/Intermodal_analyst_2018_is_heck_of_a_year_72534.aspx?source=Related)

relies on a fleet of equipment, including 34.5 million domestic and international containers and more than 700,000 chassis for first- and last-mile drayage by truck.<sup>46</sup>

## TOP COMMODITIES FOR INTERNATIONAL CONTAINERIZED INTERMODAL FREIGHT

Whether by container volumes or by the weight of containerized goods shipped, far more products enter North America by container than are exported. IHS Markit, through its Journal of Commerce news service, produces annual reports of the top 100 importers and top 100 exporters. For 2017, the United States imports 1.91 million TEU per month, while exports are just over half that count, averaging 1.04 million TEU per month. IHS Markit compiles data from importers and exporters through review of their bills of lading. This system uses the acronym PIERS, for Port Import/Export Reporting Service. In 2015, PIERS processed 20.7 million bills of lading and tracked almost 5.2 million containers. Based on this information, IHS calculated 22.9 million TEU of imports to the U.S., and 12.5 million TEU of exports.

**Table 5: Top 2017 U.S. Container Imports (TEU)**  
(Source: Journal of Commerce).

Import Commodity Group	2017 U.S. Container Volume
Retail Products	3,500,000
Foodstuffs	708,600
Household Goods	644,800
Conglomerates	606,200
Auto Parts and Automobiles	452,400
Electronics	324,800
Clothing	309,100
Toys	96,500
Miscellaneous	76,300
Heavy Machinery	53,800

**Table 6: Top 2017 U.S. Container Exports (TEU)**  
(Source: Journal of Commerce).

Export Commodity Group	2017 U.S. Container Volume
Recyclables	1,100,200
Agricultural Goods	630,400
Paper/Forest Products	521,300
Chemicals	309,800
Foodstuffs	273,800
Conglomerate	194,100
Auto Parts and Automobiles	172,800
Miscellaneous	164,600
Retail	143,400
Minerals	79,300
Heavy Machinery	59,600

Tables 5 and 6 identify the nation’s largest import and export commodities in domestic container trade.<sup>47,48</sup>

## SECTION SUMMARY: INTRODUCTION TO CONTAINERIZED FREIGHT

Intermodal freight is moved globally in reusable containers of standard sizes (usually 40’ or 20’ in length), and across North America in longer standardized containers (usually 53’ in length). Global trade

<sup>46</sup> <https://www.intermodal.org/what-intermodal>

<sup>47</sup> <https://www.joc.com/special-topics/top-100-us-importers>

<sup>48</sup> <https://www.joc.com/special-topics/top-100-us-exporters>

by container is rising between five and six percent per year, with more than half of the largest ports in Asia. North America's busiest container ports are at Los Angeles-Long Beach, New York-New Jersey, Savannah, Seattle/Tacoma, and Vancouver. North American intermodal traffic rose by almost five percent in 2017 after falling slightly in 2016; traffic has grown by 50 percent since the Great Recession. Five of the seven Class I railroads (BNSF, NS, UP, CSX, and CN) each moved more than two million containers in 2017. Data from 2018 indicates container trade rose even higher than projections, nearing a seven percent growth rate. One trend for international trade is the transloading of international containers at gateway ports into domestic containers; this trend may limit access to international containers for Wisconsin's exporters. Many of the top exports for the U.S. are grown or manufactured in Wisconsin, and comprise a large portion of the state's economy.

## METRICS USED TO MEASURE INTERMODAL FREIGHT ACTIVITY AND PERFORMANCE

The intermodal sector is driven by data measurement and performance. Volumes, costs, capacities, dwell time, and other factors are regularly compared by liner services, railroads, ports and terminals, freight brokers, beneficial cargo owners, and analysts. Data is used to change schedules, adjust capacities, schedule employment and equipment deployment, establish rates, inform infrastructure project planning, and modify other operational functions. Through data-driven decision-making, freight transportation providers can increase efficiency and lower operating costs. While some data is directly measured, other data is derived by relation to a benchmark or as part of an index.

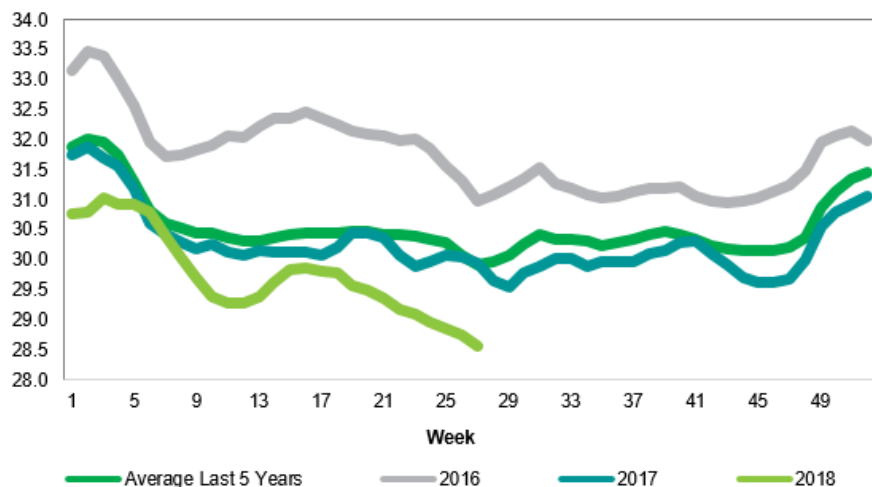
### VOLUMES

While volumes are the most apparent way to measure intermodal freight, there are many ways to measure volume, and many sources. Most international volume measurements incorporate the TEU as a basis of measurement, but measurements could include total throughput (including imports, exports, and empty containers), TEU for export, volume (by weight), or value. For domestic movements, data for containers and trailers is usually collected separately, with metrics based on number of lifts. Sources of this data include the individual ports themselves, as well as reporting services such as PIERS; the U.S. DOT's Marine Administration (MARAD), which captures U.S. import TEU, export TEU, import tonnage, and export tonnage;<sup>49</sup> and trade groups such as IANA and the Association of American Railroads (AAR).<sup>50</sup>

### VELOCITY AND DWELL TIME

The velocity by which intermodal trains operate is a key metric for measuring the sector's efficiency across North America. In mid-2018, the average intermodal train velocity was 29 miles per hour (mph), 1 mph slower than 2017 and 1.5 mph below the five-year average. Chart 4 shows intermodal train speed fluctuations between 2016 and mid-2018, relative to the five-year average.<sup>51</sup> Related to

*Chart 4: Four-Week Moving Average Intermodal Train Velocity (in mph)  
(Source: Journal of Commerce/Gross Transportation Consulting)*



<sup>49</sup> <https://www.marad.dot.gov/resources/data-statistics/>

<sup>50</sup> [https://www.logisticsmgmt.com/article/iana\\_data\\_points\\_to\\_solid\\_intermodal\\_volume\\_growth](https://www.logisticsmgmt.com/article/iana_data_points_to_solid_intermodal_volume_growth)

<sup>51</sup> [https://www.joc.com/rail-intermodal/year-theres-no-time-present-your-us-shipment\\_20180712.html](https://www.joc.com/rail-intermodal/year-theres-no-time-present-your-us-shipment_20180712.html)

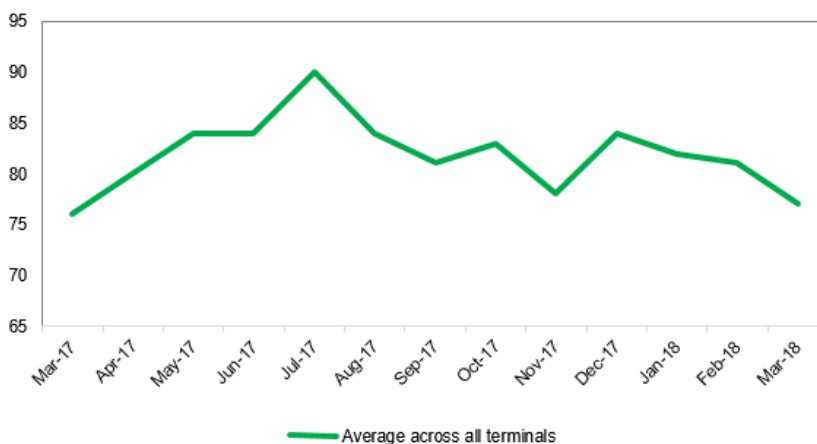
velocity is container dwell time – the time (measured in hours) that a container sits in a port or inland terminal awaiting loading to a vessel, a rail car, or a chassis for drayage. Following major service disruptions in the upper Midwest in 2013 and 2014, Congress directed the Surface Transportation Board (STB) to collect performance data from all the Class I railroads. Initially an interim order, the requirement was made permanent in November 2016, with revisions to accommodate existing railroad data collection methods.<sup>52</sup>

Data captured specific to intermodal operations includes the number of revenue railcars not moved for more than 48 hours, number of trains held per day (and cause of delay), weekly average number of cars on line, and average train speed. Dwell-time data for several large rail yards (covering all rail car types) is also collected.<sup>53</sup> Of note, dwell times for Union Pacific, Norfolk Southern, Canadian National (CN), and Kansas City Southern saw spikes from mid-December 2017 through late January 2018; CN saw a second spike in February 2018.<sup>54</sup> Winter weather and higher-than-anticipated volumes (including intermodal) were cited as reasons for service declines.<sup>55</sup> Railroads also collect more detailed metrics for internal proprietary use and analysis.

Transport Canada (the Canadian government’s transportation agency) has an easy-to-use web page of freight transportation performance indicators. Among the relevant data collected and displayed are commodity flows (containers) for Halifax, Montreal, Vancouver, and Prince Rupert; port dwell times for West Coast and East Coast ports; average speeds for intermodal trains; and end-to-end shipping times for Shanghai-to-Toronto container shipments.<sup>56</sup>

For drayage, truck turn times at intermodal yards are an important measure of efficiency, as the ability of truckers to locate, load, and leave a yard with a container for drayage (or, conversely, to drop off a container) is a direct reflection of the efficiency and organization at a container terminal. Turn times also interact with dwell times in that delays in drayage operations directly extend the dwell times at intermodal terminals. Chart 5 shows how truck turn time at the ports of Los Angeles and Long Beach rose in mid-2017, and then fell as efforts to improve efficiency,

*Chart 5: Average Truck Turn Time (in Minutes), Los Angeles-Long Beach Terminals (Source: Journal of Commerce/Harbor Trucking Association).*



<sup>52</sup> <http://trn.trains.com/news/news-wire/2016/12/02-stb-statistics>

<sup>53</sup> [https://www.stb.gov/stb/railserviceissues/rail\\_service\\_reports.html#loaded](https://www.stb.gov/stb/railserviceissues/rail_service_reports.html#loaded)

<sup>54</sup> <https://www.stb.gov/stb/docs/RETAC/2018/April/Performance%20Metrics.pdf>

<sup>55</sup> <https://www.progressiverailroading.com/federal-legislation-regulation/news/CP-CSX-UP-respond-to-STBs-rail-service-concerns--54308>

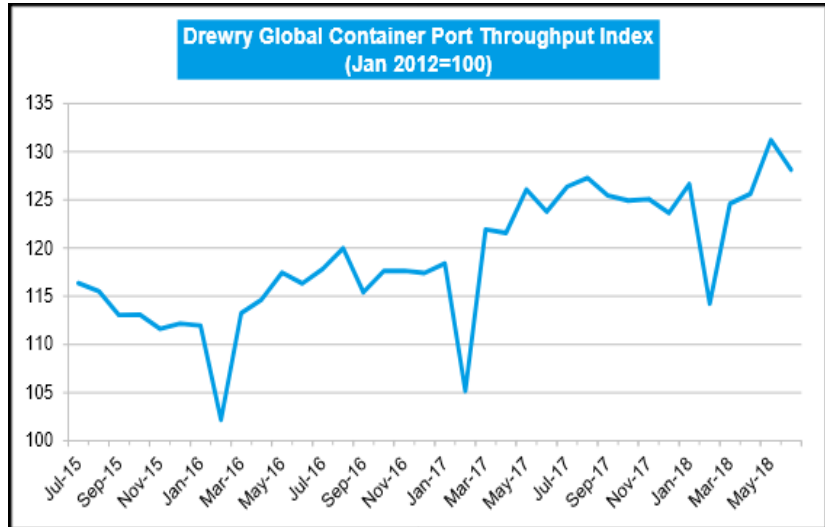
<sup>56</sup> <https://www144.statcan.gc.ca/tdih-cdit/performance-eng.htm?wbdisable=true>

coupled with lower container volumes, combined to reduce both truck turn times and container dwell times.<sup>57</sup>

## DREWRY INDICES

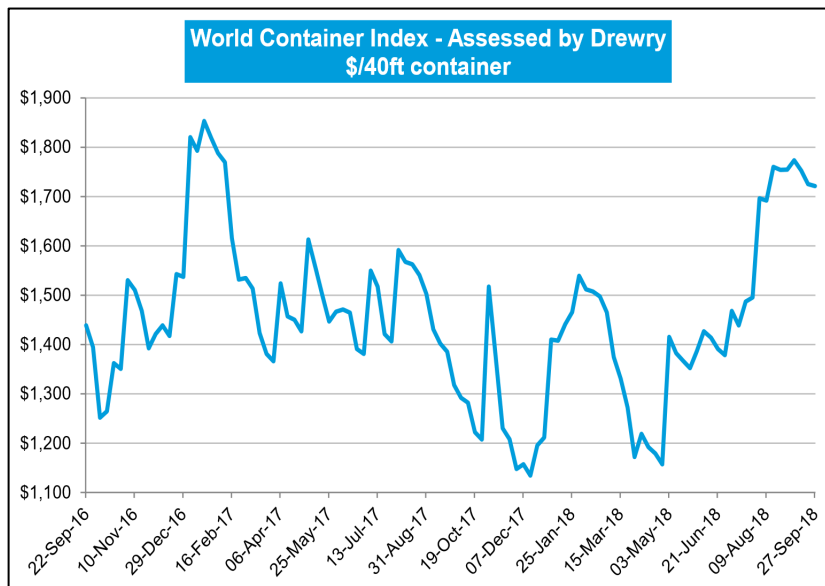
Drewry is a United Kingdom-based maritime research firm with a large array of proprietary data and indices to measure global maritime freight performance. One set of its performance indices measures port throughput across 220 global ports, capturing 75 percent of global volumes. The Global Container Port Throughput Index, as displayed in Chart 6, illustrates a general rise in traffic, with the only predictable interruptions based on drops in shipping during Chinese New Year.<sup>58</sup>

**Chart 6:** Drewry Global Container Port Throughput Index (Source: Drewry).



A second metric captured by Drewry, the World Container Index, tracks international marine container freight rates (for 40' containers) on eight routes linking the U.S., Europe, and Asia. As shown in Chart 7, the two-year trend for the index is one of substantial swings, with price fluctuations of as much as \$400 (more than 25 percent) within a four-week period. After peaking at over \$1,800 in early 2017, the index experienced rates under \$1,200 in late 2017 and again in April 2018. As of late September 2018, the index stood at \$1,721.17.<sup>59</sup>

**Chart 7:** Drewry World Container Index, 40' Containers (Source: Drewry).



<sup>57</sup> [https://www.joc.com/port-news/us-ports/port-los-angeles/la-lb-truck-turn-times-container-dwell-times-continue-decline\\_20180425.html](https://www.joc.com/port-news/us-ports/port-los-angeles/la-lb-truck-turn-times-container-dwell-times-continue-decline_20180425.html)

<sup>58</sup> <https://www.drewry.co.uk/maritime-research/maritime-research-related-content/port-throughput-indices>

<sup>59</sup> <https://www.drewry.co.uk/supply-chain-advisors/supply-chain-expertise/world-container-index-assessed-by-drewry>



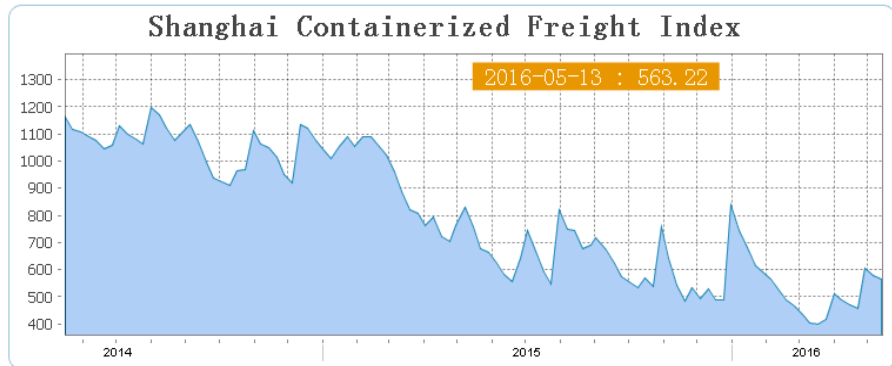
## SHANGHAI CONTAINERIZED FREIGHT INDEX AND CHINA CONTAINERIZED FREIGHT INDEX

The Shanghai Containerized Freight Index (SCFI) dates to 2005, when the Chinese government created the index to measure spot rates along 15 different global shipping routes originating in Shanghai. The other justification for the SCFI was to create a derivatives market that would minimize risks from spikes and plunges in rates.

Similar indices are also based in China, including the broader China Containerized Freight Index (CCFI), which tracks both spot rates and contracted

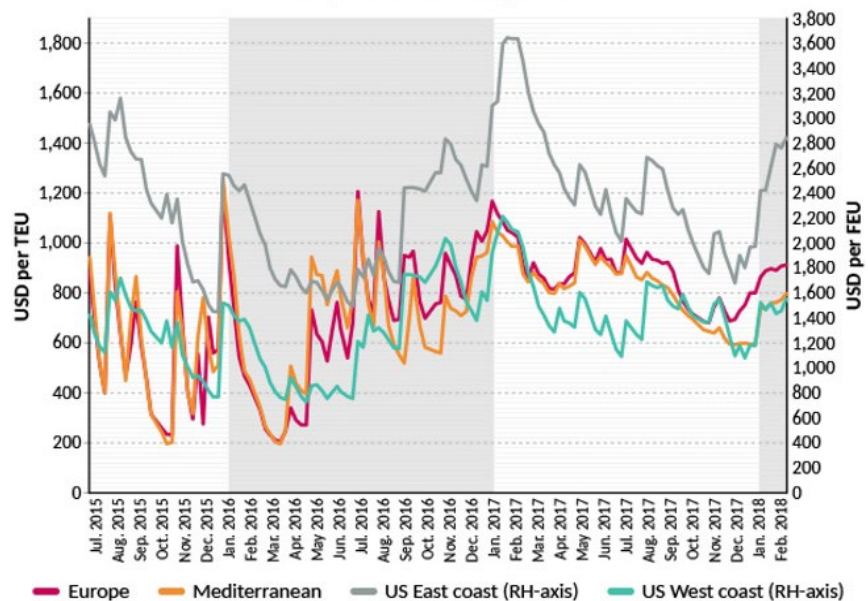
rates from multiple Chinese ports. As most trade (approximately 75 percent) is based on contractual rates, the CCFI is a better gauge of overall shipping costs, while the SCFI tracks the changes in demand better—particularly at points where demand surges in a short period of time. As such, the SCFI fell by almost half in 2015, as over-capacity of liner services reduced the spot price of shipping, even as overall trade volume grew by 3.7 percent. Chart 8 shows the drop in that index between 2014 and 2016.<sup>60</sup>

Chart 8: Shanghai Containerized Freight Index, 2014-2016 (Source: Flexport).



Following the bankruptcy of Korean-based liner company Hanjin, the mergers and affiliations of other liner companies, and acceleration of vessel scrapping, the SCFI recovered from lows in 2015-2016 of \$400 per TEU (to the U.S. West Coast) to a range of between \$600 and \$800 per TEU in 2017. Of note, the index captured spikes in shipping demand to the U.S. East Coast in both 2017 and 2018, coincident with Chinese New Year slowdowns. Chart 9 shows the range of rates along lanes to both U.S. coasts, to the Mediterranean, and to Europe.<sup>61</sup>

Chart 9: Shanghai Containerized Freight Index, 2015-2018 (Source: Hellenic Shipping News, BIMCO, Shanghai Shipping Exchange).



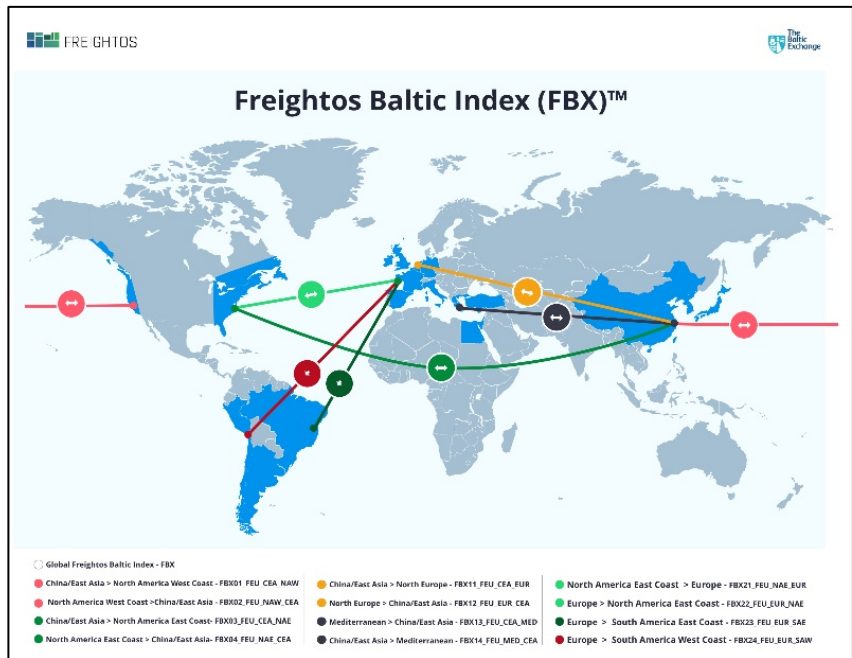
<sup>60</sup> <https://www.flexport.com/blog/shanghai-containerized-freight-index-scfi-history/>

<sup>61</sup> <https://www.hellenicshippingnews.com/container-shipping-a-year-where-fleet-growth-and-demand-growth-are-the-same-2/>

## FREIGHTOS

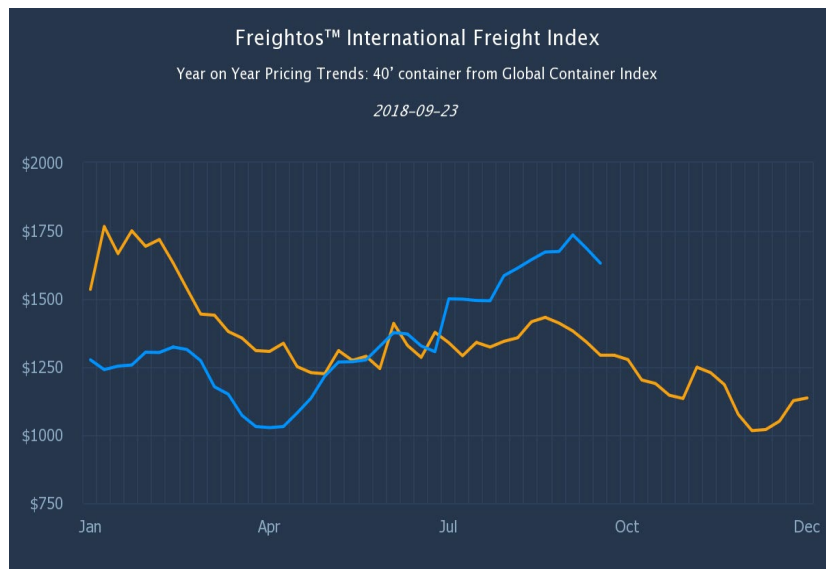
Freightos, a technology firm based in Hong Kong, provides online pricing and automation tools for a range of customers. On a weekly basis, the company measures the price movements for 12 major maritime lanes, expressed as an average price per 40' container. The indices allow a general comparison of the costs of delivery to a different coast, allowing shippers to compare the extra cost of delivery through the Panama Canal with the cost of using rail intermodal across North America. The cost variations also serve as a proxy for volume, in that higher demand for container slots will trigger a rise in prices, thereby indicating an increase in trade volume across a given lane.<sup>62</sup>

**Graphic 3: Freightos Baltic Index (FBX) Trade Lanes** (Source: FreightWaves, Freightos).



As of April 2018, Freightos partnered with the Baltic Exchange, a long-standing measure of bulk maritime freight costs, to establish the Freightos Baltic Index.<sup>63</sup> Graphic 3 shows the trade lanes used to measure the index. Chart 10 shows the index measurements for 2017 and 2018 through mid-September. In that period, the 2017 pricing trends were declining thorough the year from a peak of over \$1,750 to a low of just over \$1,000. The 2018 trend has generally been the opposite; following a low of just over \$1,000 in April, the index rose to \$1750 before falling slightly. This index appears to track closely with the Shanghai and China Containerized Indices.

**Chart 10: Freightos International Freight Index, 2017-18** (Source: Freightos).



<sup>62</sup> <https://www.freightwaves.com/freightos-baltic-index/>

<sup>63</sup> <https://www.freightos.com/introducing-freightos-baltic-index/>

Freightos also operates as a data clearinghouse for more than 50 freight forwarders and carriers, allowing customers to choose different shipping options and prices, depending on need.<sup>64</sup>

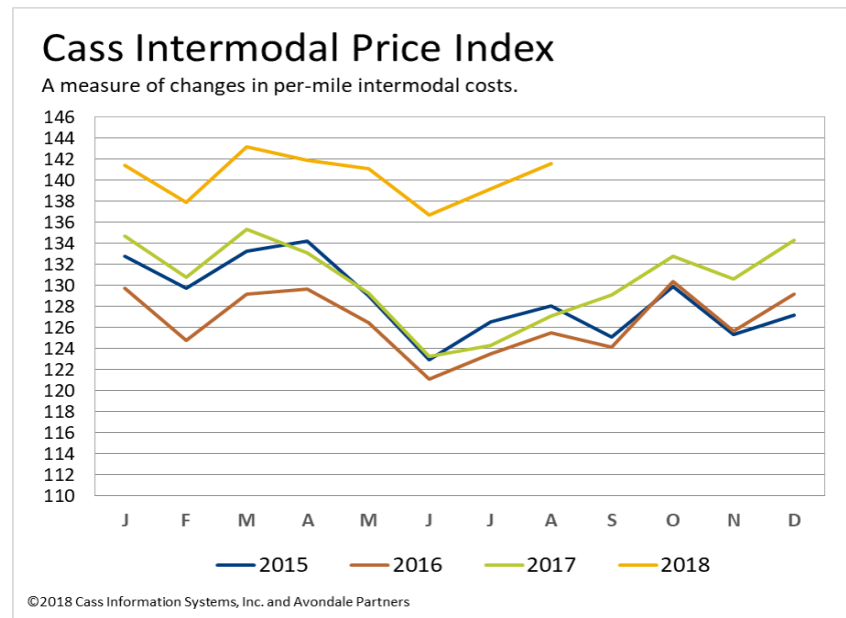
## CASS INTERMODAL PRICE INDEX

Cass Information Systems (in partnership with securities analyst firm Broughton Capital, LLC) tracks \$25 billion in annual freight spending, and uses these expenditures to measure relative costs for both truckload linehaul freight and intermodal freight. The Cass Intermodal Price Index measures the changes in per-mile costs for domestic (as opposed to international) intermodal freight transportation. Higher index values indicate greater demand for the service, as demonstrated by the willingness of shippers to pay more. The index was established in January 2005,

with an initial base value of 100. As of August 2018, Cass measured an 11.4 percent rise in costs, year-over-year, raising the index score to 141.6, its third-highest monthly reading ever.

Chart 11 shows the Cass index on a month-to-month measure for 2015 through 2018; Chart 12 shows the index from 2008 through present.

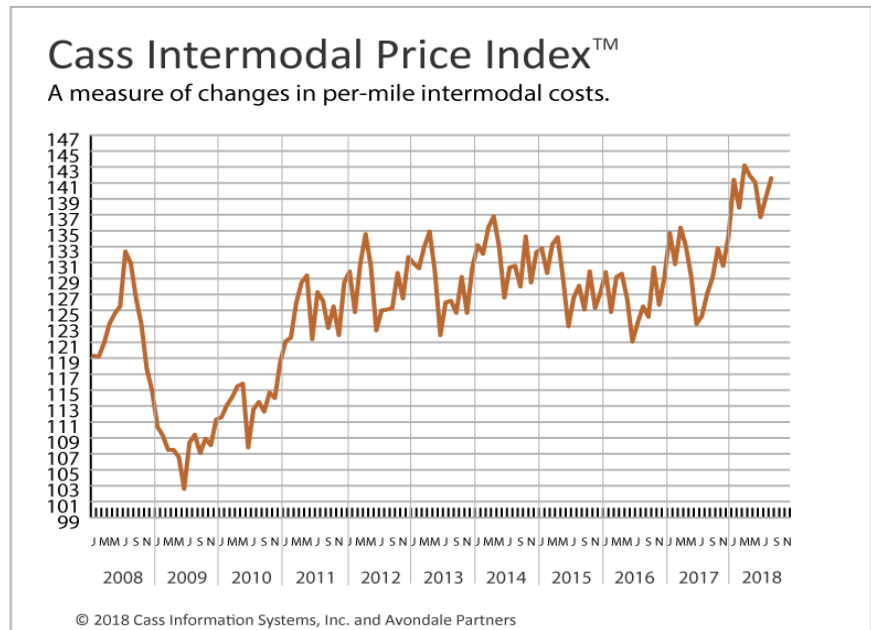
**Chart 11: Cass Intermodal Price Index (year-over-year), 2015-2018**  
(Source: Cass Intermodal Systems, Inc. and Avondale Partners).



<sup>64</sup> <https://www.freightos.com/compare-book-rates-from-multiple-top-forwarders-2018>

Chart 12 also depicts the steep decline in the index during the 2008-2009 recession and its recovery in 2011 to new highs in recent months.<sup>65</sup>

**Chart 12:** Cass Intermodal Price Index, 2008-2018  
(Source: Cass Information Systems, Inc. and Avondale Partners).



## SECTION SUMMARY: METRICS USED TO MEASURE INTERMODAL FREIGHT ACTIVITY AND PERFORMANCE

Data-driven decision-making informs freight transportation providers on opportunities to modify operational functions that can increase efficiency and lower operating costs. A number of direct measurements and indices are used to measure the performance of the intermodal freight sector. While some of these measurements are public, many others are private and/or proprietary. Efficiency can be tracked with train velocity and dwell time at terminals. Volume measurements can be by weight or by container, and can be aggregated by country or across North America.

Indices have been developed to track global container demand and availability, using spot prices as a proxy for demand. Most of these indicators showed price increases in late 2017 and throughout 2018 for both international and domestic container moves, indicating limited container availability and/or higher demand. These transportation price increases can make delivered goods costs higher for Wisconsin’s importers, and can make Wisconsin’s exports less competitive on a global market.

## SERVICE AREAS FOR CONTAINERIZED INTERMODAL FREIGHT INTERNATIONAL CONTAINER TRADE

According to the World Shipping Council, the major trade lanes to North America are across the Pacific Ocean, between eastern Asian ports and ports along the western coast of North America. Other key trade lanes are through the Suez Canal between Asia and Europe, across the Atlantic between ports in

<sup>65</sup> <https://www.cassinfo.com/transportation-expense-management/supply-chain-analysis/transportation-indexes/intermodal-price-index.aspx>

Europe and eastern North America, and through the Panama Canal between Asian ports and ports along the United States' eastern coast and the Gulf of Mexico. Table 7 shows the top trade routes, by TEU shipped in 2017.

*Table 7: Top Containerized Trade Routes by TEU, 2017 (Source: World Shipping Council).*

Trade Route	Westbound	Eastbound	Northbound	Southbound	Total
Asia-North America	7,490,000	19,482,000			26,572,000
Asia-North Europe	9,924,000	5,139,000			15,063,000
Asia-Mediterranean	5,504,000	2,409,000			7,913,000
North Europe-North America	3,284,000	2,120,000			5,404,000
Asia-Middle East	3,340,000	1,400,000			4,740,000
Asia-East Coast South America			730,000	1,344,000	2,074,000
North Europe/Mediterranean-East Coast South America			830,000	850,000	1,680,000
North America-East Coast South America			794,000	474,000	1,268,000

*Table 8: Volume of Services on Global Container Trade Routes, 2017 (Source: World Shipping Council).*

Trade Route	Services
Asia-East Coast North America	19
Asia-West Coast North America	54
Asia-North Europe	20
Asia-Mediterranean	29
North Europe-North America	32
Mediterranean-North America	17
Asia-Middle East	43
Asia-South Asia	53
North America-Mid-East/South Asia	10
South Asia-Europe	20
Middle East-Eastern Europe	36
Oceania	46
East Coast South America	14
West Coast South America	31
South Africa	19
West Africa	46
<b>Total</b>	<b>487</b>

Another measure made available by the World Shipping Council offers a means to compare activity along key trade lanes. The number of services (regular stops) that liner companies make between markets identifies the corridors where container service is most available. Nearly 500 liner shipping services move between trade markets. Table 8 identifies the lanes with the largest number of services offered.<sup>66</sup>

For the United States, the Journal of Commerce/IHS Markit analyzed the volume/share of TEU imports by global regions. Table 9 shows the global regions of origin by volume and market share, dividing the volumes by coast (Pacific, Atlantic, or Gulf) where the containers are unloaded.<sup>67</sup>

<sup>66</sup> <http://www.worldshipping.org/about-the-industry/global-trade/trade-routes> (Services may be counted on more than one route.)

<sup>67</sup> IHS Markit/Journal of Commerce Webcast, The JOC Top 100 Importers, June 21, 2018

**Table 9: Origins and Destinations of U.S. Containerized Imports (Source: IHS Markit).**

Global Region	2017 Mkt. Share	2017 TEU Volume	2016 TEU Volume	% Change	2017 TEU Volumes*		
					U.S. East Coast	U.S. West Coast	U.S. Gulf Coast
Northeast Asia	57.1%	13,094,610	12,531,084	4.5%	3,903,924	8,659,059	490,594
Southeast Asia	11.2%	2,561,870	2,314,331	10.7%	1,699,586	1,550,571	262,429
North Europe	9.6%	2,202,682	2,071,614	6.3%	932,622	225,466	258,756
Mediterranean	5.6%	1,283,872	1,192,337	7.7%	922,717	199,381	141,247
Central America & Mexico	4.6%	1,042,820	930,227	12.1%	638,944	173,837	95,920
Indian Subcontinent	3.9%	889,116	824,778	7.8%	581,214	171,336	79,854
West Coast South America	2.5%	582,962	569,669	2.3%	358,416	161,509	74,654
East Coast South America	2.0%	467,374	443,875	5.3%	330,331	109,015	46,503
Caribbean	1.3%	308,976	297,028	4.0%	245,064	35,405	31,783
Australia & South Pacific Islands	0.9%	200,634	206,058	-2.6%	88,934	21,187	16,239
Middle East	0.6%	142,087	130,285	9.1%	83,920	8,268	9,569
Africa	0.4%	97,597	96,906	0.7%	79,674	6,256	7,489
Total U.S. Containerized Imports	100.0%	22,914,788	21,644,126	5.9%	9,865,345	11,321,291	1,515,038

\*TEU volumes do not add accurately. Error was inherent in source document; the originator has been notified. Source was used to illustrate the relationship between different origins/destinations and the U.S., which are accurately characterized in relationship to one another.



Table 10 identifies the global destinations of U.S. exports by volume and market share, and the coast from which those exports are made.<sup>68</sup>

*Table 10: Destinations and Origins of U.S. Containerized Exports (Source: IHS Markit).*

Global Region	2017 Mkt. Share	2017 TEU Volume	2016 TEU Volume	% Change	2017 TEU Volumes		
					U.S. East Coast	U.S. West Coast	U.S. Gulf Coast
Northeast Asia	39.3%	4,929,926	5,033,879	-2.1%	1,603,605	3,090,833	224,182
North Europe	11.5%	1,441,744	1,371,559	5.1%	1,038,667	137,767	264,055
Southeast Asia	10.2%	1,277,541	1,247,043	2.5%	527,480	678,369	68,184
Caribbean	8.2%	1,025,488	1,016,345	1.0%	969,864	12,277	40,314
Central America & Mexico	5.7%	709,401	708,256	0.2%	416,220	68,036	222,447
Mediterranean	5.1%	646,202	623,020	3.7%	402,131	74,695	168,984
Indian Subcontinent	4.7%	592,106	548,101	8.0%	412,318	109,264	69,078
West Coast South America	3.9%	493,653	477,248	3.4%	280,094	62,991	143,223
Middle East	3.9%	490,367	469,536	4.4%	290,641	110,505	89,051
East Coast South America	2.9%	363,569	342,281	6.2%	220,278	13,138	129,865
Oceania	2.6%	320,206	326,816	-2.0%	103,644	208,565	7,777
Africa	2.0%	250,940	229,609	9.3%	164,102	17,432	69,146
Total U.S. Containerized Exports	100.0%	12,554,828	12,397,585	1.3%	6,429,046	4,583,873	1,496,307

Examined together, these two tables illustrate many of the key challenges to, and opportunities for, improving and expanding the use of intermodal freight for exports and imports. These include:

- The volume of container imports into the U.S. is more than 10 million TEU higher than the volume of exports – an almost 2:1 ratio.
- The West Coast imported 1.46 million more TEU than the East Coast, but the East Coast exported 1.85 million TEU more than the West Coast.
- More than twice as many TEU are exported to the Caribbean than are received as imports.

Combined, the challenges of lane balance and “match-back” moves represent ongoing concerns for the intermodal freight industry.

<sup>68</sup> IHS Markit/Journal of Commerce Webcast, The JOC Top 100 Exporters, June 27, 2018

## SECTION SUMMARY: SERVICE AREAS FOR CONTAINERIZED INTERMODAL FREIGHT

The trade lane between Asia and North America has the greatest TEU volumes of any global trade lanes; large volumes of containers also move between Asia and North Europe, between Asia and the Mediterranean, and between North Europe and North America. More than 57 percent of imports to the U.S. originate in Northeast Asia; another 11 percent of imports originate in Southeast Asia, while North Europe accounts for almost 10 percent of imports. Nearly 23 million TEU of containerized freight was brought into the U.S. in 2017, an increase of almost 6 percent from 2016. By comparison, the volume of U.S. exports in 2017 was just over half that of imports, at 12.5 million TEU. Northeast Asia was the destination for 39 percent of those exports, with North Europe (over 11 percent), South Asia (over 10 percent), and the Caribbean (over 8 percent) as other major destinations for exports.

# INTERMODAL EQUIPMENT INVENTORY

## INTERNATIONAL CONTAINER FLEET

According to the research firm Technavio, the global dry container fleet stood at 32.81 million TEU in 2016, and was forecast to grow to 36.36 million TEU by 2021. About one in three of those containers (10.85 million TEU) was open-top (as opposed to the sealed box).<sup>69</sup> While data on the vessel capacity of liner service fleets is available, the volume of containers (by TEU) is more difficult to determine, as data is held by proprietary sources.

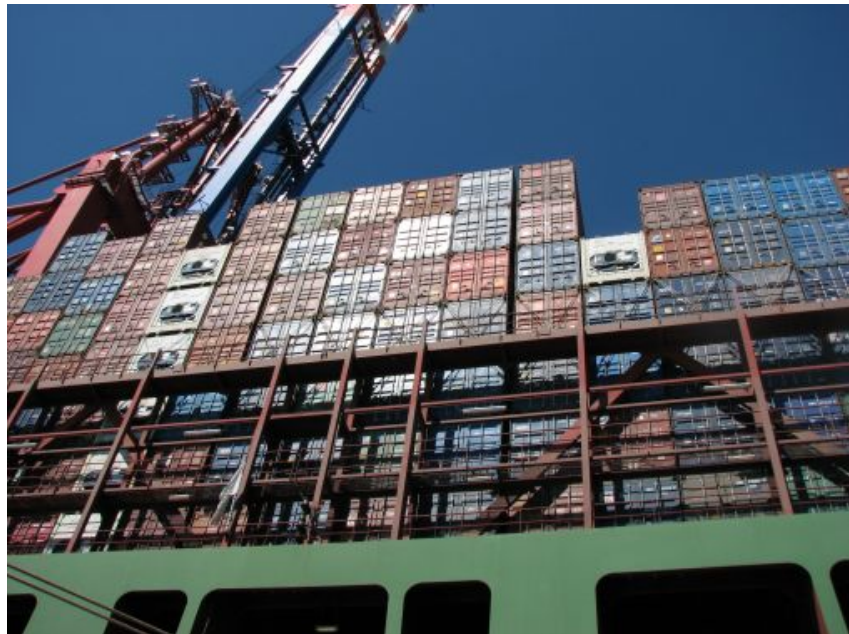
Each of the major liner services has its own branded fleet of containers, including dry containers (the most common container type), refrigerated containers, and other specialized configurations. One of the largest liner companies, Maersk, simply states it has “millions of containers”.<sup>70</sup>

Mediterranean Shipping Container (MSC) states it owns a fleet of 2.5 million containers.<sup>71</sup> CMA CGM states its fleet amounts to 3.5 million TEU,<sup>72</sup> including the globe’s second-largest fleet of refrigerated containers, at 385,000 TEU.<sup>73</sup> Hapag-Lloyd

states it owns or leases a fleet of 2.3 million TEU;<sup>74</sup> the company also declares its refrigerated container fleet will top 100,000 by the end of 2018.<sup>75</sup> Ocean Network Express (ONE) is growing its refrigerated container fleet to 263,000 TEU;<sup>76</sup> dry container fleet volumes for ONE could not be determined. COSCO/OOCL and Evergreen container ownership numbers are also not made readily available.

An added layer of complexity is that several large non-liner companies also own maritime containers. Among the largest of these is Triton International (a merged company of Triton and TAL), with a

*Image 6: International (ISO) / Global Containers on Vessel  
(Source: World Shipping Council).*



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<sup>69</sup> <https://www.businesswire.com/news/home/20170727006270/en/Global-Dry-Container-Fleet-Market-2017-2021-Top>

<sup>70</sup> <https://www.maersk.com/solutions/shipping>

<sup>71</sup> <https://www.msc.com/zaf/our-services/dry-cargo>

<sup>72</sup> <https://www.cma-cgm.com/products-services/containers>

<sup>73</sup> <https://www.cma-cgm.com/products-services/reefer/containers-fleet>

<sup>74</sup> <https://www.hapag-lloyd.com/en/products/fleet/vessel.html>

<sup>75</sup> <https://www.hapag-lloyd.com/en/press/releases/2018/08/hapag-lloyd-increases-reefer-fleet-by-11-100-containers-.html>

<sup>76</sup> <https://www.maritime-executive.com/article/one-orders-14-000-reefers>

combined container fleet of more than 4.8 million TEU,<sup>77</sup> or 3.5 million containers; its market share is 26 percent. Also in the largest group of container lease companies is Florens Asset Mangement, with 18 percent of the market, and Textainer, with a 16 percent market share<sup>78</sup> and more than three million TEU owned or managed.<sup>79</sup> CAI declares a fleet of 1.2 million TEU for all applications.<sup>80</sup>

## DOMESTIC CONTAINER FLEET

As of 2018, the North American 53' intermodal container fleet amounted to almost 256,000 units.<sup>81</sup> By comparison, in 2014, an estimated 227,000 domestic containers were service.<sup>82</sup> This 12.7 percent growth in the container fleet was largely driven by expansion of the fleets of the largest owners and operators. These include J.B. Hunt (up 19,500 containers, or almost 30 percent); UMAX, an interchange partnership between CSX and UP, (up 10,350 containers, or almost 32 percent); EMP, an interchange partnership between UP and NS, also inclusive of Canadian Pacific,<sup>83</sup> (stable at 35,300 containers); Hub Group (up 12,900 containers, or 56 percent); and Schneider (up 1,200 containers, or eight percent). Pacer, now part of XPO Logistics, was

noted for shrinking from 18,000 containers to 10,000. Other major domestic container owners include Swift, UPS, and rail companies CN and CSX. Table 11 lists the estimated domestic container fleets by owner, separating railroad-owned containers from container fleets owned by other private firms.<sup>84, 85</sup>

*Table 11: Estimated Domestic Container Ownership, 2017  
(Source: InTek Freight & Logistics).*

Container Ownership	Railroad Fleet	Private Fleet
J.B. Hunt		85,200
UMAX	43,050	
Hub Group		36,000
EMP	35,000	
Schneider		17,000
XPO/Pacer		10,000
Swift		9,150
UPS		5,750
Milestone		2,950
FedEx		1,850
Other Private		4,096
Other Railroad	5,700	
Total	83,750	171,996
Total (All Containers)	255,746	

<sup>77</sup> <https://www.businesswire.com/news/home/20151109006824/en/Triton-TAL-International-Announce-Merger-Creating-World%E2%80%99s>

<sup>78</sup> <https://www.barrons.com/articles/this-shipping-play-looks-like-a-winner-and-yields-nearly-7-1532736002>

<sup>79</sup> <https://www.textainer.com/company>

<sup>80</sup> <https://www.capps.com/leasing>

<sup>81</sup> <https://blog.intekfreight-logistics.com/looking-for-intermodal-capacity>

<sup>82</sup> <https://19january2017snapshot.epa.gov/sites/production/files/2016-05/documents/jbhunt-trends-intermodal-freight-transport-05-2014.pdf>

<sup>83</sup> <https://www.canadianshipper.com/transportation-and-logistics/cpr-increases-intermodal-options-through-the-emp-container-program/1000002384/>

<sup>84</sup> <https://blog.intekfreight-logistics.com/looking-for-intermodal-capacity>

<sup>85</sup> <https://19january2017snapshot.epa.gov/sites/production/files/2016-05/documents/jbhunt-trends-intermodal-freight-transport-05-2014.pdf>

## OTHER INTERMODAL EQUIPMENT

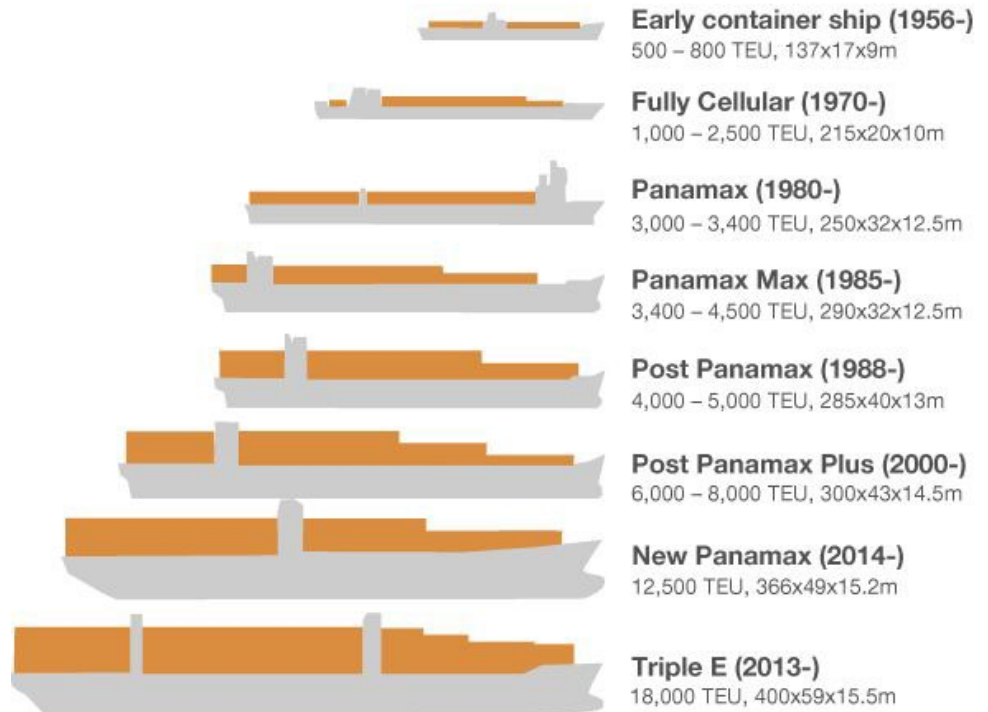
### VESSELS

Maritime container vessels, referred to as global liner services (or “steamships”), are at the core of global intermodal trade. These vessels provide economy of scale through the transportation of thousands of containers per vessel. The liner services also control the access to maritime shipping by containers. On an 11,000-TEU vessel, containers can be stacked up to eight containers high and 19 containers across, secured with specialized locking fittings and lashings.<sup>86</sup> Containers are also held in place on vessels by large cell compartments and racking systems within the cargo holds of vessels.<sup>87</sup>

**Graphic 4: Evolution of Container Ships (Source: BBC).**

#### Evolution of container ships

TEU: twenty-foot equivalent units,  
length x width x depth below water in metres



Adapted with permission from The Geography of Transport Systems, Jean-Paul Rodrigue

Container ship vessel size had been constrained by the size of the Panama Canal for many years, although vessels unable to navigate the original canal had been constructed and placed into service. From the opening of the Canal in 1914, vessels were limited to 965 feet in length, 106 feet in width, and 39.5 feet in depth; these were labeled as Panamax dimensions. In 2009, the Panama Canal Authority published a set of standards for maximum vessel dimensions for the expanded Canal: 1,200 feet long, 160.7 feet wide, and 49.9 feet deep. These new standards are referred to as New Panamax, as shown in Graphic 4. The increased vessel dimensions allow capacity to grow from 5,000 TEU to 13,000 TEU.<sup>88</sup> As with the previous dimensions, container vessels were constructed beyond the New Panamax standards. These new “Triple E” class vessels, which can only call on a limited number of ports (mostly between

<sup>86</sup> <http://www.worldshipping.org/about-the-industry/liner-ships>

<sup>87</sup> <https://www.tracintermodal.com/wp-content/uploads/PDFs/Introduction%20to%20Intermodal%20Industry%20-%20TRAC.pdf>

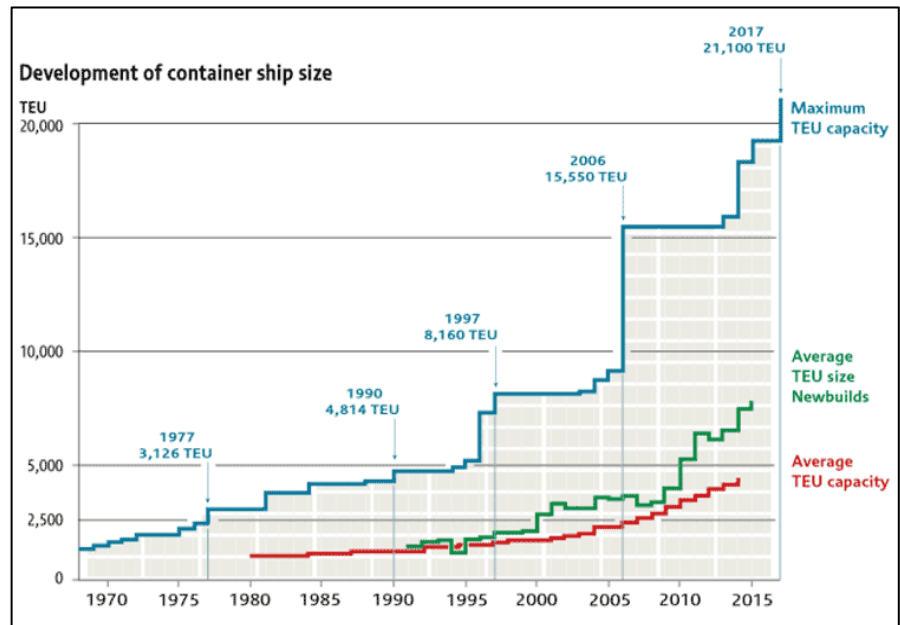
<sup>88</sup> <http://maritime-connector.com/wiki/panamax/>

Asia and North Europe), can carry in excess of 18,000 TEU. Graphic 4 also shows the evolving dimensions of container vessels from their inception.<sup>89</sup>

The size of both average and maximum vessels has grown substantially since the late 1990s. As of 2015, the average size of newly built vessels was approximately 8,000 TEU; average vessel capacity was over 4,000 TEU. Maximum vessel sizes exceeded 20,000 TEU in 2017.<sup>90</sup>

At the end of 2017, total maritime capacity for containers was 21.1 million TEU, with 5,177 vessels in container service for the global liner shipping companies. This marked a 3.7 percent increase in capacity over 2016. Newer ships with larger capacities are generally replacing the older, smaller vessels in container service. Analysts project capacities will increase by 5.6 percent in 2018.<sup>91</sup>

**Chart 13: Growth of Container Vessel Size by TEU**  
(Source: International Transport Forum/OECD, *The Impact of Mega-Ships*).



Challenges to landside operations, coupled with a limited number of destination ports with large demand, have limited the utility of the largest vessels. Many trade lanes favor vessels in the 5,500 to 6,500 TEU range for their flexibility to make multiple scheduled port calls.<sup>92</sup> Chart 13 shows how the average overall vessel size has risen since 1980, as has the average size of newly-built vessels.

## RAIL CARS

For both international and North American/domestic containerized trade, rail cars are an essential link in the supply chain. Dedicated intermodal trains carry international containers between coastal and inland ports; domestic containers move between facilities in major metropolitan areas. The current rail car designs position containers in a “well” that lowers the car’s center of gravity, allowing a second container to be stacked on top (“double stack”), while still maintaining the ability to meet most overhead clearance limitations.

<sup>89</sup> <https://www.bbc.com/news/magazine-21432226>

<sup>90</sup> [https://www.itf-oecd.org/sites/default/files/docs/15cspa\\_mega-ships.pdf](https://www.itf-oecd.org/sites/default/files/docs/15cspa_mega-ships.pdf)

<sup>91</sup> <https://theloadstar.co.uk/global-fleet-capacity-bulge-container-ships-delivered-2018/>

<sup>92</sup> [https://transportgeography.org/?page\\_id=2232](https://transportgeography.org/?page_id=2232)



**Image 7:** Hub Group and J.B. Hunt 53' Intermodal Containers in Well Car  
(Source: RRPictureArchives.Net; photo by Gary Walton).



Much of the intermodal rail car fleet is owned by TTX, with a capacity of 116,000 well units in its fleet. The most common cars are articulated into multiple-unit configurations, with five-unit configurations hauling international containers (20', 40', and 45') and three-unit configurations carrying 53' domestic containers.

TTX also owns approximately 17,000 flat cars with various configurations for hauling highway truck-trailers,<sup>93</sup> the

“piggy-back” operation<sup>94</sup> upon which TTX was founded in 1955 (under the name Trailer Train), with co-ownership by two large eastern railroads and a trailer company.<sup>95</sup> GATX is another rail car leasing company that offers well cars and other specialty intermodal cars.<sup>96</sup>

The load capacity for each unit of a well car/well car unit varies greatly, which often creates challenges for shippers of heavier bulk goods in containers. As mentioned earlier, the maximum gross weights of containers (20' and 40') can be over 67,000 pounds, meaning that maximum gross weights for 2 20' containers under a 40' container could exceed 200,000 pounds. Few well cars have that capacity. One common single unit car, the all-purpose double-stack, can carry trailers or containers up to 53', with a load limit of 166,000 pounds per car (83,000 pounds per tier).<sup>97</sup>

Articulated (permanently joined) double-stack cars are common, with both three- and five-unit configurations. Greenbrier manufactures a five-unit articulated double-stack car, Maxi-Stack I. This car is able to handle 20' and 40' containers in the wells, and longer containers on top. The total load limit of this equipment is 623,500 pounds, or 124,700 pounds per container slot

**Image 8:** DynaStack53 Articulated Well Car (Source: Freight Car America)



<sup>93</sup> <https://www.ttx.com/about/equipment/>

<sup>94</sup> [http://www.gatx.com/wps/wcm/connect/GATX/GATX\\_SITE/Home/Rail+North+America/Products/Equipment+Types/Freight/Intermodal+Railcars/Specialty+Intermodal/](http://www.gatx.com/wps/wcm/connect/GATX/GATX_SITE/Home/Rail+North+America/Products/Equipment+Types/Freight/Intermodal+Railcars/Specialty+Intermodal/)

<sup>95</sup> <https://www.ttx.com/about/our-history/>

<sup>96</sup> [http://www.gatx.com/wps/wcm/connect/GATX/GATX\\_SITE/Home/Rail+North+America/Products/Equipment+Types/Freight/Intermodal+Railcars/](http://www.gatx.com/wps/wcm/connect/GATX/GATX_SITE/Home/Rail+North+America/Products/Equipment+Types/Freight/Intermodal+Railcars/)

<sup>97</sup> <https://www.gbrx.com/manufacturing/north-america-rail/double-stack-cars/all-purpose-double-stack-car/>

(62,350 pounds per tier).<sup>98</sup> Another company, Freight Car America produces the DynaStack 53, a three-unit articulated double-stack car with a carrying capacity of 120,000 pounds per unit (60,000 pounds per tier).<sup>99</sup> Some equipment capable of handling heavier loads includes the GATX Articulated Bulk Container car (ABC), featuring a spine configuration and capacity for four to eight containers. This equipment can carry a gross range of 359,000 to 429,000 pounds in loaded containers, or 80,000 to 107,000 pounds per container slot (when not stacked).<sup>100</sup> Among the heaviest-capacity well cars is the NSC Super Stack, with capacity of up to 226,000 pounds per car (113,000 pounds per tier).<sup>101</sup> Shippers with heavier loads need to inform drayage and rail companies of their needs to ensure equipment availability and legality.

## CHASSIS AND TRAILERS

Movement of containers and trailers between rail yards and customers is handled by specialized motor carriers through drayage moves. IANA states that 60 million intermodal drayage moves are made annually in North America, handled by a pool of 7,000 trucking companies that manage intermodal freight.<sup>102</sup>

Key to these moves are the chassis owned or leased by the drayage companies. Chassis use is critical to the first- and last-mile movement of intermodal containers, whether international/maritime containers or domestic (53') containers. Chassis used for the international containers are generally built to the configuration of the container they haul. According to a major chassis manufacturer, the available chassis ratios are generally in keeping with the ratios of containers in use: 25% at 20'; 65% at 40'; and 10% at 45'. Most ocean-container chassis cannot accommodate 53' domestic intermodal containers.<sup>103</sup> For 20' containers that are overweight, special tri-axle chassis are required.<sup>104</sup>

At one time, chassis were provided by the ocean carriers through daily rentals to drayage drivers. In 2009, the Federal Motor Carrier Safety Administration implemented a strict enforcement policy on equipment condition and safety. This "Roadability Rule" required all equipment to be registered, have regular inspections for brakes, tires, electrical, and mechanical equipment, and that Driver-Vehicle

*Image 9: Tri-Axle Chassis for 20' Containers (Source: Alibaba).*



<sup>98</sup> <https://www.gbrx.com/manufacturing/north-america-rail/double-stack-cars/maxi-stack-i-car/>

<sup>99</sup> <http://freightcaramerica.com/products/flat-cars/flat-cars-articulated-flat-cars/3-unit-53-double-stack-well-car/>

<sup>100</sup> [http://www.gatx.com/wps/wcm/connect/GATX/GATX\\_SITE/Home/Rail+North+America/Products/Equipment+Types/Freight/Intermodal+Railcars/Specialty+Intermodal/](http://www.gatx.com/wps/wcm/connect/GATX/GATX_SITE/Home/Rail+North+America/Products/Equipment+Types/Freight/Intermodal+Railcars/Specialty+Intermodal/)

<sup>101</sup> <https://www.steelcar.com/products/intermodal-well>

<sup>102</sup> <https://www.intermodal.org/what-intermodal>

<sup>103</sup> <https://www.cimcintermodalequipment.com/what-is-a-container-chassis/>

<sup>104</sup> <https://www.scarbrough-intl.com/chassis-shortage-across-america/>

Inspection Reports (DVIRs) would need to be submitted (thereby placing the responsibility for equipment inspection on drivers). As such, safety improved but container deliveries based on short-term chassis use were delayed. Many chassis were removed from service as the cost of repairs was higher than the value of the equipment. Furthermore, ocean carriers exited the chassis supply business as costs eclipsed lease rates.<sup>105</sup>

Drayage usage has the most direct impact on chassis availability. Short-term leases are typified by “turn times” that are approximately six to seven days; the average “street” time (on-hire) is five days. Companies such as TRAC Intermodal, Direct ChassisLink, Inc. (DCLI), American Intermodal Management, and Star provide chassis leases that range from days to years.<sup>106</sup> One of the largest companies, DCLI, states it operates “over 450 locations on or near port facilities and intermodal hubs throughout the U.S.,”<sup>107</sup> while TRAC states its chassis are available at 600 international marine terminal locations throughout the continent.<sup>108</sup> The pooled fleets of these larger companies allow for higher asset utilization, provide a central location for pickup and drop-off, and allow repair operations to be co-located for fast repairs and return to service. Given the heavy-duty use by the leased trailers, annual chassis repair costs are typically \$600 to \$800 at inland locations, and more at the ports. Therefore, lease companies must charge rental fees commensurate with the costs and equipment depreciation.<sup>109</sup> Of note, in early 2018, TRAC sold its domestic trailer operation to DCLI.<sup>110</sup>

*Image 10: 40' Tandem Intermodal Chassis (Source: Pro-Haul Manufacturing).*



Chassis availability is also driven by the operational model of the port or intermodal facility. Some operate with a “wheeled” model, where containers are loaded onto a yard chassis for ease of mobility and placement in an assigned area within the yard; others operate with a “stacking” model where containers are stacked on top of each other. This second model increases container capacity but also increases dwell time, as pickers need to be used to reposition other containers to get access to the targeted container. In some cases, drayage truckers are compelled by the liner services to use only a designated pool or type of chassis, further limiting the availability of equipment.<sup>111</sup>

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<sup>105</sup> <http://www.globeconfreight.com/blog/causes-chassis-shortage-mean-freight-forwarders/>

<sup>106</sup> [http://intermodalmarketplace.com/Listing/Index/Chassis\\_Containers/Chassis\\_Leasing/4343/45](http://intermodalmarketplace.com/Listing/Index/Chassis_Containers/Chassis_Leasing/4343/45)

<sup>107</sup> <https://dcli.com/about/company-history/>

<sup>108</sup> <https://www.tracintermodal.com/products-and-services/>

<sup>109</sup> <https://www.tracintermodal.com/wp-content/uploads/PDFs/Introduction%20to%20Intermodal%20Industry%20-%20TRAC.pdf>

<sup>110</sup> <https://www.fleetowner.com/trailers/more-consolidation-intermodal-chassis-market>

<sup>111</sup> <https://www.fleetowner.com/equipment/intermodal-truckers-call-chassis-changes>



Chassis identification is standardized, using the Global Intermodal Equipment Registry (GIER) under IANA as a clearing house for tracking equipment across North America. There are over 650,000 chassis registered in the GIER database, representing 114 intermodal equipment providers.<sup>112</sup>

Demand for container drayage has increased since late 2017, with one index showing significant volatility and shortages at points in 2018.

Chart 14 shows these fluctuations.<sup>113</sup>

**Chart 14:** Gross Drayage Index, 2016-2018

(Source: Journal of Commerce, Drayage.com, Gross Transportation Consulting).



Many of the domestic intermodal companies have attempted to ensure sufficient access to chassis by owning their own fleets of chassis for use with their containers. Schneider states that they have purchased 15,000 chassis in the past four years. Ownership allows using internal tracking to ensure that a chassis is available to match a company container, and that the chassis is in good repair. Older chassis are also heavier, which reduces fuel efficiency and can potentially lead to axle loads over weight limits.<sup>114</sup> J.B. Hunt’s Intermodal Unit (JBI) states it owns 100 percent of its chassis.<sup>115</sup> Of note, the JBI fleet of containers and chassis is designed and engineered so that only they may be paired together for transport, with all drayage services conducted in-house. JBI also notes that its collaborative agreement with BNSF, dating back to 1989, established the first agreement linking major rail and truckload carriers for joint service.<sup>116</sup>

In addition to the domestic containers moved across North America (mostly by Class I operators), the semi-trailer fleet amounted to 5.6 million registered units as of 2012, about a 3:1 ratio of trailers to trucks.<sup>117</sup> Truck trailers have been moved on rail cars between cities since the 1920s, when the Chicago, North Shore, & Milwaukee (the North Shore Line, an electric, interurban railroad) began the service. Other companies followed in the 1930s, including the Chicago Great Western; New York, New Haven, & Hartford; the Burlington Route; the Rio Grande; and the Rock Island.<sup>118</sup>

<sup>112</sup> [https://www.uiia.org/sites/default/files/documents/Info\\_Svcs\\_Overview-Revised-new%20logos.pdf](https://www.uiia.org/sites/default/files/documents/Info_Svcs_Overview-Revised-new%20logos.pdf)

<sup>113</sup> [https://www.joc.com/rail-intermodal/year-theres-no-time-present-your-us-shipment\\_20180712.html](https://www.joc.com/rail-intermodal/year-theres-no-time-present-your-us-shipment_20180712.html)

<sup>114</sup> <https://www.trucknews.com/business-management/schneider-sees-benefits-owning-container-chassis/1003084552/>

<sup>115</sup> <https://www.jbhunt.com/freight-shipping-solutions/intermodal/>

<sup>116</sup> [https://www.sec.gov/Archives/edgar/data/728535/000143774918003239/jbht20171231\\_10k.htm](https://www.sec.gov/Archives/edgar/data/728535/000143774918003239/jbht20171231_10k.htm)

<sup>117</sup> <https://www.popularmechanics.com/cars/trucks/g116/10-things-you-didnt-know-about-semi-trucks/>

<sup>118</sup> <http://onlinepubs.trb.org/Onlinepubs/hrr/1967/153/153-001.pdf>

As domestic containerization services grew, aided by the use of double-stacking, TOFC volumes declined by an average of five to six percent per year. In 2017, however, that decline reversed; trailer traffic rose by 7.6 percent over 2016.<sup>119</sup> In April and May of 2018, TOFC volumes grew 21 percent, with the federal mandate for Electronic Logging Devices identified as one of the factors driving up demand for rail movement of trailers.<sup>120</sup>

*Image 11: UPS TOFC Train on CSX, Amsterdam, NY, 2016 (Source: Kevico24Railfan/YouTube).*



Among the major companies that use TOFC are Walmart,<sup>121</sup> FedEx,<sup>122</sup> and UPS. UPS notes its TOFC service (part of its Supply Chain Solutions Unit) includes climate-controlled trailers for perishable products, as well as general freight trailers and containers for timely, lower-cost shipments.<sup>123</sup> One of the region's most important UPS facilities is the company's Chicago Area Consolidation Hub (CACH) in Hodgkins, IL, a two million-square-foot part of UPS's distribution network that is the second-largest package-processing facility in the company's global operations.<sup>124</sup> More information on the CACH and on BNSF's adjacent Willow Springs Intermodal Facility can be found later in this report.

## SECTION SUMMARY: INTERMODAL EQUIPMENT INVENTORY

Millions of pieces of equipment are integral to the operation of intermodal freight transportation. Globally, almost 33 million TEU of container capacity exists for international transportation, handled by almost 5,200 maritime vessels. Most of these containers are owned and managed by the liner services. The movement of maritime containers inland limits their ocean service; as such, the liner services attempt to minimize these movements. This paradigm presents a challenge for Wisconsin exporters who desire access to export containers. Across North America, more than 250,000 domestic intermodal containers, 650,000 chassis, and 135,000 rail cars comprise the rail and drayage segments of intermodal freight. After a long period of decline, a renewed interest in the use of TOFC shipping appears to be related to shortages in capacity from the trucking sector and to growth in package delivery services.

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<sup>119</sup> <https://www.railwayage.com/intermodal/ron-sucik-ref-2018-growing-rail-intermodal-market-share/#>

<sup>120</sup> <https://www.joc.com/rail-intermodal/intermodal-shipping/us-shippers-seek-capacity-jb-hunt-intermodal-dedicated-truck-20180716.html>

<sup>121</sup> <https://www.truckinginfo.com/279800/a-dangerous-close-up-of-a-piggyback-trailer>

<sup>122</sup> <http://www.ftn.fedex.com/us/services/transportation/surfacetransportation.shtml>

<sup>123</sup> <https://www.ups-scs.com/transportation/rail.html>

<sup>124</sup> <https://pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=PressReleases&id=1506517434480-486>

## GROUND FACILITIES

### COASTAL PORTS

In general, the largest intermodal facilities are at coastal ports- the locations where containers are moved from vessel to rail, or to drayage for local delivery, repositioning, or transloading.<sup>125</sup> There are characteristics that most intermodal facilities share, while other characteristics vary. One variable is governance. Most intermodal ports are governed by port authorities or harbor districts that are usually part of state or local governments. Port authorities can run operations directly, contract them out to an independent operator, lease portions of the property to individual operators on a landlord-tenant basis, or have varying degrees of oversight over privately owned and operated businesses that collectively comprise the port's geographic footprint.

*Image 12: Fairview Terminal, Port of Prince Rupert, B.C.  
(Source: Journal of Commerce / Prince Rupert Port Authority).*



The size of the terminal areas at the most active North American container ports also varies greatly. The Port of Los Angeles covers 1,700 acres; the adjacent Port of Long Beach covers about 1,400 acres. The Port of New York and New Jersey dedicates about 1,500 acres to its container terminal; Savannah, Jacksonville, Virginia, and Houston also have container footprints that exceed 800 acres.<sup>126</sup> In contrast, the Fairview Intermodal Terminal at the Port of Prince Rupert covers a scant 79 acres, with plans to increase its footprint to 101 acres.<sup>127</sup>

As noted earlier, vessel sizes grew both before and after the construction of the expanded Panama Canal. Longer vessel lengths require longer berths, deeper vessel drafts require harbors and channels to be deepened for safe accommodation, and wider vessels require larger and taller gantry cranes to load and unload containers. Berth lengths at the three largest ports (Los Angeles, Long Beach, and New York-New Jersey) all have more than 25,000 feet of berth length; only two other ports have berth lengths over 15,000 feet (Oakland and Jacksonville). Most high-use coastal ports have drafts that range between 40 and 50 feet; many have seen recent projects to increase those depths. Larger vessels also require

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<sup>125</sup> <http://www.worldshipping.org/about-the-industry/global-trade/inland-dispersal-of-cargo>

<sup>126</sup> <https://www.bts.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/port-performance/216906/bts-ppfsp-ar-congress-2017.pdf>

<sup>127</sup> <https://canada.constructconnect.com/joc/news/economic/2018/08/massive-fairview-container-terminal-expansion-works>



gantry cranes with lift heights over 160 feet and outreach (the ability to reach across vessels to the furthest containers) of 20 to 23 containers.

*Table 12: Key Port Components and Their Effect on Performance (Source: U.S. DOT Bureau of Transportation Statistics)*

Component	Description	Connection to Throughput and Capacity
Berths	A place to stop and secure a vessel for cargo transfer or other purposes. Berth locations are often determined by the availability of securement points on the wharf and may not have fixed sizes or boundaries.	The length of berths is significant for container and break-bulk terminals, where the full length of the vessel must be accessed for cargo movement. Insufficient berth availability can result in vessels waiting to be unloaded and loaded.
Waterside Access	The waterways, channels, reaches, and anchorages that enable vessels to reach a port.	Limited waterside access can constrain the number and size of vessels that can call at a terminal.
Channel	A navigable designated waterway leading from open water to port terminals. Many channels have had sediment and other materials removed from the channel bottom via dredging. This accommodates larger vessels, but requires periodic maintenance dredging to maintain channel depths.	The shallowest point of a channel can be a limiting factor on the size of ships that can access a terminal. Channel access may also be limited by air draft restrictions imposed by bridges.
Terminal	A port facility where vessels are discharged or loaded. Terminals can be defined by their facilities, equipment, the type of cargo handled, physical barriers or boundaries, ownership or operating structure, and other characteristics. Terminals may be operated by a port authority, independent marine terminal operators, vessel operators, or by private companies handling their own cargo.	Many ports contain numerous terminals, each with its own berths, equipment, and landside storage space; these terminals may be adjacent to each other or separated by many miles. Terminals vary widely in configuration and infrastructure, and the number and size.
Loading and Unloading Equipment	The fixed or mobile terminal equipment needed to handle different vessel and cargo types.	Most container vessels are loaded and unloaded with shore-side gantry cranes ("container cranes"). Smaller vessels and barges may be handled with on-board equipment, or with mobile harbor cranes. Operations may be limited by landside infrastructure and operational efficiency.
Modal Connections	Connections for moving cargo between vessels and surface transportation modes, including road, rail, and pipeline.	Road access is used for delivery and removal of all types of cargo, including containers and bulk. Highway capacity and congestion are a constraint for throughput. For container terminals, the rail intermodal connection is described as on-dock (located within the terminal), near-dock (close to the terminal), or off-dock (farther away from the terminal). Rail is the primary mode of moving dry bulk export commodities, such as grain, to port terminals. Rail lines connect coastal ports to inland import and export markets.
Container Storage and Chassis Depots	Places to store shipping containers or container chassis outside of port terminals	Off-terminal storage can include space for cargo before and after it is transferred to or from vessels; parking areas for empty and loaded containers and for truck chassis to haul containers; trackage to store rail cars; space to pile dry bulk cargo (for potential transloading to containers); and warehouses for indoor cargo storage. A lack of storage space may constrain the overall capacity of a terminal as cargo cannot be stored prior to loading or when it awaits pickup after unloading. The availability of space may also facilitate throughput as separation of activities may alleviate terminal congestion.

Vessel heights (vertical draft) have also become an issue with bridge clearances; in 2017, the Port Authority of New York and New Jersey completed a \$1.6 billion project to raise the roadway for the Bayonne Bridge from 151 feet above water level to 215 feet. This allows the Port to accommodate

vessels up to 18,000 TEU; the previous maximum limit was 9,800 TEU.<sup>128</sup> Other factors at coastal ports include rail access (including length of on-dock rail sidings), the number of entry and exit gates, on-site or adjacent container and chassis pools, and surrounding local warehouse space.

The U.S. DOT's Bureau of Transportation Statistics (BTS) publishes an annual report to Congress that evaluates port performance. In that document, the BTS identifies key port components and their impact on port infrastructure. Table 12 summarizes those elements.<sup>129</sup>

The United States Maritime Administration (MARAD) publishes an annual report of port capacity, using maximum and average vessel size (as measured in TEU), and tracks how many vessels have called at each port. The ports with the largest maximum vessel capacity tend to have the largest average vessel capacity. However, some of the busiest ports (as measured by vessel calls) are not the ports with the largest overall TEU volume. Table 13 identifies the coastal ports able to accept the largest vessels; Table 14 identifies the ports with the greatest number of vessel calls. Of note, some of the ports with the largest maximum and average capacities (Seattle, Baltimore, and Boston) are not in the top ten ranking of vessel calls. By comparison, some of the ports with the greatest number of vessel calls (Port Everglades, Miami, and Houston) have maximum and average vessel capacities that are below those of other ports.<sup>130</sup>

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<sup>128</sup> [http://www.panynj.gov/bridges-tunnels/media-item.cfm?headLine\\_id=2695](http://www.panynj.gov/bridges-tunnels/media-item.cfm?headLine_id=2695)

<sup>129</sup> <https://www.bts.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/port-performance/216906/bts-pfosp-ar-congress-2017.pdf>

<sup>130</sup> <https://www.marad.dot.gov/wp-content/uploads/pdf/Containership-Size-Comparison-2015-2016-3.pdf>

**Table 13:** Top U.S. Container Ports by Maximum and Average Vessel Capacity, 2016 (Source: MARAD).

Container Port	Maximum Vessel Capacity (TEU)	Average Vessel Capacity (TEU)
Seattle, WA	17,859	6,761
Oakland, CA	17,859	6,637
Long Beach, CA	17,859	6,498
Los Angeles, CA	17,859	6,473
Norfolk, VA	10,700	5,901
Charleston, SC	10,700	5,791
Savannah, GA	10,700	5,656
Newark, NJ	10,700	5,584
Tacoma, WA	10,106	6,568
Philadelphia, PA	9,403	3,160
Baltimore, MD	9,400	5,534
Jacksonville, FL	9,040	4,253
Boston, MA	8,930	5,760

**Table 14:** Most Active U.S. Container Ports, Ranked by Vessel Calls, 2016 (Source: MARAD).

Container Port	Vessel Calls	Average Vessel Capacity (TEU)
Newark, NJ	2,296	5,584
Savannah, GA	1,992	5,656
Norfolk, VA	1,858	5,901
Oakland, CA	1,735	6,637
Port Everglades, FL	1,633	2,017
Charleston, SC	1,377	5,791
Los Angeles, CA	1,169	6,473
Miami, FL	1,056	3,290
Houston, TX	935	4,132
Long Beach, CA	927	6,498
Philadelphia, PA	585	3,160
New Orleans, LA	546	4,118
Tacoma, WA	495	6,568

## INLAND PORTS AND TERMINALS

As with coastal ports, inland facilities have a large range of sizes and equipment. At the top end are the Joliet (1,000-acre) and Elwood, Illinois (770-acre) intermodal terminals that comprise the CenterPoint Intermodal Center development, which incorporates millions of square feet of warehouse space on land parcels surrounding the terminals.<sup>131</sup> At the other end of the spectrum are lower-volume operations, including those primarily dedicated to individual customers. For instance, the Duluth Cargo Connect

<sup>131</sup> [http://web.willcountycd.com/businesslocationassist/featured\\_available\\_properties.aspx](http://web.willcountycd.com/businesslocationassist/featured_available_properties.aspx)

Terminal covers 7.5 acres, with equipment that includes one reach stacker and two 81-ton gantry cranes.<sup>132</sup>

Chassis management can be one of the greatest challenges for inland facilities; chassis can use up to 35 percent of terminal parking capacity at large operations. Chassis rotators can stack chassis four high (horizontally); chassis rackers place the chassis onto vertical racks, where nine chassis can fit into one horizontal space. Empty container handlers can stack up to eight containers on top of each other.

Container lifting is also a critical operational consideration, especially at larger facilities. Custom-designed wide-span cranes, strategically selected to optimize performance at a given location, can operate across multiple train tracks and multiple trailer/truck positioning roads. These cranes can even rotate containers for proper positioning on the chassis. Multiple technologies within the terminal, including global positioning systems (GPS) and track-centering sensors, help automate the transfer of containers between rail, chassis, and ground locations and restrict crane operations to safe locations.<sup>133</sup> Whatever the size of the facility, secure check-in technologies for both drivers and container check-in and check-out are inherent in contemporary operations.

## SECTION SUMMARY: GROUND FACILITIES

Coastal port facilities are critical exchange points between maritime and ground transportation. The largest ports have the capability of unloading the largest vessels and move the containers off-site for further activity. The largest West Coast ports (Los Angeles-Long Beach, Seattle-Tacoma, Oakland, and Vancouver) and the largest East Coast ports (New York-New Jersey, Savannah, and Norfolk) remain attractive as destinations due to the degree of infrastructure invested in their operations as well as the established operations that bring containers through these ports quickly and efficiently. The economies of scale also make these ports as attractive or more attractive than ports with shorter distances to and from overseas locations.

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<sup>132</sup> <https://www.dot.state.mn.us/ofrw/mfac/pdf/mfacmarch2017mtghandout4.pdf>

<sup>133</sup> [http://www.theccib.com/2010\\_Seminar\\_Presentations/Tom\\_Kelly\\_BNSF.pdf](http://www.theccib.com/2010_Seminar_Presentations/Tom_Kelly_BNSF.pdf)

## KEY ENTITIES INVOLVED IN INTERMODAL FREIGHT MOVEMENT GLOBAL

### GLOBAL LINER SHIPPING (STEAMSHIP COMPANIES)

Maritime container movement is conducted by a specialized set of vessels owned or chartered by carriers. The eight largest companies account for more than 75 percent of the overall market share. As of September 2018, the container fleet capacity was more than 22.1 million TEU in 5,297 fully cellular vessels (those designed exclusively for stacking containers). Table 15 identifies the largest liner shipping companies by TEU capacity and number of ships within their control. It is important to remember that many of the shipping companies charter more vessels (and capacity in TEU) than they have in ownership.<sup>134</sup>

*Table 15: Ranking of Largest Liner Shipping Companies, by TEU Capacity (Source: Alphaliner Top 100).*

Rank	Operator	Total			
		TEU	TEU % Chartered	% Market Share	Ships
1	APM-Maersk	4,039,434	43.9%	17.9%	718
2	Mediterranean Shipping Co.	3,251,245	66.5%	14.4%	517
3	COSCO Group	2,812,927	53.7%	12.5%	478
4	CMA CGM Group	2,644,276	62.6%	11.7%	507
5	Hapag-Lloyd	1,590,788	34.2%	7.1%	221
6	ONE (Ocean Network Express)	1,543,231	62.1%	6.8%	224
7	Evergreen Line	1,168,976	50.4%	5.2%	203
8	Yang Ming Marine Transport	637,716	71.2%	2.8%	101
9	PIL (Pacific International Line)	418,242	33.4%	1.9%	136
10	Hyundai M.M.	416,043	68.9%	1.8%	73
11	Zim	385,982	92.1%	1.7%	76
12	Wan Hai Lines	263,890	36.1%	1.2%	97

The liner industry has witnessed a substantial consolidation within the past five years, with most of the large companies using acquisition and/or mergers to ensure their market share. Financial pressure has played a large role in driving these mergers, as spot-freight rates declined between 2012 and 2016 on major lanes, even as the overall global economy recovered from the 2008-09 recession.<sup>135</sup> The 2016 bankruptcy of South Korea-based Hanjin had a profound impact on the sector, with 96 vessels left stranded at sea containing \$14 billion in cargo. Hanjin had 2.9 percent of the share of the global market prior to its bankruptcy.<sup>136</sup>

<sup>134</sup> <https://alphaliner.axsmarine.com/PublicTop100/>

<sup>135</sup> [https://www.drewry.co.uk/AcuCustom/Sitename/DAM/003/Drewry\\_WhitePaper\\_Liner\\_Industry\\_Consolidation\\_March\\_2016.pdf](https://www.drewry.co.uk/AcuCustom/Sitename/DAM/003/Drewry_WhitePaper_Liner_Industry_Consolidation_March_2016.pdf)

<sup>136</sup> <http://www.seatrade-maritime.com/news/asia/the-end-of-hanjin-shipping-officially-declared-bankrupt.html>

## BENEFICIAL CARGO OWNERS (BCOs)

BCOs are the parties that take custody of the cargo at the destination; for imported goods, BCOs are the importer of record but do not act as a party to the movement of goods.<sup>137</sup>

## INTERMODAL ASSOCIATION OF NORTH AMERICA (IANA)

IANA provides more than a database of intermodal activity. IANA manages several information services for the industry. One operational branch of IANA, the Uniform Intermodal Interchange and facilities Access Agreement (UIIA), has standardized rules for the interchange of equipment between the drayage companies, railroads, liner services, and equipment leasing companies. UIIA provides standard contracts, insurance information, and communications mechanisms for the interchange process. More than 7,400 intermodal trucking companies and 53 equipment providers participate in the UIIA, covering 95 percent of North American equipment interchanges.

IANA also manages the Global Intermodal Equipment Registry, an identification/marketing program that addresses Federal Motor Carrier Safety Administration regulations. The registry ties equipment to U.S. DOT registration, connects with state enforcement authorities, and streamlines exchanges in operating control between equipment providers and operators.<sup>138</sup>

## OCEAN TRANSPORTATION INTERMEDIARIES (OTIs)

Within the maritime shipping sector, a category of service providers has emerged. Categorized by the Federal Maritime Commission as OTIs, these companies connect the vessel-operating companies, the railroads, and truck-drayage companies on behalf of BCOs.

Two of the most common types of OTIs are freight forwarders and non-vessel-operating common carriers (NVOCCs). Each of these entities perform complementary activities on behalf of BCOs. Freight forwarders act on behalf of the BCO to arrange shipping, including booking movements, processing relevant shipping documents, and issuing approved bills of lading. Freight forwarders may also negotiate with carriers to establish rates for the BCO, and may act as a consultant to identify the appropriate “incoterms” that establish where the seller’s role and responsibility in shipping ends and where the buyer’s responsibility begins. In a growing number of examples, freight forwarders also accept and arrange storage of the cargo at various points during the shipping process, especially at the final stage before direct distribution to the customer.

NVOCCs act as carriers, even in the absence of direct vessel ownership. Thus, they have the same responsibilities for being licensed and filing tariffs (including freight rates, surcharges, classifications, rules, regulations, and practices). NVOCCs operate by buying vessel slots/space for container movement directly from the vessel operators, and then reselling those slots to customers.<sup>139</sup>

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<sup>137</sup> <https://shipgsl.com/shipping-tools/shipping-terms/bco/>

<sup>138</sup> [https://www.uiia.org/sites/default/files/documents/Info\\_Svcs\\_Overview-Revised-new%20logos.pdf](https://www.uiia.org/sites/default/files/documents/Info_Svcs_Overview-Revised-new%20logos.pdf)

<sup>139</sup> <https://www.xeneta.com/blog/difference-between-nvocc-freight-forwarder>



## WITHIN NORTH AMERICA

### RAILROADS

Across the United States, there are seven Class I freight railroads, as defined by the Surface Transportation Board (STB). The STB uses revenue thresholds to determine railroad classes. For 2018, Class I railroads are identified as those with \$447,621,226 in revenue. Class II lines have revenue between \$35,809,698 and the Class I threshold; Class III lines fall below that. The seven Class I railroads are:

- BNSF Railway Company
- Kansas City Southern Railway Company
- Union Pacific Railroad Company
- Soo Line Railroad Company (Canadian Pacific's U.S. operations)
- CSX Transportation Inc.
- Norfolk Southern Railway Company
- Grand Trunk Corporation (Canadian National's U.S. operations)<sup>140</sup>

All seven of these lines have multiple intermodal terminal locations across North America.

As shown in Table 16, intermodal freight transportation comprises more than 20 percent of corporate revenue for four of these seven companies. For BNSF, intermodal freight contributes more than a third of that revenue.<sup>141</sup>

*Table 16: 2017 Intermodal Revenue and Share of Overall Revenue, Class I Railroads (Source: Transport Topics).*

Railroad	Intermodal Revenue	Portion of Overall Revenue %
BNSF	\$7.5 B	35%
CN	C\$3.1 B	24%
CP	C\$1.4 B	21%
CSX	\$1.8 B	16%
KCS	\$360 M	14%
NS	\$2.4 B	23%
UP	\$4.1 B	19%

Several short lines also serve or operate intermodal facilities, including Genesee & Wyoming (a holding company for several shortlines), Florida East Coast,<sup>142</sup> Iowa Interstate,<sup>143</sup> and the Indiana Railroad.<sup>144</sup>

As shown in Graphic 5 and in Appendix I, within Wisconsin, four of the Class I rail companies have major corridors. These corridors help define locations with the best potential viability for future intermodal service; however, they do not exclude other rail corridors from consideration.

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<sup>140</sup> <https://www.stb.gov/stb/faqs.html>

<sup>141</sup> <https://www.ttnews.com/articles/rail-profits-rise-intermodal-growth-not-certain>

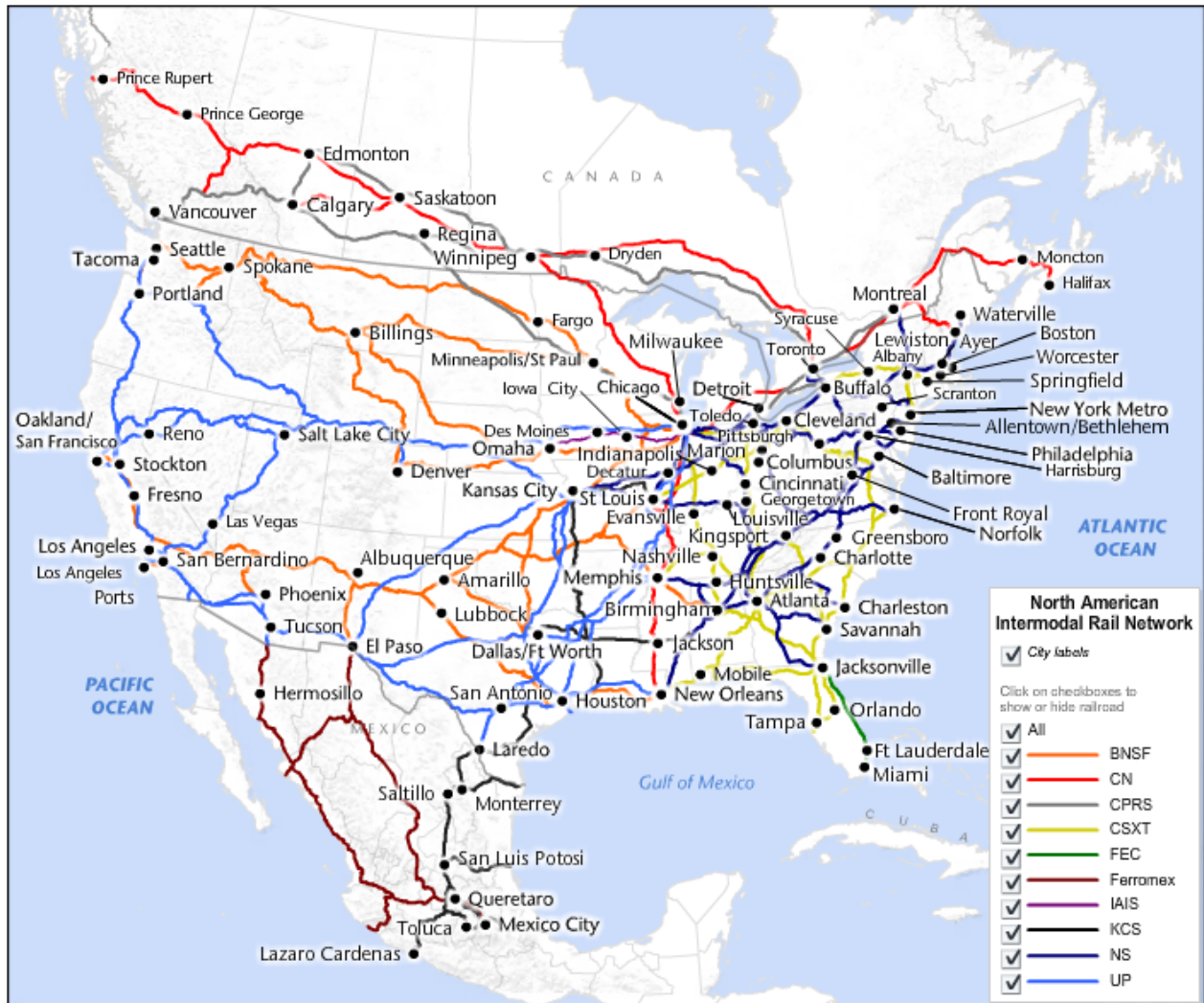
<sup>142</sup> <https://www.ajot.com/premium/ajot-smaller-railroads-playing-bigger-role-in-intermodal>

<sup>143</sup> <https://iaisrr.com/ship-with-iais/intermodal/>

<sup>144</sup> <http://www.inrd.com/intermodal.aspx>

The BNSF transcontinental line between Seattle and Chicago goes through the Twin Cities, entering Wisconsin at Prescott and following the east bank of the Mississippi River through La Crosse and Prairie du Chien, crossing the border to Illinois at East Dubuque. A separate BNSF line crosses northern Minnesota to reach Superior.<sup>145</sup>

Graphic 5: North American Intermodal Network (Source: New Harbor Consultants).



CN's transcontinental line to Chicago extends from Vancouver and Prince Rupert through Edmonton, Saskatoon, and Winnipeg, entering Wisconsin at Superior and extending diagonally through Stevens Point, Neenah, Fond du Lac, and Waukesha before exiting the state at Trevor. CN also has major lines branching off of the corridor, including lines to Minneapolis (through Chippewa Falls, servicing that community's intermodal terminal); to Arcadia (the Ashley Furniture intermodal terminal); to Wausau and Tomahawk; and to Appleton, Green Bay, Marinette, and Sault St. Marie. CN also has an eastern transcontinental route from Halifax through Quebec City, Montreal, Toronto, Sarnia, and Lansing to

<sup>145</sup> <https://www.bnsf.com/ship-with-bnsf/maps-and-shipping-locations/rail-network-maps.html>

Chicago; and a north-south transcontinental from New Orleans and Mobile through Jackson, Memphis, and Champaign to Chicago.<sup>146</sup>

CP's transcontinental to Chicago originates at Vancouver and extends through Calgary and Moose Jaw, crossing into the U.S. at Portal, North Dakota. A second CP line extends from Winnipeg through a border crossing at Noyes, Minnesota; the lines meet at Glenwood, Minnesota and then continue to the Twin Cities. CP's corridor then follows the western shore of the Mississippi through Red Wing and Winona, crossing the river into Wisconsin at La Crosse. From there, the corridor passes through Tomah, Portage, Watertown, Milwaukee, and Sturtevant before crossing into Illinois at Pleasant Prairie. CP also has an eastern "truncated" transcontinental, extending from Montreal through Toronto and Detroit, then (via trackage rights) to Chicago.<sup>147</sup>

UP's corridor through the state is not a transcontinental route. It extends northward from Chicago, entering the state at Kenosha, then through Racine, Milwaukee, and northwest through a mostly rural corridor, including Sussex, Adams, and Eau Claire, crossing into Minnesota at Hudson before extending to St. Paul. A light-density UP line extends southwest from the Twin Cities through Mankato and Sioux City to Omaha.<sup>148</sup> CSX, NS, and KCS have no operations in Wisconsin.

## TRUCKING (DRAYAGE)

Intermodal operations depend on the trucking sector for critical first- and last-mile connections between the rail connections at intermodal terminals, the shippers, and the customers. The movement of containers by truck and trailer is called drayage. Drayage can also be performed at other points in the supply chain, including connecting ports with rail terminals, or connecting between rail terminals. Empty containers can also be drayed to and from container depots, where empty equipment is stored to await future use.<sup>149</sup> As noted elsewhere in this report, IANA states that 60 million intermodal drayage moves are made annually in North America, handled by a pool of 7,000 trucking companies that manage intermodal freight.<sup>150</sup>

The online Drayage Directory identifies four companies serving CN's Chippewa Falls terminal; all of these companies are based in Minnesota. The Directory also lists 44 companies in the Twin Cities and two companies in Duluth. None are based in Wisconsin.<sup>151</sup>

The Drayage Directory also identifies 343 separate companies conducting drayage operations to and from the Chicago intermodal terminals; 14 of these are based in Wisconsin. Most (but not all) handle 20' and 40' international containers; many (but not all) handle 53' domestic containers. The majority of drayage companies listed are based in the Chicago/Joliet region, other companies identify their locations as far away as Milwaukee, Neenah, Junction City, and Green Bay, Wisconsin; Indianapolis, Indiana; Davenport, Iowa; Plymouth (Detroit-Ann Arbor) and Wayland (Grand Rapids), Michigan; Hillard

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<sup>146</sup> <https://www.cn.ca/en/our-services/maps-and-network/>

<sup>147</sup> <https://www.cpr.ca/en/choose-rail-site/Documents/cp-network-map-2018.pdf>

<sup>148</sup> <https://www.up.com/aboutup/usguide/index.htm>

<sup>149</sup> <https://www.containerport.com/what-is-drayage/>

<sup>150</sup> <https://www.intermodal.org/what-intermodal>

<sup>151</sup> <http://www.drayage.com/directory/city.cfm>

(Columbus) and Cincinnati, OH; and Oakville, Ontario (for loads between Chicago and Detroit).<sup>152</sup> At Rochelle, the Drayage Directory lists 17 drayage companies; 2 of these are based in Wisconsin.<sup>153</sup>

## FEDERAL GOVERNMENT

Federal taxation, rules, and regulation governs all aspects of freight transportation, including the intermodal sector. The U.S. Department of Transportation is central to many of these rules, including offices within the Federal Railroad Administration (FRA), Federal Motor Carrier Safety Administration (FMCSA), Federal Highway Administration (FHWA), and the Maritime Administration (MARAD). The Federal Highway System is the most visible and critical demonstration of the government's role in freight transportation.

All motor carrier drayage companies must abide by the rules and regulations other trucking companies must follow. These include obtaining a Federal DOT Number and Motor Carrier Authority Number, and obtaining an International Registration Plan tag and International Fuel Tax Agreement Decal.<sup>154</sup> Drivers need to obtain commercial driver's licenses; companies also need to file Unified Carrier Registration (to verify active insurance coverage) and a BOC-3 Form (to designate a "process agent" in each state the company operates).<sup>155</sup>

Specific to intermodal transportation, operators in all modes also are required to obtain a Standard Carrier Alpha Codes (SCAC) to identify their company in all transactions. This also applies to tariffs and Customs and Border Protection (CPB) automated notifications and manifests used in tracking and properly regulating imports. SCACs are also applied throughout many other parts of the intermodal freight transaction process.<sup>156</sup>

As noted, CPB performs a critical role in the safety, security, and regulation of container freight movements at the nation's borders. CPB requires carriers transporting cargo into and out of the U.S. to have International Carrier bonds on file. CPB also recommends participation in the Free and Secure Trade (FAST) program for trade with Canada or Mexico. Participation in this program requires supply-chain continuity be documented under the Customs-Trade Partnership Against Terrorism (C-TPAT) program. CPB also requires advanced electronic submission of cargo information under the Required Advance Electronic Presentation of Cargo Information rule.<sup>157</sup>

The Transportation Security Administration (TSA) requires all workers who access maritime facilities and vessels to obtain a Transportation Worker Identification Credential (TWIC) under the Maritime Transportation Security Act. The TSA conducts background checks to determine the eligibility of applicants. As of July 2018, TSA began issuing a more secure credential, TWIC NexGen, with improved security features.<sup>158</sup>

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<sup>152</sup> <http://www.drayage.com/directory/results.cfm?city=CHI>

<sup>153</sup> <http://www.drayage.com/directory/city.cfm>

<sup>154</sup> <https://www.sba.gov/blogs/starting-trucking-business-0>

<sup>155</sup> <https://www.rtsfinancial.com/guides/license-and-permit-checklist-starting-trucking-company>

<sup>156</sup> <http://www.nmfta.org/pages/scac>

<sup>157</sup> [https://help.cbp.gov/app/answers/detail/a\\_id/615/related/1/session/L2F2LzEvdGltZS8xNTQ3NTg3NDY0L3NpZC9UUjF6Z1c0bw%3D%3D](https://help.cbp.gov/app/answers/detail/a_id/615/related/1/session/L2F2LzEvdGltZS8xNTQ3NTg3NDY0L3NpZC9UUjF6Z1c0bw%3D%3D)

<sup>158</sup> <https://www.tsa.gov/for-industry/twic>

Federal programs also offer support for transportation projects that can benefit intermodal freight transportation. These include the Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants Program, the Infrastructure for Rebuilding America (INFRA) Discretionary Grants Program, and the Consolidated Rail Infrastructure and Safety Improvements (CRISI) Grants Program. Appendix II includes more details on these and other federal assistance programs that could be used to support intermodal freight projects.

## STATE AND LOCAL GOVERNMENTS

As with federal oversight, state and local rules and programs offer regulation and potential assistance to freight transportation. States administer registration of motor carriers and commercial drivers licenses. States also collect fuel taxes and allocate those to highway construction projects. Some local governments (such as the City of Milwaukee and Brown County) own and operate port terminals. Local governments may establish zoning where intermodal and warehousing facilities are and are not allowed.

WisDOT, along with other state agencies, has several assistance programs for which intermodal freight projects may be eligible. Appendix II identifies these programs and briefly discusses their eligibility and financial limits. Of note, public-private partnerships (such as port terminal operations) can be considered for many of the needs of intermodal freight transportation.

## FREIGHT BROKERS AND THIRD-PARTY LOGISTICS (3PL) FIRMS

Many companies have chosen to contract out varying portions of their transportation logistics operations to third parties. The most basic arrangement is that of a freight broker, which acts as an intermediary between the shipper (or BCO) and a carrier. Most freight brokers are not asset-based, but instead work with multiple partners to match the needs of customers with the availability of carriers. Brokers are best utilized when shippers have transportation needs that arise from unpredictable circumstances, such as a large custom shipment or the inability of a different shipper to meet a long-term contract.

For longer, more strategic logistical planning, many businesses utilize firms identified as 3PLs (third-party logistics firms). 3PLs take a more comprehensive approach to the supply chains of their customers, and can use either the assets of outside transportation providers or the assets of the 3PL itself.<sup>159</sup> 3PLs can arrange and acquire transportation, warehousing, inventory management, equipment, technology, and staffing for those functions for the businesses they serve. Some even offer other value-added operations for their client businesses, such as packaging and light manufacturing. 3PLs can also carry certifications (such as food-grade storage) that allow smaller manufacturers to have access to larger markets, and routinely apply data analysis and predictive analytics to improve performance.<sup>160</sup>

For intermodal transportation, a specific subset of 3PLs is critical: that of intermodal marketing companies (IMCs). IMCs operate as intermediaries between railroads and shippers, giving customers one contact point for shipping across multiple modes and/or multiple railroads, while also giving railroads a large block of predictable traffic from a smaller pool of businesses. In recent years, IMCs have

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<sup>159</sup> <http://blog.capps.com/3pl-vs-freight-brokers-whats-the-difference>

<sup>160</sup> <http://www.globaltrademag.com/features/americas-100-leading-3pls>

partnered more closely with railroads as the latter have developed more door-to-door services within their operations. Under this arrangement, railroads assume responsibility for arranging drayage and yard operations; the IMC focuses on customer communication.<sup>161</sup>

## SECTION SUMMARY: KEY ENTITIES INVOLVED IN INTERMODAL FREIGHT MOVEMENT

Intermodal freight transportation operations are conducted and managed by numerous private, for-profit businesses. Communication and collaboration are core roles for all the entities involved in intermodal transportation, both internationally and domestically. With the exception of drayage, ownership of transportation operations is generally concentrated. More than 60 percent of the market share of international maritime container movement is performed by six companies; almost all of the domestic intermodal freight rail transportation is provided by the seven Class I railroads. Truck drayage, by contrast, has more than 7,000 companies that offer truck movement of containers. IANA establishes cooperative agreements for the sector's operations. Global trade and transport is assisted by ocean transportation intermediaries; some may have equipment, while others are focused on ensuring the proper custody, transfers, permits, and payment terms for shipping are in place. Domestically, freight brokers help shippers to find transportation capacity for non-routine circumstances, while 3PLs work to identify long-term supply-chain improvements as well as provide other value-added services. Federal, state, and local governments play substantial roles with taxation, regulation, facility planning and development, and ownership.

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<sup>161</sup> <https://blog.intekfreight-logistics.com/definition-of-an-intermodal-marketing-company-imc-and-their-new-value>



## RECENT HISTORY OF INTERMODAL OPERATIONS IN WISCONSIN WISCONSIN CENTRAL LIMITED ERA<sup>162</sup>

Prior to the advent of containerized shipping, Wisconsin's railroads offered customers many domestic intermodal opportunities through the use of TOFC piggyback services. Operations included a Milwaukee Road weekday overnight Sprint train between Green Bay and Chicago, a Neenah terminal for Soo Line, and a Wausau piggyback ramp on the Chicago & North Western.

The bankruptcy of the Milwaukee Road led to the sale of many of its assets to the Soo Line. Following that acquisition in 1985, the Soo calved off most of its old system east of Minneapolis (plus parts of other low-density lines) as the Lake States Transportation Division. This division would be sold off in 1987 to become a regional railroad, the Wisconsin Central, Limited (WCL).<sup>163</sup> Throughout its existence, WCL worked to develop business through its intermodal terminals, especially following the 1993 acquisition of Green Bay & Western by WCL (which included a private intermodal terminal at Ashley Furniture's Arcadia, Wisconsin headquarters and factory). WCL's operational methods of support included repositioning empty containers from Arcadia to other system terminals in Green Bay, Neenah, and Stevens Point.

The rise in the use of containers for domestic traffic coincided with major ownership and operational changes across Wisconsin, and in the broader freight marketplace. The first of these factors included the emergence of truckload carriers into the intermodal market (primarily Schneider and J.B. Hunt). Both these companies battled for market presence in the 1990s, using WCL for TOFC service. Schneider's local presence dominated, and J.B. Hunt shifted its container traffic to truck drayage or truckload. In the first ten months of 2001, Schneider accounted for more than a third of WCL's overall intermodal volume of 46,000 revenue shipments; empty container repositioning accounted for 21 percent; import containers to Arcadia accounted for just under 16 percent.

The second broader change in the intermodal marketplace was the shift from railroad-owned/controlled trailers to containers within pooled Class I railroad ownership (such as EMP). Throughout WCL's history of intermodal operation, the company faced challenges in securing enough empty equipment for outbound traffic at Green Bay, even with support from J.B. Hunt and Schneider as customers. Railroad companies such as Union Pacific, Santa Fe (BNSF's predecessor), Conrail (later split between CSX and NS), Canadian Pacific, C&NW (later acquired by UP), and Illinois Central (like WCL, another company later purchased by CN) were each facing traffic management issues and challenges of corporate integration. The mergers and acquisitions amongst Class I companies during the 1990s, the third broader change in intermodal transportation, also compelled management to direct their attention to consolidation and away from collaborative services with WCL. Through that decade, WCL's connecting Class I railroad and yard in Chicago changed several times, and promising lanes were terminated as Class I scheduling changes instantly reduced the attractiveness of the WCL service. WCL eventually joined the EMP container management program in 1999; however, by that time, WCL's future was already being guided away from independence.

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<sup>162</sup> Unless otherwise cited, the majority of this information was provided by two internal documents (a timeline and a historical narrative) provided by Subcommittee member Brian Buchanan of Canadian National.

<sup>163</sup> <https://www.american-rails.com/wisconsin-central-railway.html>

The fourth and final factor was the increasing use of WCL's system by CN for its own long-distance international container operations, which culminated in the purchase of WCL by CN in 2001. With the exception of Ashley Furniture, intermodal freight movement for Wisconsin businesses flowed away from WCL over time, as customers and others saw greater consistency and competitive rates for trucking between WCL's terminals and Chicago. WCL attempted many short-lived operational strategies and partnerships that may have distracted the company from building on the core successes in its operations. Equipment problems (rail car supply), congestion, and inconsistent interchanges with Class I railroads in Chicago also challenged WCL and frustrated its shippers.

The following narrative focuses on the terminals that had been part of the WCL operation, and discusses some proposed operations that were never initiated. This section also discusses the operation and 2012 closure of Canadian Pacific's intermodal facility in Milwaukee.

## GREEN BAY

The largest and most long-lived of the terminals operated by WCL, the Green Bay intermodal facility covered almost 24 acres, with five tracks available to spot cars. At its busiest, the terminal handled over 100 lifts per day, a volume limited by problems with car and trailer supply and lack of inbound business. In the

*Image 13: Green Bay WCL Terminal, January 1990 (Source: Flickr/David Wilson).*



final months of service, most of the activity at Green Bay was Schneider trailers and containers, which accounted for 55 percent of volume into and out of the terminal in 2001. International containers accounted for about 25 percent of all traffic; the Port of Montreal was the primary exchange point for this traffic. The Green Bay facility was operated by Wisconsin Central as a carryover from the Soo Line, which consolidated its northeastern Wisconsin operations there in 1985. The terminal closed in October of 2003. Consumer paper products (toilet paper, facial tissues, paper towels) were the primary loads from Green Bay, with destinations in the population centers of the northeastern U.S., Atlanta, Texas, and the U.S. West Coast. Finished paper, furniture, liquid smoke, foodstuffs, electrical retail products, and seasonal items were other commonly shipped items. In 1990, Green Bay accounted for 73 percent of WCL's intermodal business.

A 2008 study examined the potential of reopening an intermodal terminal at the Port of Green Bay, where direct container transfers could be made across truck, rail, and waterborne modes. A 2013 report prepared for WisDOT by the National Center for Freight & Infrastructure Research & Education examined issues related to the lack of export container availability in Northern Wisconsin, Michigan's

Upper Peninsula, and portions of Minnesota. It concluded there was sufficient demand for intermodal container pooling and shipping in Northeastern Wisconsin, but that many barriers stood in the way of effectively increasing the availability of those containers.<sup>164</sup>

On the bulk side of the ledger, the tonnage of material going through Green Bay fluctuated between 1.7 million tons (2010) and just over 2.5 million tons (2005 and 2006).<sup>165</sup> Tonnage in 2017 was 1.833 million tons, a one percent increase over 2016 (at 1.8 million tons) and a slight decline from 2015 (1.9 million tons). A total of 166 vessels landed at the port in 2017, up from 158 in 2016. The vast majority of traffic – in both tonnage and vessels – is Great Lakes-based. Primary imports across the Great Lakes (including from Canadian sources) include petroleum products, salt, limestone, coal, and cement. The port’s previous role as exporter of petroleum products reversed to the role of importer, following closure of a petroleum pipeline that had served northeastern Wisconsin. Top foreign imports include salt and pig iron.<sup>166</sup>

In 2018, the Brown County Harbor Commission began efforts to communicate with Wisconsin Public Service (WPS) regarding the Pulliam power generation plant. In November 2017, WPS announced it would be decommissioning two remaining coal-fired generating units at the plant by early 2019.<sup>167</sup> A 91-megawatt gas-fired generator would remain in operation. Some community leaders identified the potential to move another coal operation to the Pulliam site.<sup>168</sup> Commissioners expressed interest in preserving additional options for the parcel, given its location at the mouth of the harbor, the significant acreage with rail and highway access, and the deep draft of the adjacent waterway. Multiple uses, including an intermodal terminal, were mentioned as other possibilities. As of September 2018, talks amongst the interested parties were being pursued.<sup>169</sup>

## NEENAH

CN (and before that, WCL) owned and operated a facility from 1989 until its closure in June of 2003. Capacity was 21 flat cars, with a trailer/container split of 40 percent/60 percent. Service was dominated by a single customer (paper products); five percent of traffic was international. The flow was unbalanced, with outbound volume twice as large as inbound volume. Food, foundry castings, and lumber were also shipped through this terminal. Under CN, this yard was an intermediate stop for intermodal trains operating between Chicago and Green Bay; no stops were made in Neenah by CN intermodal trains operating between Winnipeg and Chicago.

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<sup>164</sup> <http://wisdotresearch.wi.gov/wp-content/uploads/WisDOT-CFIRE-project-0092-12-12-final-report.pdf>

<sup>165</sup> <http://www.portofgreenbay.com/ship-activity/cargo-quantities-shipped>

<sup>166</sup> <https://www.portofgreenbay.com/press-releases/>

<sup>167</sup> <https://www.wbay.com/content/news/WPS-shutting-down-coal-powered-Pulliam-Plant-461107283.html>

<sup>168</sup> <https://www.greenbaypressgazette.com/story/news/2018/05/17/green-bay-coal-piles-move/601879002/>

<sup>169</sup> <https://static1.squarespace.com/static/56ec0372859fd0e272858772/t/5b7c1e67352f53dadbb98a45/1534860904060/Minutes+6.11.18.pdf>

## STEVENS POINT

Wisconsin Central (WC) opened an intermodal terminal drive-on ramp in Stevens Point on August 1, 1989. The intent was to expedite trailer freight to and from Chicago, where it interchanged with Union Pacific. Service times were between 32 and 38 hours. By 1990, WC expedited these shipments to overnight runs, giving next-day service. Volumes were meager, averaging less than 100 shipments per month in the first nine months of 2001. Trucking was a more competitive alternative as interchange in Neenah added run time and potential for delays. The ramp closed in November 2001, within a week of CN's takeover of WCL.

## DORCHESTER AND STANLEY

The Dorchester and Stanley locations were used as drop-off spots for customers who loaded hardwood timber for export into outward-facing trailers that stayed mounted on rail cars. Little additional information is available.

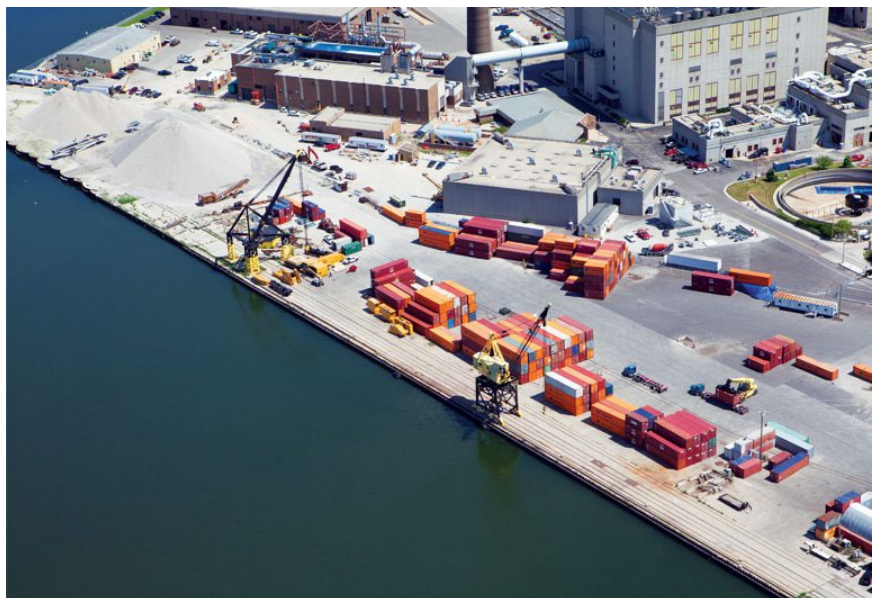
## WAUKESHA (PROPOSED)

In 1995, Wisconsin Central proposed a major upgrade of its corridor and yards in Waukesha; the proposal included mention of a potential intermodal yard. As CN exerted greater control over WC in the years before its final takeover, CN invested in building a Chicago-area yard at Harvey. Soon, the headquarters for WC's intermodal operations were moved to Chicago, and a Waukesha intermodal terminal was never opened.

## PORT OF MILWAUKEE

Once the state's largest intermodal facility, the Port of Milwaukee's intermodal service was discontinued by Canadian Pacific Railway (CPR) in September of 2012, although the far more active trade through bulk transloading remained in place. When in operation, the terminal covered 10 acres of Port property, with service for both European and Pacific shipments. From 1986 through its closure, Milwaukee had received a daily train of European-generated containers from Montreal, and from 2001 onward had been a direct stop on CPR's Vancouver, B.C.-to-Chicago container train. The stop also handled both import and export cargoes to/from the Far East.

*Image 14: Port of Milwaukee Intermodal Operation, Circa 2011-12 (Source: BizTimes).*



Terminal equipment included a 70-ton gantry crane and a 200-ton stiff leg derrick. Container volumes in its last full year of operation (2011) totaled 12,382.<sup>170</sup>

According to City of Milwaukee and Port of Milwaukee web pages dating to the time the port's intermodal terminal was in operation, shippers maximized the weight of goods they could bring to Milwaukee in containers, and then arranged for partial transloading to reduce container weight for final truck transport. The 2007 TRANSEARCH data for intermodal shipments to and from the Port of Milwaukee seems to match anecdotal comments by the Port and other transportation providers on past shipment patterns. Shipments classified as Freight of All Kinds (FAK) under TRANSEARCH correspond to containerized consumer goods, especially for inbound shipments. Table 17 identifies the origins, tonnage, and contents of intermodal containers *inbound* to the Port of Milwaukee in 2007, 2011, and 2012.

*Table 17: Milwaukee Inbound Intermodal Rail Tonnage, 2007-2012 (Source: Transearch).*

Origin State or Province	Intermodal Rail Tonnage by Year			Contents
	2007	2011	2012	
PQ	88,880	58,000	36,880	FAK
BC	8,560	13,120	10,120	FAK
IL	9,600	5,600	NA	Empty Returned Containers
PQ	640	NA	NA	Empty Returned Containers
PQ	NA	760	NA	Aluminum /Alloy Basic Shapes

What this data shows is that the source of most inbound container shipments to Milwaukee was Montreal (and ultimately, Europe). Discussions identified inbound items as tractor parts (from Europe) and consumer goods. The data also indicates a large volume of empty trailers were dropped off in Milwaukee from Illinois- these might have included shipments that were received at Chicago-area terminals, then delivered and unloaded in the northern Illinois counties closest to Wisconsin. Given Chicago-area freight congestion, shippers may have determined that it would be easier to deliver the empty containers to Milwaukee rather than back to any of the Chicago-area terminals. The data may also have been indicative of the substantial volume of empty container repositioning needed to match supply and demand.

*Table 18: Milwaukee Outbound Intermodal Tonnage, 2007-2012 (Source: Transearch).*

Destination State or Province	Intermodal Rail Tonnage by Year			Contents
	2007	2011	2012	
PQ	131,840	48,600	21,920	FAK
BC	128,880	56,280	58,400	FAK
PQ	NA	320	160	Empty Returned Containers
BC	1,600	1,280	960	Empty Returned Containers
MN	NA	160	NA	Empty Returned Containers
IL	320	NA	NA	Empty Returned Containers
PQ	1,760	NA	NA	Storage Batteries or Plates
PQ	1,600	NA	NA	Hazmat Products
BC	NA	720	NA	Distilled or Blended Liquors
BC	NA	720	NA	Chemical or Petroleum Waste
BC	NA	NA	1,600	Chemical Preparations, Nec

<sup>170</sup> <http://wisdotresearch.wi.gov/wp-content/uploads/WisDOT-CFIRE-project-0092-12-12-final-report.pdf>



The TRANSEARCH results for outbound intermodal loads show that a more balanced distribution between European and Asian destinations existed. Table 18 identifies the destinations, tonnage, and contents of intermodal containers *outbound* from Milwaukee in 2007, 2011, and 2012.

The TRANSEARCH data shows that the volume of imports from and exports to Europe via Montreal both declined substantially between 2007 and 2011. There was also a large decline in exports to Asian markets via British Columbia. These were possible contributing factors in the closing of the Milwaukee facility. Another factor complicating Milwaukee's status was the imbalance of containers coming in from British Columbia versus going out; this left Milwaukee short the containers needed to ship exports to Asian markets. To a lesser degree, there was also a similar container imbalance for European shipments.

The findings show a small but important export cluster of batteries and hazmat materials existed, most likely bound for Europe; however, the Port could not confirm the battery shipments. Via previous discussions with the Port, the most significant outbound commodities included logs (Europe and Asia) and scrap metal, wire, grains, and soybeans (all to Asia). The wire and scrap do not show up in TRANSEARCH.

When compared with the inbound intermodal findings, it appears that Milwaukee's outbound intermodal volumes were generally twice the size of its inbound volumes. As such, it indicates that intermodal freight had an opposite imbalance to that of bulk freight at the Port; the Port received much higher inbound tonnage than it shipped outbound.

Further information about the Port's intermodal operation was stated in an article published in the Milwaukee Journal Sentinel in August of 2012.<sup>171</sup> At that time, Port volume was approximately 1,000 containers per month. Top outbound shippers and commodities included 50 containers of grain per week from The DeLong Co., Inc. (based in Clinton), and 40 containers of scrap per week from Miller Compressing in Milwaukee. The article noted Miller Compressing's loads would be too heavy to easily dray to a different facility. However, an article from December 2012 noted that CP had worked with three unnamed shippers to find alternative service options.<sup>172</sup>

Even in the absence of intermodal traffic, the Port of Milwaukee remains one of the most active on the Great Lakes. In 2017, 160 "lakers" (vessels operating only on the Great Lakes), 43 foreign vessels, and 94 barges called at the Port. These numbers were up from 2016, when 137 American/Canadian "lakers", 42 foreign vessels, and 92 barges called at the Port. By comparison, in 2015, 214 "lakers", 46 foreign vessels, and 49 barges called at Milwaukee. The net income for the Port was \$834,674 in 2017, up from \$722,486 in 2016, but down from \$1,113,811 in 2015.<sup>173, 174</sup>

By volume, the Port has fluctuated between 2.0 million tons and 3.0 million tons between the years 2011 to 2017. The 2011 volume of 2.895 million metric tons fell to 2.016 tons in 2012, as deliveries of coal and salt declined. The year 2012 did realize increases in shipments of steel, grain, and cement;

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<sup>171</sup> "Railway's plans would put port terminal customers in a bind," Rick Romell, Milwaukee Journal Sentinel, August 17, 2012. <http://www.jsonline.com/business/railways-plans-would-put-port-terminals-customers-in-a-bind-j56hijl-166601206.html>

<sup>172</sup> "Number of Canadian Pacific job cuts in Milwaukee unclear," Jeff Engel, Milwaukee Business Journal, December 5, 2012. <http://www.bizjournals.com/milwaukee/news/2012/12/05/number-of-canadian-pacific-job-cuts-in.html>

<sup>173</sup> <http://city.milwaukee.gov/ImageLibrary/User/portbn/PDF/Annual-Reports/2016PortofMilwAnnualReportforWEB.pdf>

<sup>174</sup> <https://city.milwaukee.gov/ImageLibrary/User/portbn/PDF/Annual-Reports/PortofMilw2017AnnualFINAL.pdf>



foreign trade (imports and exports) rose 34.5%. Among the key exports were mining shovels.<sup>175</sup> Volumes rose in 2013 to 2.7 million tons, with an increase in salt deliveries helping raise the volume. Tonnage peaked in 2014 at 3.0 million tons, declining to 2.7 million tons in 2015 and 2.4 million tons in 2016, before recovering to 2.6 million tons in 2017.<sup>176</sup>

The Port's 400,000-pound crane-lifting capacity allows it to handle the largest manufactured items, including several from companies in southeastern Wisconsin.<sup>177</sup> Upgrades to the Port's rail tracks and grade crossings, along with upgrades to the liquid cargo pier, should allow the Port to remain competitive for bulk deliveries. Commodities regularly shipped through the Port include salt, coal, cement, steel, limestone, asphalt, fertilizers, mining shovels, liquid cargoes including biodiesel and ethanol, and agricultural commodities such as corn, wheat, and soybeans.<sup>178</sup>

## SECTION SUMMARY: RECENT HISTORY OF INTERMODAL OPERATIONS IN WISCONSIN

The intermodal operations that WCL conducted in Green Bay, Neenah, and Stevens Point during the 1990s and early 2000s are still viewed by many shippers as the standard of service to customers in northeastern Wisconsin. While Green Bay had ample traffic, Stevens Point was unable to build a sustainable cargo base, and Neenah suffered from proximity to options in Green Bay, Milwaukee, and Chicago. WCL faced challenges with Class I interchange in Chicago, delaying shipments for customers and removing many incentives to use intermodal. A lack of trade balance (with more outbound loads than inbound loads) and limited access to rail cars further reduced the efficiency and potential of WCL's intermodal operations. CN's purchase of WCL in 2001 placed greater focus on the long-distance international market, and contributed to that company's decision to close all of WCL's public terminals.

The Port of Milwaukee's arrangement with CP benefitted shippers by providing consistent international import/export access to both coasts, with trains from Montreal and Vancouver. Corporate restructuring that emphasized use of Chicago facilities, coupled with container imbalances and a decline in traffic at Milwaukee in 2011, were factors that contributed to the closing of the Milwaukee intermodal terminal in 2012. Both Milwaukee and Green Bay remain active, vital ports for bulk and breakbulk shipping.

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<sup>175</sup> <http://www.jsonline.com/business/port-of-milwaukee-reports-30-decline-in-cargo-tonnage-al8n49l-190401661.html>

<sup>176</sup> <https://city.milwaukee.gov/ImageLibrary/User/portbn/PDF/Annual-Reports/PortofMilw2017AnnualFINAL.pdf>

<sup>177</sup> <http://city.milwaukee.gov/ImageLibrary/User/portbn/PDF/2015annualreport.pdf>

<sup>178</sup> <http://city.milwaukee.gov/ImageLibrary/User/portbn/PDF/Annual-Reports/2016PortofMilwAnnualReportforWEB.pdf>

# INTERMODAL TERMINALS AND SUPPORTING FACILITIES IN WISCONSIN

## ARCADIA

The Arcadia intermodal facility, at One Ashley Way, was opened in 1994 by Wisconsin Central. The facility, now privately-operated, is dedicated to shipments to and from Ashley Furniture’s large assembly plant. Canadian National serves the facility. The ramp handles approximately 300 40’ containers per week along a 3,050-foot-long spur. Ashley also has 400 chassis on site,<sup>179</sup> with all trucking done by Ashley Distribution Services. No other trucking companies are allowed in the terminal.<sup>180</sup>

Inbound containerized loads appear to be almost exclusively from Asia, typically routed through Prince Rupert or Vancouver. Outbound loads are either destined for consumer markets, or loaded with agricultural products for export to Asia. Import volumes declined from just under 12,000 forty-foot equivalent (FEU) containers in 2012 to 10,000 in 2013; with steady to slightly rising volumes since. Export volumes declined from just over 9,000 FEU in 2012 to less than 8,000 in 2013, before climbing to match the 10,000-container import numbers in 2015 and holding steady since.<sup>181</sup>

*Image 15: Ashley Furniture Arcadia Intermodal Ramp (Source: Ashley Distribution Services).*



According to the TRANSEARCH database, the historic inbound containerized freight volumes (measured in 2007) were higher in Arcadia than in Milwaukee, while outbound volumes were 25-30 percent less than in Milwaukee. Tables 19 and 20 show the TRANSEARCH reports for 2007 and 2011-16 county-level commodity flows for intermodal container movements to and from Trempealeau County, where Arcadia is located:

*Table 19: Arcadia Inbound Intermodal Tonnage, 2007-2016 (Source: Transearch).*

Origin State or Province	Intermodal Rail Tonnage by Year							Contents
	2007	2011	2012	2013	2014	2015	2016	
WA	83,680	NA	NA	NA	NA	NA	NA	FAK
BC	46,960	119,680	111,440	93,600	97,960	104,080	46,480	FAK
Vancouver, BC*	NA	NA	NA	NA	NA	NA	52,080	FAK

\* Vancouver data separated from the rest of British Columbia beginning in 2016.

<sup>179</sup> <http://www.ashleydistributionservices.com/Intermodal.html>

<sup>180</sup> [http://www.loadmatch.com/directory/company\\_detail.cfm?companyID=6577](http://www.loadmatch.com/directory/company_detail.cfm?companyID=6577)

<sup>181</sup> “Investing in Capacity to Support Service and Growth,” presentation by Lonny Kubas, CN Director of Marketing Intermodal International, October 31, 2017.

Table 20: Arcadia Outbound Intermodal Tonnage, 2007-2016 (Source: Transearch).

Destination State or Province	Intermodal Rail Tonnage by Year							Contents
	2007	2011	2012	2013	2014	2015	2016	
ON	118,080	93,520	92,240	98,800	99,560	71,400	81,600	FAK
MN	35,440	NA	NA	NA	NA	NA	NA	FAK
IL	17,200	5,160	6,680	6,640	1,520	4,400	920	FAK
ON	1,440	8,640	6,680	6,960	7,840	NA	200	Furniture or Fixtures
LA	NA	1,000	129	NA	NA	NA	NA	FAK
ON	NA	NA	760	800	NA	NA	NA	Primary Iron or Steel Products
ON	NA	NA	NA	NA	840	9,440	880	Lumber or Dimension Stock
ON	NA	NA	NA	NA	3,720	NA	NA	Distilled or Blended Liquors
MN	640	NA	NA	NA	NA	NA	NA	Empty Returned Containers
WA*	640	NA	NA	NA	NA	NA	NA	Empty Returned Containers

\*Origin listed as Buffalo County, WI; Arcadia is within 2 miles of Buffalo County.

In recent years, Allied Co-op in Arcadia had been a major exporter of grain, utilizing the empty containers that had brought freight to Ashley. As of late 2017, the Co-op, citing market conditions, placed its intermodal operations on hold.<sup>182</sup> According to reports, Buck Country Grain, another facility in Arcadia, continued to use containers for export, becoming the terminal’s largest outbound customer for bulk agriculture. Other outbound commodities include computers/electronic components for recycling, deer hides (in-season), lumber, and furniture. Approximately eight companies use the terminal for exporting. All the inbound and matchback traffic goes through Prince Rupert or Vancouver, with Prince Rupert the dominant port. Ashley states that any exporters must integrate with the company’s operational process for safety and efficiency. Ashley also states it has no plans to invite other importers to use the ramp, although the topic is considered from time to time. Rule changes and security protocols are identified as the challenges to that possibility. Challenges to adding exporters include rates from liner services that are not economical for potential users.<sup>183</sup>

Ashley uses some containerization for eastbound exports, bringing empty containers in from Chicago via drayage. At one time, Ashley interchanged with BNSF (where the Whitehall branch ends at the Mississippi River) for westbound exports from U.S. ports; that interchange has not been used for years.<sup>184</sup>

According to the Journal of Commerce, in 2017, Ashley was the eighteenth-largest importer into the United States, with 85,700 TEU identified.<sup>185</sup>

<sup>182</sup> <http://www.allied.coop/images/E0067101/2017AnnualReport.pdf>

<sup>183</sup> Per e-mail from R. J. “Skip” Marshall, Director – Rail & Intermodal Logistics, Ashley Distribution Services, Ltd.

<sup>184</sup> Per e-mail forwarded by Subcommittee member Larry Krueger, Lake States Lumber Association.

<sup>185</sup> [https://www.joc.com/regulation-policy/trade-data/united-states-trade-data/tariffs-trucking-top-threats-top-100-us-importers-and-exporters\\_20180521.html](https://www.joc.com/regulation-policy/trade-data/united-states-trade-data/tariffs-trucking-top-threats-top-100-us-importers-and-exporters_20180521.html)

## CHIPPEWA FALLS

Canadian National opened its facility in Chippewa Falls at 1160 W. River Street on Feb 3, 2012. Community leaders had first proposed this location in 2006, after Canadian National (CN) closed its regular freight rail yard there. The community envisioned containerized freight could be brought in for Menards through an intermodal terminal in Prince Rupert, British Columbia that opened in 2007. Although Chippewa Falls was off CN's main line (branching off at Owen, WI), this service gained viability when paired with an intermodal stop in Minneapolis.

Service initially was twice weekly; with deliveries on the fifth morning after arrival from the Pacific Coast/Prince Rupert. Cargo contents were mostly consumer products inbound (mostly destined for Menards stores); outbound loads included grain and manufactured goods. Chippewa Falls had a small footprint relative to other intermodal facilities, with a size of 8.5 acres, primarily along a 2,500-foot-long loading and unloading track.<sup>186</sup> The initial cost of the facility (in 2012 dollars) was estimated to be \$4.5 million.<sup>187</sup>

*Image 16: Container Lift Operations at Chippewa Falls (Source: The Chippewa Herald).*



By 2013, CN helped coordinate match-back loads through an onsite grain transfer facility, with a weekly transload capacity of 40 FEU (40' equivalent units) per week. Two other facilities also supplied loaded grain containers for export through the Chippewa Falls facility. Immediately adjacent to the terminal, the River Country Co-op began by loading about 50 containers per week, growing to 100 containers per week by mid-2013. Exports were marketed through The Scouler Company.<sup>188</sup> By making the transfer 'across the fence' rather than using public roads, River Country was free to load the containers above highway weight limits. Construction projects included a covered area for grain loading, and the ability to weigh containers as they are being loaded. Loads were primarily dried distiller's grain (from ethanol plants) and soybeans. At full capacity, the facility was anticipated to handle 15 to 20 containers per day at 29 tons per container.<sup>189</sup>

An additional facility in the area has also been supplying similar volumes of grain for export, Custer Farms / Chippewa Valley Grain.<sup>190</sup> Working with export marketing by North West Grains International,

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<sup>186</sup> [http://www.cn.ca/en/news/2012/02/media\\_news\\_chippewa\\_falls\\_open\\_20120203](http://www.cn.ca/en/news/2012/02/media_news_chippewa_falls_open_20120203)

<sup>187</sup> [https://www.joc.com/rail-intermodal/intermodal-shipping/carriers-strategize-fill-empties-inland-export-cargoes\\_20120618.html](https://www.joc.com/rail-intermodal/intermodal-shipping/carriers-strategize-fill-empties-inland-export-cargoes_20120618.html)

<sup>188</sup> <http://www.slideshare.net/corp-marketing/2013-257-linkedingrainexport0830>

<sup>189</sup> <http://www.wqow.com/story/23553092/2013/09/27/local-grain-headed-overseas-thanks-to-new-facility-in-chippewa-falls>

<sup>190</sup> <http://www.custerfarms.com/>

Custer has been permitted to transport loaded grain containers along a 10-mile route between its facility and the intermodal terminal. Operating volumes were stated as 50 to 75 trucks per week;<sup>191</sup> the capacity for Chippewa Valley is listed at 100 FEU/week.<sup>192</sup>

From the opening of the Chippewa Falls terminal, CN was noted for coordinating match-back loading of identity-preserved grains and animal feed grains. One Journal of Commerce article discussed how CN match-back moves included use of the import containers brought to Wisconsin to then be tasked for intermediate moves of consumer products from Wisconsin to Alberta, before the container was reloaded with goods for export back to Asia.<sup>193</sup>

In its brief period of operation, the Chippewa Falls terminal has exceeded its full operation projection, as train frequencies increased to three times per week (with containers loaded on rail cars at Prince Rupert blocked and then cut off in Stevens Point from trains continuing to

*Image 17: Canadian National intermodal train (Source: Progressive Railroading).*



Chicago). Additional review seems to indicate the facility handling volumes of 70 to 80 carloads per train at frequencies of up to four times per week – or approximately 14,500 containers per year.<sup>194</sup> However, other sources noted a slower, steadier growth, with import volumes climbing from around 3,000 FEU containers in 2012 to 4,500 in 2014, to more than 6,000 in 2016 before declining below 6,000 for 2017. Of note, the export container volumes matched the imports through 2015, rising to 6,000 FEU in 2016 and surpassing import volumes with nearly 7,000 FEU in exports for 2017.<sup>195</sup> According to Canadian National, Dried Distiller’s Grains (DDGs) are trucked 126 miles to the terminal. Other grain products are trucked by up to 70 miles from the north and east, and up to 40 miles from the west and south.<sup>196</sup>

The tables on the following page list origins and destinations for intermodal freight shipped to and from Chippewa County from 2011 through 2016. Of interest, the TRANSEACH model shows containerized exports in 2011, the year PRIOR to the opening of the facility.

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<sup>191</sup> <http://www.chippewafalls-wi.gov/meeting%20minutes/2013/Board%20of%20Public%20Works/August%2026%202013.pdf>

<sup>192</sup> <http://www.slideshare.net/corp-marketing/2013-257-linkedingrainexport0830>

<sup>193</sup> [https://www.joc.com/rail-intermodal/intermodal-shipping/carriers-strategize-fill-empties-inland-export-cargoes\\_20120618.html](https://www.joc.com/rail-intermodal/intermodal-shipping/carriers-strategize-fill-empties-inland-export-cargoes_20120618.html)

<sup>194</sup> <http://wisconsindot.gov/documents2/research/WisDOT-CFIRE-project-0092-12-12-final-report.pdf>

<sup>195</sup> “Investing in Capacity to Support Service and Growth,” presentation by Lonny Kubas, CN Director of Marketing Intermodal International, October 31, 2017.

<sup>196</sup> E-mail from Brian Buchanan, Canadian National.



**Table 21: Chippewa Falls Inbound Intermodal Tonnage, 2011-2016 (Source: Transearch).**

Origin State or Province	Intermodal Rail Tonnage by Year						Contents
	2011	2012	2013	2014	2015	2016*	
BC	NA	28,920	51,840	52,400	78,600	63,880	FAK
IL	NA	NA	NA	NA	2,000	320	FAK
NJ	NA	NA	10,120	2,440	NA	NA	FAK
CAL (Los Angeles)	NA	NA	NA	840	NA	NA	FAK
WA	NA	NA	840	NA	NA	NA	FAK
Vancouver, BC	NA	NA	NA	NA	NA	5,360	FAK

\* Vancouver data separated from the rest of British Columbia beginning in 2016

**Table 22: Chippewa Falls Outbound Intermodal Tonnage, 2011-2016 (Source: Transearch).**

Destination State or Province	Intermodal Rail Tonnage by Year						Contents
	2011	2012	2013	2014	2015	2016	
ON	52,360	NA	111,560	99,000	114,600	115,120	FAK
IL	NA	NA	160	1,040	NA	NA	FAK

A local newspaper article from October 2015 supported the TRANSEARCH findings. In that article, the River Country Co-op stated that in 2013, it handled nearly 60,000 tons of grain shipped from the Chippewa Falls terminal to the Prince Rupert terminal, for export to Asia.<sup>197</sup> This volume exceeded the Co-op’s own export projections of 45,000 to 50,000 tons, made in a 2013 article.<sup>198</sup> Inbound customers identified included both Menards and Federal Express.<sup>199</sup>

Discussions during a WisDOT site visit to the facility noted the variety of inbound equipment (cars and containers) does not consistently meet shipping needs for outbound grain loads. Many of the container-carrying rail cars have restricted capacities that are unable to handle the weight of grain-loaded double-stacked containers. In other cases, the container sizes for inbound loads (especially 20’ containers) are not useful for outbound grain shipment, and must be sent to Chicago empty to be exchanged for larger containers.

Although the loading of many containers at the adjacent River Country Co-op provided for some additional room for storage and staging, the yard was otherwise tightly constrained by adjacent operations, which restricted its ability to expand. In the summer of 2017, an adjacent 1.25-acre property housing a large restaurant and bar was acquired by Menards. Plans were to demolish the building to allow for additional yard area and handling capacity for both imports and exports.<sup>200</sup>

As of late 2017, the Chippewa Falls Terminal was listed as encompassing 5 acres, with ground storage capacity of 150 containers. Rail service was provided seven days per week, with the yard open Monday through Saturday. The loading/unloading track remained at 2,500 feet in length, serviced by one top-

<sup>197</sup> [http://chippewa.com/news/local/river-country-co-op-keeps-up-to-date-with-latest/article\\_97a2795d-3a11-5261-9836-85d77fdff5d2.html](http://chippewa.com/news/local/river-country-co-op-keeps-up-to-date-with-latest/article_97a2795d-3a11-5261-9836-85d77fdff5d2.html)

<sup>198</sup> <http://www.leadertelegram.com/News/Front-Page/2013/09/28/New-Chippewa-Falls-loading-depot-to-boost-exports.html>

<sup>199</sup> [http://chippewa.com/business/businessreport/chippewa-falls-rail-terminal-opens-world-markets-to-area-businesses/article\\_bf9ac85e-1baa-544f-a2df-1199a90e57ee.html](http://chippewa.com/business/businessreport/chippewa-falls-rail-terminal-opens-world-markets-to-area-businesses/article_bf9ac85e-1baa-544f-a2df-1199a90e57ee.html)

<sup>200</sup> <http://www.leadertelegram.com/News/Front-Page/2017/06/28/Eatery-to-be-razed.html>



picking lift and two shunt trucks. Grains and grain products were identified as the primary exports, with USDA grading available and an auger system being tested.<sup>201</sup>

Overall, the large number of containers moving through the intermodal facility demonstrates its viability. CN advertises the facility’s connections to export ports on three coasts (Pacific, Atlantic, and Gulf of Mexico), with customers in 40 countries for the dried distillers’ grains (DDGs) loaded for export.<sup>202</sup> The additional space afforded by acquisition of the adjacent property should allow for increased import and export volumes.

## WISCONSIN CONTAINER YARDS

Container yards serve as centralized collection and distribution points for empty containers. At these locations, containers can be inspected for integrity and, when needed, be cleaned and/or repaired for safe and secure use. Liner services use container yards to manage inventory of empty containers, ensuring sufficient volumes for projected demand. Where demand is projected to exceed availability, containers can often be relocated from other nearby yards via drayage. Where availability exceeds demand, empty containers can be moved to railroad intermodal terminals for repositioning or return overseas.

The Intermodal Association of North America (IANA) identifies nine container yards/depots within Wisconsin. These include the facilities listed in the Table 23, below.<sup>203</sup>

*Table 23: Wisconsin Container Yards/Depots (Source: IANA).*

Ownership/Management	Address	City	Services Offered
ConGlobal Industries	1160 W. River St.	Chippewa Falls	Container and chassis management for TRAC and steamship lines; mobile repairs <sup>204</sup>
ACE World Wide	1901 E. Ace Worldwide Ln	Cudahy	International moving, storage, logistics, warehousing and distribution <sup>205</sup>
Aim Transfer & Storage	7714 S 10 <sup>th</sup> St.	Oak Creek	Intermodal drayage, 3PL services, secure warehousing, maintenance <sup>206</sup>
Jet Intermodal	1125 W. Waterford Ave.	Milwaukee	Transloading, secured storage, repair services <sup>207</sup>
Milwaukee Intermodal (MIT)	1225 S. Carferry Dr.	Milwaukee	Intermodal cargo and container handling services; transloading and warehousing of domestic and international freight; sales,

<sup>201</sup> [http://www.chippewa-wi.com/images/Chippewa\\_County\\_Profile/CN\\_Intermodal/CNIntermodal\\_FactSheet2page.pdf](http://www.chippewa-wi.com/images/Chippewa_County_Profile/CN_Intermodal/CNIntermodal_FactSheet2page.pdf)

<sup>202</sup> <https://www.cn.ca/chippewa-falls>

<sup>203</sup> <https://www.intermodal.org/resource-center/intermodalsystem>

<sup>204</sup> <http://www.cgini.com/blog/locations/chippewa-falls-wi/>

<sup>205</sup> <http://www.aceworldwide.com/commercial-movers/move-logistics/>

<sup>206</sup> <http://www.aimtransfer.com/>

<sup>207</sup> <http://jetintermodal.com/index.php>

			rentals, and refurbishing of used shipping containers <sup>208</sup>
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IANA also identified three Master Fleet locations (in Green Bay, Neenah, and Franksville) as container yards. Based on Master Fleet’s web page, comments from Subcommittee members, and Google Maps, it was determined these locations are repair facilities only, not true container depots. In addition, a location previously listed for Jet Intermodal at 445 W. Oklahoma now appears to be a dedicated Hub Group container yard, per Google Maps. Another Jet Intermodal location identified by IANA at 2775 S. Chase Avenue now appears to be an auto body shop, also per Google Maps.

By comparison, IANA directory identifies about 35 facilities in the immediate Chicago area and 19 locations in the Joliet/Elwood area.<sup>209</sup>

## SECTION SUMMARY: INTERMODAL TERMINALS AND SUPPORTING FACILITIES IN WISCONSIN

Wisconsin’s two active intermodal freight terminals perform important functions for the regions they serve, albeit with limited volumes and capacity for expansion. Chippewa Falls has allowed one major Wisconsin business, Menards, the ability to import large volumes of merchandise at lower costs, due to the yard’s proximity to the company’s large distribution center. The empty containers have allowed the region’s bulk agriculture operations to gain access to overseas markets, providing (until recently) a stable, predictable demand and price for their products. The Arcadia terminal operates in a similar manner, with Ashley Furniture as the beneficiary of the access to containerized freight imports, and bulk agriculture leading a small set of export commodities.

From a statewide perspective, these locations have limited potential. Both facilities are in the western part of the state, more than 100 miles each way from the largest concentrations of state manufacturing activity (in the eastern portion of the state). Ashley’s private ownership and management of its Arcadia location excludes other importers, and establishes rules that limit interest from additional exporters. Arcadia is also several miles from any Interstate Highway access. Chippewa Falls’ narrow footprint, limited equipment, and constrained storage capabilities also dissuades additional importers and exporters.

For the businesses in eastern Wisconsin that rely on containerized shipping, drayage to and from the Chicago and Joliet yards has become the essential supply chain link, especially since the closing of CP’s Terminal at the Port of Milwaukee in 2012. Several container yards in the region offer limited availability of international containers. The concentration of container yards in the Chicago and Joliet areas challenges Wisconsin’s shippers to find in-state availability of containers from preferred liner services and to gain sufficient container capacity for large-volume exporters.

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<sup>208</sup> <http://www.mitcontainers.com/>

<sup>209</sup> <https://www.intermodal.org/resource-center/intermodalsystem>

## INTERMODAL FACILITIES NEAR WISCONSIN

Chicago has been a hub of railroad activity for more than 150 years, and its role in intermodal freight is even more pronounced. Around 25 percent of all railroad traffic goes through the region, but almost half of all intermodal traffic – 46 percent of the containers – goes through the region.<sup>210</sup> This prominence means that intermodal access and opportunity in Wisconsin is directly affected by the intermodal operations, challenges, and plans within the Chicago region.

The immediate Chicago area contains no fewer than 16 active intermodal facilities. In addition, three other facilities are situated southwest of Chicago, in or near Joliet, and another facility is located about 80 miles west of Chicago. Six Class I railroads and one regional shortline railroad each operate at least one facility. Due to the geography of Chicago and the historical placement of rail lines to and through the city, most of these intermodal facilities are on the near- and far-south side of the Chicago area.

The pattern of development for the Chicago area intermodal terminals is that the western railroads (UP and BNSF) have built larger terminals at the edge of the region, near Interstate Highways. These locations are along the historic west-east corridors of each company. An operational pattern exhibited in Chicago, in cases where railroads have more than one terminal, is to dedicate terminals to specific corridors, destinations, and/or container markets (often separating domestic containers and international/global containers).

Combined, Chicago's terminals accounted for almost 7.8 million lifts in 2015,<sup>211</sup> an increase of 25 percent from 2006 and 32 percent from 2009. Truck drayage to these terminals extends 200 miles.<sup>212</sup>

Note: Unless cited otherwise, the following information was taken from the websites of the railroad companies, or from the Intermodal Association of Chicago website.<sup>213</sup>

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<sup>210</sup> <https://www.theherald-news.com/2016/08/19/regional-planners-get-up-close-look-at-will-county-trucks/a5asrjn/?page=2>

<sup>211</sup> <http://www.chicagobusiness.com/article/20170408/ISSUE01/170409896/railroads-prepare-for-freight-volumes-to-rise>

<sup>212</sup> <http://www.chicagobusiness.com/article/20150815/ISSUE01/308159990/this-rail-yard-is-bustling-and-thats-very-good-for-greater-chicago>

<sup>213</sup> [http://www.intermodalofchicago.org/terminals\\_map.cfm](http://www.intermodalofchicago.org/terminals_map.cfm)

Graphic 6: Map of Chicago Area Intermodal Rail Terminals (Source: Intermodal Association of Chicago).



## CHICAGO, IL – CENTRAL AND NORTH BNSF CICERO

BNSF's Cicero facility is located in the community of Cicero at 5601 W. 26<sup>th</sup> Street, about 8 miles west-southwest of the Chicago Loop, with gates at 5275 W. 26<sup>th</sup> Street and 5010 W. Ogden Avenue.<sup>214</sup> The facility operates 24/7. Google street and satellite views show the south side of the yard (off of Ogden Avenue) to be dedicated to domestic 53' containers, with intermingling of some 28' and 53' trailers and 40' containers (on chassis). The images from the middle and northwest side of the yard (off 26<sup>th</sup> Street) include a mix of 28' and 53' TOFC operations (many for UPS) and 20' and 40' containers; 53' domestic containers are also present.

Information on BNSF's schedules and routes is password-protected;<sup>215</sup> however, other sources identify Cicero as dedicated to destinations along the Pacific Northwest corridor, including Seattle (South Seattle Yard and Seattle International Gateway), Washington; Portland, Oregon; Spokane, Washington; and St. Paul, Minnesota.<sup>216</sup> While BNSF's Willow Springs facility (see page 86) is operationally driven by UPS, capacity constraints compel outbound trailers to be loaded at Cicero's TOFC operations.<sup>217</sup> One source noted that BNSF had provided a TOFC service between Chicago and St. Paul for UPS, but was unable to meet performance thresholds for delivery times.<sup>218</sup> CSX also identifies this yard as a connection point to its network.<sup>219</sup>

Since 2010, the Chicago Metropolitan Agency for Planning (CMAP) estimates the yard has averaged 396,000 lifts per year.<sup>220</sup>

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<sup>214</sup> <https://www.bnsf.com/ship-with-bnsf/intermodal/service-options-and-details.html#subtabs-2>

<sup>215</sup> <http://www.bnsf.com/ship-with-bnsf/pricing-and-tools/intermodal-schedules.html>

<sup>216</sup> <https://www.bnsf.com/ship-with-bnsf/support-services/facility-listings.html>

<sup>217</sup> <http://midamericafreight.org/rfs/network-inventory/rail/intermodal-facilities/bnsf-chicago-cicero/>

<sup>218</sup> <https://www.trainorders.com/discussion/read.php?1,4345311>

<sup>219</sup> <http://www.intermodal.com/index.cfm/intermodal-maps/>

<sup>220</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)



## BNSF CORWITH

BNSF's Corwith facility is located at 3526 W. 43<sup>rd</sup> Street, between the Brighton Park and Archer Heights neighborhoods of Chicago. The yard is just south of I-55 (the Stevenson Expressway), about 7 miles southwest of the Chicago Loop, and operates 24/7. The main gate access is at 4012 S. Kedzie Avenue. The facility also houses a J.B. Hunt regional terminal at its southwestern corner (off of 47<sup>th</sup> and

*Image 18: BNSF Corwith Terminal (Source: Wikimedia Commons/Richard Hurd).*



Hamlin); Norfolk Southern tracks enter the yard from the south and provide opportunities for interchange; CSX also identifies this yard as a connection point to its intermodal network.<sup>221</sup> Corwith is BNSF's most active yard in Chicago; since 2010, the Chicago Metropolitan Agency for Planning (CMAP) estimates the yard has averaged 794,000 lifts per year.<sup>222</sup>

## CANADIAN PACIFIC BENSENVILLE

Canadian Pacific's primary Chicago-area intermodal terminal is located at 10800 Franklin Avenue, in unincorporated Cook County's Leyden Township. The mailing address uses a Franklin Park ZIP code; a non-intermodal portion of the yard is located within the municipality of Bensenville. The yard operates 24/7 and is situated just south of O'Hare International Airport and adjacent to I-294 (the Tri-State Tollway), about 15 miles west-northwest of the Chicago Loop. Between 2012 and 2018, Bensenville was CP's only terminal, with the closing of the Schiller Park terminal (see below). Based on images of the yard from Google and other sources, the containers are a mix of international and domestic. CP subcontracts management of the yard to the Terminal Operations Management (T.O.M.) corporation, which provides lifts, gate management, repairs, and management of containers and chassis.<sup>223</sup> CP's annual report also notes the presence of a facility to transload bulk agricultural products to intermodal containers.<sup>224</sup>

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<sup>221</sup> <http://www.intermodal.com/index.cfm/intermodal-maps/>

<sup>222</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>223</sup> <https://terminalops.com/locations/bensenville-illinois/>

<sup>224</sup> [http://s21.q4cdn.com/736796105/files/doc\\_financials/Annual-Report/2016/CP\\_Annual-Report\\_2016.PDF](http://s21.q4cdn.com/736796105/files/doc_financials/Annual-Report/2016/CP_Annual-Report_2016.PDF)



From 2009 through the closing of the Schiller Park Yard in 2012, CMAP estimates Bensenville averaged 139,000 lifts per year. From 2013 through 2016, Bensenville averaged 233,000 lifts per year.<sup>225</sup>

*Image 19: Canadian Pacific Bensenville Yard, looking west over I-294, the Tri-State Tollway (Source: Terminal Operations Management).*



News reports highlighted the land constraints within the Bensenville yard, even as the Illinois State Toll Highway Authority (ISTHA) has attempted to acquire land for a connecting road across the western portion of the yard, resulting in litigation.<sup>226</sup> In June of 2018, an agreement was reached between CP and ISTHA on a negotiation process for land acquisition.<sup>227</sup> This pending sale, coupled with other capacity constraints and a new liner service contract, contributed to the reopening of Schiller Park.

## CANADIAN PACIFIC SCHILLER PARK

Canadian Pacific's other Chicago-area intermodal yard is about 2 miles northeast of the Bensenville facility at 9665 W. Lawrence Avenue, in the municipality of Schiller Park. The yard is about 15 miles northwest of the Chicago Loop, just east of O'Hare International and the Tri-State Tollway/I-294; it is also just south of I-90 (the Jane Addams Tollway/Kennedy Expressway). Yard/depot access is available Monday through Saturday during daytime hours.<sup>228</sup> The facility is also managed by the T.O.M. corporation, which still identifies it as container depot rather than a yard. Lifts, gate management, repairs, and management of containers and chassis are identified as functions available.<sup>229</sup> From 2009 through the terminal's closing in 2012, CMAP estimates Schiller Park averaged 88,000 lifts per year.<sup>230</sup> The yard reopened to inbound traffic in March 2018, prompted by an agreement to handle 85 percent of the ONE containers landing at the Port of Vancouver.<sup>231</sup>

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<sup>225</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>226</sup> <http://www.chicagobusiness.com/article/20180126/ISSUE01/180129906/why-canadian-pacific-needs-bensenville-rail-yard>

<sup>227</sup> <https://www.dailyherald.com/news/20180613/land-deal-hailed-as-substantial-step-for-western-access-to-ohare>

<sup>228</sup> <https://www.cpr.ca/en/choose-rail/network-and-facilities>

<sup>229</sup> <https://terminalops.com/locations/schiller-park-illinois/>

<sup>230</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>231</sup> <http://trn.trains.com/news/news-wire/2018/03/23-canadian-pacific-to-re-open-schiller-park-yard-to-intermodal-traffic>

## CSX 59TH STREET

The CSX 59<sup>th</sup> Street intermodal yard is located at 2101 W. 59<sup>th</sup> Street, about 8 miles southwest of the Chicago Loop, straddling 59<sup>th</sup> Street just east of Western Avenue in the West Englewood neighborhood of Chicago. The yard is about one mile west of I-90/94 (the Dan Ryan Expressway) and is open 24/7, serving both domestic and international containers.<sup>232</sup> Inbound international and domestic containers come from Atlanta, Baltimore, Buffalo, Charleston, Charlotte, Cleveland, Columbus (international containers only), Detroit (international only), Northwest Ohio (New Baltimore), Portsmouth, and Savannah. Outbound containers go to Atlanta, Baltimore, Charleston, Charlotte, Detroit (international only), Portsmouth, and Savannah. Trains are dedicated with declared cut-off times and container availability times, ranging from 48 to 77 hours.<sup>233</sup> Since 2010, CMAP estimates the yard has averaged 279,000 lifts per year.<sup>234</sup>

## NORFOLK SOUTHERN 47TH STREET

Norfolk Southern's 47<sup>th</sup> Street facility is located at 361 W. 47<sup>th</sup> Street, about 6 miles south of the Chicago Loop, in Chicago's Fuller Park neighborhood. The yard is just west of I-90/94 (the Dan Ryan Expressway), and is open 24/7. Inbound COFC loads come from Ayer, MA (about 33 miles northwest of Boston); Albany, NY; Elizabeth, NJ (the E-Rail Intermodal Port Terminal); Morrisonville, PA (across from Trenton, NJ); Bethlehem, PA (6 miles east of Allentown); Taylor, PA (15 miles northeast of Wilkes-Barre); Harrisburg, PA; Buffalo, NY (TOFC also); Cleveland, OH; and Detroit-Livernois, MI. Outbound COFC trains stop in Toledo, OH (TOFC also), Detroit-Livernois, Cleveland, Buffalo (TOFC also), Harrisburg, Morrisonville, Taylor, Bethlehem, Albany, and Ayer. Trains are dedicated with declared cut-off times and container availability times, ranging from 32 to 70 hours (inbound) and 12 to 70 hours (outbound) from cut-off to availability.<sup>235</sup> This yard has the most container traffic of the four NS yards in the Chicago area. Since 2010, CMAP estimates the yard has averaged 550,000 lifts per year.<sup>236</sup> NS has reportedly assembled 84 acres adjacent to the facility to allow for expansion.<sup>237</sup>

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<sup>232</sup> [http://www.intermodal.com/index.cfm/channel-partners/locations-served/terminal-details/?terminal\\_id=9&Core=true](http://www.intermodal.com/index.cfm/channel-partners/locations-served/terminal-details/?terminal_id=9&Core=true)

<sup>233</sup> [https://shipcsx.com/pub\\_sx\\_mainpagepublic\\_jct/sx.shipcsxpublic/Main?module=public.ischedule](https://shipcsx.com/pub_sx_mainpagepublic_jct/sx.shipcsxpublic/Main?module=public.ischedule)

<sup>234</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>235</sup> <http://www.nscorp.com/content/nscorp/en/shipping-options/intermodal/terminals-and-schedules/chicago-ill-47thstreet.html>

<sup>236</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>237</sup> <http://www.chicagobusiness.com/article/20170408/ISSUE01/170409896/railroads-prepare-for-freight-volumes-to-rise>

## NORFOLK SOUTHERN 63RD STREET / ENGLEWOOD

The Norfolk Southern's 63<sup>rd</sup> Street yard is located at 169 E. 63<sup>rd</sup> Street, about 7 ½ miles south of the Chicago Loop, between the Englewood and Park Manor neighborhoods of Chicago. The yard is also just east of I-94 (the Dan Ryan Expressway) and north of I-90 (the Chicago Skyway).

The yard is open 24/7.

Inbound COFC/TOFC loads come from Baltimore, MD, Bethlehem (Allentown), PA (TOFC only); Croxton (Jersey City), NJ; Morrisville, PA (across from Trenton, NJ; TOFC only); Pittsburgh, PA; Rutherford (Harrisburg), PA; and Toledo, OH. Outbound COFC/TOFC trains stop at Rutherford, Pittsburgh, Morrisonville, Croxton, Bethlehem (TOFC only), and

Baltimore. Trains are dedicated with declared cut-off times and container availability times, ranging from 24 to 48 hours from cut-off to availability.<sup>238</sup> The yard changed ownership from CSX to NS between 2000 and 2005. Since 2010, CMAP estimates the yard has averaged 330,000 lifts per year.<sup>239</sup>

*Image 20: Norfolk Southern's 63rd Street Yard, Chicago (Source: Milord Company).*



## UNION PACIFIC GLOBAL I

The Union Pacific (UP) Global I terminal, also called 14<sup>th</sup> Street, is located approximately four miles west-southwest of the Chicago Loop, at 1425 South Western Avenue, between the Illinois Medical District and the Pilsen Neighborhood of Chicago. The yard is open 24/7, and is listed as available for COFC and TOFC.<sup>240</sup> The yard is primarily dedicated to domestic intermodal operations, serving southern California, Las Vegas, and Salt Lake City.<sup>241</sup> Since 2010, CMAP estimates the yard has averaged 309,000 lifts per year.<sup>242</sup>

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<sup>238</sup> <http://www.nscorp.com/content/nscorp/en/shipping-options/intermodal/terminals-and-schedules/chicago-ill-63rdstreet.html>

<sup>239</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>240</sup> <https://www.up.com/customers/premium/intmap/int-chi/global1/index.htm>

<sup>241</sup> <https://www.up.com/customers/premium/intmap/int-chi/joliet/index.htm>

<sup>242</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

## UNION PACIFIC GLOBAL II

UP's Global II terminal is located about 15 ½ miles west-northwest of the Chicago Loop, south of Lake Street (street address of 301 West Lake Street) and east of I-294 (the Tri-State Tollway), with property split between the City of Northlake and the Village of Berkeley. The 120-acre yard is open 24/7, and is listed as available for COFC and TOFC.<sup>243</sup> The yard is primarily dedicated to domestic intermodal operations, serving northern California, the Pacific Northwest, Denver, and Reno.<sup>244</sup> Between three and six outbound intermodal trains are processed through the yard daily, averaging 700 daily lifts. The Global II Yard coordinates with UP's Global III Yard in Rochelle, Illinois (see below) for outbound train assembly.<sup>245</sup> Since 2010, CMAP estimates the yard has averaged 287,000 lifts per year.<sup>246</sup>

## UNION PACIFIC CANAL STREET

Union Pacific's Canal Street location is at 436 W. 25<sup>th</sup> Place, just south of Chicago's Chinatown neighborhood. The facility straddles over I-55 and is straddled by I-90, three miles south-southwest of the Chicago Loop. A second access point to the location is unmarked and secluded, off 47<sup>th</sup> Street, just north of NS's yard. Until the opening of Global IV in Joliet, UP had a formal operation at the Canal Street Yard that began as a TOFC operation in the 1960's for Chicago and Eastern Illinois (C&EI). UP assumed yard custody at this location from predecessor Chicago & Western Indiana (C&WI). Operations are performed by Intermodal Services of America (formerly Omnitrax), using locomotives leased from TransGlobal.<sup>247</sup> Although UP does not officially list the yard in its list of destinations, the company confirms that the location remains operational, primarily due to capacity constraints at Global I. Per Google Maps, traffic appears to be domestic containers (especially EMP and Hub Group) concentrated at the north end of the facility, near the 25<sup>th</sup> Place access point. Holding tracks for well cars (both loaded and empty) are situated south of 35<sup>th</sup> Street. From 2014 through 2016, CMAP estimates the yard averaged 14,000 lifts per year.<sup>248</sup>

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<sup>243</sup> <https://www.up.com/customers/premium/intmap/int-chi/global2/index.htm>

<sup>244</sup> <https://www.up.com/customers/premium/intmap/int-chi/joliet/index.htm>

<sup>245</sup> [https://www.up.com/cs/groups/public/@uprr/@newsinfo/documents/up\\_pdf\\_natedocs/pdf\\_up\\_facilities\\_global\\_2.pdf](https://www.up.com/cs/groups/public/@uprr/@newsinfo/documents/up_pdf_natedocs/pdf_up_facilities_global_2.pdf)

<sup>246</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>247</sup> Dennis DeBruler, Industrial History blog, June 2, 2018.

<sup>248</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)



## CHICAGO, IL – SOUTH

The facilities in the southern and near-southwestern suburbs of Chicago are further from Wisconsin, and thus more difficult to access via truck drayage within a one-day turn-around. The scale of these facilities varies greatly.

### BNSF WILLOW SPRINGS

The BNSF Willow Springs facility is located at 7600 Santa Fe Drive, in the community of Hodgkins, Illinois; a portion of the yard also falls within the jurisdiction of Willow Springs. The yard is situated approximately 17 miles west-southwest of the Chicago Loop, and is adjacent to I-294 (the Tri-State Tollway), just south of I-55 (the Stevenson Expressway).<sup>249</sup> Operations at this 186-acre facility are primarily dedicated to United Parcel Service (UPS), which has a major sorting and distribution center on a 240-acre site adjacent to the rail yard, along with a drop lot about a mile away.<sup>250</sup>

That facility, the Chicago Area Consolidation Hub (CACH), opened in 1995 and encompasses 1.5 million square feet of indoor processing space, with 148 inbound dock doors and 1,054 outbound doors for trailers and containers. Its daily volume averages 1.7 to 2.1 million packages.<sup>251</sup> This volume is ten percent of UPS's nationwide volume. Half of this volume moves by rail, accounting for 92 trains per day across Willow Springs and 12 other Chicago area ramps. The next-most active UPS ramp is the CSX Bedford Park Terminal, which is adjacent to the former UPS Chicago consolidation facility.

In 2011 and 2012, UPS invested in 5,000 53' containers to allow more double-stack loads to be carried by rail intermodal operations. While TOFC operations for UPS are still a critical function for BNSF, UPS was able to divert about half its trailers to containers within two years. The combined volume of TOFC for UPS and other customers accounted for 80 percent of overall intermodal volume in 2013 at Willow Springs; COFC (including UPS) comprised the other 20 percent.<sup>252</sup>

*Image 21: UPS CACH Facility, Hodgkins, IL (Source: Power Construction).*



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<sup>249</sup> <https://www.bnsf.com/ship-with-bnsf/support-services/facility-listings.html>

<sup>250</sup> <https://www.lee-associates.com/elee/chicago/listings/6600river.pdf>

<sup>251</sup> <http://www.itsmidwest.org/2015AnnualMeeting/factsheet.pdf>

<sup>252</sup> <https://www.progressiverailroading.com/csx/article/UPS-relies-heavily-on-railroads-to-keep-the-giant-Chicago-Area-Consolidation-Hub-on-schedule--37645>

By 2017, the CACH facility size expanded to 2 million square feet.<sup>253</sup>

According to CMAP, the Willow Springs Terminal averaged more than 700,000 lifts per year until the opening of BNSF's CenterPoint Facility in Elwood, Illinois. Since 2010, CMAP estimates Willow Springs conducts an average of 536,000 lifts annually.<sup>254</sup>

## CANADIAN NATIONAL HARVEY

Canadian National's Harvey Intermodal Terminal is located at 16800 S. Center Street, in the city of Harvey, Illinois. This yard is 21 miles due south of the Chicago Loop, adjacent to I-80/294 (the Tri-State Tollway). The yard opened in late 1996 on 67 acres adjacent to an existing Illinois Central intermodal yard (Moyers); at that time, capacity was 225,000 units per year with an estimated initial operation of 75,000 to 100,000 lifts.<sup>255</sup> The yard operates 24/7, with COFC and TOFC service. Satellite views from Google Maps show the yard to be mostly dedicated to international containers, with some domestic TOFC and COFC operations. The yard also houses a grain transload operation.<sup>256</sup>

The Harvey Terminal serves three corridors. To the northwest, origins/destinations include Vancouver (Surrey), Prince Rupert, and Prince George, B.C.; Calgary (27<sup>th</sup> Street) and Edmonton, AB; Saskatoon (Chappell Yard), SK; Winnipeg (Plessis), MB; and Duluth, MN. To the northeast, locations served include Halifax, NS; Moncton (Gordon Yard), NB; Montreal (Taschereau Yard), QC; Toronto (Brampton) and Mississauga (Malport), ON; and Detroit (Ferndale-Moterm), MI. To the south, the corridor stops include New Orleans (Mays Yard), LA; Jackson (Richland), MS; and Memphis (Intermodal Terminal), TN.<sup>257</sup>

Other supporting facilities in the immediate area of the Harvey Terminal include the Integrated Industries container yard at 281 E. 155<sup>th</sup> Street in Harvey,<sup>258</sup> and Fore Transportation's 28-acre full-service facility (including container storage, drayage, chassis rental, and repairs) at 250 E. 167<sup>th</sup> Street.<sup>259</sup> The Integrated Industries location also acts as a "surge" holding location for inbound containers waiting to be picked up by drayage operators.<sup>260</sup> Multiple anecdotal reports note Harvey's congestion, including difficulty in maneuvering through the yard due to frequent blockage by long trains.<sup>261</sup> Since 2010, CMAP estimates the Harvey Terminal has averaged 450,000 lifts per year, topping 560,000 lifts annually in 2015 and 2016.<sup>262</sup>

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<sup>253</sup> <https://pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=PressReleases&id=1506517434480-486>

<sup>254</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>255</sup> [https://www.nwtimes.com/uncategorized/new-freight-terminal-to-be-built-in-harvey/article\\_2476f2c4-1e03-5a54-8a68-7ced3acf87cc.html](https://www.nwtimes.com/uncategorized/new-freight-terminal-to-be-built-in-harvey/article_2476f2c4-1e03-5a54-8a68-7ced3acf87cc.html)

<sup>256</sup> <https://www.cn.ca/en/our-services/maps-and-network/intermodal-terminals/>

<sup>257</sup> <https://www.cn.ca/en/our-services/maps-and-network/intermodal-terminals/>

<sup>258</sup> [http://www.loadmatch.com/directory/company\\_detail.cfm?companyID=7652](http://www.loadmatch.com/directory/company_detail.cfm?companyID=7652)

<sup>259</sup> <http://www.foretransportation.com/new/contact-and-location/>

<sup>260</sup> [https://www.livingstonintl.com/livingston-content/uploads/2018/06/CN-Rail\\_Passport-2018-Intermodal.pdf](https://www.livingstonintl.com/livingston-content/uploads/2018/06/CN-Rail_Passport-2018-Intermodal.pdf)

<sup>261</sup> <https://www.youtube.com/watch?v=SFioLCF7qz8>

<sup>262</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)



## CSX BEDFORD PARK

The CSX Bedford Park intermodal facility is located at 7000 W. 71<sup>st</sup> Street, in the Village of Bedford Park, approximately 14 miles southwest of the Chicago Loop. The yard is two miles southwest of Midway Airport, and is just south of the Stevenson Expressway / I-55. Bedford Park operates 24/7.<sup>263</sup> Based on a Google Maps search, the majority of the facility's traffic appear to be domestic 53' containers, with some TOFC (UPS) and international containers (20' and 40').

*Image 22: CSX Bedford Park Intermodal Terminal (Source: Bright India Group).*



Inbound domestic COFC traffic to Bedford Park comes from several locations in the northeast, including Worcester (also TOFC) and Springfield (also TOFC), MA; North Bergen (also TOFC), Kearney (Newark), and Little Ferry (also TOFC), NJ; Philadelphia, Chambersburg, and Pittsburgh (also international containers), PA; Syracuse, NY (also TOFC); Columbus, OH; and Valleyfield, QC. A separate lane for inbound Bedford Park intermodal shipping comes from the Florida cities of Miami (also TOFC), Fort Lauderdale, Fort Pierce, Tampa, Jacksonville (also TOFC), and the Central Florida Intermodal Logistics Center (ILC) in Winter Haven.

Outbound domestic container traffic from Bedford Park goes east and northeast to Worcester (also TOFC) and Springfield (also TOFC), MA; Kearney (Newark) and Little Ferry (also TOFC), NJ; Philadelphia, Chambersburg, and Pittsburgh (also international containers), PA; Syracuse (also TOFC) and Buffalo, NY; Cleveland, Columbus, and Columbus, OH; and Valleyfield, QC. Florida traffic includes the destinations of Miami (also TOFC), Fort Lauderdale, Fort Pierce, Tampa, Jacksonville (also TOFC), and the Central Florida Intermodal Logistics Center (ILC) in Winter Haven.<sup>264</sup>

Transit times to and from Bedford Park range from 27 hours for Ohio destinations, to 37 hours for Massachusetts, to 72 hours for Miami, to 110 hours for Valleyfield, Quebec. Bedford Park is one of Chicago's busiest intermodal yards, averaging 875,000 lifts since 2010, according to CMAP.<sup>265</sup>

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<sup>263</sup> [http://www.intermodal.com/index.cfm/channel-partners/locations-served/terminal-details/?terminal\\_id=10&Core=true](http://www.intermodal.com/index.cfm/channel-partners/locations-served/terminal-details/?terminal_id=10&Core=true)

<sup>264</sup> [https://shipcsx.com/pub\\_sx\\_mainpagepublic\\_jct/sx.shipcsxpublic/Main?module=public.ischedule](https://shipcsx.com/pub_sx_mainpagepublic_jct/sx.shipcsxpublic/Main?module=public.ischedule)

<sup>265</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

## IOWA INTERSTATE BLUE ISLAND

The Iowa Interstate (IAIS) Intermodal operation is approximately 16 miles south-southwest of the Chicago loop, at 2050 Prairie Street in Blue Island, Illinois. The IAIS intermodal system is linear, with another terminal in Council Bluffs, Iowa (across from Omaha), the western extent of the railroad. The Blue Island ramp operates daytimes, six days per week. Based on images from Google Maps, equipment at both termini appear to be mostly international containers.<sup>266</sup> Since 2010, CMAP estimates the yard has averaged 41,500 lifts per year.<sup>267</sup>

## NORFOLK SOUTHERN CALUMET

Norfolk Southern's Calumet Yard is located about 14 miles south-southeast of the Chicago Loop, at 2040 East 103<sup>rd</sup> Street in the South Deering neighborhood of Chicago. The yard is just east of I-94 (the Bishop Ford Freeway), and is open 24/7. This yard is dedicated to domestic intermodal operations, and is declared as a private terminal by NS. Inbound COFC traffic comes from Austell, GA (about 12 miles west of Atlanta; TOFC also); Charlotte, NC; Greensboro, NC (TOFC also); and Charleston, SC. Outbound COFC traffic is directed to Austell, Charlotte, and Greensboro (TOFC also). Trains are dedicated with declared cut-off times and container availability times, ranging from 38 to 90 hours (inbound) and 31 to 42 hours (outbound) from cut-off to availability.<sup>268</sup> Since 2010, CMAP estimates the yard has averaged 97,000 lifts per year; however, 2016 was its busiest year to date, with an estimated 203,330 lifts.<sup>269</sup>

## NORFOLK SOUTHERN LANDERS

Norfolk Southern's Landers Yard is located about 10 miles south-southwest of the Chicago Loop, at 7540 S. Western Avenue in the Wrightwood neighborhood of Chicago. It operates 24/7, and connects to more U.S. locations than any of NS's other Chicago-area facilities.

Inbound COFC-only trains originate in or have loads from Appliance Park (Louisville), KY; Charleston, SC; Columbus, OH; Elizabeth (Marine Terminal and E-Rail Port Terminal), NJ; Georgetown, KY; Norfolk (container terminal and International Terminal), VA; Staten Island (New York Container), NY; Portsmouth (Virginia International Gateway), VA; and Savannah, GA. Inbound COFC/TOFC trains include loads from Cincinnati, OH; Jacksonville, FL; and Miami, FL. Outbound COFC-only train destinations include Appliance Park, KY; Charleston, SC; Columbus, OH; Elizabeth (Marine Terminal and E-Rail Terminal), NJ; Georgetown, KY; Miami, FL; Norfolk (container terminal and International Terminal), VA; Staten Island (New York Container), NY; Portsmouth (Virginia International Gateway), VA; and Savannah, GA. Outbound COFC/TOFC train destinations include Cincinnati, Landers also operates a TOFC-only train outbound to Austell (Atlanta), GA and Jacksonville, FL.

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<sup>266</sup> <https://iaisrr.com/ship-with-iais/intermodal/>

<sup>267</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>268</sup> <http://www.nscorp.com/content/nscorp/en/shipping-options/intermodal/terminals-and-schedules/chicago-ill-calumet.html>

<sup>269</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

Trains are dedicated with declared cut-off times and container availability times, ranging from 26 to 94 hours (inbound) and 30 to over 100 hours (outbound) from cut-off to availability.<sup>270</sup> NS recently completed several projects at Landers to increase efficiency and throughput volumes, including location tracking of all containers stacked on-site; purchase and use of two rubber-tire gantry cranes for lifts to and from rail cars; and a truck dispatch area to regulate on-site congestion.<sup>271</sup> Since 2010, CMAP estimates the yard has averaged 405,000 lifts per year.<sup>272</sup>

### UNION PACIFIC YARD CENTER (DOLTON)

UP's Yard Center is located in Dolton, IL, with gate entry off of S. Indiana Avenue near 149<sup>th</sup> Street (just north of Sibley Boulevard). The yard is dedicated to both domestic and international intermodal operations, serving Dallas, Houston, Laredo, San Antonio, and Mexico.<sup>273</sup> Virtually all of the containers visible in satellite images are 53' domestic/North American containers.<sup>274</sup> Since 2010, CMAP estimates the yard has averaged 232,000 lifts per year.<sup>275</sup>

### JOLIET, IL / ELWOOD, IL

Joliet, Illinois is approximately 40 miles southwest of Chicago; Elwood is 10 miles further south. Facilities in this area are often grouped with Chicago; however, the scale of the BNSF and Union Pacific operations in this area, combined with the additional distance of these yards from Wisconsin, merits listing them in a separate category. In effect, the BNSF and UP facilities are part of the same planned development for the nation's largest inland port.<sup>276</sup> More than \$43 billion in imports and \$56 billion in exports pass through the area each year.<sup>277</sup>

Built on the former Joliet Arsenal site, the CenterPoint Elwood Intermodal Center development encompasses 2,500 acres and drew in \$1 billion in total investment, becoming one of the largest private developments ever undertaken in the United States. Its counterpart, the CenterPoint Joliet Intermodal Center, covers 3,600 acres, with a projected investment to reach \$2 billion. The combined developments are expected to include more than 30 million square feet of industrial/warehouse space at build-out.<sup>278</sup>

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<sup>270</sup> <http://www.nscorp.com/content/nscorp/en/shipping-options/intermodal/terminals-and-schedules/chicago-ill-landers.html>

<sup>271</sup> <http://www.nscorp.com/content/dam/nscorp/ship/Intermodal/Landers-Stacking-combined.pdf>

<sup>272</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>273</sup> <https://www.up.com/customers/premium/intmap/int-chi/joliet/index.htm>

<sup>274</sup> Google Maps.

<sup>275</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>276</sup> <https://centerpoint.com/parks/centerpoint-intermodal-center-jolietelwood/>

<sup>277</sup> <https://businessfacilities.com/2017/05/logistics-leaders/>

<sup>278</sup> [http://web.willcountyced.com/businesslocationassist/featured\\_available\\_properties.aspx](http://web.willcountyced.com/businesslocationassist/featured_available_properties.aspx)

Of note, The DeLong Company, Inc. (based in Clinton, WI) operates two transloading facilities in the Joliet area to load agricultural products into containers. One facility, at 3750 Centerpoint Way (Joliet North), is dedicated to containerization of DDGs. A second facility, at 2131 Logistics Court (Joliet South) is dedicated to soybean containerization. DeLong also appears to operate containerization transloading at 60 U.S. Highway 52 in Minooka, IL.<sup>279</sup>

**Image 23:** The DeLong Co., Inc. Joliet South Container Loading Facility (Source: The DeLong Co., Inc).



According to the Journal of Commerce (JoC), DeLong is the nation's sixth-largest containerized exporter overall, with an estimated

106,000 TEU of containerized exports (animal feed and grain) in 2017. No other Wisconsin-based company ranks in the JoC Top 100 containerized exporters.<sup>280</sup>

### BNSF LOGISTICS PARK / CENTERPOINT INTERMODAL FACILITY

The BNSF Logistics Park Chicago (LPC) Intermodal Facility is located at 26664 Elwood International Port Road in the Will County Village of Elwood, Illinois. The site is about 50 miles southwest of the Chicago Loop, with 24/7 operations.<sup>281</sup> The LPC was constructed on the site of the former Joliet Army Ammunition Plant, with initial capacity to handle 400,000 container lifts per year. One phase of expansion tripled capacity to 1.2 million annual lifts;<sup>282</sup> current capacity is listed at 1.6 million lifts. The LPC now covers 638 acres, with space for 9,000 stacked containers and 6,000 wheeled containers; 34 overhead cranes are used to transfer containers to and from rail cars. The LPC is also a foreign trade zone, with automated gate technology that includes biometric fingerprint technology. It is North America's largest inland port.<sup>283</sup>

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<sup>279</sup> <http://www.delongcompany.com/#>

<sup>280</sup> [https://www.joc.com/regulation-policy/trade-data/united-states-trade-data/tariffs-trucking-top-threats-top-100-us-importers-and-exporters\\_20180521.html](https://www.joc.com/regulation-policy/trade-data/united-states-trade-data/tariffs-trucking-top-threats-top-100-us-importers-and-exporters_20180521.html)

<sup>281</sup> <https://www.bnsf.com/ship-with-bnsf/support-services/facility-listings.html>

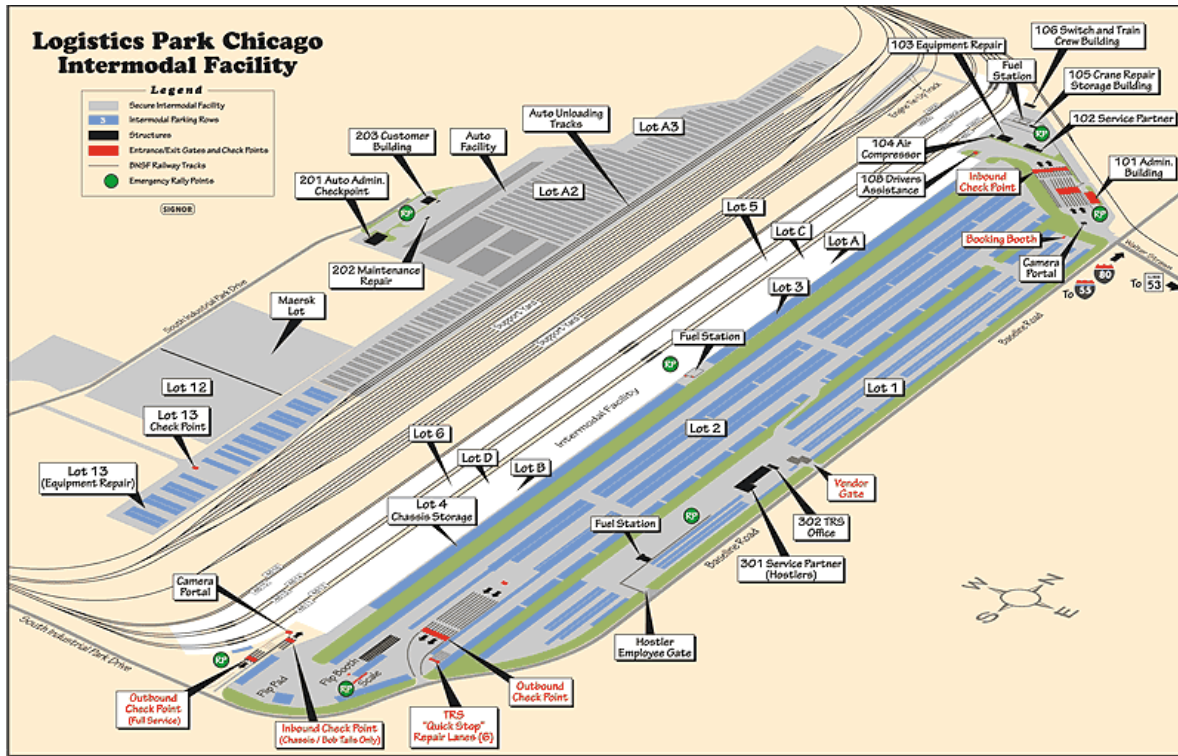
<sup>282</sup> <http://www.transystems.com/Home/Markets/Freight-Rail/Intermodal-and-Industrial-Facilities/Projects/BNSF-Logistics-Park-Chicago-Expansion.aspx>

<sup>283</sup> <https://www.bnsf.com/ship-with-bnsf/rail-development/pdf/Logistics-park-Chicago-web-v3.pdf>



According to BNSF's 2017 Annual Review, CenterPoint expanded from 140,000 feet to 230,000 feet of total track, and from 40,000 feet to 80,000 feet of production track (track where containers and trailers can be loaded and unloaded). Support track (for arriving and departing trains) expanded from 100,000 feet to 150,000 feet. Six new wide-span cranes were acquired, allowing up to 6 tracks to be worked before repositioning. Six stacking cranes were also added; this addition of 40 percent in lift capacity allowed stacked parking for more than 2,500 containers.<sup>284</sup>

Graphic 7: BNSF Logistics Park Chicago (Elwood) Facility Layout (Source: BNSF).



The immediate Elwood area has ample industrial park land, used primarily for warehousing. Currently, 2,100 acres are available, with 237,000 square feet of speculative space available.<sup>285</sup> At build-out, the community envisions up to 10 million square feet of industrial and distribution facilities.<sup>286</sup> Warehouse operations in the immediate area of the LPC include Walmart, Samsung Electronics, Ikea, Georgia-Pacific, Clearwater Paper, Partners Warehouse, DSC Logistics, and RMC Logistics, and NFI.<sup>287</sup> Google Maps also identifies a Cargill grain transload/ containerization operation and a Bissell warehouse. Since 2010, CMAP estimates BNSF's Logistics Park has averaged 917,000 lifts per year, making it the region's most active intermodal terminal.<sup>288</sup>

<sup>284</sup> <http://bnr.com/about-bnsf/bnsf-review/2017/service-main.html>

<sup>285</sup> <https://www.bnsf.com/ship-with-bnsf/rail-development/pdf/Logistics-park-Chicago-web-v3.pdf>

<sup>286</sup> <https://www.villageofelwood.com/201/Intermodal-Center>

<sup>287</sup> [https://centerpoint.com/wp-content/uploads/2018/06/CIC\\_Joliet-Tenant-Aerial.pdf](https://centerpoint.com/wp-content/uploads/2018/06/CIC_Joliet-Tenant-Aerial.pdf)

<sup>288</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)



## UNION PACIFIC GLOBAL IV / JOLIET INTERMODAL TERMINAL (JIT)

Union Pacific's Global IV/JIT is located at 3000 Centerpoint Way, about six miles south of downtown Joliet and 43 miles southwest of the Chicago Loop. The yard handles both TOFC and COFC on a 24/7 basis. The yard is dedicated to international and limited domestic intermodal operations, serving southern California, northern California, the Pacific Northwest, El Paso, and Tucson.<sup>289</sup> The terminal covers 550 developed acres, with capacity to handle more than 500,000 containers per year, serving both domestic and international container markets.<sup>290</sup> The facility opened in 2010 as part of the larger CenterPoint development;<sup>291</sup> continuing investments at the terminal and immediate surrounding area are expected to top \$2 billion at full build-out.<sup>292</sup>

In June of 2017, Union Pacific expanded its land ownership in the immediate area by purchasing 106 acres from developer CenterPoint. The land acquired is south of the existing JIT footprint, proximate to the UP rail line. While UP's existing parcel still contains 400 acres that could be developed, the rapid growth of freight traffic in Will County of 138 percent over ten years (compared to ten percent in Chicago, nine percent in Kansas City, and four percent in Los Angeles) is compelling the transportation providers to retain options for future growth and demand.<sup>293</sup>

*Image 24: UP's Joliet Intermodal Terminal/Global IV (Source: Journal of Commerce).*



Many companies have operations in the immediate area of Global IV/JIT, including large retailers and consumer products (Home Depot, Mars/Wrigley), liner services (APL, MSC), logistics and domestic intermodal and trucking companies (XPO, Saddle Creek, ARC Logistics, Indo Trans Logistics, RoadOne, Neovia, Odyssey/CMI Logistics, Central States Trucking, C.R. England, Gertsen Interstate, ContainerPort Group), grain containerization (DeLong, Cargill, Gavilon, Saturn), chemical warehousing (Stepan Company), and electronics refurbishment and repair (CTDI).<sup>294</sup>

Since 2013, when construction at Global IV was completed, CMAP estimates the yard has averaged 492,000 lifts per year, making this the most active of UP's six terminals across Northern Illinois.<sup>295</sup>

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<sup>289</sup> <https://www.up.com/customers/premium/intmap/int-chi/joliet/index.htm>

<sup>290</sup> [https://www.up.com/cs/groups/public/@uprr/@customers/documents/up\\_pdf\\_natedocx/pdf\\_up\\_joliet\\_brochure.pdf](https://www.up.com/cs/groups/public/@uprr/@customers/documents/up_pdf_natedocx/pdf_up_joliet_brochure.pdf)

<sup>291</sup> [https://www.fhwa.dot.gov/ipd/project\\_profiles/il\\_centerpoint.aspx](https://www.fhwa.dot.gov/ipd/project_profiles/il_centerpoint.aspx)

<sup>292</sup> [http://web.willcountycd.com/businesslocationassist/featured\\_available\\_properties.aspx](http://web.willcountycd.com/businesslocationassist/featured_available_properties.aspx)

<sup>293</sup> <https://www.theherald-news.com/2017/06/30/union-pacific-buys-106-acres-from-centerpoint-for-26-million/ax9de4/>

<sup>294</sup> [https://centerpoint.com/wp-content/uploads/2018/06/CIC\\_Joliet-Tenant-Aerial.pdf](https://centerpoint.com/wp-content/uploads/2018/06/CIC_Joliet-Tenant-Aerial.pdf)

<sup>295</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

## CANADIAN NATIONAL JOLIET

The Canadian National Joliet Intermodal Terminal is located at 785 Draper Avenue in Joliet, just north of U.S. Highway 6. Operational times are first- and second-shift, Monday through Friday, and daytime Saturday and Sunday. Google Street view shows containers are almost exclusively international sizes and from liner corporations. The Joliet Terminal serves three corridors. To the northwest, origins/destinations include Vancouver (Surrey), Prince Rupert, and Prince George, B.C.; Calgary (27<sup>th</sup> Street) and Edmonton, AB; Saskatoon (Chappell Yard), SK; Winnipeg (Plessis), MB; and Duluth, MN. To the northeast, locations served include Halifax, NS; Moncton (Gordon Yard), NB; Montreal (Taschereau Yard), QC; Toronto (Brampton) and Mississauga (Malport), ON; and Detroit (Ferndale-Moterm), MI. To the south, the corridor stops include New Orleans (Mays Yard), LA; Jackson (Richland), MS; and Memphis (Intermodal Terminal), TN.<sup>296</sup> Since its opening in 2013, CMAP estimates CN's Joliet Yard has averaged 43,000 lifts per year.<sup>297</sup>

Of note, another major logistics center is under development in Wilmington, Illinois, eight miles southwest of Elwood along the BNSF transcontinental line and I-55. The RidgePort Logistics Center is a 2,500-acre planned development with the potential for over 30 million square feet of distribution, warehouse, and light manufacturing. The development is jointly marketed by BNSF and Elion Partners.<sup>298</sup> Tenants include General Mills,<sup>299</sup> Lineage, Post Consumer Brands, Batory Foods, Michelin, and World Foods Processing.<sup>300</sup> As of September 2018, 6.3 million square feet of space had been developed at RidgePort; when completed, the development will be the largest distribution center in the Midwest.<sup>301</sup>

The transportation and logistics-driven real estate activity in Joliet, Elwood, and Wilmington reflects broader trends driving demand for large commercial warehouse space. According to real estate developer CBRE, the Chicago area was the fourth-most active region for industrial and logistics leases in the nation during the first half of 2018, with 11 deals for 6.8 million square feet of space. The regions with greater activity were California's Inland Empire (San Bernardino/Riverside Counties), Atlanta, and the Pennsylvania I-78/I-81 Corridor. Consumer products companies (including food and retail goods) are the primary tenants; they seek locations with easy access to the largest population centers. Companies are also seeking to improve supply chain efficiency by consolidating operations from smaller, dispersed facilities into larger spaces with fewer locations. The growth in on-line retailing was also cited as major factor compelling these developments.<sup>302</sup>

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<sup>296</sup> <https://www.cn.ca/en/our-services/maps-and-network/intermodal-terminals/>

<sup>297</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

<sup>298</sup> <https://www.bnsf.com/ship-with-bnsf/rail-development/ridgeport-flipbook/?page=1>

<sup>299</sup> <https://www.rejournals.com/elion-partners-delivers-1-5m-to-general-mills-at-ridgeport-logistics>

<sup>300</sup> <https://www.theherald-news.com/2017/08/25/ridgeport-logistics-center-in-wilmington-continues-to-expand/aa3kgep/>

<sup>301</sup> <https://www.ttnews.com/articles/spurring-economy>

<sup>302</sup> <https://www.rejournals.com/logistics-and-consolidation-driving-activity-for-large-leases-20180924>

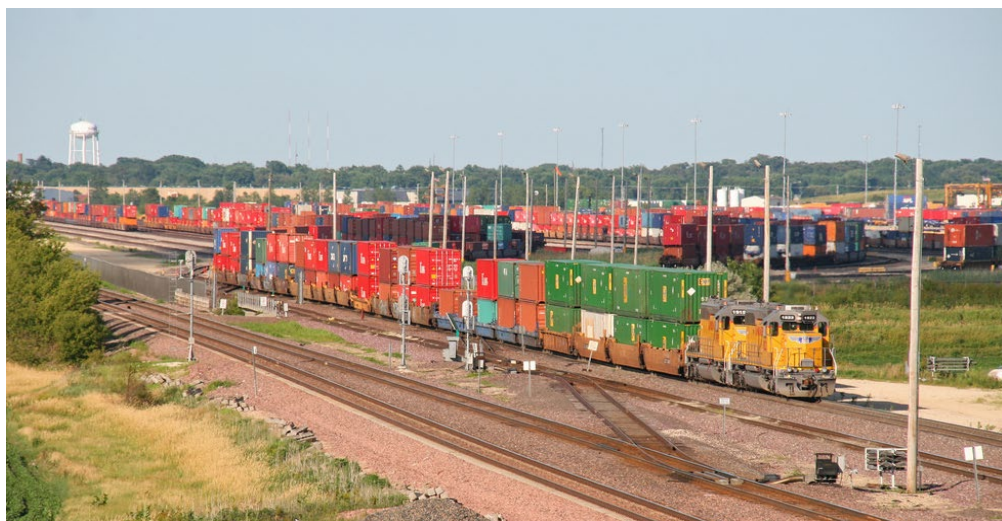
## ROCHELLE, IL

### UNION PACIFIC GLOBAL III

Union Pacific's Rochelle Global III Intermodal Facility is located about 80 miles west of Chicago's Loop (and 65 miles west of UP's Global II Facility) at the southwestern edge of the City of Rochelle, Illinois. The facility is just north of I-88 (the Reagan Memorial Tollway) and about 3 miles west of I-39. The 1,200-acre, 24/7 facility handles more than 25 trains and 3,000 containers/trailers (COFC/TOFC) daily. Current features include U.S.

Customs capability and refrigeration capability; future plans at the facility include transload of grains and wind energy components.<sup>303</sup> The yard is dedicated to both domestic and international intermodal operations, serving southern California, northern California, and the Pacific Northwest.<sup>304</sup> Since 2010, CMAP estimates the yard has averaged 136,000 lifts per year.<sup>305</sup>

*Image 25: Union Pacific Global III Yard, Rochelle, IL (Source: Flickr/dlanek).*



## DULUTH, MN

### DULUTH CARGO CONNECT

Although Duluth is one of the newest additions to intermodal facilities in the Upper Midwest, there appears to have been service to Superior for a brief period in the 1990s. On April 1, 1996, CN began providing service to Superior, Wis., from Vancouver, Calgary, Edmonton, Saskatoon, and Winnipeg, with Wisconsin Central, Limited (WCL) handling the service between Superior and Chicago. One month later, CSX was brought in as a partner for extending service between Chicago and the eastern U.S. The date of service cessation to Superior could not be determined. Since then, railroads and community leaders expressed public support for (re)opening an intermodal terminal at the Twin Ports of Duluth and Superior. Several publications from the University of Wisconsin-Superior bolstered the outlook for such a facility.

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<sup>303</sup> [https://www.up.com/cs/groups/public/@uprr/@newsinfo/documents/up\\_pdf\\_nativedocs/pdf\\_up\\_facilities\\_global\\_3.pdf](https://www.up.com/cs/groups/public/@uprr/@newsinfo/documents/up_pdf_nativedocs/pdf_up_facilities_global_3.pdf)

<sup>304</sup> <https://www.up.com/customers/premium/intmap/int-chi/joliet/index.htm>

<sup>305</sup> [http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal\\_Lifts](http://www.cmap.illinois.gov/programs/regional-economic-indicators/clusters#Intermodal_Lifts)

Beginning in the fall of 2016, discussions stated that the opening of an intermodal facility in Duluth, MN was imminent. The facility opened in March 2017 as a cooperative partnership between CN and Duluth Cargo Connect, a partnership of the Duluth Seaway Port Authority and Lake Superior Warehousing. The facility is on port-owned land, and is part of a Foreign Trade Zone; combined, the efficiencies of this facility are projected to save local businesses as much as one-third of their shipping costs.<sup>306</sup> The operational elements provided by Lake Superior Warehousing include storage, cross-dock reloading and distribution (including reloading of overweight containers), U.S. Customs processing, a chassis pool, a certified truck scale for SOLAS compliance, and inventory control and processing systems that include electronic data exchange and radio-frequency identification (RFID) capabilities.<sup>307</sup>

The facility, located at 1310 Port Terminal Drive in Duluth, is at the base of the Richard Bong Bridge (I-535), on the Rice's Point peninsula, just across the St. Louis River from Superior. Operations are daytime Monday through Friday, and morning only on Saturday.<sup>308</sup> Storage

*Image 26: Duluth Intermodal Terminal Ribbon-Cutting Ceremony (Source: Canadian National).*



capacity at Duluth is 400,000 square feet (some heated), plus 40 acres of secure outdoor space. The terminal dedicates 7.5 acres for ramp operations, with one reach stacker and two 81-ton gantry cranes for lifts. The yard has storage capacity for 750 40' containers, with an annual throughput capacity of 45,000 TEU (22,500 40' containers). The terminal operates six days per week, with transit times to and from the Pacific of 7-10 days; to and from the Atlantic in 5 to 8 days; and to and from Gulf of Mexico ports in 5 to 8 days.<sup>309</sup> Contents of containers have included forest products, machine parts, door components, agricultural commodities, and steel products. The service area for drayage extends to Wisconsin, Minnesota, North Dakota, and the Upper Peninsula of Michigan.<sup>310</sup>

<sup>306</sup> <https://www.lakesuperior.com/the-lake/maritime/going-intermodal/>

<sup>307</sup> <http://duluthcargo.com/services/intermodal/>

<sup>308</sup> <https://www.cn.ca/en/our-services/maps-and-network/intermodal-terminals>

<sup>309</sup> "Investing in Capacity to Support Service and Growth," presentation by Lonny Kubas, CN Director of Marketing Intermodal International, October 31, 2017.

<sup>310</sup> <http://tcbmag.com/news/articles/2017/september/transport-superhighway>



*Image 27: CN Operations at Duluth (Source: Journal of Commerce).*



Advantages for shippers include cost savings; a \$500 to \$700 advantage over shipping through Chicago was stated (factoring in drayage costs). Direct trade through the Port of Prince Rupert was seen as another advantage. In addition, Duluth was

expected to offer greater availability of containers for exporters of forest products and agriculture. Shortages of empty containers in the Twin Cities were noted as a barrier to that trade.<sup>311</sup>

## MINNEAPOLIS/ST. PAUL, MN

Two intermodal terminals in the Twin Cities also provide rail intermodal service options via drayage for much of western and northern Wisconsin.

### BNSF MIDWAY

BNSF's St. Paul Intermodal Facility is located at 1701 Pierce Butler Route in St. Paul, in the Midway district between downtown Minneapolis and downtown St. Paul. The facility is two miles north of I-94, and operates 24/7. The site encompasses 44 acres, and had been conducting 260,000 lifts per year prior to the recession. The yard's capacity is approximately 338,000 lifts per year, incorporating use of overflow lots (Lot 20, off of Dale Street, about three miles east; and the Bridal Veil Lot, off of Westgate Drive, about three miles west).

The container revenue is approximately 60 percent from domestic operations (UPS and J.B. Hunt) and 40 percent from international traffic. Between five and seven intermodal trains are handled at the yard per day; two of these are high-priority runs between St. Paul and Chicago. Approximately 500 trucks/container units enter the facility per day, with origins in Minnesota, Wisconsin, Iowa, and the Dakotas. 120 of these trucks are for UPS. Mail, packages, and consumer goods are the primary container contents; agricultural products for export also comprise a portion of the loads.<sup>312</sup>

Per Google Maps, the operations include a mix of international (40' and 20') and domestic (53') containers, with a limited TOFC presence (including UPS 28' trailers). Most containers are stored on chassis. The yard appears to lack overhead lifting cranes; only two working tracks and three storage tracks for intermodal trains appear to be in operation. The yard location is also constrained by surrounding development and roadways.

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<sup>311</sup> [https://www.joc.com/rail-intermodal/class-i-railroads/canadian-national-railway/us-exporters-eye-new-cn-ramp-truck-savings-new-markets\\_20170328.html](https://www.joc.com/rail-intermodal/class-i-railroads/canadian-national-railway/us-exporters-eye-new-cn-ramp-truck-savings-new-markets_20170328.html)

<sup>312</sup> <https://www.stpaul.gov/sites/default/files/Media%20Root/Planning%20%26%20Economic%20Development/West%20Midway%20Industrial%20Area%20Plan%20ADOPTED%20for%20Met%20Council.pdf>



The St. Paul/Midway facility directly connects the Twin Cities with Chicago and Seattle, including port gateways at Seattle, Tacoma, and Portland, Oregon.<sup>313</sup>

### CANADIAN PACIFIC SHOREHAM

Canadian Pacific's Shoreham Terminal is located at 615 30<sup>th</sup> Avenue NE in Minneapolis, off of University Avenue NE (State Highway 47), about three miles northwest of I-35W and two miles east of I-94 in Northeast Minneapolis. As with CP's Bensenville and Schiller Park facilities in the Chicago area, Shoreham is operated by Terminal Operations Management (T.O.M.), a private terminal management firm.<sup>314</sup> T.O.M. also manages the Portal, North Dakota Border Crossing Facility for CP, with functions that include off-load and re-load of containers, warehouse management, and customs exam inspections.<sup>315</sup> The facility operates days and evenings Monday through Friday, and daytime only on Saturday and Sunday. The on-site empty container depot operates daytimes Monday through Friday, and is closed on weekends.<sup>316</sup>

The facility encompasses 36 acres, with a significant portion of its container traffic originating at Montreal.<sup>317</sup> Other intermodal facility locations connected to Shoreham include Vancouver, Calgary, Edmonton, Toronto, and Bensenville (Chicago).<sup>318</sup> Recent volume data is not readily available; however, Shoreham reported 83,000 container lifts in 2009.<sup>319</sup>

*Image 28: Canadian Pacific's Shoreham Terminal, Minneapolis (Source: Terminal Operations Management).*



In addition to these two facilities, a Canadian National operation previously listed for Minneapolis at 132 31<sup>st</sup> Avenue NE is not a direct rail intermodal operation, but rather a “paper” terminal that handles intermodal containers for drayage to and from Chippewa Falls.<sup>320</sup> The operation is managed by C Base, which includes inspections, drayage, storage, and repair at this location.<sup>321</sup>

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<sup>313</sup> <https://www.dot.state.mn.us/ofrw/mfac/pdf/wp-intermodalminnesota.pdf>

<sup>314</sup> <https://terminalops.com/locations/minneapolis-minnesota/>

<sup>315</sup> <https://terminalops.com/locations/portal-north-dakota/>

<sup>316</sup> <https://www.cpr.ca/en/choose-rail/network-and-facilities>

<sup>317</sup> <https://trrjournalonline.trb.org/doi/pdf/10.3141/1659-18>

<sup>318</sup> <http://www.cpr.ca/en/customer-resources-site/Documents/intermodal-domestic-schedule-2018.pdf>

<sup>319</sup> <http://midamericafreight.org/index.php/rfs/network-inventory/rail/intermodal-facilities/cp-minneapolis-mn/>

<sup>320</sup> <http://midamericafreight.org/rfs/network-inventory/rail/intermodal-facilities/cn-minneapolis-mn/>

<sup>321</sup> <http://cbasemn.com/depot.html>

In the 1990s, the Minnesota Intermodal Rail Study (MIRTS) was formed as a public-private partnership amongst BNSF, CP, the Minnesota DOT (MnDOT), and the Metropolitan Council (the region's MPO). Following its acquisition of the Chicago & North Western Railroad, UP joined the partnership. The objective of this study was to assess future intermodal terminal service demands, to explore the feasibility of a shared-use facility, to identify potential sites and infrastructure needs for such a site, and to determine the economic benefits of a consolidated facility for the region's shippers. The study determined that demand would outgrow capacity, particularly at the BNSF St. Paul terminal.

The next phase explored the potential cost to develop a site, and what lift costs would be required to cover site development, construction, and operation. That fee was calculated to be 50 to 65 percent more than industry norms. Further, the sites identified by the study as most favorable would all require expensive infrastructure connections, far off of existing BNSF or CP track. BNSF expressed concern over track and facility ownership and service for UPS; CP noted it had adequate capacity for its projected growth and no need to invest in another facility. Local road costs and land use plans were also seen as obstacles. Therefore, the study group expired; MnDOT and the Metropolitan Council decided to not to pursue the initiative.<sup>322</sup>

Given the primary transcontinental routings of the Class I carriers, the Twin Cities are likely to have limited growth in these terminals, unless Asian imports to the Ports at Vancouver and Seattle dramatically increase. Portland, which had been a western terminal for BNSF and handled almost 340,000 containers at its peak in 2003, suffered an effective termination of containerized shipping as Hanjin, Hapag-Lloyd, and Westwood Shipping all ended service by 2015. With channel depth of 43 feet, Portland is also unable to accommodate the larger Post-Panamax vessels now routinely used for trans-Pacific shipping.<sup>323</sup> The opening of CN's Duluth facility further limits the potential for new intermodal facilities near the Twin Cities.

## SECTION SUMMARY: INTERMODAL FACILITIES NEAR WISCONSIN

The proximity of Wisconsin to the Chicago and Joliet area intermodal terminals presents both opportunities and challenges to shippers in southeastern Wisconsin. Chicago is the closest location where the six largest North American Class I railroads come together. Further, an estimated 46 percent of all intermodal containers cross through the Chicago area;<sup>324</sup> this concentration of activity provides a competitive market for shipping options. However, congestion has long been an issue with rail and truck movement into, through, and out of the Chicago region. Competition for drayage drivers willing to travel to and from Wisconsin (and the costs of such drayage, especially for shippers north of Milwaukee) minimizes or negates any cost advantages of rail quotes from the Chicago yards. The exponential development of Will County into a freight nexus adds more challenges to Wisconsin businesses, with at least one additional hour of drive time each way above the transit times to and from Chicago. The

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<sup>322</sup> <https://trrjournalonline.trb.org/doi/pdf/10.3141/1659-18>

<sup>323</sup> [https://www.joc.com/port-news/us-ports/port-portland-ore/portland-asking-hard-questions-future-containers\\_20170727.html](https://www.joc.com/port-news/us-ports/port-portland-ore/portland-asking-hard-questions-future-containers_20170727.html)

<sup>324</sup> <https://www.theherald-news.com/2016/08/19/regional-planners-get-up-close-look-at-will-county-trucks/a5asrjn/>

supportive warehousing infrastructure surrounding the major Chicago and Will County terminals also gives advantages to operations in those regions.

Operations in Minnesota, by comparison, are developing more gradually. BNSF has addressed its immediate capacity challenges by utilizing remote yards for container and trailer storage; CP's Shoreham Yard has yet to reach capacity. The Duluth terminal's attractiveness includes the value-added services of Duluth Cargo Connect through its Lake Superior Warehousing operations. While this location has the benefit of being adjacent to the main CN corridor between the Canadian West Coast ports at Vancouver and Prince Rupert and Chicago (with additional connectivity to New Orleans, Montreal, and Halifax), it is unclear what the maximum inbound demand for this locations will be, and whether that will provide sufficient container capacity for outbound traffic.

## CONTAINER PRICING FOR INTERMODAL SERVICE TO WISCONSIN

The cost of container shipping is a major consideration for both domestic and international liner service users. The challenge for them – and the logistics companies, freight forwarders, and other professionals they deal with – is to determine what is and is not included in quotes for service. Some companies are all-inclusive, using their own truck fleets and chassis to dray loads to their final destinations. Other transportation companies include surcharges – from chassis rental, to overweight loads, to tolls, to insurance, to fuel costs and more – in determining the final costs to the customer. Spot prices are subject to rapid fluctuation based on availability vessel slots, fuel costs, driver availability, terminal location, and container need at its destination. Most larger companies choose to establish long-term contracts to ensure vessel capacity, drayage and chassis availability, and predictable pricing.

### INTERNATIONAL

One member of the Intermodal Subcommittee graciously shared rates for both import and export containers through the terminals in northeastern Illinois. The pricing varies based on point of export (Southeast Asia versus Chinese Base ports), destination intermodal terminal, container size (20' or 40'), route within North America (Canadian port entry, U.S. West Coast port entry, or U.S. East Coast port entry), and date of quote. "City Ramps" refers to intermodal yards in Chicago and immediate surrounding communities. Tables 24 and 25 give examples of rates offered for importers and exporters.<sup>325</sup>

*Table 24: Sample Ocean Container Import Quotes from Asia to Chicago Area Terminals, July 2018  
(Source: The DeLong Company, Inc.).*

Origin	Destination	20' Rate (\$)	40' Rate (\$)	Entry/Route
China Base	Elwood/Joliet	2,900	3,400	Canada
China Base	Harvey	2,800	3,300	Canada
China Base	City Ramps	2,800	3,300	Canada
China Base	Elwood/Joliet	3,150	3,775	U.S. West Coast
China Base	Rochelle	3,350	4,000	U.S. West Coast
China Base	City Ramps	3,150	4,025	U.S. West Coast
China Base	City Ramps	3,600	4,000	U.S. East Coast
South East Asia	Elwood/Joliet	2,800	3,450	Canada
South East Asia	Harvey	2,850	3,350	Canada
South East Asia	City Ramps	2,850	3,350	Canada
South East Asia	Elwood/Joliet	3,200	4,025	U.S. West Coast
South East Asia	Rochelle	3,500	4,025	U.S. West Coast
South East Asia	City Ramps	3,200	4,025	U.S. West Coast

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<sup>325</sup> Rate quotes provided by Subcommittee member Bo DeLong, The DeLong Company, Inc.

**Table 25: Sample Ocean Container Export Quotes from Chicago Area Terminals to Asia, July 2018**  
(Source: The DeLong Company, Inc.).

Origin	Destination	20' Rate (\$)	40' Rate (\$)	Entry/Route
Elwood/Joliet	China Base	760	950	U.S. West Coast
Elwood/Joliet	South East Asia	1,000	1,200	U.S. West Coast

## DRAYAGE

The costs of drayage from Chicago area terminals varies due to many factors, including the terminal, the destination, and whether the move is daytime or nighttime. Table 26 includes sample drayage quotes, as furnished by a member of the Intermodal Subcommittee. Of note, a “Milwaukee Ramp” origin was also provided; this price would be for an intermodal container being moved from a location in Milwaukee to another Wisconsin destination (as could be done for repositioning empty containers).

**Table 26: Sample Intermodal Drayage Costs from Chicago Area Terminals, July 2018** (Source: The DeLong Company, Inc.).

Origin	Destination	Rate (\$)	Day Tolls (\$)	Night Tolls (\$)
Elwood/Joliet	Milwaukee	750	46.40	34.90
Harvey	Milwaukee	900	39.85	30.00
Rochelle	Milwaukee	750	8.15	6.10
City Ramps	Milwaukee	600	26.85	20.20
Milwaukee	Milwaukee	350	N/A	N/A
Elwood/Joliet	Madison	900	60.25	45.30
Harvey	Madison	1,100	53.70	40.40
Rochelle	Madison	600	8.15	6.10
City Ramps	Madison	750	40.70	30.60
Milwaukee	Madison	500	N/A	N/A
Elwood/Joliet	Green Bay	1,250	46.40	34.90
Harvey	Green Bay	1,500	39.85	30.00
Rochelle	Green Bay	1,250	8.15	6.10
City Ramps	Green Bay	1,000	26.85	20.20
Milwaukee	Green Bay	700	N/A	N/A
Elwood/Joliet	Wausau	1,500	60.25	45.30
Harvey	Wausau	1,700	53.70	40.40
Rochelle	Wausau	1,250	8.15	6.10
City Ramps	Wausau	1,250	40.70	30.60
Milwaukee	Wausau	1,000	N/A	N/A



Table 26 also shows that the drayage costs from the Chicago/Joliet ramps are significantly higher for northern Wisconsin (Green Bay and Wausau) than for Milwaukee and Madison, as quotes anticipate extra costs related to a two-day trip cycle. When comparing transportation from a Milwaukee location, the costs are less in all cases, especially for drayage to Green Bay. Drayage from Milwaukee also avoids the toll charges, which can be as high as \$60 one-way. The table also identifies a premium cost involved of \$150 to \$250 over comparable Chicago/Joliet area ramps for drayage hauls originating at the Harvey CN facility.

*Image 29: Intermodal Container Drayage (Source: TKI Intermodal).*



## SECTION SUMMARY: LINER SERVICE AND DRAYAGE PRICING

Imported goods originating in Asia and destined for the U.S. Midwest pay a premium cost, as attested to by examining inbound rates across the Chicago area terminals. This reflects the desire of the liner services that own the containers to maximize their use in maritime transportation, and a challenge to cost-effective international container service for Wisconsin-based companies. By comparison, exports from the Chicago terminals are priced at a discount, to encourage the expedited return of these containers to maritime service. This pricing is a direct factor in the use of containers for grain exports, and in the proliferation of grain transloading facilities at and near the major Chicago/Joliet yards.

Costs to and from Southeast Asia are slightly higher than to and from China, reflecting the additional transit time involved for those shipments. Should trade policies compel manufacturing to relocate from China to Vietnam or Thailand, those shipments will face higher rates than comparable products shipped from China.

Import rates for China to East Coast ports are becoming competitive with West Coast ports due to the new Panama Canal vessel capacity, coupled with increased port capacity and lower labor rates at East Coast ports. Railroads have also made investments to allow double-stacked containers to be delivered into mid-America. One rate quote had a 40' container priced less for delivery from China to Chicago ramps via the East Coast than via the West Coast. Importers and exporters from Wisconsin may find new competitive pricing opportunities as the East Coast ports increase volumes and efficiencies.

Drayage charges to northern Wisconsin are at present almost twice the rates for moves to southern Wisconsin. These charges reduce the competitiveness of importers and exporters from that area of the state. Daytime drayage to and from Chicago also faces higher tolling rates, which can exceed \$60 per load each way.

## TRADE LANES FOR INTERMODAL SERVICE INTERNATIONAL

Globally, the busiest trade routes are between Asia and North America, with the Asia-North Europe also generating substantial volumes of traffic. As discussed earlier (in the “Service Areas for International Containerized Intermodal Freight” section), more than 26 million TEU moved between Asia and North America in 2017; more than twice as many loaded containers move to North America (19.4 million TEU)

**Graphic 8:** Top Container Ship Trade Routes (Source: Geopolitical Futures)



than from North America (7.5 million TEU). The next-most active lane is between Asia and North Europe, with 9.9 million TEU moving to North Europe and 5.1 million TEU moving on that lane to Asia. Other active lanes include Asia-Mediterranean,

Asia-Middle East, and North Europe-North America.<sup>326</sup> A different source (using U.S. data only) notes that about a third of the imports to the U.S. from Northern Asia in 2017 (13.1 million TEU) went to the U.S. East Coast (3.9 million TEU) or U.S. Gulf Coast (491,000 TEU); the vast majority of this volume likely passed through the Panama Canal. Graphic 8 displays a simplified view of the global container ship trade routes.<sup>327</sup>

## NORTH AMERICAN

The surface transportation trade routes for containerized shipments across North America focus on one primary location: Chicago. With the nation’s third-largest population, and tied to a transcontinental rail system established more than a century ago, Chicago has developed into the top exchange point for containerized freight. Of the seven North American Class I railroads, the six largest have terminals in the Chicago area. The western railroads (BNSF and UP) and the Canadian railroads (CN and CP) routinely interchange or operate run-throughs of intermodal trains with the eastern railroads (NS and CSX). Three of the primary intermodal corridors pass across Wisconsin: CN’s corridor from Vancouver or Prince Rupert to Chicago through Superior, Stevens Point, Neenah, and Waukesha; CP’s corridor from

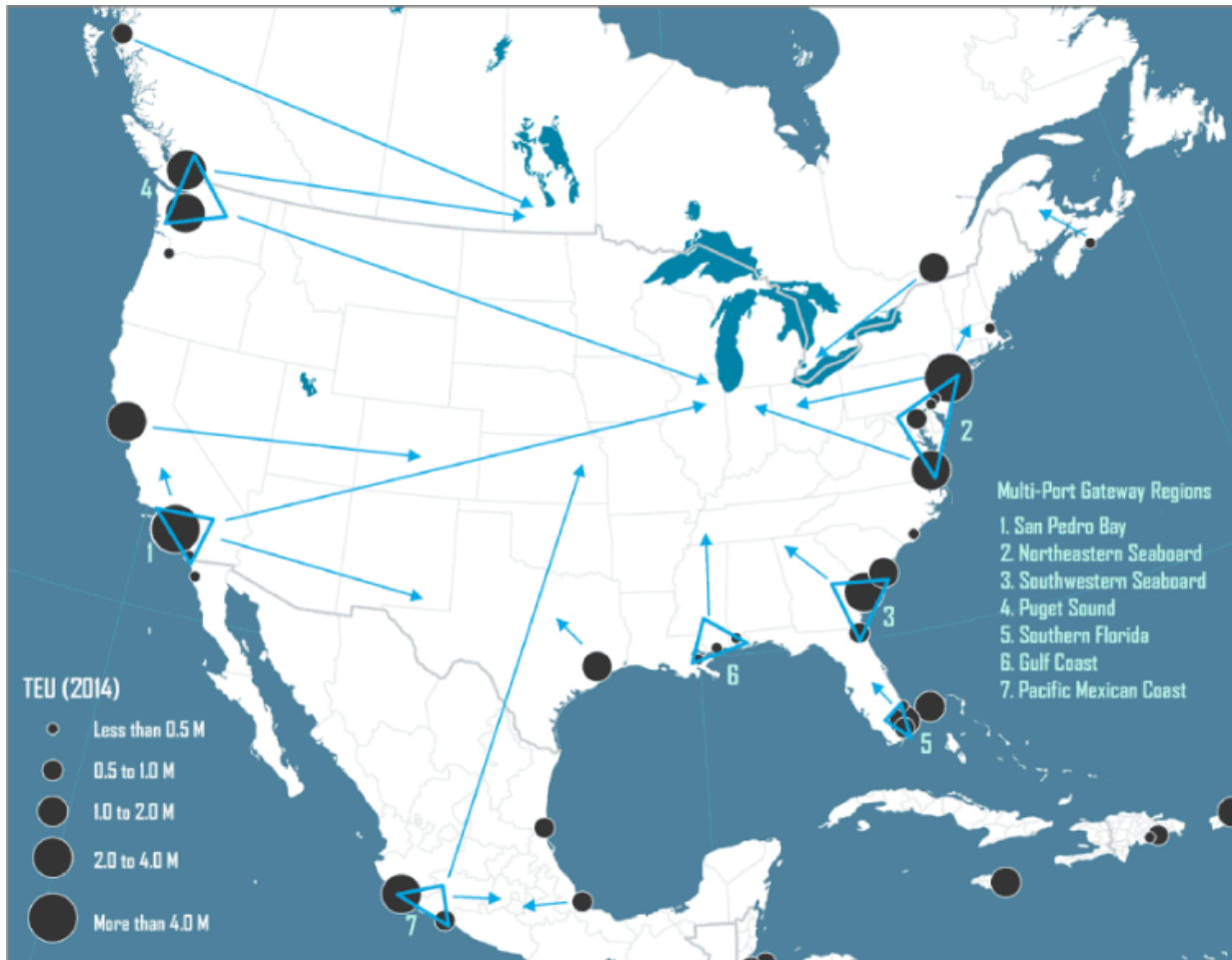
<sup>326</sup> <http://www.worldshipping.org/about-the-industry/global-trade/trade-routes>

<sup>327</sup> <https://geopoliticalfutures.com/top-container-ship-trade-routes/>

Vancouver to Chicago through La Crosse, Tomah, Portage, and Milwaukee; and BNSF's corridor from Seattle-Tacoma to Chicago, running along the eastern side of the Mississippi River from Prescott through La Crosse, Prairie du Chien, and East Dubuque. Although Union Pacific has a corridor through Wisconsin from the Twin Cities to Milwaukee and Chicago, it is not part of that company's transcontinental routes. Neither of the two eastern railroads has trackage in Wisconsin.

Graphic 9 displays the trade flows from North America's major container ports and multi-port gateway regions.<sup>328</sup>

**Graphic 9:** North American Trade Flows from Container Ports and Gateway Regions  
(Source: Jean-Paul Rodrigue, *The Geography of Transport Systems*).



In addition to the trade flows of international containers from coastal ports to inland locations (primarily along a west-east axis), the North American Free Trade Agreement (NAFTA) has contributed to an increase in trade along south-north corridors. Some are long-standing, such as the I-95 corridor along the East Coast. Closer to Wisconsin, the Mid-Century Corridor (called the NAFTA corridor or the I-35 Corridor) extends across the central United States, just west and south of Wisconsin. A second corridor

<sup>328</sup> [https://transportgeography.org/?page\\_id=7677](https://transportgeography.org/?page_id=7677)

of importance to the state is the St. Lawrence/Great Lakes Corridor between Quebec City and Chicago. A third emerging corridor of importance is the Asia-Pacific Gateway, which extends not just to Winnipeg, but to Duluth and Chicago along the CN mainline. Graphic 10 identifies these trade corridor initiatives.<sup>329</sup>

**Graphic 10:** North American Trade Corridor Initiatives (Source: Jean-Paul Rodrigue, *The Geography of Transport Systems*.)



The Intermodal Association of North America compiles domestic intermodal trade lane volumes, and reports on their performance quarterly. Seven lanes comprise the highest density of activity (more than 60 percent of overall volumes). Of these, the lane with the fastest growth in the first half of 2018 was the Northeast-Midwest lane, with an 18 percent increase in traffic; westbound freight was much greater than eastbound. Further data showed international container volume growth was a major part of the increase. These statistics indicate that expansion projects at the Northeastern U.S. ports, coupled with the Panama Canal expansion and railroad infrastructure improvements, have made these ports more competitive with the West Coast for total delivered costs on containers destined for mid-America.<sup>330</sup>

<sup>329</sup> [https://transportgeography.org/?page\\_id=7692](https://transportgeography.org/?page_id=7692)

<sup>330</sup> [https://www.joc.com/rail-intermodal/factors-behind-north-america%E2%80%99s-intermodal-acceleration\\_20181018.html](https://www.joc.com/rail-intermodal/factors-behind-north-america%E2%80%99s-intermodal-acceleration_20181018.html)

## SECTION SUMMARY: TRADE LANES FOR INTERMODAL SERVICE

Shippers face an ever-changing marketplace for container pricing to and from Wisconsin. The dynamics of the liner company pricing changes and surcharges are made more variable through changes in drayage rates, chassis fees, and more. By comparison, the global and continental trade lanes are more enduring, with large volumes of containerized freight passing through the Chicago region. New trade lanes have developed through NAFTA-supported trade, with several north-south corridors emerging, along with a Great Lakes-St. Lawrence Seaway Corridor. The expanded Panama Canal compelled East Coast ports to make improvements to their capacities; the results of those improvements are now being seen with increased import containers moving from East Coast ports to Midwestern destinations.



## PORT OF MILWAUKEE / MILWAUKEE METROPOLITAN ASSOCIATION OF COMMERCE SURVEY

In early 2017, the Port of Milwaukee began a process to evaluate the potential for restoring intermodal container service to southeastern Wisconsin. Discussions with the two Class I railroads serving the Port, CP and UP, determined there was an absence of valid, current data to determine the viability of restoring direct rail intermodal service to southeastern Wisconsin.

To demonstrate the existing level of demand for such service, the Port of Milwaukee partnered with a large group of private and public coalition partners to create and distribute a survey of existing and potential users of both international and domestic containers and compile the results. The partnership included:

- The Metropolitan Milwaukee Association of Commerce and its World Trade Association
- The M7 regional economic partnership
- Wisconsin Manufacturers & Commerce (WMC)
- The Logistics Council of Milwaukee
- Wisconsin Economic Development Corporation
- Wisconsin Department of Agriculture, Trade, & Consumer Protection
- Wisconsin Department of Transportation
- Gateway to Milwaukee

The survey results presented an updated view of intermodal activity, with results demonstrating significant volumes for both international and domestic container shipping by rail. In all, 70,000 TEU of international traffic and 20,000 containers of domestic trade were identified from the 100-plus responses that were received. As of mid-2018, the Port of Milwaukee was continuing communications with both railroads as part of more detailed evaluations of businesses currently using drayage to connect their containers to global or North American markets, and to examine other factors that would support re-establishing intermodal service for southeastern Wisconsin.<sup>331, 332</sup>

The work provided by the Port of Milwaukee and its partner organizations helped establish a starting point for collecting trade information on the existence of intermodal container use in southeastern Wisconsin. The work also helped to set a template for the intermodal survey conducted as part of this report.

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<sup>331</sup> Peter Hirthe, comments at July 10, 2018 Intermodal Subcommittee Meeting.

<sup>332</sup> <https://city.milwaukee.gov/ImageLibrary/User/portbn/PDF/Annual-Reports/PortofMilw2017AnnualFINAL.pdf>

## WISCONSIN MANUFACTURERS & COMMERCE (WMC) SURVEY

### SURVEY DEVELOPMENT AND IMPLEMENTATION

The centerpiece of the Intermodal Subcommittee's efforts was the development and distribution of a survey of current and potential users of containerized intermodal transportation, for both international and domestic/North American movement of freight. The goal was to get an accurate, current assessment of the volumes, products, and locations where containerized freight shipping was used or desired, and which trade lanes are used or would be used to connect seller and buyer. Through this process, data would be collected and analyzed as part of a process to inform external partners of the potential market for containerized shipping.

As previously noted, the origin of the survey instrument was in a previous survey developed, distributed, and analyzed by the Port of Milwaukee, its partners at the Metropolitan Milwaukee Association of Commerce, WMC, and several other public- and private-sector organizations. That survey documented sufficient demand for both international and domestic/North American service to sustain an intermodal facility; that survey did not, however, identify the trade lanes for the freight. Further, that survey targeted businesses in the southeastern portion of Wisconsin, rather than throughout the state. These two factors compelled the development of the Subcommittee's survey.

To ensure responses from businesses would remain confidential, WMC took ownership of the survey. WisDOT staff, in conjunction with Subcommittee members, took the lead in developing the questions, and collaborated with WMC on building the questions into an internet-based survey tool. The survey itself asked respondents to identify any international import, international export, domestic/North American import, or domestic/North American export activity they currently transact with containers, and then to project five years ahead to any changes in activity they envision. Respondents were asked to give the volumes of their freight movements (by number of 20' and 40' international containers or by 53' containers for domestic shipments), and to identify the Wisconsin point of origin or destination by ZIP code. These two factors would then be used to create a series of "heat maps," geographically illustrating where the greatest activity/demand for intermodal service exists, now and in the near-future.

Respondents were also asked to identify the contents of their containerized freight from a limited list of broad commodity groups and whether the contents were hazardous and/or temperature-controlled. International importers and exporters were asked to identify which location(s) were used as gateways for import/export; rather than identify the specific ports, respondents were asked to select from two West Coast options (United States and Canada), two East Coast options (United States and Canada), and one Gulf Coast option. Although point of origin (for imports) or destination (for exports) was suggested as a survey item, the final version of the survey excluded this question.

WMC served as both the host of the survey link and as the collection point for raw survey data. Identifying factors (business name, e-mail address of respondent, etc.) were removed before data was shared with WisDOT. As the survey was internet-based, distribution of the web link was made via e-mail, web-page postings, and social media. Subcommittee members volunteered to promote the survey through their contact lists; WMC directly notified its 3,800 members; and the Wisconsin Department of Agriculture, Trade, and Consumer Protection notified more than 3,000 contacts. Notifications were also sent to regional economic groups, Metropolitan Planning Organizations, Regional Planning Commissions,

and all members of the Subcommittee and the Freight Advisory Committee (FAC). The link, along with introductory language, was also posted to LinkedIn in the hope of reaching key Wisconsin businesses. Recipients were asked to continue to forward the link to all their contacts; therefore, it is impossible to determine how many potential responders received the invitation and the hyperlink.

The survey was opened to responses on August 8, 2018. Results were compiled using a database tied to Excel, allowing comparison of different responses based on the fields with entered data. As the original early September deadline approached, the Subcommittee assessed the less-than-anticipated number of submitted surveys and decided to extend the survey deadline until September 28, 2018. One member noted the short average completion times hinted that larger companies were not participating, as their completion times would have raised the average. Another said that local managers might not have the permission from an out-of-state corporation to respond on behalf of the company. The general consensus of the Subcommittee was that a great deal of data was missing.

Even as surveys were being submitted, the internal survey team was developing the format for displaying the survey data. The final decision was to display the data using a set of color- and size-coded circles, placed at the center of ZIP code locations on a map of Wisconsin. Data that was incomplete or seemed implausible was reviewed and WMC was asked to follow up and, where possible, confirm the data. As a result of that review, at least one duplicate entry was removed. There was some discussion of supplementing missing data using other sources, but the decision was made to maintain the consistency of the survey and report only the validated submissions.

**Table 27:** Statewide Current, Future, and Projected Wisconsin Intermodal Volumes  
(Source: WisDOT/WMC Survey).

Shipment Type	WI Locations	20' Equivalent Units	53' Equivalents
<b>International</b>			
Current Overseas Imports	50	117,193	
Future Overseas Imports	27	18,293	
Projected Overseas Imports	59	135,486	
<b>Domestic/North America</b>			
Current Domestic Imports	25		11,081
Future Domestic Imports	19		8,558
Projected Domestic Imports	35		19,639
Current Domestic Exports	30		40,752
Future Domestic Exports	26		7,967
Projected Domestic Exports	42		48,719

After the revised survey deadline was reached, the Subcommittee was again asked to review the set of maps. Their general observation was that the locations of demand followed expectations, but the volume of containerized goods movement reported in the survey was far lower than expected. Subcommittee members specifically noted a lack of survey data from the Fox Valley region, Wisconsin's second-largest manufacturing area. In all, 122 completed surveys were submitted.

WisDOT staff quantified the survey volumes by region, splitting the state into quadrants. Those maps are included in this section. Table 27 quantifies the overall statewide numbers for international and domestic/North American

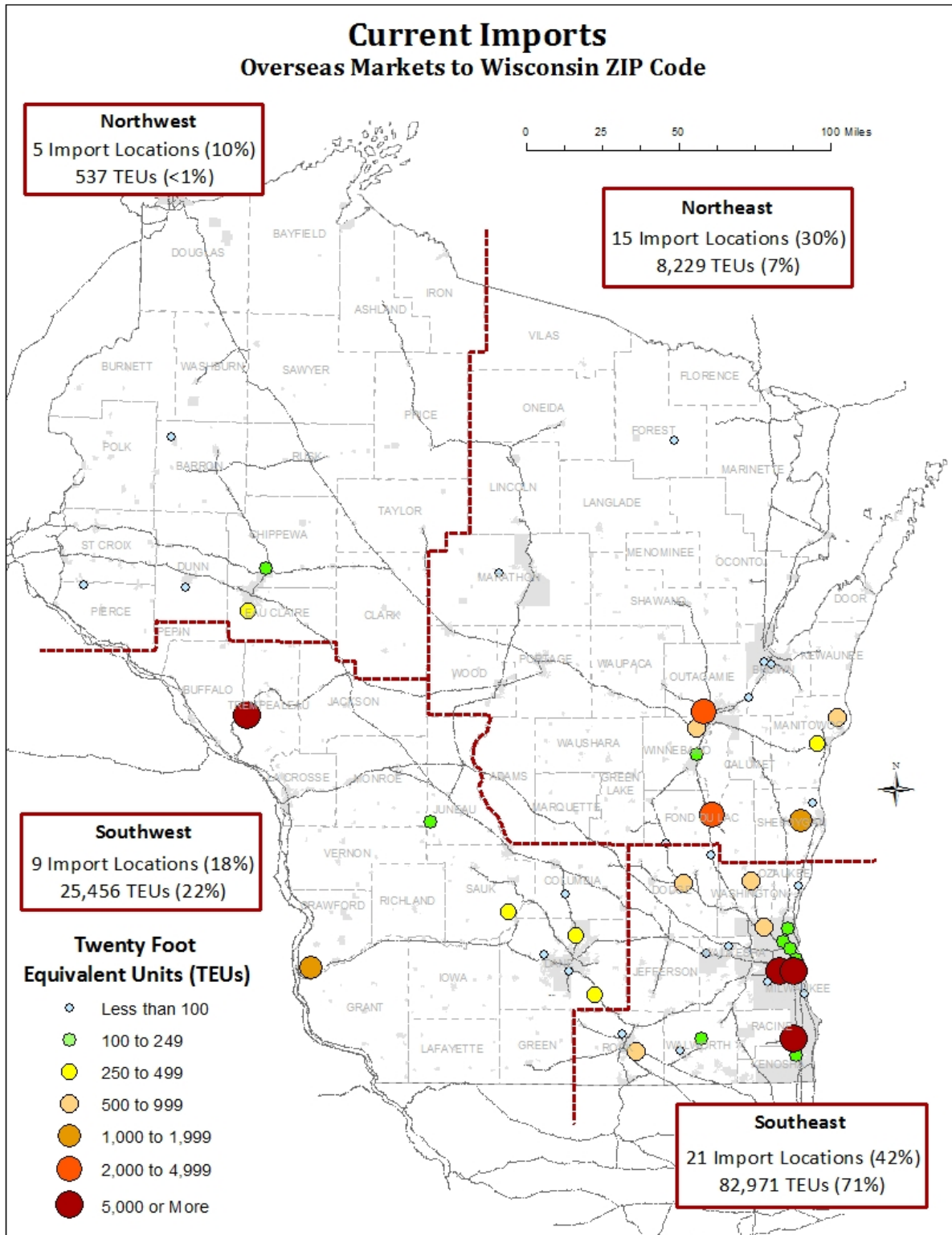
imports/inbound containers and exports/outbound containers, with current volumes, projected growth, and anticipated projected future total volumes.

## WISCONSIN BUSINESSES AND INTERMODAL OPERATIONS - CURRENT AND POTENTIAL USERS

### HEAT MAPS

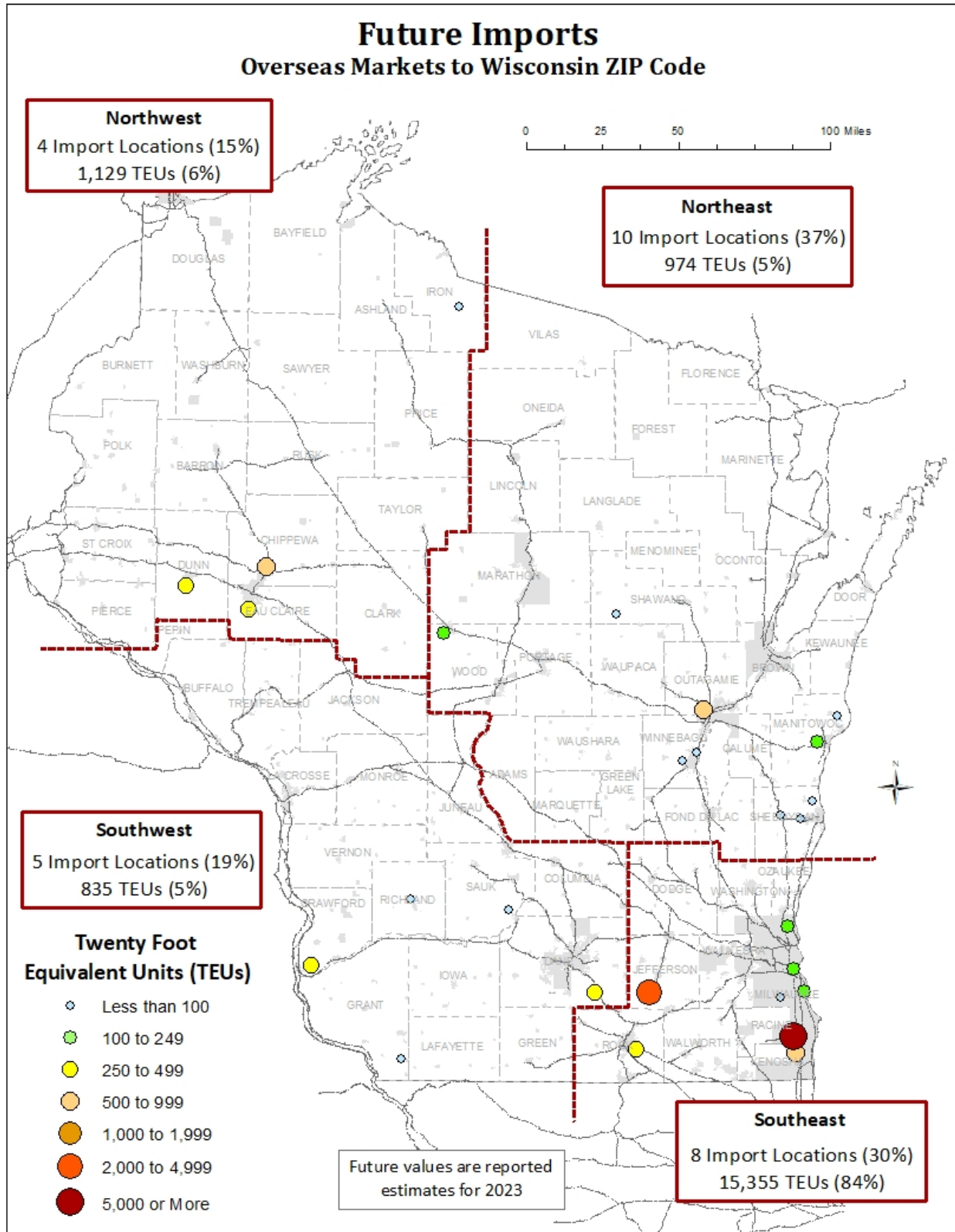
The following maps depict the survey results for current, future (growth), and projected (total future) volumes of international and domestic/North American container shipping, both inbound (imports) and outbound (exports). Each map quantifies the volume of container activity in each quadrant, and the percentage of overall activity that volume represents.

Graphic 11: Current Overseas International Imports to Wisconsin (Source: WMC Survey).

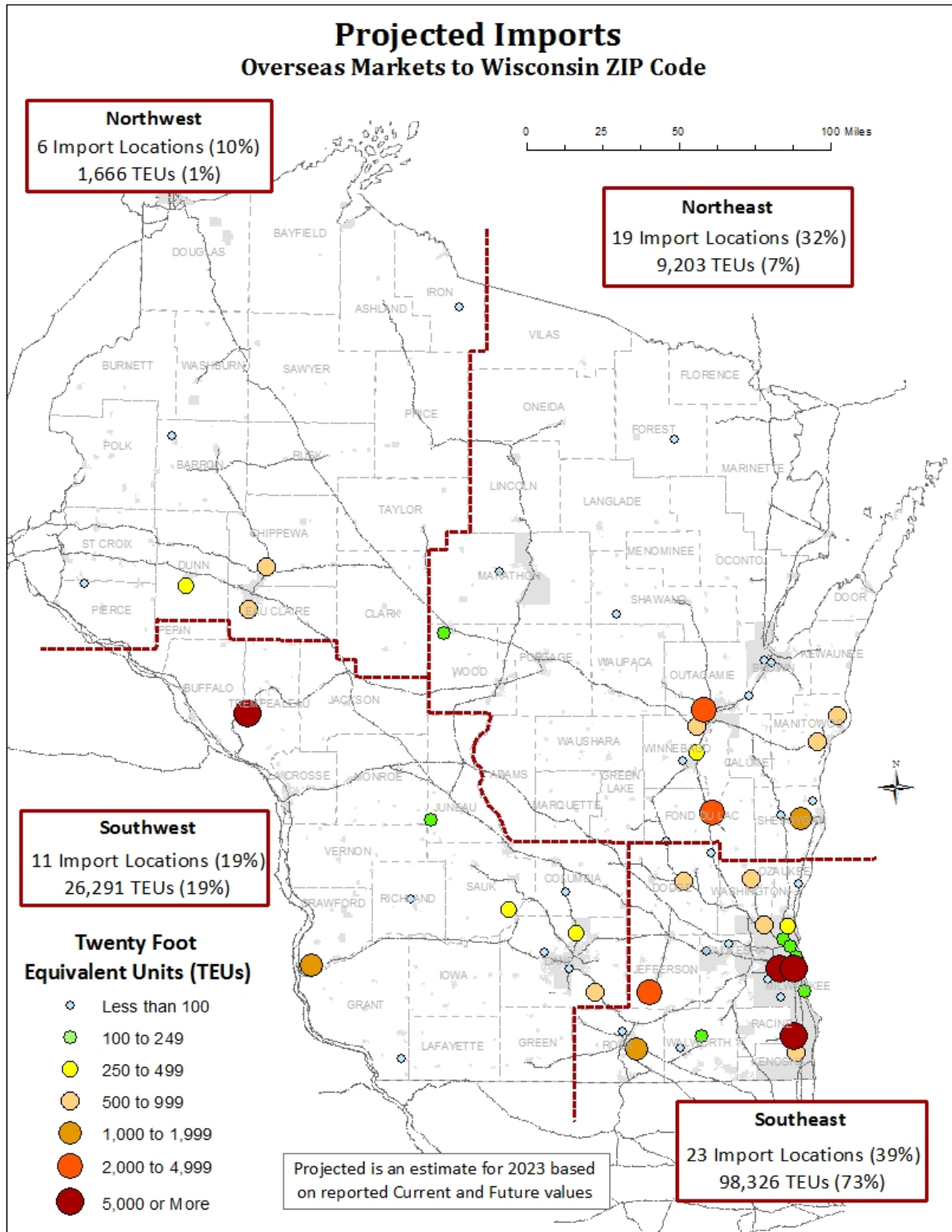




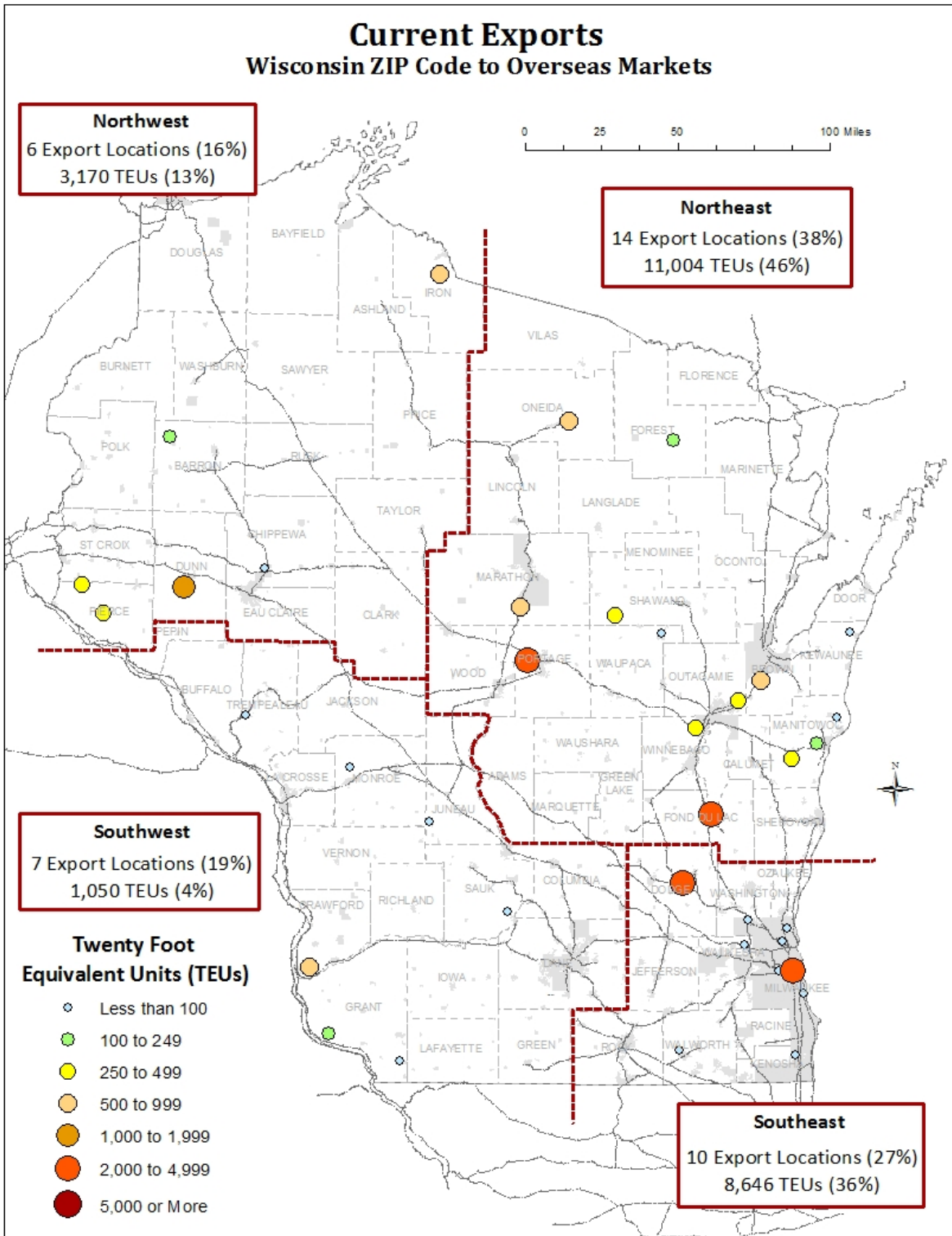
Graphic 12: Future Import Growth to 2023, Overseas International Imports to Wisconsin (Source: WMC Survey).



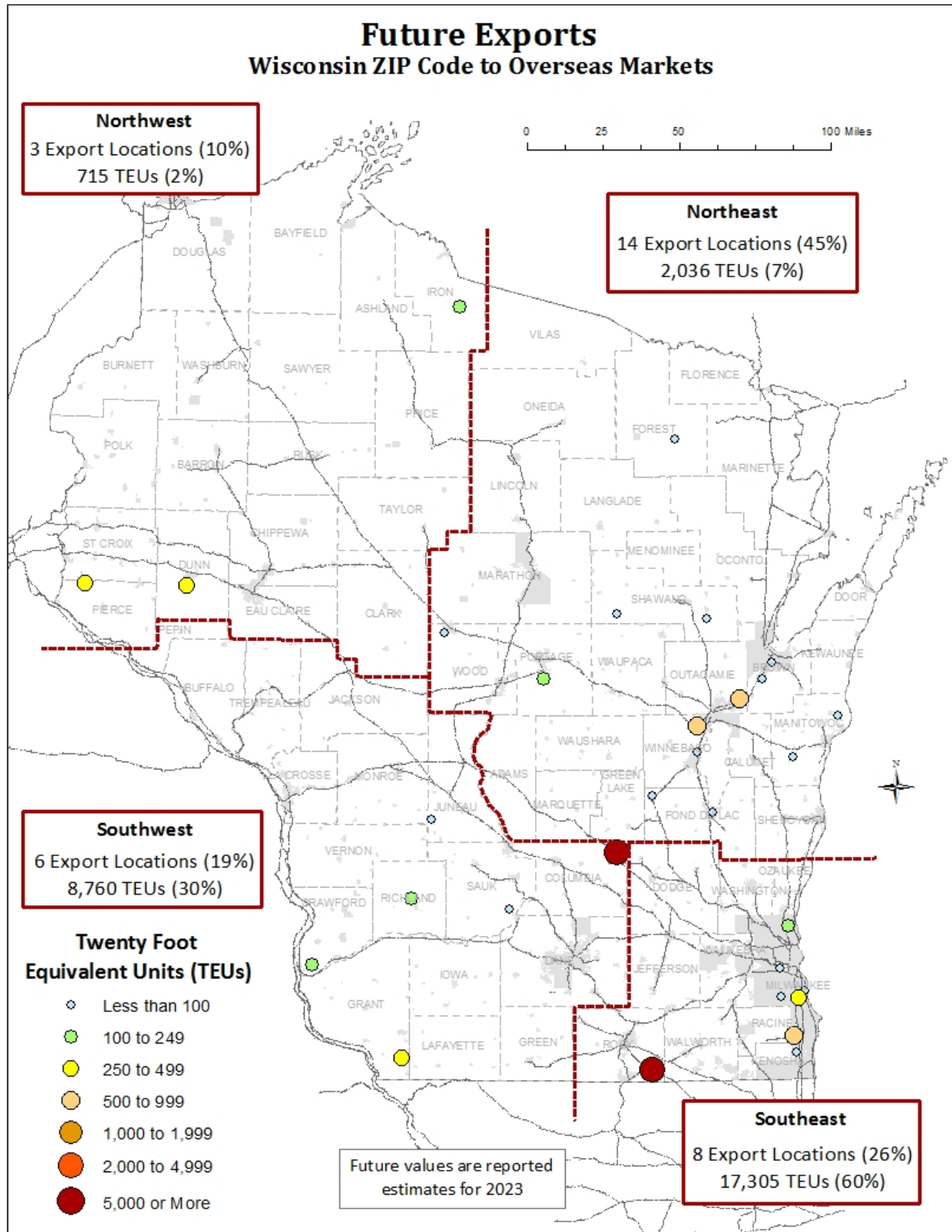
Graphic 13: Projected Total 2023 Traffic, Overseas International Imports to Wisconsin (Source: WMC Survey).



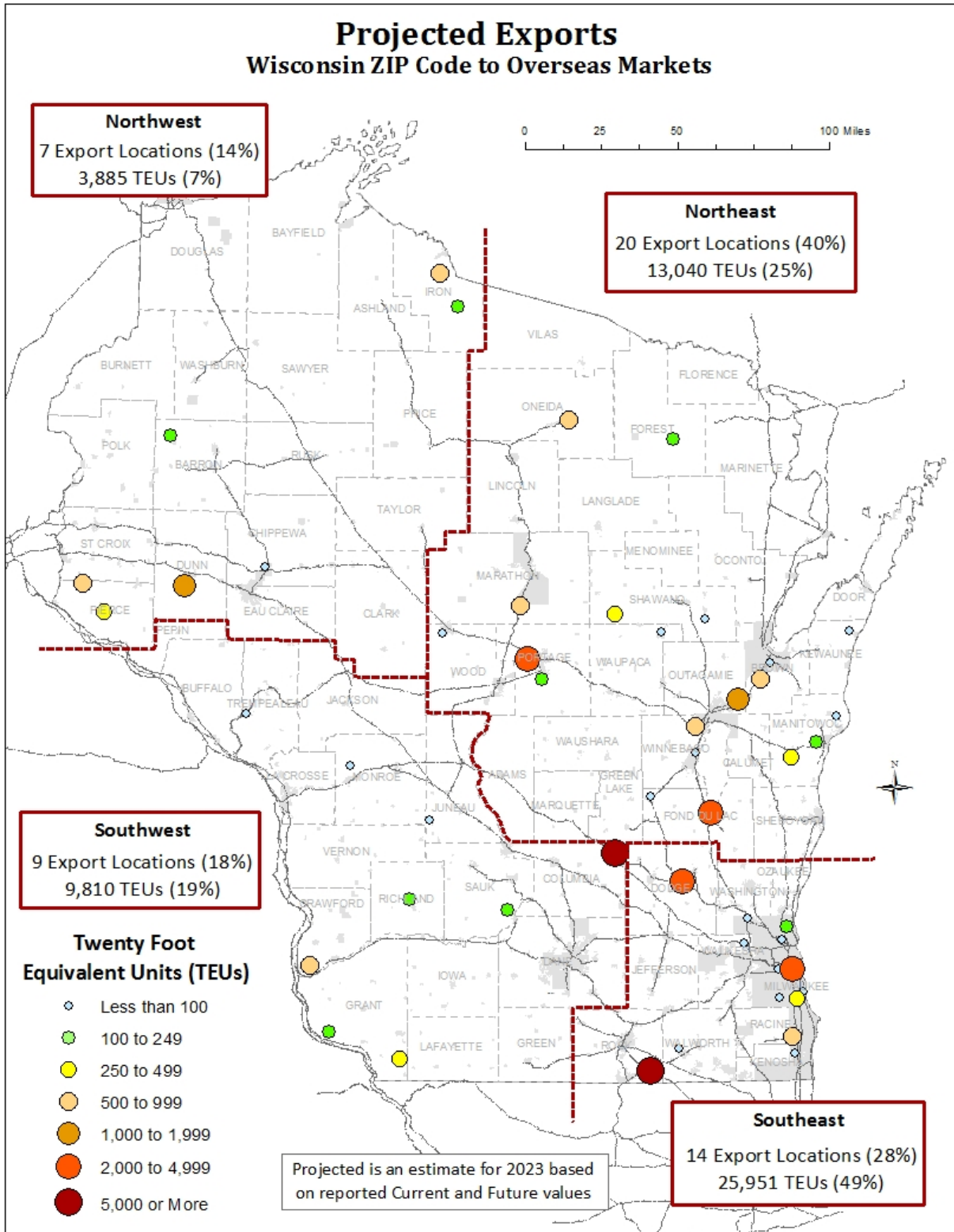
Graphic 14: Current Overseas International Exports from Wisconsin (Source: WMC Survey).



Graphic 15: Future Export Growth to 2023, Overseas International Exports from Wisconsin (Source: WMC Survey).

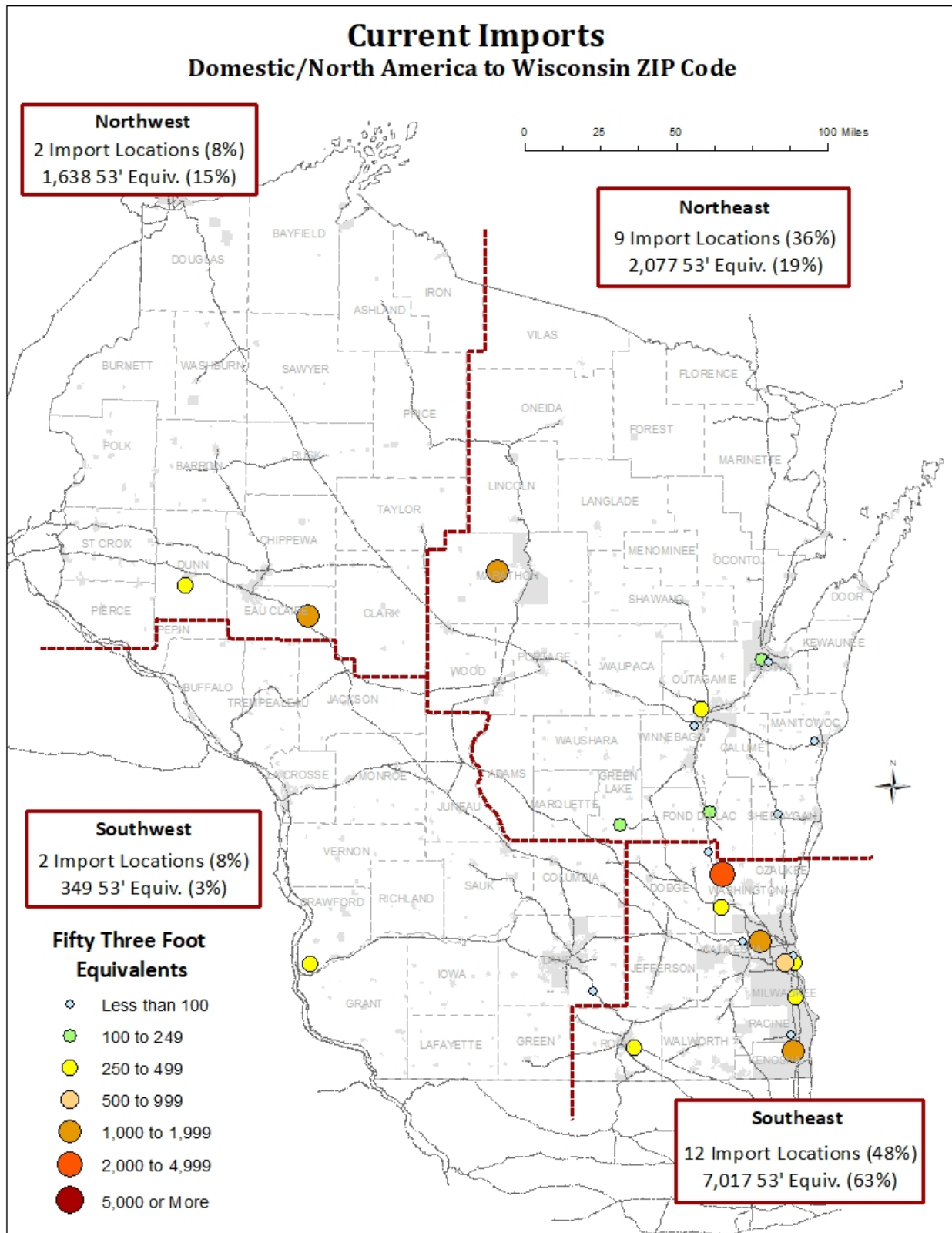


Graphic 16: Projected Total 2023 Traffic, Overseas International Exports from Wisconsin (Source: WMC Survey).

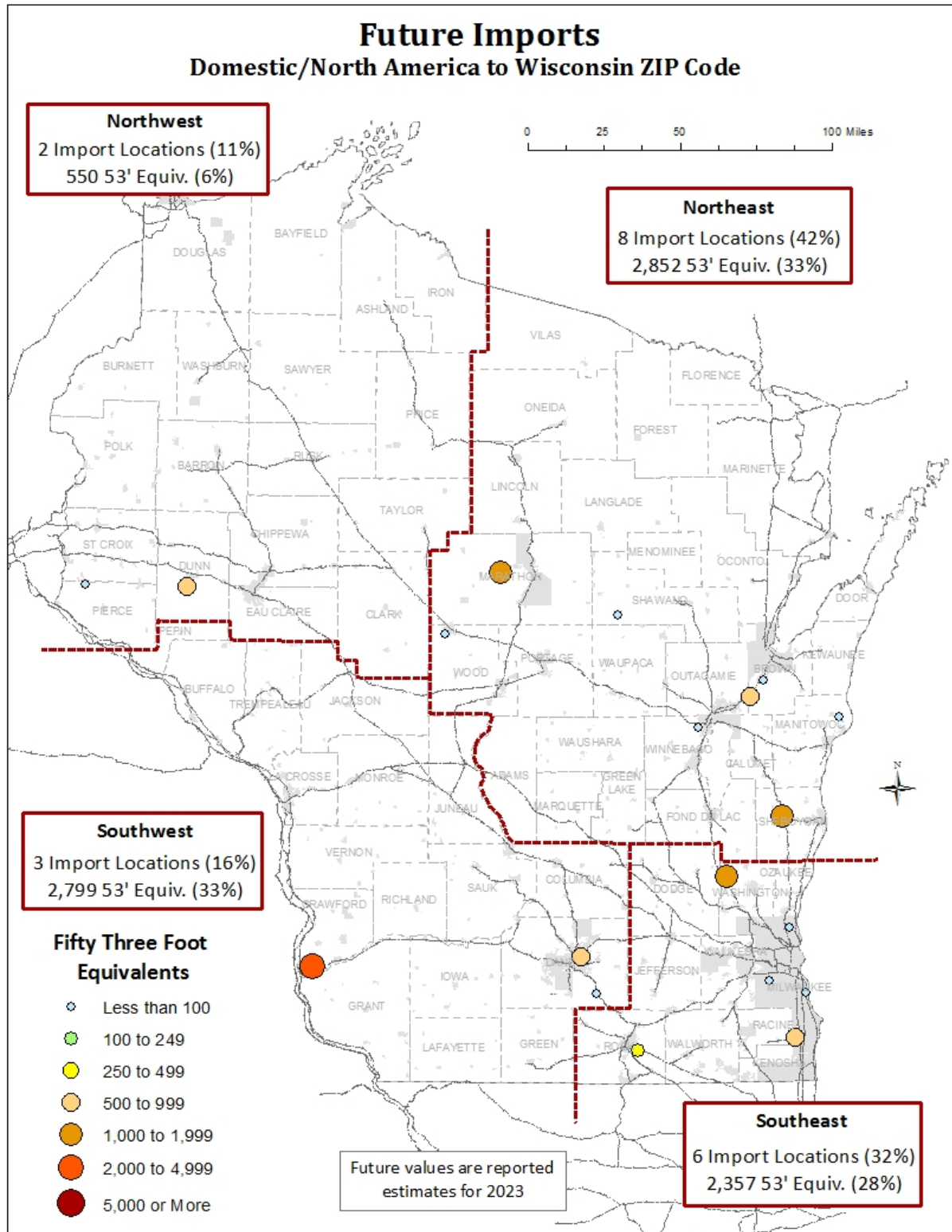




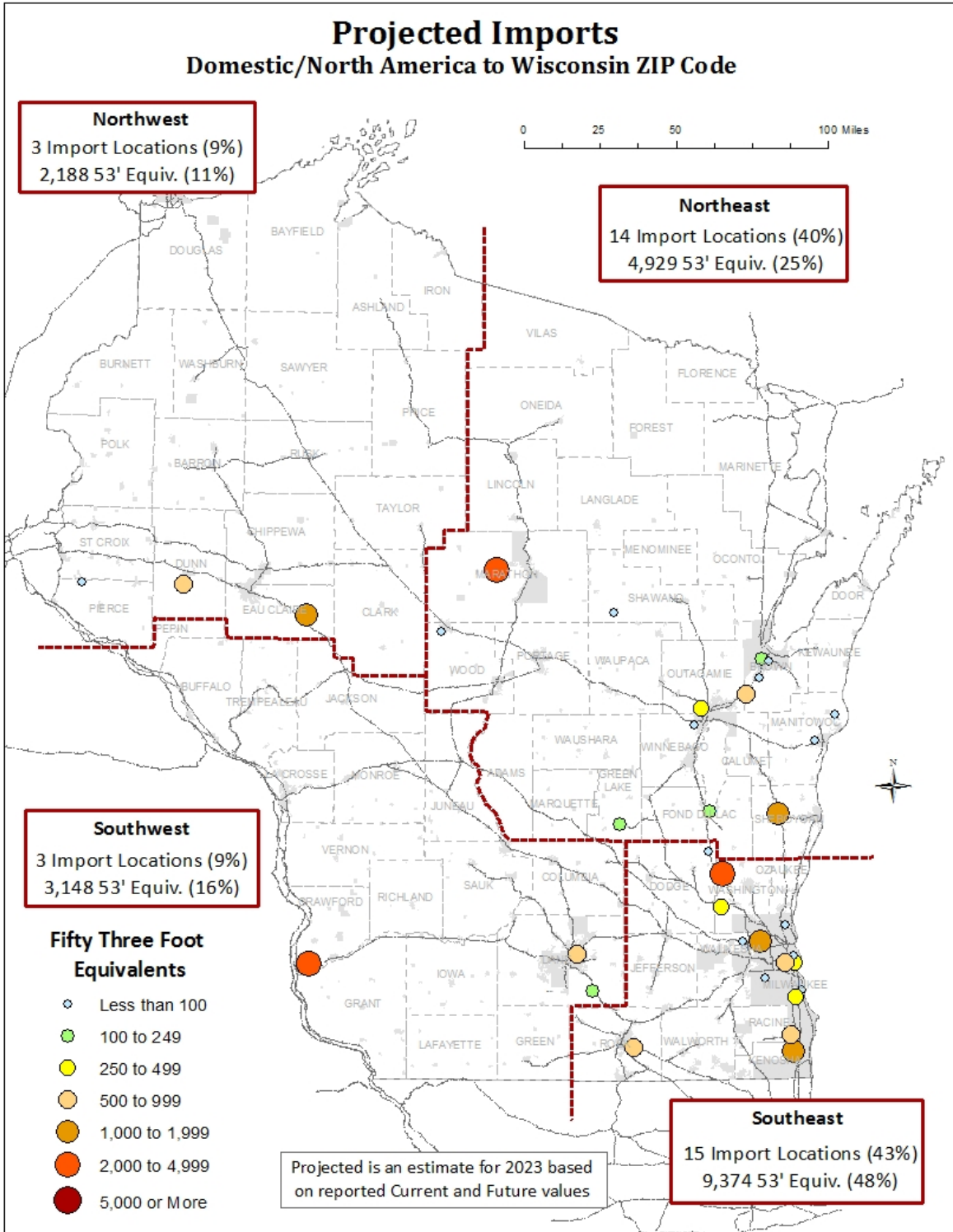
Graphic 17: Current Inbound Domestic/North American Containers to Wisconsin (Source: WMC Survey).



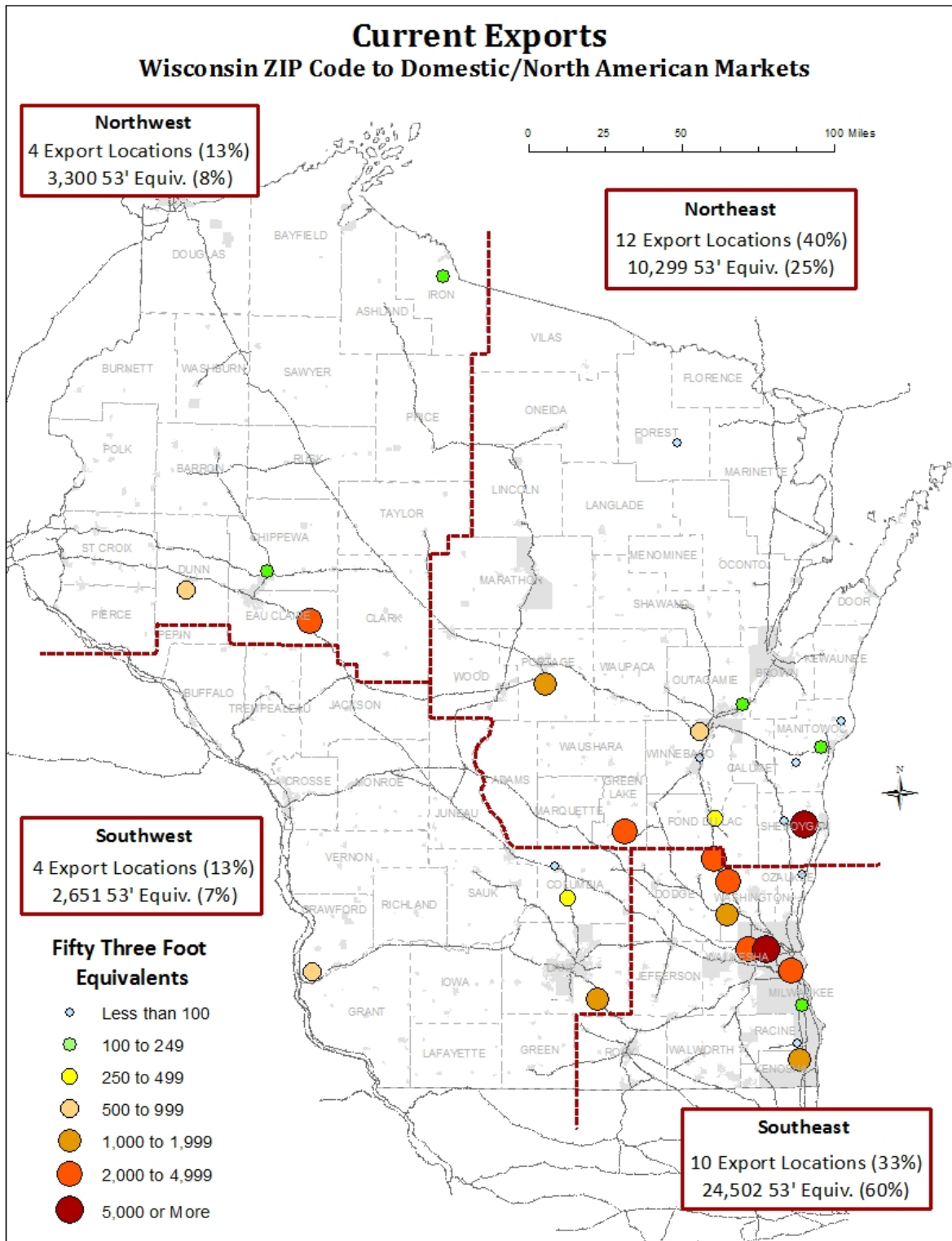
**Graphic 18: Future Inbound Growth to 2023, Domestic/North American Container Traffic to Wisconsin**  
 (Source: WMC Survey).



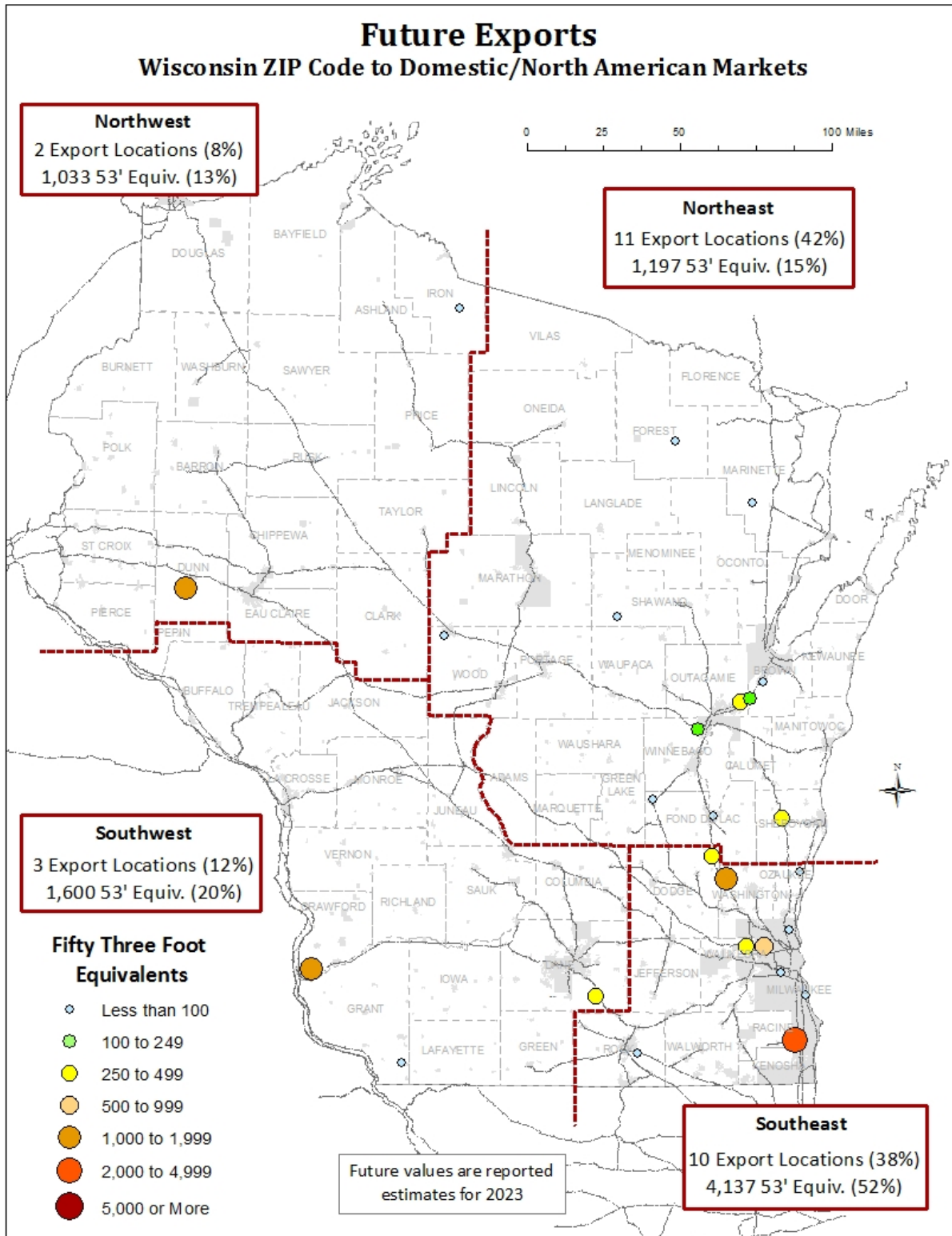
**Graphic 19: Projected Total 2023 Traffic, Inbound Domestic/North American Containers to Wisconsin**  
 (Source: WMC Survey).



Graphic 20: Current Outbound Domestic/North American Containers from Wisconsin (Source: WMC Survey).

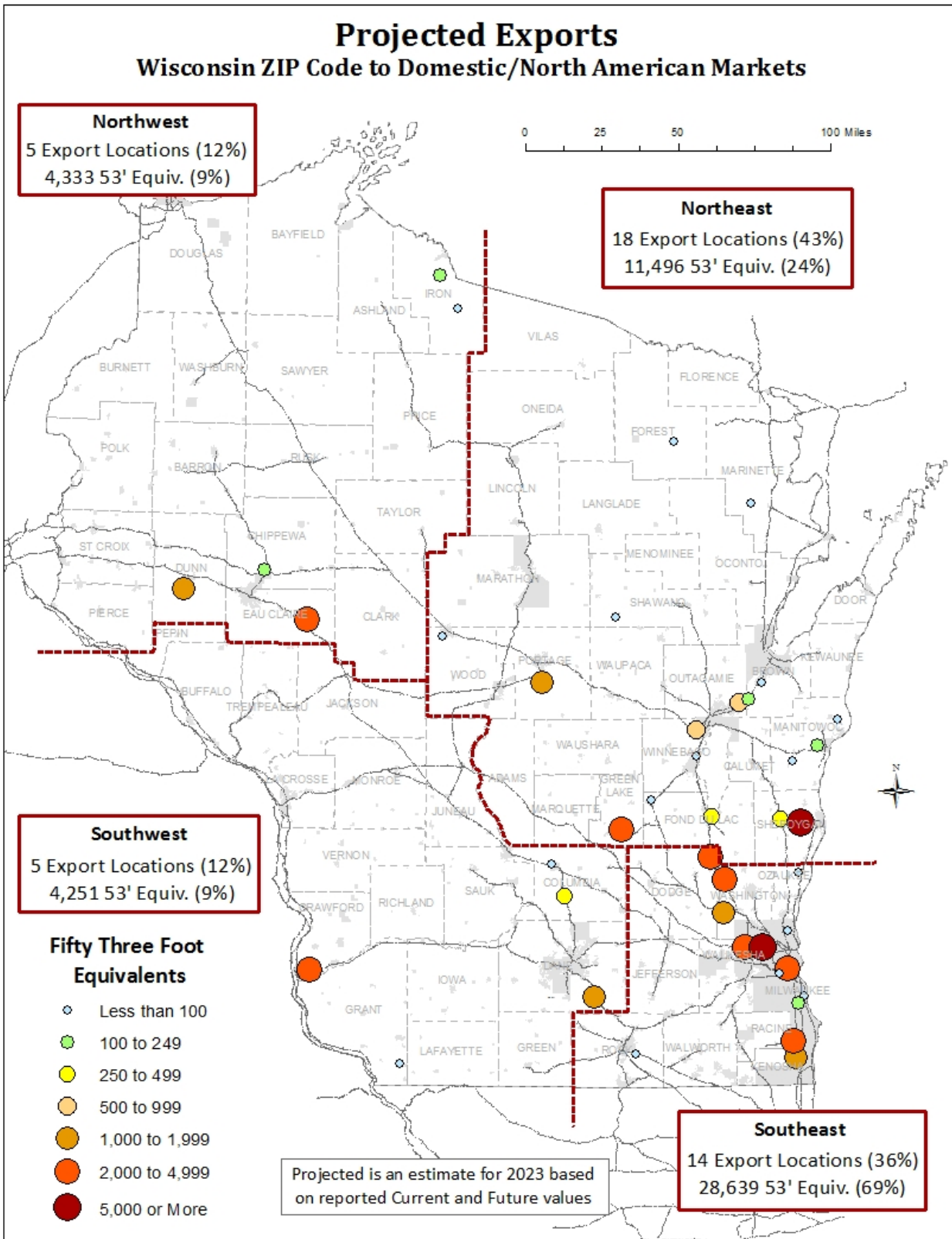


**Graphic 21: Future Outbound Growth to 2023, Domestic/North American Container Traffic from Wisconsin**  
 (Source: WMC Survey).





**Graphic 22: Projected Total 2023 Traffic, Outbound Domestic/North American Containers from Wisconsin**  
 (Source: WMC Survey).



## SURVEY RESULTS

A review of the geographic concentration of current and potential future use of containerized shipping follows many of the expectations, based on the results of the Port of Milwaukee Survey and anecdotal discussions. These findings include:

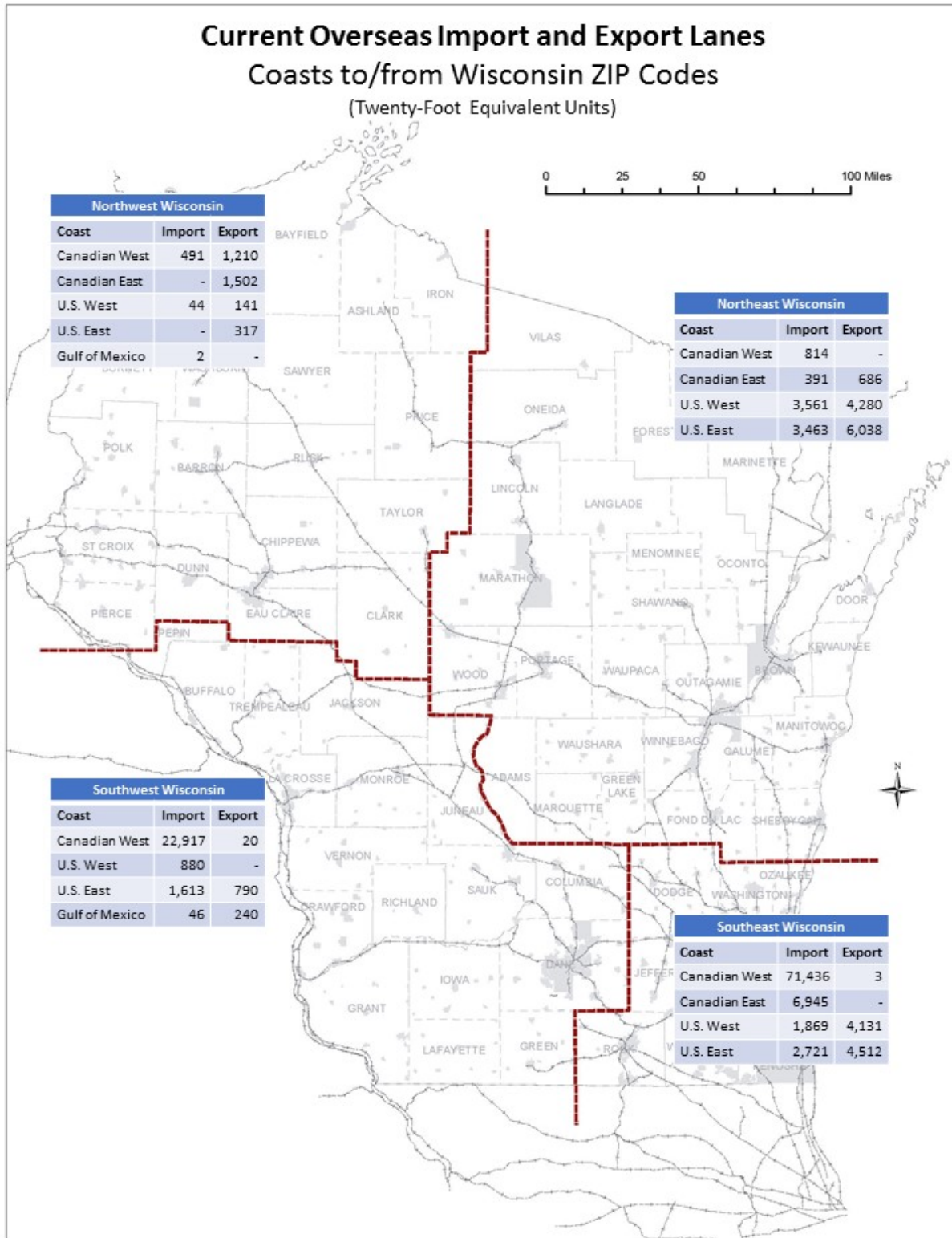
- The state brings in a large volume of international imports by container, especially to the southeastern part of the state.
- The survey identified 117,200 TEU of international container imports, serving businesses in 50 different state ZIP codes. 71 percent of this volume terminates in southeastern Wisconsin.
- Survey respondents projected a 15.6 percent growth in international import container volumes over the next five years, to a 2023 volume of 135,500 TEU serving 59 state ZIP codes. At that time, 73 percent of inbound international containers (more than 98,300 TEU) will terminate in southeastern Wisconsin.
- The survey identified 23,900 TEU of international container exports, from 37 state ZIP codes. 46 percent of these exports originate in northeastern Wisconsin; another 36 percent originate in southeastern Wisconsin.
- Survey respondents projected a 121 percent increase (more than doubling) in international container exports over the next five years, to a 2023 volume of almost 52,700 TEU originating from 50 ZIP codes. At that time, the survey indicated almost half of the state volume of containerized exports (26,000 TEU) would originate in southeastern Wisconsin, while another quarter (13,000 TEU) would originate in northeastern Wisconsin.
- For international container movements, the survey found a large imbalance in Wisconsin's international container traffic, with almost five times the volume of containers terminating in the state versus originating in the state. The 2023 projections note this will become more balanced; however, the survey indicated there will still be five inbound containers for every two outbound containers.
- The survey collected data on domestic/North American (53') container traffic to and from Wisconsin. At present, all this traffic is drayed (carried by truck) to and from Wisconsin.
- Current and projected volumes of inbound domestic/North American containers were lower than international volumes. The survey identified 11,100 TEU of current traffic, terminating at 25 state ZIP codes. 63 percent of these containers terminate in southeastern Wisconsin.
- Survey responses projected a 77 percent increase in inbound 53' domestic/North American containers over the next five years, to a 2023 volume of 19,600 containers terminating at 35 ZIP codes. At that time, responses indicated 48 percent (9,400 containers) of inbound domestic container traffic would terminate in southeastern Wisconsin; another 25 percent (4,900 containers) would terminate in northeastern Wisconsin.
- The survey identified almost 40,800 53' domestic/North American containers going outbound with freight originating from 30 ZIP codes in Wisconsin. 60 percent of these containers originate in southeastern Wisconsin; another 25 percent originate in northeastern Wisconsin.

- Survey responses project a nearly 20 percent increase in outbound domestic/North American containers over the next five years, to a 2023 volume of 48,700 containers originating from 42 different Wisconsin ZIP codes. The survey indicated more than 80 percent of the outbound domestic/North American containers volumes will originate in either the southeastern (69 percent) or northeastern (24 percent) quadrants of the state.
- The survey also found an imbalance in the domestic/North American container flows to the state, but in the opposite direction from international traffic. Almost four times as many domestic/North American containers were identified as originating in Wisconsin than terminating in the state. As with international traffic, this imbalance is projected to moderate by 2023. However, there will still be five outbound domestic/North American containers to every two inbound containers coming to Wisconsin.

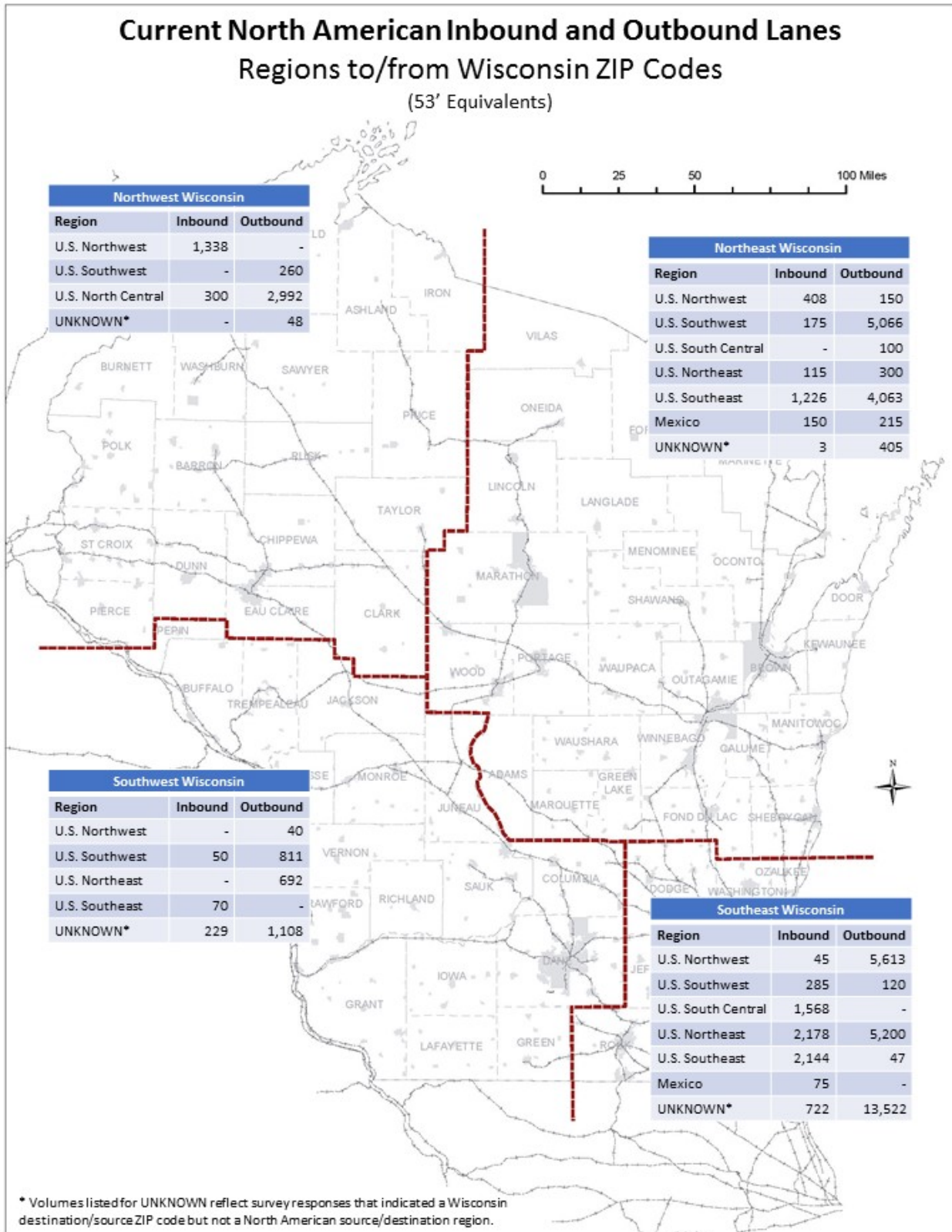
### IDENTIFICATION OF CONTAINERIZED FREIGHT LANES

The Survey also asked respondents to identify, in general terms, the coastal location for international imports to arrive and exports to depart. For domestic container movement, respondents were given sub-regions of North America to identify as the origin of inbound freight or the destination of outbound freight. Not all respondents identified sources or markets for their goods moved by intermodal containers. Graphics 23 and 24 display tables that identify the inbound origins and outbound destinations of the state's intermodal traffic, as reported by respondents, separated into the quadrants of the state used for the survey.

Graphic 2: Import/Export Lanes for Overseas International Containers, in TEU by Quadrant (Source: WMC Survey).



**Graphic 3: Inbound/Outbound Lanes for Domestic/North American Containers, in 53' Equivalents by Quadrant**  
 (Source: WMC Survey).





## OBSERVATIONS ON TRADE LANES FROM SURVEY DATA

Based on the information provided by respondents to the survey, the state's trade lanes are challenged by significant imbalances on the busiest trade lanes, and by more modest imbalances and limited volumes on other trade lanes. Some of the key observations follow.

### INTERNATIONAL CONTAINERS

- For Southeast and Southwest Wisconsin, the dominant origination location for imported containers is the Canadian West Coast (Ports of Vancouver and Prince Rupert).
- These trade lanes are the most unbalanced pairs, according to survey data. The inbound/outbound split for international traffic between the Canadian West Coast and Southeast Wisconsin is 71,436/3; for Southwest Wisconsin, the split is 22,917/20.
- The lack of any appreciable return volume for containers imported to southern Wisconsin indicates a potential operational mandate that restricts these containers from “matchback” opportunities in Wisconsin. One hypothesis is that the liner services compel the immediate return of empty containers and chassis to container yards in the Chicago metropolitan area.
- The Canadian East Coast is also an important North American arrival point for international containers bound for Southeast Wisconsin, but as with Canadian West Coast arrivals, there are negligible numbers of containers being reloaded and returned for export. The conditions that curtail return traffic from Wisconsin to Canada's West Coast may also be limiting any return traffic to Canada's East Coast.
- With the exception of the Northwest Wisconsin quadrant (the location of CN's Chippewa Falls Terminal), the export lanes with the largest volumes are the U.S. East Coast and the U.S. West Coast.
- The exports to the U.S. East Coast are more numerous than those going through the U.S. West Coast. What is unknown is whether this difference is based on the products being moved, the markets the products are supplying, the comparative pricing of the overall export cost, or some combination of these and other factors.
- The use of the U.S. East Coast by Wisconsin's exporters indicates there is value in extending communication to Norfolk Southern and CSX, as they may discover opportunities to increase the import volumes for Wisconsin customers. Through coordination, “matchback” opportunities may be identified and established, benefitting all parties involved.
- The volume of export traffic to the U.S. West Coast is modest, with traffic concentrated in the state's eastern half. The data does not indicate strong demand for these lanes at present. No other lanes have demand sufficient enough to support development of international container traffic.

## DOMESTIC CONTAINERS

- For each quadrant of the state, the outbound domestic container traffic far outnumbers the inbound domestic container traffic.
- Outbound volumes are relatively strong for Northeast Wisconsin shippers sending product to the U.S. Southwest and U.S. Southeast.
- By contrast, the regions with the greatest “pull” of products from Southeast Wisconsin are the U.S. Northwest and the U.S. Northeast.
- More than 13,000 domestic containers in Southeast Wisconsin have unknown regional destinations.
- None of the state quadrants has any balanced inbound/outbound lane for domestic service.

## DEVELOPMENTS IN INTERMODAL OPERATIONS THAT COULD AFFECT WISCONSIN

The containerized shipping sector is in a constant state of evolution and change. Numerous operators and factors have influenced the sector's development, and will continue to define the intermodal marketplace. Additional factors are emerging that may also shape the future form and availability of intermodal operations in Wisconsin.

Wisconsin's connections to global and national markets are varied, with intermodal freight transportation options for importers and exporters alike. While many shippers are able to arrange door-to-door delivery through a single point of coordination, the process of that container movement involves many different modes and services, each with their own set of opportunities and challenges for shippers.

This section will discuss the current and emerging factors affecting those container movements, and how these factors may affect the availability, efficiency, and/or affordability of intermodal freight service for businesses in Wisconsin.

### INTERNATIONAL MARITIME OPERATIONS

#### *ALLIANCES AND MERGERS*

As noted in an previous section, the liner services for container shipping have witnessed consolidation (and in one large example, elimination) since 2014. Some examples of this include:

- COSCO acquired Orient Overseas Container Lines (OOCL) (2017-18)
- "K" Line, MOL, and NYK Line allied to form a new joint venture, Ocean Network Express (ONE) (2017-18)
- Hapag-Lloyd and United Arab Shipping Company (UASC) combined businesses (2016-17)
- Maersk acquired Hamburg Süd (2016-17)
- CMA CGM acquired Neptune Orient Lines (NOL) and its operating brand, APL (2016)
- COSCO and China Shipping merged (2016)<sup>333</sup>

The consolidation efforts appear to still be underway, with CMA CGM's unsuccessful pursuit of Hapag-Lloyd has led to speculation it may seek merger with or acquisition of Evergreen or ZIM.<sup>334</sup> As of September 20, 2018, Evergreen denied reports of CMA CGM's acquisition efforts.<sup>335</sup> The CEO of Maersk, Soren Skou, stated that he anticipates further consolidation within the coming decade, resulting in five to six major carriers – down from 25 large container companies as recently as 2000.<sup>336</sup>

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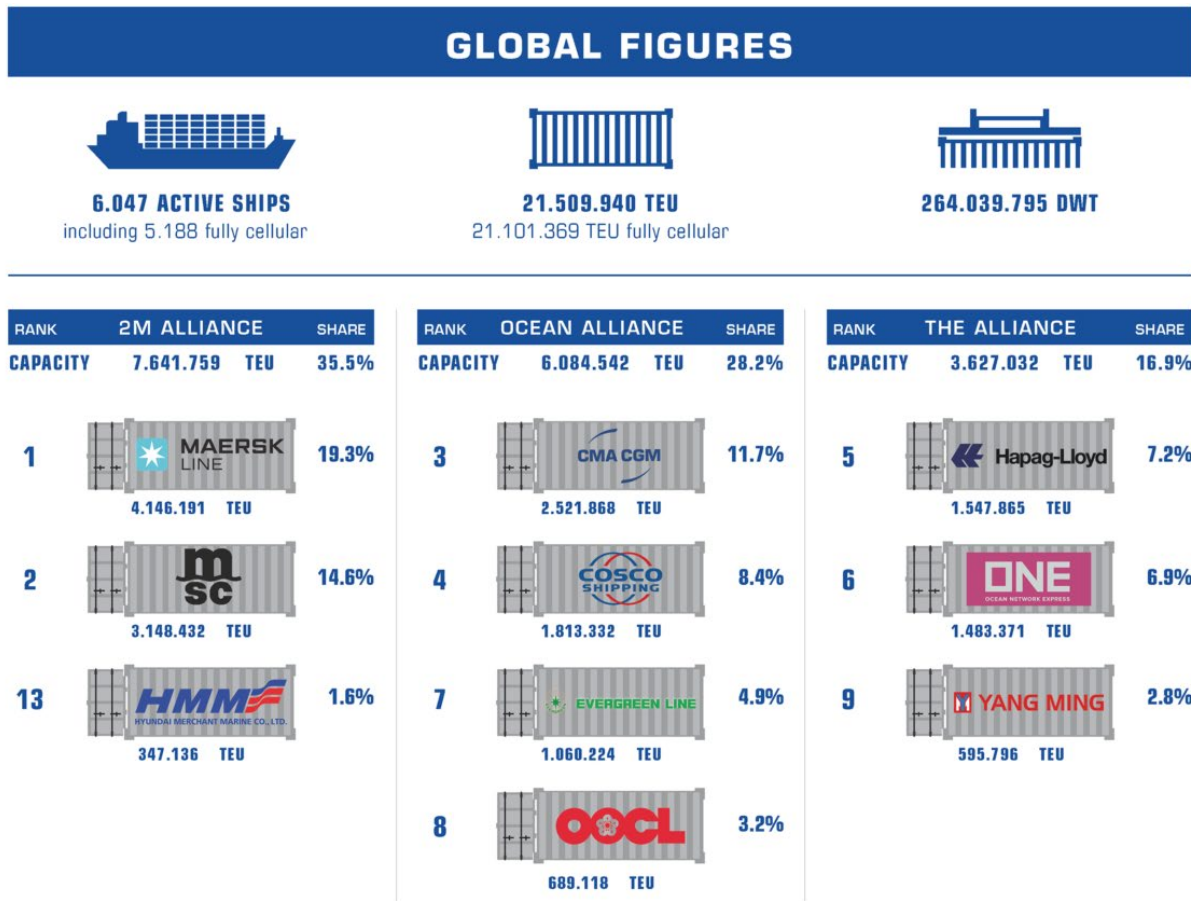
<sup>333</sup> <https://www.joc.com/maritime-news/container-lines/container-carrier-mergers-acquisitions.html>

<sup>334</sup> <https://theloadstar.co.uk/analysis-cma-cgm-looking-opportunities-zim-evergreen/>

<sup>335</sup> <https://www.americanshipper.com/main/fullasd/evergreen-denies-rumor-about-cma-cgm-purchase-72556.aspx>

<sup>336</sup> <https://www.xeneta.com/blog/shipping-alliances>

Graphic 25: Alliances of the Major Container Liner Companies, 2018 (Source: DR Group).



In addition to the mergers and acquisitions, most of the major carriers have formed three large alliances for cooperative movement of containers. The three largest alliances - 2M, the Ocean Alliance, and The Alliance - together comprise more than 80 percent of container vessel capacity.<sup>337</sup> These alliances offer mutual benefits to each other and (potentially) to their customers. Allied companies can share space on vessels with their partner companies, providing additional capacity and services without use of their own vessels. Alliances also allow companies to consolidate when a lane could operate more efficiently with fewer services. This works as an advantage to the liner companies, but could be a disadvantage to BCOs or their agents who seek to book capacity on a service with specific departure dates and/or locations. Shippers may face storage charges or increased drayage costs for the containers they are unable to ship under previous scheduling. Over time, there may be opportunities for improved liner company efficiencies as allied carriers can better analyze, forecast, and plan capacities. Reduced costs may be passed along to customers.<sup>338</sup> Graphic 25 shows these three alliances as they were configured in

<sup>337</sup> <https://www.xeneta.com/blog/how-external-factors-affect-ocean-freight-rates>

<sup>338</sup> <http://www.gocatapult.com/blog/are-ocean-carrier-alliances-beneficial-to-the-industry/>

early 2018.<sup>339</sup> Since then, ZIM, the tenth-largest carrier, announced a “strategic cooperation” with the 2M alliance for trade on Asia-U.S. East Coast service.<sup>340</sup>

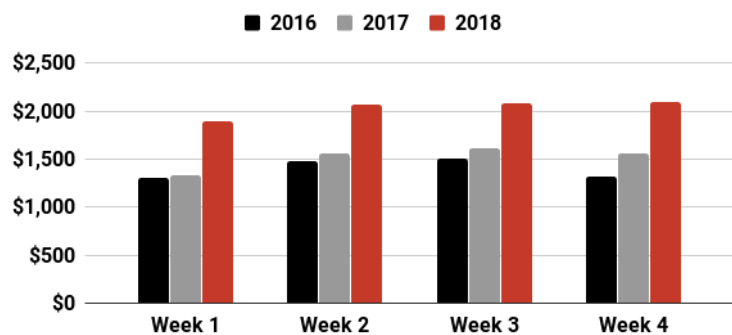
Further evidence of industry collaboration came in November 2018, as Maersk, CMA CGM, Hapag-Lloyd, MSC, and ONE jointly announced creation of an industry association of ocean carriers. The stated purpose of the association is to prepare for the increasing degrees of automated data exchange by developing standardized data exchange and security standards for carriers and customers. These interoperability measures would support free, open-source information technology to increase transparency and efficiency across the sector. There are questions as to whether this association will pass regulatory hurdles; organizers are emphasizing that commercial and operational matters will not be discussed.<sup>341</sup>

### RATES

After several years of falling, ocean rates have risen substantially in 2018. Spot rates (for shipments not covered under long-term contracts) rose to \$2,354 for a 40’ container move between China and the North American West Coast as of September 9, 2018, up from \$1,900 in August. By comparison, in August 2016, that same move cost \$1,300, as shown in Chart 15. Three factors were identified as contributing to the rate spike: higher crude oil costs (a 58 percent increase from August 2016), an earlier peak season for container shipping demand (shifting from August to July), and carriers cutting capacity (by at least 31,300 TEU of capacity between July 2017 and July 2018.<sup>342</sup> West Coast service capacity shrunk by nearly seven percent; East Coast capacity was reduced by 1.6 percent. This created vessel overbooking by as much as ten percent, leading to cargo being “rolled” (delayed until the next available vessel).

**Chart 15: Year-to-Year China-North America West Coast August Container Rates, 2016-2018** (Sources: Freightos Baltic Index, Supply Chain Dive).

#### Peak season is getting more expensive for shippers



China - North America West Coast freight rates per week in August

Other factors involved in spot rate spikes included importers scrambling to beat tariff increases and Asian typhoons. BCOs and their drayage companies noted that delivery scheduling was complicated by trans-Pacific reliability dropping to as low as 35 percent, and by related rail delays and chassis dislocations. By contrast to the spot rates, long-term contract rates negotiated in mid-2018 were noted as falling by about \$100 per 40’ container from 2017 rates, to a range of \$1,100 to \$1,200 for Asia-West

<sup>339</sup> <https://www.vandongederoo.com/doing-things-more-efficiently/>

<sup>340</sup> <https://www.supplychaindive.com/news/ZIM-slot-sharing-2M-Maersk-MSC/528178/>

<sup>341</sup> <https://www.supplychaindive.com/news/largest-ocean-carriers-confirm-industry-association/542343/>

<sup>342</sup> <https://www.supplychaindive.com/news/industry-pulse-August-rates-rise-factors/531957/>



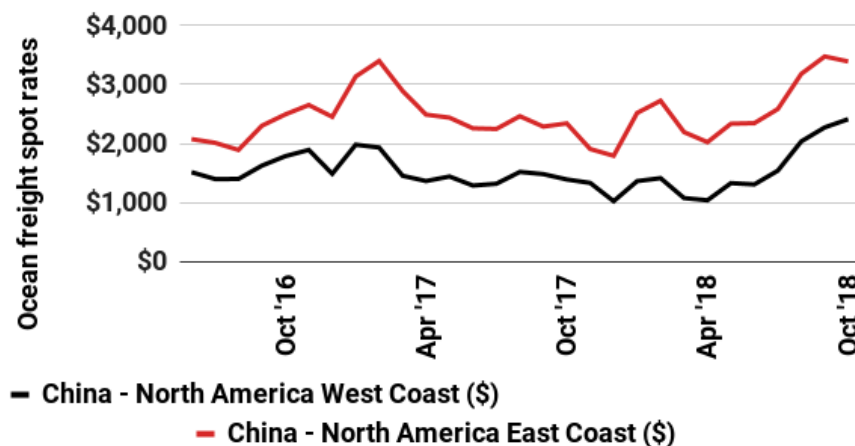
Coast services and \$2,100 to \$2,200 for Asia-East Coast services. Some shippers who have guaranteed rates for a set volume are willingly paying the spot rates for the additional container volumes.<sup>343</sup>

As stated earlier (and demonstrated with rate tables), the costs of maritime container use for importers to North America is substantially higher than for exporters. The differential is driven by supply and demand (as the U.S. market imports more consumer products than it exports). This differential has been a benefit to bulk exporters in the agricultural products and recyclable waste sectors, who have built markets in China and other Asian nations, retaining containers in the same trade lane. Tariffs and other trade challenges have already disrupted these “matchback” operations. Should North American consumer demand for Asian imports decline, the volume of available containers available for return to Asia will also decline, and the cost advantage for exporters will also be reduced.

Spot rates continued to climb entering autumn; West Coast spot rates rose to an average of \$2,413 per TEU in October. The spot rates to the East Coast also saw increases, from \$2,342 in October 2017 to \$3,393 in October 2018, a 45 percent increase.<sup>344</sup> Chart 16 shows the spot container rates for trade lanes between China and the North American West Coast and North American East Coast.

Rate increases also follow a cycle of monthly adjustments, general rate increases (GRIs). GRIs represent an average increase in base shipping rates, driven by operating costs such as fuel and staffing, and by capital costs for equipment and technology.<sup>345</sup> For U.S.-bound shipments, carriers are required to announce their increases 30 days in advance, but may lower rates at any time. Rates also may be subjected to a Peak Season Surcharge (PSS), reflecting periods with high demand and/or reduced availability, such as in the late summer/early fall (ahead of the holiday season), or before Chinese New Year (late January/early February).<sup>346</sup> Larger shippers, who have the ability to negotiate with liner services, typically negotiate longer-term contracts that exclude

**Chart 16:** Spot Container Rates, China to North American West Coast and East Coast, 2016-2018 (Source: Supply Chain Dive/Freightos Baltic Index).



<sup>343</sup> [https://www.joc.com/maritime-news/trade-lanes/trans-pacific/space-scramble-us-imports-asia-intensifies\\_20180817.html](https://www.joc.com/maritime-news/trade-lanes/trans-pacific/space-scramble-us-imports-asia-intensifies_20180817.html)

<sup>344</sup> <https://www.supplychaindive.com/news/industry-pulse-ocean-october-2018/540842/>

<sup>345</sup> <https://www.freightquote.com/blog/what-is-general-rate-increase-in-shipping-and-how-online-service-providers-can-assist>

<sup>346</sup> <https://www.flexport.com/help/21-gri-pss-freight-fees>

GRI. <sup>347</sup> The cost and capacity challenges for liner services was further evidenced in GRIs for September of 2018 of between \$900 and \$1,100 per 40' container. <sup>348</sup>

#### *FUEL REGULATIONS AND COSTS*

For maritime vessels, fuel is one of the largest operating expenses. Estimates are that the maritime sector's annual fuel bill is \$100 billion per year. The cost of fuel is poised to rise further – perhaps as much as 25 percent, as regulations limiting sulfur content of fuel are fully implemented. <sup>349</sup> These regulations, agreed to under the United Nations' International Maritime Organization (IMO), require a reduction from 3.5 percent to 0.5 percent in sulfur content for maritime fuel by 2020. Liner services have the choice of installing “scrubbers” to reduce emissions, thereby allowing use of low-sulfur fuel oil; or switching fuel to ultra-low sulfur diesel (ULSD) fuel. If the maritime sector opts to not pay the costs for scrubbers, the demand for ULSD will spike, raising prices and price volatility for the trucking sector. <sup>350</sup> As of September 2018, Japan's K-Line (part of ONE) planned to use scrubbers on some vessels, use low sulfur fuel on others, and convert other to operate on liquefied natural gas (LNG). Meanwhile, MSC contracted to fit 29 vessels with scrubbers. <sup>351</sup> Maersk announced plans to install scrubbers on 383 container vessels. <sup>352</sup> The shipping industry consumes about five million barrels per day of fuel, roughly five percent of the globe's overall daily production. Sources of bunker fuel include the Canadian Tar Sands; the value of the petroleum extracted fell by almost half between May and September 2018, potentially indicating a reduction in long-term demand. <sup>353</sup>

To help cover the costs of the lower emissions, many companies have announced and/or implemented surcharges for their customers. Maersk's surcharge will be based on factors such as fuel costs and backhaul cargo activity, and could range from \$90 to \$1,050 per 40' container. The company calculates that the added costs of compliance would reach \$2 billion in fuel costs alone. At least one shipping association, based in Great Britain, has raised objections to the surcharges. <sup>354</sup> Another source cites a lower range of surcharges, from \$55 to \$120 per 40' container. <sup>355</sup> Hapag-Lloyd, citing anticipated additional fuel expenses of \$1 billion, published a formula for surcharges it will begin in 2019. Depending on trade lane and fuel costs, these expenses range from \$117 to \$321 per container for U.S. trade lanes. <sup>356</sup>

In November 2018, Hapag-Lloyd announced it would be seeking to fit scrubbers on its vessels, but that a shortage of qualified engineers would limit installations to a total of only 500 per year across all liner services, or about 1,500 (out of a global fleet of 60,000 vessels) by the January 1, 2020 effective date of the IMO regulation. By contrast, the IMO had estimated 4,000 vessels would receive scrubbers. Scrubber

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<sup>347</sup> <https://www.xeneta.com/blog/how-external-factors-affect-ocean-freight-rates>

<sup>348</sup> [https://www.joc.com/maritime-news/trade-lanes/trans-pacific/space-scramble-us-imports-asia-intensifies\\_20180817.html](https://www.joc.com/maritime-news/trade-lanes/trans-pacific/space-scramble-us-imports-asia-intensifies_20180817.html)

<sup>349</sup> <https://www.reuters.com/article/us-shipping-fuel-costs/shipping-fuel-costs-to-spike-25-percent-in-2020-on-sulfuric-cap-woodmac-idUSKBN1HI1AT>

<sup>350</sup> <https://www.freightwaves.com/news/monthly-market-update-florence-impacts-macroeconomics-imo-2020>

<sup>351</sup> <https://www.freightwaves.com/news/k-line-msc-2020>

<sup>352</sup> <https://www.freightwaves.com/news/imo2020-report-scrubber-use>

<sup>353</sup> <https://www.freightwaves.com/news/looming-canadian-freight-recession>

<sup>354</sup> <https://www.freightwaves.com/news/bifa-maersk-sulfur-surcharge>

<sup>355</sup> <https://theloadstar.co.uk/drewry-wades-wave-anger-builds-emergency-bunker-surcharges/>

<sup>356</sup> <https://www.hapag-lloyd.com/en/press/releases/2018/10/hapag-lloyd-establishes-marine-fuel-recovery--mfr--mechanism.html>

cost (estimated at \$10 million for the largest vessels) is far less than the cost of conversion to liquefied natural gas (LNG) at \$25 million. MSC states it will install scrubbers on 120 of its 500 vessels; Evergreen on 70 of its 200 vessels. Hyundai Merchant Marine states it is ordering scrubbers on 20 newly-built ultra-large vessels. The other cost option, conversion to use of ULSD, would add \$15 billion to the annual fuel costs of ocean carriers, or about \$250 per ton of fuel.<sup>357</sup>

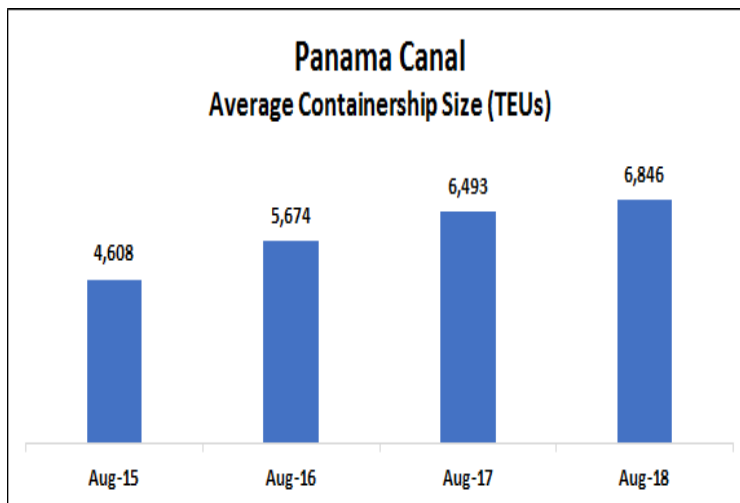
Liner services have also been conserving fuel (and thereby reducing costs) for at least a decade by reducing vessel speed from 24 knots to 21 knots or less (thereby lengthening transit times). The practice, labeled as slow steaming, reduces costs and emissions. The practice has become more normalized in recent years as other market dynamics have pressured liner services on costs; newer mega-ships are specifically designed to operate at slower speeds. Some services offer faster transit times by retaining higher speeds, with freight rates as the strongest of six factors determining the optimal speed for operations.<sup>358</sup> Global fuel price fluctuations are also a contributing factor in compelling slow steaming; Hapag-Lloyd reported a 23 percent increase in fuel costs for the first half of 2018.<sup>359</sup>

The IMO 2020 mandate is also expected to remove older and less-efficient vessels from liner services, especially those where the cost of scrubber installation or conversion to ULSD exceeds the value of the revenue such vessels generate. The economics of these decisions hinges on the ability of the liner services to pass costs along to BCOs and shippers.<sup>360</sup>

#### IMPORT/EXPORT LANE CHANGES

The opening of the expanded Panama Canal in 2016 has encouraged liner companies to use larger vessels for trade between Asia and the North American East Coast. At present, the largest vessels using the Panama Canal are each greater than 14,000 TEU. The average vessel size in August of 2018 was more than 6,800 TEU, an increase of almost 50 percent over three years. These changes have compelled infrastructure investments at port facilities along the East Coast, which will be discussed at length in a later section. Chart 17 documents the growth of the average container vessel size transiting the Panama Canal.<sup>361</sup>

**Chart 17:** Panama Canal Average Container Ship Size (TEU), 2015-2018  
(Source: American Shipper/BlueWater Reporting).



<sup>357</sup> <https://theloadstar.co.uk/hapag-lloyd-jumps-scrubber-band-wagon-sell/>

<sup>358</sup> <http://www.seatrade-maritime.com/news/americas/the-economics-of-slow-steaming.html>

<sup>359</sup> <https://www.freightwaves.com/news/hapag-lloyd-first-half-results>

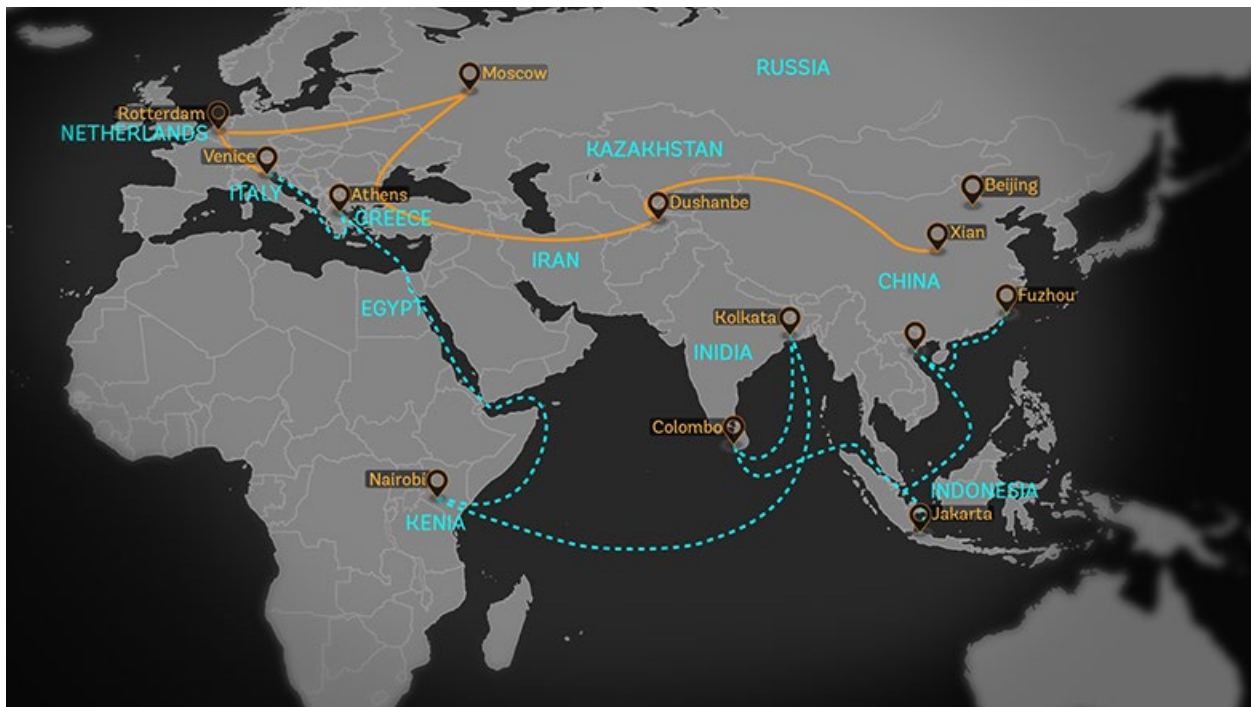
<sup>360</sup> <https://theloadstar.co.uk/2020-low-sulphur-regulations-saviour-container-shipping/>

<sup>361</sup> <https://www.americanshipper.com/news/?autonumber=72518&source=redirected-from-old-site-link>

From the opening of the expanded canal through early 2018, approximately 1,900 Neo-Panamax container vessels passed through the waterway. In March of 2018, the Canal Authority added an additional reservation slot for Neo-Panamax vessels, allowing eight of these larger vessels per day to pass through the Canal.<sup>362</sup>

A 2016 article in Crain’s Chicago Business identified concerns over the impacts of the Panama Canal Expansion, including taking away some of the freight moved into and through the Chicago region by BNSF and UP. The article also noted that CN, which has port access in New Orleans and Mobile, was exploring how to bring business through those ports, to Memphis and Chicago. Others questioned if the additional transit time would be accepted by BCOs. The most likely catalyst for diverting more traffic from the U.S. West Coast was identified as labor unrest and slowdowns.<sup>363</sup>

*Graphic 26: Belt and Road Initiative (Source: World Bank).*



One other major change in trade routes may be emerging with the Chinese Belt and Road Initiative. The concept is to improve regional cooperation and connections between China and 65 other nations across Asia, Europe, and Africa; combined, the region includes 62 percent of the globe’s population, 30 percent of GDP, and 75 percent of energy reserves. As illustrated in Graphic 26, maritime lanes would focus on Indonesia, India, Kenya, Egypt, Greece, and Italy; land connections (labeled the Silk Road Economic Belt) would cover Kazakhstan, Iran, Turkey, Russia, and all of Europe. Infrastructure (in the form of rail connections between China and Europe) is one area of focus; however, changes in importation procedures across the nations is also expected to be a critical subject for reform. Over time, the stronger

<sup>362</sup> <https://www.porttechnology.org/news/panama-canal-breaks-monthly-tonnage-record>

<sup>363</sup> <https://www.chicagobusiness.com/article/20160624/NEWS10/160629897/panama-canal-expansion-could-shift-some-freight-flow-away-from-chicago>

ties between China and the other nations will have implications for export opportunities from North America as trade costs within the Belt and Road region are potentially reduced, opening different supply chains for China and the other 65 nations.<sup>364</sup>

#### *NEARSHORING*

With the 2018 implementation of tariffs against Chinese-manufactured products, manufacturers in China and elsewhere are considering or implementing movement of production from China to Southeast Asia, nations, including Vietnam and Myanmar. The diversification of manufacturing locations had already been under consideration, as rising wages had compelled businesses to seek other options. Electronics, clothing, and toys were identified as product lines under consideration for relocation. Given the need to rebuild supply chains to and from the new locations, however, the potential for relocation is seen as a medium- to long-term option. Existing Chinese manufacturers also benefit from having long-standing experience with U.S. retailers.<sup>365</sup> Companies from South Korea, Japan, and Taiwan have already invested in Vietnam. Of note, from January to August 2018, Vietnam received \$11.25 billion in foreign direct investment, a 9.2 percent increase from the same period a year earlier.<sup>366</sup> As Vietnam is more geographically-distant from the U.S. market than China, the cost of shipping goods (and the transit time for those shipments) will generally be higher than for those currently shipped from China.

Factors interacting with nearshoring are the investments made by the governments of China and South Korea in liner services; specifically, Hyundai Merchant Marine (South Korea) and OOCL (China). The collapse and bankruptcy of Hanjin had profound impacts on the Korean manufacturing sector, which lost critical export capacity. Hyundai has been subsidized in growing its capacity to one million TEU. Industry publication FreightWaves observed that these liner services will act as “loss leaders” for the national economies, allowing cheaper container rates and thereby making goods from those countries cheaper on global markets. This arrangement threatens other liner services who lack substantial government support.<sup>367</sup>

#### *RISK MANAGEMENT*

In the wake of concerns over terrorism, trafficking, and other illegal operations, the intermodal sector has taken many steps to improve security and safety for its operations. Among these was the Safety of Life at Sea (SOLAS) rule, brought into effect in 2016, that required verification of container weights prior to their loading.

A fire on the 15,000-TEU Maersk Honam in March 2018 killed five crew members, and spurred investigations into the improper declaration, labeling, and stowage of hazardous cargo. In 2017, four percent of 31,000 containers inspected by the U.S. non-profit National Cargo Bureau were discovered to have improperly secured hazardous materials in containers. The Bureau also found 20 percent of vessel stow plans it inspected had errors covering dangerous goods and/or compliance. Maersk’s internal investigation led to that company instituting new loading and verification rules; however, to date, there

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<sup>364</sup> <https://www.worldbank.org/en/topic/regional-integration/brief/belt-and-road-initiative>

<sup>365</sup> <https://www.ft.com/content/da53939c-8bdb-11e8-bf9e-8771d5404543>

<sup>366</sup> <https://www.cnn.com/2018/09/11/vietnam-economy-shines-despite-southeast-asia-struggles-with-trade.html>

<sup>367</sup> <https://www.freightwaves.com/news/oo-cl-plans-rapid-growth-maersk-slashes-guidance>



have been no changes to SOLAS. Observers note that shippers will still incorrectly declare the cargoes; other vessel companies are exploring options for better verification of contents.<sup>368</sup>

## EQUIPMENT

### *CHANGES IN VESSEL AND SECTOR CAPACITY*

As noted in an earlier section, vessel sizes – both average and maximum – have grown substantially since 1995. The capacity of ultra-large container vessels (ULCVs) currently ranges from 14,000 to 21,000 TEU. These vessels are adding to the overall global capacity for container trade; more than 200 ULCVs are anticipated to be in service by the end of 2018. The advantages of ULCVs comes through fuel costs, operational costs, and capital costs. Larger capacity vessels allow more freight-laden containers to be moved at a lower cost per container, thereby generating better return for the operators.<sup>369</sup>

These vessels are generating impacts beyond trade lanes and port facilities. The ULCVs are most frequently used on the Asia-North Europe trade lanes. As more of these vessels are deployed, vessels in the 10,000 to 14,000 TEU range are being deployed or redeployed to serve lanes that include North America.<sup>370</sup> Not all North American ports can currently handle the larger vessels; thus, the ports that can become the destination ports of the global liner companies that utilize the larger vessels.

*Image 30: Bridge View from Container Vessel (Source: Journal of Commerce/Shutterstock).*



Among the challenges of larger vessels is the management of large container volumes being dropped off at once. Crane positioning is also a challenge, as ports require more cranes per vessel, each with taller heights and longer reaches. On-ground management is also more challenging, with limited dockside capacity for absorbing more container volume, and limited on-site and off-site drayage capacity. Container dwell times can increase at these congested coastal ports.<sup>371</sup>

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<sup>368</sup> [https://www.joc.com/regulation-policy/transportation-regulations/international-transportation-regulations/horrific-maersk-honam-fire-killed-five-safety-wake-call-industry\\_20180716.html](https://www.joc.com/regulation-policy/transportation-regulations/international-transportation-regulations/horrific-maersk-honam-fire-killed-five-safety-wake-call-industry_20180716.html)

<sup>369</sup> <https://www.businesswire.com/news/home/20170727006270/en/Global-Dry-Container-Fleet-Market-2017-2021-Top>

<sup>370</sup> <https://worldmaritimeneews.com/archives/229511/alphaliner-no-room-for-overcapacity-fears-from-new-ulcvs/>

<sup>371</sup> [https://www.joc.com/port-news/us-ports/us-transloading-growth-reshaping-cargo-routing\\_20170303.html](https://www.joc.com/port-news/us-ports/us-transloading-growth-reshaping-cargo-routing_20170303.html)

Other factors that determine the capacity of maritime container shipping are the construction and scrappage rates of the vessels themselves, and the capacities of the vessels within each of those two categories. Vessel orders increased substantially between 2010 and 2013, but resulted in overcapacity, with up to six percent of vessels idle. By 2016, the carrying costs of that excess capacity led to the scrapping of more than 200 container ships that year alone, removing 700,000 TEU of volume (on top of 185,000 TEU in the vessels scrapped in 2015). Many of these were Old Panamax vessels in the range of 4,000 TEU.<sup>372</sup>

As of early 2018, more than 2.1 million TEU in new vessel capacity was scheduled to be added to the fleets for the year. Evergreen (508,000 TEU), COSCO (444,000 TEU), Mediterranean/MSK (332,000) and CMA CGM (305,000) were the liner services with the greatest vessel capacities on order. Within these orders are 108 ULCVs, which represent an effective doubling in the number of ULCVs in service, to over 200 by the end of 2018. The Ocean Alliance comprises most of the ordered vessel capacity; those companies alone comprise 60 percent of the increase in ULCVs. Deployment of those vessels is expected to have significant changes to the Ocean Alliance network, including freight rates.<sup>373</sup>

Through much of 2018, scrappage rates were minimal. But in November, 23 vessels were sold for scrap, raising the total number of demolished vessels for the year to 52, with 94,000 TEU of capacity. For the comparable period of 2016, 141 vessels with 398,500 TEU of capacity had been scrapped. As noted earlier, the IMO 2020 fuel mandate is likely to compel an increase in scrappage of vessels where economics do not justify either scrubbers or use of higher-cost fuel.<sup>374</sup>

At coastal ports in the U.S., the trend for liner services has been to reduce the number of services (scheduled vessel routings) and number of deployed vessels, but increasing the average vessel capacity. At the start of 2017, only three ports – Los Angeles, Long Beach, and Oakland – had average vessel sizes in excess of 8,000 TEU. After alliance changes took effect in April, four more ports – New York-New Jersey, Savannah, Seattle, and Norfolk – saw their average vessel size increase to more than 8,000 TEU.<sup>375</sup>

#### *AVAILABILITY OF MARITIME CONTAINERS*

Global analysts track the overall number of containers and the production rate of new containers, mostly supplied by manufacturing facilities in China. The anticipated production for 2018 is 3.5 million TEU, up slightly from previous years. Purchases by leasing companies have eclipsed purchases by maritime services in recent years; those leasing companies have also purchased used containers from the liner services. The rate at which older containers are removed from the overall maritime fleet will affect the overall availability of containers globally.<sup>376</sup>

Most container fleets are governed by the liner companies that own the vast majority of containers. These companies manage the availability of empty containers by coordinating container yard storage, by setting terms for the amount of time a BCO has to unload the container and return it empty or face

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<sup>372</sup> <https://www.agcs.allianz.com/insights/white-papers-and-case-studies/safety-and-shipping-review-2017/>

<sup>373</sup> <https://www.xeneta.com/blog/how-external-factors-affect-ocean-freight-rates>

<sup>374</sup> <https://theloadstar.co.uk/containership-scrapping-gathers-pace-ahead-imo-2020/>

<sup>375</sup> [https://www.logisticsmgmt.com/article/top\\_30\\_u.s.\\_ports\\_2017\\_digitization\\_is\\_driving\\_change](https://www.logisticsmgmt.com/article/top_30_u.s._ports_2017_digitization_is_driving_change)

<sup>376</sup> <http://www.globaltrademag.com/global-logistics/heading-toward-container-shortage>

demurrage charges, and by dictating which overseas ports an empty container can be delivered to. Thus, even when containers appear to be available for export, the terms of use that liner companies establish can be prohibitive for exporters, especially in locations not near coastal ports or major inland terminals such as Chicago.<sup>377</sup>

Beginning in 2012, the U.S. Department of Agriculture began publishing an Ocean Shipping Container Availability Report (OSCAR), using data provided by carrier lines that were party to a trade agreement, the Westbound Transpacific Stabilization Agreement (WTSA). The service gave a snapshot of equipment availability at 18 inland intermodal load locations (including Chicago and Minneapolis), declaring surplus or deficit totals and expected container availability for two weeks into the future.<sup>378</sup> The data included five container configurations: 20' and 40' dry containers, 40' high-cube containers, and 20' and 40' refrigerated containers. OSCAR was suspended at the end of 2017, following dissolution of the WTSA, combined with the ONE affiliation that compromised the confidentiality of data reported due to a reduced number of reporting liner services.<sup>379</sup> This loss of information has reduced the ability of Wisconsin shippers and researchers to track and monitor the availability (or shortage) of containers for goods export.

## SECTION SUMMARY: INTERNATIONAL MARITIME

Wisconsin's importers and exporters have multiple liner companies to choose for their needs. Alliances have helped smooth out operations by allowing allied liner companies to position containers on each other's vessels, shifting spikes to vessels with available capacity. Liner services may continue to merge and consolidate operations in ways that affect the ability of Wisconsin importers and exporters to have shipments performed in a timely and cost-effective means. After several years of low rates, shippers are facing higher rates, especially for spot shipments. Wisconsin's exporters currently benefit from reduced costs for containerized export to Asian ports, but that advantage could change with changes in trade policies and/or consumer demand.

The International Maritime Organization's rule to reduce sulfur emissions, which takes effect in 2020, will require vessel operators to use more expensive fuels or install pollution-capturing systems. These efforts are expected to add up to \$15 billion or more per year in operational costs to liner service companies. Many companies are already passing along these costs to shippers through surcharges.

The 2016 opening of the expanded Panama Canal has already altered trade flows to North America, as East Coast and Gulf Coast ports receive more large vessels and containers from Asia. This shift could provide Wisconsin's importers and exporters additional cost-competitive options for liner services and rail transportation. The Chinese Belt and Road Initiative also has the potential to reshape supply chains on a global scale. New product sources and trade lanes are being established as restrictions on exports of recyclables and changes to tariffs and trade agreements take effect.

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<sup>377</sup> <https://www.csiu.co/soc-shipper-owned-containers-for-forwarders-and-nvoc>

<sup>378</sup> <https://www.recyclingtoday.com/article/usda-tracks-ocean-shipping-container-availability/>

<sup>379</sup> <https://www.ams.usda.gov/services/transportation-analysis/oscar>

Vessel security and safety at sea is becoming a greater concern, as threats from improperly-labeled cargoes increases risks.

Average and maximum vessel sizes are becoming larger, as vessels up to 14,000 TEU can pass through the Panama Canal. Liner services are ordering more capacity than they are scrapping, slowly increasing overall maritime capacity at rates that match or slightly trail the growth in demand. Maritime containers are made available by liner services or by leasing companies. Container availability is limited by the terms of use and return that the container owner establishes. For Wisconsin shippers, terms of use often require inefficient drayage of empty containers to and from the Chicago area's terminals and container yards.

## DOMESTIC MARITIME INTERMODAL SERVICE OPERATIONS & EQUIPMENT

The U.S. DOT's Maritime Administration (MARAD) has established America's Marine Highway (AMH) Program to incorporate the inland waterways of the Great Lakes, inland rivers, coastal routes, and other maritime corridors into the greater U.S.

transportation system. The program identifies corridors where marine transportation is efficient, effective, and sustainable. As of 2018, the designated Marine Highway system includes 25 all-water routes that could serve to relieve congestion and other concerns on Interstate Highways and related roads. Two of these routes cover Wisconsin: M-35/M-55 (the Upper and Lower Mississippi River corridors, plus the Illinois River

Graphic 27: MARAD Marine Highway Routes (Source: MARAD).



corridor) and M-90 (covering the entire Great Lakes and St. Lawrence Seaway System).<sup>380</sup> The M-55 and M-35 Marine Highway Corridors were designated through an application of multiple ports, associations, and economic development groups (including the Port of Milwaukee). The goal of this designation is a container-on-barge (COB) service between New Orleans and Chicago, with scheduled stops in Memphis and St. Louis and subsequent routes to and from additional ports.

<sup>380</sup> <https://www.marad.dot.gov/ships-and-shipping/dot-maritime-administration-americas-marine-highway-program/>



The second designation, M-90, was submitted by the Port of Milwaukee for a container vessel service, operated by Eco Ships, across Lake Michigan to the Port of Muskegon, Michigan. Containers would be transported via repurposed vessels previously used for supplying offshore oil drilling platforms. Cargos could also include commercial trucks, trailers, and bulk items.<sup>381</sup>

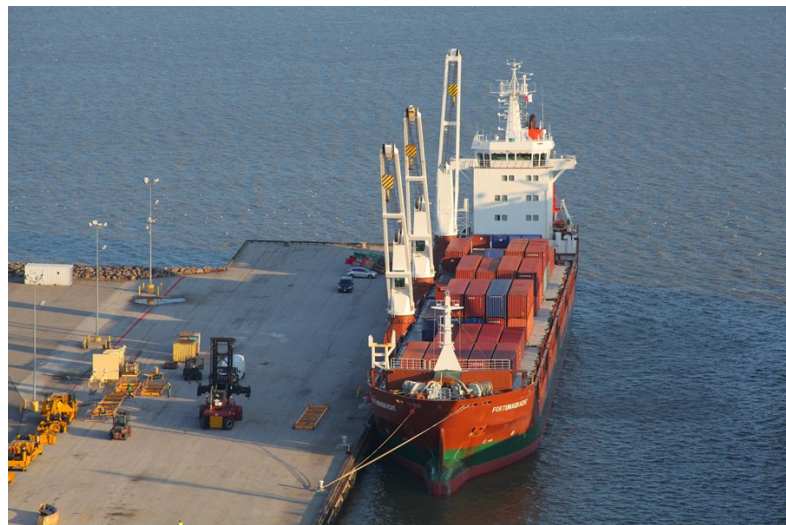
In August 2018, U.S. DOT Secretary Chao announced \$4.8 million in grants towards Marine Highway projects. The largest of these went to the Ports of Baton Rouge and New Orleans (\$2.5 million); that project is discussed on page 143. Other recipients included Davisville, R.I. (\$855,000 for a short-sea container-on-barge service also servicing Brooklyn, N.Y. and Newark, N.J.); the Port of Virginia (\$456,000 for service between Hampton Roads and Richmond); New York City (\$298,000 for studying the capacity of other locations in the Northeastern U.S. to accept container-on-barge service and reduce truck drayage congestion at the New York-New Jersey Terminal); and Paducah Riverport Authority (\$252,000 for an 18-month demonstration of container-on-barge services, including purchase of shore-side container handling equipment).<sup>382</sup>

The National Center for Freight and Infrastructure Research and Education (CFIRE) at the University of Wisconsin–Madison has examined the potential advantages of using Wisconsin’s ports for short-sea operations, in a report, “[Leveraging our Comparative Advantage, Phase II: Identification and Development of Wisconsin Port Market Scenarios.](#)” The report found that in some cases, short-sea shipping of containers can be cost-competitive with trucking, can avoid highway congestion, and can reduce emissions on a per ton-mile basis.<sup>383</sup>

#### GREAT LAKES

A 2018 study published by the Great Lakes Seaway Partnership, *Economic Impacts of Maritime Shipping in the Great Lakes-St. Lawrence Region*, comprehensively examined trade throughout the basin. It found that containerized goods (primarily handled through Montreal) accounted for 13.8 million metric tons of goods. The value of these goods was over \$47.5 billion (U.S.), by far the most valuable category for trade in the basin. The container trade also directly supported 2,673 Canadian jobs.<sup>384</sup>

*Image 31: Cleveland-Europe Express (CEE) Vessel (Source: Port of Cleveland).*



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<sup>381</sup> <https://www.marad.dot.gov/wp-content/uploads/pdf/Marine-Highway-Project-Description-Pages-3.pdf>

<sup>382</sup> <https://aashtojournal.org/2018/08/10/marad-awards-4-8-million-marine-highway-grants/>

<sup>383</sup> [http://www.wistrans.org/cfire/2017/01/cfire-research-is-helping-shape-marine-transportation-planning-and-economic-development-across-the-state/?\\_sm\\_au=iVVNQF52tnRQt5kP](http://www.wistrans.org/cfire/2017/01/cfire-research-is-helping-shape-marine-transportation-planning-and-economic-development-across-the-state/?_sm_au=iVVNQF52tnRQt5kP)

<sup>384</sup> <http://greatlakesseaway.org/downloads/2018-glsls-study-en-hr.pdf>



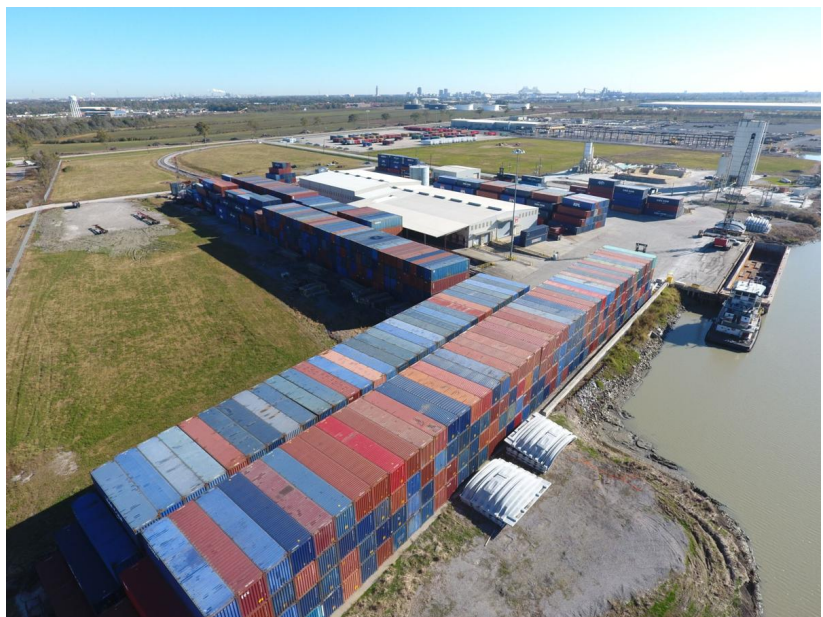
Currently, limited container deliveries exist in both watersheds. Beginning in 2014, the Port of Cleveland signed an agreement with the Amsterdam-based Spliethoff Group for a three-year container service between Antwerp, Belgium and Cleveland, dubbed the Cleveland-Europe Express (CEE). This service is the only containerized cargo operation in the Great Lakes Basin. Subsidies of \$850,000 per month were granted by the Cleveland Port Authority in the first year; the total subsidy fell to \$1.6 million for the 2016 season. Service began with one vessel per month, rising to two to four vessels per month by the end of 2017. Container volumes were at 2,500 to 3,000 TEU annually; the Port Authority is aimed to grow that volume to 15,000 TEU. Imports were noted as being more abundant than exports; competition from Atlantic coast ports at Baltimore and Newport News was noted for limiting the growth of this service.<sup>385</sup>

Literature from Spliethoff noted a 15-day transit time, with service to Valleyfield (Montreal) as well.<sup>386</sup> When the St. Lawrence Seaway is closed, cargo movement is via East Coast ports.<sup>387</sup>

### INLAND RIVERS

In the Lower Mississippi, the Ports of New Orleans, Baton Rouge, and Memphis have collaborated with shipper Seacor AMH and producers of polyethylene, polypropylene, and other resins on exports. The availability of cheap natural gas has contributed to the market; exports are expected to double to more than 1 million TEU annually over the next few years. New Orleans is noted for a lack of container availability; loaded exports outnumber imports by a 3:1 ratio. Seacor AMH loads empty containers in Memphis, where they are available, and offloads them in Baton Rouge. From there, they are drayed to resin plants, loaded, and returned to Baton Rouge for loading on barges to New Orleans for export to markets in Asia and northern Europe. A second cycle of container collection and delivers is planned to serve export markets in South America. Barge capacity is 48 FEU, or 36 loaded boxes.<sup>388</sup>

*Image 32: Port of Greater Baton Rouge (Source: Port of Greater Baton Rouge).*



This service has been facilitated by a U.S. DOT grant to the two Louisiana Ports. In Baton Rouge, the grant was slated for container lifting equipment that will expedite loading and unloading of containers

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<sup>385</sup> <http://www.crainscleveland.com/article/20180126/news/150011/port-keeps-pulling-its-weight>

<sup>386</sup> [https://www.spliethoff.com/media/1766/spliethoff\\_leaflet\\_cee-way\\_v02.pdf](https://www.spliethoff.com/media/1766/spliethoff_leaflet_cee-way_v02.pdf)

<sup>387</sup> <http://www.portofcleveland.com/maritime-logistics/cleveland-europe-express/>

<sup>388</sup> [https://www.joc.com/port-news/us-ports/port-new-orleans/mississippi-river-container-barge-service-set-expand\\_20171219.html](https://www.joc.com/port-news/us-ports/port-new-orleans/mississippi-river-container-barge-service-set-expand_20171219.html)

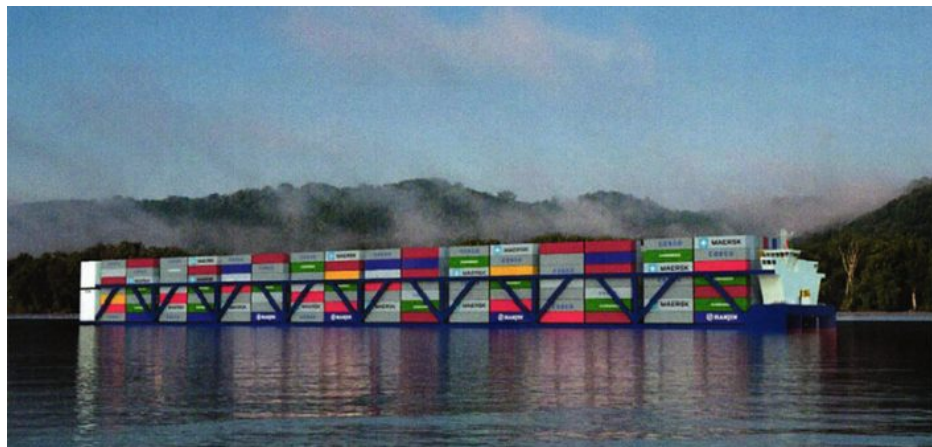
from barges; the handling capacity is expected to grow four-fold; equipment in New Orleans allowed inland container traffic to grow from 4,000 containers to 15,000.<sup>389</sup> Baton Rouge-area producers include ExxonMobil, Dow Chemical, and Shintech; on average, 200 containers per week are loaded for export. One article noted that container-on-barge service through the Louisiana ports was offered, on a limited basis, prior to Hurricane Katrina.<sup>390</sup>

At least one company is making efforts to establish container service further up the Mississippi. American Patriot Holdings, under subsidiary American Patriot Container Transport (APCT) has proposed a hub-and-spoke system with container-on-vessel (COV) transportation, based in Plaquemines, Louisiana. At Plaquemines, containers from Asia, sent via the Panama Canal, would be off-loaded to trains, or to barges for waterway transportation to ports throughout mid-America, as far north as St. Louis. Once emptied, the containers would be loaded with exports for the return voyage; agricultural exports are envisioned as the most abundant export opportunity. The APCT model would use a different vessel design than the limited container-on-barge (COB) services currently being tested. The largest vessel design could carry 2,500 containers at speeds up to 13 miles per hour, allowing a round-trip between Plaquemines and St. Louis in 10 days- less than half the 24-day round trip for COB. APCT claims this new trade lane would save shippers between 30 and 40 percent over other intermodal alternatives.<sup>391</sup>

The lock-and-dam system for the Upper Mississippi, which begins at Granite City, Illinois (across from St. Louis),<sup>392</sup> would preclude the larger vessels from directly servicing locations in Wisconsin; however, transloading to conventional barges at St. Louis would theoretically allow an

all-waterway shipping option. Further, APCT plans smaller-size vessels (592'/1,824 TEU and 772'/2,392 TEU) using an "exoskeleton" structure to be able to fit through the locks on the Mississippi and Illinois, extending the operating reach of this transportation model.<sup>393</sup>

*Image 33: American Patriot Container Transport Vessel Proposal (Source: APH).*



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<sup>389</sup> <http://www.thefmz.com/infrastructure-bill-push-container-barge/>

<sup>390</sup> [https://www.theadvocate.com/baton\\_rouge/news/business/article\\_217efeda-da9f-11e7-bedf-379d28e759c0.html](https://www.theadvocate.com/baton_rouge/news/business/article_217efeda-da9f-11e7-bedf-379d28e759c0.html)

<sup>391</sup> <https://www.americanshipper.com/main/fullasd/mississippi-river-container-on-vessel-service-envisioned-72558.aspx>

<sup>392</sup> <http://greatriverroad.com/all/locksanddam.htm>

<sup>393</sup> <https://www.workboat.com/news/coastal-inland-waterways/inland-container-vessels-highlight-project/>

## SECTION SUMMARY: DOMESTIC MARITIME

The U.S. DOT's Maritime Administration has established the America's Marine Highway Program to encourage the development of freight services and facilities along several designated waterborne corridors. Wisconsin sits between two of those corridors: M-35 (along the Mississippi River) and M-90 (through the Great Lakes, including the Ports of Superior, Milwaukee, and Green Bay). Short-sea shipping of containers, along the western shore of Lake Michigan and across the lake between Milwaukee and Muskegon, has been proposed and/or studied.

One current container operation exists on the Great Lakes, between Cleveland, Ohio and Antwerp, Belgium. One container service also exists on the Mississippi River, connecting Memphis, Baton Rouge, and New Orleans. At least one proposal exists for container vessel services on the Mississippi River to reach St. Louis; lock size and winter season closure may limit the potential for services further north.

## NORTH AMERICAN COASTAL PORTS

### PORT DEVELOPMENT AND EXPANSION

Across the North American continent, the past decade has witnessed the opening and rapid expansion of ports on all coasts. Driven by increasing vessel sizes and growing volumes of containerized imports, public and private sector investments have contributed hundreds of millions of dollars into projects at and near coastal ports. These projects have improved the capacity at almost all the leading port facilities, with some ports making aggressive plans to reshape the inland North American trade routes for imported containers. This section examines the projects on the West, East, and Gulf Coasts, and briefly considers the potential for changes to Wisconsin's connections to global markets.

#### *NORTH AMERICAN WEST COAST*

##### *PRINCE RUPERT*

For many Wisconsin-based importers and exporters, the most significant change to trade lanes has been the development and expansion of the Fairview Terminal at the Port of Prince Rupert, B.C., a collaboration between Canadian National, the Port Authority, private terminal management company DP World, and the Canadian government. Following completion of an expansion project in 2017, overall capacity for the port's throughput was raised from 850,000 TEU to 1.35 million TEU. A second vessel berth was added, with three larger cranes to unload the vessels of greater than 20,000 TEU. Other capacity improvements included 6,000 feet of dockside rail and an increase of 27 acres to the port's area.<sup>394</sup> As a result, the terminal saw a 26 percent increase in container operations from 2016 to 2017, with 926,540 TEU moved.<sup>395</sup> These volumes were achieved even as the port experienced congestion that raised dwell times from three days to a peak of two weeks.<sup>396</sup> Prior to the expansion, CN operated 14 to 16 trains each week into and out of the port.<sup>397</sup>

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<sup>394</sup> <https://www.newswire.ca/news-releases/port-of-prince-rupert-completes-fairview-terminal-expansion-642146923.html>

<sup>395</sup> <http://www.rupertport.com/news/releases/2017-port-performance>

<sup>396</sup> [https://www.ioc.com/port-news/international-ports/port-prince-rupert/prince-rupert-port-congestion-persists\\_20171208.html](https://www.ioc.com/port-news/international-ports/port-prince-rupert/prince-rupert-port-congestion-persists_20171208.html)

<sup>397</sup> <https://www.ioc.com/sites/default/files/u45421/Whitepapers/PrinceRupert/2016-WP.pdf>



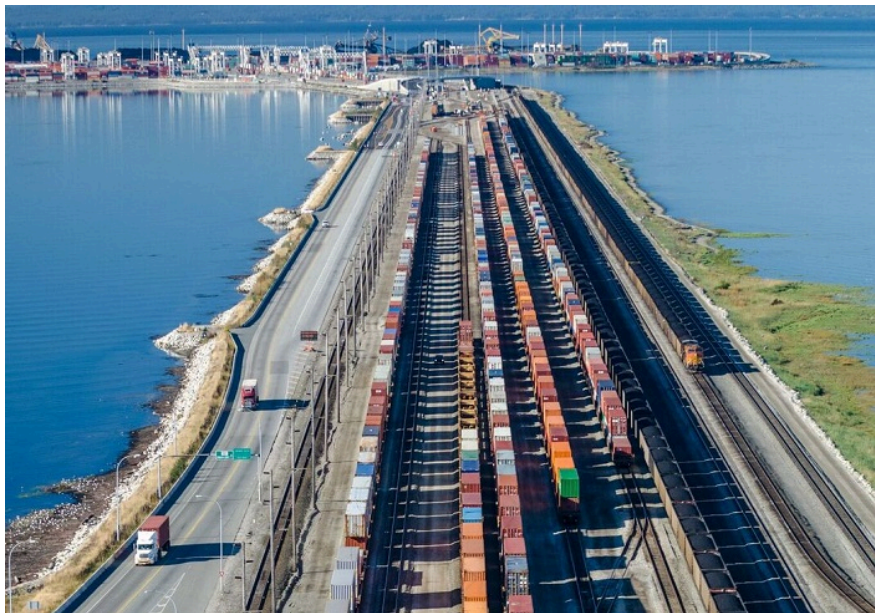
The expanded port witnessed capacity use of 75 to 80 percent, generating almost immediate plans for another expansion project. As of August 2018, the next round of expansion was expected to add 450,000 TEU of capacity by 2022, taking capacity to 1.8 million TEU per year. Two phases would be employed. In the first phase, the container yard will be expanded by more than 21 acres, with an eighth dock gantry crane and two rubber-tired cranes. Movement of a truck gate and administrative buildings will provide more operational space, and accommodate an additional 6,680 feet of dockside rail; by 2022, the on-dock rail capacity will be almost 25,000 feet.<sup>398</sup> Prince Rupert has become one of the primary ports for handling imported containers to Wisconsin; CN is the lone Class I railroad with access to the port and to the two active intermodal facilities in the state.

## VANCOUVER

The Port of Vancouver has also invested in expansion and modernization projects. Four separate container ports comprise Vancouver's operations: Centerm, adjacent to downtown Vancouver in the Burrard Inlet; Vanterm, located about a mile east of Centerm; Deltaport, a peninsula to the southwest of the metropolitan area and the largest port facility in Canada; and the Fraser Surrey Docks, on the southeast bank of the Fraser River in Surrey, B.C. Combined, the terminals have annual capacity of almost three million TEU.<sup>399</sup>

In June of 2018, the Canadian government announced an investment of C\$167 million for three projects at Vancouver. The source of the funds is the National Trade Corridors Fund, administered by Transport Canada (the nation's transportation agency). Other funds are being supplied by CN and CP. Projects will improve ventilation for a tunnel used by CN for port access; adding a passing siding of almost six miles of CP; grade-separating two roads, and extending and realigning two other roads. Another six miles of rail track will be added parallel to existing lines at two locations, including CN's line to Centerm and Vanterm.<sup>400</sup>

*Image 34: Deltaport, Vancouver, B.C. (Source: Journal of Commerce/GCT Deltaport).*



Since 2015, the port operator of Deltaport, GCT Canada, has made investments in preparation for a major reconfiguration project. These include additional cranes, container handling equipment, and a new maintenance facility. In collaboration with the Province of British Columbia, GCT will be investing

<sup>398</sup> <https://canada.constructconnect.com/joc/news/economic/2018/08/massive-fairview-container-terminal-expansion-works>

<sup>399</sup> <https://www.portvancouver.com/cargo-terminals/container/>

<sup>400</sup> <https://www.rtands.com/freight/yards-terminals/canada-invests-in-port-rail-projects-at-port-of-vancouver/>

C\$300 million to expand rail capacity at the facility, addressing constraints and allowing additional volumes. The project will rearrange the four existing tracks into seven tracks, replace the rail-mounted gantry cranes, add mobile container handling equipment, and more.<sup>401</sup> Now complete as of September 2018, Deltaport has added automation and increased rail capacity by 50 percent. This raises the port's rail capacity to 1.9 million TEU per year, and allows 34,000 feet of intermodal train capacity on-site.<sup>402</sup>

In 2018, Vancouver's port facilities have been challenged by dwell times that regularly exceeded three days, climbing to over five days at Deltaport and over seven days at Centerm. Vancouver's dwell times were 37 percent above the average of other West Coast ports. By comparison, mid-year dwell times at Prince Rupert maintained a 2.5-day goal. Record volumes (of 1.64 million TEU in the first half of the year for the four facilities), delayed departures and bunching of vessels arriving from Asia, and the conclusion of the Deltaport project were identified as factors contributing to the backlog.<sup>403</sup>

Combined capacity increases from the projects at Deltaport and Centerm are increasing Vancouver's container capacity by 1.2 million TEU in the near-term. Meanwhile, a new container terminal, Roberts Bank Terminal 2, is slated for the 2020's. It alone will add 2.4 million TEU of capacity.<sup>404</sup>

#### LOS ANGELES-LONG BEACH

Further down the West Coast, both Los Angeles and Long Beach are North America's largest concentration of global freight movement. Long Beach extends across 3,500 acres of land, with 22 active terminals (including six container facilities with 68 post-Panamax gantry cranes), handling more than 7.5 million TEU per year.<sup>405</sup> The Port of Los Angeles extends across 4,300 acres of land, with 26 terminals and 86 gantry cranes that handled 9.3 million TEU in 2017.<sup>406</sup> The ports serve as destinations for higher-value and time-sensitive imports, bolstered by the large consumer population in the region and by more than 1.5 billion square feet of industrial/warehouse space for transloading international containers to truck or domestic containers. Southern California also has strong rail links to Chicago, Dallas, and other major population centers for expediting container movement. Those rail links formed the nexus of a major cooperative effort between the ports and railroads, the Alameda Corridor. The Corridor, a "trench" that grade separated rail from road traffic for 20 miles, was completed in 2002 after 20 years and \$2.4 billion. The separation, which eliminated 200 crossings, allowed train speed to increase to 40 mph. As of late 2018, 39 trains per day leave the ports via the Alameda Corridor each day.<sup>407</sup>

Liner services routinely discharge 80 percent or more of their loads at Los Angeles-Long Beach; as shown in Chart 18, these facilities capture almost half of the gateway traffic for Asian imports.<sup>408</sup>

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<sup>401</sup> [https://globalterminalsCanada.com/rail\\_listing/gct-deltaport-intermodal-yard-reconfiguration-project/](https://globalterminalsCanada.com/rail_listing/gct-deltaport-intermodal-yard-reconfiguration-project/)

<sup>402</sup> [https://www.joc.com/port-news/international-ports/port-vancouver/expanded-deltaport-rail-deepens-vancouver%E2%80%99s-interior-reach\\_20180924.html](https://www.joc.com/port-news/international-ports/port-vancouver/expanded-deltaport-rail-deepens-vancouver%E2%80%99s-interior-reach_20180924.html)

<sup>403</sup> [https://www.joc.com/port-news/international-ports/port-vancouver/vancouver-rail-delays-ahead-winter-worry-shippers\\_20181004.html](https://www.joc.com/port-news/international-ports/port-vancouver/vancouver-rail-delays-ahead-winter-worry-shippers_20181004.html)

<sup>404</sup> [https://www.joc.com/maritime-news/container-lines/north-american-ports-delicate-balance\\_20180101.html](https://www.joc.com/maritime-news/container-lines/north-american-ports-delicate-balance_20180101.html)

<sup>405</sup> <http://www.polb.com/about/facts.asp>

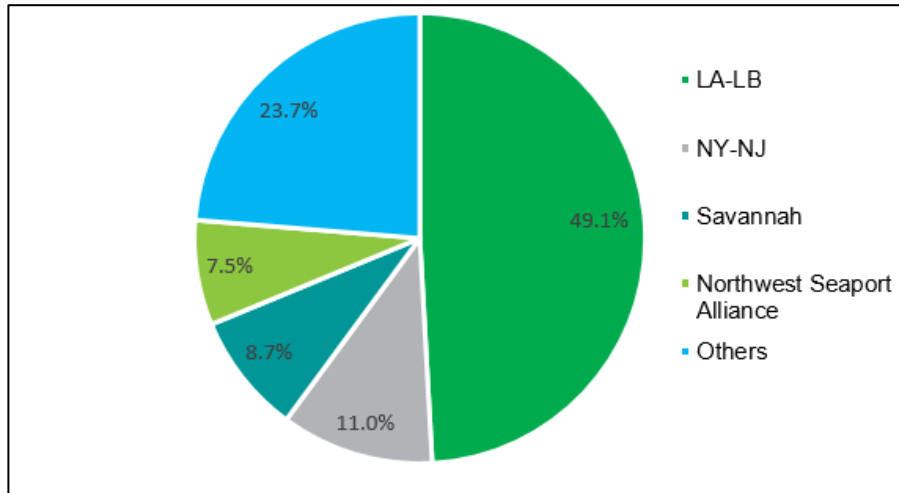
<sup>406</sup> <https://www.portoflosangeles.org/business/statistics/facts-and-figures>

<sup>407</sup> <https://www.supplychaindive.com/news/los-angeles-blueprint-for-freight-efficiency/541746/>

<sup>408</sup> [https://www.joc.com/port-news/us-ports/port-los-angeles/top-us-port-gateways-expand-share-asian-imports\\_20180831.html](https://www.joc.com/port-news/us-ports/port-los-angeles/top-us-port-gateways-expand-share-asian-imports_20180831.html)



Chart 18: Asia Import Market Shares for U.S. Ports (Source: Journal of Commerce)



The Port of Long Beach touts a \$4 billion investment program that includes a replacement of the General Desmond Bridge (scheduled to open in 2019), a new automated terminal capable of handling 23,000 TEU vessels, a new headquarters building, and other operational changes to lower emissions.<sup>409</sup>

The Port of Los Angeles identifies \$2.6 billion in improvements in its capital investment plan. Completed projects include deepening harbor depth to 53 feet, and a \$71 million semi-automated on-dock rail yard with eight tracks. The Port is also working with GE Transportation on a port information portal that securely allows BCOs and their transportation and logistics partners to access information on their shipments through a digital network informed by the U.S. Customs and Border Protection.<sup>410</sup>

The Port of Los Angeles

With larger vessels placing space for containers at a premium, Los Angeles and Long Beach are looking to remove any operations not essential at the port terminals, including chassis storage. The movement of chassis to a nearby yard can free 10 to 20 acres of area at a terminal. Such facilities will need to perform maintenance and keep chassis roadworthy while remaining convenient for truckers heading to or from the port.<sup>411</sup>

While the Alameda Corridor has allowed efficient rail movement out of the ports, drayage still dominates. Long Beach currently moves between 35 and 37 percent of containers by rail; the long-term goal is to increase that to 50 percent.<sup>412</sup>

The Port of Los Angeles has also received a \$21.6 million grant under the state's Trade Corridor Enhancement Program to help advance a \$34 million project to expand a rail yard at the Port's Terminal Island. The Port will fund the balance of the project's cost. When complete, the Terminal Island yard will have 31,000 additional feet of track, as the number of storage tracks increases from six to 11. This will allow the Pier 400 on-dock yard to increase its annual capacity by ten percent overall, to 525,000 TEU. Reductions in emissions and truck congestion are among the anticipated benefits of the project.<sup>413</sup> BNSF

<sup>409</sup> <https://www.ajot.com/insights/full/ai-cordero-says-2017-was-turn-around-year-for-port-of-long-beach>

<sup>410</sup> <https://businessfacilities.com/2017/05/logistics-leaders/>

<sup>411</sup> [https://www.joc.com/maritime-news/container-lines/north-american-ports-delicate-balance\\_20180101.html](https://www.joc.com/maritime-news/container-lines/north-american-ports-delicate-balance_20180101.html)

<sup>412</sup> <https://www.americanshipper.com/main/fullasd/ports-call-for-national-freight-policy-71833.aspx>

<sup>413</sup> <https://www.progressiverailroading.com/intermodal/news/Port-of-LA-receives-21-million-grant-for-rail-yard-expansion-project--55957>

is projecting that the combined ports of Los Angeles and Long Beach will see their annual container volumes rise to more than 44 million containers per year.<sup>414</sup>

One additional challenge facing Long Beach is the sale of the OOCL-leased Middle Harbor terminal. This sale was a condition of the Committee of Foreign Investment in the U.S., following the announcement that China's COSCO had agreed to a \$6.3 billion purchase of OOCL parent company OOIL. Concerns were raised by defense and other government sectors. The terminal is still expanding; by 2020, it is expected to cover 306 acres and have a 3.3 million TEU capacity. As of November 2018, no other liner service expressed interest; pension funds and other investors are possible bidders.<sup>415</sup>

## OAKLAND

The Port of Oakland has built a specialized role in the export of refrigerated and temperature-controlled products, primarily food-grade products. Oakland has invested in "Cool Port," a 280,000-square-foot refrigerated warehouse for meat, fruit, vegetables, and other perishables. This \$90 million project, opened in mid-2018, will build on an advantage for the port: it is frequently the last U.S. port for exports to Asia. Food and farm products typically account for 40 to 50 percent of port exports; the facility is anticipated to move 54,000 TEU per year.<sup>416, 417</sup> Private developer CenterPoint also began construction in mid-2018 on a 440,000-square-foot distribution center across the street from the terminal, potentially allowing cargo to be transloaded.<sup>418</sup>

## NORTH AMERICAN EAST COAST

The combination of European trade growth and the opening of the wider Panama Canal have compelled many ports on the East Coast to undertake large-scale infrastructure projects to become or remain competitive for liner services and intermodal shipping. These projects have addressed marine, landside, and overhead clearances and capacities.

## HALIFAX

As with their West Coast counterparts, Canada's East Coast ports have made investments to remain active in international containerized shipping. Halifax has two container terminals that combined for a volume of 560,000 TEU in 2017, with available capacity to triple present volumes. The port's deep-water draft allows ULCVs to berth at the Halterm International Container Terminal, otherwise called the South End facility. Refrigerated cargoes are an important component at this terminal. The north end of the harbor features the Fairview Cove Container Terminal. CN is the Class I railroad company serving the Port. Long-term, consideration is being given to extending the berth at Halterm to allow for a second ULCV to be accommodated.<sup>419</sup>

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<sup>414</sup> [https://www.joc.com/sites/default/files/u48783/story\\_images/KeyChicagoAreaMultimodalPark-RidgePort.pdf](https://www.joc.com/sites/default/files/u48783/story_images/KeyChicagoAreaMultimodalPark-RidgePort.pdf)

<sup>415</sup> <https://www.joc.com/maritime-news/container-lines/orient-overseas-container-line/ooil-readies-long-beach-terminal-sale-20181119.html>

<sup>416</sup> <https://www.americanshipper.com/main/fullasd/ports-call-for-national-freight-policy-71833.aspx>

<sup>417</sup> <https://www.supplychaindive.com/news/port-of-oakland-bets-cool-cargo-will-accelerate-growth/522667/>

<sup>418</sup> <https://www.americanshipper.com/main/fullasd/ports-call-for-national-freight-policy-71833.aspx>

<sup>419</sup> <https://www.ajot.com/premium/ajot-bigger-ships-sparking-halifax-comeback>

## MONTREAL

The Port of Montreal, which was one of the two container ports that assembled trains for the CP Intermodal terminal in Milwaukee, features four container ports. Seventeen percent of the container traffic at Montreal goes to the U.S. Midwest. The largest-sized vessel that can call on Montreal is 6,000 TEU.<sup>420</sup> The yards have 17 ship-to-shore gantry cranes, 28 yard cranes, and four to eight rail tracks per terminal. There are 11 vessel berths; depth can range from 27 to 36 feet.<sup>421</sup>

*Image 35: Port of Montreal (Source: Journal of Commerce/Port of Montreal)*



Montreal's advantage is that it is the most inland port available to conventional container vessels. The annual volume is approximately 1.54 million TEU.<sup>422</sup>

Since 2013, several projects have been announced in Montreal. In two stages, the Viau Terminal development added 600,000 TEU of capacity to the Port's total capacity (now at 2.1 million TEU). In April 2018, the Canadian government announced it would fund C\$18.4 million for rail network improvements at the Port, including road relocation and new tracks. The announcement noted 25 percent of Port traffic originated in Asia in 2016.<sup>423</sup> In May 2016, Canada announced C\$45.8 million in funding for City of Montreal infrastructure projects on roads adjacent to and serving the Port of Montreal, including the construction of a road link connecting the Port to the Trans-Canada Highway.<sup>424</sup> Montreal is noted for several operational advantages, including balanced export/import volumes, short dwell time for containers on docks, and two-day rail connections to Chicago.<sup>425</sup>

Another proposed project, Contrecoeur, would create another container terminal with a capacity of 1.4 million TEU at a greenfield site. This port would be 25 miles downstream (towards the Atlantic) from Montreal, on the south shore of the St. Lawrence River. Project cost is estimated at C\$750 million. An environmental impact statement was released in February of 2018 as part of the development process; if approvals and funding follow, Contrecoeur would be operational by 2023.<sup>426</sup> Commentary noted that

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<sup>420</sup> [https://www.port-montreal.com/files/PDF/publications/2015-07-28\\_jaquette-corpora-en.pdf](https://www.port-montreal.com/files/PDF/publications/2015-07-28_jaquette-corpora-en.pdf)

<sup>421</sup> [https://www.port-montreal.com/files/PDF/port-en-chiffres/2016-08-26\\_port-en-chiffres-infrastructures-EN.pdf](https://www.port-montreal.com/files/PDF/port-en-chiffres/2016-08-26_port-en-chiffres-infrastructures-EN.pdf)

<sup>422</sup> [https://www.joc.com/regulation-policy/infrastructure-news/canada-infrastructure-news/analysis-eastern-canada-ports-battle-mega-ship-calls\\_20180523.html](https://www.joc.com/regulation-policy/infrastructure-news/canada-infrastructure-news/analysis-eastern-canada-ports-battle-mega-ship-calls_20180523.html)

<sup>423</sup> <https://www.newswire.ca/news-releases/the-government-of-canada-invests-in-transportation-infrastructure-at-the-port-of-montreal-to-move-canadian-goods-to-market-679637083.html>

<sup>424</sup> <https://www.newswire.ca/news-releases/the-government-of-canada-invests-in-transportation-infrastructure-at-the-port-of-montreal-to-move-canadian-goods-to-market-682554641.html>

<sup>425</sup> <https://www.ajot.com/premium/ajot-dual-container-port-strategy-for-st-lawrence>

<sup>426</sup> Ibid.

loaded vessels are limited to less than 4,200 TEU capacity, are challenged by environmental and tribal issues, and would depend on several market factors.<sup>427</sup>

## QUEBEC

In 2017, the Port of Quebec, an existing bulk terminal, proposed redevelopment of its Beauport site into a container terminal, with an initial capacity of 750,000 TEU and longer-term goal of 1.5 million TEU. This project would give Quebec an advantage over Montreal, in that the terminal could handle vessels up to 15,000 TEU and have a harbor depth of 49 feet. The market for this service would be Ontario and the U.S. Midwest.<sup>428</sup> As proposed, the estimated project cost for Beauport would be C\$400 million.<sup>429</sup> As of August 2018, Beauport had a director (the former director for Prince Rupert), but lacked environmental approval and financing.<sup>430</sup>

## OTHER CANADIAN PROPOSALS

In addition to the Port of Quebec, other locations in eastern Canada have proposed entering the trade for container vessels. These include Dartmouth (Halifax Harbor), Milford, and Novaporte/Sydney (all in Nova Scotia). Combined with projects in Quebec and Montreal, more than 4.3 million TEU of capacity would be added – double the current volume handled by all Canadian East Coast ports. Each of these project proposals have challenges in permitting; the Milford and Sydney locations would need substantial investment in rail infrastructure to be viable. The development of any of these projects would affect the viability of other proposals, as well as that of the existing terminals in Halifax and Montreal. Transloading of containers to smaller vessels for moves further up the St. Lawrence, or improvements to rail connectivity and pricing through higher volumes, may be considered as part of the economic justification for any of these projects.<sup>431</sup> Activity at Boston and the Port of New York and New Jersey (including rail connectivity) will also shape the viability of these initiatives.

In the United States, most east coast ports have taken steps to increase their capacities and harbor depths to accommodate the larger ships now passing through the new, larger Panama Canal lock system. With the potential for more containerized cargo being delivered to East Coast ports, containers to and from Chicago are likely to place additional demands for capacity at the Chicago-area facilities for the eastern railroads (NS and CSX).

## NEW YORK-NEW JERSEY

The busiest East Coast container port is the Port of New York and New Jersey (NY-NJ), managed by a bi-state agency that also has jurisdiction over bridges, airports, bus terminals, commuter rail, and the World Trade Center.<sup>432</sup> There are six primary container terminals within NY-NJ: Port Newark, Maher, APM, GTC Bayonne LP, GTC New York LP (Staten Island), and Red Hook (Brooklyn). The Port hosts one of the largest single projects undertaken to improve container vessel capacity: reconstruction of the roadway across the Bayonne Bridge, raising the clearance beneath the bridge from 151 feet to 215 feet.

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<sup>427</sup> [https://www.joc.com/regulation-policy/infrastructure-news/canada-infrastructure-news/analysis-eastern-canada-ports-battle-mega-ship-calls\\_20180523.html](https://www.joc.com/regulation-policy/infrastructure-news/canada-infrastructure-news/analysis-eastern-canada-ports-battle-mega-ship-calls_20180523.html)

<sup>428</sup> Ibid.

<sup>429</sup> <https://www.ajot.com/premium/ajot-dual-container-port-strategy-for-st.-lawrence>

<sup>430</sup> <https://www.ajot.com/insights/full/ai-krusel-selected-to-develop-port-of-quebec-container-terminal-project>

<sup>431</sup> [https://www.joc.com/regulation-policy/infrastructure-news/canada-infrastructure-news/analysis-eastern-canada-ports-battle-mega-ship-calls\\_20180523.html](https://www.joc.com/regulation-policy/infrastructure-news/canada-infrastructure-news/analysis-eastern-canada-ports-battle-mega-ship-calls_20180523.html)

<sup>432</sup> <http://www.panynj.gov/>



*Image 36: Bayonne Bridge After Reconstruction (Source: Port Authority of New York and New Jersey).*

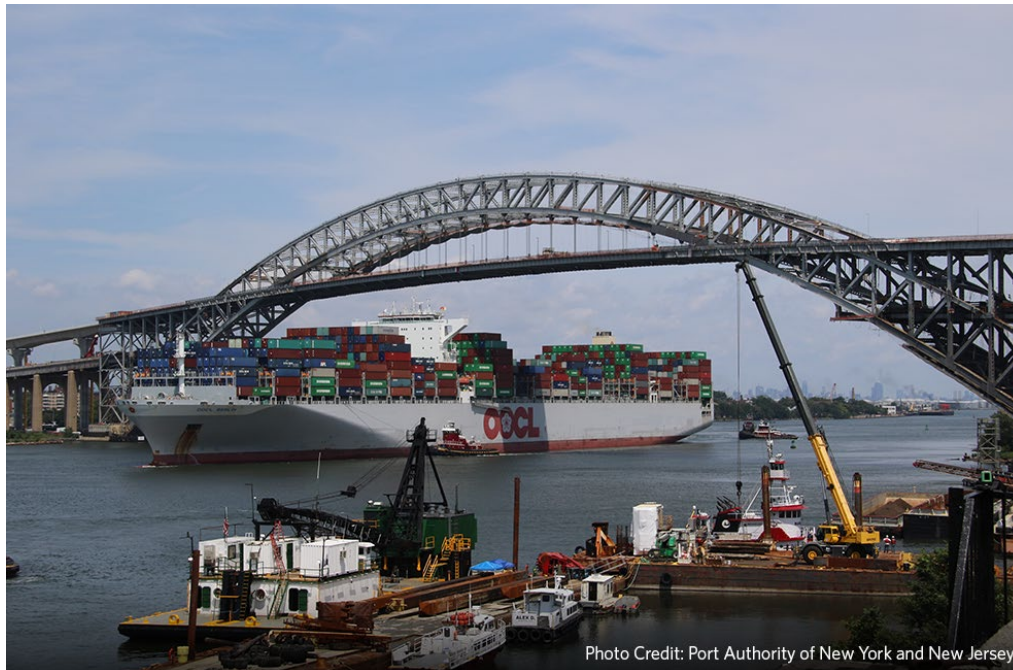


Photo Credit: Port Authority of New York and New Jersey

Prior to the project, which finished in the summer of 2018, most of the terminals were restricted from accepting vessels larger than 8,000 to 9,000 TEU. The \$1.6 billion reconstruction project opened the vertical clearance, allowing new ULCVs (up to 18,000) to pass

under the roadway. The Bayonne Bridge project was one of several high-value projects undertaken at the port in recent years. Other efforts included a \$2.1 billion project to dredge the port to 50-foot navigational depth (which included federal support) and unspecified “billions spent” by private sector terminal operators.<sup>433</sup>

At Port Newark, a multi-year project is underway to expand that terminal’s capacity from 1 million TEU to 2.4 million TEU per year by 2020. The \$500 million investment also includes a new gate, dredging, new cranes, an additional berth, and a new computer system.<sup>434</sup>

Another major series of projects at NY-NJ, ExpressRail, is devoted to improvements to rail facilities at and near the container ports. Four projects have been completed and are operational as of mid-2018 (Elizabeth, Newark, Corbin Street, and Staten Island). A fifth project, (Port Jersey/Greenville Yard), began construction in late 2016. When completed, the combined \$600 million project will establish direct on-dock or near-dock rail access to all the major marine terminals. The configuration will move more containers directly from vessel to rail without drayage, reducing an estimated 375,000 truck moves per year.<sup>435</sup> For the first six months of 2018, ExpressRail performed more than 311,000 lifts, a 15 percent increase, year-over-year.<sup>436</sup>

Operationally, NY-NJ is now the first port of call for many liner services, meaning it is the first stop for imported containers, for both trans-Panama Canal and trans-Suez Canal routes. For some vessels, it also has become the last port of call, a status that benefits exporters. An appointment system for GTC

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<sup>433</sup> <https://www.ajot.com/news/governor-christie-announces-bayonne-bridge-raise-the-roadway-ahead-of-sched>

<sup>434</sup> <https://www.universalcargo.com/ny-nj-port-terminal-spending-hundreds-of-millions-to-increase-capacity/>

<sup>435</sup> <http://container-news.com/ny-port-authority-break-ground-new-expressrail-port-jersey-facility/>

<sup>436</sup> [https://www.americanshipper.com/Main/ASD/North\\_Atlantic\\_ports\\_expanding\\_for\\_larger\\_vessels\\_72518.aspx](https://www.americanshipper.com/Main/ASD/North_Atlantic_ports_expanding_for_larger_vessels_72518.aspx)



Bayonne is one example of strategies deployed at NY-NJ to reduce congestion.<sup>437</sup> NY-NJ is also considering alternatives for reducing truck drayage through rail movement of freight across the Hudson River, preparing for expected volume increases of 40 percent by 2035. Options under consideration are rail-on-barge (which would reduce truck traffic by 600 vehicles per day) or a new tunnel under the Hudson (which would eliminate 1,500 truck trips). The capital cost estimates for barges range from \$100 million to \$600 million; the tunnel would cost between \$7 billion and \$11 billion.<sup>438</sup>

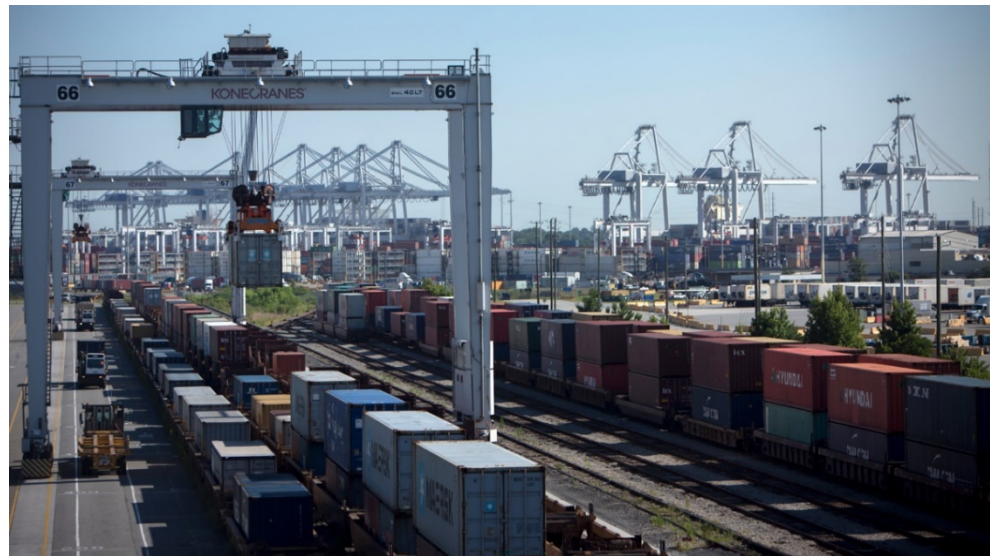
In the year following the lifting of height restrictions at NY-NJ, 107 vessels in excess of 9,500 TEU have called at the Port's terminals. These vessels were unable to serve the Port previously. The volume of import containers has risen by 10 percent, with contents that include furniture, appliances, and beverages.<sup>439</sup>

## SAVANNAH

The other East Coast port making great efforts to capture a larger share of containerized trade is the Port of Savannah, governed by the Georgia Port Authority (GPA).

In September 2018, *Image 37: Garden City Terminal at the Port of Savannah (Source: GPA Photo/Stephen B. Morton).*

GPA approved \$92 million in state funding for rail projects that will double the rail capacity at the terminal to one million containers by 2020. The project at the Port's Mason Mega Rail Terminal will combine current NS and CSX on-dock terminals into one



facility, with 124,000 feet of new track and 88 automated switches. Each railroad will have access to at least nine working tracks, a minimum of 2,700 feet in length. Trains up to 10,000 feet will be able to be accommodated; the terminal will be the largest on-dock rail facility in North America when the project is completed in 2020. GPA anticipates rail connections to Memphis, St. Louis, Chicago, and Cincinnati, growing by 2025 to 8 million TEU- equal to that of Los Angeles or Long Beach.<sup>440</sup>

When complete, the Mason Mega-Rail Terminal will allow both NS and CSX to build lengthy unit trains, which will reduce rail time to the Midwest by 24 hours. Other elements of the expansion project include

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<sup>437</sup> <https://www.ajot.com/premium/ajot-campbell-leaving-port-of-ny-nj-on-solid-course-for-sustained-growth>

<sup>438</sup> [https://www.joc.com/port-news/us-ports/port-new-york-and-new-jersey/ny-nj-considering-options-aid-cross-harbor-volumes\\_20180621.html](https://www.joc.com/port-news/us-ports/port-new-york-and-new-jersey/ny-nj-considering-options-aid-cross-harbor-volumes_20180621.html)

<sup>439</sup> [http://www.panynj.gov/bridges-tunnels/media-item.cfm?headline\\_id=2948](http://www.panynj.gov/bridges-tunnels/media-item.cfm?headline_id=2948)

<sup>440</sup> <https://www.railwayage.com/intermodal/georgia-to-double-intermodal-rail-capacity/>

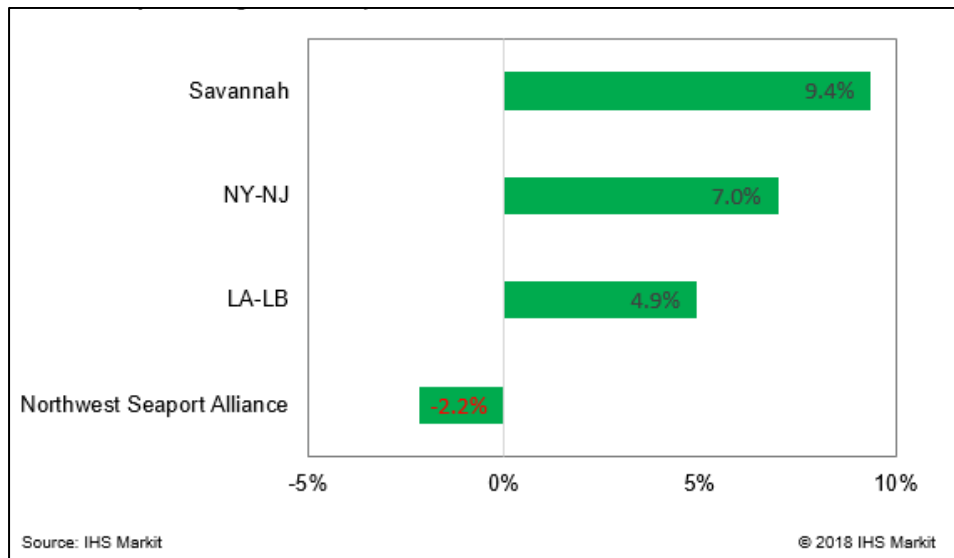
eight new ship-to-shore cranes (bringing the total to 40), adding 64 rubber-tired gantry cranes to the existing fleet of 146, container storage expansion, berth improvements, and road expansions on adjacent highways.<sup>441</sup> One of those road projects will be an \$8.8 million overpass of the 10,000-foot rail lines into and out of Mason Terminal. The Mason Terminal project received \$44 million in Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies (FASTLANE) grant funds in July 2016; when those are combined with the GPA-approved funds, the project is fully funded.<sup>442</sup>

Savannah also has capacity at the adjacent Garden City Terminal for temperature-controlled containers. Expansion approved in July 2018 will add the capacity for 360 additional refrigerated containers, in addition to the existing capacity of nearly 2,500 containers.<sup>443</sup> Further, Savannah is in the process of deepening its harbor from 42 feet to 47 feet. The \$973 million project is expected to be completed by 2021.<sup>444</sup>

GPA’s strategic positioning of Savannah’s strategy includes a satellite operation also run by GPA, the inland Appalachian Regional Port (ARP), in northwestern Georgia’s Murray County. The two ports are connected via a 388-mile rail corridor; CSX is also a partner in this arrangement. The ARP is expected to reduce as much as 50,000 truck drayage operations on Georgia highways.<sup>445</sup> Savannah handled 3.7 million TEU in FY2015 and 4.2 million TEU in FY2018; by 2025, GPA expects to be handling more than five million TEU per year at Savannah.<sup>446, 447</sup>

Chart 19 shows the growth of Savannah as a destination for Asian imports, relative to other major U.S. gateway ports. Savannah’s Asian import TEU volume grew by 9.4 percent; the growth rate at NY-NJ was 7.0 percent. Los Angeles-Long Beach volumes also grew, but at slower rates than the large East Coast ports. The Northwest Seaport

**Chart 19: Year-Over-Year Change in Asia Import TEU Volume**  
(Source: Journal of Commerce/IHS Markit).



<sup>441</sup> <https://www.freightwaves.com/news/gpa-expansion-plans>

<sup>442</sup> <https://www.railwayage.com/intermodal/georgia-to-double-intermodal-rail-capacity/>

<sup>443</sup> <https://www.railwayage.com/intermodal/port-of-savannah-tops-container-mark/>

<sup>444</sup> [https://www.joc.com/port-news/us-ports/port-jacksonville/jacksonville-dredging%E2%80%99s-goal-larger-ships-full-loads\\_20180205.html](https://www.joc.com/port-news/us-ports/port-jacksonville/jacksonville-dredging%E2%80%99s-goal-larger-ships-full-loads_20180205.html)

<sup>445</sup> <https://www.railwayage.com/intermodal/port-of-savannah-tops-container-mark/>

<sup>446</sup> <https://www.railwayage.com/intermodal/port-of-savannah-tops-container-mark/?RAchannel=intermodal>

<sup>447</sup> <https://www.freightwaves.com/news/2017/11/13/panama-canal-expansion-pits-east-coast-vs-west-coast>

Alliance (Seattle and Tacoma) saw a reduction in volume; this loss may reflect the stronger competition from Vancouver and Prince Rupert as well as the growing use of East Coast ports for Asian trade.<sup>448</sup>

Other U.S. East Coast ports are also making investments to improve their ability to handle larger vessels and greater container volumes. Below are some port locations and the investments made at each.

#### BOSTON

As with other East Coast ports, the efforts at the Port of Boston are dedicated to harbor dredging to deepen the ship channels, and to dockside improvements to improve the landside facilities. Of the total \$850 million in project costs, \$350 million is directed to dredging the outer harbor channel from 40 feet to 51 feet, and the main and reserve shipping channels from 40 feet to 47 feet. Completion of the dredging is expected in 2021. The remaining \$500 million will construct two new vessel berths (at 50-foot depths), add three new ship-to-shore cranes, expand refrigerated cargo storage, and provide new gate facilities. Funding includes a \$42 million U.S. DOT FASTLANE Grant, and \$107.5 in funding from the Commonwealth of Massachusetts.<sup>449</sup>

#### CHARLESTON

The Army Corps of Engineers awarded a contract in October 2017 for the second phase of dredging to deepen port channels from 45 feet to 52 to 54 feet. The project could take up to four years, and cost \$573 million.<sup>450</sup> This project is part of larger set of improvements, costing \$1.6 billion, that will also feature a new terminal, new rail access, and wharf improvements. The Port set a record monthly volume in October 2017, handling 184,000 TEU.<sup>451</sup> As with Savannah, Charleston (under the South Carolina Ports Authority) has inter-connected, supporting inland ports: Inland Port Greer (opened in 2013) and Inland Port Dillon (opened in April 2018).<sup>452</sup>

#### PHILADELPHIA

Now branded as PhilaPort, the facility received a \$25.5 million INFRA grant in June 2018, to complete the second phase of a multiphase improvement plan for the Packer Avenue Marine Terminal. Components to the plan include deepening the berth to 45 feet, conversion of two cranes from diesel to electric, and replacement/relocation of two temperature-controlled warehouses.<sup>453</sup>

PhilaPort had also received a commitment of \$300 million in state funds in 2016 through a comprehensive Capital Investment Program. Over four years (through 2020), the program will build infrastructure that will more than double the Port's container capacity. \$200 million of the funds were targeted to the Packer Avenue Marine Terminal. Components of those investments include four new post-Panamax gantry container cranes, relocation and new construction of multiple warehouse

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<sup>448</sup> [https://www.joc.com/port-news/us-ports/port-los-angeles/top-us-port-gateways-expand-share-asian-imports\\_20180831.html](https://www.joc.com/port-news/us-ports/port-los-angeles/top-us-port-gateways-expand-share-asian-imports_20180831.html)

<sup>449</sup> [https://www.americanshipper.com/Main/ASD/North Atlantic\\_ports\\_expanding\\_for\\_larger\\_vessels\\_72518.aspx?source=ASD Side](https://www.americanshipper.com/Main/ASD/North Atlantic_ports_expanding_for_larger_vessels_72518.aspx?source=ASD Side)

<sup>450</sup> [https://www.joc.com/port-news/us-ports/port-jacksonville/jacksonville-dredging%E2%80%99s-goal-larger-ships-full-loads\\_20180205.html](https://www.joc.com/port-news/us-ports/port-jacksonville/jacksonville-dredging%E2%80%99s-goal-larger-ships-full-loads_20180205.html)

<sup>451</sup> <https://www.freightwaves.com/news/2017/11/13/panama-canal-expansion-pits-east-coast-vs-west-coast>

<sup>452</sup> [https://www.joc.com/port-news/us-southeast-ports-expand-intermodal-rail-reach\\_20180418.html](https://www.joc.com/port-news/us-southeast-ports-expand-intermodal-rail-reach_20180418.html)

<sup>453</sup> [https://www.americanshipper.com/Main/ASD/North Atlantic\\_ports\\_expanding\\_for\\_larger\\_vessels\\_72518.aspx?source=ASD Side](https://www.americanshipper.com/Main/ASD/North Atlantic_ports_expanding_for_larger_vessels_72518.aspx?source=ASD Side)

structures, and dockside power connections to power vessels at dock (rather than using their engines at idle). One more container crane will be purchased by Astro Holdings, a Port tenant. Astro will also be dedicating a 40-acre site for container operations. The first phases of the project will bring annual capacity at PhilaPort to 900,000 TEU, up from the current 400,000 TEU capacity. Future options could increase the facility's capacity to 1.2 million TEU.<sup>454</sup>

#### HAMPTON ROADS/NORFOLK

The Port of Virginia (covering multiple facilities in the James River/Chesapeake Bay area) has completed dredging channels to 50 feet. As of September 2018, it has been given federal approval to dredge to 55 feet, with a construction start date target of January 2020. Berth construction at the Virginia International Gateway (VIG) in Portsmouth finished in late 2018, allowing the addition of four new ship-to-shore gantry cranes, due to be in place in early 2019. On the land side, VIG has received 26 new rail-mounted gantry cranes (RMGs), with full operability expected by January 2019. The next phase of rail yard expansion is expected to be complete by mid-2019. Truck gate access has also been upgraded.

At the Norfolk Intermodal Terminal (NIT), a major expansion is expected to be completed by June 2020. Among the infrastructure upgrades are 60 new RMGs, being delivered through 2018 and 2019. Collectively, the projects at VIG and NIT will increase the Port's annual container capacity by 40 percent, or one million additional TEU.<sup>455</sup> The Port of Virginia is also advancing deployment of technology; as of mid-2018, almost 35 percent of the Port's capacity was in an "automated state." By 2020, the goal is to reach 70 percent.<sup>456</sup>

#### WILMINGTON, DE

Wilmington, Delaware is a leading gateway for fresh fruit imports.<sup>457</sup> In September 2018, Gulftainer signed a 50-year agreement to control the port, committing to \$600 million in future project investments. These include expansion of the existing 350,000 TEU capacity to 600,000 TEU by 2021. Gulftainer will also be converting a former DuPont chemical facility to a new 1.2 million TEU facility by 2023.<sup>458</sup>

#### JACKSONVILLE

In 2018, Jacksonville began a \$483 million, three-year project to dredge its shipping channel from 40 feet to 47 feet. Asian imports have driven growth in volumes, accounting for more than 56 percent of the market share.<sup>459</sup>

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<sup>454</sup> <http://www.philaport.com/wolf-announces-300-mil-investment-port-philadelphia-to-double-container-capacity-create-jobs/>

<sup>455</sup> [https://www.americanshipper.com/Main/ASD/North Atlantic ports expanding for larger vessels 72518.aspx?source=ASD](https://www.americanshipper.com/Main/ASD/North%20Atlantic%20ports%20expanding%20for%20larger%20vessels%2072518.aspx?source=ASD)

<sup>456</sup> <https://news.transportation.org/Pages/062218sol2.aspx>

<sup>457</sup> [https://www.americanshipper.com/Main/ASD/North Atlantic ports expanding for larger vessels 72518.aspx?source=ASD](https://www.americanshipper.com/Main/ASD/North%20Atlantic%20ports%20expanding%20for%20larger%20vessels%2072518.aspx?source=ASD)

<sup>458</sup> [https://www.joc.com/port-news/us-ports/port-wilmington-del/gulftainer-plan-quintuple-wilmington-delaware-capacity-stirs-competition\\_20181010.html](https://www.joc.com/port-news/us-ports/port-wilmington-del/gulftainer-plan-quintuple-wilmington-delaware-capacity-stirs-competition_20181010.html)

<sup>459</sup> [https://www.joc.com/port-news/us-ports/port-jacksonville/jacksonville-dredging%E2%80%99s-goal-larger-ships-full-loads\\_20180205.html](https://www.joc.com/port-news/us-ports/port-jacksonville/jacksonville-dredging%E2%80%99s-goal-larger-ships-full-loads_20180205.html)

## NORTH AMERICAN GULF COAST

### HOUSTON

Projects that will support intermodal operations at the Port of Houston total \$1.2 billion.<sup>460</sup> These include a modernization program to increase cargo handling efficiency and capacity at the Barbours Cut Terminal. Elements include replacement of older Panamax cranes with larger Post Panamax Ship-to-Shore cranes, lights and dock improvements, and yard reconfiguration. These items are expected to increase the terminal's capacity from 1.2 million to two million TEU when completed. On the waterside; the terminal channel has been deepened to 45 feet to match the depth of the federal Houston Ship Channel.<sup>461</sup>

At the Port's other container terminal, Bayport, Container Yard 7 will add 50 acres of capacity.<sup>462</sup> Once completed, Bayport will have the capacity to handle 2.3 million TEU on a footprint comprised of 376 acres of container yard and a 123-acre intermodal facility. The terminal features electronic data interchange capabilities and a computerized inventory control system that tracks the status and location of individual containers.<sup>463</sup> In September, the Port approved a \$13.6 million contract to bring rail service to Bayport.<sup>464</sup> Synthetic resins (such as polyethylene) and other plastics are major exports; abundant natural gas supplies provide source material for their manufacture.<sup>465</sup>

### NEW ORLEANS

Approval to deepen the Mississippi River to 50 feet is among the activities at New Orleans. The federal share of costs will be approximately \$118.1 million, the non-federal share about \$39.4 million. The ship channel is currently maintained at 45 feet.<sup>466</sup>

Other projects at the Port of New Orleans include a new container facility on the grounds of the Port, adjacent to the existing Napoleon Avenue Terminal and 12-acre rail yard. This expansion is expected to add 200,000 TEU to the Port's annual capacity.<sup>467</sup>

### MOBILE

Mobile's container port opened in 2008 as a partnership between the Alabama State Port Authority and APM Terminals. Through late 2018, two project phases totaling \$350 million have been invested at the terminal, which has 2000 feet of berth at 45-foot depth. The Port Authority also invested \$50 million in a container transfer facility that opened in 2016. A third phase expansion (\$50 million) will add 20 acres of operating yard, and extend the dock 400 feet, thereby allowing the port to serve two post-Panamax vessels at once. Capacity will increase to 650,000 TEU per year when that phase is completed in 2020.

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<sup>460</sup> [https://www.joc.com/port-news/us-gulf-regions-ports-eye-new-business-competitive-edge\\_20180413.html](https://www.joc.com/port-news/us-gulf-regions-ports-eye-new-business-competitive-edge_20180413.html)

<sup>461</sup> <https://porthouston.com/container-terminals/barbours-cut-container-terminal/>

<sup>462</sup> <https://porthouston.com/infrastructure-projects/current-projects/>

<sup>463</sup> <https://porthouston.com/container-terminals/bayport-container-terminal/>

<sup>464</sup> <https://www.houstonchronicle.com/business/bizfeed/article/Port-Houston-sees-larger-container-ships-invests-13257827.php>

<sup>465</sup> [https://www.joc.com/port-news/us-gulf-regions-ports-eye-new-business-competitive-edge\\_20180413.html](https://www.joc.com/port-news/us-gulf-regions-ports-eye-new-business-competitive-edge_20180413.html)

<sup>466</sup> [https://www.joc.com/port-news/us-ports/port-new-orleans/port-new-orleans-%E2%80%93-deeper-channel-better-rail-more-business\\_20180921.html](https://www.joc.com/port-news/us-ports/port-new-orleans/port-new-orleans-%E2%80%93-deeper-channel-better-rail-more-business_20180921.html)

<sup>467</sup> <https://www.freightwaves.com/news/2017/11/13/panama-canal-expansion-pits-east-coast-vs-west-coast>



Should demand warrant additional expansions, the port has the capacity to nearly triple in capacity, to 1.8 million TEU.<sup>468</sup>

As with other port locations, the Port of Mobile is leveraging container traffic with warehousing opportunities. Wal-Mart opened a 2.6 million-square-foot distribution center near the Port of Mobile in May 2018.<sup>469</sup>

## CONTAINER MANAGEMENT AT SEAPORTS

### *TRANSLOADING TO DOMESTIC CONTAINERS*

As liner companies seek to maximize use of their containers, and as BCOs, 3PLs, and other supply chain managers seek to increase efficiency and reduce costs, the practice of transloading the contents of maritime containers into domestic containers at or near the coastal ports has gained favor. At the Ports of Los Angeles and Long Beach, 58 percent of containers are now transloaded, up from 52 percent in just five years.<sup>470</sup> The advantages to transloading include more efficient use of well car slots, as the contents of three 40' international containers can usually be transloaded into two 53' domestic containers. Railroads benefit by loading, transporting, and unloading fewer containers, which in turn lowers costs to the shippers and BCOs. More discussion of transloading can be found in the *Inland Ports* section.

### *TRANSFERS TO INLAND PORTS*

Constrained land area at ports compels the quick relocation of containers to off-site facilities, whether by rail or by truck drayage. In California, the Inland Empire (San Bernardino County) is one of the key locations of activity, with concentrations of distribution centers. Inland ports allow ports to act as transit facilities, reducing container dwell time and increasing velocity, especially when ULCVs are in port.<sup>471</sup>

### *CAPACITY CHALLENGES AND RESPONSES*

During mid-2018, many importers faced challenges in a lack of overall container shipping capacity on vessels. As stated earlier, spot rates for container shipping surged, with the Drewry World Container Index climbing to over \$1,700 per TEU.<sup>472</sup> Reports also noted loaded containers being "rolled" (delayed from a scheduled vessel slot to a later slot due to overbooking), sometimes more than once. Meanwhile, alliances and a slot-sharing agreement between ZIM and the 2M Alliance alone reduced more than 31,000 TEU of weekly capacity between China and North America. Observers noted that the liner services had the ability to shift capacity from other lanes to the Asia-North America lane, if the service demand remains high. Those observers believed this uptick in demand was generated by a mix of shippers seeking to beat potential tariffs, combined with shippers seeking to beat the annual rush of pre-holiday merchandise.<sup>473</sup>

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<sup>468</sup> [http://www.asdd.com/facilities\\_MCT.html](http://www.asdd.com/facilities_MCT.html)

<sup>469</sup> [https://www.joc.com/port-news/us-gulf-regions-ports-eye-new-business-competitive-edge\\_20180413.html](https://www.joc.com/port-news/us-gulf-regions-ports-eye-new-business-competitive-edge_20180413.html)

<sup>470</sup> [https://www.joc.com/port-news/us-ports/us-transloading-growth-reshaping-cargo-routing\\_20170303.html](https://www.joc.com/port-news/us-ports/us-transloading-growth-reshaping-cargo-routing_20170303.html)

<sup>471</sup> [https://www.joc.com/port-news/us-ports/port-los-angeles/la-long-beach-working-speed-cargo-flow-docks-inland-sites\\_20150323.html](https://www.joc.com/port-news/us-ports/port-los-angeles/la-long-beach-working-speed-cargo-flow-docks-inland-sites_20150323.html)

<sup>472</sup> <https://www.drewry.co.uk/supply-chain-advisors/supply-chain-expertise/world-container-index-assessed-by-drewry>

<sup>473</sup> [https://www.joc.com/maritime-news/trade-lanes/trans-pacific/space-scramble-us-imports-asia-intensifies\\_20180817.html](https://www.joc.com/maritime-news/trade-lanes/trans-pacific/space-scramble-us-imports-asia-intensifies_20180817.html)

Technologies have proven to help manage many of the processes at coastal and inland container terminals. These technologies and others will be discussed the *Technological Factors* section.

## SECTION SUMMARY: NORTH AMERICAN COASTAL PORTS

North American coastal ports in both Canada and the United States have witnessed investments in the billions of dollars over the past decade. The West Coast ports have made investments to address landside capacity and throughput, especially with vessel-to-rail connections. Los Angeles-Long Beach continues to move most of its containers inland through drayage, but proposals are being evaluated for direct rail container movements between the ports and the Inland Empire region. East Coast ports have seen vessel sizes and terminal volumes increase with the opening of the expanded Panama Canal. Dredging operations have been consistently implemented at these ports to allow larger vessels. The Port Authority of New York and New Jersey conducted a \$1.6 billion project to raise the Bayonne Bridge roadway by 65 feet, thereby allowing vessels over 9,000 TEU to call at the port. To manage limited on-site storage capacity, coastal ports have implemented several strategies, including transloading of maritime containers to domestic containers and use of technology for coordinating container drayage.

## INLAND PORTS AND TERMINALS OPERATIONS

As noted previously, a key consideration in increasing port efficiency and throughput is moving import containers out of the actual port facility as quickly as possible. Many inland ports have become “relief valves” for congested coastal ports, accepting trainloads of containers and staging them for further activity. Most of these facilities are within 300 to 500 miles of coastal terminals. Further inland, other inland ports serve as consolidation and distribution hubs. Both types of inland ports typically support surrounding warehouse and distribution facilities that serve large regional markets with populations of greater than three million, and have direct rail connections to coastal ports. Most also have

*Image 38: Inland Port Greer, South Carolina (Source: Automotive Logistics)*



established Free Trade Zone status, allowing import functions to also be moved away from the coastal ports.<sup>474</sup>

For inland ports closest to coastal locations, many have partnerships with specific coastal ports. One example is Port Greer, South Carolina. Port Greer's operations are linked to the Port of Charleston, 212 miles away, with multiple container trains per day. The key factor driving Port Greer's traffic is the BMW manufacturing plant five miles away; the plant is the state's largest exporter. Imported automotive parts (including engines and transmissions) provide the traffic into the facility.<sup>475</sup> As of 2018, container volume is 124,000 per year, with Michelin, Dollar General, and Dollar Tree also establishing regional facilities at Port Greer.

The success of Port Greer led to a second inland port in South Carolina, Port Dillon, which opened in April 2018. The Dillon site cost \$50 million, covering 158 acres (30 paved acres), with two rubber-tire gantry cranes and an initial projected volume of 45,000 TEU. Harbor Freight Tools is the anchor business, with International Paper also planning to use the site.<sup>476</sup>

The Georgia Ports Authority has also established an inland port as a satellite to its growing Port of Savannah. The Appalachian Regional Port (ARP), located in Chatsworth (about 85 miles north of Atlanta), opened in the summer of 2018. ARP is 388 rail miles from Savannah, and is equipped with three cranes that give the terminal capacity of 100,000 containers per year. Customers include Mohawk Industries (carpeting and flooring); Lowe's and Frito-Lay are viewed as potential customers.<sup>477, 478</sup>

The largest inland port operation away from the coasts is the combined CenterPoint development in Joliet and Elwood, Illinois. As discussed earlier, the two major intermodal terminals (UP's Global IV and BNSF's Logistics Park Chicago) dominate the landscape and freight operations in the region. The entire complex covers more than 6,500 acres, with more than 15 million square feet of industrial space built since 2002. Dozens of large retailers and consumer products companies have warehouse facilities across the CenterPoint area. The annual economic activity for the complex exceeds \$75 billion.<sup>479</sup> Other successful examples of inland ports include Columbus, Ohio's Rickenbacker Intermodal Terminal and Global Logistics Park, with 75 million square feet of warehouse and distribution space.<sup>480</sup>

One of the most recent examples of state involvement in inland port development is in De Witt, New York (near Syracuse). The State of New York is providing \$19 million towards construction of an inland port for CSX, for containers landing at the Port of New York and New Jersey. The funding will allow the existing yard to be reconfigured for additional capacity, purchase stacking equipment and tracking

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<sup>474</sup> <https://www.tradeandindustrydev.com/industry/logistics-warehousing-distribution/the-emergence-inland-port-jones-lang-lasalle-5398>

<sup>475</sup> <http://newharborllc.com/2016/08/05/inland-ports-on-track-for-growth/>

<sup>476</sup> [https://www.postandcourier.com/business/million-inland-south-carolina-port-opens-monday-bringing-jobs-to/article\\_0cfae7dc-3dad-11e8-9f5a-5beb11f18370.html](https://www.postandcourier.com/business/million-inland-south-carolina-port-opens-monday-bringing-jobs-to/article_0cfae7dc-3dad-11e8-9f5a-5beb11f18370.html)

<sup>477</sup> [https://www.joc.com/rail-intermodal/class-i-railroads/csx-transportation/inland-port-feeding-savannah-gives-south-appalachia-shippers-rail-option\\_20180822.html](https://www.joc.com/rail-intermodal/class-i-railroads/csx-transportation/inland-port-feeding-savannah-gives-south-appalachia-shippers-rail-option_20180822.html)

<sup>478</sup> <https://www.freightwaves.com/news/northwest-georgia-inland-terminal-begins-operations>

<sup>479</sup> [https://assets.recenter.tamu.edu/Documents/MktResearch/DFW\\_Houston\\_Industrial\\_InlandPortsLogistics.pdf](https://assets.recenter.tamu.edu/Documents/MktResearch/DFW_Houston_Industrial_InlandPortsLogistics.pdf)

<sup>480</sup> <https://rickenbackeradvantage.com/warehouse-distribution>

technology, and upgrade security. Reduced congestion from truck drayage on I-81 is projected to be a major benefit from this project.<sup>481</sup>

The “inland port” term is also being applied to a smaller development in Decatur, Illinois. Archer Daniels Midland, a major agricultural business, is collaborating with CN and others on the “Midwest Inland Port.” Local economic development officials are seeking to bring in sufficient imported boxes for the region’s industrial businesses to provide available capacity for export of agricultural products, food products, and other customers.<sup>482</sup>

Not all inland port proposals and projects are successful, however. In Kingsbury, Indiana, local officials established a 1,000-acre business park with the expectation that CSX would build an inland port facility adjacent to the site. Instead, CSX opted for a location about 175 miles east, in North Baltimore, Ohio. Subsequent efforts to attract tenants to the part, or to attract CSX or NS to develop a terminal facility, have been unsuccessful.<sup>483</sup> The critical element for the success of an inland port is to ensure the long-term commitment of high-volume customers (such as retail) at warehouse facilities adjacent to the rail terminal facility. Without a steady volume of containers, rail companies will direct their resources elsewhere.

#### WAREHOUSING

Major inland ports feature millions of square feet of warehouse capacity, allowing several intermodal trains per day to be unloaded and positioned for truck delivery across larger geographic areas. The connections between logistics and warehousing have become evident through the real estate market, as 3PLs are now the largest group holding leases among the nation’s 100 largest warehouses. As of mid-2018, 3PLs held 33 leases for over 20 million square feet, followed by E-commerce companies, with 23 leases for more than 17 million square feet. Other sectors with leases of large facilities include manufacturers (14 leases), food and beverage (11 leases), retailers (7 leases), and technology (4 leases). Use of 3PLs gives companies flexibility on lease terms and tenure, allowing resources to be redirected as market demands and conditions change. The supply chain expertise and other value-added services of 3PLs also motivates this trend.<sup>484</sup>

Intermodal transportation, including inland port operation, has integrated with the established just-in-time (JIT) logistics model. Companies reduce or eliminate warehouse inventories (and carrying costs) with the expectation of predictable delivery volumes and times, whether the freight is ordered from within the same city or from the other side of the planet. At Port Greer, BMW uses the Port to conduct off-site management of containers, in place of warehousing. When the manufacturing facility requires particular components, those containers are retrieved and delivered to BMW within a 45-minute window, several times daily. The operation allows more efficient use of space at the manufacturing plant.<sup>485</sup>

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<sup>481</sup> <https://cnycentral.com/news/local/dot-awards-19-million-to-construction-of-inland-port-at-csx-rail-yard-in-dewitt>

<sup>482</sup> <https://www.midwestinlandport.com/overview/>

<sup>483</sup> [https://www.nwitimes.com/business/local/csx-lays-out-intermodal-terminal-plans-for-crete/article\\_b59b110f-0f7d-51fb-a71d-24899d082dee.html](https://www.nwitimes.com/business/local/csx-lays-out-intermodal-terminal-plans-for-crete/article_b59b110f-0f7d-51fb-a71d-24899d082dee.html)

<sup>484</sup> <https://www.supplychaindive.com/news/3PLs-lead-warehouse-leases-2018/532967/>

<sup>485</sup> THE INLAND PORT: A Versatile Solution for Today’s Most Pressing Supply Chain Challenges, South Carolina Ports and Supply Chain Dive, 2018.



An emerging subset of warehousing is that of fulfillment centers – warehouses within urbanized areas that are positioned to address the emerging demands for same-day or next-day deliveries. Two examples of large-scale, last-mile fulfillment center projects are located on the southwest side of the City of Chicago. The first is a centrally-located warehouse development being completed by late 2018 at 2075 W. 43<sup>rd</sup> Street, in the Back of the Yards neighborhood, about 6 miles southwest of the Loop. Labeled as Marina Crossings, this project features a 633,000-square-foot building, said to be the largest industrial spec development in Chicago in more than 100 years.<sup>486</sup> The facility is being marketed for last-mile fulfillment, e-commerce, and food and service-related users. Four intermodal yards are nearby.<sup>487</sup>

*Image 39: Marina Crossings Facility, Chicago (Source: Marina Crossings).*



Just northwest of the BNSF Corwith Intermodal Yard (across the Stevenson and the Chicago Sanitary and Ship Canal), a 70-acre parcel along Pulaski Road that housed the Crawford power generating station was acquired by Hilco Redevelopment Partners in 2018. The coal-fired plant building is to be demolished and replaced by a warehousing/distribution facility designed to serve the growing online retail market.<sup>488</sup> The \$100 million project, named Exchange 55, received approval from the Chicago Plan Commission in September 2018. The facility is planned to include more than 1 million square feet of warehousing, with up to 188 truck loading berths.<sup>489</sup>

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<sup>486</sup> <https://www.rejournals.com/the-largest-spec-warehouse-in-over-a-century-builds-on-chicago%E2%80%99s-history-20180618>

<sup>487</sup> <https://www.marinacrossings.com/>

<sup>488</sup> <http://www.chicagotribune.com/business/columnists/ori/ct-biz-crawford-station-redevelopment-ryan-ori-20180205-story.html>

<sup>489</sup> <https://therealdeal.com/chicago/2018/09/13/hilco-gets-citys-go-ahead-for-1m-sf-spec-warehouse-on-sw-side/>



## TRANSLOADING

As noted previously, a noteworthy trend in containerized freight is that of transloading between international and domestic containers, especially for imports. From 2011 through 2016, the North American ports with the largest volumes, Los Angeles and Long Beach, witnessed the percentage of cargo volume transloaded grow from 52 percent to 58 percent. Due to their proximity to large consumer markets and proximity to Asian manufacturing locations, those ports are the primary destination for higher-value products such as electronics and auto parts. Retailers are noted as “pushing” the maritime containers to transload locations, where the contents – reloaded into domestic containers – can be directed to regional distribution centers.<sup>490</sup>

*Image 40: Transloading of containers (Source: Journal of Commerce)*



Among the advantages of transloading is use of rail car and chassis capacity, which translates to cost-savings of three to 11 percent.<sup>491</sup> Generally, the contents of three 40’ maritime containers can be transloaded to two 53’ domestic containers. One of the challenges to this model in Southern California is the truck drayage involved, moving the containers 50 miles each way between the ports and the Inland Empire (where transloading operations are concentrated). Approximately 6.8 million drays are conducted each year for the transloading and reshipment of containerized imports. A separate measurement of the disposition of imports to Southern California found that as of 2015, 21.3 percent of the cargoes stayed local; 36.5 percent of the containers were loaded intact for shipment inland, and 42.2 percent of containers were transloaded and reshipped in domestic containers or trailers. By comparison, in 2001, 47 percent of containers moved intact inland, while 32 percent of containers were transloaded. The researcher evaluating the region’s container transloading recommended shorter-distance drayage by incentivizing the construction of larger-capacity warehouses on under-utilized land parcels near the ports. Alternately, UP and BNSF could be incentivized to provide short-haul container moves to the Inland Empire, or cooperate with a terminal railroad that would conduct the movements.<sup>492</sup>

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<sup>490</sup> [https://www.joc.com/port-news/us-ports/us-transloading-growth-resaping-cargo-routing\\_20170303.html](https://www.joc.com/port-news/us-ports/us-transloading-growth-resaping-cargo-routing_20170303.html)

<sup>491</sup> <https://schneider.com/knowledge-hub/whitepaper/transloading-inland-bound-freight>

<sup>492</sup> [https://www.joc.com/port-news/us-ports/port-los-angeles/paths-slash-la-lb-drayage-costs-emerge-transloads-rise\\_20170127.html](https://www.joc.com/port-news/us-ports/port-los-angeles/paths-slash-la-lb-drayage-costs-emerge-transloads-rise_20170127.html)

In addition to transloading for imported merchandise, transloading is important for exports. Several inland port operations, including both active Wisconsin intermodal

*Image 41: Grain Transloading Operation (Source: World Shipping, Inc.)*



terminals, transload bulk agricultural products (including soybeans, corn, and DDGs) into containers for export. Beyond Wisconsin, the DeLong Company and Gavilon have transload facilities in the Joliet/Elwood area;<sup>493</sup> CN hosts a grain transloading operation in Joliet;<sup>494</sup> CP hosts a transloading operation at Bensenville.<sup>495</sup> The capacity to fill containers with agricultural products for return to Asia was a major factor in the agreement between CP and Genesee and Wyoming (G&W) for a dedicated intermodal service to Bluegrass Farms in Jeffersonville, Ohio on the Indiana & Ohio Railway, a G&W company.<sup>496</sup>

One major customer of rail intermodal that incorporates transloading as an essential function is UPS. As previously mentioned, the Chicago Area Consolidation Hub (CACH) in Hodgkins, Illinois is adjacent to BNSF's Willow Springs intermodal terminal. UPS is planning to invest in more "super-hubs" to handle the expected growth in parcel shipments.<sup>497</sup>

A major challenge for the transloading model is the mismatch it creates for the containers needed by inland-based exporters. If a greater share of maritime containers is unloaded and reloaded (or returned empty) from coastal areas, the availability of these containers in inland areas could be reduced, especially in locations distant from inland ports. Competing demands for the existing containers, combined with Wisconsin's distance from coastal and inland ports, would be likely to further increase containerized shipping costs for some of the state's agricultural and timber exporters. In turn, this could be expected to increase total delivered goods prices, making state products less competitive on global markets.<sup>498</sup> Where the option exists, exporters of containerized agricultural products may be compelled to send commodities by bulk (in rail cars or by barge) to coastal ports, for transload to either bulk freighters or available maritime containers.

#### *ACCESS VIA LOCAL ROADS*

The first- and last-mile issues at inland ports are of great importance, as the time-sensitivity of shipping influences drayage operations - including deliveries of loaded containers to terminals for export,

<sup>493</sup> <https://centerpoint.com/park/centerpoint-intermodal-center-joliet-elwood/our-tenants/>

<sup>494</sup> <https://www.ajot.com/news/cn-to-build-joliet-il-intermodal-ramp>

<sup>495</sup> <https://www.cpr.ca/en/choose-rail/transload-trucking>

<sup>496</sup> <https://www.cpr.ca/en/media/cp-extends-reach-into-the-ohio-valley-and-expands-presence-in-asia>

<sup>497</sup> <https://www.supplychaindive.com/news/ups-super-hubs-high-margin-shipments/532381/>

<sup>498</sup> Based on comments from Larry Krueger, Subcommittee member.

removal of loaded containers to warehouses for deconsolidation, repositioning of empty containers, and truck deliveries to on-site grain containerization operations. Inland ports often require road expansion projects before the terminal opens, as these facilities typically generate substantial increases in traffic volumes. As terminals grow in volume and size, and as surrounding parcels are developed with warehouse and distribution facilities, more pressure is placed on local roads and the municipalities or counties in which they are located.<sup>499</sup>

The U.S. DOT has recognized these challenges through the creation of the National Highway System (NHS) Intermodal Connector system. At the end of 2014, 950 NHS connectors spanning 1,407 miles of roadways had been designated. More than half (54 percent) of the identified connectors are under the jurisdiction of cities or municipal highway agencies; 29 percent were controlled by state highway agencies, and 11 percent by counties.<sup>500</sup>

The Federal Highway Administration, in collaboration with states and MPOs, has also designated several highway corridors and local roads as elements of a national freight network. The Primary Highway Freight System (PHFS) is comprised of 41,518 miles of highway, mostly Interstate Highways. The remainder of the Interstate (9,511 miles) is folded into the larger National Highway Freight Network (NHFN). Also within the NHFN are two categories of local and regional roads: Critical Rural Freight Corridors (CRFCs) and Critical Urban Freight Corridors (CUFCs). States have been given the ability to designate set lengths of roadway under each of those classifications, based on overall National Highway System mileage. Wisconsin has been allowed to designate 150 miles of CRFCs and (in collaboration with MPOs) 75 miles of CUFCs.<sup>501</sup> As of late 2018, these designations were being reviewed by WisDOT and partner agencies.

In some circumstances, port congestion challenges have compelled projects funded within the budgets of terminal operators, including bridges over/into terminals (Savannah, Long Beach). One larger project has been approved for the Joliet/Elwood CenterPoint area: a direct-access toll bridge across the Illinois River, connecting the CenterPoint properties directly with I-80. The project was compelled by growing traffic, additional warehouse development, and by closure of the most direct access to

*Graphic 28: Houbolt Road Toll Bridge, Joliet, IL (Source: Times Weekly).*



<sup>499</sup> <https://www.theherald-news.com/2018/05/15/joliet-will-county-seek-grant-to-plan-for-future-growth/aem17ro/>

<sup>500</sup> <https://ops.fhwa.dot.gov/publications/fhwahop16057/fhwahop16057.pdf>

<sup>501</sup> <https://ops.fhwa.dot.gov/freight/infrastructure/nfn/>



the BNSF Terminal, based on safety concerns over an at-grade rail crossing immediately adjacent to the access point to a state highway. Drayage drivers were compelled to drive 16 miles further each round-trip.<sup>502</sup>

The cost of the bridge construction is estimated at \$160 million; Reduced congestion and increased safety are benefits expected for the existing local road network. The bridge construction and management will be private; tolls are expected to be comparable with those of the Illinois Tollway. The State of Illinois is financing the construction of a new interchange at I-80 and widening of the existing section of Houbolt Road; cost of these elements is projected at \$20 million to \$26 million. Construction is expected to begin in the spring of 2019, with completion in the fall of 2020.<sup>503</sup>

#### *OPTIMIZATION OF CONTAINER MANAGEMENT*

An ongoing issue with intermodal freight is management of empty containers. Among the inefficiencies noted, the average container spends half its life idle, while more than a third of the containers in circulation are empty. Return of containers to China is the greatest imbalance; overall, the empty container movement costs the intermodal sector \$20 billion per year. At the Port of Los Angeles, 57.7 percent of outbound containers were empty in 2017. Between 2010 and 2017, the growth in outbound empty container volumes was 35.2 percent at Los Angeles, 40.6 percent at Long Beach, and 58.5 percent at New York-New Jersey (2011-2017). By comparison, outbound loaded TEU volumes grew 13.8 percent at Los Angeles, 13.7 percent at Long Beach, and 11.8 percent at New York-New Jersey. Among the Uber-type matching services are xChange, which helps match loads and third-party equipment for one-way container moves; and reUse, a triangulation service that includes CMA CGM and Hapag-Lloyd as participants.<sup>504</sup>

Several other factors involved in the management (and potential solutions) for empty/idle containers were discussed at the 2018 Inland Distribution Conference, sponsored by the Journal of Commerce. Visibility of supply chains is important in identifying collaborative opportunities for matchbacks, but much of the data is locked in proprietary protection. Matchbacks can save \$150 to \$400; yet the data gaps (and manual operations) are limiting efficiency. Digital brokerage services are one opportunity for matching fragmented capacity and smaller carriers with demand. However, rates within these services are very volatile. Tracking the fluctuations can help shippers lock in rates as they start climbing. Uber has a freight program, Powerloop, helps harmonize trailer pools.<sup>505</sup> More discussion of container management can be found in the *Technology* section.

Container management through coastal ports to inland ports has also been a concern, evident through periods where dwell times spike. These factors become even more critical during peak periods, during labor slowdowns/disputes, and/or at the port calls of the largest container vessels.<sup>506</sup>

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<sup>502</sup> [https://www.joc.com/rail-intermodal/inland-ports/relief-coming-truckers-serving-fast-growing-chicago-area-inland-port\\_20160714.html](https://www.joc.com/rail-intermodal/inland-ports/relief-coming-truckers-serving-fast-growing-chicago-area-inland-port_20160714.html)

<sup>503</sup> <https://www.theherald-news.com/2018/05/15/joliet-will-county-seek-grant-to-plan-for-future-growth/aem17ro/>

<sup>504</sup> <https://www.supplychaindive.com/news/empty-container-imbalance-transparency-startup/540949/>

<sup>505</sup> [https://www.joc.com/trucking-logistics/inland-distribution-2018-news-intelligence-analysis\\_20181022.html](https://www.joc.com/trucking-logistics/inland-distribution-2018-news-intelligence-analysis_20181022.html)

<sup>506</sup> [https://www.joc.com/port-news/us-ports/port-los-angeles/la-long-beach-working-speed-cargo-flow-docks-inland-sites\\_20150323.html](https://www.joc.com/port-news/us-ports/port-los-angeles/la-long-beach-working-speed-cargo-flow-docks-inland-sites_20150323.html)

For domestic container shortages, the market has resurrected trailer-on-flat-car (TOFC) business, up 19.8 percent in the first seven months of 2018. Customers are using this equipment as a “safety valve” to cover for domestic containers that are unavailable. Industry observers noted that while private fleets of domestic containers saw their productivity/level of use (as measured in revenue moves per working day) increase by 11 percent from 2016 to 2018, the rail-owned fleet of domestic containers only saw its use increase by one percent. Reduced train velocity is noted as one factor reducing domestic container productivity for the rail companies.<sup>507</sup>

## SECTION SUMMARY: INLAND PORTS AND TERMINALS

Inland ports typically operate as “relief valves” for capacity-constrained coastal ports. Some facilities are directly tied to coastal ports, as in South Carolina and Georgia. This connection allows the coastal ports to move containers by rail to locations closer to consumer markets, thereby reducing drayage mileage and cost. Most inland ports have robust warehousing and distribution operations adjacent to the port facility, and routinely offer dedicated services to primary customers.

In Chicago and other large cities, newer warehouses are being built near intermodal yards to serve the emerging parcel delivery and same-day delivery “Amazon” model. Higher-value imports are routinely transloaded at coastal ports into domestic containers, where capacity is available.

Transloading of agricultural products into containers for export is a frequent operation for inland ports in the Midwest, but depends on the availability of sufficient maritime containers for export. Local roads are critical to first- and last-mile drayage movements at inland ports; major projects have been built to address congestion and access.

Technology that supports improved container visibility and coordination is being instituted across the intermodal sector, but large volumes of containers are returned empty to overseas destinations.

## RAILROADS

### OPERATIONS

#### *SYSTEM MANAGEMENT*

The Chicago region has been a historic challenge to Class I railroad operations, and intermodal operations have been no exceptions. Weather-related delays, particularly in winter months, have reduced the throughput of many yards. But even without complications from weather, railroad congestion has affected several operations. Canadian National witnessed performance deterioration for its intermodal service in 2017 and early 2018, with average intermodal train speeds slipping from 28.6 miles per hour to 23.3 miles per hour; and yard dwell times at the Harvey (Chicago) yard increasing from 10 hours to 16 hours. These factors led to CN’s Board of Directors replacing its CEO in March of 2018,

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<sup>507</sup> <https://www.americanshipper.com/news/intermodal-analyst-2018-is-heck-of-a-year?autonumber=72534&origin=relatedarticles>



coupled with a commitment by the new leader to invest in equipment, staff, and infrastructure across the system to improve overall operational efficiency.<sup>508</sup>

Following a series of rail system congestion issues in the winter of 2013- 2014 that left powerplants with low coal supplies, delays in delivery of fertilizer to agricultural regions, and grain elevators with few cars for export, Congress convened hearings to compel the Class I railroads to monitor and openly disclose key performance metrics from their systems on a weekly basis, and to report on progress made in addressing service needs. An interim rule was established in October 2014 to report the performance of the Class I railroads and of the Chicago gateway on a weekly basis. Following a Notice of Proposed Rulemaking and additional hearings, the reports were made permanent as of March 2017. The ten metrics being tracked are:

- System average train speed by train type
- System average terminal dwell
- Cars online by car type
- Average dwell time at origin for unit trains by train type
- Trains held greater than 6 hours
- Cars not moved in greater than 120 hours and 48 hours
- Grain cars loaded and billed
- Grain cars: past due, average days late, new orders, orders filled, and orders canceled
- Grain trains: plan vs. performance
- Coal trains: plan vs. performance<sup>509</sup>

Future spikes in demand, major weather incidents, infrastructure failures, or intentional acts of sabotage could disable key rail corridors. While individual railroads have made major capital investments to improve resilience to such acts, incidents that affect multiple railroads or broader geographic areas could be more difficult to address.

#### *CAPACITY CONSTRAINTS*

The intermodal freight sector saw a spike in demand in mid-2018, driven by several factors coming together. First, cost spikes in truckload transportation were implemented as a result of driver shortages, fuel cost increase, and the ELD mandate. While railroads had anticipated increased traffic, demand still stretched the capacity of railroads. Spot rates for Los Angeles to Chicago rail intermodal increased by 90 percent over between May 2017 and May 2018; for Los Angeles to Dallas, that increase was more than 117 percent. Union Pacific stated in May 2018 that it was fully booked for domestic outbound intermodal contract volume through the end of 2018.<sup>510</sup>

The Chicago area was noted for constraints that continued into the summer, with lack of eastbound intermodal rail capacity from the West Coast and intensive use of local drayage that reduced the ability of shippers to get sufficient outbound trucking capacity. Truck lanes leaving Chicago that paralleled rail

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<sup>508</sup> [https://www.joc.com/rail-intermodal/class-i-railroads/canadian-national-railway/ruest-named-canadian-national-ceo-interim-tag-lifted\\_20180724.html](https://www.joc.com/rail-intermodal/class-i-railroads/canadian-national-railway/ruest-named-canadian-national-ceo-interim-tag-lifted_20180724.html)

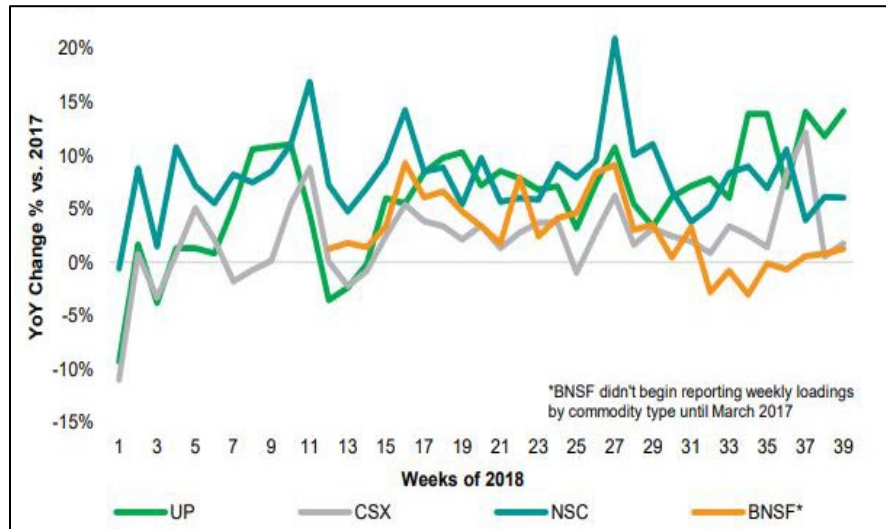
<sup>509</sup> [https://www.stb.gov/stb/railserviceissues/rail\\_service\\_update.html](https://www.stb.gov/stb/railserviceissues/rail_service_update.html)

<sup>510</sup> [https://www.joc.com/rail-intermodal/us-shippers-hitting-capacity-barriers-rail-road\\_20180524.html](https://www.joc.com/rail-intermodal/us-shippers-hitting-capacity-barriers-rail-road_20180524.html)

lines (Chicago to Dallas and Chicago to Allentown, PA) were identified as witnessing huge per-mile rate spikes, further giving support to the assessment that no additional rail intermodal capacity existed.<sup>511</sup>

By October 2018, rail intermodal capacity eased outside of California, even as monthly volume records were set in August. Chart 20 shows how the 2017 to 2018 week-to-week volumes for the four largest U.S. Class I railroads have been almost completely in positive territory through most of 2018. In California, domestic container use remains tight, with one asset provider charging \$2,000 penalties for “street

**Chart 20:** U.S. Class I Container/Trailer Load Volume Changes, 2018 vs. 2017  
(Source: Journal of Commerce)



turns” (reloading containers for a new move after unloading the delivered cargo) without prior approval. The company stated its fleet was at 96 percent utilization. Union Pacific also imposed a \$1,200 surcharge on its shared fleet containers outbound from Los Angeles. Industry observers expressed concerns over looming seasonal demand from UPS and FedEx. The assessment is that across the U.S., peak demand periods will challenge all freight modes, and that shippers using California facilities will be confronted with equipment shortages and surcharges.<sup>512</sup>

In Wisconsin, one capacity barrier for Union Pacific is a series of bridges on the south side of Milwaukee that do not allow safe clearance for double-stack intermodal cars. A 2014 incident demonstrated the issue, as three bridges were damaged by an “ArroWedge” affixed to an empty double-stack container car that had been sent to UP’s Butler Yard for classification. Issues with misclassification of the car in Chicago yards were cited as factors contributing to the equipment being incorrectly sent through the low clearance routes.<sup>513</sup> Future use of this corridor by double-stack cars for through traffic (or for traffic destined for a potential Wisconsin facility) will require increasing the distance between railbed and bridge structures.

<sup>511</sup> <https://www.freightwaves.com/news/intermodal-tightness-pumps-chicago-freight-market>

<sup>512</sup> [https://www.joc.com/rail-intermodal/class-i-railroads/peak-season-were-us-intermodal-rail-expectations-set-too-high\\_20181010.html](https://www.joc.com/rail-intermodal/class-i-railroads/peak-season-were-us-intermodal-rail-expectations-set-too-high_20181010.html)

<sup>513</sup> <http://archive.jsonline.com/newswatch/255929101.html>

## CAPACITY IMPROVEMENT PROJECTS

As previously noted, the Alameda Corridor marked a new paradigm for public-private partnerships that generated community benefits while modernizing and improving the capacity of freight railroad operations. In 2004, another project with transcontinental significance opened: the “Argentine Connection,” otherwise dubbed the Kansas City Flyover. This \$60 million project grade-separated BNSF’s Los Angeles-to-Chicago lines over UP. At the time, the project allowed 135 trains daily to pass over or under each other without traffic conflicts.<sup>514</sup>

For Wisconsin’s intermodal freight customers, many of which have their freight drayed to and from the Chicago area, the most influential set of rail capital projects is assembled under the acronym CREATE (for Chicago Region Environmental and Transportation Efficiency) Program. The plan was established

in 2003 as a \$4.4 billion interrelated set of projects targeted at relieving congestion in the Chicago area and preparing the region for future traffic growth. A total of 70 projects were identified, including grade separations of rail crossings at six locations. The national importance of these projects was recognized through successful grant applications, including \$100 million in 2010 under the first Transportation Investment Generating Economic Recovery (TIGER) grants, and \$10.4 million in 2012 (under TIGER IV). Railroad commitments to the projects totaled \$366 million directly to CREATE projects, and \$5.2 billion for other infrastructure improvements in the Chicago region.<sup>515</sup> As of mid-2018, 29 CREATE projects had been completed, 5 projects were under construction, 4 projects were in final design, and 13 projects were in environmental/preliminary engineering.<sup>516</sup> \$2 billion in public and private funds had been

Graphic 29: CREATE Project/Corridor Map, 2018 (Source: CREATE).



<sup>514</sup> <https://www.progressiverailroading.com/mow/news/BNSF-begins-to-move-trains-across-Kansas-City-flyover--6593>

<sup>515</sup> <https://www.progressiverailroading.com/mow/article/After-13-years-of-collaboration-and-determination-CREATE-partners-continue-to-take-on-Chicagos-tangled-rail-network--48837>

<sup>516</sup> [http://createprogram.org/linked\\_files/StatusGraphSlide.pdf](http://createprogram.org/linked_files/StatusGraphSlide.pdf)

invested. When completed, CREATE projects will allow the region to accommodate 50,000 more freight trains per year by 2051.<sup>517</sup>

In 2018, the U.S. DOT awarded \$132 million in Infrastructure for Rebuilding America (INFRA) grant funding towards the 75<sup>th</sup> Street Corridor Improvement Project (CIP), the largest project grouping within CREATE.<sup>518</sup> The CIP will separate passenger and freight traffic through infrastructure investments that include one flyover, one road and rail grade separation, two junction replacements, two improved interchanges, and improved signaling. These collective projects will amount to \$474 million, with funding that also included \$111 million from the State of Illinois, \$116 million from the rail industry, \$78 million from Cook County, \$28 million from Amtrak and Metra, and \$9 million from the City of Chicago. In addition to freight efficiency improvements, the corridor project is expected to eliminate 32,000 annual passenger hours of rail delay in the region.<sup>519</sup>

Away from Chicago, Class I railroads continue to invest in corridor projects to improve intermodal capacity. One example is the BNSF effort to double-track its entire 2,200-mile Los Angeles-to-Chicago route. As of the end of 2015, more than 99 percent of the corridor had double-track in place, allowing the daily train volume to increase from 62 to 78. The velocity was also increased, reducing the trip time from 64 hours to 61 hours. Other projects addressing “chokepoints” cited include CSX rebuilding a Washington, D.C. tunnel to allow double-stack movement on double tracks; and UP adding a second track on its 760-mile Los Angeles-El Paso corridor.<sup>520</sup>

#### *CORPORATE RESTRUCTURING*

The tenure of E. Hunter Harrison at CSX was brief, but his management team and philosophy of “Precision Scheduled Railroading” (PSR) has remained, reworking many of the paradigms for the company’s intermodal operations. First, CSX’s North Baltimore facility, opened in 2011 as a “hub” for intermodal operations in the Midwest, witnessed a major change in its function. As recently as 2016, the yard tallied 809,000 container lifts, or 29 percent of the total CSX container operations. Instead of serving as a containerized intermodal facility that also distributed intermodal trains to Chicago, Detroit, and Louisville, the yard’s operations were altered in late 2017 to support the PSR model for faster service along key corridors. Intermodal service to and from low-volume destinations ceased, and traffic (including most intermodal) has been diverted to faster corridors and in some cases integrated with merchandise trains. The yard was repurposed for more conventional operations, with freight cars of all configurations being brought in and sent out on different trains. Trains going to and coming from Chicago interchange with BNSF, CP, and UP were slated to be block-swapped, with no more intermodal lifts conducted at North Baltimore.<sup>521, 522</sup>

Then, in October 2018, North Baltimore was once again selected as a terminal for premium intermodal service. BNSF and CSX announced a scheduled intermodal service for both domestic and international

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<sup>517</sup> <https://www.railwayage.com/freight/plans-aim-to-streamline-chicago-rail-network/>

<sup>518</sup> [Ibid.](#)

<sup>519</sup> <http://www.progressiverailroading.com/mow/news/Rail-government-officials-mark-75th-Street-Corridor-project-in-Chicago--55757>

<sup>520</sup> <https://www.dallasnews.com/business/business/2015/10/11/bnsf-builds-rail-superhighway-to-grab-truck-freight>

<sup>521</sup> <http://trn.trains.com/news/news-wire/2017/11/02-csx-intermodal-cuts>

<sup>522</sup> <http://trn.trains.com/news/news-wire/2017/11/02-csx-and-block-swapping>



containers between Los Angeles and North Baltimore, as well as expanded service to and from the eastern terminals at the Port of New York and New Jersey. The announcement also noted plans to develop a 500-acre logistics park adjacent to the Ohio terminal, featuring a container yard, transloading, export containerization, and a heavy-haul corridor.<sup>523</sup>

Of interest, the other eastern railroad, Norfolk Southern, has been more consistent with regards to its recently-built large intermodal facility in Ohio. In 2008, NS opened a combined rail/truck/air intermodal facility at the Rickenbacker International Airport in Columbus, Ohio, conducting more than 200,000 lifts per year. Plans have been submitted to increase capacity and allow more than 300,000 lifts by 2024. NS stated the facility was operating at or beyond its capacity in 2015.<sup>524</sup> That year, a TIGER grant application for \$17.15 million towards the \$34.3 million project was unsuccessful.<sup>525</sup>

In September 2018, CSX announced further cutbacks in its intermodal service, primarily affecting interchange with UP. Almost two-thirds of domestic intermodal pairs between UP and CSX – 197 of 301 – were eliminated due to low volumes, or no volume at all. Much of the traffic was routed through Chicago. UP stated its intent to divert loads to NS, and provided a matrix for its customers to use. Some remaining routes were shifted to interchange in Memphis. CSX corporate statements noted the company would focus improvements on three intermodal corridors, including those between Chicago and Syracuse, New York and between Chicago and Jacksonville, Florida. The company also indicated concern over customers leaving containers in yards, or surges in the volume of containers delivered.<sup>526</sup>

In September 2018, Union Pacific announced that it would also be adopting principles of Precision Scheduled Railroading. Its announcement identified four objectives as part of its new operating plan:

- Shifting the focus of operations from moving trains to moving cars.
- Minimizing car dwell, car classification events, and locomotive power requirements.
- Utilizing general-purpose trains by blending existing train services.
- Balancing train movements to improve the utilization of crews and rail assets.

The announcement noted that the initial implementation would include the north-south corridor between Wisconsin and Texas.<sup>527</sup>

#### *OPERATIONAL COLLABORATION WITH OTHER CLASS I LINES*

As Class I railroads seek efficiencies, collaboration with other railroads have taken on greater favor. These collaborations include several strategies. One example is shared corridor use that improves operational efficiency for both companies, such as a bi-directional agreement between CN and CP for 155 miles in British Columbia's Fraser Canyon. Capacity increased from 30 trains per day to over 100 trains per day. Another example are regional dispatching centers (in Spring, Texas; San Bernardino, California; and Kansas City, Kansas) for BNSF and UP that have led to other bi-directional operating agreements. Among several partnerships, since 2005 CN and BNSF have agreed on routings at five

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<sup>523</sup> <https://www.railwayage.com/intermodal/bnsf-csx-launch-la-ohio-intermodal-service/>

<sup>524</sup> <http://www.dispatch.com/content/stories/business/2015/07/02/railway-plans-to-expand-airport-hub.html>

<sup>525</sup> <https://www.bizjournals.com/columbus/news/2015/11/09/exclusive-34m-rickenbacker-project-in-limbo-after.html>

<sup>526</sup> <https://www.railwayage.com/intermodal/csx-overhauling-intermodal-up-customers-affected/?RAchannel=intermodal>

<sup>527</sup> <https://www.up.com/media/releases/180917-unified-plan-2020.htm>



interchange points, including Chicago and Superior. Computer programs and marketing agreements determine revenue splits. CN and UP have established collaboration for interchanging traffic between Texas and western Canada in Superior, one of multiple corridor agreements between the two companies.<sup>528</sup>

As of early 2018, CP and CSX are performing direct interchange through Chicago. Each company blocks the rail cars in other yards, then swaps them in Bensenville. The block swap of 100 cars from each company removes 200 cars from the Chicago Clearing Yard.<sup>529</sup>

#### *AFFILIATIONS BETWEEN CLASS I LINES AND SHORT LINES*

The Indiana Railroad (IRR), a regional railroad based mostly in its namesake state, began a partnership in 2013 to extend CN's intermodal operations to Indianapolis, and to provide that region with direct containerized rail access to Asia through Prince Rupert and Vancouver.<sup>530</sup> A 2015 article stated IRR's container volumes grew from 12,562 in 2014, to an expected 14,000 in 2015, to a potential for 17,000 in 2016. One source of business at that time was export of Miller Genuine Draft and Miller Lite beer to Canada.<sup>531</sup>

*Image 42: Indiana Railroad Intermodal Train (Source: Trains/Eric Powell).*



As previously noted, in the southwestern Ohio community of Jeffersonville (about halfway between Columbus and Cincinnati), a 90-acre terminal has been developed by Bluegrass Farms of Ohio, a corn and soybean producer. Through a cooperative agreement similar to that of CN and the Indiana Railroad, Canadian Pacific and the shortline holding company Genesee & Wyoming (G&W) have partnered to deliver intermodal containers to and from Vancouver, exporting agricultural products to Asian markets. CP interchanges the cars in Chicago with G&W's Chicago, Fort Wayne & Eastern for transport to Lima, Ohio; there, the cars are interchanged with G&W's Indiana & Ohio Railway for delivery to Jeffersonville.<sup>532</sup> Service started in late July 2018 with six-day-per-week service; targeted markets for

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<sup>528</sup> [https://www.progressiverailroading.com/bnsf\\_railway/article/Shared-Interest-Class-I-Collaboration-Capacity--31829](https://www.progressiverailroading.com/bnsf_railway/article/Shared-Interest-Class-I-Collaboration-Capacity--31829)

<sup>529</sup> <https://www.railwayage.com/regulatory/cps-creel-stb-significant-productivity-efficiency-service-financial-stability-gains/>

<sup>530</sup> <http://www.inrd.com/intermodal.aspx>

<sup>531</sup> [http://www.progressiverailroading.com/short\\_lines\\_regionals/article/As-he-earns-his-CEO-stripes-Peter-Mills-strives-to-put-his-stamp-on-the-Indiana-Rail-Road--46380](http://www.progressiverailroading.com/short_lines_regionals/article/As-he-earns-his-CEO-stripes-Peter-Mills-strives-to-put-his-stamp-on-the-Indiana-Rail-Road--46380)

<sup>532</sup> <http://trn.trains.com/news/news-wire/2017/10/11-gw-cp-intermodal-ohio>

imports include auto parts shippers who will be able to bypass interchange issues in Chicago.<sup>533</sup> Graphic 30 displays (in blue) the G&W lines used for this operation.

**Graphic 30:** Canadian Pacific / Genesee & Wyoming Cooperative Intermodal Service  
(Source: Canadian Pacific)



The previously-discussed collaborations between CP and G&W into Ohio, and between CN and the Indiana Railroad into Indianapolis, provide potential examples of how Class I lines have partnered with short lines to extend service into geographic areas beyond their existing systems. As of December 2018, Watco's Wisconsin & Southern (WSOR) unit does not have any such partnerships. WSOR has a distinct advantage in that its access to Chicago allows it to directly interchange with six of the seven Class I lines. Should market conditions warrant,

WSOR could partner with Norfolk Southern or CSX to give Wisconsin companies access to ports on the Atlantic Coast, including New York-New Jersey and Savannah. One factor to consider in this scenario would be connection fees charged by both railroads for the exchange, which could challenge the economic feasibility of such an operation.

#### NEW TERMINALS CEDAR RAPIDS, IA

One new facility under development may provide intermodal options for the southwestern part of Wisconsin. The Iowa Department of Transportation was awarded a grant of \$25.65 million under the FASTLANE program for the construction of a new containerized intermodal, cross-docking, and transloading freight facility / logistics park near Cedar Rapids. The federal funds will be matched by \$21 million in local funds from Alliant Energy and other partners to build the \$46.5 million, 75-acre project. The facility will be rail-served by a shortline operator, the Cedar Rapids and Iowa City Railway (CRANDIC).<sup>534</sup>

Based on a 2016 presentation, the Cedar Rapids Logistics park will feature 35 acres for integrated intermodal; a 120,000-square-foot cross-docking warehouse with 200 doors; and a two-track truck-rail bulk transload area. The consolidation of freight operations at this location was calculated to yield a benefit-cost ratio of greater than 26:1, factoring in the intermodal, cross-dock, transload, safety, and

<sup>533</sup> <http://trn.trains.com/news/news-wire/2018/08/17-cp-genesee-wyoming-launch-southwest-ohio-intermodal-service>

<sup>534</sup> <https://www.americanshipper.com/main/news/iowa-to-move-forward-with-cedar-rapids-intermodal-64630.aspx>

emissions benefits and savings. Agreements, environmental analysis, and final design was expected to be completed by the end of 2017, with bid letting, equipment purchase, and construction to be conducted in 2018.<sup>535</sup> The range of the facility was expected to be at least 90 minutes by truck.<sup>536</sup> Subsequent revisions to the timeline have moved the opening date back to 2019.<sup>537</sup>

Challenges to the Cedar Rapids intermodal operation include the lack of container balance, as Iowa exports far more than it brings in. Empty containers would need to be repositioned to be available for loading exported goods. An additional factor is the Class I rail business model that has already invested heavily in Chicago area intermodal terminals, and to date has shown reluctance to add service that competes with existing facilities. Of note, another short line, Iowa Northern, has been pursuing development of an intermodal facility in Manly, Iowa, along I-35 near the Minnesota-Iowa state line. As of 2018, the Manly hub has not been successful in receiving federal grants.<sup>538</sup>

#### CRETE, IL

CSX had proposed building a new large-scale intermodal facility on 250 acres south of Crete, IL, west of the junction of Illinois Highway 1 and Interstate 394. This facility would have capacity for 500,000 lifts per year, with room to expand by 100 additional acres to handle more than 1 million containers per year. The project cost was estimated to be \$230 million.<sup>539</sup> However, the tenure of E. Hunter Harrison led to a review of this proposal; his death at the end of 2017 has left the project uncertain.<sup>540</sup> While CSX has retained a fact sheet on the project that can be found via an internet search,<sup>541</sup> the Crete proposal does not show up on searches of either the CSX website<sup>542</sup> or that of its CSX Transportation (CSXT) intermodal affiliate.<sup>543</sup>

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<sup>535</sup> [https://iowadot.gov/systems\\_planning/freight/FAC/presentation\\_CRLogisticsPark\\_090916.pdf](https://iowadot.gov/systems_planning/freight/FAC/presentation_CRLogisticsPark_090916.pdf)

<sup>536</sup> <http://www.thegazette.com/iowaideas/stories/transportation/can-iowa-keep-up-with-what-it-needs-to-ship-20170709>

<sup>537</sup> <https://www.thegazette.com/iowaideas/stories/transportation/shipping-containers-in-high-demand-20171020>

<sup>538</sup> <https://www.corridorbusiness.com/news/long-haul/>

<sup>539</sup> <http://www.chicagobusiness.com/article/20170408/ISSUE01/170409896/railroads-prepare-for-freight-volumes-to-rise>

<sup>540</sup> <http://www.chicagobusiness.com/article/20171218/NEWS10/171219881/whats-the-fate-of-the-csx-crete-terminal-now-that-hunter-harrison-has-died>

<sup>541</sup> <https://www.csx.com/index.cfm/about-us/projects-and-partnerships/crete-intermodal-terminal/>

<sup>542</sup> <https://www.csx.com/>

<sup>543</sup> <http://www.intermodal.com/>

## EQUIPMENT

### TEMPERATURE-CONTROLLED INTERMODAL

One important subset of intermodal shipping is the temperature-controlled sector, which provides not only refrigeration but moderation in temperatures for commodities such as fresh fruits and

*Image 43: Refrigerated Intermodal Containers (Source: RRPictureArchives.NET/Mike Berka).*



pharmaceuticals. Improvements in temperature monitoring and control systems allow shippers to track location and temperature in real time, with the ability to remotely change the internal temperature of containers.<sup>544</sup> These systems were compelled by the 2011 Food Safety Modernization Act, which required more robust tracking and security for food products throughout the supply chain.

Refrigerated containers can cost \$20,000; in

addition to ensuring food contents are kept at safe temperatures throughout transit, the monitoring systems also allow container owners to quickly remove malfunctioning equipment from service when repairs are needed.<sup>545</sup>



**CP TempPro**

Several carriers promote their ability to service the temperature-controlled intermodal market. BNSF offers an Expedited Intermodal Service that offers 2.5-day service using containers or trailers.<sup>546</sup> Canadian Pacific upgraded its temperature-controlled fleet under the CP TempPro perishable products brand. The investments included acquiring 41 Genset containers, plus approximately 400 53' refrigerated containers and 350 heated units.<sup>547</sup> Canadian National also has its own temperature-controlled service, CargoCool, with telematic monitoring under the ReeferTrak name.<sup>548</sup> In October 2018, CN acquired the TransX Group, a logistics service company with



<sup>544</sup> <https://www.intekfreight-logistics.com/temp-controlled-intermodal-service>

<sup>545</sup> <https://csnews.com/next-advancement-food-supply-chain-safety>

<sup>546</sup> <https://www.bnsf.com/ship-with-bnsf/ways-of-shipping/temperature-controlled.html>

<sup>547</sup> <https://www.railwayage.com/intermodal/cp-introduces-temp-pro-one-stop-service-perishable-products/>

<sup>548</sup> [http://cncargocool.com/?\\_sm\\_au=iVVfvpnrTVjHHZs7#/quickfactsanchor](http://cncargocool.com/?_sm_au=iVVfvpnrTVjHHZs7#/quickfactsanchor)



expertise in refrigerated intermodal sector; this acquisition was noted as strengthening CN's presence in that sector.

The liner services are also noting the potential for growth in the refrigerated container market. In August 2018, Hapag-Lloyd announced an order for 11,000 units. With this order, Hapag Lloyd will have a fleet of more than 100,000 refrigerated containers. That same month, newly-formed ONE ordered 14,000 units (13,000 40' units and 1,000 20' units).<sup>549</sup> Non-rail companies that promote temperature-controlled intermodal service include Tiger Cool Express,<sup>550</sup> Infinity Transportation Logistics,<sup>551</sup> and Hub Group (through its TemStar subsidiary).<sup>552</sup>

Refrigerated containers represent a potential means of increasing the state's agricultural exports. In 2017, Wisconsin exported \$3.5 billion worth of agricultural products to 147 countries. Wisconsin ranks 12<sup>th</sup> among states in the value of agricultural exports, with the largest markets in Canada, Mexico, and China. Prepared vegetables and fruits were the state's most-valuable export category in 2017.<sup>553</sup>

## SECTION SUMMARY: RAILROADS

Rail system management has become an acute concern at times over the past decade, often in relation to winter weather. Federal rules have been established to monitor several operational metrics for the Class I companies and the Chicago interchange. Wisconsin's rail service is directly affected by disruptions to Chicago's operations.

Intermodal freight volumes have grown due to mode shifts from trucks and marketplace demand. At points in 2018, railroads lacked the capacity to accept additional intermodal container loads. Mega-projects such as Chicago's CREATE are addressing capacity constraints and inefficiencies while improving safety and allowing for volumes to grow in the future.

Corporate restructuring will continue to impact intermodal operations, including the availability of service, the location of open terminals, and the speed and cost of deliveries. The closing of the intermodal terminal at the Port of Milwaukee in 2012 followed a corporate restructuring by Canadian Pacific.

Class I railroads routinely collaborate with each other on operational strategies of mutual benefit. The Class Is also have partnered with some short lines to extend intermodal service to several locations in the Midwest. There may be opportunities to apply some of the successful strategies from these operations to opportunities in Wisconsin. Elsewhere in surrounding states, potential new intermodal terminals have been proposed, but face financial and customer demand challenges.

Temperature-controlled intermodal container service is a growing sector in North America, with promise for Wisconsin's food industry exporters.

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<sup>549</sup> <https://theloadstar.co.uk/coolstar/one-adds-14000-new-reefers-box-carriers-continue-target-cool-chain/>

<sup>550</sup> <http://www.tigercoolexpress.com/>

<sup>551</sup> <https://www.prnewswire.com/news-releases/infinity-transportation-logistics-to-buy-new-next-generation-refrigerated-intermodal-containers-to-double-its-fleet-300702557.html>

<sup>552</sup> <http://www.dcvelocity.com/articles/20180904-hub-sells-mode-transport-unit-to-focus-efforts-on-core-businesses/>

<sup>553</sup> <https://datcp.wi.gov/Pages/Publications/WIAgStatistics.aspx>



## TRUCKING AND DRAYAGE OPERATIONS – DRAYAGE

### *DRIVER SHORTAGES*

As noted elsewhere, the trucking sector continues to be faced with challenges to driver availability, driver demographics, and willingness of drivers to travel long distances. Remaining drivers are seeking higher wages and shorter routes, shippers will need to wait longer for deliveries, and pay more for loads delivered to or received at remote locations far from urban areas. Other geographic locations also generate competition for qualified drivers, including the Permian Basin in western Texas and southeastern New Mexico. One-way trips of longer than 200 miles to and from Chicago area terminals are challenged by the hours-of-service limit (11 hours), coupled with highway and terminal congestion, making travel times less predictable and placing more portions of the state beyond one-day service.<sup>554</sup> This will continue to suppress economic opportunities for businesses in large portions of Wisconsin.

### *DELAYS AT TERMINALS*

In early 2018, CN's intermodal services to/from Prince Rupert and Vancouver faced prolonged cold weather conditions, leading to railroad-mandated limits on train size and velocity, thereby reducing capacity. CN made numerous adjustments to container acceptance at many CN terminals (including Harvey).<sup>555</sup> These factors combined to generate a backlog of containers, a shortage of chassis, and delays at gates that limited the ability of drivers to complete round trips under ELD monitoring.<sup>556</sup>

Even as weather warmed, Harvey was noted for continued challenges to drayage drivers. In July, "unplanned network outages" led to five-hour wait times at Harvey. Lack of chassis in good condition and train operations blocking the entry road at the yard were specified as continuing issues; some drayage drivers refused to provide service.<sup>557</sup> Rates for drayage from the CN Harvey Terminal remained at a premium over other Chicago/Joliet-Area facilities through the summer, lending credence to anecdotal comments on continued delays for drivers at the facility.

## EQUIPMENT – DRAYAGE

### *CHASSIS AVAILABILITY/MANAGEMENT*

The intermodal industry has faced challenges with sufficient import chassis availability since 2014. Several circumstances have been identified as contributing to these shortages, including the ELD mandate (which slows container pickups and chassis turnover), a large pool of broken chassis, larger volumes, and drayage companies who overbook short-term leases and keep chassis to ensure they have on-demand availability for their customers.<sup>558</sup>

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<sup>554</sup> [https://www.joc.com/trucking-logistics/Intl-shipping/chicago%E2%80%99s-dray-challenges-resonate-nationwide\\_20181026.html](https://www.joc.com/trucking-logistics/Intl-shipping/chicago%E2%80%99s-dray-challenges-resonate-nationwide_20181026.html)

<sup>555</sup> <http://www.farrow.com/news-20180102-cold-affects-rail-cn-operations>

<sup>556</sup> [https://www.joc.com/rail-intermodal/class-i-railroads/chicago-intermodal-rail-delays-unprecedented-january\\_20180222.html](https://www.joc.com/rail-intermodal/class-i-railroads/chicago-intermodal-rail-delays-unprecedented-january_20180222.html)

<sup>557</sup> [https://www.joc.com/rail-intermodal/class-i-railroads/canadian-national-railway/chicago-shippers-face-surcharges-even-cn-says-terminal-%E2%80%98near-normal%E2%80%99\\_20170731.html](https://www.joc.com/rail-intermodal/class-i-railroads/canadian-national-railway/chicago-shippers-face-surcharges-even-cn-says-terminal-%E2%80%98near-normal%E2%80%99_20170731.html)

<sup>558</sup> <https://www.scarbrough-intl.com/chassis-shortage-across-america/>

Chassis availability is also controlled by the liner services, who (in an estimated 60 percent of moves) control chassis use through haulage contracts. These chassis are owned by larger operations, labeled intermodal equipment providers (IEPs). BCOs, truckers, ports, and others have also acquired chassis to ensure availability when containers are ready. These entities are increasingly demanding “open choice” to allow for use of other chassis, should the contracted chassis from an IEP be unavailable or in poor condition.<sup>559</sup> IEPs have attempted to improve reliability for chassis availability, using predictive analytics. The challenge has been accurately predicting when chassis will be returned, especially if return terms allow as much as ten days. The chassis can also be returned to different locations from which they originated, further complicating forecasting. Repositioning costs equipment providers \$20 million alone in Southern California yards.<sup>560</sup>

Port congestion has compelled terminal operators to reduce the amount of time containers can remain on-site without fines, as well as increasing the level of the fines.<sup>561</sup> Some drayage companies are making short-distance “pre-pull” moves to place the containers in the truck company yards, thereby saving the customer on storage costs but adding more moves to the overall drayage operation.<sup>562</sup> Other complicating factors for chassis providers include a shortage of qualified repairmen.<sup>563</sup>

*Image 44: Loading Container on Chassis (Source: Transport Topics/Flexi Van).*



Chassis ownership and management companies have taken steps to mitigate shortages in the Chicago terminals. Beginning in February 2018, IEP firm Direct ChassisLink moved the first 450 of an anticipated 1,600 chassis, to increase drayage capacity as delays and reduced predictability and chassis availability.<sup>564</sup>

In Chippewa Falls, Duluth, Minneapolis, St. Paul, and Rochelle, Trac Intermodal is the primary owner/manager of chassis pools for international containers, with flexible leases from one day to one month or longer. Trac also has 13 locations in the Chicago/Joliet area, and manages the chassis fleet of

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<sup>559</sup> [https://www.joc.com/trucking-logistics/joc-chassis-explainer-shipping-industry-seeks-solutions\\_20180716.html](https://www.joc.com/trucking-logistics/joc-chassis-explainer-shipping-industry-seeks-solutions_20180716.html)

<sup>560</sup> [https://www.joc.com/trucking-logistics/us-container-shippings-conundrum-chassis\\_20171229.html](https://www.joc.com/trucking-logistics/us-container-shippings-conundrum-chassis_20171229.html)

<sup>561</sup> [https://www.joc.com/international-logistics/forwarders-warn-rising-unreasonable-demurrage-detention\\_20181003.html](https://www.joc.com/international-logistics/forwarders-warn-rising-unreasonable-demurrage-detention_20181003.html)

<sup>562</sup> <https://www.scarbrough-intl.com/chassis-shortage-across-america/>

<sup>563</sup> [https://www.joc.com/trucking-logistics/repairmen-shortage-exacerbates-us-chassis-scarcity\\_20180703.html](https://www.joc.com/trucking-logistics/repairmen-shortage-exacerbates-us-chassis-scarcity_20180703.html)

<sup>564</sup> [https://www.joc.com/trucking-logistics/drayage/addressing-dislocation-dcli-shifts-chassis-chicago\\_20180226.html](https://www.joc.com/trucking-logistics/drayage/addressing-dislocation-dcli-shifts-chassis-chicago_20180226.html)

Norfolk Southern. The company offers two-axle chassis for 40' containers, or tri-axle chassis for heavyweight 20' containers.<sup>565</sup>

East Coast ports are taking innovative strategies to address chassis demand at their terminals. In 2005, the Port of Virginia inaugurated the Hampton Roads Chassis Pool to provide chassis availability at its terminals.<sup>566</sup> In an echo of that model, Georgia and South Carolina port authorities have been approved to create their own Southern States Chassis Pool for the Charleston and Savannah ports. The existing fleet of 53,000 chassis at those ports is insufficient; demand requires a fleet of 60,000 to 65,000. The fleet will see upgrades, with radial tires and better braking systems.<sup>567</sup>

#### *ELECTRONIC LOGGING DEVICES AND HOURS OF SERVICE*

Although widely-used for years by larger carriers, the Electronic Logging Device (ELD) mandate has now been applied to smaller carriers. The Owner-Operator Independent Drivers Association requested exemptions through the Federal Motor Carrier Safety Administration (FMCSA); that request was denied in mid-2018.<sup>568</sup> Motor carriers are demonstrating increased compliance, with inspections finding a 0.64 percent violation rate in May 2018, down from 1.31 percent in May 2017.<sup>569</sup> The tighter enforcement, coupled with reduced one-day travel ranges for drivers, has led to increased time needed for deliveries and higher costs for drayage – particularly for locations more than a four-hour (one-way) trip from Chicago/Joliet and Twin Cities intermodal terminals. Based on the loss of productivity from early adopters of ELDs, carrier productivity was anticipated to decline by three to seven percent. The impacts would be felt most heavily on one-day hauls of more than 450 miles; 400- to 600-mile jobs would need to go from one shift to a shift-and-a-half.<sup>570</sup> More awareness is being directed to the time drivers spend moving through facilities, and to amenities (such as Wi-Fi) that enable drivers to operate more efficiently.<sup>571</sup>

## FACILITIES – STATE AND LOCAL ROADS

### *FIRST-/LAST-MILE ISSUES*

In the context of intermodal freight transport, the “last mile” refers to the portion of a delivery route between the major national or regional transportation systems and an intermodal facility. Many existing and potential intermodal facilities are located in urbanized areas, often without direct access to major transportation networks. For most intermodal facilities in the Midwest, last mile issues are typically discussed in the context of using local roadways as the connection between the National Highway System and the intermodal facility. Many last mile issues are caused by insufficient roadway design standards, a mix of conflicting land uses near the intermodal site, and the need for coordination between multiple levels of jurisdictional authority.

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<sup>565</sup> <https://www.tracintermodal.com/>

<sup>566</sup> [https://www.joc.com/trucking-logistics/joc-chassis-explainer-shipping-industry-seeks-solutions\\_20180716.html](https://www.joc.com/trucking-logistics/joc-chassis-explainer-shipping-industry-seeks-solutions_20180716.html)

<sup>567</sup> <https://www.savannahnow.com/business/20180726/chassis-pool-for-georgia-south-carolina-ports-approved>

<sup>568</sup> <https://www.ajot.com/news/request-denied-to-small-business-truckers-seeking-exemption-from-eld-mandate>

<sup>569</sup> <https://www.ccjdigital.com/fmcsa-hours-violations-have-dropped-significantly-under-eld-mandate/>

<sup>570</sup> <https://www.bnsflogistics.com/wp-content/uploads/2017/12/MTA-Dec2017.pdf>

<sup>571</sup> <https://www.ttnews.com/articles/supply-chain-partners-focus-efficiency-improve-capacity>

## HIGHWAY INFRASTRUCTURE STANDARDS

A common concern for freight haulers is the transition in design standards from national or state highway systems to the local roadway network. The national and state networks are typically designed with the assumption that they will be used by large commercial vehicles and are better able to withstand the increased wear and tear from heavy freight traffic. In contrast, urban and rural local roadways are not likely to be designed to these same standards. The most problematic concern is roadways and bridges that are not designed to handle 80,000 lb. commercial vehicles, precluding their potential use for accessing intermodal facilities. Vertical clearance issues at bridges and other overhead structures may also prevent the use of some local corridors. Additionally, many of the goals and policies of local road jurisdictions, especially those in urbanized areas (i.e., Complete Streets, improved pedestrian and bicycle infrastructure) result in roadway geometry that is difficult for large vehicles to navigate.

Federal Highway Administration (FHWA) guidance calls for newly-constructed overhead highway bridges to have 23' minimum vertical clearance above the top of the rails. This guidance gives ample clearance for the railroads to operate within their standard vertical clearance of 20'-2" above rail for a loaded double-stack rail car.<sup>572</sup> This guidance is echoed within the WisDOT Facilities Development Manual (FDM), which requires minimum 23' clearances unless special permission is obtained through the Office of the Commissioner of Railroads (OCR), as stated in FDM 17-40-40. Chapter 17 of the FDM establishes engineering guidelines and process for interacting with railroads on all projects where highways and rails intersect, including guidance on agreements among the parties involved.<sup>573</sup>

One additional strategy for addressing these issues is the designation of highway intermodal connectors as part of the National Highway System (NHS). This designation process is handled through coordination between U.S. DOT and State DOTs or Metropolitan Planning Organizations (MPOs). Designation as a highway intermodal connector provides additional funding opportunities through federal freight funding programs under the FAST Act. The FHWA provides recommended criteria for consideration intermodal connector designation, including truck/rail terminals that handle a minimum of 50,000 TEU per year or a minimum of 100 trucks per day in each direction on the principal connecting route.<sup>574</sup> Wisconsin currently has 22 designated Intermodal Connectors.<sup>575</sup> As noted earlier, Wisconsin and its MPOs are collaborating with FHWA on the designation of Critical Urban Freight Corridors and Critical Rural Freight Corridors.

WisDOT has collaborated with partners in Milwaukee County (including the Port of Milwaukee, WE Energies, Milwaukee County, and the cities of West Allis, Greenfield, and Milwaukee) to establish a route for oversize loads originating at a manufacturing facility in West Allis. This route was formally codified in 2017 Wisconsin Act 114. The Act prohibits encroachment of utilities, signage, and other

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<sup>572</sup> [https://www.arena.org/files/library/2013\\_Conference\\_Proceedings/CSX-National\\_Gateway\\_Initiative\\_Clearance\\_Improvement\\_Project-Greenwich-OH\\_Chambersburg-PA.pdf](https://www.arena.org/files/library/2013_Conference_Proceedings/CSX-National_Gateway_Initiative_Clearance_Improvement_Project-Greenwich-OH_Chambersburg-PA.pdf)

<sup>573</sup> <https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/rdwy/fd-down.aspx>

<sup>574</sup> <https://ops.fhwa.dot.gov/publications/fhwahop16057/fhwahop16057.pdf>

<sup>575</sup> <https://wisconsindot.gov/Pages/projects/data-plan/plan-res/nhs.aspx>

elements within a 28-foot-wide and 23-foot-high corridor.<sup>576</sup>

### SECTION SUMMARY: TRUCKING AND DRAYAGE

The trucking sector is challenged by growing freight demand and shortages of qualified drivers. Delays at intermodal terminals for drayage drivers are often tied to chassis availability challenges. Chassis ownership and management remains a problem, as in cases where the liner services dictate the equipment to use for drayage.

Electronic logging devices (ELDs) have led to some productivity losses; one-day drives have been reduced to less than 450 miles. For Wisconsin, this places many parts of the state outside of a one-day round-trip to the Chicago and Joliet yards, especially when delays are factored into hours-of-service. Compliance with the hours-of-service rules have improved between 2017 and 2018.

The Federal Highway Administration (FHWA) has established guidance for bridge projects over roads to provide sufficient vertical clearance for double-stack intermodal trains; this guidance is echoed in WisDOT's Facilities Development Manual. The federal government has also designated several corridors as Intermodal Connectors, and has encouraged states to establish Critical Urban and Rural Freight Corridors.

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<sup>576</sup> <https://docs.legis.wisconsin.gov/2017/related/lcactmemo/act114>



## GLOBAL AND DOMESTIC FACTORS

### ECONOMIC

#### CONSUMER DEMAND

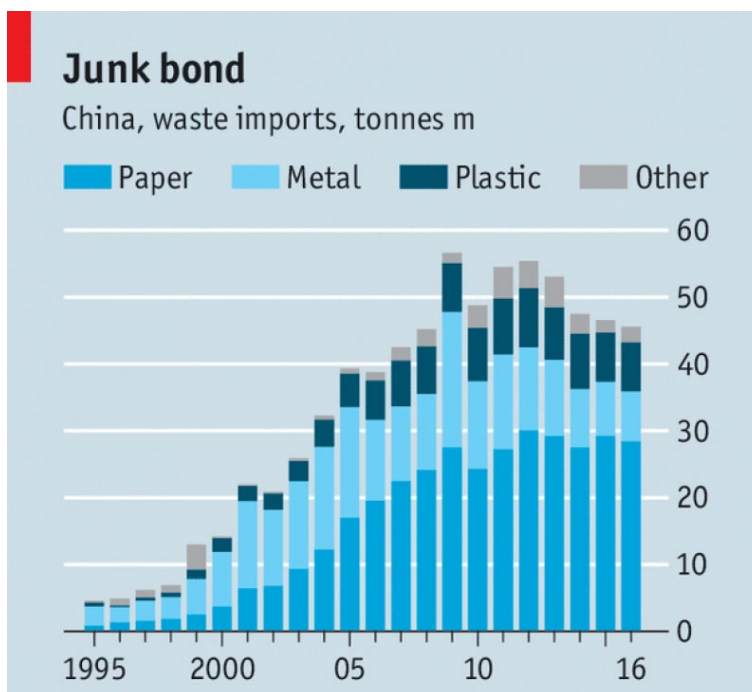
#### EXPORTS

As noted previously in this report, the largest commodity group exported from the U.S. in containers is recyclables, accounting for more than 1.1 million TEU in 2017.<sup>577</sup> For many years, China has taken in items to be reprocessed. Plastics for recycling alone accounted for 106 million metric tons of imports into China from 1992 through 2016, or 45 percent of the total global inventory of such plastics. The U.S. exported 26.7 million tons of plastic between 1988 and 2016. In 2017, China passed laws to prohibit imports of waste and scrap as of January 1, 2018, forcing the materials to be sent elsewhere. Many of these exports have been diverted to other southeast Asian nations, including Thailand, Malaysia, Indonesia, and Vietnam. Vietnam saw its imports of plastic scrap more than double between 2016 and 2017. However, Vietnam became overwhelmed by the volumes of plastic scrap imported, and also passed a law prohibiting plastic scrap imports until at least October 2018.<sup>578</sup>

Electronic scrap is also overwhelming alternative markets to China, which had accepted more than 70 percent of the world's 500 million tons of electronic waste in 2016. Illegal imports into Thailand have occurred,

as electronic scrap and other items for reprocessing have flowed to nations with weaker laws and enforcement against such imports.<sup>579</sup> The Chinese ban has impacted more than just exports from the U.S., as nations such as Germany and New Zealand are also facing stockpiles at recycling centers with few opportunities for export. Experts state that each nation needs to invest in its own reprocessing centers, rather than exporting the materials to another nation.<sup>580</sup>

**Chart 21:** China Imports of Waste/Recyclables, 1995-2016  
(Sources: OECD/The Forum Network, Economist.com; UN Comtrade).



<sup>577</sup> <https://www.ioc.com/special-topics/top-100-us-exporters>

<sup>578</sup> <https://www.npr.org/sections/goatsandsoda/2018/06/28/623972937/china-has-refused-to-recycle-the-wests-plastics-what-now>

<sup>579</sup> <https://www.reuters.com/article/us-thailand-pollution-ewaste/thailand-is-new-dumping-ground-for-worlds-high-tech-trash-police-say-idUSKCN1IV0T9>

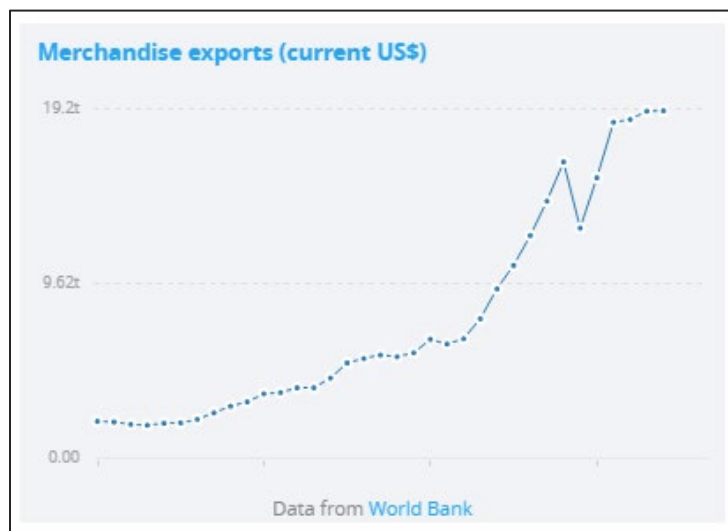
<sup>580</sup> <https://www.stuff.co.nz/environment/103503306/china-has-stopped-taking-our-recycling-and-waste-heres-where-its-ending-up>

In counterpoint to the “pull” of consumer product-driven imports, one operational model is demonstrating the “push” of a major exporter. In Decatur, IL, Archer Daniels Midland (ADM) has partnered with local economic development agencies and three Class I railroads (NS, CN, and CSX) at a privately-owned 280-acre intermodal ramp, branded as Midwest Inland Port.<sup>581</sup> With operations five days per week, the facility primarily serves as an export terminal for DDGs, soybeans, and other grains. As of 2015, the inbound container volume to central Illinois was approximately 21,500 per year. ADM and other companies were collaborating to increase that volume to provide sufficient container capacity to sustain efficient export volumes.<sup>582</sup>

#### TRADE POLICIES AND REGULATIONS

The exchange of goods and services between countries has grown tremendously in the past 30 years. According to World Bank data, as shown in Chart 22, total merchandise exports have grown from \$6.5 Trillion (current U.S. \$) in the year 2000 to \$19.0 Trillion in 2014.<sup>583</sup> The United States has played a key role in this increase and is currently second only to China in terms of the total value of exported goods. In fact, in the past ten years, exports have accounted for between 11 and 13 percent of the United State GDP.<sup>584</sup>

**Chart 22:** Global Merchandise Exports (Current U.S. \$), 1980-2014  
(Source: World Bank)



The type and extent of international trade that each country participates in is largely guided by its international trade policies. These policies may include the use of tariffs, import/export quotas, and licensing requirements or restrictions. These and other trade policies may be enacted for a variety of reasons which may include the protection of domestic industries, consumer protection, or national security. The purpose of this section is to provide an overview of current U.S. trade policies, describe Wisconsin’s connection to the global economy, and discuss the potential impact of trade policies on intermodal freight movements in Wisconsin.

#### CURRENT U.S. TRADE AGREEMENTS

The U.S. has a number of trade agreements current in place with both individual countries and groups of countries.<sup>585</sup> As discussed in later parts of this section, imports to and exports from the State of Wisconsin are predominantly traced to Canada, Mexico, and China. Other major trade areas include southeast Asia, Australia, and the European Union. As such, the trade agreements with the highest

<sup>581</sup> <http://www.midwestinlandport.com/wp-content/uploads/2017/05/ADM-Intermodal-Ramp.pdf>

<sup>582</sup> <https://www.ilsoy.org/sites/default/files/u88/ZubrodClair%20Decatur%20Intermodal%20Report%202015%2009%2020.pdf>

<sup>583</sup> <https://data.worldbank.org/topic/trade?end=2014&start=1980>

<sup>584</sup> <http://databank.worldbank.org/data/reports.aspx?source=2&series=NE.EXP.GNFS.ZS&country=>

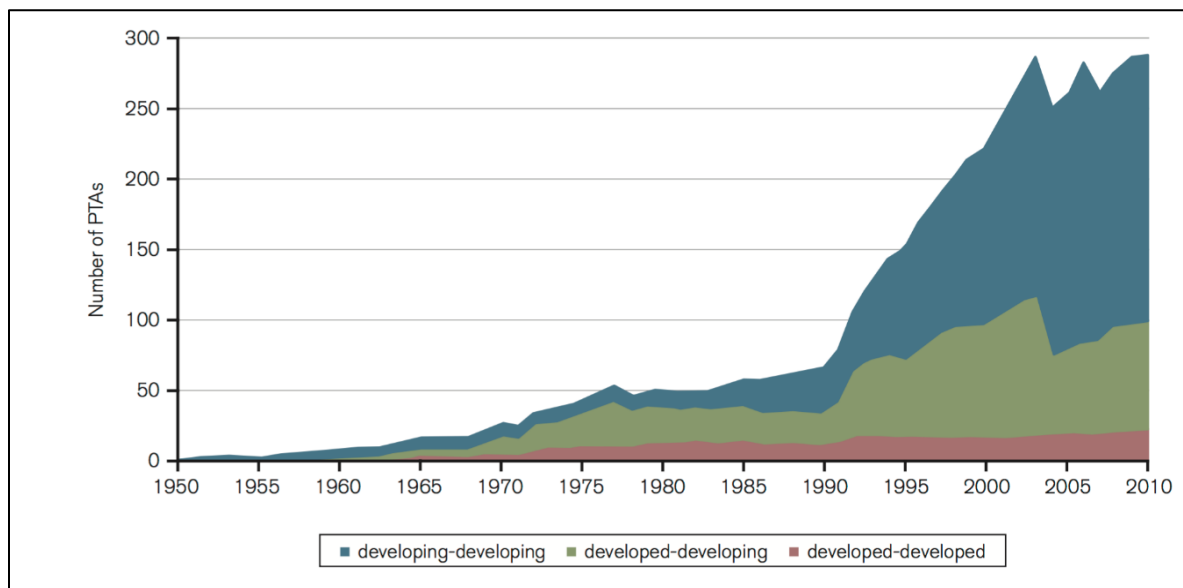
<sup>585</sup> <https://ustr.gov/trade-agreements/free-trade-agreements>

potential for impacting Wisconsin industries and intermodal service are the North American Free Trade Agreement (NAFTA), the Singapore Free Trade Agreement (FTA), the Australian FTA, and the KORUS (South Korea-US) FTA. Additional U.S. trade policies are listed below:

- Bahrain FTA
- CAFTA-DR (Dominican Republic-Central America FTA)
- Chile FTA
- Colombia TPA
- Israel FTA
- Jordan FTA
- Morocco FTA
- Oman FTA
- Panama TPA
- Peru TPA
- Transatlantic Trade and Investment Partnership (T-TIP)

Another trade agreement of note is the Trans-Pacific Partnership (TPP), an agreement originally signed by the U.S. and eleven other countries in 2016. The agreement was signed but was not ratified and did not go into effect. In January 2017 the U.S. withdrew its signature from the agreement. The remaining TPP signatories have signed a new agreement called the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). The agreement will go into effect after the ratification of at least 50 percent of the signatories.

*Chart 23: Preferential Trade Agreements Amongst All Countries, 1950-2010 (Source: Our World in Data/WTO).*



In addition to the trade agreements noted above, the U.S. also assigns the status of Permanent Normal Trade Relations (PNTR)<sup>586</sup> with most other countries in the world (exceptions include Cuba and North Korea). A designation of PNTR status ensures that a country will receive the same trade advantages as other countries with similar status. As shown in Chart 23, trade agreements across the globe have

<sup>586</sup> In the United States, this designation was formally known as Most Favored Nation status prior to 1998.

increased since 1990, particularly in the developing world.<sup>587</sup>

## OVERVIEW OF WISCONSIN'S CONNECTIONS TO THE GLOBAL ECONOMY

Wisconsin businesses conduct international trade with companies around the world, both importing and exporting goods. The scale and scope of globalization has created an environment where the transportation sector must adapt. This is particularly the case for North America because of the scale and scope of production, distribution and consumption taking place, and the large distances involved. Global trade routes for several major industries flow through Wisconsin on roadways, railways, and waterways. For example, wholesale goods and raw materials flow from Asia to the Port of Prince Rupert in western Canada, then on railroads, often through Wisconsin, to major U.S. markets in Chicago and the Northeast. Agricultural products travel down the Mississippi River, and goods bound for Europe travel from Wisconsin's Great Lakes ports to the Atlantic Ocean via the St. Lawrence Seaway. Wisconsin's highways connect the state to major truck, air, and rail transportation hubs in Chicago and Minneapolis-St. Paul.

Exports from Wisconsin have been shipped to over 200 countries around the world for a total of \$22.3 Billion dollars in 2017. This represents 1.4 percent of total U.S. exports.<sup>588</sup> Table 28 on the following page highlights the total value of exports shipped by both commodity type and destination country. The table summarizes commodity type using the Harmonized System classification system.

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<sup>587</sup> <https://ourworldindata.org/trade-and-globalization>

<sup>588</sup> <https://www.census.gov/foreign-trade/statistics/state/data/wi.html>

**Table 28:** Cross-tabulation of Wisconsin Exports by Country and Commodity (Millions of U.S. Dollars) (Source: U.S. Census Bureau).

Commodity Type	Canada	Mexico	China	Saudi Arabia	Japan	United Kingdom	Germany	Australia	South Korea	France	Other	Total	
Machinery / Electrical	\$1,895	\$1,473	\$482	\$134	\$248	\$228	\$197	\$264	\$145	\$105	\$2,449	\$7,621	34%
Miscellaneous	\$463	\$164	\$390	\$23	\$241	\$100	\$155	\$68	\$77	\$178	\$953	\$2,813	13%
Transportation	\$559	\$276	\$275	\$608	\$28	\$195	\$76	\$90	\$17	\$22	\$579	\$2,725	12%
Chemicals & Allied Industries	\$657	\$118	\$95	\$5	\$78	\$49	\$143	\$55	\$65	\$107	\$452	\$1,824	8%
Foodstuffs	\$1,024	\$80	\$37	\$8	\$54	\$15	\$5	\$24	\$53	\$6	\$299	\$1,605	7%
Wood & Wood Products	\$850	\$144	\$137	\$6	\$36	\$32	\$16	\$9	\$11	\$9	\$194	\$1,446	6%
Plastics / Rubbers	\$454	\$278	\$60	\$2	\$17	\$23	\$42	\$17	\$7	\$6	\$267	\$1,174	5%
Metals	\$321	\$275	\$74	\$5	\$15	\$28	\$30	\$13	\$25	\$9	\$212	\$1,008	5%
Vegetable Products	\$79	\$224	\$28	\$0	\$9	\$39	\$3	\$1	\$6	\$3	\$231	\$622	3%
Animals & Animal Products	\$111	\$72	\$69	\$3	\$47	\$19	\$6	\$11	\$75	\$1	\$142	\$556	2%
Mineral Products	\$279	\$14	\$3	\$0	\$0	\$1	\$3	\$1	\$0	\$0	\$22	\$324	1%
Raw Hides, Skins, Leather, Furs	\$77	\$23	\$66	\$0	\$2	\$0	\$1	\$0	\$33	\$0	\$13	\$215	1%
Textiles	\$61	\$34	\$11	\$1	\$3	\$5	\$5	\$4	\$2	\$2	\$74	\$201	1%
Stone / Glass	\$73	\$19	\$6	\$1	\$9	\$1	\$10	\$2	\$1	\$8	\$26	\$156	1%
Footwear / Headgear	\$7	\$1	\$0	\$0	\$0	\$1	\$0	\$1	\$0	\$0	\$8	\$19	0%
Total	\$6,911	\$3,196	\$1,732	\$797	\$789	\$737	\$692	\$559	\$517	\$455	\$5,923	\$22,306	
	31%	14%	8%	4%	4%	3%	3%	3%	2%	2%	27%		

Table 28 highlights the importance of Canada, Mexico, and China as key Wisconsin trading partners. Trade with these countries accounts for more than half of all Wisconsin exports. The table also highlights the prominence of the industries producing Machinery/Electrical products. This commodity category accounts for a full 34 percent of Wisconsin’s exports while exports of Machinery/Electrical products to Canada and Mexico on their own account for 15 percent of exports.

It is also crucial to understand the role that containerized intermodal shipping plays in Wisconsin’s export markets. Table 29 shows the total value of containerized exports compared to the value of all exports. Table 30 shows similar information for each commodity category. The data show that containerized exports account for a minimal proportion of exports to Canada and Mexico, but account for approximately 50 percent of exports to Australia and South Korea. On average 17.4 percent of all Wisconsin exports are transported via intermodal containers.



**Table 29:** Wisconsin Containerized Exports by Country, 2017 (Millions of U.S. Dollars) (Source: USA Trade Online).

Country	Total Value	Containerized Value	Containerized Proportion
Canada	\$6,911	\$0	0.0%
Mexico	\$3,196	\$1	0.0%
China	\$1,732	\$507	29.2%
Saudi Arabia	\$797	\$128	16.0%
Japan	\$789	\$269	34.1%
United Kingdom	\$737	\$116	15.7%
Germany	\$692	\$139	20.1%
Australia	\$559	\$311	55.7%
South Korea	\$517	\$249	48.2%
France	\$455	\$37	8.2%
Other	\$5,923	\$2,133	36.0%
World Total	\$22,306	\$3,889	17.4%

A review of exports by commodity type show that 21.2 percent of Wisconsin's largest category, Machinery/Electrical, is transported using containers. While relatively small in terms of total value, the commodity categories of Animals & Animal Products; Raw Hides, Skins, Leathers & Furs; and Footwear/Headgear have the largest proportions shipped using via containers.

**Table 30:** Wisconsin Containerized Exports by Commodity Category, 2017 (Millions of U.S. Dollars) (Source: USA Trade Online).

Commodity	Total Value	Containerized Value	Containerized Proportion
Machinery / Electrical	\$7,621	\$1,617	21.2%
Miscellaneous	\$2,813	\$276	9.8%
Transportation	\$2,725	\$196	7.2%
Chemicals & Allied Industries	\$1,824	\$290	15.9%
Foodstuffs	\$1,605	\$343	21.4%
Wood & Wood Products	\$1,446	\$269	18.6%
Plastics / Rubbers	\$1,174	\$220	18.7%
Metals	\$1,008	\$193	19.2%
Vegetable Products	\$622	\$65	10.5%
Animals & Animal Products	\$556	\$237	42.6%
Mineral Products	\$324	\$23	7.1%
Raw Hides, Skins, Leather, & Furs	\$215	\$73	34.0%
Textiles	\$201	\$66	32.9%
Stone / Glass	\$156	\$15	9.9%
Footwear / Headgear	\$19	\$7	34.9%
Total	\$22,306	\$3,889	17.4%

The growth of freight trade through the Chicago Region will have a direct effect on the economic health and import/export capacity of Wisconsin’s businesses, especially those in the southeastern portion of the state. Between 2000 and 2013, intermodal container shipments in the Chicago region grew by 26 percent. By 2040, the Chicago region’s inbound truck and rail shipments are projected to grow by 58 percent and 55 percent, respectively. Outbound truck and rail shipments are projected to increase 38 percent and 147 percent, respectively.<sup>589</sup>

## POTENTIAL IMPACTS OF TARIFFS AND SIMILAR TRADE POLICIES

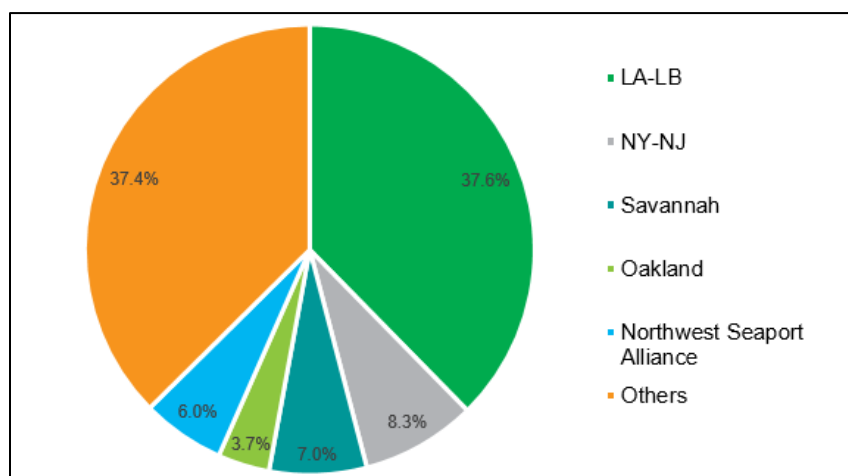
Tariffs typically function by imposing a proportional fee on the value of imported goods. Other trade policies such as import/export quotas restrict the total volume of specific products that can be traded between countries. The general impact of these and other similar trade policies is an increase in the cost of international goods, resulting in an overall reduction in shipment volumes. It is also important to note that trade policies impacting one commodity type have the potential to impact the costs of production for multiple other commodities. This is particularly true for trade policies impacting raw materials such as steel and aluminum as these commodities are integral parts of the supply chain and production lines for many different industries.

<sup>589</sup> [https://assets.recenter.tamu.edu/Documents/MktResearch/DFW\\_Houston\\_Industrial\\_InlandPortsLogistics.pdf](https://assets.recenter.tamu.edu/Documents/MktResearch/DFW_Houston_Industrial_InlandPortsLogistics.pdf) (citing Chicago Metropolitan Agency for Planning analysis of 2012 Freight Analysis Framework)

A distinction should be made between trade policies that will have an impact on Wisconsin export volumes as a whole, and policies that would have an impact specifically on products shipped with intermodal containers. For example, as shown in the previous section, trade with Canada and Mexico represents approximately 45 percent of Wisconsin exports. However, very little of these exports are shipped via intermodal containers. Therefore, trade policies impacting trade between the U.S. and Canada or Mexico would have a large impact on Wisconsin exports in general but should not be expected to have as large an impact on intermodal exports. Trade policies expected to have the largest impacts on Wisconsin intermodal freight are those that affect the commodity categories of Mechanical/Electrical; Foodstuffs; and Chemicals & Allied Industries or affect trade with China, Australia, Japan, or South Korea.

The tariffs against Chinese-manufactured goods, announced in July 2018, apply to both intermodal containers and to drayage chassis. Based on the projected purchases, these tariffs could increase trailer costs by \$16 million and container acquisition costs by almost \$44 million. The two largest U.S. ports for imports from China, Los Angeles-Long Beach and New York-New Jersey, import 75 percent of the Chinese items targeted by tariffs. Chart 24 displays the share of tariff impacts by U.S. port.<sup>590</sup>

**Chart 24: Share of Tariff Impacts by U.S. Port, 2018**  
(Source: Journal of Commerce/IHS Markit).



Of note, soybean exports have been the U.S. export hardest-hit by tariffs. China effectively ceased purchase of soybeans from the U.S. in the latter half of 2018, shifting its purchases to Brazil. In 2017, China purchased 60 percent of the U.S. soybean production, amounting to \$12 billion. Through the end of September, the 2018 exports to China declined by 45 percent, according to the USDA.<sup>591</sup>

## LOGISTICAL

The use of specialists for coordinating transportation needs is a hallmark of 21<sup>st</sup> century business operations. Encompassing the inter-related fields of freight forwarding, logistics, and supply chain management, the market for transportation services was estimated at \$5.8 trillion globally in 2017.<sup>592</sup> The 3PL operational structure – assisting companies on logistical decision-making to optimize their decisions for transportation services – is now being met by 4PL – where the 3PL provides a greater range

<sup>590</sup> [https://www.joc.com/port-news/port-equipment/tariffs-expose-us-shippers-higher-chassis-container-costs\\_20180717.html](https://www.joc.com/port-news/port-equipment/tariffs-expose-us-shippers-higher-chassis-container-costs_20180717.html)

<sup>591</sup> <https://af.reuters.com/article/commoditiesNews/idAFL1N1Y81CU>

<sup>592</sup> <https://www.ttnews.com/articles/how-logistics-firms-can-compete-age-amazon>

of services for the customer. The effective “one-stop” supply chain management moves beyond the selection for transportation, warehousing, and distribution to the management of all these supply chain elements, including facilities and reverse logistics. Customer demand has compelled many historic 3PLs to take on elements of 4PL, or to become full 4PLs through acquisition of complementary business operations, or expansion into additional operational areas.<sup>593</sup>

## REGIONAL AND LOCAL FACTORS

### *CONFLICTING LAND USES*

The operational characteristics of intermodal freight handling and transportation have the potential to conflict with adjacent land uses. For example, intermodal facilities typically generate large amounts of freight traffic, resulting in negative impacts such as noise, vibration, safety concerns, light pollution, and air quality impacts. These may impact nearby residential neighborhoods — and to some extent, commercial — land uses in adjacent areas. However, the rapid expansion of suburban development outside of city centers has generally left very little room for new intermodal facility developments, in many cases requiring construction of the facilities adjacent to these sensitive land uses.

The FHWA’s *Freight and Land Use Handbook* provides guidance, recommendations, and case studies for use by freight and land use planning practitioners.<sup>594</sup> Many of the recommendations in the manual hinge on coordination and planning between multiple jurisdictions at all levels. Examples include coordinated land use policies, implementation of freight-exclusive transportation infrastructure (e.g., truck lanes, direct highway connections, and elimination of highway-rail grade crossings), and coordinated operations policies (e.g., off-peak delivery restrictions and anti-idling policies).

Efforts have been taken by some agencies to use a systematic approach to identifying potential land use conflicts. As part of the Tampa Bay Regional Strategic Freight Plan<sup>595</sup> a GIS analysis was conducted to overlay and compare land use data, freight activity centers, truck traffic counts, and other key data sets to assign one of nine classifications measuring areas of livability, freight activity, and the areas where these land uses conflict with each other. The results of this analysis will help inform freight planning efforts in the region. Similar efforts have been taken by the Chicago Metropolitan Agency for Planning (CMAP) as part of their GO TO 2040 Comprehensive Plan.<sup>596</sup> The analysis identified potential conflict points between freight-intensive land uses and sensitive land uses to find potential areas for future study.

### *MULTI-JURISDICTIONAL COORDINATION*

Coordination between state, regional, and local jurisdictions is a critical part of identifying and addressing last mile issues. Through the FAST Act, U.S. DOT strongly encourage the creation of a Freight Advisory Committees (FAC) for each state. Each FAC should consist of comprehensive representation from both the public and private sector and is intended to function as a means of gathering information

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<sup>593</sup> <https://www.supplychaindive.com/news/3pl-4pl-evolution-logistics-supply-chain-management/532779/>

<sup>594</sup> <https://ops.fhwa.dot.gov/publications/fhwahop12006/fhwahop12006.pdf>

<sup>595</sup> <https://tampabayfreight.com/wp-content/uploads/AppendixC.pdf>

<sup>596</sup> [http://www.cmap.illinois.gov/documents/10180/525524/Freight\\_supportive\\_LU\\_and\\_freight\\_LU\\_conflicts\\_20160321.pdf/1bef456e-4ccd-4deb-99a0-9911ee7a4702](http://www.cmap.illinois.gov/documents/10180/525524/Freight_supportive_LU_and_freight_LU_conflicts_20160321.pdf/1bef456e-4ccd-4deb-99a0-9911ee7a4702)

on system needs and concerns, providing opportunities for education and outreach, and establishing connections between various freight stakeholders. The Wisconsin FAC<sup>597</sup> was established in 2015 with representation from trucking, railroad, industry, and public sectors.

State and regional agencies can also assist in coordination efforts by providing technical assistance to local jurisdictions. This assistance can be in the form of providing data on truck traffic counts and travel patterns, assisting with the development of local freight standards and policies, or simply with providing opportunities for education and outreach related to freight concerns and issues. The 2018 Wisconsin State Freight Plan includes multiple new policies that will help to address this need including, “WisDOT will provide information to communicate and educate industry and the general public on pertinent freight topics and issues” and “WisDOT will work with stakeholders to facilitate a discussion to develop an intermodal strategy for Wisconsin.”<sup>598</sup>

## SECTION SUMMARY: GLOBAL AND DOMESTIC FACTORS

Global demand drives trade, and recent changes in trade policies have disrupted supply chains. China discontinued accepting scrap imports in 2018; paper and plastics for recycling have been diverted to other Southeast Asian nations. Some of those countries have now put in place their own limitations. Additional container repositioning is required.

With the exception of a setback during the Great Recession, global trade grew steadily since the 1980’s, facilitated by favorable trade agreements. Wisconsin’s primary trading partners are Canada and Mexico. There is limited movement of containerized freight for Wisconsin exports to these countries, at least as is currently measured. About 29 percent of exports to China are containerized.

Of all Wisconsin’s exported goods, about 17.4 percent by value are containerized. Machinery/electrical, foodstuffs, wood and lumber, plastic and rubber, and metals are the most frequent containerized exports.

Trade disputes with China and subsequent tariffs have reduced the total U.S. soybean exports to China by 45 percent in 2018. The Chinese market accounted for \$12 billion in sales in 2017.

## TECHNOLOGICAL FACTORS

Multiple new and emerging technologies have substantially changed the operations of freight haulers and intermodal facilities. The following sections provide a brief overview of emerging freight and intermodal technology trends. Many of the technologies rely on instant access to large databases and other data sources, highlighting the importance for intermodal facilities to have access to highspeed broadband or similar internet service.

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<sup>597</sup> <https://wisconsindot.gov/Pages/doing-bus/freight/fac.aspx>

<sup>598</sup> <https://wisconsindot.gov/Documents/projects/sfp/plan.pdf>



## E-COMMERCE

### CONSUMER DEMAND

The proliferation of e-commerce (the purchase of products from online retailers, typically with an expectation of delivery within days or hours) has had substantial impacts on all facets of the global economy. The high cost of expedited delivery times in combination with the need for price competitiveness has forced retailers to find cost savings in other parts of the supply chain. Many are looking to intermodal operations to achieve these goals.<sup>599</sup> E-commerce sites such as Amazon are significantly increasing the number of international shipments that will likely make use of intermodal transportation during their delivery. International sales now constitute one quarter of sales on the Amazon Marketplace. The rise in e-commerce has increased the proportion of smaller parcels being transported intermodally, resulting in an increase in the use of smaller containers as well as an increase in less than container load (LCL) shipping.<sup>600</sup> The popularity of the Amazon e-commerce model is prompting other major retailers such as Wal-Mart to expand their e-commerce presence as well.<sup>601</sup> As the scope of e-commerce continues to grow, this will put an ever-greater demand on existing intermodal operations.

## TRACKING TECHNOLOGIES

### CONTAINER TRACKING AND MONITORING

As expectations for the speed and efficiency of freight delivery continues to rise, it has become more important than ever to quickly identify potential issues with containerized shipments. Modern container tracking technologies allow intermodal customers to continually be apprised of not only the geographical location of their containers, but also their physical condition. Container sensors can broadcast detailed information about each container such as whether the container has been opened, whether the container is moving or stationary, and the temperature of the container contents. The instantaneous access to this information allows for a prompt response in the case of a container being misplaced or damaged. By avoiding these potentially costly delays, this technology improves the overall efficiency of the entire intermodal system. The monitoring technology also helps shippers to meet existing and new regulations such as the Food and Drug Administration's Final Rule on Sanitary Transportation of Human and Animal Food and hazardous materials regulations found in the Code of Federal Regulations.<sup>602, 603</sup> Container tracking technology tracking systems range in complexity from single RFID tags to GPS devices to Bluetooth short-range wireless systems.<sup>604, 605, 606</sup>

One example product, eModal.com, is a hosted, software-as-a-service (SaaS) solution that allows port authority and terminal customers to manage and accelerate the movement of trucks and containerized cargo as they move through ports, marine terminals and depots. This public platform integrates a

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<sup>599</sup> <https://www.ttnews.com/articles/intermodal-operators-expand-e-commerce-online-retailers-look-control-costs>

<sup>600</sup> <https://theloadstar.co.uk/small-beautiful-logistics-e-commerce-brings-era-fcl-end/>

<sup>601</sup> <https://www.fool.com/investing/2017/03/03/wal-mart-is-acting-more-like-amazon-but-that-may-n.aspx>

<sup>602</sup> <https://www.federalregister.gov/documents/2016/04/06/2016-07330/sanitary-transportation-of-human-and-animal-food>

<sup>603</sup> <https://www.law.cornell.edu/cfr/text/49/chapter-I/subchapter-C>

<sup>604</sup> <https://www.link-labs.com/blog/container-tracking>

<sup>605</sup> <https://www.inboundlogistics.com/cms/article/shipment-monitoring-technology-picking-up-the-signals/>

<sup>606</sup> <http://www.globeconfreight.com/blog/technological-advancements-intermodal-transportation/>

variety of information and process automation functions to serve as a one-stop window for port users to get information and clear their cargo for pickup or delivery. eModal.com is used by 45 ports and terminals to streamline the landside logistics operations of over 79,000 registered users while processing or automating more than 10,000,000 container transactions per month.

Some of the functions of the software's modules and services include:

- A truck appointments and pre-arrival management system, integrated with the terminal's operating system.
- Container availability and location identification.
- Drayage truck registry, which validates motor carriers, trucks, RFID tags and drivers in the port area.
- Export booking management.
- Fee collection services for all aspects of the intermodal service chain, including demurrage, storage detention, exam, and port fees.
- RFID tag management services, including tag fulfillment, customer service, and support.
- Chassis rental management and billing, connecting contracts with motor carriers to collection of usage fees from those carriers or cargo owners.<sup>607</sup>

### 3PL FREIGHT COORDINATION

#### *TRANSPORTATION MANAGEMENT SYSTEMS*

The complexity of the modern supply chain has led to the development of transportation management systems. These software system solutions provide advanced data analytics, supply chain visibility, and provide opportunities to quickly compare multiple transportation options to ensure maximum efficiency. These systems actively work to maximize intermodal shipping capacity, reducing overall costs for intermodal customers. These systems also provide increased flexibility and response times when disruptions to the supply chain require alternative strategies or solutions.<sup>608</sup> One example of a leading Transportation Management System platform used by multiple Class I railroads is Pegasus by Princeton Consultants.<sup>609</sup>

#### *FREIGHT MATCHING SERVICES*

Transportation network companies such as Uber and Lyft provide additional transportation options by matching passengers with available drivers. Similar approaches are now being pursued in the freight industry to match freight shippers with trucking providers. Many companies are experimenting with freight matching services such as Uber Freight,<sup>610</sup> Convoy,<sup>611</sup> Trucker Tools,<sup>612</sup> Cargofy,<sup>613</sup> and

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<sup>607</sup> <https://www.adventintermodal.com/home/solutions/emodal>

<sup>608</sup> <https://www.ratelinx.com/integrated-data-services-daas/transportation-management-system-tms/>

<sup>609</sup> <http://www.princeton.com/intermodal-transportation-management>

<sup>610</sup> <https://www.pymnts.com/news/delivery/2018/uber-freight-shippers-logistics-trucking-industry/>

<sup>611</sup> <http://www.dcvelocity.com/articles/20180808-convoy-rolls-out-real-time-freight-booking-platform/>

<sup>612</sup> <https://www.fleetowner.com/technology/trucker-tools-upgrades-mobile-driver-app-adds-digital-load-matching>

<sup>613</sup> <https://www.truckinginfo.com/311042/cargofy-incorporates-ai-virtual-assistant-into-freight-matching-service>

DrayNow.<sup>614</sup> These freight matching services can add flexibility and capacity to current trucking operations.<sup>615</sup> While these services have the potential to greatly impact the freight industry, many of the current market leaders such as Uber Freight have focused primarily on long-haul trucking and have been less focused on intermodal service.<sup>616</sup> However, additional platforms and services are continuously entering the market, with some such as DrayNow focusing on intermodal drayage service.

## AUTONOMY

At this time, this technology is still in the early to middle stages of development. However, the potential to reduce shipping costs and to increase shipping speed and efficiency has led dozens of companies to enter this market.<sup>617</sup> In 2016, Uber conducted one of the first autonomous trucking deliveries in Colorado.<sup>618</sup> However, in 2018 Uber suspended operation of its autonomous trucking program to focus exclusively on its autonomous passenger vehicle program, partially in response to the fatal accident between an Uber autonomous vehicle and a pedestrian.<sup>619</sup> Despite these setbacks, the development of connected and autonomous vehicle technology has continued at a steady pace, with many major automakers predicting fully autonomous vehicles on the road by the early 2020s.<sup>620</sup> Rules and regulations determined by individual state legislatures will also likely impact the development of these technologies.<sup>621</sup>

The overall impact of this technology on intermodal operations and other transportation systems is unknown, but the possibility of driverless trucks or platooned vehicles requiring only one driver has the potential to significantly reduce the cost of trucking and reduce the demand for intermodal service. Other infrastructure improvements such as dedicated truck lanes may also support the implementation of connected and autonomous vehicles. However, at this time any such predictions are—and will continue to be—purely speculative until the technology has progressed further. Despite the impacts of autonomous vehicle on demand, intermodal facilities will likely need to prepare for the handling and operation of autonomous vehicles.

## SAFETY AND SECURITY

In recent years all transportation infrastructure has undergone increased scrutiny with regard to the potential for physical, biological, chemical, and cyber-attacks. Intermodal containers and facilities are at risk as the potential target of an attack and the containers themselves may also be used to facilitate attacks on other locations. Technology to address security concerns is emerging for intermodal facilities

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<sup>614</sup> <https://www.ttnews.com/articles/trucking-app-provider-draynow-gains-5-million-venture-capital>

<sup>615</sup> [https://www.logisticsmgmt.com/article/land\\_olakes\\_gets\\_on\\_board\\_with\\_uber\\_freight\\_to\\_lock\\_in\\_texas\\_based\\_capacity](https://www.logisticsmgmt.com/article/land_olakes_gets_on_board_with_uber_freight_to_lock_in_texas_based_capacity)

<sup>616</sup> [https://www.joc.com/trucking-logistics/trucking-freight-brokers/uber-freight-no-hurry-enter-drayage-market\\_20170921.html](https://www.joc.com/trucking-logistics/trucking-freight-brokers/uber-freight-no-hurry-enter-drayage-market_20170921.html)

<sup>617</sup> <https://www.cbinsights.com/research/autonomous-driverless-vehicles-corporations-list/>

<sup>618</sup> <https://www.wired.com/2016/10/ubers-self-driving-truck-makes-first-delivery-50000-beers/>

<sup>619</sup> <http://www.landlinemag.com/Story.aspx?StoryID=72736#.W4iqBs5KiM9>

<sup>620</sup> <https://www.techemergence.com/self-driving-car-timeline-themselves-top-11-automakers/>

<sup>621</sup> <http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx>

as well as for intermodal containers. Many of these same technologies also reduce the potential for theft of goods transported in intermodal containers.

Intermodal facilities rely on many traditional security measures such as fencing, closed circuit televisions, and manned patrols. Much of the container tracking and monitoring systems described previously also serve the purpose of enhancing security. GPS locations, accelerometers, and other monitoring devices are able to inform freight shippers and haulers of any unexpected change in the location or movement of individual containers. Many containers are also equipped with tamper-resistance sensors or equipment that notify users of any breach of the container seal.

As supply chain operations become increasingly reliant on digital platforms, they also become more vulnerable to cyber-attacks from malicious actors. As an example, the May 2017 ransomware attack known as “WannaCry” exploited vulnerabilities in Microsoft software products at companies across the globe, including many companies involved in goods transportation.<sup>622</sup> Other recent examples include a 2017 attack on Maersk shipping company<sup>623</sup> and the 2018 attack on COSCO Shipping Lines.<sup>624</sup> Ransomware attacks effectively hold companies hostage by stealing data or crippling electronic platforms until a ransom has been paid. Intermodal transportation stakeholders should conduct internal cyber risk assessments to evaluate and address their vulnerabilities. Implementation of redundant electronic infrastructure and development of backup plans in the event of an attack are growing trends to prepare for potential threats.<sup>625</sup> The emergence of blockchain systems may also play a role in reducing cyber security risks.<sup>626</sup>

## CUSTOMS AND BORDER CONTROL

A substantial proportion of intermodal traffic crosses international borders. The need for border and customs enforcement has the result of slowing down or delaying intermodal operations. However, many ports of entry are undertaking measures to minimize delay while maintaining sufficient levels of security. An example of such measures is the recent upgrades installed at the Port of International Falls-Ranier, MN. This port of entry is used by CN as a key connection between the Port of Prince Rupert in British Columbia and the intermodal markets in Chicago, IL. The recent upgrades have nearly doubled the capacity of the port of entry through the implementation of a track-side centralized examination station, a new refrigerated cargo inspection area, an expanded fumigation bay, and increase staff and cargo handling equipment.<sup>627</sup>

## SECTION SUMMARY: TECHNOLOGICAL FACTORS

E-tailing and consumer demand have intertwined to remake the consumer market. Technology is also

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<sup>622</sup> [https://www.supplychain247.com/article/massive\\_cyber\\_attack\\_hits\\_countries\\_worldwide](https://www.supplychain247.com/article/massive_cyber_attack_hits_countries_worldwide)

<sup>623</sup> <https://www.cNBC.com/2017/08/16/maersk-says-notpetya-cyberattack-could-cost-300-million.html>

<sup>624</sup> [https://www.joc.com/maritime-news/container-lines/cosco/cosco%E2%80%99s-pre-cyber-attack-efforts-protected-network\\_20180730.html](https://www.joc.com/maritime-news/container-lines/cosco/cosco%E2%80%99s-pre-cyber-attack-efforts-protected-network_20180730.html)

<sup>625</sup> [https://www.joc.com/technology/ports-say-they-take-cyberattacks-seriously\\_20171215.html](https://www.joc.com/technology/ports-say-they-take-cyberattacks-seriously_20171215.html)

<sup>626</sup> [https://transportgeography.org/?page\\_id=8517](https://transportgeography.org/?page_id=8517)

<sup>627</sup> <https://www.railwayage.com/freight/cn-upgrades-busy-border-crossing-services/>

being applied to tracking and monitoring containers, both in-transit and within intermodal terminals. Other services integrate the entire intermodal freight operation, including drayage, permits, and financial responsibility.

Freight matching services are still in their infancy, but have promise to improve efficiency through better load-matching for containers. Although pilot operations have been conducted, a timeline for autonomous freight operations is still speculative.

Safety and security are intermodal transportation concerns, as witnessed by crippling cyberattacks of liner services Maersk and COSCO. Technology has improved efficiency for cross-border inspections and approvals of containerized freight at Canadian-U.S. gateway rail crossings.



## POTENTIAL OPTIONS FOR IMPROVING INTERMODAL DEVELOPMENT IN WISCONSIN

At two meetings (July 6 and August 9, 2018), the Intermodal Subcommittee discussed concepts for ways that Wisconsin could be made more attractive for intermodal facility development and operations. Those concepts included the leadership roles for government (both state and local) and for the private sector. Many suggestions emphasized the need for collaboration of all entities to identify opportunities and create solutions to the current challenges for the state's intermodal users.

### SUGGESTIONS FOR STATE GOVERNMENT'S POTENTIAL ROLES

- Provide assistance on applications for federal grants, such as Better Utilizing Investments to Leverage Development (BUILD), the Consolidated Rail Infrastructure and Safety Improvements (CRISI) program, and through the Economic Development Administration (EDA) and Small Business Development Center.
- There are also some state programs – the Freight Railroad Infrastructure Improvement Program (FRIIP), Transportation Economic Assistance (TEA), and possibly the Freight Rail Preservation Program (FRPP) – that are existing grant or loan programs that might be eligible for use.
- The state could also help with orchestrating partnerships and investments, including local governments and the private sector.
- The state could also serve as a repository for data, including identification of promising regions for intermodal facility development.
- State agencies could recruit businesses to provide intermodal facilities and services- just as the state could recruit businesses to use those facilities and services.
- The state could show where intermodal operations are in demand.
- The state could potentially help to streamline processes such as DNR regulations, local permits, and land use.
- The state could work with local governments to identify and designate potential heavyweight corridors.
- The state could work with local governments to orchestrate partnerships and investments between the public and private sectors.
- Permitting CDLs for younger truck drivers to haul intrastate with drayage.
- Exempt agricultural transportation from CDL regulation.
- Standardize the overweight permitting system with surrounding states for containerized agricultural exports, including efforts to ensure more all-weather roads to reduce the restrictions during the spring thaw periods.
- Data-sharing across state agencies.
- Data-sharing (and report-sharing) with a broad group of stakeholders.
- Marketing coordination and cooperation – leveraging data to encourage business development and facility investment.
- System preservation and restoration (Milwaukee County example).

## SUGGESTIONS FOR LOCAL GOVERNMENTS' POTENTIAL ROLES

- Local governments could help by supporting the local roadway infrastructure, especially the first/last mile connections to intermodal facilities.
- Brownfields redevelopment.
- TIF districts.
- Site assessment.
- Corridor plans.
- Regional coordination amongst local municipal/county/town governments-especially for grant writing.

## SUGGESTIONS FOR PRIVATE SECTOR'S POTENTIAL ROLES

- The private sector role could include support of a data-driven report, including providing the information needed for investment in an intermodal facility.
- The private sector is also tasked with due diligence of the business demand and of site selection. They, too, have a role in orchestrating partnerships among their colleagues in the private sector, and in collaborating with state and local officials.
- Improving access into, through, and out of intermodal terminals.
- Improve coordination of empty containers, including positioning at terminals convenient to shippers.
- Explore potential partnerships between shortline railroads and Class I lines to extend intermodal access to/from Wisconsin.
- Identify opportunities and optimal locations for transloading commodities between bulk truckloads and containers.
- Matching funding for available grants and/or loans.
- Utilities – providing needed infrastructure in a cost-effective way (water, sewer, electric, and broadband).

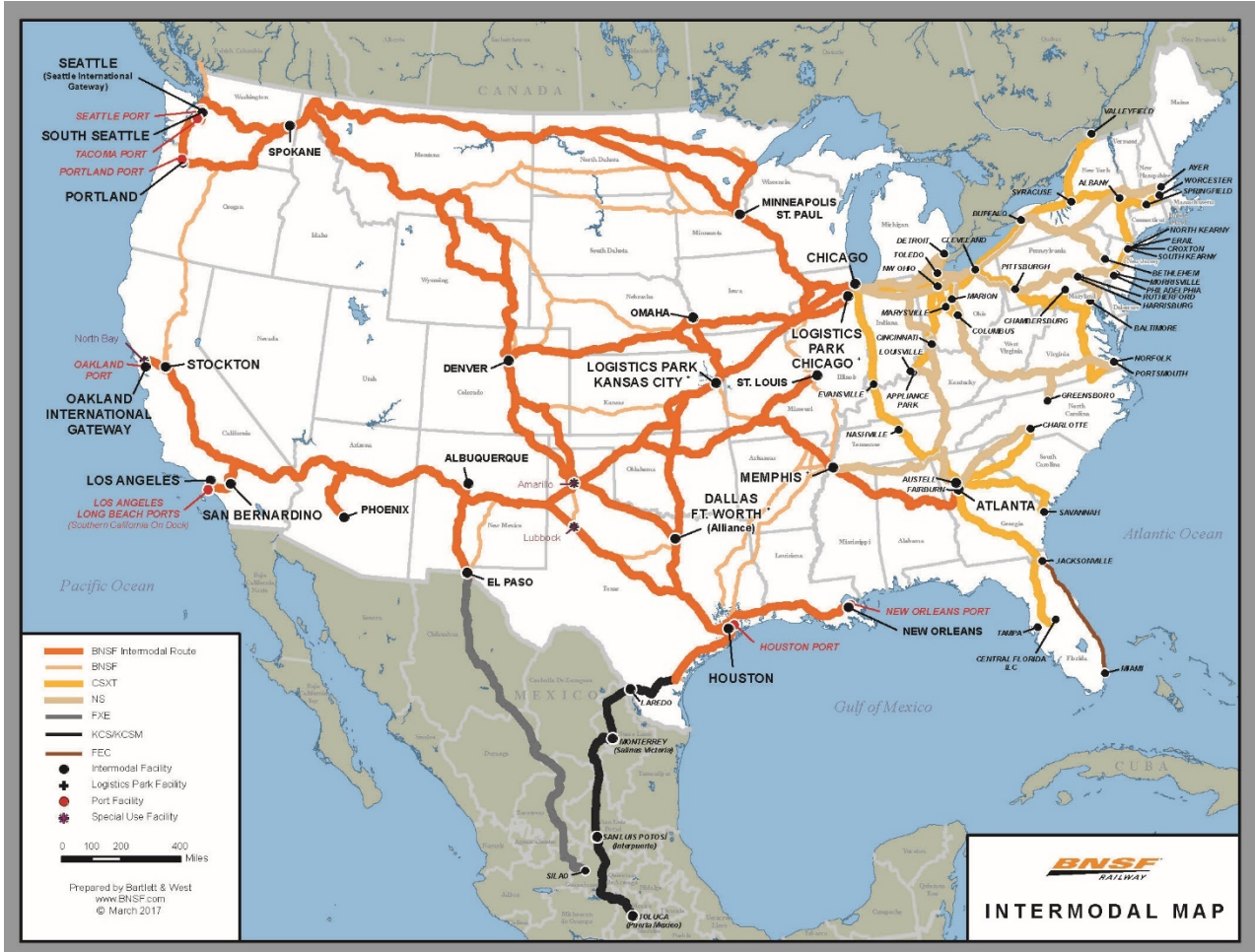
## CONCLUSION

This report presents a realistic appraisal of the current status of intermodal shipping in Wisconsin, and of future opportunities and challenges for Wisconsin-based shippers. The volume of containerized shipments to and from Wisconsin indicates a strong and sustained demand by the state's businesses for use of intermodal freight. Many businesses seek enhanced opportunities to access the efficiencies inherent in containerized freight shipping, including decreased shipping costs, greater predictability of delivery times, and reduced roadway congestion. Looking forward, Wisconsin's public and private sector partners will need to overcome existing geographic and market factors before containerized freight services will be improved, especially in the eastern part of the state. Among the critical factors that intermodal service providers will need to justify expanded options are growth in business demand for containerized freight service, coupled with long-term commitments by shippers. Railroads, regional and state economic development agencies, the business community, local governments, maritime liner services, trucking companies, real estate development companies, and others will need to collaborate to optimize the potential for any new facility development.

# APPENDICES

## APPENDIX I: CLASS I INTERMODAL MAPS

Graphic 31: BNSF Intermodal Map.



Graphic 32: Canadian National Intermodal Map.



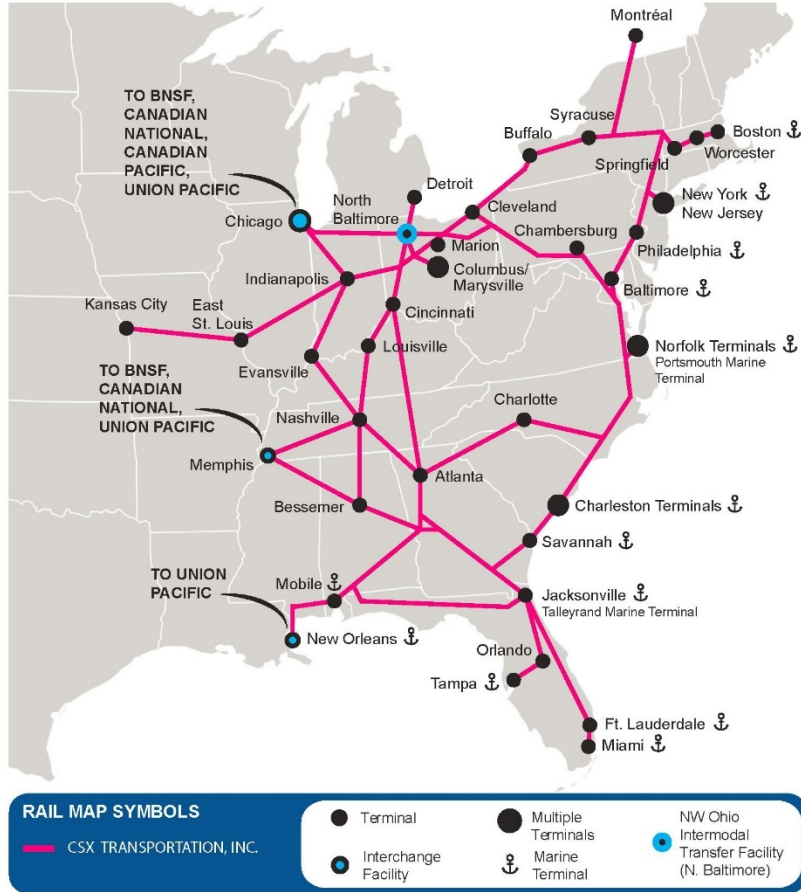
Graphic 33: Canadian Pacific Intermodal Map.





Graphic 34: CSX Intermodal Map.

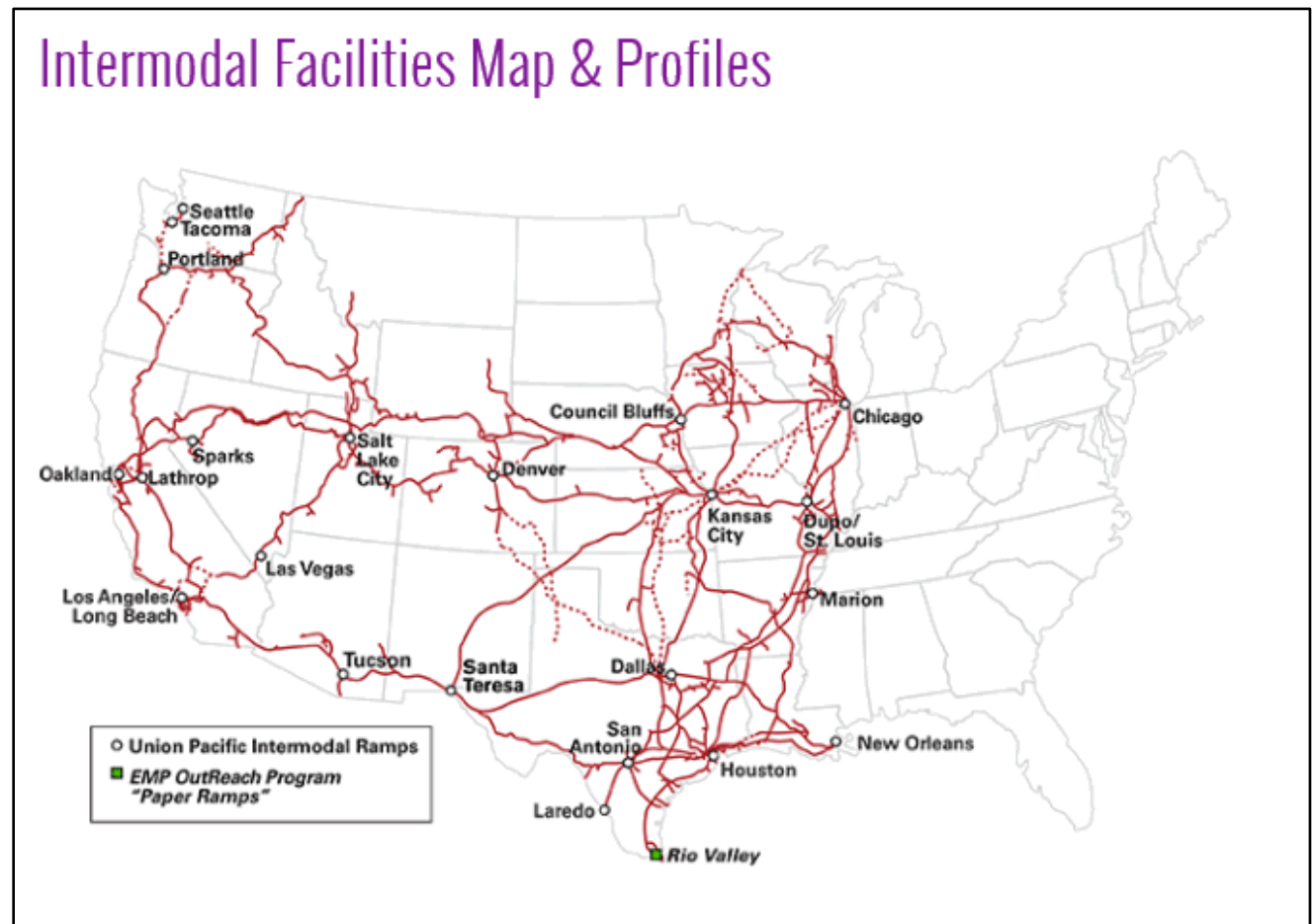
## CSX System Intermodal Network Map



Graphic 35: Norfolk Southern Intermodal Map.



Graphic 36: Union Pacific Intermodal Map.



## APPENDIX II: POTENTIAL FUNDING OPTIONS AND SOURCES

Improving and maintaining the efficient movement of freight along the nation's transportation infrastructure is of critical importance to Wisconsin's local and regional economies. The facilitation of intermodal freight transfers is particularly important for connecting Wisconsin businesses to economic markets across the globe. Due to the widespread benefits of intermodal freight facility improvements, the funding of these projects is often achieved through a combination of local, state, national, and private sources. The purpose of this document is to summarize the current funding programs and financing tools available for funding potential intermodal projects in the State of Wisconsin.

The following intermodal funding options have been grouped into federal, state, local, or other categories according to their source. The funding options include discretionary grants, state allocations of federal dollars, state-managed programs, project financing tools, financial incentives, and public-private partnerships.

### FEDERAL

1. **Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants Program:** Previously known as the TIGER program, these federal grants are to be used by communities to revitalize their surface transportation systems, with a particular focus on projects in rural areas. Funding for the BUILD program was made available by the Consolidated Appropriations Act of 2018. The program will award \$1.5 Billion in funding through a competitive process over multiple rounds through September 2020.
2. **Infrastructure for Rebuilding America (INFRA) Discretionary Grants Program:** Previously known as the FASTLANE Program, these federal grants are to be used to construct or rehabilitate America's transportation infrastructure. Compared to the FASTLANE Program, INFRA grants have a much greater emphasis on innovation, private sector participation, and economic vitality and competitiveness. It is anticipated that these factors will make freight and intermodal projects excellent candidates for this program.
3. **Consolidated Rail Infrastructure and Safety Improvements (CRISI) Grants Program:** This is a new federal program authorized under the FAST Act with a strong focus on improving the safety and efficiency of the freight and passenger rail systems. While primarily safety-focused, eligible project categories include projects "necessary to enhance multimodal connections or facilitate service integration between rail service and other modes." Freight rail intermodal connections are noted as a project example in the notice of funding opportunity.
4. **America's Marine Highway Program (AMHP) – Marine Highway Grants:** The purpose of this federal program is to provide funding for support the development and expansion of vessels and port and landside infrastructure. Projects must have been previously designated as a Marine Highway Project to be eligible for this program. In Wisconsin, this includes only one project, the proposed Great Lakes Shuttle Service on the M-90 Marine Highway Route (Lake Michigan between the Port of Milwaukee and the Port of Muskegon).
5. **Surface Transportation Block Grant Program:** Formerly known simply as the Surface Transportation Program, this federal program allocates federal funding to each state for the improvement of Federal-aid streets. Funding is apportioned separately for urban and rural areas. Project selection is determined by each state independently.

6. **Congestion Mitigation and Air Quality Improvement (CMAQ):** This federal program supports surface transportation projects that result in improved air quality and reduced roadway congestion. Intermodal facility projects improve transportation network efficiency and reduce long-haul truck traffic, making them ideal candidates for this program.
7. **Transportation Infrastructure Finance and Innovation Act (TIFIA):** This federal program provides credit assistance to transportation projects of regional or national significance. Exact terms of the assistance are determined on a case-by-case basis with project stakeholders but is limited to no more than 33 percent of total estimated project costs. Eligible projects include intermodal freight transfer facilities and projects providing access to these facilities.
8. **Private Activity Bonds:** This federal program authorizes the U.S. Secretary of Transportation to disburse up to \$15 Billion in tax-exempt bonds to projects including highway and freight transfer facilities. These bonds are intended to encourage private sector involvement and financial commitment by significantly lowering the cost of cost of capital.
9. **Rail Rehabilitation and Improvement Financing Program (RRIF):** This program authorizes the Federal Railroad Administration to provide direct loans and loan guarantees to finance the development of railroad infrastructure. This includes the development of new intermodal railroad facilities.

## STATE

1. **Wisconsin Freight Rail Preservation Program (FRPP):** This state program provides funding for up to 80 percent of the cost for projects that rehabilitate rail facilities such as tracks and bridges on publicly-supported rail lines.
2. **Business Development Loan Program:** This state program, provided by the Wisconsin Economic Development Corporation (WEDC), supports the retention and expansion of businesses operating in Wisconsin. Eligible activities include real property, plant and equipment; long-term leasehold improvements; and working capital, if fixed assets are also financed with (WEDC) funds.<sup>628</sup>
3. **Brownfields Grant Program:** This state program, provided by the WEDC, supports community and economic development by assisting with brownfield site acquisition costs, site clearance, demolition, or building renovation, and infrastructure improvements.<sup>629</sup>
4. **Transportation Economic Assistance (TEA) Program:** This state program provides 50 percent state grants for road, rail, harbor and airport projects that help attract employers to Wisconsin or encourage business and industry to remain and expand in the state.
5. **Wisconsin Harbor Assistance Program:** This state program was created to assist Wisconsin communities along the Mississippi River and the Great Lakes by improving and maintaining

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<sup>628</sup> Additional WEDC funding and financing programs may be available depending on project-specific characteristics: <https://wedc.org/programs/>

<sup>629</sup> <https://wedc.org/programs-and-resources/brownfields-grant-program/>



waterway freight infrastructure. Eligible projects must benefit cargo transfer and must have been identified in a current Three-Year Harbor Development Plan.

6. **State Bonding:** The State of Wisconsin currently issues general obligation bonds that have historically been used for freight rail, harbor, bridge, and highway projects. Authorizations over the past six biennial budgets ranged from \$125 Million to \$658 Million in total.<sup>630</sup>
7. **Wisconsin Freight Railroad Infrastructure Improvement Program (FRIIP):** This state loan program allows Wisconsin to encourage a broad array of improvements to the rail system and provides loan assistance for facilities such as track and trackside facilities. Terms are typically 10 years at a 2 percent interest rate.
8. **Wisconsin State Infrastructure Bank:** This state program provides loan and credit options to transportation projects. The program was funded through a combination of federal and state funds for a total initial value of \$1,875,000. WisDOT provides loans to eligible projects at a 2 percent interest rate with the potential to amortize repayments for up to 25 years.
9. **Community Development Block Grants (CDBG) – Economic Development:** This program allocates funding to municipalities so that they may provide loans to local businesses to support economic development and job creation and retention. Funding is awarded through an on-going application process. Eligible projects must meet at least one state CDBG program goal, such as supporting regional economic development strategies or fostering new businesses that result in job creation. Examples of a recent freight-related use of this program is the 2017 allocation for the Shullsburg Creamery Cold Storage and Warehouse (\$1,000,000).

## LOCAL

1. **Tax Increment Financing (TIF):** These programs identify a geographic area that stands to benefit from the implementation of a transportation project. The taxes on properties within this “TIF district” are increased proportionally to the value that the project will add. These incremental tax increases are then used to service bonds and loans issued to construct the project.
2. **Tax Credits:** Municipalities and counties have the option of providing tax credits or incentives to encourage the development of specific businesses or industries. These strategies may be used to further incentivize intermodal development or to help ease the overall cost burden for private stakeholders. While this option is included under Local sources, tax credits or incentives provided at the state level are also a potential funding avenue.

## OTHER

1. **Public-Private Partnerships (PPP):** This category includes contractual agreements between public agencies and private actors. FHWA encourages this type of agreement due to the potential for the private sector to bring creativity, efficiency, and additional capital to help address transportation issues.

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<sup>630</sup>[https://docs.legis.wisconsin.gov/misc/lfb/informational\\_papers/january\\_2017/0035\\_transportation\\_finance\\_informational\\_paper\\_35.pdf](https://docs.legis.wisconsin.gov/misc/lfb/informational_papers/january_2017/0035_transportation_finance_informational_paper_35.pdf)

2. **Venture Capital:** This category describes private funds that typically invest in projects or industries with the potential for rapid growth. Many of these private equity funds are started to specialize in transportation infrastructure such as airports, railroads, and water ports.

### INTERMODAL PROJECT FUNDING EXAMPLES

It is rare for a transportation infrastructure project to be funded entirely through a single funding source, particularly when that project affects multiple modes of transportation. Large-scale capital projects typically will rely on multiple sources of funding and financing in combination. Multiple sources are also sometimes necessary to provide funding for various aspects of a projects. For example, many public funding sources are eligible only for transportation infrastructure improvements adjacent to the proposed facility and other funding sources are necessary to construct the facility itself.

The table on the following page summarizes the funding sources for six recent intermodal projects. Where possible, the table includes information related to the size and capacity (annual lifts) of each facility as well as the total funding contribution from each source. Funding amounts are not known for projects constructed using only private funds. These projects highlight the many funding options available for intermodal projects. All of the examples have some form of private sector funding contribution. This highlights the importance of considering public-private partnerships for future intermodal development.

As shown in the Cedar Rapids Logistics Park example, federal grants can provide a substantial portion of project funding, but the competitive nature of the grant selection process means they cannot be relied on. Various state funding programs were also used on three of the examples: Cedar Rapids, Syracuse, and Carolina Connector. The facilities in Kansas City and Oklahoma City were constructed entirely through private funds.

The various funding options summarized in this section and the examples below highlight the many ways that an intermodal facility may be funded. Funding scenarios range from using only private funds to using a combination of private, state, and federal funding sources. The exact mix of funding options suitable for proposed intermodal projects will depend on many factors including potential competitiveness for federal grants, benefits to neighboring communities, and whether they meet qualifying criteria for various programs.

**Table 31: Intermodal Facility Funding Summary (Millions of U.S. Dollars).**

Intermodal Facility/Project	Description	INFRA/FASTLANE Federal Grants	BUILD/TIGER Federal Grants	Private Activity Bonds	Tax Increment Financing (TIF)	State Bonding	Other State Funding	Local Funding	Private Funding	Total Project Cost
Cedar Rapids Logistics Park	75 acres (35-acre integrated intermodal) 68,000 annual lifts (estimated)	\$27					X	X	X	\$47
CenterPoint Intermodal Center (Joliet, IL)	6,400 acres 1,000,000/year lift capacity			\$225	X				X	\$1,260
Logistics Park Kansas City	443 acres 500,000/year lift capacity								X	?
Logistics Center Oklahoma City	195 acres								X	?
Syracuse, NY Intermodal Terminal	30,000 annual lifts (estimated)						X		X	\$19
Carolina Connector Intermodal Terminal	330 acres 110,000/year lifts capacity						\$118		X	\$272

*X indicates unknown funding contribution*