REGIONAL FREIGHT COMMODITY PROFILE
E-Commerce Deliveries

COMMODITY BUNDLE OVERVIEW

This bundle represents the movement of a variety of goods that consumers order online for delivery to a specified location, often the consumer's home.

Like the warehouse and terminal moves commodity bundle, this bundle consists of shipments of mixed or multiple types of goods, including apparel, food, electronics, instruments, paper products, or drugs.

This commodity bundle profile describes the movement of e-commerce shipments as they are making their "last-mile" trip from a fulfillment center, retail store, parcel shipping center, or postal service facility to their ultimate destination.

The primary data sources for data reported in this profile include e-commerce consumer data acquired from Rakuten Intelligence and NJTPA's Freight Forecasting Tool, which generates commodity freight data and forecasts for a 2020 base year and 2050 forecast year.
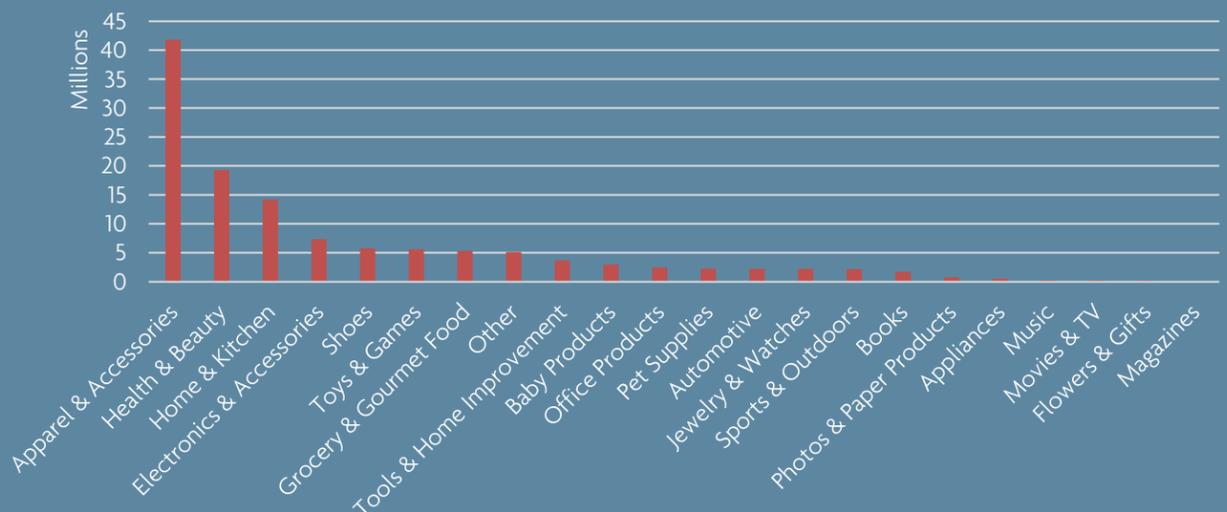
Highlights

- 88 million e-commerce packages delivered in the NJTPA region in 2019
- More than 126 million items delivered in the NJTPA region in 2019
- Apparel represents about one-third of e-commerce items ordered
- Four major carriers delivering 97 percent of the e-commerce packages in the region
- About 1,900 vehicle trips are performing e-commerce deliveries daily

Composition

E-Commerce Items by Product Category, 2019
Source: Rakuten Intelligence, 2019

Bar chart. Y-axis: Millions, scale 0 to 45 in increments of 5. Categories (left to right): Apparel & Accessories, Health & Beauty, Home & Kitchen, Electronics & Accessories, Shoes, Toys & Games, Grocery & Gourmet Food, Other, Tools & Home Improvement, Baby Products, Office Products, Pet Supplies, Automotive, Jewelry & Watches, Sports & Outdoors, Books, Photos & Paper Products, Appliances, Music, Movies & TV, Flowers & Gifts, Magazines.

LOGISTICS SUMMARY

The graphic to the right represents the supply chain for this commodity bundle, illustrating the process of moving shipments of e-commerce packages from the locations where the orders are fulfilled—i.e., warehouses, fulfillment centers, or retail stores—through the logistics chain to the consumer's requested delivery location.

This supply chain consists of four steps:

1. Consumers place orders with the manufacturer of a product, or with a retailer that specializes in selling products manufactured by others. The product may be stocked in a warehouse, fulfillment center, or on the shelves of a retail store. The manufacturer or retailer fulfills the consumer's order and prepares it for distribution through the U.S. Postal Service (USPS) distribution system or a private carrier's (e.g., UPS, FedEx, etc.) system.

2. The package containing the consumer's order is sent by truck to the nearest USPS or private carrier distribution facility. The USPS distributes packages by ground or air transportation, depending upon the distance and consumer's specification. Some private companies, including UPS and FedEx, hand some orders to the USPS for delivery to the consumer. Those packages enter the USPS system in this step.

3. Packages are loaded into mail delivery trucks at the local post office, or if being delivered by a private company, the package is loaded at the distribution facility serving that area. The package is delivered by mail truck, box truck, van, or, in some cases, by contractors using personal automobiles.

4. The package is delivered to the consumer's specified location, including the consumer's home, or a retail store for in-store pick-up.
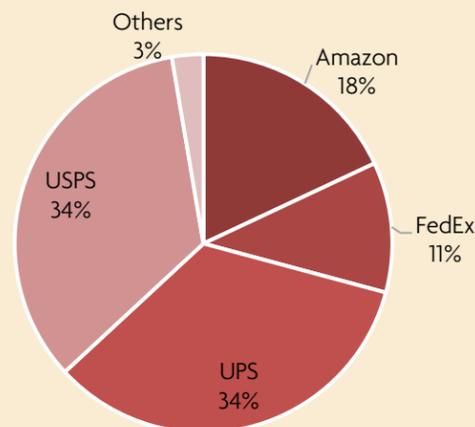
Note that some e-commerce retailers (e.g., Amazon) deliver some products directly from their fulfillment centers to the consumer, bypassing USPS and/or carrier facilities. Some retailers, such as grocery stores, may dispatch orders to be delivered from the store to consumers, using employee drivers or third-party services. These situations are illustrated by the arrow that connects step 1 with step 4.
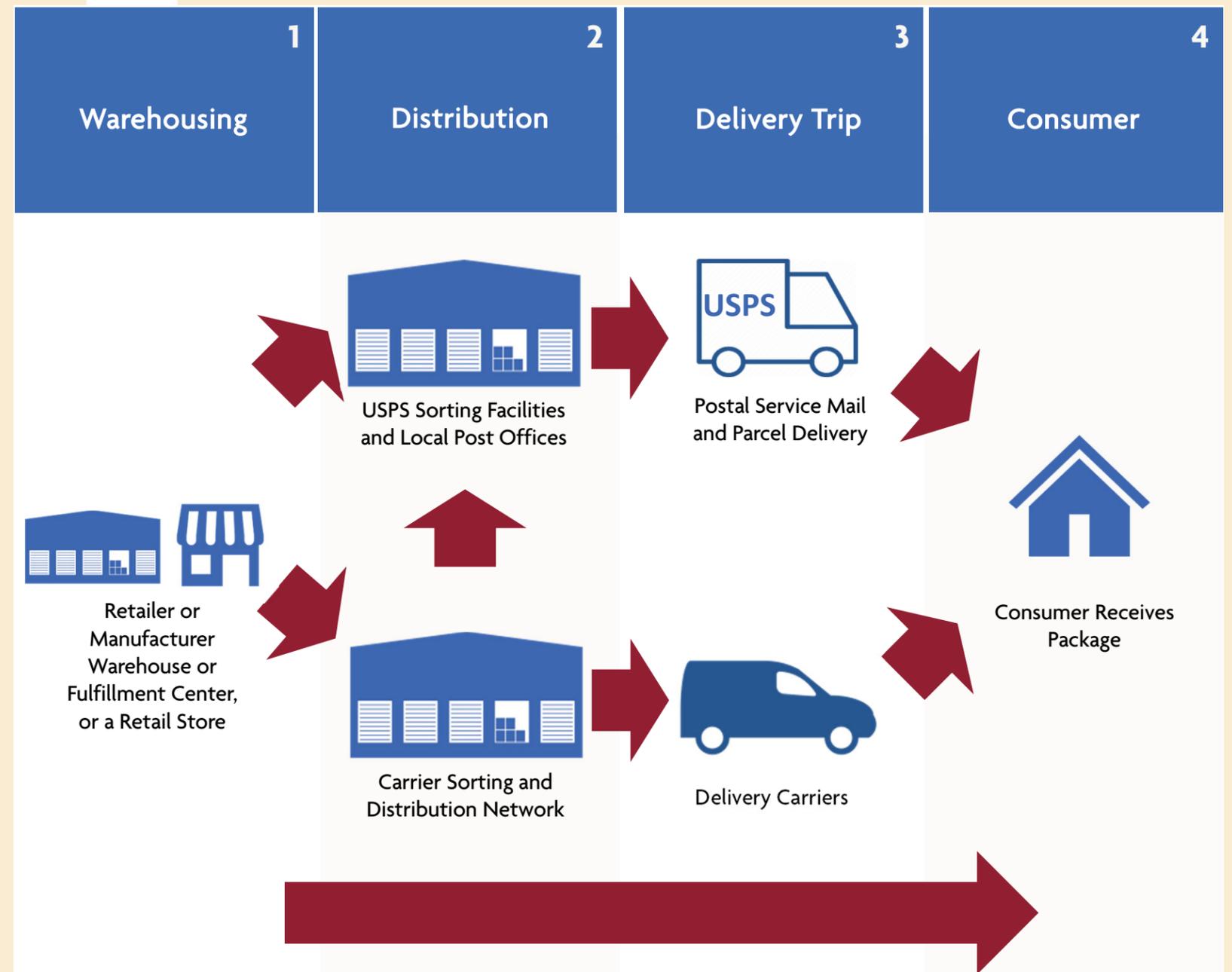
E-COMMERCE DELIVERY CARRIERS

The U.S. Postal Service (USPS) and UPS each deliver approximately 34 percent of e-commerce packages in the NJTPA region.

Each carrier's share varies by county. USPS delivers between 28 percent (Middlesex County) and 58 percent (Sussex County) of e-commerce packages. UPS shares range from 28 percent (Warren and Middlesex counties) to 37 percent (Hunterdon County). Amazon shares range from less than 1 percent (Sussex County) to 25 percent (Somerset County). FedEx shares range from 8 percent (Sussex County) to 14 percent (Hudson County).

Packages by Delivery Carrier

Others 3%
Amazon 18%
FedEx 11%
USPS 34%
UPS 34%

Source: Rakuten Intelligence, 2019

1	2	3	4
Warehousing	Distribution	Delivery Trip	Consumer

Retailer or Manufacturer Warehouse or Fulfillment Center, or a Retail Store

USPS Sorting Facilities and Local Post Offices

Postal Service Mail and Parcel Delivery

Consumer Receives Package

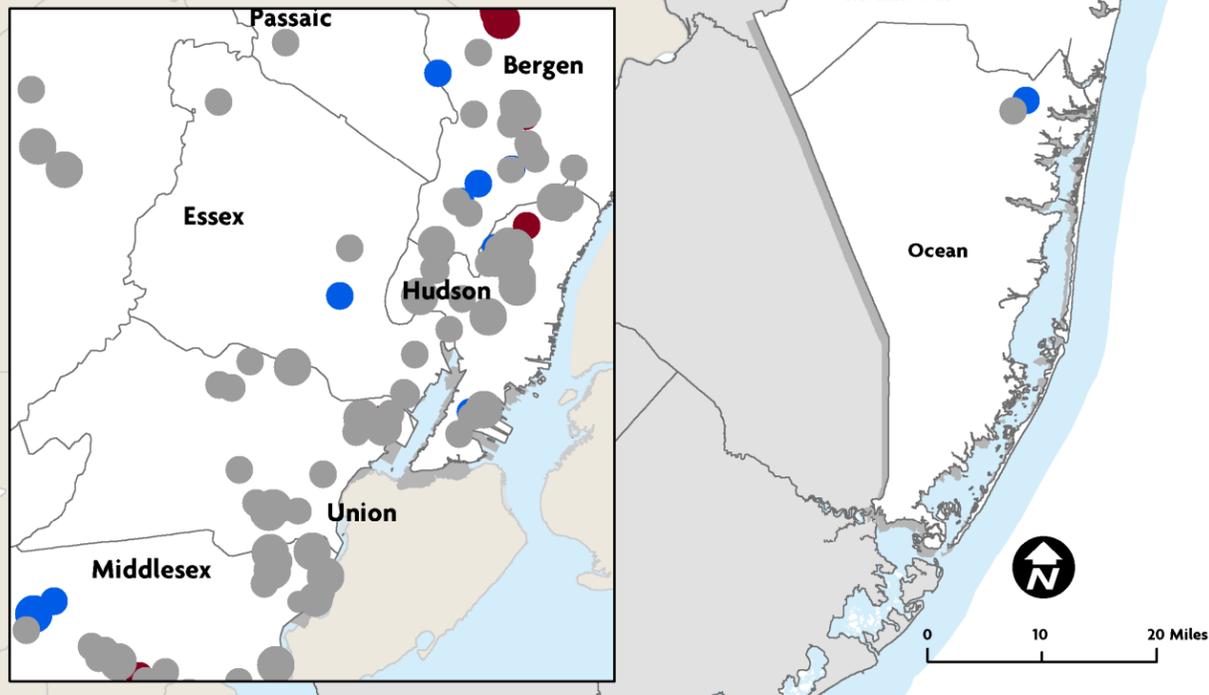Carrier Sorting and Distribution Network

Delivery Carriers

Business Square Footage by Industry Type

E-Commerce

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: Source: CoStar, 2015; InfoGroup, 2019; Cambridge Systematics, 2020; NJOIT, 2008; Esri, 2014
Note:
"Production" includes Manufacturing, Utilities, Mining, & Agriculture
"Logistics" includes Transportation and Distribution
"Sales" includes all other categories

Map labels: Sussex, Passaic, Bergen, Morris, Warren, Essex, Hudson, Union, Somerset, Hunterdon, Middlesex, Monmouth, Ocean

Inset map labels: Passaic, Bergen, Essex, Hudson, Union, Middlesex

0   10   20 Miles

BUSINESS LOCATIONS SUMMARY

The map on the previous page illustrates the locations of facilities that ship and distribute 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.

- Sales, also represented in Step 1 on the logistics summary chart, including retail, services, and institutional establishments where goods are sold.

- Logistics facilities, including warehousing and transportation facilities through which goods are distributed, and correspond to step 2 on the logistics summary chart.

Clusters of establishments are located in portions of Middlesex County near NJ Turnpike Exit 8A, the Interstate 287 corridor in Middlesex and Somerset counties, portions of eastern Union, Essex, western Hudson and southern Bergen counties. Establishments handling e-commerce are also scattered throughout the region.

KEY INDUSTRY TRENDS

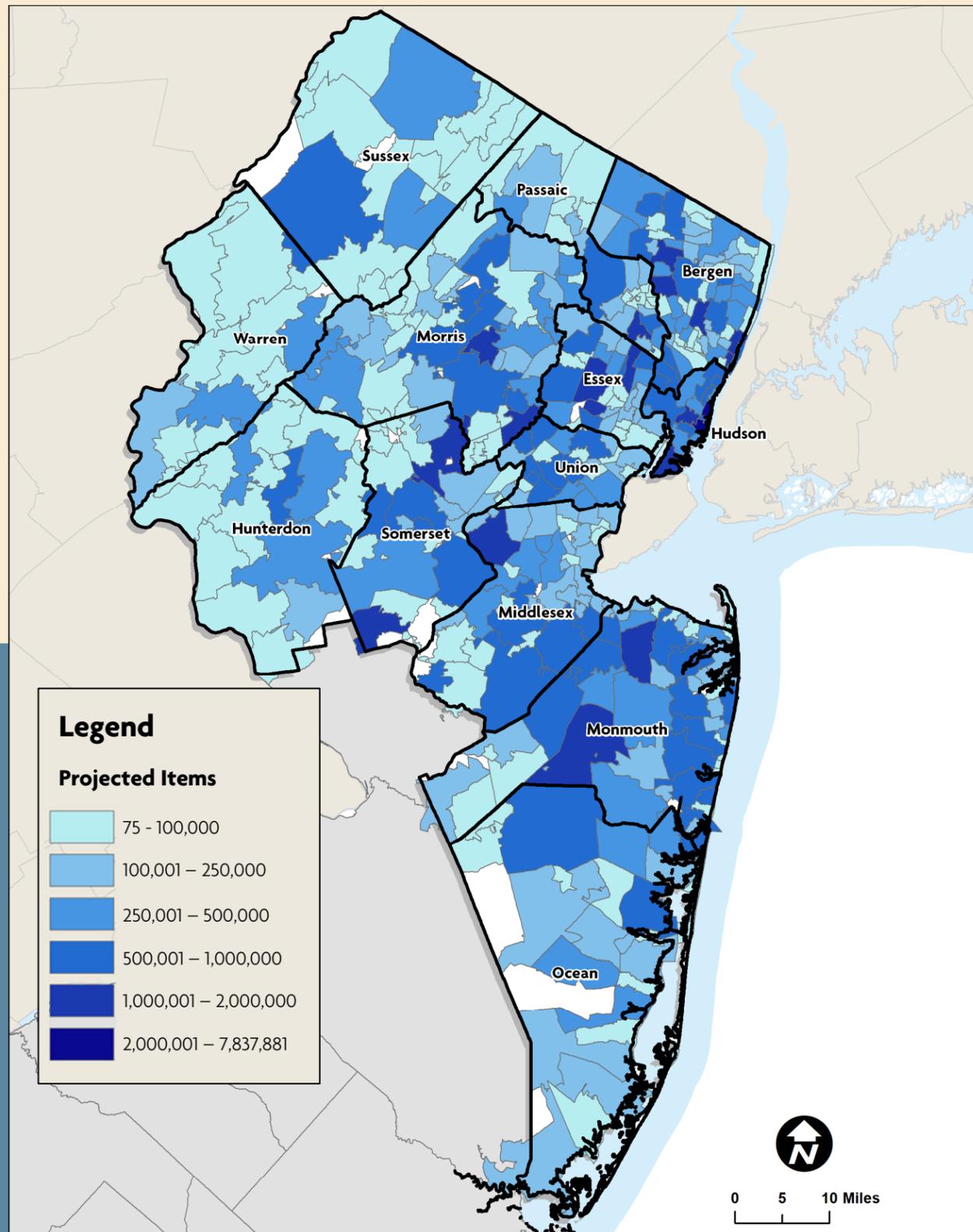The following trends are shaping demand for e-commerce deliveries today, and projected demand in the future:

- Growth in online sales have continued to outpace instore purchases. In light of store closures or limited openings and physical distancing in response to the COVID-19 crisis, e-commerce experienced an abrupt increase in demand, as consumers replaced trips to stores and restaurants with online orders and deliveries.

- E-commerce growth, which may continue to accelerate post-pandemic, will fuel demand for warehouse and distribution space in North Jersey.

- Consumers increasingly expect item personalization and customization. This trend, along with the increasing demand for speedy delivery, will force businesses to either decrease lead times or carry larger stocks of diversified items to meet consumer expectations.

- Extended delivery hours and specific time slot programs are increasing as consumers expect time-definite delivery.

- Information technology is critically important for companies to interact with customers and to manage logistics.

Managing Inventory Inside a Logistics Facility

E-Commerce Items Delivered by Zip Code, 2019

Legend

Projected Items

- 75 – 100,000
- 100,001 – 250,000
- 250,001 – 500,000
- 500,001 – 1,000,000
- 1,000,001 – 2,000,000
- 2,000,001 – 7,837,881

0   5   10 Miles

Source: Rakuten Intelligence, 2019; NJOIT, 2008; ESRI, 2014.

E-COMMERCE DEMAND AND FORECAST

In 2019, approximately 88 million e-commerce packages, containing 126 million items, were delivered in the NJTPA Region. As the map on the previous page shows, the sources of the greatest shares of that demand were the zip codes covering Hoboken and downtown Jersey City, both of which are in Hudson County.

Population, number of households, household income, and median age are strong socioeconomic predictors for e-commerce demand. Over time, age will likely become less of a determining factor.

E-commerce, as a share of retail sales, has been increasing year over year, growing from less than 1 percent of all retail sales in the United States in 1999 to about 11 percent retail sales in 2019. Continued evolution of e-commerce channels, platforms, and technologies over time, combined with new generations of increasingly tech-savvy population, could advance e-commerce penetration in the retail market to 47 percent by 2050.

The expected increased presence of e-commerce in the retail sector, and forecasted population growth in the NJTPA region, suggest that the number of e-commerce packages and items delivered in the region could increase by more than 400 percent, to over 390 million packages, between 2020 and 2050.

Parts of the region experiencing the greatest growth in population and income are likely to experience the greatest growth in e-commerce packages delivered as well. As the graph below shows, Hudson County is expected to remain the top county by number of e-commerce packages delivered in 2050, with Bergen County close behind. Ocean County is expected to experience the greatest growth in e-commerce package volume (over 500 percent).

Growth in the number of e-commerce packages delivered is expected to be lowest in Sussex (356 percent) and Hunterdon (378 percent) counties.

The maps on the following page illustrate the number of e-commerce packages expected to be delivered in each county in 2020 and the forecasted percent change in number of packages between 2020 and 2050.
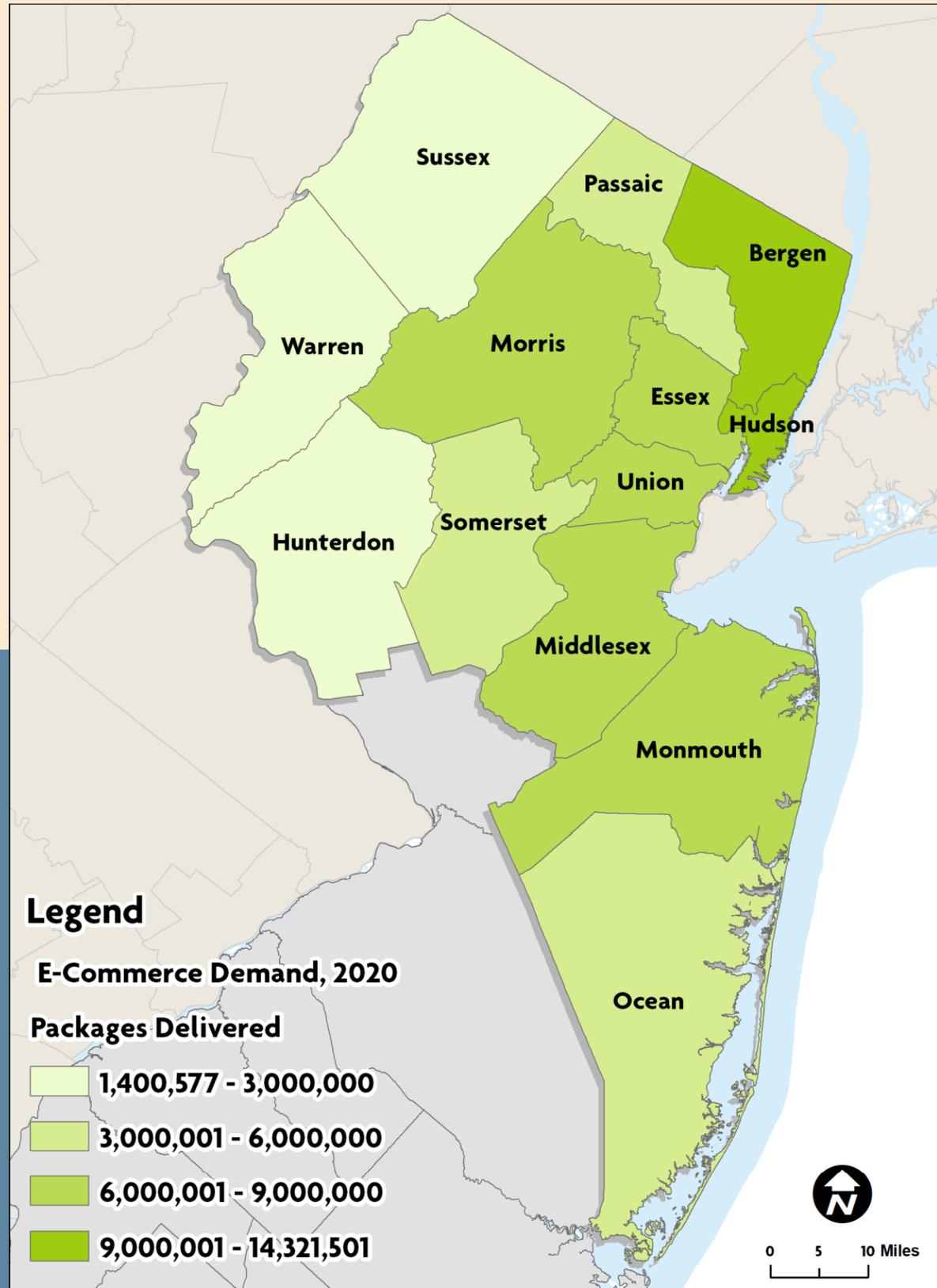
Forecasted E-Commerce Packages by County, 2020-2050
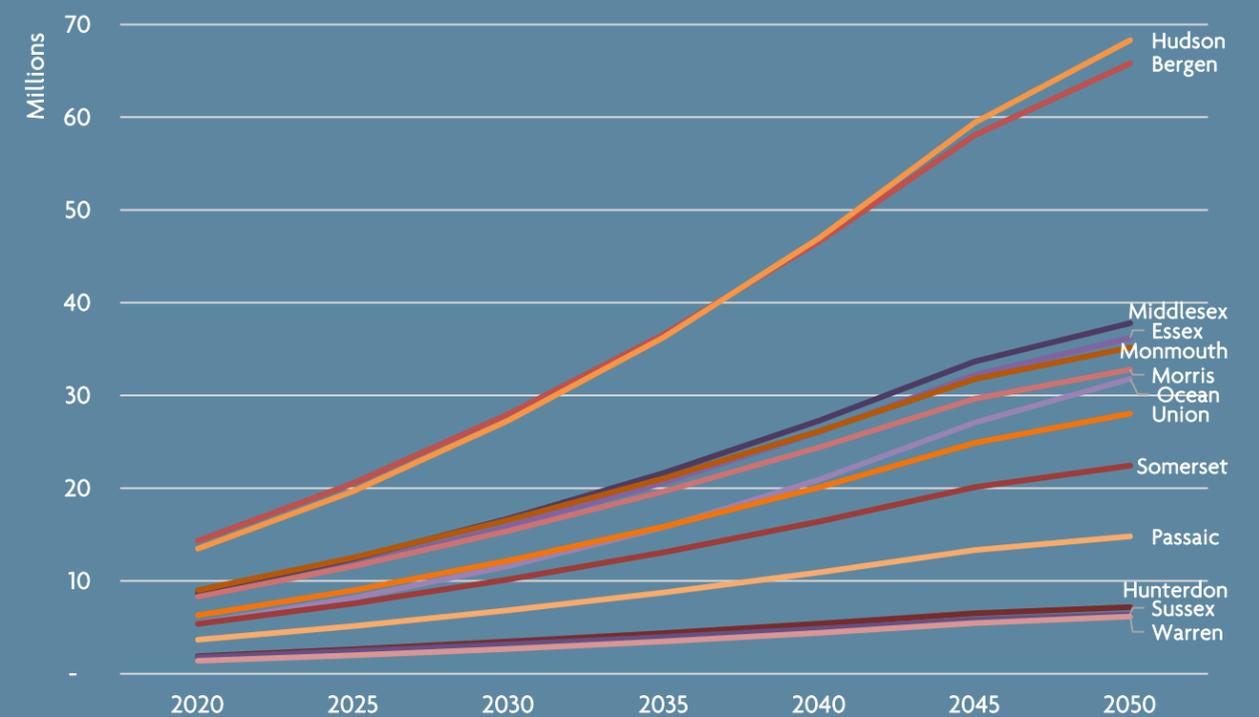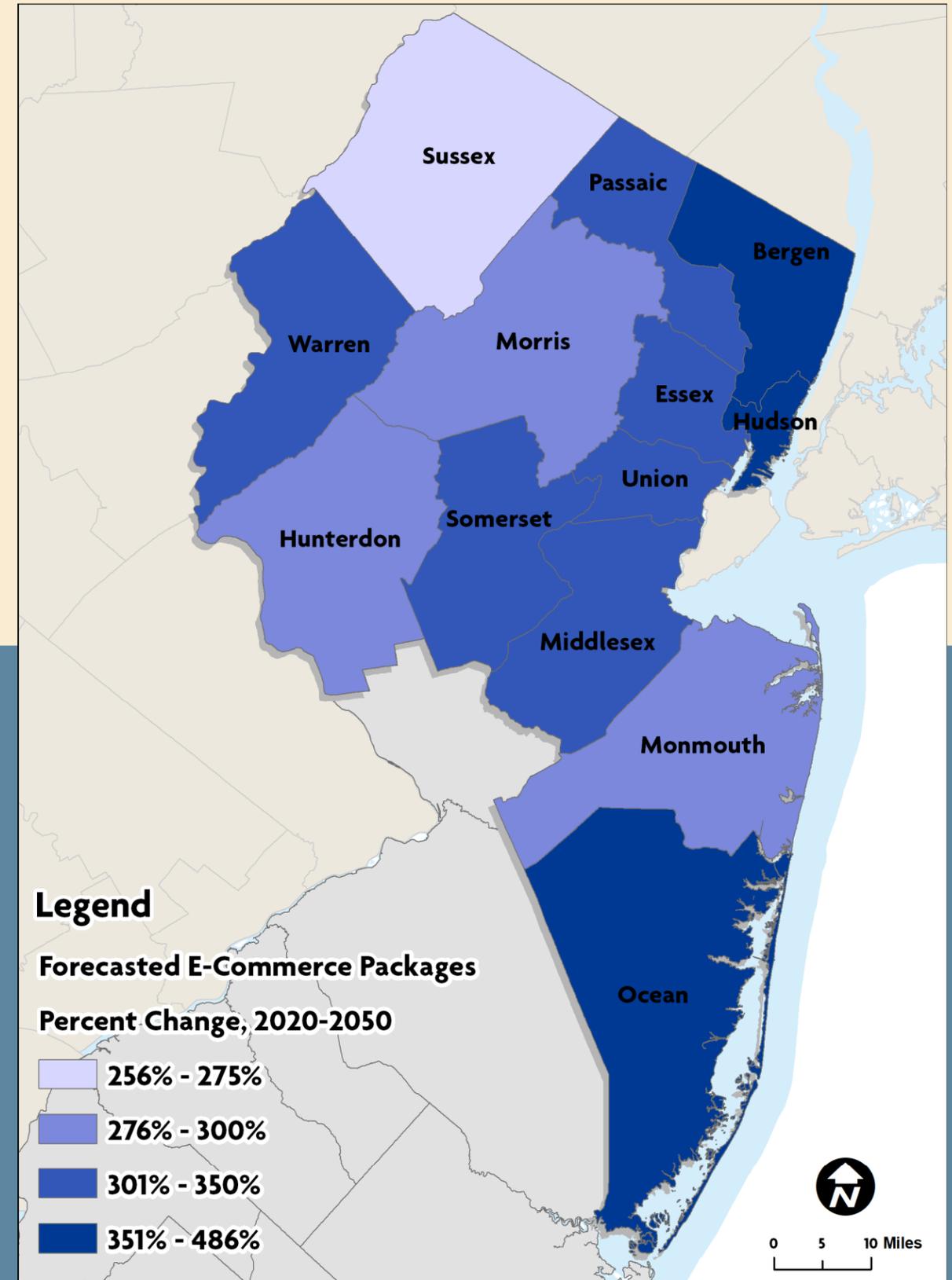
Source: NJTPA Freight Forecasting Tool, 2020

E-Commerce Packages Delivered by County, 2020

Legend

E-Commerce Demand, 2020

Packages Delivered

- 1,400,577 – 3,000,000
- 3,000,001 – 6,000,000
- 6,000,001 – 9,000,000
- 9,000,001 – 14,321,501

0   5   10 Miles

Source: NJTPA Freight Forecasting Tool, 2020; NJOIT, 2008; ESRI, 2014.

Forecasted Growth in Package Deliveries, 2020-2050

Legend

Forecasted E-Commerce Packages

Percent Change, 2020-2050

- 256% – 275%
- 276% – 300%
- 301% – 350%
- 351% – 486%

0   5   10 Miles

Source: NJTPA Freight Forecasting Tool, 2020; NJOIT, 2008; ESRI, 2014.

Highway Network Utilization, 2020

Legend

E-Commerce Deliveries

Daily Vehicle Trips

— 2 - 10
— 11 - 25
— 26 - 50
— 51 - 100
— 101 - 287

Source: NJTPA Freight Forecasting Tool, 2020; NJOIT, 2008; ESRI, 2014.
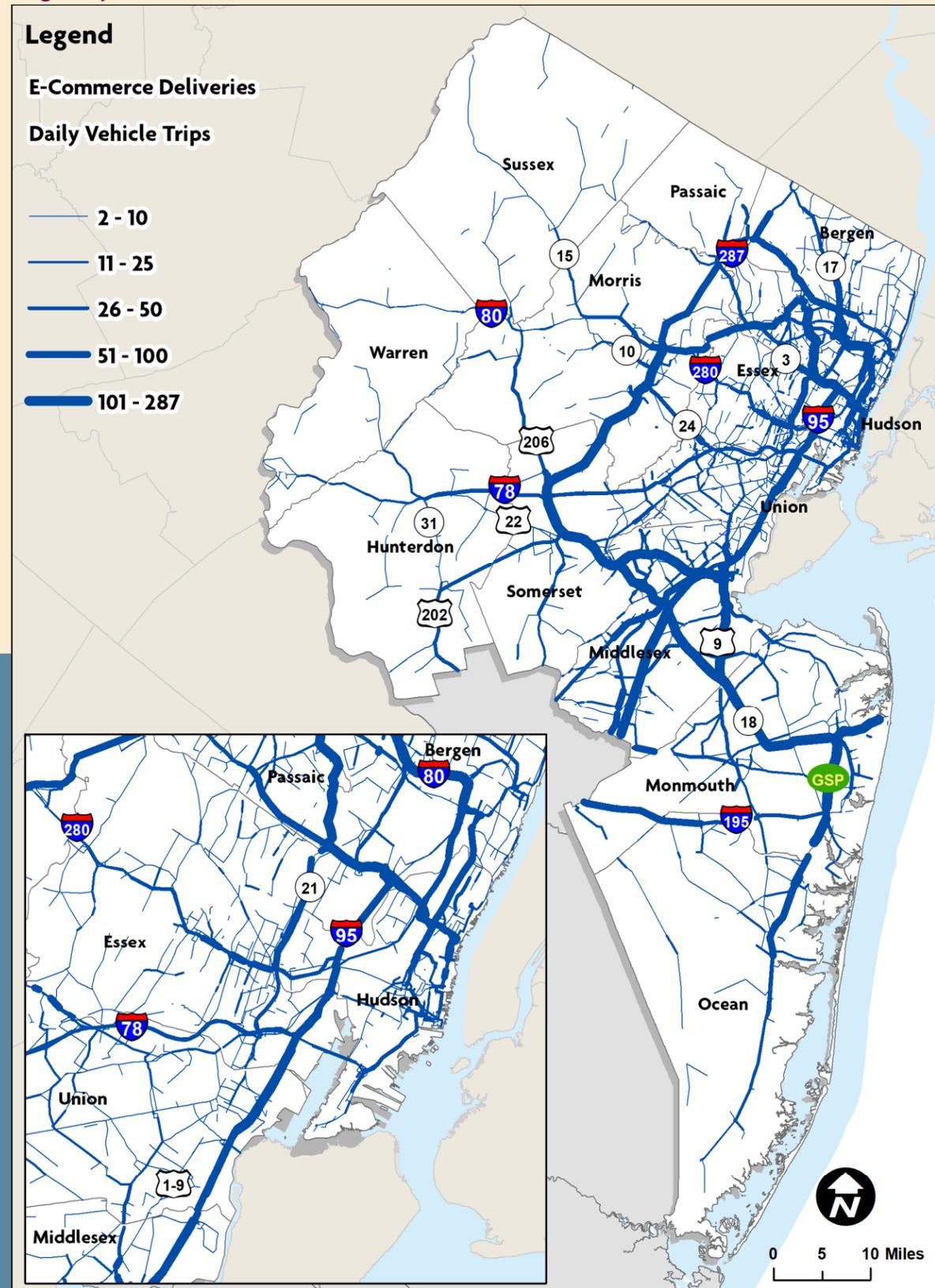
HIGHWAY NETWORK FLOWS OF E-COMMERCE DELIVERY TRIPS

The map on the previous page shows the volume of trucks, vans, and other vehicle trips delivering packages consumers order online in the NJTPA region. These trips originate at carrier distribution facilities, post offices, and other locations from where packages are loaded for final delivery to consumers. These trips represent step 3 in the Logistics Summary flow chart shown on pages 2 and 3.

Portions of the New Jersey Turnpike/Interstate 95, Interstate 287, Routes 3, 4, 9 17, 18, 208, and 495 carry more than 100 e-commerce delivery vehicles in each direction every day. Trips occur in smaller numbers on other state highways, county roads, and local roads throughout the region.

EXAMPLES OF E-COMMERCE DELIVERY VEHICLES

References

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

- New Jersey Business and Industry Association, www.njbia.org
- New Jersey Retail Merchants Association, www.njrma.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 York/New Jersey Roundtable, www.cscmpnynj.org

ABOUT THE NJTPA

The North Jersey Transportation Planning Authority (NJTPA) is the federally authorized Metropolitan Planning Organization for 6.7 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

Conditions in the goods movement industry have changed over the last several years. The 2050 Freight Industry Level Forecasts Study developed updated information on current and projected freight demand through 2050 for the NJTPA to use in its freight planning activities. This effort built on two previous NJTPA freight planning studies: the 2040 Freight Industry Level Forecasts Study (completed in 2012) and the Regional Freight Commodity Profiles Study (completed in 2015).

This study helps identify locations with concentrations of goods movement activity and where they will occur in the future; the types of commodities that are and will be moving through the region; and where strategic investments should be considered to support economic growth and enhance regional resiliency. The results of this work will serve as background for the NJTPA's next Long Range Transportation Plan as well as freight planning and subregional planning studies.