Regional Freight Transportation Study for the Delmarva Peninsula: Conducted for the Maryland Department of Transportation

Summary Report

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October 2010

Prepared in cooperation with the United States Department of Transportation, Federal Highway Administration and Federal Transit Administration.

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Introduction

The Regional Freight Transportation Study for the Delmarva Peninsula was intended to be an overview of the current freight transportation systems on the Delmarva Peninsula, as well as a forecast for long-range possible future scenarios. It was conducted for the Maryland Department of Transportation by the Business, Economic, and Community Outreach Network of the Franklin P. Perdue School of Business at Salisbury University (BEACON). The study region encompasses fourteen counties across three states: Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, and Worcester Counties in Maryland; Sussex, Kent, and New Castle Counties in Delaware, and Accomack and Northampton Counties in Virginia. The project was a collaboration of many agencies; the Maryland Department of Transportation (MDOT), the Salisbury/Wicomico Metropolitan Planning Organization (S/W MPO), the Delaware Department of Transportation (DelDOT), the Virginia Department of Transportation (VDOT), and Virginia Department of Rail and Public Transportation (DRPT). Representatives from the various transportation industries in the region also contributed to the study.

The study describes the current freight system on the Delmarva Peninsula including an inventory of infrastructure, volume and types of freight. It also covers the economic impact of the regional and national freight corridors on Delmarva including freight-dependent and supporting industries and their associated workforce. Growth possibilities are examined, both potential freight generators and projected industry growth in the region over a 5-, 20-, and 25-year time span. The study provides various scenarios based on modeling programs: economic impact, changes in truck congestion, and projected impact on greenhouse gas levels. It also provides analysis of the impact of off-peak shipping and receiving, as well as examines the relationship between the tourism and freight industries. Finally, it identifies policy issues and provides considerations to guide the efforts of the agencies involved. The study outcome is reported in two documents: this Summary Report and a Technical Report that contains details on the data collection, reporting, and analyses.

Summary

The freight network on the Delmarva Peninsula is a balanced system of interdependent transportation options that include rail, truck, air, and water transport . Each of the various modes of transportation provides a significant value to the region. Analysis shows that the freight transportation system on the Peninsula is modal interdependent, and the balance of the entire system is reliant on each modal component. The infrastructure is affected by the unique geography of the Peninsula; three geographic chokepoints exist where extensive congestion in surface transportation may occur during certain peak-hours or seasonal travel patterns. Access to the Peninsula is limited to the William Preston Lane Jr. Memorial Bay Bridge over the Chesapeake Bay to the west, and the Chesapeake Bay Bridge Tunnel and the Bay Coast Railroad Car Float to the south. There are existing gaps between the industrial zoning in the area and the connecting infrastructure, which leads to opportunities to improve transportation efficiencies for goods that are manufactured on the Peninsula.

Projections indicate that, while the number of freight intensive industries will grow in the next 30 years, the number of jobs will decrease slightly. The economic impact of freight moving along major freight corridors from other regions into and out of the Delmarva Peninsula also shows possibilities for growth over the coming years. The study looked specifically at the energy industry, which relies heavily on movement of freight for consumable fuel for power plants. As new sources of energy production are discovered or created, such as wind farms and natural gas, the industry's dependence on freight will be impacted.

A scenario analysis model was developed to determine the impact of certain changes, including economic impact, projected changes in truck congestion, and projected impact on greenhouse gas (GHG) levels. The possible loss of various rail services, barge service, and the rail car float were considered. The effect of fluctuations in fuel prices, the possible benefits of off-peak delivery systems, and the relationship between tourism-related traffic congestion and freight transport issues were also considered through scenario analysis.

Issues and Considerations

The Issue: Regional Access

Access to the Delmarva Peninsula is limited by geography, and will continue to tighten as it continues to be developed and grow in population. To help relieve access limitations and resultant travel delay, alternatives to additional highway lane miles should be explored and implemented. An additional Chesapeake Bay crossing is neither feasible nor advisable. Similarly, a vehicle ferry service extending from the Eastern Shore of Maryland to Virginia has been shown to be financially and logistically impractical. These conditions, as well as continued

Consideration

1) Alternatives to the William Preston Lane Jr. Memorial Chesapeake Bay Bridge crossing should be identified and forwarded through the planning process. These potential alternatives include passenger transport options that should help alleviate highway congestion to allow truck mobility. For example, rail service as proposed in the Amtrak 2030 Master Plan; possible charter or transit bus opportunities (i.e. reduced-fare express bus to Ocean City), and marine highway barge service on the surrounding bays and waterways. It is important to note that MDOT and DelDOT are working on a passenger rail plan while also coordinating on freight rail opportunities.

2) Intermodal freight opportunities that can help shift more tonnage to rail, thereby reducing truck trips across the bridge, must continue to be encouraged.

3) A public-private partnership for the operation of a rail car float should be explored. This option is critical for access redundancy to the region.

4) Detailed regional access planning is needed to prepare for continued freight operability and resiliency. Such planning efforts will assist the stakeholders when they seek political support and funding assistance.

The Issue: Railroad Maintenance

The privately owned railroads have indicated that maintaining and improving assets on the Delmarva may not realize a return on the investment. However, there are certain critical regional and national considerations that make this issue important to serving the public's interest.

Consideration

A partnership of federal, state, and local stakeholders should be convened to designate critical rail corridors on the Delmarva Peninsula as common economic assets and create a mechanism for funding the maintenance of these assets. The railroad operators would share in the cost, and a significant portion of the burden would be the responsibility of a wider coalition of stakeholders. The future of freight transportation by rail may depend on the development of a regional solution that separates the ownership and track maintenance responsibility from the operation of the trains. As an example, the DRPT manages the Short Line Railway Preservation and Development Fund, which funds maintenance work on short line railroads in Virginia. The fund awards approximately $3,000,000 in grants each year statewide. The aim of this fund is to keep short line railroads operating at Federal Railroad Administration Class II track standards, and to enable the businesses reliant on rail transportation to keep that mode option. Bay Coast Railroad recently finished a track maintenance project with monies from this fund and is using the fund to pay for 70 percent of the repairs to the rail car float.

The Issue: Seasonal Traffic Congestion

The Chesapeake Bay, the tidal wetlands, and the Atlantic Ocean make the Delmarva Peninsula an attractive travel destination to millions of residents from the Mid-Atlantic region. With a high-volume season (Memorial Day to Labor Day), and two shoulder seasons (April – May and September – October), freight transportation on the Delmarva Peninsula becomes subject to a series of bottlenecks on major Routes 50, 301, 13, 113, and 1.

Consideration

Variable priced tolling combined with a more pervasive use of E-Z Pass are recommended to help distribute seasonal traffic congestion across off-peak times and dates. While the concept of congestion charges is usually discussed in conjunction with densely populated urban corridors and zones, the impact of seasonal traffic congestion on the limited transport corridors

on the Delmarva Peninsula is similar. This consideration requires supplemental analysis of its impact on all areas of traffic: freight, commuter, and tourist.

The Issue: National Security Concerns

The Delmarva Peninsula is part of one of the most critical political, economic, and demographic area in the United States. In a time of national crisis on the eastern seaboard, any major disruption to the infrastructure on and around the I-95 corridor (Richmond, Washington D.C., Baltimore, Wilmington, Philadelphia, and New York City) will likely cause traffic diversion to the Route 13/Route 1 corridor through Delaware and the Maryland Chesapeake Bay Bridge/Route 50 corridor. The Cape May – Lewes Ferry at the mouth of the Delaware Bay, and the rail car float at the mouth of the Chesapeake Bay will be unable to sustain the increased volumes of bypassing traffic. Freight movement on the Peninsula would be adversely impacted by any such disruption.

Consideration

Consideration should be given to the creation of a Delmarva Transportation – National Security Task Force with broad participation from the stakeholders and policy leadership circles. Many of these issues have been studied and discussed in various forums, but the results and considerations remain segregated. If a unified plan were developed, owned by the majority, and accepted by all of the stakeholders, response to a crisis would be more timely, effective, and equitable.

The Issue: Data Collection and Analysis

Economically, the Delmarva Peninsula operates as a relatively self-contained system. However, because three different states manage the transportation system, policies, practices, and priorities for transportation planning are not consistent. Standards for data sources, data collection procedures, reporting units, report formats, and report frequencies also suffer the same inconsistency.

Consideration

A day-long Delmarva Freight Transportation Data Convention, bringing together all interested parties, can be the beginning of the process. This could be the catalyst for the creation of a study group or coalition, which can provide the oversight for such a project. Such a conference

will provide a forum to discuss the opportunities, limitations, and challenges. Moving forward, under the guidance of the key stakeholders, the coalition can develop a series of data collection, storage, and reporting guidelines for freight transportation on the Delmarva Peninsula. This coalition should identify the most important and actionable data needs, as well as the best approach to developing an appropriate data model and identify the responsible parties for maintaining the model. A follow-up conference would be an appropriate venue to present the project findings and to ratify recommendations for further action at the various state and federal levels.

The Issue: GIS and DASHBOARDS

This study provides a preliminary investigation of how some Delmarva Peninsula-specific freight transportation policy analysis can be facilitated by GIS solutions and related executive dashboards. There is a need for a series of detailed regional GIS models and executive dashboards to facilitate solutions related to data collection and analysis.

Consideration

Include freight transportation GIS solutions and executive dashboards for the Delmarva Peninsula to the scope of work of the data collection project discussed in the consideration for Data Collection and Analysis.

The Issue: Waterway Dredging

The water transport system depends on recurring dredging to remove silt and keep water depth at usable levels. Waterway dredging decisions are made by the Army Corps of Engineers, and are based on present economic activity, without consideration of future activity. As discussed in this study, the lack of dredging on the Wicomico and Nanticoke Rivers will impact the tonnage that can travel on waterways. This freight will travel on rail or highway, increasing the impact on the surface freight transportation network.

Consideration

One immediate step would be to hold a regional roundtable meeting with key stakeholders to develop a consensus on the proper definition of the nature and scope of the problem, and to create a small task force to explore potential solution strategies. One potential solution to this problem is the sharing of some of the costs of dredging by local and regional stakeholders, perhaps in the form of a regional authority and/or a regional fee/surcharge system distributed

across a wider range of supply chain and end users. While such cost allocation may be seen as an unsupportable burden for local jurisdictions and supply chain members, the regional benefits and opportunity costs necessitate a different way of approaching the problem.

The Issue: Network Preservation

A viable freight network is critical to the economy of the Delmarva Peninsula. There is very little "wiggle room" in the balance of freight transport modes. Disruption to any piece of the network would affect the network as a whole and negatively impact the region.

Consideration

Develop a process or structure to evaluate the Delmarva Peninsula's freight transportation network as a whole in terms of regional access, land use development, and resiliency, regardless of geographic boundaries. It is especially important to focus on retaining commercial or industrial zoned land in close proximity to the railroads and freight corridors as a means of preserving and expanding the commercial and industrial base, and in the long run, the economic base of the area.

Conclusion

The current freight network on the Delmarva Peninsula is stable. If the balance were to be disrupted by the unavailability of a mode of transport or an access point, the consequences would affect the entire network. There is no room for sudden change in the network. The current transportation mode options must be maintained to maximize economic and environmental impact. This study recommends several ways in which to maintain, improve, and lengthen the life of these freight modal options.

The freight network is not a closed system. Local, regional, and national freight corridors identified in this study greatly impact the Delmarva Peninsula. When making decisions related to the freight network and the industries it serves, it is important to consider other industries such as energy and tourism.

The considerations made in this summary report are supported by the separate Technical Report, Map Book, and Executive Dashboard, which detail the study findings and research methodology.

Regional Freight Transportation Study
For the Delmarva Peninsula
Conducted For The
Maryland Department of Transportation

Technical Report

Conducted By:
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October 2010

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Business, Economic, and Community Outreach Network
at Salisbury University

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1.0 About the Study

The *Regional Freight Transportation Study for the Delmarva Peninsula* was intended to be an overview of the current freight transportation systems on the Delmarva Peninsula, as well as a forecast for long-range possible future scenarios. It was conducted for the Maryland Department of Transportation by the Business, Economic, and Community Outreach Network of the Franklin P. Perdue School of Business at Salisbury University (BEACON). The study region encompasses fourteen counties across three states: Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, and Worcester Counties in Maryland; Sussex, Kent, and New Castle Counties in Delaware, and Accomack and Northampton Counties in Virginia. The project was a collaboration of many agencies, including the Maryland Department of Transportation, the Salisbury/Wicomico Metropolitan Planning Organization, the Delaware Department of Transportation, the Virginia Department of Transportation, and Virginia Department of Rail and Public Transportation, as well as representatives from various transportation industries in the region.

The study is organized into the following sections:

- **2.0 - Delmarva's Freight System** - Describes the current freight system on the Delmarva Peninsula, including an inventory of infrastructure currently in place and volume and types of freight.
- **3.0 - Economic Impact** - Details the economic impact of the regional and national freight corridors on Delmarva, including freight-dependent and supporting industries and their associated workforce.
- **4.0 - Growth Possibilities** - Examines potential freight generators and projected industry growth in the region over a 5-, 20-, and 25- year time span.
- **5.0 - "What-If" Possibilities** - Provides various scenarios, based on modeling programs, including economic impact, changes in truck congestion and projected impact on greenhouse gas levels. Also provides analysis of the impact of off-peak shipping and receiving, as well as examines the relationship between the tourism and freight industries.
- **6.0 - Issues & Considerations** - Assesses issues raised based on analyses and provides considerations to guide the efforts of the agencies involved.

2.0 Delmarva's Freight System

The freight network on the Delmarva Peninsula is critical to region's economy. This industry provides jobs and consumer goods for all. The existing freight system includes excellent rail, road, air, and water transport systems within the region.

It is important to note, access to the Peninsula is limited to three main facilities: 1) the William Preston Lane Jr. Memorial Bay Bridge over the Chesapeake Bay to the west, 2) the Chesapeake Bay Bridge Tunnel, and 3) the Bay Coast Railroad Car Float to the south. There are also gaps between the industrial zoning in the area and the connecting infrastructure, which leads to opportunities to improve transportation efficiencies for goods manufactured on the Peninsula. Each of the various modes of transportation provides a significant value to the region. Analysis shows that the freight transportation system on the Peninsula is modal interdependent, and the balance of the entire system for freight is reliant on each modal component. An inventory of the freight transportation network can be found in the accompanying tables, GIS files, and related maps (Appendix G-Map Book).

2.1 Rail

The Peninsula is serviced by one main north-south 286 pound rated rail line (Norfolk Southern), with numerous branches operated by Maryland Delaware Railroad, Delaware Coast Line Railroad, Bay Coast Railroad, Amtrak and CSX Transportation. The Bay Coast Railroad Car Float connects Cape Charles and Norfolk Virginia by way of a water route over the Chesapeake Bay, using two tugboat-guided barges, which hold railroad cars.

2.2 Road

The highway system on the Delmarva Peninsula is dominated by US Routes 13, 50, 301, 113 and 1. US Route 13 traverses the Peninsula from north to south, beginning at the Delaware/Pennsylvania border, passing through Maryland and crossing to Norfolk, Virginia at the Chesapeake Bay Bridge-Tunnel. US Route 1 and US Route 113 are primary north-south routes in Delaware; US Route 113 crosses into Maryland and connects with US Route 13 in Pocomoke City, Maryland. US Route 301 originates south of Wilmington, Delaware, traverses south and west through Maryland to join US Route 50. US Route 50 is a primary east-west route from Ocean City Maryland, over the Chesapeake Bay, into Washington, DC, to the Maryland Virginia border. Road maintenance is the responsibility of the separate states. There are also numerous state and county roads that are utilized for truck transportation of freight.

2.3 Water Transport

The geography of the Delmarva Peninsula allows for water transport via the Chesapeake Bay and its tributaries, as well as ports along the Atlantic Ocean. A comprehensive list of barge and tug operators located within the study region can be found in Appendix B, Table 27.

Water depth must be maintained along these waterways via dredging. Local jurisdictions develop strategic dredge plans and the dredging is administered by the US Army Corps of Engineers. A comprehensive list of current and future dredging contracts for years 2009, 2010, and 2011 waterways relevant to the study region can be found in Appendix B, Table 29 through Table 32. A map displaying historical dredge locations can be found in Appendix G-Map Book. A necessary part of dredging operations, various "spoils" areas must be maintained to receive dredged material. In particular, it is important to obtain dredge material placement sites for future dredging endeavors along the Nanticoke and Wicomico Rivers. A comprehensive list of all established spoils disposal locations within the study region are in Appendix B, Table 28.

2.4 Infrastructure Gaps/Zoning

For the greatest efficiency in freight movement, those areas zoned for industry and manufacturing require ready access to the transportation infrastructure. The industrial areas that lack access to the freight transportation infrastructure were identified based on the current zoning and the freight transportation network,

Table 1. Summary of Industrial-to Infrastructure Gap Analysis

Nearest Feature to Industrial Zoned Area	Frequency of Nearest Infrastructure	Furthest Distance (Miles)	Average Distance (Miles)
Delmarva Rail	240	1.54	0.04
Delmarva Non-Local Roads	410	2.75	0.16
Delmarva Ports	1	1.53	1.53

This table shows that of the areas currently zoned industrial, non-local roads provide the closest access to the freight network for approximately 63% of the industrial areas. Approximately 37% of the industrial areas are served by railroads as the closest access point to the freight network. Only one of the 651 areas identified has a port as the closest access point. The furthest distance where rail is located from an industrial area is 1.54 miles, for non-local roads the furthest distance is 2.75 miles, and for ports, the furthest distance is 1.53 miles. The average

distance between industrial areas and rail, non-local roads, and ports is .04 miles, .16 miles, and 1.53 miles respectively.

3.0 Economic Impact Analysis

Each of the freight modes provides significant value to the region. To quantify this, we examine the current and projected tonnage and monetary value of freight movement by mode and by commodity. We also examine employment and business trends for the related transportation industries. Variables such as freight mobility, freight resiliency, flexibility for mode shift, and interconnectivity affect the value of the various modes, and combined with quantitative findings, help support our policy considerations.

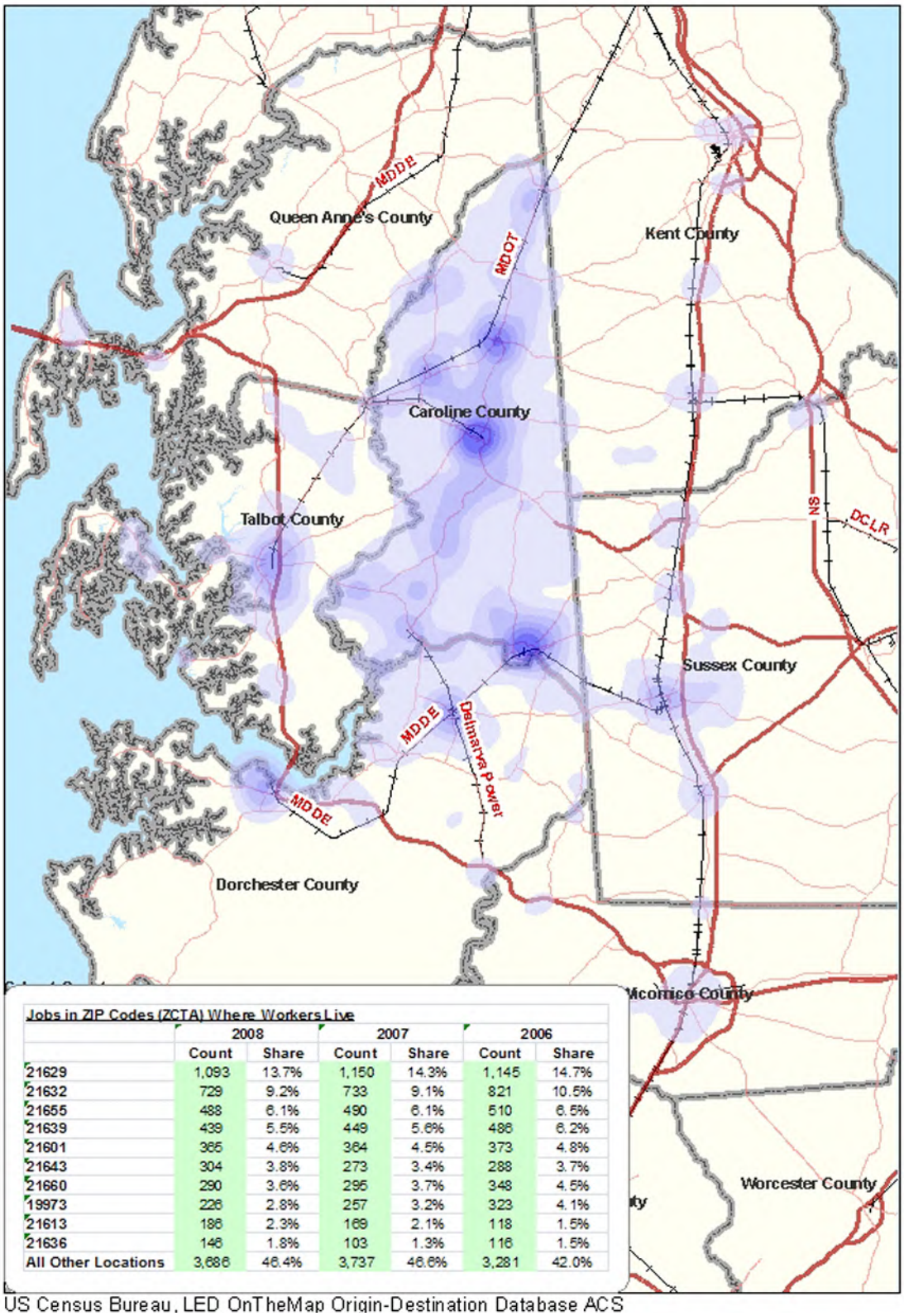
3.1 Labor Shed Analysis

Tables 13 through 26 in Appendix B display the labor-shed breakdown by county for the freight transportation related industries. The tables provide a breakdown of the workforce in each county for freight transportation related industries, the number of workers and percentage of that workforce that resides in each of the zip codes in the county, and the number and percentage of workers that are coming from outside the county. In addition to the tables provided in Appendix B, a set of maps presenting this data geographically are provided in Appendix G-Map Book. One example is also provided below.

If the current industrial zones were fully utilized, based on current employment data, it is estimated that a 65 percent increase in jobs would result from the full use of such zones. Freight-related jobs are sensitive to increases in economic activity in industries with substantial supply chain operations. Industrial zones by design generate significant supply chain activity; therefore, their full use leads to increases in freight-related jobs. A labor-shed analysis shows that many employees in transportation-related jobs come from outside the county of their employment. The table displaying the estimated job creation by county can be found in Appendix B Table 12.

Laborshed Analysis

Caroline County 2006-2008 as Example



Jobs in ZIP Codes (ZCTA) Where Workers Live

	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
21629	1,093	13.7%	1,150	14.3%	1,145	14.7%
21632	729	9.2%	733	9.1%	821	10.5%
21655	488	6.1%	490	6.1%	510	6.5%
21639	439	5.5%	449	5.6%	486	6.2%
21601	365	4.6%	364	4.5%	373	4.8%
21643	304	3.8%	273	3.4%	288	3.7%
21660	290	3.6%	295	3.7%	348	4.5%
19973	226	2.8%	257	3.2%	323	4.1%
21613	186	2.3%	169	2.1%	118	1.5%
21636	146	1.8%	103	1.3%	116	1.5%
All Other Locations	3,686	46.4%	3,737	46.6%	3,281	42.0%

US Census Bureau, LED OnTheMap Origin-Destination Database ACS

4.0 Growth Possibilities

4.1 Industry Growth

The study also presents estimated industry growth in the areas of transportation establishments, employment, and freight movement. The number of establishments in freight intensive industries is projected to grow from 2,539 in 2010 to approximately 30,339 in 2040. On the other hand, employment in the transportation/materials moving occupation is projected to decline slightly to 30,144 jobs in 2040 (compared to current level of 33,692). By 2040, the freight network is projected to transport an additional 152,279.88 kilotons[1] (KTons) per year worth approximately $483,856.92 million into, out of, and within the study region.

Historical data from the federal Bureau of Labor Statistics (BLS) for freight intensive industries in the Maryland Multi-Modal Freight Profile were examined in order to project future trends of the number of establishments and employment over five, 20, 25, and 30 years. The table below provides a summary of the industries by 2-digit NAICS codes. For a complete list of industries identified as freight intensive, refer to Appendix C-Freight Intensive Industries.

Table 2. Freight Industry Codes (NAICS)*

Code	Industry Title
21	Mining
22	Utilities
31-33	Manufacturing
42	Wholesale Trade
48-49	Transportation and Warehousing
51	Information
53	Real Estate and Rental and Leasing

**North American Industrial Classification System*

The following table shows the projections for the total number of freight intensive industry establishments in the study region.

[1] A kiloton is equal to one thousand tons.

Table 3. Number of Transportation Establishments Freight Intensive Industries				
2010	**2015**	**2030**	**2035**	**2040**
2,539	4,135	13,675	20,075	30,339

It is difficult to project employment in the study region for all freight intensive industries due to the lack of data, particularly given that employment figures are not reported at the county level for industries with only one or two establishments. However, data pertaining to transportation/materials moving occupations in the study are available and provide some perspective on employment projections for other related freight intensive industries. The table below shows the aggregate employment projections in the study region for the transportation/ materials moving occupations identified as Occupation Code 53-0000 by the Maryland Department of Labor, Licensing, and Regulation. These projections are based on the annual growth rates by county in these occupations for the period of 2000-2009, extrapolating that growth rate out over the entire projection period. As can be seen in the table, the employment projections for the study as a whole in the transportation/materials moving occupations decrease slightly out through 2040.

Table 4. Study Region Employment Projections: Transportation/Materials Moving Occupations				
2010	**2015**	**2030**	**2035**	**2040**
33,692	34,901	31,684	30,861	30,144

Tables 33 and 34 in Appendix B show a breakdown of freight movement tonnage and value in the region by mode and direction. The base year is 2008 with projections out to 2010, 2015, 2030, 2035 and 2040. Additionally, Table 35 provides a breakdown of the 2008 freight movement by commodity.

4.2 Potential Freight Generators

As the freight transportation network in the study region is not isolated, the activity economically impacts other areas of the country and vice versa. This study examines the impact of neighboring Metropolitan Planning Organizations (MPOs) as critical linking points for the region's freight network. For instance, the freight movement between the Washington DC Council of Governments planning area and the study region is approximately valued at $28,672.15 million in 2010. This freight movement in the study region generates a value of

approximately $26,788.68 million. Furthermore, the value and economic impact of 21 regional and national corridors with an origin-destination pair inside the region have been studied. The I-95 corridor most significantly impacts the study region with an estimated economic impact of $62,560. The impact was $150 million in 2010.

4.3 Planning Areas Outside of the Region

Neighboring planning areas, commonly defined by the overseeing metropolitan planning organizations, have a significant impact on the region and are critical linking points for the region's freight network. To better quantify the extent to which these areas affect the study region, the economic impact of the freight movement between the study region and the neighboring planning areas is estimated. Projections for future freight movements and economic impact estimates over the next five, 20, 25, and 30 years are also established. Analysis is limited to the following six MPO/planning areas that were identified as the most significant potential freight generators for the region:

- Delaware Valley Regional Planning Commission (DVRPC)
- Cape May/South New Jersey MPO
- Hampton Roads Transportation Planning Organization (TPO)
- WashCOG (Washington Council of Governments)
- Baltimore MPO
- Harrisburg Area Transportation Study (HATS) /Tri-County Regional Planning Commission (TCRPC)

The analysis examines freight movement from the MPO/planning areas into the region and out from the region to the MPO/planning areas by all modes. The results of the analysis are found in Appendix B, Tables 36 and 37.

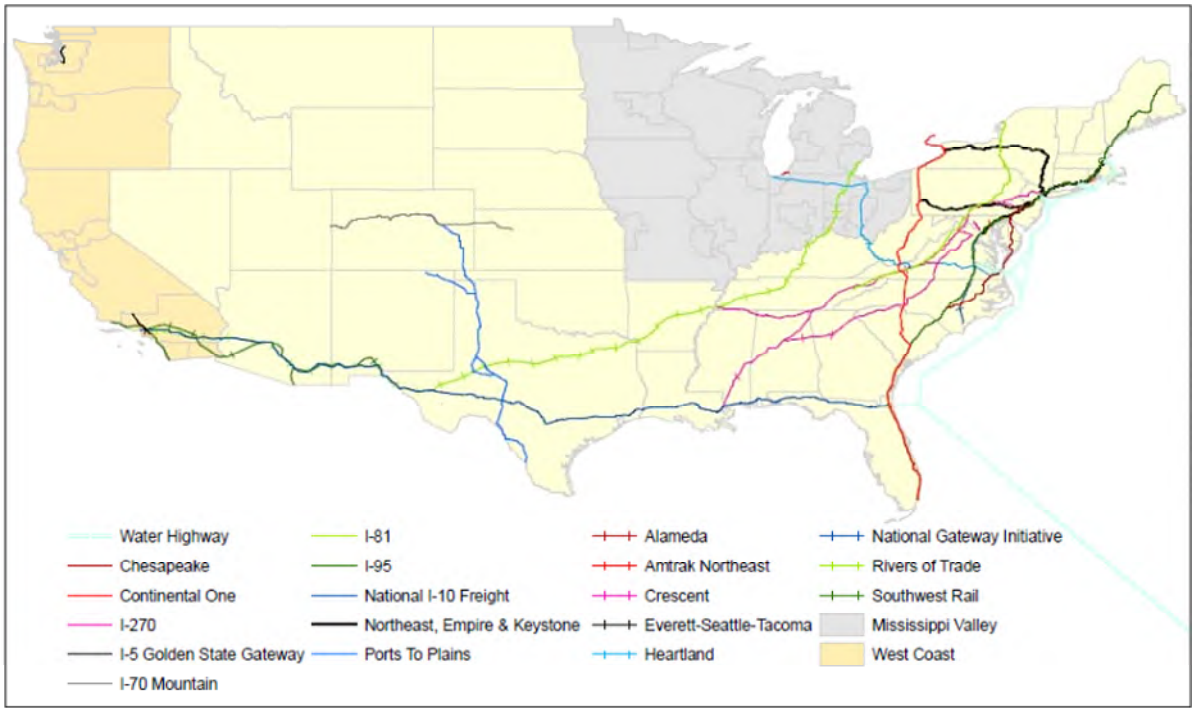
4.4 Major Freight Corridors

The freight network in the U.S. allows freight to move over large geographic distances by various modes. The following freight corridors are examined in order to gain a better understanding of how freight flows across the nation and how other regional and national freight corridors impact this region.

- National I-10 Freight Corridor (truck)
- Heartland Corridor (rail)

- Crescent Corridor (rail)
- I-95 Corridor (truck)
- Alameda Corridor (rail)
- Everett-Seattle-Tacoma Corridor (all)
- I-5 Golden State Gateway Coalition (truck)
- Ports to Plains Corridor (truck)
- River of Trade Corridor (all)
- Southwest Rail Corridor (rail)
- West Coast Corridor (all)
- I-270 Corridor (truck)
- National Gateway Initiative (rail)
- 1-70 Mountain Corridor (truck)
- I-81 (truck)
- Continental One Corridor (truck)
- (Potential) Marine Highway (water)
- Northeast (NEC) Corridor (rail)
- Keystone Corridor (rail)
- Chesapeake Corridor (truck)

Major Freight Corridors



Each corridor mentioned above is examined individually to determine which corridors impact the region and to what extent. To complete this analysis, the value of freight that has an origin-destination pair inside the study region and the respective corridor was determined. Only movement by relevant freight modes are considered for each corridor (indicated in parenthesis in the above list). The economic impact of this freight movement is then estimated for each corridor. The results of this analysis for base year only can be found in Appendix B, Table 38.

This analysis does not take into consideration the money churning in the other corridor's economy from freight movement that may trickle down into the study region's economy. For example, some employees of a transportation industry in a nearby regional corridor may live in the study region. This impact is likely to be insignificant.

4.5 Climate and Energy

One industry that relies heavily on freight is the energy industry, which must move fuel sources from production points to energy plants. Coal and natural gas are the two main sources of fuel. The energy industry has seen drastic changes in recent years, and is likely to experience additional changes in the near future. As new sources of energy production are discovered or created, such as wind farms and natural gas, the industry's dependence on freight will change.

Based on data from the U.S. Energy Information Administration on the power generated in each state by fuel source for 2008, of the total power generated, 97 percent is generated from coal and the remaining three percent from oil. This assumes that power generation in the study region follows the power generation patterns of the sum of the tri-state region. This also assumes that the region follows the national pattern of megawatt generated per fuel source. For coal, this factor is approximately 1,350 tons per megawatt generated, and for oil, this factor is 59,172.2 gallons per megawatt generated.

4.5.1 Indian River Power Plant

The Indian River Power Plant near Millsboro, Delaware, is a customer of Norfolk Southern, using the railroad to transport coal into the facility. Approximately one million tons of coal is shipped via rail to the power plant annually requiring approximately 9,450 carloads to generate an output of approximately 740 megawatts. If the power plant were to shift its fuel source from coal to natural gas, the value of coal freight lost would be significant. iDecide and IMPLAN are utilized to determine the value of the coal freight lost as well as the economic impact this would

have on the region. The influence diagram of the iDecide model that was utilized can be found in Appendix D-Scenario Analyses iDecide Influence Diagrams.

Assumptions

The delivered price per short ton of coal for the South Atlantic region in 2008 was $67.97. Assuming the annual change of 17.4 percent from 2007-2008 holds true through 2010, the 2010 delivered price per short ton of coal would be approximately $93.68. Given the uncertainty of future prices, this model takes into consideration a range of +/- 5% in the projected delivered price per ton. Presumably, it would take an extended period of time to shift the entire fuel source from coal to natural gas; therefore, this analysis examines the effect if the plant shifts 0 percent to 100 percent of the fuel source to natural gas. No coal ash is shipped out of the facility, thus only inbound freight traffic is a factor in this analysis.

Results

The iDecide results show that if the plant were to convert to using 100 percent natural gas as its fuel source, the total value of coal freight that would be lost is approximately $101 million. At a 50 percent conversion to natural gas, approximately $48 million of coal freight would be lost. Using IMPLAN to estimate the economic impact of this loss in freight movement, it is found that a total loss of coal freight movement results in a loss of approximately $95 million in total economic activity (including direct, indirect, and induced impacts), while a 50 percent loss in coal freight movement results in a loss of approximately $45 million in total economic activity. It can be assumed that the value of coal freight lost and the resulting economic impact follows a generally linear trend in estimating other rates of conversion from coal to natural gas.

4.5.2 Wind Farms

There are no wind farms located in the study region; however, four wind farms are being proposed by Delmarva Power that would supply some power to the study region. Table 7 in Appendix B provides information how much power each would supply to the region.

In order to estimate the impact of the wind farms on freight transportation, it was assumed that all four wind farms are operating at maximum output. Three different scenarios are considered:

- Scenario 1: The output from the wind farms will replace power currently being imported into the region to meet demand,
- Scenario 2: The output from the wind farms will replace power currently being produced from existing power plants, and

- Scenario 3: The output from the wind farms will be an addition to the power supply in the region but will not replace any power currently being supplied.

It is important to note that the economic effects estimated in these scenarios only account for the loss in freight movement. The scenarios do not take into account any economic activity generated by the wind farms construction or operations. Rail would likely be the mode of choice for transporting large equipment and components, and this activity would create a positive economic impact.

The results of the three scenarios are as follows:

Scenario 1

Given that 75% of the power consumed in the region is currently imported, it is likely all power from the wind farms would go toward filling this gap if this scenario were to occur. As the population continues to increase and the area continues to develop, the demand for power will also increase and new sources of power generation, such as wind farms, can help to mitigate this issue.

Scenario 2

If the power from the wind farms replaces power currently being generated by existing plants in the study region, the result would be less coal and oil being transported on the freight network. If 100% of the power generated by the wind farms replaced current power generation sources, this would lead to a loss in coal and fuel freight movement, with an associated economic impact of approximately negative $44.30 million annually.

If this scenario were to happen, congestion on the transportation network would be relieved on both the road and railroad. On the railroad, the additional available capacity could be utilized by other industries further reduce truck shipments and road congestion.

Scenario 3

Under this scenario, there is no impact on freight transportation in the region (assuming all else is equal). Existing power plants will continue to produce the same amount of power using the same fuel sources. There will not be any changes to the amount of freight being moved on the region's network.

For more a more detailed examination of each scenario please refer to Appendix D "Scenario Analyses: iDecide Influence Diagrams".

5.0 "What-if" Possibilities

5.1 Scenario Analysis-Changing Freight Network

Due to the nature of the transportation system on Delmarva, any changes can have an impact on the overall efficiency and effectiveness of freight movement. A scenario analysis model was developed, using iDecide and IMPLAN software (the iDecide models used can be found in Appendix D and IMPLAN information in Appendix E) to determine the impact of certain changes, including economic impact, projected changes in truck congestion and projected impact on GHG (greenhouse gas) levels. The greenhouse gases that are examined in this analysis are carbon dioxide (CO_2) and nitrogen oxide (NO_X), and pollution from particulate matter (PM). Economic impact estimations calculate the differences associated with the mode of freight transportation but do not include the impacts from factors such as changes in travel time, reliability factors, and changes in transportation cost per mile. The freight network's importance can be seen by examining different scenarios that involve a change in the current network. The overall value of the regional freight services to the study region is significant, and it's very limited resiliency is why these "what-if" analyses are important. In all of the scenarios, the outcomes from loss of transportation operations would have a negative impact on the local economy and an overall increase in greenhouse gas levels.

5.2 Scenario: Loss of Rail Service South of Northeast Corridor

Rail service is a critical piece of the freight transportation network of the region. This scenario examines the possible effects of a total loss of all rail service in the study region south of the Northeast Corridor.

If rail service south of the Northeast Corridor at Wilmington, Delaware was lost, the freight previously being transported by rail will most likely shift to truck transportation. The annual economic impact of this portion of rail service, as estimated by IMPLAN, is approximately $1.5 million. The annual economic impact from the same value of freight being transported by truck is approximately $1.039 million. Assuming all freight that shifts from rail to truck stays in the study region, this impact would remain in the study region. The net effect of the shift in mode is an annual economic impact of ($475,562,000). By shifting the total rail freight tonnage (8,687,000 tons in 2010) to truck would lead to approximatley 482,562 more truck shipments on the road. The net effect on GHG from the mode shift is an additional 316,110 tons of CO_2, a loss of 2,219 tons of NO_X, and an additional 46 tons of PM.

Table 5. Summary of Pollution Effect			
Type	**Tons from Rail**	**Tons from Truck**	**Net Effect from Mode Shift (Tons)**
CO_2	20,860	336,970	316,110
NO_X	2,470	251	-2,219
PM	63	109	46

5.3 Scenario: Loss of Barge Service

This scenario examines what would happen if there were no barge service to the area. Two different outcomes for this scenario are examined here:

- Scenario 1: all barge freight shifting to rail
- Scenario 2: all barge freight shifting to truck

As determined using IMPLAN, the annual economic impact of barge service to the region is approximately $31.5 million. Under Scenario 1, in which all barge freight movement is shifted to rail, the annual economic impact of the increase in rail freight movement is approximately $45. 9 million, resulting in an estimated net annual economic impact of approximately $14.4 million. Under Scenario 2, in which all barge freight movement is shifted to truck, the estimated annual economic impact of the increase in truck freight movement is approximately $45.9 million, resulting in a net annual economic impact of approximately $15.4 million. Scenario 1 will likely result in the need for 6,151 additional railcar shipments. The shift to rail transportation would lead to approximately 6,590 additional tons of CO_2, 78 additional tons of NO_x, and 2.0 additional tons of PM. Scenario 2 would result in 30,750 additional truck shipments on the road. The shift to truck transportation would lead to approximately 10,645 additional tons of CO_2, 79 additional tons of NO_X, and 3.4 additional tons of PM.

5.4 Scenario: Loss of Bay Coast Railroad Car Float

The value of the Bay Coast Railroad car float is its connection of the study region to the rest of Virginia. It can be assumed that if this operation ceased, the freight previously transported via the rail car float will either be rerouted via the railroad or shifted to truck, which would likely travel to and from Virginia via the Chesapeake Bay Bridge Tunnel. Based on information provided by Bay Coast Railroad, the rail car float was recently out of commission and the short-term solution was to reroute via railroad. The long-term solution to be implemented if the rail car float were to be permanently out of commission is yet to be decided. Currently this is viewed as

a decision to be made by Bay Coast Railroad. However, the regional negative impact of such an outcome means that a public dialog should be held to help resolve this issue.

The iDecide results show the possible maximum effects if all freight currently utilizing the rail car float was shifted to truck. It is recognized that some unknown combination of rerouting and mode shift is likely, which would lead to a percentage of the maximum effects being realized.

As reported by the Virginia Department of Transportation in the Construction of I-99 Report (2006), the Virginia portion of US Route 13 operates at a "good" level of service (LOS C or better). Trucks would have to travel approximately 37 miles between the origin and destination of the rail car float (Cape Charles, VA to Norfolk, VA). Estimates for the number of rail cars being transported via the rail car float are based on 2007 numbers because the rail car float was out of commission in 2009, and 2008 numbers were likely affected by the recession. The value of the current rail car float operations is estimated using an average of 90 tons per rail car and an average value per ton of freight transported via rail in the region.

The effect of restrictions on trucks traveling via the Chesapeake Bay Bridge Tunnel rather than the rail car float is not considered because the exact specifications of the freight transported are unknown. Additional drayage costs are not considered here.

The annual economic impact of the rail car float service, as estimated by IMPLAN, is approximately $4.2 million. The annual economic impact from the same value of freight being transported by truck is approximately $6.2 million. The net effect of the shift in mode is a positive annual economic impact of $1.933 million. Results of the scenario analysis show that at maximum mode shift to truck, approximately 720 additional truck shipments would be on the road. The pollution effect would be approximately 80 tons of additional CO_2, an additional .60 tons NO_x, and an additional 58 lbs of additional PM. Fuel consumed by the additional trucks on the road is estimated to be approximately 28.3 million gallons.

5.5 Scenario: Loss of Norfolk Southern Harrington-South Line

The necessary data for building a scenario model for this line was not available, partially due to proprietary reasons and partially due to issues with data collection, data frequency, data units, and data reporting at the local level. However, information gathered from a series of conversations with stakeholders allows for the diagnosis of the problem and for the development of a potential solution.

As a for-profit entity, Norfolk Southern has to balance the required investment in a line with the expected return on that investment from the operations on that line. The metrics are easily expressed in terms of monetary profit. On the other hand, the public value of the line, which is not easily expressed in term of dollars and cents, is higher than the railroad's return on its investment.

The viability of shippers and receivers depending on the Harrington-South line to transport their inputs and outputs within a range of affordability is frequently at stake in these scenarios. Such viability issues impact regional economic impact and workforce. As a result, the Harrington-South line is more valuable to the shippers and receivers than it is to Norfolk Southern as the operator of the line. A purely economic solution would spread the cost of necessary investments of such key infrastructure elements over a broader coalition of beneficiaries, including the shippers and receivers, state and local governments.

In the policy realm, these solutions are not so easy to develop and implement. There is a need for maintaining such lines and even for improving them to handle faster and heavier traffic.

5.6 Scenario: Impact of Fuel Price Fluctuation

Fluctuations in fuel prices affect every mode of transportation. An iDecide scenario analysis model was developed to examine the impact of fuel price fluctuation on barge, rail, and truck modes of transport. Two trip types were used for the analysis:

1. Long distances with off-Peninsula as origin or destination;
2. Short distances entirely on the Peninsula.

For short distance trips, which transport freight entirely on the Peninsula, the model showed no statistically meaningful change in choice of mode or mode sensitivity, using a fuel price fluctuation range of minus 50% to plus 200%.

The main impact was on the longer trips with off-Peninsula origins or destinations. For these trips, using the same price fluctuation range of minus 50% to plus 200%, the following impacts by mode were observed:

5.6.1 Barges

For barge transport, ninety percent (90%) of the scenario iterations showed no change in mode choice. This is probably due to the fact that a fuel price increase for barges would also be mirrored in the cost of fuel for rail and trucks and would maintain the cost advantage of water

transport where it is a viable alternative. At about a plus 50% increase in fuel price, however, it is estimated that more than half of the users will cease to use the mode. Certain users with low operating margins may cease to operate on the Delmarva Peninsula or seek business model changes if fuel prices cause barge shipments to no longer be the lowest cost freight transportation alternative.

5.6.2 Rail

For rail transport, 85% of the scenario iterations showed no change in mode choice. Use of rail on the Delmarva Peninsula is determined primarily on the basis of availability of service and type of freight. For the majority of these users, switching to barge is not always an option (i.e. lack of availability) and switching to trucks is cost prohibitive. Again, since any fuel price fluctuation would affect all modes of transport, the relative advantages of the modes would remain largely unchanged. At about plus 100% increase in fuel prices, it is estimated that more than half of the users will cease to use rail. It appears that certain rail-dependent users with low operating margins could not absorb a 100% fuel price increase and would move their operations from the Delmarva Peninsula to take advantage of less expensive freight shipment.

5.6.3 Truck

For truck transport, ninety percent (90%) of the scenario iterations for fuel price fluctuations showed no change in mode choice. It is assumed that the choice of trucks for a majority of users is made based on the scheduling flexibility, delivery time, and size of shipments. Price fluctuations of minus 50% to plus 200% are not sufficient to negate these mode-choice factors at about plus 200% increase, which is at the upper limit of the range studied, since price fluctuations would probably be the same across the country, the probability is that the demand and pricing equations would adjust throughout the supply chain, giving a certain level of tolerance to users of these services in the long-run. The model is inadequate in estimating the short-term impacts as the broader economic systems are moving towards equilibrium. It is assumed that about 25% to 33% of truck freight users may have to face temporary or permanent business model changes during the transition period, depending on how long it would take bring national fuel price volatility back to equilibrium.

5.7 Scenario: Restriction of Waterway Dredging

An analysis of waterway dredging for water transport on the Delmarva Peninsula shows that if dredging options are further restricted by the Corps of Engineers, the current infrastructure will not be able to handle the removal of key water transport corridors due to shallow depth on the

Wicomico and Nanticoke Rivers based on data from a 2005 study (updated in 2008) conducted by BEACON for the Delmarva Water Transport Committee, the following assumptions were used in this analysis:

A barge has the capacity of 1,500 to 3,000 tons; 62,500 bushels, or 453,500 gallons of product. This translates into 50 to 100 truckloads depending on the density of the cargo and the configuration of the truck. From a cost perspective, barge rates are about 50% lower than rail and nearly 95% lower than truck rates.

The analysis shows that, were barge traffic to cease, it would be replaced by over 50,000 trucks per year. However, since the products that are barged into and out of the Delmarva Peninsula's are currently distributed over short distances predominantly by truck, this is not a net replacement. The net impact is found in where the traffic shifts. These trucks would travel on the congested main arteries instead of being local deliveries.

In terms of cost, the loss of barge traffic would result in heavy economic burdens. This would force certain business and agricultural operations that currently operate on razor thin margins to cease operations or depart the Peninsula. The loss of these businesses could add over $0.95 to the price of a gallon of gas sold on the Delmarva Peninsula, and increase the cost of a pound of processed poultry products by seven to twelve cents. All dredging decisions by the Corps of Engineers are made on the basis of current economic values and not on possible future changes. When opportunity costs and potential economic development scenarios are not considered in the decision process, a dilemma of public policy results.

5.8 Scenario: Loss of Cape May – Lewes Ferry

The Cape May - Lewes Ferry currently provides minimal freight transportation services to the region. Based on information obtained from the Ferry operations department, it currently carries an average of one to two trucks per day. The commodity type and value of the freight being transported is not tracked, and trucks are charged solely on the basis of the square footage of the truck’s footprint. For those trucks that use the Ferry, the effect of the loss of the Ferry would be an increase in travel time. Because few trucks currently use the Ferry, the overall effect on traffic and congestion in the study region would be minimal. A summary of the effect on pollution and fuel consumption due to the disappearance of Ferry service is found in the following table.

These estimates assume that one or two trucks use the Ferry every day, each hauling an average of 18 tons, and would travel approximately 168 miles around the Delaware Bay if the Ferry did not exist.

Table 6. Loss of Ferry Service-Pollution and Fuel Effects		
	1 Truck/Day	2 Trucks/Day
Additional CO_2 (lbs)	411,150	822,301
Additional NO_x (lbs)	3,068	3,137
Additional PM (lbs)	132	265
Additional Fuel Consumed (gallons)	65,121,840	130,243,680

Although currently the number of trucks utilizing the Cape May - Lewes Ferry is low, it is important to examine the potential capacity of the ferry to transport freight. It is recommended that a study be conducted to determine the viability of freight carriers utilizing the Ferry as an effective option of moving freight particularly in light of any changing trends in passenger traffic on the Ferry.

5.9 Scenario: Effect Off-Peak Deliveries (OPD)

Off-peak deliveries (OPD) in which shipping and receiving that occurs at times other than peak traffic hours, as well as tourism, affect the region's freight network. With incentives, the number of truckloads that could potentially be diverted ranges between approximately 24,000 and 64,000 under the different scenarios examined in the study. The seasonality of tourism affects freight flow through fluctuations in the amount of commodities needing to be transported to destination areas to support a seasonal population and non-freight related traffic which significantly affects shipping times and costs.

In this analysis of OPD by truck, we examine both receivers (customers who are accepting the deliveries) and shippers (those companies that contract for deliveries). Both companies that transport their own product and third party shipping companies are classified as "shippers", and the assumption is that their general operating behaviors will be the same. It is important to note that this type of program will likely not work overall in the study region because of the local nature of the roads and prohibitive truck operational rules and regulations.

Off-peak shipping and receiving offers several benefits, including reduced travel time, faster turn-around time, lower costs for shippers, and less congestion on the roads and bridges, in

particular during high tourism seasons when traffic congestion is at its peak. These practices can potentially help relieve congestion at bottlenecks such as the Chesapeake Bay Bridge. Not all industries are appropriate candidates for OPD because of the nature of the products being shipped. One that may benefit from OPD is the poultry industry, particularly during the summer months when congestion that slows down delivery times can be detrimental to the freshness of product delivery.

There are several possible impediments to acceptance and widespread use of OPD. The success of off-peak shipping and receiving depends on the receiver's willingness to accept deliveries at off-peak hours. If shippers realize the benefits of higher productivity, the likelihood of use will be increased. Shippers must be responsive to the needs of receivers, by providing deliveries at the times their customers need them. However, if the receivers are widely dispersed geographically, OPD will not be feasible for the shippers The receiver's willingness to accept OPD is directly related to the potential cost savings for them, which can possibly be accomplished by providing financial incentives to either the receivers, shippers, or both.

There are several ways to incentivize shippers and receivers to implement OPD. One approach is if shippers entice their customers to receive OPD by passing along some of the cost savings. Financial incentives can be offered to one or both parties including tax incentives, financial rewards on a per mile basis, and toll savings. On the other hand, policies can be put in place to deter peak-time deliveries, including time of day restrictions (although restriction of truck activity on highways needs to be viewed in light of federal prohibitions on restricting truck traffic except in certain circumstances-Seattle Urban Mobility Plan) and traffic mitigation fees or congestion charges.

A scenario analysis model was developed to estimate the number of truckloads that could potentially be diverted to off-peak hours as well as the employment impact of OPD implementation for the receivers. It is assumed that shippers will only use OPD if there are sufficient requests from receivers. (The influence diagram, assumptions, and scenario details can be found in Appendix D-Scenario Analyses iDecide Influence Diagrams.) Based on the scenario analysis, the potential number of truckloads that could be diverted to off-peak deliveries ranges from a minimum of 23,571 to a maximum of 60,880. (The totals for each scenario can be found in the following table, based on 2008 truck freight movement levels).

Table 7. Potential Truckload Diversion to Off-Peak Deliveries		
	Minimum	Maximum
Scenario 1	23,571	44,109
Scenario 2	23,804	53,321
Scenario 3	24,631	53,497
Scenario 4	23,874	63,623
Scenario 5	24,073	51,545
Scenario 6	24,817	60,880

Table 8. Potential Employment Impact from Increased Off-Peak Deliveries		
	Minimum	Maximum
Tax Deduction (Scenario 1, 2, & 3)	97	1,161
Financial Incentive (Scenarios 4, 5, & 6)	136	1,636

5.10 Balancing Tourism and Freight

The tourism industry, particularly in areas that are seasonal recreation destinations such as the Delmarva Peninsula, has a significant impact on the freight industries in those areas. The impact is twofold; seasonal fluctuations in population causes fluctuations in the amount of goods needing to be transported to destination areas, and increases in traffic can slow down the movement of freight increasing total transportation costs.

When the population doubles or triples in a short amount of time, as can happen on a summer holiday weekend at the beach resorts, the amount of freight needed to support the additional population increases. As vacationers drive to their destinations, road traffic increases, and traffic congestion problems are compounded. Due to the agricultural nature of the Peninsula, the increase in transportation of commodities at harvest time also adds to the problem. Other less critical factors that impact congestion more during the summer months include increased traffic accidents and traffic stops, both of which further slow down the flow of traffic (AASHTO). Because trucking is a critical connector for freight shipped initially by rail or barge, the impact of traffic congestion is felt by all within the freight network.

Tourism brings many positive economic impacts to the region; however, it affects the freight industry negatively in several ways. The seasonal population of a region is not taken into consideration in the federal and state funding formulas for highway maintenance and repairs,

even though the increase in traffic poses a significant burden on the infrastructure. Seasonal traffic congestion also creates a negative economic impact on businesses, as in addition to longer travel times and increased costs for deliveries, congestion also causes less reliable pick-up and delivery times for truck operators. This means that more inventory needs to be kept on hand, due to uncertain delivery schedules, and keeping higher inventories increases costs (USDOT 2006). In 2007, the national average delay in hours per traveler was 51 hours in very large areas, 35 hours in large areas, 23 hours in medium areas, and 19 hours in small areas (Texas Transportation Institute, 2007). Depending on the product being transported, the additional cost to shippers and carriers due to increases in travel time can range from $25 to $200 per hour with an additional cost increase of 50 to 250 percent for unexpected delays. To counteract these problems, motor carriers may add vehicles and drivers and adjust their hours of operation to accommodate different shipping times, further increasing costs due to delay (Cambridge Systematics, Inc. 2005). Increases in transportation costs are typically passed along to the shipper/receiver, whether in part or in whole, which then pass these costs along to consumers if they are able. Higher consumer cost, however, may result in loss of business due to consumers moving to less expensive alternatives. Table 10 in Appendix B summarizes the estimated annual traffic congestion costs for different size areas.

For this analysis, Worcester County, Maryland was used as a base case for estimating the impact that tourism has on the amount of freight movement. Sales tax figures for Worcester County, from which gross sales were estimated, were examined over the year across industries. Based on this data, sales for freight-dependent and freight-related industries on average double in the summer and shoulder months. Three assumptions can be made through this study: 1) the number of trucks on the road delivering the goods required by these industries doubles to meet demand, 2) less-than-truckloads that move goods during the off-season become full truckloads during the tourism season, and 3) some businesses may prepare for the tourism season fluctuation by receiving consistent deliveries of non-perishable goods throughout the year rather than larger deliveries just during the high tourism season.

6.0 Issues and Considerations

The Issue: Regional Access

Access to the Delmarva Peninsula is limited by geography, and will continue to tighten as it continues to be developed and grow in population. To help relieve access limitations and resultant travel delay, alternatives to additional highway lane miles should be explored and implemented. An additional Chesapeake Bay crossing is neither feasible nor advisable. Similarly, a vehicle ferry service extending from the Eastern Shore of Maryland to Virginia has been shown to be financially and logistically impractical. These conditions, as well as continued

Consideration

1) Alternatives to the William Preston Lane Jr. Memorial Chesapeake Bay Bridge crossing should be identified and forwarded through the planning process. These potential alternatives include passenger transport options that should help alleviate highway congestion to allow truck mobility. For example, rail service as proposed in the Amtrak 2030 Master Plan; possible charter or transit bus opportunities (i.e. reduced-fare express bus to Ocean City), and marine highway barge service on the surrounding bays and waterways. It is important to note that MDOT and DelDOT are working on a passenger rail plan while also coordinating on freight rail opportunities.

2) Intermodal freight opportunities that can help shift more tonnage to rail, thereby reducing truck trips across the bridge, must continue to be encouraged.

3) A public-private partnership for the operation of a rail car float should be explored. This option is critical for access redundancy to the region.

4) Detailed regional access planning is needed to prepare for continued freight operability and resiliency. Such planning efforts will assist the stakeholders when they seek political support and funding assistance.

The Issue: Railroad Maintenance

The privately owned railroads have indicated that maintaining and improving assets on the Delmarva may not realize a return on the investment. However, there are certain critical regional and national considerations that make this issue important to serving the public's interest.

Consideration

A partnership of federal, state, and local stakeholders should be convened to designate critical rail corridors on the Delmarva Peninsula as common economic assets and create a mechanism for funding the maintenance of these assets. The railroad operators would share in the cost, and a significant portion of the burden would be the responsibility of a wider coalition of stakeholders. The future of freight transportation by rail may depend on the development of a regional solution that separates the ownership and track maintenance responsibility from the operation of the trains. As an example, the DRPT manages the Short Line Railway Preservation and Development Fund, which funds maintenance work on short line railroads in Virginia. The fund awards approximately $3,000,000 in grants each year statewide. The aim of this fund is to keep short line railroads operating at Federal Railroad Administration Class II track standards, and to enable the businesses reliant on rail transportation to keep that mode option. Bay Coast Railroad recently finished a track maintenance project with monies from this fund and is using the fund to pay for 70 percent of the repairs to the rail car float.

The Issue: Seasonal Traffic Congestion

The Chesapeake Bay, the tidal wetlands, and the Atlantic Ocean make the Delmarva Peninsula an attractive travel destination to millions of residents from the Mid-Atlantic region. With a high-volume season (Memorial Day to Labor Day), and two shoulder seasons (April – May and September – October), freight transportation on the Delmarva

Peninsula becomes subject to a series of bottlenecks on major Routes 50, 301, 13, 113, and 1.

Consideration

Variable priced tolling combined with a more pervasive use of E-Z Pass are recommended to help distribute seasonal traffic congestion across off-peak times and dates. While the concept of congestion charges is usually discussed in conjunction with densely populated urban corridors and zones, the impact of seasonal traffic congestion on the limited transport corridors on the Delmarva Peninsula is similar. This consideration requires supplemental analysis of its impact on all areas of traffic: freight, commuter, and tourist.

The Issue: National Security Concerns

The Delmarva Peninsula is part of one of the most critical political, economic, and demographic area in the United States. In a time of national crisis on the eastern seaboard, any major disruption to the infrastructure on and around the I-95 corridor (Richmond, Washington D.C., Baltimore, Wilmington, Philadelphia, and New York City) will likely cause traffic diversion to the Route 13/Route 1 corridor through Delaware and the Maryland Chesapeake Bay Bridge/Route 50 corridor. The Cape May – Lewes Ferry at the mouth of the Delaware Bay, and the rail car float at the mouth of the Chesapeake Bay will be unable to sustain the increased volumes of bypassing traffic. Freight movement on the Peninsula would be adversely impacted by any such disruption.

Consideration

Consideration should be given to the creation of a Delmarva Transportation – National Security Task Force with broad participation from the stakeholders and policy leadership circles. Many of these issues have been studied and discussed in various forums, but the results and considerations remain segregated. If a unified plan were developed, owned by the majority, and accepted by all of the stakeholders, response to a crisis would be more timely, effective, and equitable.

The Issue: Data Collection and Analysis

Economically, the Delmarva Peninsula operates as a relatively self-contained system. However, because three different states manage the transportation system, policies, practices, and priorities for transportation planning are not consistent. Standards for data sources, data collection procedures, reporting units, report formats, and report frequencies also suffer the same inconsistency.

Consideration

A day-long Delmarva Freight Transportation Data Convention, bringing together all interested parties, can be the beginning of the process. This could be the catalyst for the creation of a study group or coalition, which can provide the oversight for such a project. Such a conference will provide a forum to discuss the opportunities, limitations, and challenges. Moving forward, under the guidance of the key stakeholders, the coalition can develop a series of data collection, storage, and reporting guidelines for freight transportation on the Delmarva Peninsula. This coalition should identify the most important and actionable data needs, as well as the best approach to developing an appropriate data model and identify the responsible parties for maintaining the model. A follow-up conference would be an appropriate venue to present the project findings and to ratify recommendations for further action at the various state and federal levels.

The Issue: GIS and DASHBOARDS

This study provides a preliminary investigation of how some Delmarva Peninsula-specific freight transportation policy analysis can be facilitated by GIS solutions and related executive dashboards. There is a need for a series of detailed regional GIS models and executive dashboards to facilitate solutions related to data collection and analysis.

Consideration

Include freight transportation GIS solutions and executive dashboards for the Delmarva Peninsula to the scope of work of the data collection project discussed in the consideration for Data Collection and Analysis.

The Issue: Waterway Dredging

The water transport system depends on recurring dredging to remove silt and keep water depth at usable levels. Waterway dredging decisions are made by the Army Corps of Engineers, and are based on present economic activity, without consideration of future activity. As discussed in this study, the lack of dredging on the Wicomico and Nanticoke Rivers will impact the tonnage that can travel on waterways. This freight will travel on rail or highway, increasing the impact on the surface freight transportation network.

Consideration

One immediate step would be to hold a regional roundtable meeting with key stakeholders to develop a consensus on the proper definition of the nature and scope of the problem, and to create a small task force to explore potential solution strategies. One potential solution to this problem is the sharing of some of the costs of dredging by local and regional stakeholders, perhaps in the form of a regional authority and/or a regional fee/surcharge system distributed across a wider range of supply chain and end users. While such cost allocation may be seen as an unsupportable burden for local jurisdictions and supply chain members, the regional benefits and opportunity costs necessitate a different way of approaching the problem.

The Issue: Network Preservation

A viable freight network is critical to the economy of the Delmarva Peninsula. There is very little "wiggle room" in the balance of freight transport modes. Disruption to any piece of the network would affect the network as a whole and negatively impact the region.

Consideration

Develop a process or structure to evaluate the Delmarva Peninsula's freight transportation network as a whole in terms of regional access, land use development, and resiliency, regardless of geographic boundaries. It is especially important to focus on retaining commercial or industrial zoned land in close proximity to the railroads and freight corridors as a means of preserving and expanding the commercial and industrial base, and in the long run, the economic base of the area.

7.0 Appendixes

7.1 Appendix A: Data Gap Analysis

In the beginning stages of the study, several data collection issues were identified. The most prevalent data collection issue identified involves the time span and unit discrepancies found in available data from various sources. There was a widespread problem with time consistency, i.e. data was from different years for the same variable as well as across numerous variables. In addition, data collected by different entities for different purposes use different data units, i.e. tons versus truckloads or carloads, or per households versus per capita, etc.

Because the available data was not always in the format or time frame needed to accomplish the study objectives, and it would be cost prohibitive to collect it from origin, BEACON had to design macros for calculating the deflators and inflators to make sure data from different sources and different dates will match in the models. BEACON also had to build stand-alone iDecide models to estimate the viable ranges where no primary or secondary source data existed at all.

The most significant data problem was that of consistent, reliable freight movement data. TRANSEARCH, by Global Insights, is the most common source for freight movement data. However, the cost of obtaining the TRANSEARCH data was prohibitive for the budget constraints of this study. To overcome this problem, BEACON utilized its own methodology described in detail in the following section.

It is recommended that a stakeholder group be organized to determine the most important and actionable data needs for planning and future study purposes. This group should also work together to determine the best approach to developing an appropriate data model and determine who should maintain such a model (i.e. counties, states, region, etc).

Another data collection issue dealt with airfreight inventory. In trying to determine the service area of the airport freight operators, several data gathering issues arose. At the smaller airports, who reported shipping/receiving less than 10,000 pounds of freight annually, specific operators could not be identified. At this level of reported freight movement, any freight being moved was identified as an emergency need or special equipment shipment. For the airports shipping/receiving more than 10,000 pounds of freight, the major freight carriers were UPS and FedEx. These operators were unable to provide origin/destination information in order to define

their typical freight service area. Both major freight carriers operate on a hub and spoke system. The UPS and FedEx regional air hubs that serve the entire study region are in Philadelphia, PA. From interviews with the smaller local airports, it was assumed that all freight moved by UPS and FedEx comes from and goes to their respective hubs and continues on the end destinations.

The airport with the highest volume of freight movement in the region is Dover Air Force Base. All attempts made to gather freight operator and service area data from Dover Air Force Base were unsuccessful due to the sensitivity of the defense freight movement.

7.2 Appendix B: Data Tables

Table 9. Proposed Wind Farms

	Contract with	On/Off Shore	Location	Size	Contract	Completion Date	Output Capacity	Delmarva Power's Share of Output
1	**Bluewater Wind Delaware LLC**	Off shore	13 miles off Delaware Coast	N/A	25 year	2015	600 MW	200 MW
2	**Synergics Wind Energy (I)**	Land based	Roth Rock, Maryland	20 turbines	20 year	Spring 2010	50 MW	40-50 MW
3	**Synergics Wind Energy (II)**	Land based	Roth Rock, Maryland	N/A	20 year	2011	60 MW	50-60 MW
4	**AES Corporation**	Land based	Troy, Pennsylvania	67 turbines	15 year	January 2010	100.5 MW	50 MW

(I) Phase I of Synergics Wind Energy's contractual agreement with Delmarva Power to build wind farms
(II) Phase II is a planned extension of Phase I

Table 10. Annual Highway Congestion Costs

	Annual Congestion Cost Per Capita ($)					Annual Congestion Cost ($ Million)				
	1998 Value	1999 Value	2000 Value	2001 Value	2002 Value	1998 Value	1999 Value	2000 Value	2001 Value	2002 Value
Very Large Area Average	486[R]	527[R]	517[R]	543[R]	567	2,991[R]	3,264[R]	3,257[R]	3,454[R]	3,652
Large Area Average	306[R]	337[R]	3,3 [R]	358[R]	364	503[R]	561[R]	580[R]	619[R]	639
Medium Area Average	178[R]	200[R]	208[R]	226[R]	238	121[R]	137[R]	144[R]	159[R]	170
Small Area Average	94[R]	100[R]	112[R]	114[R]	116	28[R]	30[R]	34[R]	35[R]	36

Research and Innovation Technology Administration, Bureau of Transportation Statistics. National Transportation Statistics: Annual Highway Congestion Cost.

Key: R =revised; Very large urban area-over 3 million population; large urban area- over 1 million and less than 3 million population; medium urban area- over 500,000 and less than 1 million population; small urban area- less than 500,000 population

Full Use of Industrial Zones

Table 11. Full Use of Industrial Zones		
	2010 Emp 16+/Occ: Production	Potential Jobs at Full Use
Accomack County, VA	1,461	2,411
Northampton County, VA	332	548
Caroline County, MD	1,102	1,818
Cecil County, MD	3,058	5,046
Dorchester County, MD	1,323	2,183
Kent County, DE	3,341	5,513
Kent County, MD	502	828
New Castle County, DE	8,139	13,429
Queen Anne's County, MD	643	1,061
Somerset County, MD	473	780
Sussex County, DE	4,950	8,168
Talbot County, MD	814	1,343
Wicomico County, MD	2,513	4,146
Worcester County, MD	849	1,401

ESRI 2010

Labor Shed Report by County–Where Workers Live who are Employed in the Selection Area (County)

Table 12. Share of Freight Transportation Related Jobs Coming from Outside of the County of Employment Summary

	2008			2007			2006		
	Total Jobs	Count	Share	Total Jobs	Count	Share	Total Jobs	Count	Share
Accomack, VA	11,343	5,884	51.9%	11,205	5,650	50.4%	10,958	4,878	44.5%
Caroline, MD	7,952	3,686	46.4%	8,020	3,737	46.6%	7,809	3,281	42.0%
Cecil, MD	25,395	11,881	46.8%	25,110	11,348	45.2%	243,926	10,415	42.7%
Dorchester, MD	10,295	4,194	40.7%	10,445	4,209	40.3%	11,702	4,811	41.1%
Kent, DE	57,439	22,688	39.5%	58,311	22,782	39.1%	55,240	22,332	40.4%
Kent, MD	7,666	2,962	28.6%	7,946	3,261	41.0%	7,632	2,694	35.3%
New Castle, DE	267,162	126,916	47.5%	264,923	127,217	48.0%	265,060	121,325	45.8%
Northampton, DE	4,552	1,951	42.9%	4,194	1,781	42.5%	4,024	1,692	42.0%
Queen Anne's, MD	11,683	6,290	53.7%	11,550	5,995	51.9%	11,308	5,737	50.7%
Somerset, MD	5,453	1,655	30.4%	5,660	1,692	29.9%	5,622	1,553	27.6%
Sussex, MD	55,159	24,428	44.3%	56,373	25,320	44.9%	55,822	23,932	42.9%
Talbot, MD	17,843	7,744	43.4%	17,793	7,622	42.8%	18,027	7,526	41.7%
Wicomico, MD	40,451	15,448	38.2%	40,315	15,513	38.5%	40,325	14,348	35.6%
Worcester, MD	19,340	6,392	33.1%	19,885	6,373	32.0%	20,143	5,958	29.6%

Source: US Census Bureau, LED OnTheMap Origin-Destination Database (Beginning of Quarter Employment, 2nd Quarter 2008, 2007, 2006, 2005, 2004, 2003, and 2002)

Table 13. Accomack County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	11,343	100.0%	11,205	100.0%	10,958	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
23417	1,062	9.4%	1,018	9.1%	1,142	10.4%
23336	802	7.1%	847	7.6%	962	8.8%
23421	759	6.7%	800	7.1%	937	8.6%
23420	481	4.2%	464	4.1%	541	4.9%
23410	459	4.0%	474	4.2%	539	4.9%
23308	451	4.0%	442	3.9%	520	4.7%
23395	440	3.9%	464	4.1%	507	4.6%
23301	410	3.6%	397	3.5%	373	3.4%
23350	298	2.6%	305	2.7%	189	1.7%
21851	297	2.6%	344	3.1%	370	3.4%
All Other Locations	5,884	51.9%	5,650	50.4%	4,878	44.5%

Table 14. Caroline County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	7,952	100.0%	8,020	100.0%	7,809	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
21629	1,093	13.7%	1,150	14.3%	1,145	14.7%
21632	729	9.2%	733	9.1%	821	10.5%
21655	488	6.1%	490	6.1%	510	6.5%
21639	439	5.5%	449	5.6%	486	6.2%
21601	365	4.6%	364	4.5%	373	4.8%
21643	304	3.8%	273	3.4%	288	3.7%
21660	290	3.6%	295	3.7%	348	4.5%
19973	226	2.8%	257	3.2%	323	4.1%
21613	186	2.3%	169	2.1%	118	1.5%
21636	146	1.8%	103	1.3%	116	1.5%
All Other Locations	3,686	46.4%	3,737	46.6%	3,281	42.0%

Table 15. Cecil County Labor Shed						
Total Primary Jobs						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
Total Primary Jobs	25,395	100.0%	25,110	100.0%	24,392	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
21921	5,943	23.4%	6,132	24.4%	6,379	26.2%
21901	2,142	8.4%	2,144	8.5%	2,221	9.1%
21911	1,406	5.5%	1,418	5.6%	1,559	6.4%
21904	894	3.5%	878	3.5%	803	3.3%
19702	598	2.4%	573	2.3%	477	2.0%
21903	546	2.2%	618	2.5%	593	2.4%
19711	534	2.1%	535	2.1%	494	2.0%
21915	514	2.0%	508	2.0%	522	2.1%
21918	477	1.9%	498	2.0%	503	2.1%
19701	460	1.8%	458	1.8%	426	1.7%
All Other Locations	11,881	46.8%	11,348	45.2%	10,415	42.7%

Table 16. Dorchester County Labor Shed						
Total Primary Jobs						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
Total Primary Jobs	10,295	100.0%	10,445	100.0%	11,702	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
21613	3,050	29.6%	3,295	31.5%	3,808	32.5%
21643	705	6.8%	747	7.2%	786	6.7%
21631	483	4.7%	492	4.7%	539	4.6%
21601	397	3.9%	338	3.2%	383	3.3%
21801	347	3.4%	340	3.3%	322	2.8%
21632	323	3.1%	271	2.6%	302	2.6%
21804	316	3.1%	348	3.3%	286	2.4%
21655	170	1.7%	146	1.4%	147	1.3%
19973	164	1.6%	112	1.1%	154	1.3%
21659	146	1.4%	147	1.4%	164	1.4%
All Other Locations	4,194	40.7%	4,209	40.3%	4,811	41.1%

Table 17. Kent County (Delaware) Labor Shed						
Total Primary Jobs						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
Total Primary Jobs	57,439	100.0%	58,311	100.0%	55,240	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
19904	8,596	15.0%	8,913	15.3%	8,573	15.5%
19901	8,052	14.0%	8,154	14.0%	8,135	14.7%
19934	3,547	6.2%	3,414	5.9%	3,212	5.8%
19977	3,200	5.6%	3,209	5.5%	2,574	4.7%
19943	2,763	4.8%	2,982	5.1%	2,832	5.1%
19963	2,305	4.0%	2,328	4.0%	2,060	3.7%
19952	2,081	3.6%	2,267	3.9%	2,143	3.9%
19962	1,723	3.0%	1,826	3.1%	1,852	3.4%
19938	1,274	2.2%	1,284	2.2%	1,289	2.3%
19720	1,210	2.1%	1,152	2.0%	238	0.4%
All Other Locations	22,688	39.5%	22,782	39.1%	22,332	40.4%

Table 18. Kent County (Maryland) Labor Shed						
Total Primary Jobs						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
Total Primary Jobs	7,666	100.0%	7,946	100.0%	7,632	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
21620	2,123	27.7%	2,065	26.0%	2,390	31.3%
21661	640	8.3%	534	6.7%	615	8.1%
21678	461	6.0%	471	5.9%	516	6.8%
21651	325	4.2%	369	4.6%	320	4.2%
21623	260	3.4%	269	3.4%	220	2.9%
21645	239	3.1%	209	2.6%	248	3.2%
21635	220	2.9%	285	3.6%	280	3.7%
21617	201	2.6%	201	2.5%	153	2.0%
21668	136	1.8%	167	2.1%	127	1.7%
21601	99	1.3%	115	1.4%	69	0.9%
All Other Locations	2,962	38.6%	3,261	41.0%	2,694	35.3%

Table 19. New Castle County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	267,162	100.0%	264,926	100.0%	265,060	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
19720	21,554	8.1%	20,592	7.8%	21,921	8.3%
19702	18,223	6.8%	18,495	7.0%	19,161	7.2%
19711	17,765	6.6%	16,958	6.4%	18,563	7.0%
19808	15,037	5.6%	15,031	5.7%	15,656	5.9%
19805	14,403	5.4%	14,475	5.5%	13,945	5.3%
19701	14,255	5.3%	13,521	5.1%	14,803	5.6%
19713	12,895	4.8%	12,144	4.6%	13,113	4.9%
19709	9,656	3.6%	9,361	3.5%	9,617	3.6%
19802	8,661	3.2%	9,096	3.4%	8,622	3.3%
19810	7,797	2.9%	8,036	3.0%	8,334	3.1%
All Other Locations	126,916	47.5%	127,217	48.0%	121,325	45.8%

Table 20. Northampton County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	4,552	100.0%	4,194	100.0%	4,024	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
23310	1,011	22.2%	965	23.0%	935	23.2%
23350	543	11.9%	469	11.2%	307	7.6%
23420	206	4.5%	187	4.5%	233	5.8%
23410	173	3.8%	151	3.6%	221	5.5%
23417	169	3.7%	167	4.0%	226	5.6%
23413	138	3.0%	142	3.4%	84	2.1%
23405	107	2.4%	109	2.6%	78	1.9%
23421	97	2.1%	89	2.1%	114	2.8%
23307	96	2.1%	86	2.1%	76	1.9%
23336	61	1.3%	48	1.1%	58	1.4%
All Other Locations	1,951	42.9%	1,781	42.5%	1,692	42.0%

Table 21. Queen Anne's County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	11,683	100.0%	11,550	100.0%	11,308	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
21666	1,177	10.1%	1,129	9.8%	1,244	11.0%
21617	1,081	9.3%	1,055	9.1%	1,126	10.0%
21619	629	5.4%	660	5.7%	622	5.5%
21638	557	4.8%	577	5.0%	561	5.0%
21620	505	4.3%	524	4.5%	581	5.1%
21658	411	3.5%	453	3.9%	458	4.1%
21601	342	2.9%	418	3.6%	357	3.2%
21629	271	2.3%	313	2.7%	251	2.2%
21668	217	1.9%	206	1.8%	202	1.8%
21401	203	1.7%	220	1.9%	169	1.5%
All Other Locations	6,290	53.8%	5,995	51.9%	5,737	50.7%

Table 22. Somerset County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	5,453	100.0%	5,660	100.0%	5,622	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
21853	945	17.3%	992	17.5%	1,063	18.9%
21817	914	16.8%	912	16.1%	1,003	17.8%
21804	542	9.9%	510	9.0%	492	8.8%
21801	411	7.5%	423	7.5%	385	6.8%
21838	282	5.2%	339	6.0%	368	6.5%
21851	274	5.0%	367	6.5%	330	5.9%
21871	138	2.5%	152	2.7%	162	2.9%
21811	108	2.0%	87	1.5%	80	1.4%
21826	92	1.7%	87	1.5%	82	1.5%
21821	92	1.7%	99	1.7%	104	1.8%
All Other Locations	1,655	30.4%	1,692	29.9%	1,553	27.6%

Table 23. Sussex County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	55,159	100.0%	56,373	100.0%	55,822	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
19973	5,675	10.3%	5,925	10.5%	5,979	10.7%
19947	4,206	7.6%	4,341	7.7%	4,555	8.2%
19958	3,795	6.9%	3,826	6.8%	4,069	7.3%
19966	3,582	6.5%	3,633	6.4%	3,761	6.7%
19971	3,114	5.6%	3,172	5.6%	2,967	5.3%
19956	3,046	5.5%	3,057	5.4%	2,901	5.2%
19963	2,604	4.7%	2,640	4.7%	2,948	5.3%
19933	1,771	3.2%	1,695	3.0%	1,776	3.2%
19968	1,765	3.2%	1,692	3.0%	1,858	3.3%
19960	1,173	2.1%	1,072	1.9%	1,076	1.9%
All Other Locations	24,428	44.3%	25,320	44.9%	23,932	42.9%

Table 24. Talbot County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	17,843	100.0%	17,793	100.0%	18,027	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
21601	4,649	26.1%	4,753	26.7%	5,011	27.8%
21613	1,160	6.5%	1,156	6.5%	1,058	5.9%
21655	712	4.0%	756	4.2%	881	4.9%
21629	671	3.8%	615	3.5%	608	3.4%
21673	592	3.3%	567	3.2%	565	3.1%
21643	528	3.0%	536	3.0%	445	2.5%
21632	515	2.9%	486	2.7%	505	2.8%
21625	499	2.8%	523	2.9%	576	3.2%
21663	476	2.7%	479	2.7%	549	3.0%
21660	297	1.7%	300	1.7%	303	1.7%
All Other Locations	7,744	43.4%	7,622	42.8%	7,526	41.7%

Table 25. Wicomico County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	40,451	100.0%	40,315	100.0%	40,325	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
21804	8,944	22.1%	9,014	22.4%	9,509	23.6%
21801	7,474	18.5%	7,284	18.1%	8,086	20.1%
21875	1,588	3.9%	1,555	3.9%	1,588	3.9%
21853	1,359	3.4%	1,385	3.4%	1,365	3.4%
21811	1,171	2.9%	1,132	2.8%	944	2.3%
21826	1,030	2.5%	1,064	2.6%	1,117	2.8%
21830	945	2.3%	890	2.2%	1,037	2.6%
19956	901	2.2%	883	2.2%	773	1.9%
21849	869	2.1%	907	2.2%	946	2.3%
19940	722	1.8%	688	1.7%	612	1.5%
All Other Locations	15,448	38.2%	15,513	38.5%	14,348	35.6%

Table 26. Worcester County Labor Shed						
Total Primary Jobs						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
Total Primary Jobs	19,340	100.0%	19,885	100.0%	20,143	100.0%
Jobs in ZIP Codes (ZCTA) Where Workers Live						
	2008		**2007**		**2006**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
21811	4,508	23.3%	4,739	23.8%	4,871	24.2%
21842	2,821	14.6%	3,019	15.2%	3,272	16.2%
21804	1,212	6.3%	1,195	6.0%	1,231	6.1%
21863	1,163	6.0%	1,185	6.0%	1,280	6.4%
21851	1,128	5.8%	1,208	6.1%	1,418	7.0%
21813	691	3.6%	617	3.1%	678	3.4%
21801	642	3.3%	694	3.5%	631	3.1%
19975	274	1.4%	290	1.5%	299	1.5%
21853	261	1.3%	321	1.6%	261	1.3%
21849	248	1.3%	244	1.2%	244	1.2%
All Other Locations	6,392	33.1%	6,373	32.0%	5,958	29.6%

Table 27. Barge and Tug Operators List for the Tri-State Region

COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
A P L MARITIME, LTD.	6901 ROCKLEDGE DR STE. 200	BETHESDA	MD	20817	301	571-0100	U. S. MILITARY CARGO, FOOD AND CONTAINERS	PT. HUENEME, NORFOLK, JACKSONVILLE, ARABIAN GULF, INDIAN OCEAN AND FAR EAST, U. S. EAST COAST TO PERSIAN GULF, FAR EAST, MEDITERRANEAN SEA	6
ALLIED TRANSPORTATION COMPANY	PO BOX 717	NORFOLK	VA	23501	757	545-7301	TOWING, PETROLEUM PRODUCTS, FERTILIZER, CHEMICALS AND BULK CARGO	ATLANTIC COAST AND GULF COAST	14
APL MARINE SERVICES, LTD.	6901 ROCKLEDGE DR SUITE 200	BETHESDA	MD	20817	301	571-0100	CONTAINERS	U. S. EAST COAST TO PERSIAN GULF, FAR EAST U. S. WEST COAST TO FAR EAST	12
ATLANTIC GULF TOWING, LLC	PO BOX 1706 110 CENTERVILLE TPKE	CHESAPEAKE	VA	23327	757	547-9391		EAST COAST OF UNITED STATES FROM MAINE TO FLORIDA AND WEST COAST OF FLORIDA	1
ATLANTIC MARINE	3465 CHANDLER CREEK RD	VIRGINIA BEACH	VA	23453	757	362-0023		IDLE	1
B & B TUGS, INC.	PO BOX 1505	HOPEWELL	VA	23860	804	347-7819	TOWING	JAMES RIVER	4
B E S, LLC	2700 LIGHTHOUSE POINT EAST SUITE 130	BALTIMORE	MD	21224	410	342-6960	PASSENGERS	PATAPSCO RIVER BETWEEN BALTIMORE'S INNER HARBOR AND KEY BRIDGE	1
BACK RIVER TOWING, INC.	116 BOW ST	CHESAPEAKE	VA	23325	757	420-1874	GENERAL TOWING	NORFOLK HARBOR AND INLAND WATERS ON EAST COAST	2
BAY COAST RAILRD, INC.	PO BOX 312	CAPE CHARLES	VA	23310	757	331-1094	TOWING AND RAILRD CARS - LOADED AND LIGHT	CAPE CHARLES TO LITTLE CREEK, VA AND CHESAPEAKE BAY	2
BAY FREIGHT, INC.	PO BOX 565	DELTAVILLE	VA	23043	804	776-6260	BARLEY, WHEAT, CORN, SOYBEANS AND MILO	KINSALE-POTOMAC RIVER; KILMARNOCK-INDIAN RIVER; TAPPAHANNOCK, VA - HOSKINS CREEK; SALISBURY, MD - WICOMICO RIVER; CHESAPEAKE, VA - ELIZABETH RIVER; SEAFORD, DE - NANACOKE RIVER; URBANNA, VA - URBANNA CREEK; ALSO INCLUDES CHESAPEAKE BAY	1
BAY TOWING CORP.	PO BOX 12677	NORFOLK	VA	23541	757	545-8416	TOWING	COASTWISE - HAMPTON RDS, INLAND WATERWAYS AND CHESAPEAKE BAY	7

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)

COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
BB&T EQUIPMENT FINANCE CORPORATION	600 WASHINGTON AVE STE. 201	TOWNSON	MD	21204	410	427-1300			3
BOARDURAN BELL	PO BOX 5592	RICHMOND	VA	23220	804	690-6665			1
C & M INDUSTRIES, INC.	121 REPUBLIC RD	CHESAPEAKE	VA	23324	757	486-4268	D GRADE MATERIAL - JP 5, DIESEL AND WATER	HAMPTON RDS, VA AREA; BALTIMORE, MD; PHILADELPHIA, PA AND WILMINGTON, NC	3
CAPE HENRY LAUNCH SERVICE, INC.	PO BOX 5326	VIRGINIA BEACH	VA	23471	757	412-2700	PERSONNEL, PAINT, OIL, FOOD AND SPARE PART	150 MILES AROUND VIRGINIA BEACH, VA; AND COASTAL WATERS FROM NEW YORK TO SOUTH CAROLINA - OUT 100 NAUTICAL MILES	2
CAPT. JOHNNY, INC.	ROUTE 1101, BOX 565	DELTAVILLE	VA	23043	804	776-6260	BARLEY, WHEAT, CORN, SOYBEANS AND MILO	KINSALE - POTOMAC RIVER/KILMARNOCK - INDIAN RIVER/ TAPPAHANNOCK, VA - HOSKINS CREEK/ SALISBURY, MD/ WICOMICO RIVER/ CHESAPEAKE, VA - ELIZABETH RIVER/ SEAFORD, DE - NAVERCOKE RIVER/ URBANNA, VA - URBANNA CREEK/ ALSO INCLUDES CHESAPEAKE	1
CASHO, R. J. MARINE TOWING CORP.	418 BIDDLE ST	CHESAPEAKE CITY	MD	21915	410	885-5421	TOWING	CHESAPEAKE BAY, CHESAPEAKE AND DELAWARE CANAL, DELAWARE RIVER, COASTWAYS - NEW YORK TO CHARLESTON, SC; COASTWISE FROM EASTPORT, ME TO BROWNSVILLE, TX	2
CHESAPEAKE BAY FOUNDATION, INC.	6 HERNDON AVE	ANNAPOLIS	MD	21403-4503	410	268-8816	PASSENGERS	THE CHESAPEAKE BAY & ITS' TRIBUTARIES	1
CHESAPEAKE MARINE TOURS, INC.	PO BOX 3350	ANNAPOLIS	MD	21403	410	268-7601	PASSENGERS	CHESAPEAKE BAY AND TRIBUTARIES BETWEEN SMITH POINT AND HEADWATERS OF CHESAPEAKE BAY	11
COLUMBIA COASTAL TRANSPORT, INC.	801 BRD ST SUITE 101A	PORTSMOUTH	VA	23707-2000	757	397-9203	CONTAINERS	EAST COAST AND GULF	2
COMMONWEALTH OF VIRGINIA DEPT. OF TRANSP.	PO BOX 26	SURRY	VA	23883	757	294-3354	MOTOR VEHICLES AND PASSENGERS	JAMES RIVER BETWEEN SCOTLAND WHARF (SURRY CO.) VA; GLASSHOUSE POINT (JAMES CITY CO.) VA	4
CONSTELLATION POWER SOURCE GENERATION, INC.	111 MARKET PLACE SUITE 500	BALTIMORE	MD	21202	410	470-2480	COAL AND OIL	BALTIMORE HARBOR, CHESAPEAKE BAY AND TRIBUTARIES; ALSO, DELAWARE RIVER AND NEWPORT NEWS, VA	9
CORMAN IMBACH	6121 PENNINGTON	BALTIMORE	MD	21226	410	355-6121	MISC. CONSTRUCTION	PORT OF BALTIMORE, PATAPSCO RIVER	10

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)									
COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
MARINE	AVE						EQUIPMENT, PILING AND CONSTRUCTION MATERIALS	AND UPPER CHESAPEAKE BAY	
CRANDELL, EDWIN A. & JOHN O., INC.	733 CRANDELL RD	WEST RIVER	MD	20778-2301	410	867-0200	TIMBER AND PILING, STONE (RIP RAP), DREDGED MATERIAL, FILL DIRT AND TOP SOIL	CHESAPEAKE BAY AND ITS' TRIBUTARIES	15
CROFTON DIVING CORP.	16 HARPER AVE	PORTSMOUTH	VA	23707	757	397-1131		LIMITED COASTWISE; ATLANTIC OCEAN BETWEEN CAPE MAY, NJ AND CAPE HATTERAS, NC	2
D&H CORPORATION	3515 SHIPWRIGHT ST	PORTSMOUTH	VA	23703	757	397-6833	TOWING, LIQUID FERTILIZER, GRAINS, PETROLEUM PRODUCTS AND CHEMICAL PRODUCTS	ATLANTIC COAST - BAYS AND SOUNDS OF ATLANTIC COAST AND TRIBUTARIES; GULF COAST AND CARIBBEAN	2
DANN MARINE TOWING	PO BOX 250	CHESAPEAKE CITY	MD	21915	410	885-5055	TOWING	ATLANTIC OCEAN AND GULF OF MEXICO	15
DELAWARE BAY & RIVER COOPERATIVE, INC.	PO BOX 624 700 PILOTTOWN RD	LEWES	DE	19958	302	645-7861	RECOVERED OIL, OIL RECOVERY EQUIPMENT AND OIL SPILL CONTAINMENT BOOM	DELAWARE BAY AND RIVER FROM MOUTH OF BAY TO BETSY ROSS BRIDGE	3
DISSEN & JUHN CORP.	101 LOG CANOE CIR SUITE J	STEVENSVILLE	MD	21666	410	604-1802		UPPER CHESAPEAKE BAY FROM SUSQUEHANA RIVER TO POTOMAC RIVER	2
DMT 4, LC	PO BOX 250	CHESAPEAKE CITY	MD	21915	410	885-5055		CHESAPEAKE BAY; TRIBUTARIES, DELAWARE BAY; TRIBUTARIES, ATLANTIC ICWW	9
DOMINION MARINE GROUP, LTD.	801 BRD ST SUITE. 202	PORTSMOUTH	VA	23707					4
EASTERN SHORE HOLDINGS, LLC	436 MILL ST	SALISBURY	MD	21801					1
FLADEL-MAR, INC.	PO BOX 250	CHESAPEAKE CITY	MD	21915	410	885-5065	TOWING	OFFSHORE - ATLANTIC COAST AND GULF OF MEXICO	2
FRAGER ENTERPRISES	14101 PARKVALE RD	ROCKVILLE	MD	20853	301	460-7447	PASSENGERS	POTOMAC RIVER - GEORGETOWN TO OCCOQUAN, VA	2
GEISLER, R. L. MARINE, INC.	7831 SOUTHWEST RD	PASADENA	MD	21122-3631	410	255-0549	CONSTRUCTION EQUIPMENT	CHESAPEAKE BAY 50 MILE RADIUS OF ANNAPOLIS, MD	1

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)

COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
HAMPTON RDS LEASING, INC.	1601 SOUTH MAIN ST	NORFOLK	VA	23523	757	627-3440		NORFOLK HARBOR AREA	3
HARBOR BOATING	1735 LANCASTER ST	BALTIMORE	MD	21231	410	563-3901	PASSENGERS (EXCURSIONS)	NORTHWEST BRANCH OF PATAPSCO RIVER FROM LAZARETTO POINT TO CONSTELLATION DOCK	13
HARBOR DREDGE & DOCK	PO BOX 35140	RICHMOND	VA	23235	804	379-6754	TOWING CONSTRUCTION EQUIPMENT	JAMES AND APPOMATTOX	1
HARBOR TOURS	1238 BAY ST	PORTSMOUTH	VA	23704	757	393-4735	PASSENGERS	ELIZABETH RIVER - NORFOLK, VA AND OLD POINT COMFORT TO INTERCOASTAL WATERWAY TO 1 MILE SOUTH OF RICKENBACKER CAUSEWAY, MIAMI, FL	1
HODGES & HODGES ENTERPRISES, LTD.	3623 SHIPWRIGHT ST	PORTSMOUTH	VA	23703	757	484-0308	TOWING CONSTRUCTION EQUIPMENT	HAMPTON RDS HARBOR AND LOWER CHESAPEAKE BAY	4
HONEYWELL INTERNATIONAL, INC.	PO BOX 761	HOPEWELL	VA	23860	804	541-5443	AMMONIUM SULFATE (BULK FERTILIZER)	BETWEEN HOPEWELL, VA AND NORFOLK, VA VIA THE JAMES RIVER & ELIZABETH RIVER	1
IRELAND MARINE TRANSPORTATION, INC.	134 TILDEN AVE	CHESAPEAKE	VA	23320	757	547-4945	TOWING; CHARTERS BARGES TO OTHERS	CHESAPEAKE BAY AREA AND ITS' TRIBUTARIES; ATLANTIC INTRACOASTAL WATERWAY; OCCASIONALLY TO NEW ORLEANS, LA	15
ISLAND AND BAY CRUISES, INC.	382 CAMPGROUND RD	REEDVILLE	VA	22539	804	453-3430	PASSENGERS	SLOUGH NORTHERLAND COUNTY, VA TO SMITH ISLAND, MD 15 MILES OUT IN THE CHESAPEAKE BAY	1
ISLAND FERRY, INC.	20915 SOMERS RD	EWELL	MD	21824	410	968-1118	PASSENGERS		1
J N B	121 REPUBLIC RD	CHESAPEAKE	VA	23324	757	543-8775	GRADE "A" AND LOWER DIESEL, JP 5, WATER, "D" GRADE MATERIAL, ETC. AND JP8	HAMPTON RDS, VA AREA; BALTIMORE, MD; PHILADELPHIA, PA AND WILMINGTON, NC	3
J. S. HOLDING CORP.	1209 ORANGE ST	WILMINGTON	DE	19801	973	632-1327	PASSENGERS	MANHATTAN, NEW YORK, NEW JERSEY, HUDSON AND EAST RIVERS	1
JACKSON CREEK SEAFOOD, INC.	PO BOX 334	DELTAVILLE	VA	23043	804	776-9840	CORN, BEANS, WHEAT AND BARLEY	CHESAPEAKE BAY AND TRIBUTARIES; RAPPAHANOCK RIVER, TANGIER SOUND, WICIMICO RIVER, POTOMAC, YOCCOMICO, TAPPAHANOCK, VA; KINSALE AND	3

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)

COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
								SALISBURY, MD; DELAWARE RIVER	
JASON FREIGHT & PASSENGER SERVICE	4032 SMITH ISLAND RD	EWELL	MD	21824	410	425-5931	PASSENGERS		2
KINDER MORGAN ELIZABETH RIVER TERMINALS	4100 BUELL ST	CHESAPEAKE	VA	23324	757	543-0335		KINDER MORGAN ELIZABETH RIVER TERMINALS; SOUTHERN BRANCH; ELIZABETH RIVER; CHESAPEAKE, VA	3
KRAUSE MARINE TOWING CORP.	9815 GUNFORGE RD	PERRY HALL	MD	21128	410	256-3007	MISCELLANEOUS SUPPLIES	BALTIMORE, MD; CHESAPEAKE BAY, DELAWARE BAY AND RIVER; NORFOLK AND PHILADELPHIA HARBORS	3
KRAUSE, DANIELLE TUG, INC.	9815 GUNFORGE RD	PERRY HALL	MD	21128	410	256-3007	MISCELLANEOUS SUPPLIES	BALTIMORE, MD; CHESAPEAKE BAY, DELAWARE BAY AND RIVER, NORFOLK AND PHILADELPHIA HARBORS	1
KRAUSE, MARIA TUG, INC.	9815 GUNFORGE RD	PERRY HALL	MD	21128	410	256-3007	MISCELLANEOUS SUPPLIES	BALTIMORE, MD; CHESAPEAKE BAY, DELAWARE BAY AND RIVER, NORFOLK AND PHILADELPHIA HARBORS	1
LANGENFELDER MARINE, INC.	400 PIER AVE	STEVENSVILLE	MD	21666	410	643-5575	OYSTER SHELL, STEEL SLAG, STONE, GRAVEL AND SAND	CHESAPEAKE BAY AND ITS' TRIBUTARIES; BALTIMORE TO LOVE POINT, MD	25
LOCKWOOD MARITIME, INC.	PO BOX 564	HAMPTON	VA	23669	757	722-1946	MACHINERY AND EQUIPMENT	U. S. EAST COAST; GULF COAST; MISSISSIPPI RIVER SYSTEM; GREAT LAKES; CARIBBEAN SEA AND REGISTRY FOR FOREIGN TRADE	2
MAERSK LINE LIMITED	ONE COMMERICAL PLACE 20TH FLOOR	NORFOLK	VA	23510	757	857-4800	CONTAINERIZED CARGO, BULK CARGO AND LIQUID CARGO	FOREIGN	31
MAGANN, W. F. CORP.	3220 MARINER AVE	PORTSMOUTH	VA	23703	757	484-2820	CONSTRUCTION MATERIALS	HAMPTON RDS HARBOR	6
MARINE CONTRACTING CORP.	PO BOX 5525	VIRGINIA BEACH	VA	23471	757	460-4666	FLOATING EQUIPMENT, PILE DRRS AND BARGES USED IN CONSTRUCTION WORK	HAMPTON RDS AREA, CHESAPEAKE BAY, INTRACOASTAL WATERWAY, CHESAPEAKE AND DELAWARE CANAL, DELAWARE RIVER - C & D CANAL TO WILMINGTON AND POTOMAC RIVER	8
MARINE LAUNCH CO., INC., DIVISION OF VANE BROTHERS	2100 FRANKFURST AVE	BALTIMORE	MD	21226	410	631-7777	PASSENGERS, SHIP SUPPLIES AND BULK LUBRICANTS	BALTIMORE HARBOR	2
MARINE OIL	201 EAST CITY	NORFOLK	VA	07202	908	282-6440	GRADES B AND LOWER	THE GREATER NEW YORK HARBOR,	3

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)

COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
SERVICE OF NEW YORK, L.L.C.	HALL PO BOX 4617						- MAINLY CYLINDER OIL, GENERATOR OIL AND SYSTEMS OIL	MANHATTAN, BROOKLYN, STATEN ISLAND, PORT NEWARK AND PORT ELIZABETH, NJ	
MARINE OIL SERVICE, INC.	1421 SOUTH MAIN ST	NORFOLK	VA	23523	757	543-1446	PETROLEUM OILS	NORFOLK HARBOR, CHESAPEAKE BAY AND TRIBUTARIES; AND INLAND WATERWAYS	1
MARINE TECH EQUIPMENT CO.	6604 FORT SMALLWOOD RD	BALTIMORE	MD	21226	410	355-2000	TOWING CONSTRUCTION BARGES	RIVERS AND HARBORS IN THE BALTIMORE, MD VICINITY	1
MCALLISTER TOWING OF BALTIMORE, INC.	2600 BROENING HWY BLDG. B PIER 1 BARGE RD	BALTIMORE	MD	21224	410	633-1847	TOWING	BALTIMORE HARBOR, CHESAPEAKE BAY AND TRIBUTARIES; AND DELAWARE RIVER	2
MCLEAN CONTRACTING CO.	6700 MCLEAN WAY	GLEN BURNIE	MD	21060-6480	410	553-6700	TOWING	INLAND WATERS, MARYLAND, DELAWARE, VIRGINIA, SOUTH CAROLINA AND NORTH CAROLINA	62
MORAN TOWING OF MARYLAND	1801 S. CLINTON ST SUITE 310	BALTIMORE	MD	21224	410	732-9600	TOWING	DELAWARE AND CHESAPEAKE BAYS AND TRIBUTARIES	2
MORAN TOWING OF VIRGINIA	1901 BROWN AVE	NORFOLK	VA	23504	757	625-6010	SCRAP METAL	NORFOLK, VA; INTERCOASTAL WATERWAYS OF VIRGINIA & NORTH CAROLINA	19
MORNING CHEER, INC.	60 SANDY COVE RD	NORTH EAST	MD	21901	410	287-5433	PASSENGERS	NORTH EAST RIVER	1
NORFOLK DREDGING CO.	PO BOX 1706	CHESAPEAKE	VA	23327	757	547-9391	DREDGED MATERIAL AND DREDGING PIPELINE	NORFOLK, VA AND APPROXIMATELY 1000 MILE RADIUS	39
NORFOLK TOWING & LIGHTERAGE, INC.	400 E. INDIAN RIVER RD	NORFOLK	VA	23523	804	545-2414	PROPELLERS FOR SHIPS, PILINGS AND ANCHOR CHAIN	INLAND WATERWAYS, WEST OF THE CHESAPEAKE BAY BRIDGE TUNNEL	22
NORFOLK TUG CO.	151 SOUTH MAIN ST	NORFOLK	VA	23523	757	545-1981	PUSH BARGES	NORFOLK HARBOR AND INTERCOASTAL WATERWAY	13
O A, LLC	500 EAST INDIAN RIVER RD	NORFOLK	VA	23523	800	446-8241			2
OBFY, INC.	27456 OXFORD RD	OXFORD	MD	21654	410	745-9023	PASSENGERS AND VEHICLES	CHESAPEAKE BAY - TRED AVON RIVER BETWEEN OXFORD AND BELLEVUE, MD	1
OMEGA PROTEIN,	PO BOX 175	REEDVILLE	VA	22539	804	453-4211	CONDENSATE WATER	COMPANY DOCK/CHESAPEAKE BAY	12

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)

COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
INC.							AND MENHADEN FISH		
OSPREY ENTERPRISES, INC.	444 CRAWFORD ST SECOND FLOOR	PORTSMOUTH	VA	23704	757	397-6833	TOWING LIQUID FERTILIZER, GRAINS, PETROLEUM PRODUCTS AND CHEMICAL PRODUCTS	ATLANTIC COAST / BAYS AND SOUNDS OF ATLANTIC COAST AND TRIBUTARIES; GULF COAST AND CARIBBEAN	1
PAPPY'S LADY, INC.	ANGLERS RD & SAVANNAH RD PO BOX 150	LEWES	DE	19958	302	645-8862	PASSENGERS	LEWES, DE; LOWEST & REHOBETH CANAL, ROOSEVELT INLET, DEL BAY & ATLANTIC OCEAN	1
PERDUE FARMS	501 BARNES RD	CHESAPEAKE	VA	23324	757	494-5567	GRAIN AND GRAIN PRODUCTS	SEAFORD, DE - CHARLESTON, SC; CHESAPEAKE BAY AND INLAND WATERWAY	17
POTOMAC RIVERBOAT COMPANY	205 THE STRAND	ALEXANDRIA	VA	22314	703	684-5986	PASSENGERS	POTOMAC RIVER, MD AND WASHINGTON, DC BETWEEN MILE 70.0 TO 99.0	7
RED RIVER SHIPPING CORP.	6110 EXECUTIVE BLVD SUITE 620	ROCKVILLE	MD	20852	301	230-0854	GENERAL CARGO / AMMUNITION	GULF / EAST COAST U. S. - NORTHERN EUROPE AND INDIAN OCEAN; U. S. WEST COAST - FAR EAST	1
ROVER MARINE, INC.	PO BOX 3125	NORFOLK	VA	23514	804	627-7245	PASSENGERS	NORFOLK HARBOR - MILE "0" ELIZABETH RIVER TO CHESAPEAKE BAY	1
SADOWSKI TOWING CO., INC.	1934 CEDAR LN	BALTIMORE	MD	21222	410	633-2103	TOWING	BALTIMORE HARBOR, CHESAPEAKE BAY, C&D CANAL, DELAWARE BAY AND RIVER	1
SEA LAND TRANSPORT CO.	4378 WATERVIEW RD	WATERVIEW	VA	23150	804	758-3940	GRAIN AND SULFATE	CHESAPEAKE BAY AND TRIBUTARIES - EAST COAST PORTS	2
SKANSKA USA CIVIL, SOUTHEAST, INC.	295 BENDIX RD SUITE 400	VIRGINIA BEACH	VA	23452	757	547-2153	CONSTRUCTION MATERIAL	HAMPTON RDS, ATLANTIC INTERCOASTAL WATERWAY AND CHESAPEAKE BAY, GULF INTERCOASTAL WATERWAY	12
SKIFFS CREEK TOWING, INC.	105 HODGES COVE RD	YORKTOWN	VA	23692	757	592-6765		HAMPTON RD HARBOR; JAMES RIVER TO JAMESTOWN; ICW, CHESAPEAKE BAY AND TRIBUTARIES ICW NORFOLK TO SOUTH CAROLINA	3
SMITH BROS.	4702 WOODFIELD RD PO BOX 124	GALESVILLE	MD	20765-0124	410	867-1818	CHARTERS TO OTHERS	CHESAPEAKE BAY, PRIMARILY LOCAL TO OUR ADDRESS	5
SMITH BROTHERS, INC.	4702 WOODFIELD RD	GALESVILLE	MD	20675	410	867-1818	LEASES TO OTHERS	LOCAL - MARYLAND WATERS AND EASTERN SEABOARD	1
SMITH ISLAND OIL	4040 EVANS DOCK	EWELL	MD	21824	410	425-2341	DIESEL FUEL,	LEVERING CREEK IN EWELL TO	2

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)									
COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
CO.	RD						KEROSENE AND UNLEADED GASOLINE	CRISFIELD, MD	
SMITH MARINE EQUIP. CO.	6211 PENNINGTON AVE	BALTIMORE	MD	21226	410	355-7626	CONSTRUCTION MATERIAL, SAND, GRAVEL AND ROCK	BALTIMORE HARBOR, CHESAPEAKE BAY AND DELAWARE RIVER	20
SMITH MARINE TOWING, INC.	6211 PENNINGTON AVE	BALTIMORE	MD	21226	410	355-7626	TOWING (SHIFTING)	BALTIMORE HARBOR, CHESAPEAKE BAY AND DELAWARE RIVER	9
SMURFIT-STONE FOREST RESOURCES CORP.	PO BOX 511	WEST POINT	VA	23181	804	843-5249	TOWING, WOOD CHIPS AND BULK OIL	CHESAPEAKE BAY - ALBEMARLE SOUND AND ALL CONNECTING INLAND WATERWAYS AND RIVERS	2
SPIRIT CRUISES, LLC	5700 LAKE WRIGHT DR STE. 203	NORFOLK	VA	23502	757	640-9248	PASSENGERS	NEW YORK; BOSTON'S HARBORS AND RIVERS; AND WASHINGTON, DC	1
SPURRY, GUY E. & JOSEPH C., JR.	7034 TRAVELERS REST CIR	EASTON	MD	21601	410	745-9329	SEED OYSTERS	THE WATERS OF THE CHESAPEAKE BAY	0
SUICIDE BRIDGE SEAFOOD, INC.	6304 SUICIDE BRIDGE RD	HURLOCK	MD	21643	410	943-4689	PASSENGERS	CHOPTANK RIVER IN THE VICINITY OF CAMBRIDGE, MD BETWEEN CHESAPEAKE BAY AND DOVER BRIDGE	2
SUNTRUST EQUIPMENT FINANCE & LEASING CORP.	HAMPTON PLAZA;300 EAST JOPPA RD 7TH FLOOR	TOWSON	MD	21286					18
SUPERIOR EQUIPMENT CORP.	3511 SILVERSIDE RD SUITE. 105	WILMINGTON	DE	19810	912	964-0711		COASTAL GEORGIA, SOUTH CAROLINA AND FLORIDA	2
TANGIER & CHESAPEAKE CRUISE, INC.	468 BUZZARD POINT RD	REEDVILLE	VA	22539	804	453-2628	PASSENGERS	REEDVILLE, VA - TANGIER, VA; TAPPAHANNOCK, VA; LEEDSTOWN, VA; SAUNDERS WHARF; FREDERICKSBURG, VA AND RAPPAHANNOCK RIVER STEWART; NO LONGER TRAVELS TO FLORIDA	3
TANGIER ISLAND CRUISES	1001 WEST MAIN ST	CRISFIELD	MD	21817	410	968-2338	PASSENGERS, MAIL, GROCERIES AND FREIGHT	TANGIER, VA TO CRISFIELD, MD AND CRISFIELD, MD TO PORTSMOUTH, VA	2
TANGIER MAIL & FREIGHT	27 W. RIDGE RD PO BOX 27	TANGIER	VA	23440	757	891-2240	PASSENGERS, MAIL, GROCERIES AND BUILDING SUPPLIES	TANGIER, VA TO CRISFIELD, MD	1
TRANSERVE	PO BOX 867	NORFOLK	VA	23501	804	545-7301	NITROGEN SOLUTION,	MISSISSIPPI RIVER AND GULF; LOUISIANA	4

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)									
COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
MARINE, INC.							CAUSTIC SODA SOLUTION AND BULK DRY CARGOES	AND TEXAS TO GULF AND EAST COASTS; AND PUERTO RICO	
TRANSPORTATION DISTRICT COMMISSION OF HAMPTON RDS	3400 VICTORIA BLVD	HAMPTON	VA	23661	757	222-6000	PASSENGERS	ELIZABETH RIVER BETWEEN PORTSMOUTH, VA AND NORFOLK, VA	3
TYLER'S CRUISES	4065 SMITH ISLAND RD	EWELL	MD	21824	410	425-2771	PASSENGERS	EWELL TO CRISFIELD, MD; EWELL, MD - LEVERING CREEK OUT OF JETTIES ON WEST SIDE OF ISLAND ACROSS CHESAPEAKE BAY TO POINT LOOKOUT, MD (MOUTH OF POTOMAC RIVER); RHODES POINT TO CRISFIELD, MD (SHANK'S CREEK THROUGH TYLERTON, MD ON TO CRISFIELD	1
VANE BROTHERS COMPANY, THE	2100 FRANKFURST AVE	BALTIMORE	MD	21226	410	631-7773	DIESEL OIL AND HEAVY FUELS, LUBRICANTS AND POTABLE WATER	UPPER DELAWARE BAY, PHILADELPHIA, CHESAPEAKE BAY, BALTIMORE, SALISBURY & VIENNA, MD; SEAFORD, DE; HAMPTON RDS, NORFOLK AND NEWPORT NEWS, VA; PLYMOUTH, NC (ALBERMARLE SOUND)	5
VANE LINE BUNKERING, INC.	2100 FRANKFURST AVE	BALTIMORE	MD	21226	410	631-7773	TOWING, PETROLEUM PRODUCTS	DELAWARE RIVER, CHESAPEAKE BAY AND TRIBUTARIES, NEAR COASTAL WATERS AND EASTERN U. S., GULF OF MEXICO	72
VIRGINIA DEPARTMENT OF HIGHWAYS & TRANS.	734 BARNFIELD RD	WARSAW	VA	22572	804	333-3696	PASSENGERS AND VEHICLES	OTTOMAN AND MERRY POINT, VA ON ROUTE 604 IN LANCASTER COUNTY, VA;CONNECTS SUNNY BANK AND OPHELIA, VA ON RT. 644 IN NORTHUMBERLAND COUNTY, VA	2
VIRGINIA MARINE STRUCTURES, INC.	217 SOUTH BATTLEFIELD BLVD	CHESAPEAKE	VA	23322	757	222-0886	TOWING, CONSTRUCTION MATERIALS AND RIP RAP	NORFOLK HARBOR (NORFOLK, VIRGINIA BEACH, CHESAPEAKE, PORTSMOUTH, HAMPTON AND NEWPORT NEWS)	1
VULCAN MARINE SERVICES	938 QUARRY RD	HAVRE DE GRACE	MD	21078	410	575-6587	SAND, GRAVEL AND CRUSHED STONE	LEONARDTOWN, POCOMOKE, SALISBURY, BALTIMORE, EASTON, HAVRE DE GRACE, MD; WOODBRIDGE, CAPE CHARLES, CHESAPEAKE, VA; JAMES RIVER; CHESAPEAKE BAY, DELAWARE BAY AND THEIR TRIBUTARIES; AND SEAFORD, DE	11
VULCAN	113 MULBERRY ST	NORFOLK	VA	23523	757	494-3235	SAND AND GRAVEL,	EASTERN BRANCH, ELIZABETH RIVER,	72

Table 27. Barge and Tug Operators List for the Tri-State Region (Cont'd)

COMPANY NAME	ADDRESS	CITY	STATE	ZIP	AREA Code	PHONE	COMMODITIES CARRIED / PURPOSE	OPERATION LOCATIONS	Total Vessels
MATERIALS CO.							CRUSHED STONE	INTRACOASTAL WATERWAY, JAMES RIVER FROM RICHMOND TO HAMPTON RDS HARBOR	
VULCAN MATERIALS MIDEAST DIVISION	113 MULBERRY ST	NORFOLK	VA	23523	757	494-3235	SAND AND GRAVEL, CRUSHED STONE	EASTERN BRANCH, ELIZABETH RIVER, INTRACOASTAL WATERWAY, JAMES RIVER FROM RICHMOND TO HAMPTON RDS HARBOR	12
WHITE'S FERRY	24801 WHITE'S FERRY RD	DICKERSON	MD	20842	301	349-5200	PASSENGERS	RIGHT BANK TO LEFT BANK; POTOMAC RIVER WHITE'S FERRY, MD	1
WICOMICO COUNTY ROADS DIVISION	PO BOX 1897	SALISBURY	MD	21802	410	548-4874	PASSENGERS AND AUTOMOBILES	WICOMICO RIVER; BETWEEN FERRY LANDINGS OF UPPER FERRY RD - NORTH & UPPER FERRY RD - SOUTH NEAR SALISBURY, MD & BETWEEN FERRY LANDINGS OF WHITEHAVEN RD & WHITEHAVEN FERRY RD IN SOMERSET COUNTY NEAR WHITEHAVEN, MD	2
WILDER, ED	5328 EARTH PRINCESS ANN RD	NORFOLK	VA	23502	757	853-0530			14
WILMINGTON TRUST CO. TRUSTEE	RODNEY SQUARE NORTH 1100 NORTH MARKET ST	WILMINGTON	DE	19890-0001	302	636-6170			100
WILMINGTON TUG, INC.	120 THE STRAND	NEW CASTLE	DE	19720	302	652-1666	SHIP DOCKING	DELAWARE RIVER	9

Source: U.S. Institute for Water Resources of the Army Corps of Engineers: Waterborne Transportation Lines of the United States, 2009

Table 28. Established Spoils Disposal Locations	
Name	Description
Cedar Hill Park DMP (Wicomico County Recreation & Parks - Bivalve Harbor)	An existing site off the Nanticoke River on Cedar Hill Road in Bivalve Maryland that handles sand and silt.
Clara Road DMP	An existing site for dredging off the Lower Wicomico River, located on Clara Road in Tyaskin, Maryland. The facility handles sand and silt and is planned to remain open until 2017.
Cox Creek Containment Facility	An existing near-shore, confined placement facility located approximately one mile south of the Francis Scott Key Bridge
Dam Neck Ocean Placement Site	An existing open-water placement site located in the Atlantic Ocean, approximately three miles east of Virginia Beach, VA
Hart-Miller Island	An existing confined dredged material management facility located offshore of the Back River near Baltimore Harbor. The site was scheduled to stop receiving dredged material in 2009.
Norfolk Ocean Disposal Site	An existing open water placement site located in the Atlantic Ocean, approximately 17 miles east of Fisherman's Island, VA.
Pooles Island	A group of existing open-water placement sites located near Pooles Island in the Chesapeake Bay. This site was scheduled to close in 2010.
Poplar Island	An ongoing island restoration project that uses dredged material to restore 1,140 acres of wetland and upland habitats; located near Tilghman, Talbot County, Maryland. The site is scheduled to stop receiving dredged material in 2016.
Rappahannock Deep Alternate Site	An existing open-water placement site located in the Virginia waters of the Chesapeake Bay, near the Rappahannock Shoals Channel.
Sharps Point DMP	An existing site for dredging off the Upper Wicomico River, located on Sharps Point Road in Fruitland, Maryland. The facility handles silt.
Simms Wharf DMP	An existing site for dredging off the Middle Wicomico River, located on Cooper Road in Eden, Maryland. The facility handles silt.
Sussex County	A newly approved placement site located near Seaford at what was previously the Woodland Golf Park. Approximately 20 acres of the 41 acre parcel will be used for dredging deposits.
Wolf Trap Alternate Site	An existing open-water placement site located in the Virginia waters of the Chesapeake Bay, east of Mathews County, Virginia.

Table 29. FY 2009 Contract Dredging Program

District Name	Seq #	Job Name	Award Date	Dredge Type	Quantity (cu.yds.)	Gov't Estimate	Winning Bid	Winning Bidder	Contract Type	SB Status	Number of Bids
B	**3**	**Ocean City, MD**	2/27/2009	P	21,331	$419,129	$427,289	SOUTHWIND CONSTRUCTION CORP	F&R	S	4
B	**1**	**Baltimore Harbor**	8/25/2009	B	1,543,420	$14,285,188	$15,464,575	WEEKS MARINE, INC.(GULF)	F&R	L	3
B	**6**	**Sand Stockpile Poplar Island**	9/3/2009	P	830,000	$5,614,607	$4,904,000	COTTRELL ENGINEERING CORP.	F&R	S	3
B	**4**	**Parish Ck & L. WICOMICO, MD**	9/9/2009	P	53,666	$1,634,164	$1,244,000	COTTRELL ENGINEERING CORP.	F&R	S	1
B	**2**	**WICOMICO River, MD**	9/16/2009	P	100,000	$2,589,919	$2,632,000	WHIT WILLIAMS	F&R	S	2
B	**7**	**Smith Isl, Somerset CO, MD**	9/28/2009	P	200,000	$4,152,052	$4,759,048	WHIT WILLIAMS	F&R	S	2
N	**35**	**Waterway on Coast of VA**	1/6/2008	P	99,500	$692,200	$744,125	COTTRELL ENGINEERING CORP.	F&R	S	2
N	**19**	**James River Dancing Point**	12/4/2008	P	224,000	$892,920	$892,920	COTTRELL ENGINEERING CORP.	IDIQ	S	1
N	**36**	**Norfolk Harbor Thimble Shoal**	2/25/2009	P	473,700	$2,581,140	$2,678,090	GREAT LAKES DREDGE & DOCK CO.	F&R	L	2
N	**33**	**Craney Is Rehandling Basin**	6/5/2009	P	494,000	$1,529,400	$1,788,210	NORFOLK DREDGING COMPANY	F&R	L	3
N	**40**	**James River Dancing Point**	6/10/2009	P	130,000	$534,704	$534,704	COTTRELL ENGINEERING CORP.	F&R	S	1
N	**38**	**Tribell Shoal**	6/10/2009	P	104,200	$567,674	$436,816	COTTRELL ENGINEERING CORP.	F&R	S	1
N	**30**	**James River Goose Hill**	6/10/2009	P	107,900	$1,089,863	$1,089,863	COTTRELL ENGINEERING CORP.	IDIQ	S	1
N	**8**	**Greenvale Creek**	6/12/2009	P	19,000	$308,500	$239,050	SELECT TRANSPORTATION, INC	F&R	S	5
N	**11**	**Hoskins Creek**	7/29/2009	P	59,200	$659,620	$814,834	SOUTHWIND CONSTRUCTION CORP	F&R	S	2
N	**6**	**Winter Harbor**	7/29/2009	P	70,300	$584,480	$533,288	SOUTHWIND CONSTRUCTION CORP	F&R	S	2
N	**5**	**Queens Creek**	7/29/2009	P	26,400	$265,000	$266,893	SOUTHWIND CONSTRUCTION CORP	F&R	S	2
N	**4**	**Chincoteague Bay Channel**	8/5/2009	P	17,000	$306,100	$270,131	J.N.D. THOMAS COMPANY, INC	F&R	S	2
N	**24**	**Lynnhaven Inlet**	8/12/2009	P	139,300	$1,576,490	$1,655,450	COTTRELL ENGINEERING CORP.	F&R	S	2
N	**22**	**Chincoteague Harbor of Refuge**	8/19/2009	P	7,000	$151,500	$54,181	J.N.D. THOMAS COMPANY, INC	F&R	S	2
N	**10**	**Hampton Creek**	8/26/2009	B	22,800	$314,000	$606,000	MCLEAN CONTRACTING CO.	F&R	L	3
N	**7**	**Pagan River**	8/26/2009	B	65,000	$756,100	$1,735,000	MCLEAN CONTRACTING CO.	F&R	L	3
N	**25**	**Norfolk Harbor and Cl Reach**	8/28/2009	P	600,300	$2,974,260	$3,691,515	NORFOLK DREDGING COMPANY	F&R	L	1
P	**1**	**Maint Dredging Upper Ches.**	9/29/2008	H	33,350	$1,751,291	$1,962,160	GREAT LAKES DREDGE & DOCK CO.	F&R	L	1
P	**11**	**Beach Nourishment Cape May**	12/14/2008	H	70,000	$4,500,000	$4,500,000	GREAT LAKES DREDGE & DOCK CO.	F&R	L	1

Table 29. FY 2009 CONTRACT DREDGING PROGRAM (cont'd)											
District Name	Seq #	Job Name	Award Date	Dredge Type	Quantity (cu.yds.)	Gov't Estimate	Winning Bid	Winning Bidder	Contract Type	SB Status	Number Of Bids
P	5	Maint. Drdg. NJIWW	5/19/2009	P	4,600	$3,442,854	$3,410,950	BARNEGAT BAY DREDGING COMPANY	F&R	S	1
P	2	Wilm Hrbr Christina River	6/17/2009	P	450,000	$1,328,174	$1,172,391	NORFOLK DREDGING COMPANY	F&R	L	1
P	15	Maint DRDG Indian River DE	7/31/2009	P	360,000	$2,813,896	$3,398,000	PAUL HOWARD CONSTRUCTION CO	F&R	S	2
P	3	Dredging Mispillion River	8/18/2009	P	20,000	$794,727	$648,631	SOUTHWIND CONSTRUCTION CORP	F&R	S	2
P	10	Mt Drdg Phl Nav Bus Center	8/20/2009	P	135,819	$3,143,828	$3,323,456	NORFOLK DREDGING COMPANY	F&R	L	1
P	7	BFIL BGT INL TO LTL EGG INL	9/8/2009	H	2,700,000	$27,688,297	$29,263,070	WEEKS DREDGING & CONTRACTING I	F&R	L	3
P	4	Maint Drdg Phila To Sea	9/30/2009	P	4,500,000	$27,218,911	$43,989,868	NORFOLK DREDGING COMPANY	F&R	L	3
P	14	MAINT DRDG C&D CANAL	10/1/2009	B	3,000,000	$15,317,775	$8,126,972	GREAT LAKES DREDGE & DOCK CO.	F&R	L	3
P	8	BCHFL GRT EGG TO PECK BCH		P	1,400,000	$10,542,711	$10,542,711	GREAT LAKES DREDGE & DOCK CO.	F&R	L	2
W	6	MOTSU	10/15/2008	B	920,000	$5,156,850	$3,990,450	NORFOLK DREDGING COMPANY	F&R	L	3
W	1	Wilmington Harbor Outer (OB)	11/20/2008	H	750,000	$2,719,000	$3,164,000	GREAT LAKES DREDGE & DOCK CO.	F&R	L	2
W	5	AIWW – Maint Dredging	12/20/2008	P	500,000	$5,934,670	$5,224,025	SOUTHWIND CONSTRUCTION CORP	F&R	S	3
W	4	Wilmington Harbor Inner (OB)	1/15/2009	P	1,200,000	$9,129,450	$14,161,750	GREAT LAKES DREDGE & DOCK CO.	F&R	L	2
W	7	Morehead City Inner Harbor	5/5/2009	B	780,000	$4,255,750	$2,725,750	WEEKS MARINE, INC.(GULF)	F&R	L	3
W	12	Manteo Ocean Bar – Spit	6/30/2009	P	1,205,000	$11,141,715	$14,258,800	GREAT LAKES DREDGE & DOCK CO.	F&R	L	3
W	2	AIWW – M Dred Bear In- Shall	8/6/2009	P	500,000	$5,082,350	$5,476,265	SOUTHWIND CONSTRUCTION CORP	F&R	L	2
W	10	Wilmington Harbor- Anc Basin	9/15/2009	P	1,500,000	$4,567,815	$5,449,850	SOUTHERN DREDGING CO., INC.	F&R	L	1

Source: Dredging Information System U.S. Army Corps of Engineers

Table 30. FY 2010 CONTRACT DREDGING PROGRAM-COMPLETE LIST OF ADVERTISED CONTRACTS

District Name	Seq#	Job		Advertised Date	Bid Open Date	Estimated Start Date	Estimated Stop Date	Cubic Yards	Work Class	Dredge Type	Unit measure	Disposal Type	Dollar Range	Set Aside	Contract Type	Point of Contact	Contract Phone
		Status	Job Name														
B	**1**	**C**	**Webster Cove, MD**	11/9/2009	12/9/2009	1/15/2010	2/14/2010	23,250	M	P	Y	C	B	S	F&R	Heather Batchelder	410-962-3687
B	**3**	**A**	**Poplar Isl Person. Pier**	2/4/2010	3/11/2010	5/4/2010	6/18/2010	36,500	M	P	Y	C	C	S	F&R	Kevin Mainquist	410-962-5674
B	**5**	**A**	**Atl. Coast Of Maryland**	3/23/2010	4/27/2010	9/7/2010	11/21/2010	1,050,000	S	H	Y	B	E	N	F&R	Mary Dan	410-962-3377
B	**4**	**A**	**W. Ocean City Harbor**	8/5/2010	9/7/2010	10/5/2010	2/2/2011	40,000	M	B	Y	C	D	S	F&R	Robert Blama	410-962-6068
B	**2**	**A**	**BAL. Harb.-Cape Henry/York S**	8/9/2010	9/9/2010	11/15/2010	4/15/2011	3,000,000	M	H	Y	O	E	N	F&R	Kevin Mainquist	410-962-5674
N	**3**	**C**	**Broad Creek**	9/28/2009	10/29/2009	12/7/2009	12/31/2009	36,000	M	P	Y	U	C	S	F&R	Doug Stamper	757-201-7861
N	**7**	**C**	**Rudee Inlet**	2/5/2010	3/5/2010	3/15/2010	5/1/2010	101,500	M	P	Y	B	D	N	F&R	Kristin Mazur	757-201-7257
N	**4**	**A**	**AIWW/DSC**	6/8/2010	7/8/2010	8/1/2010	8/30/2010	50,000	M	P	Y	C	B	S	F&R	Joel Scussel	757-201-7642
N	**10**	**A**	**James River IDIQ TO 0001**			8/1/2010	10/30/2010	300,000	M	P	Y	O	D	N	IDIQ	Steve Powell	757-201-7788
N	**2**	**A**	**Tylers Beach**	7/16/2010	8/17/2010	10/1/2010	12/30/2010	25,000	M	P	Y	U	C	S	F&R	Doug Stamper	757-201-7861
N	**11**	**H**	**Fishermans Cove**	7/14/2010	8/13/2010	10/12/2010	1/3/2011	5,000	N	P	Y	B	B	S	F&R	Gregg Williams	757-201-7616
N	**18**	**A**	**Thimble Shoal**	8/9/2010	9/9/2010	11/15/2010	4/15/2011	300,000	M	H	Y	O	D	N	F&R	Doug Stamper	757-201-7861
N	**5**	**A**	**Southern Branch**	11/15/2010	12/15/2010	1/16/2011	8/25/2012	160,000	M	B	Y	O	D	N	F&R	Michael Anderson	757-201-7584
N	**16**	**H**	**USCG ISC**					5,900	M	B	Y	U	B	N	F&R	Gregg Williams	757-201-7616
N	**17**	**A**	**James River IDIQ**	4/16/2010	5/18/2010			600,000	M	P	Y	S	D	N	IDIQ	Steve Powell	757-201-7788
P	**1**	**C**	**Great Egg to Peck Beach NJ**	7/20/2009	8/20/2009	10/6/2009	5/4/2010	1,973,000	S	P	Y	B	E	N	F&R	Dwight Pakan	215-656-6785
P	**3**	**P**	**Del River Deepening Reach C**	6/26/2009	9/11/2009	10/15/2009	3/15/2010	3,218,107	N	P	Y	C	E	N	F&R	Timothy Rooney	215-656-6592

Table 30. FY 2010 CONTRACT DREDGING PROGRAM-COMPLETE LIST OF ADVERTISED CONTRACTS (cont'd)

District Name	Seq#	Job Status	Job Name	Advertised Date	Bid Open Date	Estimated Start Date	Estimated Stop Date	Cubic Yards	Work Class	Dredge Type	Unit measure	Disposal Type	Dollar Range	Set Aside	Contract Type	Point of Contact	Contract Phone
P	**2**	**C**	**Barnegat Inlt to Little Egg**	11/7/2008	8/25/2009	10/23/2009	6/21/2010	1,995,000	S	H	Y	B	E	N	F&R		
P	**4**	**C**	**Maint Dredging Wilm Hrbr De**	4/19/2010	5/19/2010	6/22/2010	8/2/2010	449,995	M	P	Y	C	D	N	F&R	Charles Myers	215-656-6736
P	**12**	**C**	**Maint Drdg Ches City Bsn**			7/15/2010	10/15/2010	69,318	M	P	Y	U	B	N	F&R	Tim Kelly	215-656-6878
P	**7**	**A**	**Maint Drdg Upper Ches Bay**	7/20/2010	8/19/2010	9/2/2010	12/31/2010	1,977,103	M	B	Y	O	E	N	F&R	Tim Kelly	215-656-6878
P	**5**	**A**	**Maint Dredging Phila To Sea**	6/25/2010	8/12/2010	9/16/2010	12/31/2010	1,218,000	M	P	Y	C	D	N	F&R	Timothy Rooney	215-656-6592
P	**10**	**P**	**Deepen Main Channel DE River**	9/14/2010	10/14/2010	11/18/2010	3/18/2011	1,336,178	N	P	Y	C	E	N	F&R	Tim Rooney	215-656-6592
W	**6**	**C**	**Caroli- Kure and O I/Wright**	9/22/2009	10/27/2009	1/15/2010	4/30/2010	2,300,000	S	Y	Y	B	E	N	F&R	CHRIS FRABOTTA	910-251-4709
W	**7**	**C**	**MOTSU- Maint Dredge**	1/8/2010	2/9/2010	3/4/2010	6/7/2010	785,000	M	B	Y	O	E	N	F&R	JANELLE MAVIS	910-251-4916
W	**9**	**A**	**AIWW- Thru Channels**	8/12/2010	9/10/2010	10/15/2010	4/30/2011	450,000	M	P	Y	C	D	S	F&R	CHRIS FRABOTTA	910-251-4670
W	**11**	**A**	**Wilm Harbor-Anch Bas -42ft**	8/5/2010	9/8/2010	11/1/2010	1/31/2011	1,500,000	M	P	Y	C	D	S	F&R	Bob Keistler	910-251-4709
W	**1**	**A**	**MHC – OB w/beach Disposal**	4/29/2010	6/9/2010	11/16/2010	4/30/2011	1,100,000	M	Y	Y	B	E	N	F&R	Chris Frabotta	910-251-4670
W	**5**	**A**	**Manteo Int Ch/Stumpy P Bay**	9/15/2010	10/19/2010	12/2/2010	4/1/2011	450,000	M	P	Y	S	D	S	F&R	CHRIS FRABOTTA	910-251-4670

Source: Dredging Information System U.S. Army Corps of Engineers

Table 31. FY 2010 CONTRACT DREDGING PROGRAM-AWARDED PROJECTS

District Name	Seq#	Job Name	Award Date	Dredge Type	Quantity Cubic Yards	Govt Estimate	Winning Bid	Winning Bidder	Contract Type	SB Status	Number of Bids
B	**1**	**Webster Cove, MD**	12/31/2009	P	23,250	$673,938	$587,482	NORTH AMERICA CONS,DREDGE CO	F&R	S	4
B	**3**	**Poplar Isl Person. Pier**	3/24/2010	P	36,500	$960,460	$581,042	SOUTHWIND CONSTRUCTION CORP	F&R	S	7
B	**5**	**Atl. Coast Of Maryland**	6/14/2010	H	1,050,000	$13,540,187	$8,884,000	GREAT LAKES DRDG & DOCK/SO ATL	F&R	L	3
N	**3**	**Broad Creek**	11/16/2009	P	36,000	$603,800	$413,647	SOUTHWIND CONSTRUCTION CORP	F&R	S	2
N	**7**	**Rudee Inlet**	3/22/2010	P	101,500	$2,356,100	$2,480,278	NORFOLK DREDGING COMPANY	F&R	L	3
N	**17**	**James River IDIQ**	6/28/2010	P	600,000	$14,044,500	$8,623,909	ORION DREDGING SERVICES,	IDIQ	L	3
P	**2**	**Barnegat Inlt to Little Egg**	9/8/2009	H	1,995,000	$28,473,226	$24,523,070	WEEKS MARINE, INC (ATLANTIC)	F&R	L	3
P	**1**	**Great Egg to Peck Beach NJ**	9/8/2009	P	1,973,000	$15,749,846	$19,093,500	GREAT LAKES DREDGE & DOCK CO.	F&R	L	2
P	**3**	**Del River Deepening Reach C**	9/30/2009	P	3,218,107	$46,158,254	$33,044,068	NORFOLK DREDGING COMPANY	F&R	L	3
P	**12**	**Maint Drdg Ches City Bsn**	6/15/2010	P	69,318	$475,770	$424,772	COTTRELL ENGINEERING CORP.	F&R	S	4
P	**7**	**Maint Drdg Upper Ches Bay**	9/1/2010	B	1,977,103	$12,137,277	$13,274,833	NORFOLK DREDGING COMPANY	F&R	L	3
P	**5**	**Maint Dredging Phila To Sea**	9/2/2010	P	1,218,000	$6,322,741	$5,874,600	NORFOLK DREDGING COMPANY	F&R	L	1
W	**6**	**Caroli- Kure and O I/Wright**	11/23/2009	H	2,300,000	$21,444,961	$22,701,108	GREAT LAKES DREDGE & DOCK CO.	F&R	L	2
W	**7**	**MOTSU- Maint Dredge**	2/24/2010	B	785,000	$3,672,353	$3,172,660	NORFOLK DREDGING COMPANY	F&R	L	4
W	**1**	**MHC – OB w/beach Disposal**	7/6/2010	P	1,100,000	$11,779,740	$10,546,000	MARINEX CONSTRUCTION CO INC	F&R	L	5

Source: Dredging Information System U.S. Army Corps of Engineers

Table 32. FY 2011 HOPPER DREDGE SCHEDULE (SCHEDULE SUBJECT TO CHANGE)

District Name	Seq#	Job Status	Job Name	Advertised Date	Bid Open Date	Estimated Start Date	Estimated Stop Date	Cubic Yards	Work Class	Dredge Type	Unit Measure	Disposal Type	Dollar Range	Set Aside	Contract		Contract Phone
															Type	Point of Contact	
P	**2**	**P**	**Maint Drdg Christina River**						M	H	Y	C	D	N	F&R	Charles Myers	215-656-6736
P	**1**	**P**	**Beachfill Lwr Cape May Mdws**						S	Y	Y	B	A	N	F&R	Dwight Pakan	215-656-6785
W	**1**	**P**	**Wilm Harbor-Outer OB/Mid Riv**	9/10/2010	10/13/2010	12/15/2010	3/31/2011	850,000	M	H	Y	B	D	N	F&R	Bob Keistler	910-251-4709
W	**11**	**P**	**Wilm Harbor - Inner O Bar**	9/27/2010	10/27/2010	1/1/2011	4/30/2011	1,500,000	M	P	Y	B	E	N	F&R	Bob Keistler	910-251-4709
W	**2**	**P**	**Wilm -Anchorage Basin**	6/15/2011	7/13/2011	9/15/2011	1/31/2012	1,500,000	M	P	Y	C	D	S	F&R	Bob Keistler	910-251-4709

Source: Dredging Information System U.S. Army Corps of Engineers

Legend

DISTRICT NAME
- B Baltimore
- N Norfolk
- P Philadelphia
- W Wilmington

JOB STATUS (JS)
- A Active-expect to award
- C Completed
- CC Claim Pending
- H Hold-Misc. Reason
- HB Hold-Protest
- HF Hold-Awaiting Funds
- HP Hold-Awaiting Permit(s)
- M Moved to Another FY
- NB No Bids Received
- OA Open by Amendment
- P Proposed- >80% chance to award
- T Terminated
- U Undefined
- W Withdrawn

WORK CLASS (WC)
- M Maintenance
- N New Work
- B Both M&N
- S Beach Nourish non-nav
- W Wetland Nourish non-nav
- U Undefined

DREDGE TYPE (DT)
- B Bucket
- D Dustpan
- H Hopper
- I Water Injection
- N Nonconventional type
- P Pipeline
- S Sidecaster
- W Combo-All Types
- X Pipeline & Bucket
- Y Pipeline & Hopper
- Z Hopper & Bucket
- U Unknown

MATERIAL UNITS (MU)
- Y Cubic Yards
- D Days
- H Hours
- L Lump Sum
- M Cubic Meters
- O Other
- S Station
- U Undefined

DISPOSAL TYPE (DS)
- B Beach Nourishment
- C Confined
- D Underwater Confined
- M Mixed Types
- O Overboard & Open Water
- S Open & Upland
- T Beach & Upland
- U Upland
- W Wetland Nourishment or Creation
- X Undefined

SMALL BUSINESS SET ASIDE (SA)
- N No
- T Yes
- S Small Business
- E Emerging Small Business
- A 8a Set Aside
- H Hubzone
- U Unknown

DOLLAR RANGE ($)
- A Up to $99,999
- B $100,000 - $499,999
- C $500,000 - $999,999
- D $1,000,000 - $4,999,999
- E $5,000,000 and above
- U Undefined

CONTRACT TYPE
- CON Converted from IFP to RFP
- F&R Fair and Reasonable
- HL Hired Labor
- IDIQ Indefinite Delivery Indefinite Quantity
- NEG Negotiated
- RFP Request for Proposal
- SS Sole Source

SMALL BUSINESS SET ASIDE (SA)
- N No
- Y Yes
- S Small Business
- E Emerging Small Business
- A 8a Set Aside
- H Hubzone
- U Unknown

Table 33. Freight Movement (2008)								
	Into Region		Out of Region		Within Region		Total	
Mode	Value (Millions)	KTons	Value (Millions)	KTons	Value (Millions)	KTons	Value (Millions)	KTons
Rail	$1,166.61	6,993.46	$307.50	820.84	$8.56	42.95	$1,482.67	7,857.25
Truck	$35,017.26	23,365.87	$32,155.53	23,816.89	$12,871.63	30,402.44	$80,044.42	77,585.20
Truck & Rail	$48.65	72.85	$814.98	72.93	No Freight	No Freight	$863.63	145.78
Air & Truck	$719.61	32.71	$207.56	7.96	No Freight	No Freight	$927.17	40.67
Other Intermodal	$3,214.61	326.42	$1,591.86	51.17	$64.24	29.59	$4,870.71	407.18
Water	$6.94	77.06	$34.85	206.91	$2.44	89.86	$44.23	373.83
Pipeline & Unknown	$9,698.46	16,259.30	$2,373.36	3,946.76	$3,171.91	3,759.60	$15,243.73	23,965.66
Total	**$49,872.13**	**47,127.68**	**$37,485.62**	**28,923.47**	**$16,118.79**	**34,324.43**	**$103,476.54**	**110,375.58**

Table 34. Freight Movement Projections (Into, Out of, and Within Study Region)										
	2010		2015		2030		2035		2040	
Mode	Value (Millions)	KTons	Value (Millions)	KTons	Value (Millions)	KTons	Value (Millions)	KTons	Value (Millions)	KTons
Rail	$1,214.22	8,597.10	$1,297.68	8,479.38	$1,845.22	8,958.72	$2,123.86	9,596.32	$2,432.65	10,188.49
Truck	$83,203.93	71,652.59	$97,858.28	78,187.37	$185,506.96	110,141.00	$234,242.89	125,400.39	$319,457.86	155,928.38
Truck & Rail	$728.65	150.73	$616.96	160.18	$526.46	278.93	$544.73	362.45	$532.95	470.09
Air & Truck	$779.63	48.71	$954.71	59.71	$2,561.80	184.86	$4,090.54	246.67	$6,572.97	435.50
Other Intermodal	$10,142.68	510.17	$12,840.98	593.98	$28,397.07	1,113.98	$37,760.51	1,424.29	$54,121.26	1,918.24
Water	$95.35	560.07	$91.12	566.36	$72.99	548.39	$66.90	531.52	$65.69	574.10
Pipeline & Unknown	$10,959.37	28,104.25	$11,960.97	29,920.20	$16,930.82	38,101.36	$19,446.74	41,835.96	$22,420.50	45,059.28
Total	**$107,123.83**	**109,623.62**	**$125,620.70**	**117,967.17**	**$235,841.32**	**159,327.25**	**$298,276.17**	**179,397.59**	**$405,603.88**	**214,574.07**

Table 35. 2008 Freight Movement by Commodity (Study Region)

	Air & Truck $MM	Ktons	Rail $MM	Ktons	Truck $MM	Ktons	Truck & Rail $MM	Ktons	Water $MM	Ktons	Other Inter-modal $MM	Ktons	Pipeline & Unknown $MM	Ktons	Total $MM	Total Ktons
Alcoholic beverages	0.00	0.00	0.00	0.00	1,939.84	1,290.30	0.54	6.97	0.74	0.03	0.00	0.00	83.10	10.94	2,024.22	1,308.24
Animal feed	0.00	0.00	49.00	198.78	455.99	1,852.71	0.00	0.00	0.00	0.00	0.82	12.15	0.29	5.14	506.10	2,068.78
Articles-base metal	2.38	0.04	0.16	1.05	2,614.25	1,051.79	0.03	0.02	0.00	0.00	121.32	24.18	159.87	11.62	2,898.02	1,088.69
Base metals	0.44	0.19	13.69	89.53	1,065.00	1,026.94	0.00	0.00	0.00	0.00	2.85	6.14	9.03	1.85	1,091.02	1,124.65
Basic chemicals	10.96	5.93	339.53	828.25	913.95	2,854.08	0.03	2.18	6.20	0.28	12.80	98.02	551.38	442.65	1,834.85	4,231.39
Cereal grains	0.00	0.00	243.14	2,845.60	163.39	2,285.42	0.00	0.00	0.00	0.00	0.08	25.85	7.33	26.48	413.95	5,183.34
Chemical prods.	0.98	0.53	0.24	0.87	2,373.10	1,333.73	0.01	0.31	0.00	0.00	55.03	9.33	56.64	4.27	2,486.02	1,349.04
Coal	0.00	0.00	25.62	245.53	2.22	43.97	0.00	0.00	0.00	0.00	0.00	5.62	0.00	0.00	27.84	295.12
Coal-n.e.c.	0.00	0.01	46.81	202.17	656.42	1,0687.17	0.00	0.00	0.00	0.00	0.85	3.45	8,516.73	21,500.00	9,220.82	32,392.80
Electronics	622.70	23.20	46.76	0.26	9,451.30	581.49	0.00	0.00	0.00	0.00	2,567.48	118.80	3,793.30	11.90	16,481.55	735.66
Fertilizers	0.00	0.00	0.00	0.00	222.05	906.26	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.14	222.06	906.40
Fuel oils	0.00	0.00	0.00	0.00	357.71	1,452.62	0.00	0.00	4.09	57.76	0.00	0.00	453.39	2,816.13	815.19	4,326.52
Furniture	0.02	0.19	0.00	0.00	1,154.69	257.22	0.16	0.01	0.00	0.00	56.67	4.63	184.39	1.07	1,395.93	263.11
Gasoline	0.00	0.00	0.00	0.00	1,005.30	4,474.29	0.00	0.00	0.10	2.46	0.00	0.10	1,950.05	6,237.56	2,955.45	10,714.41
Gravel	0.00	0.00	11.33	2,480.03	443.22	49,025.62	0.00	0.00	7.46	275.97	0.00	0.00	0.00	0.00	462.02	51,781.63
Live animals/fish	0.00	0.00	0.00	0.00	1,039.73	776.09	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	1040.07	776.09
Logs	0.00	0.00	0.00	0.00	27.61	605.15	0.00	0.00	0.00	0.00	0.00	0.00	0.12	19.18	27.73	624.32
Machinery	9.63	0.30	0.00	0.00	10,163.11	1,355.43	0.00	0.00	0.00	0.00	74.15	7.58	200.94	7.95	1,0447.83	1,371.26
Meat/ seafood	1.24	0.64	0.54	3.09	5,411.48	2,766.30	0.40	0.09	0.00	0.00	8.16	6.38	199.24	37.96	5621.06	2,814.46
Metallic ores	0.00	0.00	4.84	39.35	16.32	6.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.16	46.04
Milled grain prods.	0.00	0.00	16.93	14.92	809.07	466.85	0.00	0.00	0.00	0.00	0.81	5.09	14.26	4.81	841.08	491.67
Misc. mfg. prods.	38.32	4.06	0.00	0.00	2,700.69	491.97	1.01	0.32	0.00	0.00	365.21	21.00	261.49	60.15	3,366.71	577.49
Motorized vehicles	0.39	0.01	105.90	15.73	5,979.65	1,138.77	831.74	108.70	0.00	0.00	57.77	10.10	3524.45	114.06	10,499.89	1,387.36

Table 35. 2008 Freight Movement by Commodity (Study Region) (cont'd)																
	Air & Truck $MM	Ktons	Rail $MM	Ktons	Truck $MM	Ktons	Truck & Rail $MM	Ktons	Water $MM	Ktons	Other Inter-modal $MM	Ktons	Pipeline & Unknown $MM	Ktons	Total $MM	Total Ktons
Natural sands	0.00	0.00	0.00	0.00	117.92	12,936.74	0.00	0.00	0.00	0.00	0.00	0.00	0.32	15.75	118.24	12,952.48
Newsprint/ paper	0.00	0.00	26.90	58.19	128.33	186.95	0.00	0.00	0.00	0.00	0.05	0.06	0.39	0.00	155.67	245.21
Nonmetallic minerals	0.00	0.00	4.22	10.76	69.19	1,585.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73.41	1,596.47
Other ag prods.	0.00	0.00	40.57	79.97	25,770.73	16,913.95	20.61	22.07	30.23	217.03	2.80	0.15	913.66	72.38	26,778.62	17,305.54
Other foodstuffs	0.00	0.00	444.58	706.94	3,901.23	3,682.37	0.00	0.00	0.00	0.00	4.99	1.54	76.34	26.75	4,427.14	4,417.61
Paper articles	0.00	0.00	2.69	1.62	1,217.61	920.11	0.00	0.00	0.00	0.00	9.03	3.53	34.90	1.41	1,264.24	926.67
Pharma-ceuticals	56.38	2.29	0.00	0.00	9,718.23	179.88	0.00	0.00	0.00	0.00	574.52	12.50	47.91	0.89	10,397.04	195.57
Plastics/rubber	16.34	0.38	60.86	59.59	4,540.01	1,511.17	0.94	0.32	0.00	0.00	142.86	9.35	151.17	13.87	4,912.19	1,594.68
Precision instruments	94.84	1.24	0.00	0.00	1,770.86	68.24	4.45	0.19	0.00	0.00	320.04	8.37	182.57	0.52	2,372.76	78.56
Printed prods.	54.41	1.18	0.01	0.01	2,333.46	870.49	0.00	0.00	0.28	0.01	161.86	19.94	135.76	19.78	2,685.78	911.41
Textiles/ leather	5.13	0.35	1.16	0.33	3,851.78	422.69	0.00	0.00	0.00	0.00	447.57	41.56	61.53	0.99	4,367.17	465.91
Transport equip.	12.99	0.13	5.38	1.06	1,126.01	229.24	0.00	0.00	0.00	0.00	9.03	9.47	0.40	0.00	1,153.82	239.89
Waste/ scrap	0.00	0.00	0.00	0.00	920.62	10,131.43	3.16	4.00	0.00	0.00	0.00	0.00	0.21	2.41	923.98	10,137.84
Wood prods.	0.00	0.00	8.92	59.52	1,355.60	2,020.28	0.55	0.61	0.00	0.00	2.06	1.47	16.38	16.24	1,383.51	2,098.13
Grand Total	**927.17**	**40.67**	**1,499.80**	**7,943.15**	**105,787.69**	**138,390.08**	**863.63**	**145.78**	**49.10**	**553.55**	**4,999.19**	**466.36**	**21,587.54**	**31,484.86**	**135,714.12**	**179,024.44**

Table 36. Freight Movement Projections Between MPO/Planning Areas and Study Region ($MM) and Estimated Economic Impacts										
MPO Planning Area	Value of Freight Moving Between Regions 2010 (Millions)	Estimated Economic Impact from Freight Movement 2010 (Millions)	Value of Freight Moving Between Regions 2015 (Millions)	Estimated Economic Impact from Freight Movement 2015 (Millions)	Value of Freight Moving Between Regions 2030 (Millions)	Estimated Economic Impact from Freight Movement 2030 (Millions)	Value of Freight Moving Between Regions 2035 (Millions)	Estimated Economic Impact from Freight Movement 2035 (Millions)	Value of Freight Moving Between Regions 2040 (Millions)	Estimated Economic Impact from Freight Movement 2040 (Millions)
DVRPC	$90,019.34	$83,919.33	$80,347.97	$74,587.92	$128,720.85	$120,119.40	$154,407.84	$144,146.70	$195,827.18	$182,893.20
Cape May/South New Jersey MPO	$12,500.33	$6,244.95	$12,398.80	$7,050.93	$18,329.94	$10,123.53	$21,628.05	$11,576.84	$27,138.33	$15,186.78
Hampton Roads	$1,054.20	$879.47	$1,153.79	$970.16	$1,541.61	$1,343.74	$1,974.80	$1,752.38	$1,952.52	$1,722.83
WashCOG	$18,283.71	$17075.45	$9,108.26	$8,496.02	$14,432.44	$13,500.43	$17,424.63	$16,300.16	$21,398.94	$20,019.89
Baltimore MPO	$28,590.08	$26,658.93	$14,431.78	$13,495.31	$19,126.73	$17,886,96	$21,844.93	$20,429.78	$25,359.19	$23,171.70
HATS/ TCRPC	$2,972.70	$2,761.76	$1,994.25	$255.25	$3,143.50	$2,934.55	$3,861.16	$3,605.58	$4,764.29	$4,424.84

**DVRPC region estimates include the Port of Philadelphia.*

Table 37. Total Freight Movement Projections Between MPO/Planning Areas and Study Region (Ktons)					
MPO Planning Area	KTons of Freight Moving Between Region and MPO/Planning Area 2010	Ktons of Freight Moving Between Region and MPO/Planning Area 2015	Ktons of Freight Moving Between Region and MPO/Planning Area 2030	Ktons of Freight Moving Between Region and MPO/Planning Area 2035	Ktons of Freight Moving Between Region and MPO/Planning Area 2040
DVRPC	76,687.00	84,402.34	113,370.73	126,835.55	151,780.74
Cape May/South New Jersey MPO	8,635.52	9,450.09	13,118.95	14,979.38	18,763.95
Hampton Roads	1,054.20	1,153.79	1,541.61	1,812.07	2,115.24
WashCOG	6,552.84	7,530.53	13,281.83	14,947.46	19,670.63
Baltimore MPO	26,243.31	27,359.58	30,813.26	32,588.15	34,556.89
HATS/ TCRPC	2,800.50	2,980.29	3,963.64	4,459.67	5,624.83

Table 38. 2010 Freight Movement Between Corridors and Study Region and Estimated Economic Impacts		
Corridor	**Value of Freight Moving Between Study Region and Corridor 2010 (Millions)**	**Estimated Economic Impact from Freight Movement 2010 (Millions)**
National I-10 Freight Corridor	$3,186	$2,982
Heartland Corridor	$832	$779
Crescent Corridor	$198	$185
I-95 Corridor	$76,776	$71,868
Alameda Corridor	$59	$55
Everett-Seattle-Tacoma Corridor	$766	$715
I-5 Golden State Gateway Coalition	$1,165	$1,090
Ports to Plains Corridor	$361	$338
River of Trade Corridor	$7,696	$7,158
Southwest Rail Corridor	$118	$110
West Coast Corridor	$3,620	$3,325
I-270 Corridor	$3,296	$3,085
National Gateway Initiative	$36	$34
1-70 Mountain Corridor	$346	$324
I-81	$16,147	$15,115
Continental One	$11,850	$11,093
(Potential) Marine Highway	$107	$69
Northeast (NEC) Corridor	$148	$139
Keystone Corridor	$94	$88
Chesapeake Corridor	$37,558	$35,157
Mississippi Valley Corridor	$14,719	$9,210

7.3 Appendix C: Freight Intensive Industries

Table 39. Freight Intensive Industries	
NAICS Code	**Description**
2121	Coal Mining
2122	Metal Ore Mining
2123	Nonmetallic Mineral Mining and Quarrying
2211	Electric Power Generation, Transmission, and Distribution
3111	Animal Food Manufacturing
3112	Grain and Oilseed Milling
3113	Sugar and Confectionery Product Manufacturing
3114	Fruit and Vegetable Preserving, and Specialty Food Manufacturing
3115	Dairy Product Manufacturing
3116	Animal Slaughtering and Processing
3117	Seafood Product Preparation and Packaging
3118	Bakeries and Tortilla Manufacturing
3119	Other Food Manufacturing
3121	Beverage Manufacturing
3122	Tobacco Manufacturing
3131	Fiber, Yarn, and Thread Mills
3132	Fabric Mills
3133	Textile and Fabric Finishing and Fabric Coating Mill
3141	Textile Furnishings Mills
3149	Other Textile Product Mills
3151	Apparel Knitting Mills
3152	Cut and Sew Apparel Manufacturing
3159	Apparel Accessories and Other Apparel Manufacturing
3161	Leather and Hide Tanning and Finishing
3162	Footwear Manufacturing
3169	Other Leather and Allied Product Manufacturing
3211	Sawmills and Wood Preservation
3212	Veneer, Plywood, and Engineered Wood Product Manufacturing
3219	Other Wood Product Manufacturing
3221	Pulp, Paper, and Paperboard Mills
3222	Converted Paper Product Manufacturing

Table 39. Freight Intensive Industries (cont'd)	
NAICS Code	**Description**
3231	Printing and Related Support Activities
3241	Petroleum and Coal Products Manufacturing
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing
3254	Pharmaceutical and Medicine Manufacturing
3255	Paint, Coating, and Adhesive Manufacturing
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing
3259	Other Chemical Product and Preparation Manufacturing
3261	Plastics Product Manufacturing
3262	Rubber Product Manufacturing
3271	Clay Product and Refractory Manufacturing
3272	Glass and Glass Product Manufacturing
3273	Cement and Concrete Product Manufacturing
3274	Lime and Gypsum Product Manufacturing
3279	Other Nonmetallic Mineral Product Manufacturing
3311	Iron and Steel Mills and Ferroalloy Manufacturing
3312	Steel Product Manufacturing from Purchased Steel
3313	Alumina and Aluminum Production and Processing
3314	Nonferrous Metal (except Aluminum) Production and Processing
3315	Foundries
3321	Forging and Stamping
3322	Cutlery and Handtool Manufacturing
3323	Architectural and Structural Metals Manufacturing
3324	Boiler, Tank, and Shipping Container Manufacturing
3325	Hardware Manufacturing
3326	Spring and Wire Product Manufacturing
3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
3328	Coating, Engraving, Heat Treating, and Allied Activities
3329	Other Fabricated Metal Product Manufacturing
3331	Agriculture, Construction, and Mining Machinery Manufacturing
3331	Industrial Machinery Manufacturing
3333	Commercial and Service Industry Machinery Manufacturing
3334	Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing

Table 39. Freight Intensive Industries (cont'd)	
NAICS Code	**Description**
3335	Metalworking Machinery Manufacturing
3336	Engine, Turbine, and Power Transmission Equipment Manufacturing
3339	Other General Purpose Machinery Manufacturing
3341	Computer and Peripheral Equipment Manufacturing
3342	Communications Equipment Manufacturing
3343	Audio and Video Equipment Manufacturing
3344	Semiconductor and Other Electronic Component Manufacturing
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
3346	Manufacturing and Reproducing Magnetic and Optical Media
3351	Electric Lighting Equipment Manufacturing
3352	Household Appliance Manufacturing
3353	Electrical Equipment Manufacturing
3359	Other Electrical Equipment and Component Manufacturing
3361	Motor Vehicle Manufacturing
3362	Motor Vehicle Body and Trailer Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product and Parts Manufacturing
3365	Railroad Rolling Stock Manufacturing
3366	Ship and Boat Building
3369	Other Transportation Equipment Manufacturing
3371	Household and Institutional Furniture and Kitchen Cabinet Manufacturing
3372	Office Furniture (including Fixtures) Manufacturing
3379	Other Furniture Related Product Manufacturing
3391	Medical Equipment and Supplies Manufacturing
3399	Other Miscellaneous Manufacturing
4211	Motor Vehicle and Motor Vehicle Parts and Supplies Wholesalers
4212	Furniture and Home Furnishing Wholesalers
4213	Lumber and Other Construction Materials Wholesalers
4214	Professional and Commercial Equipment and Supplies Wholesalers
4215	Metal and Mineral (except Petroleum) Wholesalers
4216	Electrical Goods Wholesalers
4217	Hardware, and Plumbing and Heating Equipment and Supplies Wholesalers
4218	Machinery, Equipment, and Supplies Wholesalers
4219	Miscellaneous Durable Goods Wholesalers
4221	Miscellaneous Durable Goods Wholesalers

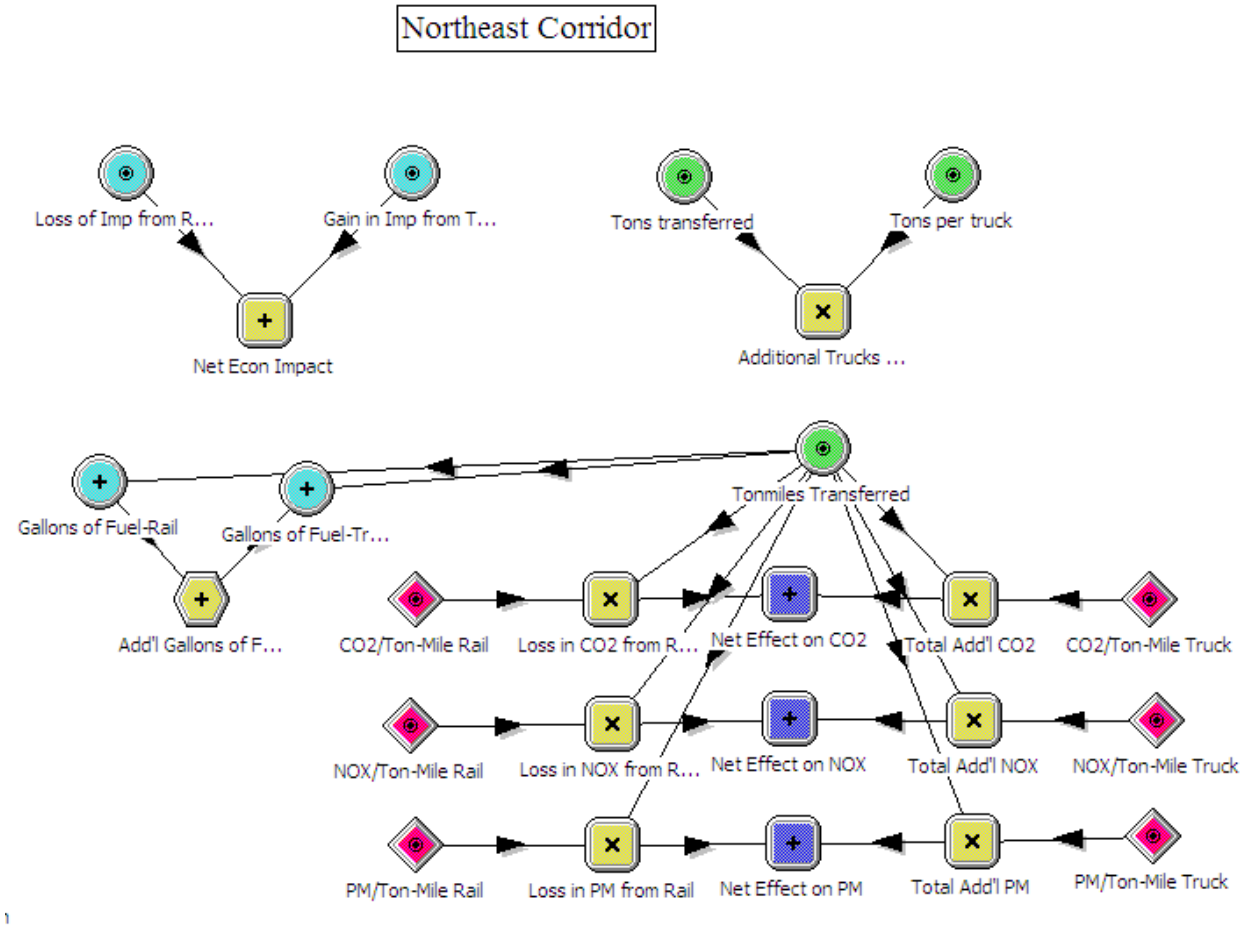
Table 39. Freight Intensive Industries (cont'd)	
NAICS Code	**Description**
4222	Drugs and Druggists' Sundries Wholesalers
4223	Apparel, Piece Goods, and Notions Wholesalers
4224	Grocery and Related Product Wholesalers
4225	Farm Product Raw Material Wholesalers
4226	Chemical and Allied Products Wholesalers
4227	Petroleum and Petroleum Products Wholesalers
4228	Beer, Wine, and Distilled Alcoholic Beverage Wholesalers
4229	Miscellaneous Nondurable Goods Wholesalers
4821	Rail Transportation
4831	Deep Sea, Coastal, and Great Lakes Water Transportation
4832	Inland Water Transportation
4841	General Freight Trucking
4842	Specialized Freight Trucking
4882	Support Activities for Rail Transportation
4883	Support Activities for Water Transportation
4931	Warehousing and Storage
5111	Newspaper, Periodical, Book, and Database Publishers
5324	Commercial and Industrial Machinery and Equipment Rental and Leasing
3362	Motor Vehicle Body and Trailer Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product and Parts Manufacturing
3365	Railroad Rolling Stock Manufacturing
3366	Ship and Boat Building
3369	Other Transportation Equipment Manufacturing
3371	Household and Institutional Furniture and Kitchen Cabinet Manufacturing
3372	Office Furniture (including Fixtures) Manufacturing
3379	Other Furniture Related Product Manufacturing
3391	Medical Equipment and Supplies Manufacturing
3399	Other Miscellaneous Manufacturing
4211	Motor Vehicle and Motor Vehicle Parts and Supplies Wholesalers
4212	Furniture and Home Furnishing Wholesalers
4213	Lumber and Other Construction Materials Wholesalers
4214	Professional and Commercial Equipment and Supplies Wholesalers
4215	Metal and Mineral (except Petroleum) Wholesalers
4216	Electrical Goods Wholesalers

Table 39. Freight Intensive Industries (cont'd)	
NAICS Code	**Description**
4217	Hardware, and Plumbing and Heating Equipment and Supplies Wholesalers
4218	Machinery, Equipment, and Supplies Wholesalers
4219	Miscellaneous Durable Goods Wholesalers
4221	Miscellaneous Durable Goods Wholesalers
4222	Drugs and Druggists' Sundries Wholesalers
4223	Apparel, Piece Goods, and Notions Wholesalers
4224	Grocery and Related Product Wholesalers
4225	Farm Product Raw Material Wholesalers
4226	Chemical and Allied Products Wholesalers
4227	Petroleum and Petroleum Products Wholesalers
4228	Beer, Wine, and Distilled Alcoholic Beverage Wholesalers
4229	Miscellaneous Nondurable Goods Wholesalers
4821	Rail Transportation
4831	Deep Sea, Coastal, and Great Lakes Water Transportation
4832	Inland Water Transportation
4841	General Freight Trucking
4842	Specialized Freight Trucking
4882	Support Activities for Rail Transportation
4883	Support Activities for Water Transportation
4931	Warehousing and Storage
5111	Newspaper, Periodical, Book, and Database Publishers
5324	Commercial and Industrial Machinery and Equipment Rental and Leasing

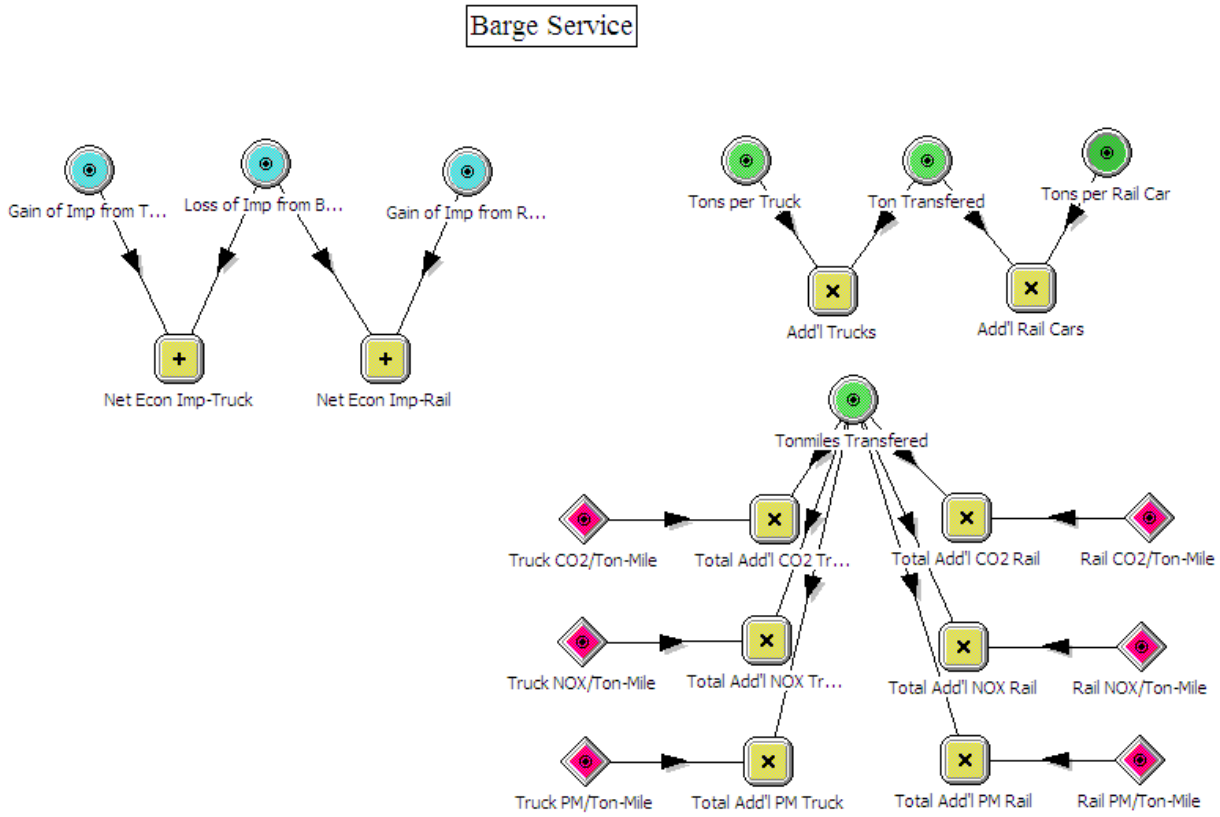
Source: Maryland Multi-Modal Freight Profile, *Maryland Department of Transportation*

7.4 Appendix D: Scenario Analyses iDecide Influence Diagrams

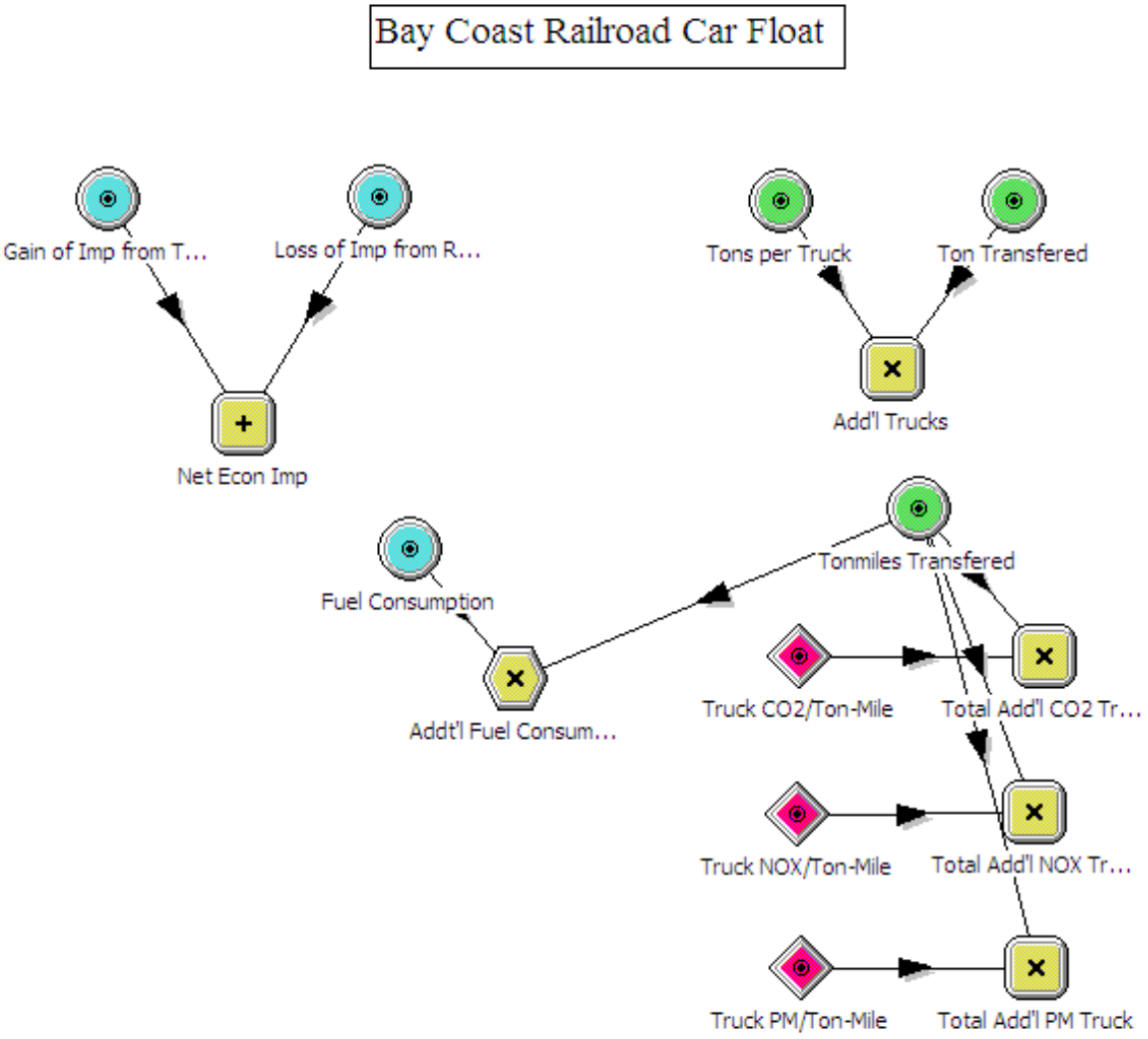
Rail Service South of Northeast Corridor



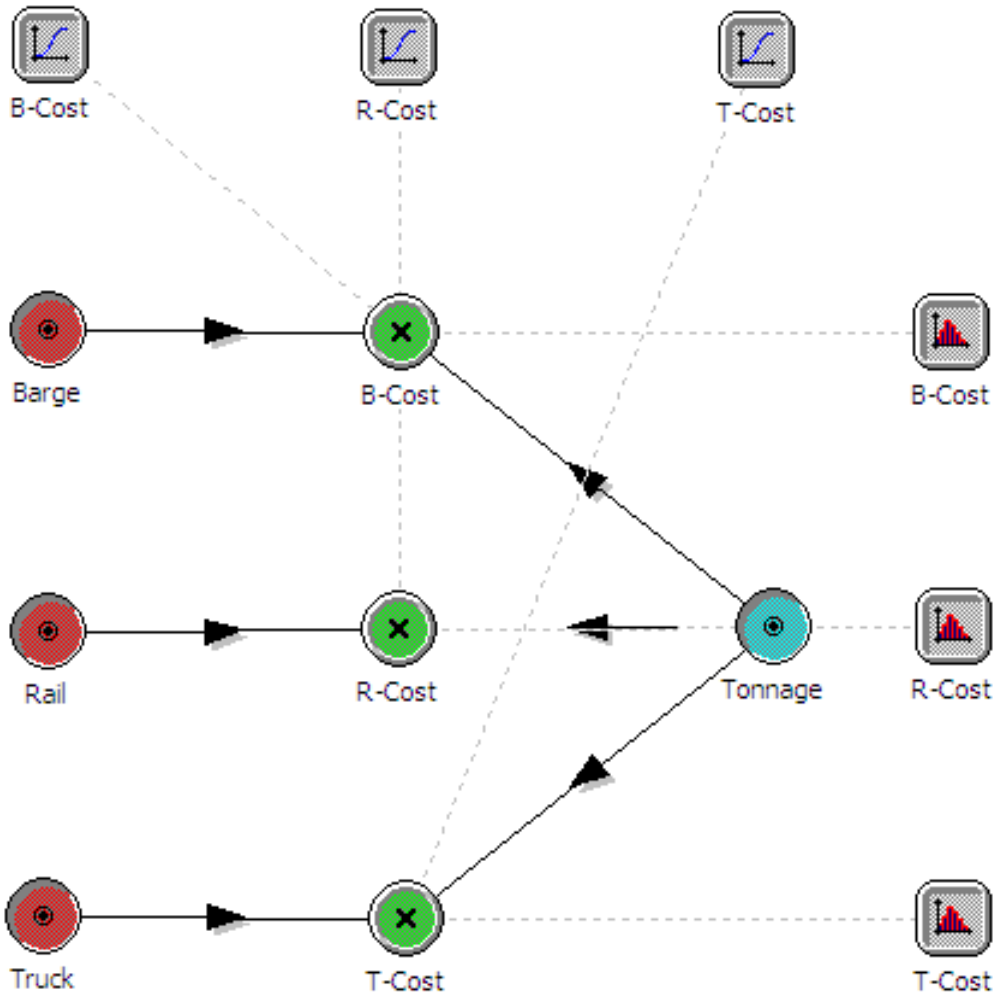
Barge Service

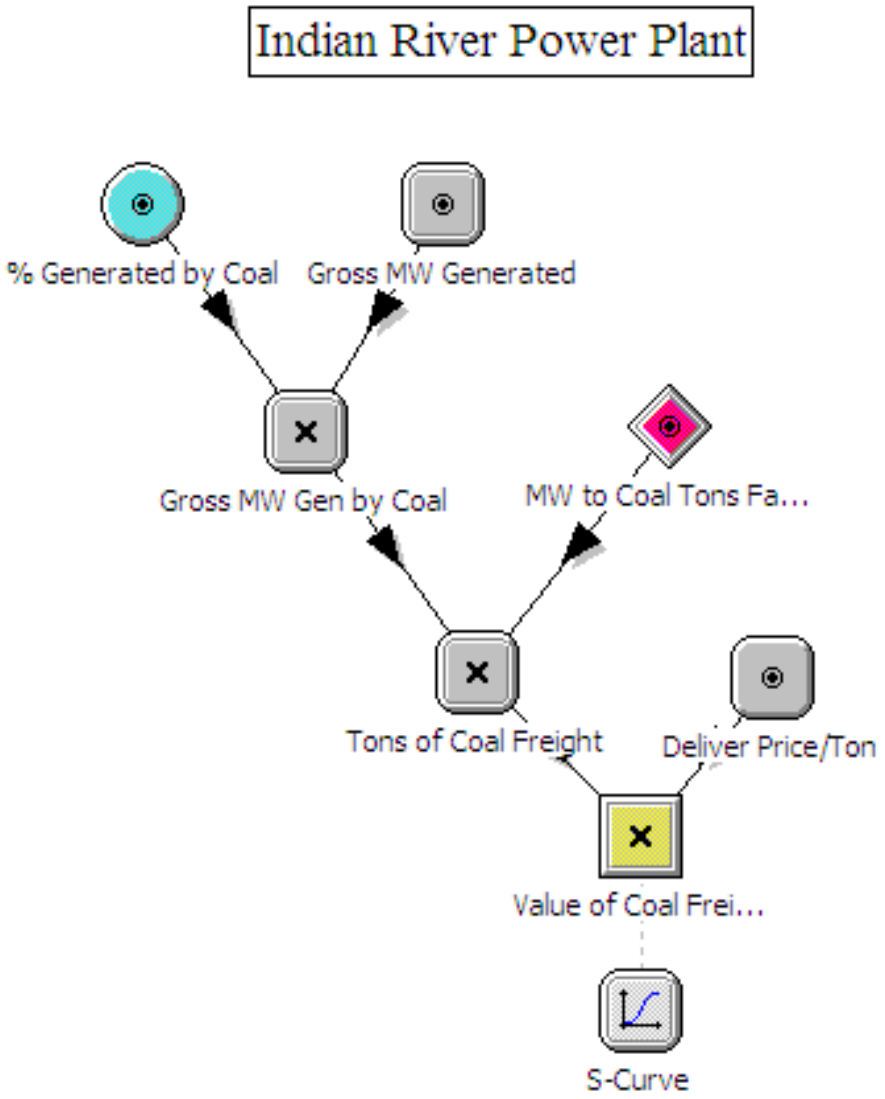


Bay Coast Railroad Car Float



Fuel Price Fluctuation





Basic Statistics			
Name	**Minimum**	**Mean**	**Maximum**
Value of Coal Freight	0	48,021,996.09	101,514,044.97
Deliver Price/Ton	79.9	93.77	105
Tons of Coal Freight	0	511,963.54	999,574.87
MW to Coal Tons Factor	1,351.00	1,351.00	1,351.00
Gross MW Gen by Coal	0	378.95	739.88
Gross MW Generated	740	740	740
% Generated by Coal	0	0.5	1

Wind Farms

Scenario 1

Currently the demand for power in Delmarva is higher than what can be supplied by power plants in the region. Therefore, Delmarva must import power from outside the region. If all of the power to be supplied by the proposed wind farms is used to reduce the amount of power being imported to the region, there is no impact on freight transportation in the region (assuming all else is held constant and all existing power plants continue to produce at current levels with the same fuel sources). In 2009, approximately 75 percent of the power consumed in the region was imported from sources outside the region through the PJM market. Presumably, if any portion of the power from the wind farms was going to replace power being imported, 100 percent of the power from the wind farms would go toward filling this gap. This scenario is the most plausible of the three scenarios. Currently power generated in the region cannot meet the demand. As the population continues to increase and the area continues to develop, the demand for power will also increase and new sources of power generation, such as wind farms, can help to mitigate the potential shortage of power.

Scenario 2

Under this scenario, it is assumed that the proposed wind farms will be replacing power that is currently being generated by existing power plants, which rely on coal or oil as a fuel source. If the replacement is maximized at the full 360 MW, approximately 486,360 less tons of coal and 639,059 fewer gallons of oil will be needed by existing plants. This is the equivalent of approximately 4,632 less railcar loads and 71 less truck loads moving on the freight network in the region annually (assuming that fuel is brought into the plant by 9,000 gallon capacity tanker trucks rather than smaller tankers, barge, or pipeline). The delivered price per short ton of coal for the South Atlantic region in 2008 was $67.97 (U.S. Energy Information Administration). Assuming the annual change of 17.4 percent from 2007-2008 holds true through 2010, the 2010 delivered price per short ton of coal would be approximately $93.68. This equals a total value of $45.6 million in coal freight being lost. Assuming the average price for No. 2 fuel oil in the first quarter of 2010 is representative of the year, the price per gallon is approximately 225 cents, for a total value of $1.437 million in fuel oil no longer required by existing power plants. The loss of economic activity associated with this reduction in coal and fuel freight movement, as determined using IMPLAN, is approximately $44.30 million annually.

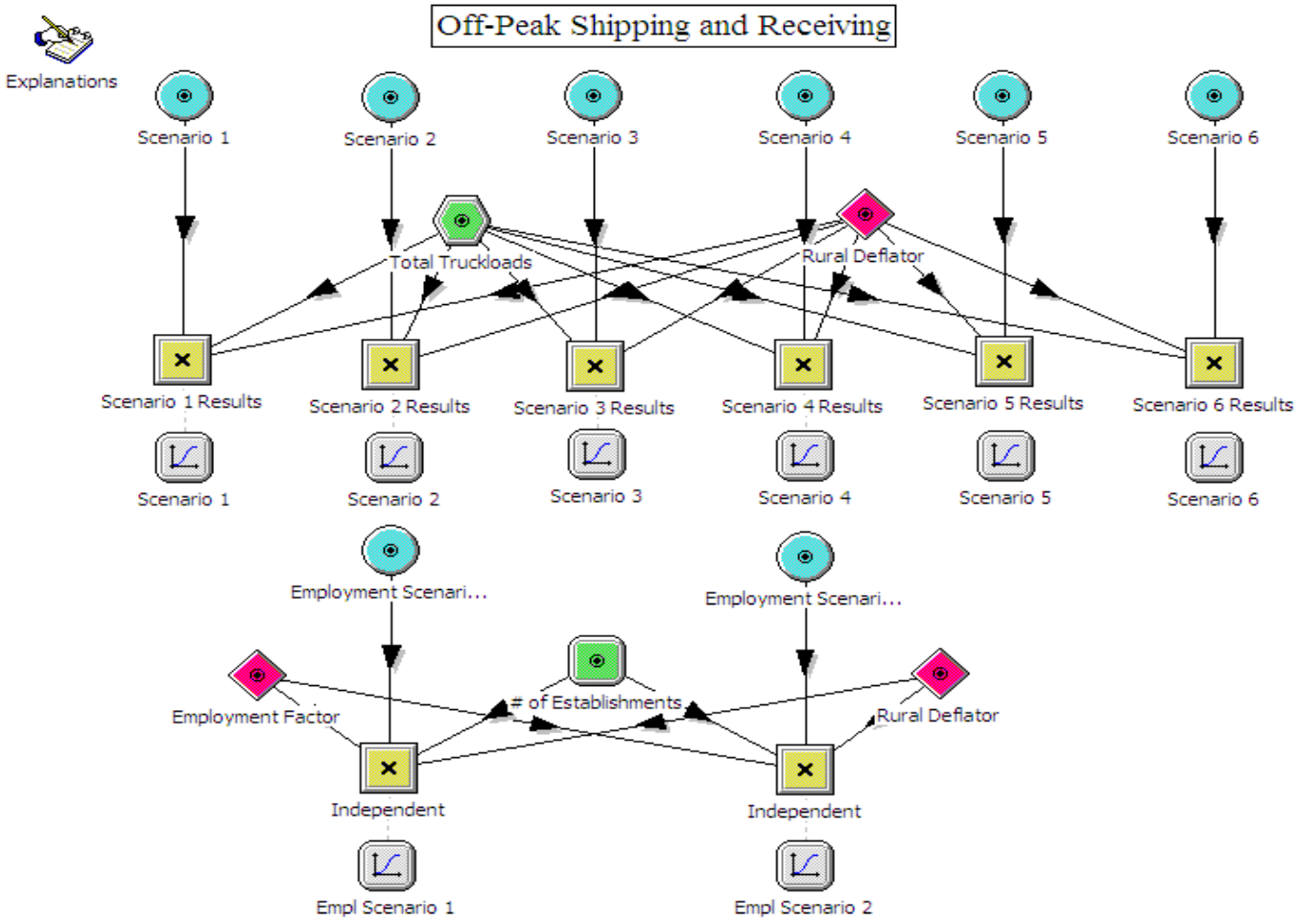
If this scenario were to happen, congestion on the transportation network would be relieved, both on the road and railroad. On the railroad, the additional available capacity can be utilized

by other industries that are encouraged to use rail to further reduce truck shipments and road congestion.

Scenario 3

This scenario assumes the power generated by the proposed wind farms will be in addition to the current power supply and will not replace any power source currently in use. Under this scenario, there is no impact on freight transportation in the region (assuming all else is equal). Existing power plants will continue to produce the same amount of power using the same fuel sources and will not result in any changes to the amount of freight being moved on the region's network.

Off-Peak Shipping and Receiving



Assumptions

Based on the estimates of the study conducted by Holguin-Veras, et. al., in 2007 in the New York City metropolitan region, the market share of OPD among carriers could reach as high as approximately 26 percent depending upon the combination of incentives implemented among both parties. This study assumes that the percentage of carriers likely to participate in off-peak shipping will be slightly lower than more congested areas due to factors such as daytime parking space issues, parking fines, etc.

The 2007 study conducted by Holguin-Veras, et. al is the basis for the model assumptions and the different scenarios considered.

This study examined the likelihood that receivers would request OPD under two different scenarios: tax deductions (between $0 and $10,000) and lower shipping costs (shipping cost differential between 0% and 100%). Given the receivers' OPD market shares as a function of

these two scenarios, carriers' OPD market shares were calculated. Three different carrier scenarios were examined in combination with the two different receiver scenarios: no policy directed toward carriers, toll savings (ranging from $0.00 to $7.00 per axle), and financial rewards (ranging from $0.00 to $.07 per mile). The following table summarizes the receivers' OPD market share ranges and the carriers' OPD market share ranges (out of the number of establishments in the OPD sensitive industries) for the various scenarios.

	Joint Market Shares for Combined Scenarios			
	Receiver Scenario	**Receivers (%)**	**Carrier Scenario**	**Receivers + Carriers (%)**
1	Tax Deduction	4.09 to 22.76	No Carrier Policy	11.71 to 18.11
2	Tax Deduction	4.09 to 22.77	Toll Savings	11.71 to 22.14
3	Tax Deduction	4.09 to 22.78	Financial Rewards	11.71 to 21.02
4	Lower Shipping Cost	4.09 to 33.78	No Carrier Policy	11.71 to 21.69
5	Lower Shipping Cost	4.09 to 33.79	Toll Savings	11.71 to 26.11
6	Lower Shipping Cost	4.09 to 33.80	Financial Rewards	11.71 to 24.89

As stated earlier, it is assumed that the percentage of carriers likely to participate in off-peak shipping will be slightly lower than in the more congested metropolitan areas. For the model, a factor of 10 to 30 percent was used to adjust the ranges for both receivers and carriers.

Potential off-peak deliveries are only calculated as a percentage of inbound and domestic truckloads and for those industries identified as being sensitive to OPD.

It is also assumed that for each additional establishment implementing off-peak shipping, one to three extra jobs will be needed (between some combination of shift employees, managers, security personnel, etc.).

7.5 Appendix E: Data Development Methodology

Developing Inputs for an IMPLAN Model: Disaggregate Origin-Destination Data from Public Sources

The inputs required for the economic impact model of freight to the Delmarva Peninsula included the *value* and *tonnage* of freight imported into the study region, exported from the area, and moved domestically within the study region by three modes: truck, rail, and water. Also required was identifying the value and tonnage of freight moving to and from the study region from other key corridors around the nation. Inputs were required at the county level and cover 15 counties and portions of 3 states. Considering the distributed nature of the data required, and the need for numbers from regions in all of the U.S. as well as the trans-border nature of the study, a multistate data source was required.

Finding county level origin-destination and/or commodity flow data from public sources was a notably challenging task. The Intermodal Transportation and Inventory Cost (ITIC) model guidance document writes the following about finding valid disaggregate inputs for its model: "…the problem is that publicly available sources of disaggregate data are difficult to find…and…[Commodity Flow Survey] aggregation destroys the disaggregate nature of the movement records and renders the information useless for the purposes here." It goes on to recommend use of data from three sources, with Freight Analysis Framework (FAF) being the best option, especially for truck transit.

The federal government has worked to provide the FAF and FAF2 database as a disaggregation of the Commodity Flow Survey, published by the US Census Bureau every five years the leading public source for freight movement,. The most recent publication data is 2007. The FAF2 database identifies origin and destination *value* and *tonnage* for regions for the entire nation. Understanding the regional scale of this data, we took the following steps to disaggregate it further in order to meet the requirements of the study.

Identify Industry Dispersal by County current and future

1. Identify freight related industries: These have been identified by the Maryland Department of Transportation as industries that are historically heavily freight related. They have been identified using a 4-digit NAICS 2007 code.
2. Identify number of establishments in those industries: Using the number of establishments from the Bureau of Labor Statistics (BLS) for 2008, the number of freight related industry establishments per county was determined.
3. These industries were then translated to the Standard Classification of Transported Goods (SCTG) classification code. This is a classification method originally developed for use in the freight industry. The FAF databases use this taxonomy.
4. We then identified the proportion of establishments of the FAF region for which each county was responsible. We then did a shift-share analysis[2].

Identifying Corridors

Source: Eastern Shore Regional GIS Cooperative (ESRGC)

Following narrative descriptions that we found during research, we used GIS to identify which FAF regions were intersected by each corridor. We were then able to execute the corridor queries by extracting the regions directly adjacent to each corridor, and the quantity of freight exchange between each corridor and the study region.

[2] **Shift/share analysis** is a technique sometimes used for retrospectively decomposing changes, usually in employment, in a set of urban areas or regions.
(*socrates.cdr.state.tx.us/iSocrates/files/**ShiftShare**Narrative.pdf*)

Identifying MPOs

Source: FAFv2 Database USDOT Freight Management and Operations

All MPO areas were identified and a shift/share analysis was completed for all that did not completely comprise one or more FAF regions. For example, the Harrisburg, PA, region was home to approximately 10 percent of industrial employment in the FAF region called "Remainder of PA". Therefore, the origin/destination freight values and tonnage were prorated for this area alone. This is a best estimate given the scale of the available data. By identifying which FAF regions were MPOs and prorating using employment numbers, we were then able to execute the MPO queries by extracting the regions and the quantity of freight exchange between each MPO and the study region. We used the FAFv2 database exclusively.

Shift-Share the FAF2 data to the County level

1. Based on the relative proportion of freight related establishments in each county within the FAF region, we shared the value and tonnage of freight by industry to these counties within the study region. This provided a consistent basis for assessing economic value of freight to each county within the study region.
2. Similar methodology was employed as we determined the value and tonnage of off-peak shipping and seasonal shipping to the study region. Freight related industries, particularly off-peak or seasonally dependent, have been identified by SCTG codes as well. Once the data was prepared for all industries, potentially off-peak dependent industries were be filtered out as we considered them a direct subset of other industries.
3. The table below shows the share of origin-destination data assigned to each industry in each county in the study region. This allowed data to be reaggregated as necessary.

SCTG_Code_Names			
ID	**SCTG**	**Description**	**Abbreviated**
1	01	Live Animals and Fish	Live animals/fish
2	02	Cereal Grains (including seed)	Cereal grains
3	03	Other Agricultural Products, except for Animal Feed	Other ag prods.
4	04	Animal Feed and Products of Animal Origin, n.e.c.	Animal feed
5	05	Meat, Fish, and Seafood, and Their Preparations	Meat/seafood
6	06	Milled Grain Products and Preparations, and Bakery Products	Milled grain prods.
7	07	Other Prepared Foodstuffs, and Fats and Oils	Other foodstuffs
8	08	Alcoholic Beverages	Alcoholic beverages
9	09	Tobacco Products	Tobacco prods.
10	10	Monumental or Building Stone	Building stone

SCTG_Code_Names			
ID	**SCTG**	**Description**	**Abbreviated**
11	11	Natural Sands	Natural sands
12	12	Gravel and Crushed Stone	Gravel
13	13	Non-Metallic Minerals, n.e.c.	Nonmetallic minerals
14	14	Metallic Ores and Concentrates	Metallic ores
15	15	Coal	Coal
16	16	Crude Petroleum Oil	Crude petroleum
17	17	Gasoline and Aviation Turbine Fuel	Gasoline
18	18	Fuel Oils	Fuel oils
19	19	Coal and Petroleum Products, n.e.c.	Coal-n.e.c.
20	20	Basic Chemicals	Basic chemicals
21	21	Pharmaceutical Products	Pharmaceuticals
22	22	Fertilizers	Fertilizers
23	23	Chemical Products and Preparations, n.e.c.	Chemical prods.
24	24	Plastics and Rubber	Plastics/rubber
25	25	Logs and Other Wood in the Rough	Logs
26	26	Wood Products	Wood prods.
27	27	Pulp, Newsprint, Paper, and Paperboard	Newsprint/paper
28	28	Paper or Paperboard Articles	Paper articles
29	29	Printed Products	Printed prods.
30	30	Textiles, Leather, and Articles of Textiles or Leather	Textiles/leather
31	31	Non-Metallic Mineral Products	Nonmetallic minerals
32	32	Base Metal in Primary or Semi-Finished Forms and in Finished Basic Shapes	Base metals
33	33	Articles of Base Metal	Articles-base metal
34	34	Machinery	Machinery
35	35	Electronic and Other Electrical Equipment and Components, and Office Equipment	Electronics
36	36	Motorized and Other Vehicles (including parts)	Motorized vehicles
37	37	Transportation Equipment, n.e.c.	Transport equip.
38	38	Precision Instruments and Apparatus	Precision instruments
39	39	Furniture, Mattresses and Mattress Supports, Lamps, Lighting Fittings, and Illuminated Signs	Furniture
40	40	Miscellaneous Manufactured Products	Misc. mfg. prods.
41	41	Waste and Scrap	Waste/scrap
42	43	Mixed Freight	Mixed freight
43	99	Unknown	Unknown

FAF Region	SCTG2 Codes	Share
DE	Alcoholic beverages	100
DE	Animal feed	100
DE	Articles-base metal	100
DE	Base metals	100
DE	Basic chemicals	100
DE	Cereal grains	100
DE	Chemical prods.	100
DE	Coal	100
DE	Coal-n.e.c.	100
DE	Electronics	100
DE	Fertilizers	100
DE	Fuel oils	100
DE	Furniture	100
DE	Gasoline	100
DE	Gravel	100
DE	Live animals/fish	100
DE	Logs	100
DE	Machinery	100
DE	Meat/seafood	100
DE	Metallic ores	100
DE	Milled grain prods.	100
DE	Misc. mfg. prods.	100
DE	Motorized vehicles	100
DE	Natural sands	100
DE	Newsprint/paper	100
DE	Nonmetallic minerals	100
DE	Other ag prods.	100
DE	Other foodstuffs	100
DE	Paper articles	100
DE	Pharmaceuticals	100
DE	Plastics/rubber	100
DE	Precision instruments	100
DE	Printed prods.	100
DE	Textiles/leather	100
DE	Transport equip.	100
DE	Waste/scrap	100
DE	Wood prods.	100
MD Balti	Animal feed	-
MD Balti	Articles-base metal	2
MD Balti	Basic chemicals	-
MD Balti	Electronics	-

FAF Region	SCTG2 Codes	Share
MD Balti	Furniture	2
MD Balti	Gravel	15
MD Balti	Live animals/fish	15
MD Balti	Machinery	-
MD Balti	Meat/seafood	15
MD Balti	Milled grain prods.	-
MD Balti	Misc. mfg. prods.	3
MD Balti	Motorized vehicles	-
MD Balti	Natural sands	15
MD Balti	Nonmetallic minerals	-
MD Balti	Other ag prods.	100
MD Balti	Other foodstuffs	-
MD Balti	Plastics/rubber	4
MD Balti	Precision instruments	-
MD Balti	Printed prods.	1
MD Balti	Textiles/leather	-
MD Balti	Transport equip.	-
MD Balti	Waste/scrap	-
MD Balti	Wood prods.	2
MD rem	Animal feed	65
MD rem	Articles-base metal	71
MD rem	Base metals	28
MD rem	Basic chemicals	100
MD rem	Cereal grains	18
MD rem	Chemical prods.	100
MD rem	Coal-n.e.c.	46
MD rem	Crude petroleum	9
MD rem	Electronics	65
MD rem	Fertilizers	18
MD rem	Fuel oils	28
MD rem	Furniture	8
MD rem	Gasoline	28
MD rem	Gravel	55
MD rem	Live animals/fish	55
MD rem	Logs	-
MD rem	Machinery	74
MD rem	Meat/seafood	65
MD rem	Metallic ores	18
MD rem	Milled grain prods.	65
MD rem	Misc. mfg. prods.	45
MD rem	Motorized vehicles	65

FAF Region	SCTG2 Codes	Share
MD rem	Natural sands	55
MD rem	Newsprint/paper	18
MD rem	Nonmetallic minerals	100
MD rem	Other ag prods.	46
MD rem	Other foodstuffs	74
MD rem	Paper articles	28
MD rem	Pharmaceuticals	46
MD rem	Plastics/rubber	71
MD rem	Precision instruments	46
MD rem	Printed prods.	84
MD rem	Textiles/leather	65
MD rem	Transport equip.	37
MD rem	Waste/scrap	-
MD rem	Wood prods.	6
VA rem	Animal feed	-
VA rem	Articles-base metal	-
VA rem	Base metals	2
VA rem	Cereal grains	2
VA rem	Electronics	-
VA rem	Furniture	-
VA rem	Live animals/fish	2
VA rem	Logs	-
VA rem	Machinery	-
VA rem	Meat/seafood	1
VA rem	Misc. mfg. prods.	-
VA rem	Nonmetallic minerals	-
VA rem	Other ag prods.	4
VA rem	Other foodstuffs	1
VA rem	Pharmaceuticals	2
VA rem	Plastics/rubber	-
VA rem	Precision instruments	-
VA rem	Printed prods.	-
VA rem	Textiles/leather	-
VA rem	Transport equip.	2
VA rem	Wood prods.	-

To disaggregate the FAF regions, we completed the following steps using ArcGIS 9.3 and MS Access 2007.

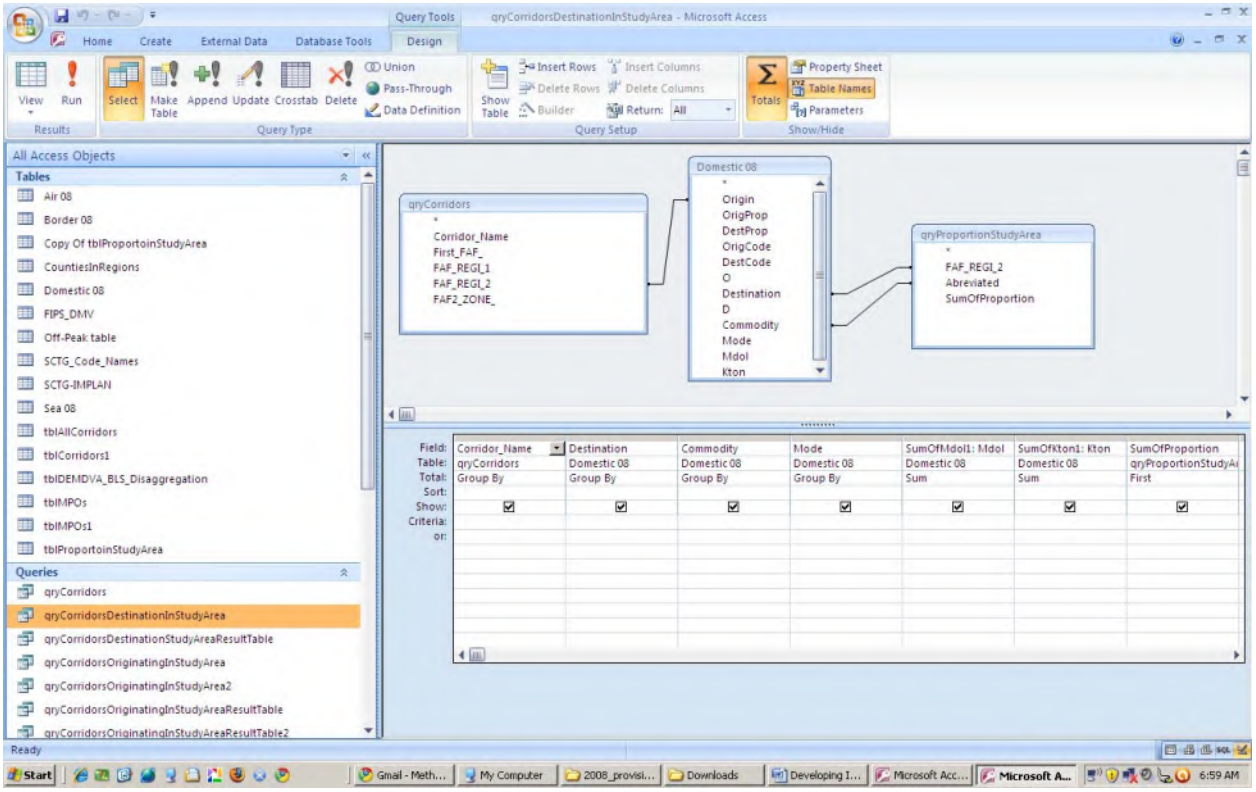
Using the FAF Geographies and the ESRI Street Map dtlCounty2002 US Counties layer, we converted all of the county polygons to centroids, verified that each fell within a FAF region (as the FAF Geographies polygon geometry was at a smaller scale), and then executed a spatial join to apply the FAF Region Names and FAF Region Codes to each county. We then proceeded to execute a second spatial join, joining the centroids back to the counties layer to apply the FAF Region Name and Code to the counties themselves. This operation served to identify to which FAF Region each county belonged.

In MS Access:

1. Create a conversion table from SCTG Codes (Standard Classification of Transported Goods) from Virginia Department of Transportation's TRANSEARCH Database. TRANSEARCH provides a consistent association of SCTG Codes and NAICS codes. We are currently awaiting a standard conversion table from the US Census Bureau Commodity Flows Survey. If we receive the table, we will then compare the two approaches.
2. Create an SCTG Code table that matches the FAF2db and the Provisional 2008 origin/destination databases code listings. The FAF Databases only provides an abbreviated SCTG Code description. These descriptions had to be matched to the full descriptions of the two-digit SCTG Codes.
3. Import the table from the counties' GIS file into MS Access and join it to the BLS data for Maryland, Virginia, Delaware, Pennsylvania and New Jersey.
4. Group by NameFAF to get totals by FAF Region for the number of establishments by NAICS Codes with associated SCTG Code.
5. Join the FAFRegionEstablishmentsSummary summary table, back the county-level BLS data, and add a field calculating the percentage of establishments in the region that belongs to each county by commodity (using two-digit SCTG Codes).
6. Multiply the % establishments by commodity by the FAF commodity data to estimate how much of freight value and tonnage can be attributed to the study region.
7. Import Disaggregation Table to the FAF Provisional 2008 database. Import FIPS_DMV Table to the FAF Provisional 2008 database.

8. Create a Proportions table by industry for the study region. Naturally, all of the SCTG categories that had any establishments showed 100% share because Delaware itself is an entire study region, all included in the study region. The Maryland and Virginia portions assumed the share by summing the proportion field in the Disaggregation table.

Several queries were generated as intermediate steps to the result table. A representative sample is shown below:



Query Corridors

SELECT DISTINCT tblAllCorridors.Corridor_Name, tblAllCorridors.First_FAF_, CountiesInRegions.FAF_REGI_1, CountiesInRegions.FAF_REGI_2, tblAllCorridors.FAF2_ZONE_

FROM tblAllCorridors LEFT JOIN CountiesInRegions ON tblAllCorridors.FAF2_ZONE_ = CountiesInRegions.FAF2_ZONE1

Joining to Study Region

SELECT qryCorridors.Corridor_Name, [Domestic 08].Destination, [Domestic 08].Commodity, [Domestic 08].Mode, Sum([Domestic 08].Mdol) AS SumOfMdol1, Sum([Domestic 08].Kton) AS SumOfKton1, First(qryProportionStudyArea.SumOfProportion) AS FirstOfSumOfProportion

FROM qryCorridors INNER JOIN ([Domestic 08] INNER JOIN qryProportionStudyArea ON ([Domestic 08].Destination = qryProportionStudyArea.FAF_REGI_2) AND ([Domestic 08].Commodity = qryProportionStudyArea.Abreviated)) ON qryCorridors.FAF_REGI_2 = [Domestic 08].Origin

GROUP BY qryCorridors.Corridor_Name, [Domestic 08].Destination, [Domestic 08].Commodity, [Domestic 08].Mode;

Summarizing From the Join to Study Region Query

SELECT qryCorridorsDestinationInStudyArea.Corridor_Name, qryCorridorsDestinationInStudyArea.Commodity, qryCorridorsDestinationInStudyArea.Mode, Sum([SumOfMdol1]*([Firstofsumofproportion]/100)) AS Mdol, Sum([SumOfKton1]*([Firstofsumofproportion]/100)) AS Kton

FROM qryCorridorsDestinationInStudyArea

GROUP BY qryCorridorsDestinationInStudyArea.Corridor_Name, qryCorridorsDestinationInStudyArea.Commodity, qryCorridorsDestinationInStudyArea.Mode;

Forecasts

Creating the Proportion Table

SELECT tblDEMDVA_BLS_Disaggregation.FAF_REGI_2, tblDEMDVA_BLS_Disaggregation.Abreviated, Sum(tblDEMDVA_BLS_Disaggregation.Proportion) AS SumOfProportion

FROM FIPS_DMV LEFT JOIN tblDEMDVA_BLS_Disaggregation ON (FIPS_DMV.CNTY_FIPS = tblDEMDVA_BLS_Disaggregation.CNTY_FIPS) AND (FIPS_DMV.STATE_FIPS = tblDEMDVA_BLS_Disaggregation.STATE_FIPS)

GROUP BY tblDEMDVA_BLS_Disaggregation.FAF_REGI_2, tblDEMDVA_BLS_Disaggregation.Abreviated;

Freight:

A requirement for this study input required projections of freight *value* and *tonnage* for 2010, 2015, 2020, 2025, 2030, and 2035. FAF2v22.mdb provides forecasts out to 2035. Using the shift-share analysis, we determined that this was likely the best public source available and could mimic our query structure to extract this data as well. We have a sample of TRANSEARCH data for two counties within the study region. We have sought to identify a valid growth curve by industry for the study region. Following TRANSEARCH, we employed a standard exponential growth model to the current data to estimate the future value and tonnage of freight moved into and domestically within the study region.

Industry growth forecasts have been collected from the FAF2_v22 database for 2010, 2015, 2020, 2025, 2030, and 2035, and shared to the study region. We have extended the forecast out to 2040. This extension can be considered extrapolation, but as it is just on the edge of the relevant range, it is a valid extension of USDOT's estimations.

Employment Forecasts:

Employment forecasts (number of establishments) were also required every five years up to 2040. We studied the BLS and ESRI growth models for forecasting the number of establishments per industry per county over the duration. To estimate the growth model, we gathered data for the 15 counties in the study region for the past 20 years, and used moving average smoothing to do a simple forecast into the future. This is a simple method of forecasting, but does well to look back into the past and generally anticipate how the future could look. We used the number of establishments again because of the disclosure issues of the BLS data for actual *Employees.* (If there are too few establishments in an industry in the region, employee counts are not publicized.) Thus, a different method and dataset was used to compute rough employment estimates by number of employees.

Employment forecasts (employees) were drawn from ESRI data, and the change from 2000 to 2010 in Production Occupations[3] was calculated. By calculating the Constant Annual Growth Rate (CAGR), we were able to grow (positively or negatively) the number of employees into the future. For each industry, we are drawing from only two data points because of the difficulty in attaining this type of information. Data was not drawn from state and local sources because of confidentiality limits during the project process.

Industry Infrastructure Gap Analysis

The Industry Infrastructure Gap Analysis used Geographic Information Systems (GIS) to calculate the distance to the nearest major infrastructure. Using the *NEAR* tool in ArcGIS 9.3x, we were able to calculate the distance from each area zoned *Industrial* on the Delmarva Peninsula and their Euclidean (straight line) distance to the nearest infrastructure (non-local roads, rail, ports). See the Data Sources table for metadata on those layers. Each industrial polygon was assigned a distance in miles value and noted as to which type of infrastructure was closest. This data was summarized by type of infrastructure to show the average distance from each type of infrastructure and the maximum nearest distance by mode.

Full Use of Industrial Zones

[3] A list of Production Occupations as defined by the US Census Bureau can be found at: http://www.bls.gov/oes/2009/may/oes_stru.htm#51-0000

The Full Use analysis is not a built out analysis but rather an estimate of potential employment if current industrial capacity was maximized at current rates. We did a cross section analysis considering the quantity of total square feet of industrial buildings for Maryland counties (source: Maryland Property View). We then used the Maryland Department of Business and Economic Development Buildings and Sites application to identify the current level of vacant industrial facility space giving us an estimate of the vacancy rate of industrial buildings. Given that these two information components were only readily available for Maryland, we assigned the average rate of .65 occupancy to the current employment levels of production occupations, giving us an estimate of current capacity for industrial employment in the region.

Rail Inventory GIS Data Attribution

Generally speaking, GIS Data development was outside the scope of this project; however, it served as the simplest method for capturing and storing the rail inventory. These polyline datasets were clipped to the region and merged together. Each line included different attributes, many of which were not usable for this process or were incorrect. The questions that were required about the rail system on Delmarva are shown below, and the answers were gathered through phone interviews with track owner/operators.

- Double Track: Created a field in the GIS Database called DoubleTrack and it is assigned Yes or No. This is also identifiable by looking at the GIS line work itself from the states and seeing where multiple lines are drawn.
- Double Stack: Create a field in GIS Database called DoubleStack and it is assigned Yes or No.
- Sidings: Most of the region was deemed Single Track with Sidings and the sidings are visually identifiable in the GIS linework.
- Switching: Identifiable in the GIS linework.
- Bridges: The National Bridge Inventory layer is included with the deliverables and has been clipped to the region.
- 286 Rail: Created a field in the GIS database called Weight and assigned with the weight class.
- Rated at >25mph or <25mph: Created a field in the GIS Database called Class and assigned the FRA class rating to each track segment as defined by track owners. These ratings are federally mandated and have specific speed limitations.

- Number of Intermodal Facilities: The intermodal facilities information was taken from the National Transportation Atlas Database.

Zoning/Planning information

To generate a Delmarva Zoning map, we gathered all of the county zoning information either through interviews with county staff, GIS contact, the county website, or a state dataset with a zoning designation. For Maryland counties other than Wicomico and Cecil, we used the Maryland Property View data points and the Generalized Zoning layer that is provided with the Camadata for each county. This allowed us to fill in the municipalities as well. For the two counties in Virginia, we received zoning datasets from the county government. We made an effort to contact the 20 municipalities in Accomack and Northampton counties. Several municipalities provided us with an image snapshot of current zoning, which we then georeferenced. These were incorporated visually into the Delmarva Zoning map and are provided on the data CD.

IMPLAN

The IMPLAN software package (produced by the Minnesota IMPLAN Group, Inc.) was utilized to calculate all economic impact estimates. The IMPLAN model is based on Input-Output (IO) theory, for which Wassily Leontief was awarded the Nobel Prize in Economics in 1973. The IMPLAN model includes all economic effects when calculating total output/employment, including direct *plus* indirect *plus* induced impacts. Direct, indirect, and induced impacts are defined by the Minnesota IMPLAN Group, Inc. as follows. Direct impact is the impact created by the money from the defined activity entering the economy. The indirect impacts are determined by the amount of the direct effect spent within the study region on supplies, services, labor, and taxes. The induced effect measures the money that is re-spent in the study region as a result of spending from the indirect effect. The total impact is a summation of the direct, indirect, and induced impacts. The IMPLAN model is based on actual data for each of the study region counties from 2008 inflated to 2010 figures (or inflated to other years when appropriate). The principle advantage of the IO IMPLAN model is in its utilization of state and county-specific data. IMPLAN uses a combination of social account matrixes, regional multipliers, and trade flow models to estimate the economic impacts.

To estimate the economic impact of the various modes of freight transportation or of the freight movement between regions, the primary input utilized by IMPLAN is the value of the freight

being transported. The value of the freight being transported is input into the industry spending patterns for the given transportation mode (i.e. rail, truck, barge, air, etc.). The industry spending pattern breaks down how each dollar spent by that industry flows and churns in the economy. Each industry has a unique spending pattern.

All economic impact estimates reported in this study are in 2010 dollars.

iDecide

The iDecide software package, developed by Decisive Tools, was utilized to run the various scenario analyses. iDecide is a software program designed for decision and risk analysis that allows the user to quickly build influence diagrams describing a given scenario. The iDecide software allows for the mixing and matching of several different variables with different viable ranges of values to plan for uncertainties. When the scenario analysis is run, iDecide uses a Monte Carlo Simulation, in which randomly selected viable values are used for every node (variable) in the model. Then iDecide's powerful Monte Carlo simulation engine runs through the influence diagram and simulates all combinations of all the factors to determine the likelihood of each possible outcome. These simulations continue until an accurate representation of all possible combinations has been created. The result is a statistically accurate representation of the range and likelihood of all possible outcomes.

ESRI

A summary of the databases ESRI offers that were used for this study:

- Updated Demographic Data—ESRI's 2010/2015 Updated Demographics data includes more than 2,000 variables of current-year estimates and five-year projections.
- Census Data—Summary variables from Census 2000 and data from the 1990 Census in 2000 geography are available in two databases.

The Business Analyst suite brings geography and business intelligence together, allowing users to view data in revealing geographic patterns that enable better decision making. ESRI's technology incorporates geographic location into viewing and analyzing business, demographic, and consumer spending data. ESRI provides demographic, segmentation, consumer spending, business, and census data to help in analyzing markets, profiling customers, evaluating competitors, and identifying opportunities.

Business Data—Esri also provides a variety of business data from industry-leading third party providers.

7.6 Appendix F: Freight Network Inventory (GIS Based)

- Elements of the Freight Inventory are:
    - Rail double track, double stack, and sidings
    - Rail nodes and bridges
    - FRA Class I, Class 2 or greater rail
    - Rail rated at 286 pounds
    - Waterway terminals, docks, ports, and barge and tug operators
    - Advertised and awarded waterway dredging contracts for FY 2009, FY 2010, and FY 2011
    - Established waterway dredged spoils disposal locations
    - Highway inventory that includes the National Highway System highways and connections, bridges, and intermodal connections
- A comprehensive zoning map of the entire Delmarva Peninsula.
- Industrial-to-infrastructure gap analysis
- Sea Level Rise SLR
- Airports and runways
- Air Freight Service areas
- Expected job creation from full use of industrial zones

7.7 Appendix G: Map Book

Refer to Map Book that accompanies this report (separate file).

7.8 Appendix H: Glossary

286 Rail: Rail track segments with 286,000 lbs. or 143-ton car capacity restrictions. Current industry standard.

Average Annual Daily Truck Traffic (AADTT) - The total volume of truck traffic on a highway segment for one year, divided by the number of days in the year.

Barge - The cargo-carrying vessel that inland water carriers primarily use. Basic barges have open tops, but there are covered barges for both dry and liquid cargoes.

Capacity - The physical facilities, personnel and process available to meet the product of service needs of the customers. Capacity generally refers to the maximum output or producing ability of a machine, a person, a process, a factory, a product, or a service.

Carload - Quantity of freight (in tons) required to fill a railcar; amount normally required to qualify for a carload rate.

Carrier - A firm which transports goods or people via land, sea or air.

Certificated airport- An airport holding an operating certificate issued by the Federal Aviation Administration in accordance with Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 139 allowing it to serve scheduled or unscheduled air carrier aircraft designed for more than 30 passengers.

Class I Carrier - A classification of regulated carriers based upon annual operating revenues- motor carrier of property greater than or equal to $5 million; railroads: greater than or equal to $50 million; motor carriers of passengers: greater than or equal to $3 million.

Class II Carrier - A classification of regulated carriers based upon annual operating revenues- motor carrier of property $1 million to $5 million; railroads: $10 million to $50 million; motor carriers of passengers less than or equal to $3 million.

Class III Carrier - A classification of regulated carriers based upon annual operating revenues- motor carrier of property less than or equal to $1 million; railroads greater than or equal to $10 million.

Commodity - An item that is traded in commerce. The term usually implies an undifferentiated product competing primarily on price and availability.

Container: A box-like device used to store, protect, and handle a number of packages or items as a unit of transit that can be interchanged between trucks, trains, and ships without re-handling the contents.

Double-stack freight service – The transport of two intermodal containers one atop the other on one platform of an intermodal rail flatcar. A vertical clearance of 20’6” is normally required for two high cube containers.

Drayage – Transporting of rail or ocean freight by truck to an intermediate or final destination; typically a charge for pickup/delivery of goods moving short distances (e.g., from marine terminal to warehouse).

Exempt Carrier - A for-hire carrier that is free from economic regulation. Trucks hauling certain commodities are exempt from federal regulation. (e.g. the largest portion of exempt carriers transports agricultural commodities or seafood).

Freight Forwarder – An entity whose business is to act as an agent on behalf of a shipper. A freight forwarder frequently consolidates shipments from several shippers and coordinates booking transportation reservations.

Full container ship: Ships equipped with permanent container cells, with little or no space for other types of cargo.

Gross Vehicle Weight (GVW) - The combined total weight of a vehicle and its freight.

Hazardous materials – Substances or materials that the U.S. Secretary of Transportation has determined are capable of posing an unreasonable risk to human health, safety, and property when transported in commerce, as designated under 49 Code of Federal Regulations Parts 172 and 173.

Heavy rail: An electric railway with the capacity to transport a heavy volume of passenger traffic and characterized by exclusive rights-of-way, multi-car trains, high speed, rapid acceleration, sophisticated signaling, and high-platform loading. Also known as “subway,” “elevated (railway),” or metropolitan railway (metro).”

Inventory - The number of units and/or value of the stock of goods a company holds.

Just-in-time (JIT) – An element of a manufacturing or production process in which the inventory and materials handling of components is minimized by means of relying on the carefully scheduled arrival of components from suppliers.

Level of Service (LOS) - A qualitative assessment of a road's operating conditions. For local government comprehensive planning purposes, level of service means an indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service indicates the capacity per unit of demand for each public facility.

LTL (Less-than-Truckload) – Shipments weighing less than the truckload minimum which normally require truck terminal trans-loading prior to and following the line haul segment.

Natural gas transmission pipeline: Analogous to a major freeway, it is the main interstate transportation route for moving large amounts of natural gas from the source of production to points of distribution. Transmission pipelines are designed to move large amounts of natural gas from areas where the gas is extracted and stored to the local distribution companies that provide natural gas to homes and businesses.

Off-peak shipping and receiving – shipping and receiving that occurs at times other than peak traffic hours (typically off-peak hours are considered to be between 6PM and 6AM)

Port Authority - State or local government that owns, operates, or otherwise provides wharf, dock, and other terminal investments at ports.

Private Carrier - A carrier that provides transportation service to the firm that owns or leases the vehicles and does not charge a fee.

Rail Siding - A very short branch off a main railway line with only one point leading onto it. Sidings are used to allow faster trains to pass slower ones or to conduct maintenance.

Reliability - Refers to the degree of certainty and predictability in travel times on the transportation system. Reliable transportation systems offer some assurance of attaining a given destination within a reasonable range of an expected time. An unreliable transportation system is subject to unexpected delays, increasing costs for system users.

Roll-on/roll-off (ro/ro) – A feature designed in a specially constructed vessel that allows wheeled cargo to be loaded and unloaded through doors in the vessel's hull. This feature allows cargo to be rolled in and out of the vessel.

Seasonality - Repetitive pattern of demand from year to year (or other repeating time interval) with some periods considerably higher than others. Seasonality explains the fluctuation in demand for various recreational products, which are used during different seasons.

Shipper - Party that tenders goods for transportation.

Short Line Railroad - Freight railroads which are not Class I or Regional Railroads that operate less than 350 miles of track and earn less than $40 million.

Short ton: 2,000 pounds.

Ton-mile: A measure of output for freight transportation, reflecting the weight of a shipment and the distance it is hauled. The movement of one ton of cargo the distance of one statute mile.

Throughput - Total amount of freight imported or exported through a seaport measured in tons or TEUs (see below).

Trackage rights: The authority of one railroad to use the tracks of another railroad for a fee**.**

Transit time - The total time that elapses between a shipment's delivery and pickup.

Truckload (TL) – The quantity of freight necessary to qualify for a TL rate, normally in excess of 10,000 pounds. Truckload operations normally permit the bypassing of intermediate terminals.

Twenty-Foot Equivalent Unit (TEU) - The 8-foot by 8-foot by 20-foot intermodal container is used as a basic measure in many statistics and is the standard measure used for containerized cargo.

Unit train – Movement of large tonnages of single bulk commodities or containers/ trailers between origin and destination, bypassing intermediate switching yards.

Vehicle-miles traveled (highway): Miles of travel by all types of motor vehicles as determined by actual traffic counts and established estimation procedures during one year (365 days).

Glossary Sources: FHWA: http://ops.fhwa.dot.gov/freight/fpd/glossary/index.htm; Delaware Freight and Goods Movement Plan: Technical Report. Delaware Department of Transportation, Division of Planning. June 2004; Delaware Transportation Profile. U.S. Department of Transportation, Bureau of Transportation Statistics.

7.9 Appendix I: Works Cited

1. American Association of State Highway and Transportation Officials (AASHTO). (n.d.). *America's Freight Transportation Network-Struggling to Keep Up*. Retrieved from http://www.transportation1.org/tif3report/freight.html
2. Cambridge Systematics, Inc. (2005). *An Initial Assessment of Freight Bottlenecks on Highways*. Retrieved from http://www.fhwa.dot.gov/policy/otps/ bottlenecks/index.htm
3. Cambridge Systematics, Inc. (2007). *Maryland Multi-Modal Freight Profile.*
4. Cambridge Systematics, Inc & Global Insight, Inc. (September 2007). *WILMAPCO Regional Freight and Goods Movement Analysis*. Retrieved from http://www.wilmapco.org/freight/
5. Cambridge Systematics, Inc. (n.d.) *Virginia Statewide Multimodal Freight Study, Phase I.* Retrieved from http://www.vtrans.org/statewide_freight_study.asp.
6. Cambridge Systematics, Inc. (2010). *Virginia Statewide Multimodal Freight Study, Final Report*, *Part III: Hampton Roads Subregion and U.S. 13 Multimodal Corridor.* Delaware 2010 Freight Shippers Survey.
7. Delaware Department of Transportation, Division of Planning. (June 2004). *Delaware Freight and Goods Movement Plan: Technical Report*. Retrieved from www.deldot.gov/information/pubs.../freight_plan/pdf/technical_report.pdf
8. Delaware Department of Transportation. (June 2006). *Delaware Rail-to-Trail & rail-with-Trail Facility Master Plan*. Retrieved from http://www.deldot.gov/information/projects /rails_to_trails/pages/master_plan_toc.shtml
9. Federal Railroad Administration. (October 2009). *Preliminary National Rail Plan*. Retrieved from www.fra.dot.gov/Downloads/RailPlanPrelim10-15.pdf
10. Hampton Roads Planning District Commission. (April 2007). *Intermodal Management System Regional Freight Study (T07-02)*. Retrieved from http://www.hrtpo.org/ TPO_Reports.asp
11. Holguín-Veras, J., J. Polimeni, B.Cruz, N. Xu, G. List, J. Nordstrom & J. Haddock. (2005). *Off-Peak Freight Deliveries: Challenges and Stakeholders Perceptions*.
12. Holguín-Veras, J. & J. Polimeni. (2006). *Potential for Off-Peak Freight Deliveries to Congested Urban Areas*.
13. Holguín-Veras, J., M. Silas, J. Polimeni and B. Cruz (2006). *An Investigation on the Effectiveness of Joint Receiver-Carrier Policies to Increase Truck Traffic in the Off-Peak Hours. Part II: The Behavior of Carriers.*
14. I-95 Corridor Coalition. (December 2009). *Mid-Atlantic Rail Operations Phase II Study*. Retrieved from http://www.i95coalition.org/i95/Default.aspx
15. I-95 Corridor Coalition. (October 2009). *Mid-Atlantic Truck Operations Study*. Retrieved from http://www.i95coalition.org/i95/Default.aspx
16. Maryland Department of Transportation. (September 2009). *Maryland Statewide Freight Plan.* Retrieved from http://www.mdot.maryland.gov/Planning/ Freight%20Planning/index
17. Virginia Department of Rail and Public Transportation. (June 2004). *Rail, Public Transportation, and TDM Needs Assessment*. Retrieved from www.drpt.virginia.gov/activities/selectedfile.aspx?id=137

18. Cambridge Systematics, Inc. (December 2009). *Feasibility Plan for Maximum Truck to Rail Diversion in Virginia's I-81 Corridor*. Retrieved from http://www.drpt.virginia.gov/activities/Rail_ref_materials.aspx
19. Reebie Associates & Atherton, Mease & Co. (2004). *The Impact of Tolls on Freight Movement for I-81 in Virginia: Examining the Potential Freight Diversion Impact of Tolling on I-81 in Virginia*. Retrieved from http://www.drpt.virginia.gov/activities/Rail_ref_materials.aspx
20. Research and Innovation Technology Administration, Bureau of Transportation Statistics. National Transportation Statistics
21. Seattle Urban Mobility Plan. (2008). *Best Practices Freight Mobility: Managing Freight Effectively from the City and Shipper Perspective*.
22. Texas Transportation Institute. (2007). *What Does Congestion Cost Us?* Retrieved from mobility.tamu.edu/ums/report/**congestion_cost**.pdf/
23. U.S. Department of Transportation. (2006). *National Strategy to Reduce Congestion on America's Transportation Network*. Retrieved from http://isddc.dot.gov/OLPFiles/OST/012988.pdf
24. U.S. Department of Transportation, Federal Highway Administration. (2002). *Freight News: Freight Transportation Profile-Delaware Freight Analysis Framework*. Retrieved from http://www.ops.fhwa.dot.gov/freight/
25. U.S. Census Bureau. *State Trade Data*. Retrieved from http://www.census.gov/foreign-trade/statistics/state/
26. U.S. Department of Transportation, Federal Highway Administration. (2002). *Freight News: Freight Transportation Profile-Maryland Freight Analysis Framework*. Retrieved from http://www.ops.fhwa.dot.gov/freight/
27. U.S. Department of Transportation, Federal Highway Administration. (2002). *Freight Info: Freight Shipments To, From, and Within Delaware*. Retrieved from http://www.ops.fhwa.dot.gov/freight/
28. U.S. Department of Transportation, Federal Highway Administration. (2002). *Freight Info: Freight Shipments To, From, and Within Maryland*. Retrieved from http://www.ops.fhwa.dot.gov/freight/
29. U.S. Department of Transportation, Federal Highway Administration. (2002). *Freight Info: Freight Shipments To, From, and Within Virginia*. Retrieved from http://www.ops.fhwa.dot.gov/freight/
30. U.S. Department of Transportation, Bureau of Transportation Statistics. (2002). *Delaware Transportation Profile*. Retrieved from http://www.bts.gov/publications/state_transportation_statistics/ delaware/index.html U.S. Department of Transportation, Bureau of Transportation Statistics. (2002). *Maryland Transportation Profile*. Retrieved from http://www.bts.gov/publications /state_transportation_statistics/ maryland/index.html
31. U.S. Department of Transportation, Bureau of Transportation Statistics. (2002). *Virginia Transportation Profile*. Retrieved from http://www.bts.gov/publications/state_transportation_statistics/ virginia/index.html
32. U.S. Department of Transportation, Surface Transportation Board. *Quarterly Reports of Fuel Cost, Consumption and Surcharge Revenue* (For Norfolk Southern Corporation and

CSX Transportation, Inc. for multiple quarters). Retrieved from http://www.stb.dot.gov/stb/industry/econ_reports.html

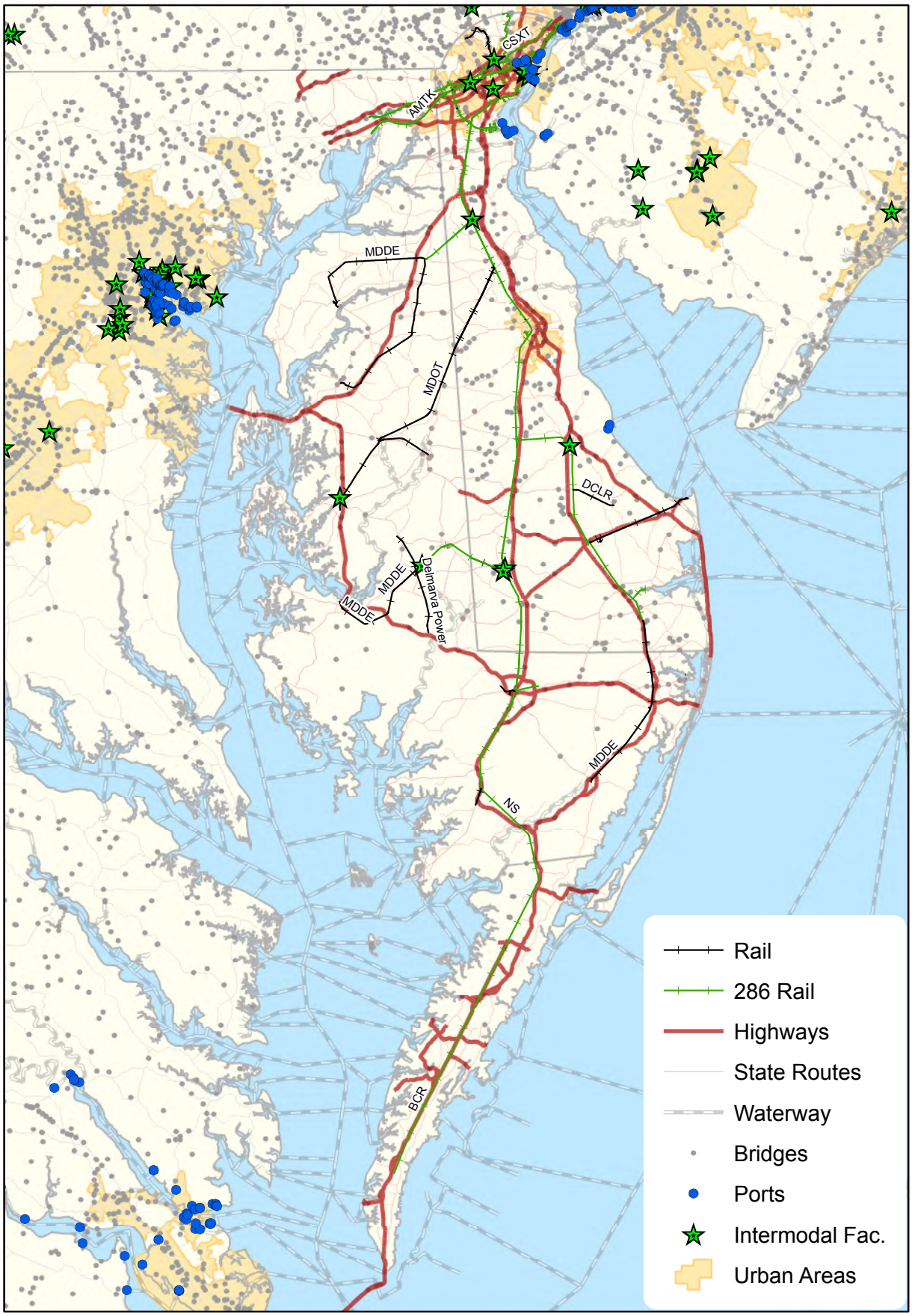
33. United States Energy Information Administration: Independent Statistics and Analysis http://www.eia.doe.gov/
34. Virginia Association of Railway Patrons. (March 2008). *Statewide Rail Plan & Current Rail Initiatives: Status Update*. Retrieved from www.varprail.org/VARP_Page_DRPT_1mar08.pdf
35. Virginia Department of Rail and Public Transportation. (December 2008). *Statewide Rail Plan Commonwealth of Virginia*. Retrieved from http://www.drpt.virginia.gov/activities/ drptplanning_details.aspx
36. Virginia Department of Rail and Public Transportation. (December 2008). *2008 Statewide Rail Resource Allocation Plan*. Retrieved from http://www.drpt.virginia.gov/activities/Rail_ref_materials.aspx
37. Virginia Department of Rail and Public Transportation. (November 2009). *Statewide Shortline Railroad Improvement Plan: Technical Memorandum*. Retrieved from http://www.drpt.virginia.gov/activities/Rail_ref_materials.aspx
38. Virginia Department of Transportation. (November 2006) Construction of I-99: Appropriation Act Item 427 H. (Special Session I, 2006). Retrieved from www.virginiadot.org/projects/.../I-99_Final_Report_-_VDOT_website.pdf

Freight Inventory

Delmarva 2010

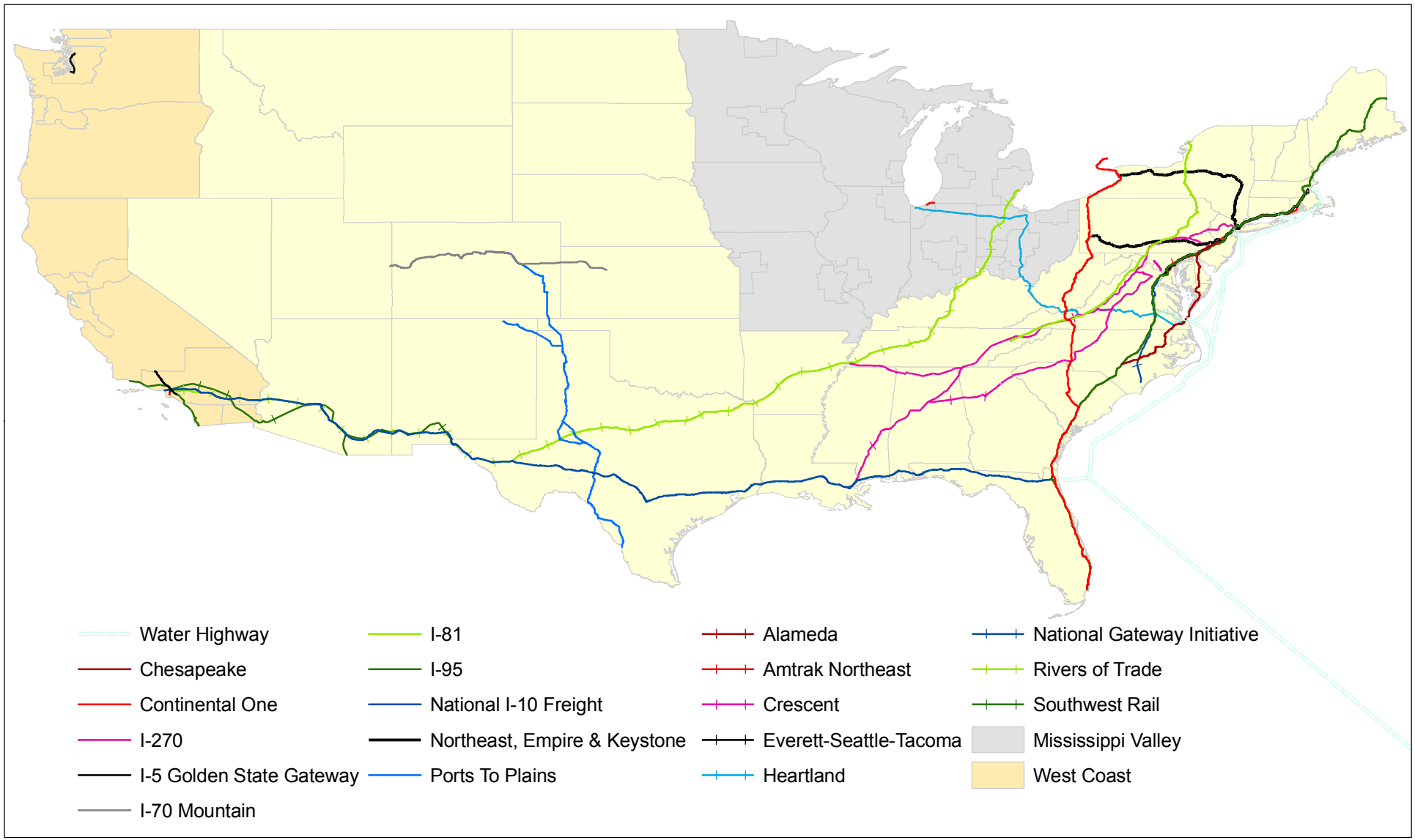
Freight Inventory

Delmarva 2010



Rail Lines and Road Centerlines are datasets assembled from best available State GIS data layers from each state.

Major Freight Corridors



Sea Level Rise

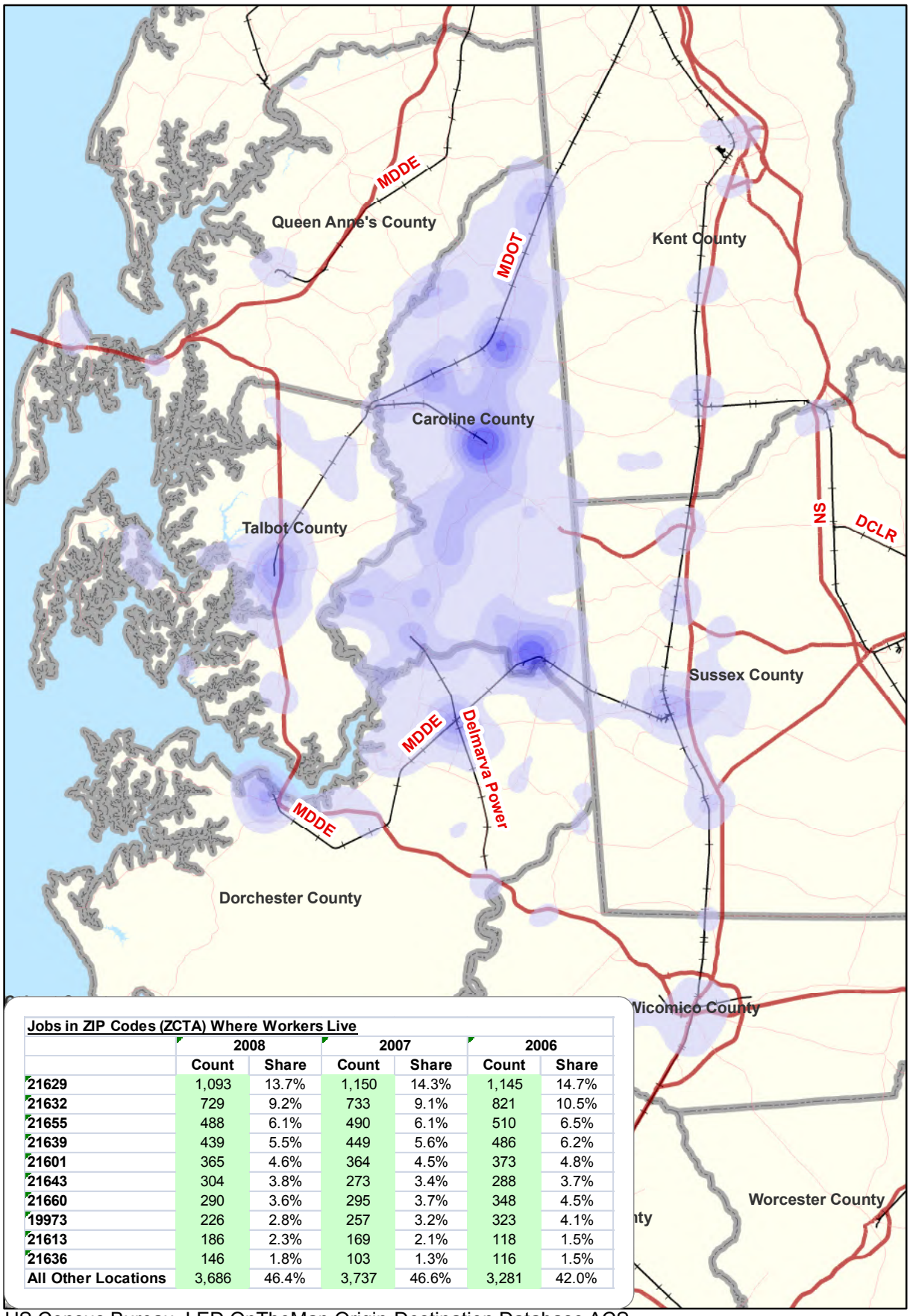
Inundation and Vulnerability

Delaware estimates show predicted average sea level rise for the years 2050, 2100, and 2150 and estimated sea level rise due to Nor'easters based on historic data.

*The Coastal Vulnerability Index (CVI) is based on a ranked scale of 1 through 5 with 1 being very low risk and 5 being very high risk. This ranking system is derived from six physical variables, which are: geomorphology, coastal slope, rate of relative sea-level rise, shoreline erosion and accretion rates, mean tide range, and mean wave height. The CVI is calculated as the square root of the geometric mean, or the square root of the product of the ranked variables divided by the total number of variables.

Laborshed Analysis

Caroline County 2006-2008 as Example



Jobs in ZIP Codes (ZCTA) Where Workers Live	2008		2007		2006	
	Count	Share	Count	Share	Count	Share
21629	1,093	13.7%	1,150	14.3%	1,145	14.7%
21632	729	9.2%	733	9.1%	821	10.5%
21655	488	6.1%	490	6.1%	510	6.5%
21639	439	5.5%	449	5.6%	486	6.2%
21601	365	4.6%	364	4.5%	373	4.8%
21643	304	3.8%	273	3.4%	288	3.7%
21660	290	3.6%	295	3.7%	348	4.5%
19973	226	2.8%	257	3.2%	323	4.1%
21613	186	2.3%	169	2.1%	118	1.5%
21636	146	1.8%	103	1.3%	116	1.5%
All Other Locations	3,686	46.4%	3,737	46.6%	3,281	42.0%

US Census Bureau, LED OnTheMap Origin-Destination Database ACS

Zoning

Delmarva 2010

Industry Infrastructure Gaps

Delmarva 2010