



Port of Vicksburg Market Analysis

Draft Final Report

Submitted by:

SEABURY
MARITIME

Global Reach. Global Scale.

Port of Vicksburg Market Analysis

Draft Final Report

Submitted by



GLOBAL REACH. GLOBAL SCALE.

Seabury Maritime
333 Thornall Street
Edison, NJ 08837 USA



Document Title: Vicksburg Market Analysis – Draft Final Report

Document Short Title: Draft Final Report

Status: Final Draft

Date: April 20, 2020

Project Name: Port of Vicksburg Market Analysis

Client: Vicksburg-Warren Partnership

Drafted By: Gerardo Ayzanoa

Checked By: Patrick Bird

Date/Check: April 18, 2020

Approved By: Patrick Bird

Date/Approval: April 20, 2020



Table of Contents

Executive Summary	1
Project Introduction	2
Project Methodology	3
Regional Profile	4
Mississippi Economy.....	4
Jackson – Vicksburg – Brookhaven Combined Statistical Area (CSA).....	7
Population	7
Employment	8
Establishments by Industry.....	9
Employment by Industry	10
Wages	11
River Freight Analysis	11
Freight Tonnage Along the Mississippi River.....	11
The Port of Vicksburg.....	12
Main River Freight Markets in Vicksburg, Natchez and Greenville	13
Air Freight Analysis	18
Technical Analysis	19
Regional Ports.....	19
Port of Vicksburg	19
Port of Greenville.....	22
Port of Natchez	23
Regional Ports – Technical Capability Matrix	24
Origin-Destination Analysis	25
State of Mississippi Freight Origin – Destination	25
Inbound Freight Commodities.....	29
Outbound Freight Commodities.....	31
Louisiana Freight	33
Freight Development Themes	37
Crude Oil and Petroleum Products.....	37
United States-Mexico-Canada Agreement and the Mississippi Energy Sector	39
Manufacturing.....	40
United States-Mexico-Canada Agreement and the Mississippi Auto Sector	41
Wood Products.....	44
United States-Mexico-Canada Agreement and the Mississippi Wood Products and Paper Sector	45
Agriculture Exports.....	47
Soybeans/Oil Seeds	47
Biomass/Biofuels	50



United States-Mexico-Canada Agreement and the Mississippi Agricultural Sector	52
Ship Yard / Drydock Services	52
Regional Ports – Strengths & Capability Comparison	53
Regional Ports – Commercial and Operational Capability Matrix	53
Regional Ports – Strengths and Opportunities Matrix.....	55
Port of Vicksburg – Intermodal Cost Assessment.....	56
Port of Vicksburg’s Catchment Area	56
Port of Vicksburg - Identified Business Opportunities	61
Spruce logs for Industrial Wood Products.....	62
Custom-blended Animal Feed	62
Biomass and Biofuel	62
Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export.....	62
Dry dock and Shipyard.....	63
Tire Shredding and Roofing Shingle Recycling Aggregate	63
Reconfigure Public Terminal.....	63
Woodchips in Ocean Containers	64
Steel Mill / Scrap Iron from Mexico / Finished Metal Storage	64
Dry fertilizer to the Louisiana delta	65
Plastic Resin Exports	65
Polyurethane and Intermediate Inputs	65
Autoparts Manufacturing & Value Add.....	66
Strategic Criteria Assessment & Opportunity Selection	69
Select Business Opportunities for Port of Vicksburg.....	70
Steel Mill / Scrap Iron from Mexico / Finished Metals Storage	70
Background	70
Market Analysis	70
Port / Transport Infrastructure Requirements	71
Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export.....	72
Background	72
Market Analysis	74
Port / Transport Infrastructure Requirements	76
Woodchips in Ocean Containers	77
Background	77
Market Analysis	78
Port / Transport Infrastructure Requirements	81
Plastic Resin Exports.....	82
Background	82
Market Analysis	83
Port / Transport Infrastructure Requirements	86
Dry dock and Shipyard.....	87
Background	87



- Market Analysis 88
- Port/Transport Infrastructure Requirements 91
- Reconfigure Public Terminal..... 91
 - Background 91
 - Market Analysis 91
 - Port/Transport Infrastructure Requirements 94
- Challenges and Key Considerations of Targeted Opportunities 94**
 - Risks and Challenges..... 94
 - Approach to Risk..... 95
 - Risk Identification 95
 - Risk Assessment..... 96
 - Risk Mitigation 96
 - Opportunity Risk Assessment..... 97
 - Steel Mill/ Scrap Iron from Mexico / Finished Metals Storage..... 97
 - Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export 97
 - Woodchips in Ocean Containers 98
 - Plastic Resin Exports 99
 - Dry dock and Shipyard..... 100
 - Reconfigure Public Terminal..... 101
 - Risk Allocation 101
- Scenario Assessment 102**
 - Opportunity Summary – Estimated Volume and Infrastructure Requirements 102
 - Opportunity Summary – Alternative Site Evaluation 104
 - Opportunity Summary – Decision Tree Analysis 104
- Barriers to Implementation & Policy Implications 105**
 - Financial Objectives 107
 - Efficiency Objectives..... 107
 - Social Objectives..... 107
- Conclusion..... 108**
- Appendix A – Documents/Data Reviewed 110**
 - Documents and Reports..... 110
 - Web Pages 110
 - News Media..... 110



List of Figures

FIGURE 1 KANSAS CITY SOUTHERN RAIL MAP	2
FIGURE 2 GROSS STATE PRODUCT – MISSISSIPPI 1997 - 2018	5
FIGURE 3 SHARE OF MISSISSIPPI ECONOMIC OUTPUT IN TOTAL US OUTPUT 1997-2018	5
FIGURE 4 JACKSON – VICKSBURG – BROOKHAVEN COMBINED STATISTICAL AREA (CSA)	7
FIGURE 5 PORT OF VICKSBURG TOTAL TONNAGE 2000-2018	12
FIGURE 6 MISSISSIPPI RIVER PORT SYSTEM TOTAL TONNAGE BY PORT.....	13
FIGURE 7 MISSISSIPPI RIVER PORT SYSTEM SHARES TOTAL TONNAGE BY PORT	14
FIGURE 8 MISSISSIPPI RIVER PORT SYSTEM PETROLEUM PRODUCTS TONNAGE BY PORT	14
FIGURE 9 CRUDE PETROLEUM SHIPMENT TONNAGE.....	15
FIGURE 10 MISSISSIPPI RIVER PORT SYSTEM GASOLINE TONNAGE BY PORT.....	16
FIGURE 11 MISSISSIPPI RIVER PORT SYSTEM AGRICULTURE TONNAGE BY PORT	16
FIGURE 12 MISSISSIPPI RIVER PORT SYSTEM CHEMICALS TONNAGE BY PORT.....	17
FIGURE 13 MISSISSIPPI RIVER PORT SYSTEM AGGREGATE TONNAGE BY PORT.....	18
FIGURE 14 VIEW OF PORT OF VICKSBURG PUBLIC AND PRIVATE TERMINALS.....	19
FIGURE 15 PROPOSED NEW PORT SITE LOCATIONS.....	21
FIGURE 16 REGIONAL PORTS LOCATION	22
FIGURE 17 US CENSUS REGIONS	26
FIGURE 18 US DEPARTMENT OF ENERGY’S (DOE) PADD3 DISTRICT	38
FIGURE 19 NORTH LOUISIANA – ARKANSAS SELECTED PETROLEUM PRODUCTS OUTPUT – THOUSAND BARRELS	38
FIGURE 20 NORTH LOUISIANA – ARKANSAS FIELD CRUDE OIL OUTPUT – THOUSAND BARRELS.....	39
FIGURE 21 MISSISSIPPI – NAFTA ENERGY TRADE BY VALUE.....	40
FIGURE 22 INDEXED MANUFACTURING INDUSTRY OUTPUT TOTAL US AND MISSISSIPPI	40
FIGURE 23 MANUFACTURING INDUSTRY LOCATION QUOTIENTS – MISSISSIPPI RELATIVE TO US OUTPUT BASED.....	41
FIGURE 24 MISSISSIPPI – NAFTA VEHICLES TRADE BY VALUE	43
FIGURE 25 WOOD MILLS LOCATIONS IN THE SOUTHEASTERN UNITED STATES AND GULF	44
FIGURE 26 WOOD MILLS LOCATED IN MISSISSIPPI	44
FIGURE 27A MISSISSIPPI – NAFTA WOOD AND ARTICLES OF WOOD TRADE BY VALUE	45
FIGURE 28 MISSISSIPPI – NAFTA PAPER TRADE BY VALUE.....	46
FIGURE 29 MISSISSIPPI – NAFTA WATERBORNE SHARE OF PAPER TRADE BY VALUE	46
FIGURE 30 US NATIONAL PRODUCTION OF SOYBEANS 2008 - 2018	47
FIGURE 31 VALUE OF US SOYBEAN EXPORTS TO THE REST OF THE WORLD 2008 – 2018.....	48
FIGURE 32 US SOYBEANS EXPORTS TO REST OF THE WORLD VIA NEW ORLEANS DISTRICT	48
FIGURE 33 US SOYBEANS EXPORTS TO REST OF THE WORLD VIA US EAST COAST PORTS.....	49
FIGURE 34 US EAST COAST SHARE OF ALL SOYBEAN EXPORT VALUE.....	49
FIGURE 35 VALUE OF SOYBEANS EXPORTS THROUGH NORFOLK, VIRGINIA.....	50
FIGURE 36 NORFOLK, VIRGINIA SHARE OF EAST COAST US OUTBOUND SOYBEANS TRADE.....	50
FIGURE 37 US CONSUMPTION OF ETHANOL FORECAST.....	51
FIGURE 38 REAL PETROLEUM PRICES: TRANSPORTATION: ETHANOL (E85): REFERENCE CASE FORECAST	51
FIGURE 39 MISSISSIPPI – NAFTA FOOD AND AGRICULTURE TRADE BY VALUE	52
FIGURE 40 SINGLE-DAY REGIONAL TRUCK TURNS FROM VICKSBURG, 300-MINUTE DRIVE-TIME AREA.....	57
FIGURE 41 TWO DAILY REGIONAL TRUCK TURNS, 135-MINUTE DRIVE-TIME AREA.....	57
FIGURE 42 THREE DAILY REGIONAL TRUCK TURNS, 90-MINUTE DRIVE-TIME AREA	58
FIGURE 43 FOUR DAILY REGIONAL TRUCK TURNS, 45-MINUTE DRIVE-TIME AREA	58
FIGURE 44 VICKSBURG’S COMMERCIAL CARVE-OUT OF CATCHMENT AREA	59
FIGURE 45 REGIONAL WAREHOUSE/DISTRIBUTION INFRASTRUCTURE IN VICKSBURG’S COMMERCIAL CATCHMENT AREA	60
FIGURE 46 REGIONAL SAWMILLS INFRASTRUCTURE IN VICKSBURG’S COMMERCIAL CATCHMENT AREA.....	60
FIGURE 47 ASIA HARDWOOD CHIP IMPORTS, 2003-2018.....	79



FIGURE 48 ASIAN WOODCHIP MARKET BALANCE 2022-2023 80

FIGURE 49 US RESINS LOADED TEU EXPORTS..... 84

FIGURE 50 WORLD TOP COUNTRIES EXPORTING POLYURETHANE – YEAR 2016..... 84

FIGURE 51 WORLD TOP COUNTRIES IMPORTING POLYURETHANE – YEAR 2016..... 85

FIGURE 52 BARGES PER NAVIGATION SYSTEM – YEAR 2018..... 88

FIGURE 53 VICKSBURG WATCO – TRACK CAPACITY AND CURVATURE IMPROVEMENTS 92

FIGURE 54 VICKSBURG WATCO – UNIT TRAIN OPERATIONS (ALTERNATIVE FOR LANDING TRACK TO RECEIVE AND DEPART A COMPLETE TRAIN)..... 93

List of Tables

TABLE 1 MISSISSIPPI LABOR MARKET OCCUPATIONAL DISTRIBUTION 6

TABLE 2 US LABOR MARKET (EXCEPT MISSISSIPPI) OCCUPATIONAL DISTRIBUTION 6

TABLE 3 JACKSON – VICKSBURG – BROOKHAVEN CSA POPULATION..... 7

TABLE 4 USA POPULATION BY CENSUS REGION..... 8

TABLE 5 CSA POPULATION GROWTH COMPONENTS 8

TABLE 6 CSA EMPLOYMENT GROWTH..... 8

TABLE 7 CSA EMPLOYMENT SHARES 9

TABLE 8 CSA ESTABLISHMENTS BY NAICS..... 9

TABLE 9 CSA EMPLOYMENT BY NAICS..... 10

TABLE 10 CSA AVERAGE WEEKLY WAGE (US\$)..... 11

TABLE 11 PORT OF VICKSBURG FREIGHT (MT) BY COMMODITY 12

TABLE 12 FUTURE PORT SITE ALTERNATIVES COMPARATIVE MATRIX 20

TABLE 13 MISSISSIPPI FREIGHT SHIPMENTS 2013 – 2017 (000 TONS)..... 25

TABLE 14 MISSISSIPPI INBOUND FREIGHT SHIPMENTS 2013 – 2017 (000 TONS) 25

TABLE 15 MISSISSIPPI OUTBOUND FREIGHT SHIPMENTS 2013 – 2017 (000 TONS)..... 26

TABLE 16 MISSISSIPPI INBOUND DOMESTIC FREIGHT SHIPMENTS 2013 – 2017 (000 TONS)..... 26

TABLE 17 MISSISSIPPI OUTBOUND DOMESTIC FREIGHT SHIPMENTS 2013 – 2017 (000 TONS)..... 27

TABLE 18 MISSISSIPPI INBOUND SHIPMENTS BY MODE (000 TONS)..... 27

TABLE 19 MISSISSIPPI OUTBOUND SHIPMENTS BY MODE (000 TONS) 27

TABLE 20 MISSISSIPPI INTER-REGIONAL INBOUND SHIPMENTS BY MODE (000 TONS)..... 28

TABLE 21 MISSISSIPPI INBOUND SHIPMENTS FROM WEST SOUTH CENTRAL REGION BY MODE (000 TONS) 28

TABLE 22 MISSISSIPPI INTER-REGIONAL OUTBOUND SHIPMENTS BY MODE (000 TONS)..... 28

TABLE 23 MISSISSIPPI SHIPMENTS TO WEST SOUTH CENTRAL REGION BY MODE (000 TONS) 29

TABLE 24 DOMESTIC INBOUND TONNAGE BY COMMODITY (000 TONS) 29

TABLE 25 INTERNATIONAL INBOUND TONNAGE BY COMMODITY (000 TONS) 30

TABLE 26 DOMESTIC OUTBOUND TONNAGE BY COMMODITY (000 TONS) 31

TABLE 27 INTERNATIONAL OUTBOUND TONNAGE BY COMMODITY (000 TONS) 32

TABLE 28 INBOUND LOUISIANA FREIGHT SOURCED FROM MS RIVER BORDER STATES (000 TONS)..... 33

TABLE 29 INBOUND WATER TRAFFIC TO LOUISIANA FROM MISSISSIPPI RIVER STATES (000 TONS) 34

TABLE 30 OUTBOUND WATER TRAFFIC FROM LOUISIANA TO MISSISSIPPI RIVER STATES (000 TONS)..... 35

TABLE 31 MISSISSIPPI TOP COMMODITY NAFTA EXPORTS 2018..... 42

TABLE 32 MISSISSIPPI TOP COMMODITY NAFTA IMPORTS 2018 42

TABLE 33 REGIONAL PORTS – COMMERCIAL AND OPERATIONAL CAPABILITY MATRIX 53

TABLE 34 REGIONAL PORTS – STRENGTHS AND OPPORTUNITIES MATRIX 55

TABLE 35 MODAL COST COMPARISON FOR A NEW ORLEANS – VICKSBURG CONTAINER SERVICE 61

TABLE 36 BUSINESS OPPORTUNITIES AND SUMMARY OF MAIN FACTORS FOR COMPARATIVE EVALUATION 66



TABLE 37 SOYBEANS EXPORTS BY PORT DISTRICT IN BULK AND CONTAINERS FOR 2017 AND 2019..... 73

TABLE 38 CORN EXPORTS BY PORT DISTRICT IN BULK AND CONTAINERS FOR 20017 AND 2019 73

TABLE 39 ESTIMATED VICKSBURG CONTAINERIZED SOYBEAN SHIPMENT VOLUME - LOW CASE 74

TABLE 40 ESTIMATED VICKSBURG CONTAINERIZED SOYBEAN SHIPMENT VOLUME - MEDIUM CASE 75

TABLE 41 ESTIMATED VICKSBURG CONTAINERIZED SOYBEAN SHIPMENT VOLUME - HIGH CASE 75

TABLE 42 COST COMPARISONS VICKSBURG - SHANGHAI..... 76

TABLE 43 COST COMPARISONS VICKSBURG - ROTTERDAM..... 77

TABLE 44 WOOD CHIPS (NON-CONIFEROUS, HARDWOOD) EXPORTS BY PORT DISTRICT IN BULK AND CONTAINERS FOR 20017
AND 2019 80

TABLE 45 POTENTIAL WOOD CHIPS EXPORTS THROUGH VICKSBURG – BASE ESTIMATE 81

TABLE 46 RESIN EXPORTS BY PORT DISTRICT IN BULK AND CONTAINERS FOR 2017 AND 2019 85

TABLE 47 POTENTIAL RESIN EXPORTS THROUGH VICKSBURG – BASE ESTIMATE 86

TABLE 48 U.S. FLAGGED VESSELS BY TYPE AND YEAR 87

TABLE 49 GEOGRAPHICAL ALLOCATION OF NON SELF-PROPELLED FLEET (BARGES) - YEAR 2018 87

TABLE 50 VICKSBURG’S NON SELF-PROPELLED FLEET (BARGES) - YEAR 2018..... 90

TABLE 51 VICKSBURG’S FLEET AGE DISTRIBUTION (AS REPORTED IN YEAR 2018) 90

TABLE 52 BUSINESS OPPORTUNITY SUMMARY 102

TABLE 53 FUTURE SITE ALTERNATIVES STRATEGIC COMPARATIVE MATRIX 104

TABLE 54 OPPORTUNITY SUMMARY - DECISION TREE ANALYSIS..... 105



Glossary of Terms, Abbreviations and Acronyms

BDMT	Bone Dry Metric Ton
BLS	Bureau of Labor Statistics
CBP	County Business Patterns
CN	Canadian National (Railway)
CSA	Combined Statistical Area
FAF	Freight Analysis Framework
FHWA	Federal Highway Administration
IWR	Institute for Water Resources
KCS	Kansas City Southern (Railway)
MT	Metric Ton
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
OECD	Organisation for Economic Cooperation and Development
POV	Port of Vicksburg
TEU	Twenty-foot Equivalent Unit
USACE	United States Army Corps of Engineers
USEIA	United States Energy Information Agency
USMCA	United States-Mexico-Canada Agreement
VSOR	Vicksburg Southern Rail



Executive Summary

The Port of Vicksburg is currently one of 16 ports in Mississippi, and one of six along the Mississippi River. It's the 11th most active inland port in the U.S, which in addition to its Mississippi River connectivity, boasts being served by a class-1 rail service, as well Interstates 20 and 55. It is also a designated foreign trade zone. The Port of Vicksburg is undertaking a critical initiative to expand the capabilities and capacity of their Port infrastructure, in order to grow the local economy, create jobs, and provide benefit to the local community. The idea is for Port of Vicksburg, when fully developed, to expand its ability to serve as a frequent continuation point along the River's shipping routes between the US Midwest and Gulf of Mexico; and ultimately onward.

In support of these efforts, the Vicksburg-Warren Partnership requested proposals in September, 2019 seeking a Consultant in port market analysis to establish the competitive position of Vicksburg (the existing Port and the local area as a port location in general), identify business and development opportunities, and perform other supporting services. The market analysis includes a review of the competitive economics for expanding the port's footprint or developing a new port area, having the ultimate aim of delivering a successful foundation for an implementable and bankable project plan.

Seabury Maritime, in collaboration with Strategic Rail Finance (the Consultant Team) was subsequently engaged in produce a full market analysis study to identify target markets and commercial opportunities to support the development of a new facility for services to feed cargo along the Mississippi River. The combined Consultant Team was composed of a team of port operations, supply chain, and intermodal professionals, in order to assess the market potential for a new facility from multiple different points of vision.

Over the course of four months, the Consultant Team has gained significant insight to the overall supply and demand picture associated with the region and developed a comprehensive understanding of the Port of Vicksburg's overall market positioning relative to its competitors, including its corresponding economic impact on the surrounding area.

The Project Methodology centered on three key tenets, which are fundamental to achieving success with this Project:

1. **Determination of Demand** - What potential volume and opportunities exist in the market which could be shifted (at least in part) to the new facility? What primary or intermediate products are "stranded" in the marketplace due to supply chain costs?
2. **Value Proposition Development** – What conditions are required by users, and what benefits would a new project create in their supply chains?
3. **Concept Validation and Implementation** – Of the opportunities created and stemming from market demand, can the concept be validated and what is the best way to implement it?

After consultation with local stakeholders and an analysis of historic and current regional and national trends, the Consultant Team identified a total of thirteen potential business opportunities which were presented to Vicksburg-Warren Partnership leadership team and its project advisor, Jacobs Engineering Group (Jacobs). The potential opportunities were subsequently trimmed down to a total of 6, representing those which, in the view of the Consultant, are the most probable in terms of job creation, infrastructure requirements, revenue generation, throughput and ease of implementation.



Following this methodology, the Consultant Team believes that the Port of Vicksburg is well-positioned to develop a new project centered around one or all of the following:

1. Steel Mill / Scrap Iron Imports from Mexico / Finished Metals Storage
2. Expanded DryDock and Shipyard operation
3. Containerized Soybean Exports
4. Woodchips Exports in Containers
5. Resin Exports
6. Reconfigure Public Terminal

This report also presents an outline of the principal risks associated with each opportunity, inclusive of high level mitigation strategies for those which have been defined. While it is believed that these opportunities have the most potential to meet the expansion and development objectives of the Port, the strategy for the successful implementation of a new terminal or expansion of the Port’s asset base must also provide an adequate return on investment to both the operation (financial impact) and the broader community (economic impact), which was not part of this analysis. The report concludes with a range of financing options and institutional frameworks for executing each project. It is thus recommended that a business plan based on firm commercial contracts should be developed for either opportunity before committing investment capital.

Project Introduction

Located at the confluence of the Yazoo River with the Mississippi River, the Port of Vicksburg is one of 16 ports in Mississippi, and one of six along the Mississippi River. It’s the 11th most active inland port in the U.S, which in addition to its Mississippi River connectivity, is located at the point where the Kansas City Southern Railway crosses the river. Vicksburg is the middle of KCS’ Shreveport – Meridian line known as the Meridian Speedway, providing joint service with NS from Mexico and Texas to all points in the Northeast and Southeast. Additionally, Interstates 20 and 55 meet in Vicksburg, with I20 providing the only interstate river crossing between Baton Rouge and Memphis. The port is also a designated foreign trade zone. Currently, the bulk of barge traffic on the Yazoo is confined to the Port of Vicksburg, with occasional river traffic moving to Yazoo City, mostly grain and fertilizer.

Figure 1 Kansas City Southern Rail Map



The Port’s location on the Yazoo River, which connects to the Mississippi River, is approximately 250 miles from the Gulf of Mexico and a crucial aspect to the success of this expansion. Much of the Port’s cargo is generated within the State of Mississippi and consists primarily of bulk and breakbulk materials, including steel, aluminum, ores, grain, forest products, pellets, chemicals, fertilizer, and liquid cargoes.

The principal focus of river traffic is thus raw materials, intermediate inputs, and products that are not time-sensitive. However, rail and truck can provide complementary market access for firms

looking to process these bulk commodities into higher-value products.



Pursuant to the market opportunities outlined in this report, it is envisioned that the Port of Vicksburg would reorganize its current configuration and/or acquire land in and surrounding the existing port facilities to convert into a new terminal with enhanced multimodal capabilities. The size of available sites, their configuration relative to river, rail, and road access, and the footprint required by potential tenants will all be taken into consideration in building a comprehensive market study. Consideration will also be placed on the benefits of long-term land lease, build-to-suit, or site sale depending on the freight-based development opportunities. Each of these elements are envisioned to be the primary inputs for the forthcoming port master planning activity.

During the course of the analysis for this report, the Consultant Team spoke with numerous stakeholders, reviewed freight data and analyzed regional and national trends in search of market opportunities which the Port of Vicksburg has a competitive advantage to attract. Several opportunities were identified and the most realistic outlined in detail later on for the Port's consideration. Once a clear market need is established for a specific project, or projects, additional feasibility studies will be required in order to establish a basis of design, ensure that the available sites can be matched to the needs of the market, and substantiate the economic viability of the project through a credible business plan for all parties involved. For the purpose of this report, the Consultant Team has focused primarily on identifying these opportunities, but also to outline at a high level what could be a practical way forward if the project is deemed economically attractive by its constituents. The objectives are the following:

- a. Facilitate an understanding of the market for commodities that typically move through Mississippi along the Mississippi River in order to accurately forecast the growth and evolution of maritime freight flows in/out of the region;
- b. Examine and evaluate the inland logistics chains that facilitate the movement of freight in and out of the port system;
- c. Outline of competing port and terminal infrastructures;
- d. Target specific customers which could potentially become anchor tenants in the new port/ terminal;
- e. Assess the Project's viability per cargo / terminal type;
- f. Outline of inland transport services enabling freight flows across the region and country, including upgrades if required for future project viability;
- g. Identification of possible commercial opportunities in the freight transport value chain in particular of industrial parks/zones;
- h. Solidify the appropriate staging of land acquisition and the development concept for the project, including what is likely to be a phased approach to such a development;
- i. Develop a realistic list of potential tenants of acquired land by industry type; and
- j. (Develop the basis for a future, realistic Supply/Demand forecast for the cargoes which can be associated with the potential tenants of the port.) – *if requested*

Project Methodology

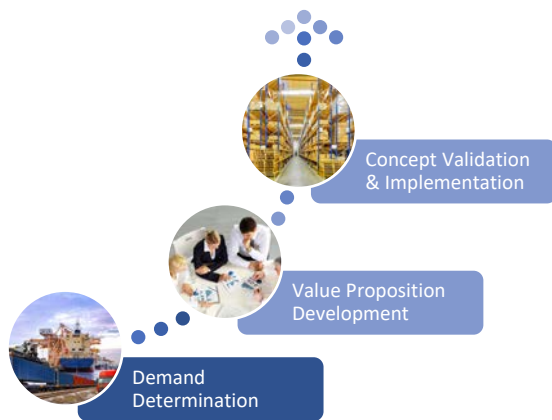
During the course of the market analysis, the Consultant Team employed a symmetrical qualitative and quantitative approach which guided our research, assessment, and recommendations for implementation.

The Project Methodology centered on three key tenets, which are fundamental to achieving success with this Project:

1. **Determination of Demand** - What potential volume and opportunities exist in the market which could be shifted (at least in part) to the new facility? What primary or intermediate products are “stranded” in the marketplace due to supply chain costs?
2. **Value Proposition Development** – What conditions are required by the users, and what benefits would a new project create in their supply chains?



3. **Concept Validation and Implementation** – Of the opportunities created and stemming from market demand, can the concept be validated and what is the best way to implement it?



Throughout Task 1, the Consultant Team worked with Port of Vicksburg to gather data and information necessary to conduct the market analysis, specifically the information required for an analysis of cargo volumes, quality of rail transportation, inbound/outbound shipments, distance to origin or destination, inbound and outbound freight shipments, airport links and other information to successfully deliver the scope.

Tasks 2 & 3 focused on assessing the port region and all relevant competition across a number of categories, including but not limited to stevedoring services, trucking services, inventory/assets, rail services and origin-destination analysis. The Consultant Team then compared and contrasted Port of Vicksburg against one

or more of the competitors in its ability to capture and execute on future opportunities.

Conversely, in Task 4, the Consultant Team identified key risks and challenges associated with each of the identified market opportunities; highlighting mitigation strategies to each primary impediment and further laying out scenarios which will range from ‘do nothing’ to a more robust ‘investment approach’. This approach helps the Port to understand the requirements of each opportunity and articulate a unique Vicksburg-centric Value Proposition to prospective clients.

Regional Profile

This first diagnostic task of the Market Analysis documents broad economic trends, regional infrastructure and cargo flows throughout the State of Mississippi and in the region.

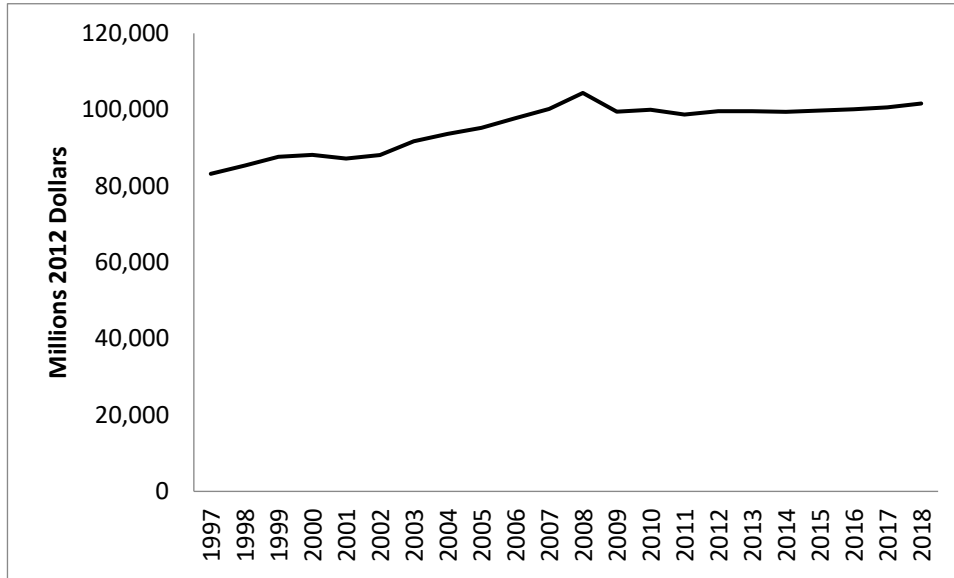
The first subsection of the report, the Regional Profile, provides a macro-view of the drivers influencing the state and the county’s economies (population, employment establishments by industry), as well as a detailed historical analysis of freight handled through Vicksburg and at the region’s other main terminal facilities. These variables provide the basis for understanding historic cargo demand and anticipated changes in future demand likely to be triggered by economic growth. The analysis of historic data on river freight helps illuminate the relationship between the regional economy and demand for port services. A detailed review of the main river freight markets is presented for the Mississippi ports of Vicksburg, Natchez and Greenville, the latter two being close competitors to Vicksburg.

Mississippi Economy

The performance of the Mississippi economy is relatively independent from the US economy. The correlation coefficient for the State’s economic output and the US is just 0.55 and a linear regression of the State’s output as a function of US output shows that only 29 percent of the variance of Mississippi’s output can be explained by changes in the US economy. That the State and the national economy appear to be relatively decoupled implies that either improvements or downturns in the US economy will not fully translate to Mississippi’s economic performance. Figure 1 shows the path of Mississippi’s gross state output from 1997 to 2018, a relatively stable positive trend.



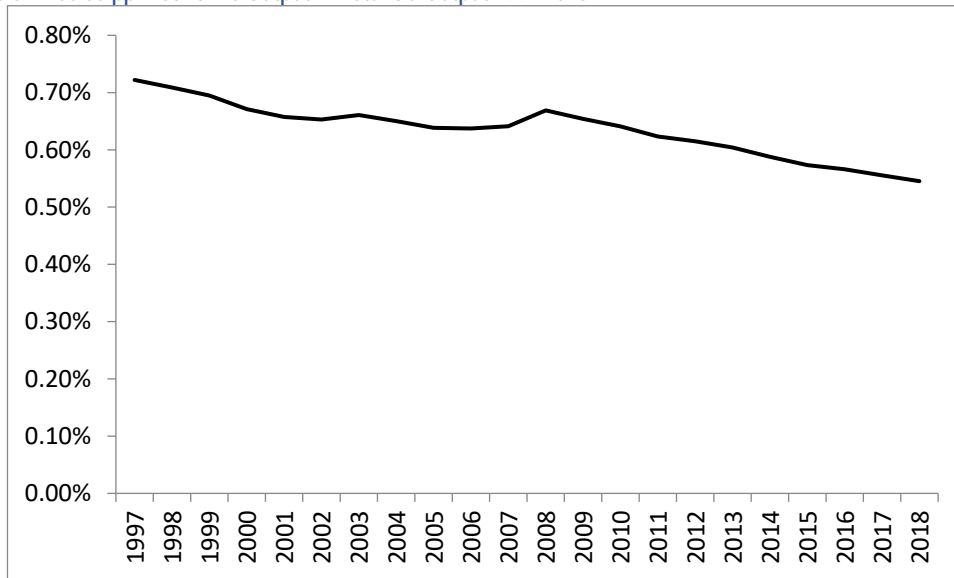
Figure 2 Gross State Product – Mississippi 1997 - 2018



Source: US Bureau of Economic Analysis

The Mississippi economy generated growth of 2.1 percent annually from 1997 to 2008 but was derailed by the financial crisis of 2008-09. Since that time, the State’s share of total US output dropped slightly from 0.72 percent in 1997 to 0.55 percent in 2018.

Figure 3 Share of Mississippi Economic Output in Total US Output 1997-2018



Source: US Bureau of Economic Analysis and Seabury Calculations

One feature that the Mississippi economy does share with the rest of the US is its changing industrial composition. Service industries are an increasingly important component of the Mississippi economy. The table below displays the Mississippi labor market’s occupational distribution from 2003 to 2018 in 5-year intervals. Production occupations (manufacturing and agriculture), construction and extractive industries are suffering a slight contraction while service-oriented occupations such as business and financial operations, community and social services, health care and computer and mathematical occupations are steadily expanding.



Table 1 Mississippi Labor Market Occupational Distribution

Occupational Title	Year				15 Year Growth Rate
	2003	2008	2013	2018	
Architecture and engineering	14,110	19,890	14,090	13,950	-0.1%
Arts, design, entertainment, sports, and media	7,350	8,260	7,730	8,140	0.7%
Building and grounds cleaning and maintenance	35,270	36,450	35,170	35,550	0.1%
Business and financial operations	23,500	26,380	27,060	32,100	2.1%
Community and social service	8,520	12,500	11,710	14,190	3.5%
Computer and mathematical	9,120	10,010	10,490	12,380	2.1%
Construction and extraction	53,300	60,690	50,470	41,250	-1.7%
Education, training, and library	66,470	75,320	75,730	74,730	0.8%
Farming, fishing, and forestry	5,630	4,460	4,330	4,800	-1.1%
Food preparation and serving related	89,800	99,700	100,800	102,770	0.9%
Healthcare practitioners and technical	59,530	69,850	73,870	79,780	2.0%
Healthcare support	27,400	33,570	34,660	31,110	0.9%
Installation, maintenance, and repair	49,950	50,480	50,060	51,980	0.3%
Legal	6,540	6,310	5,000	5,720	-0.9%
Life, physical, and social science	6,820	7,300	6,540	6,220	-0.6%
Management	51,200	44,160	49,010	56,330	0.6%
Office and administrative support	174,980	177,670	161,260	163,150	-0.5%
Personal care and service	24,740	24,860	26,470	32,980	1.9%
Production	131,070	121,020	106,160	108,810	-1.2%
Protective service	30,150	32,290	33,260	32,290	0.5%
Sales and related	110,510	120,210	112,190	115,820	0.3%
Transportation and material moving	99,740	96,840	87,520	99,780	0.0%
Total	1,085,700	1,138,220	1,083,580	1,123,830	0.2%

Source: US BLS, Occupational Employment Statistics (OES) Survey Various Years

Table 2 US Labor Market (Except Mississippi) Occupational Distribution

Occupational Title	Year				15 Year Growth Rate
	2003	2008	2013	2018	
Architecture and engineering occupations	2,375,460	2,515,510	2,381,440	2,557,660	0.5%
Arts, design, entertainment, sports, and media occupations	1,537,810	1,804,960	1,757,940	1,950,460	1.6%
Building and grounds cleaning and maintenance occupations	4,270,740	4,444,860	4,307,040	4,430,630	0.2%
Business and financial operations occupations	4,940,860	6,155,040	6,675,000	7,735,080	3.0%
Community and social service occupations	1,620,990	1,869,130	1,908,280	2,174,070	2.0%
Computer and mathematical occupations	2,825,290	3,308,130	3,695,960	4,383,910	3.0%
Construction and extraction occupations	6,098,630	6,502,160	5,079,810	5,954,800	-0.2%
Education, training, and library occupations	7,800,940	8,448,460	8,407,970	8,776,870	0.8%
Farming, fishing, and forestry occupations	405,130	434,250	432,850	477,090	1.1%
Food preparation and serving related occupations	10,198,210	11,416,150	11,894,400	13,346,570	1.8%
Healthcare practitioners and technical occupations	6,156,380	7,055,190	7,733,390	8,621,330	2.3%
Healthcare support occupations	3,187,360	3,761,110	3,902,720	4,097,540	1.7%
Installation, maintenance, and repair occupations	5,216,700	5,364,670	5,122,780	5,610,010	0.5%
Legal occupations	950,460	1,001,910	1,041,990	1,127,550	1.1%
Life, physical, and social science occupations	1,115,570	1,299,760	1,136,890	1,172,340	0.3%
Management occupations	6,643,890	5,697,040	6,537,260	7,605,420	0.9%
Office and administrative support occupations	22,703,650	23,264,950	21,469,470	21,836,100	-0.3%
Personal care and service occupations	2,952,660	3,403,630	3,977,740	5,434,190	4.2%
Production occupations	10,449,600	9,881,780	8,725,500	9,064,210	-0.9%
Protective service occupations	3,037,460	3,168,760	3,292,310	3,466,460	0.9%



Sales and related occupations	13,533,820	14,334,620	14,074,520	14,532,660	0.5%
Transportation and material moving occupations	9,391,100	9,478,440	8,975,150	10,193,050	0.5%
Total	127,412,710	134,610,510	132,530,410	144,548,000	0.8%

Source: US BLS, Occupational Employment Statistics (OES) Survey Various Years

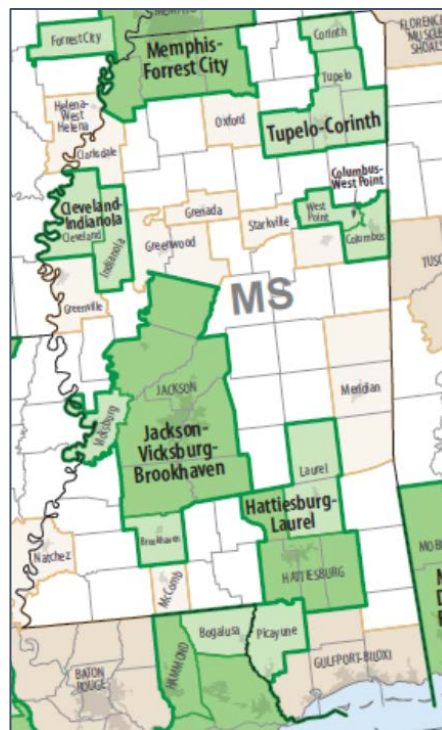
In the national labor market, jobs increased by 0.8 percent per year, four times the pace of Mississippi’s expansion. Production occupations nationally fell by 0.9 percent per year still slightly above the 1.2 percent average annual decline in Mississippi. Transportation and material moving occupations rose by 0.5 percent per year in the US while in Mississippi, employment in this category remained constant. Other sectors such as healthcare and other service occupations followed the national trends.

Jackson – Vicksburg – Brookhaven Combined Statistical Area (CSA)

Population

The City of Vicksburg is the County Seat of Warren County and lies on the far western reaches of the Jackson – Vicksburg – Brookhaven Combined Statistical Area (CSA). In addition to Warren County, the CSA includes the counties of Yazoo, Madison, Hinds, Rankin Copiah, Simpson, Lincoln and Claiborne. The CSA spans 6,310.7 square miles with a total estimated population in 2018 of 669,549 persons.

Figure 4 Jackson – Vicksburg – Brookhaven Combined Statistical Area (CSA)



Source: US Census 2019

Table 3 Jackson – Vicksburg – Brookhaven CSA Population

County	2010	2012	2014	2016	2018	Average Annual Growth 2010-2018
Hinds	245,285	247,980	245,278	242,232	237,085	-0.4%
Rankin	141,617	145,804	148,425	151,527	153,902	1.0%
Madison	95,203	98,065	100,860	103,892	105,630	1.3%
Warren	48,773	48,216	47,944	46,996	46,176	-0.7%
Lincoln	34,869	34,848	34,739	34,373	34,205	-0.2%



Copiah	29,449	29,047	28,980	28,663	28,543	-0.4%
Yazoo	28,065	28,336	27,805	27,925	28,248	0.1%
Simpson	27,503	27,417	27,508	26,991	26,758	-0.3%
Claiborne	9,604	9,353	9,168	9,163	9,002	-0.8%
Jackson-Vicksburg-Brookhaven CSA	660,368	669,066	670,707	671,762	669,549	0.2%

Source: US Census

The CSA population has expanded just 0.2 percent per year on average during 2010-2018. While faster than the State of Mississippi (+0.08%/year), population growth in the CSA falls significantly behind the nation as a whole (+0.7%/year), and each individual US Census region except for the Northeast. Mississippi lies in the Southern Census Region.

Table 4 USA Population by Census Region

Region	2010	2012	2014	2016	2018	Average Annual Growth 2010-2018
Northeast	55,317,240	55,776,729	56,015,864	56,058,789	56,111,079	0.2%
Midwest	66,927,001	67,336,937	67,752,238	67,996,917	68,308,744	0.3%
South	114,555,744	117,271,075	119,657,737	122,401,186	124,753,948	1.1%
West	71,945,553	73,489,477	74,960,582	76,614,450	77,993,663	1.0%
Total US	308,745,538	313,874,218	318,386,421	323,071,342	327,167,434	0.7%

Source: US Census

Population growth in the CSA is primarily an organic process. Cumulative births during the 2010-2018 period amounted to 71,065 while deaths were 50,668. But while international migration added a cumulative 5,083 persons, domestic net migration showed a loss of 16,945 people during the period. Moreover, net domestic migration has been negative every year since 2011. Overall 11,862 more persons left the CSA during the period than settled there from someplace else.

Table 5 CSA Population Growth Components

Population Growth Component	2010	2012	2014	2016	2018	Total
Births	2,109	9,012	8,885	8,502	7,977	71,065
Deaths	1,092	5,874	6,150	6,348	6,409	50,668
Natural Increase	1,017	3,138	2,735	2,154	1,568	20,397
International Migration	169	432	705	280	771	5,083
Domestic Net Migration	139	-1,748	-2,412	-1,536	-4,464	-16,945
Overall Net Migration	308	-1,316	-1,707	-1,256	-3,693	-11,862

Source: US Census

Employment

Job growth in the CSA compares favorably to the broader State of Mississippi. From 2001 – 2018 employment in the CSA increased an average of 0.5 percent per year, accelerating to 0.8 percent per year from 2010 to 2018. Job growth was comparatively low across the State of Mississippi with an average annual increase of just 0.1 percent from 2001 – 2018 and a 0.6 percent per year increase from 2010 to 2018. Of the nine counties that comprise the CSA, Madison county posted the fastest rate of job growth during the 2001 – 2018 (4.1%) period and the 2010 – 2018 period as well (3.4%). Job growth in Warren County was negative and the worst performer among all nine CSA counties.

Table 6 CSA Employment Growth

	Warren	Simpson	Rankin	Madison	Lincoln	Hinds	Copiah	Claiborne	Yazoo	Total CSA	State



Year 2001	24,104	6,715	45,709	27,763	11,596	134,285	7,243	3,862	6,470	267,747	1,111,255
Year 2010	21,508	7,405	54,404	42,404	10,803	122,548	7,107	3,397	6,085	275,661	1,074,617
Year 2018	19,725	7,146	62,354	55,416	12,185	120,145	6,967	3,458	6,397	293,793	1,130,786
Avg Annual Growth 2001 - 2018	-1.2%	0.4%	1.8%	4.1%	0.3%	-0.7%	-0.2%	-0.6%	-0.1%	0.5%	0.1%
Avg Annual Growth 2010 - 2018	-1.1%	-0.4%	1.7%	3.4%	1.5%	-0.2%	-0.2%	0.2%	0.6%	0.8%	0.6%

Source: US Bureau of Labor Statistics

Hinds County, in which the City of Jackson is located, held by far the largest share of CSA employment in 2018 (40.9%). However, that is nearly 10 percentage points lower than in 2001. During the same period, employment shares in Madison County and Rankin County improved significantly and are now 18.9 percent and 21.2 percent of CSA employment, respectively.

Table 7 CSA Employment Shares

	Warren	Simpson	Rankin	Madison	Lincoln	Hinds	Copiah	Claiborne	Yazoo	Total CSA
2001	9.0%	2.5%	17.1%	10.4%	4.3%	50.2%	2.7%	1.4%	2.4%	100.0%
2010	7.8%	2.7%	19.7%	15.4%	3.9%	44.5%	2.6%	1.2%	2.2%	100.0%
2018	6.7%	2.4%	21.2%	18.9%	4.1%	40.9%	2.4%	1.2%	2.2%	100.0%

Source: USBLS and author’s calculations

Establishments by Industry

According to the US Census County Business Patterns, in 2017 there were 15,195 business establishments in the CSA and 58,927 establishments across the State of Mississippi. The industrial distribution is displayed below.

Table 8 CSA Establishments by NAICS

NAICS Classification	CSA Establishments	CSA NAICS Share	State Establishments	State NAICS Share	CSA Share of State by NAICS
Accommodation and Food Services	1,392	9.2%	5,661	9.6%	24.6%
Administrative and Support Services	662	4.4%	2,233	3.8%	29.6%
Agriculture, Forestry, Fishing and Hunting	99	0.7%	676	1.1%	14.6%
Arts, Entertainment, and Recreation	178	1.2%	700	1.2%	25.4%
Construction	1,049	6.9%	3,846	6.5%	27.3%
Education	178	1.2%	584	1.0%	30.5%
Finance and Insurance	1,240	8.2%	4,652	7.9%	26.7%
Health Care and Social Assistance	1,738	11.4%	6,375	10.8%	27.3%
Information	289	1.9%	988	1.7%	29.3%
Management of Companies and Enterprises	116	0.8%	351	0.6%	33.0%
Manufacturing	415	2.7%	2,143	3.6%	19.4%
Mining, Quarrying, and Oil and Gas Extraction	79	0.5%	292	0.5%	27.1%
Other Services (except Public Administration)	1,593	10.5%	6,404	10.9%	24.9%
Professional, Scientific, and Technical Services	1,557	10.2%	4,686	8.0%	33.2%
Real Estate and Renting and Leasing	705	4.6%	2,383	4.0%	29.6%
Retail Trade	2,568	16.9%	11,544	19.6%	22.2%



NAICS Classification	CSA Establishments	CSA NAICS Share	State Establishments	State NAICS Share	CSA Share of State by NAICS
Transportation	420	2.8%	2,110	3.6%	19.9%
Utilities	113	0.7%	594	1.0%	19.0%
Wholesale Trade	783	5.2%	2,628	4.5%	29.8%
Other	21	0.1%	77	0.1%	27.3%
Total	15,195	100.0%	58,927	100%	25.8%

Source: US Census County Business Patterns 2017

From the data above, it is apparent that the CSA economy is composed primarily of firms providing professional, managerial or administrative functions. For instance, CSA finance and insurance industry were 26.7 percent of all establishments in the State, compared to the CSA’s total establishment statewide share of 25.8 percent. Similar numbers are revealed for professional, scientific and technical services (33.2% compared to 25.8%), and management of companies and enterprises (33.0% compared to 25.8%). Of the industries that are most reliant upon freight transportation, establishments classified as wholesale trade, were 5.2 percent of all CSA establishments compared to a statewide share of 4.5 percent. CSA wholesale trade establishments accounted for 29.8 percent of all statewide establishments in that classification. Establishments classified as retail trade were 16.9 percent of all CSA establishments compared to 19.6 percent statewide. CSA retail trade was 22.2 percent of all establishments statewide. Manufacturing, however, was just 2.7 percent of the CSA compared to 3.6 percent for the State. CSA manufacturing establishments accounted for 19.4 percent of all such establishments across the State.

Employment by Industry

Employment by industrial classification is calculated using the County Business Patterns employment shares by NAICS applied to the US Bureau of Labor Statistics total CSA employment of 2018.¹

Table 9 CSA Employment by NAICS

NAICS Classification	CSA Employment	CSA NAICS Share	State Employment	State NAICS Share	CSA Share of State by NAICS
Accommodation and Food Services	34,734	11.8%	159,555	14.1%	21.8%
Administrative and Support Services	13,340	4.5%	53,270	4.7%	25.0%
Agriculture, Forestry, Fishing and Hunting	681	0.2%	5,681	0.5%	12.0%
Arts, Entertainment, and Recreation	2,514	0.9%	10,583	0.9%	23.8%
Construction	13,338	4.5%	53,109	4.7%	25.1%
Education	9,053	3.1%	19,641	1.7%	46.1%
Finance and Insurance	14,219	4.8%	39,249	3.5%	36.2%
Health Care and Social Assistance	63,571	21.6%	201,988	17.9%	31.5%
Information	7,641	2.6%	17,017	1.5%	44.9%
Management of Companies and Enterprises	3,573	1.2%	10,703	0.9%	33.4%
Manufacturing	27,915	9.5%	179,774	15.9%	15.5%
Mining, Quarrying, and Oil and Gas Extraction	945	0.3%	4,233	0.4%	22.3%
Other Services (except Public Administration)	13,878	4.7%	47,069	4.2%	29.5%
Professional, Scientific, and Technical Services	12,623	4.3%	36,688	3.3%	34.4%
Real Estate and Renting and Leasing	3,750	1.3%	12,001	1.1%	31.2%
Retail Trade	40,732	13.9%	173,027	15.3%	23.5%
Transportation	14,146	4.8%	48,380	4.3%	29.2%
Utilities	2,918	1.0%	11,515	1.0%	25.3%

¹ Note that the CBP and the USBLS arrive at different employment estimates. To be consistent we apply the CBP shares by NAICS to the US BLS totals.



Wholesale Trade	14,188	4.8%	44,895	4.0%	31.6%
Other	35	0.0%	120	0.0%	29.1%
Total	293,794	100.0%	1,128,498	100.0%	26.0%

Source: US Census County Business Patterns 2017

Twenty-six (26.0%) percent of all employment in Mississippi is located in the CSA. As in the case of establishments, the industrial distribution of jobs is weighted towards professional, managerial or administrative occupations. Almost 45 percent of statewide information jobs are in the CSA; 34.4 percent of professional, scientific and technical services jobs and 46.1 percent of education jobs. At 31.6 percent, wholesale trade is overrepresented by the CSA, however, retail jobs (23.5%) and manufacturing jobs (15.5%) are both underrepresented.

Wages

Claiborne County workers are the best paid among all CSA counties and outstrip Mississippi average wages, as well. However, this is primarily due to the location of the Grand Gulf Nuclear Power Plant, where workers earn relatively high wages and benefits, and therefore, skew the county-wide wage distribution. Warren County is ranked third behind Claiborne and Hinds, but well-above the State of Mississippi. Wage growth has been relatively stable across the CSA.

Table 10 CSA Average Weekly Wage (US\$)

	Warren	Simpson	Rankin	Madison	Lincoln	Hinds	Copiah	Claiborne	Yazoo	Total CSA*	State
2001	537	376	534	515	480	599	415	694	476	556	499
2010	719	485	660	720	608	783	530	957	638	722	660
2018	850	530	788	844	707	889	664	1,047	770	834	765
Avg Annual Growth 2001-2018	2.7%	2.0%	2.3%	2.9%	2.3%	2.3%	2.8%	2.4%	2.9%	2.4%	2.5%
Avg Annual Growth 2010-2018	2.1%	1.1%	2.2%	2.0%	1.9%	1.6%	2.9%	1.1%	2.4%	1.8%	1.9%

Source: US Bureau of Labor Statistics *Weighted average using employment share by county.

River Freight Analysis

Freight Tonnage Along the Mississippi River

The US Army Corps of Engineers (USACE) collects data on freight tonnage moving along the Mississippi River. Geographic markets along the river are defined by mile markers. Detailed statistics were analyzed for the period 2000-2018 on freight tonnage handled by the ports of Vicksburg, Natchez and Greenville. The tonnage reported includes cargo handled at both public and private terminal river segments defined by the USACE Institute for Water Resources (IWR) as follows:

- **Vicksburg, MS** – Section Included: From Mississippi River mile 437 Above Head of Passes (AHP) on left descending bank in a northerly direction, a channel 14,500 feet long by 150 feet wide in the Yazoo Diversion Canal, thence a dredged entrance channel 4,800 feet long and 150 feet wide, transitioning into a 300-foot wide dredged slack water harbor and turning basin 10,700 feet long.
- **Natchez, MS** - Section Included: From Mississippi River mile 359 through mile 365 AHP.
- **Greenville, MS** - Section Included: From Mississippi River mile 537 AHP left descending bank in an easterly direction, an entrance channel, 8,000 feet long and 250 feet wide transitioning into the harbor and port area 10,000 feet long and 500 feet wide, then transitioning into Lake Ferguson, a channel 5,700 feet long and 250 feet wide.

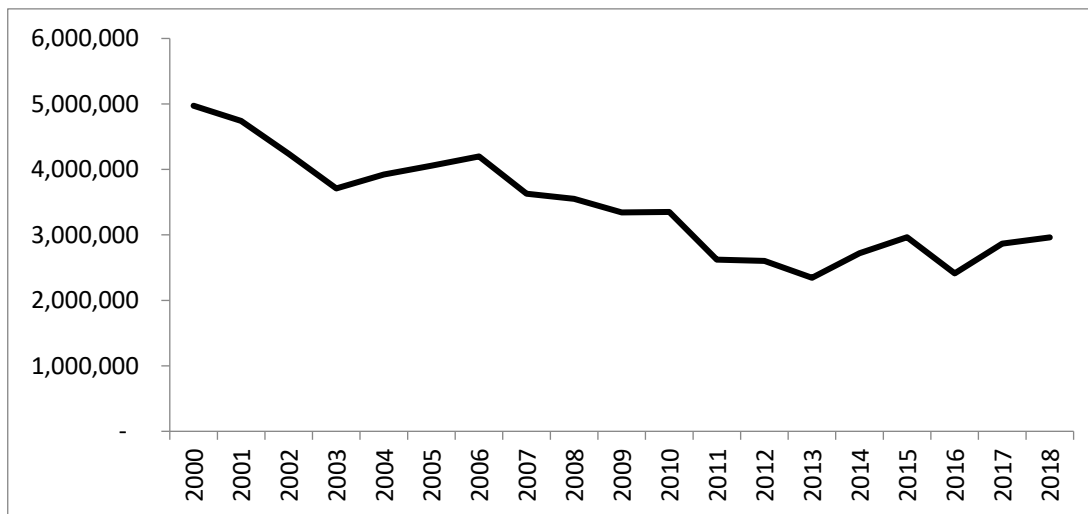


The Port of Vicksburg

The following section provides freight tonnage handled by the Port of Vicksburg (POV) which is subsequently disaggregated by inbound traffic (receipts), outbound traffic (shipments) and inter-port traffic defined as freight moving within the Vicksburg port system.

Aggregation of all commodities and movement types reveals a steady decline in freight since 2000. Averaging an annual decline of 2.8 percent, POV tonnage fell to just under 6 million tons in 2018 from nearly 10 million tons reported in 2000. There have been brief interruptions in the decline, with positive growth in the intervals 2003 – 2006, 2013 – 2015 and most recently 2016 – 2018.

Figure 5 Port of Vicksburg Total Tonnage 2000-2018



Source: USACE, Institute for Water Resources

Regarding commodities, it is not surprising given its location near oil producing and refining areas, that petroleum products dominate the mix by weight. Of the tonnage handled at the POV during the period between 2000 and 2018, 53 percent consisted of petroleum products, including: crude oil, distillates, gasoline, residual fuel oil, petroleum coke and hydrocarbon gases and liquids. Twenty percent of the cargo mix is classified as aggregates, such as sand and gravel, and eight percent are agricultural and forest products. The remaining eighteen percent include steel and iron, as well as various chemicals, including petrochemicals, fertilizers and a small amount of manufactured goods. Table 11 lists the top 10 commodities handled by the POV between 2000 and 2018.

Table 11 Port of Vicksburg Freight (MT) by Commodity

Year	Crude Petroleum	Lime-stone	Distillate Fuel Oil	Lube Oil & Greases	Asphalt, Tar & Pitch	Lime	Gasoline	Sand & Gravel	Corn	Residual Fuel Oil	Total
2000	1,263,130	422,723	357,527	225,605	553,702	7,200	252,319	281,176	139,437	274,630	3,777,449
2001	1,050,872	285,675	342,223	253,135	374,931	189,083	235,450	210,791	140,877	740,987	3,824,024
2002	934,849	240,251	284,524	252,479	306,689	180,295	336,870	219,806	305,847	295,424	3,357,034
2003	929,384	218,774	294,693	307,964	302,938	172,356	261,340	248,964	148,177	55,606	2,940,196
2004	1,002,203	87,237	332,753	270,030	414,075	266,885	254,987	105,986	161,819	214,175	3,110,150
2005	956,215	540,531	360,590	253,141	310,963	241,528	211,823	242,677	105,069	293,145	3,515,682
2006	1,027,304	460,811	370,069	282,044	414,254	253,280	213,168	147,158	119,466	87,571	3,375,125
2007	802,740	207,293	405,418	345,739	383,049	241,531	201,461	183,138	79,751	69,885	2,920,005
2008	984,656	245,510	338,375	253,905	331,848	184,987	206,770	159,209	89,083	48,368	2,842,711
2009	809,235	308,906	284,197	295,926	237,527	100,801	171,221	150,594	137,040	34,799	2,530,246
2010	797,379	325,391	400,685	285,618	181,144	257,156	148,883	83,592	115,364	63,508	2,658,720



2011	400,507	266,090	222,933	333,415	98,597	252,437	153,755	126,201	75,232	71,239	2,000,406
2012	326,964	189,326	272,972	159,001	161,470	211,549	145,107	44,643	133,260	96,314	1,740,606
2013	274,525	357,630	246,731	112,479	139,589	202,375	161,721	19,551	98,472	12,892	1,625,965
2014	239,836	321,905	255,673	334,173	102,337	175,416	125,252	42,909	51,970	9,054	1,658,525
2015	208,799	490,949	235,706	280,655	96,117	198,610	116,978	221,775	233,203	73,960	2,156,752
2016	149,304	284,646	246,894	120,203	61,970	212,133	126,087	220,242	191,868	17,953	1,631,300
2017	305,158	337,355	252,287	168,215	86,296	220,004	90,616	216,857	282,467	27,922	1,987,177
2018	432,932	627,414	191,686	215,174	150,037	157,770	83,908	130,240	115,753	80,087	2,185,001
Growth Rate 2000 - 2018	-5.8%	2.2%	-3.4%	-0.3%	-7.0%	18.7%	-5.9%	-4.2%	-1.0%	-6.6%	-3.0%
Growth Rate 2008 - 2018	-7.9%	9.8%	-5.5%	-1.6%	-7.6%	-1.6%	-8.6%	-2.0%	2.7%	5.2%	-2.6%

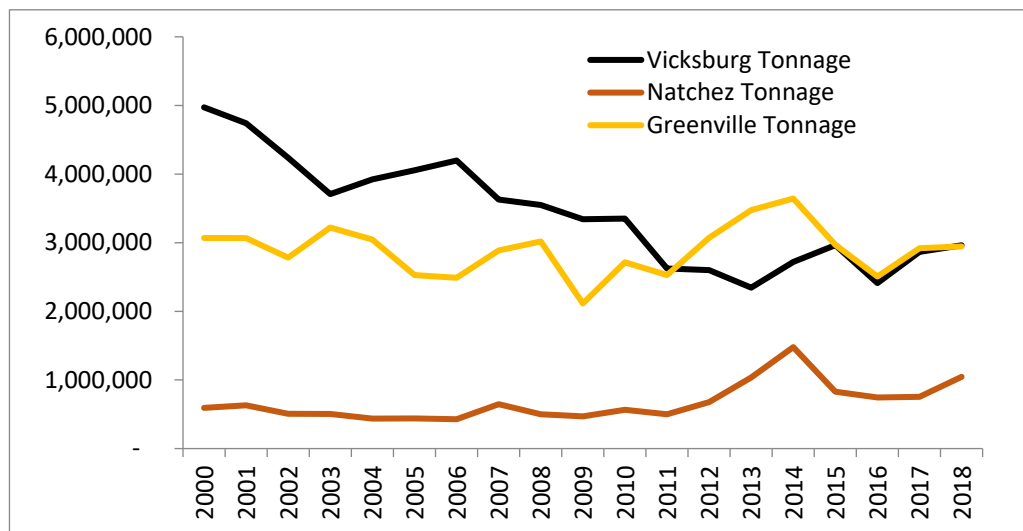
Source: USACE, Institute for Water Resources

Except for residual fuel oil during the 2008 – 2018 period, petroleum product shipments were down across all categories with cargo switching to pipelines. Limestone shipments, however, improved throughout the historical period, while the 2008 – 2018 period witnessed a decline in lime.

Main River Freight Markets in Vicksburg, Natchez and Greenville

POV competes directly with Greenville and Natchez for freight tonnage. In 2000, POV held a dominant share among the three ports with 57.6 percent of the regional port system’s tonnage compared to 35.5 percent for Greenville and 6.9 percent for Natchez. Since that time, POV’s share has steadily eroded as freight tonnage dropped by an average of 2.8 percent per year, while freight handled by Natchez increased 3.2 percent per year and tonnage at Greenville dipped only slightly, at an average rate of 0.2 percent per year. The next sections present a detailed view at the main products shipped through these river ports during the same period.

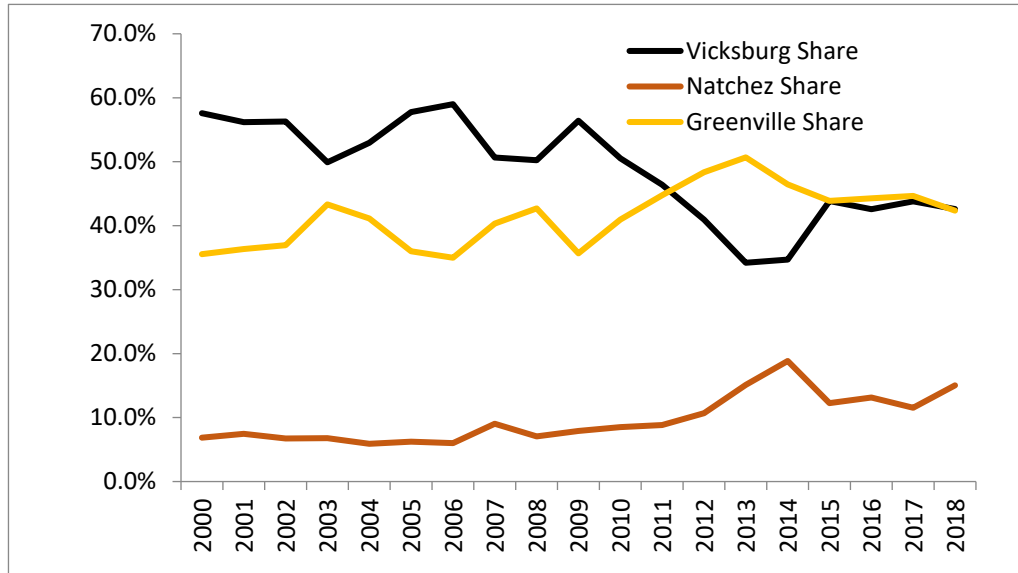
Figure 6 Mississippi River Port System Total Tonnage by Port



Source: USACE, Institute for Water Resources



Figure 7 Mississippi River Port System Shares Total Tonnage by Port



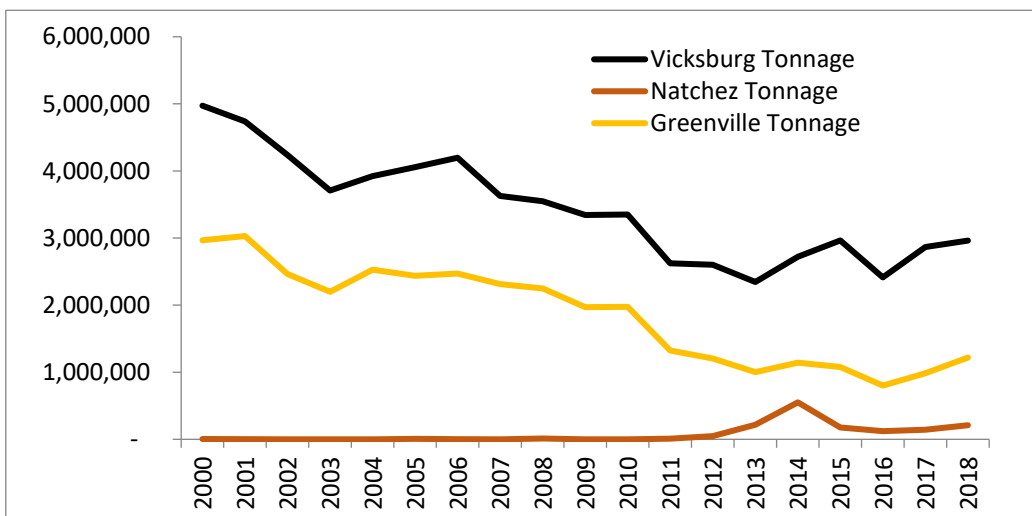
Source: USACE, Institute for Water Resources

Petroleum Products

Petroleum products include various primary and refined products, including crude oil, asphalt, tar and pitch, gasoline, kerosene distillates and others. In this segment, POV is, and has been, the dominant player among the three ports. One key advantage is that it is the only one of the three ports that handles asphalt, tar and pitch. However, POV does appear to be vulnerable to competition. Its market share in 2018 was 59.4 percent but that was down from 68.1 percent in 2000. The overwhelming majority of the loss in share was accounted for by competition from Port of Natchez, whose share in 2000 was near 0 percent, but after introducing crude oil in 2013, climbed to 10.1 percent by 2018, most likely representing at least a portion of Eron’s crude tonnage moving via Natchez. Meanwhile, Greenville’s share of petroleum products shipments was relatively stable during the period at 30 percent.

What is striking about this commodity group is its long-term decline. Average annual growth in total shipments was -4.1 percent in the 2000 – 2018 period, with Greenville traffic declining an average of 4.3 percent per year and Vicksburg an average of 4.8 percent per year.

Figure 8 Mississippi River Port System Petroleum Products Tonnage by Port



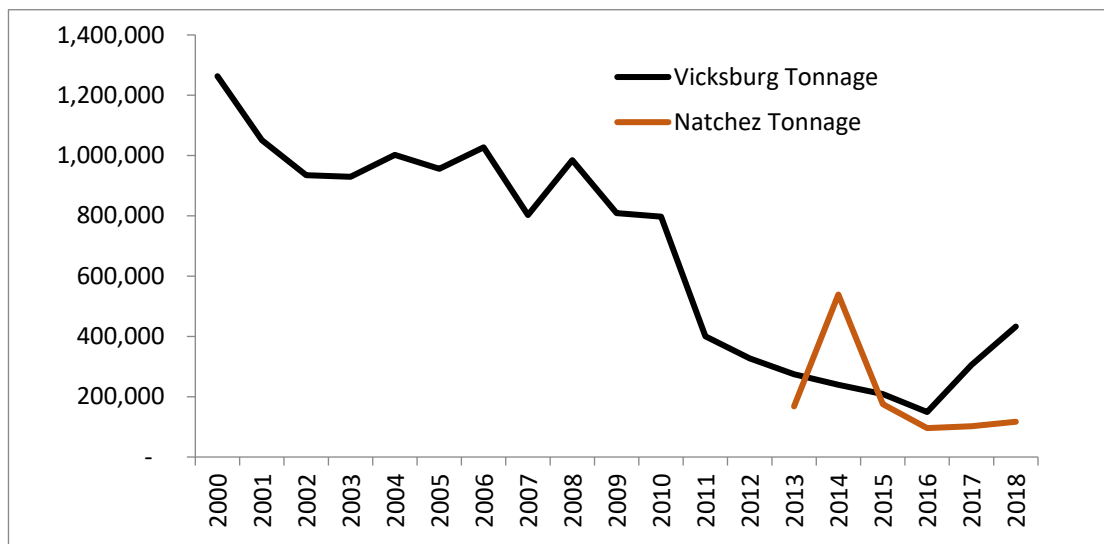
Source: USACE, Institute for Water Resources



Crude Oil

The sharply rising activity at Natchez can be traced primarily to the introduction of crude oil at that port in 2013. During the six years from 2013 to 2018, Natchez handled 1.2 million tons of crude while POV handled 1.6 million tons. It is assumed that Vicksburg could move all of this cargo back to the port if Ergon were able to unload the crude imports locally, which would require growing rail operations, likely at the expense of barge, leading to a net savings for a key port tenant. Nevertheless, crude oil shipments are a declining commodity for both ports, falling at an average of 4.5 percent per year since 2000.

Figure 9 Crude Petroleum Shipment Tonnage



Source: USACE, Institute for Water Resources

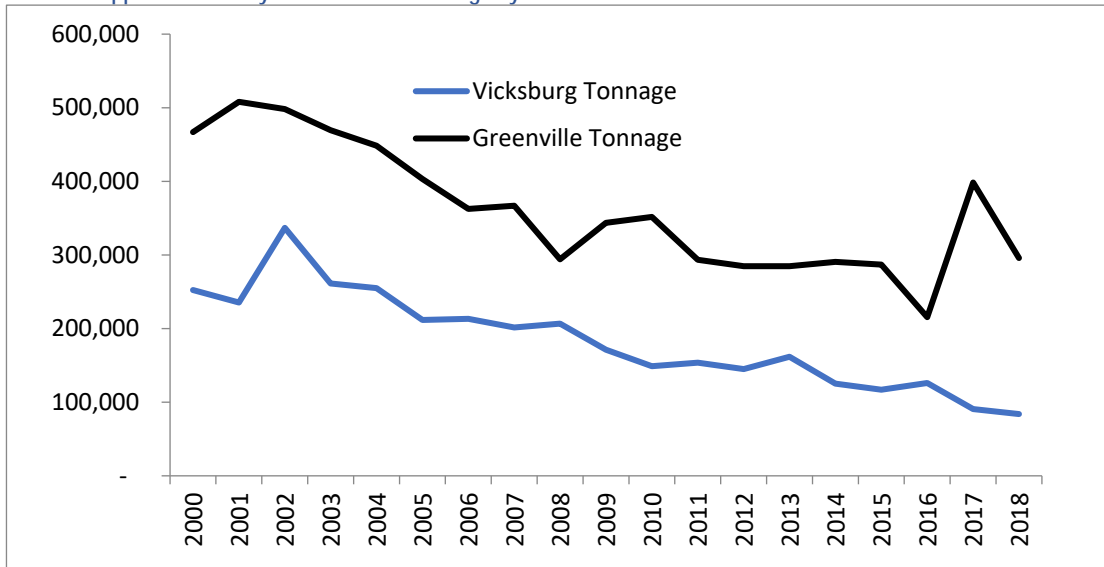
Gasoline

And while Natchez was challenging POV’s dominance of crude oil shipments, the Port of Greenville was increasing its share of the shrinking gasoline market. Overall gasoline shipments handled by the three ports fell an average of 3.5 percent annually in the 2000 – 2018 period, as competition from pipelines and generally weak US demand cut into the Mississippi river port gasoline business. POV’s market gave up considerable ground to Greenville, its share falling from 35.1 percent of all gasoline tonnage moving in and out of the three ports in 2000 to 22.1 percent in 2018. Meanwhile, Greenville’s share increased to 77.9 percent from 64.9 percent in 2000.²

² Natchez gasoline tonnage is not shown since totals are small and uneven over time.



Figure 10 Mississippi River Port System Gasoline Tonnage by Port

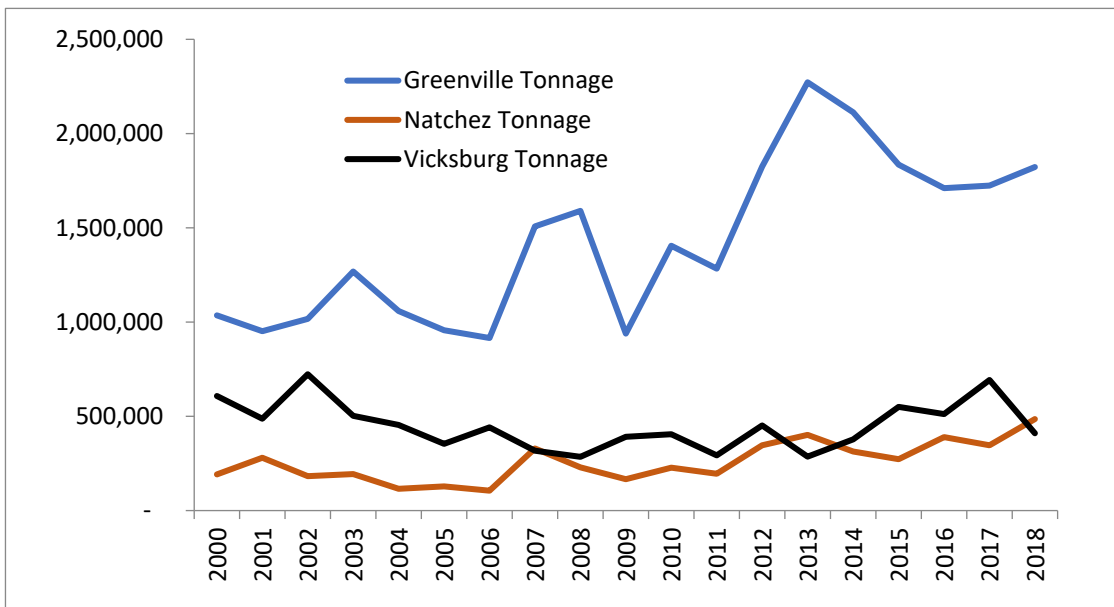


Source: USACE, Institute for Water Resources

Agriculture

Dry bulk, wet bulk and break-bulk agricultural products are important commodities on the Mississippi River. For the purposes of this report, we aggregate primary agricultural and forestry products, including animal feeds, with processed agricultural materials. The following figure displays the performance of this group across all three ports from 2000 – 2018.

Figure 11 Mississippi River Port System Agriculture Tonnage by Port



Source: USACE, Institute for Water Resources

Agricultural shipments in and out of the three river ports increased a modest 2.2 percent annually during 2000 – 2018 but POV has not shared in that growth. Greenville continued to be the dominant port with a 67.0 percent share of total tonnage in this class of commodities during 2018. Greenville’s proximity to production areas has traditionally provided a competitive advantage, but relatively recent investments in both private and public facilities has accentuated its role as a regional grain gateway. However, if Vicksburg were to provide the capability to unload barges into 100-car trains, Kansas City Southern has the market to

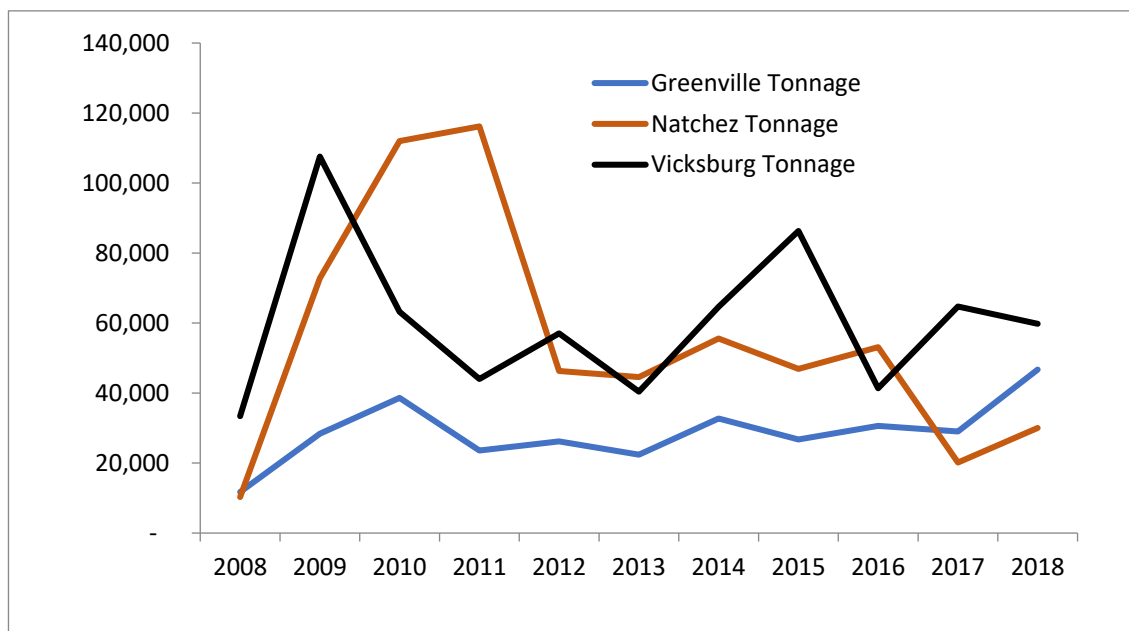


move that corn to Mississippi or to Mexico—which would stimulate grain-handling activity, that could in turn help improve the cost structure to drive other grain to the Port of Vicksburg. Natchez held a 17.9 percent share in 2018, but that is up from just 10.5 percent in 2000. POV held a 15.1 percent share in 2018, down from 33.1 percent in 2000.

Chemicals

POV has fared better in the regional chemicals trade but since 2008 (the earliest year for which all three ports were involved) its growth (+3.3%) has lagged considerably behind both Greenville (+8.0%) and Natchez (+6.1%). POV’s share of chemicals fell from 60.3 percent in 2008 to 43.8 percent in 2018. At the same time, Greenville’s share rose from 21.2 percent to 34.2 percent, and Natchez increased its share from 18.6 percent to 22.0 percent.

Figure 12 Mississippi River Port System Chemicals Tonnage by Port



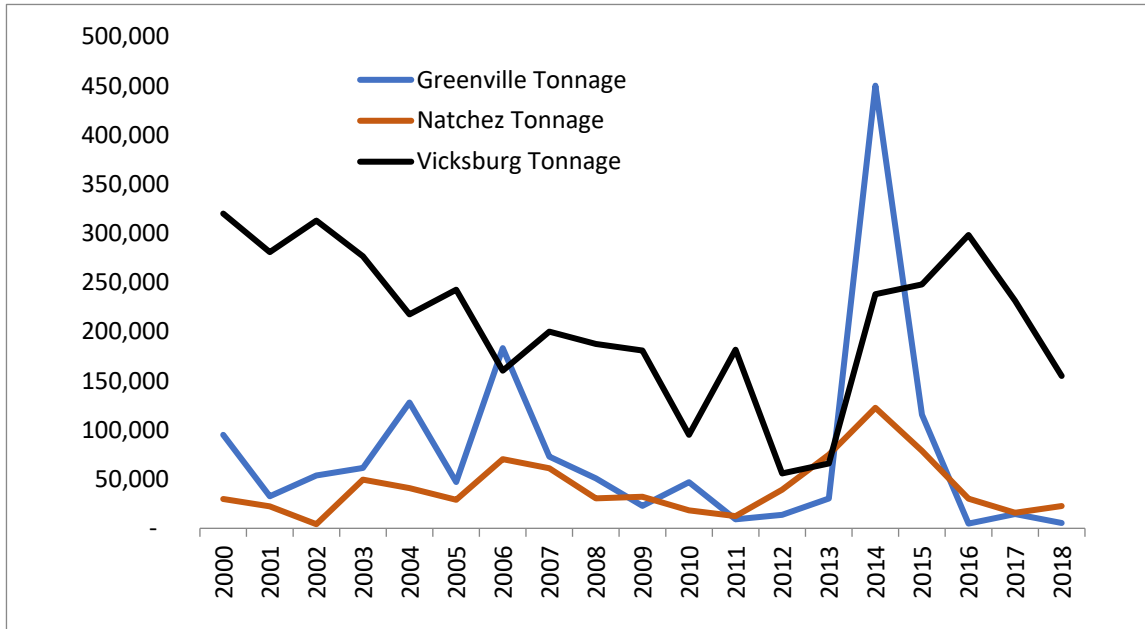
Source: USACE: Institute for Water Resources

Aggregates

Aggregates are defined as sand and gravel and waterway improvement material - which in the case of Vicksburg, is material dredged from the Mississippi River, or elsewhere, and redeposited. In line with lower USACE dredging activity on the Mississippi River, the aggregates trade in and out of the three river ports has suffered a 4.0 percent average annual loss during the 2000-2018 period. However, with a market share of 84.7 percent, the POV dominates both Greenville and Natchez in this trade. Shipments of aggregates in and out of Greenville fell 14.8 percent per year on average during the period, the Port of Natchez suffered a relatively modest 1.5 percent average annual decline, while POV witnessed 4.0 percent fewer tons per year on average.



Figure 13 Mississippi River Port System Aggregate Tonnage by Port



Source: USACE, Institute for Water Resources

Air Freight Analysis

Because it overwhelmingly consists of high value goods, air freight cargo is not in the same product market as the river port of Vicksburg and therefore was not included in this analysis.



Technical Analysis

The Technical Analysis focuses on the river infrastructure, or the supply of competing cargo services in the region. A description of both the capacity and conditions of the existing facilities is presented and a Competitive Matrix compiles detailed information on the ports' facilities, equipment, storage, and access.

Regional Ports

Port of Vicksburg

Facilities

The Port of Vicksburg is located within an 800-acre marine industrial park located on Vicksburg Harbor. The Port's Public Terminal is operated by the Watco Companies, LLC. The Port's terminal handles a variety of bulk and break-bulk materials including steel, aluminum, ores, grain, and fertilizer. The Public Port of Vicksburg maintains a 150-ton crane, two 15-ton overhead cranes, all-weather loading and unloading, and 129,000 square feet of insured and sprinkled warehouse space. Other equipment used at the Public Terminal includes various Forklifts/Front End Loaders, a Bulk Conveyor, an RBT Conveyor and a Truck Scale.

Figure 14 View of Port of Vicksburg Public and Private Terminals



Source: Google Earth

Access

The Port is connected to Interstate 20 via Highway 61 North Bypass just twelve miles away. The Port is served by a short line operated by a short line railroad, the Vicksburg Southern Rail (VSOR). This short line is directly connected to Kansas City Southern's (KCS) mainline on the Meridian Speedway. KCS connects to Canadian National (CN) at Jackson, MS and Union Pacific at Tallulah, LA. The KCS line also provides direct access to the only railway that crosses the Mississippi River between Memphis and Baton Rouge.

Truck traffic alone is in excess of 250,000+ trucks annually and the Port has direct access to US-61 (north-south) via Haining Road; and is 12 miles from I-20 (east-west).



Rail

The Port of Vicksburg’s short line railroad connects to Class 1 KCS and crosses the Mississippi river. The short line is managed by Vicksburg Railroad Service.

Customs Service

The Vicksburg port is a designated Foreign Trade Zone (#158), a Port of Entry, and it maintains a United States Customs Service.

Proposed Improvements

The current Port operator (Watco) is officially proposing the following improvements to the Public terminal:

- \$250,000 for the T-Dock Winch System,
- \$100,000 in Warehouse No. 4 improvements, and
- \$90,000 in railroad crossing improvements on the north side of the terminal.

Based upon further market analysis and conversations with both Watco and KCS, the Consultant Team has identified more expansive investments for barge, rail, and terminal operations that would facilitate attracting some of the volumes that are currently bypassing Vicksburg or otherwise stranded in the marketplace.

- Barge-to-rail and rail-to-barge facilities to handle 100-car trains of grain (floating pier, conveying equipment, silo buffer storage, 7500-foot landing track, and improved loop)
- Dry fertilizer barge unloading (floating pier, conveying equipment, silo buffer storage, flat storage)
- Crude oil train unloading for 100-car trains (7500-foot landing track, improved runaround track, piping equipment from ethanol plant to refinery)
- Infrastructure suitable for transloading scrap iron from rail to barge (crane, pad, rail access, and vertical dock)
- Steel warehousing (indoor rail and truck unloading, overhead crane, and vertical dock)

In order to leverage its competitive rail advantage, POV needs the ability to handle 100-car unit trains. This would require improvements to create a separate 7500-foot long track where a complete train can be received, assembled, and departed in a single piece. Watco can then break the train down into smaller segments to process through different facilities. From a rail standpoint, the existing terminal site has the most available land for building an unloading loop; while not able to handle an entire train it can be made to function operationally. Conversely, other sites would require significant fill to create enough land to handle the longer cuts of railcars needed. Furthermore, Watco has expressed a willingness to invest in many of the required facilities if it has an agreement with POV long enough to capitalize each project.


Future Development

Three sites are currently being considered by the Port Commission, although the Consultant Team has identified a possible fourth side later this report. Important criteria for analysis must include land use and zoning and if the sites can be subdivided for public and private use, based on the outputs of this market assessment.

Table 12 Future Port Site Alternatives Comparative Matrix

Proposed Port Site	Armstrong Property	Hwy 61 South Site	Letourneau Site
Size (Acres)	57.3	834	115
Direct Waterway Access	Yes	No	Yes
Waterfront Frontage	800	N.A.	4,400



Proposed Port Site	Armstrong Property	Hwy 61 South Site	Letourneau Site
(Ft)			
Access Highway	US 61	US 61	US 61
Distance to Interstate	4.5	4.5	10
Direct Rail Service	Yes	No	Yes
Aerial View			

Source: Port Commission and Seabury Assessment

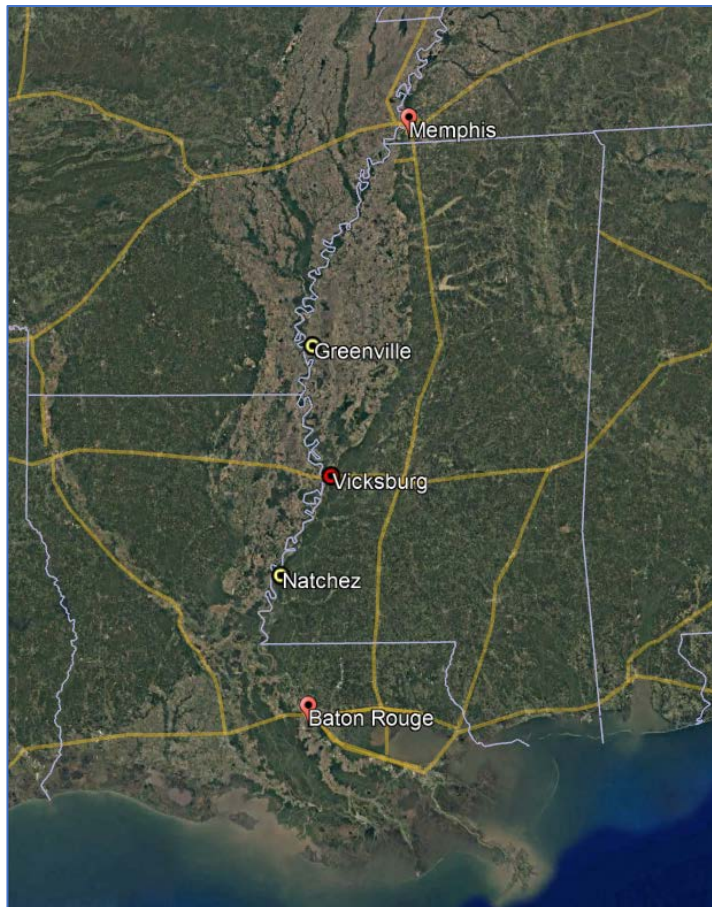
Figure 15 Proposed New Port Site Locations



Source: Google Earth



Figure 16 Regional Ports Location



Source: Google Earth

Port of Greenville

Facilities and Equipment

Greenville Port Terminal is located approximately 80 miles north of Vicksburg and handles various bulk, break-bulk, and project cargo. The Port has a double pier wharf connected with a concrete dock providing 680 ft of berthing. The Greenville Terminal is located on a shallow draft, slack water natural harbor, 11 miles long 250 ft. minimum channel width, with a harbor front minimum channel width of 500 ft. and a fleeting area capable of holding several hundred barges.

Port handling equipment includes a 60 Tons - All weather covered bridge crane and a LST 218 Linkbelt crawler crane, with a 4½-yard bucket, bulk truck/rail loading conveyer, 5,000-lb. to 52,000-lb. forklifts and scrap handling magnets. The Port has a 22,000 sq. ft. climate-controlled warehouse and a 50,000 sq. ft. (1.5 Acres) open yard hard stand storage. The Port of Greenville offers towing, mooring assistance, stevedoring, and drayage services to port users.

Private Facilities

The Greenville Gravel Company Inc. owns and operates a private wharf in the Port of Greenville to receive sand, crushed stone, gravel, and bulk lime. The open storage area at the back of the levee covers about 12 acres and can accommodate about 300 thousand tons of cargo.

Access

The Port of Greenville facilities are located 3 miles from the nearest US Highway (US 82/278), 20 miles from US 61 and 75 miles from the nearest Interstate Highway (I-55). Rail service is provided at the port facility by the Columbus and Greenville Railroad, and connects with the Canadian National Railway via a 55-mile rail



link. One surface track serves the open storage area. The Greenville Gravel Company Wharf has berthing distance of 59.4 meters (195 feet) with alongside depth of 3.7 meters (12 feet) LWRP.

Port of Natchez

Facilities

The Natchez -Adams County Port is located approximately 72 miles down-river from Vicksburg. The terminal consists of two cargo docks, one liquid transfer dock and one Roll-On Roll-Off site. A berthing area of 400 feet, with three dock cranes, supports cargo dock operations. The depth at the berths range from 9 – 22-foot mean depth.

The Port has 100,000 sq. ft. of covered warehouse on site and 500,000 sq. ft. of climate controlled private warehouse space within the Port Industrial Park, which are both connected by rail. The Port also has a stockpile surface loading area of 3 acres, plus 4.5 acres of open yard pit storage.

Main Cargos and Handling Equipment

The Port specializes in handling unitized, palletized, containerized, dry bulk liquid, baled, heavy lifts and Roll on Roll off cargo. The Port's forklifts range from 4,500 to 15,500-pound capacity. Also, on site are a 9TM Whitney Track-mobile, a 45-yard hopper, and a six-yard light weight re-hauling bucket. Roll clamp trucks range from 4,500 to 12,000-pound capacity. A conveyor designed for bottom dump hopper rail cars can unload directly to each barge. Rail infrastructure is capable of handling 100-car unit trains.

Access

The Port is served by Natchez Railroad (NTZR) connecting with the Canadian National (CN) Railroad. The roadway connections to the Port include access to U.S. Highways 61 (5 miles away), 98 and 84 intersect in Natchez, connecting the Port with Interstate 10 (90miles), Interstate 20 (80miles), and Interstate 55 (65 miles).

According to MDOT's recent Multimodal Study, the Port of Natchez would like to capitalize on its deep-water assets to attract container ships, however, is prevented from taking full advantage of its water depth because of the low air draft (112 feet) of the Mississippi River Bridge. Additionally, because of the proximity with the Port of Baton Rouge it would be difficult for the Port of Natchez to develop a separate container business. However, the Port believes that increasing the air draft of the US 190 crossing of the Mississippi River might bring more international and domestic trade to southwestern Mississippi. If it could attract larger vessels, then that would increase the import/export capacity of the Port enabling it to take advantage of the naturally deep channel.



Regional Ports – Technical Capability Matrix

	Vicksburg	Greenville	Natchez
Public Terminal Operator	WATCO	Port Commission	Port Commission
Hours of Operation			
Facilities & Equipment			
Size of Terminal	11 Ac.	700 acre industrial park	25 acres
Berthing Length	800 feet	680 feet	400-ft and 300-ft Extension (inland)
Number of Docks/Berths	2	2	1 and RORO Ramp
Depth at Berth	12 feet	9 feet	9 – 22 foot mean depth
Scale Available	Yes	Yes	Yes
Barge Moorings Available	Yes	Yes	Yes
Cargo Handling Equipment	15 Ton Overhead Crane 125 Ton Crawler Crane Forklifts/Front End Loaders Bulk Conveyor RBT Conveyor Truck Scale	Sennebogen 835 barge crane, LST 218 Linkbelt crawler crane; 60-ton Bridge Crane	Pedestal Cranes (300-, 125- & 100-ton capacities)
Storage			
Transit Sheds/Warehouses	4	1	1 public & 1 private
Total Covered Storage	4 warehouses w/ 129,000 square feet	10 steel storage tanks; 22,000-sq.-ft Warehouse	100,000 sq-ft Port Warehouse
Open Storage Area	4 ac.	1.6 Ac.	Stock pile surface loading area - 3 acres; plus 4.5 acres of open yard pit storage
Covered Storage Capacity	27,000 Tons	4,600 Tons	110,000 Tons (includes both warehouses)
Open Storage Capacity	65,000 Tons	26,000 Tons	122,500 Tons
Other Storage Capacity		900,00 Gallons (liq. Fertilizer); 2 Grain Bins (42,000 Bushels / bin)	500,000 sq. Private Warehouse; private grain silos of 150,000 bushel capacity
Security and Customs			
Fencing and Gates	Fencing and Manual Gate to Berth and Operational Areas	No fencing or gates.	No Gate, some fencing
US Port of Entry	Yes	No	No
Access			
Port of Entry	Yes	No	No
Unit Train Capable	No	No	Yes
Railroad Connection	Short line managed by Vicksburg Railroad service connects all river facilities with Class 1 KCS that crosses the Mississippi river	2 tracks on apron, loading siding at Transit Shed, connecting to Columbus and Greenville RR. Port owns rail between Port facilities and downtown Greenville	Natchez Railway, LLC, connects with Canadian National Railroad (CNRR)
Main Highway Access	Direct access to US-61 (north-south) via Haining Road; 12 miles from I-20 (east-west)	Nearest Interstate Highway: I-55 (75 miles); Nearest US Highways– US 82/278, US 61 (20 miles),	Nearest Interstate Highway: I-55 (65 miles) Nearest US Highway: US 61 (5 miles)

Source: Seabury Analysis



Origin-Destination Analysis

This section presents a detailed analysis of freight flows in the state. A comprehensive view of cargo shipments to/from the state by mode and commodity is possible by using the recently released “Freight Analysis Framework - FAF” (Bureau of Transportation Statistics & Federal Highway Administration). Since the Port of Vicksburg could potentially serve as a transshipment hub for cargoes moving to/from Louisiana to/from States that border the Mississippi River, cargo flows through Louisiana are also documented.

State of Mississippi Freight Origin – Destination

Cargo shipments are documented in the “Freight Analysis Framework (FAF)”, a survey of freight movements by mode and by commodity between various origin-destination pairs throughout the US and internationally. The latest FAF is Version 4.5 and includes tonnage and value for cargo moved during 2013 - 2017. The origin-destination data made available to the public does not break out individual regions of Mississippi but instead treats the entire state as an origin or destination.³ The following provides some cross tabulations and analysis of this data for the State of Mississippi. It should be noted that FAF does not provide exact counts of freight movements but instead provides estimates based on statistical sampling. Therefore, the data is best understood in terms of relative magnitudes and growth rates rather than as absolute totals.

Total cargo movements in and out of the State of Mississippi amounted to 585,768 thousand tons with the balance tipping towards inbound cargo which accounted for 53 percent of all tonnage. Table 13 contains inbound and outbound tonnage by year since 2013.

Table 13 Mississippi Freight Shipments 2013 – 2017 (000 tons)

Year	Outbound	Inbound	Total
2013	276,981	323,373	600,354
2014	269,016	315,945	584,961
2015	266,984	303,776	570,760
2016	270,968	301,618	572,586
2017	274,343	311,425	585,768

Source: FHWA Freight Analysis Framework Version 4.5

Shipments in total have steadily declined since 2013, falling on average by 0.6 percent per year. The decline in outbound shipments is significantly lower (-0.2%) than inbound shipments (-0.9%). Splitting the data by domestic versus international, it is clear that the decline in inbound shipments is driven primarily by sharply falling international shipments, down an average of 4.4 percent per year from 2013 – 2017. At the same time, inbound shipments from domestic sources fell just 0.7 percent annually.

Table 14 Mississippi Inbound Freight Shipments 2013 – 2017 (000 tons)

Year	Domestic Inbound	Foreign Inbound	Total Inbound
2013	305,238	18,135	323,373
2014	301,777	14,168	315,945
2015	289,873	13,902	303,776
2016	288,522	13,097	301,618
2017	296,275	15,150	311,425

Source: FHWA Freight Analysis Framework Version 4.5

³ One is tempted to use the “mode” field in the freight data and assume that all water shipments can be attributed to the river ports. However, Mississippi is home to several river ports besides Vicksburg as well as several seaports.



Outbound shipments to foreign destinations were just 4.5% of total outbound freight, but they were the fastest growing market for the State, rising 3.8 percent per year during the study period. Shipments to domestic locations, in contrast, fell 0.4 percent per year during the same period.

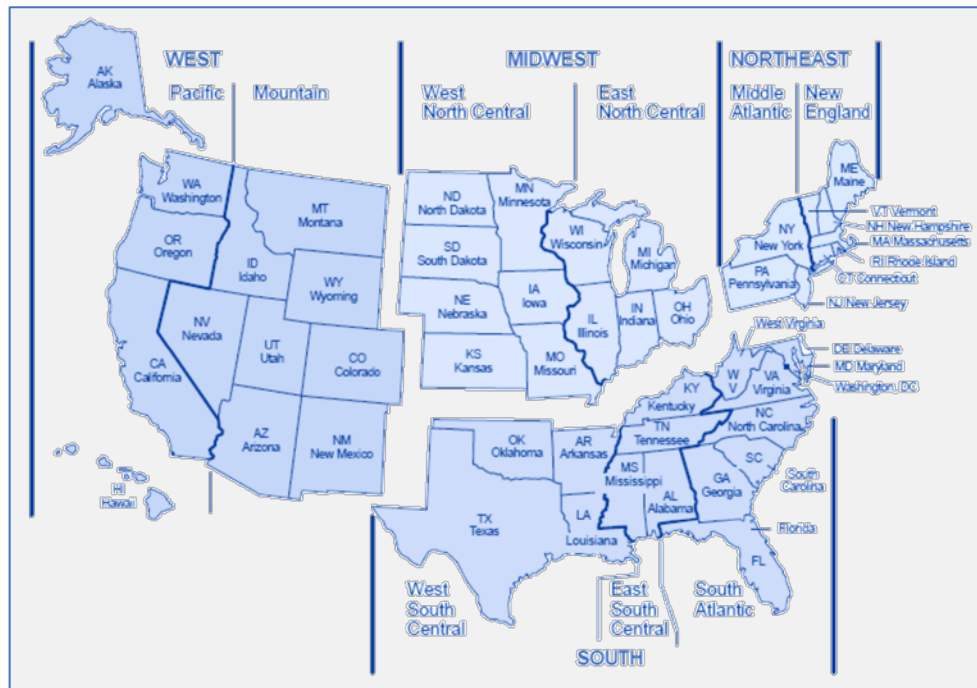
Table 15 Mississippi Outbound Freight Shipments 2013 – 2017 (000 tons)

Year	Domestic Outbound	Foreign Outbound	Total Outbound
2013	266,268	10,712	276,981
2014	258,598	10,418	269,016
2015	255,106	11,878	266,984
2016	258,896	12,072	270,968
2017	261,914	12,430	274,343

Source: FHWA Freight Analysis Framework Version 4.5

Further analysis was conducted by domestic region of origin and destination. Regions conform to US Census Bureau definitions as portrayed by the following map.

Figure 17 US Census Regions



Source: US Census 2019

Table 16 Mississippi Inbound Domestic Freight Shipments 2013 – 2017 (000 tons)

Year	East North Central	East South Central	Mid-Atlantic	Mountain	New England	Pacific	South Atlantic	West North Central	West South Central
2013	7,427	141,632	440	1,083	102	381	3,706	2,171	148,296
2014	7,941	145,781	450	1,095	107	407	3,723	2,269	140,004
2015	7,379	150,419	439	977	104	417	3,697	2,305	124,137
2016	7,826	154,332	438	797	103	521	3,714	2,345	118,445
2017	7,795	152,904	437	864	102	652	3,731	2,350	127,441

Source: FHWA Freight Analysis Framework Version 4.5



As expected, the majority of inbound shipments to the State since 2014 originated in the local region.⁴ The average share of shipments from East South-Central region (which includes intra-Mississippi) for the 2013-2017 period was just over 50 percent of all inbound tonnage. The other major share was held by the West South Central Region (44.4%) which includes Louisiana, Texas, Oklahoma and Arkansas. Less than 5 percent of inbound shipments originated further afield than East and West South Central Regions.

Table 17 Mississippi Outbound Domestic Freight Shipments 2013 – 2017 (000 tons)

Year	East North Central	East South Central	Mid-Atlantic	Mountain	New England	Pacific	South Atlantic	West North Central	West South Central
2013	4,413	228,960	1,693	797	331	1,014	4,223	3,219	21,619
2014	4,525	220,614	1,792	788	338	1,030	4,205	3,512	21,793
2015	4,547	218,403	1,372	745	334	1,022	3,945	3,360	21,379
2016	4,533	221,943	1,358	743	437	1,025	3,955	3,354	21,549
2017	4,496	225,008	1,343	732	327	1,024	3,935	3,525	21,524

Source: FHWA Freight Analysis Framework Version 4.5

The overwhelming majority (85.7%) of Mississippi’s outbound domestic shipments are intra-regional while another 8.3 percent travel only as far as West South Central. The modal breakdown for domestic shipments is provided in Tables 18 (inbound) and Table 19 (outbound).

Table 18 Mississippi Inbound Shipments by Mode (000 tons)

Year	Air (include truck-air)	Multiple modes & mail	Other and unknown	Pipeline	Rail	Truck	Water
2013	21	2,787	34	120,507	12,723	164,645	4,522
2014	21	2,961	35	112,816	13,154	168,097	4,694
2015	20	3,044	43	98,045	12,294	171,630	4,797
2016	20	3,052	49	91,877	12,818	175,962	4,744
2017	21	3,033	41	99,715	12,855	175,980	4,629

Source: FHWA Freight Analysis Framework Version 4.5

Trucking is clearly the preferred mode for inbound shipments which is not surprising considering the majority of inbound shipments are intra-regional. Total tonnage trucked into the State increased by 1.7 percent per year during 2013-2017 increasing its share from 53.6 percent of all freight shipments in 2013 to 59.0 percent in 2017. Water plays only a minor role in the inbound domestic market with just 1.6 percent of the total inbound tonnage in 2017. Annual growth for this mode has been a sluggish 0.5 percent during 2013-2017.

Table 19 Mississippi Outbound Shipments by Mode (000 tons)

Year	Air (include truck-air)	Multiple modes & mail	No domestic mode *	Pipeline	Rail	Truck	Water
2013	8	2,614	14,453	97,413	6,835	142,100	2,846
2014	8	2,897	9,411	90,825	6,770	145,749	2,938
2015	8	2,697	8,027	87,283	6,317	148,420	2,354
2016	8	2,720	8,233	86,668	6,485	152,554	2,228
2017	8	2,892	8,610	89,442	6,095	152,086	2,780

Source: FHWA Freight Analysis Framework Version 4.5

*Includes shipments that have an international mode, but no domestic mode and is limited to import shipments of crude petroleum transferred directly from inbound ships to a U.S. refinery at the zone of entry.

⁴ Mississippi is located in the East South-Central Region of the United States according to US Census Bureau definitions.



This is done to ensure a proper accounting of import flows, while avoiding assigning flows to the domestic transportation network that do not use it.

As in the case of the inbound market, outbound tonnage travels primarily by truck which held a 57 percent share of all outbound tonnage during 2013 – 2017. Shipments by water during the same time period accounted for just 1.0 percent of the total market. The average annual growth in total outbound truck tonnage amounted to 1.7 percent while water traffic declined by 0.5 percent per year on average. We cut this data further to explore the modal breakdown for shipments moving outside the US Census-defined local market. Table 20 contains the results of this exercise for inbound shipments.

Table 20 Mississippi Inter-Regional Inbound Shipments by Mode (000 tons)

Year	Air (include truck-air)	Multiple modes & mail	Pipeline	Rail	Truck	Water
2013	21	845	116,468	9,693	32,917	3,664
2014	20	847	108,661	10,099	32,463	3,906
2015	20	847	93,572	9,262	31,824	3,929
2016	20	819	87,285	9,778	32,423	3,865
2017	20	830	95,115	9,770	33,790	3,844

Source: FHWA Freight Analysis Framework Version 4.5

Excluding intra-regional traffic, trucking plays a far smaller role than do pipelines which carried 68.0 percent of all inbound tonnage during 2013-2017 with the trucking share falling to just 22.2 percent. Inter-regional shipments to Mississippi by water were just 2.6 percent of all tonnage but inter-regional rail shipments garnered a 6.6 percent share.

Table 21 displays the modal breakdown for tonnage sourced from West South Central suppliers, the State’s largest inter-regional partner.

Table 21 Mississippi Inbound Shipments from West South Central Region by Mode (000 tons)

Year	Air (include truck-air)	Multiple modes & mail	Pipeline	Rail	Truck	Water
2013	0.60	408	116,454	2,451	25,975	3,008
2014	0.60	415	108,643	2,328	25,441	3,176
2015	0.58	414	93,554	2,179	24,829	3,161
2016	0.55	386	87,268	2,265	25,411	3,115
2017	0.57	385	95,098	2,148	26,729	3,080

Source: FHWA Freight Analysis Framework Version 4.5

While the share of pipeline tonnage in the modal mix rises to 76 percent (all pipeline traffic into Mississippi is sourced from West South Central), trucking’s share falls to 19.5 percent and rail falls to 1.4 percent. The share of tonnage carried by water into the State from West South Central locales rises to 2.4 percent. The same analysis was carried out for outbound tonnage. The results for inter-regional shipments by mode (excluding East South Central) are contained in Table 22 below.

Table 22 Mississippi Inter-Regional Outbound Shipments by Mode (000 tons)

Year	Air (include truck-air)	Multiple modes & mail	Pipeline	Rail	Truck	Water
2013	7.8	2,422	3,085	4,856	25,479	1,458
2014	7.7	2,704	3,425	4,829	25,407	1,611
2015	7.7	2,517	3,642	4,484	24,911	1,142
2016	7.6	2,544	3,254	4,654	25,343	1,150
2017	7.7	2,719	3,246	4,355	25,331	1,247

Source: FHWA Freight Analysis Framework Version 4.5



Growth in total inter-regional outbound traffic from Mississippi was flat during the study period. By mode, trucking held a 68 percent share of all inter-regional outbound tonnage with slightly less tonnage in 2017 than in 2013. Rail shipments declined at a faster 2.7 percent rate but managed a 12.5% share for the period. Tonnage carried by pipelines increased 1.3 percent per year while capturing a 9.0% share. Water shipments held a 3.6 percent share with negative growth during the period. Table 23 displays statistics for State shipments exclusively to West South Central.

Table 23 Mississippi Shipments to West South Central Region by Mode (000 tons)

Year	Air (include truck-air)	Multiple modes & mail	Pipeline	Rail	Truck	Water
2013	0.30	819	2,150	1,154	16,813	682
2014	0.29	920	2,387	1,128	16,666	692
2015	0.29	867	2,538	1,084	16,235	656
2016	0.29	879	2,267	1,081	16,665	656
2017	0.29	950	2,262	1,026	16,629	656

Source: FHWA Freight Analysis Framework Version 4.5

For outbound shipments to West South Central locales, the State’s largest market, trucking is the dominant mode with an overwhelming 77 percent share followed by pipeline (10.8%) and rail (5.1%). Water shipments held a 3.1 percent share and barely budged between 2013 and 2017. As was the case for total outbound, inter-regional traffic, shipment tonnage to the West South Central region from Mississippi was flat during the period.

Inbound Freight Commodities

Total domestic inbound shipments by commodity are displayed in Table 24.

Table 24 Domestic Inbound Tonnage by Commodity (000 tons)

Commodity	2013	2014	2015	2016	2017	Average Annual Growth Rate
Coal-n.e.c.	147,595	140,781	129,115	124,268	131,788	-2.8%
Gasoline	19,565	19,905	20,697	21,177	21,302	2.1%
Logs	16,057	17,792	18,540	19,507	18,329	3.4%
Other ag prods.	12,209	12,444	11,840	12,123	13,918	3.3%
Gravel	12,532	13,204	13,059	13,276	13,095	1.1%
Cereal grains	15,368	14,226	12,932	13,793	12,801	-4.5%
Fuel oils	10,974	11,281	12,322	12,167	12,394	3.1%
Wood prods.	11,392	11,470	11,496	12,181	12,163	1.7%
Nonmetal min. prods.	7,029	7,126	6,820	7,287	7,288	0.9%
Motorized vehicles	5,568	6,008	6,260	6,330	6,346	3.3%
Waste/scrap	5,520	5,542	5,541	5,554	5,565	0.2%
Other foodstuffs	5,241	5,213	5,231	5,285	5,351	0.5%
Basic chemicals	4,978	4,801	4,497	4,472	4,205	-4.1%
Mixed freight	3,906	3,950	3,949	3,948	3,976	0.4%
Animal feed	2,903	3,015	3,061	3,044	3,051	1.3%
Crude petroleum	2,146	2,566	2,779	2,622	2,787	6.7%
Natural sands	2,055	2,313	2,271	2,447	2,623	6.3%
Base metals	2,684	2,675	2,542	2,411	2,348	-3.3%
Live animals/fish	1,958	1,968	2,064	2,100	2,148	2.3%
Plastics/rubber	1,950	1,985	2,092	2,132	2,036	1.1%
Newsprint/paper	1,679	1,684	1,551	1,552	1,876	2.8%
Meat/seafood	1,297	1,248	1,247	1,281	1,328	0.6%
Articles-base metal	988	1,015	994	957	1,011	0.6%
Machinery	1,088	1,093	1,016	923	976	-2.7%



Fertilizers	1,545	1,388	1,088	1,041	906	-12.5%
Paper articles	799	814	808	809	807	0.2%
Coal	1,019	1,014	864	659	733	-7.9%
Chemical prods.	731	743	704	677	680	-1.8%
Furniture	575	576	602	604	605	1.3%
Milled grain prods.	597	592	588	596	598	0.0%
Alcoholic beverages	585	594	585	633	596	0.5%
Misc. mfg. prods.	555	561	552	566	577	1.0%
Textiles/leather	609	592	553	531	562	-2.0%
Nonmetallic minerals	470	520	515	465	471	0.1%
Electronics	383	381	385	375	390	0.5%
Transport equip.	188	197	232	247	172	-2.2%
Building stone	104	113	120	127	125	4.6%
Pharmaceuticals	119	120	122	116	118	-0.2%
Printed prods.	126	118	109	107	99	-5.9%
Precision instruments	65	59	55	56	57	-3.2%
Metallic ores	50	53	41	41	42	-4.2%
Tobacco prods.	35	34	34	33	32	-1.9%
Total	305,238	301,777	289,873	288,522	296,275	-0.7%

Source: FHWA Freight Analysis Framework Version 4.5

While coal dominates the inbound tonnage mix with a 2017 share of more than 44 percent it exhibited a 7.9 percent average annual decline during the study period. Fuel oil shipments accounted for 4.2 percent of all inbound tonnage, but it too experienced a sharp annual decline of 12.9 percent on average. Overall, inbound shipment growth reveals a negative trend since 2013 with total tonnage dropping by 0.7 percent per year through 2017. This weakness is in line with the State’s economic performance and demographic growth. Mississippi’s population edged up during the study period while employment expanded just 0.6 percent per year. Given the increasingly strong role played by international imports in the US economy during the past two decades, one is also tempted to attribute the decline of inbound domestic shipments to international competition. However, the statistics in Table 25 below show the opposite. Mississippi imports from abroad are first a small share (4.8%) of total inbound freight shipments to the State and second, inbound shipments to Mississippi from abroad have declined remarkably during the forecast period; 4.4 percent per year on average since 2013. A large proportion of this decline can be traced to reduced oil imports which is a phenomenon not specific to just Mississippi. With US oil production hitting record levels as of late it has become a net exporter of energy products meaning that imported energy products would be cut significantly.

Table 25 International Inbound Tonnage by Commodity (000 tons)

Commodity	2013	2014	2015	2016	2017	Growth Rate
Crude petroleum	14,874	10,371	8,274	8,364	8,840	-12.2%
Metallic ores	110	325	1,426	1,025	2,361	115.1%
Basic chemicals	133	95	1,277	646	754	54.4%
Fuel oils	122	262	431	222	410	35.5%
Electronics	241	255	284	318	371	11.5%
Base metals	132	370	120	352	361	28.7%
Machinery	186	214	255	288	236	6.1%
Articles-base metal	200	201	226	284	229	3.5%
Furniture	163	170	189	169	183	2.9%
Nonmetal min. prods.	118	138	140	148	170	9.6%
Plastics/rubber	122	153	137	142	165	8.0%
Textiles/leather	148	162	162	156	160	2.0%
Motorized vehicles	162	156	154	174	155	-1.1%
Other ag prods.	209	164	115	156	136	-10.3%
Waste/scraps	81	160	85	124	130	12.7%
Wood prods.	67	78	101	84	64	-1.2%



Commodity	2013	2014	2015	2016	2017	Growth Rate
Precision instruments	30	39	68	70	56	16.7%
Coal-n.e.c.	57	46	187	115	53	-1.8%
Nonmetallic minerals	782	573	31	31	51	-49.3%
Chemical prods.	39	45	42	28	46	4.5%
Pharmaceuticals	23	43	59	33	45	17.8%
Newsprint/paper	51	48	40	42	39	-6.4%
Printed prods.	8	11	12	10	35	42.4%
Misc. mfg. prods.	20	27	33	30	28	8.9%
Milled grain prods.	18	16	19	20	26	10.2%
Paper articles	6	6	7	6	11	14.5%
Gravel	0	1	1	1	9	131.6%
Other foodstuffs	4	9	5	16	6	14.9%
Transport equip.	8	5	4	6	5	-10.4%
Fertilizers	2	4	5	23	4	17.9%
Alcoholic beverages	4	2	2	3	3	-6.3%
Animal feed	9	13	4	4	2	-30.1%
Coal	3	2	0	0	2	-12.1%
Gasoline	0	0	4	8	2	NA
Meat/seafood	0	2	1	1	1	11.8%
Cereal grains	0	0	0	0	0	-24.6%
Live animals/fish	0	0	0	0	0	-1.2%
Logs	0	0	0	0	0	NA
Mixed freight	0	0	0	0	0	-11.3%
Natural sands	1	1	0		0	-80.9%
Tobacco prods.	0	0	0	0	0	NA
Building stone	0	0	0	0	0	NA
Total	18,135	14,168	13,902	13,097	15,150	-4.4%

Source: FHWA Freight Analysis Framework Version 4.5

Outbound Freight Commodities

Domestic shipments from Mississippi performed only marginally better than inbound shipments during the study period. Annual growth averaged -0.4 percent with strong gains in forest products erased by declining shipments of top commodity coal (-0.5%), crude petroleum (-8.6%) and cereal grains (-6.7%).

Domestic outbound freight by commodity and year is provided below.

Table 26 Domestic Outbound Tonnage by Commodity (000 tons)

Commodity	2013	2014	2015	2016	2017	Growth Rate
Coal-n.e.c.	138,016	131,747	131,064	132,415	135,406	-0.5%
Logs	16,186	17,936	18,690	19,665	18,477	3.4%
Wood prods.	14,727	14,832	14,878	15,734	15,683	1.6%
Crude petroleum	18,559	13,970	12,875	12,564	12,930	-8.6%
Cereal grains	9,403	8,347	7,842	7,947	7,124	-6.7%
Other ag prods.	5,654	6,681	6,075	6,209	7,001	5.5%
Nonmetal min. prods.	6,276	6,385	5,841	6,379	6,379	0.4%
Gravel	6,494	6,706	6,172	6,252	6,209	-1.1%
Gasoline	5,162	5,419	5,435	5,673	5,730	2.6%
Mixed freight	4,669	4,720	4,707	4,706	4,745	0.4%
Waste/scrap	4,400	4,416	4,397	4,390	4,392	-0.1%
Basic chemicals	4,185	4,075	3,800	3,761	3,523	-4.2%
Fuel oils	2,631	2,845	3,096	2,844	3,140	4.5%
Live animals/fish	2,863	2,889	3,021	3,061	3,135	2.3%
Plastics/rubber	2,691	2,739	2,906	2,956	2,813	1.1%



Commodity	2013	2014	2015	2016	2017	Growth Rate
Newsprint/paper	2,114	2,227	2,249	2,271	2,319	2.3%
Other foodstuffs	2,224	2,211	2,205	2,230	2,255	0.4%
Animal feed	2,045	2,124	2,159	2,148	2,152	1.3%
Metallic ores	508	771	1,208	1,235	2,060	41.9%
Meat/seafood	1,842	1,814	1,841	1,894	1,924	1.1%
Natural sands	1,359	1,497	1,472	1,683	1,799	7.3%
Furniture	1,505	1,517	1,587	1,593	1,595	1.5%
Base metals	1,515	1,515	1,435	1,361	1,322	-3.4%
Fertilizers	2,112	1,956	1,523	1,455	1,253	-12.2%
Nonmetallic minerals	1,760	1,743	1,227	1,108	1,122	-10.6%
Articles-base metal	906	938	932	913	933	0.7%
Textiles/leather	892	909	888	888	898	0.2%
Electronics	885	877	878	863	883	-0.1%
Misc. mfg. prods.	779	786	775	795	809	0.9%
Paper articles	767	783	778	778	775	0.3%
Motorized vehicles	578	631	647	658	663	3.5%
Machinery	677	686	635	590	613	-2.5%
Chemical prods.	526	535	507	488	489	-1.8%
Milled grain prods.	478	476	471	476	478	0.0%
Alcoholic beverages	355	361	355	384	362	0.5%
Pharmaceuticals	167	169	171	163	166	-0.2%
Transport equip.	138	144	142	136	136	-0.4%
Building stone	98	106	112	119	117	4.6%
Printed prods.	65	61	57	55	51	-6.0%
Precision instruments	35	34	33	33	35	0.2%
Tobacco prods.	22	22	22	21	21	-1.9%
Total	266,268	258,598	255,106	258,896	261,914	-0.4%

Source: FHWA Freight Analysis Framework Version 4.5

Mississippi exports to the rest of the world fared better than imports during the study period. Although just 4.7 percent of domestic exports in 2017, exports grew an average of 3.8 percent per year. Fuel oil, the State’s top commodity export by tonnage expanded an average of 6.8 percent per year and coal added 12.9 percent each year from 2013 to 2017. Table 27 displays Mississippi international export performance by year and commodity.

Table 27 International Outbound Tonnage by Commodity (000 tons)

Commodity	2013	2014	2015	2016	2017	Growth Rate
Fuel oils	2,514	2,570	3,388	3,231	3,268	6.8%
Coal-n.e.c.	1,446	2,105	2,166	2,320	2,354	12.9%
Gasoline	2,363	1,790	2,422	2,135	2,086	-3.1%
Newsprint/paper	1,399	1,247	1,338	1,352	1,459	1.1%
Basic chemicals	592	485	489	599	609	0.7%
Other ag prods.	460	389	259	275	485	1.3%
Base metals	194	159	164	234	264	8.0%
Wood prods.	235	209	179	197	228	-0.8%
Cereal grains	172	183	137	236	215	5.8%
Plastics/rubber	162	143	146	131	169	1.1%
Machinery	128	127	158	128	161	5.9%
Motorized vehicles	127	101	116	138	154	4.8%
Fertilizers	118	69	64	99	125	1.5%
Precision instruments	49	64	75	88	108	21.8%
Textiles/leather	69	106	101	79	107	11.5%
Meat/seafood	115	109	108	81	103	-2.7%



Commodity	2013	2014	2015	2016	2017	Growth Rate
Animal feed	51	51	39	70	63	5.8%
Electronics	61	55	51	54	63	0.9%
Articles-base metal	83	82	78	64	62	-7.2%
Logs	27	40	45	13	45	13.6%
Paper articles	21	33	42	41	42	18.3%
Nonmetallic minerals	35	36	43	47	40	4.0%
Chemical prods.	55	48	50	52	39	-8.2%
Furniture	45	40	39	35	36	-5.4%
Printed prods.	50	44	39	35	32	-10.4%
Nonmetal min. prods.	53	32	25	21	24	-17.5%
Transport equip.	12	10	55	71	24	20.2%
Misc. mfg. prods.	8	10	11	11	15	17.3%
Other foodstuffs	11	18	15	23	13	6.2%
Milled grain prods.	9	10	10	11	12	9.4%
Crude petroleum	0	0	0	0	10	NA
Waste/scrap	10	8	6	6	6	-10.9%
Mixed freight	1	2	6	11	5	67.7%
Pharmaceuticals	5	1	1	1	1	-39.5%
Alcoholic beverages	0	0	0	0	0	NA
Coal	0	0	0	185	0	111.4%
Gravel	0	0	0	0	0	7.2%
Live animals/fish	0	0	0	0	0	76.0%
Metallic ores	6	5	4	0	0	-60.4%
Natural sands	30	34	12	0	0	-70.2%
Building stone	0	0	0	0	0	NA
Total	10,712	10,418	11,878	12,072	12,430	3.8%

Source: FHWA Freight Analysis Framework Version 4.5

Louisiana Freight

Interstate 20 joins Vicksburg road traffic to Louisiana via the Vicksburg Bridge. Just upstream, Kansas City Rail uses the Old Vicksburg Bridge to carry freight between the two States. FAF4.5 splits Louisiana into three separate markets; specifically, the New Orleans market, Baton Rouge and the remainder of Louisiana.

Given these connections, preliminary indications are that the Port of Vicksburg could serve as a transshipment hub for cargoes moving to/from Louisiana to/from States that border the Mississippi River. Table 28 displays the inbound segment of that analysis.

Table 28 Inbound Louisiana Freight Sourced from MS River Border States (000 tons)

Census Region	Mode	2013	2014	2015	2016	2017	Growth Rate
East North Central	Air (include truck-air)	1	1	1	1	1	3.1%
East North Central	Multiple modes & mail	2,399	3,143	2,851	1,483	2,121	-3.0%
East North Central	Other and unknown	0		0	0	0	NA
East North Central	Pipeline	2,312	2,269	2,138	2,110	2,023	-3.3%
East North Central	Rail	3,546	4,926	3,770	3,814	3,039	-3.8%
East North Central	Truck	1,350	1,336	1,428	1,320	1,448	1.8%
East North Central	Water	7,458	8,226	7,791	8,381	8,370	2.9%
Total East North Central		17,066	19,902	17,980	17,109	17,003	-0.1%
East South Central	Air (include truck-air)	3	3	3	2	3	-4.2%
East South Central	Multiple modes & mail	2,863	2,856	2,819	2,745	2,785	-0.7%
East South Central	Other and unknown			0	0	0	NA
East South Central	Pipeline	2,116	2,351	2,498	2,232	2,228	1.3%
East South Central	Rail	404	571	792	511	361	-2.8%
East South Central	Truck	11,135	11,107	10,810	11,110	11,203	0.2%



Census Region	Mode	2013	2014	2015	2016	2017	Growth Rate
East South Central	Water	16,554	16,545	15,555	14,202	14,280	-3.6%
Total East South Central		33,077	33,433	32,476	30,803	30,860	-1.7%
West North Central	Air (include truck-air)	2	2	2	2	2	0.9%
West North Central	Multiple modes & mail	8,386	8,825	9,166	8,997	8,993	1.8%
West North Central	Pipeline	202	228	233	211	214	1.4%
West North Central	Rail	7,972	10,843	9,751	11,328	12,867	12.7%
West North Central	Truck	1,138	1,162	1,220	1,309	1,285	3.1%
West North Central	Water	15,333	17,124	15,967	17,839	17,540	3.4%
Total West North Central		66,110	71,617	68,814	70,488	71,760	2.1%
West South Central	Air (include truck-air)	0	0	0	0	0	-29.3%
West South Central	Multiple modes & mail	6,132	6,489	6,885	7,744	8,740	9.3%
West South Central	No domestic mode	30,856	27,161	29,347	32,561	31,674	0.7%
West South Central	Other and unknown	397	578	772	994	929	23.7%
West South Central	Pipeline	148,546	154,045	157,950	161,327	150,233	0.3%
West South Central	Rail	8,135	8,592	7,845	8,407	8,483	1.1%
West South Central	Truck	171,169	182,310	180,280	186,076	191,563	2.9%
West South Central	Water	100,749	110,609	109,177	117,135	127,801	6.1%
Total West South Central		465,985	489,783	492,257	514,244	519,422	2.8%

Source: FHWA Freight Analysis Framework Version 4.5

Of most interest to Port of Vicksburg is cargo moving directly by water since it is this cargo that holds the most potential for capture. Table 29 shows the commodity mix moving inbound to Louisiana by water from States that border the Mississippi River.

Table 29 Inbound Water Traffic to Louisiana from Mississippi River States (000 tons)

Commodity	2013	2014	2015	2016	2017
Cereal grains	31,179	41,239	39,144	44,836	47,412
Fuel oils	24,418	23,765	24,204	24,135	25,640
Other ag prods.	16,395	16,602	16,744	16,437	20,481
Coal-n.e.c.	18,035	18,316	18,489	19,926	20,003
Gasoline	12,149	11,740	10,739	11,986	13,929
Basic chemicals	13,452	13,100	12,499	12,995	12,714
Gravel	5,950	6,229	6,491	6,746	6,631
Coal	8,654	7,865	6,648	5,515	6,112
Fertilizers	2,547	2,750	3,024	3,897	3,925
Metallic ores	1,793	3,625	3,173	3,550	3,131
Nonmetallic minerals	649	1,309	1,242	1,859	1,968
Crude petroleum	1,369	1,568	1,666	1,642	1,700
Other foodstuffs	864	962	1,098	852	933
Animal feed	699	861	947	837	927
Nonmetal min. prods.	476	470	500	578	608
Waste/scrap	524	531	534	542	547
Transport equip.	411	531	561	440	423
Plastics/rubber	173	161	235	317	376
Chemical prods.	79	107	112	172	146
Alcoholic beverages	1	31	1	59	103
Machinery	82	434	297	99	103
Base metals	8	6	8	45	52
Articles-base metal	30	150	44	39	49
Wood prods.	2	15	24	24	25



Newsprint/paper	0	1	10	0	13
Electronics	8	16	19	7	10
Motorized vehicles	1	3	2	1	8
Precision instruments	6	11	14	5	6
Logs	1	2	2	2	3
Meat/seafood	3	4	2	3	3
Mixed freight	15	4	4	3	3
Furniture	1	5	4	1	2
Textiles/leather	7	8	5	2	2
Misc. mfg. prods.	1	4	2	3	1
Paper articles	0	1	1	1	1
Milled grain prods.	0	0	0	1	0
Natural sands	0	0	0	0	0
Pharmaceuticals	110	73	0	0	0
Printed prods.	0	0	0	0	0
Total	140,095	152,504	148,491	157,556	167,990

Source: FHWA Freight Analysis Framework Version 4.5

This market has grown at an average annual rate of 4.6 percent during the 2013 – 2017 period with a particularly strong performance in cereal grains traffic, which increased by 11.0 percent per year on average during the period.

The same analysis applied to the outbound market reveals a similar performance overall (+5.0% average annual growth) and in particular for cereal grains (+18.1% average annual growth).

Table 30 Outbound Water Traffic from Louisiana to Mississippi River States (000 tons)

Commodity	2013	2014	2015	2016	2017
Cereal grains	16,761	25,623	25,379	29,417	32,634
Fuel oils	25,112	24,480	24,941	24,858	26,389
Coal-n.e.c.	18,497	18,696	18,863	20,294	20,373
Gasoline	14,891	14,619	13,615	15,007	16,963
Basic chemicals	16,139	15,715	14,940	15,414	14,979
Other ag prods.	5,702	4,890	4,969	3,885	7,516
Fertilizers	6,927	6,861	6,261	6,996	6,620
Nonmetallic minerals	3,741	4,734	4,637	4,928	5,075
Metallic ores	2,492	4,358	3,746	4,125	3,719
Crude petroleum	1,385	1,736	1,691	1,672	1,807
Coal	1,338	623	497	825	1,289
Other foodstuffs	864	962	1,098	852	933
Waste/scrap	788	797	802	811	816
Animal feed	318	465	544	436	525
Transport equip.	483	607	636	511	494
Plastics/rubber	173	161	235	317	375
Nonmetal min. prods.	20	28	41	135	164
Chemical prods.	79	107	112	172	146
Gravel	100	6	9	128	145
Machinery	82	434	297	99	103
Alcoholic beverages	1	31	1	59	103
Base metals	8	6	8	45	52
Articles-base metal	30	150	44	39	49
Newsprint/paper	0	1	10	0	13
Electronics	8	16	19	7	10
Motorized vehicles	1	3	2	1	8



Precision instruments	7	11	15	5	6
Meat/seafood	3	4	2	3	3
Mixed freight	16	4	4	3	3
Logs	1	2	2	2	3
Textiles/leather	9	10	7	3	3
Wood prods.	0	0	4	0	3
Furniture	1	5	3	1	2
Paper articles	0	1	1	1	1
Misc. mfg. prods.	1	4	2	3	0
Pharmaceuticals	110	73	0	0	0
Natural sands		0	0	0	0
Milled grain prods.	0	0	0	1	0
Printed prods.	0	0			0
Total	116,089	126,226	123,437	131,051	141,324

Source: FHWA Freight Analysis Framework Version 4.5



Freight Development Themes

General and sustained improvement of the US economy presents several development opportunities for the region and is expected to increase demand for freight services, including road, rail and river transport. Short-term projections offered by the OECD, the World Bank, US government agencies and for the US economy call for economic growth of between 2-3 percent per year through 2024. Longer-term forecasts are less robust, calling for growth in the range of 1.6 percent to 2.0 percent through 2060. Globally, the outlook is also modest as short-term risks weigh heavily upon forward economic prospects. These include a slowdown in international trade, geopolitical tensions, weak performance in China and climate change. In December of 2019 the OECD projected a 3 percent short-term expansion while the IMF was marginally more optimistic. However, the current COVID-19 pandemic has cut deeply into those short-term outlooks. The OECD cut its short-term global outlook to 2.4 percent and for the G-20⁵, growth will just barely top 1.0 percent. The IMF has similarly revised its projections for the global economy warning that an overwhelming majority of countries will suffer a reversal in living standards during 2020. Nevertheless, as long as the COVID-19 pandemic can be limited to 2020, a rebound is in store for 2021 after which the modest projections will likely be restored.

In general, there is a strong correlation between economic performance and demand for freight services. However, as a general caution, in order to sustainably participate in this relationship, it is recommended that the Port of Vicksburg actively seek out specific opportunities that are consistent with its attributes and further, that it focuses on critical cargos as opposed to discretionary.

The information presented in the previous sections provide insight into certain themes which establish the basis for evaluating potential cargo opportunities at the Port of Vicksburg. The analysis of past trends provides valuable background on the markets served at the port, the encroachment of other ports or transport modes on the traditional cargo base, and how it can be brought back. Also, recent trends illustrate which traditional or new cargos are showing an increased level of activity or represent an opportunity for a step-change in terms of markets served for the Port of Vicksburg.

The following paragraphs elaborate on identified trends within which certain candidate projects can be framed for the Port of Vicksburg's consideration. After discussing market opportunities which the Consultant Team believes are available for the Port of Vicksburg, this report will discuss Vicksburg's ability to capture these opportunities based on its current state as well as areas for improvement which must be addressed in the near, mid and long-term in order to attract sustainable sources of cargo volume going forward.

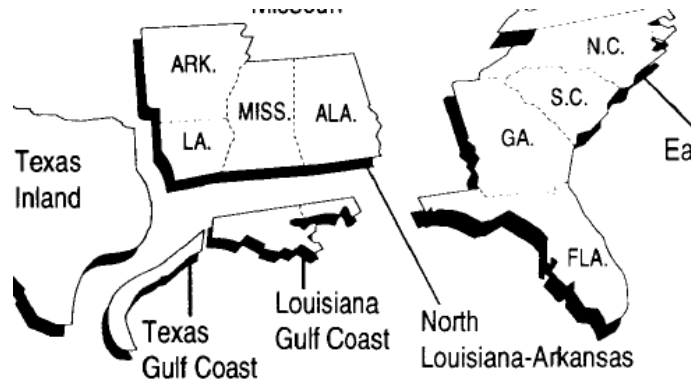
Crude Oil and Petroleum Products

The Port of Vicksburg is located within the US Department of Energy's (DOE) PADD3 district. Further refinement of the DOE geography places Vicksburg in the North Louisiana – Arkansas refining district which includes roughly all of Louisiana north of Baton Rouge, all of Mississippi, Arkansas and Alabama.

⁵ The G-20 are known as the industrialized countries of the world



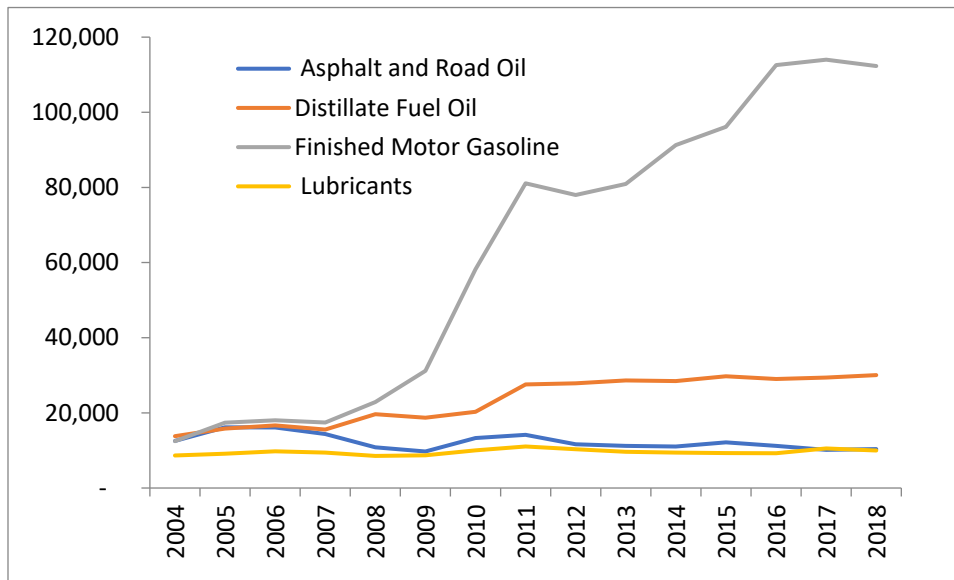
Figure 18 US Department of Energy's (DOE) PADD3 district



Source: US Department of Energy, 2019

The Port of Vicksburg has benefitted in the past from increased regional crude oil and refined petroleum products output; specifically, asphalt and road oil, distillate fuel oil, finished motor gasoline and lubricants. Including crude, these commodities together dominate the port's current commodity mix. Historical petroleum products output in the North Louisiana – Arkansas region that are important components of Vicksburg's business are displayed in the figure below. Note that 2004 is the earliest year for which full data is available.

Figure 19 North Louisiana – Arkansas Selected Petroleum Products Output – Thousand Barrels



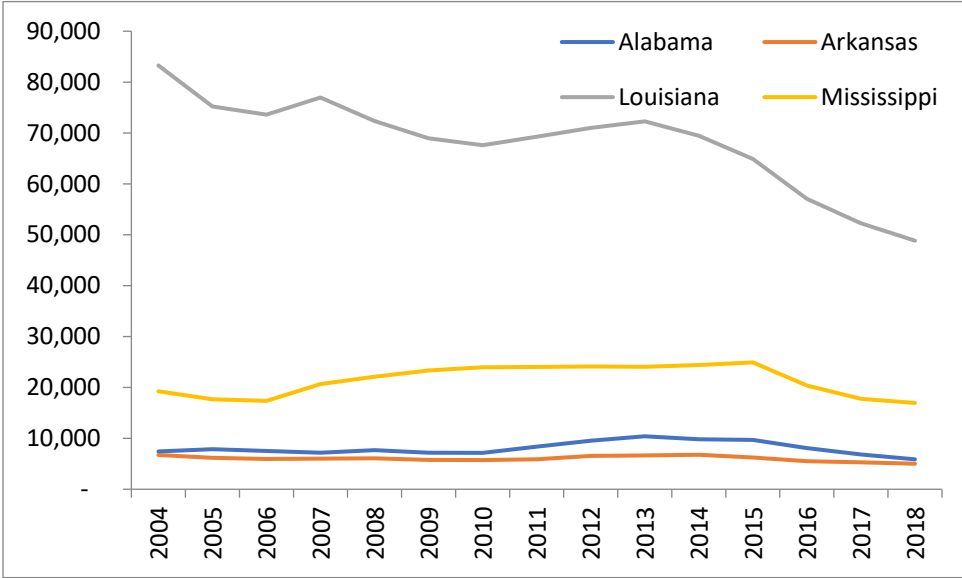
Source: US Department of Energy

Of the four key products handled by POV, regional gasoline production increased at an average annual rate of 17.0 percent during the 2004 – 2018 period, while distillates posted a 5.7 percent average annual increase. Growth in lubricants output was 1.0 percent, while asphalt and road oils posted a 1.4 percent average annual decline. Overall, regional output in these four commodity classes, clearly propped up by impressive growth in gasoline, increased by 9.2 percent per year during the 2004 – 2018 period. Meanwhile, POV shipments of these same commodities moved almost in the exact opposite direction, falling by 4.8 percent per year on average.



Crude oil output from the region’s oil fields has performed relatively poorly, falling 3.0 percent annually from 2004 – 2018. Sharply negative growth in Louisiana field production (-3.7%) was followed by more modest declines in the remaining three States. POV crude shipments reflect this decline falling 5.8 percent per year during the same period.

Figure 20 North Louisiana – Arkansas Field Crude Oil Output – Thousand Barrels

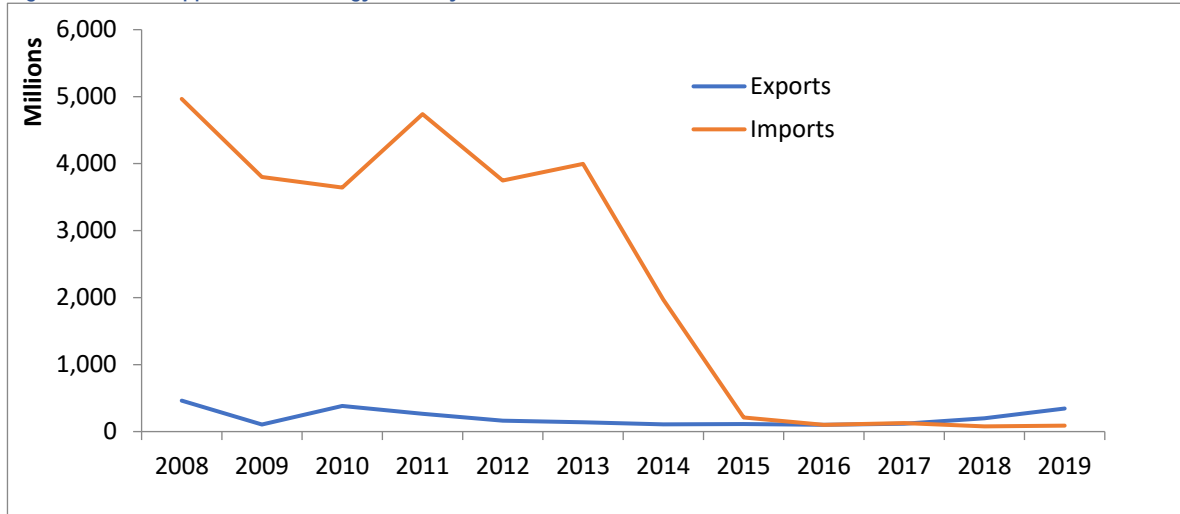


Source: US Department of Energy

United States-Mexico-Canada Agreement and the Mississippi Energy Sector
The USMCA proposes to eliminate tariffs on energy trade among the participants. For the US energy sector, this reform will lower imports costs of Canadian and Mexican oil to feed US refineries in addition to improving market access in Mexico and Canada for finished energy products and crude oil. The benefit to Vicksburg would be in the form of increased barge traffic filled with imported crude oil to feed the Ergon refinery. . A view of the current trajectory of NAFTA – Mississippi crude oil imports and exports is provided in Figure 21. The trend is clearly down reflecting the US’ newly acquired status as an energy-independent nation.



Figure 21 Mississippi – NAFTA Energy Trade by Value

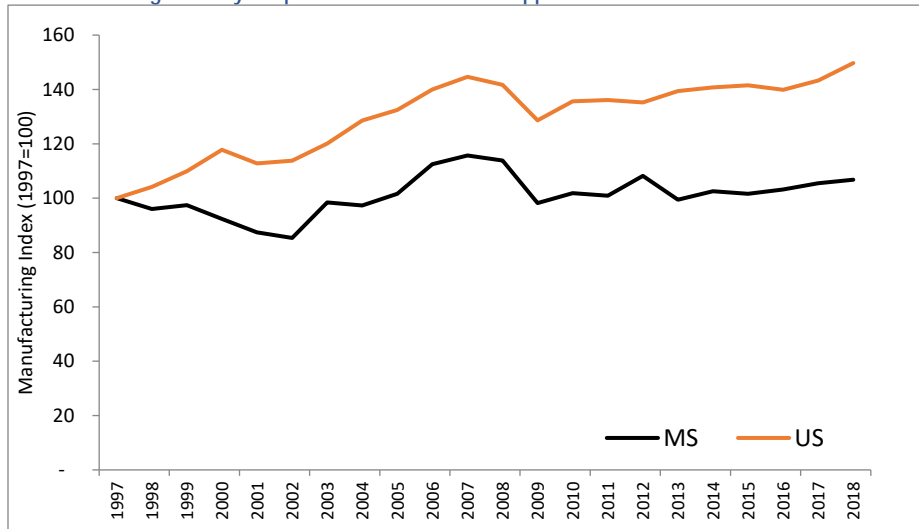


Source: US Census USA Trade Online

Manufacturing

From 2000 to 2018, manufacturing output in Mississippi expanded at a 0.8 percent annual rate, significantly below the 1.3 percent increase generated by the total US economy. Figure 22 displays the manufacturing time series indexed at 1997=100 for the State and the nation.

Figure 22 Indexed Manufacturing Industry Output Total US and Mississippi



Source: US Bureau of Economic Analysis

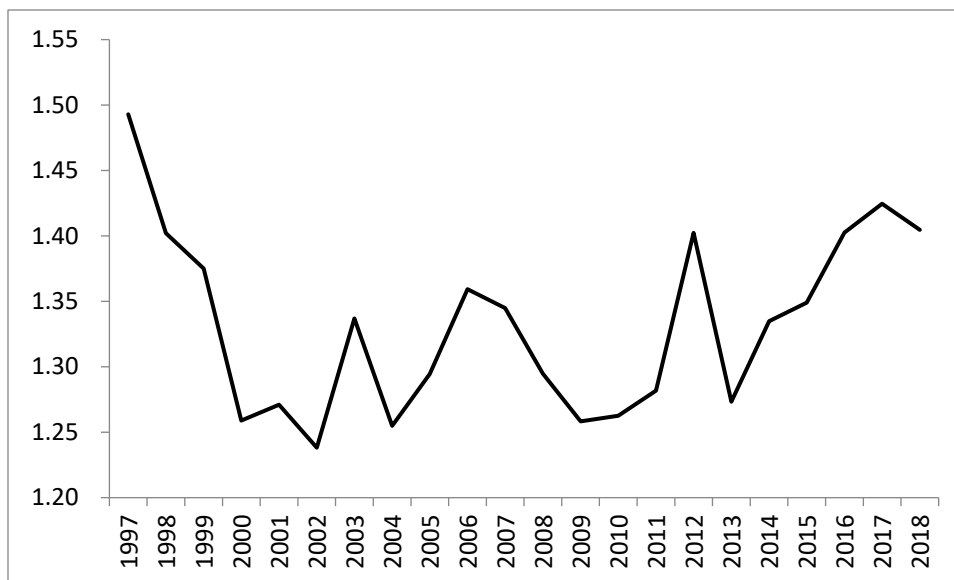
The two series initially diverge from 1997 to roughly 2000, when they begin mirroring one another closely until 2012, when another divergence occurred. Manufacturing output in Mississippi fell, while for the US, the series maintained a steady, albeit sluggish pace of expansion. Nevertheless, location quotients calculated for Mississippi manufacturing show that while currently lower than in the late 1990s, the industry is more important to overall State output than it is to output in the broader US economy.⁶ The series has displayed

⁶ Location quotients in general are calculated as the share of some variable, (in this case the value of manufacturing output) in a particular market relative to the share of that same variable in another market. A location quotient of more than 1.0 indicates



significant volatility since 1997, but it has never dipped below 1.0, which would indicate structural weakness relative to the rest of the US. One reason is textiles. Bucking the overall trend, textiles manufacturing increased by 6.1 percent per year since 1997 and an only slightly more modest increase of 4.1 percent annually since 2008. The expansion compares favorably to the aggregate US, where textiles manufacturing declined by 2.0 percent per year during the 1997 – 2017 period and expanded by just 0.004 percent from 2008 – 2017. Another key commodity for the State is autos and light trucks production. Thanks to the Nissan factory in Canton, MS, just north of the State capitol Jackson, and the Toyota plant in Blue Springs, MS near Tupelo, motor vehicle production in the State generated a 4.9 percent average annual increase during 1997 – 2017, but nearly twice that number (8.6%/year) during the 2008 – 2017 period. Comparable numbers for the aggregate US economy were 1.8 percent for 1997 – 2017 and 6.5 percent for 2008 – 2017. Overall, the above analysis suggests that Mississippi should be a net exporter of manufactured goods to the rest of the nation, especially across textiles and motor vehicles.

Figure 23 Manufacturing Industry Location Quotients – Mississippi Relative to US Output Based



Source: US Bureau of Economic Analysis

United States-Mexico-Canada Agreement and the Mississippi Auto Sector

The USMCA updates the North American Free Trade Agreement (NAFTA) with new provisions that are more favorable to US domestic producers, particularly in the auto manufacturing sector. The product of two years of renegotiation with representatives of Canada and Mexico, USMCA redresses the original agreement’s short-comings in the areas of wages and environmental protections and is intended to improve the competitiveness of US producers in the three-nation pact, while minimizing what has been characterized as “free-riding” by countries outside of the agreement .⁷

With direct rail connection to the KSC network, a major carrier of NAFTA trade between the US and Mexico, the Port of Vicksburg may find itself in an advantageous position to exploit opportunities generated by the new USMCA. The following table provides an overview of such opportunities. We consider how current and anticipated commodity trade within USMCA can be tied to critical features of Vicksburg’s regional economy and to trade routes that, either includes the Port of Vicksburg directly or that could potentially be served by the Port of Vicksburg.

that the variable in question is more concentrated or more important to the aggregate measure in one market than it is to the comparison market.

⁷ Free riding refers to the NAFTA practice of allowing third country producers of auto parts to “deem” them as originating in North America when in fact they are not.



Table 31 displays Mississippi’s top ten NAFTA commodity exports by value in 2019, before the name change. Manufactured goods accounted for the lion’s share of Mississippi’s exports to NAFTA partners, Canada and Mexico. At over a billion dollars, vehicles and parts dominated the commodity mix followed by nuclear reactors, boilers and machinery (\$683 million), electrical machinery (\$640 million) and petroleum (\$345 million). There were no primary agricultural goods among the top ten exported commodities by value, and an overwhelming majority of Mississippi’s NAFTA exports move by truck or rail. Waterborne shipments are concentrated in petroleum and wood pulp.

Table 31 Mississippi Top Commodity NAFTA Exports 2018

Rank	Commodity	Value of Shipments	Vessel Share	Air Share	Rail/Truck Share
1	Vehicles and Parts	1,091,531,177	0.0%	0.0%	100.0%
2	Nuclear Reactors, Boilers, Machinery and Parts	683,253,170	0.0%	3.8%	96.2%
3	Electric Machinery	640,526,386	0.0%	39.2%	60.7%
4	Mineral Fuel, Oil, etc.	345,275,062	77.1%	0.0%	22.9%
5	Iron and Steel	245,498,014	0.0%	0.0%	100.0%
6	Tanning & Dye	182,097,148	0.0%	0.4%	99.6%
7	Optic, Photo, etc., Medical or Surgical Instruments, etc.	138,848,449	0.0%	23.0%	77.0%
8	Plastics	126,266,677	0.0%	0.4%	99.6%
9	Furniture; Bedding, etc.	79,603,359	0.0%	0.2%	99.8%
10	Wood Pulp	74,138,869	32.1%	0.0%	67.9%

Source: US Census, USA Trade Online

The top ten NAFTA commodities on the inbound side are presented in Table 32.

Table 32 Mississippi Top Commodity NAFTA Imports 2018

Rank	Commodity	Value of Shipments	Vessel Share	Air Share	Rail/Truck Share
1	Nuclear Reactors, Boilers, Machinery and Parts	528,974,477	0.4%	1.9%	97.7%
2	Electric Machinery	528,238,083	0.0%	3.1%	96.9%
3	Vehicles and Parts	478,848,837	0.0%	0.1%	99.9%
4	Furniture; Bedding etc.	127,572,112	3.0%	0.4%	96.6%
5	Optic, Photo, etc., Medical or Surgical Instruments etc.	123,038,772	0.5%	14.3%	85.1%
6	Plastics	89,553,522	0.8%	1.0%	98.2%
7	Mineral Fuel, Oil, etc.	87,842,197	27.5%	0.0%	72.5%
8	Organic Chemicals	79,040,491	86.7%	0.0%	13.3%
9	Special Classification Provisions, NESOI	74,570,102	1.2%	9.1%	89.6%
10	Prep Cereal, Flour, Starch or Milk; Bakers Wares	49,861,562	0.4%	1.9%	97.7%

Source: US Census, USA Trade Online

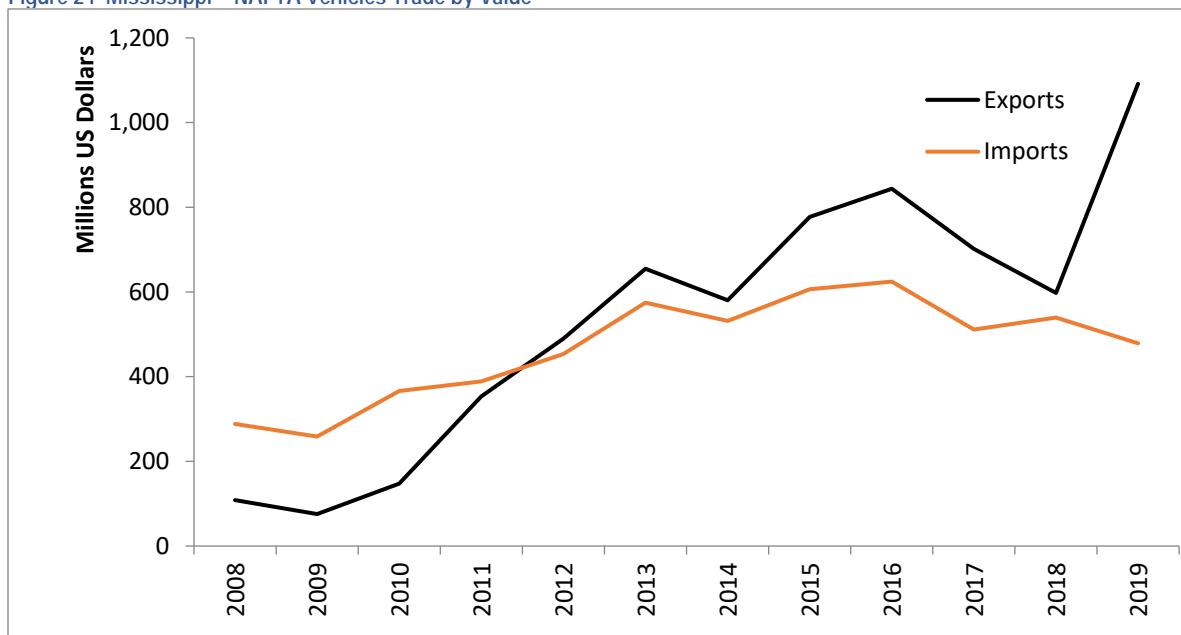
Vehicles and parts shipments ⁸are prominent on the inbound side as well, adding \$479 million to the State’s NAFTA imports. Like the outbound trade, waterborne transport however plays no role in the market, leaving the Port of Vicksburg unlikely to participate directly without modifications to the supply chain.

The annual progression of vehicles and parts shipments by direction is provided in Figure 24. While the imports trade has weakened since 2016, the export trade has accelerated remarkably, rising by 29 percent during those four years. Since 2008, average annual growth in Mississippi’s outbound vehicles and parts trade reached 23 percent.

⁸ Vehicles and parts are a broad class of commodities that consists mainly of autos and auto parts but also includes, trucks, buses, tractors, motorcycles, vehicle bodies, vehicle chassis, military vehicles, trailers and forklifts.



Figure 24 Mississippi – NAFTA Vehicles Trade by Value



Source: US Census, USA Trade Online

The Consultant Team predicts that under the provisions of the USMCA, the Mississippi vehicles and parts trade will continue to prosper on both the outbound and inbound sides. In particular, the USMCA proposes to raise the value of North American produced inputs (known as Regional Value Content) used for the manufacture of autos from 62.5 percent to 75 percent and 70 percent for steel and aluminum purchases.⁹ Critically for the US, the USMCA will require that a certain percentage of qualifying vehicles must be produced by employees making an average of \$16 per hour. This will significantly bolster the ability of US labor to compete with workers in Mexico.

Given the two existing auto plants in Blue Springs, MS (Toyota) and in Canton, MS (Nissan), the Consultant Team believes that there may be an opportunity for the Port of Vicksburg to participate, at least indirectly, in the auto trade for instance by attracting vehicle parts manufacturing or even a new auto manufacturing plant to the region, though it is duly noted that the three expansion sites currently under consideration by the Port are insufficient to accommodate the required footprint for full-scale auto manufacturing.

CSA – Based Manufacturing Location Quotients

Looking at the manufacturing location quotient in the narrower CSA, we can reference the employment data offered by the County Business Patterns. In 2017, manufacturing employment was 9.5 percent of all employment in the CSA. Across the State, however, the ratio increased to 15.9 percent resulting in a location quotient of just 0.60. By this measure, manufacturing in the CSA is a relatively less important contributor to economic performance than it is in the broader State economy.

The above location quotients suggest that manufacturing in the State of Mississippi has important growth potential but the same cannot be said for the CSA. However, because of the presence of the Nissan plant at Canton a conclusion that the CSA is unable to attract manufacturing to the area is premature. Under the correct circumstances, the Nissan plant indicates that manufacturing growth in the CSA and by extension,

⁹ One specific area where the Port of Vicksburg transport infrastructure could be attractive is regarding North American steel and aluminum content requirements. A plant located at the Port of Vicksburg would have easy access to steel and/or aluminum to use in stamping auto body parts, constructing chassis or engines and engine blocks. These intermediate inputs can then be railed or trucked to either Blue Springs or Canton for use in final vehicle assembly.

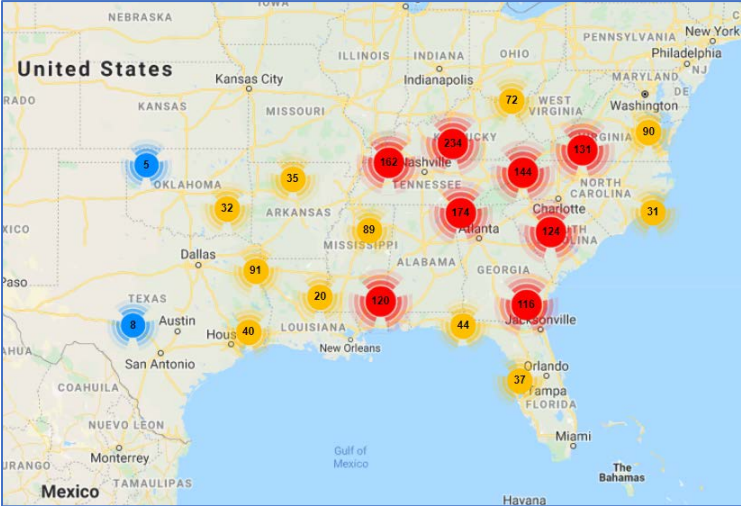


participation in that potential growth by the Port of Vicksburg should not be ruled out, at least as an ambition.

Wood Products

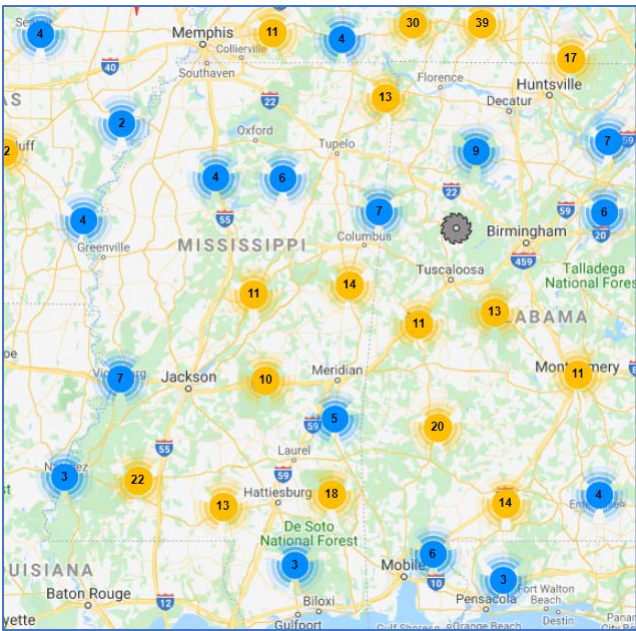
Wood products, a traditionally important cargo for the Port in the past (generating over 125,000 tons even 6 years ago), has the potential for continued expansion and growth, due to the geographic proximity of mills like that of Anderson-Tully. Other related industries (e.g. Industrial Wood Products) have opened plants or are in the port’s geographical area of influence (see figures below), and a “cluster” of related businesses can develop around lumber being handled at the river facilities.

Figure 25 Wood Mills Locations in the Southeastern United States and Gulf



Source: Primary Forest Products Network, 2019

Figure 26 Wood Mills Located in Mississippi



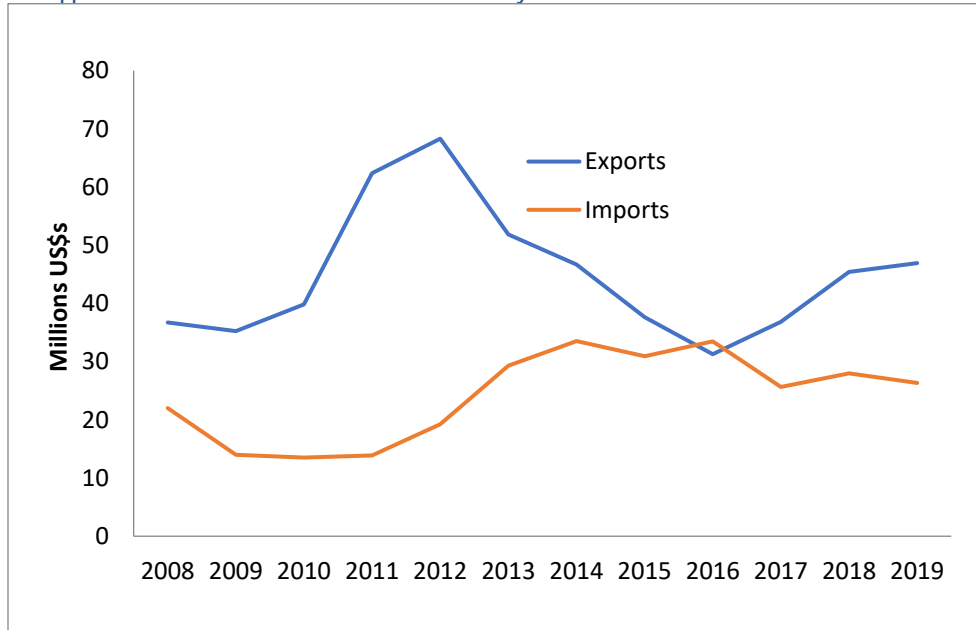
Source: Primary Forest Products Network, 2019



United States-Mexico-Canada Agreement and the Mississippi Wood Products and Paper Sector

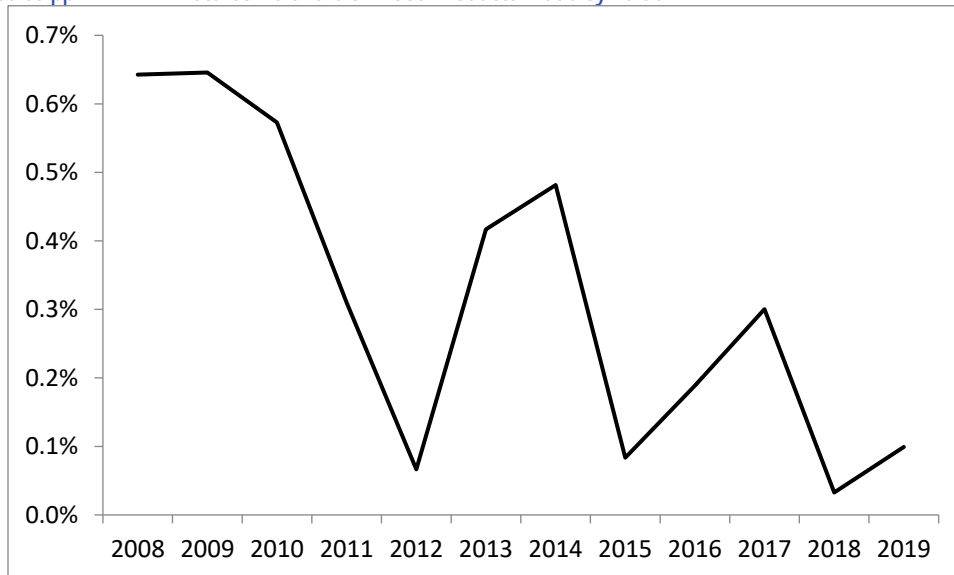
Except for the year 2016, Mississippi has enjoyed a NAFTA trade surplus from 2008 – 2019 in the product category labelled as Wood and Articles of Wood (Commodity code 44). In dollar value terms imports increased 1.6 percent per on average during the period while exports increased 2.3 percent per year. While imports are almost all railed to the State from Canada and Mexico, water shipments have participated at least marginally in the trade with a market share of less than 1 percent.

Figure 27a Mississippi – NAFTA Wood and Articles of Wood Trade by Value



Source: US Census, USA Trade Online

Figure 27b Mississippi – NAFTA Waterborne Share of Wood Products Trade by Value

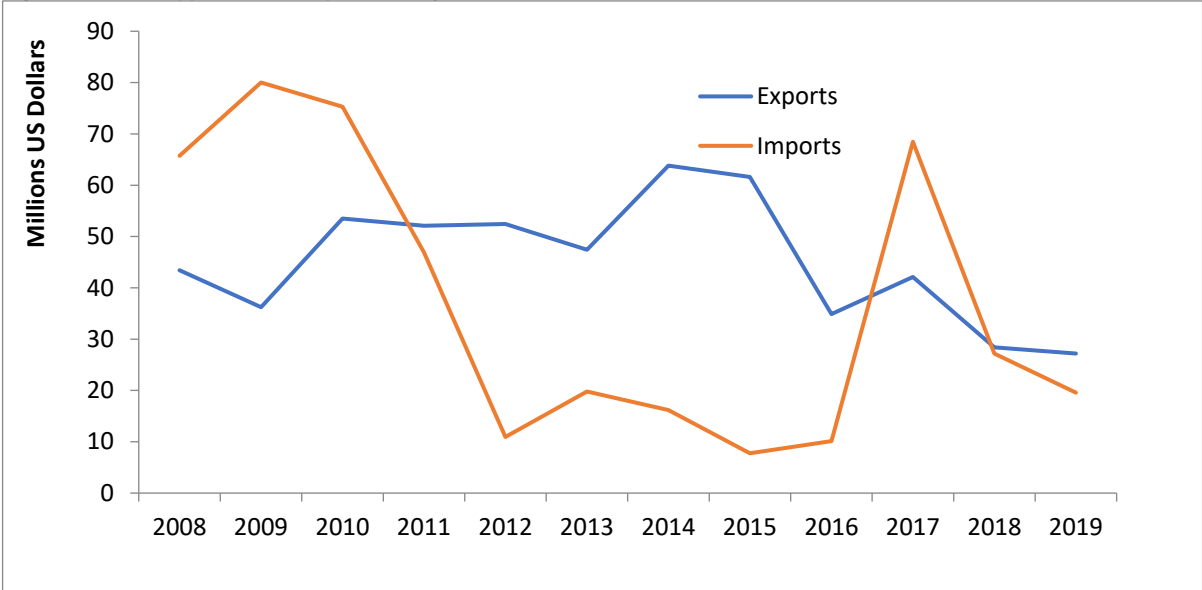


Source: US Census, USA Trade Online



Although not listed among the top ten commodities on either the export or import side, paper is an important Mississippi commodity traded within USMCA, formerly NAFTA. The next figure displays its trajectory since 2008.

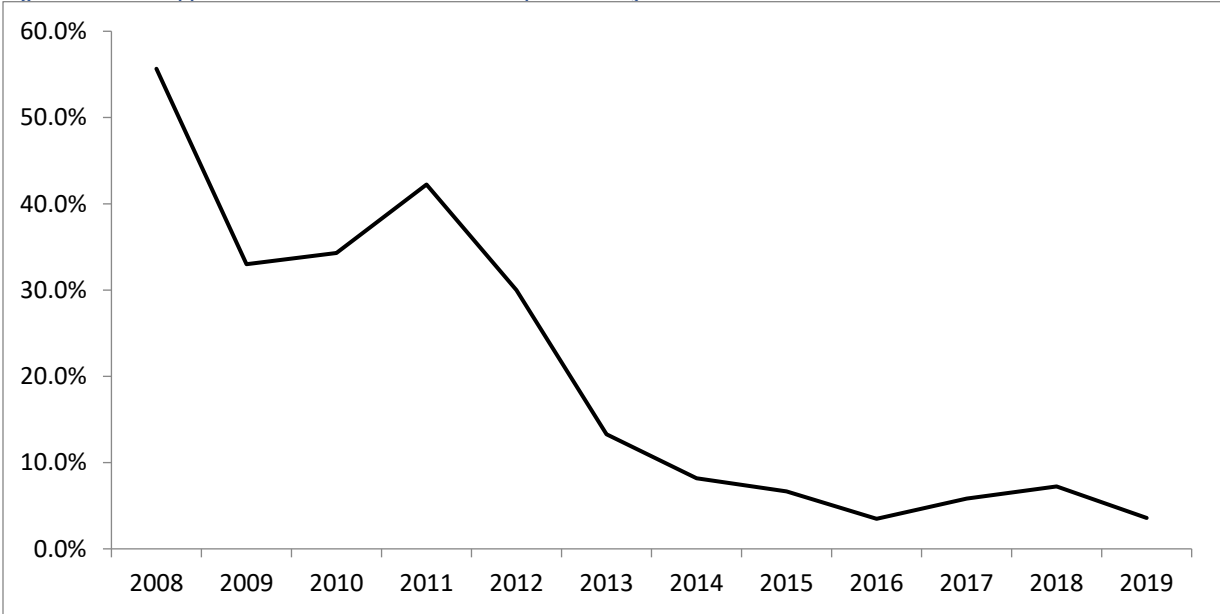
Figure 28 Mississippi – NAFTA Paper Trade by Value



Source: US Census, USA Trade Online

Overall and in spite of its uneven appearance, the paper trade is generally flat. Moreover, it has been increasingly shipped by means other than water, leaving out the possibility that the Port of Vicksburg would benefit from policy-induced improvements in this trade.

Figure 29 Mississippi – NAFTA Waterborne Share of Paper Trade by Value



Source: US Census, USA Trade Online



Agriculture Exports

The Consultant Team has identified several agricultural commodities, or groups of commodities that represent potential for growth at the Port of Vicksburg. Among all considered, the Team believes that bulk agricultural commodities, especially oilseeds and grains represent the best potential to increase Port of Vicksburg’s business.

Soybeans/Oil Seeds

Oil seeds, particularly soybeans are an important US export to the rest of the world, especially Asia, and the Mississippi River is an important conduit for US soy exports moving from Midwest and southern farms to international markets predominantly via the Port of New Orleans district.

US production of soybeans has boomed over the past ten years, especially on a per acre basis. From 2008 – 2018, production increased an average of 4.1 percent annually, while acreage planted rose just 1.6 percent per year. Figure 30 displays US production statistics during the period.

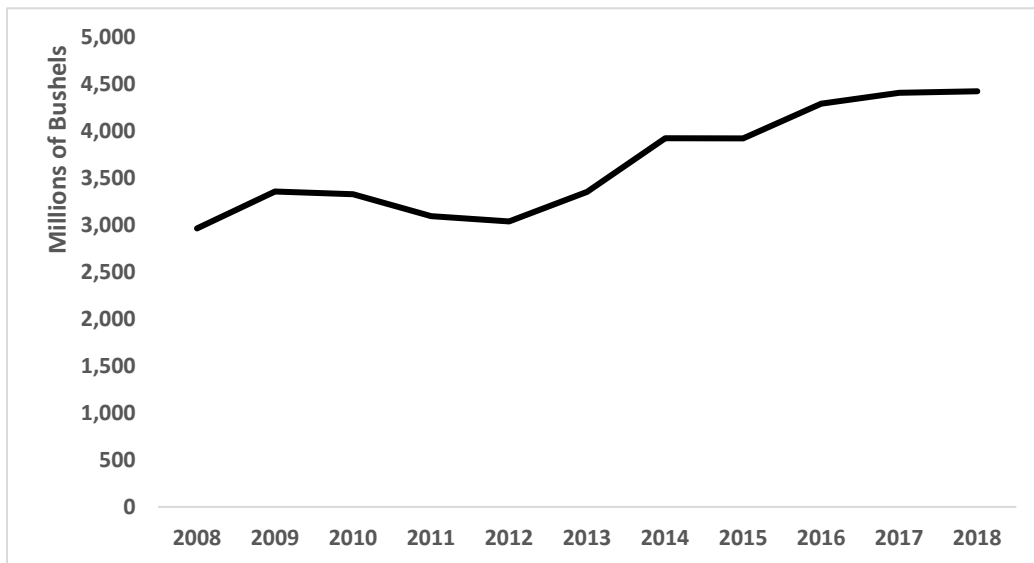


Figure 30 US National Production of Soybeans 2008 - 2018

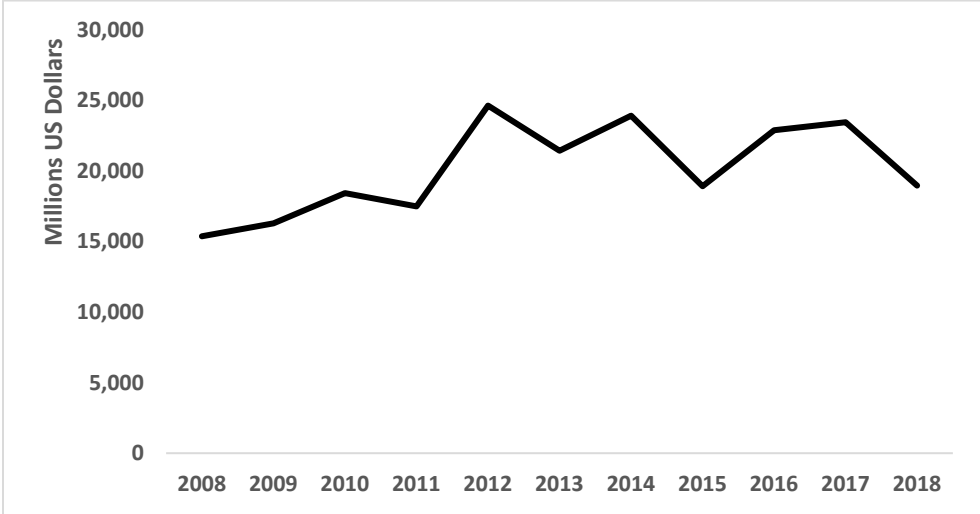
Source: US Department of Agriculture

The increase in production has been driven largely by increased overseas demand. From 2008 to 2018, the dollar value of soybean exports to the rest of the world increased an average of 2.1 percent per year even as trade tensions between the US and China pushed 2018 levels down from their 2012 peak. It is widely believed that recent easing of trade tensions between the US and China will underpin a reacceleration of soy exports going forward.¹⁰

¹⁰ During 2018, China imposed retaliatory tariffs of 25 percent or more on nearly all U.S. agricultural commodities. Seabury expects that the January completion and signing of the Trump Administration’s Phase I trade agreement with China will gradually reduce these tariffs through 2020 and beyond.



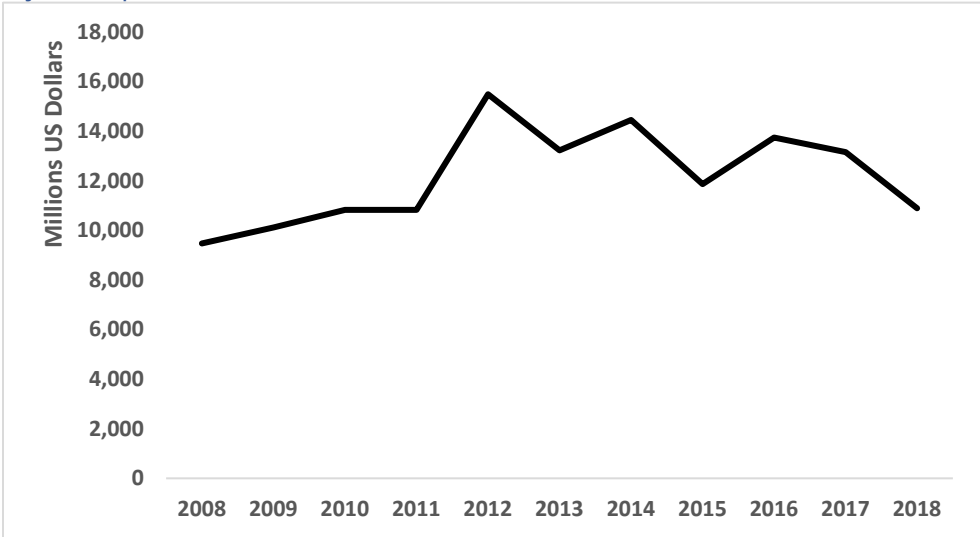
Figure 31 Value of US Soybean Exports to the Rest of the World 2008 – 2018



Source: US Census - USA Trade online

The Mississippi River to the Port of New Orleans is an important conduit for US growers in the US Midwest and the Southern States. However, recent years have witnessed a decline in shipments on this route. Figure 32 displays the value of US soybean exports to the rest of the world via the Port of New Orleans in the years between 2008 and 2018. Shipment value peaked in 2012 and has been slipping lower ever since. We attribute this partially to a global decline in demand, particularly from China but in addition, the geographic pattern of US soybeans exports and their mode of transport is changing. More soybeans are moving to world markets through US East Coast ports, which after years of dredging and other improvements are now able to accommodate the increasingly large and cost-efficient containerships that have appeared in the maritime trades over the past ten to twenty years. Containerization is increasingly becoming a viable alternative for US soy shippers as the availability of empty containers at US ports give shippers an advantage in negotiating freight rates. And while costs are an important factor in the shifting logistics of the soybeans trade, changing demand patterns are also playing a role. Asian and European soybeans customers, many of whom are small food producers and farmers purchasing feeds are increasingly looking for smaller purchase lots available in containers as opposed to large, bulk shipments.

Figure 32 US Soybeans Exports to Rest of the World via New Orleans District

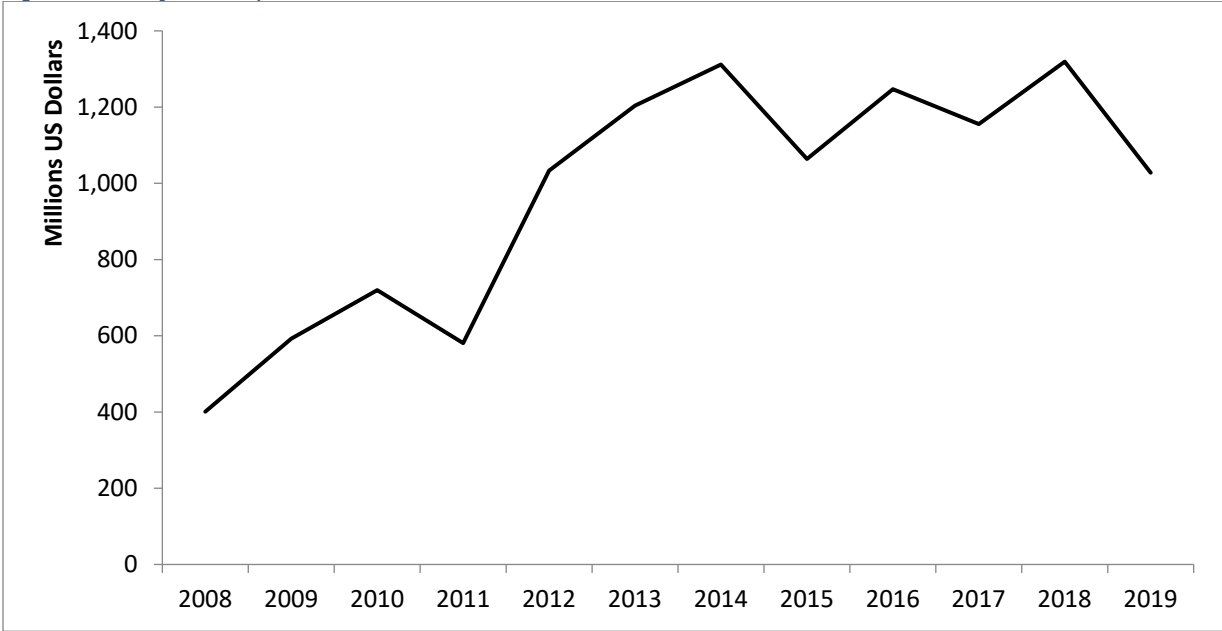


Source: US Census USA Trade Online



Figure 33 shows the progression of soybean export value through US East Coast ports from 2008 - 2018.¹¹ Average annual growth reached 8.9 percent per year during the period.

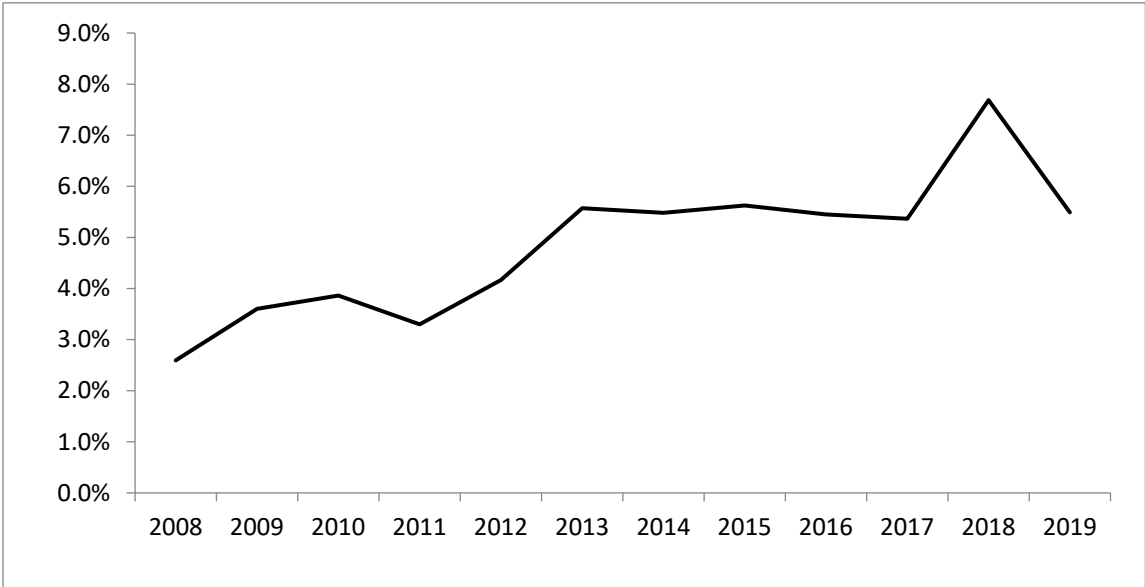
Figure 33 US Soybeans Exports to Rest of the World via US East Coast Ports



Source: US Census – USA Trade Online

While absolute export value of soy through the US East Coast has soared over the past 10-11 years, the relative performance of US East Coast ports has accelerated as well. Figure 34 shows the share of soybean export value moving to the rest of the world through US East Coast ports.

Figure 34 US East Coast Share of All Soybean Export Value



Source: US Census, USA Trade Online

¹¹ US East Coast ports include Baltimore, MD, Charleston, SC, New York City, NY, Norfolk, VA, Philadelphia, PA, Savannah, GA, Wilmington, NC.

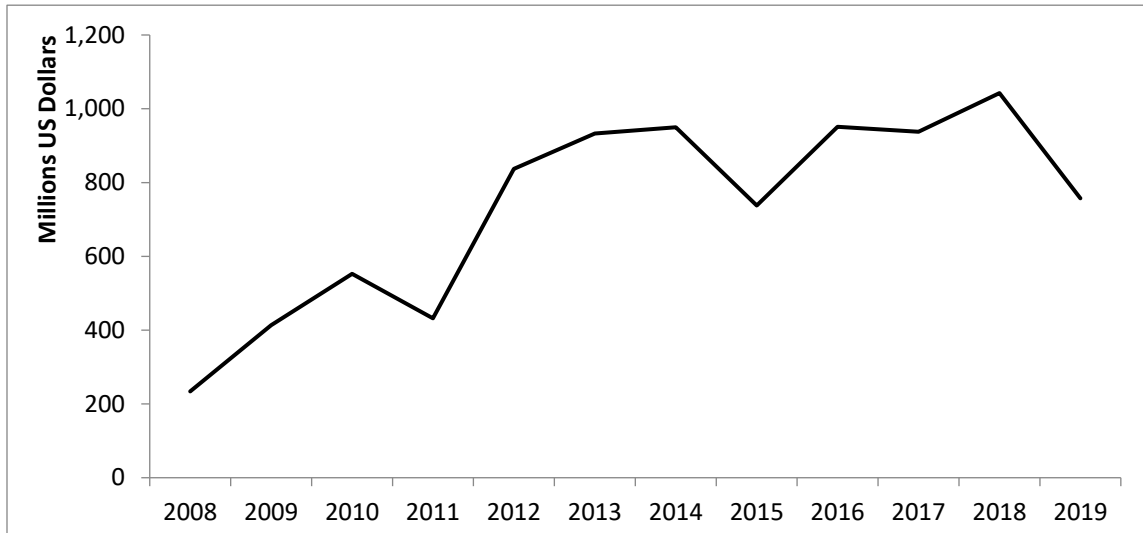




Of all US east coast ports, it is Norfolk that dominates the outbound soybeans trade. The value of soybean exports from Norfolk increased from \$234 million in 2008 to \$757 million in 2019, going as high as \$1.0 billion in 2018. Trade tensions between the US and China pushed the trade down to \$757 million in 2019.

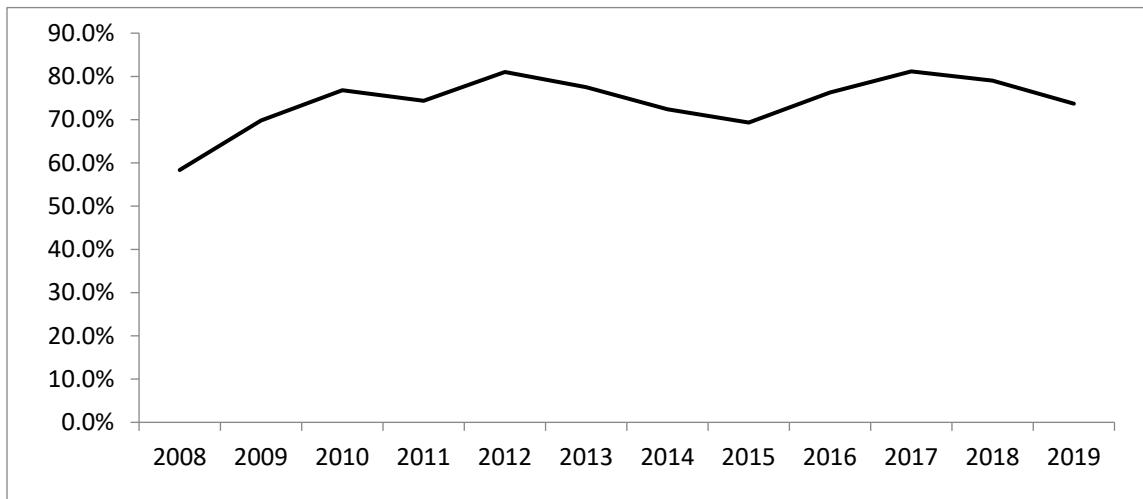
Figure 35 below displays the total value of Norfolk’s soybeans exports to the rest of the world followed by its performance relative to all other US East Coast ports in Figure 36.

Figure 35 Value of Soybeans Exports through Norfolk, Virginia



Source: US Census, USA Trade Online

Figure 36 Norfolk, Virginia Share of East Coast US Outbound Soybeans Trade



Source: US Census, USA Trade Online

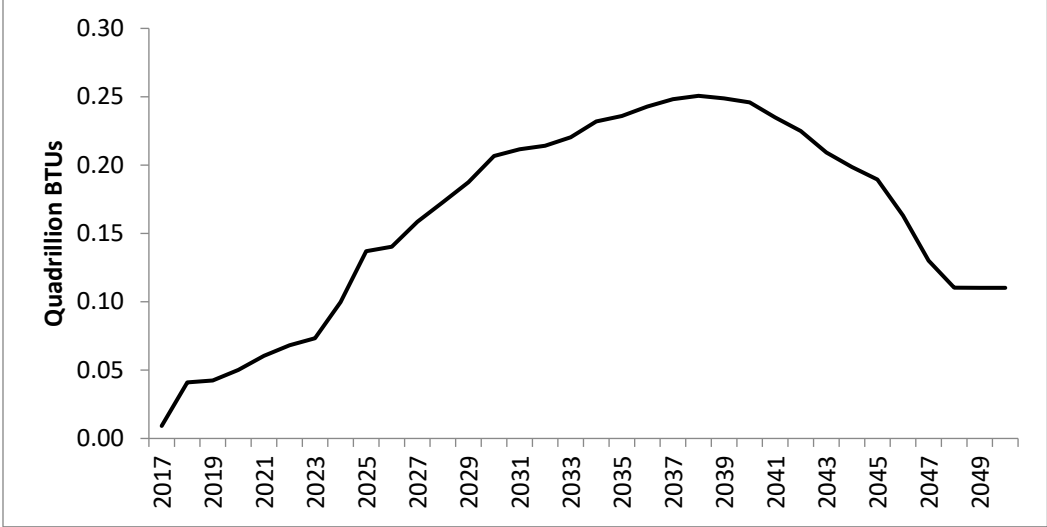
Biomass/Biofuels

The biofuels industry involves the processing of agricultural products and waste into relatively clean-burning ethanol and biodiesel for use in motor vehicles. The industry is highly dependent on environmental regulations that currently call for 10 percent of auto fuels to be composed of ethanol. In recent years, margins at US ethanol plants have shrunk so much that several, including the Ergon plant at Vicksburg have been unable to survive. The current US administration appears to be cool on ethanol and it shows. Requirements for ethanol production were increased by 3.0 percent for 2020, but total volume requirements are 30 percent below what was originally intended in the 2007 US Energy Independence and Security Act. Given low oil prices, and generally weak demand for motor vehicle travel, it is not surprising that domestic



ethanol prices are not currently profitable. However, the latest long-term forecast generated by the US Energy Information Agency (USEIA) predicts a rapid turnaround in the domestic consumption of this fuel. Consumption is anticipated to grow sharply and peak around the year 2037, after which there will be a gradual decline, consistent with wider-scale adoption of Battery Electric Vehicles and other alternative transport fuels. Average annual growth from 2018 through 2017 amounts to 9.9 percent and 3.1 percent through 2050.

Figure 37 US Consumption of Ethanol Forecast

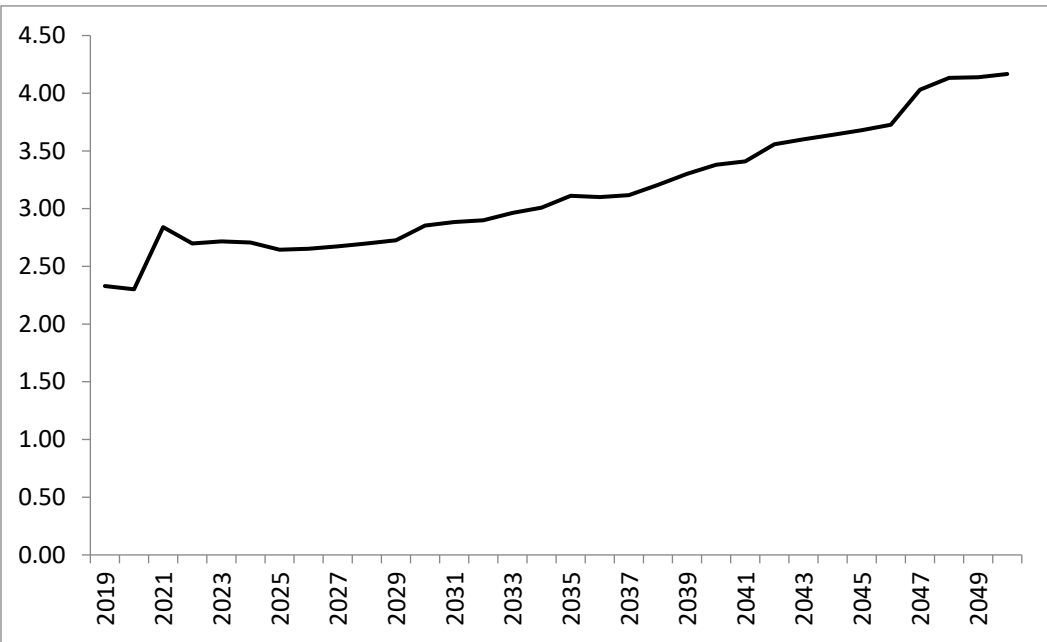


Source: US Energy Information Agency

International consumption of ethanol is predicted to be modest, but consistent. This is especially true for Canada where expectations are for modest gains over the long term.¹² The EIA’s ethanol price forecast reflects such increased demand.

Figure 38 Real Petroleum Prices: Transportation: Ethanol (E85): Reference Case Forecast

Source: U.S. Energy Information Administration



¹² According to the USDA “Agricultural Projections to 2028” Canada is projected to be the world’s largest importer of biofuels over the next decade, with most Canadian biofuel imports coming from the United States. Argentina, Brazil, and the United States are the largest biofuel exporters.

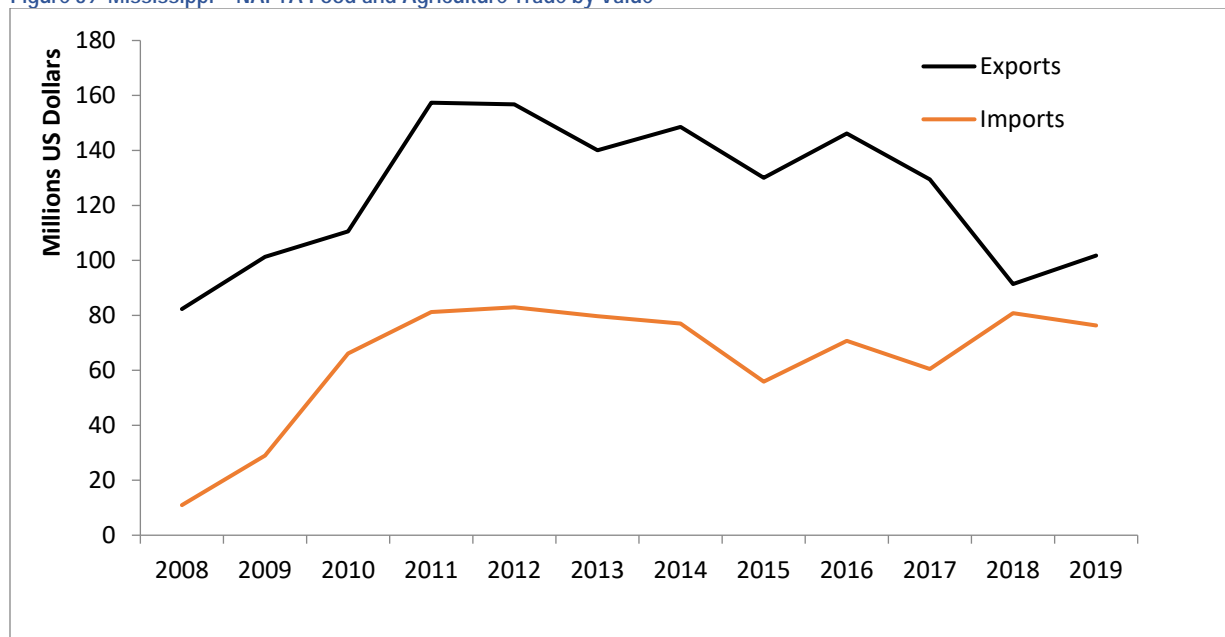


Moreover, technological advances are increasingly making cellulosic biofuels more economical, which means that regionally abundant wood chips and forest products waste can be added to the feedstock mix for a Vicksburg operation or exported in containers.

United States-Mexico-Canada Agreement and the Mississippi Agricultural Sector

The food and agriculture industries of Mississippi have not performed as well within NAFTA as have manufactured products, nor is this sector expected to perform substantially better going forward. While USMCA does address perceived unfairness for US exporters or agricultural goods, especially in the dairy industry, Mississippi’s share of this trade is too small for such broad trade agreement reforms to have a material impact. Figure 39 displays the trajectory of food and agricultural trade with NAFTA partners since 2008.

Figure 39 Mississippi – NAFTA Food and Agriculture Trade by Value



Source: US Census, USA Trade Online

Ship Yard / Drydock Services

The process of dry-docking refers to when a vessel is taken to the service yard and brought to dry land so that submerged portions of the hull can be cleaned and inspected. This work is both preventative as well as a regulatory requirement within the maritime industry. Depending on the type of barge in use (single or double hull, for example) along the River system, drydocking and inspection are required at a minimum of regular 5-year intervals, creating a recurring and consistent revenue stream for drydock owners.

While the Vicksburg region does currently have one drydock / shipyard in Big River Shipbuilders, the facility’s current capabilities are limited to its two drydocks (having 650 ton and 1650-ton capacities respectively). Barges and other river-going vessels in the region requiring higher tonnage capacity are required to travel to Greenville, Mississippi, approximately 90 miles upriver or further south toward the Gulf of Mexico for service. Considering the amount of barge traffic within the immediate Vicksburg area, the lack of corresponding heavy capacity creates a potential development opportunity within the Port area and significant potential cost saving opportunity for local users vs. other regional counterparts. A relatively precise market assessment can be estimated from USACE IWR traffic statistics for the river segment between Memphis to Baton Rouge.



Regional Ports – Strengths & Capability Comparison

Regional Ports – Commercial and Operational Capability Matrix

This section builds on the technical capabilities identified for each of the regionally competing ports and elaborates further on their commercial and operational ability in terms of sufficiency to capture new market opportunities relative to its peers. A set of ten criteria were used to provide necessary context.

1. **Physical Capability of Terminals:** Terminal facilities and cargo handling system needs are identified.
2. **Trends and Technology:** New growth sectors, change in economic conditions, vessel size, and responsiveness or ability to adapt or keep up with modern technological requirements.
3. **Productivity of Terminals:** Cargo handling productivity needs to be estimated, which will impact vessel port time, and ultimately service frequency and vessel capacity.
4. **Cost of Transitioning Terminals:** Since the proposed expansion or new facility will likely be able to capture cargo currently handled at other facilities, some customers will need to engage in a modal switch in the transportation process for shippers’ supply chains. It is important to identify how much they are willing to trade off between time and cost.
5. **Delivered Cost to the Market:** Speed to Market and proximity to supply chain nodes.
6. **Intermodal Capacity:** What is the facility’s connectivity to key intermodal capacity? The first and last mile drayage needs are identified.
7. **Import/Export Balance:** Does the facility provide shipping lines a balance of import and export cargo, thus reducing overall cost per MT or TEU.
8. **Local Demand:** Is there a captive local and sustainable market in place?
9. **Price Competitiveness:** How does one facility compare price-wise to its competitor?
10. **Existing shippers’ supply chain structure(s):** Characteristics and transportation needs are identified and clearly understood in terms of Origin-Destination (“O –D”), volume (annual, seasonal, monthly, and weekly), and locations of Distribution Centers (“DC’s”), inventory policy, inventory order cycle, order quantities, modal usage, IT and data sharing, and internal business rules.

Table 33 Regional Ports – Commercial and Operational Capability Matrix

<i>Characteristic</i>	<i>Port of Vicksburg</i>	<i>Port of Natchez</i>	<i>Port of Greenville</i>
<i>Physical Capability of Terminals</i>	Average capability. Docking facilities are adequate but handling equipment is limited. Adjacent private terminals provide complementary and diversified (multiple cargo types) docking and storage capabilities.	Average capability. Specialized for handling only grains/dry bulk. Other adjacent private terminals handle crude oil.	Average capability. Specialized for handling only grains/dry bulk. Other adjacent private terminals oil products.
<i>Trends and Technology</i>	Adequate responsiveness; most cargo types can be processed (transferred) at the port; some private terminals are specialized and have adapted to serve large tank barges.	Adequate responsiveness; most cargo types can be processed (transferred) at the port and can adapt to higher demand.	Adequate responsiveness; loading rates for dry bulk cargo have been maintained at adequate levels and adapted to demand levels.
<i>Productivity of Terminals</i>	Relatively low in the public terminal due to lack of equipment (cranes, mechanized loader/unloader for dry bulk cargos).	Average; vessel throughput not affected due to relatively low demand.	Average; vessel throughput not affected due to relatively low/seasonal demand.



<i>Characteristic</i>	<i>Port of Vicksburg</i>	<i>Port of Natchez</i>	<i>Port of Greenville</i>
<i>Cost of Transitioning Terminals</i>	Transition to improved loading/unloading at berth (with better equipment) and land (with improved rail facilities) will ultimately lower costs and be supported by users.	No expansion is planned; markets do not require extra capacity.	No expansion is planned; markets do not require extra capacity.
<i>Delivered Costs to the Market</i>	Location is key feature as demand/production zones are close to centrally located port. Delivery costs are consistent with costs in the region.	Delivery costs are comparatively higher as demand/production zones are relatively further away from the port.	Delivery costs are comparatively lower as production zones are close to the port.
<i>Intermodal Capacity</i>	High connectivity. The Port is served by a short line operated by a short line railroad, the Vicksburg Southern Rail (VSOR) directly connected to KCS mainline on the Meridian Speedway. KCS connects to Canadian National (CN) at Jackson, MS and Union Pacific at Tallulah, LA; KCS line also provides direct access to the only railway that crosses the Mississippi River between Memphis and Baton Rouge.	Good connectivity; the Port is served by Natchez Railroad (NTZR) connecting with the Canadian National (CN) Railroad.	Low connectivity. The Port is connected with the Illinois Central Railway via a 55-mile rail link; additionally, one surface track serves the open storage area and connects with the Columbus and Greenville Railroad; rail volumes are relatively low.
<i>Import/Export Balance</i>	No international trade; domestic in/out flows are unbalanced: 70%/30%.	No international trade; domestic in/out flows are relatively balanced: 45%/55%.	No international trade; domestic in/out flows are unbalanced: 35%/65%.
<i>Local Demand</i>	Industrial tenants generate important in/out flows.	Relatively low local markets.	Grain market generates steady out flows.
<i>Price Competitiveness</i>	Average to low due to low productivity (but price relative disadvantages offset but better logistics setting/connectivity).	Competitive prices but with little effect on markets (logistics setting is the key driver).	Competitive prices as facilities complement private terminals (mostly for grain shipments).
<i>Existing Customer Supply Chains</i>	Long-term users/tenants have well established supply chains; existing setting could improve if rail services improve connectivity at terminal and intermodal services.	Existing supply chains are adequate for existing flows.	Existing supply chains are adequate for existing flows; grain out flows benefit from proximity of production areas.

Source: Seabury Analysis

From there, certain Strengths and Opportunities can be extrapolated, such as was done in the illustration below:



Regional Ports – Strengths and Opportunities Matrix

Table 34 Regional Ports – Strengths and Opportunities Matrix

<i>Port</i>	<i>Strengths</i>	<i>Opportunities</i>
<i>Vicksburg</i>	<ul style="list-style-type: none"> • Central Location • Highest proximity to populated centers and industrial parks • Diverse user/tenant base • Best intermodal/rail connectivity • Available capacity 	<ul style="list-style-type: none"> • Scope for diverse markets to grow • Increase employment (availability of low-cost work force) and potential high inputs/outputs industry flows • Opportunity to reduce logistics costs • Opportunity to increase market share
<i>Natchez</i>	<ul style="list-style-type: none"> • Good intermodal/rail connectivity • Available capacity 	<ul style="list-style-type: none"> • Opportunity to diversity trades and increase overall market share • Concentration of Port Calls
<i>Greenville</i>	<ul style="list-style-type: none"> • Closely connected to production areas 	<ul style="list-style-type: none"> • Potential for increasing grain out flows and market share

Source: Seabury Analysis

Our assessment provides that the Port of Vicksburg offers competitive advantages for the development of new freight opportunities in comparison with other locations in the region and the state, among them:

- Labor Costs – Vicksburg’s regional economy is characterized by some of the lowest wages in the nation. While generally low wages suggest lower skills, the success of the nearby Toyota and Nissan plants challenge this assumption.
- Logistics – the direct connection to KCS is a significant advantage for moving intermediate inputs to a plant and finished goods to market. While the Consultant Team does not foresee the Mississippi River playing a key role in certain time sensitive trades, it can instead serve suppliers of raw materials such as scrap iron, biofuels and crude oil/ gas. Moreover, the Port of Vicksburg is close to major freight airports in Jackson and Memphis and is connected by interstates 20 (East – West) and 50 (North – South). The latter extends to the Port of New Orleans in the South and Memphis in the North.
- Workforce Development – Mississippi is in the process of expanding its workforce development programs in universities and community colleges (Hinds’ Vicksburg-Warren Campus) with the expressed intent of attracting and retaining qualified workers to operate sophisticated manufacturing plants such as autos.¹³ [include name of regional vocational school that Pablo touts.]
- Technical Knowledge and Clustering – With several well established wood products and hydrocarbon plants located at the Port of Vicksburg, the availability of technical knowledge in these sectors as well as nearby vehicles manufacturing is growing and can be leveraged by a new facility at Vicksburg.
- Policy Incentives – The government of the State of Mississippi emphasizes tax policy to incentivize development of its manufacturing base
- Land – The Port of Vicksburg has ample land (across numerous sites) to host new industrial development, which is complemented by the nearby CERES Research and Industrial Interplex.

¹³ <https://www.manufacturedinmississippi.com/2016/08/01/mama-evolution-automotive-manufacturing-mississippi/>



Port of Vicksburg – Intermodal Cost Assessment

Notwithstanding the relative strength of Vicksburg’s competitive position, the Consultant Team’s research identifies a need to improve the interconnectivity of logistics in the region to support international trade growth and reinforce the access/reach of regional business with international markets. A river-based intermodal transport option will complement existing rail connectivity and offer cost effective alternatives to movement of cargo in/out if the integration of such can be planned more effectively for the region. If regular services exist, a container operation in the Port of Vicksburg can also become a transfer point for low cost equipment relocation (empty containers).

To that end, it is envisioned that a successful development in Vicksburg depends on combining various niche markets that may not be able to stand alone into services that are viable when put together. Niche markets have been identified throughout this analysis and, on the import side, require the combination of “transshipment” of international containerized goods with domestic container barge shipping services. For example, the import of spruce logs in containers from Europe through a Gulf port (e.g. customs cleared at New Orleans) can be moved to Vicksburg to reach local sawmills. The economics of this logistic chain improve significantly if any inbound trade is matched with outbound international goods produced in the region. Also, the relocation of empty containers can be found more cost effective if long hauls include barge transportation instead of just trucking.

Therefore, the case for creating cargo demand at Vicksburg’s river facilities should be based at least partially on transitioning shipper cargo flows from highways to barge. Assuming “anchor volume” transported by barge is identified, the commercial viability of the new barge-based logistic chain will improve by the identification of backhaul cargo in Vicksburg’s “catchment area”. The next sections detail the analysis performed to define the geographic region where shippers would realize a significant advantage from the new transportation service option.

Port of Vicksburg’s Catchment Area

The Consultant Team employs a drive-time analytics approach to define the catchment area surrounding the Port of Vicksburg. Drive-time analytics addresses the daily revenue requirements of first- and last-mile trucking, a major cost component of shipping. In the case of containers, the specific premises behind this approach are:

- the barge terminal service requires first- and last-mile trucking of containers to and from the Port; and
- due to federally mandated maximum daily hours of service (HOS) of 11 hours for truck drivers, catchment-area modeling is the preferred approach to determine the size of the catchment area.

Following these premises, the definition of the catchment area is relatively straight forward. The outer ring of the catchment area represents the distance a trucker can travel in one round trip from the customer to the Port. One half of a round-trip is 300 minutes and, therefore, the outer ring is defined as the distance that can be traveled in 300 minutes. Additional drive-time rings of 135-, 90-, and 45-minutes can be created to represent a trucker making two, three, and four round trips in a single 11-hour shift. A final commercial carve-out of the catchment area can then be created in order to specifically identify the market region where freight attraction is likely to occur.

Figure 40 illustrates the outer ring for Vicksburg’s catchment area. The 300-minute drive-time, as depicted, represents the potential commercial reach for Vicksburg. Although its application is generally more theoretical, the specific primary purpose of this exercise is to identify alternative container handling facilities within the broad regional market. Inside this outer ring, the most notable presence is that of Memphis, TN, which draws a significant volume in container cargo.



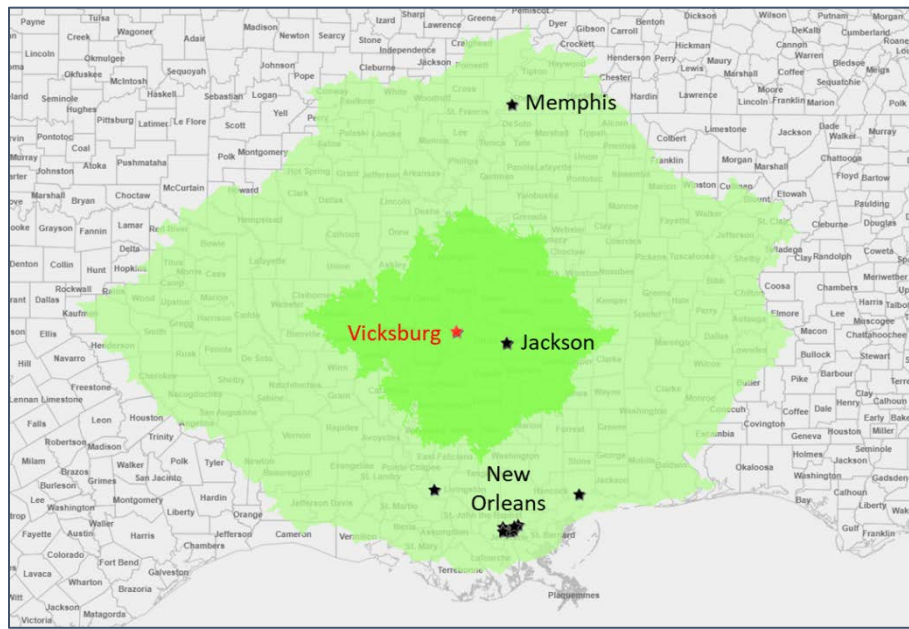
Figure 40 Single-Day Regional Truck Turns from Vicksburg, 300-minute drive-time area



Source: Seabury / SRF Analysis

The 135-minute drive-time more realistically represents the potential commercial reach for Vicksburg. This region allows for two complete truck turns per day and therefore significantly reduces the cost of trucking. This regional depiction provides a sufficient distance from Memphis to draw containerized freight southward to Vicksburg.

Figure 41 Two Daily Regional Truck Turns, 135-minute drive-time area



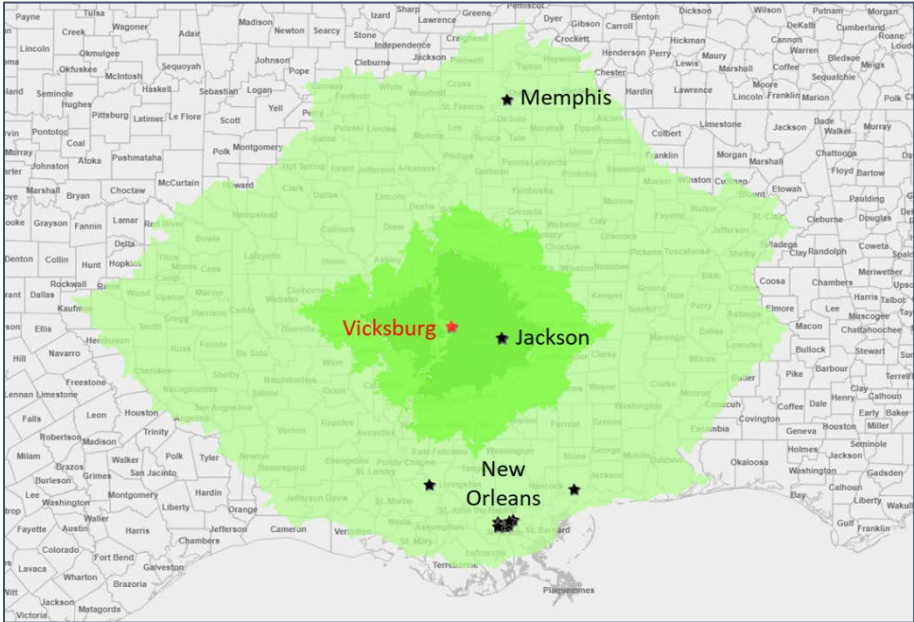
Source: Seabury / SRF Analysis

The 90-minute drive-time, as depicted below, indicates the sweet-spot for freight attraction to Vicksburg. This regional area allows for three complete truck turns per day and therefore further reduces the cost of trucking to and from Vicksburg to the customer location. As a cautionary note, the image captures the



market region and counties south of Vicksburg and, as such, may present a competitive challenge against direct trucking to New Orleans if delays at the gate in New Orleans are not a consideration.

Figure 42 Three Daily Regional Truck Turns, 90-minute drive-time area

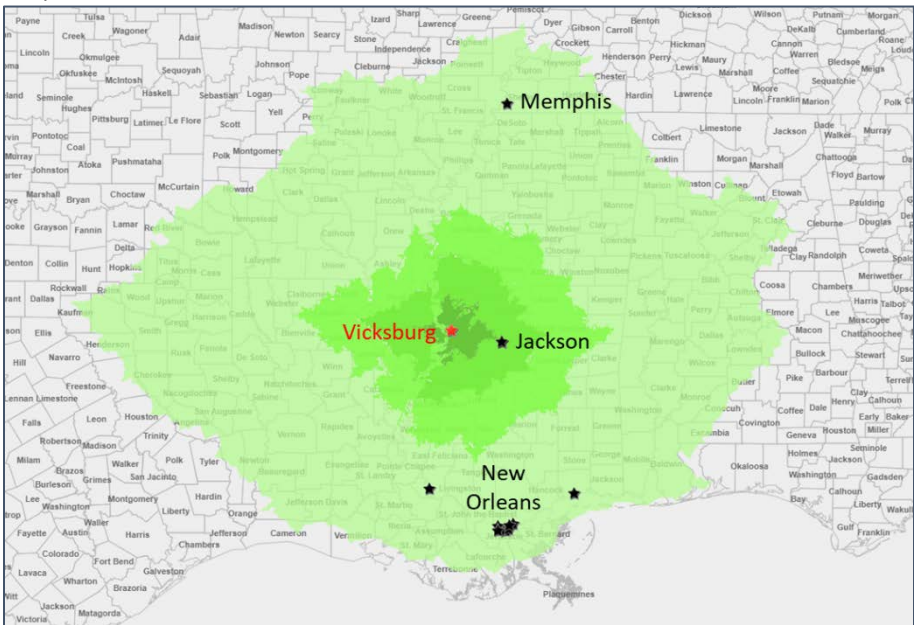


Source: Seabury / SRF Analysis

Finally, a 45-minute drive-time represents the organic freight-capture opportunity for Vicksburg and the counties immediately surrounding Warren. This regional location is isolated from competing container-handling facilities and is likely to provide a significant value alternative to shippers that currently may be trucking containers directly to and from New Orleans and other Gulf ports.

Figure 43 Four Daily Regional Truck Turns, 45-minute drive-time area

Source: Seabury Analysis



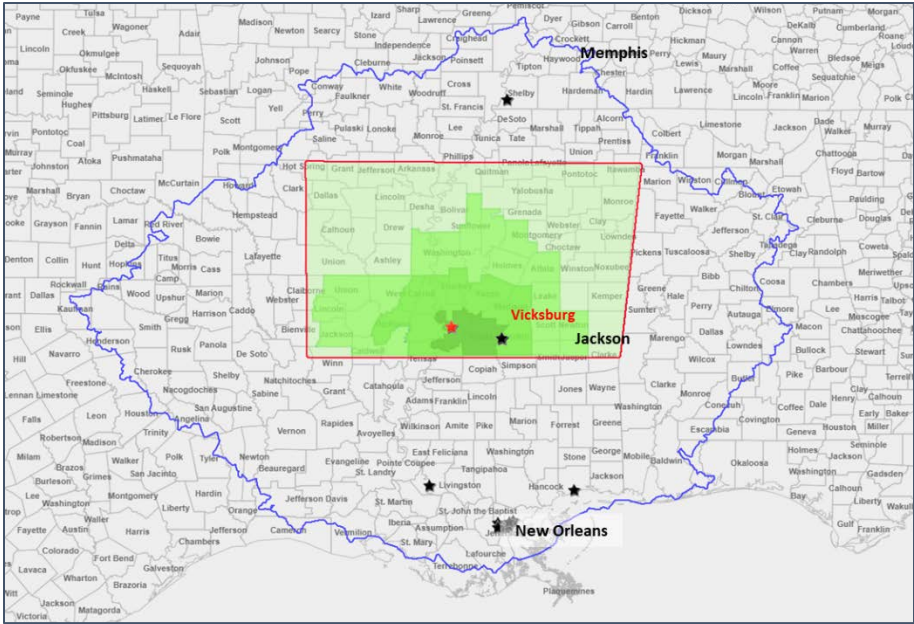


The commercial-carve-out of the catchment regions considers a number of factors that serve to limit the size and scope of the Vicksburg regional freight opportunity to arrive at a rational commercial freight capture region. It considers:

- State boundaries,
- Competing container terminal service,
- Direct container trucking vs. Vicksburg barge service, and
- Highway access.

Figure 44 illustrates the area considered as the commercially viable catchment area for Vicksburg.

Figure 44 Vicksburg's Commercial Carve-Out of Catchment Area



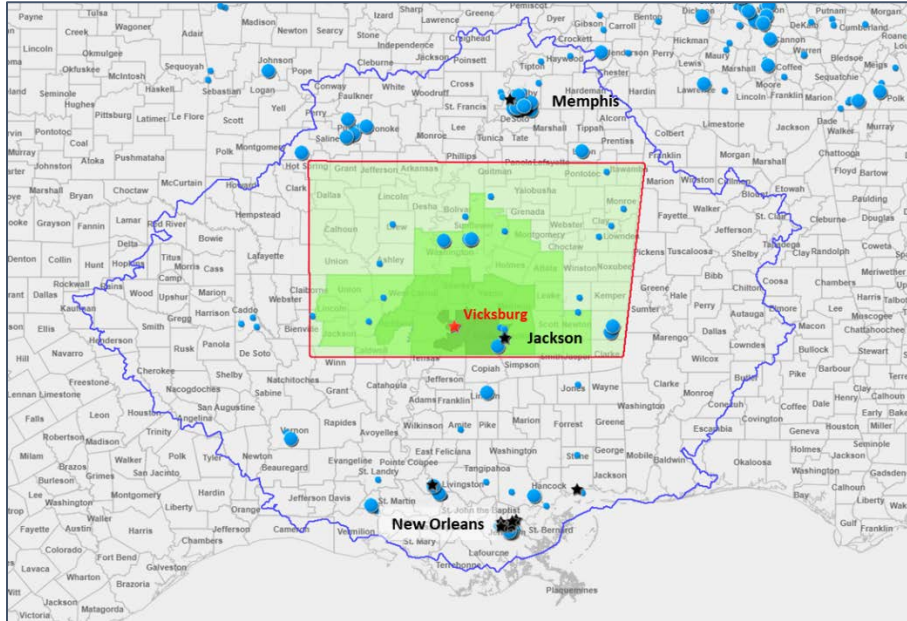
Source: Seabury / SRF Analysis

Once the commercial catchment area has been defined, the next step is to map facilities that belong to a specific commercial activity and that could consider transitioning cargo if there are clear economic and qualitative improvements (level of service) to their transportation and supply chain requirements.

A first layer of businesses that can benefit from an improved barge-based system is warehousing/distribution centers. There are approximately 70 warehouse and distribution facilities that reside within the broad 300-mile drive-time catchment area, with approximately 27 residing in the commercial catchment area (see figure below). Of these 27, five are of relatively large size as they employ 50 or more employees. Attention should be drawn to the lack of warehouse and distribution infrastructure near POV.



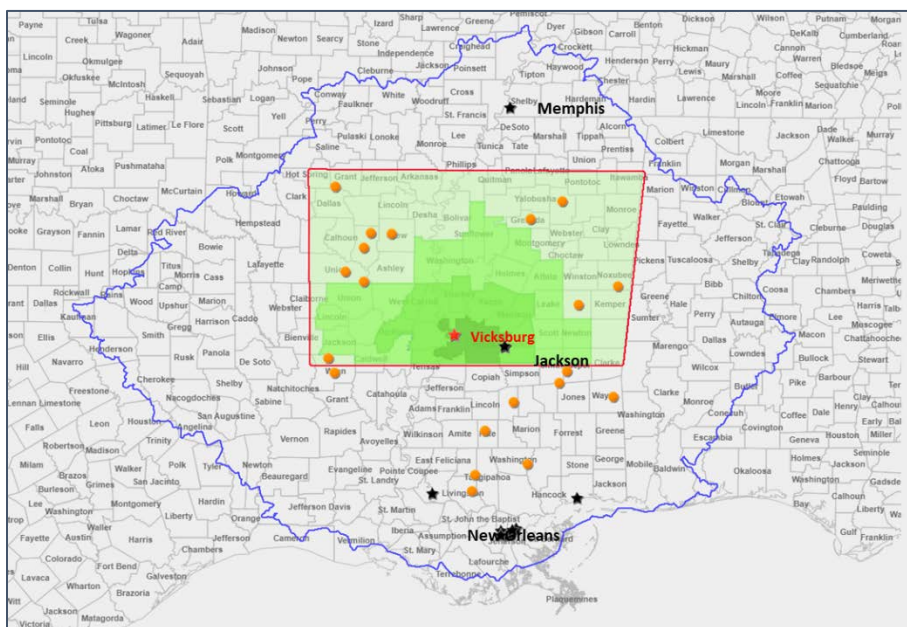
Figure 45 Regional Warehouse/Distribution Infrastructure in Vicksburg's Commercial Catchment Area



Source: Seabury / SRF Analysis

Similarly, a spatial analysis can be made for other industrial activities. Softwoods have been identified as potentially important inputs for regional sawmills' new product lines. These containerized imports can be transported through Gulf ports and barged to Vicksburg for final short drayage distribution. The next figure maps local sawmills that could benefit from this new cargo distribution dynamic. Our analysis identified and plotted 20 sawmill operations on the 300-mile drive-time map with eleven of these mills located in the commercial catchment area.

Figure 46 Regional Sawmills Infrastructure in Vicksburg's Commercial Catchment Area



Source: Seabury / SRF Analysis



Finally, another important industry that can be analyzed spatially is steel mills, but a wider radius would be required, and cargo is not containerized. Within a 500-mile radius, 7 different steel mills located on the river system and are competing for inbound scrap iron. Although the inbound cargo should use the rail network up to Vicksburg, a transload operation can be optimized for reaching upriver steel mills by barge. Equally so, the Port of Vicksburg represents a potential site for the location of a steel mill itself.

The single greatest advantage, as it stands today, is that the Vicksburg barge service costs are likely to present regional shippers with an attractive cost savings when compared to the regional container trucking market that originates or terminates in New Orleans. Due to excess driver wait-times at the deep-water port, container drayage firms may be highly receptive to shuttle service to Vicksburg, where negotiated low-cost rates may be obtained.

A final step of the analysis is to estimate the degree of cost savings that a new logistic alternative can bring to the targeted cargoes. A shipper savings calculation can provide a first general approximation of the economic savings a shipper would accrue if it transitions cargo movements from an all-road single modal activity to a multi-modal barge-based option.

Commercial quotes were obtained both for barge and trucking container services¹⁴. Table 35 offers a modal comparison of a container transported from New Orleans to Vicksburg. The cost advantage for the barge-based service is significant and provides enough shipper cost savings to consider a modal transition if the level of service provided is satisfactory and reliable.

Table 35 Modal Cost Comparison for a New Orleans – Vicksburg Container Service

Cost item	All-Truck Service	Barge Service (local drayage by truck)
Trucking commercial quote, New Orleans – Vicksburg	\$725	
Fuel Surcharge 28%	\$203	
Chassis daily cost @ \$35 per day	\$35	
Barge Service – 341 river miles ¹⁵		\$300
Local Drayage Vicksburg, transport to final dropping location		\$150
Fuel Surcharge 28%		\$42
Chassis daily cost @ \$35 per day		\$35
Total Transport Cost	\$963	\$527

Source: Seabury / SRF Analysis

Port of Vicksburg - Identified Business Opportunities

This subsection presents a preliminary list of identified business opportunities with a summary of the main factors considered to evaluate their viability. These business opportunities were identified from various sources of data, interviews with local industries and transport services providers, as well as our analysis of the Port of Vicksburg comparative advantages. As stated before, Vicksburg’s strengths place the Port on a relatively advantageous strategic position to take advantage of the general national economic/trade trends presented in the previous section.

¹⁴ SEACOR AMH and Noatum Logistics. We also developed a cost function based on market drayage costs for origin/destination nodes in Louisiana and Mississippi that yielded similar results than the commercial trucking quoted rates.

¹⁵ Cost includes Lift Charge



“Business Profiles” have been developed for the identified opportunities and are presented in the next sections.

Spruce logs for Industrial Wood Products

- Local wood processing plants are expanding their markets and require high quality inputs sourced directly from abroad.
- Local business has studied the feasibility of importing 3,000 containers per year of spruce logs from Europe, mill into siding, and ship to retail distribution centers.
- Industrial Wood Products (IWP) currently stains siding for a large retailer (Lowe’s), which is received from another mill in North Carolina.
- Possibility to agglomerate freight for IWP and other mills in the region to reduce overall freight costs.
- Supports a new, growing employer (+25 employees in 2 years) in a traditional Vicksburg sector.
- To import containers from Europe, New Orleans represents a competitive option, but bringing containers to Vicksburg via rail is not competitive.

Custom-blended Animal Feed

- Two dozen poultry farms in the state are located in a radius of 150 miles from the port.
- The poultry industry trends to higher sophistication of their inputs and better margins; thus need to bring in DDGs (dried distillers' grains), meal, pellets, and other animal feed ingredients by cost effective means (bulk by barge and rail) and blend into custom animal feeds for local distribution by truck.
- Farmers use custom-blended feed for livestock, and companies exist that blend bulk product to each herd’s specifications.
- Vicksburg’s ready access to barge, rail, and truck transportation make it a suitable location to bring in product, blend it, and ship it out.

Biomass and Biofuel

- Increasing global interest in clean-burning biofuels to partially replace petroleum.
- In 2019, renewables surpassed coal in generating electricity in the US.
- Opportunity to supplement declining coal usage, while remaining an energy exporter and to fulfill federal mandates on gasoline ethanol content.
- Mississippi already has the 8th largest US production capacity for biofuels and can easily provide access to expertise and skilled labor.
- Significant supply of feedstocks (wood chips, poultry waste, corn, vegetable oils and crop residues) available locally.
- Pipeline infrastructure already in place.
- Provides expanded market for regional agricultural producers.
- Nationwide, US EIA anticipates 14 percent increase in renewables consumption from 2019 – 2021.
- Long term forecast of 1.6 percent average annual expansion in renewables demand through 2050.

Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export

- US soybeans output rising an average of 2.1 percent per year; forecasted production increase.
- Recognized trend in containerization of for soy and other bulk agriculture commodities exports.
- Cost efficient shipping – a means to fill empty containers moving back to Asia
- Easing trade tensions between the US and China.



- Small but growing food businesses in Asia that are unable to accommodate large bulk shipments but prefer smaller shipment sizes consistent with containers.
- Increasing use of US East Coast ports to access international bulk agriculture markets.
- Larger capacity vessels, large pool of empty containers translate to lower shipping costs on US East Coast.
- Make use of KCS connection and Meridian Speedway connection to Norfolk Southern for transport to Hampton Roads, Virginia Port or Savannah, GA.
- Provides alternative markets for regional soybeans producers.
- Opportunities extend beyond soybeans to grains, rice, corn other bulk agriculture.

Dry dock and Shipyard

- Fleet by Home base provides enough demand – Vicksburg (Magnolia Marine Transport + Goldwin companies).
 - o Dry Bulk Barges / Average Age: 15 barges / 46 years
 - o Tanker Barges / Average Age: 170 barges / 18 years
 - o Towboats / Average Age: 68 boats/ 26 years
- The fleet based in Vicksburg (base location) incurs regular maintenance costs, but services their fleet in Greenville, Memphis and the Gulf.
- Fulfills main goals of investing in river infrastructure and employment generation.
- Supports the city’s tradition and vocation of a river hub.

Tire Shredding and Roofing Shingle Recycling Aggregate

- New raw materials used in the production of asphalt are sourced from areas outside of the Vicksburg Ergon facility, including potentially from nearby Continental Tire’s new manufacturing plant.
- The alternate solution to help offset the sourcing of new material while providing an eco-friendly solution is to use both recycled tires and roofing shingles as an aggregate blend in asphalt production.
- According to the EPA and the Rubber Manufacturers Association, some 290 million tires are discarded in the United States each year. Over 80 percent of these (about 233 million tires) are reused or recycled in some way.
- Continental Tire has opened a new Tire Manufacturing plant in Clinton, MS between Jackson and Vicksburg, which likely is producing ‘run off’, which could be available as an input to Ergon’s asphalt production.
- Approximately 11 million tons of asphalt shingle waste is generated in the U.S. each year.¹⁶ This waste is comprised of approximately one million tons of scraps from asphalt shingle manufacturers, and ten million tons of construction scraps from installations and tear-offs from re-roofing.
 - o Both these materials can be used as recyclable product and used as aggregate blend in Asphalt production. The ultimate use being for road construction and repair.

Reconfigure Public Terminal

- The existing public terminal operator, Watco has indicated an ability to handle significant additional volumes of liquid and dry bulk as well as breakbulk cargos with enough vertical and horizontal storage space, along with better equipment.
- Watco, has a lease which is set to expire within this year. To date, it has been operating on 5-year extensions, which somewhat understandably has inhibited investment levels.

¹⁶ U.S. EPA Office of Solid Waste and Emergency Response, “Tear-off Asphalt Shingles Recycling” (http://www.epa.gov/oswer/iwg/pilots/docs/2005_0520_asphalt_formatted_final.pdf)



- The existing public terminal facility configuration is outdated and prevents Watco from being able to aggressively pursue certain cargo opportunities, especially if those cargos must be handled in 100-car unit trains.
- A new long-term concession style agreement with Watco with reduced annual payments to the Port Commission in exchange for investment in a new facility or refurbishing their current would spur economic growth in terms of job creation (during construction) and long-term operation.
- A new public facility would provide enough land to handle unit train unloading, horizontal and vertical bulk storage, as well as provide increased fleeting space at slack water.
- Relocating or reconfiguring the public facility would also allow Big River Shipbuilders to expand their dry dock / shipyard footprint.

Woodchips in Ocean Containers

- As ocean containers are imported into the local market, there is an imbalance between the number of imported loaded containers full versus the opportunities to export full.
- Many export containers are therefore moved empty, making any opportunity to find cargos to help offset these repositioning costs ideal for the ocean carriers. One area for consideration is the woodchip market, particularly given Vicksburg Forest Product's desire to expand.
- The country of Turkey has a strong demand for woodchips to produce MDF board and particle plywood. Much of this material is used in the production of furniture, home sheathing and cabinetry.
- In other major markets such as Asia and Europe, wood chips are used as sources of fuel for heating and cooking.

Steel Mill / Scrap Iron from Mexico / Finished Metal Storage

- Within a 500-mile radius, 7 different steel mills located on the river system are competing for inbound scrap iron. This local market demand exceeds the supply. Mexico is a net exporter of scrap iron, and is a direct rail move to Vicksburg.
- Supporting the growth of steel manufacturing in the mid-south region requires bringing additional scrap iron into the market.
- Its location on KCS, with a direct single-railroad move from Mexico, makes Vicksburg an excellent location for transloading the scrap from rail to barge.
- In addition to transloading, a firm sited in Vicksburg could engage in further processing of scrap iron, increasing its net value to the mills.
- Ultimately, if Vicksburg becomes a destination point for Mexican scrap iron, it becomes more competitive for the siting of a new steel mill because the landed cost will be lower than those mills receiving the transloaded iron.
- Supports a new, growing employer (+25 employees in 2 years) in a traditional Vicksburg sector.
- Moving product from Mexico to Vicksburg by rail plays to the strength and interests of KCS, so it will be attractive business.
- One of the key deficiencies in the Vicksburg barge market is that dry hopper loads don't originate there, but only terminate. This would create a large volume of outbound product that will significantly improve pricing on all inbound hopper barge moves that become match back shipments.
- With a large volume of inbound scrap metal by rail, some opportunity will develop for outbound metals movements via rail using the same railcars—enhancing the competitiveness of mid-south steel mills to the Mexican markets vs. their Texas competition.
- If Vicksburg does not capture this market, it will likely move by vessel to Mobile AL, then by barge, and bypass Vicksburg and KCS altogether.
- This is excellent foundational volume to drive incremental growth, especially if it creates a net demand for empty barges in Vicksburg; which in turn has the potential to stimulate the development of other opportunities such as inbound dry fertilizer.



Dry fertilizer to the Louisiana delta

- Transloading dry fertilizer from hopper barge to truck/railcar for final delivery.
- Watco has three different customers looking to ship dry bulk fertilizer into the delta market and does not have a suitable facility nearby to handle the business.
- Vicksburg's ready access to barge, rail, and truck transportation make it an ideal location to bring in product.
- Watco is eager to make the investment to pursue this market, pending a suitable lease and fee structure with the port.

Plastic Resin Exports

- US exports of resins are growing at exceedingly high rates with a projection of 1 million TEU in 2019 up from 677,000 TEU in 2018. Production and exports are predominantly in the Gulf, with Houston the recognized market leader.
- Much of this production is transported by rail to the Ports of Los Angeles and Long Beach because Houston lacks sufficient capacity.
- As long as the US has cheap natural gas production, it will have a competitive advantage in the exportation of resin.
- Vicksburg's location gives it ready access to natural gas from pipelines, opportunity to access the inland US manufacturing market via barge, and opportunity to easily access each of the major Southeast US ports of Houston, New Orleans, and Savannah.
- The Mississippi Polymer Institute in Hattiesburg, MS now produces subject matter experts in this field.
- Even without a production plant, given its location and barge access, Vicksburg could build a bagging facility, and take laden barges filled with bulk resin products and empty containers from nearby ports, and fill the containers with bagged resin and send laden containers for export.

Polyurethane and Intermediate Inputs

- Polyurethane is a versatile chemical group with countless uses across numerous verticals including construction, transportation, and consumer products with new end uses constantly developing.
- Overall growth outlook for polyurethane products and positive outlook for US manufacturing bode well for polyurethane input values.
- The United States is a major producer, exporter and consumer of polyurethane and polyurethane products. Because the US is a net importer of TDI and Polyol (major intermediate inputs to Polyurethane) predominantly from China, trade tensions with China can seriously impact polyurethane product costs.
- Given that the US has cheap natural gas readily available, TDI and Polyol can also be sourced from new plants in the US, in order to have complete control of the production process to create Polyurethane.
- The US could benefit from an increase in capacity of polyurethane raw materials, and Vicksburg can capitalize on the current supply chain inefficiency.
- Vicksburg's location gives them ready access to natural gas supply, and ready access to polyurethane production facilities along the Gulf coast, including Innocor who is increasing its polyurethane product production in Mississippi.
- Vicksburg's location allows them to export polyurethane products via US southeast ports or into the center of the US via barge.



Autoparts Manufacturing & Value Add

- Under the provisions of the USMCA, the Mississippi vehicles and parts trade will continue to prosper on both the outbound and inbound sides.
- Critically for the US, the USMCA will require that a certain percentage of qualifying vehicles must be produced by employees making an average of \$16 per hour. This will significantly bolster the ability of US labor to compete with workers in Mexico.
- There are currently two auto plants in Blue Springs, MS (Toyota) and in Canton, MS (Nissan), creating the potential for the Port of Vicksburg to participate, at least indirectly, in the auto trade for instance by attracting vehicle parts manufacturing or even a new auto manufacturing plant to the region.

Table 36 Business Opportunities and Summary of Main Factors for Comparative Evaluation

Opportunity	Employment generation/ Skilled Labor pool	Estimated Tonnage / Market Considerations	Revenue Generation	Needed Transport Infrastructure/ Connectivity	Ease of Implementation
1. Spruce logs for Industrial Wood Products	New 25-employees production line / Skilled labor developed at local plant	Market has been identified by local wood processing plants. Container generating potential. Imports through Gulf would allow backhaul cargos at low freight rates	Depends on product lines for soft wood products. Revenue potential could reach \$2-\$4 million.	New container facilities are required/New logistic framework is needed for container on barge services	Easy. Plants already in place. Two logistic initiatives needed: barge container service linking a Gulf port with Vicksburg, and container loading/unloading equipment at the port. However, container logistics initiative is of broader/shared interest for several opportunities.
2. Custom-blended Animal Feed	New blending plant requires entire new staff staff/Some skilled labor needed	Potential market has to be estimated with lower logistics costs by is developed but new cost effective. No container potential. Bulk inputs products are barged or railed in and output products are trucked.	Medium, relatively good prices but market penetration could take some time to develop.	New container facilities are required / Barging should use current public or private facilities. Additional investment in physical plant for the intermediate processing is required.	Difficult, new plant needed.
3. Biomass and Biofuel	New operation will be created/ Skilled labor was already developed from unsuccessful previous operations	Market volatility has to be evaluated carefully as federal policies affect low margins. No container potential.	Medium. Margins are dependent on federal incentives.	No new transport infrastructure is needed.	Difficult. Previous initiatives resulted unprofitable and business community remain somewhat sceptic about markets and margins.



Opportunity	Employment generation/ Skilled Labor pool	Estimated Tonnage / Market Considerations	Revenue Generation	Needed Transport Infrastructure/ Connectivity	Ease of Implementation
4. Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export	Non labor intensive	Significant market demand coming from Asia. Potential for container cargo exports to the Asia via East Coast and Gulf Ports can take advantage of low backhaul freight rates	Medium. Depend on market penetration.	No new transport infrastructure is required /Rail connectivity is needed along route serviced by several operators; Bunge has additional silo capacity currently.	Easy. Two initiatives needed: barge container service linking a Gulf port with Vicksburg, and container loading/unloading equipment at the port. However, container logistics initiative is of broader/shared interest for several opportunities.
5. Dry Dock and Shipyard	Labor intensive activities/ Skilled labor needed	Limited container potential apart from inbound supplies for dry dock.	High (\$10s of millions annually) due to specialized work orders and high demand.	A facility with enough river frontage has to be identified. Additional marine infrastructure required.	Somewhat difficult. If current facility is used, extra waterfront needed from neighboring tenants.
6. Recycle Tire Shred (f.ex. Continental Tire plant in Clinton, MS) and Roofing Shingle for Asphalt aggregate with Ergon	Labor Intensive	Recycling Market. No container cargo potential.	Depends on product lines.	Land space to receive, shred material and store for future use as aggregate.	Difficult, new plant required.
7. Relocate Public Terminal	Limited new terminal job creation, apart from construction-related activity	Would allow the Operator to capture additional cargos. Potential for handling containerized cargo at new facility	Medium to High; a new terminal with new equipment, improved storage and rail facilities will increase offerings to regional shippers.	Entire new (and modern) marine facility to be created as a greenfield, with expanded rail and road connectivity.	Somewhat difficult. New site has to be developed but potential locations exist and have been scoped. Also, terminal operators could share development burden.
8. Woodchips in Ocean Containers	Labor intensive	Export for use as fuel and particle board plywood. Potential for container cargos.	Medium to high. Inputs locally available and markets have favorable growth potential.	Land space to receive, shred material and store for future export on barge.	Easy. Two initiatives needed: barge container service linking a Gulf port with Vicksburg, and container loading/unloading equipment at the port. However, container logistics initiative is of broader/shared interest for several opportunities.



Opportunity	Employment generation/ Skilled Labor pool	Estimated Tonnage / Market Considerations	Revenue Generation	Needed Transport Infrastructure/ Connectivity	Ease of Implementation
9. Steel Mill / Scrap Iron from Mexico / Finished Metals Storage	Increased port handling requires some labor; processing plants will require skilled labor	Demand for scrap iron exceed current supply; demand for processed scrap is also high in the region. No potential for container cargos.	Medium to high. Demand base is ample due to several regional steel mills. If a local steel mill is developed, revenues will increase considerably.	Mechanized loading/unloading equipment is needed.	Relatively easy as transfer of inputs from rail to barge can be done at the port.
10. Dry bulk fertilizer	Limited new terminal job creation as unloading/loading operations are mechanized	Current port operator has identified local shippers. Some cargo can be shipped bagged and in containers	Medium to high due to relatively high local demand but low margins.	Mechanized unloading equipment is needed.	Easy as business involve implementing logistics of receiving bulk cargo on barges and distributing it by truck/rail.
11. Plastic Resin Exports	Labor intensive	New market; international demand is high. Potential for container cargos.	High due to potential high demand and high cargo value.	Container facilities are needed if LA ports are used as international gateways.	Difficult as new plant has to be developed.
12. Polyurethane and Intermediate Inputs	Labor intensive	New market; local and international demand is high. No potential for container cargos.	High due to potential high demand and high cargo value.	No river facilities are used.	Difficult as new plant has to be developed.
13. Autoparts Manufacturing / Value Add	Labor intensive	New market potential established by USMCA.	Medium to high due as revenues/margins are based on manufactured product. Order of magnitude depends on type/scope of business.	Most likely to generate rail and air freight due to Just In Time Delivery requirements, but potential for river freight if viable container service can be established.	Difficult. Challenging site selection due to land area required and. Complementary business extent of land challenges.

Source: Seabury Analysis



Strategic Criteria Assessment & Opportunity Selection

To determine the most viable and economically attractive opportunities for the Port of Vicksburg, each of the thirteen conceptual projects were ranked across five categories, with equal weighting (perceived stakeholder importance). Each opportunity was then ranked objectively by the Consultant Team with a score of between 1 – 3, as outlined below.

The Ranking Criteria were:

- Job Creation (20%)
 1. 1 to 20 Jobs
 2. 20 to 50 Jobs
 3. >50 Jobs
- Tonnage (20%)
 1. <10k tons
 2. <1k to 50k tons
 3. >50k tons
- Revenues (20%)
 1. <\$1 million
 2. \$1 to \$5 million
 3. >\$5 million
- CAPEX (20%)
 1. >\$20 million
 2. \$10 to \$20 million
 3. >\$5 million
- Implementation (20%)
 1. Difficult, >2 years
 2. Moderate, 1-2 years
 3. Easy, <1 year

S/N	Ranking Criteria	Weight (Stakeholder Importance)					Score
		20%	20%	20%	20%	20%	
		A Job Creation	B Tonnage	C Revenues	D CAPEX	E Implementation	
		[1] 1 to 20 jobs [2] 20 to 50 jobs [3] 50+ jobs	[1] <10k tons [2] 10k to 50k tons [3] 50k tons	[1] < \$1 million [2] \$1 to \$5 million [3] >\$5 million	[1] > \$20 million [2] \$10 to \$20 million [3] <\$10 million	[1] Difficult, > 2 years [2] 1 - 2 years [3] Easy, < 1 year	
1	Spruce Logs for Industrial Wood Products	1.0	2.0	2.0	3.0	2.7	2.1
2	Custom-blended Animal Feed	1.3	2.0	1.7	3.0	2.7	2.1
3	Biomass and Biofuel	2.7	2.0	2.3	2.7	2.4	2.4
4	Containerized Soybean (& Bulk Agricultural product) Export	1.7	3.0	2.7	2.7	2.3	2.5
5	Dry dock and Shipyard	2.7	2.3	3.0	2.0	1.3	2.3
6	Tire Shredding and Roofing Shingle Recycling Aggregate	1.3	2.3	1.7	1.3	2.0	1.7
7	Reconfigure Watco Terminal	2.3	2.3	2.0	2.3	1.0	2.0
8	Woodchips in Ocean Containers	1.7	3.0	2.3	2.3	2.0	2.3
9	Steel Mill/ Scrap Iron / Metals Storage from Mexico	2.3	2.7	2.3	2.0	2.0	2.3
10	Dry fertilizer to the Louisiana delta	2.0	2.0	2.0	2.3	2.3	2.1
11	Plastic Resin Exports	2.7	3.0	3.0	2.3	1.3	2.5
12	Polyurethane & Intermediate Inputs	2.7	3.0	2.7	2.3	1.3	2.4
13	Autoparts Manufacturing & Value Add	3.0	2.0	2.7	2.3	1.0	2.2



A forced ranking of the opportunities resulted in a down selection to the following top six opportunities¹⁷:

- Steel Mill / Scrap Iron from Mexico / Finished Metals Storage
- Containerized Soybean (& Bulk Agricultural Products) Export
- Woodchips in Containers
- Plastic Resin Exports
- DryDock / Shipyard
- Reconfigure Watco Terminal

Select Business Opportunities for Port of Vicksburg

After presenting the aforementioned thirteen potential opportunities to representatives from Vicksburg-Warren Partnership and the Jacobs team, each opportunity was researched in greater detail to identify potential showstoppers for each and whether the underlying competitive economics were such that a credible business plan could reasonably be developed for each going forward. The following summary opportunities represent the Consultant Team’s views on which are prime candidates for further discussion.

Steel Mill / Scrap Iron from Mexico / Finished Metals Storage

Background

Mexico has a net surplus of scrap steel, while the mid-American steel mills have a net deficit of scrap steel. At least nine steel mills are reachable from Vicksburg via the Mississippi River basin. Scrap steel and other inputs can be brought on rail via KCS and transloaded onto barges at Vicksburg for delivery to these mills. Similar operations currently exist at the Port of Greenville to supply Big River Steel and other locations, but the net demand can accommodate additional imports from Mexico. Additionally, KCS sees a market for providing warehouse storage for finished steel products, including galvanized coils.

Market Analysis

The following plants have water access within the Mississippi basin, and does not include idled plant capacity or those plants which consume predominantly raw iron ore.

Plant	Location	River	Tons/year (ooo)
Steel Dynamics	Columbus MS	Tenn-Tom	2370
ThyssenKrupp	Calvert AL	Tenn-Tom	1102
North American Stainless	Ghent KY	Ohio	1609
Eco Steel Recycling	Amory, MS	Tenn-Tom	805
Big River Steel	Osceola, AR	Mississippi	1650
Nucor – Yamato	Armored AR	Mississippi	2579
Nucor – Yamato	Memphis TN	Mississippi	882
Nucor – Yamato	Blytheville AR	Mississippi	2646
Nucor – Yamato	Trinity AL	Tennessee	2403
Total			16,046

Source: Seabury Analysis

¹⁷ Despite the relatively high ranking of the “Autoparts Manufacturing / Value Add” opportunity, the Consultant Team has decided not to pursue further due to client feedback that the Port and City has tried to attract this type of activity previously without success.



Currently, KCS brings roughly 275,000 tons per year of scrap from Mexico to the US, to meet demand at Big River and Steel Dynamics. If moved further north to Vicksburg, it would represent 2,700 railcars in and 180 barges out. Market dynamics may allow for more tonnage to move north, but currently KCS does not have the long haul north of Laredo to serve this business unless it can be placed onto the river for final delivery. Bringing this tonnage in would also support the growth of steel manufacturing in the mid-south region. Furthermore, a significant part of the value adding that the scrap industry provides is to make the steel “melt-ready” for the mill. Potentially, the steel arriving from Mexico can be further upcycled by cutting or sorting it into better plate or shear stock. This upcycling would help pay for the cost of material handling done in Vicksburg, making the operation more competitive.

At March market rates (\$101/ton), a barge per day (15 railcars) of scrap iron would be valued at \$60M per year. If Watco charged a \$2/ton throughput charge, a barge per day would generate \$1.2M in additional revenue annually. If the terminal simply captures KCS’ existing volumes, the revenues would approach \$550,000 annually.

Meanwhile, KCS has been developing a relationship with Steel Dynamics in Columbus MS. This plant currently receives scrap and pig iron as inputs via the Port of Mobile, which KCS does not serve directly. KCS would be interested in bringing those inputs via barge to Vicksburg and transload to rail. Simultaneously Steel Dynamics has been transitioning the Columbus plant to produce galvanized steel coils that needs indoor storage and expressed interest in both the vacant Vicksmetal sites and the boxcar-served warehouse building at the Port of Vicksburg. KCS sees this as part of a broader play that can include bringing zinc ingots north from Mexico and shipping steel coils south.

In the long term, if Vicksburg can become a destination point for Mexican scrap iron and a focal point for steel and steel input storage and transloading, it becomes more competitive for the siting of a new steel mill because the landed cost of scrap will be lower than those mills receiving the transloaded iron. Development of this marketplace can also help cost-justify the assembly and construction of additional land that wouldn’t be possible without a metals marketplace in Vicksburg.

Port / Transport Infrastructure Requirements

Moving product from Mexico to Vicksburg by rail plays to the strength and interests of KCS, so it will be attractive business. Currently KCS ships steel to Big River, but must hand it off to Union Pacific in Laredo, which short-hauls KCS by over 700 miles.

One of the key deficiencies in the Vicksburg barge market is that dry hopper loads don’t originate there, but only terminate. This would create a large volume of outbound product that will significantly improve pricing on all inbound hopper barge moves that become match back shipments. With the opportunities that KCS and Watco can provide to bring in dry fertilizer and grain, this scrap metal business can create the demand that encourages additional barge lines to serve Vicksburg. While the market for outbound steel shipments can be somewhat temperamental, the legacy Vicksmetal facilities and a steady flow of scrap steel will create some opportunities for outbound metals movements via rail using the same railcars—enhancing the competitiveness of mid-south steel mills to the Mexican markets vs. their Texas competition. Conversely, if Vicksburg does not capture this market, it will likely move by vessel to Mobile AL, then by barge, and bypass Vicksburg and KCS altogether. As foundational volume to drive incremental growth, creating a demand for empty hopper barges in Vicksburg will stimulate other opportunities that can’t be predicted.

For finished steel, moving outbound product from Steel Dynamics in Columbus to Vicksburg by rail and then transferring it to barge for movement to Houston could be a compelling option. With a shortage of warehouse buildings for galvanized coils in Columbus and direct rail access to Vicksburg, product stored in Vicksburg would have a wide variety of destination options via river, rail, or truck. Any of this product that departs via barge would also enhance the overall viability of Vicksburg by generating more outbound hopper barge loads.



Transloading scrap metal will require a vertical pier, non-permeable pavement for placing any metal on the ground during the transloading process, and a pad at the pier suitable for a magnet crane or high-cab excavator. Additional track may need to be constructed to effectively unload the railcars close to the water and minimize the amount of double-handling or on-site storage of metals.

If opportunity emerges to upcycle the steel received from Mexico, Watco Terminals or a third party operator may choose to implement sorting, cutting, or shearing operations. However, given the volumes required to operate profitably, a shredder is not expected to fit in the market.

Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export

Background

The increasing containerization and shipment of US-grown soybeans and other grains to international markets could present an opportunity to generate increased tonnage at Vicksburg and support the case for an injection of investment capital to develop the port's containerized cargo capacity.

Containerization is making significant progress in penetrating the US soybeans and other grains international transportation market. There are two underlying causes of such a shift. First, on the demand side, the structure of overseas demand in Asia and in Europe is changing. Asian and European importers are increasingly seeking to purchase soybeans and grains in smaller lots suitable for containers rather than in large bulk shipments carried by dedicated vessels. On the demand side, US soy is shipped primarily to Asia and Europe. In Asia, demand is shifting towards small food producers who are unable to economically receive large shipments while in Europe, demand for crushed soybeans to feed the continent's livestock, and fish farms in smaller lots is growing.

Second, and on the supply side, the maritime merchandise trades have become increasingly dominated by large, ocean-going fully cellular container vessels that prior to a decade of dredging and other infrastructure improvements were not able to call ports on the US East Coast but instead would be diverted to the more costly option of transshipment hubs. Now that most of the US East Coast ports, particularly Hampton Roads in Norfolk, VA and the Port of New York straddling both New York and New Jersey, are able to accommodate such large vessels, shippers are afforded the opportunity to exploit the vessels' inherent unit cost advantages.

Containerized soybeans exports is a relatively new market but one that fills a void left open by traditional bulk shipments. This last point is particularly relevant as major US markets for its soybeans shift from China, which prefers large bulk shipments of up to 60,000 metric tons at a time to Indonesia, Vietnam, Japan Malaysia, Thailand, Pakistan and Bangladesh in Asia and the Netherlands in Europe. And, as in Indonesia soybeans are directed more towards human consumption rather than strictly for animal feed, the quality of the product, which containers can preserve during the shipment process, becomes more important. According to the United Soybean Board (USB), not only is there a clear market opportunity but there is sufficient infrastructure to meet it. In particular, the USB claimed as recently as September that there were 390,000 empty containers arriving at East Coast ports that could be filled with soybeans and shipped East to Europe and via Suez to Asia.¹⁸ Since filling containers on the backhaul reduces carrier costs, cooperation from ocean container shipping firms is anticipated.

The following tables provide an overview of the steady increase of containerized soybeans and corn exports, as reported by the US Census Bureau. East Coast and Gulf ports account for 43% of soybeans exported in containers and 20% of corn exports.

¹⁸ <https://www.unitedsoybean.org/article/east-coast-containerized-shipments-possible-for-u-s-soy>



Table 37 Soybeans Exports by Port District in Bulk and Containers for 2017 and 2019

Port District	Year 2017				Year 2019			
	Container	Bulk	Total MT	Cont Share	Container	Bulk	Total MT	Cont Share
Los Angeles, CA	2,365,087	91,749	2,456,836	96%	2,266,504	4,105	2,270,609	100%
Norfolk, VA	1,011,215	1,366,802	2,378,016	43%	1,142,554	877,454	2,020,008	57%
New York City, NY	349,635	13,521	363,156	96%	567,009	2,145	569,154	100%
Seattle, WA	261,501	4,889,475	5,150,976	5%	330,551	3,705,020	4,035,572	8%
New Orleans, LA	122,031	32,327,018	32,449,049	0%	93,968	30,355,935	30,449,903	0%
Charleston, SC	97,796	1,340	99,137	99%	66,326	0	66,326	100%
Baltimore, MD	34,296	4,614	38,910	88%	49,940	0	49,940	100%
Duluth, MN	25,031	0	25,031	100%	15,525	0	15,525	100%
Wilmington, NC	20,304	0	20,304	100%	15,349	0	15,349	100%
Savannah, GA	10,680	320	11,000	97%	4,467	14	4,481	100%
San Francisco, CA	15,835	0	15,835	100%	2,995	0	2,995	100%
Chicago, IL	448	79,398	79,846	1%	2,627	22,322	24,949	11%
Portland, ME	18	0	18	100%	1,939	0	1,939	100%
Miami, FL	552	218	770	72%	1,100	15	1,115	99%
Other	6,550	9,414,351	9,420,901	0%	1,011	8,370,915	8,371,927	0%
Total	4,320,979	48,188,806	52,509,785	8%	4,561,868	43,337,925	47,899,792	10%

Source: U.S. Census Bureau, Economic Indicators Division

Table 38 Corn Exports by Port District in Bulk and Containers for 2017 and 2019

Port District	Year 2017				Year 2019			
	Container	Bulk	Total MT	Cont Share	Container	Bulk	Total MT	Cont Share
Los Angeles, CA	592,980	48,985	641,964	92%	592,136	2,215	594,351	100%
Seattle, WA	216,653	4,008,000	4,224,653	5%	278,388	2,423,602	2,701,989	10%
New Orleans, LA	104,357	29,782,005	29,886,363	0%	130,082	21,435,547	21,565,629	1%
Norfolk, VA	41,642	42,684	84,327	49%	50,556	89,475	140,032	36%
New York City, NY	22,067	3,305	25,371	87%	19,927	24	19,951	100%
San Francisco, CA	12,445	3,460	15,904	78%	13,237	336	13,574	98%
Savannah, GA	9,514	1,000	10,514	90%	10,839	58	10,897	99%
Charleston, SC	1,691	248	1,939	87%	5,815	0	5,815	100%
Miami, FL	3,179	1,215	4,394	72%	4,779	179	4,958	96%
Baltimore, MD	18,894	374	19,267	98%	2,353	20	2,373	99%
Chicago, IL	266	9,689	9,954	3%	1,718	40	1,758	98%
Houston-Galveston, TX	1,520	259,930	261,449	1%	946	129,264	130,211	1%
Detroit, MI	8,060	31,946	40,007	20%	607	17	624	97%
Philadelphia, PA	778	162	940	83%	593	0	593	100%
Duluth, MN	677	0	677	100%	521	8	529	98%
Tampa, FL	3,489	658	4,147	84%	341	0	341	100%
Other	44,994	7,780,547	7,825,541	1%	520	5,216,633	5,217,154	0%
Total	1,083,204	41,974,207	43,057,411	3%	1,113,359	29,297,420	30,410,779	4%

Source: U.S. Census Bureau, Economic Indicators Division



Market Analysis

The following presents several alternatives that the Port of Vicksburg should consider exploring as a means of participating in the expansion of soybean containerization in international trade.

Option 1 Local Cargo to Plaquemines Port for Service to Asia

The introduction of containerization on the Mississippi River is already in the works. A partnership between the Plaquemines Port Harbor and Terminal District in South Louisiana, and American Patriot Holdings was formed in 2017 with the objective of introducing four, 1,700 TEU capacity, LNG-fueled container vessels to transship cargo left by post-Panamax ships serving Asia up the Mississippi River from Plaquemines Port beginning in 2022. An additional eight vessels of 2,500 TEU capacity are to be deployed by 2027. These vessels will link Plaquemines to other ports upriver as far north as Jefferson County, Missouri. Critically, such an arrangement could generate empty containers that can be filled with soybeans and soybean meal for the trip back down river to the Plaquemines hub where cargoes will be transhipped to ocean-going container vessels serving Asia, Europe and the rest of the world.

Below is analysis of the potential volume of international soybean shipments through Vicksburg. Since Mississippi River shipments can reasonably be assumed to include Northeastern Louisiana (USDA District 30) plus Arkansas’s production¹⁹, we have added both areas to Mississippi soybean production in the analysis. Table 39 displays history and forecast of the region’s production in bushels converted to containers per week under various assumptions about annual production growth, the share of containerization, Vicksburg capture of this market (relative to Natchez) and the share of production shipped to overseas markets. Table 39 assumes a production growth rate of 3 percent, an export share of 5 percent, a 10 percent rate of containerization, and a 50 percent market share for Vicksburg.

Table 39 Estimated Vicksburg Containerized Soybean Shipment Volume - Low Case

Year	Bushels Per Year	Pounds Per Year	Short Tons Per Year	Export Tons Per Year	Containerized Tonnage Per Year	Vicksburg TEUs Per Year	Vicksburg TEUs per Week
2015	241,572,454	14,494,347,250	7,247,174	362,359	36,236	2,588	50
2016	275,555,819	16,533,349,165	8,266,675	413,334	41,333	2,952	57
2017	326,570,000	19,594,200,000	9,797,100	489,855	48,986	3,499	67
2018	314,685,000	18,881,100,000	9,440,550	472,028	47,203	3,372	65
2019	226,580,000	13,594,800,000	6,797,400	339,870	33,987	2,428	47
2020	233,377,400	14,002,644,000	7,001,322	350,066	35,007	2,500	48
2021	240,378,722	14,422,723,320	7,211,362	360,568	36,057	2,575	50
2022	247,590,084	14,855,405,020	7,427,703	371,385	37,139	2,653	51
2023	255,017,786	15,301,067,170	7,650,534	382,527	38,253	2,732	53
2024	262,668,320	15,760,099,185	7,880,050	394,002	39,400	2,814	54
2025	270,548,369	16,232,902,161	8,116,451	405,823	40,582	2,899	56
2026	278,664,820	16,719,889,226	8,359,945	417,997	41,800	2,986	57
2027	287,024,765	17,221,485,902	8,610,743	430,537	43,054	3,075	59
2028	295,635,508	17,738,130,480	8,869,065	443,453	44,345	3,168	61
2029	304,504,573	18,270,274,394	9,135,137	456,757	45,676	3,263	63
2030	313,639,710	18,818,382,626	9,409,191	470,460	47,046	3,360	65

Source: USDA and Seabury Calculations

¹⁹ The vast majority of Arkansas’s soybean production occurs in the USDA districts (30, 60 and 90) bordering the Mississippi River.



Table 39 shows that in 2030, under the conservative assumptions mentioned above, Vicksburg will handle 65 TEUs per week of outbound soybeans via containers. Leaving annual production growth at 3 percent but doubling the international trade share of soybeans to 10 percent, and further raising the rate of containerization to 20 percent generates the data in Table 40.

Table 40 Estimated Vicksburg Containerized Soybean Shipment Volume - Medium Case

Year	Bushels Per Year	Pounds Per Year	Short Tons Per Year	Export Tons Per Year	Containerized Tonnage Per Year	Containers Per Year	Containers per Week
2015	241,572,454	14,494,347,250	7,247,174	724,717	144,943	10,353	199
2016	275,555,819	16,533,349,165	8,266,675	826,667	165,333	11,810	227
2017	326,570,000	19,594,200,000	9,797,100	979,710	195,942	13,996	269
2018	314,685,000	18,881,100,000	9,440,550	944,055	188,811	13,487	259
2019	226,580,000	13,594,800,000	6,797,400	679,740	135,948	9,711	187
2020	233,377,400	14,002,644,000	7,001,322	700,132	140,026	10,002	192
2021	240,378,722	14,422,723,320	7,211,362	721,136	144,227	10,302	198
2022	247,590,084	14,855,405,020	7,427,703	742,770	148,554	10,611	204
2023	255,017,786	15,301,067,170	7,650,534	765,053	153,011	10,929	210
2024	262,668,320	15,760,099,185	7,880,050	788,005	157,601	11,257	216
2025	270,548,369	16,232,902,161	8,116,451	811,645	162,329	11,595	223
2026	278,664,820	16,719,889,226	8,359,945	835,994	167,199	11,943	230
2027	287,024,765	17,221,485,902	8,610,743	861,074	172,215	12,301	237
2028	295,635,508	17,738,130,480	8,869,065	886,907	177,381	12,670	244
2029	304,504,573	18,270,274,394	9,135,137	913,514	182,703	13,050	251
2030	313,639,710	18,818,382,626	9,409,191	940,919	188,184	13,442	258

Source: USDA and Seabury Calculations

Under these more optimistic assumptions, Vicksburg would handle 258 TEUs per week in 2030. Finally, Table 41 generates projections based on the share of exports rising to 25 percent, containerization to 30 percent and annual production growth remaining at 3 percent. In this scenario, volume of shipments rises to 969 TEUs per week by 2030.

Table 41 Estimated Vicksburg Containerized Soybean Shipment Volume - High Case

Year	Bushels Per Year	Pounds Per Year	Short Tons Per Year	Export Tons Per Year	Containerized Tonnage Per Year	Containers Per Year	Containers per Week
2015	241,572,454	14,494,347,250	7,247,174	1,811,793	543,538	38,824	747
2016	275,555,819	16,533,349,165	8,266,675	2,066,669	620,001	44,286	852
2017	326,570,000	19,594,200,000	9,797,100	2,449,275	734,783	52,484	1,009
2018	314,685,000	18,881,100,000	9,440,550	2,360,138	708,041	50,574	973
2019	226,580,000	13,594,800,000	6,797,400	1,699,350	509,805	36,415	700
2020	233,377,400	14,002,644,000	7,001,322	1,750,331	525,099	37,507	721
2021	240,378,722	14,422,723,320	7,211,362	1,802,840	540,852	38,632	743
2022	247,590,084	14,855,405,020	7,427,703	1,856,926	557,078	39,791	765
2023	255,017,786	15,301,067,170	7,650,534	1,912,633	573,790	40,985	788
2024	262,668,320	15,760,099,185	7,880,050	1,970,012	591,004	42,215	812
2025	270,548,369	16,232,902,161	8,116,451	2,029,113	608,734	43,481	836



Year	Bushels Per Year	Pounds Per Year	Short Tons Per Year	Export Tons Per Year	Containerized Tonnage Per Year	Containers Per Year	Containers per Week
2026	278,664,820	16,719,889,226	8,359,945	2,089,986	626,996	44,785	861
2027	287,024,765	17,221,485,902	8,610,743	2,152,686	645,806	46,129	887
2028	295,635,508	17,738,130,480	8,869,065	2,217,266	665,180	47,513	914
2029	304,504,573	18,270,274,394	9,135,137	2,283,784	685,135	48,938	941
2030	313,639,710	18,818,382,626	9,409,191	2,352,298	705,689	50,406	969

Source: USDA and Seabury Calculations

Port / Transport Infrastructure Requirements

Since the distances from the relevant growing areas of Louisiana, Mississippi and Arkansas are 400 miles or less, growers will likely truck their produce directly to Vicksburg where proposed new facilities will load it into containers.

Option 1 Local Cargo to Plaquemines Port for Service to Asia

The distance between Vicksburg and the Port of New Orleans District is 342 miles. To Plaquemines Port Harbor & Terminal District, in Belle Chasse, LA it is a further 30 river miles. Shipping costs from local growing area would consist of drayage from soybean farms in Louisiana, Arkansas and of course Mississippi to Vicksburg, filling containers there and loading onto river container vessel. The last leg is the voyage to Plaquemines Port and transshipment to ocean-going container vessels. The relevant cost comparison is the container vessel versus barge from Vicksburg to port Plaquemines. Specifically, the cost differentials will be in loading the barge versus loading the container (then subsequently loading the container aboard the vessel), the voyage itself and the final transfer to ocean-going vessels. In terms of speed, there is no question that the containership will be faster than a towed (or pushed) river barge and the tonnage per voyage would likely be similar. To enhance the competitiveness of container transport versus barge, there needs to be sufficient upriver cargo for the backhaul. This will consist of cargo transshipped at Plaquemines.

Table 42 Cost comparisons Vicksburg - Shanghai

Segment	Mode	Distance (Miles)	MPH	Travel Time (Hours)	Cost per Metric Ton Mile	Total Cost (Per Metric Ton)
Vicksburg – Plaquemines	Container on Barge	372	4.47	80	\$0.018	\$6.70
Vicksburg – Plaquemines	Containership	372	14.9	25	\$0.003	\$1.15
Vicksburg – New Orleans	Traditional Barge	372	4.67	80	0.0143 ⁽²⁾	\$5.32
New Orleans -Shanghai	Containership	11,523 ⁽¹⁾	14.9	773	\$0.003	\$34.57
Total Cost Via Container on Barge						\$41.27
Total Cost Via Containership						\$35.72
Total Cost Via Traditional Tug Barge						\$39.87

(1) Via Panama Canal.

(2) USACE tariff rate

Source: Bai, Y., Higgins, C., Kemmsies, W., & Rezvani, A. (2016). Transportation Cost Modeling of International Containerized Soybean Exports in United States (Rep.). New Brunswick, NJ: Rutgers, the State University of New Jersey. December, 2016. <http://dx.doi.org/10.9752/TS207.04-2017>

Option 2 Local Soybeans to US East Coast and Canada for Service to Europe

US soy producers in the Upper Midwest are likely to service the European market by utilizing truck for local drayage, rail to New York then transshipment to ocean-going vessels. Vicksburg is unlikely to capture any



share of this trade since the distance from it to the most suitable US East Coast port (likely Norfolk, VA) is longer by roughly 200 miles than from Chicago to New York (989 versus 789). However, Vicksburg may offer an advantage relative to the New Orleans alternative in accessing the US East Coast using intermodal containers for local area growers in Mississippi, Louisiana, Arkansas and even Tennessee. Its ultimate advantage would be in cost-effectively satisfying the increasing European demand for more finely divisible soybean and soymeal shipments.

The relevant cost comparison therefore is Vicksburg to New Orleans via barge plus the cost of transshipment to an ocean-going bulk vessel and the ocean voyage cost to Europe versus service to Vicksburg by barge or truck, Vicksburg to Norfolk by intermodal rail, container loading at Norfolk and the ocean voyage cost from there to Europe. Alternatively, the route could utilize intermodal rail to Montreal / Halifax. We consider transport to Rotterdam for reference.

Table 43 Cost comparisons Vicksburg - Rotterdam

Segment	Mode	Distance	MPH	Travel Time (Hours)	Cost per Mile	Total Cost
Vicksburg - Norfolk	Intermodal Rail	987	30.8	32	0.054	53.30
Norfolk - Rotterdam	Containership	3,978	14.9	267	0.003	11.93
Total				299		65.23
Vicksburg - Montreal	Intermodal Rail	1,546	30.8	50	0.054	83.48
Montreal - Rotterdam	Containership	3,786	14.9	254	0.003	11.36
Total				304		94.84
Vicksburg – New Orleans	Barge	372	4.67	80	0.0143 ⁽¹⁾	5.32
New Orleans - Rotterdam	Bulk Carrier	5,586	11.5	486	0.004	20.95
Total				566		26.31

(1) USACE tariff rate

Source: Source: Bai, Y., Higgins, C., Kemmsies, W., & Rezvani, A. (2016). Transportation Cost Modeling of International Containerized Soybean Exports in United States (Rep.). New Brunswick, NJ: Rutgers, the State University of New Jersey. December, 2016. <http://dx.doi.org/10.9752/TS207.04-2017>

Woodchips in Ocean Containers

Background

Wood chips can be derived from different species of trees. Those chips that are derived from angiosperm trees that are not monocots are usually broad-leaved and are considered Hardwood Chips. This Includes Alder, Balsa, Beech, Hickory, Mahogany, Maple, Oak, Teak, and Walnut trees. These trees have a slower growth rate. Chips that are derived from gymnosperm trees which usually have needles and cones are considered Softwood Chips. These Include Cedar, Douglas Fir, Juniper, Pine, Redwood, Spruce, and Yew trees. These trees have a faster rate of growth.

Wood chips are produced by chipping any kind of the above species of wood. The production of wood chips is fully mechanized by a mobile chipper or at a chipping plant. They are roughly chipped to a non-uniform size between 3.5 and 100 mm and can be classified into two product segments: Clean and Dirty. Dirty wood chips consist of those chips where the bark remains on the wood chips. The second type, clean wood chips have tree bark stripped from the tree prior to processing into wood chips.

Wood chips are used in the following products and industries.

- Primary feedstock for MDF board production
- Particleboard production



- Fuel wood pellets production for use in power generation
- Solid Biofuel for use in power generation
- As a base in poultry houses
- Paper and pulp production at mill; wood pulp is created when wood fiber is reduced chemically or mechanically to pulp and used in the manufacture of paper

The type of wood chips used in the production of the above products is a major consideration. For example, when producing paper and pulp, clean chips are typically used. However dirty chips would be more commonly used in the production of fuel wood pellets and particleboard.

Market Analysis

Based on application, the global wood chips market can be divided into combined heat and power (CHP), household furnishing, residential heating, and others. The demand for the product as fuel in CHP applications is anticipated to experience noteworthy growth over the coming years.

Turkey is the largest market for imported wood chips used to produce wood-based panels (MDF and Particleboard). Turkey's largest wood panel company, Kastamonu, reported that it is expanding its presence in the Russia, Eastern Europe and Italy panel markets. The panel market has become weaker in Turkey over the past several years due in part to political and economic turmoil in the country.

Asia presents a continued growth market for imported wood chips, where pulp and paper companies produce over 12 million tons of pulp annually with imported wood fiber. The barriers to imports of recovered paper which China instituted earlier in 2018 have had a profound impact on the wastepaper trade, however this has resulted in some interesting market shifts in demand for both wood pulp and paper products. In general demand for pulp is expected to grow steadily, but relatively slowly, over the next four to five years with current high pulp prices expected to be maintained due to a lack of new large projects starting production in the next several years.

Companies such as APP, Oji Holdings and Hokuetsu Paper are reviewing the outlook for wood chip demand in China and Japan and those suppliers of wood chips from Australia, Chile, Vietnam, Brazil, Uruguay, Thailand, the USA, Canada, Indonesia and South Africa.

In 2017, companies in China, Japan, South Korea, Taiwan and India imported 22.9 million BDMT (bone dry metric ton) of hardwood chips and 1.9 million BDMT of soft-wood chips. These chips were almost all used to produce wood pulp. In 2018, imports were to track to reach 23.6 million BDMT of hardwood chips and 2.1 million BDMT of softwood chips. Demand is expected to continue to grow, but at a slower pace than in the past, reaching 24.9 million BDMT of hardwood and 2.4 million BDMT of softwood by 2022 or 2023. There are various factors restricting available wood chip supply and lead to a possible shortfall of more than 3.0 million BDMT of wood chips by 2023. These factors could result as positive opportunities for the US export wood chip market.

These factors included:

- The Vietnamese government adopting a policy to reduce wood chip exports in favor of more value-added processing in the country. To date, the government has only instituted a 2% export duty on wood chips and had not otherwise restricted the trade, but it has made it clear that any new production facilities will receive priority in terms of gaining access to wood chip supplies.
- Australia's lack of adequate tree planting after the 2009 financial crisis and the conversion of large areas from tree plantations back to agriculture. According to Australian suppliers, 2018 shipments were lower than in 2017 and shipments are expected to decline further in the years ahead, indicating that the peak has past there.
- Global wood pulp and panel manufacturer - Arauco's new MAPA project will require a large increase in domestic consumption of hardwood chips in Chile. This will result in a reduction in the supply of

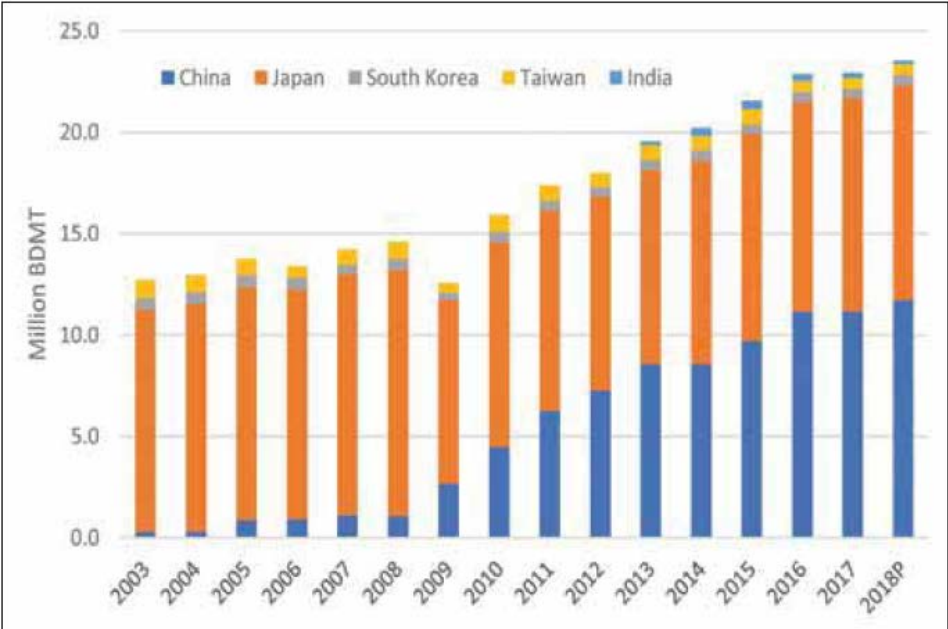


available product from Chile for export. Chilean suppliers indicated that Arauco is already in the market buying standing eucalyptus timber to let its own plantations grow until the mill is ready. Therefore, exports for 2019 were forecasted to be lower in 2017-2018 which was likely the peak in Chilean export volumes. This also presents a new market for US export of wood chips.

- A shortage of hardwood chips in Indonesia due to problems with their plantations which include disease, animal damage and fires. It is estimated that Indonesian imports of pulp logs and /or wood chips will expand rapidly in the next few years which will further reduce the volume available for mills in China and Japan.

According to Fastmarket RISI, they project by 2022 or 2023, available hardwood chip supply will be roughly 3.5 million BDMT less than demand in the Asian markets, even assuming some small new suppliers start up in Colombia and Mozambique. The chip market is expected to be balanced by a combination of capacity closures in Asia, (older less efficient mills), a renewed trade in hardwood chips from certified native forests (e.g. tanoak from Northern California and mixed hardwood chips from the US South), and possibly aggressive purchasing of existing plantations by Asian pulp companies.

Figure 47 Asia Hardwood Chip Imports, 2003-2018



Source: IFTPA Journal 4/2018



Figure 48 Asian Woodchip Market Balance 2022-2023



Source: IFTPA Journal 4/2018

Other markets are expected to grow consistently in the short and mid-term, especially Europe as it has to fulfill mandated targets for clean energy sources. The European market is the main destination of wood chips in containers, but South/Central America and Asia markets are also growing. Naturally, East Coast and Gulf ports are better positioned to serve these trades.

The following tables provide an overview of the steady increase of containerized hardwood wood chips (softwood wood chips are exported mainly in bulk), as reported by the US Census Bureau. East Coast and Gulf ports account for 64% of hardwood wood chips exported in containers in 2019.

Table 44 Wood Chips (Non-coniferous, hardwood) Exports by Port District in Bulk and Containers for 2017 and 2019

Port District	Year 2017				Year 2019			
	Container	Bulk	Total MT	Cont Share	Container	Bulk	Total MT	Cont Share
New York City, NY	125,100	1,027	126,127	99%	118,162	3,316	121,478	97%
Los Angeles, CA	59,596	358	59,954	99%	78,103	31	78,134	100%
Norfolk, VA	51,379	1,043	52,422	98%	21,960	0	21,960	100%
Tampa, FL	10,561	0	10,561	100%	11,484	0	11,484	100%
San Francisco, CA	47,222	9,671	56,893	83%	11,218	10,993	22,211	51%
Houston-Galv., TX	2,979	0	2,979	100%	5,847	0	5,847	100%
Miami, FL	7,518	252	7,770	97%	3,475	1,185	4,660	75%
Savannah, GA	3,150	33	3,184	99%	3,423	1,995	5,418	63%
Seattle, WA	444	0	444	100%	2,480	280	2,760	90%
Charleston, SC					1,859	0	1,859	100%
Columbia-Snake, OR					1,145	0	1,145	100%
Buffalo, NY					1,039	0	1,039	100%
Baltimore, MD	8,672	1,533	10,206	85%	231	0	231	100%
Philadelphia, PA	1,691	0	1,691	100%	138	120	258	54%
Other					84	0	84	100%



Total	318,313	13,917	332,230	96%	260,646	17,919	278,565	94%
--------------	----------------	---------------	----------------	------------	----------------	---------------	----------------	------------

Source: U.S. Census Bureau, Economic Indicators Division

US exports more containerized wood chips into the Atlantic markets than the Pacific, with increased volumes to South/Central America in addition to the traditional destinations in Europe (Turkey, UK, France). The East Coast and Gulf ports (mainly Houston-Galveston and Tampa, with a minor participation from New Orleans) exported 180-210 thousand metric tons annually on average during 2017-2019; the bulk exports to Europe have significantly decreased in the last years, following a change in import patterns as the supply has moved to Eastern Europe countries.

Therefore, the market potential for exports through Vicksburg is based on market trends observed recently:

- Specialization of wood chips exports to Europe and South/Central America in containers with a significant containerization of exports through Gulf ports (containerized exports through East Coast ports is currently 63% while for Gulf ports is 18%)
- Relatively small of but steady exports to Asian markets due to high demand in China and Japan; Gulf ports plus Norfolk and Savannah exported 11,000 metric tons of hardwood wood chips in 2019

A conservative target of 10% market captured by a local exporter should generate roughly the following volumes:

Table 45 Potential Wood Chips Exports Through Vicksburg – Base Estimate

Trade	Total MT	Captured Market	Captured MT
Europe & South Central America	96,554	10%	9,655
Asia	13,000	10%	1,300
All Trades			10,955
Container weight (MT)			22
Containers Total			498
Weekly Containers			10

Port / Transport Infrastructure Requirements

Wood chips are one of only a handful of commodities that require custom designed vessels specifically engineered to maximize the economics of this lightweight commodity. Wood chips are generally stored in close proximity to a deep sea port where they are shipped in bulk using specialized vessels called wood chip carriers. Japanese companies own 89% of the world’s wood chip carriers with 58% being controlled by just two Japanese companies, MOL and NYK; Limited wood chip carrier availability in the Atlantic and near monopoly control of the worldwide fleet increases costs, limits flexibility and puts pressure on wood chip exporters.

The stevedoring of wood chips to bulk ocean vessels is managed by marine terminals that are designed specifically for the handling of wood chips in bulk. The terminals specialize in loading wood chips to these special purpose vessels.

When there is a downturn in bulk freight rates, shipping options become more readily available to exporters. In recent years, several shipments of wood chips were carried on standard bulk carriers at rates that were competitive to the rates provided by specialized wood chip carriers. Having bulk carriers as a shipping option allows a level of flexibility to the exporter that is not afforded by the traditional wood chip carrier; and The sheer volume of bulk carriers available allows exporters more spot opportunities and to be more flexible with deliveries to its customers.

The ocean container market also provides the ability to capitalize on a weaker US export container market combined with import match back opportunities. As ocean containers are imported into the local market due to a stronger import market, there is a higher imbalance between the number of imported loaded



containers versus opportunities for export full containers. Many export containers are therefore moved empty out of the United States. Identifying opportunities and building transport markets for non-traditional cargoes such as wood chips that normally do not move in ocean containers is an ideal scenario for the ocean carriers that manage these containers. Doing so helps to offset the repositioning costs for the ocean carriers.

Plastic Resin Exports

Background

Plastic resin pellets are the raw form of the material needed to produce a variety of plastic goods. Other names for this material include pre-production plastic and nurdles. These pellets can be either disc shaped or barrel shaped, with their sizes ranging from 2mm to 5m in most cases. Common types of resin pellets include:

- High-density polyethylene (HDPE) pellets
- Low-density polyethylene (LDP) pellets
- Linear low-density polyethylene (LLDPE) pellets
- Polypropylene (PP) pellets
- Polystyrene pellets
- Polyvinyl chloride (PVC and vinyl) pellets
- Polyethylene terephthalate (PET, PETE) pellets

Resins are produced from crude oil and originate from a refinery cracking process. During this refining, plasticizers, colors, and flame-resistant chemicals are added to improve the resins. The result being a polymer resin that has been crafted into beads, or, more often, pellets. Some of the more popular uses of resin pellets include the following:

- Injection molding – During the injection molding process, resin pellets are heated and then placed within a chamber for mixing. Through the use of high pressure, the melted mixture is then put within a cooled mold for further development of the end product.
- Extrusion – During the extrusion process, resin pellets are once again heated and then placed within a chamber. Following this, the material is put through a small opening for cooling by way of either water or air.
- Rotational molding – In this process, the pellets are heated and then cooled down within a mold that has the ability to be rotated three dimensionally. Because of the rotation, the plastic is distributed evenly within the mold, covering its walls. Oversized, hollow plastic items are often crafted by way of this process, including such products as children’s toys, sporting goods, trash cans, and more.
- Blow molding – Both injection and extrusion molding play a role with blow molding. During the process, the selected resin pellets are heated and then compressed within a liquid tube. Following this, the resin is placed within a cooled mold where compressed air is blown, which expands to the walls of the mold. One common application for this process is the creation of plastic bottles.

Virtually any industry which incorporates plastics processing into their operations may well utilize resin pellets at some stage, but some of the more common industries include:

- Personal care industry
- Automotive
- Agriculture
- Construction
- Sporting goods industry
- Packaging industry

Within these industries, there are a wide variety of products crafted by the diverse types of resin pellets, such as HDPE resins and PP resins. Some common products include:



- Milk containers
- Bottles for cleaning supplies
- Bottles for personal care items
- Fuel tanks
- Linings for truck beds
- Toys
- Piping
- Drums and buckets
- Grocery bags
- Car upholstery
- Home furnishing upholstery
- Plastic covers

Along with all these ways that resin pellets can be melted down and used in various applications, other applications involve utilizing raw resin pellets for bean bags and cornhole bags (from the popular party game)

Market Analysis

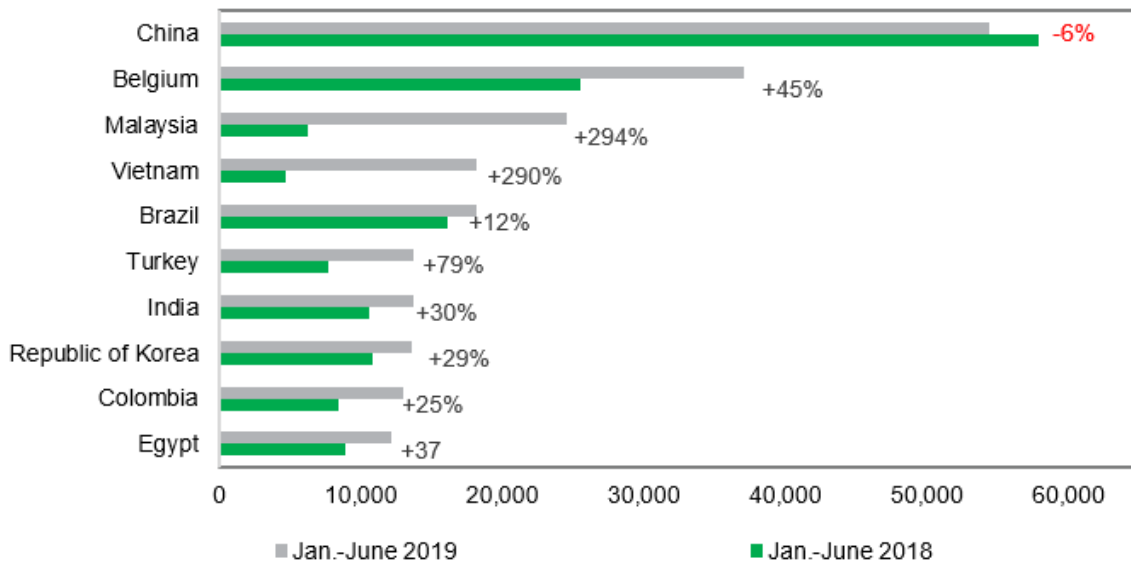
IHS Market Research estimates that containerized exports of the commodity polyethylene would reach 1 million TEU in 2019. In 2018, the value was 677,000 TEU representing 13% year over year growth. Cheap natural gas gives the United States a cost advantage hence the large growth numbers. Over the next five years, approximately 6.4 million metric tons of polyethylene production capacity will come online in the United States, according to IHS Market Research. Comparatively, about 4.2 million metric tons of US capacity was added to the market between 2014 and 2018. In 2018, Houston handled 42 percent of US resin exports and New Orleans handled 19 percent which totals 61% for the United States Gulf. New York, New Jersey and Charleston handled about 7 percent each, according to HIS Market Research. Most US resin production is on the Gulf Coast while Savannah is currently increasing their capacity for resin exports.

The industry is very consolidated among top chemical companies Sasol (~20b chemical facility in Lake Charles, LA; Houston, TX), Exxon Mobil(Houston, TX; Baton Rouge, LA; Pensacola, FL), Formosa (Baton Rouge, LA; Point Comfort, TX), Dow each operating in the Gulf. Shell is building a ~\$5-10b facility near Pittsburgh, 80% of production is expected to serve domestic markets near the location.



Figure 49 US Resins Loaded TEU Exports

Laden TEU volume of US resin* exports among top 10 destination countries with year-over-year change

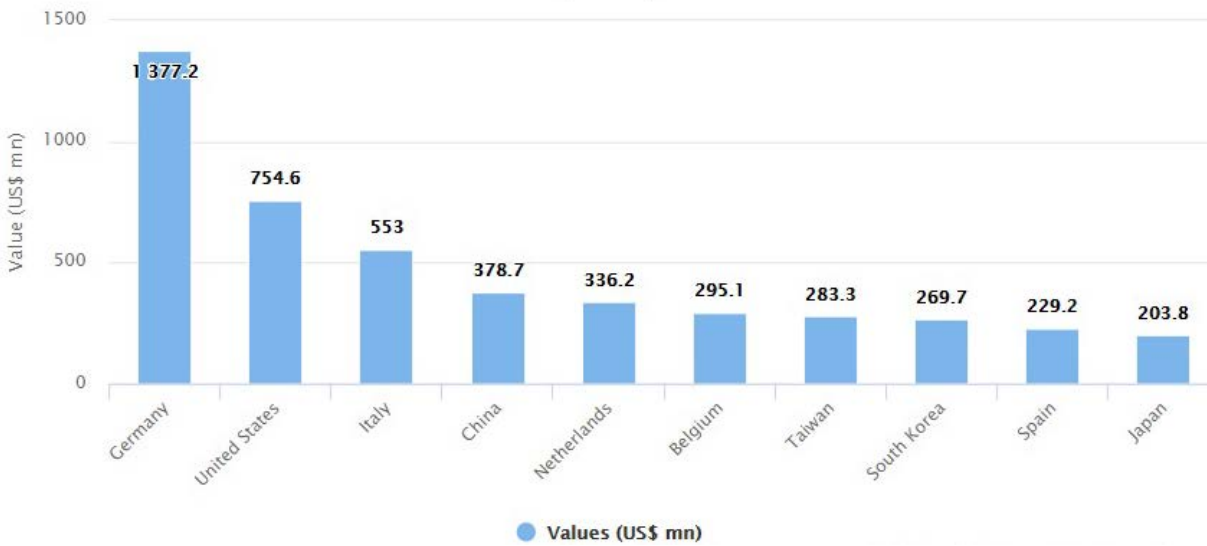


Notes: HS code: 3901-3909; 3911; 3926
Source: IHS Markit

© 2019 IHS Markit

Source: HIS Markit

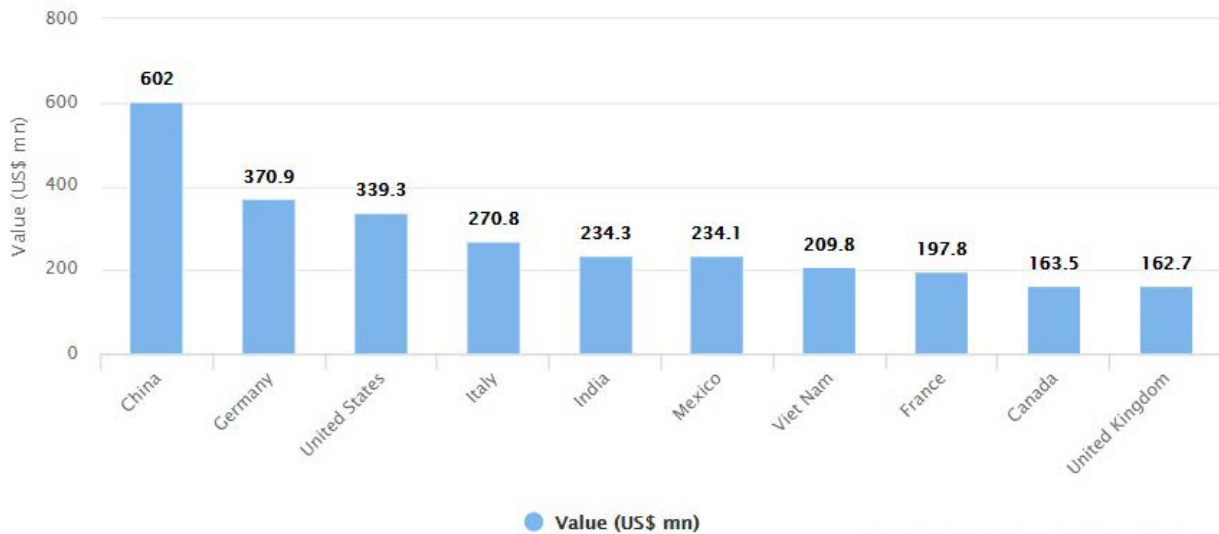
Figure 50 World Top Countries Exporting Polyurethane – Year 2016



Source: U.S. Census Bureau, Economic Indicators Division



Figure 51 World Top Countries Importing Polyurethane – Year 2016



Source: U.S. Census Bureau, Economic Indicators Division

The following tables provide an overview of the steady increase of containerized resins, as reported by the US Census Bureau. Houston and New Orleans ports accounted for 78.65% of resins exported in containers in 2019.

Table 46 Resin Exports by Port District in Bulk and Containers for 2017 and 2019

Port District	Year 2017				Year 2019			
	Container	Bulk	Total MT	Cont Share	Container	Bulk	Total MT	Cont Share
Houston-Galv., TX	4,195,898	137,178	4,333,076	97%	8,014,705	144,189	8,158,894	98%
New Orleans, LA	1,023,087	44,249	1,067,335	96%	1,528,087	54,749	1,582,835	97%
Los Angeles, CA	889,720	49,280	939,000	95%	895,990	19,119	915,109	98%
Charleston, SC	245,476	20,004	265,479	92%	547,727	34,415	582,143	94%
Savannah, GA	141,010	26,115	167,125	84%	266,383	16,454	282,837	94%
New York City, NY	255,550	27,029	282,580	90%	264,767	19,289	284,056	93%
Mobile, AL	282,066	1,295	283,361	100%	220,318	4,157	224,475	98%
Norfolk, VA	216,892	8,723	225,615	96%	213,943	4,993	218,936	98%
Philadelphia, PA	46,341	1,575	47,916	97%	38,763	881	39,644	98%
Tampa, FL	45,347	1,075	46,422	98%	35,101	1,957	37,058	95%
San Francisco, CA	12,125	495	12,620	96%	31,083	1,708	32,791	95%
Miami, FL	32,885	8,311	41,195	80%	29,704	4,640	34,343	86%
Seattle, WA	10,214	679	10,893	94%	17,111	321	17,433	98%
Baltimore, MD	20,104	1,303	21,406	94%	15,732	152	15,883	99%
Wilmington, NC	17,189	2,386	19,575	88%	14,165	361	14,526	98%
Total	7,433,904	329,696	7,763,599	96%	12,133,578	307,384	12,440,963	98%

Source: U.S. Census Bureau, Economic Indicators Division



A conservative target of 5% market captured for the 2019 containerized volumes moving via the Gulf Ports Houston and New Orleans should generate roughly the following volumes:

Table 47 Potential Resin Exports Through Vicksburg – Base Estimate

Trade 2019	Total MT	Captured Market	Captured MT
Asia	3,528,657	5%	176,432
South America	2,839,869	5%	141,993
Europe	2,058,387	5%	102,919
Other	1,097,544	5%	54,887
		Total	476,231
Container weight (MT)			22
Containers Total			21,647
Weekly Containers			416

Source: Seabury Analysis

Port / Transport Infrastructure Requirements

To accommodate the handling of resins, the Port of Vicksburg would need to accommodate a bulk transfer station that would receive resin moved via bulk truck and load into sacks. This transfer station would be part of a storage facility that would accommodate the long-term storage of resin for future shipments. In addition, an industrial onsite scale would be needed to ensure that each supersack weight is captured.

To support the transportation of containerized resin products, the Port of Vicksburg would further explore the infrastructure required to handle the movement through Vicksburg port via a container on barge service to New Orleans and Houston. Working with a barge operator will allow for the heavy movement of containers that may be impacted by road weight restrictions as previously mentioned.



Dry dock and Shipyard

Background

Barge activity follows national trade trends for grains, crude oil and by-products and other dry/liquid bulk commodities flows, both for domestic and international trades. Table 48 presents the barge/towboat fleet development in the last 20 years²⁰ and shows that although the total number of barges and towboats have remained relatively constant, the number of tank and deck barges has grown consistently (2% and 1% annually on average respectively) while the number dry cargo barges has shown a steady decrease (-1% annually on average). This shift has resulted on a significant change on the total cargo capacity share per barge type. The dry cargo barges’ 68% of cargo capacity share in 1998 was reduced to 54% in 2018; in contrast, the tanker barges share increased from 18% in 1998 to 27% in 2018.

Table 48 U.S. Flagged Vessels by Type and Year

Fleet Type	1998	2003	2008	2013	2017	2018
Non Self-Propelled						
Dry Cargo Barges						
Number of Vessels	24,376	23,428	21,712	20,164	19,910	19,882
Cargo Tons	38,391,033	38,892,778	37,774,719	36,108,225	36,757,483	36,826,657
Tank Barges						
Number of Vessels	3,539	3,755	4,269	4,673	5,133	5,183
Cargo Tons	10,364,394	11,701,897	14,050,733	15,587,723	18,031,282	18,253,438
Deck Barges						
Number of Vessels	5,844	6,015	6,255	7,210	7,765	7,763
Cargo Tons	7,344,721	7,964,537	8,687,273	11,358,258	13,558,463	13,589,805
Total Non-Self-Propelled						
Number of Vessels	33,759	33,198	32,236	32,047	32,808	32,828
Cargo Tons	56,100,148	58,559,212	60,512,725	63,054,206	68,347,228	68,669,900
Self-Propelled						
Towboats						
Number of Vessels	5,766	5,771	5,925	5,925	5,827	5,820
Horsepower	10,552,825	11,084,054	11,647,792	12,293,637	12,585,939	12,632,578
Cargo Tons	79,630	86,128	105,833	131,512	171,333	173,850

Source: IWR - USACE

In terms of fleet geographical allocation, most of the barge activity is allocated in the “Inland” navigation system (Mississippi River System and Gulf Intracoastal Waterway).

Table 49 and Figure 52 present detailed distribution statistics for the most recent year compiled by the IWR-USACE.

Table 49 Geographical Allocation of Non Self-Propelled Fleet (Barges) - Year 2018

Non Self-Propelled Barge Type	Total 2018 fleet	Coastal	Inland	Great Lakes
Dry Cargo Barges				
Number of Vessels	19,882	1,545	18,188	149

²⁰ “Waterborne Transportation Lines of the United States – Calendar Year 2018”, Institute for Water Resources U.S. Army Corps of Engineers, published November 2019.



Cargo Capacity (short tons)	36,826,657	4,197,429	32,069,469	559,759
Tank Barges				
Number of Vessels	5,183	546	4,626	11
Cargo Capacity (short tons)	18,253,438	3,992,058	14,195,995	65,385
Deck Barges				
Number of Vessels	7,763	2,480	5,119	164
Cargo Capacity (short tons)	13,589,805	4,678,168	8,669,489	242,148
Total Non-Self-Propelled				
Number of Vessels	32,828	4,571	27,933	324
Cargo Capacity (short tons)	68,710,463	12,868,234	54,974,937	867,292

Notes:

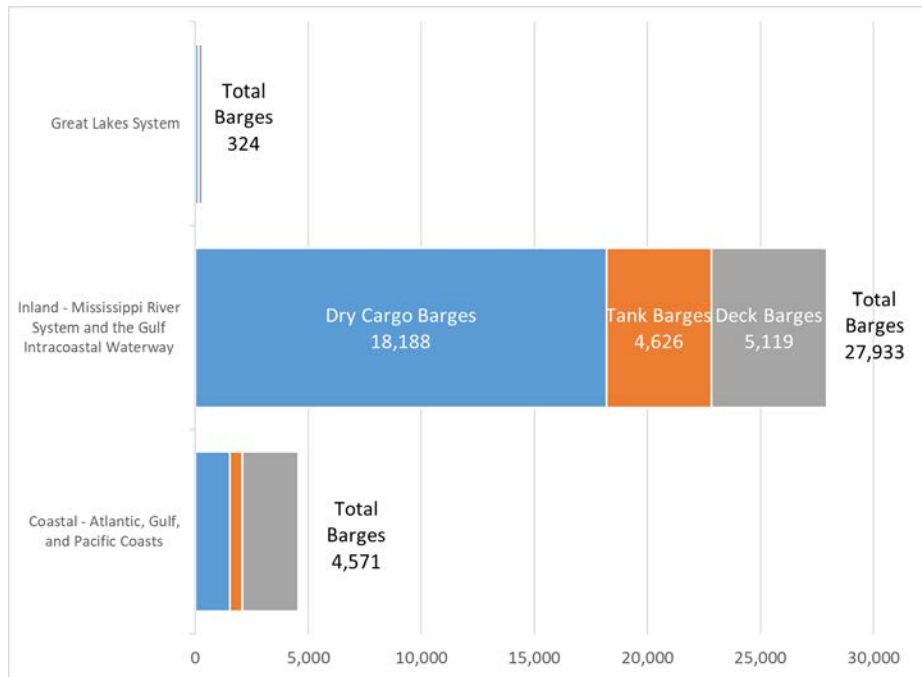
Coastal: Atlantic, Gulf, and Pacific Coasts

Inland: Mississippi River System and the Gulf Intracoastal Waterway

Great Lakes: Great Lakes System

Source: IWR – USACE

Figure 52 Barges per Navigation System – Year 2018



Source: IWR – USACE

Reporting requirements by the fleet owners to the USACE provide comprehensive data on the fleet type, age, and allocation (base, or operating headquarters) and other fleet characteristics (construction type, cargo capacity, area of operation, operator). This data source supports an in-depth analysis of barge maintenance and repair demand that was identified as an opportunity in our interviews with local companies.

Market Analysis

As any barge fleet, the fleet based in Vicksburg (base location) incurs regular maintenance that is performed locally but also in Greenville, Memphis and the Gulf. The demand for maintenance and repair is a well-known and constant need, as vessel’s exterior and interior are affected by operations and the carried cargo’s own nature. Regularly scheduled maintenance is a critical part of extending the service life of a vessel. For



pushboats, key components such as engines, pumps and generators need to be checked at regular intervals to make sure they're working properly. Of key importance is maintenance of the marine coatings that protect barges and tugboats. Common causes for repair and maintenance include:

-
- Damage caused by driftwood and other debris in the water
- Hull regularly scrapes the river bottom
- When moored to other barges, rising and falling wake leads to a lot of bumping and raking for it and its neighbors.
- Regular loading and unloading of cargo which can cause impact damage in the case of dry goods
- In the case of tanker barges, liquids corrosion can cause pitting and rusting

The targeted market for repair and maintenance services can be conservatively defined by the fleet's base (proximity to the repair and maintenance shop) and the fleet's age. In the case of Vicksburg, there is a presence of several barge companies that own and/or operate pushboats, and dry and tank barges. The overall fleet numbered 217 vessels in 2018, as shown in Table 50. Of special importance is number of tank barges: a total of 182 barges based in Vicksburg provides a significant foundation for repair and maintenance services.

A complementary analysis for estimating potential demand should consider the fleet's age. Half of the US tank barges are less than 10 years old, while most of the US dry barge fleet is older than 10 years. In the case of Vicksburg companies, their fleet follows the national trend for dry barges, with 100% older than 10 years; for tank barges, only one third of its fleet is less than 10 years old. Table 51 shows a detailed profile of Vicksburg's barge fleet age.

This profile provides the basis to estimate demand. Of course, operating conditions (turn around per year, cargo types, fleeting, etc.) dictates repair and maintenance needs but assuming that, on average, barges older than 10 years should be maintained every 2-3 years, the Vicksburg-based fleet should provide 6 – 8 service orders monthly (75 to 95 annually).

Finally, it should be noted that additional demand can be captured from fleets based in neighboring states. Louisiana (New Orleans, Harvey, Houma) and Arkansas (Pine Bluff, North Little Rock) companies could provide an important volume of service orders that can complement local demand.



Table 50 Vicksburg's Non Self-Propelled Fleet (Barges) - Year 2018

Company	Pushboat	Dry Barges				Tank Barges		
		Covered	Open	Deck Barge	Other	Single Hull	Double Hull	Other
ERGON MARINE AND INDUSTRIAL SUPPLY	7	0	0	1	0	0	7	--
HOLLY RIDGE MARINE, LLC	--	--	--	--	--	--	1	--
GOLDING	22	0	0	0	0	0	63	--
SMITH BOAT LEASING LLC	1	0	0	0	0	0	0	--
BIG RIVER SHIPBUILDERS, INC.	2	0	0	2	1	0	0	--
WORK BARGE, LLC	0	0	0	1	0	0	0	--
RIVERSIDE CONSTRUCTION CO., INC.	3	0	0	0	0	0	0	--
MISSISSIPPI LIME CO.	0	2	6	1	0	0	0	--
YAZOO RIVER TOWING, INC.	7	0	1	0	0	0	0	--
MAGNOLIA MARINE TRANSPORT CO.	26	0	0	1	0	1	89	3
P & S BOAT RENTAL	--	--	--	--	--	--	--	--
VICKSBURG PLANT FOOD	--	--	--	4	0	0	18	--
WARREN COUNTY BOARD OF SUPERVISORS	1	0	0	0	0	0	0	--
All Vicksburg Companies	69	2	7	10	1	1	178	3

Total by vessel type

Pushboat	69
Dry Barges	20
Tank Barges	182
All Vessels	271

Source: IWR-USACE, Seabury Analysis

Table 51 Vicksburg's Fleet Age Distribution (as reported in Year 2018)

Vessel Type	Age Distribution (years)				Total
	<= 5	6-10	11-15	>15	
Push boats	3	18	11	37	69
Dry Cargo Barges				20	20
Tank Barges	13	52	28	89	182
Total vessels	16	70	39	146	271

Source: IWR-USACE, Seabury Analysis



Port/Transport Infrastructure Requirements

River front is the main requirement for repair and maintenance operations as well as fixed and floating cranes. For the estimated demand, at least 3 docking positions would be needed, or about 900-1000 feet (almost all the Vicksburg tank barges are 296 ft long).

Reconfigure Public Terminal

Background

Existing public terminal operator, Watco, who has a lease which is set to expire within this year has been operating on 5-year extensions, which somewhat understandably has inhibited investment levels. A new long-term agreement with Watco with adjusted annual payments to the Port Commission in exchange for investment in a new or improved facility would spur economic growth in terms of job creation (during construction) and long-term operation as a result of being strategically better positioned to capture new business opportunities.

The existing public terminal facility configuration is outdated and prevents Watco from being able to aggressively pursue certain cargo opportunities, such as those related to wood and wood exports, agricultural products and resins in containers. A new or newly configured public facility would provide enough land to handle unit train unloading, horizontal and vertical bulk storage, as well as provide increased fleeting space at slack water. Relocating the public facility would likely even allow Big River Shipbuilders to expand their dry dock / shipyard footprint.

Port operations generally require several categories of long-lived assets, some of which are inherently more amenable to private investment and user fee recapture than others. For some long-lived, high cost infrastructure assets, charges for incremental use can only be assigned arbitrarily to individual users because the marginal benefit derived from using this common infrastructure significantly outweighs the marginal cost of replacing it. Port assets also include long-lived, high cost infrastructure, such as quays and terminals, whose incremental use can be meaningfully assigned to users and whose marginal cost and marginal benefit can be balanced through a number of price regulation regimes or intra-port competition. Finally, port assets include long-lived superstructure and equipment whose use is closely associated with specific users and specific service delivery systems.

All three categories of assets can be provided or maintained by the private sector. However, from the perspective of private investors, the first category involves the greatest risk, has the longest payback, and involves the highest tradeoff between their ability to set prices independently without regulatory constraint and the level of investment they are prepared to make. In general, private investors are prepared to make larger investments when they are unconstrained by regulators, the payback time horizon is sufficiently long-enough or when the price schedules (including escalation mechanisms) they propose in advance of awards are accepted and locked in for a long term.

Market Analysis

Watco executive, Kevin Neihaus, cited in an e-mail to Vicksburg Port Commission staff that one of the primary reasons it had missed out on commercial opportunities in the past was due to a lack of available floating dock and transload space on premise. While in most instances not able to specify quantities, Mr. Neihaus identified “scrap [steel] in bulk form in by rail out to barge (approximately 20-25k tons), Aggregate in by barge out to truck or rail, Pig iron in by barge out to rail, [and] Various bulk feed products due to lack of warehouse capacity” as missed opportunities.”²¹

Further, during one of the Consultant Team’s interviews with Kansas City Southern (“KCS”) executives Darrin Selby, David Fiveash, and Todd Middleton on March 26, 2020, a possible market opportunity for corn moved

²¹ E-mail from Mr. Kevin Neihaus (Watco) to Mr. Pablo Diaz (Vicksburg-Warren Partnership) on 3/23/2020.



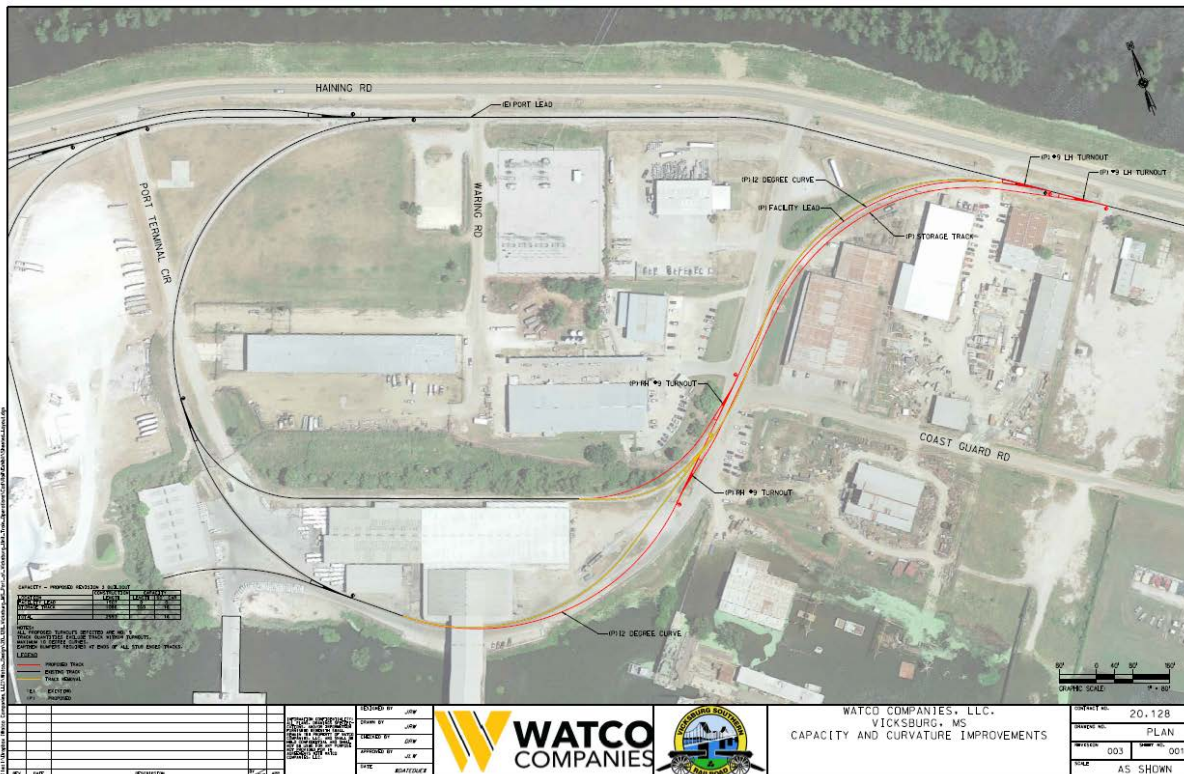
by rail to poultry feed mills in the state was identified. Currently, KCS is loading local corn in Delhi, Louisiana at a facility operated by the Andersons, and shipping to poultry mills in Morton, Mississippi and Lake, Mississippi. It serves two facilities capable of receiving 100-car trains, one handling 75-cars, and two handling 50-cars. Several others could receive 25-cars at a time. The railroad envisioned serving this market via a truck- or barge-to-rail transload in Vicksburg, ideally capable of loading full unit trains. The Delhi facility also loads corn to Mexico.

As a point of comparison, the Delhi, Louisiana facility capable of loading 100-car unit trains has a return loop, which has a 1600-foot diameter and does not require blocking any roads. Conversely, the existing port facilities in Vicksburg cannot hold a return loop of greater than 1100 feet and requires blocking at least 12 roads and driveways in its current configuration.

Additionally, the Levee Street yard in Vicksburg cannot hold a single train of 100 cars, which is required to assemble, arrive, and depart such a unit train. South of the port, along US 61, it is possible to add a second 8000-foot long landing track for unit trains if one private crossing to river access can be blocked. Although the 8000-foot requirement is an estimate and a shorter track may be possible, the Consultant Team is not aware of any other locations along the Vicksburg Southern Railroad (“VSOR”) that meet the requirement, despite the filling and grading that would be required.

In discussions with Watco’s internal design group, it prepared some possible alternatives that could help meet these objectives. While not validated designs, they do provide some context for a master planning process to ensure sufficient land is allowed for unit train operations.

Figure 53 Vicksburg Watco – Track Capacity and Curvature Improvements



Source: Watco



Louisiana. It is recommended that each of these lanes be studied further to determine which has enough consistent volume to build a match back, but in the meantime, the Port could almost immediately begin emphasizing new rail-served prospects that could bring in boxcar products from those general directions.

Port/Transport Infrastructure Requirements

The combination of modern port infrastructure, improved rail access and enhanced service frequency will reduce transaction costs for local and regional businesses, in turn making their goods and services more competitive in the global marketplace. A high quality, efficient and effective terminal operation is fundamental to the Port of Vicksburg's integration with major international ports and by extension in global trade flows. In order to compete and capture additional cargo opportunities, the upgraded facility should have:

- Barge-to-rail and rail-to-barge facilities to handle 100-car trains of grain (floating pier, conveying equipment, silo buffer storage, 7500-foot landing track, and improved loop)
- Dry fertilizer barge unloading (floating pier, conveying equipment, silo buffer storage, flat storage)
- Crude oil train unloading for 100-car trains (7500-foot landing track, improved runaround track, piping equipment from ethanol plant to refinery)
- Infrastructure suitable for transloading scrap iron from rail to barge (crane, pad, rail access, and vertical dock)
- Steel warehousing (indoor rail and truck unloading, overhead crane, and vertical dock)

In order to leverage its competitive rail advantage, POV needs the ability to handle 100-car unit trains. This would require improvements to create a separate 7500-foot long track where a complete train can be received, assembled, and departed in a single piece. Watco can then break the train down into smaller segments to process through different facilities. From a rail standpoint, the existing terminal site has the most available land for building an unloading loop; while not able to handle an entire train it can be made to function operationally. Conversely, other sites would require significant fill to create enough land to handle the longer cuts of railcars needed. Furthermore, Watco has expressed a willingness to invest in many of the required facilities if it has an agreement with POV long enough to capitalize each project.

The cost of developing or improving the infrastructure alone for such a port is expected to be significant and anticipated to be beyond the immediate capacity of the Vicksburg- Warren Port Commission to finance from its current statutory revenues. Accordingly, the Port Commission must consider options available to it to concession or long-term lease the provision and operation of the improved facility to the private sector, on terms which will be mutually beneficial for both counterparts.

Challenges and Key Considerations of Targeted Opportunities

Risks and Challenges

This section identifies and analyzes specific risks associated with each of the targeted business opportunities. Risks identified to this point are based off the level of detail of the potential business opportunities as they currently stand and are meant to be instructive as opposed to all encompassing. As each opportunity is further developed, a more clear and precise risk identification can be conducted and the likelihood, impact, and allocation of each risk must be further refined.

Along with refinement of the already developed risk identification and assessment, a preliminary risk evaluation and prevention plan has been outlined for each risk. The risk evaluation will utilize the risk assessment to determine the high danger risks. Mitigation strategies have also been developed for each of



the risks for the final selected opportunities to help prevent each risk from occurring and to minimize the impact of each risk on the business should it occur with prioritization given to mitigating the risk of high likelihood and high disruption events.

Approach to Risk

Risk Identification

To identify the specific risks of each opportunity, we analyzed the inherent risks based off company operating profiles within each industry and considered the risks inherent to the Vicksburg location as they apply specifically to each opportunity. The risks are broken out into categories based off the aspects of the opportunity to which they pertain.

Category Definitions

- **Asset:** Risks of damage to the company's assets which could incur a cost increase associated with repairs and disruption of the company's ability to complete their normal operations. These risks include but are not limited to fires, explosions, theft, natural disasters, vessel collisions, and severe weather events any of which could cause significant damage to the company's assets and cause a temporary disruption to their operations.
- **Construction:** Risks associated with construction of the company's facilities could increase the time and cost associated with bringing the facilities online. Risks in this category include but are not limited to inadequate surveying, procurement disruptions, and disruptions to the local infrastructure.
- **Demand:** Risks associated with pricing of output goods not being competitive in global markets, transportation costs to end users becoming prohibitive, oversaturation of the market with alternatives from competitors, economic slowdowns, changes in market makeup such that a product is no longer desirable and other changes that would reduce the desirability of the company's offering.
- **Environmental:** Risks that the operations of the company will have an adverse impact on the environment. Risks in this category include spills of toxic chemicals to the ecosystem or release of toxic gases, among others. These risks are present in factories that use these substances, terminal operations where these substances are transferred and stored and throughout the supply chain wherever these substances are being transported.
- **Operational:** Risks incurred during normal functions of the company which are not directly associated with supply and demand. For example, severe weather events can disrupt the company's ability to produce their offering as these events can impair their ability to transport their products, could lead to temporary facility shutdown, to other hampering impacts. Potential disruptors include but are not limited to labor shortages, strikes, or failed labor retention; weather events and natural disasters; and litigation or other legal proceedings which could reduce management's ability to focus on the day to day operations of the company.
- **Reputational:** Risks associated with the company developing a negative reputation with the local community due to excessive noise, release of odors, infrastructure strain or otherwise which could anger the local community and impair their ability to deal with the local government and community. Also, in this category, risks of the company developing a negative reputation among clients due to poor product quality or negative reputation among suppliers could each negatively impact their operating conditions.
- **Regulatory:** Risks associated with government policy changes to given industries that could impact the company's cost of operations, ability to procure their inputs, sell their products, or otherwise impact their operations fall into this category.
- **Supply:** Risks associated with availability and pricing of feedstocks for any given opportunity. Potential impacts to supply include but are not limited to geopolitical disruptors, tariff changes, diseases, transportation infrastructure disruptions, any of which could impair the company's ability to secure their necessary inputs and maintain marketplace competitiveness.



Risk Assessment

After the risks of each opportunity were identified and categorized, they were assigned likelihood and impact values. The likelihood of a risk occurring on a scale of one to five, with one being a low probability event and five being a very high probability event, presents the probability of a particular risk becoming a reality. The likelihood of a risk occurring does not mean it will necessarily have a significant impact on the company's operations. The impact of a risk is the likely disruption level to the company's business if a particular event comes to pass on a scale from one to five, with one being a low impact and five being a very high impact. If an event comes to pass, it could have a level higher or lower than the expected level based on the scale of the particular disruption. For example, if a fire is very small, it could have a lower level of impact than expected or if it is very large, it could have a higher level of impact than expected. These values are based off expectations of event sizes, but there is no way of completely accurately predicting the occurrence or magnitude of disruptive events.

Based on the preliminary identification and assessment of risks, it was determined that in general demand risks represent the highest danger to these business opportunities. Demand risks are of the greatest concern of the risk categories because they are the most difficult risks to mitigate and of the highest potential impact. If there is no demand for a product or offering, the company will not be able to sell their product or offering and effectively does not have a business proposition. For this reason, a more detailed market assessment is important to make sure a service offering will be robust in the market allowing it to maintain market share for an extended period of time and that demand for the offering will remain through disruptors during the life of the opportunity.

Lastly, and with respect to market disruption specifically, it must be noted that the bulk of research for this report has been carried out in a pre COVID-19 world, where historic trade flows offers valuable insight into future opportunity. This report has therefore not taken into account any impact of the COVID-19 virus on global markets, nor in fairness is it easy to predict at this stage.

Risk Mitigation

Risk Mitigation is defined as the coordinated application of resources to minimize, monitor, and control the probability or impact of unfortunate events or to maximize the realization of opportunities. Broadly speaking, risk mitigation involves the acceptance, avoidance, transfer or reduction of such events. For each identified risk outlined below, high level mitigation strategies are provided.



Opportunity Risk Assessment

Steel Mill/ Scrap Iron from Mexico / Finished Metals Storage

Unique ID	Description	Risk	Category	Likelihood	Impact	Mitigation	Allocation
1	Steel Mill / Scrap Iron from Mexico / Metals Storage	Changes in trade relations with Mexico could impair the pricing and ease of importing scrap iron which could reduce throughput at the facility.	Supply	2	5	Trade agreement sets basis for reliable input flows; diversification of input sources have to be planned.	Private
2	Steel Mill / Scrap Iron from Mexico / Metals Storage	A US economic downturn could lead to a reduction in building and other segments that utilize steel and other products which utilize iron which would in turn reduce demand for scrap iron.	Demand	2	5	Obtain long-term contracts with purchasers; develop plant in phases.	Private
3	Steel Mill / Scrap Iron from Mexico / Metals Storage	Severe weather events could damage the facilities or disrupt rail services which could delay/affect the company's supply chain.	Operational	2	4	Work contingency plans with the rail/port operators; secure flooding protection works; insure properly.	Shared
4	Steel Mill / Scrap Iron from Mexico / Metals Storage	Major international steel producers in China and elsewhere could potentially produce steel for export to the US more cost effectively than US steel producers thus impacting the business need for imported scrap iron to the US.	Demand	4	5	Update demand projections in line with changing market conditions and trade deals.	Private
5	Steel Mill / Scrap Iron from Mexico / Metals Storage	Due to scrap market volatility, iron scrap consumers in the US could begin sourcing their iron from other countries if price dynamics change.	Demand	4	5	Obtain long-term contracts with purchasers; develop plant in phases.	Private
6	Steel Mill / Scrap Iron from Mexico / Metals Storage	Barge operating dynamics could change such that the current load mismatch could disappear or more valuable commodities could grow in market share thus reducing barge operator desire to ship iron scrap.	Operational	2	4	Secure long term contracts with transport companies.	Shared
7	Steel Mill / Scrap Iron from Mexico / Metals Storage	Development of composite alternatives to steel could reduce construction industry demand which would impact steel mills and the company's ability to transship iron scrap.	Demand	3	5	Obtain long-term contracts with purchasers; develop plant in phases.	Private

Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export

Unique ID	Description	Risk	Category	Likelihood	Impact	Mitigation	Allocation
8	Containerized Soybean Exports	Competition from emerging markets could put downward pressure on prices. Countries could increase their agricultural production and price dynamics could shift to cause the US to export less agricultural commodities.	Demand	4	3	Implement strategies to take advantage of trade deals; diversify markets to specialized customer base.	Private
9	Containerized Soybean Exports	Disease, adverse weather conditions or other disruptors that reduce US production of agricultural products could impact US exports.	Supply	2	4	Secure sources from multiple producers and engage non-local suppliers in case it is needed.	Shared
10	Containerized Soybean Exports	US regulations on the use of fertilizers or acceptable farming practices could negatively impact US crop production and thus exports.	Regulatory	1	3	Government lobbying efforts	Private
11	Containerized Soybean Exports	Severe weather events such as flooding, tornados or other events such as fires could cause significant damage to the production facility and have a material impact on throughput.	Asset	3	3	Secure sources from multiple producers and engage non-local suppliers in case it is needed.	Shared
12	Containerized Soybean Exports	Price and trade dynamics within US ports could change to reduce or eliminate the advantage of shipping containerized grains through east coast or gulf ports.	Demand	2	5	Optimize logistics to increase transport cost margins; take advantage of trade agreements favorable conditions.	Private



Woodchips in Ocean Containers

Unique ID	Description	Risk	Category	Likelihood	Impact	Mitigation	Allocation
13	Woodchips in Ocean Containers	Changes in trade dynamics or liner services to New Orleans could impair the ability of the company to obtain empty containers and container space on vessels in a cost efficient manner.	Operational	3	4	Insurance, high end management, skilled workforce	Private
14	Woodchips in Ocean Containers	Adverse weather conditions or diseases could impact the supply of forestry products to local facilities and accordingly impact the ability of the company to cost effectively export wood chips.	Supply	2	3	Diversification of feedstocks	Private
15	Woodchips in Ocean Containers	A global economic downturn could damage demand for construction materials and wood furniture products and accordingly reduce the demand for wood chips.	Demand	3	3	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
16	Woodchips in Ocean Containers	Geopolitical disruptions such as wars could impact global trade and materially damage the ability of the company to successfully export woodchips.	Demand	2	4	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
17	Woodchips in Ocean Containers	Changes in trade relations with foreign countries could increase the cost of US woodchips and accordingly reduce demand from foreign entities.	Demand	2	3	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
18	Woodchips in Ocean Containers	Severe weather events, flooding or natural disasters could damage the facility and impair their ability to produce wood chips.	Asset	2	4	Insurance, security, skilled workforce	Private
19	Woodchips in Ocean Containers	As wood chips and saw dust by-products are highly flammable, a fire at the facility could cause extensive damage and impair their financial conditions and operations.	Asset	2	4	Insurance, security, skilled workforce	Shared
20	Woodchips in Ocean Containers	The supply chain could be impacted by numerous disruptors such as adverse weather conditions reducing agricultural feedstock supply or demand increases from competing sectors such as food supply which would impact the cost and availability of biofuel inputs.	Supply	5	2	Diversification of feedstocks	Private
21	Woodchips in Ocean Containers	Questions and concerns about the actual emissions of biofuels and lack of clear-cut answers presents a risk because if it is found that biofuels are non-green than the use case for biofuels would be greatly impacted.	Environmental	1	4	Insurance, employing best safety and environmental conservation practices	Private
22	Woodchips in Ocean Containers	Potential fossil fuel price reductions could adversely impact the competitiveness of biofuel in the marketplace.	Demand	1	4	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
23	Woodchips in Ocean Containers	If a spot market develops for the feedstock, then there will be low quantity risk as the company could go to the spot market as necessary to meet their supply needs but would be subjected to the price risk associated with spot market volatility. In the absence of a spot market, the company would rely on contractual obligations with feed suppliers which would reduce price risk but increase quantity risk because if the company required additional feedstock they would not be easily able to obtain it.	Supply	2	3	Diversification of feedstocks	Private
24	Woodchips in Ocean Containers	Spills or operational accidents which cause a release of product into the environment could have a potentially significant impact to the local environment.	Environmental	1	3	Insurance, employing best safety and environmental conservation practices	Shared
25	Woodchips in Ocean Containers	International, low labor cost markets could potentially produce biofuels at a lower cost than a U.S. based plant depending on market conditions.	Demand	3	3	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
26	Woodchips in Ocean Containers	Severe weather events such as flooding, tornados or other events or events such as fires could cause significant damage to the production facility and have a material impact on the throughput of the facility.	Asset	3	3	Insurance, security, skilled workforce	Shared



Plastic Resin Exports

Unique ID	Description	Risk	Category	Likelihood	Impact	Mitigation	Allocation
27	Resin Exports	Resin production facilities are large, capital intensive, and complex and the risk associated with building these plants are numerous. Site geographic conditions such as ground composition could potentially delay and/or increase the cost associated with building such a facility. These facilities require large components which can be difficult to transport to the location of the site.	Construction	1	5	Proper due diligence, utilization of high end surveying companies, contractors and designers, ensuring that contracts with contractors place sufficient liability on the contractor such that the exposure is shared and the company is partially insulated from the risk.	Private
28	Resin Exports	Concerns over the environmental detriments associated with petrochemical products in general and plastics specifically causing the government to impose regulations on their production could have a materially adverse impact on throughput but diversified (non "single use") uses make this unlikely especially given improved recycling methods.	Regulatory	1	4	Analyzing the regulatory framework so the company is aware of regulatory changes ahead of time and can adapt their operations accordingly	Private
29	Resin Exports	The feedstocks for resins are highly flammable making fire and explosion potentially highly damaging given the size and complexity of these plants.	Asset	2	4	Insurance, security, skilled workforce	Shared
30	Resin Exports	Because the feedstocks are gaseous there is potential for a release of toxic and environmentally damaging gases to the atmosphere.	Environmental	1	4	Insurance, employing best safety and environmental conservation practices	Shared
31	Resin Exports	Regulations on the oil and gas industry could impact availability of the raw materials.	Supply	3	3	Contracts with suppliers to insure sourcing at the expected rates, diversified material sourcing	Private
32	Resin Exports	Demand for natural gas could strain the distribution infrastructure causing an increase in cost to receive natural gas via pipeline and otherwise.	Supply	3	4	Contracts with suppliers to insure sourcing at the expected rates, diversified material sourcing	Public
33	Resin Exports	There are a limited number of suppliers of resin feedstocks and the price and availability of these commodities could be impaired depending on supply and demand forces.	Supply	3	4	Contracts with suppliers to insure sourcing at the expected rates, diversified material sourcing	Private
34	Resin Exports	Due to the size of resin plants, supply comes online in large increments thus potentially creating supply demand imbalances and negatively impacting resin prices.	Supply	5	3	Contracts with suppliers to insure sourcing at the expected rates, diversified material sourcing	Private
35	Resin Exports	Due to environmental concerns, regulations on chemical processing facilities have the potential to tighten which could reduce the profitability of the facility and leave the company in danger of punitive actions by the government if they fail to comply.	Regulatory	5	2	Analyzing the regulatory framework so the company is aware of regulatory changes ahead of time and can adapt their operations accordingly	Shared
36	Resin Exports	Severe weather events or natural disasters could potentially damage the plant or disrupt the supply of feedstocks and the ability for the product to reach its end markets.	Asset	2	3	Insurance, security, skilled workforce	Shared
37	Resin Exports	Geopolitical unrest particularly in Asia could have a significant impact on demand for resins as the largest resin importers are in Asia.	Demand	5	4	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
38	Resin Exports	This highly competitive market could cause significant price pressures if demand were to decrease or competition among the major players leads them to cut prices to try and grow their market share.	Demand	1	4	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
39	Resin Exports	There is risk of political tensions such as tariffs and trade wars to greatly disrupt demand if tariffs change the market such that the US is no longer a low cost producer of resins for export markets.	Demand	3	4	Diversification of offerings, choosing robust industries, obtaining contracts with purchasers	Private
40	Resin Exports	Disruptors to the local community during construction in terms of heightened noise levels, heightened traffic levels due to trucks and strain on the local infrastructure to support a large number of construction workers could insight anger among the local citizens which could damage the reputation of the facility. Likewise, during operations, if the plant emits bad odors or excessive noise, damage to the organization's reputation could occur.	Reputational	2	2	Proper due diligence to assess the impact of operations on the community and developing methods to reduce or eliminate impacts if they are found to exist	Private



Dry dock and Shipyard

Unique ID	Description	Risk	Category	Likelihood	Impact	Mitigation	Allocation
41	Dry dock and Shipyard	Operational incidents such as fires or vessel accidents could damage the facilities and adversely impact the company's operations.	Asset	2	3	Strict implementation of industrial & health management program; proper level of insurance.	Shared
42	Dry dock and Shipyard	Loss of availability of qualified labor: In general the US is experiencing a shortage of skilled industrial laborers and if the facility is unable to maintain a workforce of skilled shipyard workers their operating profile could be damaged.	Operational	3	5	Use local/regional programs at specialized technical education institutions for recruiting; establish clear compensation/advancement policies.	Private
43	Dry dock and Shipyard	Litigation with vessel owners: Given the complexities of ship repair work, it is possible that contract disputes could lead to costly and time consuming legal proceedings for the company.	Operational	3	4	Draft standard, fair, contracts with proper termination and liability clauses.	Private
44	Dry dock and Shipyard	Shipyards are generally open spaces and contain expensive industrial equipment. If the facility is not adequately secured, theft of expensive equipment could occur.	Operational	3	2	Investment on high-tech, comprehensive security system should be included on CAPEX/OPEX.	Private
45	Dry dock and Shipyard	Due to its location, this facility would only serve vessels based at the port or operating on this very specific trade route making the dry dock operations coupled to a relatively limited fleet.	Demand	1	5	Offer specialized services to fleet locally based and long term contracts.	Shared
46	Dry dock and Shipyard	Designing shipyards is complex as it is highly dependent on the geography of the location. If the design is poorly laid out and designed it can materially damage the company's operating cash flows, lead to construction difficulties, or otherwise damage the company's operations over time.	Construction	3	5	Proper due diligence, utilization of experienced designers & contractors; proper placement liability on contractors.	Private
47	Dry dock and Shipyard	Given its proximity to the river, any spill of ship fuels, oils, or other toxic chemicals to the environment could have a serious impact on the local ecosystem.	Environmental	2	5	Employing best safety and environmental conservation practices; place proper insurance.	Shared
48	Dry dock and Shipyard	Unforeseen construction challenges at the location could lead to time and cost overruns. If the facility is near other cargo facilities, any dredging or large equipment movements that lead to shipping disruptions will occur a cost on the company.	Construction	2	3	Proper planning and project management to reduce any down time for affected parties; place sufficient liability/ insurance such that the exposure is shared.	Shared
49	Dry dock and Shipyard	Shipyards require large amounts of power and if the local energy system is strained to provide this power or is disrupted by any of a number of factors outside the control of the company, it could disrupt the shipyard operations.	Operational	2	3	Secure power source capacity with clear supply contracts; plan for backup systems.	Private



Reconfigure Public Terminal

Unique ID	Description	Risk	Category	Likelihood	Impact	Mitigation	Allocation
50	Reconfigure Public Terminal	Terminals require a skilled workforce and failure to retain workers could materially impact the company's ability to operate successfully.	Operational	1	5	Limited attrition risk. As a corporate, Watco can ensure employees are appropriately incentivized and informed about expansion opportunities.	Private
51	Reconfigure Public Terminal	Unforeseen problems with construction of the new facility such as inopportune ground composition or river depths could lead to construction time and cost overruns and delay start of operations of the terminal.	Construction	2	3	Appropriate feasibility studies to be undertaken prior to civil works commencing. Third party advisors and experts can be hired to ensure project timeline is adhered to. Different contract types can be used to balance risk and price accordingly between proponent and contractor.	Shared
52	Reconfigure Public Terminal	Vessel collisions or disabled vessels stuck at the terminal could damage the facility or impair the facility from throughputting cargo for a period of time.	Operational	2	4	Use of experienced pilots and barge captains. Establish appropriate port and terminal rules for operations and safe navigation.	Shared
53	Reconfigure Public Terminal	Contamination of products being transited through the terminal while in their storage facilities could leave the company liable for the cost of product damaged.	Operational	2	3	Can mostly be managed through effective contracts. Terminal management can be trained on best practice for any new operation type not currently being done at port.	Private
54	Reconfigure Public Terminal	Severe weather events, flooding, or natural disasters could damage the facility and impair their ability to throughput cargo.	Environmental	2	4	Ensure new project is appropriately constructed against flooding expectations	Shared
55	Reconfigure Public Terminal	Given the proximity of potential locations to the operational shipping channel, any disruptions to the channel during construction such as during dredging operations could create an unforeseen cost associated with the construction or adverse affect on other port users	Construction	2	3	Port must coordinate vessel traffic and construction activity to minimize interference. A traffic management plan/ construction timeline can be created in advance of project getting started.	Shared
56	Reconfigure Public Terminal	Cargo spills during transfer operations, directly from vessels servicing the port, or from failures in terminal storage facilities could cause serious damage to the local environment.	Environmental	2	4	Operating manuals to be in place prior to handling any environmentally sensitive cargos. Quality Control to be a focus of the operation. Ensure proper oversight from Authority and State environmental agencies, as required.	Shared
57	Reconfigure Public Terminal	Failure of the terminal to comply with prescribed accounting practices for cargo throughput and vessel calls could lead to deficient revenue for the Port Commission.	Regulatory	1	3	If a new contract is reached, Authority to maintain proper oversight of cargo throughput and annual reporting requirements to ensure revenue generation is appropriately captured.	Public
58	Reconfigure Public Terminal	Due to its location, this terminal serves only one cargo shipping route and accordingly disruption to cargo transportation along the Mississippi River could significantly impact their cargo throughput.	Demand	3	5	Secure long-term contracts on a take or pay basis.	Private

Risk Allocation

Each risk was given an allocation of either private, public or shared risk based off which Party is best positioned to mitigate a particular risk.



Scenario Assessment

Having analyzed principal risks associated with the targeted business opportunities outlined in this report, the Consultant Team is able to evaluate their implications on project delivery, particularly whether the cumulative effects of said risks, after mitigation, make the case for a lesser future development or conversely, a larger scale investment.

Presented initially with three potential sites for port expansion and development, during our time on site and throughout conversations with various port stakeholders, we have identified the possibility of extending the existing port north along the Yazoo River as a potential fourth expansion option. Noting that each of the three initially presented sites have limitations, as discussed below, the existing port configuration and use of space raises the possibility of whether certain footprints could be consolidated to accommodate some of the future opportunities we will highlight as part of this Market Analysis. Furthermore, we recommend as follow-up to this exercise that a Port Master Plan be created to optimize the existing land area and water access before evaluating the purchase of additional sites. We would recommend that this master plan include a new public facility which will eventually have enough land to accommodate unit train unloading, horizontal and vertical bulk storage, as well as provide increased fleeting space at slack water.

Opportunity Summary – Estimated Volume and Infrastructure Requirements

The table below summarize the main strategic issues raised when comparing the development of the proposed sites.

Table 52 Business Opportunity Summary

Business Opportunity	Estimated Volume	Frequency	Existing or Future?	Champion	Infrastructure needed	Organizational change needed?	Commission sponsorship needed?
Steel Mill / Scrap Iron from Mexico / finished metal storage	KCS brings 275,000 tons per year of scrap from Mexico for Big River and Steel Dynamics. If moved to Vicksburg, = 2,700 railcars in and 180 barges out	3.5 barges/week	Future	Watco Terminals and KCS	Dock and suitable land to unload from rail and transfer to barge. Fleeting space and return loop of 1600 ft. Covered warehouse storage, ideally with overhead crane and indoor rail unloading	Possibly - it depends on who needs to make investments for scrap iron material handling equipment and improved warehousing	Yes, in order to incorporate an appropriate site into the Port master plan
Containerized Soybeans (and Other Traditionally Bulk Agriculture Commodities) Export	Monthly empty container exports from USEC ports = 390k units. Could represent >2,500 TEU p.a. export in low case	Weekly sailings	Future	Watco Terminals	Dock for container-by-barge or alternative vessel, unless moved via rail; container chassis pool	Possibly - it depends on who needs to make investments for a container-by-barge dock if required	Yes, requires investment in new infrastructure and equipment







Business Opportunity	Estimated Volume	Frequency	Existing or Future?	Champion	Infrastructure needed	Organizational change needed?	Commission sponsorship needed?
Woodchips in Containers	10% of export market to Asia, Europe & S. Central America = 10,955 MT. Could lead to est. 498 containers p.a. or 10 per week	Weekly sailings	Future	Watco Terminals	Dock for container-by-barge or alternative vessel	Possibly - it depends on who needs to make investments for a container-by-barge dock if required	Yes, requires investment in new infrastructure and equipment
Reconfigure Watco Terminal	See other Opportunities	N/A	Future	Watco Terminals	8000 ft. landing track for unit trains plus 1600 ft. return track. Container by-barge dock. Space to fleet and shift roughly 7 barges for every train loaded.	Possibly - it depends on who needs to make investments for a container-by-barge dock if required	Yes, requires investment in new infrastructure and equipment
Drydock and Shipyard	271 vessels currently based in Vicksburg. Potential for 75-95 service orders annually	Monthly	Future	Big River Shipbuilders	Expanded Drydock area and workspace. Larger Equipment	No	Yes, requires additional land area or reconfiguration of existing port space
Plastic Resin Exports	Est. 476,231 MT (equivalent 21,647 containers p.a.) = 5% of the containerized resins market moving via Gulf Ports.	Weekly sailings	Future	Watco Terminals	Bulk Transfer Station to receive cargo from bulk truck to load into sacks. Industrial On-site Scale. Dock for container-by-barge or alternative vessel	Possibly - it depends on who needs to make investments for the required infrastructure	Yes, requires additional land area or reconfiguration of existing port space

Source: Seabury Analysis



Opportunity Summary – Alternative Site Evaluation

Table 53 Future Site Alternatives Strategic Comparative Matrix

Proposed New Site	Main Features	Level of Investment	Strategic Value
Armstrong Property 	Size: 57 acres Riverfront: 600 ft Rail connectivity: Yes	Low, with investments needed for property purchase, acquisition of neighboring property to increase river frontage and construction of docks on marshland	Site is situated on the current port developed area; purchase value is relatively low
Hwy 61 South Site 	Size: 834 acres Riverfront: N/A Rail connectivity: No	High investments needed for dredging, land fill, flood protection, basic infrastructure, road/rail connections	Site has significant acreage; it is next to main highway; and rail access can be extended to the site.
Letourneau Site 	Size: 115 acres Riverfront: 4400 ft Rail connectivity: Yes	Medium: protection from river currents, levees, rail connection	Site is developed and purchase price is relatively low, but limited by site gradient and lack of good piers
New Port Site (Yazoo River) 	Size: Significant acreage Riverfront: Significant Rail connectivity: No but existing track ends nearby	High investments needed for dredging, land fill, basic infrastructure, road/rail connections	Will allow for long term master planning; enough land to attract tenants/operators willing to invest in diverse storage facilities; creation of protected water areas will increase fleeting areas

Source: Vicksburg-Warren Partnership, Seabury Analysis

Opportunity Summary – Decision Tree Analysis

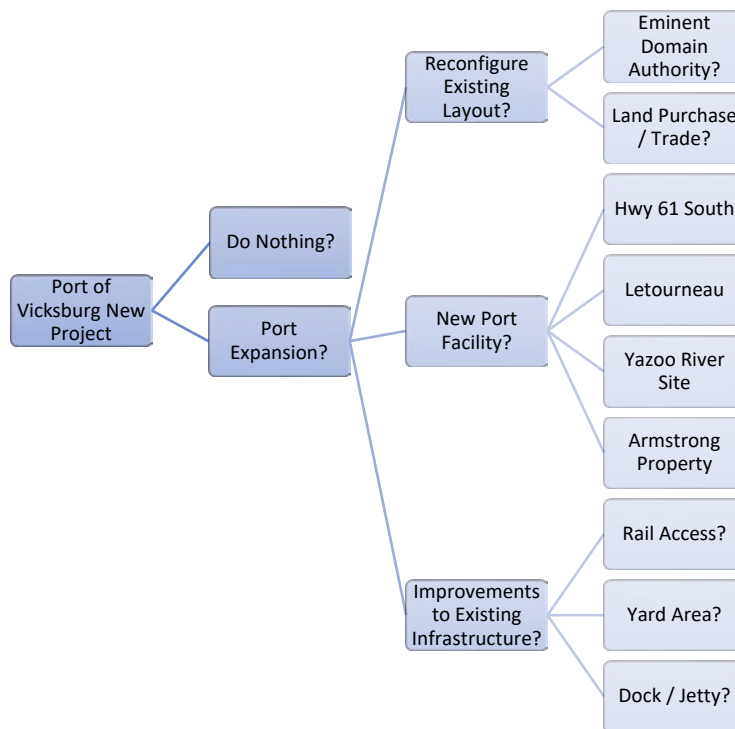
The above notwithstanding, any port expansion and investment decision process must begin with the clear definition of the objectives that the expansion is intended to achieve. For each decision point along an ordered path, options and alternatives should be developed and assessed, as with the below Decision Tree, albeit in greater detail. In particular, all of the possible outcomes resulting from the selection of any specific option need to be fully evaluated with respect to the stated objectives of the port expansion.

For each key decision point, several options exist. While additional inputs from Jacobs and the Vicksburg-Warren Partnership are required in terms of confirming which opportunity, or opportunities to pursue and at which time, the below decision matrix provides additional framework for how to proceed in terms of appropriate infrastructure planning and investment.



The framework adopts a “bottom-up” approach to risk assessment that aims at a thorough understanding of a project’s vulnerabilities and uncertainties relative to investment planning.

Table 54 Opportunity Summary - Decision Tree Analysis



Barriers to Implementation & Policy Implications

Barriers to Implementation

With each planning scenario described above, a different strategy for implementation can be considered. For example - Time to delivery, environmental planning complexity and overall project cost may be deterrents to the larger scale investment scenario, whereas such an effort may equally be required to ensure that port operations have sufficient space to expand operations if one or all of the business opportunities are successful moving forward.

Understanding the barriers to implementation for any infrastructure project assist project developers to devise strategies for countering this opposition. Some of the most significant barriers for expanding the Port of Vicksburg are likely to include:

- Lack of political will
- Opposition from key stakeholders (community, existing tenants, market participants)
- Limited institutional and technical capacity
- Insufficient funding and financing
- Environmental concerns
- Geographic / physical limitations



Political will is one of the most important ingredients in ensuring a new infrastructure initiative happens. Overcoming resistance from special-interest groups (government and private sector) and the general inertia against change is often an insurmountable obstacle for project developers and their supporters in government. Still, for those public officials that have made the commitment, the political rewards can be significant.

Citizens and relevant stakeholders, as a whole, must also be involved from the early stages of the development to ensure their buy-in and avoid costly and timely delays later on in the project lifecycle. Their points of view are extremely relevant, as they will become users of the infrastructure or be impacted by its development, so a favorable opinions are worth pursuing during the planning process. This will also reduce the likelihood of opposition to the project during any environmental review period and further, once implementation (i.e., building the infrastructure) has begun.

Depending on which development option is pursued, the corresponding institutional capacity, particularly human resource capacity, can often be a constraint to effective project implementation with larger projects. This deficiency can of course be augmented by the use of consultants and other advisors, but the Port Commission will need to cope with an array of issues, with a limited number of staff.

Financial support at the local, state or federal level can become another barrier to implementation, though needless to say becomes less of an issue with lower-cost options, such as reconfiguring an existing layout as opposed to undertaking a full-scale greenfield port development. As with any major infrastructure project, fraught with opportunities for cost-overruns or unforeseen environmental risks, the more effort and resource spent during the pre-development phase tends to reduce the likelihood of such risks occurring later on, when they will be more expensive to rectify or mitigate. Additionally, the lack of resources to sustain any sort of operational subsidy means that infrastructure projects must be largely designed to be financially self-sustainable, with an appropriate allocation of risk between counterparties. The development of a sound business case should underpin any major undertaking.

Particularly if it is determined, as a result of further master planning efforts, that the best course of action moving forward is to expand operations into a new brown or greenfield site, a careful review of the underlying environmental factors must be undertaken, in consultation with local stakeholders. Various local conditions, such as urban, geographic, and topographic factors, can also present barriers to implementation. For instance, increased cargo throughput can lead to increased traffic congestion in Vicksburg. The need to design infrastructure around critical levees, which prevent flooding, can pose design challenges. However, there are typically technical solutions for each one of these issues. Local conditions typically require local solutions, so garnering strong local support is critical for project developers to secure during this phase as it helps to expedite the approval process.

All of the barriers noted in this section can be overcome. Nevertheless, for many municipalities, these issues greatly dampen the Port Authority's ability to initiate a project. Project champions must be prepared to provide answers to each of these barriers that represent a threat to the project being accepted.

Strategic Objectives and Policy Context

The opportunities highlighted throughout the report each have separate, but in some cases overlapping value propositions. Each opportunity entails different capital expenditure requirements and more than likely represent a different investment return profile. As such, the principal policy consideration for the Port of Vicksburg which underpins the overriding consideration to expand is whether to seek private sector partnership to assist in the delivery of said marine infrastructure.

It is envisioned that in the medium to long term, such a strategy would deliver on the following objectives:



Financial Objectives

1. Improve Port Commission revenue.
2. Enhance Vicksburg's position regionally as an important node in international supply chains
3. Support the State Government's initiatives in attracting and retaining industry.
4. Accelerate investments in port infrastructure that are of international acceptable standards.
5. Improve the availability, quality and efficiency of terminal operations.
6. Enhance rail operations and performance.
7. Properly allocate project risk across the public and private sector.

Efficiency Objectives

1. Establish modern container handling port capacity by ~2023.
2. Expedite cargo clearance & delivery.
3. Reduce over the road truck movements.
4. Enhance the competitiveness of Mississippi's economy by reducing transaction costs which have heightened freight rates.
5. Focus on cost-effectiveness.
6. Provide incentives to improve efficiency and performance and encourage innovation.

Social Objectives

1. Increase the capacity and diversity of private investment by providing opportunities for investors and contractors in the provision of public infrastructures thus encouraging efficiency, innovation and flexibility.
2. Accelerate economic growth, productivity, competitiveness and access to markets.
3. Provide training & development and job opportunities to an underdeveloped axis of Mississippi.

Furthermore, the nature of private sector involvement in the port sector is typically prescribed by the adoption of a specific institutional model. In Vicksburg's case, the Port itself has both public and private terminals, with regulatory oversight on just one terminal (Watco). Thus, in terms of institutional models, Vicksburg currently acts as a landlord to Watco, though given its footprint and wider economic development role, appears agnostic to the model going forward, so long as certain other public objectives can be fulfilled, such as job creation.

Within these institutional models, a broad array of options exists with respect to the specific form a future public-private partnership may take. These can significantly affect the agility and responsiveness of service providers, their market orientation and efficiency, as well as their decision-making autonomy. However, a number of other factors should also be considered, including:

- The strategic fit with the identified needs of the existing and potential market.
- The competitive consequences for other ports in the same range.
- The compatibility with other approaches to public-private partnerships used in other transport infrastructure projects in Mississippi, as well as other sectors of the economy.
- The fit with the investment capacity and interests of potential strategic investors.

To that end, two key issues involving public interest oversight are what powers and authorities need to be retained by a public oversight body if significant infrastructure investment is made by the public entity, and what economic benefits it shall receive as a result of such investment. Increased private sector participation in the delivery of port services should be viewed as an instrument to achieve well-defined public interest objectives, as stated above. Planning the future development of ports and sharing those plans with private developers who can help implement them is a continuing responsibility, and every port's vision of its future needs to be realistically set in the context of its commercial environment and its competitive position versus other ports. It must also consider the likely effects of proposed increases in capacity on regional markets,



since one port's efforts to increase its share of regional trade typically evoke competitive responses and a negotiation of commercial risk between counterparties.

Another important policy context for the Port of Vicksburg to consider is the appropriate allocation of financial risk. For example:

- Which categories of port assets should private investors be at risk for providing, maintaining, and repairing versus those for which the public sector will be responsible?
- On what basis should user fees or subsidies be used to cover the cost of long-lived port assets and when is an appropriate transfer of such assets, depending on the development model pursued?

Of course, the above questions can only be answered within the context of a public authority's ability to raise capital, either through bonding activity, recurring revenue or state subsidy. Certain incentives or federal grants are also available, such as the US Maritime Administration's Port Infrastructure Development Program (PIDP).

The port's vision should also encompass other land transport reforms to ensure the complementary development of interconnected links in the transport infrastructure, which at least for the purpose of this report, is noted but not elaborated on in as great of detail as is envisioned in the ensuing Master Planning efforts, to be led by Jacobs.

Lastly, to initiate a comprehensive port expansion project, the legal framework that underpins the institutional arrangements of a transaction may require significant amendment, for example shifting from a short-term lease arrangement with Watco to a longer-term concession structure, if the incumbent is so inclined to support such investment as part of their ongoing business activity. In particular, prior to any major investment, particularly that which involves build-operate-transfer (BOT) arrangements, the Vicksburg-Warren Partnership and State, as required, should set out clearly the principles of the process and establishing the rules and responsibilities for each party.

Expansion which involves the relocating of some port activity or development of a new port area requires the completion of a number of complex transactions in connection with the ownership of assets or use rights. Transactions should be completed only after an elaborate preparation and due diligence process is undertaken.

Conclusion

Our analysis clearly reveals the existence of important markets for cargo trade and transport services that can benefit from an improved Port of Vicksburg. Most of these products and services have traditionally developed due to the strategic economic singularities of the state and the region; their related demand will continue to grow consistently in response to national and international trends. The business opportunities associated with these products and services will generate important traffic if they are located in the port's hinterland.

Therefore, a key observation is that these markets exist and are expected to grow independently of the port's enhancement or even its existence, as the development of cargo and corresponding logistics responds in great part to exogenous factors (national and international economic and trade trends). However, the Port of Vicksburg has strategic advantages (location, connectivity, presence of diverse industrial base, capacity to expand, etc.) to attract and nurture these opportunities. Materializing these opportunities will relaunch the Port and secure its position as a diversified regional cargo hub. Our report presents a thorough assessment of these opportunities and recommendations for institutional actions (including policies for allocating investment risks).



A second observation is that the envisioned Port of Vicksburg’s transformation and growth should rest its technical modernization and adaptability: the port will be a model port offering specialized and efficient services to all cargo types. Port handling for dry and bulk cargos is needed to complement industrial/private terminals and specialized container handling facilities and equipment are required to develop multiple business opportunities that will successfully exploit local resources and favorable logistics setting. A final observation relates to the business partnerships that the Port should develop with the private sector. The Port’s constant outreach to local/regional businesses have shaped and facilitated investments in the county. Similar efforts have to be intensified and partnerships have to be forged with cargo handling (port operators) and transport/logistics providers (rail) to improve service offerings and market the port to a broader business base.



Appendix A – Documents/Data Reviewed

Documents and Reports

- Port Series; USACOE, Institute of Water Resources, Navigation Data Center, 2006
 - Port Series No. 71: Memphis, TN; Helena AR; and Ports on Lower Mississippi River Miles 620-954 AHP;
 - Port series No. 72: Natchez, Vicksburg, and Greenville MS, and Ports on Lower Mississippi River Miles 255 – 620 AHP;
- Mississippi’s Unified Long-Range Transportation Infrastructure Plan, 2035 Multiplan, Mississippi DOT; Final Report; Appendix H: Port and Waterway Needs Assessment
- Strategic Master Plan, International Port of Memphis; 2019

Web Pages

<https://www.portofgreenville.com/port-commission/>
<https://www.irpt.net/map-location/port-of-greenville/>
<https://www.mswater.org/members/ports/mississippi-river-ports>
<http://www.worldportsource.com/ports/USA>
<https://mdot.ms.gov/ports/>
http://natchezinc.com/?/site_selection/transportation
<https://www.portofrosedale.com>
<http://portofmemphis.com>
<https://www.ttnews.com/articles/port-memphis-plans-public-terminal-overhaul-strategic-plan>
<https://www.watcocompanies.com/services/terminal-services/>
<http://ports.com/united-states/>
<https://www.portgbr.com>
<http://www.fullendock.com>
<http://portofmemphis.com/industry/fullen-dock-warehouse/>
https://ops.fhwa.dot.gov/freight/freight_analysis/faf/
<https://www.iwr.usace.army.mil/>
<https://usatrade.census.gov>

News Media

<https://www.unitedsoybean.org/article/east-coast-containerized-shipments-possible-for-u-s-soy>
<https://ajot.com/premium/ajot-two-projects-promise-to-boost-containerized-soybeans>
<https://www.ajot.com/premium/ajot-american-soybean-farmers-look-for-new-markets-and-fresh-ways-to-ship>
https://www.nola.com/news/business/article_2d19de5e-52ed-5809-83de-1e99c5e04edb.html
<https://www.1012industryreport.com/transport/plaquemines-port-edges-closer-to-lng-fueled-container-ships/>
https://www.joc.com/rail-intermodal/intermodal-shipping/mississippi-river-underutilized-container-shipping_20160310.html
https://www.joc.com/port-news/lower-prices-more-space-drives-us-soy-shippers-east-coast-ports_20180205.html



<https://www.manufacturedinmississippi.com/2016/08/01/mama-evolution-automotive-manufacturing-mississippi/>

http://www.epa.gov/oswer/iwg/pilots/docs/2005_0520_asphalt_formatted_final.pdf