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NYMTC Regional Freight Plan Update 2015-2040 Interim Plan

Task 2.2.3 Industry-Specific Logistics Analysis



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technical memorandum

Task 2.2.3 Technical Memorandum

Industry-Specific Logistics Analysis

prepared for New York Metropolitan Transportation Council

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1.0 Introduction

The Commodity Flow Analysis prepared under Task 2.2.1 of the NYMTC Regional Freight Plan Update 2015-2040 Interim Plan provides a thorough summary of commodity flows, mode shares, direction splits, and trading partners across all commodity groups. That analysis provides a useful summary of all freight moves into, out of, through, and within the region in aggregate.

As a logical extension of the Commodity Flow Analysis, this memorandum more closely examines several "priority" commodity groups, which support major legacy or emerging industries in the region, and summarizes the travel patterns of those commodities into, out of, and within the region. The primary objective of this analysis is to identify the critical elements of the region's transportation network for handling these priority commodity groups, and therefore, the infrastructure elements whose safe, reliable, and efficient operation are essential to support key sectors of the region's economy. The findings of this analysis will serve as one, among several, considerations in the Task 4 Needs Assessment and subsequent tasks of the Regional Freight Plan Update.

In consultation with NYMTC's Project Manager, five priority commodities were selected for analysis. Selection criteria included volume (in tonnage and value), employment in related industries, and handling characteristics (i.e., ensured representation of bulk and intermodal commodities). The five selected priority commodities, associated standard transportation commodity codes (STCC), and related industries are listed in Table 1.1.

Commodity	STCCs	Industries that Produce or Consume the Commodity
Food Products	20	Food manufacturing, food services, wholesale and retail trade
Apparel	23	Apparel manufacturing, wholesale and retail trade
Lumber	24	Construction, wholesale and retail trade
Refined Petroleum	2910, 2911, 2912	Petroleum refining, manufacturing, fuel and heating oil distribution, retail gasoline
Secondary Freight	50	Transportation and warehousing, wholesale and retail trade

Table 1.1 Key Commodities and Related Industry Sectors

Food products was selected because it is the fourth-ranked commodity by tonnage and seventh by value in the region, because it represents a significant inbound flow of perishable consumer goods from domestic origins, and because it moves by truck and by rail. Apparel is a commodity that is closely tied with the move of international cargo through various U.S. ports of entry, linked with domestic truck and rail transportation into the NYMTC region. Lumber represents a commodity that, although not ranked among the region's top commodities by tonnage or by value, is closely tied with the region's construction industry, which employs more than 332,000 people in the NYMTC region.1 Lumber moves into the region by both truck and rail. Refined petroleum ranks third among top commodities in the region by tonnage and eighth by value, is moved in greater shares by water and other modes than most other commodities, and is consumed by nearly every industry in the region. Secondary traffic is the top commodity in the region by tonnage and by value and includes shipments, primarily of consumer goods, moving from multimodal terminals and warehouses and distribution centers. All five commodities selected are linked with wholesale trade and retail trade industries, which employ 1.3 million people in the NYMTC region.²

1.1 SOURCE DATA

The data source for the analysis in this report is the IHS Global Insight's TRANSEARCH D database³ provided by NYMTC for truck, air, water, rail⁴ and other freight movements. TRANSEARCH is a database that estimates domestic flows of freight into, out of, and within the 10-county NYMTC Region (see Figure 1.1) by annual tonnage, annual value, commodity, trade type (domestic, Canadian or Mexican trade, or the domestic leg of international import or export traffic), origin, and destination. Flows reported in TRANSEARCH are unlinked, which means each portion of a shipment's journey is reported as a separate trip, with no distinguishing indicator to link the trips together.

For example, a shipment of apparel that is transported from Asia to Port Newark Container Terminal (in Essex County, NJ) by sea, from Port Newark Container

² Ibid.

⁴ Surface Transportation Board (STB) Full Carload Waybill Sample was processed by IHS Global Insight for the rail flows.

¹ BLAT database, New York State Department of Transportation, 2013.

³ NYMTC negotiated a data purchase agreement with IHS Global Insight to acquire the same 2007-2035 TRANSEARCH database package that the Port Authority of New York and New Jersey is using for its planning efforts. Between 2009 and 2011, IHS Global Insight delivered four versions of the TRANSEARCH database to the Port Authority. The ultimate acceptable TRANSEARCH database delivery is referred to as TRANSEARCH D. The TRANSEARCH D package contains data for 54 counties in parts of New York, New Jersey, Connecticut, and Pennsylvania. For the purpose of this study, data for the 10 NYMTC counties have been extracted from the TRANSEARCH D database for analysis.

Terminal to a distribution center in Hudson County, NJ by truck, and then to a retail store in Nassau County by truck would appear in two lines of the TRANSEARCH database. The international water move from Asia to Essex County, NJ would not be reported (TRANSEARCH includes domestic and moves associated with Mexican and Canadian trade only). The trip from Port Newark Container Terminal to the distribution center would appear as a portion of the annual tonnage and value of international cargo (apparel) moving from Essex County to Hudson County by truck. The trip from the distribution center to the store would appear as a portion of the annual tonnage and value of the annual tonnage and value of domestic apparel from Hudson County to Nassau County by truck. Figure 1.1 illustrates the types of domestic and North American freight moves that are detailed in the TRANSEARCH database, and the overseas international trips that are not detailed in the database.



Figure 1.1 Freight Trip Detail Included in TRANSEARCH Database

The base year for this database was 2007 and the forecast year was 2035. The database was developed in 2010, and includes consideration of the impacts of the 2008-2009 economic recession in the forecast. Cambridge Systematics proceeded to adjust the base year truck data to better reflect results obtained from other data sources and Origin – Destination surveys done in the region and to extend the forecast year to 2040, to be consistent with the Regional Transportation Plan planning horizon.



Figure 1.2 Ten-County NYMTC Region

1.2 Key Findings of the Commodity Flow Analysis

A summary of key findings and trends in the regional commodity flow profile, as presented in the Task 2.2.1 Technical Memorandum, are presented below. Full details are available in the Task 2.2.1 Technical Memorandum, titled, "Commodity Flow Analysis."

- About 405 million tons of inbound, outbound, intraregional, and through freight moved over the NYMTC region's transportation network in 2007. Thirty percent of this traffic was inbound, 23 percent was outbound, 19 percent was intraregional, and 28 percent was through traffic.
- By 2040, inbound, outbound, intraregional and through freight is expected to increase to 592 million tons a 48 percent increase. Thirty-four percent of this traffic is expected to be inbound, 21 percent outbound, 16 percent intraregional, and 29 percent through traffic.
- Seventy-five percent of the tonnage moved into, out of, within, or through the study region traveled less than 500 miles in 2007, and this share is expected to be 69 percent in 2040, as trade with faster-growing regions in the

Southern and Western United States is expected to grow at a faster rate than trade with regions in the Northeast and Midwest.

- When measured by weight, in 2007, 86 percent (342 million tons) of the regional freight moved by truck; 11 percent (44 million tons) by water between origins and destinations in the United States, Canada, and Mexico (trans-oceanic waterborne freight is not included in the source data); 2 percent (10 million tons) rail; and less than 1 percent (3 million tons) by air and other modes. Other modes include multiple modes, pipeline, and unspecified modes.
- In 2040, the freight transportation mode split is expected to be the same as the base year. Although the share of trips traveling more than 500 miles, a distance at which rail becomes more cost-competitive with trucking, is expected to increase during the forecast period, the source data does not make the assumption that a significant shift of freight from truck to rail will occur.
- When measured by value, in 2007, \$1.34 trillion of inbound, outbound, intraregional, and through freight moved in the NYMTC region. Ninety-seven percent (\$1.3 trillion) moved by truck, 2 percent (\$24 billion) by water, 1 percent (\$9 billion) by rail, and less than 1 percent (\$6 billion) by air and other modes. These dollar values are expressed in 2010 dollars.
- By 2040, the total value of the inbound, outbound, intraregional, and through freight is expected to increase 77 percent to \$2.37 trillion and the freight transportation mode split is expected to be the same as the base year. These dollar values are expressed in 2010 dollars.
- Kings County is the largest freight generator and receiver within the region. In 2007, it accounted for more than 44 percent (41 million tons) of all outbound tonnage and over 19 percent (22 million tons) of all inbound tonnage. Kings County is projected to account for 48 percent (60 million tons) of the 2040 outbound tonnage and 23 percent (45 million tons) of the inbound tonnage in the region.
- Bronx, New York, Queens, and Suffolk counties each received 14 to 15 percent (17 million tons) of the incoming freight to the region in 2007. By 2040, Bronx and Suffolk counties are expected to continue to account for 15 percent (29 million tons) each, and New York and Queens counties' inbound share is expected to be 12 percent (24 million tons) each in 2040.
- The top five commodity groups moving inbound, outbound and intraregionally in both 2007 and 2040 are secondary freight (defined here as freight flows to and from distribution centers or via intermodal facilities and typically represents consumer goods), nonmetallic ores and minerals, petroleum and coal products, food and kindred products, and clay, concrete, glass and stone products. Together they account for more than 68 percent of total commodities by weight both currently and in the future.

- Domestic freight constituted 86 percent of the tonnage moving into, out of, within and through the region in 2007. By 2040, domestic freight is expected to account for 80 percent of the region's freight tonnage. International trade related (including NAFTA trade related) freight tonnage moving into, out of, within and through the region is expected to grow at a significantly higher rate than domestic freight tonnage.
- The top three trading partners of the study region Northern New Jersey, Rest of New York State, and Eastern Pennsylvania – account for about half of total inbound and outbound freight flows by weight in 2007 and are expected to remain the same over the next three decades.

2.0 Industry-Specific Commodity Flows and Logistics Patterns

This section describes the unique logistics patterns of each of the five priority commodity groups, including: component commodities, tonnage and value moved in the region, transportation modes used to move the commodity group, direction of travel of the commodity group (inbound, outbound, or within the region), the top regions of origin or destination, the locations of clusters of shippers and receivers, and flows of the commodity on the region's highway network. The commodity groups are presented in order of their standard transportation commodity code (STCC) number.

2.1 FOOD PRODUCTS (STCC 20)

Food products support thriving food manufacturing, wholesale and retail trade, and accommodations and food services industries, and are a primary factor in the health and quality of life for residents of the NYMTC region. By tonnage, food products is the fourth-largest commodity group traveling into, out from, or within the NYMTC Region. Approximately 24 million tons of food products, worth more than \$30 billion, moved in the region in 2007. By 2040, the volume of food products is expected to increase by 90 percent, to more than 45 million tons.

The food products commodity group consists of dozens of individual commodities. The top ten component commodities are shown in Figure 2.1. Miscellaneous food preparations, bread or other bakery products, soft drinks or mineral water, wine/brandy/brandy spirit, mixed canned or preserved food products, and canned fruits and vegetables are the top component commodities in this group, and over 1 million tons of each traveled in the region in 2007.

Figure 2.1	Component Commodities Within the Food Products Commodity Group, by
	Weight, 2007

		Millions of Tons
		0 1 2
Top Ten Commodities	Misc. Food Preparations Bread or Other Bakery Products Soft Drinks or Mineral Water Wine, Brandy, or Brandy Spirit Canned or Preserved Food, Mixed Canned Fruits or Vegetables Dried Fruits or Vegetables Prepared or Canned Feed Candy or Other Confectionery Malt Liquors	2.0 1.8 1.6 1.6 1.6 1.5 1.0 0.9 0.9 0.9 0.9 0.9
Other Commodities	Flour Or Other Grain Mill Products Distilled Or Blended Liquors Processed Milk Frozen Fruit, Veg Or Juice Sugar, Refined, Cane Or Beet Meat Products Frozen Specialties Macaroni,spaghetti, Etc. Dog,cat Or Other Pet Food,nec Biscuits, Crackers Or Pretzles Meat, Fresh Or Chilled Ice Cream Or Rel Froz Desserts Processed Fish Products Ice, Natural Or Manufactured Wet Corn Milling Or Milo Misc Flavoring Extracts Meat, Fresh Frozen Canned Specialties Canned Or Cured Sea Foods Blended Or Prepared Flour Malt Cheese Or Special Dairy Products Pickled Fruits Or Vegetables Milled Rice, Flour Or Meal Processed Poultry Or Eggs Nut Or Veg Oils Or By-products Animal By-prod, inedible Dressed Poultry, Fresh	$\begin{array}{c} 0.7 \\ 0.5 \\ 0.5 \\ 0.5 \\ 0.4 \\ 0.4 \\ 0.4 \\ 0.4 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.1 \\ 0.1 \\ 0.1 \\ 0.1 \\ 0.7 \\ \end{array}$

Food products travel into, out of, and within the region primarily by truck. In 2007, 97 percent of food products (by tonnage) moved by truck, and 3 percent moved by rail. By value, trucks carried a larger share, 99 percent. The difference indicates that trucks carry higher-value food products than rail, including frozen or refrigerated foods and high-value processed foods. Rail carries some bulk food products such as flour and food oils, while most packaged food products move into, out of, or within the region more efficiently by truck. Food products being transported to grocery stores, bakeries, and restaurants must move by truck to reach the customer's door. Mode splits by tonnage and value are illustrated in Figure 2.2.

About 3.9 million tons, or 18 percent, of food products transported in the region are perishable. These commodities include: milk; frozen fruit or vegetables; frozen or chilled fruit or vegetable juices; fresh or chilled meat products; fresh or chilled poultry products or eggs; fresh or chilled fish products; fresh or chilled dairy products; ice; and butter and margarine. Perishable commodities must be transported through a temperature-controlled logistics chain, also known as a "cold chain" in order to ensure that goods are kept chilled or frozen at the appropriate temperature. This process aims to preserve the product and prevent contamination with bacterial and parasitic pathogens. These commodities must be transported in refrigerated containers, move through temperature-controlled warehouses and distribution centers, and each shipment's temperature must be monitored and documented throughout the supply chain.



Figure 2.2 Mode Split of Food Products in 2007 by Weight (Left) and by Value (Right)

About 58 percent of food products travel inbound from points of origin outside the region, as Figure 2.3 shows. Less than one-quarter of food products originate in the NYMTC region and travel outbound. About 18 percent of food products travel intra-regionally, with origin and destination located within the NYMTC region. As Figure 2.4 shows, trucks move about 100 percent of food products traveling outbound or within the NYMTC region. Rail carries about 5 percent of inbound food products.



Figure 2.3 Direction of Movement of Food Products by Weight, 2007





Kings County is the top origin and destination for food products in the NYMTC Region. Approximately 8.5 million tons of food products were handled in Kings County in 2007. As Figure 2.5 shows, Bronx, Queens, Suffolk, and New York compose the remaining top five counties in the region by tonnage of food products moved. Figure 2.6 shows the distribution of food product tonnage by direction—outbound, inbound, and intra-county. New York, Suffolk, and Putnam counties registered the highest shares of inbound tonnage, while Rockland and Richmond counties are home to several manufacturing facilities, including a

cookie factory and a large bakery in Rockland County, and several large bakeries and a dairy product production facility in Richmond County, which receive farm products, food products, chemicals, and other commodities, and generate a net export of food products. The outbound freight generated from these facilities may be over-represented in the database, and the impact on overall direction of movement is significant given the small reported inbound volumes of food products to these counties.



Figure 2.5 Total Food Products Weight by County, 2007





Trading partners are regions from which inbound tonnage of a commodity originates and outbound tonnage of a commodity is destined. More than 4 million tons of food products traveled within the NYMTC region, making the region's top trading partner itself, as Figure 2.7 shows. Other top trading partners include the rest of New York State, the South Atlantic States (Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, and West Virginia), and Northern New Jersey. These three regions are also the top origins of inbound food products. The top destinations for outbound food products include the South Atlantic states, New England, and the rest of New York State.



Figure 2.7 Top 10 Food Products Trading Partners by Weight, 2007

Because 97 percent of the food products moving into, out of, or within the NYMTC region move by truck, the region's highway network is the most critical transportation infrastructure asset supporting this commodity and the industries that produce food products and the industries and institutions that consume food products. Figure 2.8 shows the location of major shippers and receivers of food products located throughout the NYMTC region, with the size of the dots corresponding to the tonnage of food products moving into or out of those facilities, according to the IHS Global Insight Freight Locator database. The points on the map are filtered to display only the businesses which send or receive a total of 10,000 tons or more of food products annually. Major clusters of shippers and receivers of food products are located in:

- portions of Kings County north of Atlantic Avenue, where 50 businesses received 3.2 million tons of food and sent out 2.5 million tons;
- New York County south of 59th Street, where more than 550 businesses receive 2.7 million tons of food products and shipped out 339,000 tons;

- the South Brooklyn waterfront and Sunset Park in Kings County, where 35 businesses receive about 1 million tons and ship out more than 500,000 tons of food products;
- southern Bronx County in the vicinity of Hunts Point, where 35 businesses receive nearly 700,000 of food product and send out nearly 8,000 tons; and
- western Queens County in the vicinity of Long Island City and Maspeth, where 15 businesses receive more than 553,000 tons and send out nearly 5,000 tons of food products.

The types of companies represented in these clusters include food distributors, including import and export companies; distribution facilities for grocery retail and home delivery of groceries; food product processing facilities or food manufacturing; dairies and farms; and beverage bottling facilities.

Figure 2.8 also shows the highway facilities that carry the greatest volumes of food products. These include:

- Interstate 95 (New England Thruway, Cross Bronx Expressway, Trans Manhattan Expressway, George Washington Bridge, and New Jersey Turnpike);
- Interstate 80 in New Jersey;
- Interstate 78 in New Jersey
- Interstate 278 (Staten Island Expressway, Verrazano-Narrows Bridge, Brooklyn-Queens Expressway);
- Interstates 87 and 287 (Tappan Zee Bridge);
- Interstate 295 (Throgs Neck Bridge and Clearview Expressway); and
- Interstate 495 (Long Island Expressway) in Nassau and Suffolk counties.

Each of these highways carry more than 500 truckloads of food products every day.



Figure 2.8 Shipper and Receiver Locations and Key Highway Links Supporting Food Industry

Source: Cambridge Systematics, using IHS Global Insight TRANSEARCH and Freight Locator, and NYMTC Best Practices Model.

2.1 APPAREL (STCC 23)

Apparel support thriving manufacturing, wholesale and retail trade industries in the NYMTC region. By tonnage, apparel ranks 21st among commodity groups traveling into, out from, or within the NYMTC Region. Approximately 1.9 million tons of apparel, worth more than \$32 billion, moved in the region in 2007. By 2040, the volume of apparel is expected to increase by 66 percent, to more than 3.2 million tons.

The apparel commodity group consists of two dozen individual commodities. The top ten component commodities are shown in Figure 2.9. Women's or children's clothing is the top component commodity in this group, consisting of 39 percent of all apparel by tonnage. More than 600,000 tons of women's or children's clothing traveled in the region in 2007.



Figure 2.9 Top Component Commodities Within the Apparel Commodity Group, by Weight, 2007

Apparel travels into, out of, and within the region primarily by truck. In 2007, 99 percent of apparel (by tonnage and by value) moved by truck, and 1 percent moved by air. Mode splits by tonnage and value are illustrated in Figure 2.10.



Figure 2.10 Mode Split of Apparel in 2007 by Weight (Left) and by Value (Right)

About 51 percent of apparel travels outbound from the NYMTC region to destinations outside the region, as Figure 2.11 shows. Most shippers and receivers of apparel, according to IHS Global Insight's Freight Locator database, are manufacturers of clothing or clothing accessories, which receive inbound shipments of textile mill products, among other commodities, and send a net outbound flow of apparel. Inbound flows of consumer product apparel destined for chain retail outlets, or which are shipped directly to consumers, but which travel through distribution centers prior to entering the region are primarily captured in the secondary traffic commodity group.

Slightly more than one-third of the apparel is traveling inbound from locations outside the NYMTC region. About 14 percent of apparel travels intra-regionally, with origin and destination located within the NYMTC region. As Figure 2.12 shows, trucks move about 100 percent of apparel traveling inbound or within the NYMTC region. Air carries about 1 percent of outbound apparel.









Kings County is the top origin and destination for apparel in the NYMTC Region. Approximately 800,000 tons of apparel was handled in Kings County in 2007. As Figure 2.13 shows, New York, Queens, Bronx, and Suffolk compose the remaining top five counties in the region by tonnage of apparel moved. Figure 2.14 shows the distribution of apparel tonnage by direction—outbound, inbound, and intracounty. Putnam, Bronx, and Westchester counties registered the highest shares of inbound tonnage, while Kings, Richmond, and New York counties registered the highest shares of outbound tonnage.









More than 350,000 tons of apparel traveled between the NYMTC region and the Pacific states of California, Oregon, Washington, Alaska, and Hawaii, making the Pacific region the NYMTC region's top trading partner, as Figure 2.15 shows. The Pacific region is the primary international gateway for apparel imported from East Asia and Southeast Asia. Other top trading partners include the South Atlantic States, the NYMTC region itself, and the West South Central states of Texas,

Oklahoma, Louisiana, and Arkansas. The top three origins of inbound apparel are the Pacific states, Northern New Jersey, and the South Atlantic states. The top destinations of outbound apparel are the West South Central states, South Atlantic states, and Pennsylvania.



Figure 2.15 Top 10 Apparel Trading Partners by Weight, 2007

Because trucks move 99 percent of the apparel that travels into, out of, or within the NYMTC region, the region's highway network is the most critical transportation infrastructure asset supporting this commodity's manufacturing, wholesale, and retail trade industry sectors today. Figure 2.16 shows the location of major shippers and receivers of apparel located throughout the NYMTC region, with the size of the dots corresponding to the tonnage of apparel moving into or out of those facilities. The points on the map are filtered to show only the businesses that send or receive a total of 5,000 tons of apparel or more per year. Major clusters of shippers and receivers of apparel are located in:

- Central Nassau County, where 20 businesses receive more than 11,000 tons of apparel and ship more than 500,000 tons outbound;
- New York County south of 59th Street, where 455 businesses receive more than 1,000 tons of apparel and ship 385,000 tons outbound;
- Kings County north of Atlantic Avenue, where 32 businesses receive nearly 100,000 tons of apparel and ship 15,000 tons outbound;
- Queens County in the vicinity of Long Island City and Maspeth, where 36 businesses receive 22,000 tons of apparel and send 200,000 tons outbound; and

• The South Brooklyn waterfront and Sunset Park in Kings County, where 85,000 tons of apparel travel in and 10,000 tons of apparel travel outbound.

The types of companies receiving or sending large volumes of apparel include retail outlets; manufacturers of clothing, accessories, fabrics and fibers, and packaging; and wholesale trade companies. Although the imbalance of inbound versus outbound flows in these clusters appears to suggest that apparel are being manufactured in these areas and then shipped outbound, it is important to note that many of the businesses in these clusters receive large volumes of secondary freight, miscellaneous freight, and apparel. This observation suggests instead that many of the outbound flows of apparel are movements of product from distributors and wholesalers to retail outlets or to other customers.

Figure 2.16 also shows the highway facilities that carry the greatest volumes of apparel. Highway segments which carry more than 100 truckloads of apparel that originate or terminate in the NYMTC Region every day include:

- The George Washington Bridge; and
- Interstates 78, 80, and 95 in New Jersey.

Highway segments which carry 50 to 100 truckloads of apparel daily include:

- Interstate 95 (Cross Bronx Expressway);
- Interstate 295 (Throgs Neck Bridge and Clearview Expressway);
- Interstate 678 (Whitestone Bridge, Whitestone Expressway, and Van Wyck Expressway);
- Interstate 278 (Staten Island Expressway, Verrazano Narrows Bridge, and Gowanus Expressway); and
- Interstate 495 (Long Island Expressway).





Source: Cambridge Systematics, using IHS Global Insight TRANSEARCH and Freight Locator, and NYMTC Best Practices Model.

2.2 LUMBER (STCC 24)

By tonnage, lumber is the thirteenth-largest commodity group traveling into, out from, or within the NYMTC region. It is one commodity group, among several, which support a construction industry in the NYMTC region that employs 332,000 people.

Approximately 4.1 million tons of lumber, worth nearly \$6 billion, moved in the region in 2007. By 2040, the volume of lumber is expected to increase by 7 percent, to more than 4.3 million tons. Due in part to the reduced residential construction demand in the region after the 2008-2009 economic recession, lumber is projected to be among the region's slowest-growing commodity groups, growing faster than only tobacco products, hazardous materials, exported municipal solid waste, metallic ores, and ordinance or accessories.

The lumber commodity group consists of nearly two dozen individual commodities. The top component commodities are shown in Figure 2.17. Lumber or dimension stock lumber makes up nearly 1.7 million tons, or 38 percent of all tonnage in this commodity group.



Figure 2.17 Top Component Commodities Within the Lumber Commodity Group, by Weight, 2007

Lumber travels into, out of, and within the region primarily by truck. In 2007, 95 percent of lumber products (by tonnage) moved by truck, 3 percent moved by rail, and 2 percent by water. By value, trucks carried 95 percent, rail carried 5 percent, and water carried about 0.3 percent. The difference indicates that rail carries higher-value lumber products and water carries low-value lumber products. Much of the lumber that travels into the region by rail arrives at terminals in Bronx, Queens, Nassau, and Suffolk counties, where it is transloaded to trucks for "last mile" hauls to customers throughout the region. Mode splits by tonnage and value are illustrated in Figure 2.18.



Figure 2.18 Mode Split of Lumber in 2007 by Weight (Left) and by Value (Right)

About 71 percent of lumber travels inbound from points of origin outside the region, as Figure 2.19 shows. Less than one-fifth of lumber originates in the NYMTC region and travel outbound. About 10 percent of lumber products travel intra-regionally, with origin and destination located within the NYMTC region. As Figure 2.20 shows, trucks move about 99 percent of lumber products traveling outbound or within the NYMTC region. Rail carries about 5 percent and water carries about 2 percent of inbound lumber.







Figure 2.20 Lumber Mode Split by Direction by Weight, 2007

Kings County is the top origin and destination for lumber in the NYMTC Region. Approximately 1.4 million tons of lumber were handled in Kings County in 2007. As Figure 2.21 shows, Suffolk, Bronx, Queens, and New York compose the remaining top five counties in the region by tonnage of lumber moved. Figure 2.22 shows the distribution of lumber tonnage by direction—outbound, inbound, and intra-county. New York, Bronx, and Westchester counties registered the highest shares of inbound tonnage, while Richmond, Rockland, and Queens counties registered the highest shares of outbound tonnage. More than one-third of the 61,833 tons of lumber that travel outbound from Richmond County travel by truck to Kings County. This material is likely moving from distributors located on Richmond County to construction sites or retail outlets located elsewhere in the region.



Figure 2.21 Total Lumber Weight by County, 2007





More than 1.1 million tons of lumber traveled between the NYMTC region and the rest of New York State, making the rest of New York State the top trading partner of lumber for the NYMTC region. As Figure 2.23 shows, most of that tonnage moved in the inbound direction. Other top trading partners include Canada, Northern New Jersey, the South Atlantic states, and the NYMTC region itself. Top origins of inbound flows of lumber are the Rest of New York State, Northern New Jersey, the South Atlantic states, and Canada. Top destinations for outbound flows of lumber are the Rest of New York State, and Pennsylvania.



Figure 2.23 Top 10 Lumber Trading Partners by Weight, 2007

Like food products and apparel, the vast majority of lumber move into, out of, or within the NYMTC region by truck. The region's highway network is therefore the most critical transportation infrastructure asset supporting this commodity and construction industry, and wholesale and retail lumber suppliers who depend on the movement of lumber. Figure 2.24 shows the location of major shippers and receivers of lumber located throughout the NYMTC region, with the size of the dots corresponding to the tonnage of lumber products moving into or out of those facilities. The points are filtered to show only business locations which send or receive a total of 50,000 tons of lumber or more per year. Major clusters of shippers and receivers of lumber are located in:

- New York County south of 59th Street, where 18 businesses handle 326,000 tons of inbound lumber and 3.4 million tons of outbound lumber;
- Western and central Suffolk County, where 1.4 million tons of lumber move inbound and 1.2 million tons move outbound from 24 businesses;
- Kings County north of Atlantic Avenue, where 1.9 million tons of lumber move inbound and 6,500 tons move outbound from less than 10 businesses; and
- The South Brooklyn waterfront and Sunset Park in Kings County, where 13 businesses receive 1.1 million tons of lumber products and send out 2,800 tons.

The types of businesses sending or receiving the greatest volumes of lumber include lumber sales, building supply, carpentry and wood products manufacturing, construction, and remodeling companies. The high volume of outbound lumber from New York County is likely due to a reporting problem in the source data, where tonnage is assigned to business headquarters addresses instead of the warehouse, distribution center, or production facility where the shipment is actually generated.

Figure 2.24 also shows the highway facilities that carry the greatest volumes of lumber. The highway links which carry more than 100 truckloads of lumber that originates or terminates in the NYMTC Region include:

- Interstate 80 in New Jersey; and
- The George Washington Bridge and Trans Manhattan Expressway portions of Interstate 95 in New York.

Highway segments carrying 50 to 100 truckloads of lumber daily include:

- The Staten Island Expressway and Verrazano-Narrows Bridge segments of Interstate 278;
- Interstate 95 (Cross Bronx Expressway);
- Interstate 295 (Throgs Neck Bridge and Clearview Expressway); and
- Interstate 495 (Long Island Expressway).



Figure 2.24 Shipper and Receiver Locations and Key Highway Links Supporting Lumber Industry

Source: Cambridge Systematics, using IHS Global Insight TRANSEARCH and Freight Locator, and NYMTC Best Practices Model.

2.3 **REFINED PETROLEUM (STCC 29)**

Refined petroleum products include fuel and heating oil, and products that are used as inputs to a number of manufacturing processes. By tonnage, refined petroleum products is the third-largest commodity group traveling into, out from, or within the NYMTC Region. Just under 37 million tons of refined petroleum products, worth more than \$20 billion, moved in the region in 2007. By 2040, the volume of refined petroleum products is expected to increase by 15 percent, to 42 million tons.

The refined petroleum commodity group selected for this analysis consists of two individual commodities, shown in Figure 2.25. About 57 percent of the refined petroleum products group consisted of fuel oils, and 43 percent was gasoline.

Figure 2.25 Top Component Commodities Within the Refined Petroleum Products Commodity Group, by Weight, 2007



Refined petroleum products travel into, out of, and within the region primarily by truck. In 2007, 71 percent of refined petroleum products (by tonnage) moved by truck, 22 percent by water, and 7 percent moved by other modes, including pipeline and multiple modes. Rail and air carried nearly 0 percent of refined petroleum products in the region. By value, trucks carried a larger share, 77 percent, compared to 18 percent by water and 5 percent by other modes. The difference indicates that trucks carry higher-value petroleum products than water. Mode splits by tonnage and value are illustrated in Figure 2.26.



Figure 2.26 Mode Split of Refined Petroleum Products in 2007 by Weight (Left) and by Value (Right)

About 53 percent of refined petroleum travels within the NYMTC region, primarily for distribution to local fuel customers and gasoline customers and retailers. Approximately 46 percent of refined petroleum travels inbound from other regions. One percent of the refined petroleum traveling in the NYMTC region is traveling outbound to other regions. As Figure 2.28 shows, truck moves about 100 percent of refined petroleum products traveling outbound or within the NYMTC region. Trucks carry about 30 percent of inbound refined petroleum, while water carries more than half (53 percent). Rail carries about 0.2 percent and other modes carry about 15 percent of inbound refined petroleum products.







Figure 2.28 Refined Petroleum Products Mode Split by Direction by Weight, 2007

Kings County is the top origin and destination for refined petroleum products in the NYMTC Region. Approximately 15 million tons were handled in Kings County in 2007. As Figure 2.29 shows, Westchester, Richmond, Suffolk, and New York counties compose the remaining top five counties in the region by tonnage of refined petroleum products moved. Figure 2.30 shows the distribution of refined petroleum product tonnage by direction—outbound, inbound, and intra-county. More than 80 percent of refined petroleum products in Bronx, Kings, Nassau, and New York counties were moving inbound, while flows of refined petroleum from Putnam, Queens, Richmond, Rockland, Suffolk, and Westchester counties moved primarily outbound, mostly to other counties in the region.





Figure 2.30 Refined Petroleum Products Directional Split by County, 2007



More than 21 million tons of refined petroleum products traveled within the NYMTC region, making itself the region's top trading partner for this commodity group. Other top trading partners include Northern New Jersey, New England states, the rest of New York State, and the South Atlantic states. These regions are the top origins of inbound refined petroleum products. The top destinations for outbound refined petroleum products include Connecticut and the rest of New York State.



Figure 2.31 Top 10 Refined Petroleum Products Trading Partners by Weight, 2007

Because 71 percent of the refined petroleum products moving into, out of, or within the NYMTC region move by truck, the region's highway network is the most critical transportation infrastructure asset supporting this commodity and the industries that produce refined petroleum and consume refined petroleum products. Figure 2.32 shows the location of major shippers and receivers of refined petroleum products located throughout the NYMTC region, with the size of the dots corresponding to the tonnage of material moving into or out of those facilities. Major clusters of shippers and receivers of refined petroleum products are located in Manhattan (New York County), southern Brooklyn (Kings County), the Newtown Creek area of Brooklyn and Queens County, and the south shore of Long Island. The recipients of the greatest volumes of refined petroleum products include fuel oil and heating oil supply companies, distribution companies, and gasoline retailers.

Figure 2.32 also shows the highway facilities that carry the greatest volumes of refined petroleum products. These include:

- Interstate 95 (Connecticut Turnpike, New England Thruway, Cross Bronx Expressway, Trans Manhattan Expressway, George Washington Bridge, and New Jersey Turnpike);
- Interstates 84 and 684 in Putnam and Westchester counties;
- Interstates 87 and 287 in Rockland and Westchester counties; and
- Interstate 295 (Throgs Neck Bridge and Clearview Expressway).

The waterborne freight transportation network is also important to the movement of refined petroleum products, as 22 percent of this commodity moves by water. Because water transportation is a significant component of the

freight network for moving refined petroleum products, the waterborne terminals which handle these products are mapped in Figure 2.33. The figure shows the locations of 53 bulk waterborne terminals located in the NYMTC region, which handle refined petroleum products. Water-served refining and transloading terminals, power plants, and other customers, including some marinas and yacht clubs which have fueling stations, are included among the waterborne facilities sending or receiving refined petroleum products. Dense clusters of these facilities exist along Newtown Creek in Brooklyn and Queens, along Gowanus Canal in Brooklyn, along Jamaica Bay and its tributaries in Queens, the north shore of Long Island, the Hudson River Valley, and Arthur Kill in Staten Island.



Figure 2.32 Shipper and Receiver Locations and Key Highway Links Supporting Refined Petroleum Industry

Source: Cambridge Systematics, using IHS Global Insight TRANSEARCH and Freight Locator, and NYMTC Best Practices Model.





Source: U.S. Army Corps. Of Engineers, 2012.

2.4 SECONDARY FREIGHT (STCC 50)

Secondary freight consists primarily of the "last mile" truck moves of intermodal commodities to or from warehouses or distribution centers, or to or from intermodal rail terminals or air cargo facilities. By tonnage, secondary freight is the largest commodity group traveling into, out from, or within the NYMTC Region. Approximately 68 million tons of secondary freight, worth more than \$630 billion, moved in the region in 2007. By 2040, the volume of secondary freight is expected to increase by 50 percent, to nearly 102 million tons.

The secondary commodity group consists of three commodities, shown in Figure 2.34. The vast majority, or 98 percent, of secondary freight consists of moves of freight to or from warehouses and distribution centers.

Figure 2.34 Top Component Commodities Within the Secondary Freight Commodity Group, by Weight, 2007



By definition, secondary freight is a truck commodity, and therefore it travels into, out of, and within the region entirely by truck. In 2007, 100 percent of secondary freight moved by truck. Mode splits by tonnage and value are illustrated in Figure 2.35.

Figure 2.35 Mode Split of Secondary Freight in 2007 by Weight (Left) and by Value (Right)



About 45 percent of secondary freight travels within the NYMTC region, as Figure 2.36 shows. About 40 percent of secondary freight travels inbound from points of origin outside the NYMTC region to destinations within the region, and 15 percent of secondary freight originates in the NYMTC region and travels outbound. The large share of secondary traffic moving interaregionally includes not only moves from large distribution centers to stores, but also some moves of smaller shipments from a small company's warehouse to a customer, for example.

As Figure 2.37 shows, trucks move about 100 percent of secondary freight traveling inbound, outbound, or within the NYMTC region.



Figure 2.36 Direction of Movement of Secondary Freight by Weight, 2007





New York County handles more secondary freight than any other county in the NYMTC region. In 2007, 19 million tons of secondary freight were handled in New York County, more than 52 percent of which traveled in the inbound

direction. According to the IHS Global Insight Freight Locator database, most of the secondary freight traveling into New York County was destined for wholesalers of consumer products and food, retail outlets, and bottling and packaging companies. While New York County maintains a large inventory of retail space, it is likely, judging by the address detail in the database, much of the reported volumes are assigned to office sites instead of retail outlets or distribution facilities. This "headquarters problem" may affect more than 10 percent of the reported volumes assigned to New York County.

As Figure 2.38 shows, Suffolk, Queens, Kings, and Nassau compose the remaining top five counties in the region by tonnage of secondary freight moved. Figure 2.39 shows the distribution of secondary freight tonnage by direction—outbound, inbound, and intra-county. Westchester, Suffolk, and Rockland counties registered the highest shares of inbound tonnage, while Bronx, Putnam, and Nassau counties registered the highest shares of outbound tonnage. More than 61 percent of outbound secondary traffic from Bronx County traveled to Kings, New York, Queens or Suffolk counties. About 62 percent of outbound secondary traffic from Putnam County traveled to Queens or Suffolk counties.









More than 30 million tons of secondary freight traveled between origins and destinations within the NYMTC region, making the region's top trading partner itself, as Figure 2.40 shows. Other top trading partners include the rest of New York State, Pennsylvania, and New England. The top origins of inbound secondary freight are Pennsylvania (10 million tons), the rest of New York State (9 million tons), and Northern New Jersey (4.5 million tons). Top destinations for secondary freight traveling outbound from the NYMTC region include the rest of New York State and New England, each of which received more than 4 million tons and Pennsylvania and Northern New Jersey, each of which received 1 million tons. Given the massive inventory of warehousing and distribution center space located in Northern New Jersey, the relatively low ranking of that region among trading partners is surprising, and may indicate an oversight in the source data. The origins of inbound secondary traffic from Pennsylvania include Lehigh, Luzerne, Northampton, and Lackawanna counties, which are in the Allentown-Bethlehem-Easton and Scranton-Wilkes Barre metropolitan areas. The Allentown-Bethlehem-Easton area has hosted a large boom in warehousing and distribution center development in recent decades, though the inventory in this region is still several times smaller than the inventory in Northern New Jersey. More than half of the inbound secondary traffic from the rest of New York State originates in Dutchess, Orange, Albany, Erie, or Schenectady counties. Dutchess and Orange counties neighbor the NYMTC region and have some warehousing and distribution center clusters along the I-84 corridor and in and surrounding Poughkeepsie. Albany, Erie, and Schenectady counties are home to significant inventories of warehousing and distribution center buildings.



Figure 2.40 Top Secondary Freight Trading Partners by Weight, 2007

Because 100 percent of the secondary freight moving into, out of, or within the NYMTC region move by truck, the region's highway network is the most critical transportation infrastructure asset supporting this commodity and the transportation and warehousing industries that handle secondary freight, and the shippers, retailers and consumers who send or receive secondary freight. Figure 2.41 shows the location of major shippers and receivers of secondary freight located throughout the NYMTC region.⁵ The data points on the map have been filtered to display only business locations which handle a total of 5,000 tons or more of secondary freight. The geographic distribution of these facilities are found in:

- New York County south of 59th Street, where 1,865 businesses receive 2.5 million tons of secondary freight;
- Western Suffolk County, where 550 businesses receive 770,000 tons of secondary freight;
- Central Westchester County, where 160 businesses receive 618,000 tons of secondary freight; and

⁵ Data points in Kings County are curiously absent from the source database.

• Western Queens County, in the vicinity of Long Island City and Maspeth, where 175 businesses receive more than 350,000 tons of secondary freight.

Figure 2.41 also shows the highway facilities that carry the greatest volumes of secondary freight. The George Washington Bridge carries more than 2,000 truckloads of secondary freight per day. Highway segments carrying 1,000 to 2,000 daily truckloads of secondary freight that originate or terminate in the NYMTC Region include:

- Portions of Interstate 87 between the Bronx County/Westchester County border and Interstate 287;
- Interstate 95 on the Cross Bronx Expressway and New England Thruway;
- Interstate 295 (Throgs Neck Bridge and Clearview Expressway);
- Interstate 495 in Nassau and Suffolk Counties;
- Interstate 684;
- Interstate 84 between Interstates 684 and 87; and
- Sections of Interstates 78, 95, and 80 in New Jersey.





Source: Cambridge Systematics, using IHS Global Insight TRANSEARCH and Freight Locator, and NYMTC Best Practices Model.