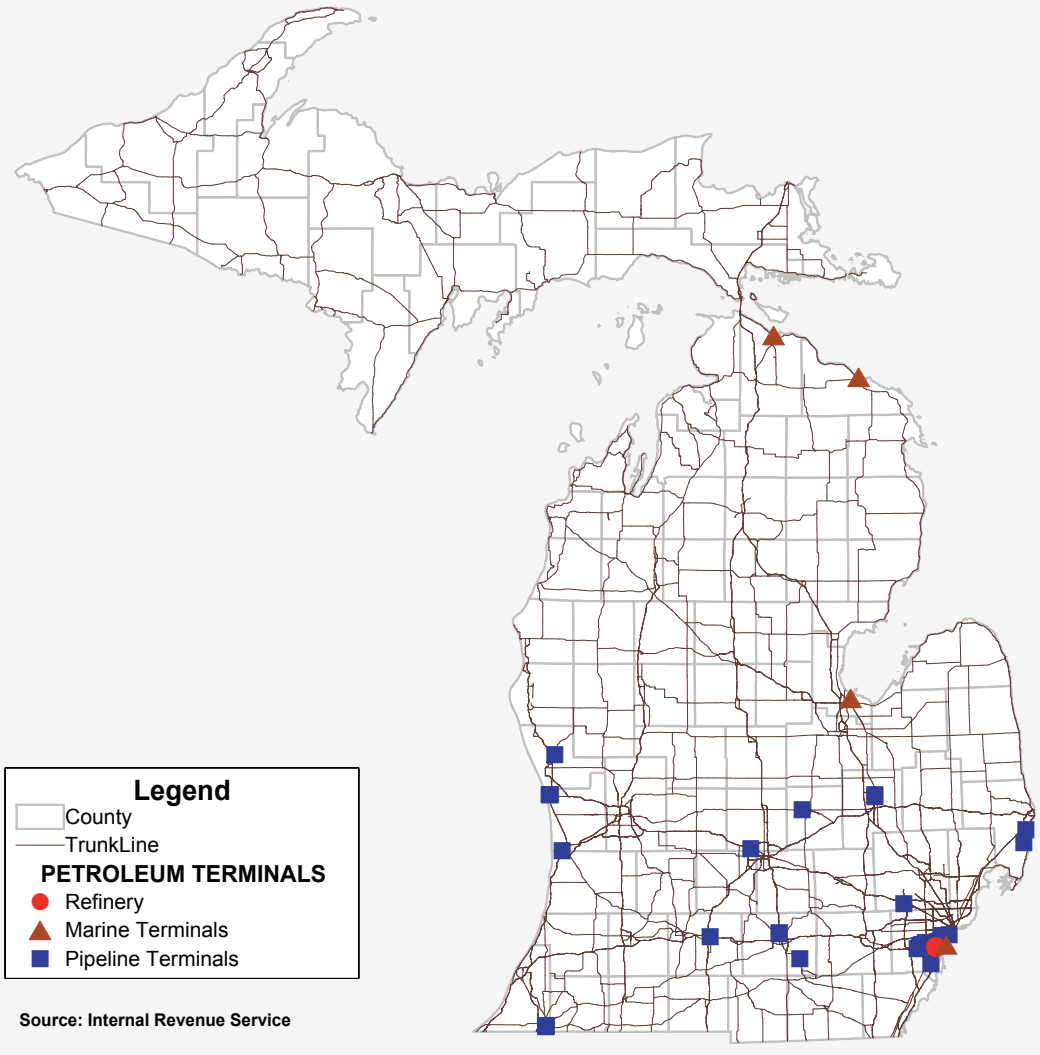
5 STATE FREIGHT TRANSPORTATION ASSETS

Pipelines

Although MDOT does not oversee pipeline infrastructure, it maintains a geographic database of petroleum pipeline terminal locations (Figure 11). These sites are major generators of petroleum movements to consumption areas. Keeping updated location information benefits the department's freight modeling efforts by allowing the simulation of origin/destination patterns on state highway infrastructure. The following map depicts pipeline terminal locations.

Figure 11 – Petroleum Terminals and Refineries in Michigan



Source: Internal Revenue Service

KEY FREIGHT INDUSTRY AND NATURAL RESOURCE LOCATIONS

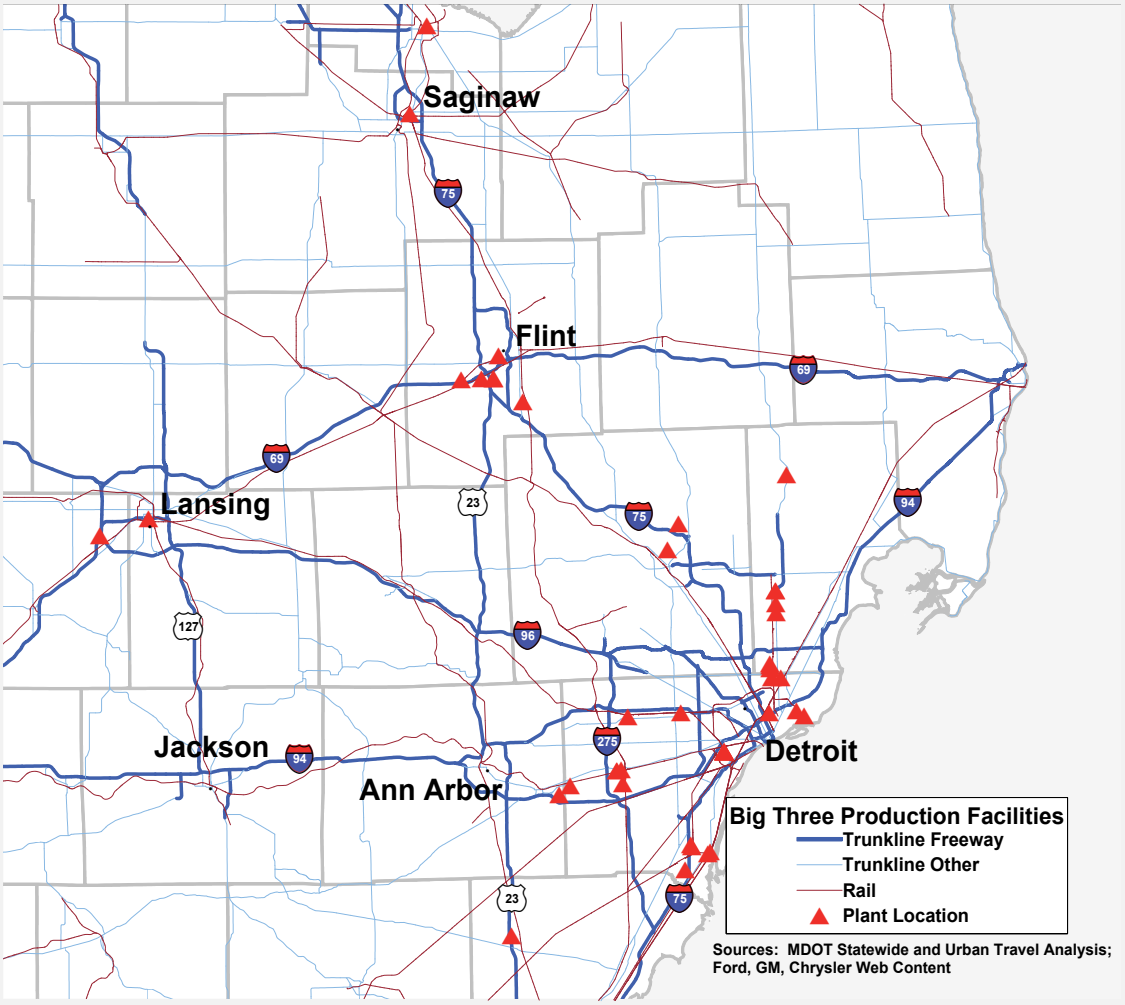
Businesses and industries involved in everything from manufacturing to agricultural production depend on the movement of goods. Easy access to high-quality transportation infrastructure is often a fundamental consideration for businesses in deciding where to locate. MDOT places strong emphasis on system preservation and system-wide integration of all modes to ensure that shippers and carriers are able to make the most efficient and cost-effective use of the transportation assets Michigan has to offer.

The following section highlights the location of warehousing terminals and the major industries in Michigan, including auto manufacturing, mining, agriculture, and logging.

Auto Manufacturing Industry

Michigan is home to the nation's auto industry and is the headquarters of General Motors, Ford, and Chrysler. Transportation equipment is a predominant freight commodity moving throughout southern Michigan, with shipments between suppliers and the major production plants occurring in a continuous cycle. The "just-in-time" delivery of auto parts and products relies on multiple modes of transportation across the state, as well as between neighboring states and Canada. The following map depicts the assembly plants and major production facilities of the Big Three auto companies, all of which are located near major trunkline facilities and rail infrastructure assets (Figure 12).

Figure 12 - Chrysler, Ford, and GM Production Facilities



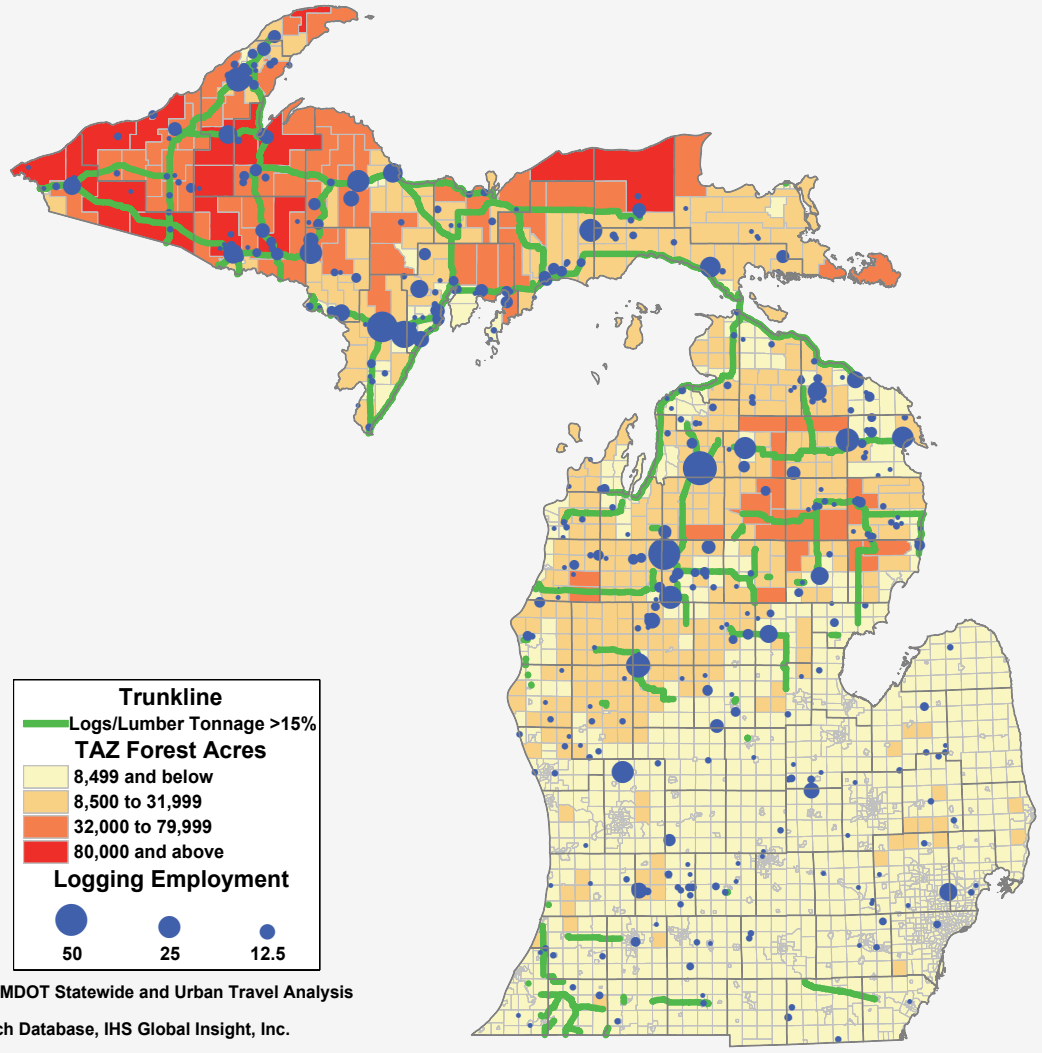
5 STATE FREIGHT TRANSPORTATION ASSETS

Logging Industry

Michigan's Upper Peninsula and northern Lower Peninsula are flush with a mix of hardwoods and pines. Michigan is a leading producer of wood products, including furniture and a variety of paper products. MDOT's employer database provides the location of logging employment, sawmills, paper mills, and other facilities using timber (Figure 13).

Quite often, logging sites are located in rural areas, making local forest roads essential to support the logging industry in Michigan. The following map portrays the location of logging employment, acres of forest land aggregated to Traffic Analysis Zone (TAZ) and the location of state roads where logs and lumber make up more than 15 percent of all commodity weight traveling on the roadway.[8]

Figure 13: Michigan Logging Locations



Sources: MDOT Statewide and Urban Travel Analysis

Transearch Database, IHS Global Insight, Inc.

8 Traffic analysis zones or TAZs, are typically small area neighborhoods or communities that serve as the smallest geographical basis for travel demand model forecasting systems. http://tmiponline.org/Clearinghouse/Items/Technical_Synthesis_-_Defining_Traffic_Analysis_Zones.aspx

Agricultural Production

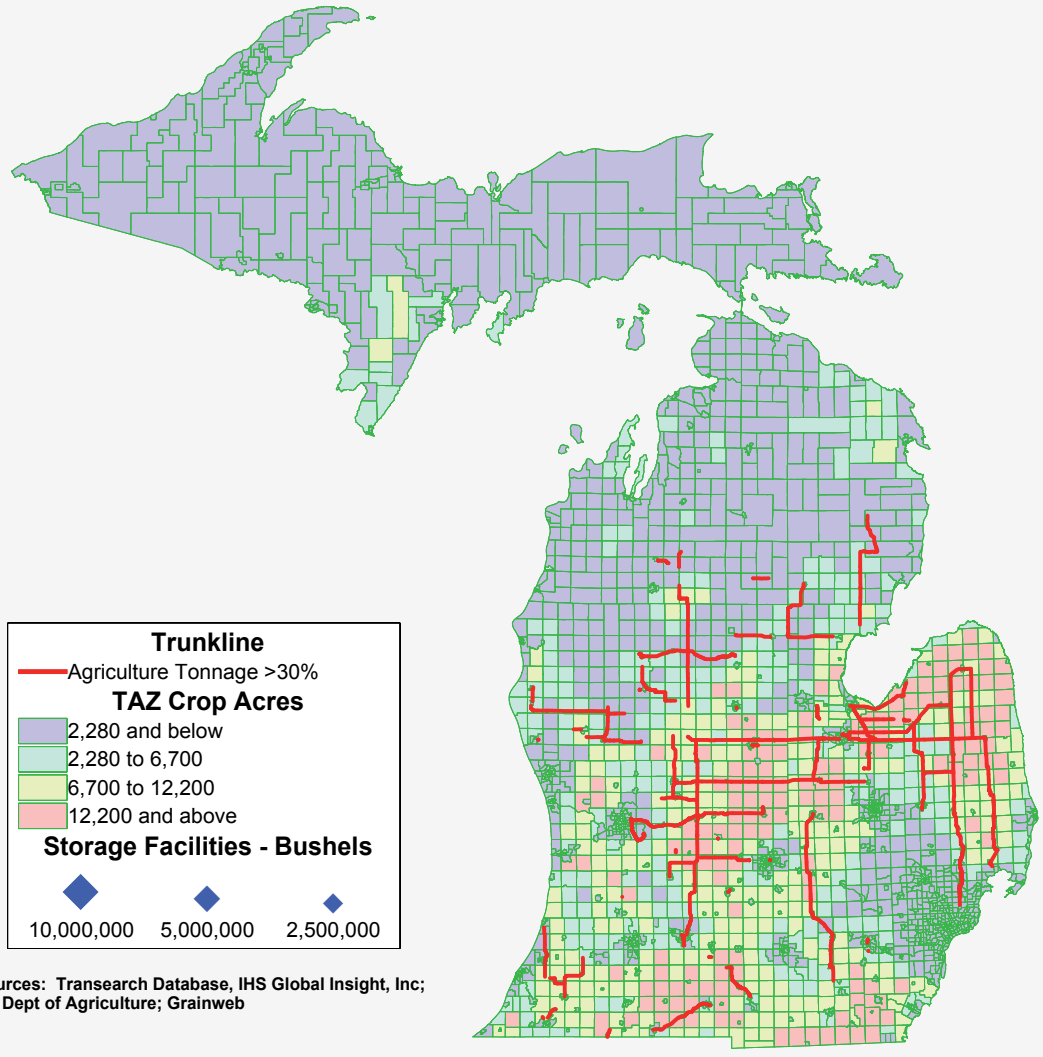
The southern half of Michigan's Lower Peninsula is home to the majority of productive agricultural land in Michigan, due in part to the longer growing season. There also are large orchard and vineyard areas along the Lake Michigan shore of the Lower Peninsula and agricultural activity in the southern tip of the Upper Peninsula. (Figure 14).

In line with the national initiative to double exports, Gov. Snyder has stated his goal to double Michigan's agriculture exports and increase the economic impact of the agriculture industry. The state's initiatives, coupled with the trend of agriculture activity moving northward, has placed additional emphasis on the quality of the transportation infrastructure in the Thumb Area, the Saginaw Bay region, the northern Lower Peninsula, and throughout south central Michigan.

In addition, recent presentations by the Michigan Agri-Business Association indicate that the movement of agricultural activity northward has raised concerns about the adequacy of transportation resources in the northern Lower Peninsula and Upper Peninsula.[9] The concerns related to non-highway modes (rail and water freight) become even more critical in light of the fact that road infrastructure may be inadequate compared to the lower third of Michigan.

Agricultural products are typically first shipped from rural areas and on local roads, followed by routes along state trunkline while en route to production, storage, and market facilities. The following map shows the major concentration of agriculture production. State roads that handle more than 30 percent of overall tonnage in farm products are indicated in red.

Figure 14 - Crop Concentration and Storage Facilities



Sources: Transearch Database, IHS Global Insight, Inc; US Dept of Agriculture; Grainweb

9 Michigan Agriculture in the Global Economy, James E. Byrum, March 2013, http://ippsr.msu.edu/policy/presentations/13MIAg.pdf.

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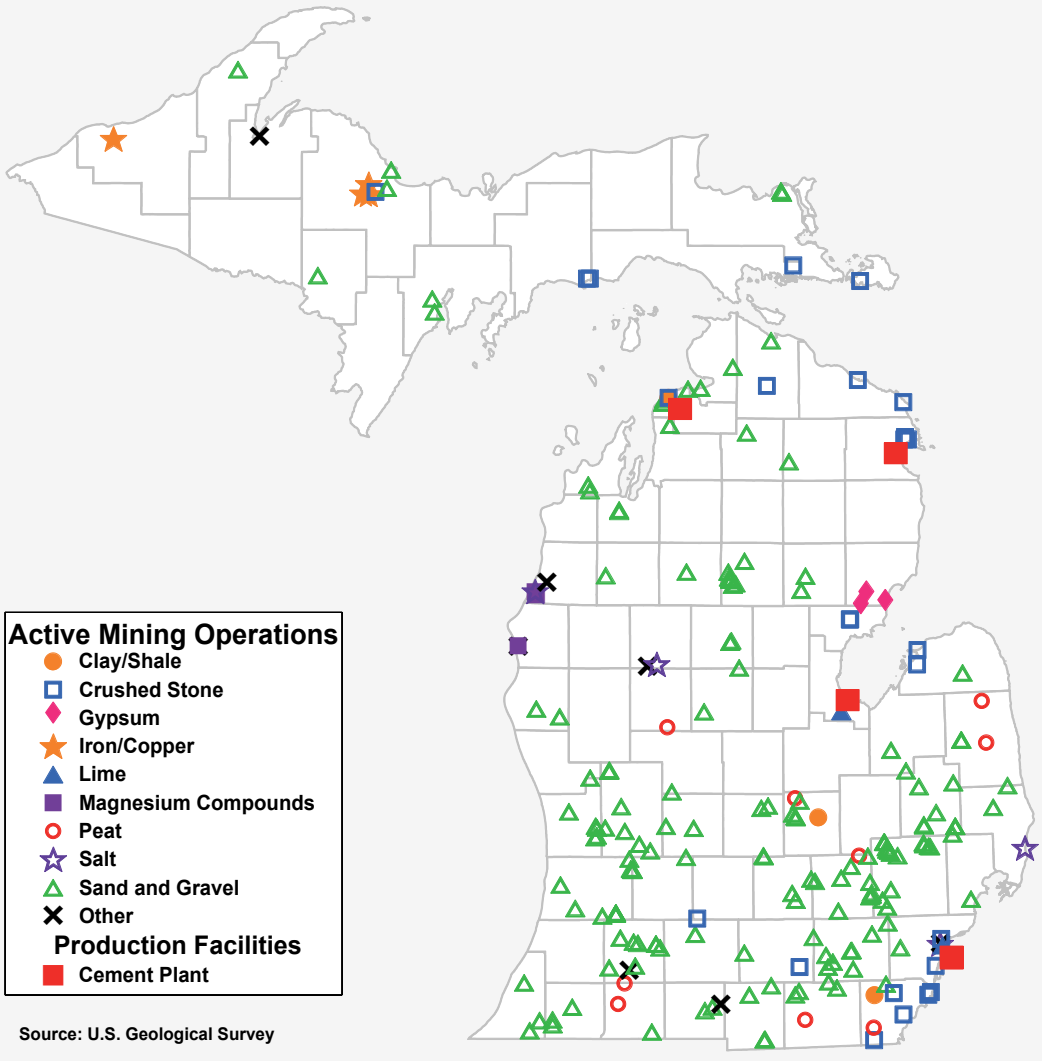
Mining Industry

Michigan has a vast supply of raw natural resources mined for use by the manufacturing industry (Figure 15). Metallic and nonmetallic ores move through the state by truck, rail, and water. Michigan also is a leader in the supply of sand and gravel, much of which moves by truck directly to construction sites within the state. Limestone and iron ore are prevalent in northern Michigan and move by rail and water. The following map displays the location of various mining and plant facilities throughout the state as of 2009.

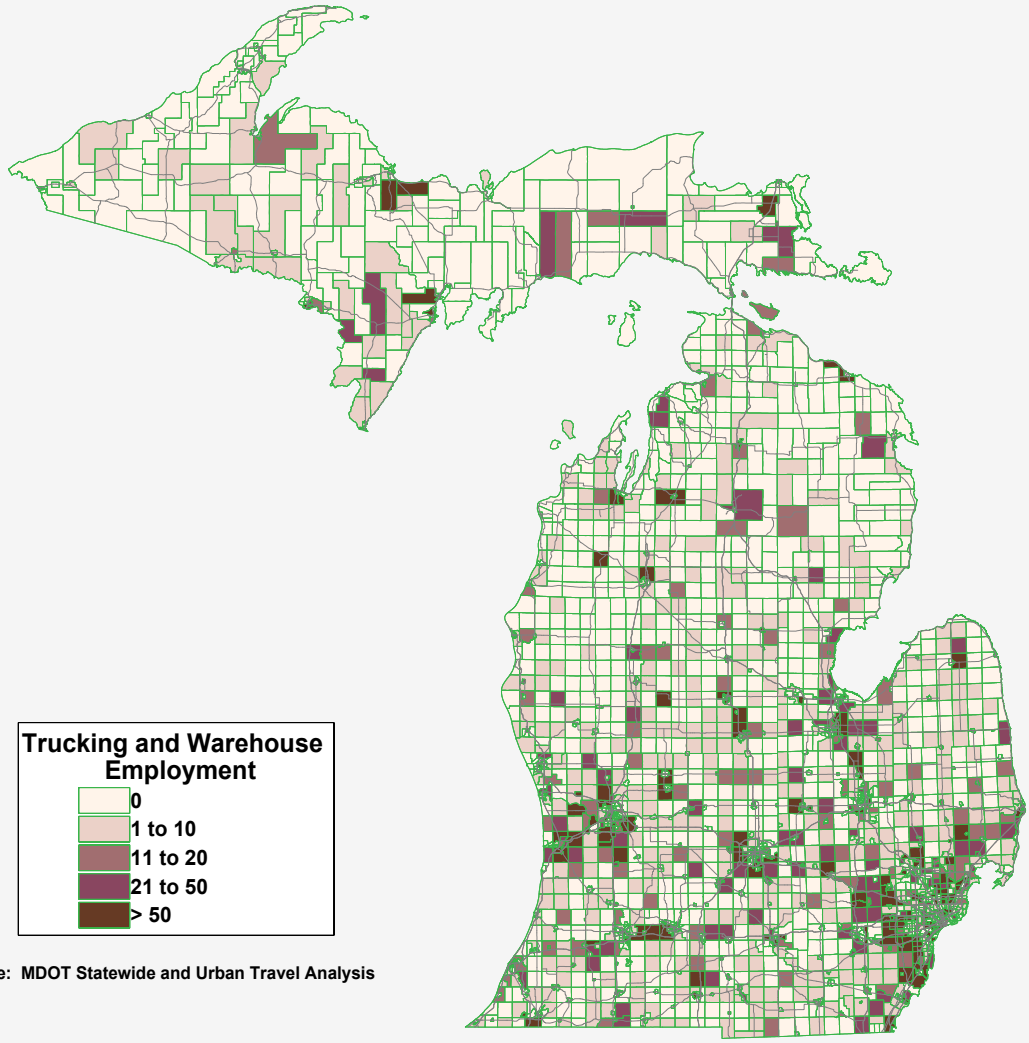
Figure 15 - Michigan Natural Resource Operations



Warehouse and Trucking Employment Centers

Although not a specific commodity type, an essential ingredient in the supply chain networks of many businesses is the location of warehousing facilities and the presence of trucking companies. These types of businesses tend to locate outside of city centers, near freeways, and in close proximity to the intersection of major highways. Ease of access and the presence of large population centers are dominant factors in determining where to locate warehouse facilities. Major retail distribution centers are included in this category as they are often key truck freight generators. The following map (Figure 16) depicts trucking and warehouse employment concentrations, aggregated by TAZ.

Figure 16 - Warehouse and Trucking Employment



Source: MDOT Statewide and Urban Travel Analysis