

ACTING FROM STRENGTH AND POSITIONING FOR THE FUTURE

A Narrative for The University of Southern Mississippi's Role in the Mississippi Gulf Coast's New Blue Economy



SeaAhead, Inc.

Mark Huang, Michael Joroff, Anthony Townsend



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Executive Summary: A Solid Foundation for Growth

SeaAhead, Inc. was tasked in August of 2019 to come to the Mississippi Gulf Coast to assist in the creation of a narrative for a new blue economy cluster, highlighting Gulfport's role. We met with a wide range of stakeholders in Jackson, Harrison and Hancock counties which revealed a deep diversity of ocean enterprises and science and technology assets that are engaged in shipbuilding, submersible vehicles, ocean sensors, tourism, fisheries, aquaculture, cargo shipping, military readiness and homeland security. These existing blue economy capabilities provide a solid base for the future.

The blue economy along the Gulf Coast is changing fast and there is a strong willingness in the community to collaborate

and build on the region's blue economy. University and government research, technology, infrastructure and innovation positions the Gulf Coast to pursue the growth sectors of the global blue economy. A true Mississippi Gulf Coast blue economy cluster is emerging as stakeholders develop organizational networks and facilities that catalyze convergence between traditionally siloed industry sub-sectors and disciplines to make the whole greater than its parts. By working and investing together on numerous initiatives, some of which are underway and others that are suggested in this report, the region is emerging as the next global blue economy cluster which will create resilient jobs for people with both technical skills and graduate level education.

Purpose: Securing the Future

Many of the enterprises along the coast are already taking action to secure their future. We see the highest value growth coming from action to converge siloed sub-industry sectors and disciplinary skills to innovate around significant, future opportunities. We

identified 6 examples whereby enterprises with different competencies can work together to create products and services of global significance. These relate to: unmanned maritime systems; ocean plastics; precision maritime aquaculture; ocean and coastal data and analytics; smart ports; and sea-space systems.



Paths for Action: Three example opportunity paths that build on the Gulfcoast's competitive advantages:

Path 1: Research Concentrated on Convergence Opportunities

Applied research aims to solve specific practical problems that are directly relevant to business and policy. Given its small size, the Gulf Coast would benefit from a highly-focused innovation strategy focusing on the types of convergence opportunities just mentioned, where applied research is not yet dominated by any other region.

Path 2: The Blue Economy Lab Bench for Prototyping and Testing

The Gulf Coast can become the nation's blue economy center for prototyping and testing across domains (land/sea, inshore/offshore, surface/underwater, air/space, sea/space). This "living laboratory" platform will stimulate research investment from corporates, governments and venture backed startups who need testing capability, makers space and access to potential customers.

Path 3: Outsourced Services for the Blue Economy Supply Chain

The Mississippi Gulf Coast has an immediate opportunity to exploit its domestic US location, low cost basis and base of talent with strong technical skills and marine experience to rapidly expand its share of the growing market for blue economy-related technical services. These include, but are not limited to: short-run production of high-value added products, as well as outsourced services including testing, verification, compliance, genetic sequencing and synthesis.

The Gulfport Blue Economy Innovation District as the Nexus of the Coast's Blue Economy

The downtowns of many American cities, particularly when linked to a university committed to innovation and economic development, lead the nation in attracting skilled talent and in creating social networks that support innovation. It is toward this end that the City of Gulfport, partnering with The University of Southern Mississippi (USM) and the business community, created a Blue Economy Innovation District (BEID). The BEID encompasses the heart of downtown and its northern fringe, the port, the area around the new aquarium and USM's Gulf Coast campus in Long Beach.

The BEID will be a nexus for the Coast's blue economy expansion through investment from, and collaborative action with, established companies and startups. This zone will provide a platform for aggregating blue economy activity as enterprises and talent connect to and feed off each other in unpredictable but highly valuable ways. Repurposed and new places within the district will accelerate professional networking, learning and innovation.

The breadth and vitality of the blue economy along Mississippi's Gulf Coast is established and growing. The BEID in Gulfport will be its global beacon to recruit companies and talent.



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Overview—Gulf Coast Blue Economy Cluster

The purpose of this report is to present a narrative for the new blue economy cluster on Mississippi Gulf Coast highlighting Gulfport’s role.

The blue economy—“the sum of all economic activity having to do with oceans, seas, harbors, ports and coastal zones”—represents one of the greatest near term opportunities for the State of Mississippi and the Gulf Coast. The region has a diversified collection of companies, communities, universities and US Government agencies and research expertise that use, develop and study the ocean. This collection of physical and human assets is well on its way to becoming an integrated cluster.

The blue economy is changing fast with technology and innovation enabling or driving much of this growth. The Mississippi Gulf Coast is changing too and is well positioned to ride this wave and take its place in a new, global blue economy that exploits scientific and engineering knowledge. Regional corporate, government and academic leaders recognize the future vitality of the cluster rests on the ability of enterprises and investors to cross existing organizational, geographic and disciplinary bounds to create value for the region that is greater than the sum of individual benefits.

The City of Gulfport, centrally located along the coast, plays a special role as an expanding focal point in the region. It hosts an array of blue economy activities ranging from cargo handling and military logistics at a 21st century port to education and tourism programs at the nation’s newest aquarium. Within this spread are programs and facilities supporting early stage innovation and prototyping including laboratories focused on ocean sensors, submersible vehicles and resilient aquaculture; lifelong learning programs enabling the workforce; research investigating critical challenges facing the ocean; and testing facilities for multinational companies and US Government agencies.

The emerging Blue Economy Innovation District (BEID) ties all of these assets and activities together. The BEID is bordered to the west by USM’s Gulf Park Campus, to the south by two advanced engineering centers at the port and to the north by a growing business district. The BEID serves as the Coast’s nexus for acceleration of innovative ideas, citizen engagement with the ocean, professional education, early stage industry engagement with the Coast, and professional networking. The BEID amplifies the value of work that goes on there, acting as a new catalyst for the Gulf Coast’s vitality in the blue economy.



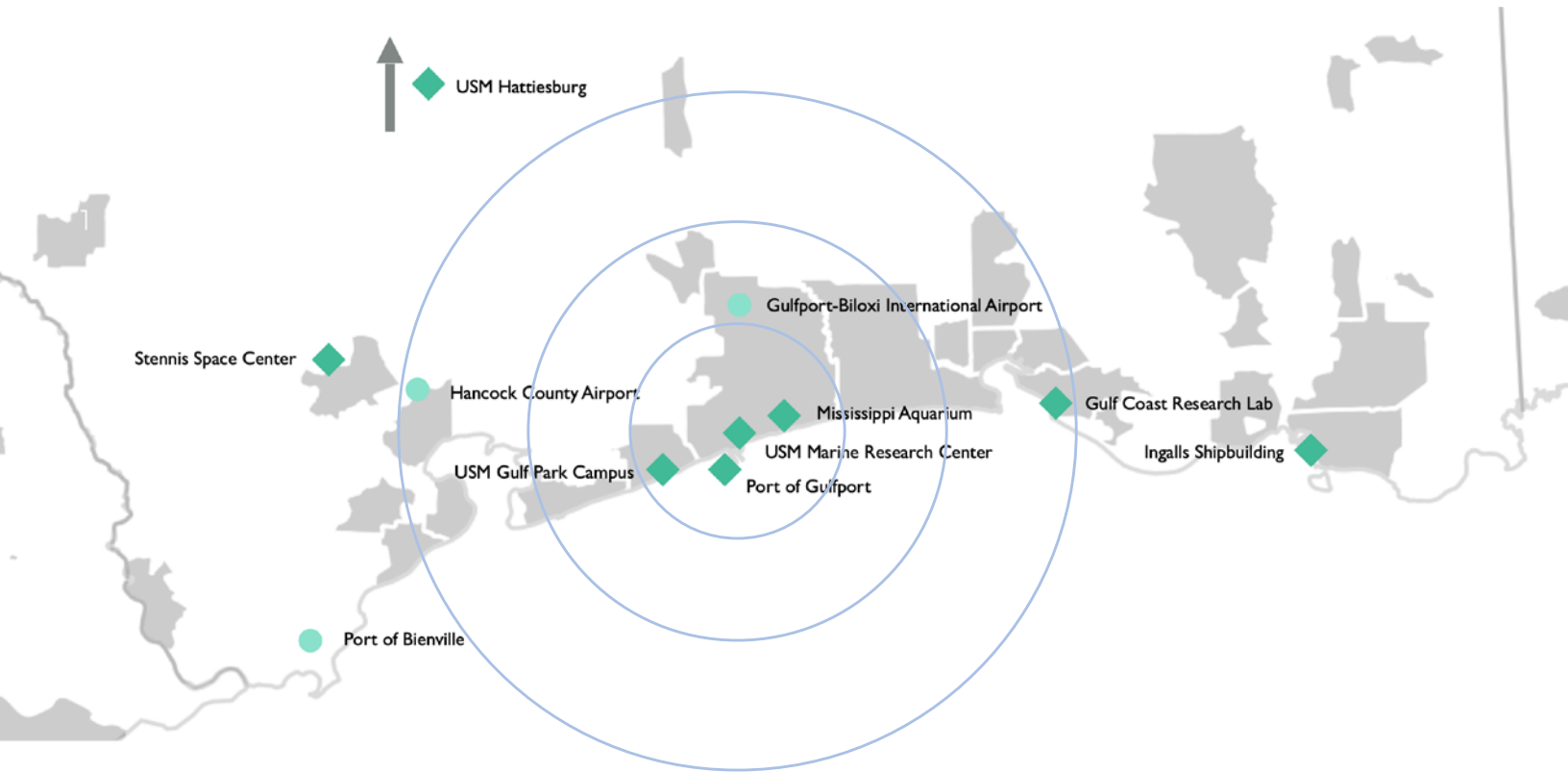
R/V Point Sur



SECTION I

Building on a Solid Foundation

THE FUTURE MISSISSIPPI'S BLUE ECONOMY
IS BUILT ON A DEEP DIVERSITY OF
OCEAN ENTERPRISES AND SCIENCE AND
TECHNOLOGY ASSETS



Building on a Solid Foundation Across the Entire Coast

Mississippi's Gulf Coast hosts one of the nation's most diversified aggregations of commercial, institutional and government ventures that employ science and technology to develop and exploit the resources of the ocean to benefit society and industry. As much as one-third of the employment along the Mississippi Gulf Coast is in ocean-related industries such as shipbuilding, submersible vehicles and ocean sensors, tourism, fisheries, aquaculture, cargo shipping, military readiness and homeland security fall

into this category¹. The economic opportunity of this blue economy is clearly recognized within the State. The Gulf Coast's new blue economy is poised to create jobs at all skill levels.

¹ A comprehensive description of blue economy programs and facilities on the Gulf Coast can be found in USM's "Mississippi Blue Economy: An Analysis of Mississippi Maritime Commerce" - www.usm.edu/sites/default/files/groups/trent-lott-national-center/pdf/mississippi_blue_economy.pdf; and Governor Bryant's Ocean Task Force's "Charting the Future of Mississippi's Ocean Technology Economy" - https://www.mset.org/Governor-Bryants-Ocean-Task-Force_Official-Copy



Industrial, engineering, and research capabilities that support the blue economy are distributed across the entire coast with sample representation:

- Ports of Gulfport, Pascagoula and Bienville;
- New Mississippi Aquarium;
- The University of Southern Mississippi's (USM) Marine Research Center and new Ocean Enterprise Center in Gulfport;

- Ingalls shipyard in Pascagoula;
- Thad Cochran Marine Aquaculture Center in Ocean Springs;
- USM Gulf Coast's campus in Long Beach; and
- USM's R/V Point Sur ocean research vessel soon to be followed by the new R/V Gilbert R. Mason. Both vessels are homeported at Gulfport.



Shipbuilding



Submersible Vehicles & Ocean Sensors



Tourism



Fisheries



Aquaculture



Cargo Shipping



Military Readiness & Homeland Security

Federal research organizations relevant to the blue economy also have a major presence along the Mississippi Gulf Coast. The 2018 CENOTE Act now promotes more interagency cooperation around Unmanned Systems:

- Multiple NOAA units including the National Data Buoy Center located in Hancock County;
- The US Navy through their Meteorological Center and the Naval Research Lab at Stennis Space Center; and
- NASA's space systems testing facilities at Stennis Space Center.

Although physically separated from the Coast, several institutions are also deeply connected to the coast's new blue economy including:

- the main USM campus in Hattiesburg, including the Mississippi Polymer Institute which has a focus on ocean plastics and the School of Ocean Science and Technology;
- US Army Corps of Engineers Engineer Research and Development Center at Vicksburg; and
- Research universities from across the state which are represented by the Mississippi Research Consortium which can contribute additional capabilities to the Gulf Coast region's blue economy.

Gulf Coast Diversity Provides Resilience

The Mississippi Gulf Coast's blue economy is resilient and builds on a broad set of achievements, current capabilities and planned or expected investments. This resilience is rooted in the region's history, culture and significant investment in infrastructure. It is the foundation for the creation of a new blue economy cluster that better connects to the global economy while providing future economic opportunities for the Gulf Coast. The geographic distribution of activities across the coast adds to this resilience, with government and business parties in each jurisdiction—all with civic pride and interest in local economic development to support growth.

Finally, the region's resilience is forged by its experience with significant adversity. The Gulf Coast community has overcome numerous man-made and natural disasters in the last 15 years. The coordinated, massive response to these crises has woven a web of layered, collaborating organizations including the Gulf Coast Business Council, Gulf Coast Community Foundation, and private sector institutions like Mississippi Power, Hancock Whitney Bank and Kessler Federal Credit Union, which are all actively involved in supporting the region's growth.



POTENTIAL ACTION

Celebrate What the Gulf Coast Already Has

Create a global marketing strategy supported by planned events. For example, a focus on wild caught Gulf shrimp and fish as healthy/local/sustainable seafood benchmarking the brand equity that has been created for Norwegian salmon and Maine lobster.



Mississippi's New Blue Economy Opportunity

A new set of ocean industries—the *new blue economy*—is taking shape, driven by global demand and powered by technology.

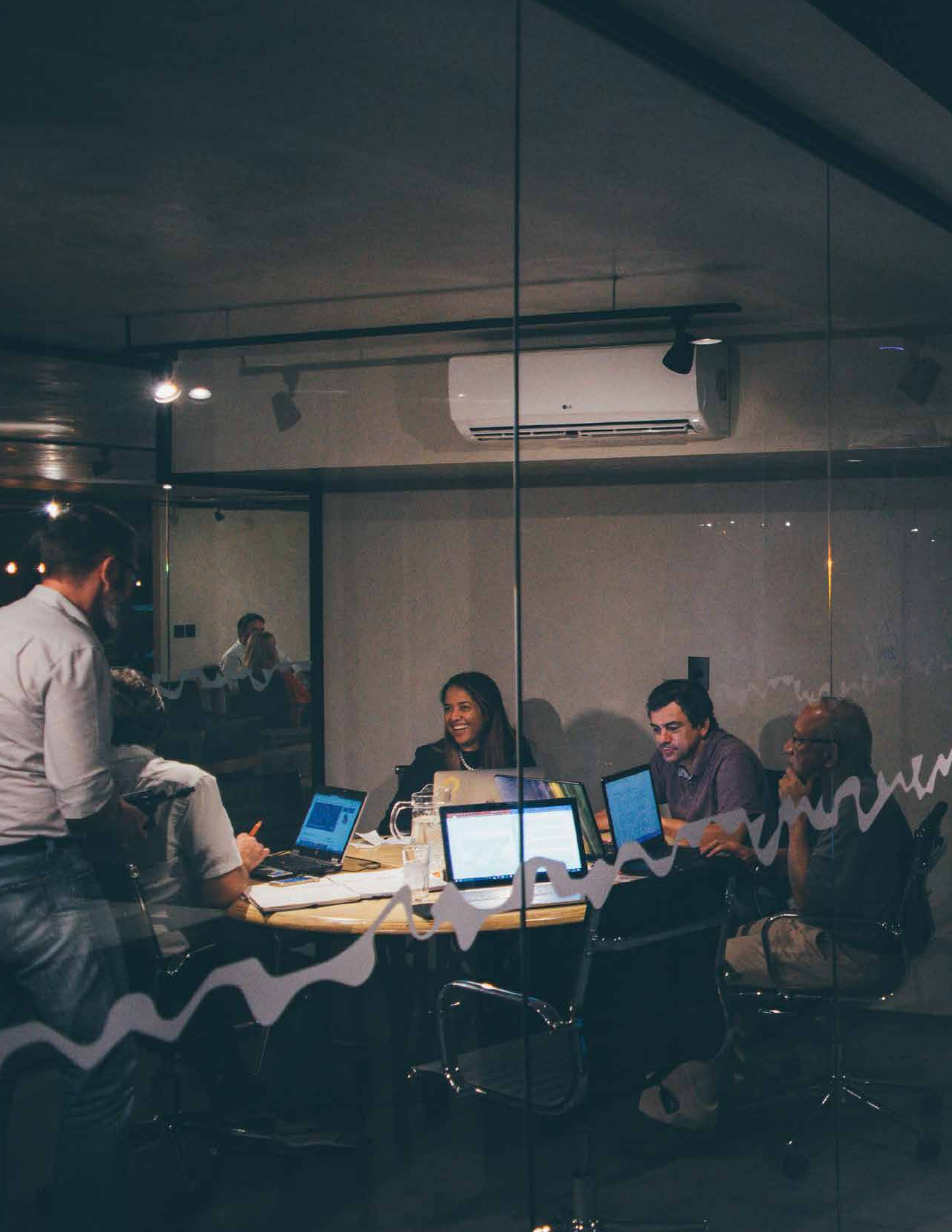
The Organization for Economic Cooperation and Development forecasts the global ocean economy will grow from \$1.5 trillion in 2010 to \$3 trillion by 2030. Ocean farming, ocean-related industries and sea-related defense and security are all entering a period of disruption and market growth driven by technology, new products and demands for more sustainable use of the ocean.¹

Humanity's demand on the world's oceans is increasingly driven by both population growth and higher rates of individual consumption for its natural bounty. There is also greater use of the ocean as the medium for trade in the global economy and increased extraction for energy and minerals. These forces are both transforming old ways of doing business in ocean-related sectors and giving birth to entirely new ones. This trend is perhaps best demonstrated by the emergence of ocean related innovation hubs in coastal cities around the world. These hubs are a result of regional collective action seeking to capture the opportunity for their respective communities.

1 OECD, Ocean Economy in 2030. https://read.oecd-ilibrary.org/economics/the-ocean-economy-in-2030_9789264251724-en#page1



Caption: Map of new bluetech clusters





SECTION II

- Transformation
Into a New Blue
Economy Cluster

MOVING AWAY FROM AN AGGREGATION
OF INDIVIDUALS TO A CLUSTER
AMPLIFIES GROWTH

Transformation Into A Blue Economy Cluster

The Mississippi Gulf Coast's blue economy is evolving from a collection of individual enterprises to a cluster—a geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular field. Clusters amplify growth by generating and sustaining an ecosystem that:



I. Creates knowledge through research and invention, such as the Marine Research Center's work on Unmanned Systems



II. Disseminates that information through education and information exchange with industry and government such as the Oceans in Actions conference organized by the local chapter of the Marine Technology Society



III. Uses new knowledge to create products and services of economic and societal value such as the services to industry provided by the Thad Cochran Marine Aquaculture Center

Within a cluster, collaboration and co-invention are easier to achieve because enterprises appreciate their position in a connected, sector specific value chain. Viability is enhanced by working with others to create value that is greater than the sum of individual efforts. This increases productivity and the potential for transformative innovation. The Mississippi Gulf Coast's new blue economy is already demonstrating its ability to form these connections.

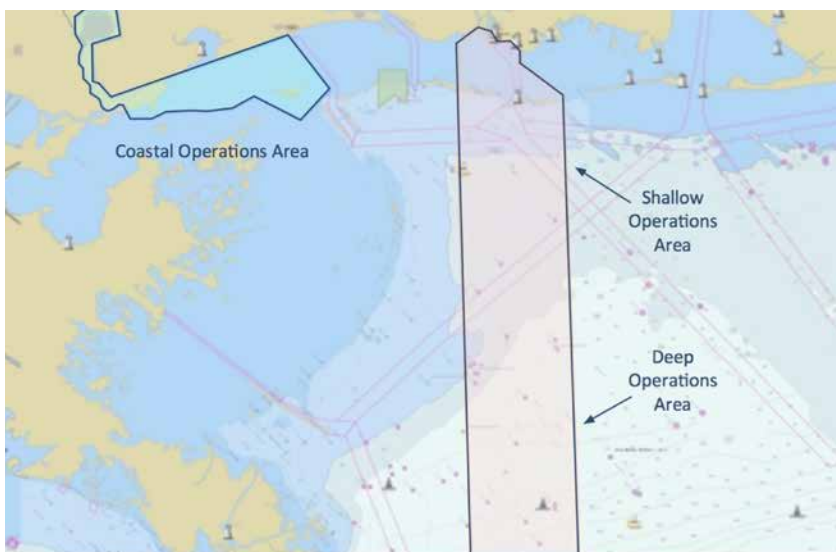


Dispersed Efforts Are Linking Up

All across the Mississippi Gulf Coast, people and organizations in different disciplines, sectors and locations are coming together to jointly address shared challenges and opportunities in the blue economy. This is demonstrated through Gulfport's USM Marine Research Center. The center was built for submersible vehicle testing and is now also open to support the study and testing of the resiliency of the Gulf's marine wildlife. At the Governor's request, USM rapidly responded to monitor Mississippi's Gulf fisheries along the entire coast following release of floodwater from the Bonnet Carre Spillway. The 2018 CENOTE Act and the joint USM and US Navy unmanned system certificate program are also new, powerful examples of inter-organizational collaboration.

Cluster-like behavior is also expressed through actions of organizations to promote the cluster itself. Mississippi Enterprise for Technology (MSET) benchmarks other emerging technology-driven blue economy clusters around the world and supports national events in Mississippi such as the Oceans in Action event. The Gulf Coast Business Council and the Knight Foundation tasked the economic development consulting firm TIP Strategies to focus on economic development strategies along the entire coast.

Reports by the Mississippi Governor's Blue Economy Task Force and a report about the future of the State's maritime commerce collaboratively prepared by USM, MSET and the Maritime Alliance all attest to the State's appreciation of and support for, collaborative behavior and the provision of required infrastructure. Through this project, meetings among Gulfport leaders from business, academia, city government, and the Port are forging a shared narrative for Gulfport's future role in the cluster. Gulfport Mayor Hewes and City Council President Rusty Walker both joined USM and business leaders to promote the development of a Blue Economy Innovation District in the City.



Caption: The USM Marine Resource Center's infrastructure and education efforts focused on unmanned systems is a unique global asset that can pioneer new Gulfcoast cluster activity. This facility will soon be augmented with the new Roger R. Wicker Ocean Enterprise Center

Six Convergence Opportunities

The capacity for collaboration is a prerequisite for exploiting opportunities to converge the interests and disciplinary skills across organizational boundaries to innovate around big industry and society problems

that contain the potential for extraordinary value creation. Eagerly pursuing these opportunities is what will spell the difference between modest growth and high growth for Mississippi's new blue economy.



Unmanned Maritime Systems

The US Navy and NOAA have funded a strong ecosystem of companies building unmanned maritime systems to collect ocean data. The region's capabilities can now be brought to bear to solve problems in new high growth sectors such as aquaculture, offshore renewables, managing coastal pollution, sustainable fisheries and urban waterfront/coastal resilience.



Ocean-Friendly Plastics

Polymer science and ocean science are converging in the development of non-polluting materials and monitoring of ocean plastics. From new biodegradable plastics, to reducing plastic packaging or increasing the ease of recycling, to tackling fishery ghost gear, global investment in sustainable plastics is just starting. Industry research reports estimate that the biodegradable plastics packaging market will grow from \$3 billion in 2018 to \$6-10 billion by 2024¹.

¹ Two reports: Markets and Markets: <https://www.marketsandmarkets.com/Market-Reports/biodegradable-plastics-93.html> and Industry Research <https://www.industryresearch.co/biodegradable-plastic-packaging-market-growth-trends-and-forecast-2019-2024--14275320>



Precision Marine Aquaculture

Aquaculture is a strength of the Gulf Coast region and an opportunity for convergence. Global seafood demand has been rising, pushing strong aquaculture growth of >5% per year, to \$240B in fish and aquatic plants, nearly matching wild capture production.¹ Continued growth will entail the use of new technology such as seaborne sensors, robotics and data analytics to optimize farm operations and alternative forms of fish feed.

¹ FAO Sophia Report 2018



We identified 6 examples of near-term opportunities for convergence in the Mississippi Gulf Coast's new blue economy, which reflect regional competency, global challenges and regional stakeholder desire. Some of these reflect existing priorities of the governor's office,

USM and other stakeholders—others are presented here for the first time. Within each is the need to interconnect knowledge creation, education and exchange, and the development of new products and services.



Ocean & Coastal Data and Analytics

The US has the largest Exclusive Economic Zone (EEZ) in the world and a common theme is the need for more data to support the varied and growing economic sectors off of the US coast. For example, Orsted recently estimated that the rapidly evolving US East Coast offshore wind sector is a \$70 billion market, but a lack of up-to-date survey data is an obstacle. Opportunities such as this build on the capabilities present at USM, such as the Gulf Coast Geospatial Center.



Smart Ports

The future of port operations will leverage new technologies to demonstrate the potential for less polluting, more efficient and safer ports. One example is exploring the crossover potential for a new generation of automotive quality lithium-ion batteries to hybridize maritime operations resulting in dramatically lower emissions.



Sea-Space Systems

An example of a still speculative, longer-term opportunity is the intersection of ocean engineering, marine science and space science. The Stennis Space Center is home to numerous government agencies and a growing number of private firms engaged in space flight and related sectors. Remote sensing and unmanned systems are two areas where historic connections between these domains can be expanded.



SENATOR
ROGER WICKER

A photograph of four men in professional attire sitting on a stage. From left to right: a man in a dark suit and orange tie looking down at papers; a man in a dark suit and striped tie looking forward; a man in a blue blazer and light blue shirt looking forward; and a man in a dark jacket and khaki pants looking forward. In the foreground, the backs of several audience members' heads are visible. The background shows an outdoor setting with a large industrial structure, possibly a ship or offshore platform, under a cloudy sky.

SECTION III

Recommendations for Gulfport Cluster Initiatives

Recommendations for Gulfport Cluster Initiatives

The momentum of Mississippi's new blue economy continues, supported by a broad group of stakeholders and public sector leadership from across the coast. It is within this context that the City of Gulfport, at the geographic center of the coast, is emerging as the nexus for activity. The City, along with the neighboring City of Long Beach, co-hosts a number of the region's research and development assets, convenes the annual Oceans in Action conference, and is deeply committed to its role in coastal tourism.

The momentum of activities clustering in Gulfport will continue to build in the next few years with already announced endeavors:

- The Mississippi Aquarium, opening in 2020, will support sea life conservation through research and action and is expected to draw tens of thousands of visitors each year.
- USM's Roger F. Wicker Ocean Enterprise Facility, its second building at the Port of Gulfport, will quadruple the amount of space devoted to research-based blue economy innovation. The opening of the first building in 2018 is already connecting private-sector companies to the coast.
- USM will soon operate the R/V Gilbert R. Mason, a new \$100 million research vessel awarded by the National Science Foundation.
- USM's Gulf Park Campus is aligning its academic mission with the blue economy.
- MS Department of Transportation will invest in new mobility infrastructure to link the USM Long Beach campus and the City's downtown. This investment likely includes e-mobility and electric transport infrastructure.
- Planned redevelopment of 30th Avenue to improve goods movement inland will substantially expand the Port's regional and national importance as a cargo center. The Port will also play an expanding role in piloting homeland security technology and as a logistic center for rapid military deployment.
- The anticipated designation of a Blue Economy Innovation District (BEID) within the City's central core, as a partnership between the City of Gulfport, USM and the business community will be a catalyst for innovation, a home for many companies establishing a presence in the Coast and a beacon to the nation of the vibrancy of the cluster.
- The Gulfport-based organizers of the 2020 Ocean in Actions conference are partnering with the Marine Technology Society and IEEE Oceanic Engineering Society. Global events such as this help build a brand equity for the entire Gulf Coast as world significant in the blue economy.



The energy driving these projects makes the time ideal for Gulfport to strengthen its position in the Coast's cluster. Active stakeholder cooperation throughout 2019 to create a common narrative about the future has mobilized an alignment to support multi-year efforts.

Three new paths of action will propel Mississippi's new blue economy and lay the groundwork for the cluster's long-term growth and vitality. These initiatives will be symbolized and energized by activities in the Blue

Economy Innovation District beginning in Gulfport, as well as the entire Gulf Coast region.

This approach grows out of the current array of activities and capabilities in the Gulfport area. Each initiative requires different capabilities, different levels of investment, and different styles of management but is also intertwined with the others to grow the cluster.

THREE PATHS OF ACTIVITIES:



PATH I

Concentrate Research on Convergence Opportunities



PATH II

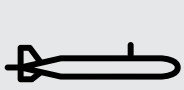
Become the Nation's Blue Economy Lab Bench for Prototyping and Testing



PATH III

Outsourced Services for the Blue Economy Value Chain

RECOMMENDATIONS FOR GULFPORT CLUSTER INITIATIVES



**Unmanned
Maritime
Systems**



**Ocean-friendly
plastics**



**Precision
aquaculture**



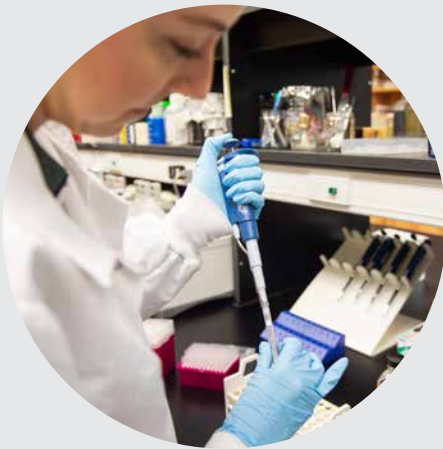
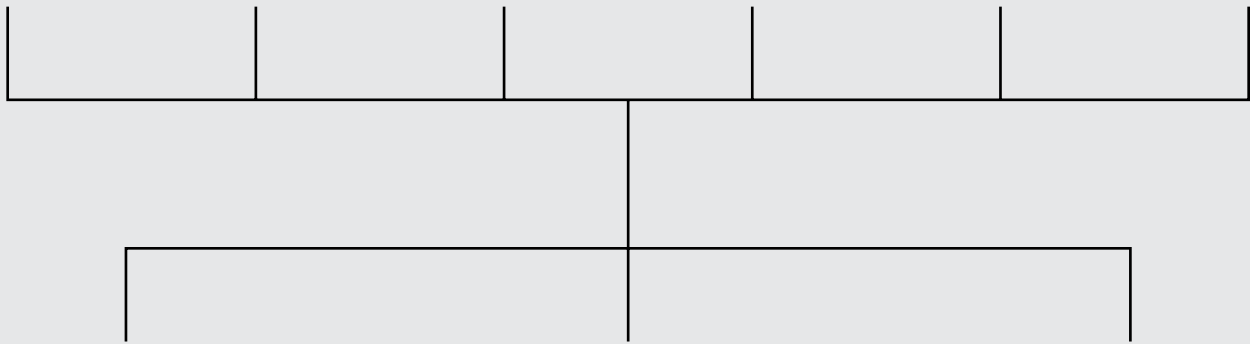
Smart ports



Coastal Data



**Sea-space
systems**



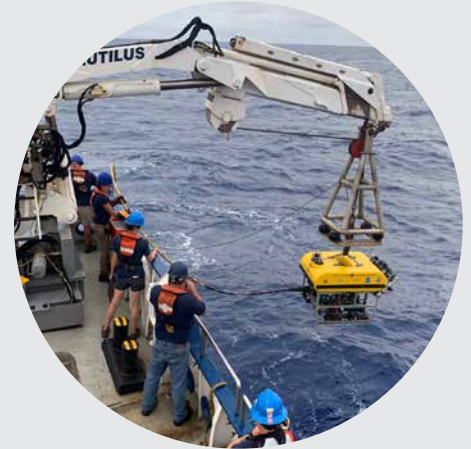
PATH I

**Concentrate Research on
Convergence Opportunities**



PATH II

**Become the Nation's Blue
Economy Lab Bench for
Prototyping and Testing**



PATH III

**Outsourced Services for the
Blue Economy Value Chain**



Path I. Concentrate Research on Convergence Opportunities

Applied research aims to solve specific practical problems that are directly relevant to business and policy. Value created from applied research can be captured and leveraged in many ways to produce economic benefits that stay within a region. Given its small size, the Gulf Coast would benefit from following the lead demonstrated by highly-focused innovation policy in small countries like Singapore, Israel and the Netherlands. Mississippi should similarly concentrate its investments within the previously described convergence opportunities, emerging areas of applied research and business development that are not yet dominated by another region. These are areas where the region has strong capability or where we see the potential to mobilize commitment among stakeholders to grow that capability. For all of these areas, USM will continue playing a leadership role with support and collaboration from federal research organizations, industry and other research institutions within and beyond Mississippi.

To move forward with these projects, the next steps are to:

- Identify a community advocate within USM for research opportunities. Build support and interest among concerned stakeholders;
- Create a shared, iterative process of continual assessment of science and technology trends, paths to market and channels to new centers of applied research such as the Gloucester Marine Genomics Institute.
- Inventory existing and needed assets and capabilities in the region, and identify gaps and potential strategies for filling them; and,
- Demonstrate initial sample projects.

POTENTIAL ACTION

Establish New Center of Excellence for Biodegradable Polymers

USM has expertise in biodegradable polymers that can be leveraged to create a new center for applied research. This effort can benchmark the National Network for Manufacturing Innovation Centers, such as America Makes, which supports the 3D printing industry out of Youngstown, OH. The goal of the manufacturing center is to bring together industry and academia to create a research development pathway and in turn, fund projects that will move the state-of-the-art forward.





Path II: Become the Nation's Blue Economy Lab Bench for Prototyping and Testing

The Gulf Coast, with a center of excellence in Mississippi and a physical hub in the BEID, can become the nation's blue economy center for prototyping and testing across domains (land/sea, inshore/offshore, surface/underwater, air/space, sea/space). This "living laboratory" platform will generate significant economic activity through test facilities, makers space and access to technical and industry experts. It will attract and stimulate more R&D investment by multinational companies and federal government agencies that seek to exploit the test bed and related platforms.

USM, the US Navy and NOAA are already pursuing the creation of a test range for non-classified unmanned maritime systems as part of its expanding presence at the Port of Gulfport. Building upon and expanding this effort, USM should accelerate and expand its competitive advantage vis-à-vis the Northeast and West Coast where cost and political obstacles to replicating this capacity are very high.

Required steps include:

- Expedite delivery of the near-shore test area planned for the Ocean Enterprise Facility;
- Establish a one-stop center and liaison for firms from outside the region who want to access the capabilities and expertise of the Mississippi Gulf Coast;
- Promote internationally the availability and capabilities of this site to entrepreneurs and enterprises; and,

- Evaluate the need for additional prototyping and testing capabilities in each of the convergence areas. For example, how can the process for testing smart port solutions at the Port of Gulfport be streamlined?

POTENTIAL ACTIONS

Ocean Prototyping Accelerator

Create the world's first accelerator focused on 'smart' seawater prototyping to include a venture funding mechanism benchmarking other bluetech accelerators which were derived from the Y Combinator-model of seed investment. Use this accelerator to draw in outside startups and Small Medium Enterprises (SME) that are ready to ocean prototype, test and who are also seeking expertise and potential customers.

Open Innovation Programs

Leverage the State's extensive academic capabilities. Make USM and other public-sector testing equipment and staff accessible for startups and SMEs through the creation of innovation stipend programs, similar to those found in states such as Massachusetts and Rhode Island. The access to equipment, new or existing, can be around the State but a program manager at the BEID with co-working space should facilitate.



Path III: Outsourced Services for the Blue Economy Value Chain

The Mississippi Gulf Coast has an immediate opportunity to exploit its domestic US location, low cost basis and base of talent with basic technical skills and maritime experience to rapidly expand its share of the growing market for blue economy-related technical services. This value chain includes but is not limited to: short-run production of high-value added products, as well as outsourced services including testing, verification, compliance, genetic sequencing and synthesis.

There is a strong base to build on already. Much of the success of the emerging clusters laboratories involves significant amounts of scientific, technical, and engineering services provided to industry and government agencies. Our interviews revealed that approximately 90 percent of the turnover of external contracts at the Gulf Coast Research Lab and the Mississippi Polymer Institute consists of this type of work—replicating and validating the results of innovations developed elsewhere, or applying existing techniques to new problems. Clients and sponsors for

outsourced services include private-sector firms located in the region and the nation as well as select multi-nationals seeking cost-competitive services.

There are clear future opportunities along this path. The expansion of shell- and fin-fish hatchery capacity and scientific capabilities at Thad Cochran Marine Aquaculture Center (TCMAC) at USM's Ocean Springs campus, as well as developing genetic sequencing capabilities on-site could tap a growing global market for these services. Attracting a national teleoperation center for unmanned land and airborne vehicle fleets could prepare the way for expansion into a role for global unmanned maritime fleet operations.

These activities and investments will support and enable high-growth innovation emerging from Path 1 and 2 activities and will position the region to serve the needs of ventures growing from the success of other clusters around the world.

Another opportunity along this path builds upon the current work of USM and its industry and government partners to expand and upgrade the skills of the existing workforce. The joint USM and US Navy unmanned



system certificate program is an example. Possibilities for supporting continuous learning abound given the rapid and often disruptive introduction of technologies into every aspect of the blue economy. Many existing academic and professional programs could benefit from a central source complimenting their efforts through cross disciplinary specialty offers. For example, the introduction of artificial intelligence or virtual reality into the day-to-day maintenance of cargo ships or inter-model logistic systems moving cargo between ships and inland.

Advancing this strategy will require:

- Creating more blue economy specific workforce development programs in addition to the USM Unmanned Systems certificate program. Other example efforts include New Bedford, MA starting offshore wind training programs to support this rapidly emerging sector and Gloucester, MA launching a new marine genomics wet lab technician school to support its emerging marine biotech sector. These programs can provide apprentice-level training from the community to include ex-military, Job Corp trainees as well as from graduates from regional high schools;

- Providing highly flexible, relatively low-cost facilities in which the most significant capital expense is for equipment;
- Discussion among the private sector, government agencies and certification agencies to determine training and continuous learning needs of the future workforce; and,
- Promoting the availability and capabilities of this site to marine and maritime entrepreneurs and enterprises throughout the world

POTENTIAL ACTIONS

Aquaculture Hatchery

Consider opportunities to position the region in supporting the aquaculture sector through the addition of hatchery infrastructure for fin and/or shell fish taking advantage of the knowledge base starting with the USM Thad Cochran Marine Aquaculture Center.

Connecting the Paths: A Gulf Coast Data Collaborative

The blue economy will be powered by data. The creation of a Gulf Coast Data Collaborative will provide a hub for companies, startups and researchers to share data. The goal is to reduce barriers to the exchange of data and to advance collective efforts on common problems and shared opportunities.

Initial steps to launch the Gulf Coast Data Collaborative include:

Seek strategic partners

Include technology and other relevant corporates as well as US government agencies as collaborators and funders. Create funding models to attract and retain startups and relevant SMEs.

Focus on an acute problem to demonstrate value

The collaborative could, for instance, document USM's Bonnet Carré spillway monitoring efforts in 2019, which included 13 PIs, 60 staff and students that conducted weekly sampling and remote sensing analysis.

Designate a manager for the data collaborative

This professional is responsible to have an understanding and formal relationship with relevant US government public database CIOs including NOAA, the US Army Corps of Engineers and the USDA. The manager's operational goal is to act as a facilitator for startups, SMEs, researchers, corporations and others who are seeking a focal point to access, synthesize and correlate relevant public databases.



This is accomplished by creating a voluntary, trusted, curated, persistent, and reusable mechanism where parties from government, the private sector, and community can all participate in solving challenges of coastal economies and environments. This service will support blue economy innovation and conservation—centered on the Mississippi Gulf Coast, by linking key partners and stakeholders. This collaborative cuts across all three paths by supporting applied research, providing opportunities for new product development and pulling in outside ecosystems to provide value-added services.

Initial steps to launch the Gulf Coast Data Collaborative include (Continued):

Activate the collaborative through events

SeaAhead and USM have been ideating on a Littoral Data Challenge which would be a hackathon to correlate inland agriculture and weather to coastal impacts. This Data Challenge would bring participants together with corporations, USDA, NOAA and the Corps of Engineer to solve specific problems related to coastal management such as sedimentation and algal blooms.

Develop assessment of data gaps

In the assessment of data gaps, the leadership of the Collaborative should cover the intersections with other convergence topics including aquaculture, unmanned systems, persistent ocean sampling and smart ports. The goal would be to increase the availability and access of data availability to drive new solution developments.





The Blue Economy
Innovation District (BEID)
in Downtown Gulfport is
a Nexus for the Mississippi
Coast's New Blue Economy

The Blue Economy Innovation District (BEID) in Downtown Gulfport is a Nexus for the Mississippi Coast's New Blue Economy

Downtowns lead the nation in attracting skilled talent. A Blue Economy Innovation District is emerging in the City's downtown and its immediate borders. This area will be a nexus for the Coast's blue economy business expansion through investment and collaborative action with established companies, startups and SMEs seeking to create and grow. As it develops, the BEID will provide facilities to support the focused work of innovation, meeting places that bring together enterprises from different sectors, and events that accelerate professional networking for the entire Mississippi Gulf Coast blue economy.

The city of Gulfport and The University of Southern Mississippi will be the prime leaders driving the BEID to fruition, mobilizing stakeholders throughout the city and the region. The establishment of the BEID reflects the intent of the City's public, institutional and commercial leadership to make Gulfport a significant hub in the Gulf Coast's blue economy. From here, the BEID will be the mechanism for the Gulf Coast to better connect to other global centers-of-excellence. The BEID strategy not only stimulates the accretive effect of existing and new ocean-related capabilities in the region but also acts as a vehicle for expressing a new economic narrative for the Mississippi Gulf Coast.

The BEID will tie together a zone of research and technology-based economic activity that is already taking shape and provide a platform for future growth.

The geographic outline of a BEID is already emerging, reflecting activity within the City.

- To the east is the Aquarium which will be a center for tourism, community education for school children and adults and research focused on the ocean and species conversation.
- To the west is the general area around 30th Avenue which is the main logistics line from the port inland and includes programmatic and transport connections to the USM Gulf Park Campus in Long Beach.
- To the south, is the interface with the Gulf of Mexico, the USM marine research and commercialization complex with a) the new Marine Research Center featuring a large maker space for seawater based prototyping, b) the Port of Gulfport and c) groundbreaking on the Ocean Enterprise Facility—all of which enjoy close ties to commercial shipping, US Navy, NOAA and US Army military logistics operations and research.
- To the north is the Trackside Innovation District that has the capacity to host light manufacturing with an emphasis on ocean related companies. Blue economy companies whose products are developed in the cluster and are ready for commercialization can now stay and grow in Gulfport.



Trackside



THE UNIVERSITY OF
**SOUTHERN
MISSISSIPPI**

Gulf Park Campus
Long Beach

Downtown Gulfport will be the BEIDs center of gravity and a focus for the district as a whole. The area provides an attractive, walkable neighborhood with dining and retail, easy access to roads and transit and many suitable spaces for business start-up, education, and innovative research and development. The area has significant potential to also attract new housing development.

This zone will provide a platform for aggregating blue economy activity as enterprises and talent connect to and feed off each other in unpredictable but highly

valuable ways. And as the anchor sector, the BEID will have a catalyzing effect attracting other sectors and urban investment not directly related to the ocean. The act of launching the BEID and the consequent growth of activity will leverage and feed Gulfport's downtown revitalization. Blue economy-related ventures in the area will add to the density of people and activities required to promote the entire central business district. The City of Gulfport and USM can use the BEID to be strategic when responding to tech-based companies seeking to relocate to Mississippi's Gulf Coast.

RECOMMENDED NEXT STEPS

Gulf & Ship Island Railroad Building

An important element for the BEID's immediate growth would be the re-use of the now-vacant Gulf & Ship Island Railroad office building as one possible location for a hub of innovation, education and small-scale ventures. Not only will the building act as a re-use anchor in downtown Gulfport, it will fill several critical gaps in the Mississippi Gulf Coast's blue economy cluster—providing an iconic symbol of the cluster's unique identity and vitality, serving as a welcoming gathering place for the region's stakeholders, and working as a "landing spot" for outsiders connecting into the cluster and USM's campus.

This potential for the Gulf and Ship Island Railroad Building is now under discussion between USM and building owner Mississippi Power Company.

Development Incentives & Policies

Build on the City's new incentives by focusing federal, state and local incentives and policies including local zoning and Opportunity Zones to support the BEID buildout. This should include a downtown housing strategy and possibly a light manufacturing park by the Trackside. All of this augments the existing economic initiatives of the City of Gulfport.

Connectivity

The BEID should include focused infrastructure investments that support and connect the district nodes. This can range from e-mobility and modern electric public transport to traffic calming zones that are bicycle and pedestrian-focused.





GULF & SHIP ISLAND R-R OFFICE

RESTRICTED POWER

Obstacles to Success

The momentum of Mississippi's new blue economy cluster's development as well as that in Gulfport is well underway. But there are potential barriers to maximizing success. Most stakeholders already appreciate these barriers but they should continuously be on the agenda for action.

Competition from other aggressive blue economy clusters.

Established and emerging blue clusters centered in larger metro areas are located in the Northwest, California and in New England. These cities have significantly greater populations than the Mississippi Gulf Coast, have urban centers that are attractive to millennials, host multiple research universities and have relatively long histories as hubs of innovation across many fields. Further, new maritime accelerators offering both industry mentoring and funding have emerged in Oslo, Singapore, Hamburg and Tel Aviv.

Facing up to this competition may seem daunting: but it need not be if stakeholders across the Coast pursue their own crafted role within the global blue economy, build capabilities around current excellence, and partner to align complementary skills and experience. Strengthening and expanding alliances with businesses and government agencies for collaborative research and development is also important.

The proponents of the cluster need, most of all, to promote the region's opportunities for career growth in the industry critical niche areas in which the Gulf excels. The Coast's warm climate, reasonable costs and a culture that enables a balanced lifestyle should also be broadcasted to the significant swath of the those in the potential workforce but who prefer not to live in the high cost, all-consuming cities with which the region competes.

What Gulfport and the Coast region has achieved, what is emerging and the career growing prospects of working in its niche-oriented enterprises must be promoted and celebrated in a positive way. This requires going beyond traditional economic development and public relations strategies. It requires a Gulf-wide, multiple enterprise, physical and social media outreach programs to proactively inform and engage the global blue economy. It requires active recruitment of firms and workforce. Regional government, industry and university partners acting in concert sometimes at the highest levels of an organization, can come together as a fast reaction cohort. In this case, the team effectively 'closes the deal' by wooing, informing and judiciously offering incentives— for enterprises to come and work and live in the area. Hence, the first step of a new global blue economy narrative for the Gulf Coast is to reach internal stakeholder buy-in.

The heavy dependence on federal funding and activity along the Gulf coast.

Approximately 30 cents of every dollar in the Mississippi economy is tied to federal spending, according to the Gulf Coast Business Council. While the Mississippi Defense Initiative is funding efforts to diversify the region's economy, this work is still in its earliest phases. The strategies discussed above serve private sector interests and their success will broaden the area's economic base.



Difficulty in attracting and retaining an adequate work force.

A recognized brain drain is sapping the state's talent. At the same time, automation and economic restructuring is reducing opportunities for less-educated workers.

Efforts to address this challenge are underway. Ideally, going forward these programs would

- Target a broader national pool of candidates whose professional interests align with the work happening along the coast;
- Provide innovative, technology exposure in the early years of the region's schools to get local youth excited about working on the Gulfcoast;
- Programs that can bridge military and private-sector retirees who want to remain in the workforce.

And perhaps the most important factor is that a new Mississippi Blue Economy cluster, with its associated convergence activities is a new vehicle to attract the younger workforce of today where challenge and impact factor into their career decisions. All stakeholders in the region must be mobilized to support recruitment and retention efforts rather than leaving firms or the public sector to do so entirely on their own.

Stakeholders not participating in cluster building and nurturing.

Because the Mississippi Gulf Coast's new blue economy is in its earliest stages of development, many organizations are not being as innovative or risk-taking in building and nurturing the cluster as in their individual enterprises. This dynamic is typical where a new narrative with leadership and an organizing entity in

the short term can obtain stronger commitments from stakeholders to act for the region's benefit. All involved have to be committed to the virtuous cycle that brings benefit to the cluster as well as to each stakeholder. It requires continuous challenging of strategies based on unsupported assumptions. For example, in addition to recruiting the millennial workforce, it may appear that many bluetech companies are actually started by professionals in their 2nd or 3rd career. Seeking a 'landing spot' for the newly retired public sector workforce builds a Gulf Coast asset emitting from the US Navy and NOAA presence. A second example is the emphasis on STEM education. A STEM-educated workforce is a necessary element of the cluster's capacity but it is not all inclusive. A cluster has the economic potential to provide a community inclusive and resilient opportunities for people of varying skill levels and education. The full prowess of the cluster will rest on its ability to integrate the potential of the entire community to address problems and exploit opportunities.

Undue reliance on stakeholders who appear to be most active.

Maximizing the value to be achieved by a cluster cannot be achieved by one organization no matter how committed and effective they may be. Economic clusters anywhere, not just the one emerging on the Gulf coast, are most effective when there is collaborative, inventive behavior among stakeholders to create beyond what any one can do. For example, USM is at this time a ubiquitous contributor across the Gulf but by itself cannot achieve what is necessary for the cluster nor should it be expected to.

Closing Thoughts

SeaAhead, Inc. was tasked in August, 2019 to come to the Mississippi Gulf Coast to assist in the creation of a narrative for a new blue economy cluster, highlighting Gulfport's role. After numerous meetings and tours with a wide range of stakeholders, it is clear that the region is well positioned to emerge as the next global blue economy cluster with the City of Gulfport's emerging Blue Economy Innovation District as the nexus.

The BEID is centered in a downtown that is on the move with the nation's newest aquarium as well as the extensive capital investments that continue at the Port of Gulfport. A true cluster will be formed when there are both physical and institutional networks to help catalyze convergence between the traditionally siloed stakeholders to make the whole greater than its parts. By working and investing together on the numerous initiatives, some of which are suggested in this report, and under the common cluster narrative, the Mississippi Gulf Coast can pro-actively integrate into the growth sectors of the global blue economy to create both knowledge-based and working class jobs that provide long-term economic resilience for its citizens.