

Mississippi's Blue Economy

An Analysis of Mississippi's Maritime Commerce

FINAL

July 14, 2014

Authored by: Ashley Edwards, Susie Veglia and Kevin Buckley

ACKNOWLEDGEMENTS

We would like to begin by acknowledging several partners whose guidance and assistance was invaluable to the process and ultimately helped make this project possible.

From the University of Southern Mississippi:

- Dr. Chad Miller
- Dr. Shannon Campbell
- Dr. Monty Graham
- Ms. Tasha May

From The Maritime Alliance:

- Michael Jones

From the Mississippi Enterprise for Technology:

- Laurie Jugan

Additionally, we would like to thank graduate assistant Chelsea Everett and the University of Southern Mississippi Master of Science in Economic Development Program for helping to compile the data for the analysis that follows in this report.



EXECUTIVE SUMMARY – MISSISSIPPI’S BLUE ECONOMY

Situated along the northern Gulf of Mexico, and bordered by the Mississippi River to the west and the Tennessee-Tombigbee Waterway to the East, the State of Mississippi’s unique geography provides for significant ties to the world’s maritime economy. For much of the state’s history, Mississippi’s coastal and river ports served as development centers, becoming catalysts for the ongoing industrial development that would occur across much of the rest of the state.

Today Mississippi is home to 15 ports situated along waterways throughout the state, including two deep-draft ocean ports along the Mississippi Gulf Coast in Gulfport and Pascagoula, making Mississippi a major competitor in terms of its industrial maritime logistics and commerce infrastructure. But the maritime economy extends far beyond port and ocean economies to include all industries that would not exist except for their synergistic relationship with the state’s geographic proximity to the Gulf of Mexico and its abundance of maritime industries.

Defining the industry sectors that should be included in a study of Mississippi's maritime economy and quantifying their economic impact is a significant challenge, given the limitations inherent in the nation's current industrial and economic reporting infrastructure. As such, Mississippi's Blue Economy remains largely undefined and thus is not treated as an inter-related economic system in the same way the state interacts with its manufacturing and agricultural economies, for example.

The result is an entire Blue Economic system in the state that operates in a relative void of collaboration, existing as a myriad of detached industry sectors with virtually no coordinated vision, strategy or centralized planning infrastructure. The lack of this infrastructure has prevented Mississippi's Blue Economy from capitalizing on the opportunities inherent in cluster-based development. If Mississippi's Blue Economy is to reach its fullest potential, leaders throughout the public and private spectrum should begin to treat it as the critical mass it is, finding competitive success through coordination and interaction designed to increase productivity, spur synergistic innovation and encourage comprehensive business growth.

Additionally, Mississippi's approach to its Blue Economy should represent a new way of thinking about the state's economic development, challenging its conventional approach to industry-specific incentives and instead focusing on how its core institutions, whether business, academic or government, can contribute to its overall success and promote "Blue" economic prosperity.

THE BLUE ECONOMY

In its broadest sense, the term “**Blue Economy**” refers to a wide range of economic activity in the maritime sector. In its analysis of San Diego’s Maritime Cluster, The Maritime Alliance defined the “Blue Economy” as “the sum of all economic activity having to do with oceans, seas, harbors, ports and coastal zones” (Kidlow, 2009). This definition drew from the work of Dr. Judith Kildow as published by the National Ocean Economics Program in The National Report: State of the U.S. Ocean and Coastal Economies, 2009.

Given Mississippi’s broad array of maritime industries and activities, its Blue Economy would necessarily include several industry sectors, such as shipbuilding, tourism, commercial fishing, and recreational sports. Additionally, industries tied to outer continental shelf oil and gas production, such as off shores drilling operations and refineries, should also be considered a component of Mississippi’s Blue Economy.

Mississippi is also home to a unique group of government and research-based firms, housed primarily at NASA’s John C. Stennis Space Center. Stennis Space Center is home to a collection of world-class maritime assets, including U.S. National Oceanic and Atmospheric Administration’s National Data Buoy Center, The U.S. Geological Survey Hydrologic Instrumentation Facility, the United States Navy’s Meteorology and Oceanography Command, a branch of the Naval Research Laboratory, the Naval Oceanographic Office the U.S. Navy SEAL’s Special Boat Team 22, and the University of Southern Mississippi’s Department of Marine Science.

Augmenting those Stennis Space Center marine assets is the University of Southern Mississippi Gulf Coast Research Laboratory in Ocean Springs, which encompasses the Department of Coastal Sciences, the Center for Fisheries Research and Development and the Thad Cochran Marine Aquaculture Center. The University of Southern Mississippi also offers a Master of Science program in Logistics, Trade and Transportation at its Long Beach Campus, focusing largely on maritime industry logistics. Additionally, Huntington-Ingalls, one of the largest ship builders in the world, is the largest identified private sector employer in the state, second only to the total public and private employment at Mississippi’s two

coastal military bases: the Naval Construction Battalion in Gulfport and Keesler Air Force Base in Biloxi.

The three Mississippi coastal counties have a workforce of 143,873, and the decipherable maritime industries account for 31,828 of those jobs or 22% of the workforce. However, analysis of existing economic data reveals the additional employment impacted by maritime industries is 51,031 or 35% of the entire coastal workforce. (EMSI/MS Dept. of Employment, 2012).

The immediate Mississippi Gulf Coast maritime industry extends beyond the readily-identifiable maritime activities and also includes all coastal tourism industries, including casinos. Additionally, the indirect and induced jobs relevant to the maritime industry should also be included in an analysis of maritime-related workforce statistics. As such, the maritime-related sector on the Mississippi Coast remains largely undefined due to limitations on the current economic reporting models. In order for decision-makers to fully understand the economic opportunities that exist for Mississippi's maritime future, adjustments must be made to current economic data accumulation and reporting methodologies. This will better assist public policy makers in objectively defining and fully measuring the potential impacts of the state's maritime economy and will inform public policy decisions and initiatives that allow for implementation of new options and capturing of new opportunities.

ECONOMIC ANALYSIS PROLOGUE

The importance of Mississippi's maritime industries is not limited only to the direct output and employment they generate. Companies in the state's maritime industries purchase products and services from other state industries, contributing to increased economic activity in those sectors. Furthermore, employees in Mississippi's maritime industries spend their incomes in their home regions, thus providing the backbone of support for many local economies throughout the state. As such, this report seeks to examine Mississippi's maritime economy in the context of its relationships to the broader state economy with the understanding that many of the multiplier effects of maritime economic activity occur in economic sectors that aren't normally classified as maritime in nature.

For example, some Blue Economy industry activities are captured in North American Industry Classification System (NAICS) Codes and are easily identifiable after basic analysis as the core maritime industries. However, many industries with both a maritime and a maritime-related focus are not easily identifiable as maritime-dependent. Moreover, those completely non-maritime service industries that are entirely dependent on maritime economic conditions for their survival (coastal construction, for example) are not as easily identifiable in a NAICS Code analysis.

This Mississippi Gulf Coast Report is largely modeled on a San Diego Report, commissioned by The Maritime Alliance, a San Diego based organization, whose mission is "Promoting Blue Tech & Blue Jobs," (TMA). The Maritime Alliance is a non-profit organization that is the "cluster organizer for the San Diego maritime technology community" (TMA) However, they also have expand beyond the San Diego region to foster "maritime business and technology innovation through collaboration around the U.S. and the world" (TMA).

For purposes of this study, Mississippi's Blue Economy is divided into three distinct categories that mirror those used by the San Diego Maritime Alliance (TMA):

- Traditional, purely maritime industries, such as shipbuilding and fishing
- Industries whose activities include both maritime and non-maritime activities, such as construction
- Maritime technology companies or Blue Tech companies (ERISS, 2012)

Through the use of extensive primary data collection, The Maritime Alliance was able to determine that the maritime cluster jobs were, in fact, 500 times higher than those identified in the NAICS codes.

As the Maritime Alliance noted in their 2012 report on San Diego's Maritime Industry:

The oceans are the future of the world – covering 66 percent of the world’s surface - sustainable usage of the ocean will be increasingly critical to produce the food, water, energy, medicine, and coastal “real estate” needed for the growing world population, over 80 percent of which lives near the oceans. The Pacific represents not a border but a frontier with enormous growth opportunity for San Diego. The fast-growing Maritime Technology Cluster has benefited from the traditional industry’s presence, and the two need to collaborate to “be all they can be”. (ERISS, 2012)

Like San Diego, if Mississippi is to fully optimize its maritime potential, it should begin to embrace the blue economy as a unique sector, invest in a detailed and comprehensive maritime industry study, and utilize the same industry-cluster economic development strategies that have proven successful in the state’s efforts to attract automotive and advanced manufacturing companies.

The Maritime Alliance found in their economic analysis of San Diego’s maritime industry, “the totality of San Diego's maritime activities involve nearly 200 separate North American Industry Classification System (NAICS) codes and include businesses not normally associated with the maritime economy” (ERISS, 2012). It stands to reason that Mississippi is situated similarly, as the state’s large variety of industrial sectors involved directly and indirectly in the maritime economy likely represents a significant portion of the state’s gross economic product.

From the data presented, we demonstrate the need for further maritime industry classification codes to fully enable communities to assess their maritime economic activities, identify gaps, and create policy directives that strengthen the Blue Economy. Included in the recommended expansion of the NAICS codes is the need to identify the emerging, robust Blue Tech cluster, which is intrinsically woven into the Blue Economy and where the higher paying jobs generally reside.

The Maritime Alliance Foundation has prepared a white paper, *UPDATING THE NAICS CODES - What One Needs to Know*, which provides a logical framework for an overhaul of the NAICS classification system. In their paper, the Maritime Alliance Foundation argues,

The NAICS codes are activity-based classifications built around production processes. What is produced is not what matters. What does matter is

HOW units are produced. In economic terms, the NAICS conceives a supply-side framework, aggregating establishments by production function. A demand-side conceptual framework is what most of us are looking for (whether engaged in economic development, public policy, or in firms providing goods and services, doing market research, etc.) (Foundation, 2014)

This study seeks to provide analysis of maritime activity from existing data available at the secondary level, to demonstrate the need for an expansion of the NAICS codes, and to provide a detailed methodology for conducting a full maritime study for the Mississippi Coast.

The research that follows builds upon the previous work of The Maritime Alliance and will serve as a startup guide for further analysis and development of Mississippi's Blue Economy, and as a set of recommendations for funding an in depth study of the Mississippi Blue Economy, which includes primary data in the analysis. This study will also provide important links to many maritime-related organizations, and a listing of trade associations, whose cooperation will be needed to successfully gather primary data that is crucial for the results to be meaningful. A table of all formal existing academic and workforce training programs on the Mississippi Coast is offered for further analysis of workforce needs in the maritime industry as gaps are identified by a more depth study. The following research also includes several public policy recommendations aimed at state and local policymakers in an effort to bring about the public dialogue necessary to embrace a more comprehensive approach to Mississippi's maritime economy, focusing on cluster development strategies.

CLUSTERS DEFINED

As a preface to this study, it is important to define what is meant by the term, "industry cluster". Michael Porter, Harvard professor and noted industry cluster expert, defines an industry cluster as follows:

"A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of clusters ranges from a region,

a state, or even a single city to span nearby or neighboring countries... More than single industries, clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services as well as providers of specialized infrastructure. Clusters also often extend downstream to channels or customers and laterally to manufacturers of complementary products or companies related by skills, technologies, or common inputs. Many clusters include governmental and other institutions... that provide specialized training, education, information, research and technical support. Many clusters include trade associations and other collective bodies involving cluster members” (Porter, 2000, P 16-17).

The concept of industry clusters is especially important in this case, as cluster development strategies can provide the basis for Mississippi’s comprehensive leveraging of the maritime economy for new economic opportunities.

Dr. Heike Mayer, a professor in the Urban Affairs and Planning program at Virginia Tech’s Alexandria Center, provides specific guidance regarding cluster analysis that is instructive in this case. Mayer notes in her publication, *Cluster Monitor*, “regular assessment of industry cluster performance is important because clusters are the building blocks of today’s regional economies” (Mayer, 2005).

Clusters are groupings of firms, within industries and with linked commonalities, which exist in close geographic proximity to each other, with the link becoming beneficial for all firms within the cluster. Of particular importance in Mississippi, clusters, such as the state’s maritime industry cluster, generally extend well beyond primary industries and include linked suppliers and service providers who locate in geographic proximity to the grouping of complimentary industries.

Industries locate in clusters in order to reap the competitive advantages inherent in clustering, such as economies of scale, greater efficiencies, access to trained, specialized workforces and access to support systems. The byproduct of clustering can lead to development of new systems, knowledge and technologies that contribute to the success of firms within the cluster.

Mayer points out a particular distinction between industries that are prominent in local economies, but who do not exhibit specific cluster attributes and should instead be considered as target or support industries. As such, Mayer suggests that the economic developer consider both formal and informal relationships and interactions among firms when identifying clusters. The cluster, she says, “is capable of generating new knowledge and creates internationally competitive products” (Mayer, 2005).

Data gathering is particularly important for cluster analysis, and a variety of data sources are helpful for a more complete analysis. This study primarily uses secondary data in its analysis. As such, it begins the process of compiling data that will contribute to a more comprehensive study of maritime industry economies in Mississippi in the future using both primary and secondary data in its analysis.

Perhaps most importantly, this study seeks to begin the dialogue about the importance of maritime industry clusters in Mississippi’s economy and advocates the need to more fully define their economic impacts. Only through a more thorough understanding of the comprehensive scope of Mississippi’s maritime economy can cluster-oriented approaches to developing the maritime economy in Mississippi be created (Mayer, 2005) (ERISS, 2012).

As a precursor to presentation of the analysis, it is important to note that the three categories used for the blue economy as identified in the San Diego Report are not all positioned to deliver purely maritime related information, so data will be included in the analysis that may not be maritime related:

- Industries that are exclusively maritime, such as fishing and shipbuilding. These are easily defined in the NAICS codes and by nature are purely maritime industries and the analysis will relate to maritime-only activities.
- Those industries that include maritime and non-maritime activity, such as construction industries capable of working on ports. NAICS codes from these industries are too broad to segment the maritime-related activity from the non-maritime, so the analysis is skewed because it is not known which percentage of the industry’s work is maritime related.

- Those technology companies that include maritime (Blue Tech) and non-maritime activity. NAICS codes from these industries are too broad to segment the maritime-related activity from the non-maritime, so the analysis is squeued because it is not know which percentage of the industry’s work is maritime related.

For the purpose of this study, analysis is focused on Mississippi’s three coastal counties, which are home to the largest concentration of potential maritime industry clusters within the state. While the majority of the state’s direct maritime jobs are located within the three coastal counties, any future analysis of Mississippi’s maritime economy should seek to include the indirect and induced effects statewide, along with a more thorough analysis of the maritime economic impacts of inland waterways, many aspects of which will be “hidden” in the NAICS codes given their lack of correlation between maritime and traditionally-related industries.

MARKETS OF SPECIAL INTEREST – SUGGESTIVE OF CLUSTER ACTIVITY

Shipbuilding as the Cornerstone of Mississippi's Maritime Economy:



The Economic Importance of shipbuilding in Mississippi cannot be overstated, as the state supports nearly 24,000 shipbuilding-related jobs, with the shipbuilding industry contributing more than \$2.1 billion to the Mississippi's Gross Domestic Product (<http://www.americanmaritimepartnership.com/maritime-community/>)

Mississippi's shipbuilding industry is comprised primarily of industrial shipyards, including fixed facilities, dry docks and fabrication equipment. Shipyards in Mississippi provide a variety of services including ship construction, ship repair, conversion and alteration, as well as the production of prefabricated ship and barge sections and other specialized services.

Mississippi's shipbuilding industry also includes related manufacturing operations and other shipbuilding-support operations, such as those that provide parts or services for shipbuilding activities in the state.

Mississippi's Maritime Centers: Coastal Ports – Logistics and Multi-Modal Hubs



The State of Mississippi features approximately 82 miles of Gulf-front coastline, which is a small coastline in relation to neighboring Gulf States such as Texas, Louisiana and Florida. However, those 82 miles are home to three coastal ports situated in each of the state's three coastal counties, two of which are deep water Gulf of Mexico ports providing Mississippi an outlet to worldwide commerce.

According to the Mississippi Gulf Coast Alliance for Economic Development:

Pascagoula, the largest industrial tonnage port in the state, provides a 38-foot channel depth for ships calling at the 3,100,000 bushel grain elevator or loading at one of the nation's largest and most modern refineries. In addition, general cargo transit warehouses and a freezer warehouse are available. CSX Railroad provides rail service at each of the port's facilities.

The Mississippi State Port at Gulfport, a state-owned port, has a 36-foot channel depth for ships calling at the freezer warehouse or transit warehouses. Gulfport has the nation's largest banana/tropical fruit

handling facilities. Two container cranes are available for handling container or bulk shipments. A 30-acre container yard provides storage for the scheduled container ships sailing to Europe and Central and South America. Foreign Trade Zone #92 is located on the dock providing distribution service to major importers. KCS Railroad provides service at the port.

In Hancock County, there is the 3,600-acre Port Bienville Industrial Park near the mouth of the Pearl River that can accommodate barges and shallow draft ships with its 12-foot channel depth. The Hancock County Port and Harbor Commission owns and operates 15 miles of short line rail serving industry within the industrial park at the port. This short line rail connects to CSX's Class I railroad that runs east to west.

The Gulf Intracoastal Waterway, stretching from Florida to Texas, is the sheltered water barge route along the state's southern border, with barge facilities available at Pascagoula, Moss Point, Biloxi, Gulfport, and Port Bienville. The major Mississippi River ports in Natchez, Vicksburg, Greenville and Rosedale are each equipped with cranes, transit sheds for general or containerized cargo, and truck and rail facilities. Smaller ports are located at Yazoo City and Greenwood on the Yazoo River, which enters into the Mississippi River at Vicksburg.

The Tennessee-Tombigbee Inland Waterway, a 234-mile system of canals and locks along the Tombigbee River in northeast Mississippi, provides a shorter, more convenient route from Mid-America to the Gulf of Mexico. Ports at Yellow Creek and Columbus are equipped with cranes, transit sheds, and truck and rail facilities (Development, 2014).

Mississippi's Blue Tech Economy



Given Mississippi's proximity to the Gulf of Mexico, coupled with the large federal installations situated along its coastline, the state is home to a growing economy of technology firms and government agencies focused primarily on maritime pursuits, whether they are in traditional maritime industrial activities, ocean sciences, or defense-related assets.

In this respect, Mississippi's maritime focus is directly comparable to San Diego's, and thus San Diego's maritime industry study is especially instructive to Mississippi's maritime goals. The San Diego study noted that "along with its functional sub-set, the maritime technology or 'Blue Tech' economy, it is one of the most unique regional economies in the world" (ERISS, 2012). The same is true in Mississippi, especially when Mississippi's growing focus on the high-technology aspects of the Blue Economy is considered.

San Diego's study further noted:

Technology is becoming ever more enmeshed in even the most traditional maritime activities. While an increased injection of technology is true of nearly every corner of nearly every economy, part of what makes the process different in maritime businesses is just how uniquely and wholly maritime the technologies are. There are other sectors that are changing in this way, such as agriculture or construction, but the evolution is not just about workers using computers; it is about the kinds of computers they are using. The role of technology in San Diego's maritime economy is also unique because of the close relationship with the U.S. Navy and the need for innovation for the Defense Department and defense industries (ERISS, 2012).

Mississippi's Blue Tech economy is centered on NASA's John C. Stennis Space Center in Hancock County. The Blue Technology Economy at Stennis Space Center includes a variety of firms, both public and private, that operate synergistically and in geographic proximity.

Major Blue Tech Stennis Employers/Industries at Stennis Space Center include but are not limited to:

United States Government:

- NASA: Currently employs approximately 200 workers and is the landlord over all property at Stennis Space Center.
- National Data Buoy Center: Department of Commerce entity. In charge of deployment and maintenance of sea buoys worldwide, particularly those located in tsunami prone areas.
- National Coastal Development Center: Studies the erosion and changes in U.S. coastal boundaries.
- National Marine Fisheries Service: Responsible for the study of over-fished and endangered marine fisheries.
- Environmental Protection Agency: The EPA has a presence at Stennis Space Center through its Gulf of Mexico program. The Gulf of Mexico program studies the effects of various factors that influence the Gulf of Mexico.
- Navy Human Resource Center Southeast: Coordinates all civilian and military human resource needs throughout the southeast United States

- U.S. Geological Survey Water Resources Division: Highly technical agency using instrumentation for studies on rivers, gulfs, and oceans both nationally and internationally.

United States Department of Defense:

- Naval Oceanographic Office: Responsible for mapping of the sea floor throughout the world.
- SBT 22: Special Boat Team 22 is the riverine branch of the Navy Seals.
- Naval Special Warfare Group 4: Trains Navy Seals and other special operation groups.
- Naval Small Craft Instruction and Technical Training School: Trains both domestic and international military personnel in both the operation and maintenance of riverine vessels.
- Naval Research Laboratory: Conducts a broad program of scientific research, technology, and advanced development for the U.S. Navy and Marine Corps.

Private Stennis Space Center Contractors:

- Mississippi Enterprise for Technology: Provides an incubation center for businesses that have a direct impact on the support mission of NASA.
- Lockheed Martin: Develops, produces and assembles satellite components and guidance engines.

Mississippi Institutes of Higher Learning:

- The University of Mississippi, Mississippi State University, The University of Southern Mississippi, Louisiana State University, Pearl River Community College and Georgia Tech all have operations at Stennis Space Center.

The variety of Blue Tech firms at Stennis Space Center, their proximate locations, coordination between the firms and their network of interrelated operations are highly suggestive of cluster activity.

Mississippi's Maritime Defense Sector



Mississippi is also home to several other United States Department of Defense Maritime assets located outside Stennis Space Center, including:

- **Gulfport Battalion Center**

The Gulfport Battalion Center, home to the U.S. Navy's "Seabees", is a significant base of operations for the U.S. Navy's construction battalion, responsible for building both common and sophisticated military constructions in military theaters around the world.

- **Keesler Air Force Base**

Keesler Air Force Base is home to the U.S. Air Force's 81-st Training Wing, 403-rd Wing, and the 2-nd Air Force, all of which operate in maritime environments and train in vast areas covering the Gulf of Mexico. Of particular note, Keesler Air Force Base is home to the Air Force Reserve 53rd Weather Reconnaissance Squadron, commonly known as the "Hurricane Hunters", which is the world's only operational military weather

reconnaissance unit. The “Hurricane Hunters” fly weather missions in an area that stretches from the Atlantic Ocean to the Hawaiian Islands.

- **Naval Air Station (NAS) Meridian**

Naval Air Station (NAS) Meridian is a military base operated by the United States Navy and located in Kemper and Lauderdale counties in Mississippi. It is one of only two such naval bases in the United States, which serve as the primary training bases for U.S. Navy jet strike operations. Unlike its twin base, Naval Air Station Kingsville in Texas, Naval Air Station Meridian supports training operations over water in marine environments, due to its proximity to the Gulf of Mexico.

The three military bases identified above are significant because they have direct ties to the maritime economy and likely would not exist in Mississippi if not for its geographic proximity to the Gulf of Mexico. Combined, the three military bases listed above constitute a significant number of employees. If total military base employment was viewed as a single sector it would constitute the largest number of employees of any industry sector in the state of Mississippi.

Mississippi's Commercial Fishing Industry



Mississippi's coastal economy was historically heavily reliant on its working waterfronts that supported the state's commercial fishing industry. Generations of Mississippians lived and worked as shrimpers, oystermen and fin fishers, with many finding steady employment as a result of the seafood packing industry prevalent along Mississippi's Gulf Coast for much of the 19th and 20th centuries.

Massive destruction from Hurricane Katrina in August 2005 and environmental impacts resulting from the 2010 Deep Horizon Oil Spill exacerbated an already declining commercial fishing economy in the state, which has seen major declines from its historic highs. The legalization of gaming along the Mississippi Gulf Coast in the early 1990s led to increased residential and recreational waterfront development, fundamentally changing Mississippi's coastal economy from an economy based largely on individual and small-scale maritime pursuits to an economy based largely on coastal tourism.

However, recent years have seen a number of publicly-funded efforts to stabilize Mississippi's commercial fishing industries, as government investments in new harbors, fishing reefs and other commercial fishing support infrastructure, have led to increased private investments in processing facilities, boat yards, and other commercial fishing support industries. These efforts have contributed to

significant economic impacts, both locally and statewide, that cannot be illustrated from simple analysis of NAICS code analytics alone, as virtually all sectors of Mississippi's coastal economy are tied directly to its historic reliance on the regional commercial fishing industry.

INDUSTRY ECONOMIC ANALYSIS

NAICS Code Data Analysis

Analysis of NAICS codes revealed maritime industry job counts that were significantly more concentrated than both the nation and the state to all jobs in the nation and the state, respectively, and those are displayed in the tables, below.

Figure 1 shows the key core maritime industries per reported data, including job numbers and average earnings across the industries reported. Shipbuilding dwarfs the others in job numbers and average earnings with 12,618 jobs and average earnings of \$80,876. Still significant to the region are Marine Cargo Handling, Fresh and Frozen Seafood Processing, and Navigational Services to shipping.

Figure 1

Key Core Maritime Industries in the Three Mississippi Coastal Counties - 2014		
Industry	Jobs	Average Earnings
Ship Building and Repairing	12,618	\$80,876
Marine Cargo Handling	329	\$49,234
Fresh and Frozen Seafood Processing	297	\$51,821
Navigational Services to Shipping	225	\$71,565
Other Support Activities for Water Transportation	146	\$22,389
Boat Building	136	\$68,212
Boat Dealers	85	\$36,644
Fish and Seafood Merchant Wholesalers	82	\$36,469

<http://www.economicmodeling.com/data/>

There are many companies that operate in multiple sectors. Construction, for example, can include harbor and office complex construction, roadway and wharf construction. This preliminary study would be better served to include all of the data and then pose questions such as what portion of time, if any, of the 6,043 total construction-related workers' jobs were spent on maritime-related construction activities. (See the first four lines of Figure 2).

Following the four construction categories in Figure 2, Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance is another industry with a large number of reported jobs at 421, also with relatively high earnings at \$72,883. Some portion of every job in Figure 2 could be maritime-related, but insufficient data is available to accurately determine that proportion.

Figure 2

Key <u>Maritime /Other</u> Industries in the Three Mississippi Coastal Counties - 2014		
Industry	Jobs	Average Earnings
Electrical Contractors and Other Wiring Installation Contractors	1,789	\$73,877
Industrial Building Construction	2,769	\$71,135
Oil and Gas Pipeline and Related Structures Construction	178	\$53,918
All Other Specialty Trade Contractors	1,307	\$60,857
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	421	\$72,883
Painting and Wall Covering Contractors	326	\$49,310
Other Building Equipment Contractors	245	\$46,695
Water and Sewer Line and Related Structures Construction	287	\$38,097
Other Heavy and Civil Engineering Construction	197	\$51,683
Water Supply and Irrigation Systems	67	\$44,066
Other Technical and Trade Schools (Private)	237	\$42,074
Other Foundation, Structure, and Building Exterior Contractors	295	\$76,812
Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing	119	\$42,585
Structural Steel and Precast Concrete Contractors	101	\$50,344

<http://www.economicmodeling.com/data/>

Shipbuilding appears again in Figure 3, which represents key Maritime/Other Technology Industries on the Mississippi Coast. Again, more data are needed to determine which jobs are high tech. The same can be said of the coastal Petroleum Refineries, which are tied to the coastline. With average earnings of \$160,175, more detailed data could be an aid in determining how to increase these jobs in number. Engineering services represents 1,358 jobs with average

earnings of \$80,876. With over 6,000 construction jobs listed in Figure 1 the correlation of maritime-related engineering jobs to maritime-related construction jobs would have to be high. Of serious concern is the inability to capture the high tech government jobs, especially in light of the high concentrations of various high tech jobs at Stennis Space Center.

Figure 3

Key Maritime/Other <i>Technology</i> Industries in the Three Coastal Counties - 2014		
Industry	Jobs	Average Earnings
Petroleum Refineries	1,516	\$160,175
Other Communications Equipment Manufacturing	145	\$47,562
Wireless Telecommunications Carriers (except Satellite)	543	\$49,727
Engineering Services	1,358	\$79,170
Ship Building and Repairing	12,618	\$80,876

<http://www.economicmodeling.com/data/>

This study is as much about what is not present in the analysis as it is about the data that is available.

Job numbers and average earnings are presented in order to portray the concentration of maritime jobs and the opportunity for higher wages. This can inform decision makers regarding where various types of effort should be concentrated. It is important to note that the NAICS code data is taken from unemployment reports, and self-employed persons will not be represented in the data. The question may arise, for example, whether the actual employment numbers for Fish and Seafood Merchant Wholesalers is realistic considering that the Mississippi Gulf Coast has a concentration of these jobs that is 3.22 times higher than the average for the entire nation for that industry. Also, data could be suppressed for confidentiality reasons, and it may only be released under conditions of confidentiality in any further study conducted.

A tool for deciphering whether an industry’s jobs in an area show more than average concentration is called the location quotient analysis. A location quotient (LQ) compares the total number of jobs in an industry in the local area to the total number of all jobs in the local area. It then compares that to the proportion of total number of that industry’s jobs in the nation to all jobs in the nation. The nation is set to a standard of 1.0. A local score higher than 1.0 indicates that a

sector is more concentrated than the nation. A local score that is lower than 1.0 indicates less concentration than the nation. Location quotients greater than or equal to 1.25 are considered significant and only those with LQ's of 1.25 or above are included in this analysis.

Figure 4, below, shows the top LQ's for core maritime industries on the Mississippi Gulf Coast. Ship Building and Repairing again tops all other industries reported with an LQ that is 107.29 times the nation. State LQ's are also presented to show the relative concentration these industries have to the entire state. Although other ship building operations exist in the state, the coast is still 7.19 more concentrated than the remainder of the state. Even at 1.74 Fish and Seafood Markets are well above the location quotient of 1.25, which starts to indicate industrial sectors of significance.

Figure 4

Core Maritime Share Location Quotients - Relative to the U.S./MS - 2014		
Industry	LQ to US	LQ to MS
Ship Building and Repairing	107.29	7.19
Other Support Activities for Water Transportation	14.97	5.02
Navigational Services to Shipping	11.40	7.33
Fresh and Frozen Seafood Processing	7.07	1.02
Marine Cargo Handling	6.45	7.35
Shellfish Fishing	4.78	7.42
Boat Building	3.84	6.19
Fish and Seafood Merchant Wholesalers	3.22	5.89
Boat Dealers	2.40	3.61
Coastal and Great Lakes Freight Transportation	1.96	7.08
Marinas	1.84	3.14
Fish and Seafood Markets	1.74	3.03

<http://www.economicmodeling.com/data/>

Maritime/Other location quotients in Figure 5 show All Other Miscellaneous Waste Management Services at 18.15 times more concentrated than the nation and 6.40 times more than the state. Additional data would determine whether there are high concentrations of maritime-related activity involved. At such a concentration, the answer would be of interest to any sector implicated. Not only are the 6,043 construction jobs in Figure 5 significant to the coast's economy,

they are 15.87 times more concentrated than the average for the nation. Many other industry sectors are likely driving this construction activity and a significant portion could be maritime-related.

Figure 5

<u>Maritime/Other Share Location Quotients - Relative to the U.S./MS - 2014</u>		
Industry	LQ to US	LQ to MS
All Other Miscellaneous Waste Management Services	18.15	6.40
Industrial Building Construction	15.87	3.06
Other Foundation, Structure, and Building Exterior Contractors	6.64	3.78
All Other Specialty Trade Contractors	4.26	3.47
Other Technical and Trade Schools (Private)	3.05	2.50
Electrical Contractors and Other Wiring Installation Contractors	2.10	1.89
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	1.98	1.36
Other Building Equipment Contractors	1.77	1.08
Water and Sewer Line and Related Structures Construction	1.73	1.35
Other Heavy and Civil Engineering Construction	1.72	0.96
Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing	1.67	1.40
Painting and Wall Covering Contractors	1.67	1.53
Water Supply and Irrigation Systems	1.50	0.35
Structural Steel and Precast Concrete Contractors	1.39	1.69
Oil and Gas Pipeline and Related Structures Construction	1.25	0.39

<http://www.economicmodeling.com/data/>

Petroleum refineries on the coast as depicted in Figure 6 are at 5.42 times the concentration of the nation, and 18.81 times more concentrated than the state average. With a petroleum refinery comes many satellite industries involved in transportation and logistics, safety, raw materials, etc. With such a high concentration, this industry is obviously critical to the coast. Other Equipment and Communication Manufacturing industries on the coast could also be significant to the maritime economy. At a concentration of 6.86 times the nation, if maritime-related activity is a large portion of this sector, it could be classified as maritime-significant.

Figure 6

Maritime/Non-Maritime <u>Technology</u> Share Location Quotients - Relative to the U.S./MS 2014		
Industry	LQ to US	LQ to MS
Petroleum Refineries	5.42	18.81
Other Communications Equipment Manufacturing	6.78	6.88
Wireless Telecommunications Carriers (except Satellite)	2.09	3.19
Engineering Services	2.03	1.32

<http://www.economicmodeling.com/data/>

The industries that were identified in the San Diego Study (ERISS, 2012) were segmented into three categories as stated: core maritime, maritime/non-maritime, and blue tech. Data for the three categories were pulled for all of the associated NAICS codes in that study. However, additional analysis of Mississippi coastal industries with high location quotients and high job numbers and/or above average earnings revealed industries whose local data were not included in the NAICS codes used by the San Diego study (ERISS, 2012). In Mississippi’s case, these sectors logically appear to have wholly or partially maritime-related activities which are likely very significant industries to the maritime economy. (See Figure 7.) Casinos and casino hotels account for nearly 12,000 jobs, and facilities support services, which could very well be tied to Stennis Space Center’s maritime activities. They account for 1,012 jobs that pay well above the regional average, while the Federal Government, Civilian, Excluding Postal Service has an LQ of 3.51, average wages of \$64,414 and 8,247 jobs. These sectors could be very significant to the maritime industry on the coast.

Figure 7

Industries not Captured in the San Diego Study (Non “Blue” in San Diego) - 2014				
Industry	LQ to US	LQ to MS	Average Earnings	Jobs
Casino Hotels	30.77	3.66	\$30,720	8,960
Casinos (except Casino Hotels)	25.60	5.45	\$28,429	2,628
Rendering and Meat Byproduct Processing	13.39	2.50	\$77,876	111
Facilities Support Services	7.06	1.60	\$45,994	1,012
Petrochemical Manufacturing	5.06	5.46	\$99,510	137
Electric Power Distribution	4.75	1.89	\$87,207	1,058

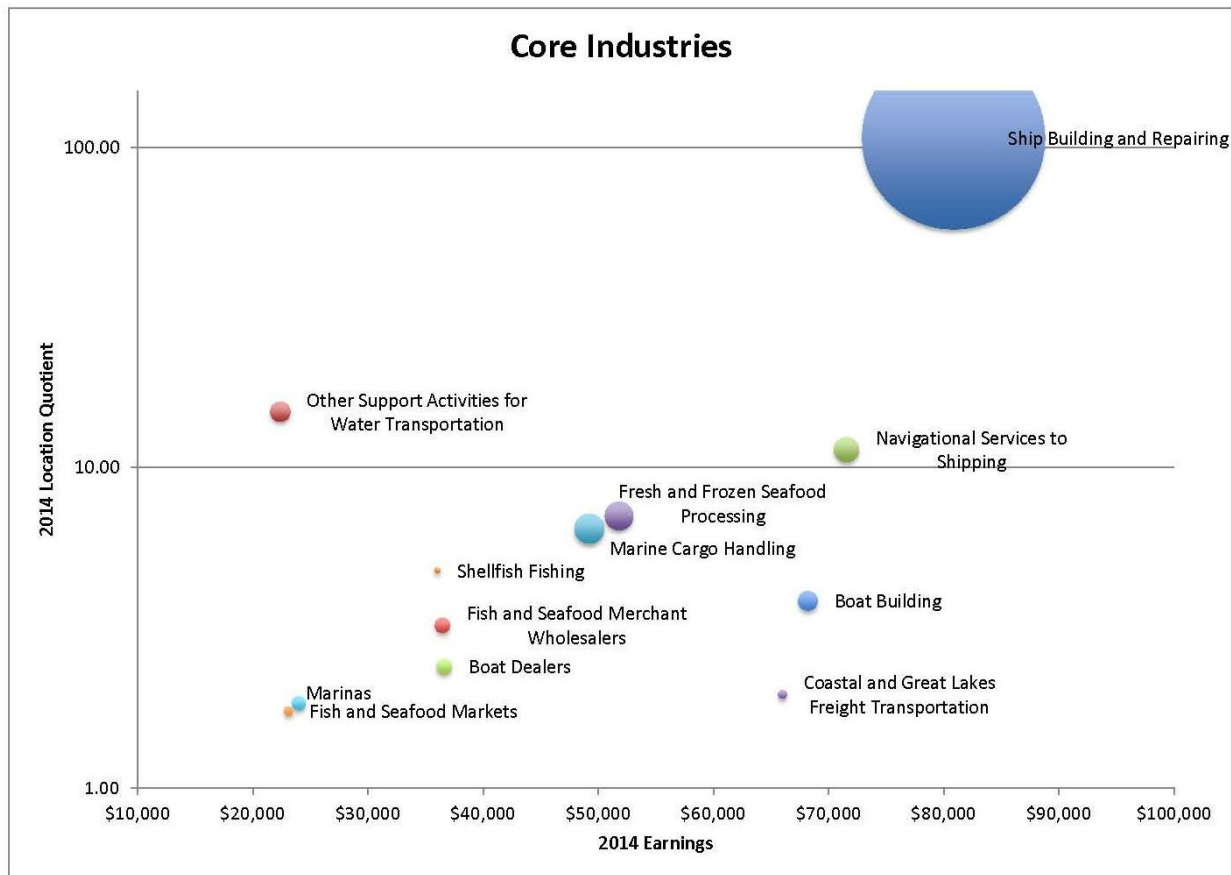
Other Metal Valve and Pipe Fitting Manufacturing	3.94	7.42	\$45,988	70
Federal Government, Civilian, Excluding Postal Service	3.51	3.00	\$64,414	8,247
Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	3.06	2.47	\$51,769	93
Cafeterias, Grill Buffets, and Buffets	2.07	1.10	\$14,287	282
Linen Supply	2.05	0.81	\$32,270	164
Environment, Conservation and Wildlife Organizations	1.55	2.62	\$32,328	100
Petroleum Bulk Stations and Terminals	1.45	0.48	\$50,240	50

<http://www.economicmodeling.com/data/>

A cluster analysis of the above data shows the positioning of the various companies relative to each other in terms of location quotients and earnings. Those that have high LQ's and high earnings, such as facilities support services, may indicate areas that need additional attention, as they may be related to the coast's maritime economy. Analyzing LQ's and above average wages provides a means for decisions to be made regarding workforce training, company recruitment and other employment issues.

Figure 8 provides a pictorial view in the form of a bubble chart, which displays the statistical relationships of the core maritime industries, only, in terms of location quotient, numbers of jobs and average earnings - the larger the bubble, the higher the number of jobs. The data is plotted on the X and Y axis with average earnings on the X axis and the location quotients on the Y axis.

Figure 8



<http://www.economicmodeling.com/data/>

With supplemental primary data, the Figure 8 bubble chart could be expanded to include all maritime activity, and public policy decision-makers could be armed with very valuable information about where the strong links and the greatest opportunities exist and where resources should be concentrated.

Shift-Share Analysis of the Blue Economy

Shift-share analysis is a method to analyze differences between local employment growth and national employment growth. This tool is another indicator of trends and must be accompanied by other data for a more thorough analysis. Shift share analysis identifies industries that are strong or weak in a region compared to elsewhere. There are three components to shift share analysis: national share, industrial mix, and local factors. National share reflects change in employment

due to national trends. Industrial mix refers to specific trends related to the industry, and local factors reflect local conditions that impact change in employment and are a reflection of local ability to compete in the industry. A high or low score in any of these components means further research needs to be conducted concerning that industry. These components are then summed to reflect the combined effect.

This analysis starts with a summary of the top three industries experiencing job growth and the top three industries experiencing job losses between 2004 and 2014. The years 2004 and 2014 were chosen to capture job numbers just before Hurricane Katrina struck the Mississippi Coast and well after the Deep Water Horizon Oil Spill in 2010, both of which devastated the coast’s economy and could potentially skew the analysis if only the years immediately post-disaster are considered.

Figure 9 shows that the top three industries for job growth had increases of 174%, 271% and 524%, respectively. While it shows the changes, it does not give the reason for the changes.

Figure 9

Top 3 Industries With Significant Job Growth from 2004 to 2014						
NAICS	Class	Description	2004 Jobs	2014 Jobs	% Change	Combined Effect
236210	Core/Other	Industrial Building Construction	444	2,769	524%	2,325
238210	Core/Other	Electrical Contractors and Other Wiring Installation Contractors	653	1,789	174%	1,137
238990	Core/Other	All Other Specialty Trade Contractors	352	1,307	271%	956

<http://www.economicmodeling.com/data/>

On the other hand, Figure 10 reveals the industries that have had a loss in jobs, with Shipbuilding and Repairing, a core maritime activity on the coast with the

largest number of jobs, at the top of the list. Again, the question of “why” bears answering. If the region is to address these changes, the “whys” have to be answered first.

Figure 10

NAICS	Description	2004 Jobs	2014 Jobs	% Change	Combined Effect
336611	Ship Building and Repairing	13,002	12,618	(3%)	(383)
517210	Wireless Telecommunications Carriers (except Satellite)	957	543	(43%)	(415)
622110	General Medical and Surgical Hospitals (Private)	1,605	1,093	(32%)	(512)

<http://www.economicmodeling.com/data/>

The data in Figures 9 and 10 is useful, but for a richer analysis, the other steps in the shift share analysis can be applied in order to find out what portion of the gain or loss was due to local factors that influenced it. It provides the means to identify weak or strong industries, and negative or positive trends the industries are experiencing; however, it does not go in depth as to the reasons of those advantages or disadvantages. Shift share can, however, point to where further research is needed.

The shift share analyses in Figures 9 and 10 show the job gains and losses between 2004 and 2014 for the three coastal counties for the industries with the highest numbers of jobs in 2014, and which are wholly or partially related to maritime activities. All industries depicted in Figures 9 and 10 have LQ’s of 1.25 or more. The deeper analyses found in Figures 12 to 14 (in blue) are derived solely from the NAICS codes identified in the San Diego Report (ERISS, 2012), and Table 15 (in white) includes significant industries to the Mississippi coast that were not included in the San Diego Study (ERISS, 2012) but which have ties to the Mississippi maritime economy.

Of the core maritime industries listed in Table 11, the coast lost 2,813 maritime jobs due to local factors or competitiveness. While the total net change (loss) in

jobs was 870, the local loss was tempered by national and industry shifts. Further research is needed to discover the reasons for the local factors that effected the major portion of job losses. Of particular interest is the zero reporting of jobs in the fishing industries, for which the coast is known, and which consists of many small proprietors whose data are not available through unemployment reporting from which NAICS data is secured. More research is needed and primary data must supplement this information. Information shown for the smaller numbers of jobs was left in because by their natures they may show potential for expansion or be missing information.

Table 11

Core Maritime Industries	2014 Jobs	% Change	Industry Mix Effect	National Share Effect	Local Factors Effect	Net Change in Jobs from 2014
Ship Building and Repairing	12,618	(3%)	1,294	657	(2,334)	(383)
Marine Cargo Handling	329	(44%)	20	30	(306)	(256)
Fresh and Frozen Seafood Processing	297	(54%)	(12)	33	(374)	(353)
Navigational Services to Shipping	225	263%	(10)	3	171	164
Other Support Activities for Water Transportation	146	(13%)	(21)	8	(9)	(22)
Boat Building	136	43%	(48)	5	84	41
Boat Dealers	85	(32%)	(38)	6	(8)	(40)
Fish and Seafood Merchant Wholesalers	82	(10%)	(3)	5	(11)	(9)
Marinas	66	35%	0	2	15	17
Fish and Seafood Markets	28	(33%)	(2)	2	(15)	(15)
Coastal and Great Lakes Freight Transportation	26	--	0	0	25	25
Inland Water Freight Transportation	20	(64%)	12	3	(51)	(36)
Scenic and Sightseeing Transportation, Water	13	(50%)	(3)	1	(11)	(13)
Shellfish Fishing	12	--	(1)	0	11	10
Finfish Fishing	0	0%	0	0	0	0
Other Marine Fishing	0	0%	0	0	0	0
Deep Sea Passenger Transportation	0	0%	0	0	0	0

<http://www.economicmodeling.com/data/>

The shift share for the maritime/other industries, which may have a total or partial maritime component, are in Figure 12. The combined effect of those

industries shows a net gain of 6,635 jobs with the local effect contributing to the net increase of 6,196 of the job increases. The maritime/other or core/other jobs include the tourism industry on the coast and the assumption is made that the majority of those jobs are maritime related. Although some industries with relatively few jobs, such as Natural Gas and Crude Petroleum Extraction, and Support Activities for Oil and Gas Operations are included in Figure 12, their mere presence in a coastal community may indicate room for expansion, for instance because of the increase in activity related to the oil and gas industries, or because there is significant data missing.

See Figure 12, next two pages.

Maritime/Other Industries	2014 Jobs	% Change	Industry Mix Effect	National Share Effect	Local Factors Effect	Net Chg in Jobs 2004-14
Industrial Building Construction	2,769	524%	(23)	22	2,326	2,325
Electrical Contractors and Other Wiring Installation Contractors	1,789	174%	(91)	33	1,195	1,137
Supermarkets and Other Grocery (except Convenience) Stores	1,766	(5%)	34	94	(213)	(85)
All Other Specialty Trade Contractors	1,307	271%	(38)	18	976	956
Janitorial Services	1,209	44%	101	42	228	371
Plumbing, Heating, and Air-Conditioning Contractors	855	2%	(46)	42	21	17
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	421	100%	37	11	161	209
Automotive Parts and Accessories Stores	415	(15%)	19	25	(116)	(72)
Sporting Goods Stores	348	58%	63	11	54	128
Painting and Wall Covering Contractors	326	72%	(47)	10	174	137
All Other Miscellaneous Waste Management Services	309	--	5	0	295	300
Other Foundation, Structure, and Building Exterior Contractors	295	310%	(1)	4	221	224
Water and Sewer Line and Related Structures Construction	287	59%	(45)	9	142	106
Site Preparation Contractors	286	62%	(39)	9	139	109
Other Building Equipment Contractors	245	140%	14	5	124	143
Other Technical and Trade Schools (Private)	237	--	0	0	236	236
Office Administrative Services	236	72%	53	7	38	98
Automotive Body, Paint, and Interior Repair and Maintenance	206	4%	(18)	10	16	8
Other Heavy and Civil Engineering Construction	197	93%	0	5	89	94
Other Building Material Dealers	182	(31%)	(81)	13	(13)	(81)
Oil and Gas Pipeline and Related Structures Construction	178	314%	35	2	97	134
Other Gasoline Stations	140	24%	(20)	6	41	27
All Other Professional, Scientific, and Technical Services	139	893%	19	1	106	126
Industrial Machinery and Equipment Merchant Wholesalers	121	48%	(1)	4	36	39
Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing	119	57%	3	4	37	44
Consumer Lending	117	(36%)	(25)	9	(49)	(65)
All Other Amusement and Recreation Industries	116	53%	7	4	30	41
Structural Steel and Precast Concrete Contractors	101	(28%)	(35)	7	(10)	(38)
Wholesale Trade Agents and Brokers	92	8%	28	4	(25)	7

Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers	82	64%	(4)	3	33	32
Crude Petroleum and Natural Gas Extraction	56	331%	8	1	35	44
Metal Tank (Heavy Gauge) Manufacturing	38	(74%)	64	8	(183)	(111)
Specialized Freight (except Used Goods) Trucking, Long-Distance	34	(35%)	9	3	(30)	(18)
Support Activities for Oil and Gas Operations	33	65%	27	1	(15)	13

<http://www.economicmodeling.com/data/>

Blue tech is of particular interest for the Mississippi Gulf Coast due to the high concentration of scientists located at Stennis Space Center (SSC), which includes a large number of oceanographers, marine scientists and engineers working in maritime related industries including the National Oceans and Atmospheric Administration (NOAA), the Naval Oceanographic Office (NAVO), and the Naval Research Lab. The presence of three university systems (the University of Southern Mississippi, Mississippi State University and the University of New Orleans) and two technology transfer enterprises add strength to activity suggestive of a maritime cluster at Stennis Space Center. These firms coupled with the University of Southern Mississippi’s marine-related education and research facilities at the Gulf Park Campus and the Gulf Coast Research Laboratory show deep entrenchment in the fields of blue technology research and development and other synergistic knowledge creation.

The search for blue tech industries is incomplete at the secondary data level due to a lack of maritime specific blue tech NAICS codes. Figure 13 depicts technology NAICS codes pulled from the San Diego Report (ERISS, 2012). It shows the technology industries with LQ’s above 1.25 and with significant impacts in job numbers. Also included are technology industries with relatively lower job numbers, such as Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing, but which are noteworthy for their potential ties to the blue tech maritime industry. Fifty-seven jobs might seem very low compared to the Petroleum Industry jobs in Figure 13, but they could represent highly specialized occupations that are in high demand and which contain a knowledge base which supports many other blue tech and other maritime activities.

There has been a total net decline in the technology industries listed in Figure 13 of 686 jobs and the local effect on the change in job numbers is 1,084. Further research is need, as this loss in high tech, high paying jobs is a very negative trajectory for the maritime industry on the coast.

Figure 13

Technology Industries – Maritime/Other	2014 Jobs	% Change	Industry Mix Effect	National Share Effect	Local Factors Effect	Net Change in Jobs 2004- 14
Petroleum Refineries	1,516	18%	11	65	160	236
Engineering Services	1,358	(2%)	186	70	(285)	(29)
General Medical and Surgical Hospitals (Private)	1,093	(32%)	94	81	(687)	(512)
Wireless Telecommunications Carriers (except Satellite)	543	(43%)	(218)	48	(245)	(415)
Drinking Places (Alcoholic Beverages)	332	19%	(18)	14	57	53
Other Communications Equipment Manufacturing	145	480%	(7)	1	126	120
Testing Laboratories	138	(26%)	24	9	(82)	(49)
Power and Communication Line and Related Structures Construction	118	90%	20	3	33	56
Museums	91	5%	12	4	(12)	4
Pharmaceutical Preparation Manufacturing	83	(51%)	(21)	9	(75)	(87)
Industrial Supplies Merchant Wholesalers	64	16%	9	3	(2)	10
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	57	375%	(3)	1	47	45
Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)	57	19%	7	2	(1)	8
Surveying and Mapping (except Geophysical) Services	57	(42%)	(34)	5	(13)	(42)
Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	52	8%	1	2	1	4
Process, Physical Distribution, and Logistics Consulting Services	34	--	0	0	33	33
Freight Transportation Arrangement	18	(87%)	11	7	(139)	(121)

<http://www.economicmodeling.com/data/>

Other Industries Not Identified by the San Diego Report – Shift Share Analysis

While Figures 11 through 13 depicted significant activities in NAICS codes identified for the San Diego Report (ERISS, 2012), there was other significant activity on the Mississippi Gulf Coast with high LQ's and/or high job numbers, which could not be omitted from this preliminary study. Figure 14 depicts those industries.

The net overall change in jobs from 2004-14 in the industries reported is a loss of 3,924, and the net change due to local effect is a loss of 4,218. Casinos are unique to the Mississippi Coast as compared to California. Because Mississippi law restricts casinos to the coastlines and major inland waterways, they are necessarily tied to the coastal economy. They are also a major component of the coast's tourism industry as can be seen in the total casino hotel and casino job numbers in 2014 of 11,588. Of major concern is the net loss in casino jobs from 2004-2014 of 5,231 with 4,506 jobs due to local effects.

Many of the Blue Tech jobs at Stennis Space Center are hidden in the Federal Government, Civilian, Excluding Postal Service subsector data. The 8,247 jobs in this subsector table report are significant to the coast's economy. The net loss of 586 jobs due to local effect (competitiveness) is of serious concern for the coast, especially since many of these are relatively highly paid jobs.

Figure 14 depicts industries whose NAICS codes were not included in the San Diego Report, (ERISS, 2012) but which are clearly maritime or partially maritime related on the Mississippi Gulf Coast.

Figure 14

Other Industries Not Included in the San Diego Report	2014 Jobs	% Change	Industry Mix Effect	National Share Effect	Local Factors Effect	Net Change in Jobs 2004-14
Casino Hotels	8,960	(34%)	(1,201)	682	(4,030)	(4,549)
Federal Government, Civilian, Excluding Postal Service	8,247	2%	335	409	(586)	158
Casinos (except Casino Hotels)	2,628	(21%)	(373)	167	(476)	(682)
Electric Power Distribution	1,058	175%	180	19	474	673

Facilities Support Services	1,012	45%	75	35	205	316
Cafeterias, Grill Buffets, and Buffets	282	(17%)	(33)	17	(43)	(59)
Linen Supply	164	134%	(5)	4	96	94
Petrochemical Manufacturing	137	1%	(33)	7	27	1
Rendering and Meat Byproduct Processing	111	(22%)	(22)	7	(19)	(32)
Environment, Conservation and Wildlife Organizations	100	150%	24	2	35	60
Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	93	94%	(1)	2	43	45
Other Metal Valve and Pipe Fitting Manufacturing	70	268%	(6)	1	56	51

<http://www.economicmodeling.com/data/>

While the above analysis of the NAICS codes can be very informative for the core maritime industries, far more research is needed to identify maritime cluster activity on the Mississippi Gulf Coast.

National Ocean Economics Program (NOEP) Data Derived from the Ocean Economics Website Market Data

NOEP provides another, although equally imperfect, data source for maritime industry activity in coastal communities.

Data from the National Ocean Economics Program (NOEP) gives valuable information for ocean economies and for coastal economies. The job numbers for 2011 (the latest year in which data is available from this source) show a disparaging difference with the NAICS codes data for the same year secured from Economic Modeling Services, Inc. (EMSI). Much of the difference is that many industries that are heavily, but not completely, engaged in maritime activity are included in the data. Because the NAICS codes do not allow differentiation in many of the sectors, primary data would have to be secured through surveys, interviews and focus groups in order to pull out specific maritime economic activity. The economic impact from these industries is impressive, nonetheless, but do not assist in identifying maritime economic activity. Only when the maritime activities can be siphoned off from the rest can an accurate picture emerge.

The NOEP data (See Figure 15) lacks any data for counties that have fewer than three casinos or three refineries, which means that the two Hancock County casinos and the Chevron refinery at Pascagoula are not included. Since they are all significant employers in the region, the reported numbers do not necessarily reflect actual jobs in the region. Nonetheless, it does provide some useful information while again pointing to the need for a much more in-depth study.

Figure 15

Employment Source	Jobs	Description
NAICS Employment (EMSI)	14,152	NAICS maritime core jobs
Ocean Data (NOEP)	31,448	Only ocean dependent industries
Coastal Data (NOEP)	144,192	All activities/industries reported by the BLS for the three MS coastal counties.

(NOEP National Ocean Economics Program, 2014)

The National Ocean Economics Program provides further data on economic impact, indicating a 7.35% increase in wages from 2005 to 2011. See Figure 16. However, while the 2011 numbers are positive, it is important to note that employment decreased by 2.5% and GDP decreased by 1.57% over the same period. Further analysis would be required to distinguish changes on a detailed level. However, much of the data for the three counties is suppressed at the sub-sector levels.

Figure 16

Economic Impact of Ocean and Coastal Economies						
Source	Employment	% change 2005 -2011	Wages*	% chg 2005 - 2011	GDP*	% chg 2005 - 2011
Ocean Data	31,448	-2.50%	\$1,036,977,276	7.34%	\$1,525,505,776	-1.57%
Coastal Data	144,192	-1.76%	\$5,041,049,218	3.73%	\$13,439,948,031	7.19%

* Comparisons stated in 2005 dollars

(NOEP National Ocean Economics Program, 2014)

Economic Impact of Maritime Industries

Maritime industries account for 22% (31,828 of 143,873) of the local workforce in the coastal counties (EMSI/MS Dept. of Employment, 2012). However, when the total impact of maritime industries is analyzed, this percentage increases to 35% (51,031 of 143,873). The total employment consists of initial, direct, indirect, and induced jobs (See Figure 17) described as follows:

- Initial: jobs in the specified NAICS-defined industry
- Direct: jobs that supply goods and services to the initial industries
- Indirect: suppliers further along the value chain. These are essentially the suppliers for the direct suppliers.
- Induced: Jobs in the local economy that provide goods and services to the employees of initial, direct, and indirect jobs.

This is determined by combining the industry employment amount with its assigned impact multiplier. Each industry has a multiplier for jobs categorized as direct, indirect, induced, and total. The multiplier indicates that each job employed in a particular industry produces another job within the supply/value chain. For example, Petroleum Refineries (NAICS 324110) has a total jobs multiplier of 4.4601; this means that for every job created in Petroleum Refineries, 4.46 other jobs are created.

Figure 17

Employment Impact of Maritime Industries					
	Initial jobs	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs
Core	13,248	2,420	310	4,958	20,935
Core/Other	12,792	1,257	168	2,786	17,003
Tech	5,788	1,555	250	5,500	13,093
TOTAL	31,828	5,232	728	13,244	51,031

(Source: MS Department of Employment, 2012) [EMSI]

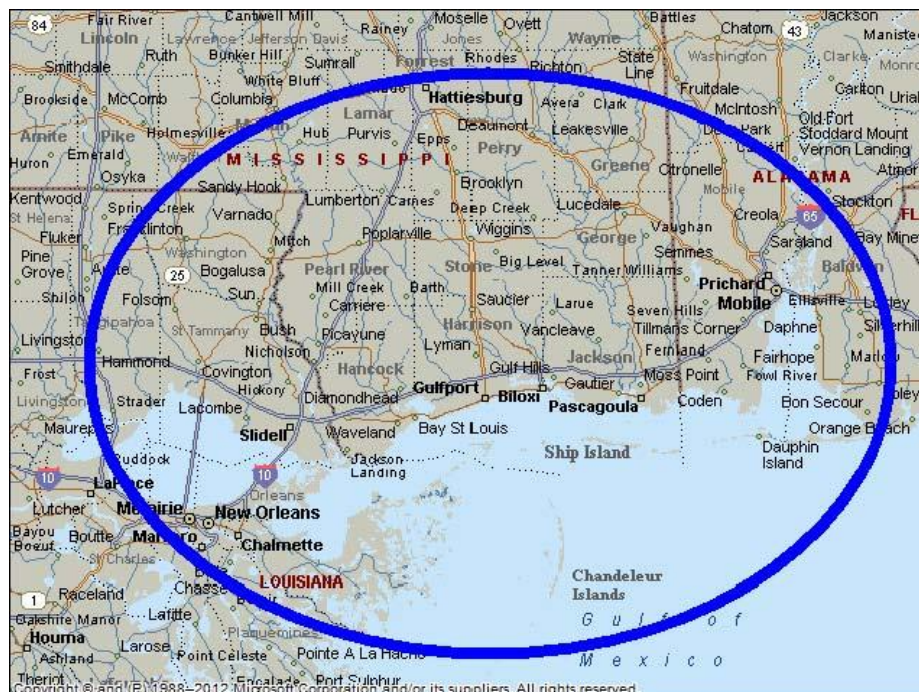
The above data can only be used in conjunction with many other sources of data. While informational, the ability to draw conclusions is limited for the maritime/ non-maritime industries, including the technology companies, until the maritime activity can be separately identified.

WORKFORCE ON THE MISSISSIPPI GULF COAST

Workforce Climate and Conditions

A recent study by The Pathfinders of the Mississippi Gulf Coast was created as a guide for economic developers in their business retention, expansion and new business development efforts. The Pathfinders is a Dallas-based, multi-disciplined company found in 1979, which provides research for economic developers including labor analysis. They were hired by the Mississippi Gulf Coast Alliance for Economic Development to perform a labor study for the three coastal counties, individually, and combined. The report identified the population within the labor shed for the Mississippi Gulf Coast as 2,043,300, with a civilian labor force of approximate 883,600 workers and an unemployed workforce of 51,100 who are actively seeking work. Labor shed is defined by The Pathfinders as “those locations from which workers might be drawn to a new employer.” (The Pathfinders, 2014)

Figure 18 – Map of the Gulf Coast Labor Shed



(The Pathfinders, 2014)

Of the existing workforce in the labor shed, 192,100 workers are underemployed. Underemployed persons are classified as those “who are working but who desire

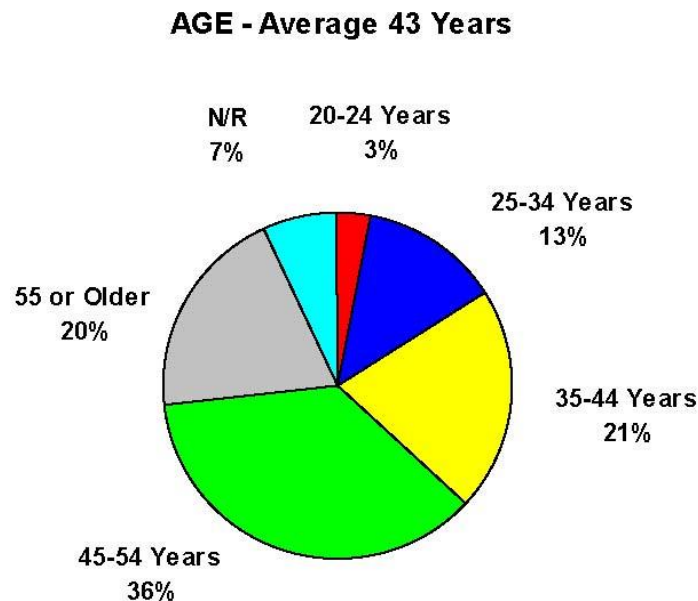
better jobs and who appear to possess the skills, education and experience to qualify them for those better jobs” (The Pathfinders, 2014). When the number of underemployed persons is added to the current 51,100 unemployed persons actively seeing work, and another 22,700 unemployed persons not currently seeking work but who are considering re-entering the workforce are added, the number of available workers for the Gulf Coast Area Labor shed increases to 235,900.

Characteristics of Underemployed Workers - 162,100

An analysis by The Pathfinders of the characteristics of the underemployed workforce, including skill set and experience netted the results found in Figures 19 through 28.

The largest portion of underemployed is in the 45-54 age group (Figure 19), leaving concerns about their ability to secure higher skilled and paid positions in time to make an impact prior to retirement. In all age groups it appears that a new or expanding industry could find a good bank of available workforce for those more highly skilled and experienced positions.

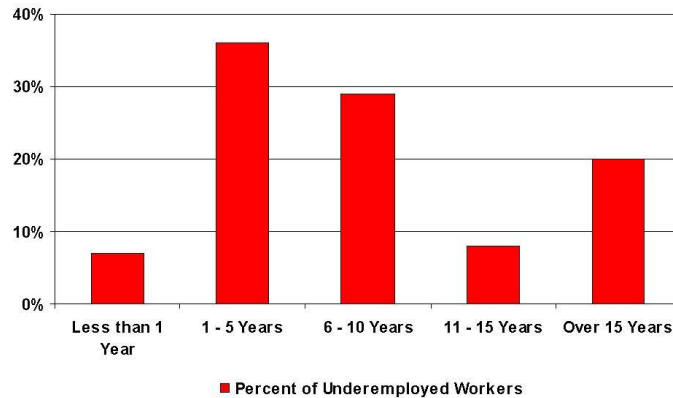
Figure 19



(The Pathfinders, 2014)

Fifty-two percent of those workers have been in their positions for more than five years with 20% in their positions 15 years or longer (Figure 20). This indicates a workforce with longevity in their positions, which may in turn indicate to a new or expanding industry that an investment in workforce training would be well placed.

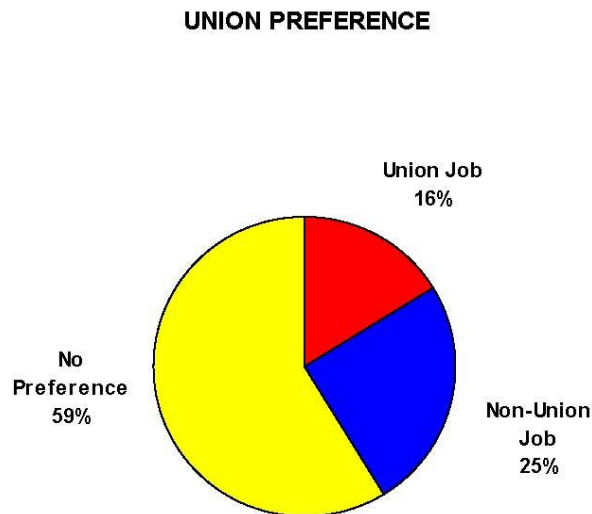
Figure 20 – Length of Time in Service



(The Pathfinders, 2014)

Mississippi is a right-to-work state and this is reflected in the low presence of union workers (Figure 21) in the labor shed at only 16%. This is also complementary to the characteristics of longevity (Figure 20) and can be very attractive to potential employers.

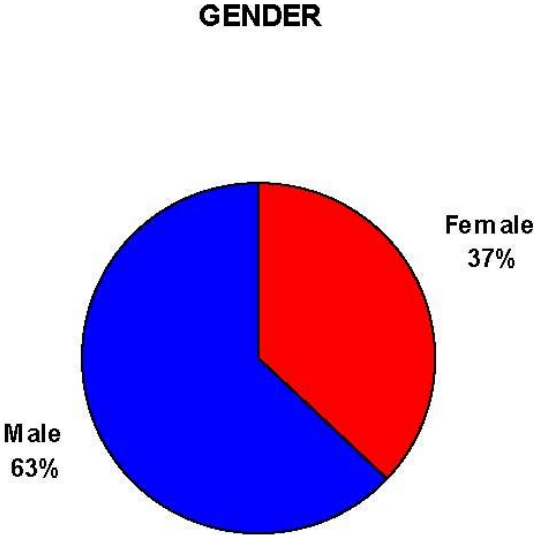
Figure 21



(The Pathfinders, 2014)

Women count for 37% of the underemployed with men weighing in at 63% or nearly twice as many men as women (Figure 22).

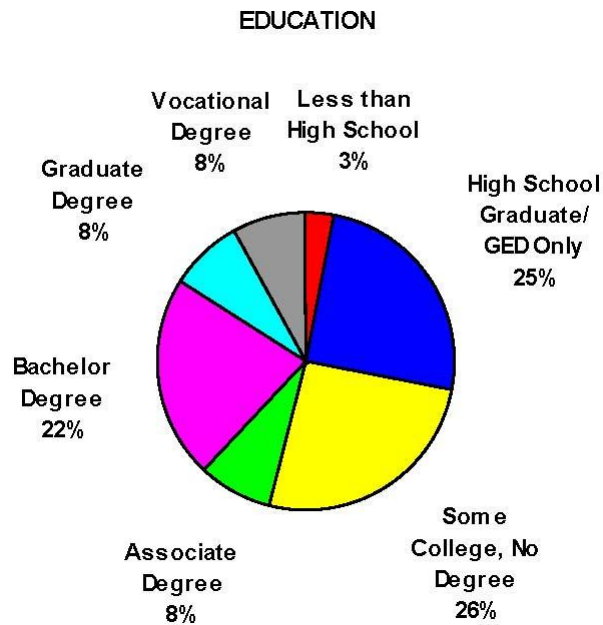
Figure 22



(The Pathfinders, 2014)

The findings in Figure 23 show that 72% of all underemployed workers have some college or technical training beyond high school with 30% of those holding a bachelors or graduate degree. Only 3% of the workers within the labor shed have not finished high school.

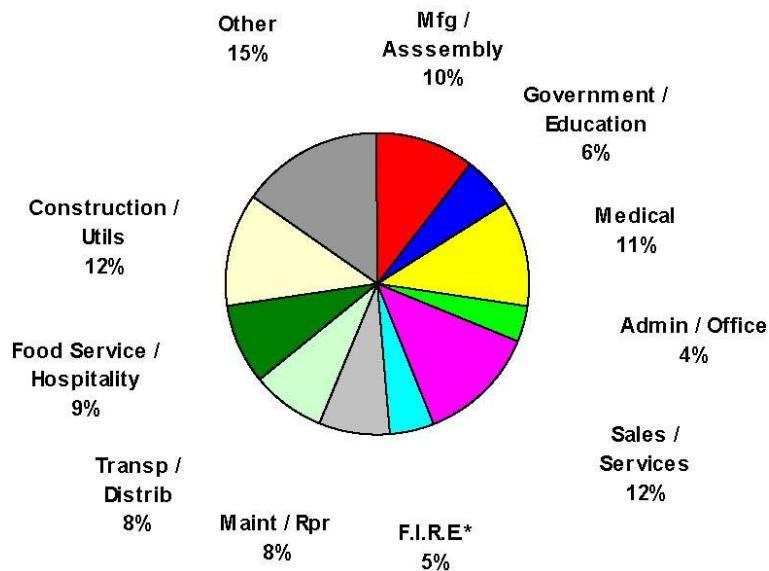
Figure 23



(The Pathfinders, 2014)

The current areas of employment of the underemployed are spread fairly evenly among the maritime industries identified in this study (Figure 24).

Figure 24 – Current Areas of Employment

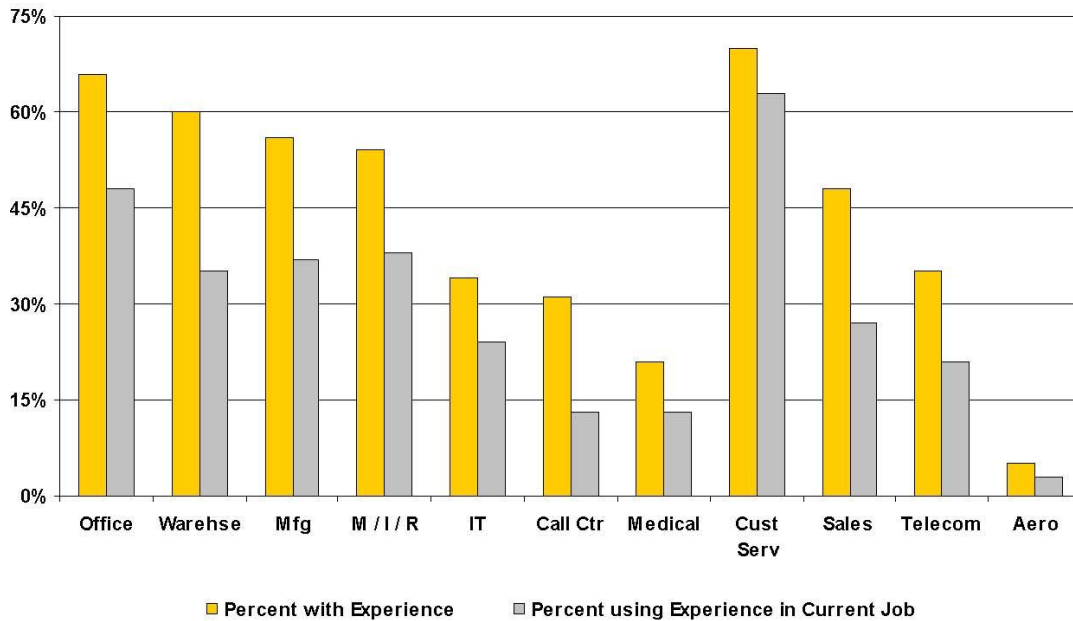


(The Pathfinders, 2014)

The median desired hourly pay rate for the underemployed worker is \$19 for the coastal labor shed. This group highly values salary, location, insurance and retirement, along with physical working environment, opportunity for advancement, paid training programs and a flexible work schedule (The Pathfinders, 2014).

As seen in Figure 25 many of the underemployed are underutilizing their experience with the most disparaging differences in warehousing, call centers, sales and telecommunications. Other than customer service, all areas had significant gaps between experience and the level of work performed.

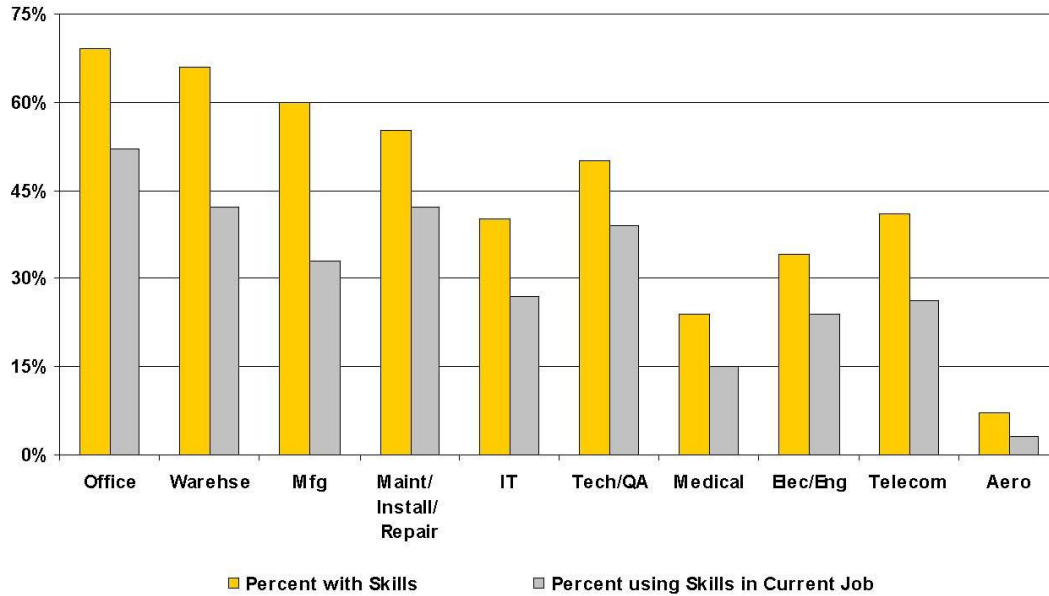
Figure 25 - Experience Used in Current Job by Underemployed Workers



(The Pathfinders, 2014)

Manufacturing rises to the forefront with unemployed workers stating that they are using only 50% of their skills in their jobs, which indicates a base of manufacturing workers who could potentially advance with the location or expansion of a business. All areas had significant gaps between skills and skills being utilized.

Figure 26 – Skills used in Current Job by Underemployed Workers

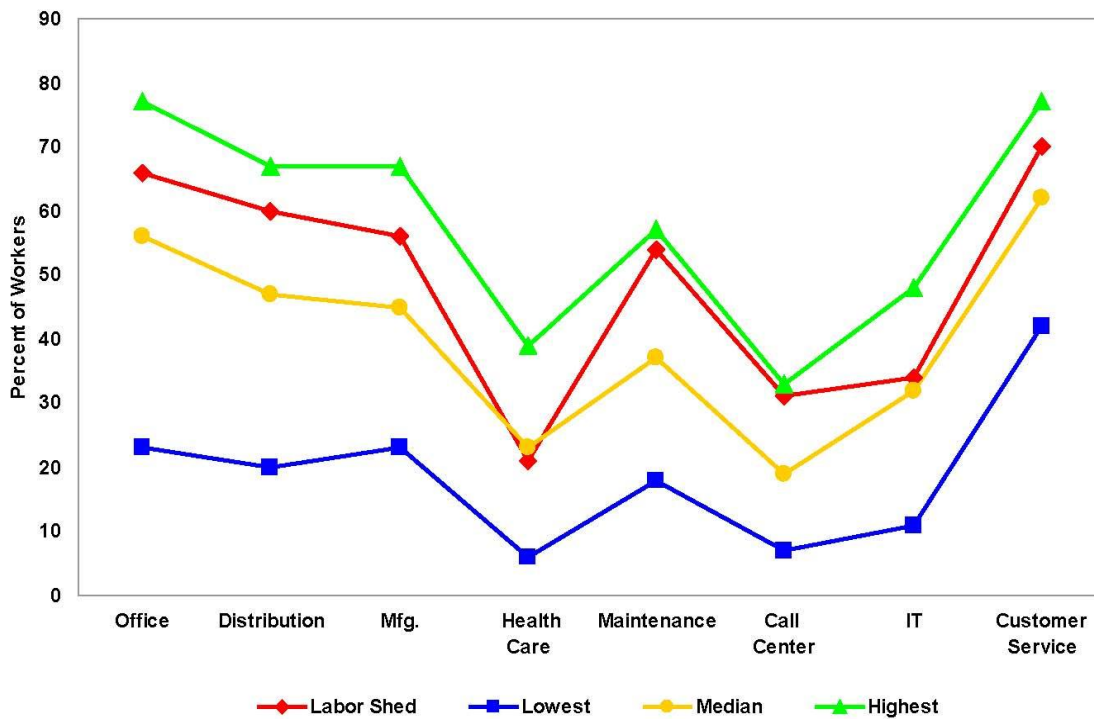


(The Pathfinders, 2014)

While Figures 25 and 26, above, depict the degree to which underemployed workers are utilizing their skills and experience, Figures 27 and 28, below, provide a comparison of skill and experience in the Gulf Coast watershed to other locations surveyed in the past 18 months. It shows the coast labor shed in a strong position near the top in both skill and experience in comparison to other labor sheds surveyed.

When compared to all labor force studies compiled by The Pathfinders in the past 18 months, the Mississippi Coast underemployed workforce rankings indicate a relatively high level of experience to the other labor shed markets surveyed, with the strongest indicators in office, distribution, manufacturing, maintenance and customer service, all of which can play a major role in the blue economy. The lowest ranking was healthcare followed by call centers and IT.

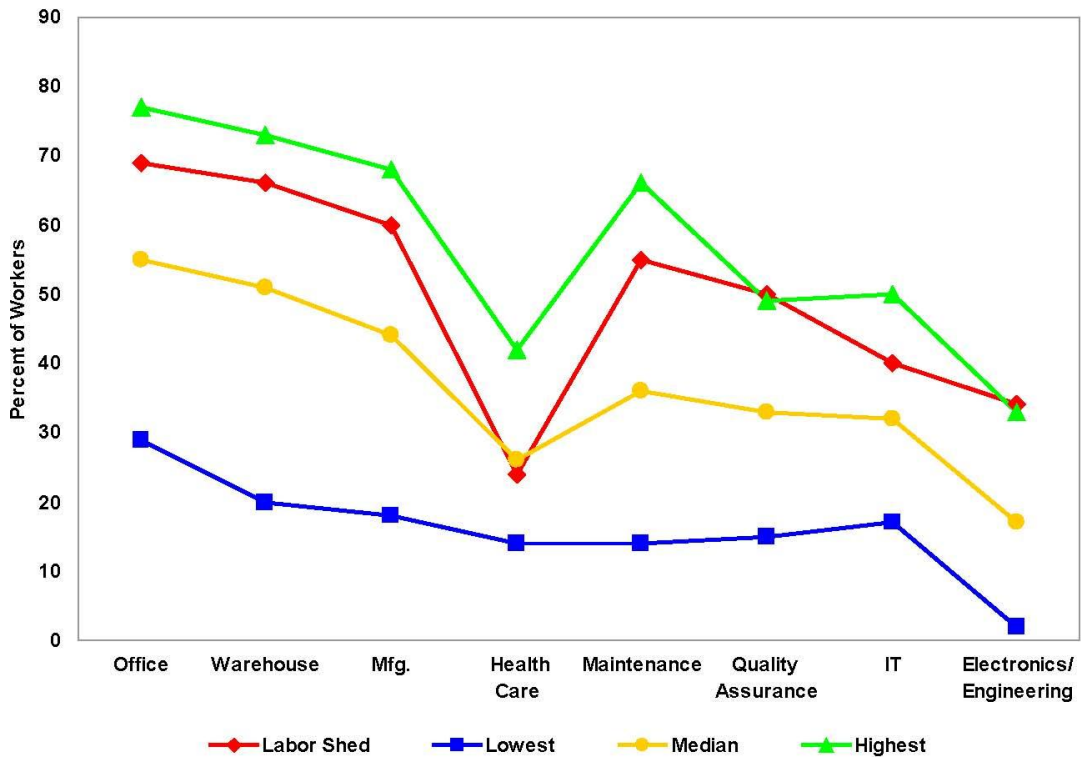
Figure 27 – Comparison of Experience of Underemployed Workers



(The Pathfinders, 2014)

The comparison of skill levels between The Pathfinder labor shed studies in the past 18 months reveals relatively high levels of skill in office, warehousing, manufacturing and maintenance, but there is a significant dip in preparation in the field of healthcare leaving questions about the area’s ability to compete for healthcare business.

Figure 28 – Comparison of Skills of Underemployed Workers



(The Pathfinders, 2014)

In summary, the coast labor shed contains many underemployed workers who have longevity in their jobs, are not union affiliated, and have a relatively high amount of academic or vocational preparation. Their skills and experience are underutilized, making a large portion of the coast labor market shed desirable and available for expanding or locating industries.

Characteristics of Unemployed Workers Actively Seeking Work– 51,100

The Pathfinders study also included unemployed workers, and those that are actively seeking work are included in this blue economy study (The Pathfinders, 2014). Unemployed workers who are actively seeking work number approximately 51,100. Their reasons and lengths of time unemployed vary, with the majority having lost their jobs due to layoffs, eliminations and closures (Figure 29). While 46% of those workers have been unemployed for six months or less, of concern is the 42% (30,998 workers) who have been out of work for 18 months or longer.

Figure 29 – Reasons for Being Unemployed

Percent Unemployed	Reason
54%	Laid Off/Jobs Eliminated/Company Closed
16%	Medical/Disability
16%	Personal Choice
10%	Discouraged
6%	Students
Percent Time Unemployed	Reason
46%	6 months or less.
12%	7-12 months
18%	13-18 months
42%	18 months or longer

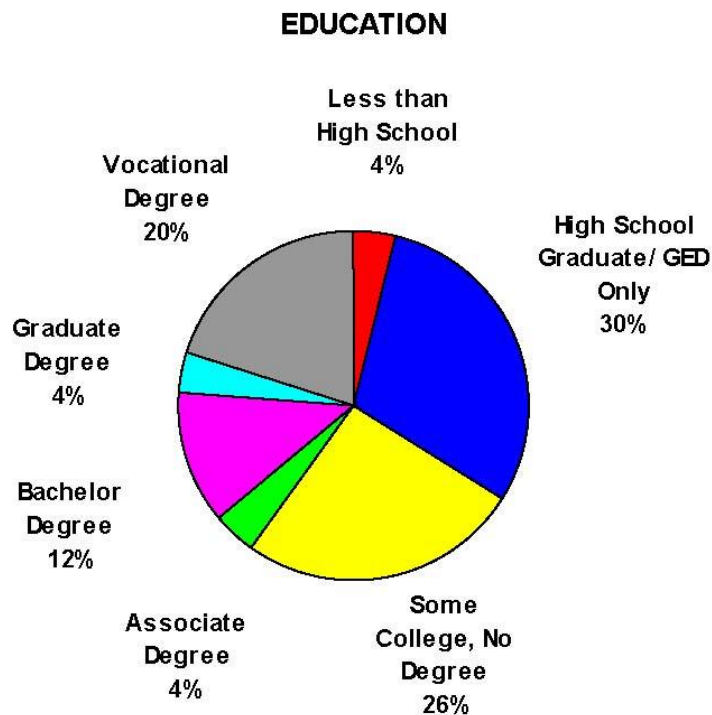
(The Pathfinders, 2014)

The average age of this unemployed class is 40 years old. At 54% the majority of them are women and a large percentage of all workers, also 54%, are between the ages of 25 and 44. The dismal 42% who have remained unemployed for 18 months or longer is a critical national issue. Job recovery continues to be slow. The jobs report released in January showed “officially, there are ten million unemployed people in the US, up from 6.8 million in 2007”

<http://www.wsws.org/en/articles/2014/02/11/pers-f11.html>. Mississippi should take this statistic seriously and focus its efforts on job creation. Enhancing the maritime industry to make it more competitive would aid in that effort.

While the underemployed workers desire \$19 per hour, this unemployed group sets their desires much lower at a median wage of \$12 per hour, which may indicate the lack of prospects they believe that they have. The education and training levels of this group have some similarities to the underemployed, but 20% of the unemployed have a vocational degree, which is 12% higher than the underemployed at 8%. The unemployed include 16% with bachelors/masters degrees compared to the 30% obtained by the underemployed. This could be an indicator that on average, they cannot pull in as high a wage.

Figure 30 – Educational Attainment of the Unemployed



(The Pathfinders, 2014)

The unemployed workers actively seeking workers have a wide range of skills and additional training and development of those skills may assist them in reentering the workforce. Many of them reported multiple areas of experience as depicted in Figure 31 with office operations, warehousing and logistics (a key maritime transportation skill), telecommunications and manufacturing/assembly /fabrication at the top of the list of levels of skill.

Figure 31

Skill Characteristics of Unemployed Actively Seeking Work		
Skills Category	Number of Individuals*	Percentage of Total
Office Operations	30,700	60%
Warehouse/Logistics	26,600	52%
Telecommunications	24,500	48%
Manufacturing/Assembly/Fabrication	24,500	48%
Maintenance/Installation/Repair	21,500	42%
Information Technology	20,400	40%
Medical/Health Sciences	19,400	38%
Technician/Quality Assurance	18,400	36%
Electronics/Engineering	12,300	24%
Aerospace	2,000	4%

(The Pathfinders, 2014)

The unemployed workers in the local labor shed have many skills and many of them have substantial academic and vocation preparation to bring to the table, adding significantly to the base of available workforce.

Workforce Training and Development

Per the GoCoast2020 Report of 2012 “The ultimate outcome of workforce training is the awarding of nationally-recognized credentials and certifications to trained workers who possess skills and knowledge that measure up to industry standards.” (Go Team, 2013)

The Mississippi Coast is well represented in academics and workforce training. See Figure 37 in the section entitled, Industry Cluster Analysis: A Start Up Guide. The workforce training network on the coast remains very flexible to industries through the Mississippi Workforce Enhancement Training (WET) Funds. The U.S. Department of Labor Workforce Investment Act funding provides a social safety net through the WIN Job Centers for those who are under or unemployed. Per the GoCoast2020 report, the seafood industries and programs for the misplaced multi-cultural workers are sorely missing and that is evident Education and Training list in Figure 37. (Go Team, 2013)

As the seafood industry in the three-county Mississippi Gulf Coast is a major component of the economic restoration and recovery, the future preparation of the labor force for the seafood processing, sales, and distribution will be critical. With environmental and regulatory issues and the natural migration of wetlands, the seafood industry will change dramatically. New fishing and processing techniques and safety regulations will require the need for formal training of these workers. Community colleges have recently been impacted by the number of multicultural individuals seeking retraining or cross-training due to manmade and natural disasters. Language barriers often pose difficulty in traditional enrollment in training programs. Interpreters are required for most technical training areas. Programs through the RESTORE Act can potentially help assist in addressing specific language barriers, training programs, interpreters and assistance for displaced and incumbent workers. (Go Team, 2013, Page 20)

If the RESTORE Act funding is not forthcoming for some time or if it is insufficient, then the Coast will have to find other ways to meet these needs.

Additional recommendations in the GoCoast2020 report is the need for dual enrollment for high school students with community colleges and universities and an easier pathway for quality employment for those who do not wish to take an

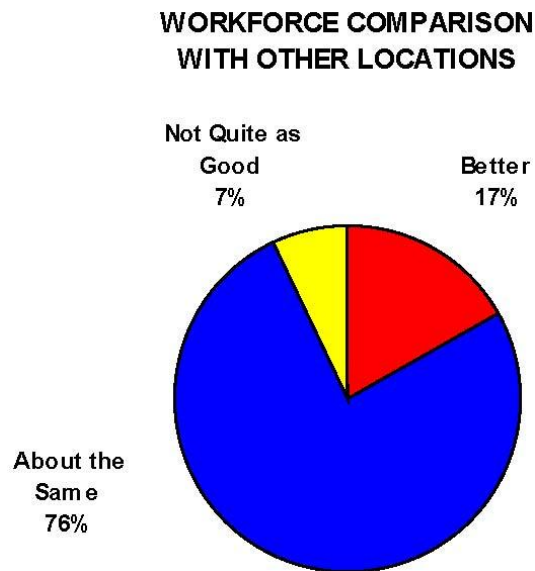
academic career path. Because 65% of the jobs in the future will require some technical training, it is imperative that these programs are launched without delay. While the community colleges are already offering many technical programs that address the blue economy, the implementation of dual enrollment will help to increase the dwindling number of students at the secondary level who continue on a career technical path. Industrial arts training should be at the heart of these programs. (Go Team, 2013)

Students often enter the workforce without essential, industrial technology skills such as applied mathematics, ruler reading, metric conversion, blueprint reading, tool identification, and other related skills. (Go Team, 2013, Page 53)

Many of these industrial technology skills will be utilized in the Blue Economy. For the Blue Economy and any other sector, not only is STEM training imperative, but soft skills training is a must that should be introduced at a young age. To be ready for the workforce, students also must learn “the traditional basic skills required for success. Those skills include basic reading, mathematics, and critical thinking, as well as soft skills such as verbal/non-verbal communications and teaming skills, work ethic, healthy lifestyles, presentation and interview skills, and leadership development” (Go Team, 2013, Page 53).

Per The Pathfinder report, surveys of employers for the Mississippi Gulf Coast Labor Shed depicted a fairly optimistic view of the workforce within the labor shed with 76% finding the area about the same as and 17% finding the area better than in the other areas surveyed by The Pathfinders in the past 18 months (Figure 32).

Figure 32

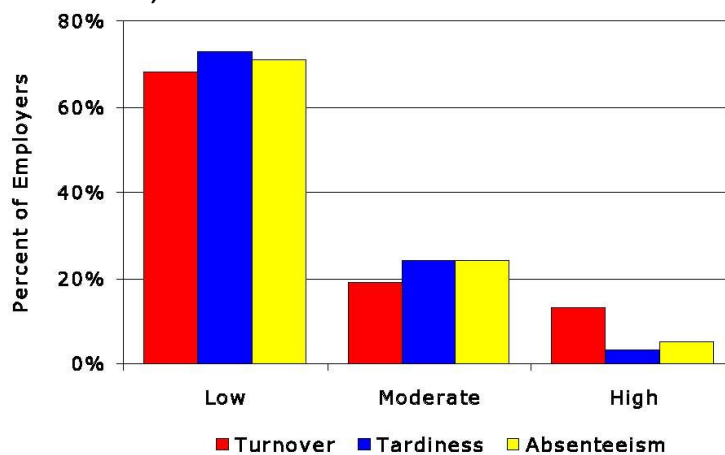


(The Pathfinders, 2014)

The Need for Soft Skills Training

The Pathfinders reported that about 25% of the companies reported moderate to high turnover, tardiness and absenteeism in their industries, indicating a need for increased soft skills training of the workforce.

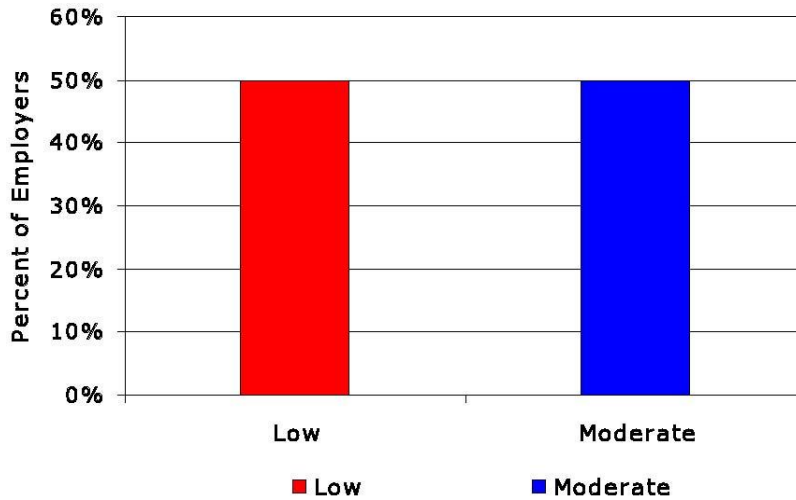
Figure 33 – Turnover, Tardiness and Absenteeism



(The Pathfinders, 2014)

The substance abuse rating for the area is moderate to low, but of enough concern that all employers reported having a substance abuse testing program in place (Figure 34).

Figure 34– Substance Abuse Rating (The Pathfinders, 2014)



(The Pathfinders, 2014)

The 51,100 underemployed coastal labor shed workers were also surveyed about training programs in which they would like to partake. Figure 35 depicts that a large percent are interested in additional training in areas that would enhance the blue economy. With 34,000 requesting training in English as a second language, it could be an indication of an untapped labor force for advancement but for a need to strengthen skills in grammar and writing and the numbers support the recommendations in the GoCoast2020 Report. (Go Team, 2013)

Figure 35

Training Desired Unemployed Workers Actively Seeking Work		
Type of Training Course	Number of Workers*	Percentage of Total
Computer Software Applications	84,300	52%
Computer Programming	82,700	51%
Industrial Machine Operations	79,400	49%
Human Resources	79,400	49%
Technical Trades	76,200	47%
Computer Maintenance or Repair	72,900	45%
Health Care	58,400	36%
Construction Trades	55,100	34%
Real Estate or Insurance	55,100	34%
Auto or Maintenance Mechanics	53,500	33%
Commercial Vehicle Operations	53,500	33%
Restaurant or Retail Management	53,500	33%
Food Service or Hospitality	50,300	31%
GED or Basic Reading, Writing, Arithmetic	38,900	24%
ESL (English as a Second Language)	34,000	21%

If the recommendations from the GoCoast2020 Report are heeded and are supplemented with this most recent workforce data updated from The Pathfinders, the Mississippi Coast may find itself well positioned to compete for high paying jobs for the Blue Economy. The Coast is already experiencing a large economic impact from the Blue Economy, but as the labor force shrinks, the preparedness of every worker will become more and more paramount to the success of the economy of the Coast as a whole. Already, a good case can be made for a company’s location or expansion to the area. It is up to the Coast to create the synergies to make it a location of choice.

Blue Economy Academic and Workforce Training Resources

The Mississippi Gulf Coast is home to two community colleges. Pearl River Community College covers Hancock County. The Mississippi Gulf Coast Community College covers Harrison and Hancock Counties. University campuses on the Coast include the University of Southern Mississippi, Mississippi State

University Tulane University and University of New Orleans. These institutions offer a wide array of degrees, and Figure 36 in the section entitled, Industry Cluster Analysis: A Start Up Guide, provides a listing of the offerings of these institutions that are most relevant to the maritime industry.

INCOMPLETENESS OF DATA

The Maritime Alliance’s a San Diego-based study was completed from secondary data using NAICS Codes but also from primary data, comprised of interviews and surveys, which helped them to identify other industries either fully or partially engaged in the Blue Economy, but whose NAICS codes were not obviously maritime-related. By adding the primary data, ERISS was able to show an increase in Blue Economy jobs from the tradition maritime, exclusive industries, which resulted in an increase from 8,176 jobs identified to 45,778 jobs identified, or an increase of 560% more jobs as detailed, below.

Total employment (September, 2011)	45,778
Traditional Maritime exclusive industries	8,176
Maritime technology industries	18,948
Other maritime (ERISS, 2012)	18,654

The San Diego Maritime Industry Report (ERISS, 2012) described the above industries in three general categories, as follows:

- **Traditional Maritime “Core” Industries** – These are the most obvious, such as fishing, ocean shipping and ports.
- **Related “Traditional” Maritime Industries** – These industries have maritime activities but are also engaged in non-maritime activities, such as construction companies or hotels.
- **Maritime Technology Industries or “Blue Tech” Industries** - These may be engaged fully or partially in maritime related activities, but are often central to the successful operations of the tradition maritime activities, such as remote sensing.

Recommendations to State for Funding a Maritime Industry Economic Analysis

In order to fully identify the maritime economic opportunities that exist in Mississippi, the state, through its economic development authority or academic institutions working with industry partners, should consider a comprehensive

maritime industry economic analysis, focusing on both primary and secondary data.

Several other states have commissioned similar analyses, which have proved useful in creation of incentives, development strategic planning and policy formulation. For example, a report commissioned by the Transportation Institute and compiled by professional services firm PricewaterhouseCoopers concluded that the State of Louisiana leads the United States in domestic maritime employment. According to a New Orleans Times Picayune article in April 2014 examining the findings of the Louisiana report:

The report shows that one in every 83 jobs in the Pelican State is connected to the maritime industry in some way, almost twice as much as that of any other separate state. The most recent federal figures available show that Louisiana's domestic maritime industry contributed more than \$11.3 billion in total economic output and posted 54,850 maritime jobs as of 2011... Employment income related to Louisiana's maritime industry is more than \$3.54 billion annually. Louisiana is the sole state to post more than \$10 billion in total gross economic output directly related to its maritime industry, according to the report. (http://www.nola.com/business/baton-rouge/index.ssf/2014/04/louisiana_leads_country_in_dom.html)

The State of Louisiana has used the above referenced report in support of championing maritime development efforts, a model which Mississippi should duplicate.

LOCAL, STATE AND FEDERAL POLICY RECOMMENDATIONS

The process of compiling this study has led to several revelations regarding necessary public policy discourse and reform. Below are several recommendations that should be considered in the context of this report's findings:

- Undertake an exhaustive study of Mississippi's maritime economy, focusing on core assets and identifying the full range of maritime-related industries, including indirect and induced maritime impacts. Utilize study results to guide public policy decisions and inform key constituencies regarding the breadth and scope of the Mississippi maritime economy.
- The State of Mississippi should establish a comprehensive set of maritime economic development incentives and policies, recognizing the full impact of the maritime industry on direct, indirect and induced economic outcomes.
- Mississippi universities should seek to maximize education opportunities related to maritime economics and logistics programs in their curriculum, to include maritime industry-specific modules inserted into existing courses, specialized elective courses that focus on maritime-related topics of study and maritime industry work-study programs
- Existing maritime industry organizations should seek to strengthen their ties to national and regional maritime stakeholders, promoting additional integration and coordination with regional and national maritime trends.
- Mississippi's coastal region elected officials, coastal agencies and other decision-makers in proximity to maritime operations should be allowed to play a role in the development of maritime policies and programs, taking into account their experience in coastal zone management and maritime logistics.
- Mississippi should seek to develop cross-border cooperation with neighboring states on maritime incentive and policy development to ensure

regional synergy, sharing of best-practices and full leveraging of available opportunities.

- The State of Mississippi, through its coastal zone government agencies, should continue its efforts to stabilize and support the commercial fishing industry, focusing on sustaining the existing industry presence, building robust workforce training programs, and attracting new entrants into the commercial fishing industry workforce.
- Mississippi's coastal counties should target outer continental shelf oil, gas and energy production industries and related support services as priority economic development targets, thus capitalizing on an industry with significant economic impact potential.
- Identify local and regional champions for promoting cluster-related development strategies, in order to fully capitalize on existing synergy and business relationships across the full spectrum of marine industries in the state. Work to educate firms regarding the benefits of cluster-related operations, focusing on the economic opportunities inherent sharing information, technologies and the collective strengths of synergistic operations.
- Enhance military-base support efforts, seeking to position Mississippi's Department of Defense assets in a competitive and sustainable position in the context of base realignment and closure decisions.
- Enhance technology transfer efforts and provide more accessible infrastructure for local firms to take advantage of Federal Government and Department of Defense procurement and contracting opportunities.
- Fully leverage Mississippi's robust shipbuilding industry, focusing on development of the state's shipbuilding, repair, and refitting infrastructure. Broaden the economic development focus to include small-scale shipbuilding operations in Mississippi's smaller coastal ports, including activities such as barge construction, shipbuilding support industries and recreational watercraft manufacturing and assembly.

- Enhance expertise and institutional involvement in maritime logistics in order to more fully leverage economic opportunities for maritime trade and its associated land-based logistics infrastructure.
- Streamline maritime and maritime-related regulatory and permitting approval processes, focusing on uniformity of requirements, rules and regulations across jurisdictions and providing adequate infrastructure to ensure timely regulatory approvals.
- Integrate more maritime industry-specific elements into local and regional planning exercises.
- Work to ensure timely maintenance dredging of Mississippi's coastal ports and waterways in order to remain competitive regionally.

INDUSTRY CLUSTER ANALYSIS: A START-UP GUIDE

This study is intended to constitute the first step of what will eventually become a robust, well-informed cluster analysis. The above referenced secondary data, which is readily available for analysis, is only a small portion of the activities involved in industry cluster analysis. However, this study does include the following outline for a more in depth cluster analysis as well as some supplemental data to assist in launching a full-scale cluster analysis for the Mississippi Gulf Coast Maritime Industry in the future.

Performing a cluster analysis is much more in depth than securing employment and economic impact information from primary and secondary data. Rather, it is a highly detailed process, most of which can be seen in the results of the San Diego Study. (ERISS, 2012)

An industry cluster, as defined, will be centered on activities and institutions that create a synergy among the maritime industries. These include knowledge sharing, research and development and other higher education facilities, competitors working together to strengthen the region even as they compete for customers, networking among industry professionals through associations and training activities, targeted workforce training activities, support for businesses at all stages of development, and primary data with which to portray a true picture of the employment and economic impacts of the area.

Identifying industry sectors with high location quotients (LQ's) to the nation is only a beginning indicator of cluster activity. The question to be answered in a cluster analysis is whether a region merely has a concentration of separate target industries competing in similar markets, or if it has high synergy among industries, governments, universities, and private business, which has been built over many years, and which makes it difficult to replicate in other regions.

Cluster analysis will also identify the gaps in coverage, such as industries that need strengthening and workforce programs that must be introduced to augment the entire cluster. It will inform which industries are inherently part of the cluster, if one is defined, and identify public policy initiatives needed to plug the gaps and enhance the cluster, overall.

Dr. Heike Mayer published a methodological frame work for performing a cluster analysis within a region (Mayer, 2005). Utilizing Mayer's recommendations, the following is proposed for a comprehensive maritime cluster analysis in Mississippi.

Mayer first suggests that the analyst conduct a comprehensive quantitative analysis of the region's employment data in order to reveal cluster characteristics. Using employment data, Mayer recommends that the analyst identify industries with location quotients above 1.25, average wages above 10 percent of the national average, and growth rates greater than the national growth rates. These factors will reveal cluster candidates, which can be further analyzed. Mayer cautions that prominence of local industries alone does not indicate a cluster by definition, so additional analysis is necessary.

After conducting quantitative analysis of the data, Mayer recommends that the analyst then perform qualitative and competitiveness analysis of the region to learn more about individual firms and their connectivity with other firms in the prospective cluster.

Mayer notes that qualitative analysis involves differentiating existing clusters from emerging clusters and target industries. She recommends a variety of methods to gather qualitative data, including interviews, surveys and focus groups with economic development practitioners and industry representatives, along with gathering data through local trade groups or professional service firms. The general goal should be to gather additional information about the potential cluster industries that cannot be gained from quantitative analysis alone.

Competitiveness analysis is achieved by collecting data that allows for comparison between the region and other regions, using variables that reveal competitive factors. Shift share analysis of the regional data is one important method used in competitiveness analysis. Shift share analysis allows the user to measure comparative growth of the local economy to the national economy or other regional economies. Competiveness analysis also seeks to reveal knowledge created from cluster activity.

Measuring factors that reveal the commercial viability of interrelated firms, when combined with other quantitative and qualitative analyses, can reveal the

existence of clusters in a region and allow policy makers to create strategies to build and enhance cluster-related economic development efforts.

Define the Region. Regions are not necessarily restricted by boundaries. Often metropolitan statistical areas (MSA's) as defined by the U.S. Census Bureau are used. The MSA's may cross city, county and sometimes state boundaries, as the focus is on the region that encompasses the potential cluster activity. As this study pursues maritime activity, only, the study was extended past any of the separately defined MSAs to instead focus on the three Mississippi coastal counties. The National Ocean Economics Program (NOEP) provides options in the market data calculator on its website to include only shore adjacent counties or to also include counties in close proximity to the coast. We have chosen for this first study to concentrate only on the shore adjacent counties. (NOEP National Ocean Economics Program, 2014)

Identify Key Partners to assist in the Study – As a first step in the collection of primary data, awareness and trust must be built among the representative industries in the maritime economy in order to receive the cooperation needed to collect sufficient data, much of which is of a confidential nature. Because the current North American Industry Classification System (NAICS) codes do not allow a subdivision of many of the Core/Other industry activities to identify those activities that are maritime, questions must be asked directly to the companies to provide the missing data. Trade associations are key partners for the cluster analysis, as they can act as a bridge between researchers and the individual firms for collecting, not only primary data about jobs, earnings and revenues, but also qualitative information needed for completion of the competitive analysis. This could include information about patents filed, raw materials used, and other information that may show synergy around which a potential cluster would be formed. Associations can provide introductions to the process and emphasize the importance of the study and also provide key contact data. They may also arrange for forums, focus groups, and individual interviews for securing the necessary primary data. They are in a position to encourage collaboration, where others may not be able to do so. The following table indicates a strong showing of maritime industry-related associations on the Mississippi Gulf Coast.

Figure 36

Maritime Trade Associations	Source
American Shipbuilders Association	http://www.americanshipbuilders.com/t/american-shipbuilding-association
American Shrimp Processors Association – Biloxi, MS	http://www.americanshrimp.com/association/about/
Coastal Conservation Association MS	http://www.ccamississippi.org/
Gulf Coast Association of Realtors	http://gcarealtors.com/
Gulf Coast Gaming Association	436 Carmargue Lane, Biloxi, MS 39531
Gulf Coast Golf Association	http://www.gulfcoast.com/Golf/GolfMap
Gulf Coast Intellectual Property Association	http://www.gcipa.org
Gulf Coast Kayak Fishing Association	http://www.gulfcoastkayakfishing.com
Gulf Coast Power Boat Association	http://www.apba.org/races/gulf-coast-powerboat-association-6
Gulf Fisherman’s Association	http://www.gulffishermen.org/
Gulf States Maritime Association	Mobile, AL - (251) 432-7003
Gulfport Stevedoring Association	450 East Pass Road, Suite 108, Gulfport, MS 39507
Marine Technology Society	https://www.mtsociety.org/communities/sections/gulfcoast.aspx
MS Charter Boat Captains Association	http://www.mscharterboats.org/
MS Coast Building Officials Association	http://boam.ms/MCBOA/mcboa_index.htm
MS Coast Yachting Association	http://www.mcyva.info/
Mississippi Casino Operators Association	120 N Congress St, Jackson, MS 39201 · Downtown (601) 965-6992
MS Gaming and Hospitality Association	http://msgaming.org/
MS Gulf Coast Attractions Association	http://www.mississippifun.org/
MS Gulf Coast Oyster Co-	A MS Cooperative Association in business since

Operative Association	1977. In good standing. No address provided
MS Hospitality & Restaurant Association	http://www.msra.org/
MS Manufacturers Association	http://www.mma-web.org/
MS Hotel & Lodging Association	http://www.mshla.com/
MS Water Resources Association	http://www.mswater.org/members/ports/
US Oil and Gas Association – Mississippi/Alabama Division	http://usoga.com/
National Ocean Industries Association	http://www.noia.org/
Pascagoula Bar Pilots Association	http://paspilot.com/
Pascagoula Maritime Association	In good standing – Since 1891 – No contact info
Southern Shrimp Alliance	http://www.shrimpalliance.com/
WorkBoat.com - links to national organizations	http://www.workboat.com/Commercial-Marine-Associations-and-Organizations.aspx

Conduct Quantitative Analysis – Identify industries that have a competitive edge on 1) employment concentration, 2) high levels of wages, and/or 3) fast growth relative to the nation. This will aid in identifying candidate industry clusters. Analysis for this study was conducted using secondary data, only.

- a) Conduct an industry analysis to identify industries with a location quotient (LQ) of 1.25 times the concentration of the nation. (See Figures 4-7) ***However, as stated throughout this study, the quantitative analysis will have to be supplemented with primary data to achieve a true picture of the cluster activity.***
- b) Calculate wage levels relative to the US. The higher the wages relative to the U.S., the higher the probability that at a high value is placed on the production of certain goods, and that value is placed on innovation and knowledge creation. This is accomplished by computing the industry average annual pay for the nation and for the

unit of analysis. Any annual average wages 10% or above the nation are an indication of that value. Information for this study was secured from Economic Modeling Specialists (EMSI), <https://east.economicmodeling.com/analyst/>. This study was completed with secondary data, only, for core and non-core maritime industries, some of which are easily identifiable and others which are only partly maritime related. (See Figures 1-3 and 8). ***This analysis will have to be supplemented with primary data to achieve an accurate picture of the cluster activity.***

- c) Calculate fast growth relative to the nation; two years of data are needed. Dr. Mayer recommends Joseph Cortwright's method of calculating the % change in wages over at least a 5-year period and at least at the 4-digit NAICS code level (Cortwright, 2003). By comparing the % change in the local region to the % change in the nation, one can arrive at an estimate of the growth rate of the region relative to the nation. Analysis of core maritime industries should be performed over an 11-year period from 2004 to 2014 to capture the overall changes from before Hurricane Katrina, which struck the Mississippi coast in 2005 and after the Deep Water Horizon Oil Spill, which impacted the coast in 2010.
- d) To find further indicators of cluster activity one can use Mayer's Method for Classifying Industry Economies to determine which are:
 - 1) Important growth industries,
 - 2) Emerging industries,
 - 3) Industries that may require attention,
 - 4) Industries that show little promise to the local economy (Mayer, 2005). (See Figure 8.)

Conduct Qualitative Analysis to facilitate differentiation of existing clusters from emerging clusters and from target industries. This requires a focus to gather information about firms and their connectedness to other firms in the potential cluster, the level to which they work together and at which they share knowledge and information. Any qualitative analysis requires cooperation with key partners in the industry. **Qualitative analysis**

is beyond the scope of this study; however, it is recommended as a next step for analyzing the region.

Conduct focus groups and perform qualitative interviews to gather information about history, patents, industry relations, challenges, the factors driving competitiveness for the firm, their sources of new products and processes, the acceptability of their talent level and support services. Encourage the group to find ways they could collaborate further and get a sense of where they are each headed. Make sure there are discussions about the effects of public policy on industrial growth over the next 10 years.

Conduct a Competitiveness Analysis to determine the relative advantage of potential industry clusters compared to other regions to inform strategic decision-making.

- e. Conduct a shift-share analysis. This will give data about the region in terms of changes in employment over time and whether they are attributable to national trends, strengths or weaknesses resulting in shifts in the local region and changes in the local industry mix. Shift share analysis has been conducted for the core maritime, maritime/non-maritime and tech NAICS codes as identified by The San Diego Report (ERISS, 2012). (See Figures 11-14.)
- f. Seek to identify a knowledge base by looking for patents and patent activity. This information can be found at the US Patent and Trademark Office.
http://www.uspto.gov/trademarks/notices/recent_postings.jsp
- g. Analyze major firms and their products, understand their history, and specific specializations to further inform regional decision-making.
<http://www.sec.gov/edgar/searchedgar/webusers.htm> ;
<http://www.hoovers.com/> (limited data is free; more detailed will cost), <http://www.dnb.com/> (must pay for information.)
- h. Look at venture capital investments for an indication of how vital and entrepreneurial the region is. Information can be found by

partnering with a venture capital firm to access the database of information available to venture capitalists at <https://www.pwcmoneytree.com/MTPublic/ns/index.jsp> . An excellent partner in the Northern Gulf of Mexico Region is the Gulf Coast Intellectual Property Association.

- i. Look at new firm formulations and entrepreneurial activity at <http://www.research.fsu.edu/techtransfer/documents/mnei.pdf>.
- j. Look at the educational attainment of the area population. This can be found at <http://www.esri.com/software/arcgis/community-analysis>, and for free at http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

Identify economic development policies and actions based on comprehensive research, and identification of gaps and missing links in cooperation with key stakeholders including workforce development agencies, state and local economic developers, higher education institutions, industry groups, utilities, and community development organizations to create greater understanding and organization within and between agencies, and to develop public policy that supports business activities and cluster growth in the future. Policy recommendations from this initial research are recorded throughout this paper.

Recommendations for Analyzing and Developing the Blue Economy on the Mississippi Gulf Coast from data collected.

1. Identify the gaps.
2. Create a Blue Economy membership organization for Hancock, Harrison and Jackson Counties, with sub-committees representing:
 - a. Shipbuilding
 - b. Transportation and Logistics
 - c. Department of Defense
 - d. Blue Tech
 - e. Commercial Fishing

- f. Recreational Fishing
 - g. Tourism, In general
 - h. Casinos and Hotels
 - i. Marine Science Research and Development
 - j. Environmental Protection
3. Expand on the University of Southern Mississippi's Marine Technology Economic Form to create a coast-wide conference or convention organized through the member organization listed in Figure 36.
 4. Hire an association management organization that will be paid by membership dues to organize the organization and the conference or convention.
 5. Attract/expand R&D organizations.
 6. Create networking groups, such as the Gulf Coast Intellectual Property Association listed in Figure 36.
 7. Enhance Small business development support.
 8. Anything else that becomes obvious from the complete cluster analysis.

As a supplement to this Start Up Guide, Figure 37 is included to provide a listing of all existing academic, vocational and workforce training programs in existence on the Mississippi coast. These will be partners in identifying key characteristics of maritime industry activity and in identifying, designing, implementing need programs once the maritime industry is analyzed thoroughly.

Table 37

Education and Training	
University of Southern Mississippi	
<i>Stennis Space Center – Hancock County</i>	<p><i>Department of Marine Sciences</i></p> <p>Marine Science</p> <ul style="list-style-type: none"> • BS in Marine Science • MS in Marine Science • DS Science in Marine Science <p>Hydrography</p> <ul style="list-style-type: none"> • MS in Hydrography • DS in Marine Biology with an emphasis in Hydrographic Science
<i>Gulf Coast Research Laboratory Enterprise– Jackson County</i>	<p><i>Department of Coastal Sciences</i></p> <ul style="list-style-type: none"> • BS in Marine Biology • MS in Coastal Science • DS Coastal Science <p><i>Center for Fisheries Research & Development</i></p> <ul style="list-style-type: none"> • Estuarine and marine fisheries <p><i>Marine Education Center</i></p> <ul style="list-style-type: none"> • Education and outreach for the public <p><i>Thad Cochran Marine Aquaculture Center</i></p> <ul style="list-style-type: none"> • Marine aquaculture research
<i>Gulf Park Campus – Harrison County</i>	<p><i>Department of International Trade and Transportation</i></p> <ul style="list-style-type: none"> • MS in Logistics, Trade and Transportation <p><i>Other Relevant Offerings</i></p> <ul style="list-style-type: none"> • BS in Applied Computer Science • BS in Environmental Biology • BA in Film Production • BS in Mathematics • BS/BA in Casino Resort Management
Mississippi State University	
<i>Stennis Space Center – Hancock County</i>	<ul style="list-style-type: none"> • Master of Science in Engineering • Master of Science in Industrial Engineering
University of New Orleans	
<i>Stennis Space Center - Hancock County</i>	<ul style="list-style-type: none"> • Master of Science in Applied Physics • Doctor of Science in Engineering and Applied Science
Tulane University	
<i>School of Continuing Studies – Harrison County</i>	<p><i>Relevant Offerings:</i></p> <ul style="list-style-type: none"> • AA, BS, MS in Applied Computing

<p style="text-align: center;"><i>Workforce Development</i> <i>This campus is designed for working students interested in continuing their studies. It offers associates, bachelors, and masters degrees, as well as certification programs at the post baccalaureate level.</i></p>	<ul style="list-style-type: none"> • AA, BS, Certificate, MS in Homeland Security Studies • AA, BS, Certificate in Digital Design
<p>Mississippi Gulf Coast Community College</p>	<p><i>University Parallel Programs</i></p> <ul style="list-style-type: none"> • Science – Including Marine Science • Engineering • Computer Science • Mathematics
	<p><i>Career Technical Programs</i></p> <ul style="list-style-type: none"> • Computer Networking Technology • Computer Programming Concentration • Construction Management Technology • Drafting and Design Technology • Electronics Technology • Graphic Design Technology • Hospitality & Restaurant Management Concentration • Hospitality & Tourism Management Baking & Pastry Arts Technology Concentration • Hospitality & Tourism Management Banquet and Catering Food Service Option • Hospitality & Tourism Management Culinary Arts Technology Concentration • Instrumentation and Controls Technology • Interpreter Training Technology • IT Specialist Technician • Logistics Technology • Process Operations Technology • Travel & Tourism Management Concentration
<p>Workforce development programs in Mississippi are provided to the industries via the Workforce Enhancement Training Funds (WET Funds). A percentage of all state unemployment insurance premiums are returned to industry in the form of workforce development programs administered by the Mississippi Community Colleges Board (MCCB) via the network of community colleges</p>	<p><i>Workforce Development</i></p> <ul style="list-style-type: none"> • Crane simulator training – basic safety, lifting and rigging • Welding – SMAW, FCAW, GMAW, GTAW, and GMAW Aluminum • OSHA training for construction • OSHA training for general industry • Blueprint reading • Forklift training • Intro to air conditioning

<p>throughout the state.</p> <p>Workforce training programs are differentiated from academic and career technical programs, in that no degrees or certifications are required. Rather the training programs are tailor to industry specifications and are extremely flexible.</p> <p>Many of the workforce training programs are conducted at the <i>MGCCC Advanced Manufacturing and Technology Center</i>.</p>	<ul style="list-style-type: none"> • Intro to heating • Career Readiness Certification (CRC) based on the ACT WorkKeys assessment of basic jobs skills • Marine pipefitting technology • Shipfitting and welding technology • <i>Any other course requested by industry</i> • Train-the-trainer reimbursements • Industry training video assistance • Curriculum development assistance
<p>Pearl River Community College</p>	
<p><i>Pearl River County – these classes are approximately an 80-mile round trip from Waveland, MS, however, training programs can be taken to the industries, and the industries’ may design their own curriculums.</i></p> <p>See above description of WET Funds under Mississippi Gulf Coast Community College.</p>	<p><i>These can be part of an associate’s degree program and/or a certification program.</i></p> <ul style="list-style-type: none"> • Computer Networking Technology • Construction Management Technology • Drafting and Design Technology • Electrical Technology • Electronics Technology • Heating, Air Conditioning Ventilation, and Refrigeration Maintenance Technology • Precision Manufacturing and Machining Technology • Utility Lineman Technology • Welding and Cutting Technology
<p><i>Hancock County – Hancock Center</i></p>	<ul style="list-style-type: none"> • Welding and Cutting Technology • Shipfitting Technology
<p><i>Stennis Space Center – Hancock County Hancock County’s workforce programs are managed through the workforce training representative situated at SSC. Most courses are offered at industry sites or at the David N. McDonald Training Center at Port Bienville</i></p>	<p><i>Academics</i></p> <ul style="list-style-type: none"> • Associate of Arts Degree <p><i>Workforce Development</i></p> <ul style="list-style-type: none"> • Geographic Information Systems – at SSC • Heavy Equipment Training • Forklift • OSHA Training • Hazwoper Training • 40-Hour Emergency Medical Response Training • First Aid/CPR/AED Training • <i>Any other course requested by industry</i> • Train-the-trainer reimbursements • Industry training video assistance • Curriculum development assistance

SUMMARY

Mississippi has enormous maritime-related assets across its state, centered primarily in the three coastal counties. It does not tout its Blue Economy in the truest sense, however, because such a concept has yet to be embraced as an all-inclusive synergistic effort to grow such an economy. Mississippi can boast of its maritime assets, which are robust pieces of a Blue Economy. However, more must be done to seize on the full range of opportunities that currently exist.

From the secondary data presented and the industries identified in the analysis, it is clearly demonstrated that there is potentially a largely undefined maritime cluster on the Mississippi Gulf Coast. Only through continuing, sustained efforts to further qualify and quantify its maritime activity can Mississippi move itself into a position of informed action.

The time for Mississippi's maritime renaissance is now. Economic interests throughout the state would be well-served to develop a shared-vision for the state's maritime future that fully leverages the state's geographic, infrastructure, industrial, academic and economic assets.

In order to fully realize the potential of Mississippi's maritime economic future, leaders from business, government and academia should consider adopting a common strategy that encourages collaboration, coalition building and ultimately develops synergistic partnerships that will move the state's maritime economy forward into the 21st century.

Through visionary, strategic leadership and action, Mississippi is poised to develop one of the most significant Blue Economies of any state in the union.

BIBLIOGRAPHY

- Cortwright, J. (2003). *Oregon Industry Clusters*. Portland, OR: Imprensa, Inc.
- Development, M. G. (2014). *Key Industries*. Retrieved from Mississippi Gulf Coast Alliance for Economic Development: <http://www.mscoastalliance.com/>
- EMSI. (2014). *EMSI*. Retrieved from EMSI: <http://www.economicmodeling.com/>
- ERISS. (2012). *San Diego Maritime Industry Report*. ERISS.
- Foundation, T. M. (2014). *UPDATING THE NAICS CODES - What One Needs to Know*. San Diego.
- Go Team. (2013). *GoCoast2020 Final Report*. GoCoast2020 Commission.
- Mayer, H. (2005). Cluster Monitor: A guide to analyzing industry clusters in regional economies. *Economic Development Journal* 4(4), 40-53.
- NOEP National Ocean Economics Program. (2014). *Ocean Economics Market Data*. www.oceaneconomics.org.
- Porter, M. (2000). Location, Competition and Economic Development: Local Clusters in a Global Economy. *Economic Development Quarterly* (14)1, 16-17.
- The Pathfinders. (2014). *The Gulf Coast Area of Mississippi Labor Availability Report*. Dallas, TX: The Pathfinders.
- TMA. (n.d.). The Maritime Alliance - <http://themaritimealliance.org>.