

REGIONAL FREIGHT COMMODITY PROFILE

Warehouse and Terminal Moves

COMMODITY BUNDLE OVERVIEW

This bundle represents of the movement of a variety of goods through intermediate steps of the supply chain between the producer and the consumer. This classification captures:

- Movement of goods from warehouses or distribution centers to retail stores or to customers;
- Movement of goods from intermodal terminals, such as rail or air cargo terminals, to warehouses, distribution centers, and/or direct-to-store or customer, an activity commonly referred to as “drayage;”
- Shipments of mail or parcels via express delivery services such as FedEx or UPS;
- Repositioning of empty shipping containers; and
- Other shipments of mixed or unknown goods.

Unlike the other 10 commodity bundles, which consist of discrete types of goods (i.e., food and beverages, apparel, electronics, construction materials, etc.), this bundle consists of shipments of mixed or multiple types of goods, consisting largely of higher-value consumer products such as apparel, food, electronics, instruments, paper products, or drugs.

This bundle captures these goods while they are in transit between intermodal terminals, warehouses and distribution centers, freight forwarders, and retail centers. Heavy or bulky goods such as construction materials, industrial chemicals, petroleum products, or livestock compose a relatively small share of the goods moved through these intermediaries.

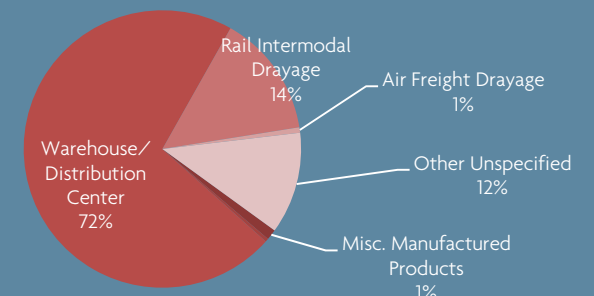
The primary data source for commodity flows reported in this profile is NJTPA’s Freight Forecasting Tool, which generates commodity freight data and forecasts for a 2010 base year and 2040 forecast year. This profile describes freight flows between domestic origins and destinations.

- 132 million tons in 2010, increasing 55% to 206 million tons in 2040.
- Represents 19% of the goods moved in the region by weight and 51% by value.
- 7,174 business establishments employing 61,752 people send or receive goods in this bundle.
- More than 101 million square feet of warehousing space dedicated to this bundle.
- 91% moves by truck, 9% by rail, and less than 1% by air or water.

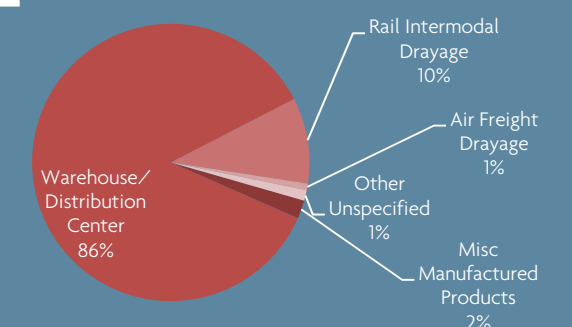
Highlights

Composition

Domestic Tons in 2010
Total: 132 million



Domestic Value in 2010
Total: \$937 billion



Source: NJTPA Freight Forecasting Tool, 2012

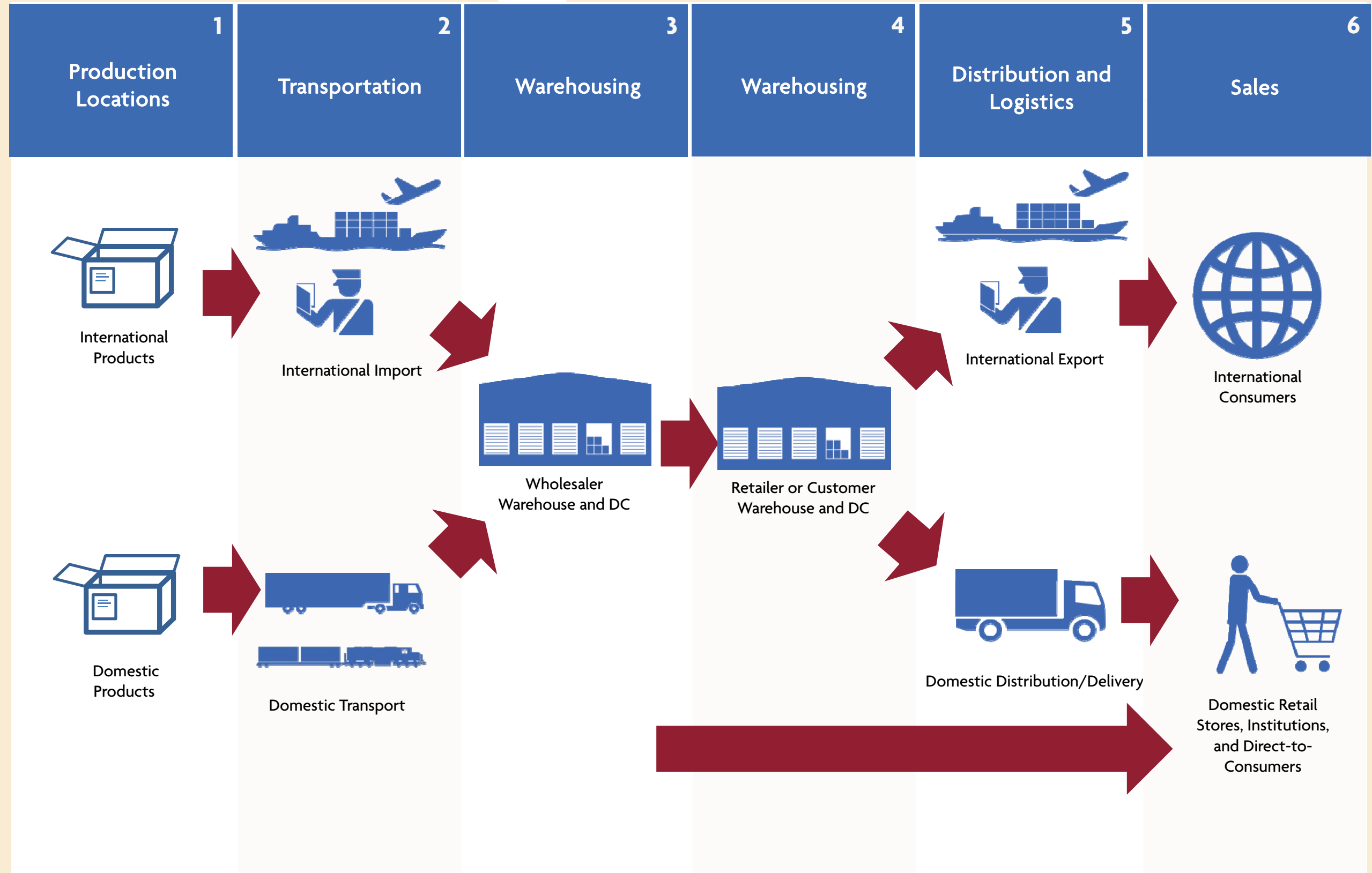
LOGISTICS SUMMARY

The graphic to the right represents the supply chain for this commodity bundle, illustrating the process of moving shipments of mixed or unspecified goods from international and domestic sources through distribution to consumers.

This supply chain consists of six steps:

1. International and domestic manufacturers produce finished goods.
2. International goods are transported by ocean vessel or air to U.S. Ports-of-Entry where they are inspected by U.S. Customs and transloaded to truck or rail carload. Domestically produced goods are transported by truck or rail intermodal.
3. Goods are sorted at a wholesaler warehouse or distribution center.
4. Products are sent by truck to a retailer or customer warehouse or distribution center.
5. Products are distributed via one of two routes:
 - A. By truck to an export distributor or freight forwarder for export to international customers via ocean vessel or air.
 - B. By truck for domestic delivery to retail establishments and to fulfill direct-to-consumer orders.
6. Shipments are delivered to international and domestic customers according to customers' specification.

Note that some products bypass retailer or customer warehousing and distribution centers and move directly from a wholesaler's warehouse to the final user.



Business Locations by Industry Type

Business Square Footage by Industry Type

Warehouse and Terminal Moves

Legend

Square Feet Occupied

Production

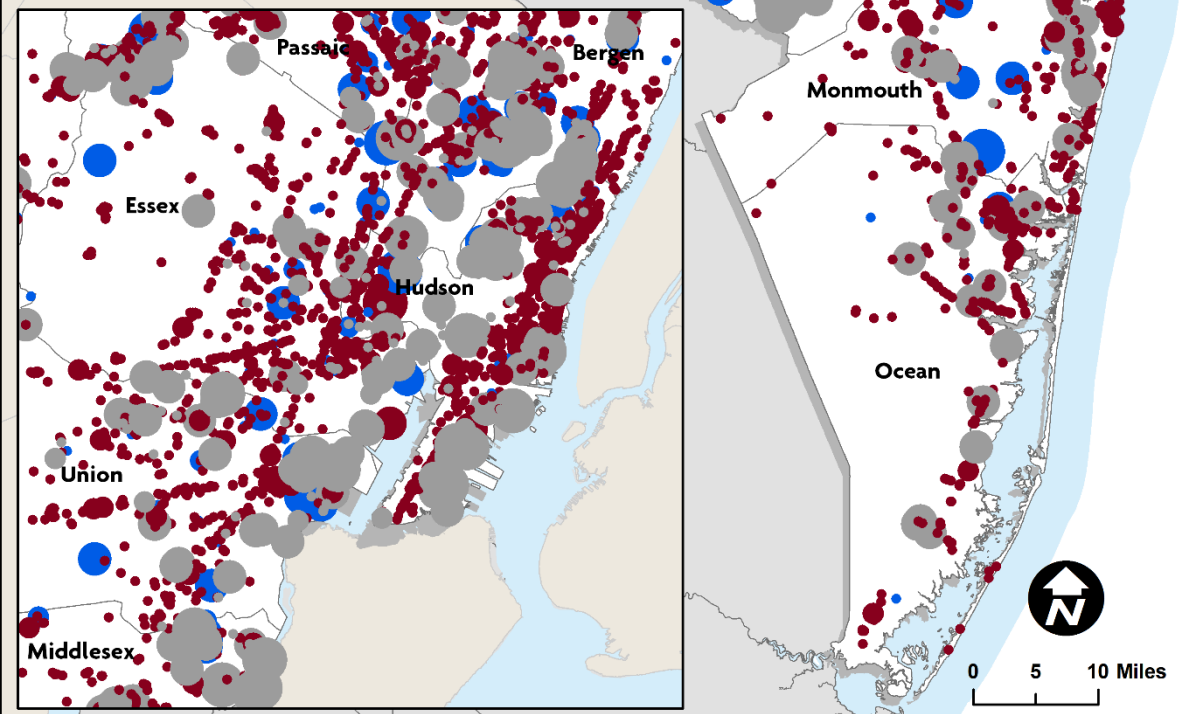
- 0 - 24,999
- 25,000 - 49,999
- 50,000 - 249,999
- 250,000 +

Logistics

- 0 - 24,999
- 25,000 - 49,999
- 50,000 - 249,999
- 250,000 +

Sales

- 0 - 24,999
- 25,000 - 49,999
- 50,000 - 249,999
- 250,000 +



Source: Co-Star, 2014; NJOIT, 2008; Esri, 2014.

Note: "Production" includes Manufacturing, Utilities, Mining & Agriculture, corresponding to Step 1 in the Logistics Summary on Pages 2-3.

"Logistics" includes Wholesale Trade and Warehousing, corresponding to Steps 2-5 in the Logistics Summary on Pages 2-3.

"Sales" includes Retail, Health Care, and Professional Services, corresponding to Step 6 in the Logistics Summary on Pages 2-3.

BUSINESS LOCATIONS SUMMARY

The map on the previous page illustrates the locations of facilities that ship, handle, or receive commodities in this bundle, including:

- Production facilities such as mining, agriculture, and manufacturing businesses where goods are produced, and correspond to Step 1 in the logistics summary chart on pages 2 and 3.
- Logistics facilities, including warehousing and transportation facilities through which goods are distributed, and correspond to steps 2 through 5 on the logistics summary chart.
- Sales, represented in Step 6 on the logistics summary chart, including retail, services, and institutional establishments where goods are sold.

Clusters of establishments are located in the urban areas of the region, including southern Bergen, Hudson, eastern Essex and Union, and Middlesex counties. Clusters are also arranged parallel to Interstate 80 in Morris County, Routes 22 and 202 in Somerset County, Routes 9 and 35 in Monmouth County, and Route 9 in Ocean County.

KEY INDUSTRY TRENDS

The following trends are shaping demand for warehouse and terminal moves today, and projected demand in the future:

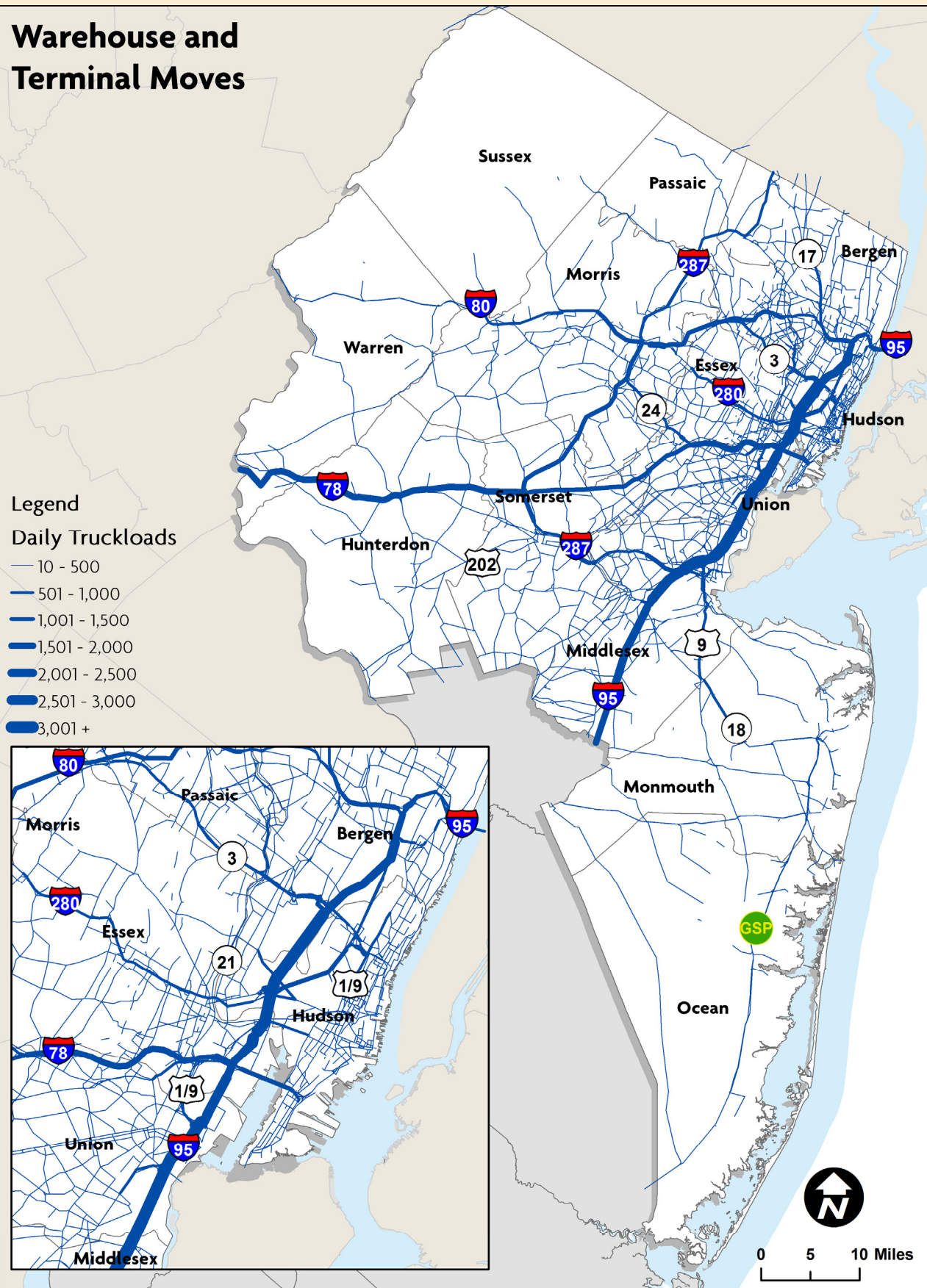
- Warehouses and distribution centers are becoming larger and serving multiple purposes, including store delivery, e-commerce fulfillment, and handling returned orders.
- Sales of retail goods online and using mobile devices are growing nearly four-times the rate of retail sales as a whole, demonstrating a growing need for e-commerce fulfillment centers.
- An expanded Panama Canal, which provides a higher-capacity route between Asia and the U.S. East Coast, and "reshoring" of some manufacturing to the U.S. are among the trends that could change the logistics patterns of freight in this bundle.

Managing Inventory Inside a Distribution Center



Highway Network Utilization, 2010

Warehouse and Terminal Moves



Source: NJTPA Freight Forecasting Tool, 2012; NJOIT, 2008; Esri, 2014.

HIGHWAY NETWORK FLOWS OF WAREHOUSE AND TERMINAL MOVES

The map to the left shows the volume of truckloads of goods in this bundle traveling on highway segments in the NJTPA region every day.

The NJ Turnpike between Exit 10 in Middlesex County and Exit 17 in Hudson County carries the greatest volume of trucks that haul warehouse/distribution center and unspecified commodities. More than 3,000 truckloads of goods in this bundle travel on this segment each day. Between 2,000 and 3,000 daily truckloads are transported on portions of the NJ Turnpike between Exit 9 and Exit 8A in Middlesex County. Interstate 78 between Exit 14A in Hudson County and the Pennsylvania border; the NJ Turnpike south of Exit 8A; Interstate 80 between Route 17 in Bergen County and Route 15 in Morris County; Interstate 287 in Middlesex, Somerset, and Morris counties; the George Washington Bridge; Route 3 in Hudson and Passaic counties; and Route 9 in Middlesex County carry 1,000 to 2,000 truckloads daily.

COMMODITY FLOW SUMMARY

Collectively, more than 132 million tons of goods moved to/from warehouses and terminals, worth \$937 billion, were transported into, out of, through, or within the NJTPA region in 2010. By 2040, nearly 206 million tons worth \$1.4 trillion (constant 2010 dollars) will move in the region. These projections represent 55 percent growth by tons and 55 percent growth by value.

This bundle represented 19 percent of the goods moved in the region by weight and 51 percent by value in 2010. By 2040, these goods are projected to represent 20 percent of the region's freight movements by weight and 53 percent by value.

Warehouse and distribution center traffic, rail intermodal drayage, freight all kinds (consisting of pooled shipments of mixed commodities), semi-trailers returned empty, and air freight drayage are the top five commodities within this bundle that originate and/or terminate in the region by weight. Together they represent 95 percent of all goods in this bundle, as the table below shows.

Commodities in the Warehouse and Terminal Moves Bundle

STCC4	Commodity	Tons (thousands)	Value (millions)	STCC4	Commodity	Tons (thousands)	Value (millions)
5010	Warehouse and Distribution Center	68,269	\$63,175	3999	Manufactured Prod, Not Elsewhere Classified	155	\$511
5020	Rail Intermodal Drayage	13,650	\$35,548	3950	Office or Art Materials	146	\$717
4610	Freight All Kinds (pooled shipments)	9,143	N/A	3910	Jewelry, Silverware, Etc.	140	\$1,069
4221	Semi-Trailers Returned Empty	1,167	\$0	4411	Freight Forwarder Traffic	49	\$7,120
5030	Air Freight Drayage	606	\$4,835	3930	Musical Instruments or Parts	20	\$1,069
3940	Toys, Amusement, Athletic Equipment	485	\$718	4511	Shipper Association Traffic	18	\$6,924
4310	Mail and Express Traffic	375	\$196	3960	Costume Jewelry or Novelties	17	<\$1
4110	Misc Freight Shipments	297	\$446	4621	Mixed Shipments, Multi-STCC	8	\$541,795
3990	Misc Manufactured Products	188	\$65	4711	Small Packaged Freight Shipments	2	\$572,207

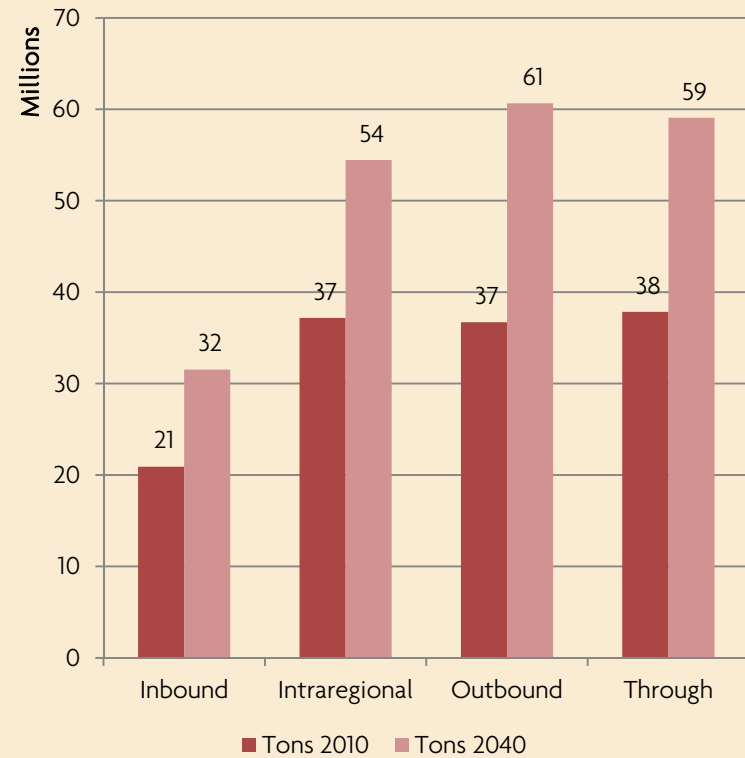
Source: NJTPA Freight Forecasting Tool, 2012

Note: "STCC4" represents the four-digit Standard Transportation Commodity Code (STCC)

Note: Commodities assigned a value of \$0 indicate the absence of sales or commercial value

Note: "N/A" indicates missing or unknown value.

Domestic Tons by Direction, 2010 and 2040



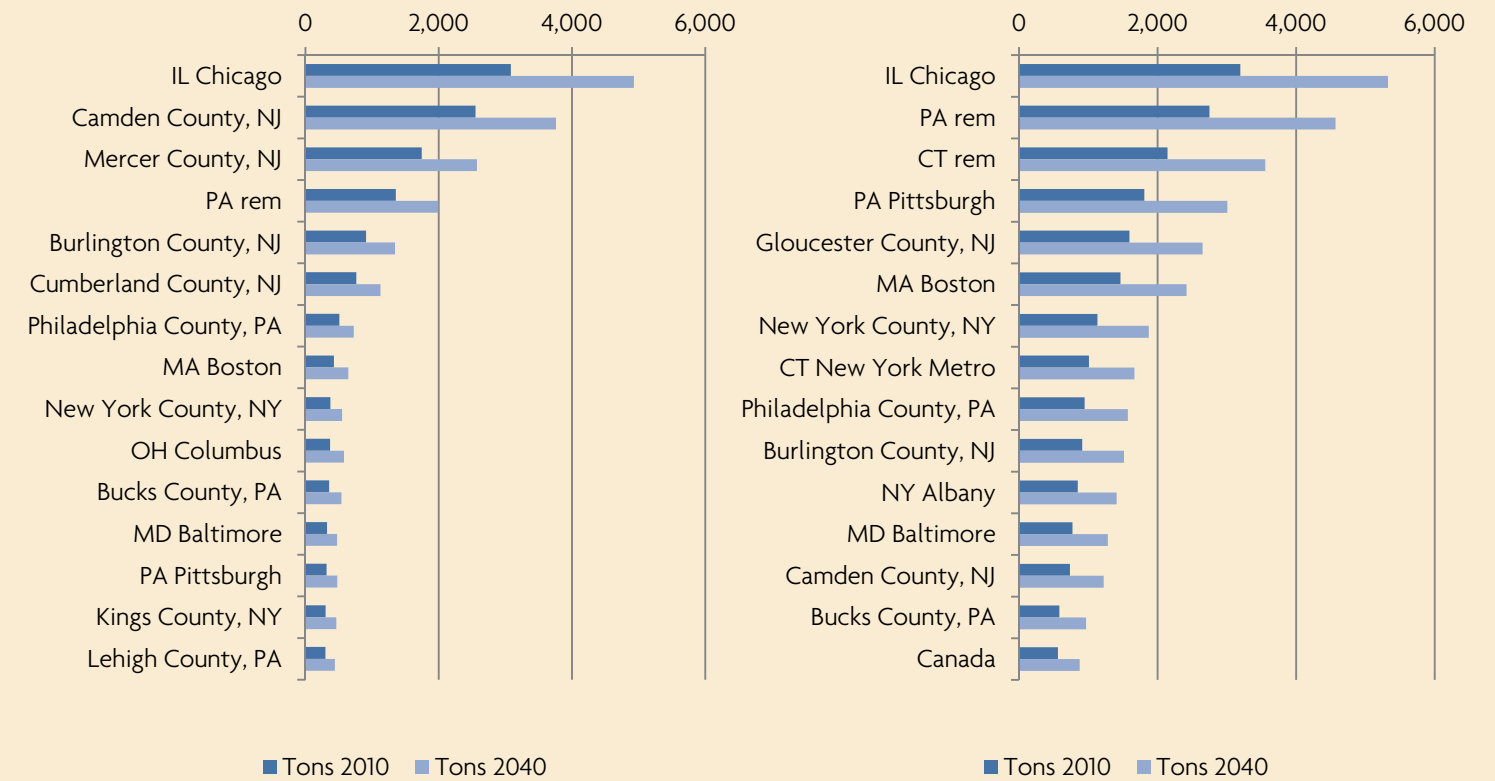
Movement of warehouse and terminal moves are nearly evenly-split between intraregional, outbound, and through, with 37 to 38 million tons, about 28 percent of goods in this bundle, moving in one of those three directions. Inbound movements account for 21 million tons, or 16 percent of goods moved in this bundle.

Two-thirds of the inbound warehouse and terminal moves originate in one of the locations shown in the graph to the right. About 3 million tons come to the region from the Chicago area, more than 2.5 million tons come from Camden County, NJ. Among the top origins, flows from Chicago are expected to grow fastest, at 60 percent, and Philadelphia slowest, at 42 percent, through 2040.

The locations shown in the far-right graph are the destinations of 56 percent of the goods in this commodity bundle that leave the NJTPA region. Among the top destinations, trade with Chicago is expected to grow fastest, at 67 percent, and trade with Canada is expected to grow slowest, at 56 percent, through 2040.

Source: NJTPA Freight Forecasting Tool, 2012

Top Origins of Inbound Domestic Commodities (Left) and Top Destinations of Outbound Domestic Commodities (Right), 2010 and 2040



Source: NJTPA Freight Forecasting Tool, 2012
 Note: "rem" stands for "remainder," which refers to the portions of a state outside major metropolitan regions.

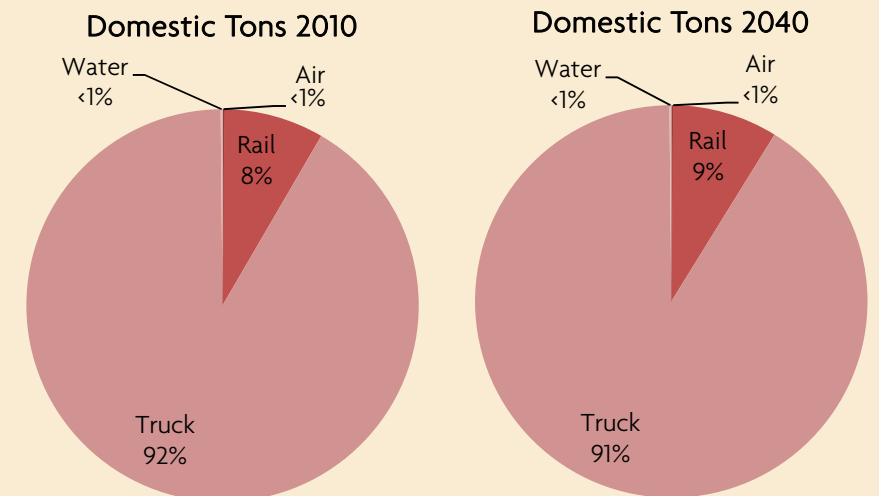
Source: NJTPA Freight Forecasting Tool, 2012
 Note: "rem" stands for "remainder," which refers to the portions of a state outside major metropolitan regions.

Nearly All of the Warehouse and Terminal Moves are Carried by Truck (Left) or Intermodal Rail (Right)



Mode Splits, 2010 and 2040

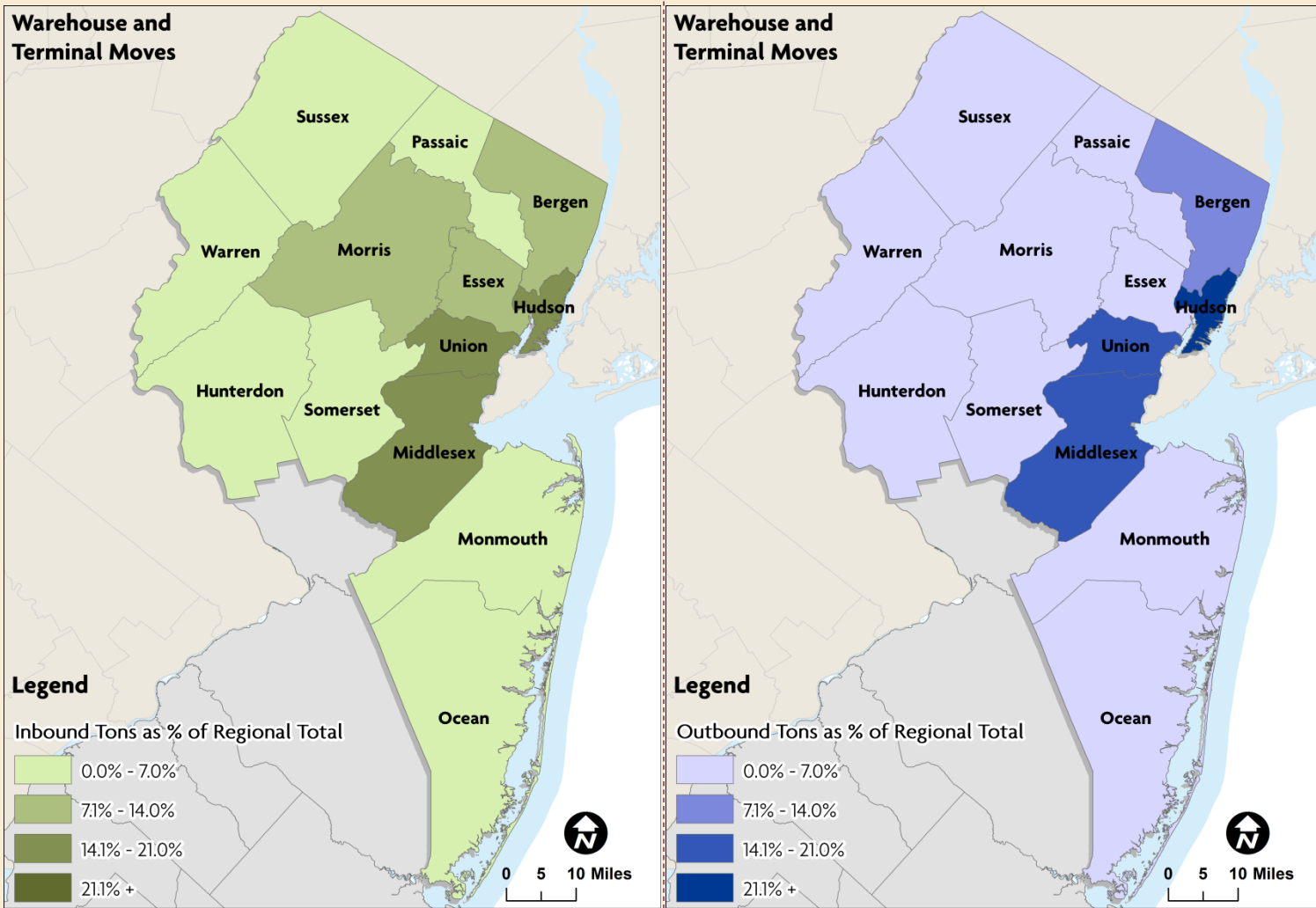
In 2010, about 92 percent of the warehouse/distribution center and unspecified commodities moving in the NJTPA region traveled by truck. Rail carried about 8 percent of goods in this commodity bundle. Air and water each carried less than 1 percent, and air and domestic water carried no significant volume of goods in this commodity bundle. By 2040, the share of tons moving by each mode is expected to remain similar.



Source: NJTPA Freight Forecasting Tool, 2012

Inbound Domestic Tons by County, 2010

Outbound Domestic Tons by County, 2010



Source: NJTPA Freight Forecasting Tool, 2012; NJOIT, 2008; Esri, 2014.

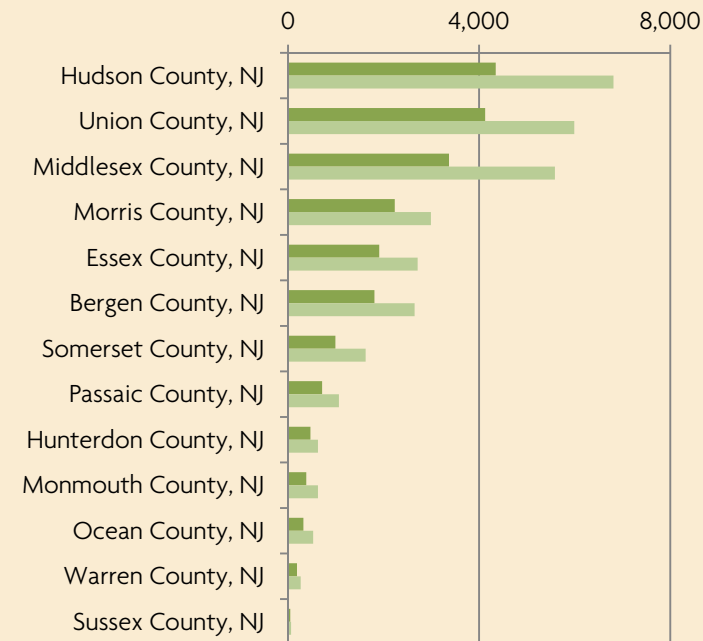
Source: NJTPA Freight Forecasting Tool, 2012; NJOIT, 2008; Esri, 2014.

The maps above and the graphs on the opposite page show the top counties of origin and top counties of destination for goods in this commodity bundle traveling to or from the NJTPA region.

Hudson, Union, and Middlesex are the top three destination counties in the region by tons of goods moved inbound, and are the destination of 57 percent of all of the region's inbound goods in this bundle. Projected growth rates in inbound tonnage of warehouse and terminal moves between 2010 and 2040 range from 34 percent (Morris and Hunterdon counties) to 66 percent (Middlesex County).

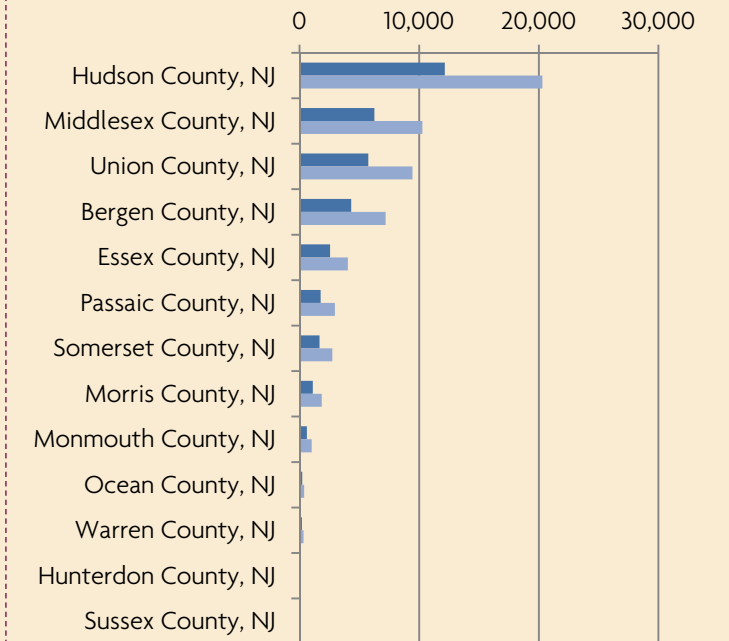
Hudson, Middlesex, and Union are also the top origins of outbound shipments of these goods. Two-thirds of all outbound warehouse and terminal moves originate in these three counties. Projected growth rates in outbound tonnage between 2010 and 2040 range from 58 percent (Essex County) to 68 percent (Warren County).

Inbound Domestic Tons by County, 2010 and 2040



■ Tons 2010 ■ Tons 2040
Source: NJTPA Freight Forecasting Tool, 2012

Outbound Domestic Tons by County, 2010 and 2040



■ Tons 2010 ■ Tons 2040
Source: NJTPA Freight Forecasting Tool, 2012

References

For more information on warehouse and terminal moves commodity flows and logistics in the North Jersey region and elsewhere, consult the following sources:

- National Association of Wholesaler-Distributors, www.naw.org
- American Society of Transportation & Logistics, Inc. www.astl.org
- New York New Jersey Foreign Freight Forwarders and Brokers Association, www.nynjforwarders-brokers.org
- Warehousing Education and Research Council, www.werc.org
- Council on Supply Chain Management Professionals New Jersey Roundtable, www.cscmpnj.org
- Bureau of Labor Statistics, U.S. Department of Labor, www.bls.gov

ABOUT THE NJTPA

The North Jersey Transportation Planning Authority (NJTPA) is the federally authorized Metropolitan Planning Organization for 6.6 million people in the 13-county northern New Jersey region. Each year, the NJTPA oversees the investment of more than \$1 billion in federal funding for transportation projects and provides a forum for interagency cooperation and public input into funding decisions. It also sponsors and conducts studies, assists county planning agencies and monitors compliance with national air quality goals.

The NJTPA Board of Trustees includes 15 local elected officials, including one representative from each of the 13 northern New Jersey counties – Bergen, Essex, Hudson, Hunterdon, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren – as well as from the cities of Newark and Jersey City. The Board also includes the Commissioner of the New Jersey Department of Transportation (NJDOT), the Executive Director of NJ TRANSIT, the Chairman of the Port Authority of New York and New Jersey, a Governor’s Representative and a Citizens’ Representative appointed by the Governor.

ABOUT THE STUDY

The NJTPA regional Freight Commodity Profiles study enhanced the NJTPA’s freight modeling tools, analyzed, and identified gaps in existing freight and industry data, collected data and information to fill those gaps, and prepared summary data products, including a set of Regional Commodity Profile documents. In addition to supporting freight planning, these profiles will be used in stakeholder outreach and education. Key work tasks included:

- Enhancement of the NJTPA’s Freight Forecasting Tool to produce commodity-specific truck trip tables.
- Identification of “Top 11 Regional Commodity Groups” based upon economic and commodity flow data.
- Collection and analysis of data on each of the commodity groups, including: direction of movement; locations of production, shipping, handling, and receiving centers; modes and routes used to transport the commodities.
- Production of “Regional Commodity Profile” documents for each of the Top 11 Regional Commodity Groups, which summarize the data analysis findings using charts, graphs, maps, and descriptive text.

ABOUT THIS PROFILE

The NJTPA developed a Freight Forecasting Tool (FFT) in 2012, which generates alternative domestic freight forecasts to support transportation, land use, and economic development decisions. The FFT was built by Cambridge Systematics, Inc., using commodity flow data from IHS Global Insight and econometric forecasts from the R/ECON model, produced and managed by the Center for Urban Policy Research at Rutgers University. Cambridge Systematics and Parsons Brinckerhoff enhanced the FFT in 2015 to produce commodity group-specific forecast tables.

The NJTPA conducted research on commodity flows and logistics chains for 11 key “commodity bundles,” that move in the North Jersey region, including warehouse and terminal moves, food, apparel, paper and printed materials, waste, construction materials, machinery and transportation equipment, other durable goods, pharmaceuticals, chemicals, and hazardous materials. This profile offers an overview of the components, freight demand, and logistics chain for warehouse and terminal moves transported into, out of, through, and within the North Jersey region.

For further information, please contact Jakub Rowinski, NJTPA Project Manager, at jrowinski@njtpa.org. This document was prepared by the North Jersey Transportation Planning Authority, Inc. with funding from the Federal Transit Administration and the Federal Highway Administration. The NJTPA is solely responsible for its contents.