BUSINESS PERSPECTIVES ON THE FEASIBILITY OF CONTAINER-ON-BARGE SERVICE

Alabama Freight Mobility Study
Phase I

Prepared for the

COALITION OF ALABAMA WATERWAY ASSOCIATIONS

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1.0 INTRODUCTION & PURPOSE

There are growing concerns about how our nation's transportation system infrastructure can best respond to growth in domestic and international trade. Policy makers in the United States Department of Transportation (US DOT) are beginning to focus more attention on the potential for waterborne transportation to provide valuable capacity for freight movement and to help relieve highway and rail congestion. The inland waterway system has unused transport capacity to accommodate higher volumes of freight movement without major investments in additional transportation infrastructure.

The Coalition of Alabama Waterway Associations (CAWA) received financial assistance from the US DOT to undertake a multi-phase project known as the Alabama Freight Mobility Study (AFMS). The purpose of the AFMS is to explore how efficient use of the transportation system, including waterways, can better enable US manufacturers and producers to be competitive in a global environment. The AFMS will also examine the potential for inland waterways to reduce highway congestion. The methodology includes analysis of freight movements in Alabama and the surrounding region using case studies, interviews and other research to develop information and economic strategies that have applicability to the transportation system in Alabama and throughout the United States. CAWA has retained Hanson Professional Services to assist in producing the AFMS.

The AFMS has one main section and four appendices:

- Business Perspectives on the Feasibility of Container-on-Barge Service
- Appendix A – An Inventory of General Purpose River Terminals
- Appendix B – Case Study of the Furniture Industry
- Appendix C – Case Study of the Montgomery, Alabama, Area
- Appendix D - Comparison of Costs for Maintaining Highway and Waterway Freight Transportation Systems

The intent of the AFMS is to frame the future actions that will be necessary to mobilize additional use of Alabama's waterway infrastructure. The AFMS report addresses the basics of international container trade, inland transportation and the State's waterway resources. The discussion of *Business Perspectives on the Feasibility of Container-on-Barge Service* explains the global container shipping process. Appendix A – *Inventory of General Purpose River Terminals* lists the general cargo capabilities among available inland river terminals in the study area. Appendix B – *Furniture Case Study* focuses on an industry cluster in the study region to review and test the application of Container-on-Barge (COB) transportation principles. Appendix C – *Montgomery Case Study* provides information to assess conditions in the Montgomery area with regard to development of a new river terminal or river port complex and to report on recent activities and opportunities. Appendix D – *Comparison of Costs for Maintaining Highway and Waterway Freight Transportation Systems* considers available data on highway maintenance costs using data generated by US DOT and compares that data to costs for operating and maintaining a waterway for moving a comparable quantity of freight between comparable origin/destination pairs.

This AFMS Phase 1 deliverable, *Business Perspectives on the Feasibility of Container-on-Barge Service,* provides important background information and analysis regarding waterway container transportation for those entities involved in enhancing Alabama freight mobility. A significant number of public and private sector organizations and businesses are involved in issues of freight mobility. One way to enhance mobility is to increase usage of the existing waterway infrastructure as a potential solution for projected growth of freight traffic on the highway and rail network. To achieve this objective, the inland waterway community must have a better understanding of the global logistics supply chain and those involved in moving containers must have a better understanding of inland waterway transportation.

Identifying ways to accommodate Alabama's increased container freight growth requires a basic understanding of the container transportation business. To address the issue and work toward solutions, interested parties most both understand the container freight market and translate that knowledge into workable plans that address commercial issues and needs.

Sections 2.0 through 6.0 of this document provide the basic knowledge necessary to advance solutions through sound business principles and cross discipline perspectives. Sections 7.0 and 8.0 use this information to identify opportunities for regional and local application.

Potential stakeholders in this effort represent a wide range of interests with varied freight transportation involvement. Public interest originates with those having responsibility to the taxpayer to a) identify the issues, b) evaluate solutions and c) channel necessary resources to beneficial programs as determined by thorough review. To achieve successful outcomes in the case for increased waterway freight movement, consensus must be reached among public entities that this is an achievable and attractive objective. These organizational entities include: CAWA members, inland ports, the Alabama State Port Authority, local and state economic development organizations and those federal, state and regional governmental subdivisions that address social impacts and public funding. As freight traffic increases, these government stakeholders must evaluate transportation system capacity, social and environmental impacts, energy consumption, and available labor, as well as significant future cost increases for maintaining highway and rail infrastructure.

Private sector business decisions play key roles in determining transportation choice, system efficiency and future opportunity. Private sector transportation service providers include: towing companies, freight forwarders, custom house brokers, shippers' interests, stevedore/terminal operators, ocean carriers and many varied service companies that support the freight transportation industry. The roles that these private sector businesses play in the movement of containers, specifically on the waterways, are not commonly understood.

This section of the AFMS describes the basic service requirements and needs for a successful container-on-barge business, as well as the customer requirements for successful service and how they can be satisfied. Following this overview, the AFMS proposes a Container-on-Barge (COB) business requirement directed toward the Port of Mobile and the Mobile Container Terminal.

2.0 CONTAINER FREIGHT GROWTH & ALABAMA IMPLICATIONS

Numerous institutions have produced forecasts and analyzed implications for world trade in the U.S. Gulf Coast region. These analyses indicate that container trade growth is—and will continue to be—a major opportunity for the State of Alabama and the Port of Mobile.

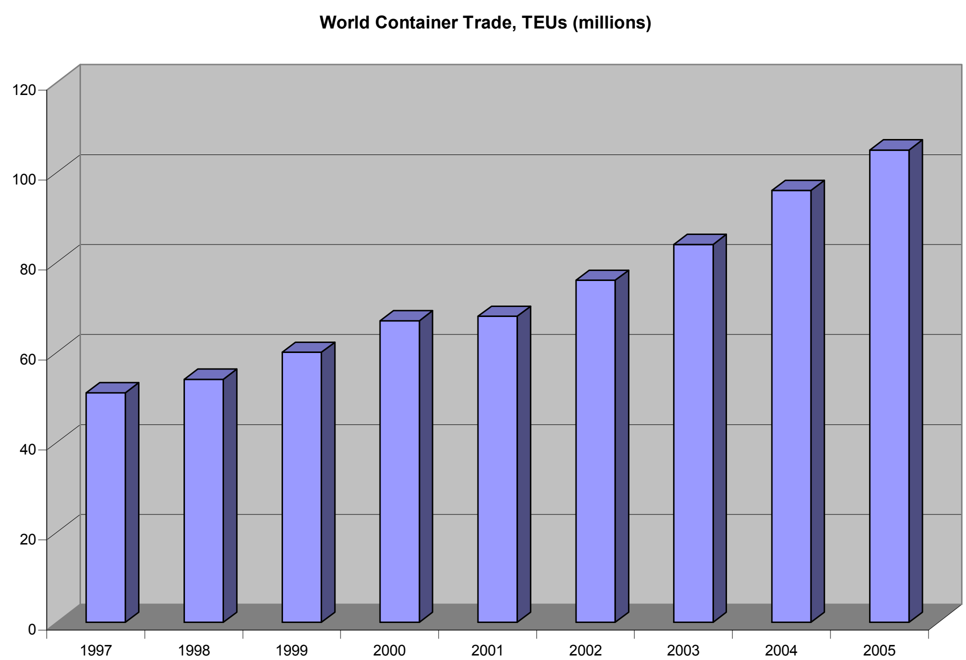
A brief review of major global and local economic factors confirms the magnitude of the freight mobility challenge and the need to identify solutions. The five principal factors that shape both the opportunity and the challenge are:

- Increased global container trade
- Expansion of the Panama Canal
- Creation of the Alabama State Port Authority
- Construction of the Mobile Container Terminal
- Constraints to regional container growth

2.1 Growth in Global Container Trade

The underlying principles of global trade are extremely complex. The most important event that has stimulated world trade growth within the past decade more than any other has been the acceptance of Asian nations, specifically China, into the World Trade Organization (WTO) as equal trading partners. Asia's recognition by the WTO has dramatically affected commerce in the United States. Studies show U.S. manufacturing sectors continue to relocate offshore, especially in China. This move has significantly boosted the growth of imported consumer goods shipped in marine containers. Global trade is expanding at a dramatic rate and the most spectacular growth is in the volume of containerized shipments.

Worldwide international trade is expected to at least double by 2020, but containerized freight is expected to nearly triple in the same time frame. Between 1997 and 2005, the number of twenty-foot equivalent units (TEUs) shipped per year in world container trade grew from 51 to 105 million, as shown in Exhibit 2-1.



Source: Transportation Journal, Summer 2005

Exhibit 2-1 – World Container Trade, TEUs (millions)

The forecast for a global container trade from 2004 to 2024 is for a 186% increase in the yearly shipment of containers to a staggering 243 million TEUs per year.

This rapid growth has serious implications for the United States. The U.S. transportation system now carries approximately 17 billion tons of freight annually, valued at more than $11 trillion. Domestic cargo volumes are expected to increase by almost 70% by 2020, as shown in Exhibit 2-2.

A major reason for this dramatic increase is a steady improvement of the U.S. economy coupled with the burgeoning new economies throughout the world. This economic activity stimulates the growth of U.S imports with increased domestic consumer demand but also improves the demand for U.S. exports; a significant volume of this trade growth and demand is projected to be containerized freight. The biggest U.S. overseas trading partners will likely continue to be the Asian nations of China, Japan, South Korea and Taiwan. (Canada and Mexico currently rank as our #1 and #2 trading partners.)

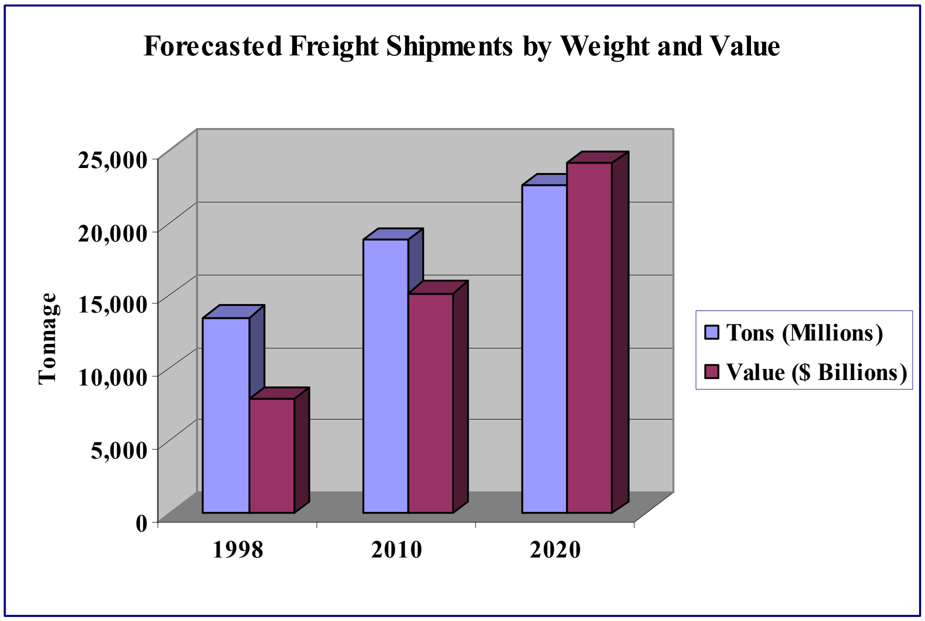


Exhibit 2-2 – Forecasted Freight Shipments by Weight and Value
(Source: U.S. Department of Transportation)

U.S. port capacity must increase if the United States is to accommodate this dramatic growth in containerized shipping from overseas. Traditional West Coast ports that have serviced our Pacific Rim trading partners will not be able to fully accommodate the forecast growth. Ocean carriers are rapidly introducing services to the East Coast and have recently turned their attention to Gulf Coast ports. The condition, reliability, and capacity of the Panama Canal are relevant factors in determining how the future growth will shape the Gulf Coast. The Panama Canal is critical to Gulf Coast transportation network because it provides the shortest route for Asian traffic. The Panama Canal also plays a necessary role in the continued growth of West Coast and South American trade traditionally moving through the Port of New Orleans.

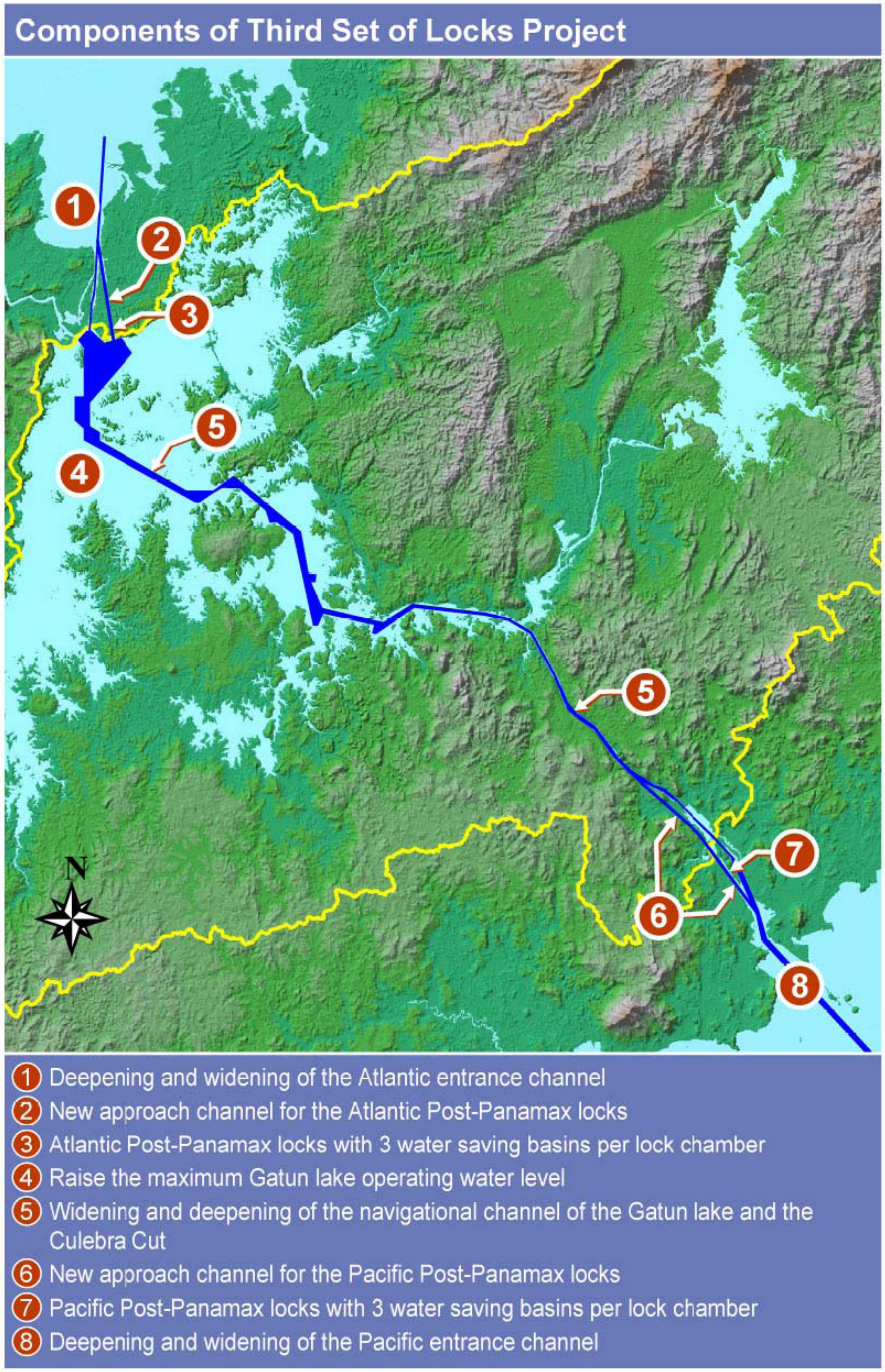
2.2 Panama Canal Expansion

The Panama Canal has remained substantially unchanged since its completion in 1914. U.S. rights to the Canal were turned over to the Panamanian Government on December 31, 1999 and it has since been operated by the Panama Canal Authority (ACP). In April 2006, the ACP announced a Panama Canal expansion proposal that entails adding a third lock system. The current locks are 108 ft. wide, accommodating vessels carrying 4,000 containers. The new locks will be 150 ft. wide, accommodating vessels carrying up to 10,000 containers. The expansion referendum was approved by a substantial margin by Panamanian voters on October 22, 2006. The project design will not only accommodate the large container ships of this generation, but will also incorporate improved environmental considerations. Completion of the Canal's expansion is scheduled for 2015.

The expansion of the Panama Canal, as shown in Exhibit 2-3, when considered in conjunction with current expansion plans at the ports of Mobile and New Orleans and the congestion on the East and West coasts, reinforces the logical assumption that Gulf Coast ports will continue to see ever increasing container volumes.

Trade flows through the Panama Canal to and from all points of the globe are illustrated below. As indicated by the largest lines, the greatest use of the canal is goods coming to or from Asia. The canal also serves as a gateway for European, Latin American, North American, and Australian trade as well.

Beside trade growth, increases in container shipping along the U.S. Gulf and Atlantic Coasts have been stimulated by West Coast labor relations. Labor issues surface from time to time which result in work slowdowns, strikes and lockouts. The most recent action shut down container handling on the West Coast in 2002 for ten days. The ten-day shutdown damaged the U.S. economy severely and resulted in major losses for most businesses dependant on Asian trade. Companies relying on imports made decisions to diversify cargo routing to include ports with other union affiliations in other geographic areas.



Source: Panama Canal Authority, April 2006

Exhibit 2-3 – Panama Canal Expansion Plans

The Port of Houston is the largest container port located on the U.S. Gulf Coast. It handled 1.5 million TEUs in 2005 and projections indicate traffic could increase to 6.2 million TEUs by 2020. It is apparent, even with Houston's expansion projects, that the ability to meet projected port container capacity needs will be severely challenged. As the map in Exhibit 2-4 illustrates, projected container growth is so dramatic that congestion is inevitable.

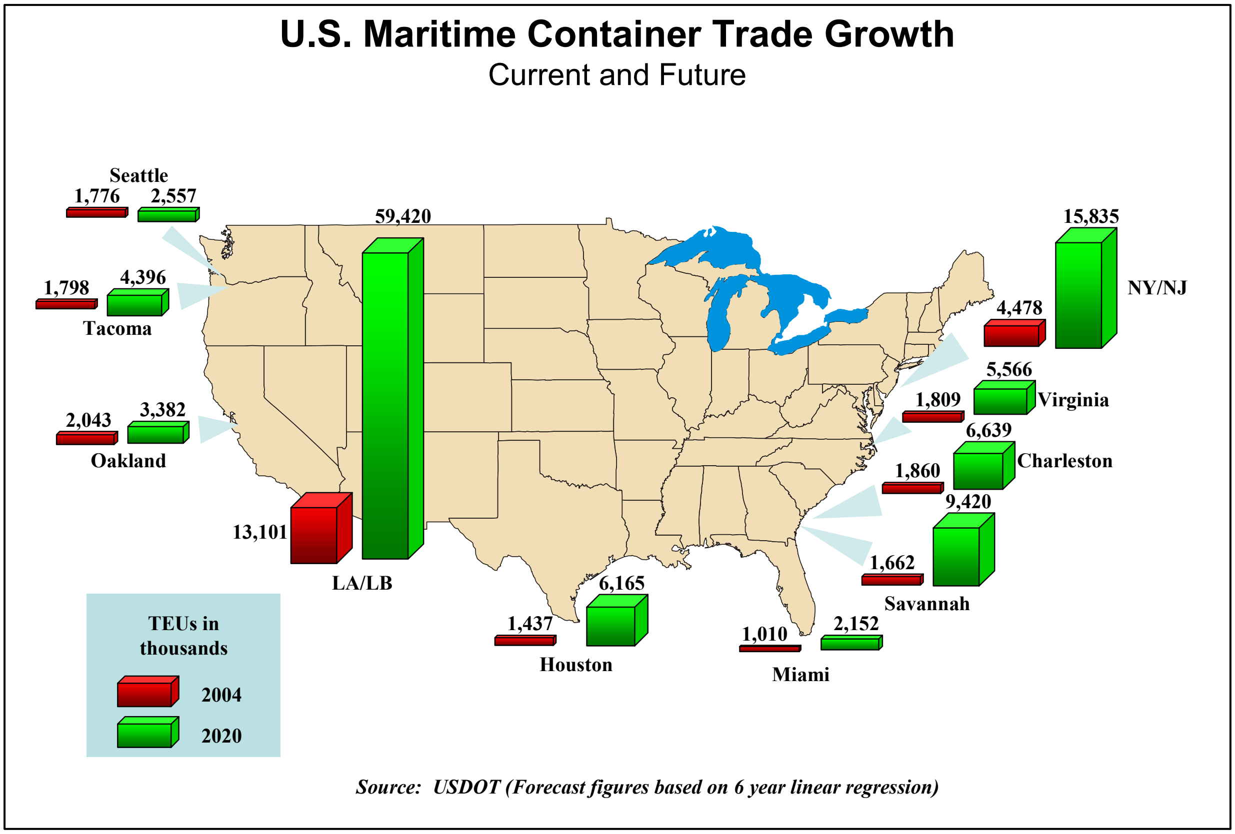


Exhibit 2-4 – U.S. Maritime Container Trade Growth

The State of Alabama, via the Alabama State Port Authority (ASPA) has initiated plans to capture a portion of the expanding global containerized shipping coming to the U.S. Gulf Coast.

It is important to note that unless containers arrive in the Gulf Ports of either New Orleans or Mobile, there is little chance of that cargo moving over the U.S. inland waterway system. (An exception, of course, is that containers arriving in Portland, Oregon, may move inland via the Columbia-Snake River system.) Like Houston, ports at both New Orleans and Mobile are in stages of aggressively expanding their capacity.

2.3 Alabama State Port Authority's Container Freight Opportunity

The State of Alabama and the Port of Mobile have a history tied to ocean shipping and ship services. The Alabama State Docks agency was first established by State law in 1920 and became operational in 1928. The Port of Mobile was operated under the administration of the Alabama State Docks. The Director for Alabama State Docks was appointed by the Governor and frequently changed with changes in political administrations. In 2000, the State of Alabama formed the Alabama State Port Authority (ASPA). Under this reorganization, the Governor appoints a Board of Directors composed of nine members who serve staggered terms, and the Board hires an Executive Director to run the organization. The ASPA is responsible for the Port of Mobile. This leadership structure helps maintain continuity of management making the organization better able to plan and implement improvements to take advantage of long term trends.

The timing of the reorganization was fortuitous as it coincided with the development of container freight opportunities for the Gulf Coast port community. The ASPA's management team seized the opportunity and commenced a forward thinking strategic repositioning plan for the Port of Mobile.

With a new Development Master Plan, the ASPA addressed several issues facing the port's future with new strategies:

- ASPA will partner in advancing commercial interests of the State
- World markets on the Gulf Coast and in the State are shifting to containers
- ASPA will secure infrastructure needed to capture new opportunities

ASPA management embarked on a series of actions to protect the port's existing markets, understand the broader role of marine transportation to enhance state opportunities, and capture a significant share of the container growth coming to the U.S. Gulf Coast.

2.3.1 The Mobile Container Terminal

The ASPA readily identified containerization as playing a significant role in the enhancement of regional economic growth; it provides the necessary gateway to international trade through the Port of Mobile. The construction of Phase 1 of the ASPA's Choctaw Point Container Terminal is a public/private venture between the ASPA and Mobile Container Terminal LLC, a private organization composed of the terminal operating subsidiaries of two ocean carriers, APM Terminals North America (a subsidiary of Maersk, Inc.) and Terminal Link (a division of CMA CGM). The facility is currently under construction with an anticipated completion in early 2008. The infrastructure of the container terminal will allow access to deep water, interstate highways, multiple Class 1 railroads and navigable shallow draft waterways.

The container terminal is near the interchanges for interstate highways I-10 East/West and I-65 North/South, important elements for effective truck distribution of containerized freight.

There will be an Intermodal Container Transfer Facility (ICTF) accessible by five Class 1 railroads, with adjoining acreage designated for value added distribution facilities. In addition, the Port of Mobile has direct access to nearly 1,500 miles of inland waterway connections. The full build out of the container terminal will accommodate 800,000 TEU container moves annually. The facility's ICTF and planned distribution acreage borders the Brookley Air Cargo Terminal resulting in future freight movement efficiencies.

2.3.2 Regional Container Freight Growth

The ASPA recognizes that other state agencies are actively marketing to domestic and international industries for new economic growth. Many of these targeted industries, such as the automotive industry, are heavily reliant on competitive import/export containerized freight for success. These objectives fit well with those of the ASPA developing a new container freight gateway at Mobile. The state's economic development efforts have proved successful, as evidenced by the number of automobile assembly plants now in the state. In addition to the ocean gateway, other transportation infrastructure will quite possibly need to be modified to accommodate the forecasted increased freight traffic. Alabama has already experienced increased highway congestion in certain areas of the state.

Research was initiated to examine the potential impacts to the State's transportation network. The University of Alabama in Huntsville (UAH) Office for Economic Development's 2005 Report to the U.S. Department of Transportation identified two findings that need to be addressed:

- Anticipated growth in major industry clusters will strain the existing infrastructure and potentially limit future growth.
- Because of its current industrial base, geographical location and its natural resources, Alabama has the potential to assume a major role in transportation, logistics and distribution as the freight gateway to Mid-America.

According to the UAH study, traditional traffic modeling forecasts based on historical trends may be inaccurate. The research suggests that it is necessary to examine growing industry clusters, such as the automotive and aerospace industries, and their related transportation requirements. The historical trend forecasting method simply looks at historical growth and then projects that trend into the future. That modeling technique does not take into account sudden growth in freight due to large, independent events, like a new automotive manufacturing plant or a new support facility to an existing aerospace plant. The research presented utilizes urban transportation planning models as a tool to model statewide freight transportation. This modeling takes input levels of transportation demand (trips produced from one area and trips attracted to another area) and transportation supply (in the form of roadways available to accommodate the trips) and predicts future traffic volumes. This modeling provides a tool to improve the ability to forecast freight transportation needs in Alabama. It proved to be superior to the historical trend line analysis because of its ability to account for plant openings and discrete changes in the industrial landscape of the state.

The results of this research indicate that the traditional method of forecasting Average Annual Daily Traffic (AADT) volumes may be lower by a factor ranging from 2.8 to 70.7% (on average 46.6%). The timing of discrete plant openings coupled with the opening of the Phase 1 facility of the Mobile Container Terminal could have a potentially detrimental effect both on Alabama's physical highway infrastructure and on freight mobility The research recommended that a systems approach be used to evaluate the transportation system and its infrastructure. By treating the system as a transportation network with interacting components and finding solutions, Alabama can serve the freight needs of its citizens and those of the surrounding region. The study also recognized that Alabama's waterways are an underutilized asset.

It is within this Alabama container transportation environment that alternative forms of inland freight service should be examined. The goal for an alternative transportation service should be to reduce cost and eliminate the public burdens of highway maintenance and capacity issues.

3.0 AN OVERVIEW OF CONTAINERIZATION

The issue of freight mobility in Alabama requires consideration of the increased transport of containerized cargo shipments. Containers are moved through the state intermodally via multiple modes of transport. These concepts of containerization and intermodalism are at the heart of any discussion of Alabama freight mobility. For this reason, it is necessary for involved parties to possess a working knowledge of containerization, intermodalism, and the terminology and characteristics of common container handling concepts. Stakeholders should be conversant in these topics in order to advance their respective positions in resolving freight mobility problems. This chapter is intended to define the 'jargon' of the containerized shipping industry and discuss opportunities for container-on-barge service on the Inland Waterway System.

The keys to understanding containerization are provided in four main topics:

- History of advancements in container standardization
- Description of container equipment and common characteristics
- Explanation of container ships and operations at the ocean port
- Understanding of container terminal operations

The container concept is discussed in the context of ocean shipping and terminal environment. However, these principles and concepts apply to inland facilities and transportation modes as well. It is important for the inland waterway community and other stakeholders to have a basic understanding of this information if the inland river system is to be used for moving containers. Shippers and the service providers engaged in containerized freight discuss issues in this framework and expect service quality measured by container standards.

3.1 History of Containers and Containerized Shipping

The idea of packing cargo in containers for transport to protect their contents and facilitate handling developed early and in many different forms. However, the father of the modern container concept is recognized to be Malcolm McLean, originally an owner of a trucking company. McLean came up with the notion of taking the body from a tractor-trailer with a standard dimension and placing it fully loaded on a ship. In 1956, McLean personally oversaw the loading of the converted tanker *Ideal X* with his containers. Thus began the movement of containerized freight as we view it today. Since then, containerization has revolutionized cargo shipping.

Not only has the volume of containerized shipping increased since its genesis in 1956, but the sophistication and intermodal approach with which it moves have also become fully integrated. Presently, containers can be tracked throughout their transit, thus providing real time delivery information to the shipper. As of 2005, 18 million total containers made over 200 million trips each year as they circulated in international trade.

3.2 Containers

Containers come in lengths varying from 20 ft. to 53 ft. mainly based on trade route, but the international standard includes three sizes: 20 ft., 40 ft., and 45 ft. The vast majority of the world container fleet is composed of 20 ft. and 40 ft. units. Other lengths of intermodal containers are typically used only for domestic cargos.

Container capacity is measured in twenty-foot equivalent units or TEUs. A TEU is a measure of containerized capacity equal to one standard twenty-foot unit. Standard container dimensions are shown below.

Type	Length	Height	TEU
20ft	20’	8’6”	1
40ft	40’	8’6”	2

Measurement in TEUs is useful in estimating how many containers (or equivalents, if of varied length) can be accommodated within a given space and when determining stacking arrangements. It is a particularly useful unit when measuring ship, terminal or unit train capacity for containers within finite vessel or area dimensions.

3.2.1 General Purpose Containers

A standard general purpose container is also known as a dry van (DV). The vast majority of containers in use today are DVs (approximately 85% of the total world container fleet). In fixed lengths of either 20 ft. or 40 ft., this standardization of DVs allows containers to be stacked and eliminates the need for unique handling equipment for every type of container. The construction of each unit typically is engineered to international standards sanctioned by the International Standards Organization (ISO) which sets specifications for stacking strength and for the corner fittings used by both shipboard securing (lashing) systems and by landside material handling equipment such as spreader lifting bars, container chassis and rail locking systems.

These containers represent 40' and 40 high cube on the left and 20' on the right

3.2.2 Other Types of Containers

In addition to the general purpose units, there are many other types of containers. For example:

OT – Open Top. OT containers are used for machinery and other heavy and bulky items that cannot be loaded through the door of the container. This type of container facilitates the top-lift for loading and unloading cargo. OTs may also have a tarp which is used to shield the cargo from the elements. Open top containers have the same frame dimensions as standard 20 ft. and 40 ft. containers so they can be stacked.

T – Tank. Tanks are sometimes loaded onto a drop frame chassis in order to: 1) lower the center of gravity, and 2) comply length-wise with bridge laws. As can be seen from the corner castings in this picture, a tank has the same frame dimensions as standard 20 ft. and 40 ft. containers.

FR – Flat Rack. FR containers may have fixed or collapsible end frames. They are used to haul oversized cargo. Flat rack containers have the same frame dimensions as standard 20 ft. and 40 ft. containers.

HC – High Cube. Pictured here on the left, HCs serve the same purpose as general purpose containers, but are one foot taller than the GP, at a height of 9'6". High cubes are not as common as standard-height containers because the difference in height affects stacking on a ship. HCs are available in lengths of 40 ft. and 45 ft.; 45 ft. containers are only available as high cubes.

Other specialty containers include curtain side, side door, refrigerated (reefers), and tanks with heaters. Specialty containers are used to allow irregular or oversized items that traditionally moved as bulk, break-bulk or project cargo to gain some of the advantages of being moved on container ships and intermodal systems.

It is important to recognize that these specialty containers are constructed in such a way to remain standardized in length and ISO corner fittings. For instance, a 45 ft container has the same corner fitting location and design as a 40 ft container. The standardization allows for the same material handling and securing equipment to be used on a 45 ft or 40 ft container.

3.3 Container Ships and Economies of Scale

Recent trends in container shipping confirm the correlation between the increase in global trade and container ship size. As global trade increases, so does the number of containers in transit. Ocean ship capacity is increasing for many reasons, one being an increase in the number of containers being shipped and another being economies of scale. Operating costs for larger ships is not a linear function related to TEU capacity. Crew cost, fuel and maintenance vary only slightly relative to increased vessel size. Capital investment is spread over many more units and the cost to build decreases on a per unit equivalent basis with larger container ships.

To put this trend in perspective, the first generation of container ships in 1960 carried approximately 1,700 TEUs. Today there are ships that measure almost a quarter mile long capable of transporting up to 14,000 TEUs (see Exhibit 3-1). An examination of the

	Panamax		Post Panamax	
Pre-1970	**1970-1985**	**1985-2000**	**2000-2010**	**Post-2010**
1,700 TEUs	2,300 TEUs	4,800 TEUs	8,000+ TEUs	13,000+ TEUs
<10 Boxes Wide	10 Boxes Wide	13-16 Boxes Wide	17 Boxes Wide	21 Boxes Wide
<30' Draft	33' Draft	44' Draft	48' Draft	44' Draft
450' Length	620' Length	900' Length	1,150' Length	1,350' Length

Source: The Virginia Port Authority

Exhibit 3-1 – Evolution of Container Ship Capacity

container fleet capacity of the top ten ocean carriers indicates the average vessel capacity is approximately 3,000 TEUs. There is a mixture of vessel sizes to accommodate the variety of world container trade routes from high volumes to low volumes. These companies are constantly redeploying vessels to adjust to different trading growth patterns. An example is the redeployment to serve the U.S. Gulf Coast via the Panama Canal with smaller vessels as discussed in Section 2.0.

Below is a table of the top container shipping companies and their total TEU capacities.

Top 10 Container Shipping Companies in Order of TEU Capacity

Company	TEU Capacity	Market Share	Number of Ships
A.P Moller-Maersk Group	1,665,272	18.2%	549
Mediterranean Shipping Co. S.A.	784,248	8.6%	299
CMA CGM	507,954	5.6%	256
Evergreen Marine Corporation	477,911	5.2%	153
Hapag-Lloyd	412,344	4.5%	140
China Shipping Container Lines	346,493	3.8%	111
American President Lines	331,437	3.6%	99
Hanjin-Senator	328,794	3.6%	145
COSCO	322,326	3.5%	118
NYK Line	302,213	3.3%	105

Barry Rogliano Salles

The increases in container numbers and vessel sizes bring with them a host of operating problems on the landside operation. Savings from ship economies of scale are severely compromised if the vessel's length of stay in port increases. The container terminal has the same economic challenges found with ships as it increases asset investment to improve terminal productivity. As reported in *American Shipper* (September 2006), North American container port capacity demand is expected to increase an average of about 78% above overall 2006 capacity by the year 2020.

3.4 Container Terminal Operations

A brief review of major container terminal operations, and the decision criteria for establishing them, is useful to inland port operators for addressing development and service issues. Ocean container terminals are dedicated facilities that require significant investment. Most container terminal infrastructure is built with public port funds. Port operations vary greatly depending upon the terminal's approach to operation, management control, public/private sector equipment investment and information technology. The decisions made by stakeholders associated with inland container terminal development follow the same basic logic as those made for an ocean terminal. The process is fairly consistent regardless of whether the facility is served by truck, rail, or waterside operations.

When developing a container terminal a sequence of decision criteria shapes the facility's eventual operating format. Those decision criteria include: design container volume or throughput, available property, relationship with ocean carriers (a chassis issue), and capital investment capacity. Once the decision criteria are in place, the fundamental operating format has to be chosen. The operating format is one of two basic choices: a wheeled operation where all containers will be on chassis, or a grounded operation with virtually all containers stacked except when moving in or out.

Grounded operations need less land but also require more expensive terminal equipment. Wheeled operations need more land, but since containers rest on "wheeled" chassis until they leave the terminal, they do not require as much terminal equipment. In the U.S., ocean carriers have generally been responsible for providing chassis to service their containers. A terminal's decision on the operating format best suited for its needs must consider issues such as available space and expected growth.

3.4.1 Grounded Operations

In terms of capacity, grounded operations place more containers per acre than wheeled operations. Grounded operations also require fewer chassis as wheels are necessary only when the container is moving to or from the facility. Grounding and mounting containers with chassis requires specialized material handling equipment to prevent damage to the container and contents. Specialized container handling equipment is heavy and therefore investment in the load bearing capacity of the terminal storage yard must also be made. Ocean carriers insist on proper equipment.

In marine or rail operations, containers can be transported between the dock or rail ramp and the storage area on special trailers equipped with guides that allow the container to be quickly loaded. These special trailers are rugged and sometimes called "bomb carts." Intra-terminal container movement by chassis or bomb cart is performed by a short, powerful, maneuverable truck with a hydraulic fifth wheel. The vehicle is called a yard jockey, yard dog or yard hostler.

3.4.2 Wheeled Operations

Wheeled operations require a chassis for every unit on the terminal being handled by a trucker for pickup or delivery. This operation has fewer units per acre as every container is parked on a chassis. Investment in material handling equipment is reduced, and the investment in the terminal storage yard is generally lower as well.

A wheeled operation could be used for a low-volume facility. In wheeled operations, the container is unloaded from the vessel or railcar and loaded directly onto a truck chassis. Containers are moved to and from storage locations by a yard hostler. The container stays on the chassis until it is returned to the facility or the container is shipped out again by rail or water. Chassis expense can become significant, but a lessor of chassis equipment can offer alternatives to ownership.

3.4.3 Gate Control & Equipment Interchange

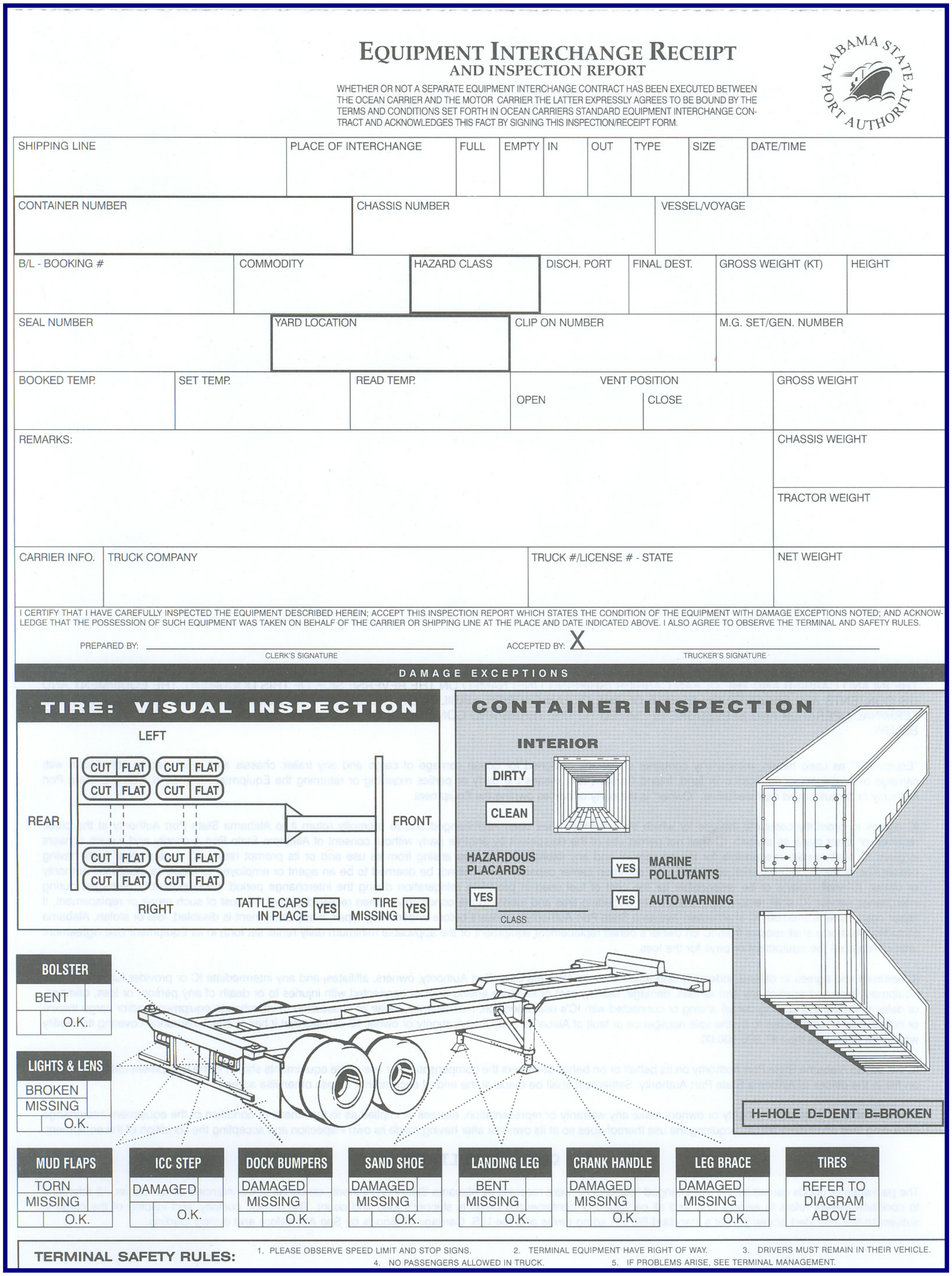
Container terminals have an obligation to control entry and dispatch of containers and chassis. This activity is called gate control and/or equipment interchange. Several activities take place during this function: verification of documents to insure the transaction is authorized by the ocean carrier, inspections to validate condition when the container/chassis is turned over for transportation, security applications, and final release by government and ocean carrier agents to complete the process.

All ocean carrier equipment requires a visual inspection when moving through a gate. A document, called an Equipment Interchange Receipt or EIR, is prepared at that time of gate move. The EIR is completed by a terminal clerk and signed by the truck driver to confirm the information. The EIR contains specific information such as:

- Ownership of the equipment, cargo and responsible party for charges.
- Identification of equipment type, cargo, and weight, as well as any exceptions.
- Date and time of transaction and detailed equipment condition at the time.
- Origin and destination of the equipment and cargo.
- Name of trucker, rail carrier and/or the water service transporting the container.

Exhibit 3-2 is a copy of an EIR, which is the source document used by the Alabama State Port Authority for input into the terminal management system data base.

Trucker acceptance of the EIR acknowledges that the driver is satisfied that the interchanged unit is in compliance with all Federal Motor Carrier Safety Administration (FMCSA) requirements for safe transport on the highway. Deficiencies noted on the EIR or anything the driver determines is not acceptable per FMCSA requirements must be resolved prior to interchange completion, including all issues involving normal wear and tear. Most terminals have a process for resolving equipment maintenance issues. Standards exist for the



EQUIPMENT INTERCHANGE RECEIPT
AND INSPECTION REPORT

WHETHER OR NOT A SEPARATE EQUIPMENT INTERCHANGE CONTRACT HAS BEEN EXECUTED BETWEEN THE OCEAN CARRIER AND THE MOTOR CARRIER THE LATTER EXPRESSLY AGREES TO BE BOUND BY THE TERMS AND CONDITIONS SET FORTH IN OCEAN CARRIERS STANDARD EQUIPMENT INTERCHANGE CONTRACT AND ACKNOWLEDGES THIS FACT BY SIGNING THIS INSPECTION/RECEIPT FORM.

ALABAMA STATE PORT AUTHORITY

SHIPPING LINE	PLACE OF INTERCHANGE	FULL	EMPTY	IN	OUT	TYPE	SIZE	DATE/TIME

CONTAINER NUMBER	CHASSIS NUMBER	VESSEL/VOYAGE

B/L - BOOKING #	COMMODITY	HAZARD CLASS	DISCH. PORT	FINAL DEST.	GROSS WEIGHT (KT)	HEIGHT

SEAL NUMBER	YARD LOCATION	CLIP ON NUMBER	M.G. SET/GEN. NUMBER

BOOKED TEMP.	SET TEMP.	READ TEMP.	VENT POSITION OPEN	CLOSE	GROSS WEIGHT

REMARKS:	CHASSIS WEIGHT
	TRACTOR WEIGHT

CARRIER INFO.	TRUCK COMPANY	TRUCK #/LICENSE # - STATE	NET WEIGHT

I CERTIFY THAT I HAVE CAREFULLY INSPECTED THE EQUIPMENT DESCRIBED HEREIN; ACCEPT THIS INSPECTION REPORT WHICH STATES THE CONDITION OF THE EQUIPMENT WITH DAMAGE EXCEPTIONS NOTED; AND ACKNOWLEDGE THAT THE POSSESSION OF SUCH EQUIPMENT WAS TAKEN ON BEHALF OF THE CARRIER OR SHIPPING LINE AT THE PLACE AND DATE INDICATED ABOVE. I ALSO AGREE TO OBSERVE THE TERMINAL AND SAFETY RULES.

PREPARED BY: ______________ CLERK'S SIGNATURE   ACCEPTED BY: X ______________ TRUCKER'S SIGNATURE

DAMAGE EXCEPTIONS

TIRE: VISUAL INSPECTION

LEFT
CUT FLAT CUT FLAT
CUT FLAT CUT FLAT
REAR FRONT
CUT FLAT CUT FLAT
CUT FLAT CUT FLAT
RIGHT
TATTLE CAPS IN PLACE YES
TIRE MISSING YES

CONTAINER INSPECTION

INTERIOR
DIRTY
CLEAN
HAZARDOUS PLACARDS YES ______ CLASS
YES MARINE POLLUTANTS
YES AUTO WARNING
H=HOLE D=DENT B=BROKEN

BOLSTER: BENT / O.K.
LIGHTS & LENS: BROKEN / MISSING / O.K.
MUD FLAPS: TORN / MISSING / O.K.
ICC STEP: DAMAGED / O.K.
DOCK BUMPERS: DAMAGED / MISSING / O.K.
SAND SHOE: DAMAGED / MISSING / O.K.
LANDING LEG: BENT / MISSING / O.K.
CRANK HANDLE: DAMAGED / MISSING / O.K.
LEG BRACE: DAMAGED / MISSING / O.K.
TIRES: REFER TO DIAGRAM ABOVE

TERMINAL SAFETY RULES: 1. PLEASE OBSERVE SPEED LIMIT AND STOP SIGNS. 2. TERMINAL EQUIPMENT HAVE RIGHT OF WAY. 3. DRIVERS MUST REMAIN IN THEIR VEHICLE. 4. NO PASSENGERS ALLOWED IN TRUCK. 5. IF PROBLEMS ARISE, SEE TERMINAL MANAGEMENT.

Exhibit 3-2 – Equipment Interchange Receipt

maintenance and repair of container/chassis equipment. Maintenance and repair guidelines are determined by the Institute of International Container Lessor (IILC), a trade organization for the container and chassis leasing industry.

3.4.4 Terminal Equipment

Selection of a container terminal operating format dictates the equipment choices made necessary by the facility's selection of either a grounded or wheeled operation. Various choices exist when considering the specific type and manufacture of material handling equipment. For the inland terminal, it is sufficient to understand the basic differences in equipment type in order to be conversant on the topic with suppliers and ocean carriers.

Crane
Perhaps the most rudimentary of the terminal equipment, a crane is a tower or derrick equipped with cables and pulleys that is used to lift and lower materials. Cranes are used to load or discharge marine vessels.

Gantry Crane
The gantry crane lifts objects by a hoist which is fitted in a trolley and can move horizontally on rails fitted under a beam. They are designed to lift very heavy loads.

Spreader
The spreader is a device for hoisting containers. Attached to a crane, it serves to stabilize the container to prevent shifting or unsettling of contents.

Rubber-Tired Gantry

A rubber-tired gantry picks up containers beneath the machine and moves them around the container facility. The containers are stacked in rows, and this equipment allows for very dense storage which enhances the utilization of valuable port property.

Container Handler
This machine is capable of stacking loaded and empty containers. However, its vertical lift prohibits from stacking in any row other than the front row.

Container Reach Stacker
A container reach stacker is more versatile than the container handler as it can reach over containers where the container handler would have to move the containers in front before it could lift the second or third row of containers.

Hydraulic Fifth Wheel Truck
The hydraulic fifth wheel truck is a short, powerful, highly maneuverable truck that can quickly hook to a trailer and lift the trailer with its hydraulic fifth wheel. This allows the driver to move the trailer without getting off the truck to roll up the landing gear.

Bomb Cart
In some grounded operations the transportation of container to and from the storage area is done on special trailers with guides so the container can be quickly loaded to the trailer. These trailers are sometimes called "bomb carts." Bomb carts have no twist locks so the containers can be quickly loaded and unloaded.

Container cranes at large ocean terminals are highly specialized with single purpose functionality. They are built with high profiles and outreach from the dock to accommodate the ship size the facility is designed to serve. These cranes operate with high speed and sophisticated control technology. The concepts for loading/unloading a marine vessel, commonly called stevedoring, are basically the same for container operations of any size. The crane equipment selection is the primary difference.

Handling containers to and from barges at a low volume facility can be accomplished through the use of a traditional crane similar to ones commonly used for heavy breakbulk operations. For example, Dock #2 at the Port of Mobile uses a Gottwald crane with a container spreader attached. Crawler or truck cranes can also suffice. Many inland facilities, such as those at Florence, Alabama, and at Columbus and Fulton, Mississippi, utilize highly productive bridge cranes. A container spreader can attach to a crane much like other spreader attachments and can come with manual functionality or in varying levels of automation.

3.5 Inland Port Operations

Containerization has evolved over the past 50 years and has changed the way cargo is shipped around the world. The container has become the preferred method of general freight transport.

Inland container operations may run the gamut from the very complex to the very simple. Successful inland operation requires a working knowledge of the different elements of containerization including: containers, operating format, terminal equipment and general terminal obligations. Adapting operations to fit into the container concept will be essential to accommodating global trade opportunity.

Container Terminal at Lewiston, ID

4.0 UNDERSTANDING GLOBAL CONTAINER SHIPPING

Global container shipping is a complex business system that requires a highly organized network of service providers. This section should serve to clarify the global container shipping process by identifying the parties involved, broadly describing the typical relationships between those parties, presenting a step-by-step outline for the process of importing containerized freight, and illustrating the flow of payment for a given transaction. With this knowledge, those trying to augment existing shipping operations with Container-on-Barge (COB) will be able to address the effort with an effective strategy, be conversant on the topic of alternatives and establish credibility with the service providers affected.

4.1 Identifying the Parties

Parties involved in the global container shipping process perform various functions that are organized to facilitate the movement of goods. A general understanding of the primary roles of each of these parties is necessary to identify potential users of a COB inland service.

i. **Factory** – The factory manufactures, assembles, and/or packages the goods for the shipper and alerts the shipper or shipper's agent that it has a shipment ready. The shipper's agent can be a freight forwarder, a third-party logistics (3PL) provider or a consolidator whose task is assembling a shipper's numerous smaller shipments together for a single, larger containerized shipment.

ii. **Consolidator** – The consolidator acts as an agent for the shipper, managing cargo flowing from factories to ocean-going vessels. The consolidator reserves space for cargo on the vessels, coordinates the on-time delivery to the origin port and manages the consolidation into a container at the port for shipment.

iii. **Customs Broker** – The customs broker's main function is to clear goods into the commercial territory of the United States. Customs brokers are licensed by the U.S.

Treasury Department. Many customs brokers offer additional services within their business organization much like a freight forwarder or 3PL firm.

iv. **Freight Forwarder** – A freight forwarder arranges services for shippers and frequently acts as the shipper's agent. For instance, a shipper may request a quote for a shipment originating in Shanghai, China to be delivered to an inland destination in the U.S. The freight forwarder can put together a price for the entire move as a package and control every aspect of the transportation process. Freight forwarders can be involved at varying stages of the process and services can be tailored to the shipper's particular need. Additional services offered by Freight Forwarders can replicate services performed by Customs Brokers and 3PLs

v. **Third-Party Logistics Provider (3PL)** – Much like a freight forwarder, the 3PL provider can provide services similar to a freight forwarder but with more options, such as end-to-end supply chain solutions. The 3PL can manage purchase orders, customs clearance, warehousing, product fulfillment, and other similar services. These services can be packaged to suit, giving flexibility to the level of involvement of the client and provider. Trends in certain industry segments have 3PLs contracted to act as a shipper's logistics department.

vi. **Ocean Carrier** – The ocean carrier is the steamship line. The main function of the ocean carrier is to provide the service of physically transporting the container from origin to destination. In containerized shipments the terms of ocean carrier transport responsibility frequently extend to inland pickup and delivery locations. Typically, the ocean carrier will deal directly with large shippers, but other situations may involve utilizing a freight forwarder, 3PL or other related third party. Freight forwarders generally are found to have strong, long-term relationships with ocean carriers.

vii. **Non-Vessel Operating Common Carrier** – A Non-Vessel Operating Common Carrier (NVOCC) books large quantities of space on steamships at volume incentive lower rates and re-sells the space to shippers in smaller amounts. NVOCCs consolidate small shipments into container loads that move under a single bill of lading. Usually small volume shippers can achieve reduced rates with NVOCCs not achieved when dealing directly with ocean carriers. Services typically offered by NVOCCs, in addition to customary services provided by freight forwarders, include consolidation of freight, and financial liability for goods due to loss or damage during transport. NVOCCs legally operate as carriers in all transport respects without operating the ships themselves. The Federal Maritime Commission (FMC) oversees the commercial activity of NVOCCs.

viii. **Port** – The port fills a vital role in the supply chain. Ports often provide the land, facilities, infrastructure and major equipment to unload and load ships. The port authority is typically an autonomous public entity that contracts with a private firm to operate a terminal within the port's jurisdiction or may choose to operate the facility itself.

ix. **Intermodal Provider(s) or Inland Carrier** – The intermodal provider or inland carrier can be a combination of entities. The combination of entities can conduct container transport between ocean ports and inland locations by way of truck, rail and/or water transportation modes. For example, a container can be transported via rail from the Los Angeles/Long Beach (LA/LB) port complex to an inland yard. From there, a truck will make the final delivery. In other scenarios, one mode will carry the cargo from port to final destination, e.g., truck service from the port to the customer's door.

4.2 Understanding the Relationships Between Parties

Relationships between the above parties and the shipper range from being very simple to extremely complex. As an example of a simple relationship, a shipper can use a freight forwarder or 3PL company to manage all aspects of shipping or supply chain requirements. Examples of such companies are APL Logistics, Maersk Logistics and DHL. These providers offer a package of services and manage the information and processes required to move a container from origin to destination.

Alternately, a shipper may opt to use separate entities for these processes. For example, a shipper could use a consolidator such as MOL Logistics to manage the consolidation of shipments from various suppliers and arrange the loading of containers onto the vessels. The shipper could also directly contract and execute bookings, with various carriers to ensure competitive rates are maintained. Shippers do this in order to capitalize on large volume incentives or to meet specific schedule offerings. These relationships can be assembled in many different ways. It is ultimately up to the shipper to decide how these relationships are structured. Carriers, however, normally do business directly with only those shippers which book large volumes of business.

4.3 Understanding the International Containerized Shipping Process

Many individual parties can be engaged in the international container shipping process. Services can be contracted independently or packaged together in various ways to meet the needs of the shipper. There is, however, a process that occurs in executing the movement of a container in the international trade arena. Regardless of the service relationship arranged, the process of importing containerized freight typically includes the following steps:

a. Shipper issues an order to a factory for product.
b. Factory contacts the shipper's agent to make product delivery arrangements.

c. Product becomes a booked shipment, and is loaded in a container for delivery to a vessel.
d. Ocean Carrier transports the container from one coastal container port to another port.
e. Customs Broker clears the container's cargo through Customs and/or another third party issues a delivery order to the intermodal provider(s).
f. Intermodal provider(s) transports the container/cargo to its final destination and completes delivery to the shipper and returns the empty container.

The above process of events describes an import scenario. Similar complexities exist in an export scenario, particularly in the movement from inland origins to the ocean ports. The only functional third party not engaged directly in the export process is the customs broker.

4.4 Tracking the Flow of Payment

It is important to understand the normal process for payment of services which takes place in a container shipment. Service providers are most responsive to the party that is responsible for issuing payment. From the shipper's perspective, payment for global container shipping services is more user-friendly than most breakbulk inland barge shipments.

For a global container move, payment can be as simple as paying one bill to a freight forwarder or 3PL provider for the entire container move from origin to destination. The carrier does not typically extend credit; therefore, payment usually is made prior to a container being released from the destination ocean port terminal. Many times, as shown in Exhibit 4-1, the customs broker, chosen by the shipper, will extend payment to eliminate delays and extra work on the shipper's behalf. The ocean carriers often offer "all-in" rates generally described under the through bill of lading that, in addition to transport on the ship, include all costs from loading the vessel at the port of origin, unloading the vessel at the port of entry, all associated port charges, movement of the container by the intermodal provider, the intermodal inland transportation and the ultimate delivery to the destination. Through bill of lading terms also cover the repositioning of empty container equipment. This eliminates the complexity and need for the shipper to pay each individual party of these services directly. This format increases shipment reliability by reducing risk of transit time delays and permits the ocean carrier to leverage its controlled volume for better rates.

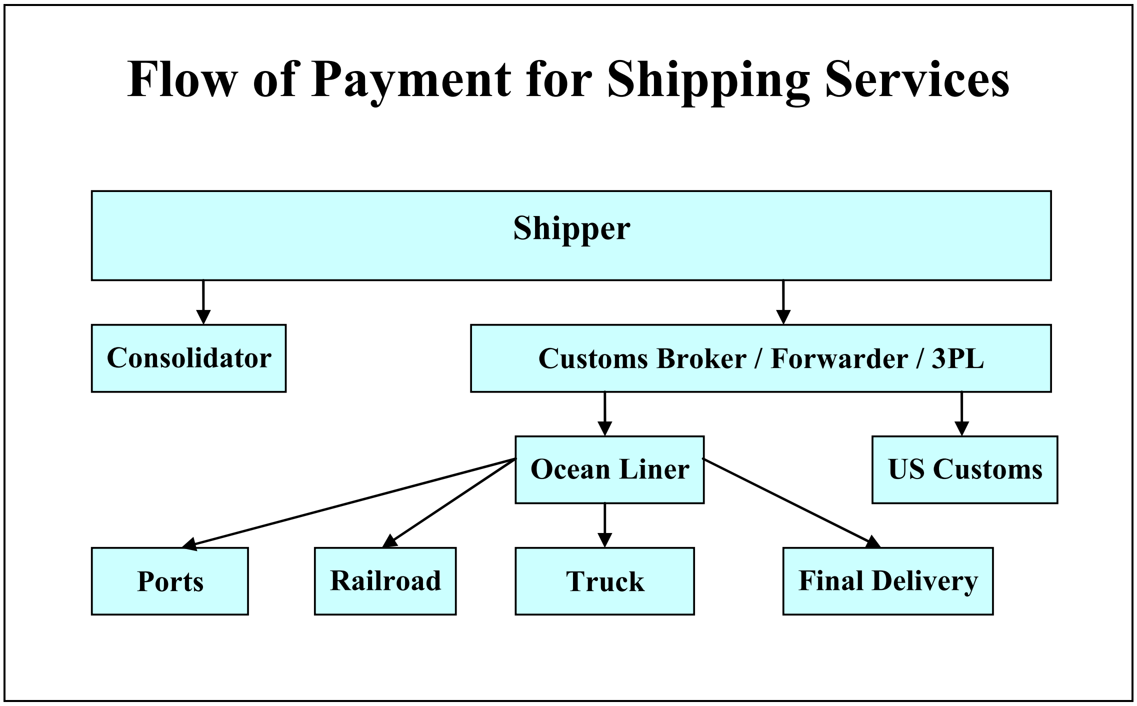


Exhibit 4-1 – Flow of Payment for Shipping Services

In contrast, it is possible for a typical domestic breakbulk shipper using inland barge transport to pay as many as five different entities on a given cargo movement, as shown in Exhibit 4-2. For example, payments may be made to:

- Truckers to deliver cargo to a river port.
- Port/stevedores for handling the cargo and loading the barge.
- Inland towing companies for transportation cost of pushing barge to inland port.
- Port/stevedores for unloading and handling the cargo at the destination port.
- Truckers to move the cargo to its final destination.

This business practice creates a significant amount of work for the shipper. Furthermore, the opportunities for service failures through the various stages of commercial custody are increased.

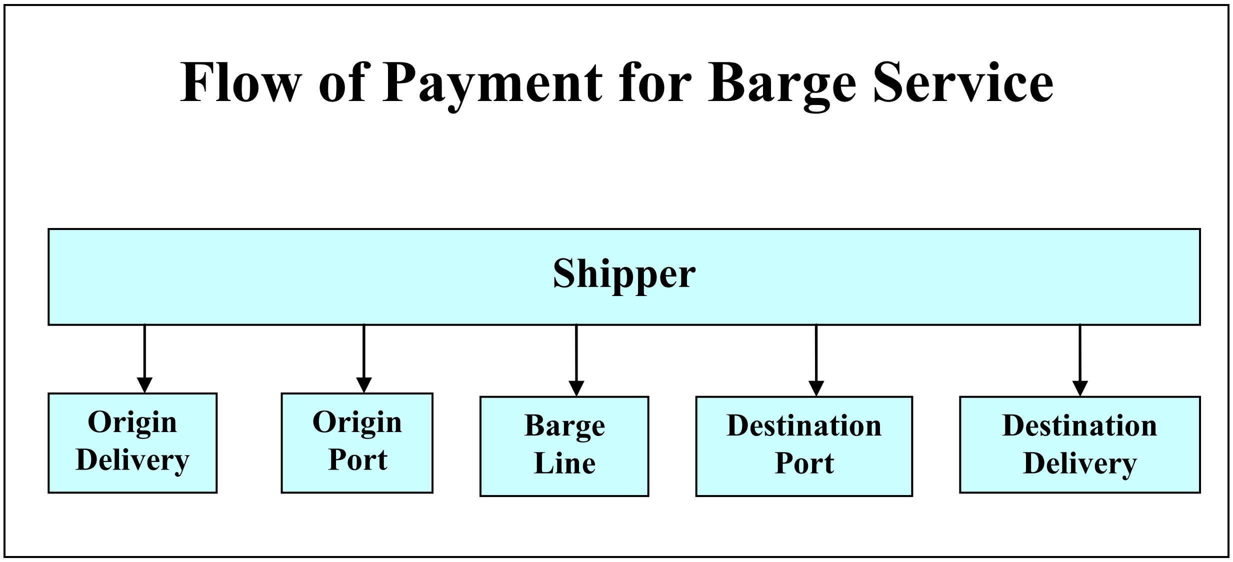


Exhibit 4-2 – Flow of Payment for Barge Service

An opportunity exists for COB to participate in the global container shipping process. The COB role can only be understood within the context of the current global container shipping cycle with its numerous parties and mature transaction process. Several parties are involved in the international container shipping process, and the relationship between them and the shipper is frequently complex.

There are six basic steps to the business of importing containerized freight; however, the payment for these services has been simplified for the shipper. Historically, payment for services to a traditional domestic barge freight movement can be quite fragmented. The comparison of these two service payment approaches and the fact that truck and rail accommodate the container shipping format indicates barge lines must also adapt to the container shipping format. This requires a simplification in the number of parties a potential

COB user must contact to arrange logistics. Initially this seems difficult given the long history of inland waterway barge transportation. However, the entire process is much less daunting when it is understood which parties are integral to any given transaction and COB, as a new opportunity, presents advantages for all.

5.0 CUSTOMER TRANSPORTATION SERVICE PRIORITIES

A survey of container shippers, freight forwarders, and carriers was conducted during Phase 1 of the AFMS. One objective of the survey was to identify transportation service priorities. From these data a transportation opportunity can be analyzed and structured to meet these priorities. Sensitivity toward specific service objectives will permit a new business to appeal to the appropriate shipper's values and priorities. Three distinct survey goals were established:

- Prioritize shipper issues of importance
- Identify a target market for potential COB
- Determine areas of customer service preference and disappointment

The survey was conducted by a team consisting of the executive directors of the following organizations, as well as employees of Hanson:

- Coosa-Alabama River Improvement Association
- Tri-Rivers Development Association
- Tennessee River Valley Association
- Tennessee-Tombigbee Waterway Development Council
- Warrior Tombigbee Development Association

The association directors primarily surveyed shippers. Hanson surveyed shippers, carriers and freight forwarders.

5.1 Container Volume in Study Area

Of the shippers surveyed, 65% handle fewer than 500 containers per year and 95% handle fewer than 5,000 containers per year. The 5% that handle more than 5,000 containers annually average over 11,500 containers per year.

Annual Container Volume	
1-100	30%
101-500	35%
501-1000	17%
1001-5000	13%
5000+	5%

Results of the survey show that there are a few companies identified that handle a very large number of containers. If service is established at the Port of Mobile, then an opportunity could exist for a COB service to retain one or two large consumers of containerized freight and fill the remaining spaces with containers from smaller shippers in the same market area. The key to this strategy is to realize the benefits of economies of scale and ship as many containers as possible each time a barge sails.

5.2 Service Priorities

The results of the shipper survey indicate that reliability is the factor responding shippers deemed most important, as shown in Exhibit 5-1. When asked their highest shipping priority, 48% of respondents reported reliability, 37% cost, and 15% transit time. These responses suggest that an alternative transportation option need not be faster or cheaper. The alternative must ultimately be reliable and remain competitive with other modes.

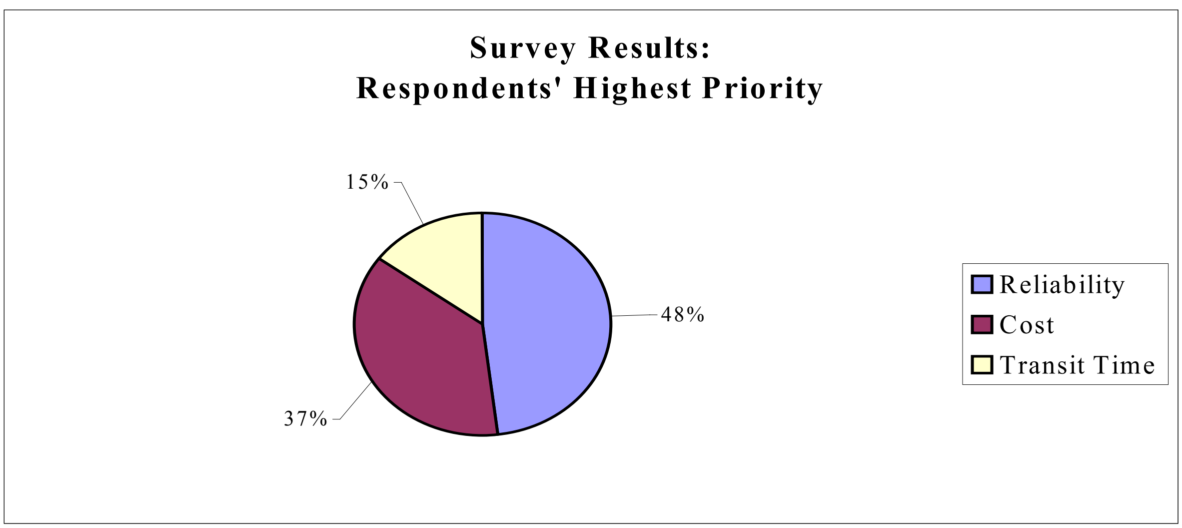


Exhibit 5-1 – Survey Results: Respondents' Highest Priority

48% of the shippers surveyed listed reliability as their highest priority over cost and transit time. Reliability means that the shipments are predictable and scheduled. The survey results indicate that frequently a company will choose a service that is reliable over a service that is of lower cost and is not predictable. In today's trend toward "just-in-time" (JIT) delivery scheduling, knowing when containers will arrive is a sensitive management variable. It is unlikely that cost savings will overshadow a perceived risk of lost productivity or lost revenue caused by delivery disruptions.

It is noteworthy that 37% of the shippers responding indicated that cost is their highest priority. Upon additional analysis, this figure may indicate the price sensitivity of a specific industry.

Only 15% of respondents listed transit time as their highest priority. To some extent, this is counter to the argument that barge transport is "too slow" for moving containers. Transit time may be a sensitive issue as barges are slower, but the transit times for all segment modes of the container movement must be added together to determine overall days in transit.

The survey indicates that shippers identify reliability to be their highest priority. These results beg the following questions, then: 1) How reliable is current service? and 2) What advantages can COB offer?

56% of responding shippers indicated they had at least 90% "on-time" shipment reliability and all had reliability of at least 75% "on-time." This is a weak performance relative to transportation goals expressed by most logistics managers. With approximately 44% experiencing below 90% on-time performance, COB with reliable service may be very competitive.

5.3 Other Observations

In addition to the identification of shipper priorities, survey analysis also revealed some interesting trends among the shippers, carriers, and freight forwarders contacted. In regard to the feasibility of COB, two issues must be addressed. One is the issue of weight and capacity. The other is the issue of third party usage.

Decision makers selecting the appropriate transit mode for a given cargo must take into consideration the matter of weight and capacity. Containerized cargo can reach its maximum capacity in one of two ways:

- *"Cube out."* This term is used in the industry to describe a container which is fully loaded by volume.
- *"Weigh out."* This term is used to describe containers which are loaded to capacity by weight before they "cube out." Therefore, if there is some space remaining for cargo, loading the container to its full volume would exceed structural weight limits of the container and/or the legal and safe operating limits of the vehicle(s) that transport it.

Survey analysis revealed that 45% of shippers "weigh out" meaning that their shipments meet weight limits before volumetric capacity is reached. These findings may represent an opportunity for COB operation to offer over-weight container transport service. Shippers pay for the use of a container whether they fill it or not. Offering a COB service will allow 45% of shippers the ability to load their containers to a weight higher than limits imposed for over-the-road transport.

As discussed in chapter 4, many manufacturers choose to employ a third party to coordinate logistics services. The survey produced the following results:

- 34% of the respondents indicated that they use a third-party logistics provider (3PL). Targeting a COB service to this type of entity is warranted due to the large proportion of those responding that they use a 3PL.

- Respondents indicated an overwhelming use of freight forwarders (66%). This indicates that many of the shippers surveyed depend on a freight forwarder to coordinate and package logistics services for them. Much like a 3PL, this would be a very strong target for marketing a COB service. Freight Forwarders can, in effect, act as selling agents of the service, offering it as an intermodal option to their customers.

- 52% of respondents report using an autonomous customs broker. A customs broker provides stand-alone customs clearance services and can also be used in the same manner as a freight forwarder. Although their volumes of freight handled are typically lower than a freight forwarder, customs brokers could be targeted in the same manner as a freight forwarder.

Feasibility for a successful COB service depends on its ability to address shipping priorities as identified by the survey. COB could present advantages over existing intermodal transportation options by allowing shippers to fully utilize container volume without regard to over-the-road weight limits. Shippers are utilizing third parties for their logistics and supply chain functions. A potential COB service should respond to this trend to effectively market its service.

6.0 UNDERSTANDING THE BARGE BUSINESS TODAY

In the early 1920's Congress mandated the U.S. Army Corps of Engineers (USACE) Lower Mississippi Division and Warrior Division, under the Secretary of War, to initiate inland water service between Mobile and Birmingham, AL. From these early days, the expansion and modernization of the system into 1,400 miles of waterways serving Alabama and the Port of Mobile has produced an efficient transportation network (Exhibit 6.1).

6.1 Inland Barge Transportation Characteristics

As part of the systemization of the inland waterway transportation services, barges were standardized to maximize freight capacity within the limitations of locks, water depths and other constraints. There are three basic types of barges in use on the inland waterway system: hopper barges, deck barges, and liquid tank barges. The dimensions of a standard jumbo hopper barge are 195 ft. long by 35 ft. wide. Hopper barges and deck barges can carry approximately 1,500 tons and maintain a draft that is near the standard waterway limit (9 ft.). The tonnage carried in a barge is the equivalent of approximately 15 to 20 loaded rail cars or 50 to 60 truck loads of freight, depending on the density of the material. A 35 ft. x 195 ft. liquid tank barge can carry approximately 10,000 barrels of liquid. Some barges are built at different dimensions to operate on other waterways and in non-standard situations.

The system to carry goods and commodities has also matured. The inland river transportation system utilizes barges secured together to form a unit called a "tow." Each tow is pushed by a towboat. The maximum number of barges in a tow primarily depends on the width/depth of the waterway and the lock dimensions to be encountered. Other factors can include bends in the river, bridge clearances and other constraints. A typical tow operating on the Upper Mississippi or the Ohio River systems is three barges wide by five barges long. Most other waterways have lock sizes that can accommodate eight barge tows. There are no locks on the Lower Mississippi River below St. Louis permitting tow sizes on this section of the river in excess of thirty barges.

Exhibit 6-1 – Inland Waterway System

6.2 Advantages of Barge Transport

Barge transportation has proven to be an extremely favorable alternative to other transportation modes. Many advantages exist for inland water transportation versus ground transportation by truck and/or rail.

Inland waterway transportation is cost-effective. Over 12% of the nation's freight is moved on the inland waterways for less than 2% of the nation's freight movement cost. The advantage is gained by operating on an existing system of rivers and canals that requires less energy to move a ton of cargo than by rail or truck. Expressed another way, the U.S. Department of Transportation (US DOT) reports that the number of miles a ton of freight can be carried utilizing one gallon of diesel fuel varies by transportation mode as follows:

Truck:	59 miles
Rail:	202 miles
Barge:	514 miles

The direct fuel cost advantage is significant but is only one of the positive factors in the use of barge transportation. Other advantages exist which have direct impact on the public. The movement of goods on the nation's waterways greatly reduces damage to highways and bridges and resulting maintenance expenditures.

Government agencies, including the U.S. Department of Transportation and the U. S. Environmental Protection Agency, note that in addition to the distinct advantages in energy savings and safety, barge transportation generates far less air pollution per ton of freight moved than truck or rail. According to the MARAD study entitled, "Environmental Advantages of Inland Barge Transportation," the pounds of emissions generated per ton-mile of cargo moved are as follows:

Mode	Hydrocarbons	Carbon Monoxide	Nitrous Oxides
Barge	0.0009	0.0020	0.0053
Rail	0.0046	0.0064	0.0183
Truck	0.0063	0.0190	0.1017

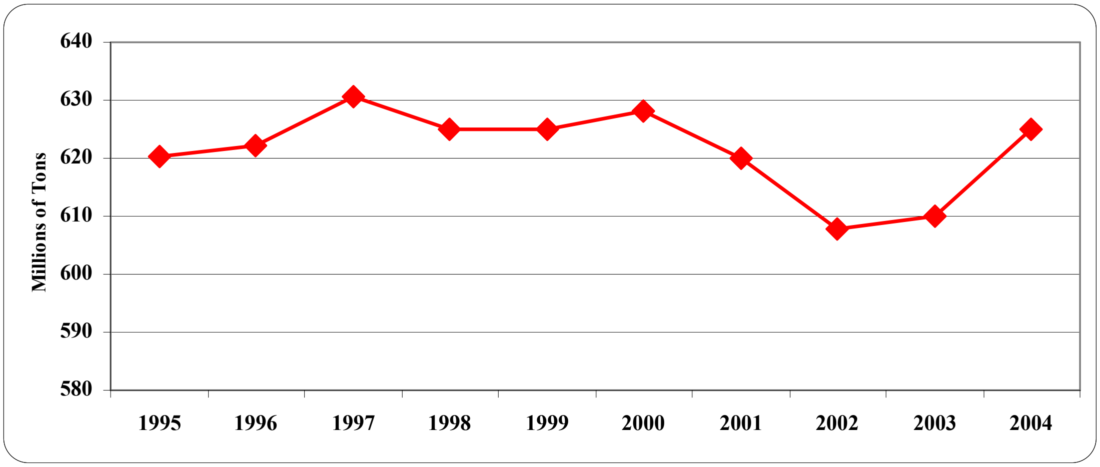
Although it is difficult to find direct comparisons of water transportation with other modes, public perception is that noise pollution is also lower for waterways than for truck or rail.

According to the US DOT, Waterway transportation is the safest mode of commercial freight transportation when considering transportation incidents. Public safety is improved by reducing the number of trucks on the highways. The reduction in truck volume and traffic congestion reduces the number of potential traffic accidents and, by extension, the number of traffic fatalities. Rail transportation, particularly with hazardous material transport through urban areas, has a higher frequency of incidents affecting public health and safety.

6.3 Commerce Statistics

Domestic inland waterborne commerce in the U.S. increased approximately 2.5 % from 2003 to 2004 (most recent available data), from 610 million tons to 625 million tons (see Exhibit 6-2). The majority of commodities moved on the waterways have a high ratio of volume to value. Coal, petroleum, construction materials, grains, fertilizer, chemicals, minerals and metals are typically moved on the inland waterway system to reduce transportation cost. These commodities require safe reliable delivery over speedy delivery as they are not normally transit-time sensitive.

Inland Waterway System – Trends in Commerce



Inland Waterway System – 2004 Commerce By Commodity

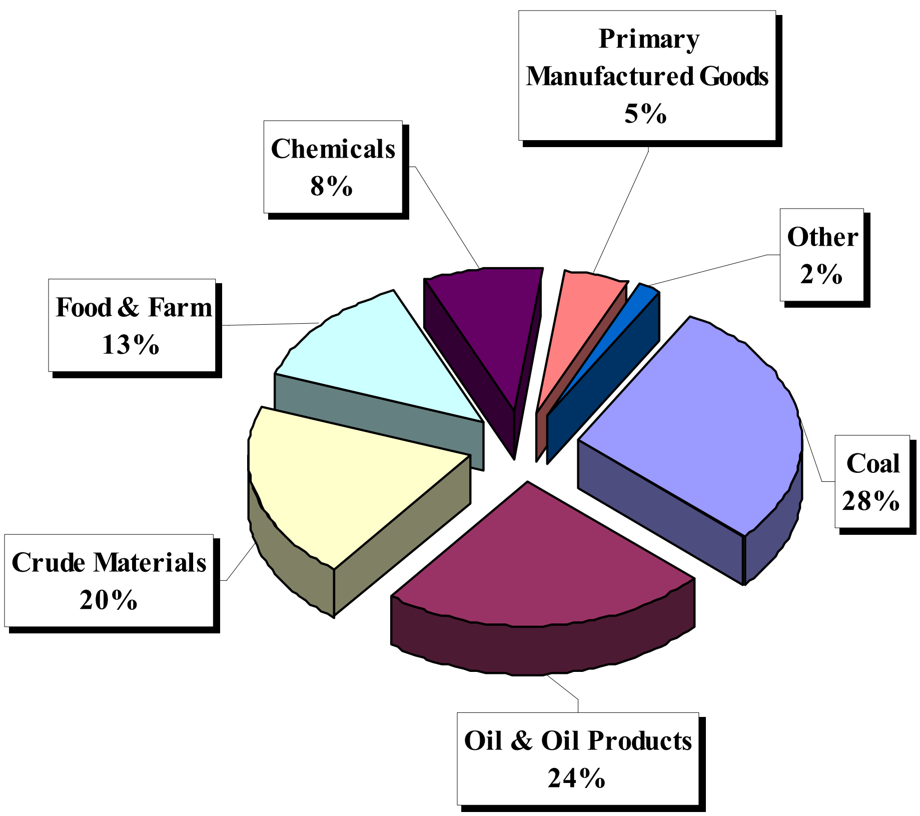


Exhibit 6-2 – Inland Waterway System – Trends in Commerce

6.4 Competitive Transportation Implications

Transportation alternatives and the competitive pricing of freight service between truck, rail and water are issues considered extremely important to shippers. This is particularly true in the case of core commodities moved by water which have economies of scale comparable with rail transportation. Where river transportation exists as a viable alternative, rail freight rates are typically found to be competitive with waterway rates. Where river transportation does not exist as an alternative, rail freight rates tend to rise closer to competing truck rates.

Not having competitive transportation service has a major negative impact on industries for which the cost of transportation is a significant percentage of the cost of goods sold. Recent studies sponsored by the USACE have demonstrated that the availability of a waterborne transportation alternative results in lower freight cost in all modes in that area.

6.5 Barge Shipping Cost Implications

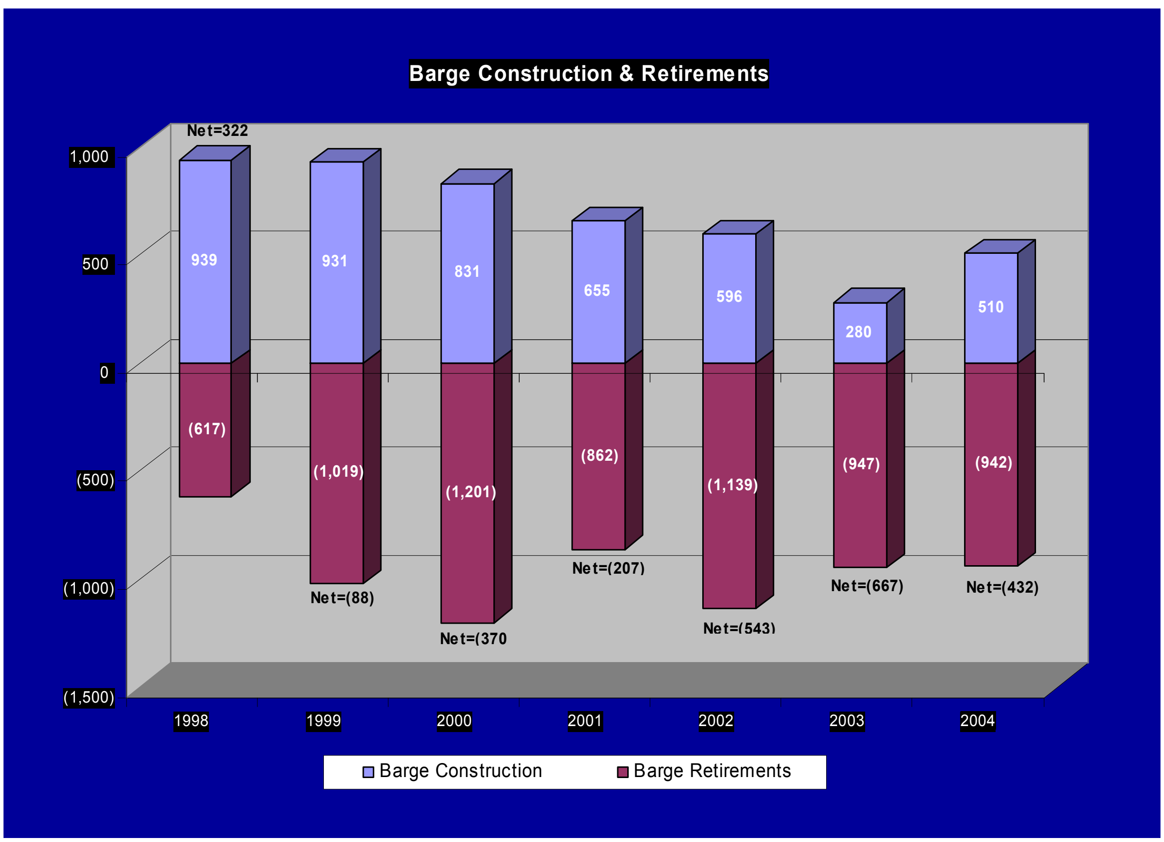
The competitive environment and operating conditions encountered in the inland barge market have a direct influence on rates and competitiveness with truck and rail. As with all transportation modes, rates are influenced by the principles of transportation equipment/resource availability, cargo volume economies, system reliability and service speed.

6.5.1 Barge Supply & Demand Impact on Rate

Transportation costs directly relate to the availability of equipment. The availability of barges and, to a lesser extent, towboats, is a factor affecting costs associated with shipping by water. Currently there are approximately 27,000 barges in use on the inland waterway system.

Barges are being built today to replace an aging fleet that was constructed in the late 1970s and early 1980s. In 1981 nearly 2,000 barges were built. Currently the cost of a new standard “jumbo” hopper barge is in the range of $550,000. This figure is significantly higher than 2003’s barge construction cost of $265,000, mainly because of steel price increases. New barge construction has decreased over the past two decades; only slightly more than 300 barges were constructed in 2005.

High steel scrap prices have influenced a net decline in overall barge availability. 1999 to 2004 saw a net loss of available barges each year, as the number of barges retiring is greater than the number of barges being built. For example, in 2003 only 280 new barges were constructed versus 947 barges retired, which resulted in a net loss of 667 barges as shown in Exhibit 6-3.



Source: Informa Economics, Inc.

Exhibit 6-3 – Barge Construction & Retirements

6.5.2 Cargo Volume Impact on Rate

A customer's volume of cargo and market size influences rates. Large volume customers will frequently negotiate multi-year barge rates based on an annual guaranteed minimum amount of cargo. For a small shipper having only a few barges to be moved, the rate will increase based on the spot (market) barge rate governed by barge equipment availability. The major barge lines typically do not deal with many small volume cargo requirements. Some companies specializing in inland logistics will contract to use a certain volume of barges from a major barge line per year and re-sell the capacity to smaller shippers. These spot rate arrangements usually include the necessary towing charges as well and are generally quoted as an "all-in rate."

The barge industry is consolidating to increase economies of scale; larger firms are buying up the smaller ones. The consolidation has an effect on shipping rates which may be difficult to measure at this time. Economies of scale that reduce costs but likewise reduce competition usually have the opposite effect when determining shipping rates.

6.6 Barge Operating Variables

Inland barge tows operate in two different formats. "Unit tows," similar to unit trains, are those which have barges and boats assigned together for the purpose of uninterrupted movement from a single origin/destination port pair. Unit tows are prevalent in the liquid bulk petrochemical and process industries. Historically, dry freight has moved differently within the "line haul" system of large barge transportation companies. In the line haul system, the transit time for barges on any given route can vary widely. The system operates within the concept of a boat being assigned to a route and barges being subsequently assigned to utilize the boat's capacity. Typically the barge lines or towing companies in the dry freight markets do not always give preference to any barges or specific customers. Usually barges are assigned to a tow on a "first come, first served" basis. If a barge is "tramped" to secure lower rates or included in another unscheduled tow, it may be delayed by waiting longer in exchange for the lower rate.

It happens occasionally that transit time changes are experienced when locks have scheduled or unscheduled closures, or are being operated with limitations because of inspection and/or ongoing repair. Lock operational reliability is a function of the available funds authorized by the Federal government to support maintenance, repair and replacement to the waterway system infrastructure.

7.0 PERSPECTIVES AND BACKGROUND ON CONTAINER-ON-BARGE (COB)

COB success is contingent upon schedule certainty and service reliability. While it's true that barges are fighting an industrial stigma of being slower than their truck and rail competitors, survey results indicated that respondents are likely to accept a longer transit time provided service is reliable. The situational understanding of containerization implies that the inland barge movement of containers should have significant potential as a substitute for truck and rail. However, historical evidence indicates that this is problematic when moving containers.

Containerized cargo is the fastest growing dry freight segment in U.S. domestic transportation. Containers are readily adaptable to COB movement, an economical form of transportation between coastal areas and inland points. The pace of inland waterway COB growth severely lags the growth of containerized cargo movement by truck and rail. A review of COB transportation history provides answers as to what business decisions can be made to increase the chance of COB success.

7.1 COB World Overview

A review of COB history may provide clues to what weaknesses in the business process cause failure and what strategies may yield success. To an outside observer, the measurement of success or failure can be determined only by the longevity of the business or its application. The financial success of any discrete venture cannot be determined by analyzing available public information. COB business ventures are typically privately and/or closely held. For publicly traded barge companies moving containerized cargo, profit and loss is not separately stated in available public financial reporting.

7.1.1 European COB Overview

European COB operations developed shortly after the advent of major international container transportation. Europe has always, much like the U.S., utilized its waterways for liquid and dry freight transportation.

COB traffic on the Rhine River grew from 10,000 TEU in 1975 to in excess of 2.3 million today. The Rhine is the primary conduit for barge traffic in the European Union (EU). It has prominent infrastructure advantages compared to other EU waterways, much like the relative position held by the Mississippi River. Extensive waterway connectors exist in Europe and COB growth continues on other navigable waterways as well as the Rhine. Population density and distribution, the size of connecting ocean ports, waterway distance, and the condition and capacities of alternative modes of transport are among the factors that must be understood in making comparisons between EU and US COB operations.

EU success in COB operations can be attributed to several factors:

- A relatively weak highway and rail infrastructure that necessitated intermodal service;
- Inconsistent border and customs clearance protocols that impede efficient landside transport;
- EU transport policy decisions regarding marketing inland waterway use as a) environmentally friendly, b) energy efficient, and c) cost effective;
- EU ports have 24-hour terminal operations;
- EU ports' perceptions of themselves as "mode neutral" transportation and distribution centers;
- Efficient material handling, navigation charting, and regulatory environment; and
- High population density, large ocean ports and short waterway lengths.

Phase 2 of the AFMS may include more detailed analysis and extraction of lessons learned which may aid in development of COB service in the US.

7.1.2 Asian COB Efforts

The success of the EU COB transportation history has not gone unnoticed in Asia. The Chinese government, as a matter of policy, has created an operating COB system in China. The core waterway is the Yangtze River which reportedly handled 605,000 containers in 2000 with expectations for the system in 2010 to reach 6.2 million containers (a staggering growth expectation of 1,000% in ten years.) The system success and forecast use is driven by the government's will to commit resources and dictate policy regarding its use. Obviously, China recognizes benefits from the existence of this system. Centralized government control in all aspects of transportation, economic and public interest choices make direct comparisons between the China and US business models difficult. Phase 2 of the AFMS may explore the situation in more detail to extract lessons-learned which may be applicable in the US.

7.1.3 Domestic COB History

The history of COB operations in the U.S. spans over thirty (30) years. It began after international containerization growth reached critical mass influencing intermodal transport beyond the deep water port. The timing closely paralleled the start of COB in Europe.

Operations initially commenced along the Atlantic coastal range and on the Columbia River system in the Pacific Northwest. These early ventures began operations about 1975 and survive today. In some cases, the respective ventures changed ownership, enhanced equipment and modified strategic direction but, nonetheless, the basic operating structure remains the same. A few companies such as McAllister Brothers and Hale Container Line were acquired or sold in a wave of coastal COB business consolidation in the late 1980's.

Other ventures categorized as COB have been unsuccessful as measured by their ability to remain in business for more than three years. Most operational ventures did not last more than two years. It is difficult to secure public information on many of these inactive operations.

7.2 Domestic COB Lessons

A review of the history of domestic COB operations can point to those strategies that worked well and those which were unsuccessful. From the review, a list of strategies can be identified and evaluated in appropriate detail so an improved COB business plan can evolve.

7.2.1 Companies & Business Ventures

Coastal and inland waterway COB operations have very similar business characteristics. The only major difference between the two is the type of marine equipment deployed. The following organizations and venture attempts were reviewed. Public information was utilized whenever available. Industry insiders were consulted to provide relevant information on specific ventures when public information was insufficient. In some instances specific ownership/entity is not discernable from public and private information:

- (SLT) St. Louis Terminals Corp., St. Louis, MO - Inland COB (1972-1973)
- (STL) Seatrain Lines, Inc. Weehawken, NJ - Coastal COB (1976-1979)
- **(TMC)** Tidewater Marine, Vancouver, WA – Inland COB (est. 1975 – Present)
- **(FMC)** Foss Maritime, Portland, OR – Inland COB (est. 1975 – Present)
- (MCA) McAllister Brothers, New York, NY – Coastal COB (1979- 1985)
- (HCL) Hale Container Line, Baltimore, MD – Coastal COB (est. 1984 - 1993)
- (NBC) NBC Lines, Norfolk, VA – Coastal COB (1978- 1981)
- **(ACL)** ACBL, Jeffersonville, IN – Inland COB (1970's – Present)
- (LTC) Leaseway Transportation – Inland COB Venture (1984)
- (WHL) Whirlpool Venture, IN - Inland COB (1989-1990)
- (ILG) International Logistics Group, Guthrie, OK – Inland COB (2000-2002)

- (BRH) Brownsville/Houston Venture, TX – Inland COB (1985)
- **(CCT)** Colombia Coastal, Liberty Corner, NJ – Coastal COB (1985 - Present)
- **(OSP)** Osprey Line, LLC, Channelview, TX – Inland COB (2000-Present)
- (TRC) Tricon/Riverway Venture, New Orleans, LA - Inland COB (1982-1983)

Bold = operating today

A historical review of these enterprises indicates several similar characteristics for success and failure. No single strategy in and of itself determines why a business may be successful or not. A compilation of strategies to apply to a given waterway, operating environment, ownership structure or market is of value. The chance for an overall successful COB business plan is increased by avoiding historical mistakes and leveraging historically successful action in business planning.

7.2.2 Common Strategy Areas

In every business venture the development of business plans, formal or informal, guide management action by forcing choice. Initial strategic choice generally impacts overall success or failure. Among the fifteen (15) COB business/ventures reviewed, the choices made influenced success or failure as measured by maintaining continuity of business over three years. The choices originate from fundamental decisions made in the following business areas: Strategic Planning, Business Organization, Market Development, Marine Operations, Landside Operations, Financial Stability and External Factors.

7.2.2.1 Strategic Planning – The strategic planning process must be undertaken with an orderly and objective set of business goals. Frequently, failed ventures occur because they relied on a single individual's experience influencing the business plan rather than a collaborative effort. Consideration of different perspectives, in a complex business, typically results in better planning. COB is a complex business. Common strategic planning requires consideration of several key issues. To this end, successful COB must: 1) achieve economies of scale; 2) plan appropriately for the specific market and waterway; 3) take a broad multi-modal view in the planning process; 4) study the history of COB for clues to success and failure; 5) keep focus and objectives narrow; 6) balance issues of service and customer preference; 7) staff accordingly for the plan and service goals; 8) establish milestones at which to measure and adjust the plan; 9) take a long term view toward business success; and 10) insure appropriate capitalization and financial structure.

7.2.2.2 Business Organization – The business organization will determine if the business plan can be focused. The business must remain agile, responsive (internally and externally) and relevant. The important principles of organization for COB success originate from common characteristics of past COB successes and failures. These principles dictate that strategic partner/owner interests must have balanced financial goals. Operations must be appropriately staffed for the multi-modal aspects of COB. Perceptions on credibility will be determined by the management. Furthermore, operations must maintain a clear division of work for processes to be effective. They should identify areas/services to self manage and those to contract out, and avoid single person "vision" or "group think."

7.2.2.3 Market Development – A lack of understanding for the COB market is by far the most significant weakness in failed ventures. The weakness in market understanding crosses the gamut of not knowing who your customer is, what service they need and how to price services. The COB market complexity is frequently underestimated or oversimplified based on the experience of executives coming from other transportation modes or traditional barge transportation companies.

Market Factors to Consider

- Markets are more than one distinct segment
- Different market segments require different services and/or pricing
- Consider rail and truck rates when establishing COB prices
- Cost is not always the determinant in selection of inland provider
- Bundle services and pricing when necessary (be user-friendly)

- Present the service as simply as possible
- Target marketing effort toward the most promising segments
- Recognize the customer's expected skepticism toward something new
- Anticipate rail and truck response to future success
- Understand customer leverage of COB with other modes
- Avoid "pass through" charges for services not relevant to COB

7.2.2.4 Marine Operations – The delivery of the service is based on the choice and format of inland marine operations and the operating service parameters on the intended waterway. The marine operational decisions are: establishing marine interests, schedule, service frequency, marine assets (barge and boat), TEU capacity, cargo protection, security, stability/cargo weight, operating economics, and waterway risks (water flow variance, locks, regional weather, etc.).

In regard to marine operations, there are several issues which must be addressed. First, the service route should be simple and direct; this will minimize route risk which will in turn increase reliability of scheduled service. Second, the cost of transportation should be balanced with reliability. Third, there are boat and crew issues: select boat size and barge TEU capacity appropriate with market size, hire operating management experienced with marine transportation, and train towboat crews in containerized freight protection. Finally, it makes good business sense to include port time in published service schedules.

7.2.2.5 Landside Operations – The stevedore and terminal operation is equally as important as marine operations. These activities have high visibility to the customer in meeting service expectations. Customer service must be seamless and unencumbered.

<u>Landside Operation Sensitivity</u>

- Bundle services and pricing when necessary
- Inland terminals must meet land, equipment and labor requirements
- Contract with others as needed in a union environment

- Data management and process flow impacts customer service
- Set cost objectives when evaluating terminal services

7.2.2.6 External Factors – External factors add to the complexity and/or difference of the COB business negotiation. Issues are important as customers make judgments on them relative to the perceived impact on their own operations.

External Factors and Soft Issues

- Marine insurance is different than truck or rail
- Sensitivity to fuel and personnel cost is different than truck and rail
- COB has favorable environmental aspects
- COB transit time could impact the customer's container free time
- Container weight capacity exceeds allowable highway limits
- Understand limits on competing modes; capacity increases, hazardous material, weight and dimensional
- Marine transportation has an excellent safety record versus other modes

7.3 Strategic & Core Business Focus

The history of COB ventures clearly indicates the importance of having a well prepared plan. Strategic Planning should be approached as a multi-disciplined effort to communicate the essential features and character of the COB venture. One should not treat a COB plan as a simple conversion of other typical marine transportation business or a copy of other modal efforts such as trucking. The underlying fundamentals and market requirements are different.

Because of the complexity of COB, the plan focus should not try to accomplish too much. Competition can take the form of rail, truck or other COB operations. Because of a successful history in rail and truck service, equivalency of performance is a critical customer service objective. Maintaining a long term business vision will keep the venture on a solid footing when reaching for economies of scale. The business must be sufficiently capitalized based on its long term projection.

7.4 Business Organization

The business organization must be reviewed from the strategic and tactical levels. This view covers the business stakeholder structure as well as the management team credibility and skills needed. Credibility is one of the most important drivers of COB success. Customers, vendors, port authorities and financial institutions must be confident that the business can deliver on its claims, and because the track record and experience in successful COB ventures is mixed, credibility takes on more relevance.

History indicates COB ventures tend to affiliate with firms that have experience in needed services. Depending on the experience needed, these affiliates can be, among others, inland towing companies, ocean carriers, trucking companies and marine terminal operators. The arrangements are valuable for projecting credibility, having economies of scale, and securing financial resources and/or needed managerial expertise. Conflicts arise when strategic affiliates take a self-serving perspective toward return on services provided to the venture. Internal pricing and service payment impositions are regularly put forth to business ventures which protect an affiliate's downside. This situation is opposite to the concept of shared risk among partners and stakeholders. These impositions can sometimes contribute to the venture's failure.

The management team must bring together a diversified set of skills which reinforce the credibility of the organization. Important skills to an emerging COB venture include experience in leadership, finance, marine transportation, operations, material handling, market development, sales and multi-modal transportation. A clear vision for the organization must be communicated and acknowledged by the team. The vision should provide clear division of responsibility but foster an environment for cross discipline mentoring.

7.5 Market Development

Historical COB efforts indicate that several markets may exist for COB services. Container market segments include inland transportation, ocean carrier inland service, shipper direct transportation, empty container repositioning and domestic intermodal freight. Once the market segment is determined, the COB venture must consider the service needed for it. By dissecting the parameters for good service, the COB venture will determine how best to meet those needs and under what conditions to do so.

As mentioned in the discussion of ocean freight, all of these service components provide a foundation for pricing the service based on a professional understanding of competing routes or modes. Each customer has a list of advantages and disadvantages relative to selecting the COB alternative. What should be understood is that in some cases lower cost may not be required to offer an attractive service. As the customer surveys show, it is not always about lower price when it comes to satisfying the customer.

It is also important to have a knowledgeable marketing and sales staff. Understanding the concepts encountered in using intermodal containers and chassis, as well as the contract terms, adds to market staff credibility.

7.6 Marine Operations

Marine operation is an area where economies of scale are very important. History indicates strategic partners/owners can provide a significant opportunity to succeed. Schedule certainty and service reliability appear to be important indicators of COB success. The marine operation area should consider all the physical constraints and risk for the given route before defining the service schedule.

Because marine operations involve more than just moving containers, the venture should seek organizational simplicity so as not to detract from the overall COB business plan goals.

Consideration must be given to all the following marine transportation issues: boat/barge equipment type, boat/barge ownership or control, manning, training, communication, regulatory compliance, maintenance and repair.

7.7 Land Operations

In many respects land side operations are the most challenging aspect of the COB business because of the speed at which they are carried out. Historically, successful COB ventures have developed from within organizations which already have experience in the marine transport of other commodities. A COB business involves landside operations and rules not generally encountered in other commodities. The unique characteristics of container and intermodal systems change the relative importance of land operations compared to other commodities moving by barge.

Successful COB ventures frequently bundle stevedoring and terminal services operations because these shore activities are quite complicated. Large investments are needed in material handling equipment and infrastructure for the COB venture to perform independently. Likewise, customers do not generally pay separately for their landside services. The requirement to load or unload a vessel is addressed as a single operating event that is priced in the COB service. Terminal and stevedoring of containers is a high risk activity best left to those skilled and equipped to perform it properly. A good understanding of land side operational requirements and rules in deep and shallow draft settings is important. Those firms which had a poor understanding of landside operations and the rules governing containers and chassis have a poor track record of success.

7.8 Public Sector & Environmental Factors

Virtually all COB ventures maintain port connectivity with at least one deepwater port. Most deepwater containerized facilities connected to domestic COB operations are publicly owned with a contract private terminal operator. This is by far the predominant form of COB-port relationships. The COB business manager must understand and be knowledgeable of the operating relationships that exist in ports where the company may work. The public port has a financial stake in the use of its terminals. All parties must recognize that COB operations are not the same as ocean carrier operations. COB operations should be perceived as a substitute for truck and rail sub-service and some price equivalency must exist from a competitive standpoint for terminal charges. COB operations can provide advantages to ports, particularly those with weak landside competition and those that have high container terminal utilization. They can also enhance strategically located industrial parks elsewhere in or near the port.

For air emissions, marine transportation is a more favorable transport mode when measured against rail and truck. The measurement is based on a per unit equivalent (ton or container) over an equal unit of distance moved (mile). Some arguments are also made regarding COB positively affecting water quality although clear and conclusive findings have proven elusive. The argument is related to the container move but centers on its truck engine oil and tire residue in storm found runoff versus the favorable track record of towboats operating on the waterways with lesser degrees of water contamination.

It is important to understand the issues that give rise to public interest in traffic congestion relief and improved highway safety when volumes of container movements are growing. Looking at traffic congestion forecasts for the State of Alabama, COB could contribute to the solution. Management can also garner support for COB initiatives because the barge industry can rapidly respond to capacity increases or sudden demand increases due to disasters. The waterway capacity utilization is low and can readily absorb these additional container moves.

Loaded containers that ordinarily cannot be handled by truck because of state DOT highway vehicle weight limitations can be moved over long distances on the water very economically. This opportunity is a win-win for the public and private sectors as well as creating a niche market segment when moving by COB.

Intermodal rail carriers are already rejecting certain hazardous shipments, forcing them to be trucked. Hazardous materials, particularly those connecting via rail and truck with ocean container terminals, are commodities which can be safely shipped by COB. Existing COB operators are securing these shipments to the net benefit of the public and the shipper. Marine transportation has an outstanding safety record with hazardous materials when compared with other modes. This is particularly true with ISO tanks and dry van containers.

8.0 NEEDS ANALYSIS FOR MOBILE CONTAINER-ON-BARGE

The historical review of COB ventures including their successes and failures provided valuable insight into COB business development for the future. The Alabama State Port Authority has, since early 2000, advanced a strategy to secure a portion of the nationally growing container freight market. The strategy objectives are to protect traditional markets in the future and to diversify cargo activity at the Port of Mobile. The option of containers and need for inland transportation solutions for them recognized the State of Alabama's economic development targets require containerized freight based on growth forecasts of Gulf Coast ocean container service, near capacity competing container ports and inland transportation capacity constraints for rail and truck. The strategy has also proven beneficial with the challenges encountered by sister Gulf Coast ports following the hurricanes of 2005. The initial phase for dedicated container freight facilities is expected to culminate in early 2008 with completion of the Phase 1 Mobile Container Terminal (pictured on page 11).

8.1 Mobile Intermodal Freight Movement

Mobile container growth is expected to increase significantly with the opening of the initial phase of the Mobile Container Terminal. Given the pressures caused by driver shortages, fuel costs and regional post hurricane demands, steps must be taken to ensure the trucking industry will be able to respond to this sudden increase for container trucking service.

The initial reliance on trucking results from not having any viable intermodal service to northern destinations due to the lack of past volumes of port container shipments to that region. Present intermodal rail service in Mobile moves east and west. It is reasonable to assume that as container volume increases at the port, north-south intermodal rail service and additional infrastructure will also develop. The affected rail carriers will evaluate investment in track and rail equipment capacity as volume and projected financial returns improve. Should a north/south intermodal rail service develop, it will likely connect to major metropolitan areas of the Midwest.

It is within these intermodal service parameters that a water option may exist as an alternative to truck and rail in the movement of high volume containerized freight. The inland waterway system in this geographic setting is well positioned on a North/South axis. A COB opportunity may be commercially feasible along this axis.

8.2 Inland/Mobile COB Service Considerations

The historical review of COB ventures and identification of those decisions indicating success or failure provide a framework for considering a Mobile connected COB service. History suggests the following actions and parameters be evaluated in a local service context.

- Organization of the COB development team
- Ocean carrier trade routes
- Inland port connections to Mobile
- Regional inland towing experience
- Landside container service understanding
- COB credibility
- Long-term business view

8.3 Organization of the COB Development Team

Assembling a multi-disciplined COB development team has proven to be of substantial benefit in the success of COB ventures. Although Mobile is largely a bulk and breakbulk port, there is expertise in container trade available within the port community. Some of the freight forwarders and brokers located there are involved in the container business. In addition, some of ASPA's senior managers also have broad backgrounds in this aspect of shipping as a result of experience at other ports.

The principal regional navigable waterways connecting with Mobile are the Alabama River, the Black Warrior-Tombigbee (BWT), and the Tennessee-Tombigbee (Tenn-Tom)

Waterway that connects with the Tennessee River. The Gulf Intracoastal Waterway (GIWW) provides east-west barge service from Mobile and connects with the Apalachicola, Chattahoochee, Flint Waterway that serves the southeastern part of the state. Bulk material is the largest commodity segment transported along these navigable waterways. Bulk operators have significant regional waterway experience and tend to operate between specialized facilities equipped for their particular commodity. The introduction of additional container traffic will likely involve these and other inland carriers. The inland carriers, however, have minimal operating experience related to moving time-sensitive goods such as those in containers. New service expectations will be necessary for participation by these traditional inland carriers.

Marine transportation schedule and reliability are critical indicators for success. The inland towing operators in the region are not as prevalent as inland operators on larger waterways that connect ocean container ports, such as Houston and New Orleans. The development team will need to posses good management skills to team with the local towing community in the COB market.

Past COB experience indicates a high percentage of failure was associated with pricing and service deficiencies. A multi-disciplinary team increases the chances to be successful with a full range of experience including marketing, operations, finance, intermodal logistics, and containerization. Past COB business models have been underdeveloped and simplistic. Services must be bundled and priced appropriately for the Mobile market by this team. It takes the customer time and money to attempt to figure out what services, and at what price, are necessary to operate through the Port of Mobile.

Rules, regulations, data requirements, port charges, gate protocols and many other issues will have to be resolved, and solutions formulated, for a successful Mobile COB venture. The right talent mix will yield the most favorable long term solutions for inland COB connections with the Port.

8.4 Ocean Carrier Trade Routes

Critical to all COB ventures is the assessment and determination of potential market mix. What separates one deepwater port COB opportunity from another is largely defined by ocean carrier services and the trade routes connected. A good example of this influence is the Columbia/Snake River system. The COB volumes have fluctuated significantly because of ocean carrier service changes through the Port of Portland, Oregon.

The Port of Mobile is not immune from this critical factor in determining the market. All of the Port's ocean carrier trade routes have not been publicly identified as of November 2006. Early in the Port of Mobile's strategic planning process, studies published at that time suggested that containerized ocean carrier service would likely come from trade growth in this hemisphere. Central and South America trade lanes were the predominant candidates for substantial volume through Mobile. These trade lanes continue to grow; however, a worldwide restructuring of Far East trade with the U.S. is moving faster. Container volume is growing more rapidly than West Coast port capacity can absorb. Ocean carriers serving Asian markets have looked to the U.S. East and Gulf Coast ports to meet the increased demand. Mobile, particularly with the recent statewide economic development focus, found this route to be the most promising in projecting future container movement.

To evaluate COB market opportunity, container industry experts must identify the ocean carriers' most likely trade lanes, ports of origin and the major cargo types expected. These forecasts will provide the basis for market identification, market analysis, service requirements and pricing. From this market data, operating details will be generated based on a factual market foundation tied to ocean carrier service parameters through Mobile.

8.5 Inland Port Connections to Mobile

Since containers have not been a significant part of the Port of Mobile's commerce and trade, intermodal rail service to northern destinations has not yet developed. Truck advantages deteriorate when distances exceed 300 miles and alternative transportation modes exist. This truck disadvantage grows when the commercial environment experiences declining resources such as drivers, fuel and hours of service. It is within this economic transportation service void, 300 to 500 miles from Mobile, where initial attention should be given to the COB opportunity. This general area is shown in Exhibit 8-1.

A review of the statewide freight clusters identified in other studies indicates several manufacturing regions exist within this intermodal void. Trucking may not be as competitive as an intermodal service package having COB connections with Mobile.

Several candidate regions for the Port of Mobile and inland port analysis exist. The analysis cannot be performed looking only at operational issues. Input from the marketing review, which must identify and rank intermodal freight information by region, must be considered beforehand. The market information should include the basic indicators of competitive pricing by other modes to the service areas. From market review rankings the development team will focus on those areas that have the best condition to gain economies of scale essential to successful COB service.

The market review indicators should rank the candidate regions for COB by containerized freight potential. It is after this ranking that a subsequent operational ranking be generated which considers schedule and marine service reliability. Schedule and service reliability will consider factors such as historical transit times, number of locks encountered, water and current fluctuations and any other marine risks that may be repetitive on a given route. Exhibit 8-2 shows the transportation routes from Mobile.

Exhibit 8-1 – 200 and 500 Mile Radius from Mobile, AL

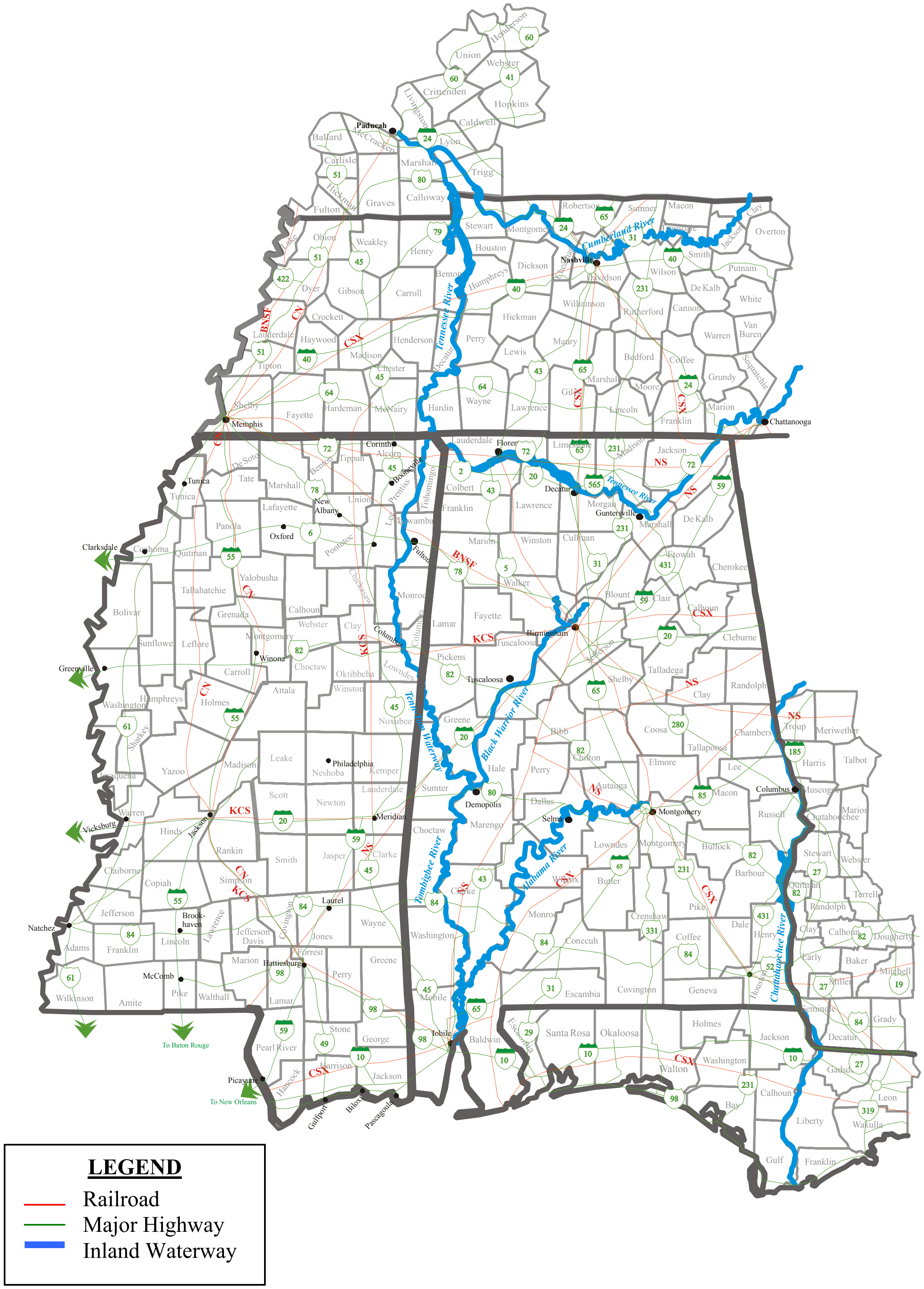


Exhibit 8-2 – Inland Transportation Routes from Port of Mobile

The development team must combine inland candidate rankings, market and schedule reliability, in a subjective manner. A wide array of known pluses and minuses for each region must be comparatively listed. The outcome of this collaboration will identify a target region for additional detailed COB analysis.

8.6 Regional Inland Marine Towing Experience

In determining an appropriate operating structure for connecting COB service with Mobile, another consideration is boat and barge equipment utilization. About 73% of COB companies analyzed made conscious decisions to integrate COB with other existing marine operations and 100% of successful COB ventures did so. Most inland COB failures involved boat and barge operations based solely on a dedicated COB service approach. These ventures had problems getting sufficient market size to cover the full cost of operation. This was particularly true in COB markets connecting immature container ports and markets.

Equipment rationalization is the use of existing inland towing operations as the basis for integration of COB. In one instance, COB marine operations transported other commodity barges in their tows as incremental business. In any instance, economies of scale during early market development were important.

As it relates to Mobile's service potential, a thorough analysis of existing marine operations from inland regions must be conducted. Important in the analysis is the commodity type, frequency of service, historical transit time, location of origin/destination facilities and a discussion on barge availability and suitability for containers. Ranking towing companies by these criteria should narrow candidates. Operational details can be thoroughly analyzed in advance of any inland marine carrier negotiation.

A viable outline of a service plan can be drafted and cost developed accordingly with appropriate confidentiality being considered. With a reasonable inland marine operating scenario, coupled with a subsequent landside service cost estimate, the targeted region(s) can be properly evaluated.

8.7 Landside Container Service Understanding

This report's earlier discussions detailing the landside requirements emphasize the need to prepare a credible inland COB service plan with the Port of Mobile. Relying on market segmentation and close teamwork, each market requirement can be identified. Once the service requirement is identified, each need can be satisfactorily considered. This will result in seamless service opportunities for the customers. The service boundary usually involves all requirements before or after a container has been landed in the Mobile ocean terminal. The various import container landside services may include such typical issues as:

- Container booking and release to barge
- Stevedoring to barge
- Transport by barge
- Stevedoring from barge
- Arrival notice and inland terminal procedure
- Truck release and gate procedure
- Shipper container delivery (if applicable)

The landside functions include a service aspect performed by the COB venture or through third party contractors. In some cases, the client can take responsibility for a portion of the service itself. Nevertheless, each aspect of the landside function has to be addressed, costs estimated, processes or protocols established, and custody and care identified. Many of the specific details are fundamental to success. In the effort to identify prospective inland terminals in a service area, the landside service team will determine if the appropriate capabilities and cost structure to service COB operations exist.

8.8 COB Credibility Priority

As previously noted, credibility is one of the most important factors in determining success or failure for an inland COB venture. In a new market area, such as Mobile, this takes on greater importance. Well-publicized COB ventures operating on the Mississippi River or the Gulf Intracoastal Waterway (GIWW) between Houston and New Orleans would make expansion or new service easier to initiate. The Port of Mobile, however, has minimal container market history. Shippers and ocean carriers traditionally connect to the target regions through other ports using other intermodal transportation service providers. The historical intermodal service has been east and west by rail between interior freight centers and South Atlantic and West Coast ports. A connection through Mobile for intermodal freight containers is breaking new ground and the addition of a COB water option to inland markets may be met with initial skepticism.

To bring in partners and service providers who will be essential to complete a COB service package, the venture team will have to discuss a totally new market opportunity in terms of the impact on their existing business. For the local towing and inland terminal industries, their businesses will probably be mature. Risk aversion will be an important determinant of how they view the COB venture. Addressing risk aversion can be accomplished by analyzing and discussing it from the beginning. If discussions begin with the COB perspective only, the venture will not likely convince mature businesses that the risk is acceptable or that sufficient financial upside exists for their long term benefit.

Both a credible message and effective communications are required to build a successful business venture. Having a complete understanding of the historical intermodal container freight market and how a COB option is different from existing options is a good starting point. All members of the development team must be conversant in the viability of COB through Mobile. Their message must be conveyed to public officials, inland ports, ASPA and service providers. The development team should also develop an effective COB marketing plan targeted toward ocean carriers. The ocean carrier inland service requirement represents a market segment that has volume potential and could assist the ocean carrier in increasing its container freight market share. The ocean carrier also brings the working knowledge of container pools, equipment control, chassis hire and other service and container repair issues. COB advocates must have a credible package ready for the ocean carriers with appropriate service reliability assurances before meeting them. The managers of the COB venture must address concerns of the ocean carriers, otherwise they will perceive COB as only serving the shipper/customer with no advantages for them. In such a case, they may hold the COB venture to the truck standards of free time and demurrage which is not in the best interest of COB.

8.9 Long Term Business View

The COB venture must originate with a long-term business perspective. For a new container market such as Mobile, the business start-up is complex and difficult. Credible partners and/or affiliates with a long history and favorable track records in their respective businesses are desired. A successful venture will likely need to focus on business plan quality with a vision for stability and financial improvement. A successful venture must also invest in the right people, container management software, quality barge equipment, long charter terms and reasonable financial goals. These early choices identified in the business plan will send the right message to the market: competency, vision, fairness and a secure future. Entrepreneurs managing the COB business should be prepared to carry the right message when discussing working capital or financing and should not buy container volume by sacrificing fair long-term pricing goals. It has proven very difficult to raise prices in the competitive transportation environment found today. This is particularly true in the marine sector where variable cost increases are often absorbed over more units moved at a single time.

APPENDIX A

INVENTORY OF GENERAL PURPOSE RIVER TERMINALS

A part of the

BUSINESS PERSPECTIVES ON THE FEASIBILITY OF CONTAINER-ON-BARGE SERVICE

Alabama Freight Mobility Study Phase 1

Prepared for the

COALITION OF ALABAMA WATERWAY ASSOCIATIONS

April 9, 2007

Prepared by:

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Nashville, TN 37215
(615) 665-9611

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1.0 GENERAL PURPOSE RIVER TERMINAL INVENTORY

This *Inventory of General Purpose River Terminals*, provides information that is central to the Alabama Freight Mobility Study (AFMS) by listing the general cargo capabilities among available inland river terminals in the study area. It describes the infrastructure components that could support more productive and cost effective container movement through the inland waterways of the Southeastern United States.

This component of the Alabama Freight Mobility Study is designed to identify the general cargo terminals along the waterways that serve the Port of Mobile and its market region. The waterways that service this market area are:

- Black Warrior River
- Tennessee-Tombigbee (Tenn-Tom) Waterway
- Tombigbee River
- Tennessee River
- Flint River
- Chattahoochee River
- Alabama River

Directors of the waterway trade organizations, which form the Coalition of Alabama Waterways Associations (CAWA), obtained and provided much of the information obtained in this inventory.

It is important to have a mutual understanding of terms used herein, such as the distinction between "port" and "terminal". A river port is a multi-use area contiguous with a navigable waterway that encompasses the actual river frontage, as well as usually holding land for further development. These port complexes can be used to house an industrial park, utilities, rail lines, and highway connectors, as well as multiple river terminals. River terminals are facilities for loading and unloading cargo from various types of inland vessels. Typically, a river terminal will also provide warehouses and material handling equipment for the later distribution of cargo to locations outside the port.

River terminals fall into two broad categories by ownership. They may be owned by a public or geopolitical entity (such as a port authority, unit of local government or a state) or by a private corporation.

Based on their intended use, river terminals are categorized as either special purpose or general purpose. Special purpose facilities are typically designed to be very efficient for moving a specific cargo either inbound or outbound, but usually not in both directions. For example, pneumatic unloading systems for cement, bucket unloaders for coal, special pipelines for liquids, and cranes for specific steel products are common types of single purpose terminals. While these facilities may not be versatile, they are normally designed to be very efficient for the handling and movement of their designed cargo and direction of movement (i.e., inbound or outbound). Further, a special purpose terminal may be located within a plant to service its particular process or manufacturing needs.

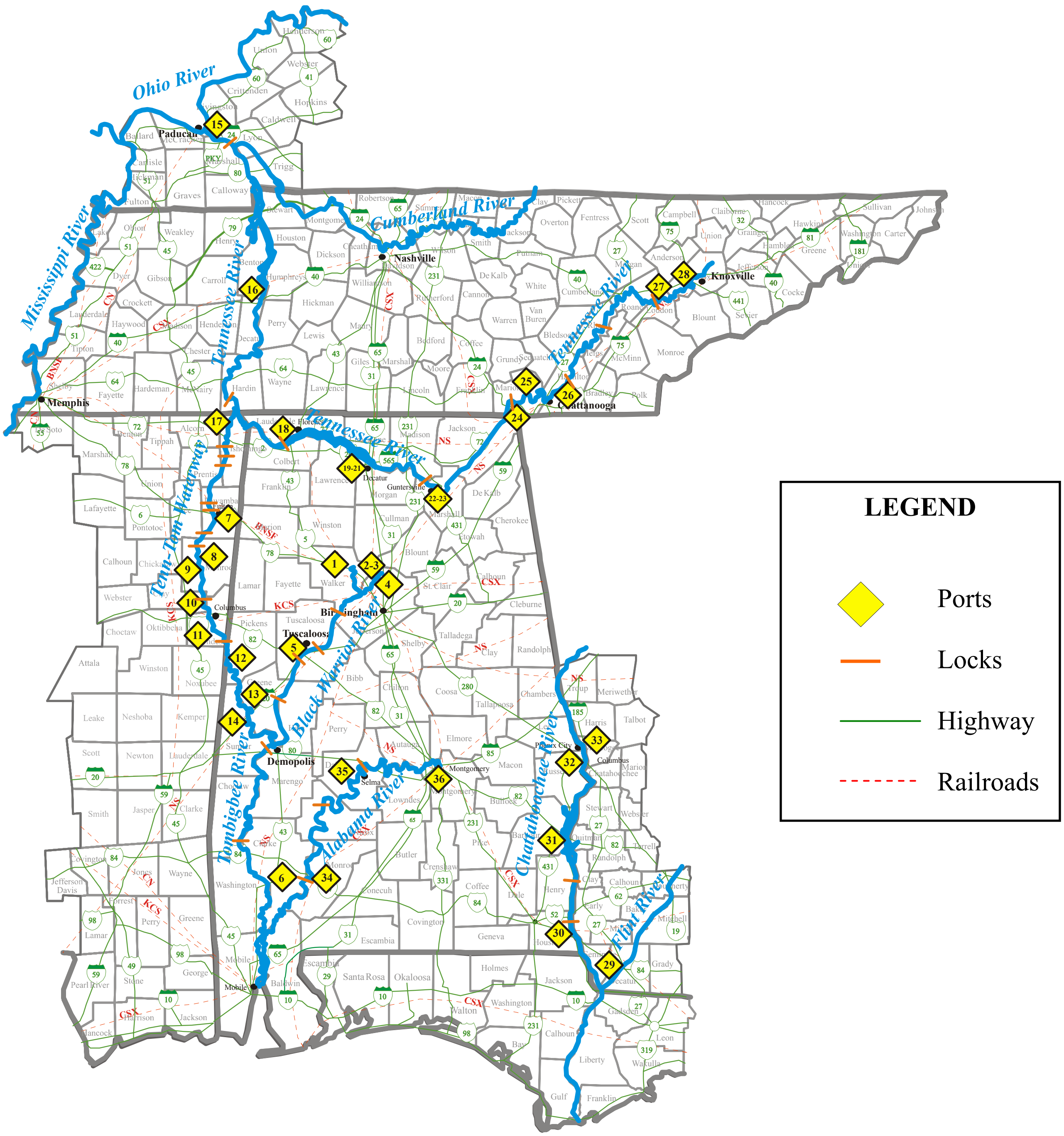
General purpose facilities are usually versatile and can be used for a wide variety of applications such as loading or unloading steel coils, slabs, wood, scrap, pipe, ores or bulk materials. Equipment may include, for example, a crawler crane which can be rigged with a bucket, spreader bar, hook, clamp, magnet or other device depending on various cargo handling requirements, and fork lift trucks or other machines for moving commodities from the dock to short-term storage.

All modes of transportation may be available at river ports, which include highway, rail, water and/or air transportation. Public ports are often owned by a special purpose public agency known as a port authority. The port authority is responsible for the overall administration of the property, terminals and other facilities at a public port. To enhance the transportation advantages of river front industrial sites, a public port authority may market some properties differently. Frequently, port authorities market direct river access for industries which require a private special purpose terminal as part of their facility. Port authorities may also develop a public general purpose terminal for those industries wanting to take advantage of the efficiency of waterborne transportation but which do not generate sufficient tonnage to justify construction of their own terminal.

The Inventory of General Purpose River Terminals provides an introduction to the facilities along the waterways in the AFMS study area. The terminal catalog includes location, site characteristics, facilities, services offered and general categories of the types of cargo each terminal is currently handling. Images of the terminals are also included to provide an understanding of the layout of the facilities and how the terminal configurations accommodate and impact their cargo handling capabilities. Maps show their accessibility to the surrounding area and the terminal's location in the AFMS study area. When considered in conjunction with each other, the catalog, images, and maps provide a cohesive representation of the cargo handling capabilities at each terminal.

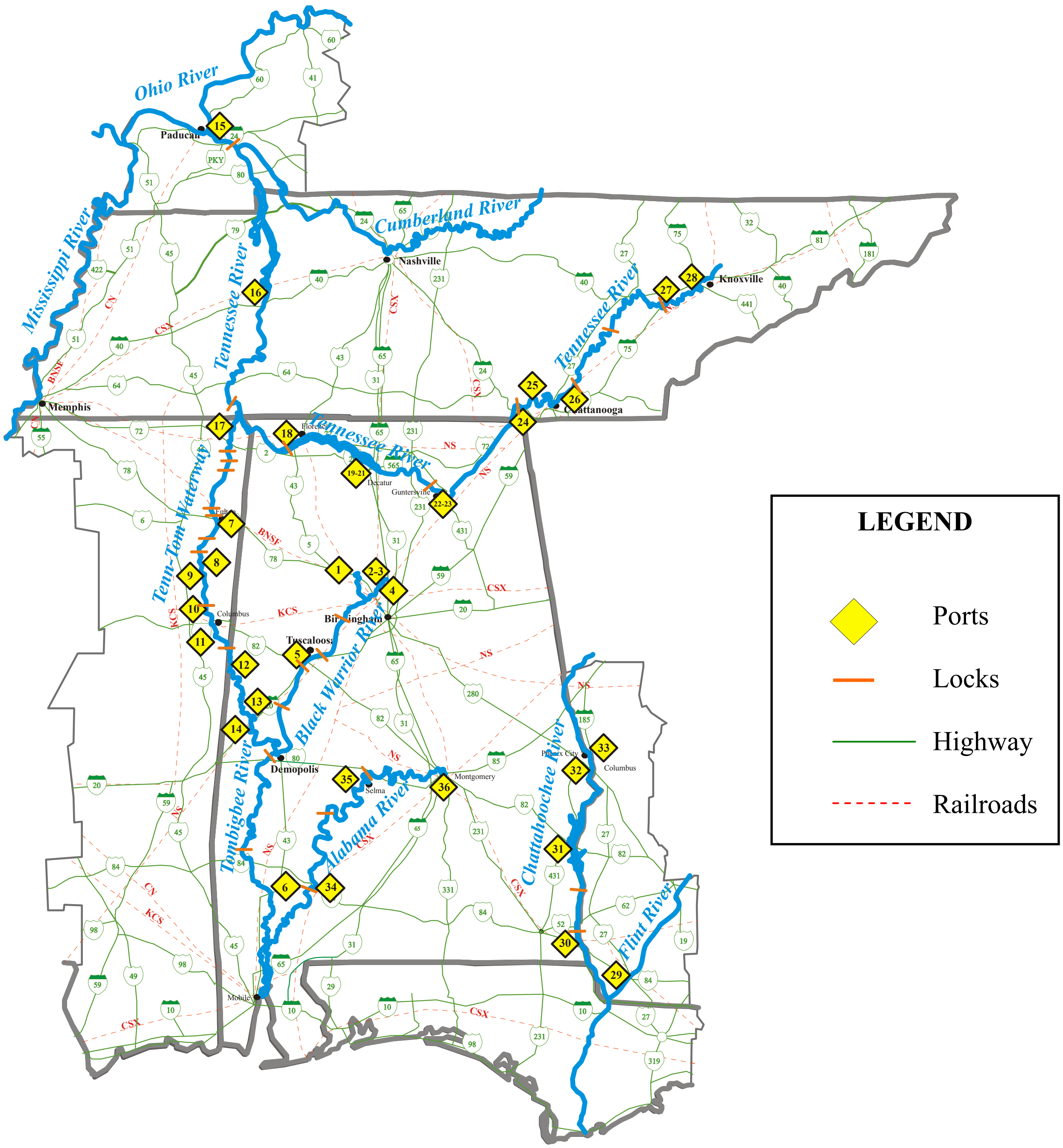
INLAND WATERWAY SYSTEM

ALABAMA FREIGHT MOBILITY STUDY
RIVERPORT INVENTORY
(With Counties)



Inventory of General Purpose River Terminals
Appendix A to the Alabama Freight Mobility Study Phase 1 -
Business Perspectives on the Feasibility of Container-On-Barge Service
Prepared for the Coalition of Alabama Waterway Associations

ALABAMA FREIGHT MOBILITY STUDY
RIVERPORT INVENTORY
(Without Counties)



Inventory of General Purpose River Terminals
Appendix A to the Alabama Freight Mobility Study Phase 1 -
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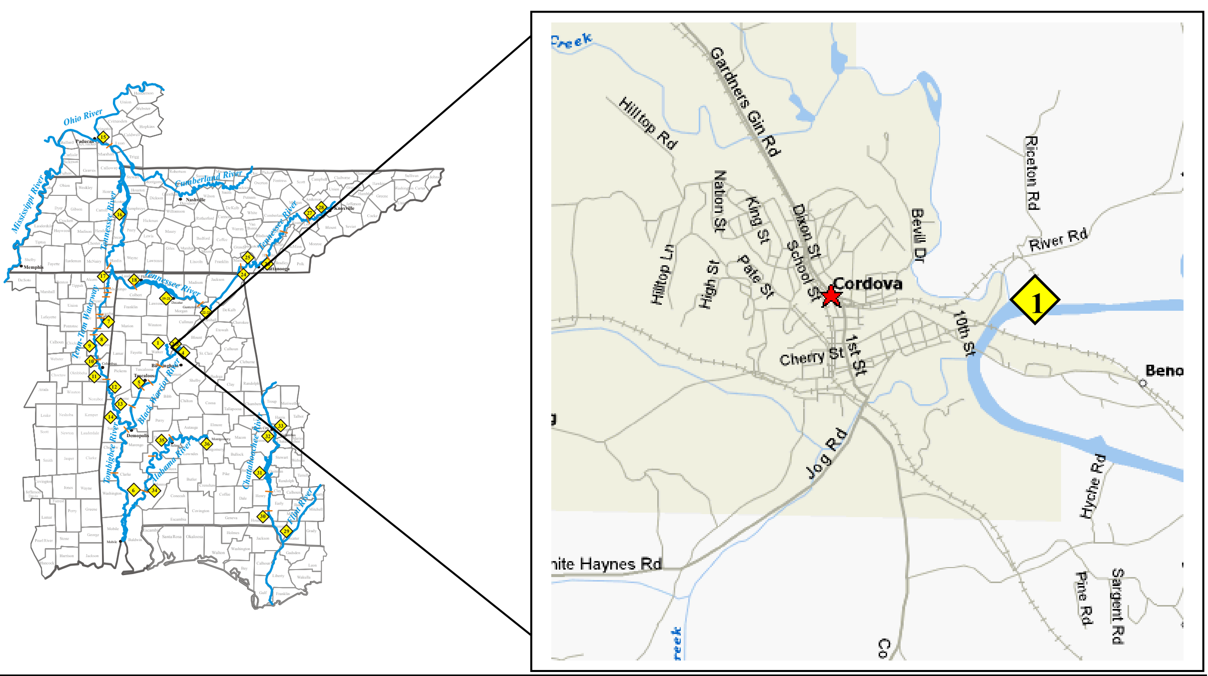
Index of River Terminals

	River	Mile	L/R	Name of Terminal	Gen Location
1	Warrior	416.5	R	G&R Cordova Inland Dock	Cordova, Walker Cty, AL
2	Warrior	398.9	R	Birmingham Marine Terminal	Birmingham, Jefferson Cty, AL
3	Warrior	398.7	R	Miller and Co. (Old Port Western)	Birmingham, Jefferson Cty, AL
4	Warrior	397.0	L	Port Birmingham	Mulga, Jefferson Cty, AL
5	Warrior	338.5	R	Tuscaloosa-Northport Inland Dock	Northport, Tuscaloosa Cty, AL
6	Tombigbee	91.0	L	Jackson City Port	Jackson, Clarke Cty, AL
7	Tenn-Tom	390.0	L	Port of Itawamba	Fulton, Itawamba Cty, MS
8	Tenn-Tom	369.5	L	Port of Amory	Amory, Monroe Cty, MS
9	Tenn-Tom	356.5	R	Aberdeen Port	Aberdeen, Monroe Cty, MS
10	Tenn-Tom	338.3	R	Clay County Port	West Point, Clay, MS
11	Tenn-Tom	330.0	R	Lowndes County Port	Columbus, Lowndes Cty, MS
12	Tenn-Tom	308.0	L	Pickens County Port	Pickensville, Pickens Cty, AL
13	Tenn-Tom	259.3	L	Crossroads of America Port	Eutaw, Greene Cty, AL
14	Tenn-Tom	247.4	R	Port of Epes	Epes, Sumter Cty, AL
15	Tennessee	1.3	L	Paducah/McCracken County Riverport	Paducah, McCracken Cty, KY
16	Tennessee	100.4	R	Sangravl Company, Inc.	New Johnsonville, Humphreys, TN
17	Tennessee	215.1	R	Yellow Creek State Inland Port	Iuka, Tishomingo Cty, MS
18	Tennessee	256.6	R	Florence-Lauderdale County Port Auth.	Florence, Lauderdale Cty, AL
19	Tennessee	298.5	L	Mallard-Fox Creek River Port	Decatur, Morgan Cty, AL
20	Tennessee	301.4	L	Decatur State Docks (AL St. Docks)	Decatur, Morgan Cty, AL
21	Tennessee	304.1	L	Decatur Transit	Decatur, Morgan Cty, AL
22	Tennessee	358.2	L	Guntersville Marine	Guntersville, Marshall Cty, AL
23	Tennessee	358.1	L	Kinder Morgan - Guntersville	Guntersville, Marshall Cty, AL
24	Tennessee	423.7	L	Port of Nickajack	South Pittsburg, Marion Cty, TN
25	Tennessee	456.2	R	Mid-South Terminals Company	Chattanooga, Hamilton Cty, TN
26	Tennessee	467.0	L	Centre South River Terminal	Chattanooga, Hamilton Cty, TN
27	Tennessee	600.2	R	Fort Loudon Terminal	Lenoir City, Loudon Cty, TN
28	Tennessee	652.2	R	Burkhart Enterprises	Knoxville, Knox, TN
29	Flint	26.5	R	Port Bainbridge	Bainbridge, Decatur Cty, GA
30	Chattahoochie	49.0	R	Columbia Inland Dock	Columbia, Houston Cty, AL
31	Chattahoochee	91.5	R	Eufaula Inland Dock	Eufaula, Barbour Cty, AL
32	Chattahoochee	153.1	R	Phenix City Inland Dock	Phenix City, Russell Cty, AL
33	Chattahoochie	154.6	L	Port of Columbus	Columbus, Muscogee Cty, GA
34	Alabama	65.5	L	Claiborne Terminal	Claiborne, Monroe Cty, AL
35	Alabama	218.9	R	Selma Terminal	Selma, Dallas Cty, AL
36	Alabama	289.4	L	Montgomery Terminal	Montgomery, Montgomery Cty, AL

Port Name	G&R Cordova Inland Dock
Inventory #	1
Location	
City	Cordova
County	Walker
State	Alabama
River	Black Warrior River, Mulberry Fork
River Mile	416.5
Dist. to Hwy.	U.S. Hwy. 78 – 3 miles; Corridor X - 10 miles
Dist. to Rail	No rail on site, Burlington Northern 1 mile
Site	
Acres Developed	30
Acres Owned	52
Topography	flat
Facilities	
Docks	Reinforced concrete dock with mooring dolphins
Buildings	24,000 sq. ft. warehouse
Equipment	(1) 600 ton crane; (1) 60 ton mobile crane; (1) 30 ton mobile crane; (1) 80,000 lb. forklift with container capability; (1) 6,000 fork lift; (3) front end loaders; (1) 60 ft. excavator
Services Offered	Truck/Barge
Business	Project and manufactured equipment, steel coil, rock, gypsum
Contact	
Port Owner	Alabama State Port Authority, Mobile Pete O'Neal (251) 441-7123
Port Operator	G&R Mineral Services Bobby Rushden (205) 956-7300

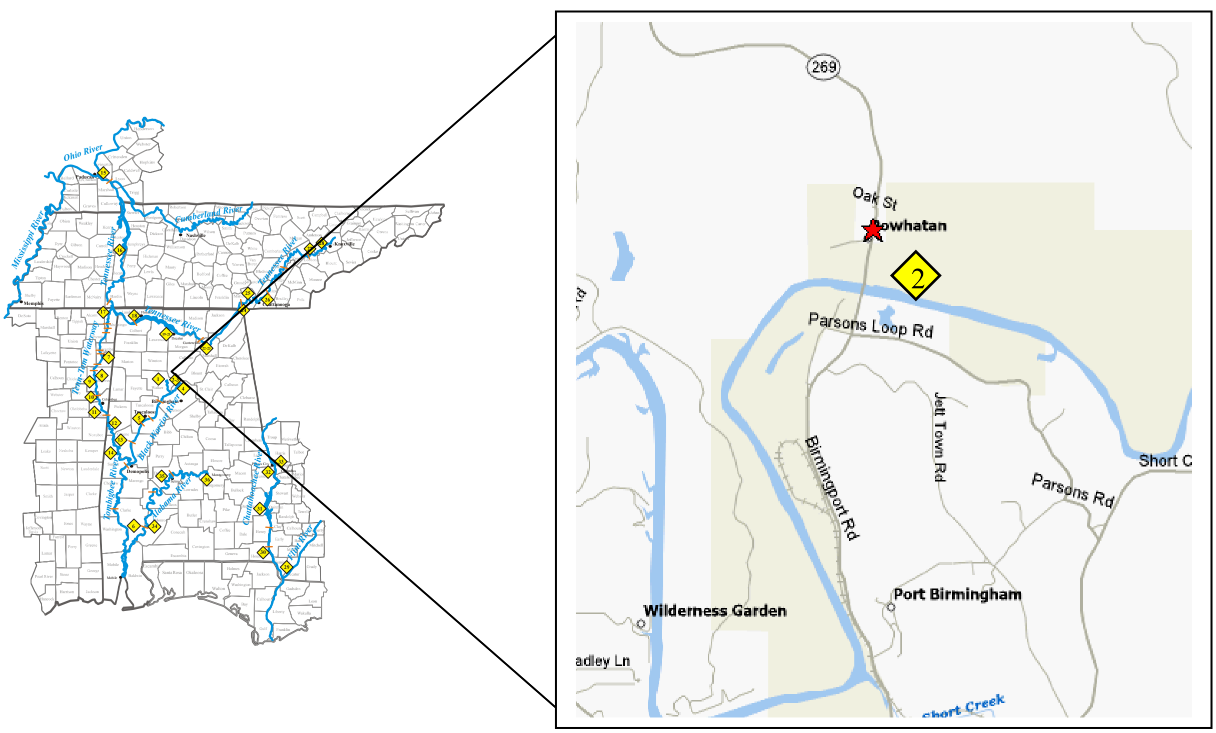
G&R CORDOVA INLAND DOCK



Inventory of General Purpose River Terminals
Appendix A to the Alabama Freight Mobility Study Phase 1 -
Business Perspectives on the Feasibility of Container-On-Barge Service
Prepared for the Coalition of Alabama Waterway Associations

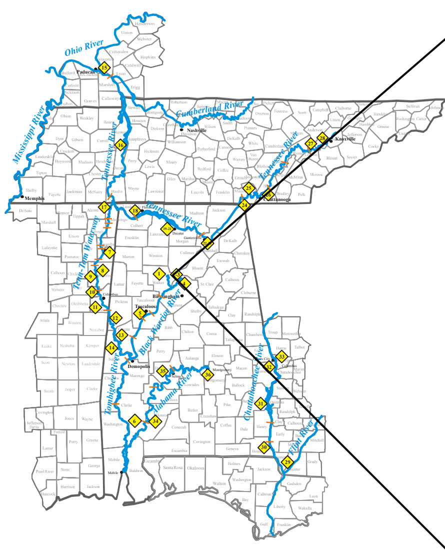
Port Name	Birmingham Marine Terminal
Inventory #	2
Location	
City	Mulga
County	Jefferson
State	Alabama
River	Black Warrior River, Locust Fork
River Mile	398.9
Dist. to Hwy.	Hwy. 269 on-site; 18 mi. to I-20/I-59
Dist. to Rail	No rail on site; Birmingham Southern 2 miles away
Site	
Acres Developed	40
Acres Owned	380
Topography	Flat
Facilities	
Docks	2 docks, 8 barge capacity with capability to work 3 at a time
Buildings	22,000 sq. ft. warehouse
Equipment	(1) 120 ton crawler crane; (1) 40,000 lb. working radius; (1) 4-yd excavator
Services Offered	Truck/Barge
Business	Iron and steel products, clay, slag, gypsum
Contact	
Port Owner/Operator	Parker Towing Company Terah Huckabee (205) 349-1677

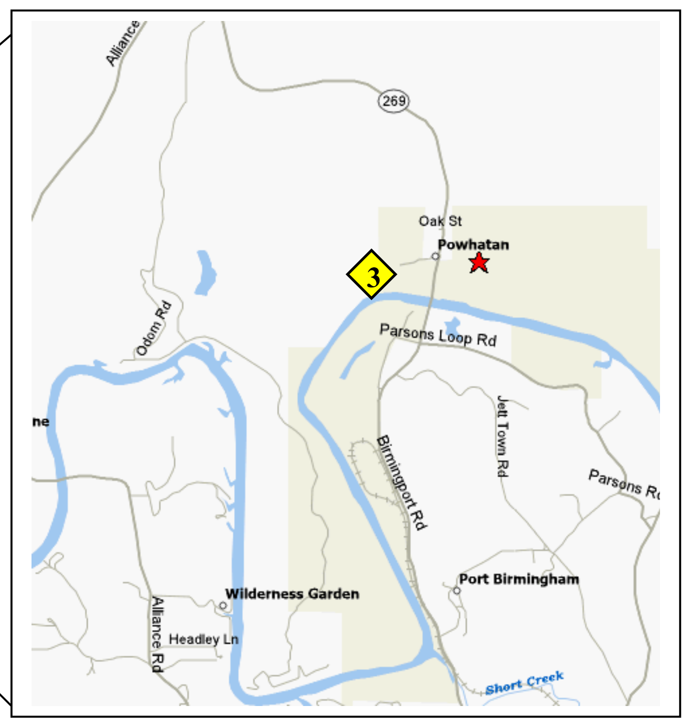
BIRMINGHAM MARINE TERMINAL



Port Name	Miller and Co.
Inventory #	3
Location	
City	Mulga
County	Jefferson
State	Alabama
River	Black Warrior River, Locust Fork
River Mile	398.7
Dist. to Hwy.	Hwy. 269 on-site; 18 miles to I-20/I-59
Dist. to Rail	No rail on site, Birmingham Southern 2 miles away
Site	
Acres Developed	12
Acres Owned	12
Topography	Flat
Facilities	
Docks	2 docks
Buildings	Covered storage
Equipment	(1) excavator; (1) 2-yd claw bucket; (2) fork lifts
Services Offered	Truck/Barge
Business	Carbon, wire rods, steel products, alloys
Contact	
Port Owner	Western Steel and Iron (leased to Miller and Co.)
Port Operator	Dowhattan Construction Company Dennis Bland (205) 436-5155

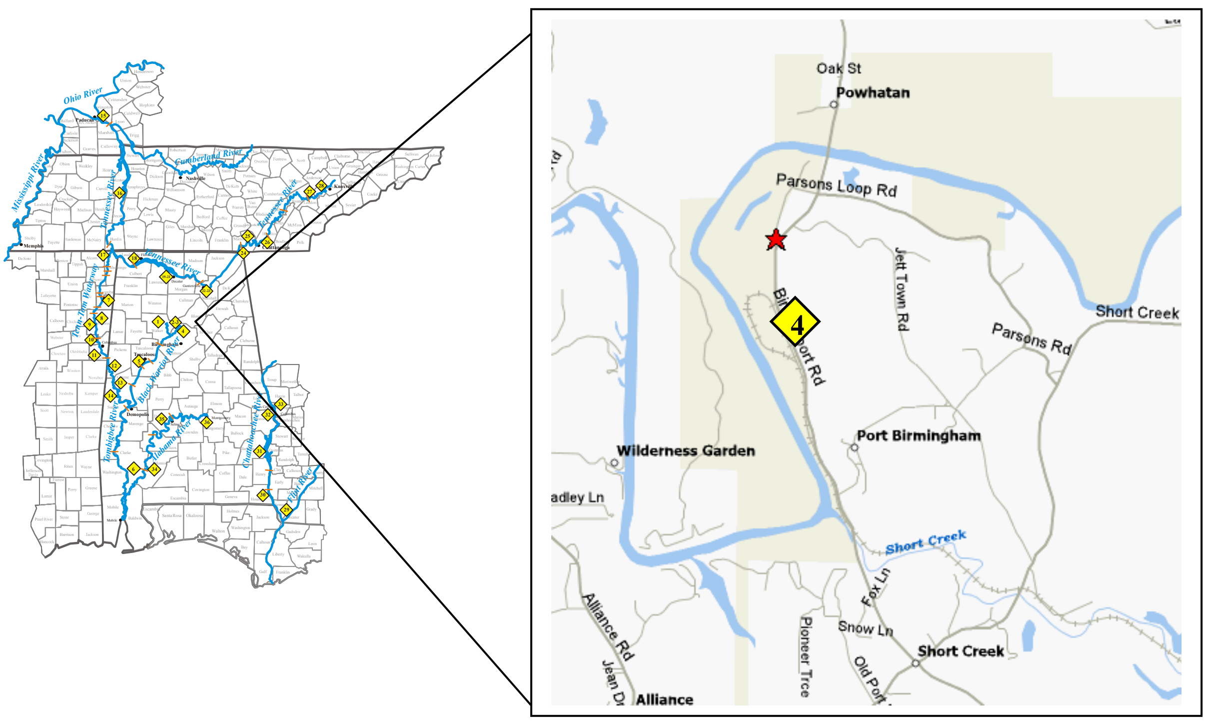
MILLER AND CO.





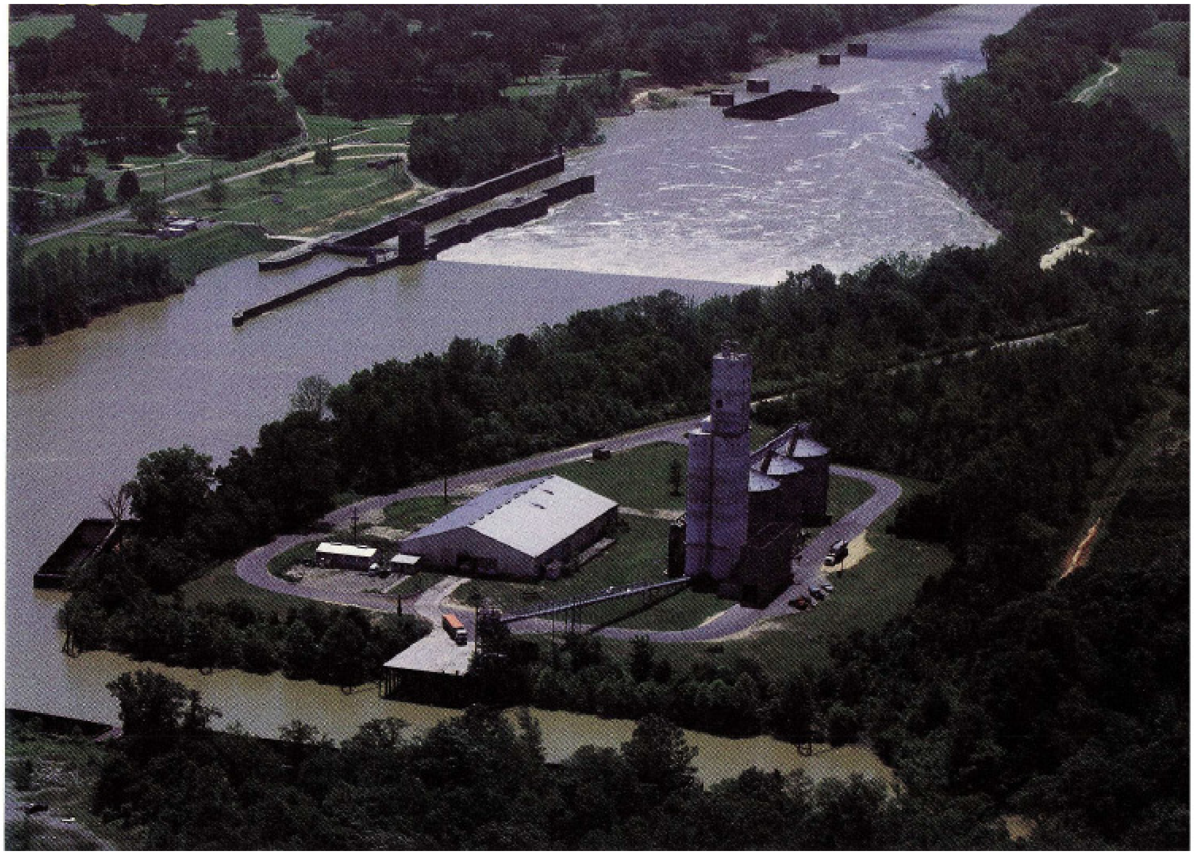
Port Name	Port Birmingham
Inventory #	4
Location	
City	Mulga
County	Jefferson
State	Alabama
River	Black Warrior River, Locust Fork
River Mile	397.0
Dist. to Hwy.	Hwy. 269 on-site; 16 miles to I-20/I-59
Dist. to Rail	Birmingham Southern to CSX and NS (22 r-mi.); BNSF (29 r-mi.)
Site	
Acres Developed	100 – open storage
Acres Owned	130
Topography	Flat between river and Hwy 269; steep terrain limits development on far side of Hwy 269
Facilities	
Docks	3,000' bulkhead; dock capacity is 25 barges
Buildings	Covered storage owned by operator
Equipment	23 ton gantry crane; 25 ton gantry crane; 100 ton stiff leg crane 4 front-end loaders; 3 bobcats; (2) 40 ton fork lifts; (8) 50 ton rock trucks
Services Offered	Rail discharge directly to barge and/or ground storage Transload from barge to truck and to dock side
Business	Dry bulk, coal, coke, iron pellets, pig iron, steel coil, slabs, wire, DRI
Contact	
Port Owner/Operator	Warrior and Gulf Navigation Company Bill Toxey (205) 436-3601, (205) 436-3957 (fax)
Rail Owner/Operator	Transtar Inc – Birmingham Southern Railroad Company

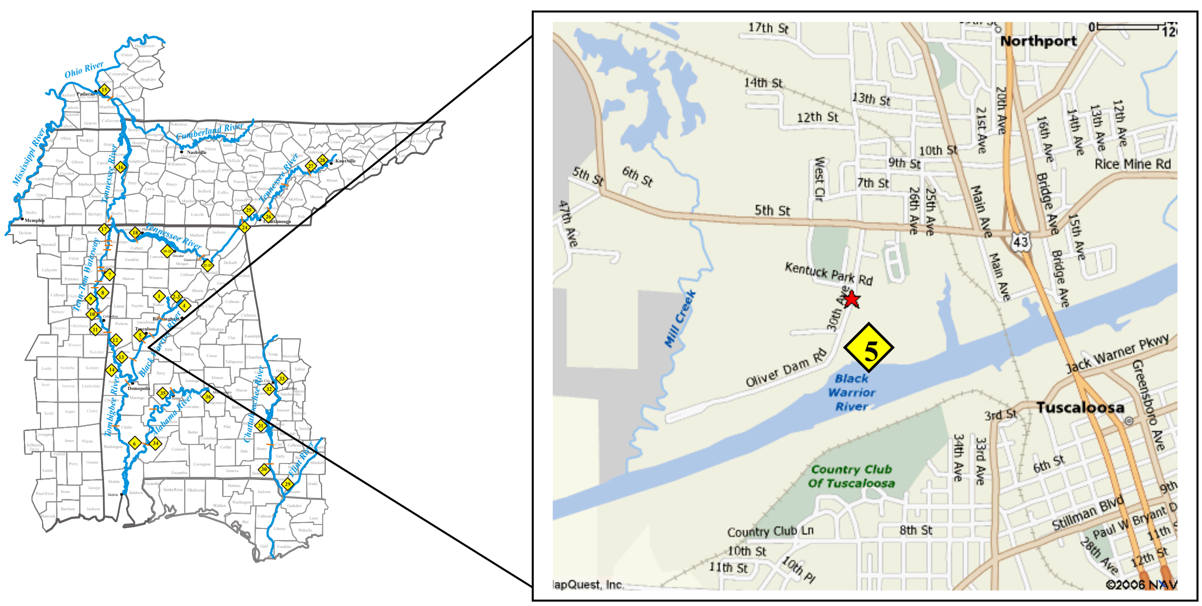
PORT BIRMINGHAM



Port Name	Tuscaloosa-Northport Inland Dock
Inventory #	5
Location	
City	Northport
County	Tuscaloosa
State	Alabama
River	Black Warrior River
River Mile	338.5
Dist. to Hwy.	Hwy. 69 - 1mi.; US Hwy. 82 – 4 mi.; I-20/I-59 - 4 mi.
Dist. to Rail	No rail on site
Site	
Acres Developed	20
Acres Owned	84
Topography	Flat
Facilities	
Docks	Reinforced concrete dock with mooring dolphins
Buildings	24,000 sq. ft.
Equipment	(1) 80 ton crawler crane
Services Offered	Truck/Barge
Business	Steel coils, magnetite, DRI, pig iron
Contact	
Port Owner	Alabama State Port Authority (251) 441-7123
Port Operator	Parker Towing Co. Terah Huckabee (205) 349-1677

TUSCALOOSA-NORTHPORT INLAND DOCK

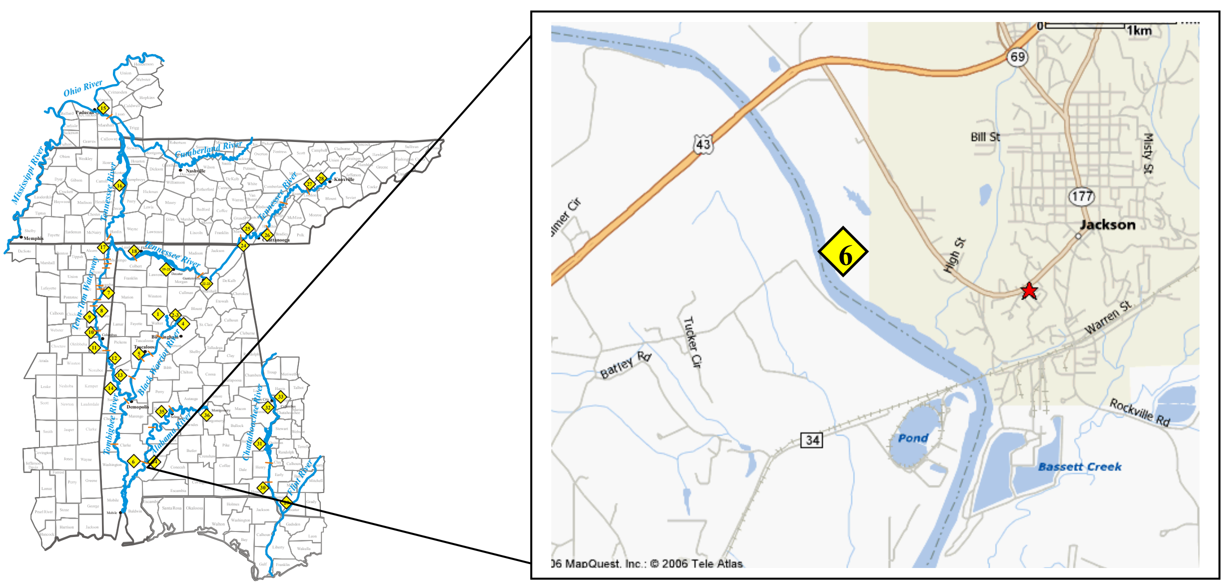




Port Name	Jackson City Port
Inventory #	6
Location	
City	Jackson
County	Clarke
State	Alabama
River	Tombigbee River
River Mile	91.0
Dist. to Hwy.	Hwy. 69 on-site; 1.5 miles to U.S. Hwy. 43
Dist. to Rail	No rail on site; Norfolk Southern 2 miles away
Site	
Acres Developed	15
Acres Owned	15
Topography	Flat
Facilities	
Docks	2 dredged slips, 3 mooring cells
Buildings	None
Equipment	(1) 120 ton crawler crane
Services Offered	Truck/barge
Business	Mostly raw wood products (chips and logs)
Contact	
Port Owner	City of Jackson, AL
Port Operator	Jackson Wood Fibre David Armstrong (251) 246-6746

JACKSON CITY PORT

No Photo Available

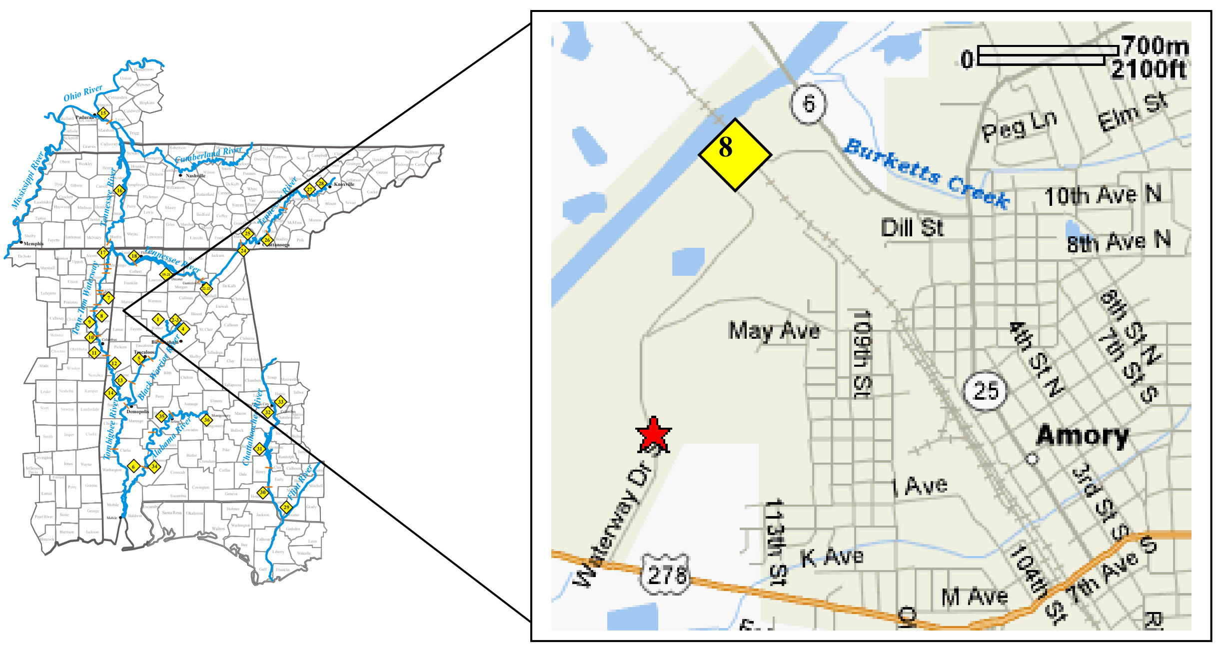


Port Name	Port of Itawamba
Inventory #	7
Location	
City	Fulton
County	Itawamba
State	Mississippi
River	Tenn-Tom Waterway
River Mile	390.0
Dist. to Hwy.	Hwy. 25 – 1 mi.; Hwy. 78 - 1 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	71
Acres Owned	71
Topography	Flat
Facilities	
Docks	1,100 ft. barge berth and 1,000 ft. berth
Buildings	15,000 sq. ft.
Equipment	175 ton mobile crane, 40 ton bridge crane, conveyor, roll-on/roll-off ramp, scales, direct dump ramp
Services Offered	Truck/ground/rail/barge service
Business	General cargo, bulk, steel and palletized cargo; forestry products, coiled steel, manufactured equipment
Contact	
Port Owner/ Operator	Itawamba County Carol Farris Upton (662) 862-4571

PORT OF ITAWAMBA

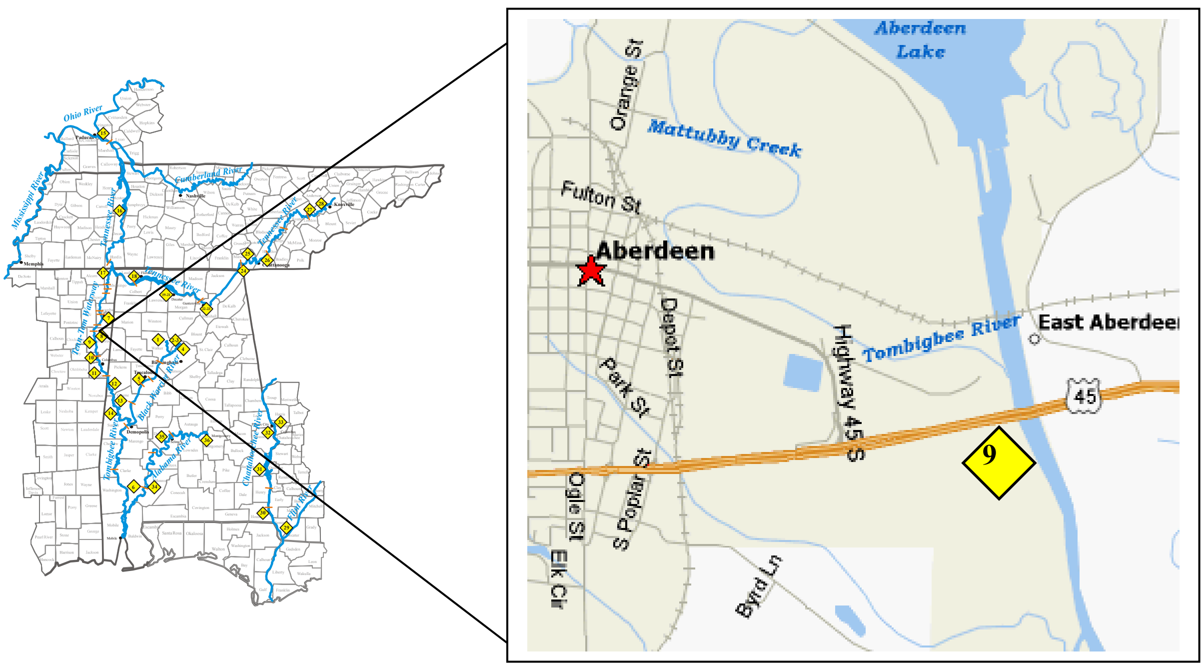
Port Name	Port of Amory
Inventory #	8
Location	
City	Amory
County	Monroe
State	Mississippi
River	Tenn-Tom Waterway
River Mile	369.5
Dist. to Hwy.	Hwy. 6 - adjacent; Hwy. 25 - 1.1 mi.; Hwy. 278 - 0.5 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	100
Acres Owned	100
Topography	Flat
Facilities	
Docks	834 ft. barge berth, bulkhead wood dock with steel pilings
Buildings	none
Equipment	30 ton bridge crane, conveyor, roll-on/roll-off ramp, scales, direct dump ramp
Services Offered	Truck/ground/rail//barge service
Business	General cargo, grain, steel, gravel, containers, lumber
Contact	
Port Owner/ Operator	City of Amory Raymond Butler (662) 256-3517

PORT OF AMORY



Port Name	Aberdeen Port
Inventory #	9
Location	
City	Aberdeen
County	Monroe
State	Mississippi
River	Tenn-Tom Waterway
River Mile	356.5
Dist. to Hwy.	US 45 - 2.0 mi.; Hwy. 25 - 2.9 mi.; I-55 - 83 mi.
Dist. to Rail	Rail - 1 mi.
Site	
Acres Developed	75
Acres Owned	175
Topography	Flat
Facilities	
Docks	One barge berth, 1000ft in length. concrete paved piling dock; mooring cell; one barge working.
Buildings	none
Equipment	90 & 100 ton crawler cranes, scales
Services Offered	Truck/liquid/barge service
Business	General cargo, grain, bentonite, wood products, petroleum
Contact	
Port Owner	City of Aberdeen
Port Operator	Tom Soya Grain Terminals Perry Lucas (662) 494-3574

ABERDEEN PORT

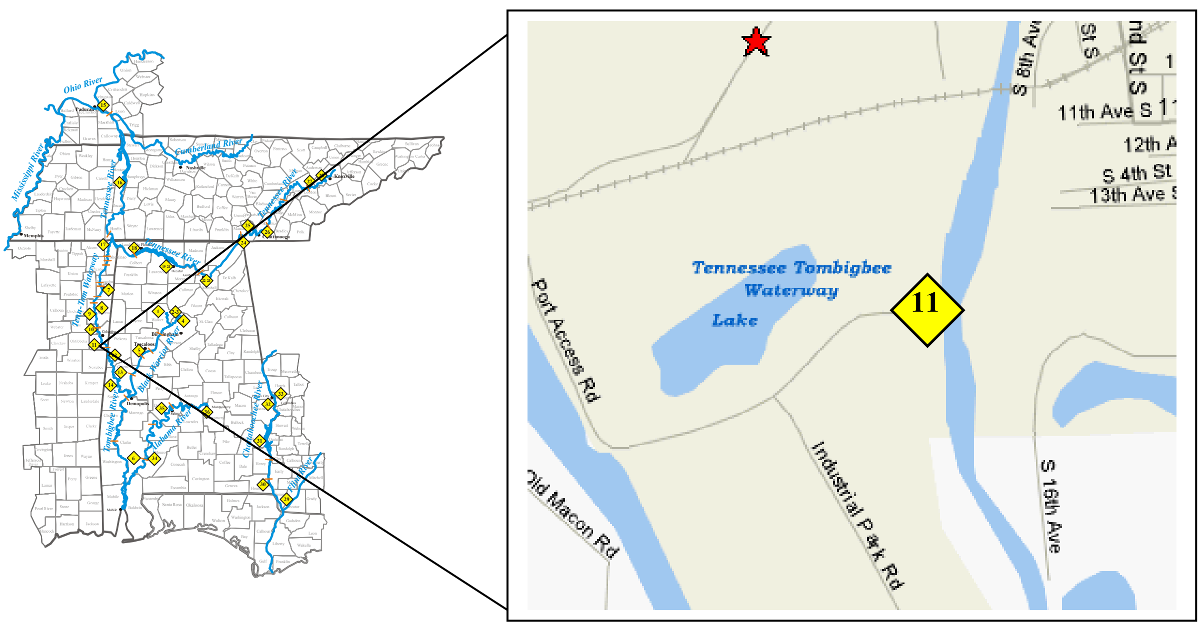


Port Name	Clay County Port
Inventory #	10
Location	
City	West Point
County	Clay
State	Mississippi
River	Tenn-Tom Waterway
River Mile	338.3
Dist. to Hwy.	Hwy. 50 - 2 miles
Dist. to Rail	No rail
Site	
Acres Developed	20
Acres Owned	20
Topography	Flat
Facilities	
Docks	995 ft. parallel barge slip, 60 ft. drive-on steel bulkhead, 120 ft. loading/off-loading crane dock; concrete dock with mooring cell; four barge working, 10 held with 6 mooring dolphins
Buildings	7,200 sq. ft.
Equipment	120 ton mobile crane with cell, scales, 240 tph and 300 tph conveyors
Services Offered	Truck/ground/barge service
Business	General cargo, coal, salt, lime, gypsum, rock, stone, fertilizer and machinery
Contact	
Port Owner	Clay County
Port Operator	Tom Soya Grain Terminals Perry Lucas (662) 494-3574

CLAY COUNTY PORT

Port Name	Lowndes County Port
Inventory #	11
Location	
City	Columbus
County	Lowndes
State	Mississippi
River	Tenn-Tom Waterway
River Mile	330.0
Dist. to Hwy	US 82 – 3 mi., US 45 – 2 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	90
Acres Owned	165
Topography	Flat
Facilities	
Docks	One covered dock with bridge crane, one open dock with tracked crane
Buildings	68,000 sq. ft., 1.5 mm gallon liquid storage
Equipment	100 ton crawler crane; 40 ton bridge crane; scales; 300 tph conveyor, dump hopper
Services Offered	Truck/ground/rail/liquid/barge service
Business	General cargo, caustic soda, wood products, coal, steel
Contact	
Port Owner	Lowndes County John Hardy (662) 329-5886
Port Operator	Stevedoring Services of America

LOWNDES COUNTY PORT

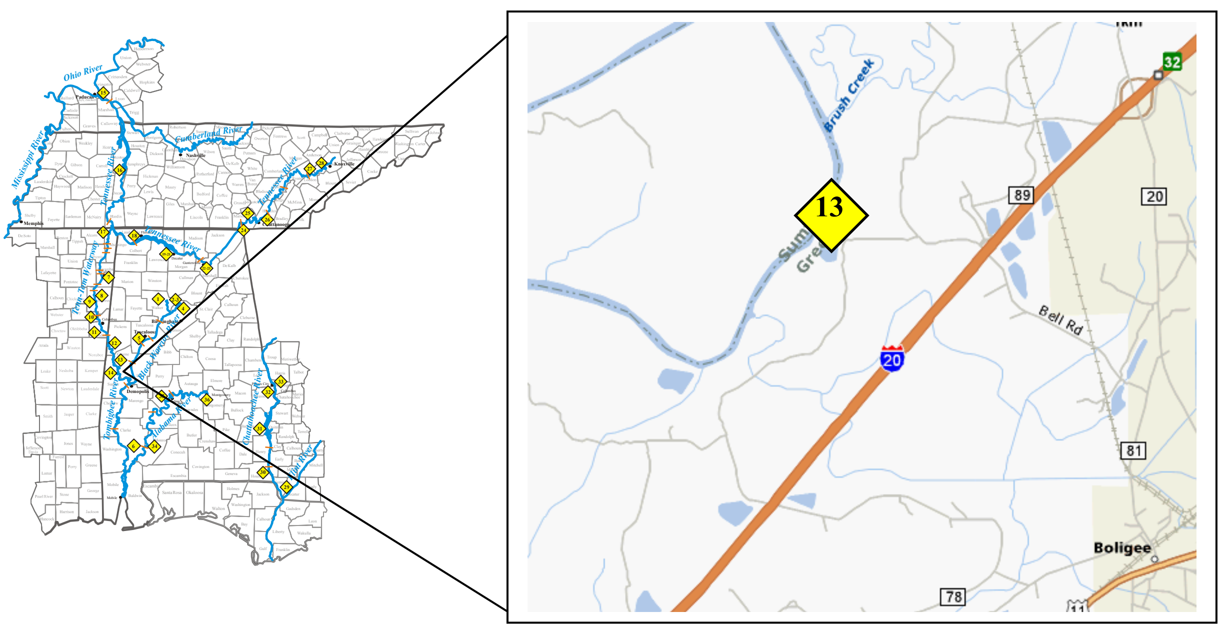


Port Name	Pickens County Port
Inventory #	12
Location	
City	Carrollton
County	Pickens
State	Alabama
River	Tenn-Tom Waterway
River Mile	309.0
Dist. to Hwy.	US 86 adjacent
Dist. to Rail	Rail on site
Site	
Acres Developed	3
Acres Owned	8
Topography	Flat
Facilities	
Docks	Steel pile bulkhead with mooring cells; two barge working, several held
Buildings	24,000 sq.ft.
Equipment	100 ton mobile crane, conveyor, loader, clam bucket; scales, grain elevator
Services Offered	Truck/ground/rail/barge service
Business	General cargo, grain, gypsum, potash, coal, cement and wood products
Contact	
Port Owner	Pickens County
Port Operator	Parker Towing (205) 373-8852

PICKENS COUNTY PORT

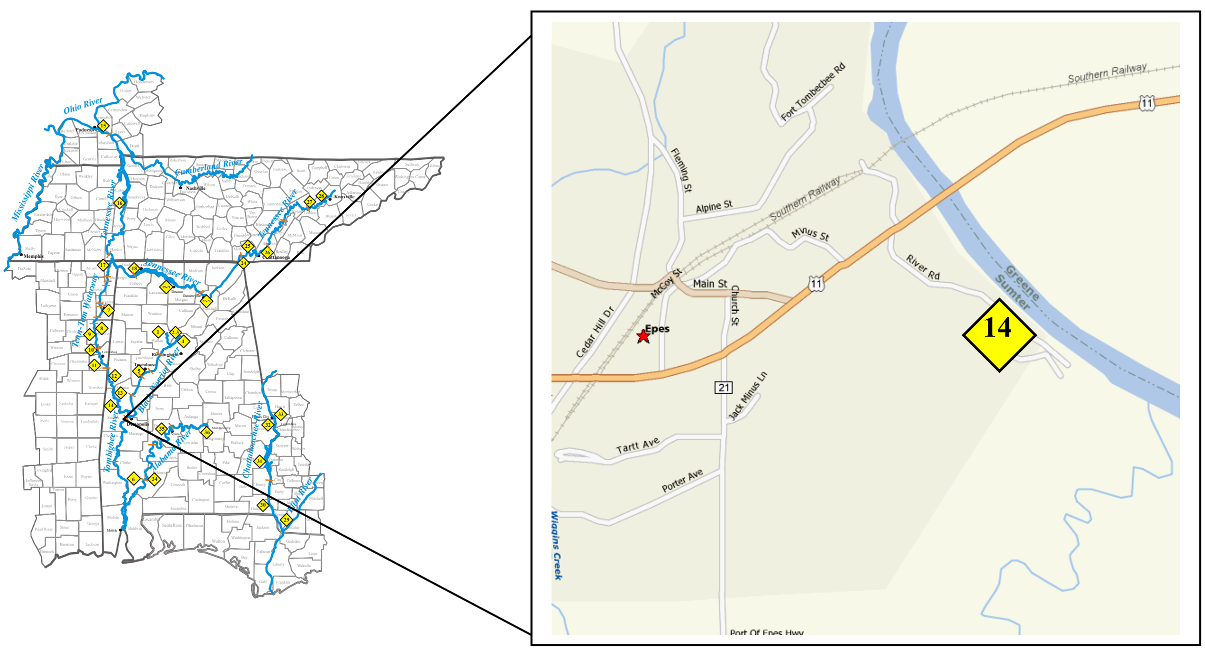
Port Name	Crossroads of America Port
Inventory #	13
Location	
City	Eutaw
County	Greene
State	Alabama
River	Tenn-Tom Waterway
River Mile	259.3
Dist. to Hwy.	Hwy. 19 - adjacent; US 11 - 2.5 mi.; I59/20 - adjacent
Dist. to Rail	Rail - 2.5 mi.
Site	
Acres Developed	1,405
Acres Owned	1,892
Topography	Flat
Facilities	
Docks	Steel bulkhead with mooring cells; two barge working, several held
Buildings	None
Equipment	None
Services Offered	Truck/ground /barge service
Business	General cargo and wood products
Contact	
Port Owner	Greene County
Port Operator	Crossroads of America Port (205) 372-9769

CROSSROADS OF AMERICA PORT



Port Name	Port of Epes
Inventory #	14
Location	
City	Epes
County	Sumter
State	Alabama
River	Tenn-Tom Waterway
River Mile	247.4
Dist. to Hwy.	Hwy. 7 - 1.5 mi.; US 82 - 1.5 mi.; I-59/20 - 3.2 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	17
Acres Owned	688
Topography	Flat
Facilities	
Docks	General cargo dock on slackwater harbor
Buildings	None
Equipment	Crane owned by tenant
Services Offered	Truck/ground/rail/barge service
Business	General cargo, aggregates, dry bulk and wood products
Contact	
Port Owner	Sumter County
Port Operator	Parker Towing (205) 456-1880

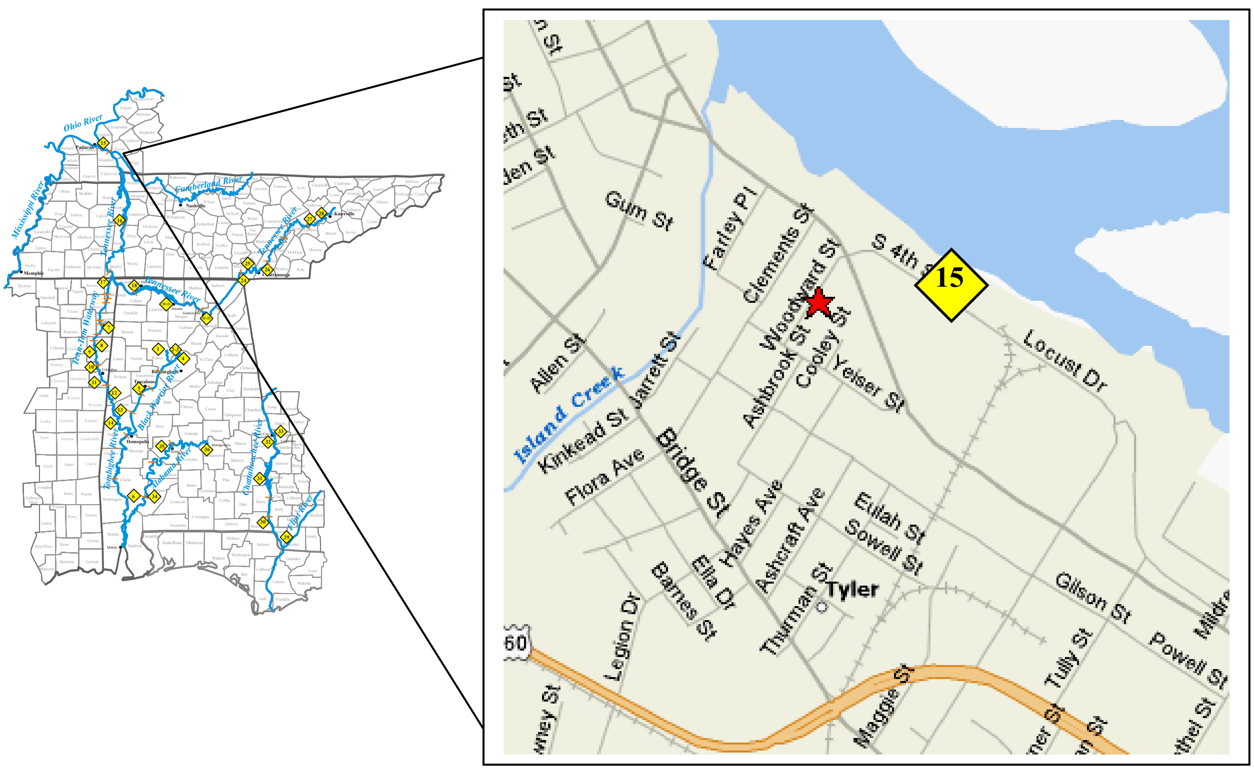
PORT OF EPES



Ohio River
Mississippi River
Cumberland River
Tennessee River
Southern Railway
Fort Tombecbee Rd
Fleming St
Alpine St
Mvius St
River Rd
Greene
Sumter
14
11
Main St
McCoy St
Church St
Cedar Hill Dr
Epes
21
Jack Minus Ln
Tartt Ave
Porter Ave
Wiggins Creek
Port Of Epes Hwy

Port Name	Paducah/McCracken County Riverport
Inventory #	15
Location	
City	Paducah
County	McCracken
State	Kentucky
River	Tennessee River
River Mile	1.3 & 2.0
Dist. to Hwy.	I-24 - 3 miles
Dist. to Rail	Rail on site
Site	
Acres Developed	37
Acres Owned	48
Topography	Flat
Facilities	
Docks	2,300 ft. river frontage; separate docks for general cargo, bulk materials, grain, fertilizer
Buildings	125,000 sq. ft. covered storage; 36,000 sq. ft. general storage; 2.6 mm gallon liquid storage
Equipment	(1) 125 ton crane, (1) 20 ton crane, 5 yd clam bucket, loaders, forklifts, trucks, conveyors
Services Offered	Truck/ground/rail/liquid/barge service , packaging and distribution
Business	Bulk cargo, rubber, steel billets, chemical cylinders Liquid fertilizer, solvents, petroleum products Aggregates, fertilizer, minerals, sand, gravel Grain Container handling
Contact	
Port Owner/ Operator	Paducah/McCracken County Ken Canter (270) 422-9326

PADUCAH/MCCRACKEN COUNTY RIVERPORT



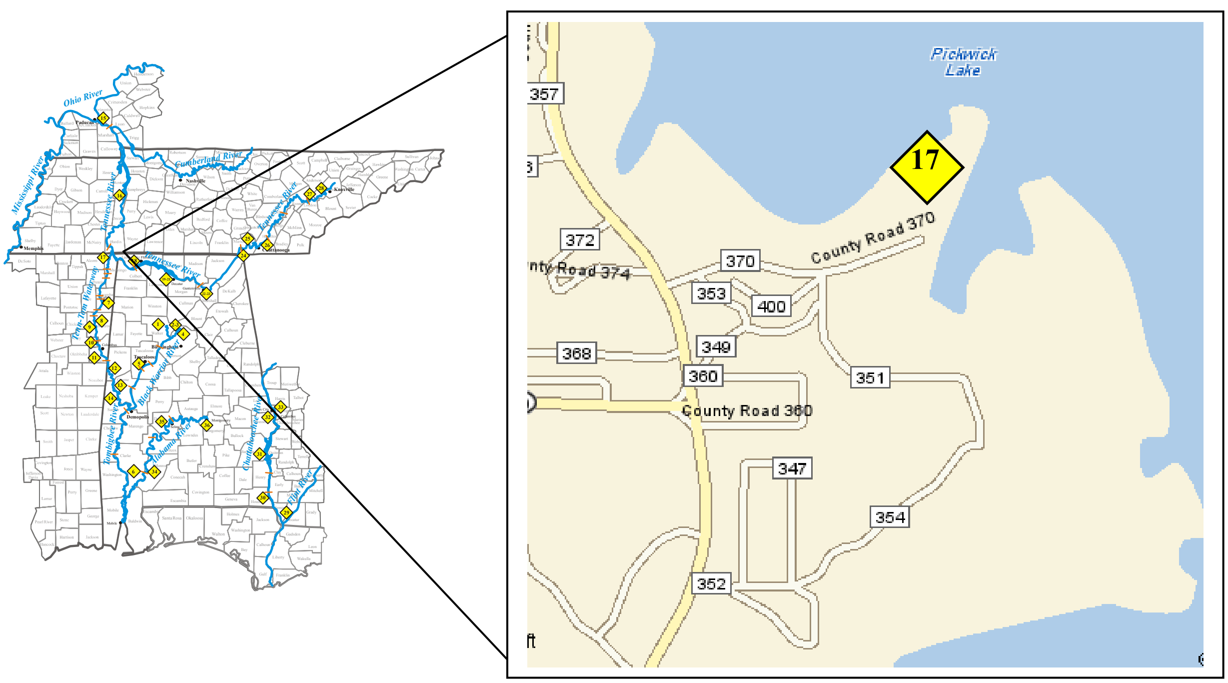
Port Name	Sangravl Company, Inc.
Inventory #	16
Location	
City	New Johnsonville
County	Humphreys
State	Tennessee
River	Tennessee River
River Mile	100.4
Dist. to Hwy.	I-40 - 10 mi.; US-70 - 5 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	15
Acres Owned	15
Topography	Flat
Facilities	
Docks	Mooring cells
Buildings	None
Equipment	(1) 150 ton crane; (1) floating crane; 4-yard clam bucket; 200 tph conveyor
Services Offered	Truck/ground/rail/barge service
Business	Aggregates, steel, coke, livilite, coal, ore, sand, aluminum
Contact	
Port Owner/ Operator	Sangravl Company John Herbert (931) 535-2196

SANGRAVL COMPANY, INC.

No Photo Available

Port Name	Yellow Creek State Inland Port
Inventory #	17
Location	
City	Iuka
County	Tishomingo
State	Mississippi
River	Tennessee River
River Mile	215.1
Dist. to Hwy.	US-72 - 15 mi.; Interstate - 50 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	100
Acres Owned	3,000
Topography	Flat
Facilities	
Docks	1,000 ft. barge berth and 400 ft. berth
Buildings	3 warehouses with a total 60,000 sq. ft.
Equipment	(2) 25 ton gantry cranes; (3) mobile cranes – (1) 200 ton and (2) 160 ton
Services Offered	Truck/ground/rail/liquid/barge service
Business	Steel coils, general cargo, containers, structural steel, wood products, cement
Contact	
Port Owner/Operator	State of Mississippi Eugene Bishop (662) 423-6088

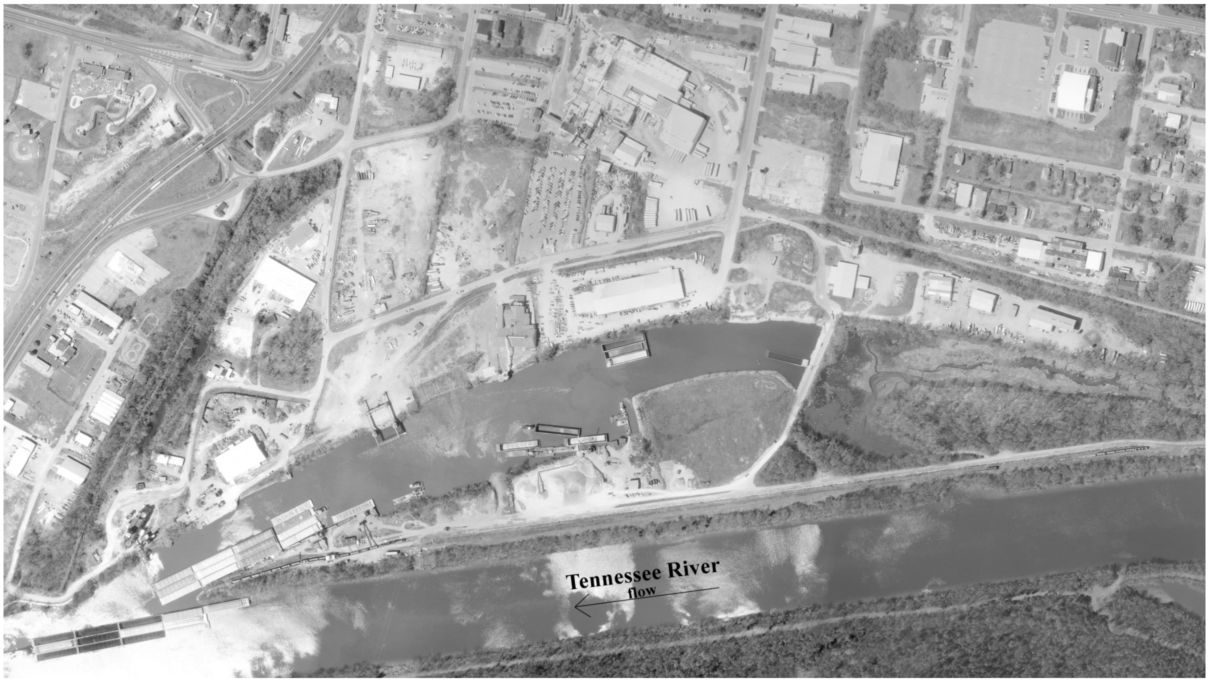
YELLOW CREEK STATE INLAND PORT



Inventory of General Purpose River Terminals
Appendix A to the Alabama Freight Mobility Study Phase 1 -
Business Perspectives on the Feasibility of Container-On-Barge Service
Prepared for the Coalition of Alabama Waterway Associations

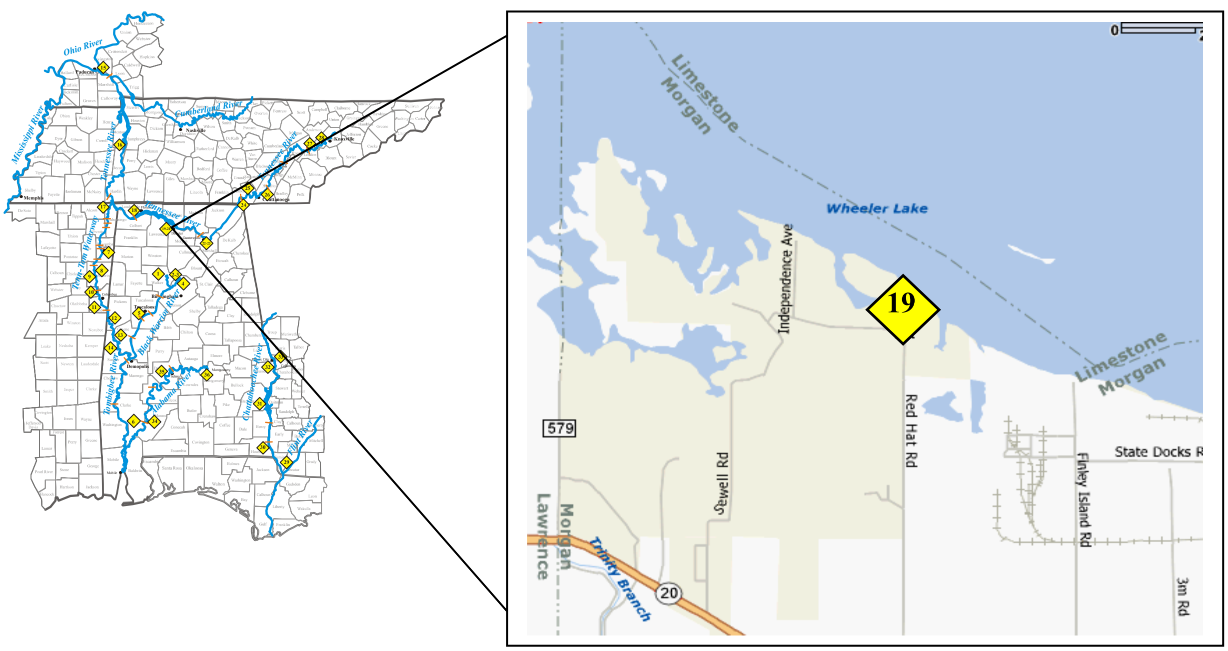
Port Name	Florence-Lauderdale County Port Authority
Inventory #	18
Location	
City	Florence
County	Lauderdale
State	Alabama
River	Tennessee River
River Mile	256.6
Dist. to Hwy.	U.S. Hwy 72 – adjacent; I-65 - 45 mi.
Dist. to Rail	Tennessee Southern short-line to CSX - 80 mi. north
Site	
Acres Developed	50
Acres Owned	50
Topography	Flat rectangle
Facilities	
Docks	Public dock, one mile frontage
Buildings	24,000 sq. ft. warehouse
Equipment	40 ton overhead crane; mobile crawler crane
Services Offered	Pubic Dock, warehouse, stevedore, harbor and fleeting service
Business	Sand, aluminum, potash, salt, sulfate, steel coils, bulk cargo, go
Contact	
Port Owner/Operator	Florence-Lauderdale County Port Authority James (Jim) Loew, Port Director (256) 767-5388

FLORENCE – LAUDERDALE COUNTY PORT AUTH.



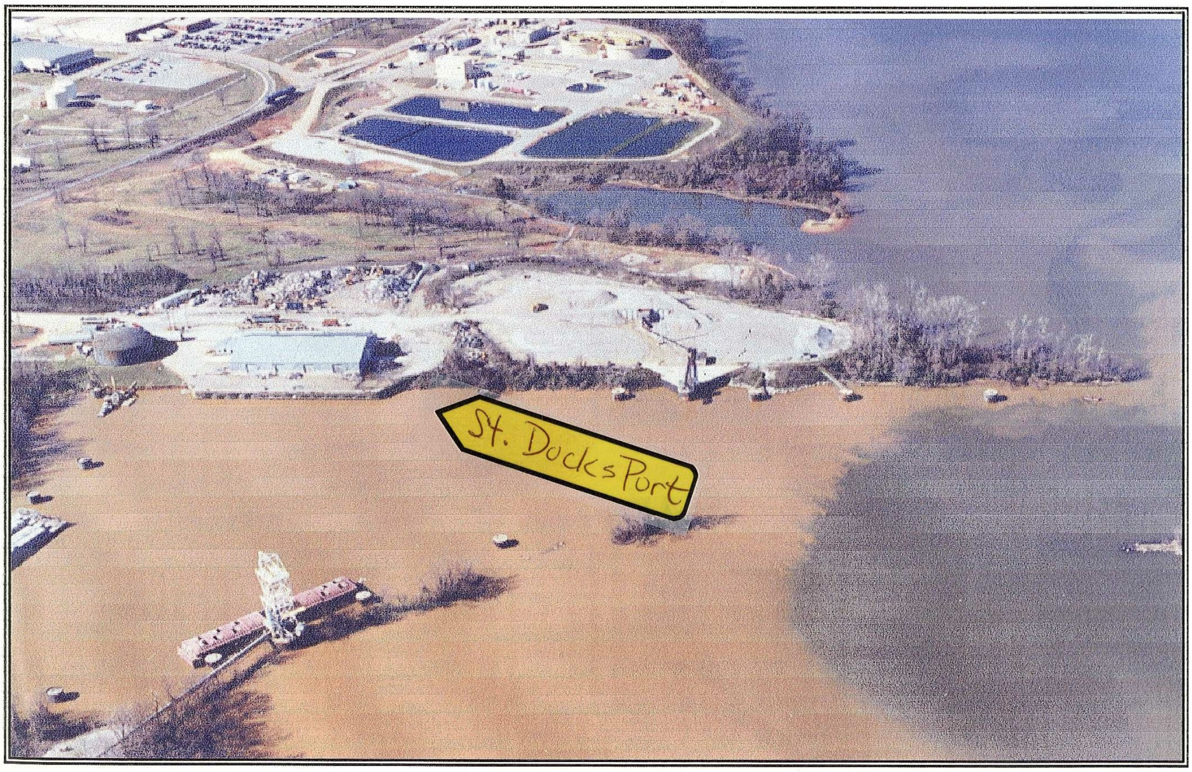
Port Name	Mallard-Fox Creek River Port
Inventory #	19
Location	
City	Decatur
County	Morgan
State	Alabama
River	Tennessee River
River Mile	298.5
Dist. to Hwy.	I-65 - 7 mi. west
Dist. to Rail	Norfolk Southern on site
Site	
Acres Developed	12.56
Acres Owned	12.56 (100 acres immediately available, 50 acres available in 2 years)
Topography	Flat
Facilities	
Docks	500 ft. dock
Buildings	24,000 sq. ft. warehouse on site; 31,800 sq. ft. warehouse off site (1/2 mile)
Equipment	(2) tug boats; (2) cranes up to 200 ton capacity; forklift with 80,000 lb. capacity; (4) flat bed trucks, scales
Services Offered	Barge to storage, truck from storage to customer, barge direct to customer, truck to storage, rail to storage, rail to customer
Business	Steel coils, steel plates, pig iron, alloys, coke, cottonseed, agricultural products, bulk cargo
Contact	
Port Owner	Deactur-Morgan County Port Authority (256) 353-1213
Port Operator	Kinder Morgan (724) 419-1070

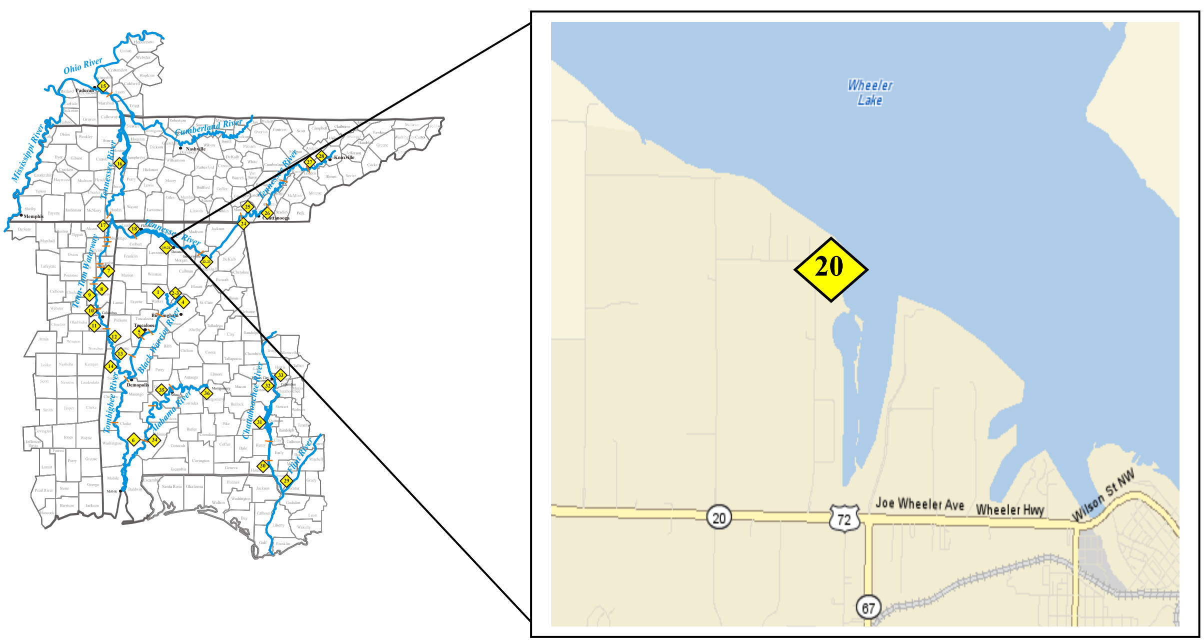
MALLARD-FOX CREEK RIVER PORT



Port Name	Decatur State Docks
Inventory #	20
Location	
City	Decatur
County	Morgan
State	Alabama
River	Tennessee River
River Mile	301.4
Dist. to Hwy.	I-65 - 12 mi. west; ST-20, US-72 adjacent
Dist. to Rail	Norfolk Southern on site
Site	
Acres Developed	16.7
Acres Owned	16.7
Topography	Flat
Facilities	
Docks	250 ft. dock
Buildings	18,000 sq. ft. warehouse on site
Equipment	(2) Manitowoc crawler cranes, 100 ton and 200 ton; (3) forklifts - (1) 80,000 lb. and (2) 65,000 lb.
Services Offered	Public dock operating as private port due to current lease/sub-lease structure.
Business	Stainless steel
Contact	
Port Owner	Decatur-Morgan County Port Authority (256) 353-1213
Port Operator	Kinder Morgan (724) 419-1070 Cronimet Corporation (724) 774-7004

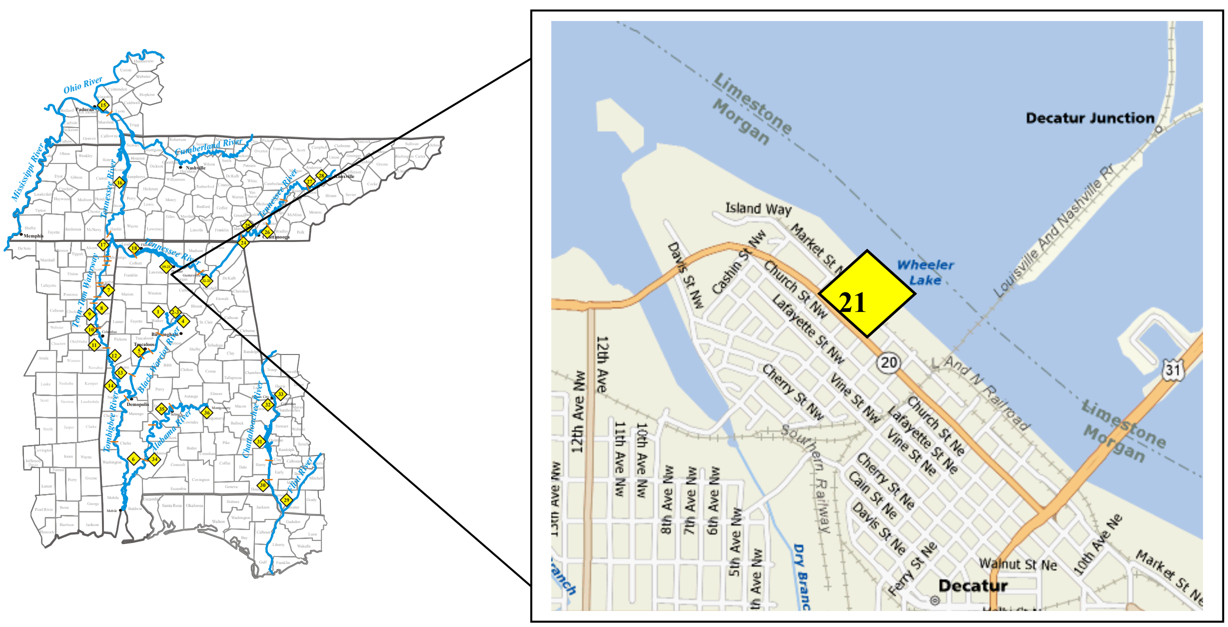
DECATUR STATE DOCKS





Port Name	Decatur Transit
Inventory #	21
Location	
City	Decatur
County	Morgan
State	Alabama
River	Tennessee River
River Mile	304.1
Dist. to Hwy.	I-65 - 6 mi. west; ST-20, US-72 adjacent
Dist. to Rail	Norfolk Southern and CSX on site
Site	
Acres Developed	14
Acres Owned	14
Topography	Flat
Facilities	
Docks	Cell
Buildings	24,000 sq. ft. warehouse on site
Equipment	(2) Switch boats, 800hp and 1000hp (2) Crawler cranes, 75 ton and 175 ton; (4) Forklifts (1) Front-end loader Truck Scales
Services Offered	Barge switching, fleeting and cleaning. Warehousing, liquid storage, JIT services.
Business	Dry Bulk – grain asphalt steel cast iron. General purpose cargo.
Contact	
Port Owner/Operator	Decatur Transit, Inc (256) 353.9601

DECATUR TRANSIT



Port Name	Guntersville Marine
Inventory #	22
Location	
City	Guntersville
County	Marshall
State	Alabama
River	Tennessee River
River Mile	358.2
Dist. to Hwy.	ST-122 nearby
Dist. to Rail	No rail on site/adjacent short line rail
Site	
Acres Developed	15
Acres Owned	20
Topography	Flat
Facilities	
Docks	220 ft. dock with 9 barge capacity, 120 ft. dock with 3 barge capacity
Buildings	2 warehouses on site - (1) 30,000 sq. ft. and (1) 9,000 sq. ft.
Equipment	(1) 100 ton crawler crane, 3.5 yd. bucket, 5 yd. bucket Komatsu PC 600 excavator with 5 yd. bucket Fuchs ML 360 excavator with 3 yd. bucket
Services Offered	Truck, barge
Business	Sand, salt, grain, gravel, iron, steel, forest products, bulk, mulch, foundry coke
Contact	
Port Owner	Guntersville Marine (314) 621-3722
Port Operator	Guntersville Marine (256) 582-0650 (314) 621-3722

GUNTERSVILLE MARINE

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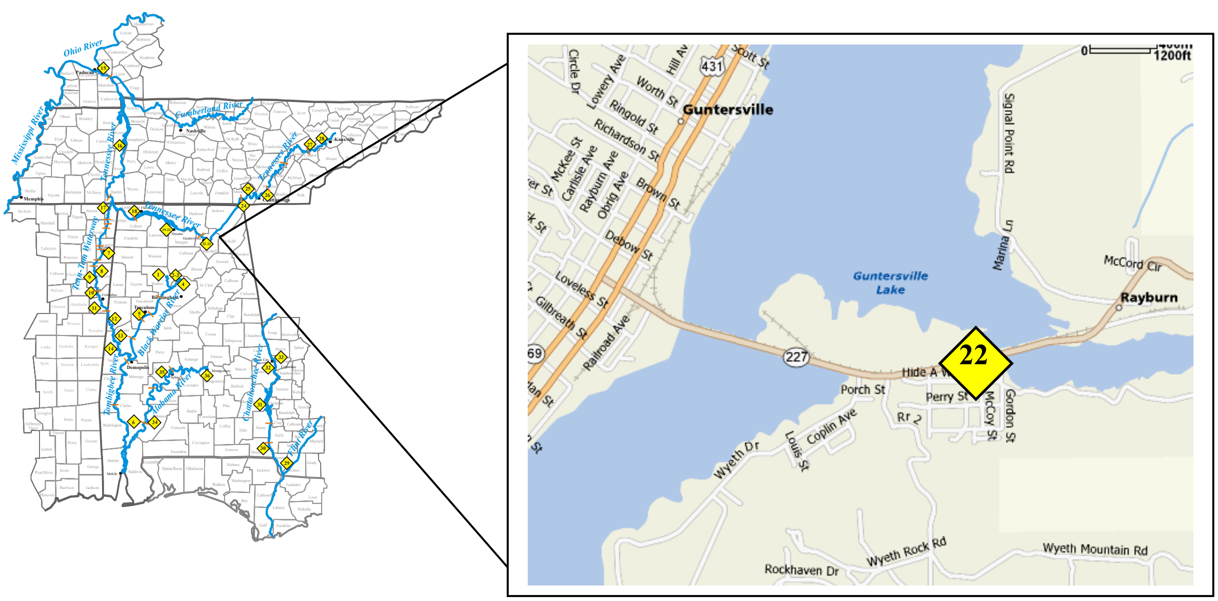
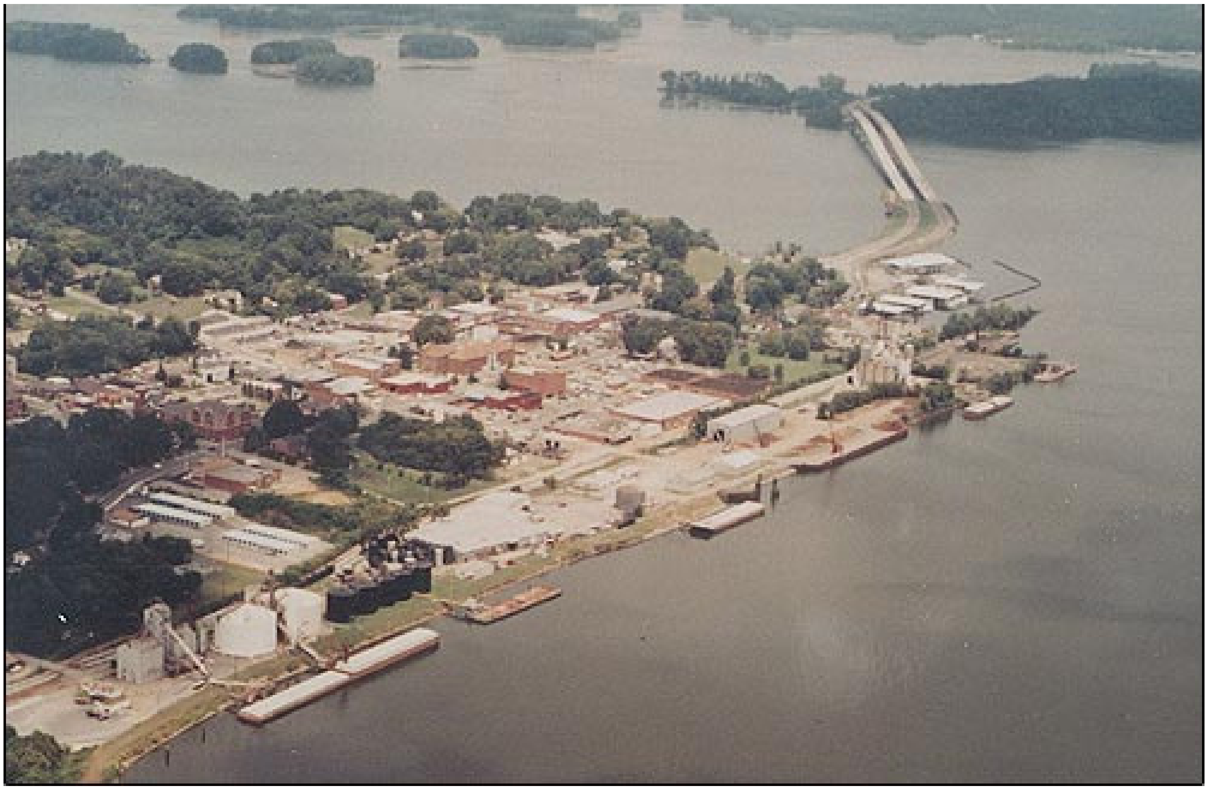
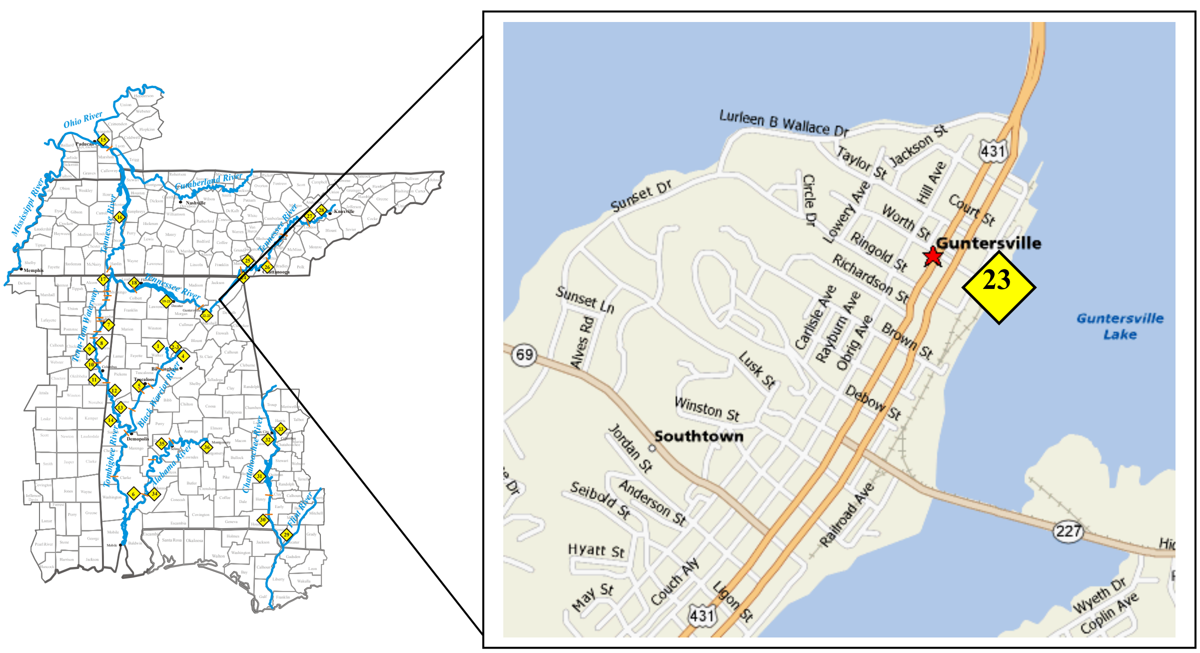


Port Name	Kinder Morgan - Guntersville
Inventory #	23
Location	
City	Guntersville
County	Marshall
State	Alabama
River	Tennessee River
River Mile	358.1
Dist. to Hwy.	ST-227 on-site and Hwy 431 adjacent
Dist. to Rail	CSX (2 spurs) on property
Site	
Acres Developed	8
Acres Owned	8
Topography	Flat point into river
Facilities	
Docks	300' concrete wall with crane; 400' steel piling dock with crane; 200' cluster piling area with steel dock for liquid transfer
Buildings	12,000 sq. ft. and 5,800 sq. ft. warehouses on site; 40,000 sq. ft. off-site; 500,000 gal. and 600,000 gal. tanks; 80 hp. boiler with a 150 hp. on its way
Equipment	40 ton, 60 ton, 100 ton crawlers; 5 ton and 15 ton overhead crane; 6,000 lb., 15,500 lb., 22,500 lb., 30,000 lb. fork trucks; unloader, (2) 2-1/2 yd. clamshells; (3) electromagnets and generators
Services Offered	Rail discharge directly to barge and/or ground storage Transload from barge to truck, to rail and to dock side
Business	Caustic soda, tin plate, pig iron, steel coil, wire rod coils, pet coke, coke breeze, rebar aluminum structural steel
Contact	
Port Owner	Kinder-Morgan (713) 365-9000
Port Operator	Mike Thompson (256) 582-3297

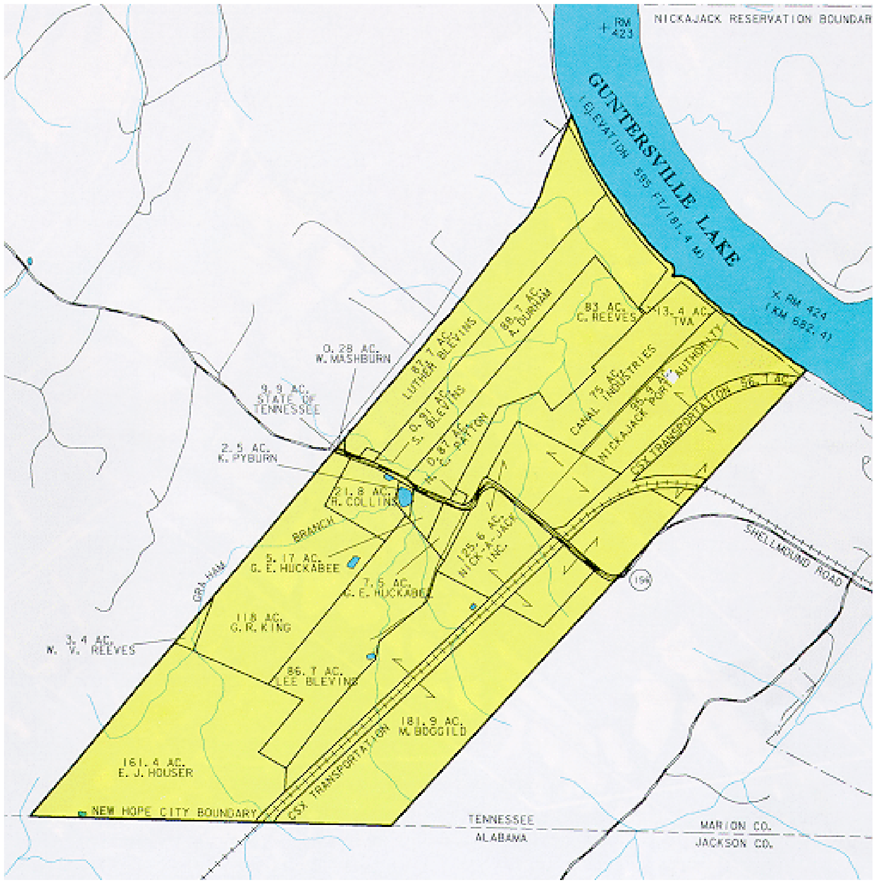
KINDER MORGAN - GUNTERSVILLE

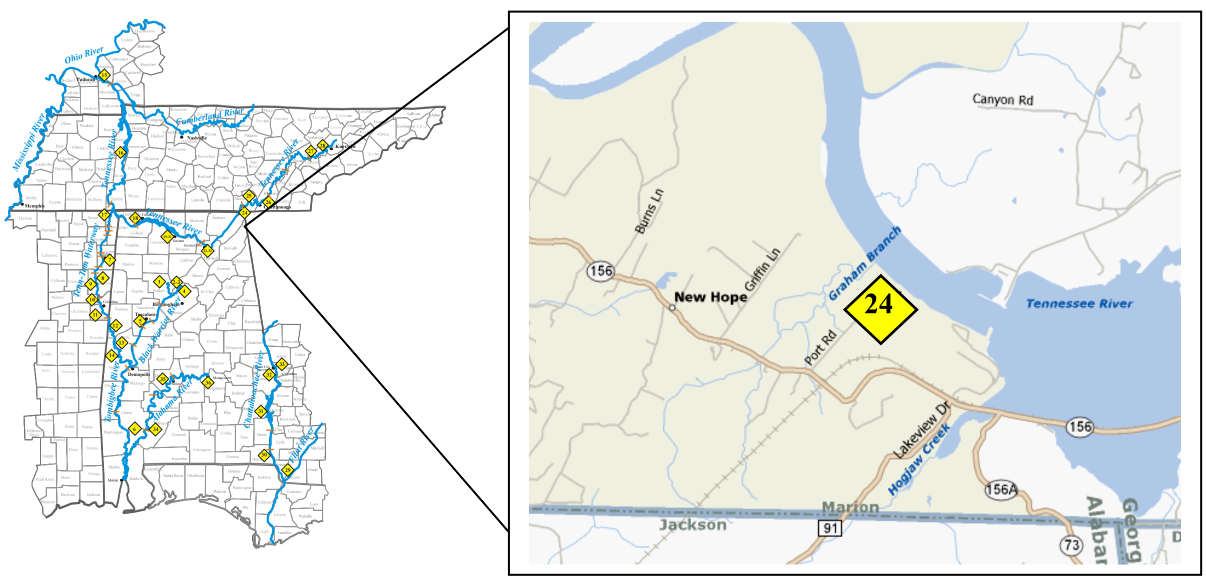




Port Name	Port of Nickajack
Inventory #	24
Location	
City	South Pittsburg
County	Marion
State	Tennessee
River	Tennessee River
River Mile	423.7
Dist. to Hwy.	ST-156 adjacent
Dist. to Rail	No rail on site
Site	
Acres Developed	3
Acres Owned	8
Topography	Flat
Facilities	
Docks	800’ river frontage with 40’ crane cell and (3) 20’ mooring cells; capacity is one working with 4 fleeted
Buildings	No storage buildings
Equipment	Crane with 40,000 lb. capacity at 40 ft.; 5 cy. clam bucket; 82” magnet
Services Offered	Transload from barge to truck and to ground storage
Business	Pig iron, steel, forest products, aggregates, coal
Contact	
Port Owner/Operator	Nickajack Port Authority Parker Towing Company Terah Huckabee (205) 391-1123

PORT OF NICKAJACK





Inventory of General Purpose River Terminals
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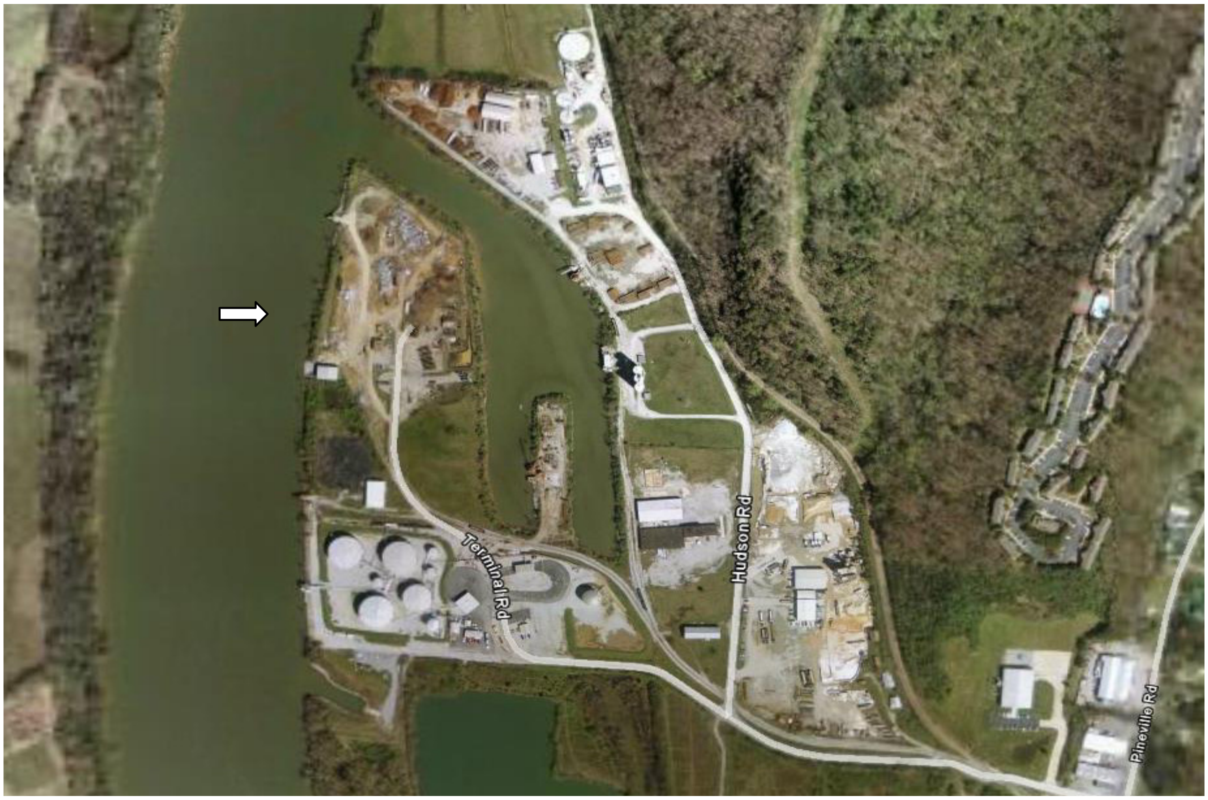
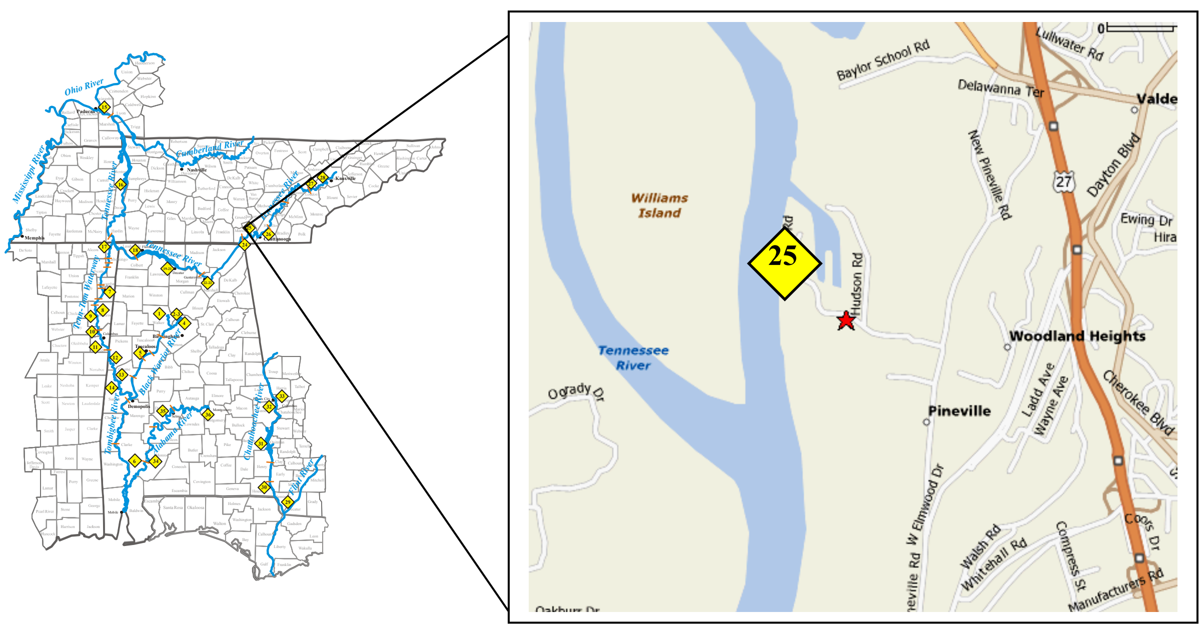
Prepared for the Coalition of Alabama Waterway Associations

Port Name	Mid-South Terminals Company
Inventory #	25
Location	
City	Chattanooga
County	Hamilton
State	Tennessee
River	Tennessee River
River Mile	456.2
Dist. to Hwy.	I-24 via US27
Dist. to Rail	Rail on site
Site	
Acres Developed	Three sites - (2) 1.5 acre and (1) 15 acre site at 456.5 that is inactive at this time.
Acres Owned	18
Topography	Flat
Facilities	
Docks	1,600 ft. river frontage with many dolphins and cells along the main channel of the river as well as the barge slip area
Buildings	None
Equipment	(2) 70 ton cranes on 25 ft. cells; (2) 100 ton cranes American 999C crawler; Manitowoc 4000 crawler
Services Offered	Barge to truck/ground/rail/liquid storage Truck/ground/rail/liquid to barge
Business	Iron, steel, coal, coke, grain and aggregates
Contact	
Port Owner/ Operator	Serodino, Inc. V.P. Serodino (423) 266-1855

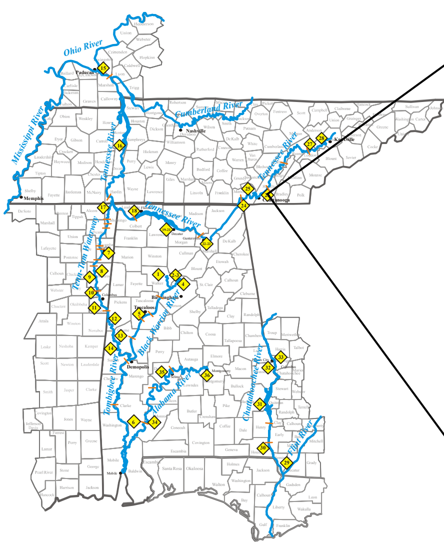
MID-SOUTH TERMINALS CO.





Port Name	Centre South River Terminal
Inventory #	26
Location	
City	Chattanooga
County	Hamilton
State	Tennessee
River	Tennessee River
River Mile	467.0
Dist. to Hwy.	I-24, I-75, and I-59 adjacent, or within 5 miles
Dist. to Rail	Rail on site
Site	
Acres Developed	10
Acres Owned	17
Topography	Flat
Facilities	
Docks	600 ft. river frontage with a 40 ft. crane cell and three 25 ft. mooring cells; capacity is one working and one held
Buildings	No warehouses
Equipment	American 999C crawler; Manitowoc 4000 crawler
Services Offered	Barge, truck, rail
Business	Pig iron, steel, aggregates and fertilizer
Contact	
Port Owner	Hamilton County, Tennessee
Port Operator	Parker Towing Terah Huckabee (205) 391-1123

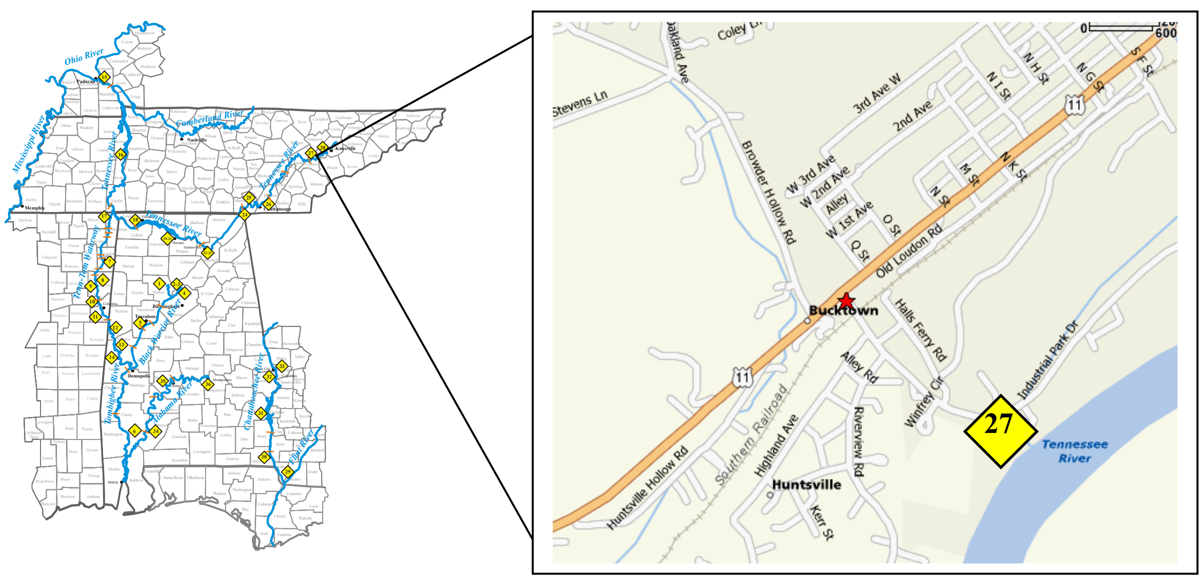
CENTRE SOUTH RIVER TERMINAL



Port Name	Fort Loudon Terminal
Inventory #	27
Location	
City	Lenoir City
County	Loudon
State	Tennessee
River	Tennessee River
River Mile	600.2
Dist. to Hwy.	I-40 and I-75 are within 3 miles
Dist. to Rail	Rail on site
Site	
Acres Developed	11
Acres Owned	22
Topography	80% flat; 20% slightly sloped
Facilities	
Docks	Extensive river frontage
Buildings	(2) storage buildings - 25,000 sq. ft. and 50,000 sq. ft; 1 acre storage pad
Equipment	(1) 30 ton crane; (4) other cranes; (2) truck scales
Services Offered	Truck/ground/rail/ service
Business	Iron, salt, forest products, alloys, fertilizers, sand, chemicals, steel, coal, coke, grain and aggregates
Contact	
Port Owner/ Operator	Tennessee Farmers Cooperative Don Lee (865) 986-6545

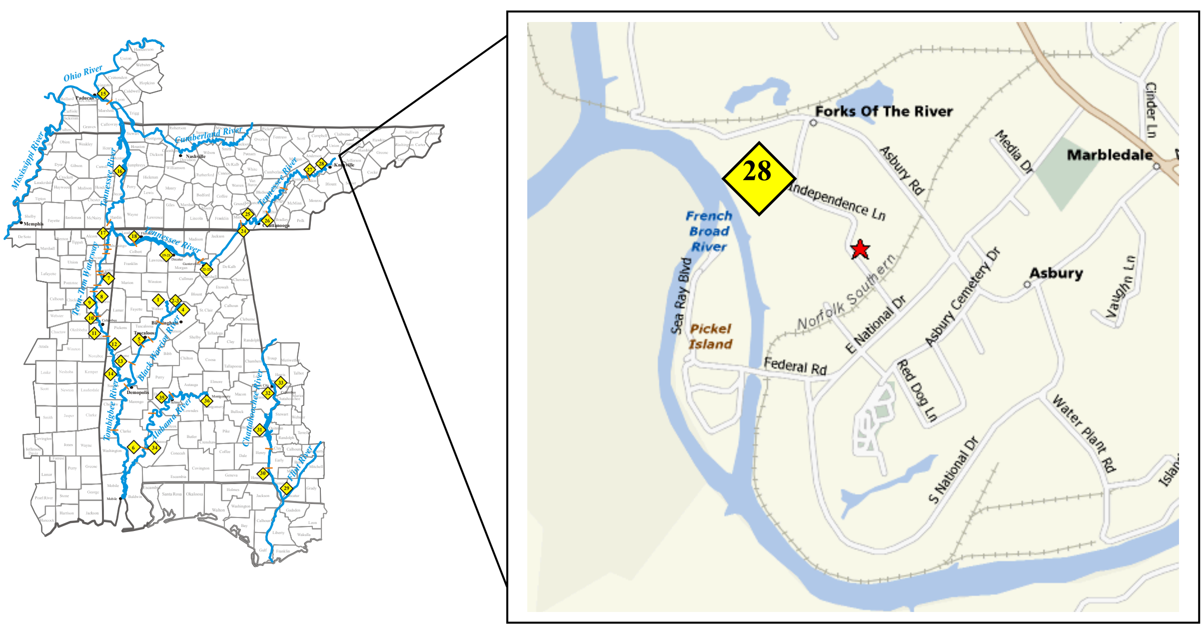
FORT LOUDON TERMINAL

No Photo Available



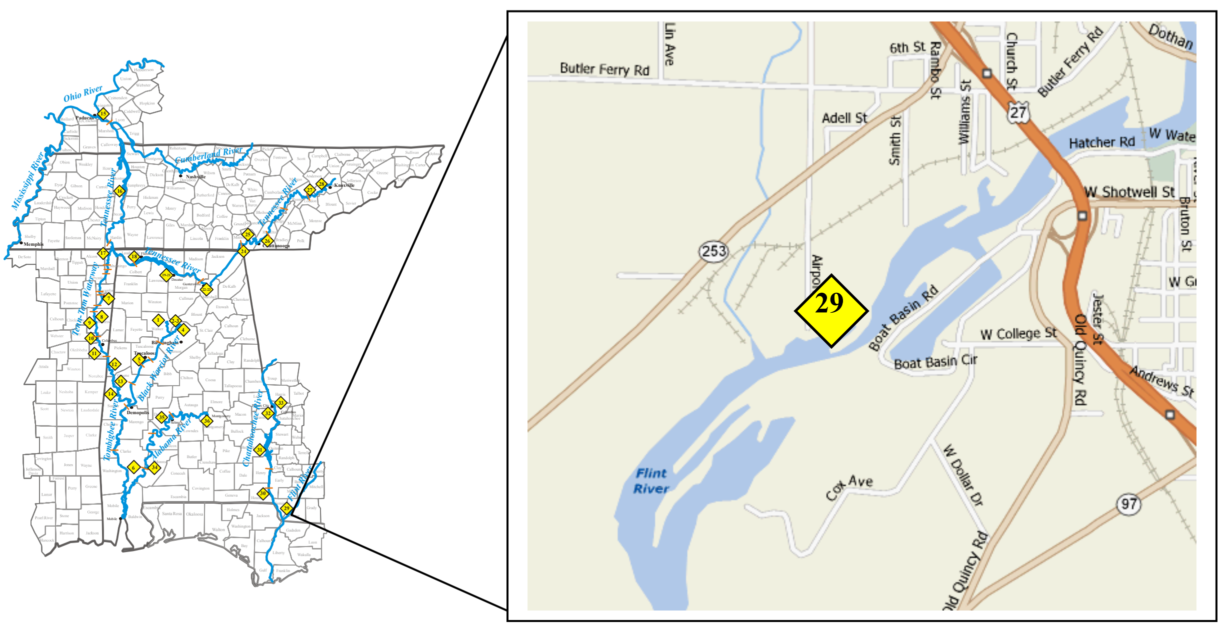
Port Name	Burkhart Enterprises
Inventory #	28
Location	
City	Knoxville
County	Knox
State	Tennessee
River	Tennessee River
River Mile	652.2
Dist. to Hwy.	I-40 and I-75 are accessible via ST-168
Dist. to Rail	Rail on site
Site	
Acres Developed	60
Acres Owned	100
Topography	Flat
Facilities	
Docks	Nearly one mile of riverfront, 2 docks – 60 ft. concrete, 40 ft. gravel
Buildings	24,000 sq. ft. warehouse; 5,000 sq. ft. bulk storage
Equipment	(1) 100 ton crane; (1) 85 ton crane; (2) truck scales
Services Offered	Truck/ground/rail/barge service
Business	Iron, salt, sand, steel, coal, coke and gravel
Contact	
Port Owner/ Operator	Burkhart Enterprises Tim Jones (865) 523-6157

BURKHART ENTERPRISES



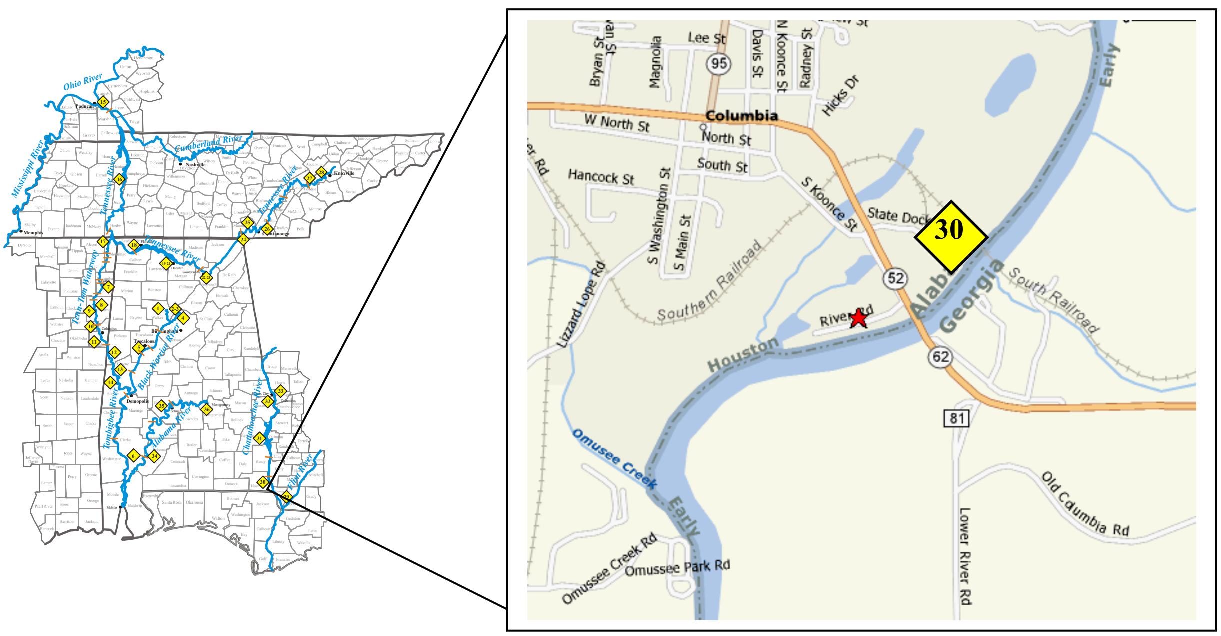
Port Name	Port Bainbridge
Inventory #	29
Location	
City	Bainbridge
County	Decatur
State	Georgia
River	Flint River
River Mile	26.5
Dist. to Hwy.	I-10 is 30 mi. and I-75 is 80 mi.; US 84 and 27 are adjacent
Dist. to Rail	Rail on site
Site	
Acres Developed	77
Acres Owned	107
Topography	Flat, hilly, possible wetlands
Facilities	
Docks	950 feet of dock, one barge working, one held
Buildings	93,000 total sq. ft. of warehouses
Equipment	(1) 65 ton mobile; (2) 4.5 ton forklifts; truck scale; stacker/conveyor belt; front-end loaders; dump trucks
Services Offered	Truck/ground/rail/barge/liquid service
Business	Potash, gypsum, cotton seed, wheat-mids, DAP
Contact	
Port Owner/ Operator	Georgia Ports Authority Kenny Slater (229) 248-2092

PORT BAINBRIDGE



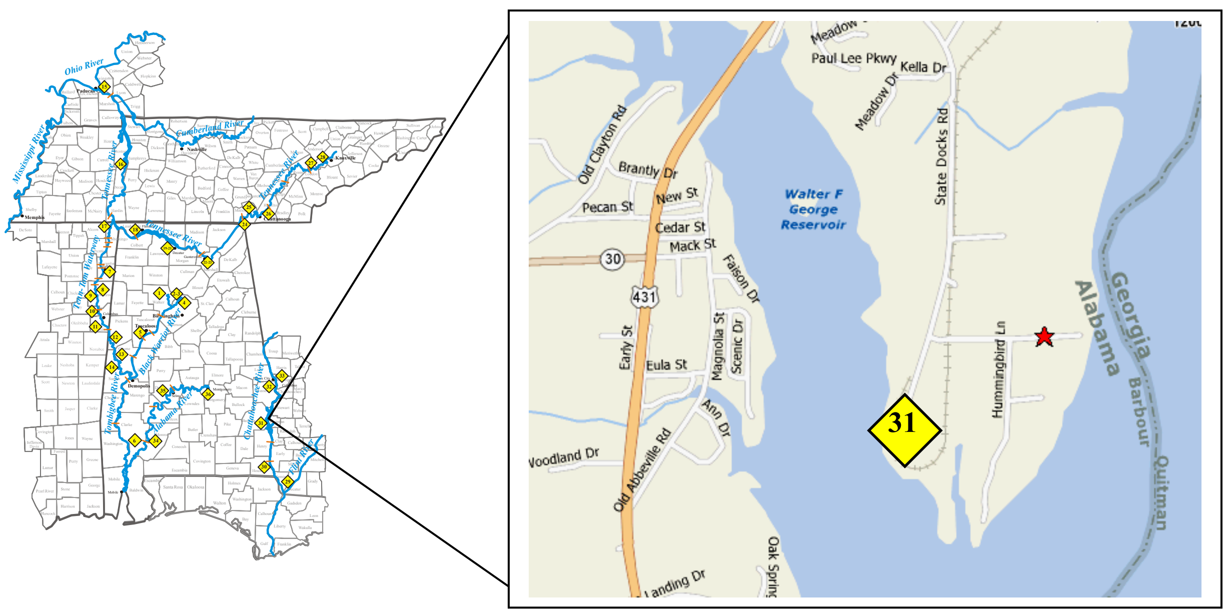
Port Name	Columbia Inland Dock
Inventory #	30
Location	
City	Columbia
County	Houston
State	Alabama
River	Chattahoochee River
River Mile	49.0
Dist. to Hwy.	US 280 - on-site; US 27 – 15 mi.; I-85 – 5 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	25
Acres Owned	25
Topography	Flat
Facilities	
Docks	One barge working, one held
Buildings	27,280 total sq. ft. of warehouses
Equipment	(1) 40 ton crane; stacker; conveyor belt; grain elevator
Services Offered	Truck/ground/rail/barge/liquid service
Business	Potash, gypsum, urea, phosphates, liquid nitrogen
Contact	
Port Owner	Alabama State Docks
Port Operator	Chatahoochie River Terminals Rob Holton (334) 696-4401

COLUMBIA INLAND DOCK



Port Name	Eufaula Inland Dock
Inventory #	31
Location	
City	Eufaula
County	Barbour
State	Alabama
River	Chattahoochee River
River Mile	91.5
Dist. to Hwy.	US 431 – one mile
Dist. to Rail	Rail on site
Site	
Acres Developed	13
Acres Owned	13
Topography	Flat
Facilities	
Docks	54 ft. x 36 ft. reinforced concrete dock
Buildings	24,000 sq. ft. rigid frame warehouse
Equipment	50 ton truck scales
Frontage	2,000 ft. water frontage
Services Offered	Truck/rail/barge/containers
Business	Liquid fertilizer, aviation fuel, sand and gravel
Contact	
Port Owner/Operator	Alabama Port Authority Pete O'Neal (251) 441-7123 E-mail: poneal@asdd.com

EUFAULA INLAND DOCK



Port Name	Phenix City Inland Dock
Inventory #	32
Location	
City	Phenix City
County	Russell
State	Alabama
River	Chattahoochee River
River Mile	153.1
Dist. to Hwy.	US 431 – one mile
Dist. to Rail	Rail on site – Norfolk Southern
Site	
Acres Developed	30 acres industrial site
Acres Owned	30 acres
Topography	Flat
Facilities	
Docks	66 ft. x 70 ft. reinforced concrete dock
Buildings	24,000 sq. ft. rigid frame warehouse, unoccupied presently
Equipment	50 ton truck scales, grain elevator
Frontage	2,800 ft. water frontage
Services Offered	Truck/rail/barge/containers
Business	Liquid fertilizer, aviation fuel, sand and gravel
Contact	
Port Owner/Operator	Alabama Port Authority Pete O'Neal (251) 441-7123 E-mail: poneal@asdd.com Port Authority has given local Economic Developers the initial okay for either sale or long-term lease Local contact: Victor Cross (334) 298-3639 Phenix City Chamber of Commerce

PHENIX CITY INLAND DOCK

Inventory of General Purpose River Terminals
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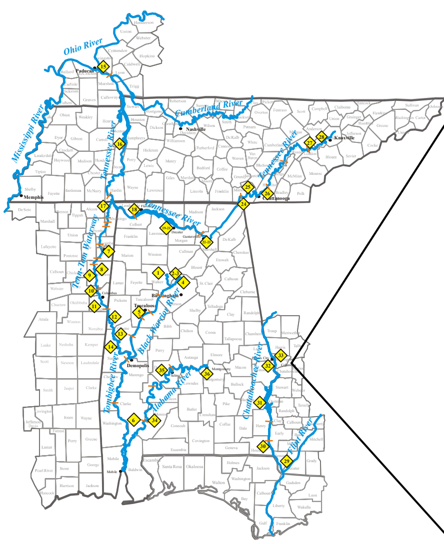
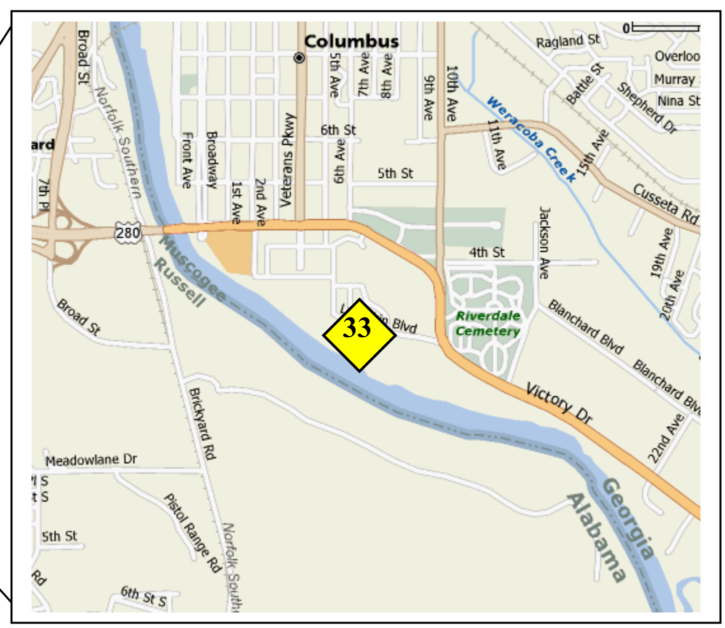
Port Name	Port of Columbus
Inventory #	33
Location	
City	Columbus
County	Muscogee
State	Georgia
River	Chattahoochee River
River Mile	154.6
Dist. to Hwy.	US 280 - on-site; US 27 – 15 mi., I-85 – 5 mi.
Dist. to Rail	Rail on site
Site	
Acres Developed	57
Acres Owned	107
Topography	Flat, hilly, possible wetlands
Facilities	
Docks	950 feet of dock, one barge working, one held
Buildings	93,000 total sq. ft. of warehouses
Equipment	(1) 65 ton mobile; (2) 4.5 ton forklifts; truck scale; stacker/conveyor belt; front-end loaders; dump trucks
Services Offered	Truck/ground/rail/barge/liquid service
Business	Liquid only, have capacity for other commodities
Contact	
Port Owner	Georgia Ports Authority
Port Operator	Valero Jason Hall (706) 327-3649

PORT OF COLUMBUS



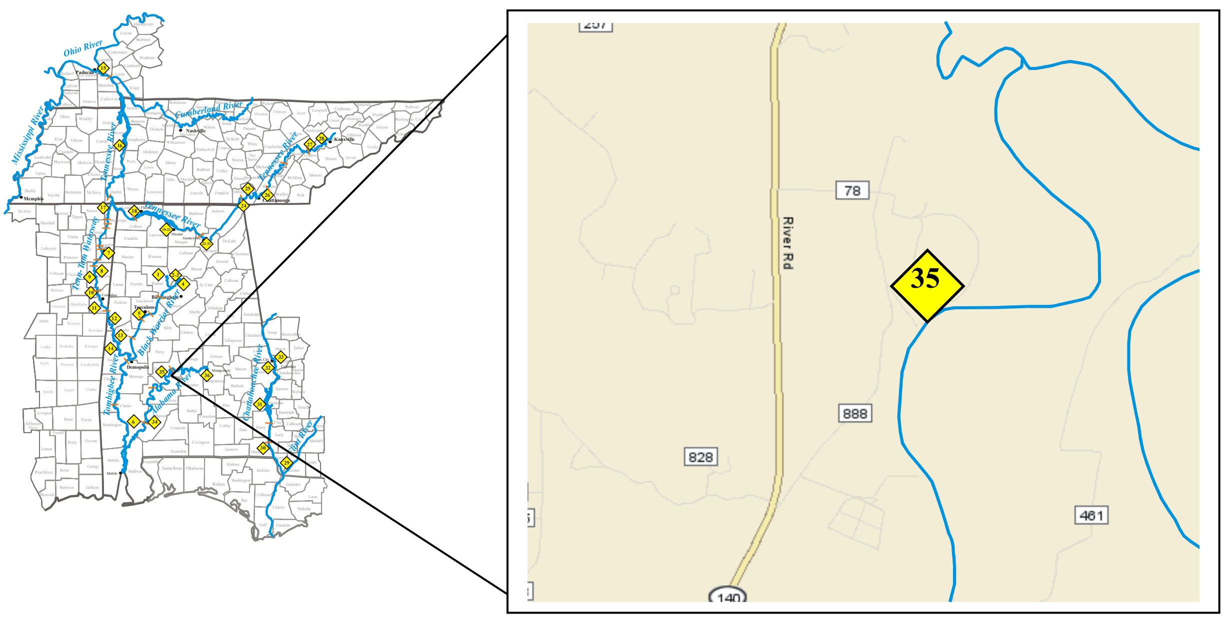


Port Name	Claiborne Terminal
Inventory #	34
Location	
City	Claiborne
County	Monroe
State	Alabama
River	Alabama River
River Mile	65.5
Dist. to Hwy.	10 mi. (approximately)
Dist. to Rail	N/A
Site	
Acres Developed	20 est.
Acres Owned	54
Topography	Flat
Facilities	
Docks	One barge working, two held
Buildings	427,603 bushel grain elevator
Equipment	N/A
Services Offered	Landlord operated
Business	Dry bulk
Contact	
Port Owner/Operator	Alabama State Port Authority Pete O'Neal (251) 441-7123

CLAIBORNE TERMINAL

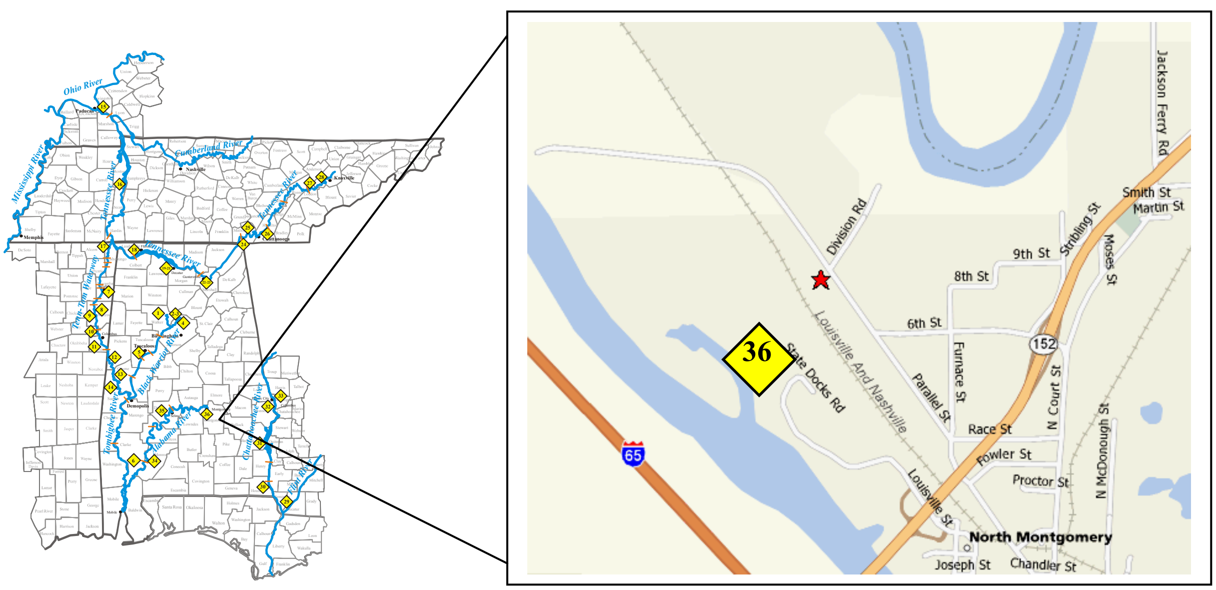
Port Name	Selma Terminal
Inventory #	35
Location	
City	Selma
County	Dallas
State	Alabama
River	Alabama River
River Mile	218.9
Dist. to Hwy.	N/A
Dist. to Rail	N/A
Site	
Acres Developed	In process of development
Acres Owned	37
Topography	Flat
Facilities	
Docks	One barge working, two held
Buildings	302,429 bushel grain elevator
Equipment	N/A
Services Offered	Landlord operated
Business	General Cargo, dry bulk
Contact	
Port Owner/Operator	Alabama State Port Authority Pete O'Neal (251) 441-7123

SELMA TERMINAL



Port Name	Montgomery Terminal
Inventory #	36
Location	
City	Montgomery
County	Montgomery
State	Alabama
River	Alabama River
River Mile	289.4
Dist. to Hwy.	3 miles
Dist. to Rail	CSX connection
Site	
Acres Developed	25
Acres Owned	32
Topography	Flat
Facilities	
Docks	One barge working, three held
Buildings	594,000 bushel grain storage
Equipment	N/A
Services Offered	Landlord operated
Business	Grain
Contact	
Port Owner/Operator	Alabama State Port Authority Pete O'Neal (251) 441-7123

MONTGOMERY TERMINAL



APPENDIX B

FURNITURE CASE STUDY

A part of the

BUSINESS PERSPECTIVES ON THE FEASIBILITY OF CONTAINER-ON-BARGE SERVICE

Alabama Freight Mobility Study
Phase 1

Prepared for the

COALITION OF ALABAMA WATERWAY ASSOCIATIONS

April 9, 2007

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NUMBER AND NAME

1.0 INTRODUCTION & PURPOSE

The intent of the Alabama Freight Mobility Study is to frame the future actions that will be necessary to mobilize additional use of Alabama's waterway infrastructure. The AFMS report addresses the basics of international container trade, inland transportation and the State's waterway resources. This *Case Study of the Furniture Industry* focuses on an industry cluster in the study region to review and test the application of Container-on-Barge (COB) transportation principles.

The furniture industry in the U.S. has evolved from an integrated manufacturing system to a highly productive assembly and finishing operation. Many domestic furniture manufacturers now import ready-to-assemble (RTA) pieces or use imported components and perform final assembly in the U.S. Most of these components are imported and shipped in containers to the factory. With completion of the Port of Mobile's Phase-I of the Choctaw Port Container Terminal (picture right) there exists the potential for furniture components to be imported through the Port of Mobile and shipped to inland destinations.

2.0 BACKGROUND ON THE REGIONAL FURNITURE INDUSTRY

This case study initially considered those manufacturers located in northwest Alabama, west- and south-central Tennessee and northeast Mississippi. The tri-state region represents a substantial industry cluster with common characteristics and an opportunity for transportation change.

2.1 Regional Industry History

The furniture industry in Mississippi can be traced back to one visionary. Morris Futorian, a Russian immigrant, came to Mississippi from Chicago in the 1940s, convinced he could make upholstered furniture cheaper by using mass production techniques adapted by the automobile industry. His concepts clashed markedly with the more traditional modular production methods used in North Carolina, which was the center of manufactured furniture at that time. Futorian started his first plant in New Albany, MS in 1948. Later, some of his former employees started many of the more successful furniture companies in northeast Mississippi. In Mississippi, most plants produce upholstered household furniture and have successfully diversified into other product lines, such as office equipment and mattresses. Mississippi plants are heavily dependant on imported fabrics and wood components.

The furniture industry in Alabama had similar beginnings in the 1960s, where it was a spin-off from the growth in the mobile home business in the northwest part of the state. The growth in manufactured housing enterprises, led by Don Tidwell of Haleyville, became a leading employer in northwest Alabama where as many as 50 plants were located during the 1970s. Other manufacturers entered the market to provide furniture and other components for the mobile home plants. These companies specialized in promotional (low cost) wooden household furniture and some provided wood components for other furniture manufacturers. The northwest Alabama manufacturers continue to rely heavily on domestic-sourced components, although not exclusively so. Other furniture industry facilities scattered throughout the state rely on imported components, but were not included in the case study. These businesses form the interconnected network defined herein as the upholstered furniture industry.

2.2 Industry Globalization & Case Study Area

The upholstered furniture industry's growth can be attributed to a number of advantages such as access to major wood sources, component suppliers and an ample labor supply. During its growth period, upholstered furniture production was a traditional domestic industry, and not an importer of raw materials or exporter of finished products. However, that has changed and it is now faced with competitive global challenges of inexpensive foreign labor and materials.

An industry trade group study identified two immediate issues for the furniture industry:

> First, the greatest concern is the growing competition from China and other low wage countries. Case goods are furniture components manufactured to meet marketed consumer style, but not yet assembled as a finished piece. They are shipped in a large quantity packaged in a format to utilize as much container space as practical. The case goods industry in North Carolina began to face stiff foreign competition in the 1990's. Other industry locations, including Northeast Mississippi have now felt the same pressure from overseas manufacturers.
>
> China is the major source of imported case goods. It now has about 50,000 furniture manufacturers employing 5 million workers and continues to grow dramatically. By comparison, the U.S. has 600,000 workers employed by 22,000 companies and will face stiffer competition in the future. Some of the larger U.S. companies have outsourced production instead of importing supplies and making the product in the U.S. The value of all imported furniture totaled nearly $22.6 billion in 2004, of

which $13.8 billion came from Asia. Asian imports increased by 46% from 2000 to 2004.

China's rapid growth in this industry can be attributed to its inexpensive labor, lower production cost and less labor and environmental regulations. It has also been able to reduce transportation costs, improve distribution channels and enhance the quality of its products. These advances by China present serious challenges to the U.S. upholstered furniture industry. Imports of upholstered household furniture during 2004 totaled 17.2% of the total domestic sales for these products; 6.7% of these imports came from China alone.

Although the U.S. is the largest market in the world for furniture, it lost 107,000 jobs in the industry from 2000 to 2004. This employment downturn has also affected the domestic suppliers associated with this industry.

Second, other concerns for the furniture industry deal with the domestic economy. U.S. manufacturers need to increase productivity and find ways to lower the cost of doing business if they are to compete in a global economy. Domestic furniture demand is driven by the U.S. economy including new housing starts, changes in interest rate, discretionary spending by consumers, and other factors.

Producing a competitive product requires maintaining low production costs. Holding down production costs depends on several factors including energy, insurance and transportation costs. With increasing use of imported materials and components, there are increasing pressures to receive these supplies sooner and get the products to retailers in less time. It now takes five weeks or more from the time materials and components are ordered from China to their ultimate delivery to a U.S. plant. Many plant operations are predicated upon the on-schedule delivery of supplies; any delays in the supply chain adversely hamper production schedules, thereby increasing production cost.

The upholstered furniture industry in Alabama, Tennessee, and Mississippi may benefit from the Port of Mobile's container terminal and the opportunity for COB transportation. Much of the region's furniture industry is clustered in and around Tupelo, MS and has access to barge transportation. These manufacturers depend upon the timely and reliable receipt of imported materials, components and ready to assemble pieces, all of which are shipped in containers. The proposed container port in Mobile may offer these companies a viable alternative service to receive their imports.

Initial investigations conducted as part of this case study disclosed that most of the furniture plants in northwest Alabama do not use containerized imports in their operations. For that reason, these companies were not included for further study at this time. That is not to say that there are not companies in Alabama that are currently receiving containers. However, these companies are located outside of the geographical area of this case study and are therefore not included in this report.

The focus of this work is furniture business in the region near the Tennessee-Tombigbee Waterway, particularly in northeast Mississippi and northwest Alabama. There are also some large manufacturers of wood furniture, such as cabinets, located in southwest Tennessee that use containerized imports. While these companies are well within the Port of Mobile market region, they are outside of the geographic scope of this case study. There may also be potential for container shipping among other types of manufacturing industries within the study area. However, these instances are not included in this case study because they do not fall within the study's defined parameters.

Exhibit 2-1 shows furniture companies located in the states of Mississippi, Alabama, and Tennessee.

2.3 Case Study Industry Needs & Competitive Environment

The furniture industry is an important sector of the tri-state economy. In Mississippi alone, some 200 plants generate directly over $2.2 billion of total industry output. Including induced or indirect benefits, the economic impact rises to $4.4 billion. As Exhibit 2-2 illustrates, this industry is a major employer in the state. The Mississippi furniture industry generates nearly 50,000 jobs and nearly $1.4 billion annually in total wages. Furniture workers earn about $30,000 annually which is more than the state's average annual wage.

Ninety-five percent of the state's furniture manufacturers and their suppliers are located within a 17-county area in northeast Mississippi. One hundred of these 200 furniture plants are located within a 60-mile radius of Tupelo, and this case study concentrates on those 100 manufacturers and suppliers as shown in Exhibit 2-3.

About 75% of the state's furniture suppliers are also located in this region. Consolidation to gain economies of scale for lower cost is occurring in the furniture industry. The number of plants in the study area is decreasing as smaller companies are bought out by larger firms.

Production of upholstered household furniture is the dominant segment of Mississippi's furniture industry and makes up nearly three-fourths of the state's total furniture manufacturing establishments. The cluster of plants around Tupelo, the focus of this case study, is the nation's leading manufacturing area of upholstered furniture.

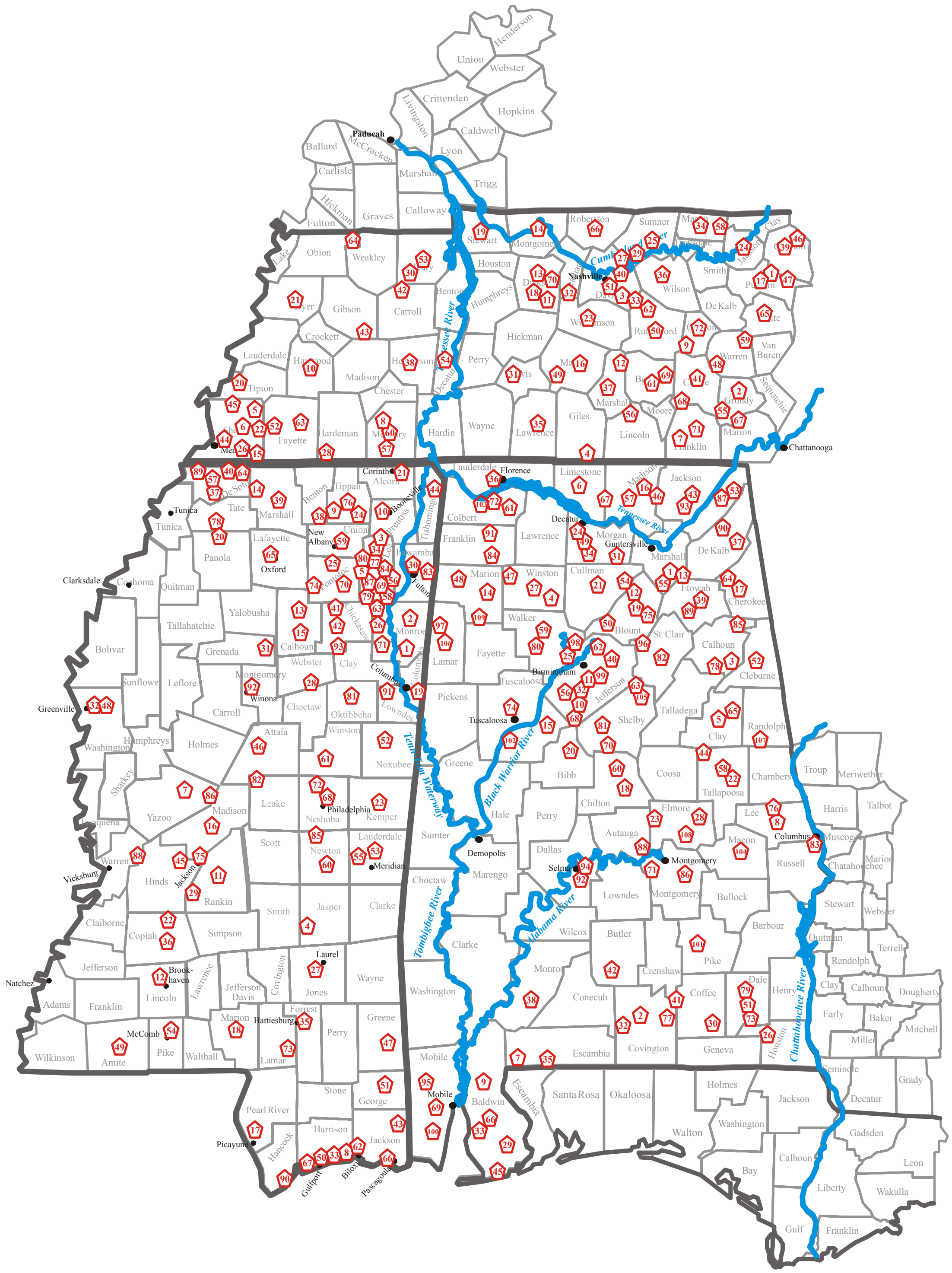


Exhibit 2-1 – Furniture Company Locations in Alabama, Mississippi and Tennessee

Exhibit 2-2 – Employment Clusters of Mississippi Furniture Manufacturers

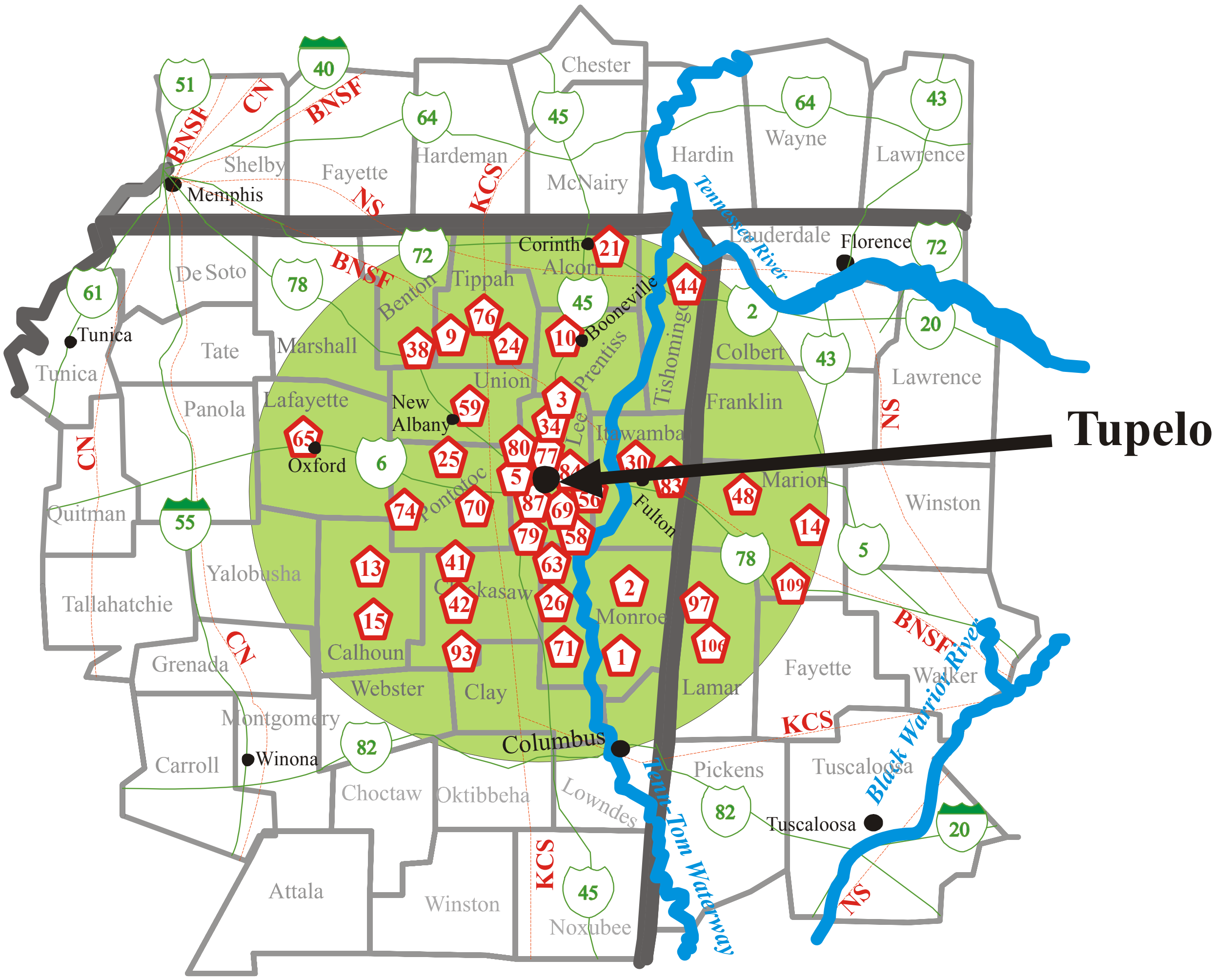


Exhibit 2-3 – Furniture Companies Within a 60 Mile Radius of Tupelo, MS

2.3.1 Existing Transportation Patterns

Information provided by the manufacturers indicates a typical transportation pattern to the import channel serving the study region. In the upholstered furniture market, containers predominately originate from China and move into the U.S. Most of the Chinese exports embark through the major ports of Shanghai and Guangdong which serve China's coastal region's manufacturers of case goods. Ocean carrier competition to the U.S. West Coast, i.e., the shortest ocean route, is significant. No less than 20 carriers compete for these services. Most goods arrive at the major container terminal complexes in the Ports of Los Angeles and Long Beach, CA (LA/LB).

Inland container movement typically involves intermodal rail routing from LA/LB to Memphis, TN or Marion, AR rail ramps. Given their proximity to the furniture cluster, both ramps will be referred to as "Memphis" in this study to simplify the discussion. The shipper or customer usually receives a through bill of lading to Memphis that covers all shipping costs from China to Memphis. The container is tendered and made available in Memphis. In most cases the customer or shipper will arrange for trucks to pick up its containers for delivery to the plant, and return the empty containers back to the rail ramp.

These routings have become well-established, with change occurring only with major cost adjustments, transportation interruptions, assurances of risk reduction, or other unusual circumstances. The major risk points include ocean carrier schedule, port congestion, and rail or truck capacity limits, especially as the case goods container demand increases in such a tight cluster.

Case goods imports from other global locations do occur. These ocean routes, mainly of Italian origin, reach ports on the South Atlantic. These containers move by rail and/or truck service from that port to the plants or directly to customers. These imports are relatively small compared to the China business and are not considered in this study.

2.3.2 Existing Transportation Cost Sensitivity

The furniture industry is sensitive to cost changes in any transportation mode. Variable costs include fuel, labor supply, and capacity influences among other items. Cost adjustments are translated on a per-unit basis showing up in the service price to the shipper. Water, rail and truck transportation cost changes do not impact each mode equally. The total freight rate for individual containers is affected less by increases in ocean vessel costs than for increases in trucking costs. Per unit cost adjustments are dampened significantly in the water mode because of the carrying capacity of the ship. This enables variable cost change to be spread over more containers. Traditional transportation patterns from China to Tupelo have a relatively significant cost risk because all three modes are utilized in substantial ways.

Truck capacity, with its fuel and driver wage implications, is very vulnerable to price change. It is perceived to be the most price sensitive mode because the shippers are usually ordering and controlling this segment. Trucking makes up approximately 10% of the total transportation cost from China to the study region. For ocean and rail transportation segments, cost was not proportional as volume sensitivity had major impact on the ocean rate. However, it appears ocean and rail prices are respectively about 70% and 20% of the total transportation rate. Case goods' shippers desire long term contractual relationships to leverage volume for term price stability and lower rates.

The cost of freight is a very sensitive issue to the case goods industry. Analysis in 2002 of case goods container shipments indicated transportation cost made up 23% of the value of the cargo of the goods in the container. Surprisingly, even with this large freight cost component, the goods still held margins 20% to 30% better than U.S. manufactured products.

3.0 FURNITURE INDUSTRY SURVEY RESPONSES

Targeted surveys are an excellent way to identify manufacturers' preferences, perceptions and needs. Survey results can be compared with those conducted across a broader industrial base to determine how a particular industry may be different and thereby better serviced. Transportation service surveys are particularly useful in determining how comparative transportation modes are perceived by different industries.

3.1 Transportation Service Priorities

Surveys of some furniture companies and suppliers were conducted specific to the upholstered furniture industry to measure transportation priorities. The results differ from those obtained in broad surveys conducted across various industry groups. With respect to shipping priorities of reliability, cost and transit time, those companies surveyed identified cost as the number one priority, followed by reliability. This is contrary to the results of other commodity industry surveys that indicated reliability as the first priority. This discrepancy seems to indicate that the furniture industry cluster is more transportation price sensitive. The furniture industry manufacturing processes is not as sensitive to reliability as the automotive industry may be. Both surveys had transit time as the relatively least important service issue. This survey result seems to indicate a small price advantage coupled with reliability could be an attractive service package to the furniture industry. Deep discounts in transportation costs may not be necessary, versus the price paid today, to secure a change in part of the existing supply chain.

The industry survey results revealed that 70% of the respondents have a time reliability factor of 90% for their shipments. The remaining 30 percent of respondents stated they observe between 75% and 90% on time reliability. Between these two thresholds of reliability, some expectations are not being met. Because cost is the number one priority for the furniture industry, ocean carriers may delay shipments of case goods when capacity is tight in preference to those industries whose commodities are more sensitive to on-time delivery schedules.

3.2 Other Results From Furniture Industry Surveys

In addition to the critical transportation priorities for the furniture industry, the survey posed questions to obtain the industry's response to service deficiencies and transportation cost reduction limitations. COB could present opportunities, not otherwise available, to make industry improvement in service and per-unit cost.

3.2.1 Utilization of Container Capacity

Containerized cargo can reach its maximum capacity in one of two ways:

- *"Cube out."* This term is used in the industry to describe a container which is fully loaded by volume.
- *"Weigh out."* This term is used to describe containers which are loaded to capacity by weight before they "cube out." Therefore, there is some space remaining for cargo, but this would result in exceeding weight limits. A container can "weigh out" due to maximum highway weight limits or due to load bearing capacity of the container itself.

If additional weight can be loaded at origin and delivered to a plant location, then major opportunity exists to reduce shipping cost on a per ton basis. Ocean carriers generally price freight on a per-container basis and not on a weight basis. In other container markets, weight advantages for high density shipments reduce transportation cost by 15 to 20 percent because the shipper can move more weight for nearly the same container freight cost.

3.2.2 Comparing Transportation Mode Perceptions

One survey question asked respondents what modes are perceived to be the best and worst based on time service performers. Trucking was selected as having the best on time performance.

The mode considered the worst for on time delivery was reported to be rail. This may indicate that potential rail delivery times, generally advertised as six days from LA/LB are not arriving as scheduled to Memphis for pick up. However, it may indicate the ocean carriers are missing their arrival schedules and the railroad is the mode the furniture industry perceives as the poor performer. Most reports and other transportation surveys consistently show rail service reliability has declined, particularly as intermodal demand increases.

For the furniture industry, water service to the Port of Mobile may increase reliability in the supply chain from China by eliminating rail as the perceived poorest performing link.

3.3 Shipping Decision Makers

Results of the furniture industry survey on shipping decision makers showed a greater reliance on third parties than broader multi-industry surveys. Third parties consist of entities such as freight forwarders, third party logistics providers (3PLs), and customs brokers. When the furniture industry cluster was canvassed to determine how logistics are controlled, it was overwhelmingly determined that freight forwarders handled the freight booking and control requirements. It would appear this is a market in which some freight forwarders have gained recognized expertise in this particular import commodity group. This expertise probably increases supply chain reliability and confidence within the furniture industry.

The survey revealed that 3PLs are involved in a larger percentage of shipments for the furniture industry than identified in other commodity surveys. Using a larger percentage of third parties indicates most of the companies have relegated the supply chain management to others rather than trying to perform these services internally.

The survey results indicate a weak internal industry decision structure on shipping choice and supply chain management. The use of third parties permits leveraging of an individual shipper's volume with others for longer term price security. A few companies are booking directly with the ocean carriers' logistics affiliates who also control truck drayage as well as the rail and ocean movements. Case goods shipments are a volume service commodity that lends itself to economies of scale. Aggregating a large number of containers results in lower overall freight costs. This concept of "pooling" shippers can be employed in negotiating, scheduling, and executing container freight contracts for the upholstered furniture industry.

4.0 CHARACTERISTICS OF THE TRANSPORTATION NETWORK FOR MOBILE, ALABAMA

A review of the various transportation connections between the Tupelo case study area and the Port of Mobile was performed. Tupelo is analyzed as the destination and the Port of Mobile is the point of origin for inland transportation. The baseline transportation review for the case study assumed the following conditions for competitive evaluation:

- Loading of ocean vessel in Shanghai, China
- Transit all water via Panama Canal to Mobile, AL
- Stevedoring to container at rest in the Port of Mobile
- Inland movement to Tupelo, MS

The transportation baseline is important elsewhere in the case study for comparing transit time, reliability and ultimately overall cost. The Mobile transportation network evaluates the existing inland movement options from the Port of Mobile to Tupelo, MS as shown in Exhibit 4-1.

4.1 The Rail Alternative

Rail plays a significant role in the current movement of large volumes of containers from China to Northeast Mississippi via LA/LB. With an all-water service to Mobile, one must consider how using overland routes will affect the product travel to Tupelo, a distance of approximately 350 miles.

Rail intermodal systems require unique infrastructure planning to ensure sufficient clearances, high rail speed, railcar equipment, and other service routing considerations such as terminals to load and unload containers from railcar.

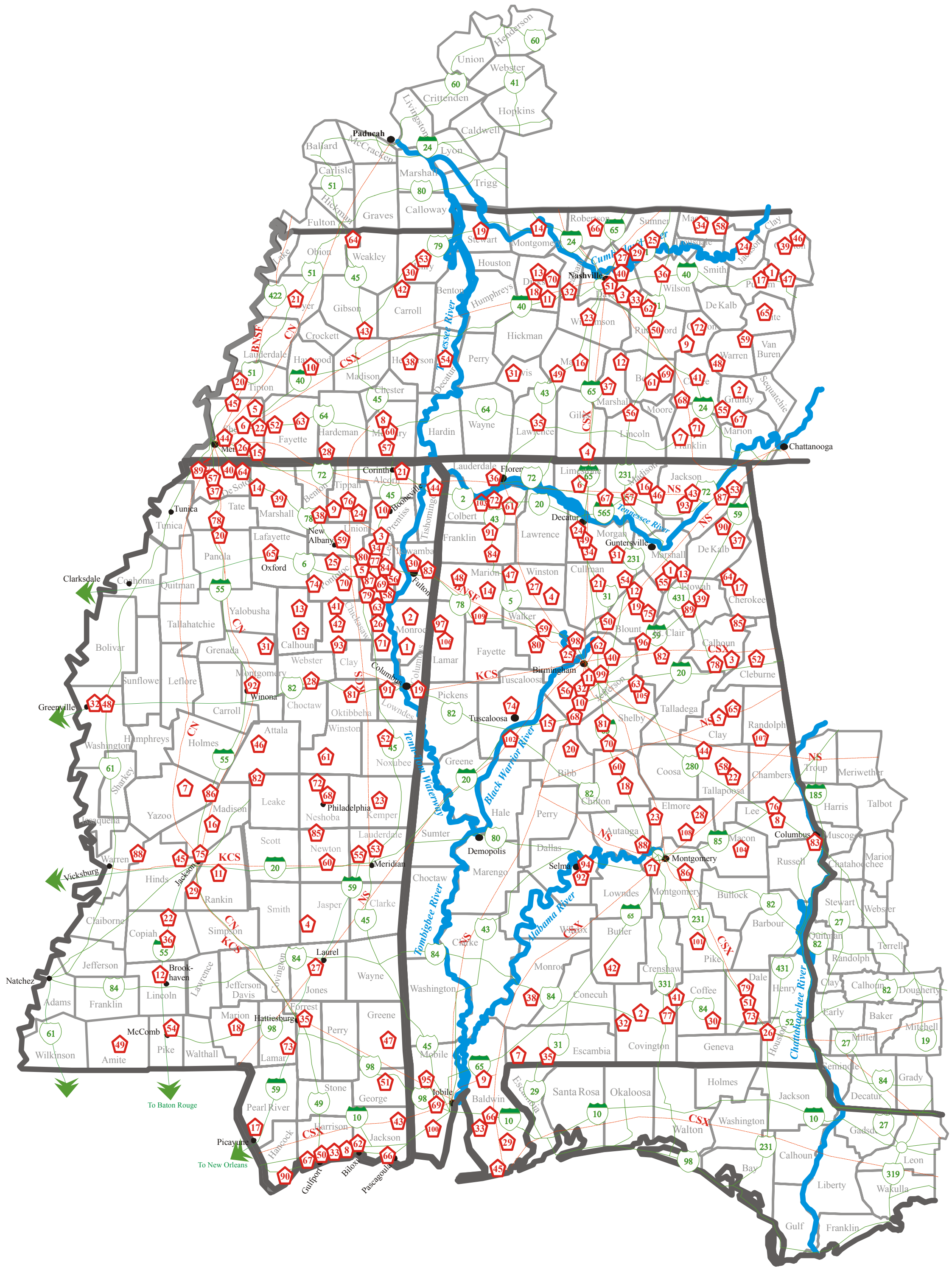


Exhibit 4-1 – Furniture Company Locations and Transportation Routes in Alabama, Mississippi, and Tennessee

Tupelo is slightly north-northwest of Mobile. Presently there is no intermodal rail service between Mobile and northeast Mississippi. Current rail service is limited to general freight shipments. According to the Alabama State Port Authority, there are no trackage impediments, such as height restrictions along this route that would preclude double-stacked container service in the future if such business opportunities should materialize.

4.2 The Truck Alternative

For case goods arriving at the Port of Mobile, another overland transport option would be to deliver the container to the Tupelo area by truck. From the customer's perspective, these truck deliveries would not be different from those now arriving from Memphis, except for scheduling modifications, as the trucking distance from Mobile is over three times that of deliveries from Memphis. The truck distance to Tupelo from Mobile is approximately 355 miles versus approximately 110 miles from Memphis.

Highway transport would likely travel from Mobile through Meridian, MS en route to northeast Mississippi, as shown in Exhibit 4-2. This routing involves transit through two states increasing the complexity of truck regulation. The route would increase the ocean carrier's need for chassis because more containers would be out of the terminal for a longer period of time. Because of the distance, drivers would likely only be able to make a single trip turn per day versus the possibility of two turns per day for the same driver serving from Memphis.

This situation could potentially have a negative effect on the developing domestic driver shortage as truck demand increases. Trucking demand in the Mobile market will increase once the terminal opens. The Port of Mobile's Phase-I container terminal opens with the planned capacity of 350,000 TEU and is expandable to 800,000 TEU. Rates would likely increase as the regional truck market tries to adjust. With the potential for truck rates to climb in this region, could total freight costs remain competitive in the baseline route (China

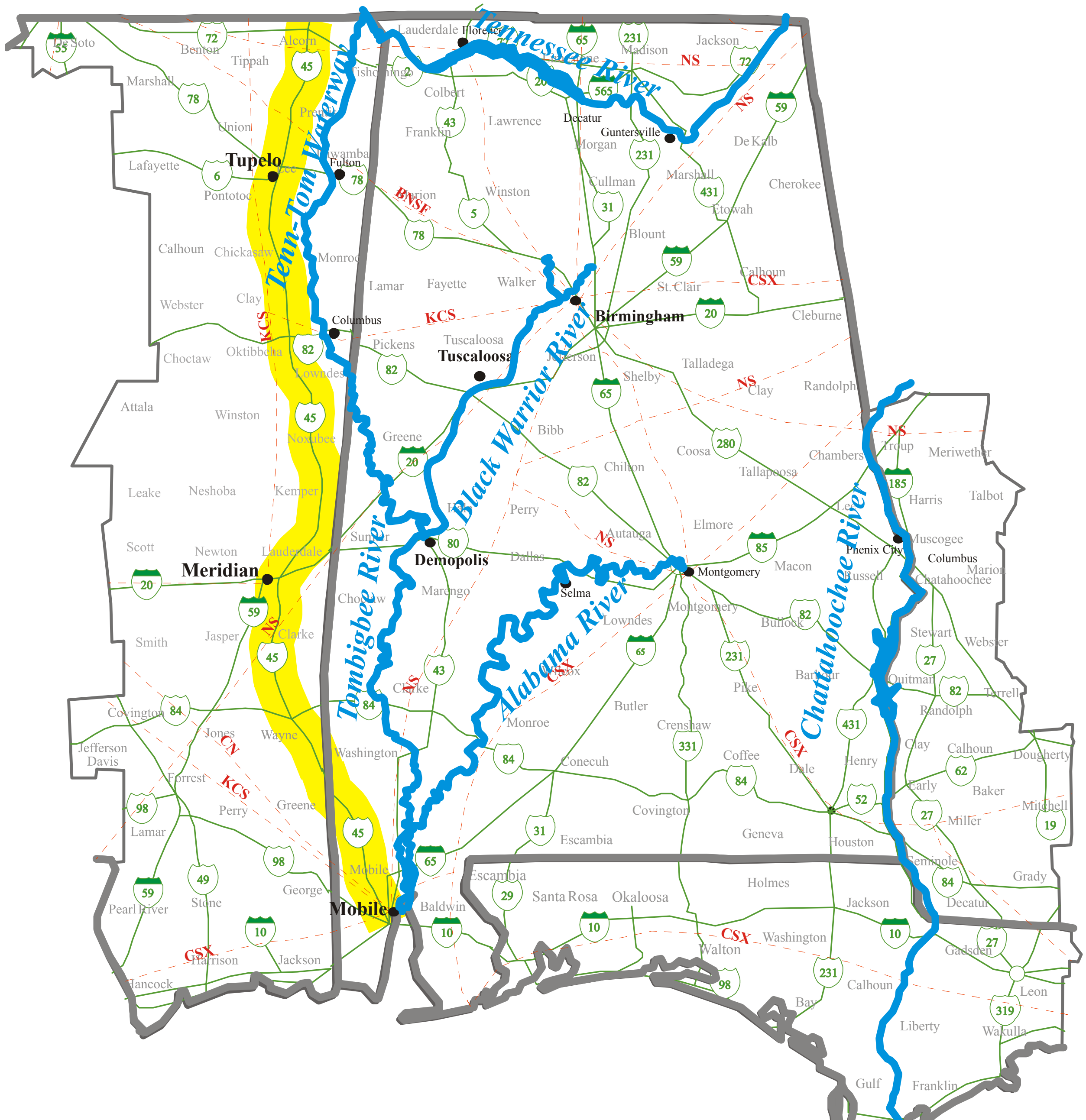


Exhibit 4-2 - Highway Transportation Route from Mobile to Tupelo

+ Mobile + Tupelo) versus the traditional (China + LA/LB + Memphis + Tupelo) route? It is unlikely the influence of Port of Mobile ocean service will measurably decrease traffic from Memphis. Ocean carriers will probably utilize the increased capacity in Mobile to help absorb the forecasted container growth in the market place serving the Port of Mobile.

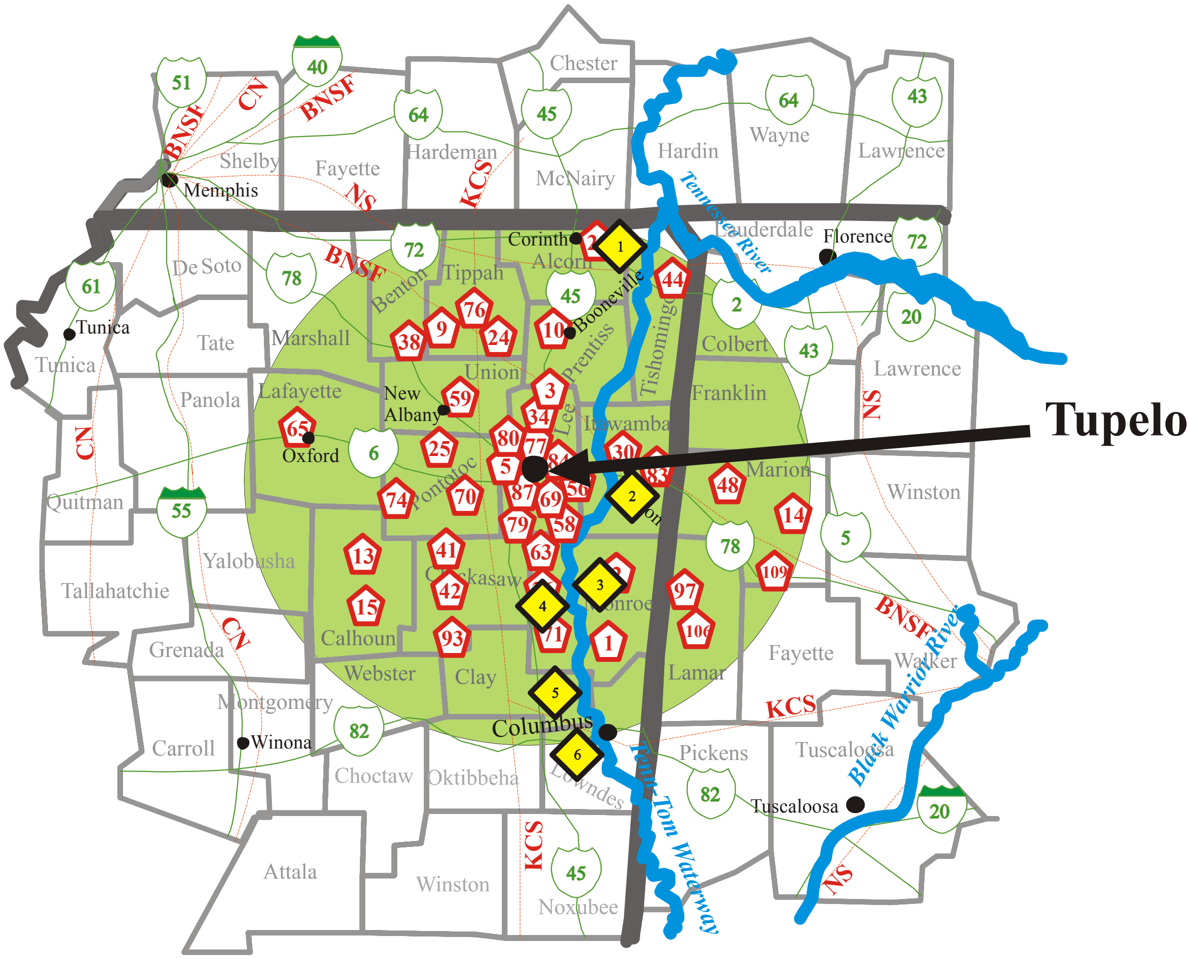
4.3 The Inland Water Alternative

Unlike many deepwater ports, Mobile is serviced by an extensive inland waterway system with access throughout Mid-America, as shown in Exhibit 4-3. Alabama has in excess of 1,270 miles of navigable waterways. These waterways, notably the Tennessee River, the Tennessee-Tombigbee (Tenn-Tom) Waterway, and the Gulf Intercoastal Waterway, connect with other waterway systems that serve the South and Midwestern region of the nation. Notably, the Tenn-Tom provides direct water access for shippers in Northeast Mississippi to Mobile and other eastern Gulf ports. In addition, the Black Warrior Tombigbee Waterway links Mobile to Birmingham, and Montgomery is linked to Mobile via the Alabama River.

There are six public riverports, as shown in Exhibit 4-4, in northeast Mississippi that are capable of handling commerce shipped to or from Mobile. For the purposes of this study, Port Itawamba in Fulton, MS was selected as a representative transfer terminal for such shipments given its central location to the furniture industry cluster. The other five ports have similar freight handling capabilities.

This study found no infrastructure impediments on the waterways that would preclude container service for the upholstered furniture industry. A significant number of established towing companies are already operating regular barge service in their respective regions. Other companies operate on an as needed basis or, if new business opportunity developed, would establish new service within the State.

Exhibit 4-3 – Inland Waterway System



Public Riverports within 60 Miles of Tupelo, MS

1. Yellow Creek State Inland Port
2. Port of Itawamba
3. Port of Armory
4. Aberdeen Port
5. Clay County Port
6. Lowndes County Port

Exhibit 4-4 – Public Riverports within the Industry Cluster

The Port of Mobile can access the furniture manufacturing area in Northeast Mississippi via the Tenn-Tom Waterway. There are several inland river ports in the vicinity of the furniture industry cluster. One port, at Fulton, was selected for the purpose of subsequent analysis. This does not imply it is the only port, or even the best port, for providing service. Other inland ports in both Alabama and Mississippi also have capability to serve this market. Fulton is approximately 15 miles from Tupelo, MS and 390 river miles from Mobile. The AFMS' *Inventory of General Purpose River Terminals* indicates Fulton's Port of Itawamba has acceptable features to serve the COB market.

The facilities at Mobile are capable of servicing barges equally as well as ships. By having the capability to load in excess of 50 TEUs on a hopper barge, potential significant economies of scale can be realized with a water connection. The investment in waterway infrastructure has already been made.

5.0 CONTAINER ON BARGE POTENTIAL

A review of the inland transportation characteristics connecting Mobile with the upholstery furniture industry in the Tupelo area indicates more study is needed to address the feasibility of truck and rail deliveries of containers from Mobile to Tupelo. Rail service for intermodal containers does not currently exist and trucking will be under pressure to serve the area competitively. A review of the viability of a water option is reasonable given a navigable waterway and origin/destination ports acceptable to service the location already exist. The logical place to examine the potential to absorb heavy, high volume containers is by barge service. With no barriers in infrastructure, the potential service can be reviewed from a commercial perspective. Essential business components were analyzed to examine the commercial feasibility of COB. Furthermore, the examination was performed from the viewpoint of meeting as many historical COB success indicators as possible.

5.1 Market Strategy for COB

A market strategy can be developed from surveys, interviews and research accumulated for the furniture industry around the Tupelo manufacturing cluster.

5.1.1 Tupelo Case Study Market Size

The Tupelo furniture industry cluster contains roughly 100 potential COB service users. To adequately assess the potential viability of service, the market size must be defined by the number of containers which can be evaluated as revenue units.

In determining the market size for the Tupelo industry cluster, it was necessary to review data gathered through past research. Current survey information was validated with historical data in order to present a total market estimate with confidence.

In 2003, the Tupelo Community Development Foundation (TCDF) surveyed approximately thirty local companies engaged in the upholstered furniture industry. This information was obtained to determine the feasibility of a Foreign Trade Zone (FTZ) to serve this industry and others in Tupelo. The TCDF survey indicated approximately 30,000 container shipments for the thirty companies moved through the region annually. Total market estimates by others, using the TCDF survey results, suggested the regional market is approximately 80,000 containers. In recent discussions, the TCDF stated container shipments have grown since its study was conducted. The TCDF also confirmed that their study did not include all the plants that were surveyed in the case study.

For the case study survey, twenty furniture manufacturers in the area responded that these companies are receiving in excess of 38,500 containers annually. Extended mathematically, the average volume per company surveyed would suggest a market size in excess of 190,000 containers. The review of individual survey responses suggests this likely overstates the market size. A single large shipper skews the average container count. Of the 20 shippers surveyed, the results of the other 19 averaged approximately 1,000 containers annually. We believe a more accurate estimate might be a total market size of 120,000 to 150,000 containers annually. In either case, it is obvious that a large number of containers are moving in and out of the 60 mile radius of Tupelo.

To determine how much of the total market is required to support a basic COB operation, certain capacity requirements must be assumed and put in the context of annual volume. Two factors enter into making the annual capacity assumption: 1) the revenue container capacity of the tow and 2) how often the tow would operate over the course of a year.

Tow size and TEU transport capacity were assumed to evaluate penetration of market. A tow configuration of six barges having a capacity of 50 TEUs in each barge indicates the tow could handle 300 TEUs a trip (this is a conservative assumption since the standard tow size on the Tennessee-Tombigbee is 8 barges). Survey data indicated most of the case goods trade is in 40' containers; the equivalent of 2 TEUs. A six-barge tow would move 150 loaded revenue containers of case goods to the region every week.

The second assumption is frequency of service, assumed to be weekly for this market calculation. Each tow would take an equal number of containers up and down, thus constituting a round trip as would be done by truck. Taking the tow capacity at 150 revenue containers over the 52 weeks of the year, the annual container volume is 7,800 container loads.

In comparing the 7,800 container requirement for a viable opportunity to the total estimated market size (120,000 to 150,000 TEU per year), the market penetration can be calculated. Market penetration on the low end market size estimate is 6.5 percent and is a modest 5.2 percent on the high end of the market estimate. It is believed the indication of market size and needed penetration suggests the Tupelo area container market is of sufficient size to support additional study of COB viability.

5.1.2 Service Requirements

Surveys of furniture shippers were conducted to obtain an opinion of the relative importance of shipping service requirements. The results indicated the order of importance to these shippers is: cost, reliability and total transit time.

<u>Cost of Service</u> - It is premature at this juncture to state, with any degree of certainty, how container routes via Mobile and via West Coast ports compare in terms of total cost to the shippers. Ocean carriers have not declared what the service structure or routings will be for vessels calling the Port of Mobile. It does appear, however, that the market size and penetration of the COB segment of this case study is sufficient to maximize ship and barge economies of scale. Furthermore, if the targeted markets are those shippers that could maximize weight utilization of the container, the significance of rate comparisons would be

dampened. It is believed an equal or lower rate structure could be developed, but much depends on the ocean carriers' selection of service at Mobile and its pricing.

Reliability - Congestion at the Panama Canal is a variable, but it is not unlike the risks of port congestion in the LA/LB area awaiting a docking berth. The Panama Canal has a system of purchasing transit priorities that can be used by ocean carriers to maintain their schedule. Eliminating potential train delays takes the issue out of the reliability/risk equation. In the extreme, containers could be trucked to Tupelo from Mobile, on a spot basis, to guarantee reliability in specific instances thereby expediting the container delivery.

Transit Time - Transit time was the issue of least concern for regional shippers. The majority of shippers indicated that approximately 30 days transit time from China is acceptable. Actual responses also indicate that some shippers are accepting transit times longer than 30 days.

To review theoretical transit time for a service via Mobile versus West Coast ports, the routes were analyzed based on estimated vessel speed over the approximate nautical miles. Other factors included in the calculation are Panama Canal transit, Mobile stevedoring, loading to barge, barge transit time to an inland port (Fulton, MS) and delivery to the plant. The calculation indicated an estimated transit time of 23 ½ days from Shanghai to Tupelo, MS plant delivery. This compares with an estimated 21 days, calculated with a similar theoretical methodology, through the West Coast routing via ship, rail and truck movement with the same Shanghai origin and Tupelo, MS destination. This estimate is also contingent on the placement of ports-of-call on the vessel string. The estimated 23 ½ days from Shanghai assumes that Shanghai is the last Asian port-of-call and that Mobile is the first U.S. port-of-call. If there are subsequent Asian ports-of-call or other ports called before Mobile, this estimate of transit time may increase as it does on West Coast routing today.

According to the ASPA, there is existing service from Shanghai to Mobile which has a transit time of about 31 days. Our understanding is that this vessel string includes subsequent stops in the Far East after Shanghai and calls ports in the Gulf of Mexico prior to the Port of Mobile. When allowing for inland delivery; a total transit time of 34-36 days would be expected with existing service through the Port of Mobile. Upon completion of the Mobile Container Terminal, it is expected that additional service will be available; however, specific origins, destinations, ports of call and transit time are not known at this time.

5.1.3 Sales Targets

Based on survey results, the sales targets will be freight forwarders and 3PLs. The survey clearly indicates that these third parties influence the choice of route and service. However, an additional sales market would be the ocean carriers that will serve the Port of Mobile with routes serving the furniture industry. Contractually structuring a sub-service (inland barge transport to Northeast Mississippi) agreement under an ocean carrier through bill of lading provides rate security as the operator working for the ocean carrier. There are many advantages to this arrangement including: 1) container and chassis free time becoming a non-issue, 2) back hauls (return loads to Mobile) are easier to secure, and 3) bill of lading protection under international law limits liability while on the water. The shipper can pick up the container at Port Itawamba or one of the other nearby Tenn-Tom ports under arrangements with truckers similar to receiving the container at the Memphis rail ramp, only closer.

5.2 COB Inland Equipment

In looking at the appropriate marine equipment for a proposed COB operation between the Port of Mobile and the Tupelo region, one must look at the lock dimensions and optimize capacity of the tow without double locking. This has to be balanced with the market conditions so full barges are being moved. Freight revenues are governed by the total number of containers included in the tow. Excess capacity is an expense that should not occur. This is particularly true in the case of 40-ft containers as fewer revenue containers can be carried on a barge versus 20-ft containers. The best use of barge volume and revenue generation is in carrying all 20-ft containers; however, 20-ft containers are not prevalent in the furniture industry.

Eight locks are encountered along this section of waterway (from Mobile to Fulton) and all are 600 ft x 110 ft dimension. It is suggested marine equipment analysis begin from the view of a maximum of six barges (six pack) of standard open hopper dimension. Actual waterway experience will dictate horsepower and cost as all operating factors and local conditions must be assessed.

Hopper barges must be properly outfitted to carry containers. Containers can not rest on the bottom as rain water accumulated in the bottom can ruin the cargo.

5.3 COB Schedule Projection

The COB route between the Port of Mobile and Fulton, MS is estimated to be 387 waterway miles. This particular route may fit well into a fixed day weekly service pattern, although some may consider it somewhat tight based on these assumptions. Operators with actual historical operating information and projecting specific boat performance should be consulted.

Tow performance will determine actual "running time" over the route. Assuming an average tow speed of 6 mph, the transit time is approximately 2.7 days one way. As discussed elsewhere, it is necessary to factor in the combined stevedoring time in the determination of transit time for a mode. The stevedoring allowance based on historical production and 300 container moves at each port is about 30 hours or 1.25 days. Based on these projections, the total transit time per round trip would be just under seven days. This represents a good objective for service design and has some qualities of regular weekly service to match certain ocean carrier objectives for vessels. It also meets an acceptable container availability standard. Containers can also meet the criteria of free time and ocean carrier utilization objectives.

5.4 COB Credibility

In the case study presented for the Tupelo area upholstery furniture industry, a number of factors enter into the evaluation of the business. To change an established typical intermodal container routing to include a COB operation on an untested waterway takes significant expertise. This expertise must come from a mixture of marine operating experience and knowledge of the container business. A key factor for successful COB ventures is to build credibility for the business team. This is important in all settings as demonstrated by the case study involving potential service between the Port of Mobile and the furniture industry cluster around Tupelo. Business disciplines identified in other AFMS components also play a role in this example.

6.0 SUMMARY

The case study illustrates a real world scenario of building a COB business around a particular industry cluster dependant on containerized imports. This example illustrates how AFMS information can be utilized in a real business setting to further the servicing of regional businesses. It also demonstrates how practical solutions to freight movement limitations and potential congestion can be addressed in an orderly way. Waterways are a major underutilized asset and in this example it is shown how increased use of waterway capacity use can positively impact the Port of Mobile and the region it serves with minimal potential investment.

A critical mass of containers is required to attract liner service to Mobile as well as to sustain a COB operation. Future work may be warranted to identify potential container shippers a) within the furniture industry outside of the geographic study area of this case study, and/or b) within the scope of the study geographically, that fall under other manufacturing industries.

The potential to relieve future highway congestion as demonstrated in the Tupelo area upholstered furniture case study is significant. The example can be applied to other business clusters utilizing containers within the market area served by the Port of Mobile. COB may also be a viable transportation alternative for interstate container shipments to regions as far away as the upper Midwest.

Waterways may provide the near term flexibility to meet immediate container transportation service requirements once the Port of Mobile's container terminal opens. This case study reveals a methodology for undertaking the analysis of COB applied to a specific opportunity.

APPENDIX C

MONTGOMERY CASE STUDY

A part of the

BUSINESS PERSPECTIVES ON THE FEASIBILITY OF CONTAINER-ON-BARGE SERVICE

Alabama Freight Mobility Study
Phase 1

Prepared for the

COALITION OF ALABAMA WATERWAY ASSOCIATIONS

April 9, 2007

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LIST OF EXHIBITS

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1.0 INTRODUCTION

This appendix, *Montgomery Case Study,* provides information that is complimentary to the Alabama Freight Mobility Study (AFMS) report, *Business Perspectives on the Feasibility of Container-on-Barge Service,* by assessing conditions in the Montgomery area with regard to development of a new river terminal or river port complex and to report on recent activities and opportunities.

The efficient and effective movement of freight is a critical component in the transformation and growth of the Alabama economy. Alabama, with a deep water port, inland waterways and inter-modal facilities, could play a more important role in the global supply chain and become a major contributor to regional economic growth.

If significant economic development is to occur along the Alabama River, all stakeholders must work to reduce barriers and foster an attractive business climate in the market area. The objectives of this appendix are to identify current market conditions and develop action items to promote industrial activity along the Alabama River.

2. BACKGROUND AND INFORMATION

Montgomery County is located in south central Alabama. The City of Montgomery is on the Alabama River along the left descending bank, approximately between RM 284 and 290. The city is in close highway proximity to Mobile (168 miles), Huntsville (190 miles), Birmingham (90 miles) and Atlanta (160 miles).

This portion of the case study includes a discussion of highway, railroad and waterway transportation facilities and issues. It also provides a brief overview of the latest available statistics for demographic and industrial base data.

2.1 Demographics

Population, per capita income, and median household income for the seven counties in the general vicinity of Montgomery are shown in Exhibits 2-1, 2-2, and 2-3, respectively. This presentation of demographics, productivity and other background information focuses on counties located primarily to the north of, and including, Montgomery County. For the most part, commercial businesses located in counties south of Montgomery would more likely move their goods to the Gulf Coast by highway or rail rather than by river. According to 2005 population estimates from the U.S. Census Bureau, Montgomery County is the most populous county in the area (population 221,600), followed by Elmore County (population 71,800).

The highest per capita income is observed in Montgomery County ($32,300) which is the seat of the state government and also has a large military community. Macon County to the east has the lowest per capita income ($18,607), based on estimates provided by the U.S. Department of Commerce Bureau of Economic Analysis (BEA). The pattern for median household income, as reported by the U.S. Census Bureau, shows that while Macon County

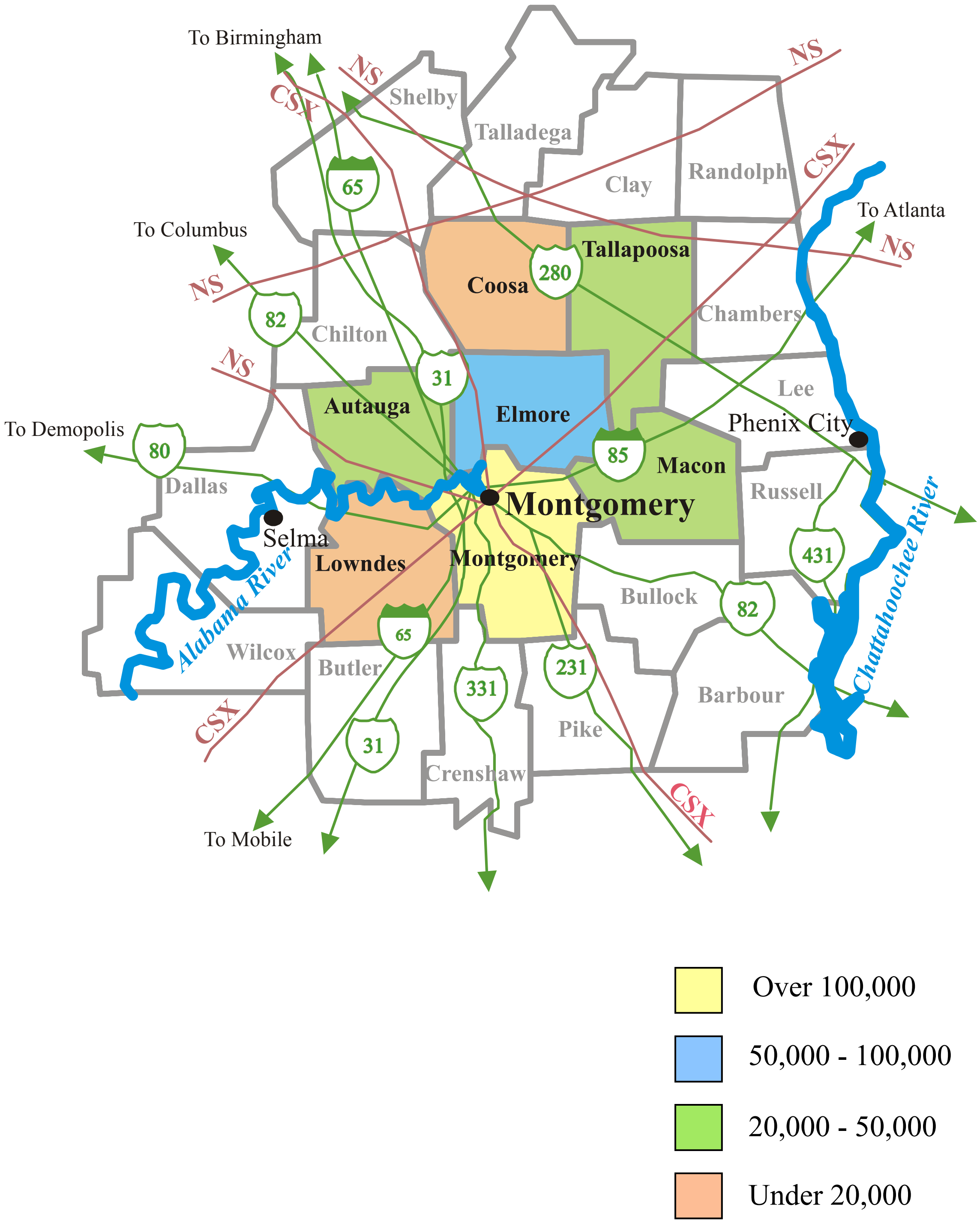


Exhibit 2-1 – 2005 Population

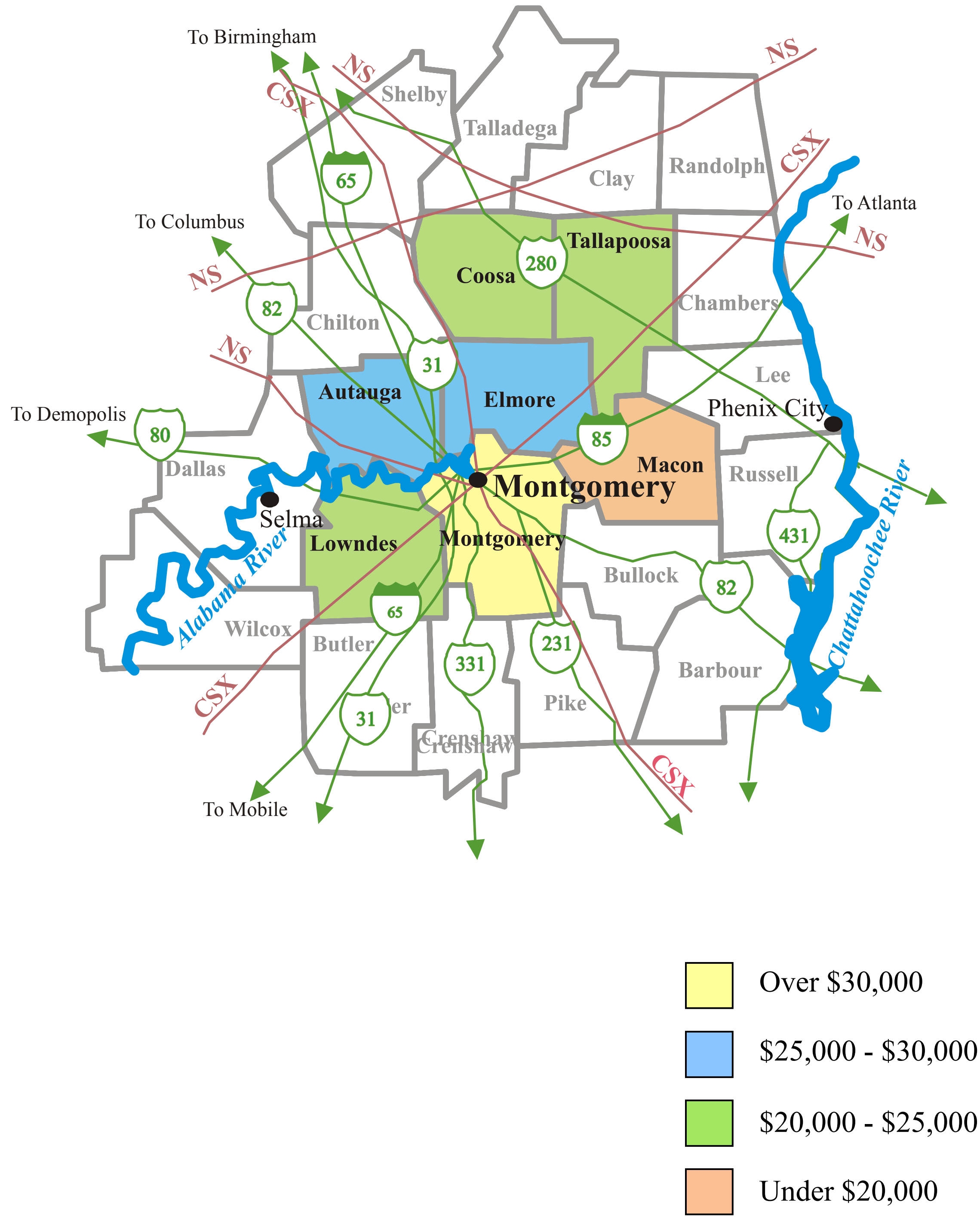


Exhibit 2-2 – 2004 Per Capita Income

(yellow)	Over $45,000
(blue)	$35,000 - $45,000
(green)	$25,000 - $35,000
(orange)	Under $25,000

Exhibit 2-3 – 2004 Median Household Income has the lowest ($23,400), Autauga ($45,400) and Elmore ($43,600) Counties have significantly higher median household incomes than Montgomery County ($35,700).

Auto manufacturing, printing, publishing and allied industries, as well as fabricated metals and, to an extent, wood-related industries are primary reasons for the relatively high median incomes in Montgomery County. Exhibit 2-4 shows manufacturing employment data for the area, the number of manufacturing establishments is shown in Exhibit 2-5, and manufacturing income for the area is shown in Exhibit 2-6. The US Census Bureau and the BEA reports that Montgomery County is the area leader in manufacturing employment and income.

2.2 Agricultural Production

Agricultural production in the counties in the study area is not the predominant source of income or employment. The majority of crops produced are either cotton or peanuts.

Total farm income for the area for 2004 is shown in Exhibit 2-7. Montgomery and Lowndes Counties are by far the highest in farm income. The agricultural commodities produced in the study area are not likely to be transported by barge in significant quantities.

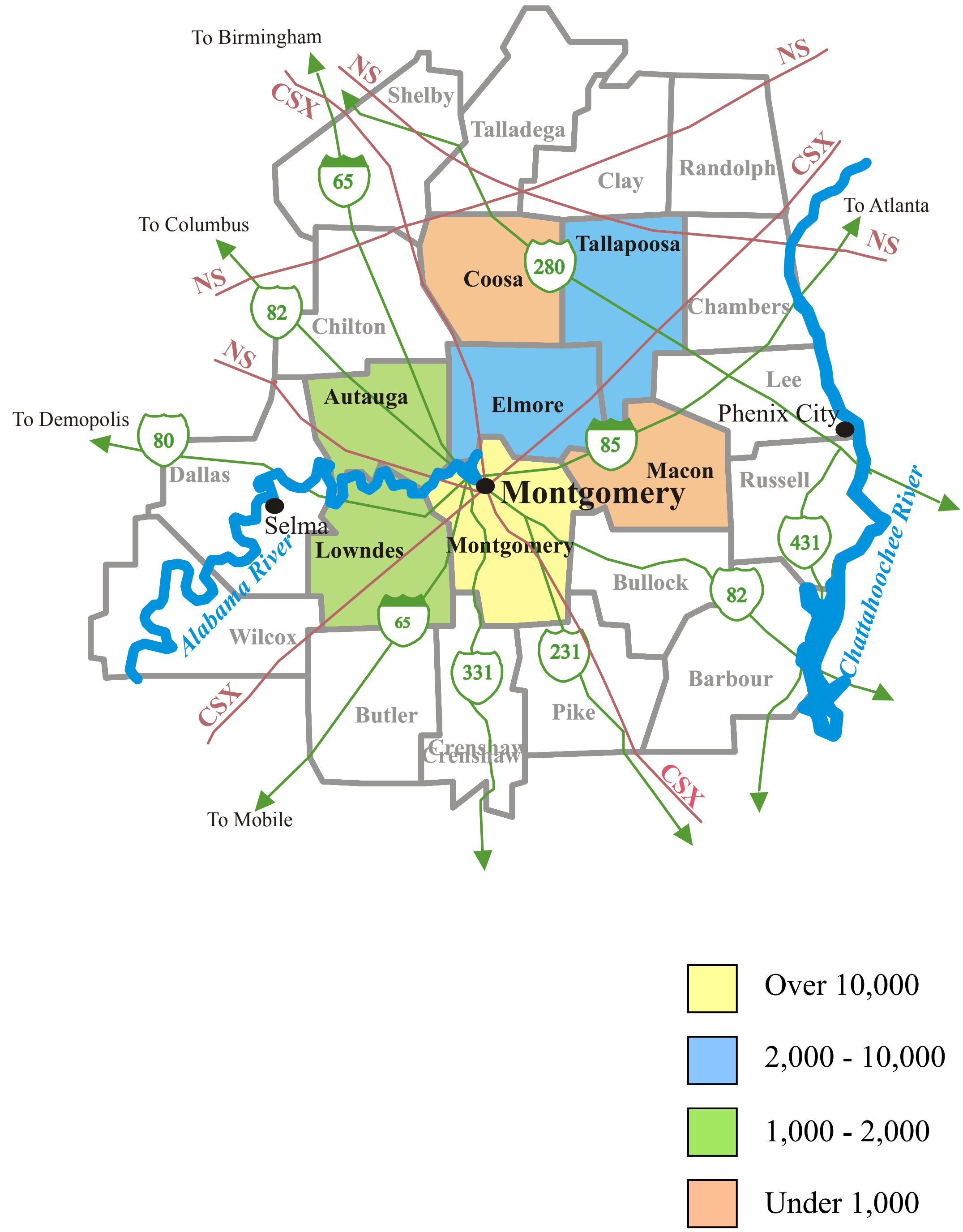


Exhibit 2-4 – 2004 Manufacturing Employment

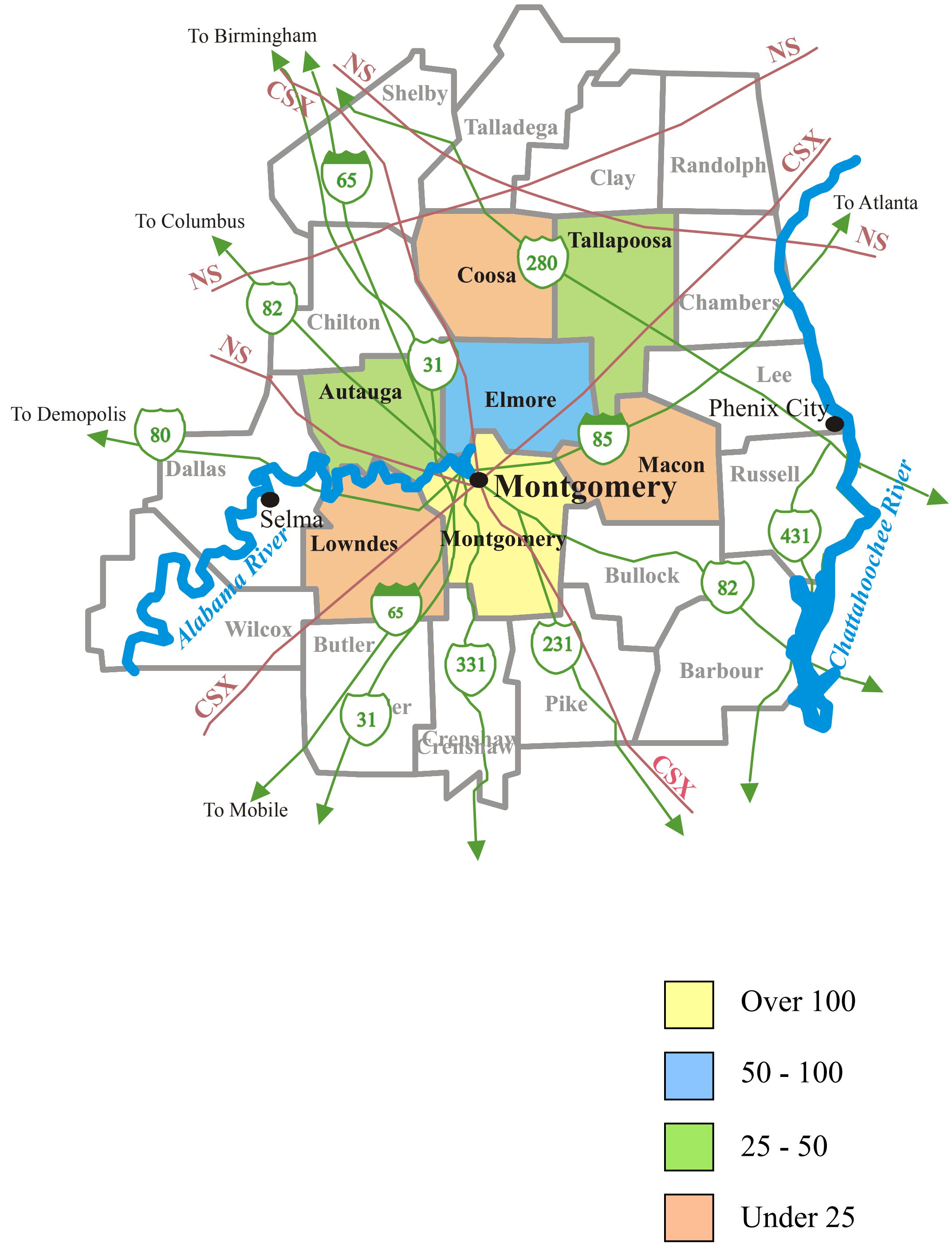


Exhibit 2-5 – 2006 Number of Manufacturing Establishments

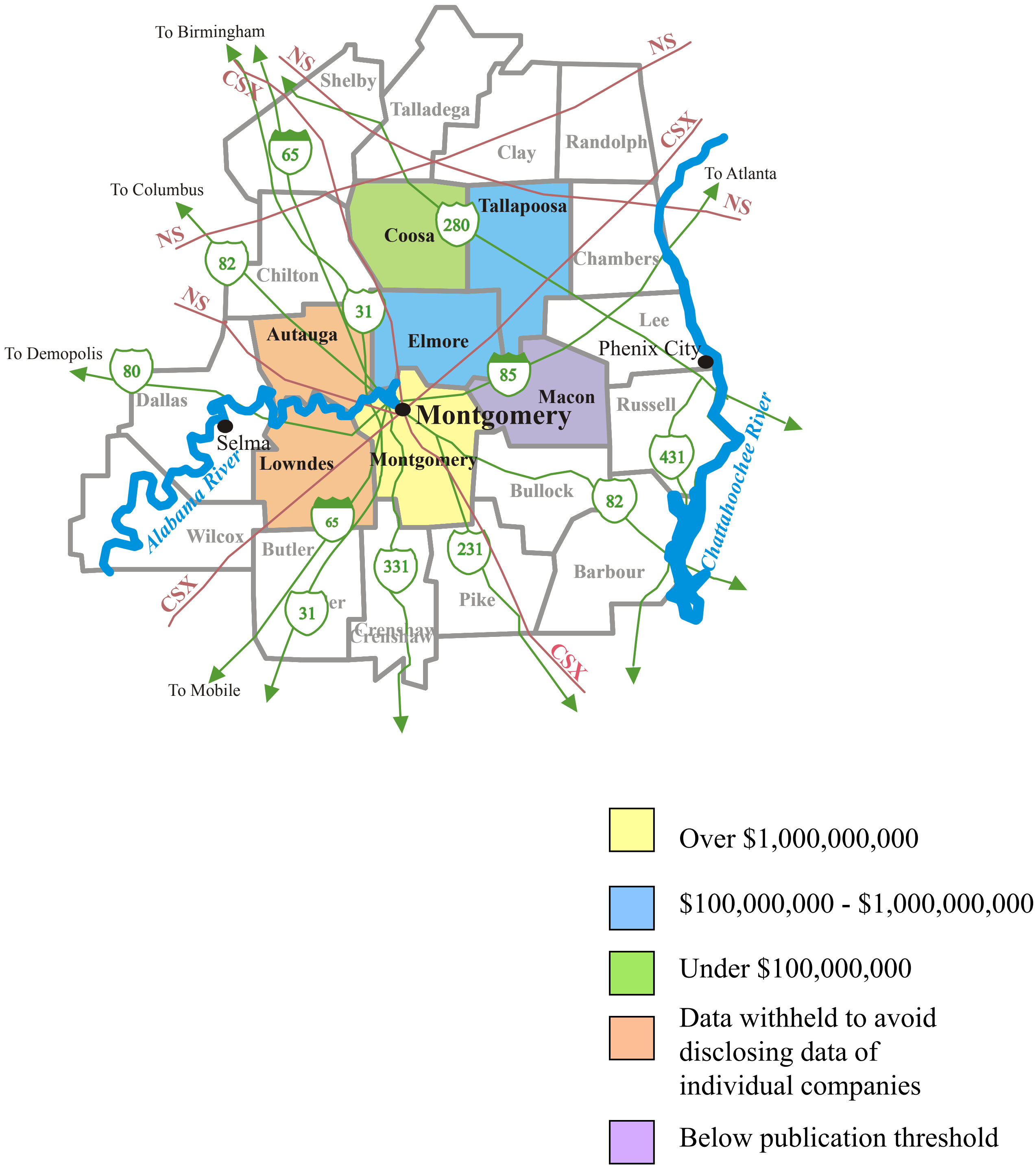


Exhibit 2-6 – 2002 Manufacturing Income

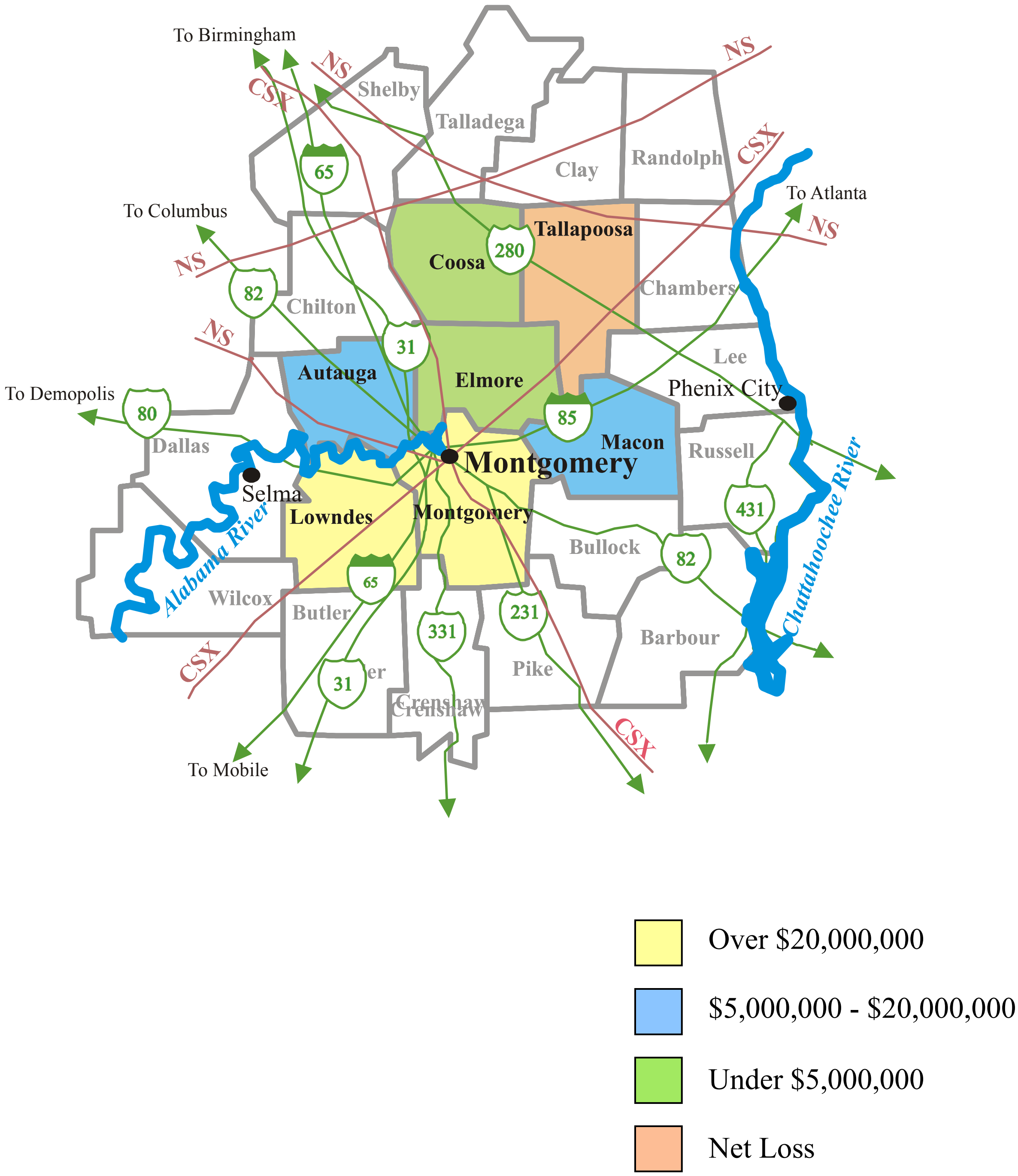


Exhibit 2-7 – 2004 Farm Income

2.3 Industrial Base

The Montgomery Area Chamber of Commerce lists the following as the largest industrial employers in the area. Locations of these employers are shown in Exhibit 2-8. It is noteworthy that many of these industries are located in reasonably close proximity to the Alabama River.

Company	Employees	Product
Hyundai Motor Manufacturing Alabama	2,700	Automobiles
Rheem Water Heaters	1,050	Water Heaters
Koch Foods	900	Poultry Processing
MOBIS Alabama	800	Cockpit Modules, Chassis, Injection Molding
GKN Aerospace	703	Aircraft Parts
U.S. Food Service	675	Food and Beverage Products
Webster Industries, Inc.	660	Plastic Freezer and Garbage Bags
International Paper - Prattville Mill	559	Liner Board
Neptune Technology Group, Inc.	552	Water Meters & Reading Systems
Big Lots Stores, Inc	500	Miscellaneous Consumer Goods
Russell Corporation-D.C.	400	Sportswear
STERIS Corporation	380	Hospital Equipment
GE Advanced Materials	360	Plastic Resin
Winn Dixie Distribution Center	350	Perishable Food Items Warehousing and Distribution
Smith Industries, Inc./Jay R. Smith	325	Commercial Plumbing Equipment
Montgomery Coca Cola Bottling Company	320	Beverage Bottling/Distribution
Hager Companies	320	Industrial Grade Door Hinges
CCC Associates	317	Lawn and Garden Care Products
Haldex Friction Products, Haldex Division	300	Block and Disc Brakes
Jim Bishop Cabinets, Inc.	275	Wood Cabinets
Thermalex, Inc.	260	Aluminum Extrusion/Heat Exchange
ThermaSys Heat Transfer	260	Welded Tubing Products and Automotive and Heat
Glovis Alabama	250	Warehousing and Logistics
Kinedyne Corporation	250	Tie Cords
Petrey Wholesale	250	Miscellaneous Consumer Goods Distribution
Russell Corporation-Coosa River Finishing	225	Knitting and Dyeing
Russell Corporation-Coosa River Knitting	225	Yarn Knitting
American Apparel, Inc.	220	Military Jackets and Trousers
Continental Eagle Corporation	210	Cotton Gin Machinery
Madix, Inc.	200	Shelving & Store Fixtures
MBM Corporation	200	Food Distribution
Herff Jones Yearbooks	200	Yearbooks

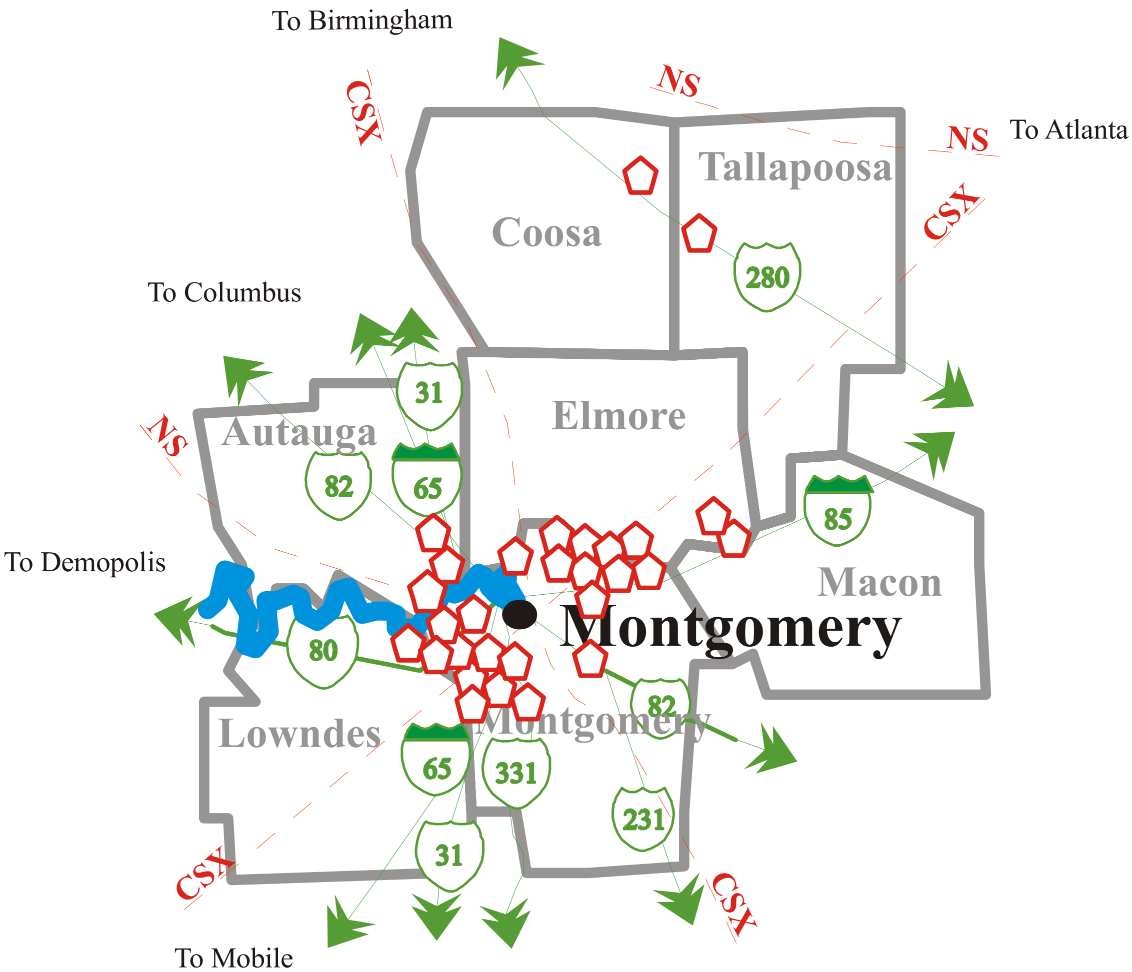


Exhibit 2-8 – Locations of Largest Industrial Employers in the Montgomery Market Area

2.4 Recent Economic Development Activities

According to the Alabama Department of Industrial Relations, in 2005 the Montgomery Metropolitan area saw an increase of 15.1% in the number of manufacturing jobs, more than any of the other Alabama metropolitan areas. From January – December, manufacturing jobs increased by 2,600. Over that same time period, the Montgomery metropolitan area saw an increase of 7,300 nonagricultural jobs. The addition of the new $1.1 billion Hyundai automotive assembly plant in the Montgomery area has contributed significantly to this growth.

2.5 Existing Transportation Routes

Economic development success is enhanced by connectivity to several modes of transportation. Success at a Montgomery port will rely on infrastructure as well as on the level of service from barge lines, railroads, trucking companies, logistics companies and ocean ports that handle commodities destined for the inland port. Exhibit 2-9 shows an overview of the regional transportation infrastructure.

2.5.1 Highway and Trucking Connectivity

As shown in Exhibit 2-10, Interstate 65 runs roughly north-south through Montgomery, connecting to Birmingham and Nashville to the north and Mobile to the south. Interstate 85 runs east from Montgomery and connects to Atlanta. US Highway 80 runs west from Montgomery and connects to several cities in central and western Alabama, joining Interstates 59/20 at the Mississippi State line near Meridian, MS.

Twenty-nine motor freight carriers maintain terminals in the Montgomery area.

Exhibit 2-9 – Transportation Routes in the Montgomery Area

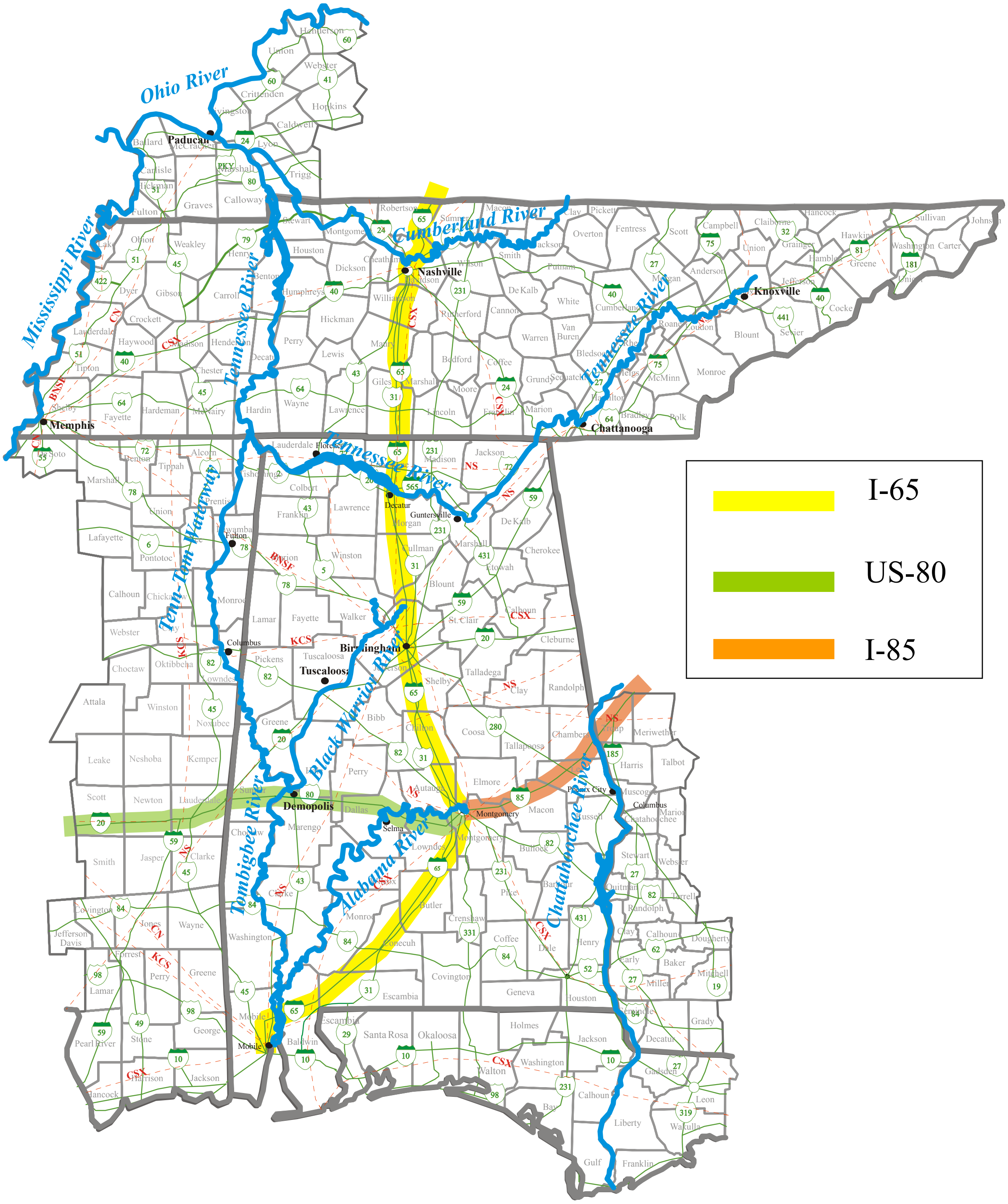


Exhibit 2-10 – Highway and Trucking Connectivity

2.5.2 *Rail Service*

Rail service to the study area is provided by the CSX Railroad, which has track going both north-south and east-west through Montgomery. Additional service is provided by Norfolk Southern, which has a track running southeast of U.S. Highway 82, where the track becomes a CSX track.

2.5.3 *Barge Lines and the Inland Waterway System*

Ports provide important access to national and global markets via the nation's inland waterway system, as shown in Exhibit 2-11. The inland waterway system includes a network of natural rivers and man-made impoundments, navigation channels, locks and dams constructed and maintained by the U.S. Army Corps of Engineers (COE) to provide a minimum nine-foot-deep channel for commercial navigation. The Alabama River links the study area to global markets via the Port of Mobile.

2.5.4 *Ocean Ports and Logistics Companies*

The Port of Mobile is the study area's coastal gateway for global waterborne commerce. Mobile is developing a major container facility that is scheduled to open for business in 2008. It will be extremely important for inland port and stevedoring personnel to maintain working relationships with management at the Port. In addition, the same working relationships should be established with logistics companies and ocean port stevedoring companies that arrange for the ship discharge and barge transport to an inland port. Contacts at the port are also important.

Exhibit 2-11 – Central U.S. Inland Waterway System

3.0 CHARACTERISTICS OF WATERBORNE COMMERCE

In the United States, locations on rivers are designated by the river mile and the side of the river (either the left or right bank as the river descends). Mile zero is located at the mouth, or downstream end, of all rivers in the U.S., with the exception of the Ohio River. River miles on the Ohio begin at mile zero in Pittsburgh, where the confluence of the Monongahela and Allegheny Rivers form the Ohio, and end at river mile 981.5 where the Ohio flows into the Mississippi River near Cairo, IL.

The portion of the Mississippi River from its headwaters in Minnesota to Cairo, IL, is designated as the Upper Mississippi River. The portion of the Mississippi from Cairo to the Gulf of Mexico is designated as the Lower Mississippi River. Upper Mississippi River Mile (UMR) 0.0 is equivalent to Lower Mississippi River (LMR) 953.8.

There are no locks on the Mississippi below St. Louis; therefore, being situated on the lower Mississippi is a distinct advantage with regard to waterborne shipping costs. This section focuses on characteristics of barge traffic and that associated with operations on the Alabama River.

3.1 General Overview of Inland Waterway Transportation

River transportation provides a cost-effective and environmentally sound alternative to land-based transportation modes. Over 15% of the nation's freight, measured in terms of tonnage, is moved on inland waterways for less than 2% of the nation's freight movement cost. The U.S. Department of Transportation (USDOT) reports that the number of miles a ton of freight can be carried using one gallon of fuel varies by mode of transport as follows:

Truck:	59 miles
Rail:	202 miles
Barge:	514 miles

The USDOT also notes that in addition to the distinct advantages in energy savings, barge transportation generates far less air and noise pollution, per ton of freight moved, than either truck or rail.

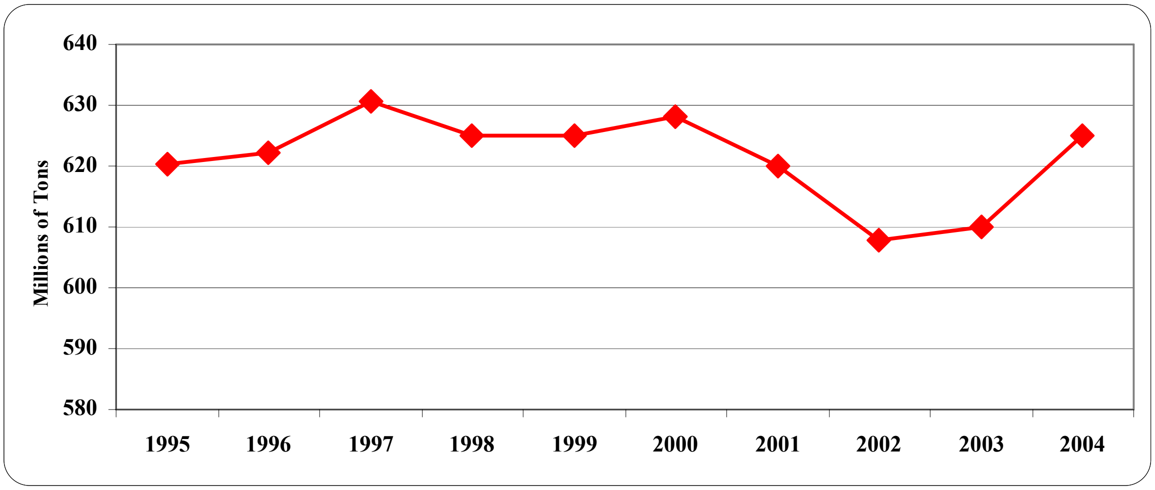
To carry goods and commodities, the inland river transportation system utilizes barges that are linked together to form tows. Each tow is pushed with a towboat. A standard jumbo hopper barge is one hundred ninety-five (195) feet long by thirty-five (35) feet wide. Each barge carries the equivalent of 15 to 20 rail car loads or 50 to 60 truck loads of material. The movement of commerce on the nation's waterways greatly reduces wear and tear on public highways and bridges. Statistics also show that waterborne transportation significantly reduces the number of traffic accidents and, by extension, the number of traffic fatalities, by reducing the number of vehicles on the highways and at rail crossings.

Where river transportation exists as a viable alternative, rail freight rates typically must be competitive with waterway shipping rates. Where a river does not exist as an alternative, rail freight rates may rise to be competitive with truck rates. According to the COE 2004 Civil Works Strategic Plan, the navigation infrastructure of waterborne commerce saves $7 billion annually in transportation costs by providing a more energy-efficient and environmentally friendly form of conveyance than rail or road transportation modes.

3.2 Waterborne Freight and Commodity Movements

According to the COE, over 625 million tons of freight moved on the nation's rivers in 2004 with dominant commodities including coal, petroleum products, raw materials and grain, as shown in Exhibit 3-1. Exhibit 3-2 shows the trends in commerce on the Alabama River. The COE's Waterborne Commerce Statistics Center reports that residual fuel is the dominant commodity transported on the Alabama River, followed by distillate fuel and sand and gravel. Local resources, however, dispute these statistics indicating that data provided by actual operators on the river indicate sand and gravel to be the dominant commodity being moved.

National Inland Waterway System – Trends in Commerce



National Inland Waterway System – 2004 Commerce By Commodity

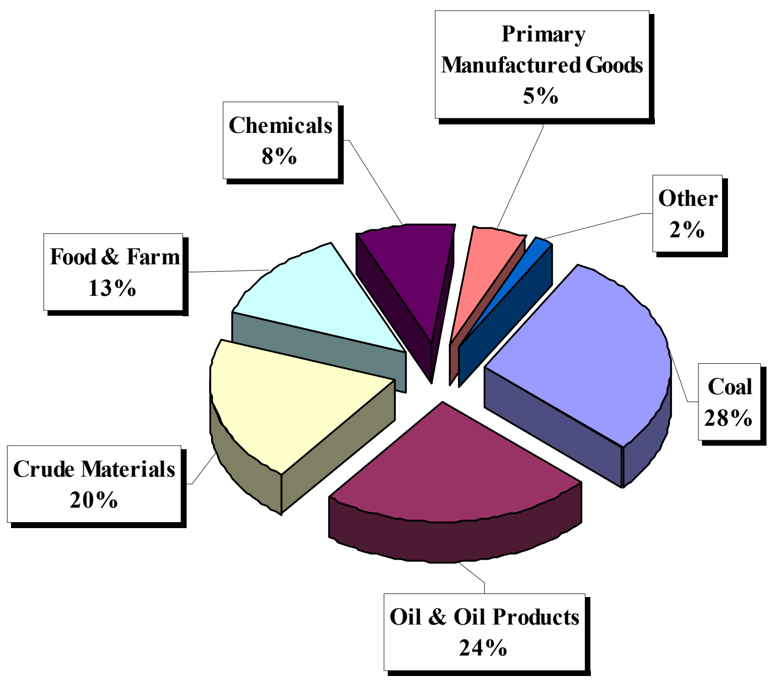


Exhibit 3-1 – 2004 National Inland Waterway System – Trends in Commerce

Trends in Commerce on the Alabama River

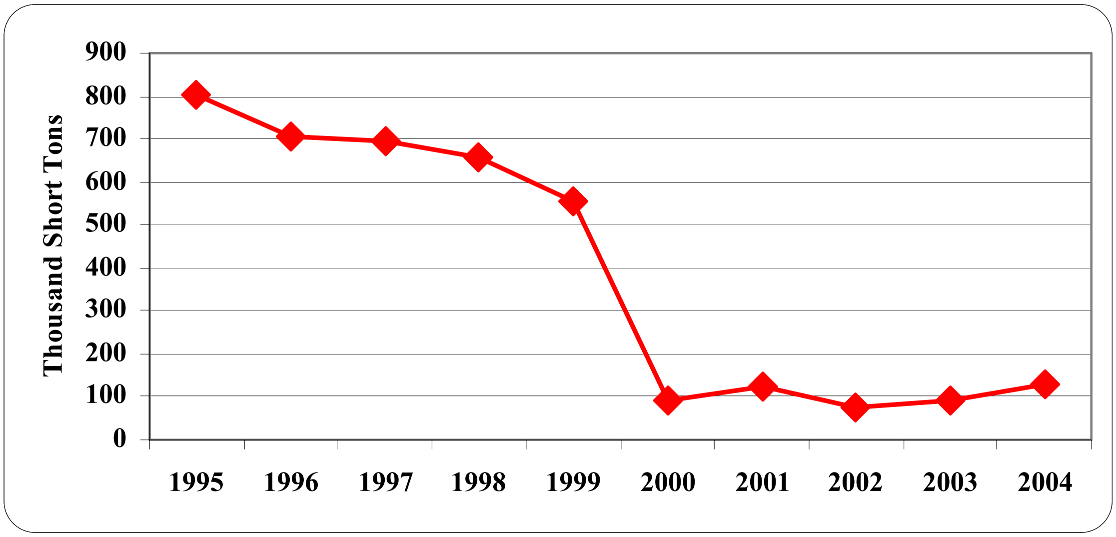


Exhibit 3-2 – 2004 Alabama River – Trends in Commerce

The COE is currently in the process of analyzing the commodity data for the River. No results have been posted as of the date of this report.

3.3 Characteristics of the Alabama River

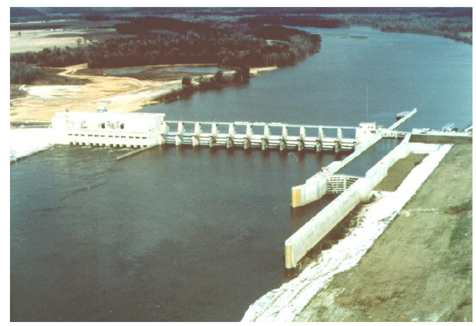
The headwaters of the Alabama River begin at the confluence of the Coosa and Tallapoosa Rivers near Montgomery. The River empties into the Mobile River approximately 45 miles above US-90 in Mobile, AL. The Alabama River is navigable for 305 miles and is separated into pools by three locks as shown below.

Alabama River Lock Locations

Claiborne Lock and Dam – located at River Mile 72.5. It is 600' x 84', with a lift of 30'. It was opened for navigation in November of 1969 and fully completed in 1971. The Claiborne Lock and Dam is for navigational use only and does not have the capacity to generate electrical power.

Millers Ferry Lock and Dam – located at River Mile 133.0. The lock chamber is 600' x 84', with a lift of 45'. It was completed in 1970 and performs two functions: generate electrical power and maintain river depths appropriate for navigation.

Robert F. Henry Lock and Dam – Located at River Mile 236.2. The lock is 600' x 84', with a lift of 45'. It was completed in 1975. The Lock and Dam perform two functions: generate electric power and maintain river depths appropriate for navigation.



The major cities and industrial areas located on the Alabama River are Selma, AL and Montgomery, AL. Traditionally, forest products and sand and gravel have been processed in the area and shipped via the Alabama River.

3.4 Waterborne Commerce on the Alabama River

Volume on the Alabama River peaked in 1985 with 4.09 million tons of cargo shipped. Two categories of commodities were responsible for most of the cargo shipped; non-metallic minerals and products (sand and gravel) and forest products and pulp (pulp logs). Since 1986, cargo volume on the Alabama River has declined. Barges on the Alabama River currently carry just over 100,000 tons of cargo per year. Reasons for this decline have been attributed to the competitive service costs of surface transportation modes, the closure of two paper mills in Mobile and the shift of sand and gravel production out of the area.

3.5 Challenges for Waterborne Commerce in the Montgomery Area

In order for waterborne commerce in the Montgomery area to exist, the river must be capable of handling cargo, and the industrial infrastructure for use of the waterway must be present.

History has shown that the Alabama River can support sustained levels of waterborne commerce, but challenges exist that have hindered its ability to do so. It is necessary to understand these challenges and to evaluate the reasons why they exist today.

3.5.1 Port Facilities Suitably Located and Designed

The Montgomery area has no regional general purpose marine facility suitably located to serve areas of new industry growth. The marine terminals in the area, of which five have been identified, were constructed essentially as special purpose terminals. They served clients having a particular commodity type or were built to meet the needs of a single user. These terminals handled grain, fertilizer, steel structures, over-sized items (such as fabricated steel or machinery), as well as sand and gravel operations.

General locations of major industry, warehousing, distribution and related industrial service companies were reviewed. Most of the new growth has occurred southwest of the City of Montgomery and west into Lowndes County generally along US 80. Much of this growth has taken place in the past ten years and economic indicators show continued momentum is expected. With large land tracts available in this area, transportation planning is being performed with a broad view toward the future.

Major plant site selection efforts conducted in the recent past have all gravitated to the same general area. These efforts recognized that having access to both highway and rail transportation was very important to maintain competitiveness. Each of these developments also targeted sites along the Alabama River corridor and adjacent to this new industrial growth area of Montgomery and Lowndes Counties. This area remains the most attractive in terms of industrial park site selection criteria and relative location to potential users. It also provides the best opportunities for development of a multi-modal industrial park which would provide "ready-to-build" industrial sites with access to highway, rail and waterway transportation. In this context, "ready-to-build" also implies sites above the 100-year flood elevation, with reasonable topography, drainage and subsurface conditions, and with reasonable and readily-available access to utilities.

3.5.2 River Reliability

According to the USACE, the basis for determining a river's reliable channel dimensions are established through a comprehensive study. Factors that are considered include types and probable future tonnage of traffic, types and sizes of vessels in general use on connecting waterways, and development on other waterways which may be indicative of the type and size of vessels likely to use the river. The USACE is authorized by Congress to maintain a navigation channel in the Alabama River of a minimum of 200 ft. wide and 9 ft. deep. Historically, key to the channel depths is the amount of rainfall in the river basin (55 inches average annually). There have been some years when the authorized depths and widths have been available all year, but droughts can have a major effect on the system. On the average, the channel is at nine feet or more during the rainy season (December through April) and more likely to be at less than authorized depths during the drier months (July through October). By far, the preponderance of siltation problems occurs below Claiborne Dam over a 52 mile stretch of the river. However, within these 52 miles, there are only seven trouble spots accounting for 1.6 miles where the river falls below it's authorized 9 ft. depth..

The Mobile District of the US Army Corps of Engineers maintains authorized channel dimensions through management of water flows, training works, and dredging. Flow management is accomplished by controlling flows through the two hydropower generation facilities at Robert F. Henry Dam and Millers Ferry Dam. (Claiborne Dam is a run-of-the-river facility.) Alabama Power Company, through an agreement with Mobile District, releases, on average, a minimum of 4,640 cubic feet per second of flow per day from the Coosa River to augment the Alabama River for navigation purposes.

Training works, designed to scour out the channel in those reaches prone to siltation, were installed below Claiborne Dam in the 1970's and 1980's, but have been only partially successful. Mobile District conducted a feasibility study in 2000 to determine the economic feasibility of modifying the training works to increase the channel reliability. The lack of industry on the river at that time contributed to a finding that installing new works or improving existing ones was not economically justified. The issue of new works should be re-visited considering the new industries which have announced locations on the river, with the intent to ship by barge, and those new industries which indicate potential to ship by barge if the river were more reliable.

Dredging is by far the most effective way to maintain river channels. When funding is available, the COE's Mobile District annually clears the trouble spots (shoals) below Claiborne Dam to maintain the authorized depths and widths. Historically, the average reliability (the amount of time the channel is at authorized dimensions) is 60-70%. This does not imply the river is "closed," but rather there are locations where the depth is less than the authorized 9 feet.

The availability of dredging funds largely determines whether the Alabama River navigation channel can be maintained. The Alabama River is categorized in the federal budgeting process as a "low-use" channel and, as such, over the past five years has not received any dredging funds in the President's annual budget proposal to Congress. Supporters of the Alabama River were successful in getting sufficient funds added back into the budget in most years, but were less successful last year. As a result, the last time the river was dredged was in July 2005.

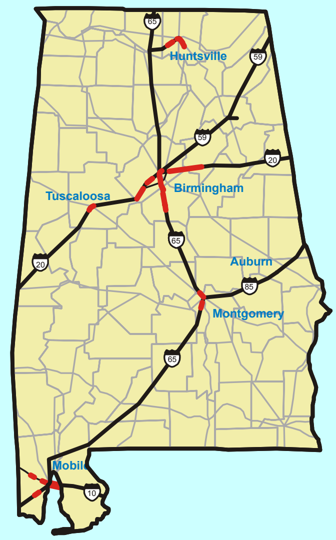
The problem of obtaining appropriate and consistent funding is somewhat circular. Dredging funds are presently appropriated based on a threshold of tons of cargo transported on the River; however tonnage will not increase unless adequate funding provides for a minimum 9-foot channel depth. A 9-foot channel depth is the minimum shippers need to deem a river reliable and to make the needed commitment to year round navigation. Without this river reliability, prospective shippers and operators think twice before locating their business in the Alabama River Basin.

The Alabama River hasn't always faced these challenges. In 1986, 4.1 million tons of commodities were transported on the river. Tonnage declined gradually since that time, but it was in 1999, when plant closures in Mobile occurred, that tonnage took a precipitous drop. Following closures, the difficulty in obtaining reliable funds for navigation has precluded shippers from shipping cargo on the River. The lack of cargo demand has also discouraged the needed capital investment in adequate terminal facilities in appropriate locations.

3.5.3 Highway Congestion

In 2005, the University of Alabama, Huntsville (UAH) published a report on the transportation infrastructure in Alabama and its role in meeting the needs for economic growth. One focus of this report was Freight Transportation Modeling and the need to redevelop models from analyzing historical trends to a more dynamic approach. A trend that the study recommended accounting for in these models is industry clustering and the related effects on highway congestion. The theory presented is that the shift of Alabama's manufacturing activity from a historically textile-based sector to automotive manufacturing will significantly under-forecast the demand for highway transportation.

Congestion is measured by Alabama Department of Transportation (ALDOT) by tabulating the number of passenger cars per hour, per lane, multiplied by the number of lanes. This product is divided by the percent of the total traffic appearing in the peak hour of demand. ALDOT determines that a rural road is congested if it has a capacity ratio of 0.75 or higher and an urban road is congested if the capacity ratio is over 0.90. In 2002, ALDOT identified 455 miles of congested highways.



2002 Congested Alabama Highways – 455 Miles

The UAH study applied the Historical Trend Forecast to determine projections for 2008. The results indicated that 1,035 miles of highways were forecast to be congested. This is an increase in highway traffic of nearly 19% in a six year period.

Alabama has expanded its manufacturing environment to include new automobile assembly plants and supporting industries. Daimler-Chrysler has a manufacturing plant in Tuscaloosa; Hyundai has recently brought an automotive manufacturing plant on-line in the Montgomery area; Kia has announced a manufacturing facility to be built approximately 100 miles east of Montgomery, just over the state line in Georgia; and Honda has a manufacturing plant in Lincoln, Alabama (40 miles east of Birmingham). With these new facilities comes increased demand for freight transportation services. These facilities, in return, generate "industry clusters" or geographical concentrations of industries and other suppliers to serve the manufacturing plants.

2008 Projection Using Historical Growth Rate – 1,035 Miles of Congested Alabama Highways

The UAH study conducted in-depth research to predict the net effect that this new manufacturing activity would have on the transportation infrastructure in Alabama. When applying the effects of industry clusters present in Alabama, the expected number of congested miles of highways increases to 1,760 in 2008.

2008 Project with Industry Cluster Information Included – 1,760 Miles of Congested Alabama Highway

The opportunities for Alabama River transportation services are two-fold: 1) provide transportation in the corridors where highway demand exceeds the ability to accommodate growth, and (2) relieve congestion in areas expected to experience increased traffic. As discussed in other sections of the AFMS, the use of barges on the inland waterways to carry traditional cargoes such as steel, aluminum, wood products, grain, ores, petroleum products and chemicals, as well as merging cargoes such as containers could diminish road congestion and provide a more efficient transportation system.

3.6 Cargo Volume and Reliability of Depth

A "reliable" 9' channel depth is the standard shippers have sought to make the needed commitment to year-round navigation. During periods of reduced operating depth, the barges must be loaded lighter to reduce the draft of the barge. Except for fuel, most of the tow cost is fixed. When less tonnage is transported, the fixed cost is spread over fewer tons being moved. These conditions reduce the positive economics usually found in marine transportation. If water levels are drastically reduced and cargo volume goes down, there is a point when per-unit cost will approach that found in competing modes influencing a potential shift from water transportation.

3.7 Results of a Fully Funded Waterway

For waterborne commerce in the Montgomery area to continue and possibly grow, the river must be capable of handling cargo, and industries that could use the waterway to transport cargo must be in the market area. A river's ability to handle cargo has two requirements: maintenance of the navigation channel, and waterborne services that meet the needs of customers in the area. Attracting users to the waterway can be accomplished by soliciting existing industries as well as by inducing new industrial development.

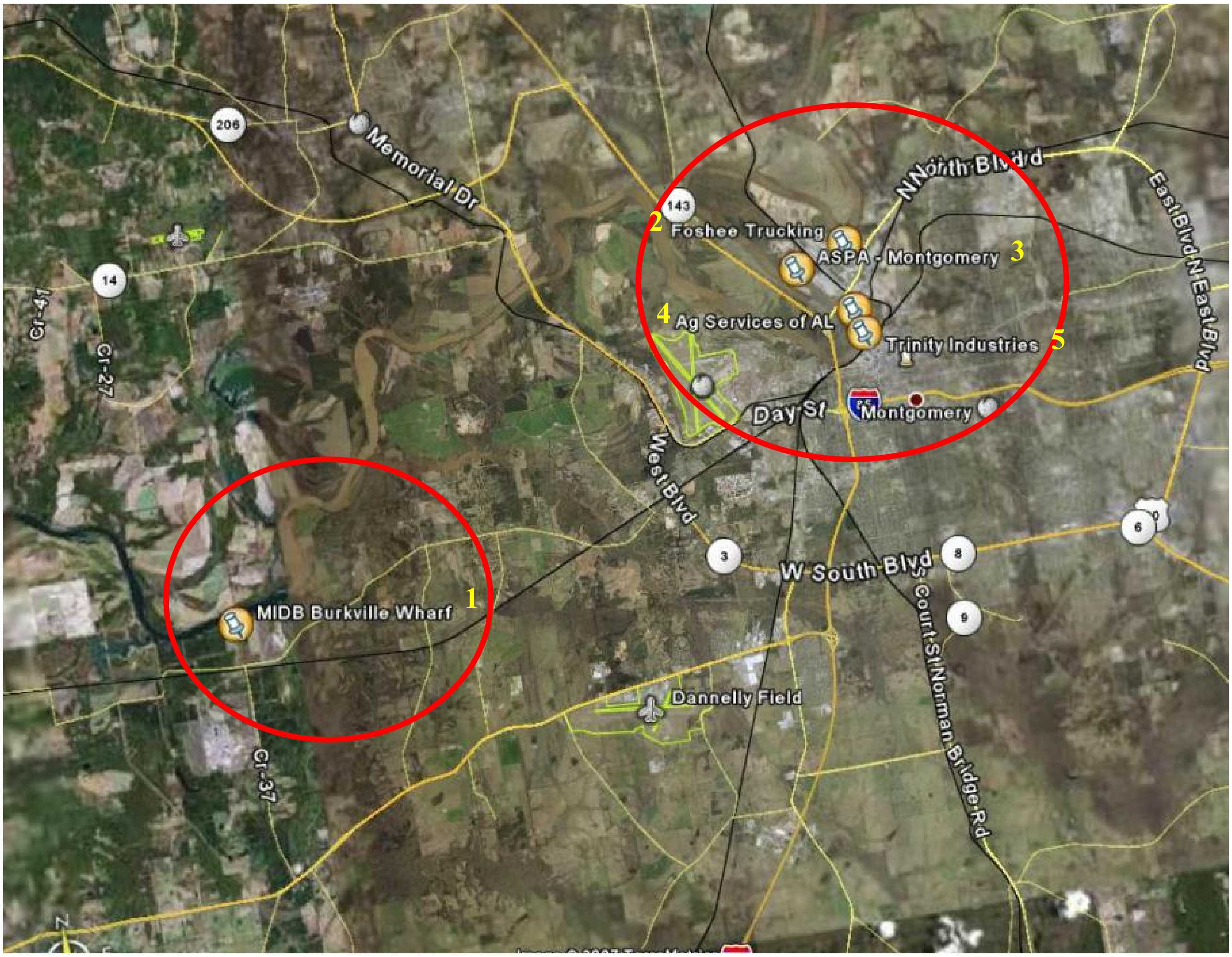
History has shown that the Alabama River can support sustained levels of commercial traffic. The causes of the decline in Alabama River waterborne cargo are mostly supply and demand related, not factors indicating systemic failure. Fully-funding Alabama River waterway improvements will allow businesses, which could use the river as a transportation mode, to relocate to the area and utilize the resource. Currently, there are two high-profile ventures breaking ground along the Alabama River: Alabama River Partners, LLP will operate a sand and gravel mine that will transport at least 500,000 tons to the Gulf Coast annually, and New Gas Concepts is developing a plant in Selma to produce wood pellets for shipment to Scandinavia. Assuring that the Alabama River is maintained to its authorized specification will help these ventures succeed in using the river to transport their goods and aide in attracting more commerce to the waterway itself and the surrounding service area.

4.0 PORT ACTIVITIES

Economic data reflects continued business development and growth in the Montgomery area. For the purposes of this case study, the Montgomery area is defined as including the counties of Autauga, Elmore and Montgomery. However, recent developments suggest Lowndes County could play an increasing role in area economic change. In the review of River Port and Industrial Park Development, Lowndes County is included with the Montgomery area counties.

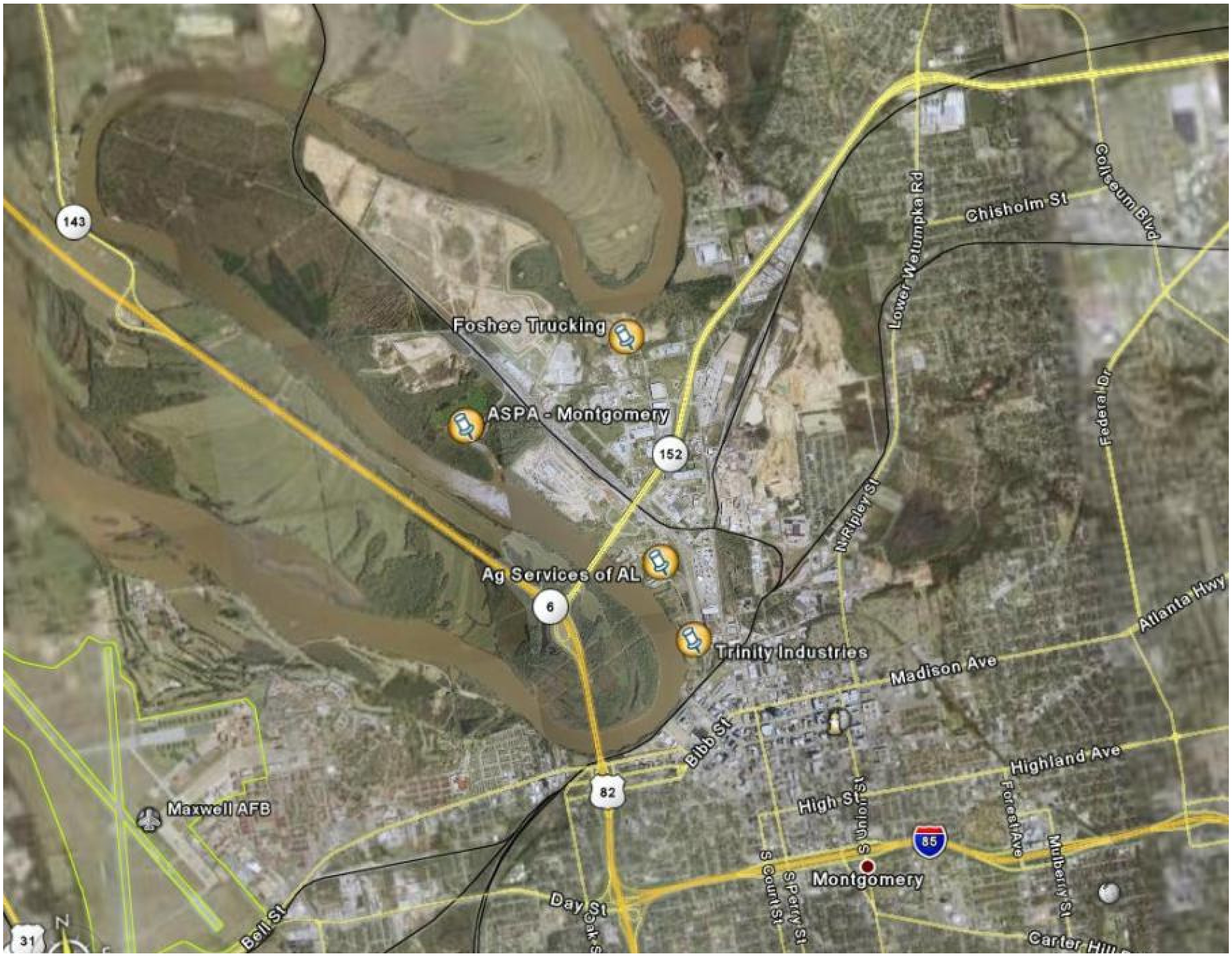
4.1 Existing Facilities

Port development has been limited along the Alabama River in the Montgomery area. 1997 was the last year the COE conducted a survey of port facilities on the river. At that time, five existing cargo port facilities were inventoried as shown in Exhibits 4.1, 4.2 and 4.3. The five structures are: 1) a GE Plastics facility dock located at Burkville, AL owned by the Montgomery Industrial Development Board (MIDB) currently not in use; 2) a private facility in Montgomery, AL owned by Trinity Industries for steel structural shipments; 3) a dry fertilizer shipment dock in Montgomery, AL owned by Agricultural Services of Alabama currently not in use; 4) an Alabama State Port Authority (ASPA) dock in Montgomery, AL currently used for storage and serviced by rail and truck only; and 5) a conveyor load structure owned by Foshee Trucking in Montgomery, AL currently not in use.



1. MIDB Burkville Wharf
2. Foshee Trucking
3. ASPA Montgomery
4. Agricultural Services of Alabama
5. Trinity Industries

Exhibit 4-1 – Existing Cargo Port Facilities in the Montgomery Area



- Foshee Trucking
- ASPA Montgomery
- Agricultural Services of Alabama
- Trinity Industries

Exhibit 4-2 – Existing Cargo Port Facilities – Montgomery County

- Burkville Wharf

Exhibit 4-3 – Existing Cargo Port Facilities – Lowndes County

4.1.1 Active Terminals

The **Trinity Industries Montgomery Wharf** facility is located at RM 287.8 on the Alabama River. It is a privately-held development involved in a specific steel manufacturing business. The adjoining properties and the Trinity property appear to be well utilized and have significant ground storage and several manufacturing buildings. In 1997 surveys by the COE, the water depth was listed at an adequate 10 feet and the complex has berthing space of 250 feet. Steel structural bridge components were moved from the facility to barges for subsequent transport thereby indicating well stabilized internal roadways and loading areas. The complex is adjacent to the CSX railroad.

The **ASPA Montgomery** Facility is a publicly-built facility that is a part of the marine terminal assets of the Alabama State Port Authority. It is constructed as a multi-purpose facility with investment in mooring clusters, a CSX connected rail track, bulk grain and liquid storage capacity, and a small dock area supporting bulk transfers and an occasional general cargo shipment. The facility is built in a slack water cut.

4.1.2 Inactive Terminals

The **MIDB Burkville Wharf** was originally used for steel and oil field equipment movement. It is presently located adjacent to property owned by GE Plastics. In 1997 it was reported to have the upstream wingwall leaning and only 5 feet of draft alongside. Its value would be in the ability to salvage some of the structure and thereby reduce marine facility capital investment in any broader-based facility development. An assessment of the adequacy of the structure for such use requires work beyond the scope of this study. The dock would have to tie into a Master Plan for the development of adjacent property to foster a suitable and competitive transportation facility. Adequate rail and road access is nearby. The site is reportedly not in use and no aerial photo is available.

The **Agricultural Services of Alabama Facility** was established to receive dry fertilizers via water and to distribute them regionally via truck and rail. Two dry fertilizer warehouses are on the site; however, the area of the facility is tightly constrained by the river on one side and the CSX railroad on the other. The 1997 survey showed 22 feet of depth alongside and 100 feet of berth space. Rail service from CSX does serve the site. The dock is reportedly not in use.

The **Foshee Trucking** Facility was established to move sand and gravel from the site. The property is in private ownership. In 1997 its loading leg for sand and gravel was reported by the COE as missing. The marine structure is apparently not in use, but the Foshee Trucking Company is still in operation. The location does have substantial open storage area which could suit some additional development if available. CSX railroad apparently serves the site at its rear. Acreage and availability is not known. The property is located above the CSX Bridge and is the most upstream existing COE inventoried marine asset in the Montgomery Area.

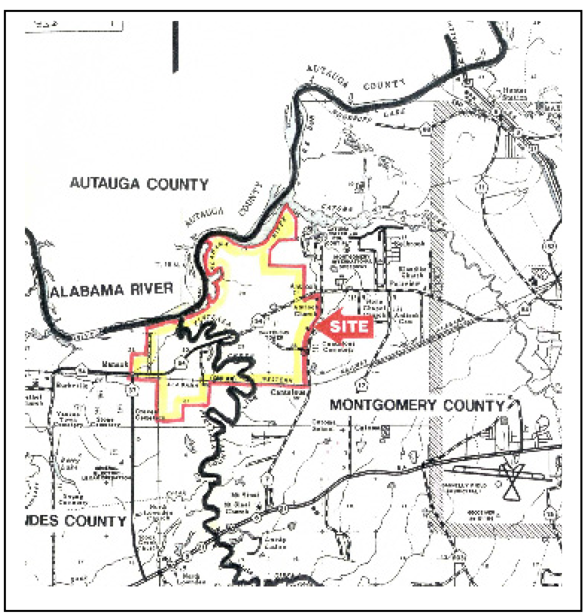
4.2 Review of Port Activities

Existing river terminals in the Montgomery area are not capable of handling significant quantities of containers and general cargo. The inactive facilities are all private and unlikely to be available for public use. Of the active facilities in the Montgomery area, one is public, but is not prepared to handle general cargo on a regular basis. In order to handle and attract general cargo to waterborne transportation, significant investment would have to be made in either existing or new facilities to handle the volume. Investments could be made to modify the ASPA facility to regularly handle general cargo, or establish a multi-modal industrial park that would offer the services of a river terminal. Land surrounding the ASPA facility does not appear to be suitable for this purpose, however.

5.0 ECONOMIC DEVELOPMENT OPTIONS

Development of a Multi-Modal Industrial Park which incorporates features conducive to all transportation modes would provide excellent infrastructure for increased River traffic. It is within this environment that the needs of tenants and those businesses needing increased transportation options can bring the marine terminal demand into focus. A general cargo facility can potentially satisfy investment objectives for marine infrastructure that a single product-oriented terminal may not. An Industrial Park with adequate land, access to the River, and proximity to appropriate rail and road connectors could be a catalyst to increase regional economic activity.

Potential economic development opportunities have been directed towards specific tracts of land approximately 12 miles west of the City of Montgomery. These tracts are contiguous and bisected by Pintlala Creek which is also the Lowndes/Montgomery county line. The Montgomery county parcel is approximately 3,213 acres. The Lowndes county parcel is 682 acres.



Potential Montgomery Area Industrial Sites

5.1 CSX Transportation

CSX Transportation has marketed two tracts of land for industrial development in the Montgomery Area.

Tract 1 is located in northwestern Montgomery County and encompasses approximately 3,213 acres with a north boundary of the Alabama River. The site has water access and is also served by CSX rail transportation. Major highway connectors are within acceptable distances. The property has been identified as Riverside Industrial Park, and it meets the criteria listed for a Multi-modal Industrial Business Park.

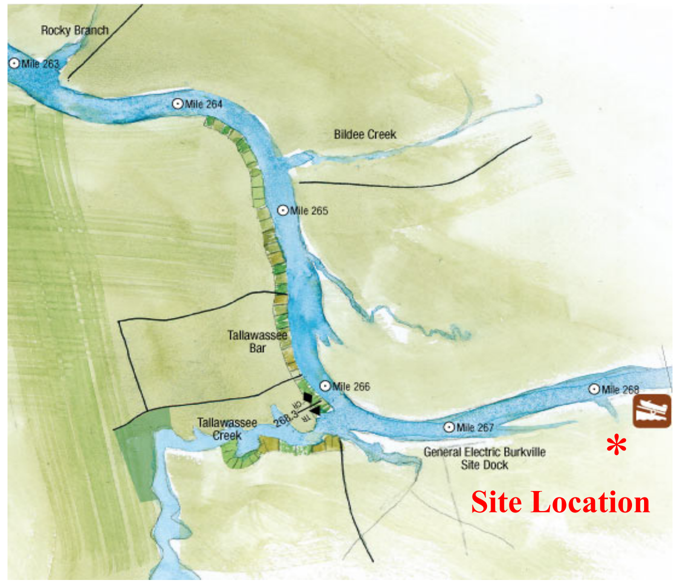
Tract 2, called the Schreiner Site, is located in Lowndes County. It is comprised of approximately 682 acres with the same connectors for transportation services as Tract 1. Utility information is generally similar for the two tracts and the properties are nearly adjacent to each other.

5.2 The Hankook Synthetics - Riverside Industrial Sites

In 1996, the Montgomery Area Chamber of Commerce was assisting Hankook Synthetics, Inc. in locating a suitable site in the area. Two Parcels were identified for potential site selection. The properties are in the same general location as the CSX Transportation Tracts. The adjoining parcels contain 942 acres in Lowndes County and 1,262 acres in Montgomery County. Utilities are available on both parcels.

5.3 Central Alabama Inland Port Facility

Alabama River Partners has proposed to bring three new industries into the area including a sand and gravel mining operation, a construction and demolition debris (only) landfill and a global inland port, if economically feasible. The 900 acre development site for the proposed projects is located along the Alabama River and Pintlala Creek, near GE Plastics in the industrial area of Lowndes County. It lies within the westernmost boundary of the previous sites described within the Lowndes County parcels. The Alabama River is located to the North and the CSX Railroad/County Road No. 54 to the South.



The proposed economic development would support a sand and gravel operation that could be among the best facilities in the country; mining sand and gravel to ship it by barge and rail to the Gulf Coast.

5.4 Review of Economic Development Options

Three distinct industrial development projects have been discussed and/or proposed for this development area in the past fifteen years. It is worth noting that all three locations are in the same general area straddling Montgomery and Lowndes Counties; all bordered to the North by the Alabama River, and all are in proximity to the same CSX rail line to the South. The three proposals included varying configurations and inclusions of adjacent properties.

Having a well placed general purpose transportation and marine facility will bring economic development opportunity to the market area. Such a development could service manufactured goods, over-dimensional freight, bulk products, steel, containers and virtually any other product in the international or domestic freight market, bringing the public and private sectors together to accomplish a variety of economic growth goals and to increase Alabama River use.

6.0 MARINE TRANSPORTATION ISSUES

With the Montgomery area's favorable economic climate, a significant opportunity exists for all transportation sectors to increase activity and stimulate additional economic benefits. Although certain sectors of the economy have declined over the last decade—namely forestry and agriculture—other economic sectors show strength and are growing. These growth areas include manufacturing, warehousing and distribution services, extraction of raw materials and new business development.

Transportation options for all modes are essential if development proposals are to provide the best value and maintain competition and options. Excellent highway connections that will accommodate existing requirements and future growth either exist in the market area or are in the planning improvement stage. The highway network is mature, and provides access to both rural and metropolitan areas of the southeast.

The Montgomery area is served by two Class I railroads, CSX and Norfolk Southern, with service to customers east of the Mississippi River. The area is well positioned to take advantage of Class I railroad expansion and improved service that will likely come from Port of Mobile international freight diversification.

The value of the Alabama River as a commercial waterway was evident through 1995, after which a slow traffic decline commenced for the following four years. A movement towards global sourcing and a decline in the specific markets the River served was apparent. A drop in demand for certain forest products led to a major plant closure which was the principal recipient of logs and wood chips originating from points on the River. Since 2000, this has caused annual barge shipments volumes to drop below 150,000 tons. Federal funding for waterways is largely driven by activity levels, and this volume reduction has continued.

A minimum 9' depth for year-round navigation is a criterion for commercial reliability. Barge transportation service must meet this criterion to be commercially viable in today's economy and for the types of businesses taking hold in the Montgomery area. Surveys for other parts of the AFMS Study found shippers rank reliability as being more important than cost. Although cost savings are generally characteristic of marine transportation, cost factors alone appear to be insufficient to overcome the negative aspects of unreliable service.

Even though the Alabama River has areas along the waterway where the navigation channel is less than 9 ft. deep, these areas encompass less than 2 miles of the 305 mile navigable length of the waterway.

7.0 SUMMARY AND CONCLUSION

The Montgomery area has significant opportunities for long-term economic development and growth. A viable marine transportation option for the Alabama River would certainly make the region more attractive to industry. Several action items are outlined below that could secure the benefits derived from increased use of the Alabama River.

7.1 Action Items

- Define clear objectives, goals and milestones that are consistent with efforts to attract new commerce and funding for the Alabama River.
- Meet with all direct stakeholders on the existing criteria established for water flow management, and review historical data to propose procedural changes that support navigation.
- Establish firm criteria with COE for a mutual, acceptable message that promotes an increase in allocated funds and management support for public and private sector goals.
- Encourage COE to update the Training Works Feasibility Study in light of emerging business opportunities.
- Educate economic development organizations on the importance of Alabama River barge service, its benefits, and the need for reliable operations and maintenance criteria.
- Counteract negative perceptions toward Alabama River marine transportation through education and marketing that leads to increased public awareness.
- Support the Alabama State Port Authority, whenever possible, to generate a positive message and respond to inquiries concerning navigation, business development and market opportunities.
- Actively solicit public, private and political support for stabilized funding over the minimum five to ten year period needed to establish the service reliability necessary for tonnage recovery.

7.2 Action Items To Be Supported

- New Industrial Park proposals with transportation and marine infrastructure plans that support general cargo operations, enhanced facilities and economies of scale.
- Political objectives that seek funding to establish Alabama River navigation stability.
- Economic development requirements that require serious consideration of marine transportation options and interest.
- Professional services to advance navigation improvement and freight enhancements for the Alabama River.
- Public and Private cooperative endeavors to expedite maritime-viable Industrial Park development.

7.3 Action Items To Be Monitored

- Ocean shipping trade route development announcements from the Port of Mobile and ocean carriers.
- Information relevant to Alabama River improvements and their implications for barge service strategies and goals.
- Political receptiveness to proposals for new action by federal, regional and local stakeholders.

Waterborne transportation will have to compete on the basis of cost, transit time, ease of transaction and reliability. The Alabama River, and the reliable transportation service that it has historically supported, could play an important role in economic development of the Montgomery area.

APPENDIX D

COMPARISON OF COSTS FOR MAINTAINING HIGHWAY AND WATERWAY FREIGHT TRANSPORTATION SYSTEMS

A part of the

BUSINESS PERSPECTIVES ON THE FEASIBILITY OF CONTAINER-ON-BARGE SERVICE

Alabama Freight Mobility Study
Phase 1

Prepared for the

COALITION OF ALABAMA WATERWAY ASSOCIATIONS

April 9, 2007

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TABLE OF CONTENTS

LIST OF EXHIBITS

1.0 INTRODUCTION AND PURPOSE

The notion of a comparison of highway and waterway maintenance costs was not part of the original scope of work at the onset of the AFMS. Through conducting research for the AFMS, a need for a comprehensive study was uncovered. This appendix, *Comparison of Costs for Maintaining Highway and Waterway Freight Transportation Systems,* is merely a brief selection of information that is available on the topic. There are rough conclusions made and information-needs identified. The intent of this appendix is to spur interest in DOT sponsorship of in-depth, formal research and study into the comparative costs of maintaining and using various transportation modes.

The scope of work for this portion of the AFMS does not include a detailed analysis of modal shift implications. Such complex evaluations would require time and budget beyond that available in Phase 1 of the AFMS. The analysis performed considers available information on highway pavement maintenance costs using data generated by USDOT. Data compiled during the course of this study provides a preliminary look at the comparative public costs for maintaining pavement of a highway versus maintaining the navigation channel of a waterway.

Pavement costs were taken from the 1997 Highway Cost Allocation Study and its respective 2000 Appendix. The costs are marginal costs and quantify the amount of maintenance required for additional use of the highway by many classes of vehicles. The costs measured in our analysis gauge the amount of maintenance costs induced by a vehicle trip. It does not take into account the costs of establishing new roads, bridges or maintenance of right of way.

The Black Warrior – Tombigbee Waterway (BWT) was chosen for this analysis of moving freight between specific origin/destination pairs due to its defined operations and maintenance budget, availability of freight data from the United States Army Corps of Engineers (USACE), relatively simple geography and its location in the AFMS study area. Freight and budget data from 1999-2004 was analyzed to determine the origin and destination of transported cargo.

The purpose of this general study is to provide basic information which may be useful in determining whether further, more detailed analysis is warranted.

2.0 HIGHWAY PAVEMENT MAINTENANCE COSTS

After a highway is constructed, there are several categories of maintenance costs including pavement repairs and markings and roadside upkeep such as mowing. The volume and weight of the traffic a roadway is constructed to carry adds to the deterioration of the system. Every vehicle which travels on the roadway adds to bridge and pavement deterioration, noise and air pollution, and increased congestion. Each of these by-products of over-the-road transportation carries with it both monetary and social costs which are borne by the taxpayer.

A Highway Cost Allocation Study (HCAS) was prepared by the US DOT Federal Highway Administration (FHWA) in 1997 and includes a quantification of marginal costs of highway use by different vehicle classes. Marginal costs of highway use are the increase in costs that accompanies the increase in travel.

There are two broad categories of public costs associated with transporting freight on the highway:

- Highway maintenance costs
- Social costs

Highway maintenance costs are simply the costs of maintaining the physical condition of the highway pavements. Social costs include those attributable to congestion, crashes, air pollution and noise. Additional information is provided in the following sections.

2.1 Pavement Maintenance Costs

The HCAS uses pavement distress models which directly relate axle loads and repetitions to the stresses, strains, and other pavement responses that lead to roadway deterioration. Pavement maintenance costs quantify the amount of damage a vehicle contributes to this deterioration and the associated costs for repair.

Marginal pavement maintenance costs for an 80,000 lb., five-axle, combination vehicle truck are calculated in the HCAS to be 12.7 cents per mile for rural highways and 40.9 cents per mile for urban highways.

2.2 Social Costs

In addition to the costs of pavement replacement and repair, the HCAS addresses several categories of "social" costs attributable to truck traffic. These social costs are not used in the comparative analysis because similar statistics are not yet available for waterways traffic, but the information is presented herein for general interest and to spur further discussion. The cumulative value of social costs described below for an 80,000 lb., five-axle, combination vehicle truck is calculated in the HCAS to be 7.2 cents per mile for rural highways and 28.7 cents per mile for urban highways.

2.2.1 Congestion Costs

When determining marginal highway costs attributed to congestion, the FHWA considered such factors as:

- Location (urban vs. rural)
- Added travel time for persons and commercial movements
- Speed-related effects on fuel and other components of motor vehicle operation costs
- Increased variability of travel time

2.2.2 Crash Costs

In determining crash costs, the FHWA borrowed data from a study which the National Highway Traffic Safety Administration conducted in 1991 titled *The Cost of Highway Crashes*. That study identified ten components of crash costs:

- Property damage
- Lost earnings
- Lost household production
- Medical costs
- Emergency services
- Vocational rehabilitation
- Workplace costs
- Administrative costs
- Legal costs
- Pain, suffering, and lost quality of life

Certain high, middle, and low assumptions were applied to these components to derive a monetary value.

2.2.3 Air Pollution Costs

Air pollution is the contamination of air by vehicle emissions yielding smoke and harmful gases, mainly oxides of sulfur, carbon and nitrogen. In terms of highway costs, this contamination takes the form of vehicle emissions. Methods for estimating costs associated with these vehicle emissions are divided into three primary elements.

- Measurement of the emissions of a single vehicle operating under specific conditions.
- Estimation of the emissions effect on ambient concentration levels.
- Damage cost calculation for a unit change in concentration per person.

The 2000 Addendum to the 1997 HCAS calculates motor vehicle-related air pollution costs in terms of cents per mile.

2.2.4 Noise Costs

In the HCAS, the FHWA assumed a 0.4 percent decrease in the value of a housing unit for each *decibels-A weighted* (dBA) increase over a 55 dBA. To estimate the marginal cost of noise, key vehicle characteristics and situational factors were analyzed.

- Speed and acceleration/deceleration
- Traffic levels
- Weight
- Adjacent land

Each of these characteristics and situational factors was taken into consideration by the FHWA in determining noise costs.

3.0 NAVIGATION SYSTEM MAINTENANCE COSTS

The US Army Corps of Engineers (USACE) has Federal authority and responsibility for maintaining the inland waterway system. Exhibit 3-1 shows the inland navigable waterways linking Alabama to global and domestic markets.

Exhibit 3-1 – Inland Waterway System

The subject of this analysis, the Black Warrior-Tombigbee (BWT) Waterway, is shown in Exhibit 3-2.

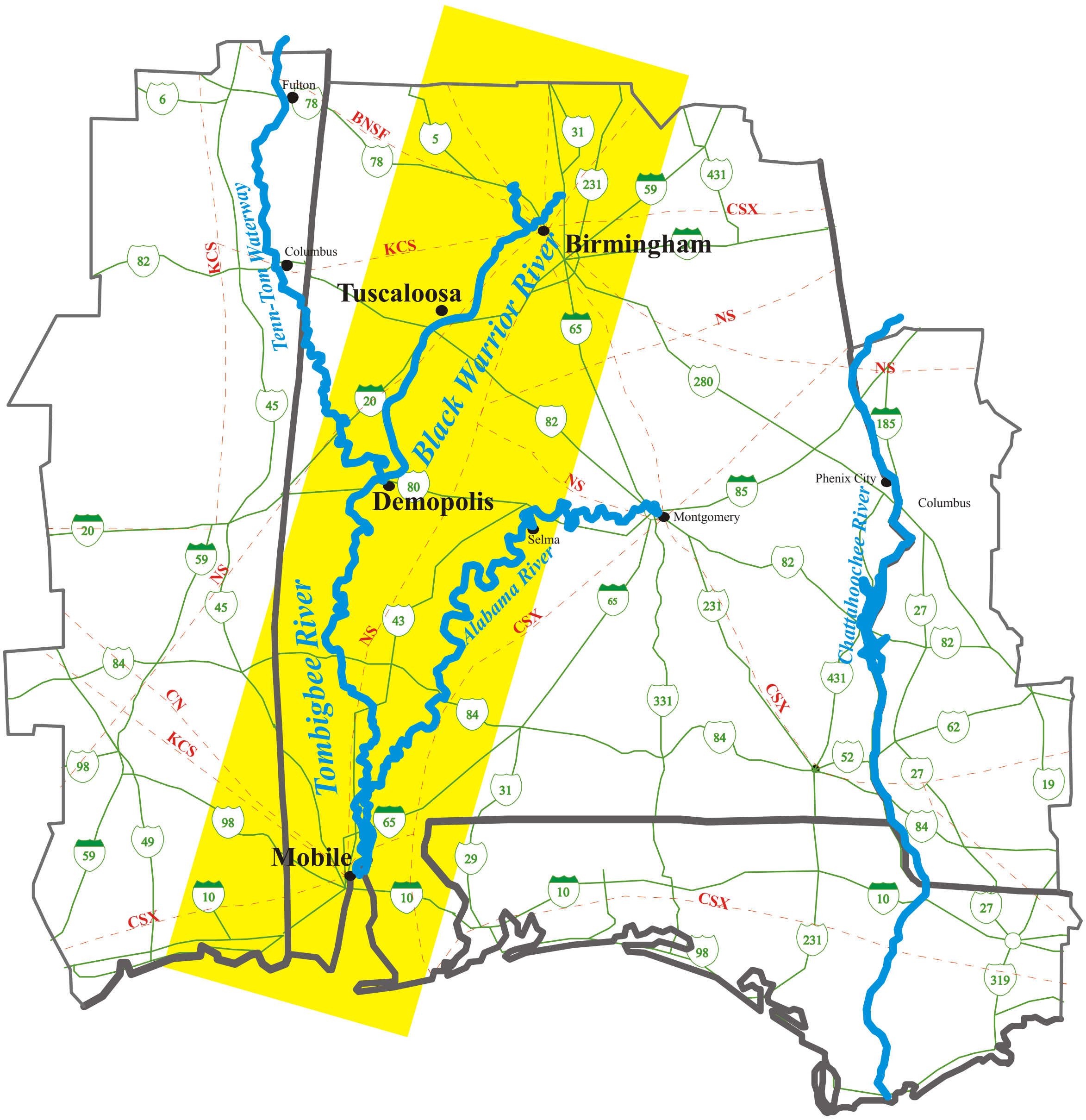

Exhibit 3-2 – Black Warrior-Tombigbee Waterway

3.1 Operation and Maintenance Costs on the BWT

The budget for navigation is provided by specific appropriations from Congress. Funds for operation and maintenance (O&M) of each individual waterway are appropriated annually to keep that particular waterway maintained for the year. This amount may fluctuate depending on anticipated needs for periodic repairs, channel dredging, or other maintenance requirements scheduled for that fiscal year. Actual O&M amounts for recent years are shown in Exhibit 3-3.

O&M Navigation Expenditures for BWT 1999-2004	
Year	**USACE Nav. O & M (Millions)**
1999	$16.93
2000	$15.07
2001	$15.88
2002	$16.49
2003	$19.48
2004	$21.33
AVG	**$17.53**

Exhibit 3-3 – BWT Funding

Exhibit 3-3 indicates in FY2004, the USACE expenditures for navigation O&M on the BWT were approximately $21 million. Average yearly O&M expenditures for the time period from FY1999 to FY2004 were just over $17.5 million.

In Section 2.2 of this Appendix, there was some discussion of the "social" costs of highway use. At the date of this report, there were no known studies containing a monetary quantification of social costs of tow boats pushing barges on rivers. However, the 1994 USDOT Maritime Administration (MARAD) report titled: "Environmental Advantages of Inland Barge Transportation" does contain data from the US Environmental Protection Agency which indicates emissions are much lower for towboats than for other modes of transport, as shown in Exhibit 3-4. No monetary costs are assigned to the data contained in the MARAD report.

EMISSIONS PRODUCED Pollutants (lbs.) produced in moving one ton of cargo 1,000 miles			
Mode	**Hydrocarbons**	**Carbon Monoxide**	**Nitrous Oxide**
Tow Boat	.09	.20	.53
Train	.46	.64	1.83
Truck	.63	1.90	10.17

Exhibit 3-4 – Emissions Produced by Different Transportation Modes

3.2 Historical Freight Volumes on the BWT

The USACE Waterborne Commerce Statistics Center provided cargo volume data for the BWT for the period from 1999 through 2004, the most recent years for which data is available. As shown in Exhibit 3-5, the BWT has transported an average of 20.75 tons per year during this period.

Cargo Volume for BWT 1999-2004	
Year	**Tons (Millions)**
1999	20.01
2000	23.48
2001	18.91
2002	19.03
2003	21.01
2004	22.02
AVG	**20.75**

Exhibit 3-5 – BWT Cargo Volume

3.3 General Origin/Destination Pairs on the BWT

There is general consensus among the USACE's Mobile District and industry trade groups that most traffic on the BWT begins or ends in the Mobile area, and connects with river terminals in one of four general upstream areas: Birmingham, Tuscaloosa, Demopolis and Jackson, AL. At Demopolis, some cargo may move to or from the Tennessee-Tombigbee Waterway and this tonnage is counted in the Demopolis total. Actual tonnage information was obtained from the Waterborne Commerce Statistics Center.

Exhibit 3-6 shows the result of an analysis of the 2004 volume of cargo on the BWT. The data indicates approximately 28% of this cargo (6 million tons) traveled the navigable length of the waterway to/from the Birmingham area; approximately 9% (2 million tons) traveled to/from the vicinity of Tuscaloosa; approximately 30% (7 million tons) traveled to/from the area near Demopolis; and approximately 32% (7 million tons) traveled to/from the Jackson, AL area. For the purpose of this analysis, the cargo which traveled through Demopolis to the Tennessee-Tombigbee Waterway is counted as Demopolis cargo.

Cargo Distribution for BWT – 2004 (Millions of tons)	
Market	**Total**
Birmingham	6
Tuscaloosa	2
Demopolis	7
Jackson	7
Total	**22**

Exhibit 3-6 – BWT Cargo Distribution

4.0 COMPARISON OF MAINTENANCE COSTS

This is not a modal shift analysis, but rather a comparison of costs to maintain highways versus waterways for moving a defined quantity of freight between comparable origin and destination pairs.

This comparison is based on the origin/destination pairs and cargo volumes associated with these pairs as identified in Section 3.3 of this Appendix. Calculating the maintenance costs for highways requires conversion of tonnage transported into an equivalent number of truck trips for each origin/destination pair and application of the costs per mile from the HCAS as presented in Section 2.0 of this Appendix. The case study comparison uses the marginal cost approach. This approach estimates the economic cost of additional incremental use of the highway system. In essence, this report compares the marginal or incremental costs of placing the cargo carried on the BWT onto the highway system in trucks.

Within a reasonable range, waterways O&M costs are not directly proportional to tonnage moved. The locks must be staffed twenty-four hours per day, the channel must be dredged to maintain the congressionally authorized channel conditions (width and depth), and the locks must be maintained. A large portion of the O&M costs is incurred maintaining the channel. The channel condition is impacted most by deposition of material from tributary streams and other natural occurrences rather than traffic volume. Similarly, many personnel costs are not directly dependent on traffic volumes. For the most part, waterway system O&M costs do not increase in a *direct* relationship to tonnage volume, but could increase significantly if traffic exceeds the capacity of the waterway.

4.1 Highway Maintenance Costs

In order to calculate the cost associated with moving the 2004 BWT tonnage by road, the number of trucks needed, origin/destination distances, and marginal highway costs must be estimated. Exhibit 4-1 illustrates the approximate number of truck trips that would have been required to transport the actual 2004 tonnage carried on the BWT. For this analysis, we use the HCAS costs associated with an 80,000 lb. truck. The weight of the empty truck and trailer is assumed to be approximately 30,000 lbs., which means the cargo carried by the vehicle can weigh up to 50,000 lbs. or 25 tons. The number of trucks required was determined by dividing the estimated volume of freight moved on the waterway by 25 tons. The actual number of trucks could quite possibly be greater because not every truck would be fully loaded.

Origin	Destination	Waterway Freight Volume (est. in millions of tons)	Tons/Truck	# of Trucks Needed
Mobile	Birmingham	6.23	25	249,200
Mobile	Tuscaloosa	2.04	25	81,600
Mobile	Demopolis	6.68	25	267,200
Mobile	Jackson Area	7.02	25	282,800
BWT Tonnage 2004		**22.02 MM tons**		**880,800**

Exhibit 4-1 – Number of Truck Trips for BWT Volume in 2004

For purposes of this comparison, in 2004, 880,800 trucks would have been needed to move the same 22 million tons of cargo that were moved by barge on the BWT. The 6.23 million tons traveling on the BWT to/from the Birmingham area would require the equivalent of 249,200 trucks to move the same amount of cargo.

Distances and routes were obtained from state highway maps and through consultation with trucking companies. Exhibit 4-2 charts the mileage from Mobile to each of the four upstream destinations and determines the cost per truck trip.

Origin	Destination	Highway Mileage			Highway Cost ($/mile)		Cost Per Truck Trip		
		Urban	Rural	Total	Urban	Rural	Urban	Rural	Total
Mobile	Birmingham	47	214	261	$0.41	$0.13	$19.21	$27.18	$46.39
Mobile	Tuscaloosa	31	210	241	$0.41	$0.13	$12.81	$26.63	$39.44
Mobile	Demopolis	16	125	141	$0.41	$0.13	$6.34	$15.94	$22.28
Mobile	Jackson	15	52	67	$0.41	$0.13	$6.34	$6.61	$12.95

Exhibit 4-2 – Cost per Truck Trip for BWT Volume in 2004

Exhibit 4-3 displays the total marginal costs to maintain the pavement along the routes to Birmingham, Tuscaloosa, Demopolis and Jackson from Mobile using the number of trucks and cost per truck per trip calculated above.

Origin	Destination	Cost/Truck Trip	# of Truck Trips	Total Cost ($millions)
Mobile	Birmingham	$46.39	249,200	$11.56
Mobile	Tuscaloosa	$39.44	81,600	$3.22
Mobile	Demopolis	$22.28	267,200	$5.95
Mobile	Jackson	$12.95	282,800	$3.66
Total				**$24.39**

Exhibit 4-3 – Marginal Costs of Moving 2004 BWT Volume on Highways

4.2 Waterway Maintenance Costs

Average yearly O&M expenditures on the BWT for the time period from FY1999 to FY2004 were just over $17.5 million. The average was used in this comparison to represent annual O&M costs without improperly skewing results due to variances in maintenance projects occurring in a particular year.

4.3 Comparison and Observations

Exhibit 4-4 shows the marginal cost for highway maintenance as a sloping line, where the cost for pavement maintenance is directly proportional to traffic volumes. That is, each heavy truck trip results in a certain amount of damage to the pavement; therefore it requires an allocation of cost to repair the damage.

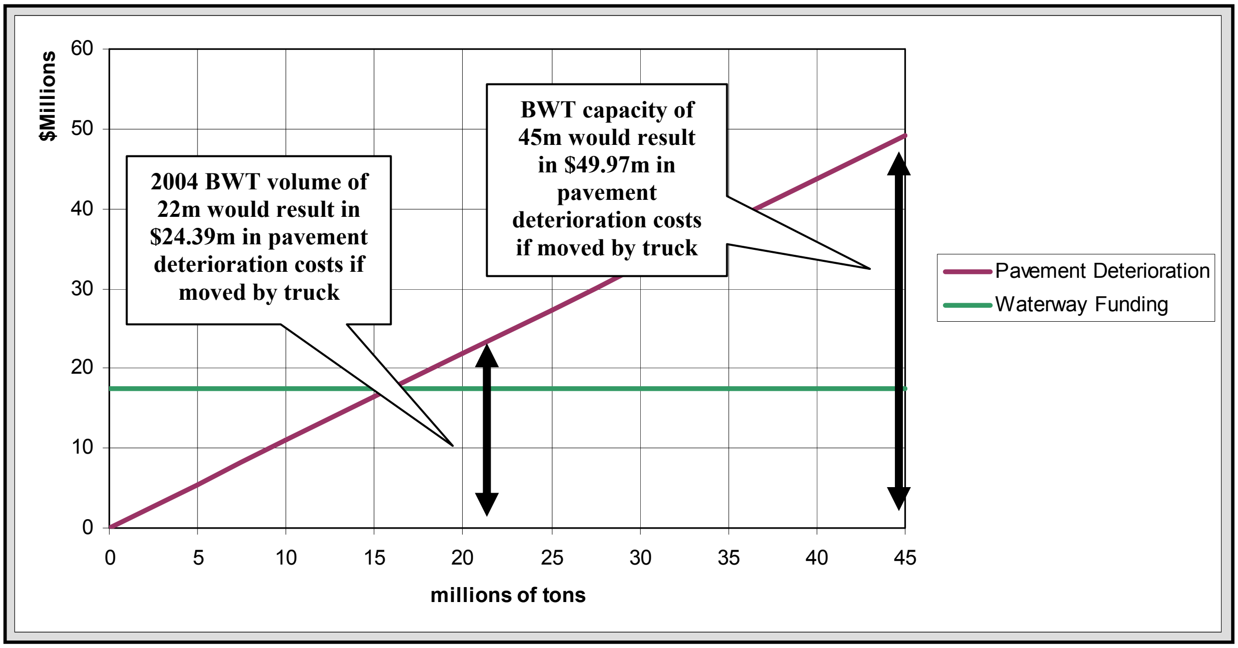

Exhibit 4-4 – Public Cost Implications of Transporting Black Warrior/Tombigbee Waterway (BWT) Cargo on Alabama Highways

Within a reasonable range, there is no direct relationship between the cost of maintaining a waterway and the volume of traffic. The waterway maintenance cost line in Exhibit 4-4 is flat because the O&M cost is not significantly related to traffic increases. The USACE estimated the capacity of the BWT to be between 45 and 55 million tons per year. For this analysis, the average waterway system maintenance cost of $17.5 million is used. If there is an increase in waterway maintenance costs related to an increase in traffic, the differentials noted below should be reduced accordingly.

By way of comparison, the 22 million tons of cargo moved on the BWT cost approximately \$17.5 million (using the average). To move that same cargo by truck would cost approximately \$24 million. Exhibit 4-4 also extends the comparison to the waterway's low-end capacity of 45 million tons. At that level, highway marginal costs are estimated to be in excess of \$49.97 million.

The difference in annual maintenance costs for highways and waterways carrying a comparable volume of cargo between comparable origin/destination pairs appears to be of significant magnitude. It should be noted that this comparison does not imply the difference is all inclusive. Further analysis is warranted to identify the effects of social costs on inland waterway traffic. It is also worth noting that the difference does not represent budgeted money saved, but rather costs which were not incurred, recognizing that highway maintenance funding and waterways maintenance funding are derived from totally different sources.

5.0 SUMMARY AND CONCLUSIONS

Regardless of the mode of transport used, reliability is of paramount importance to most shippers and continued maintenance of any transportation system is vital for sustaining its reliability. This cursory analysis and comparison shows comparative costs and savings at the actual 22 million tons transported on the BWT in 2004 and also at a projected 45 million ton capacity for the BWT. The results of this brief analysis show there is opportunity to save millions of tax dollars each year by utilizing the waterway for cargo movement. It is recommended from this comparison that specific DOT sponsored studies be funded and undertaken to comprehensively quantify cargo movement costs on waterways, highways and all of our country's transportation options as a whole. An intermediate objective would be to raise awareness of public costs for maintaining alternative freight transportation modes, with the ultimate goal of strengthening our economic stance and positioning the nation as an exemplary model for transportation efficiency.