



January 31, 2019

We present this request for funding to promote job growth and economic development in Wakulla County and beyond, as well as restore the Panhandle ecosystem through the partnership of the Panacea Oyster Co-Op Corporation and the Florida Agricultural and Mechanical University. By combining the Panacea Co-Op's burgeoning aquaculture oyster industry with FAMU's leading edge research and innovations relating to aquaculture, we will be able to take a leadership role in the nation's aquaculture sector, while ensuring the protection of our Gulf waters.

Thank you for the opportunity to present our final application.

Sincerely,

Katherine Waldron,  
CEO and Chair, Panacea Co-Op  
&  
Victor Ibeanusi PhD,  
Dean, School of the Environment  
Florida A&M University

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## **Section 1: Applicant Information**

Name of Entity/Organization:

***Panacea Oyster Co-op Corporation***

**Background of Applicant Individual/Entity/Organization:**

Panacea Oyster Co-Op Corporation is a for-profit business based in Wakulla County, Florida and is comprised of more than 20 ranchers, who come from around the region and are from various economic backgrounds. The Co-op is devoted to supporting and growing the aquaculture business in Apalachee Bay. The Co-op was founded to aid in the economic and environmental recovery, diversification and enhancement of Wakulla and surrounding counties. This area was disproportionality affected by the oil spill and has recently been adversely impacted by Hurricane Michael. Our ongoing mission is resurrecting a sustainable aquaculture system to improve the health, diversity and abundance of fish in Apalachee Bay and beyond; the creation of jobs and career paths in the aquaculture and ecotourism industries; and lifting the economy of the surrounding business community to allow our area to once again thrive. The Florida Gulf Coast has long been known to produce some of the world's best oysters. The Panacea Co-Op's oysters uphold the unique taste qualities of the natural environment, which yields an oyster that embodies the perfect balance of salty and sweet. Our ranching process produces a product that is naturally clean, meatier and easier to shuck. As a result, our oysters have won national awards, including Fish 2.0 and also has been featured at major events, such as the upcoming Augusta Masters Tournament as well as Major League Baseball events. We are also, the first oyster group in Florida, to be certified to sell in Whole Foods stores. From a restoration perspective, the growth of oysters helps the water come back to support other aquatic species in decline. It will bring back a community that was built on fishing. And it is reinvigorating a culture that's been here for generations. Should this project be funded, Panacea Oyster Co-Op and its member/ranchers will be able to generate hundreds of jobs, directly and indirectly for our region and ensure Florida's place at the forefront of the rapidly growing aquaculture industry.

Federal Employer Identification Number: 81-2644697

Contact Information:

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Co-Applicants/Partners: Florida A&M University.

Total amount of funding requested from Triumph Gulf Coast: \$19,241,000

Has this been submitted for funding before? No

Financial Status of Applicant (attach financial statement): (See Attachment B)

Has the applicant filed for bankruptcy in the last ten (10) years? No

## **Section 2: Eligibility**

### **Purpose of the Proposed Project**

**(Selected from the list provided in the Triumph Funds application)**

Grants to support programs that prepare students for future occupations and careers at K-20 institutions that have campuses in the disproportionately affected counties. Eligible programs include those that increase students' technology skills and knowledge; encourage industry certifications; provide rigorous, alternative pathways for students to meet high school graduation requirements; strengthen career readiness initiatives; fund high-demand programs of emphasis at the bachelor's and master's level designated by the Board of Governors; and, similar to or the same as talent retention programs created by the Chancellor of the State University System and the Commission of Education, encourage students with interest or aptitude for science, technology, engineering, mathematics, and medical disciplines to pursue postsecondary education at a state university or a Florida College System institution within the disproportionately affected counties.

and

Grants to support programs that provide participants in the disproportionately affected counties with transferable, sustainable workforce skills that are not confined to a single employer.

### **Project Details**

#### **Title:**

The Panacea Oyster and Florida Agriculture and Mechanical University Aquaculture Initiative:  
**Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay.**

#### **Location:**

Crawfordville and Panacea, Wakulla County, Florida

Impacted Sites: Apalachee Bay, including: Oyster Bay, Skipper Bay, Alligator Harbor. Also, Panacea and Crawfordville.

#### **Project Summary:**

The Panacea Oyster Co-Op in partnership with Florida Agricultural and Mechanical University (FAMU) is proposing:

- 1) To lead job creation, investments and economic growth for communities throughout northwest Florida through the creation of a vertical business model that builds on the growing aquaculture industry in Wakulla County.
- 2) To develop educational and training programs for students that will establish pathways to careers in the rapidly growing aquaculture industry – both here and outside the region.
- 3) To develop a business framework for the oyster aquaculture industry that will assist small businesses in creating jobs, investments and economic growth for communities throughout Northwest Florida



- 4) To scale-up and advance research on new isolated strains of microalgae (patent pending) to significantly enhance the overall health and productivity of oyster production that are economically and environmentally cost-effective relative to the existing algal feedstock;
- 5) To ensure the ecosystem restoration for the area through best aquaculture practices
- 6) To implement innovative and unique processing techniques including (patent pending) a novel microwave pasteurization process to increase the addressable market by ensuring the microbial safety of the oyster and by increasing the shelf life of the raw shellfish without degradation of taste
- 7) To implement a state-of-the-art underwater drone swarm technology (patent pending), that uses SASER (Sound Amplification by Stimulated Emission of Radiation) energy to ensure the protection against invasive species and harmful micro-organisms, while providing real time environmental monitoring and control.

Aquaculture is critical to resolving the world's food insecurity and projected future food shortages. Food production needs to double by 2050 in order to feed the projected world population. The world's oceans represent the greatest potential source of protein by generating 30 x more yield per acre of water versus an acre of land. Aquaculture will be an ever-growing portion of the seafood industry and will enable us to have available, accessible and affordable seafood while bringing much needed economic development. The ocean ecosystem depends upon a vibrant oyster population. An individual oyster can filter up to 50 gallons of water a day, thereby greatly improving the surrounding water quality and setting into motion the nutrient stream that underpins the entire food chain. The federal government recognizes the importance of growing the aquaculture industry.

The National Oceanic and Atmospheric Administration (NOAA) has stated that marine aquaculture is an important part of its strategy for building economic and environmental resiliency in coastal communities. (Ref., <https://www.fisheries.noaa.gov/leadership-message/momentum-grows-aquaculture-united-states>, September 2017). Current data indicate more than 85% of the world's oyster beds have died. Along Florida's expansive coastline, the situation is more dire - more than 95% of native oyster beds having disappeared. This decline precipitously accelerated following the BP Oil Spill of 2010, where Apalachee Bay Oyster harvests declined from ~10 million per year to zero in less than 5 years. This ecological event in Wakulla and surrounding counties was devastating and resulted in the loss of oyster-related jobs and challenged the future viability of this critical Florida industry, as well as all commercial fishing enterprises. In order to address this economic "tipping point" the residents of the Wakulla County engaged local higher education leaders to create a dedicated Oyster Rancher training program predicated upon best practices from around the world. The result was the creation of the state of Florida's first Oyster Rancher Training Program that utilizes the proven Australian/Canadian "full water column" ranching approach. This sustainable method of oyster ranching has already been proven to work in Florida's coastal waters. Recognizing that "full water column" aquaculture offers a pathway toward a sustainable future for seafood harvesting, local citizens created the Panacea Co-Op as a critical first step to resurrect and transform the Oyster industry in Florida. New jobs and the return of important species of sea life are in progress thanks to these dedicated oyster ranchers.

Currently, the Panacea Co-Op consists of 20 members utilizing 30 acres of state water leases. These members currently have millions of oysters in production. By the end of 2019, the oysters are projected to represent a market value of more than \$7 million and an overall economic impact of exceeding \$21 million for Wakulla County by means of ancillary industries including boat building and seafood processing. The Cooperative was externally validated in 2017 by the

Fish 2.0 Competition in which the Cooperative was awarded “The most innovative aquaculture strategy in the US.” The members of Cooperative believe that this innovative process can be expanded to include more than 100 ranchers involving more than 150 acres of state water leases producing more than 190 million oysters per year within seven years. This would represent a projected economic impact of more than \$460 million per year for Wakulla County.

However, the business ecosystem to undergird this critical industry expansion must be developed, if Wakulla County is to meet its economic destiny. Like many other ranchers, the Cooperative, is experiencing the impact of critical rate-limiting issues (including but not limited to): (a) lack of dedicated hatchery support;

(b) lack of dedicated flash freezing facilities; and

(c) lack of adequate nutrients for the oysters in the form of dedicated algae supplementation.

In order to rapidly expand the scope and scale of the Oyster Ranching industry in Wakulla County, these impediments must be resolved. In order to expedite our program, the Panacea Co-Op has teamed with FAMU to help meet our technology implementation and K-20 education needs. FAMU, an 1890 Land Grant Institution is uniquely positioned to leverage this project based on decades of research on the gulf coast region by students and faculty generating PhD dissertations, including federally funded research by faculty addressing the BP oil spill remediation. FAMU will serve as the fiscal entity targeting K-20 education improvements, developing a dedicated science-based marine ecology education facility that incorporates a water quality and estuary propagation education center of excellence. This in conjunction with the Co-Op initiatives, will spur the resurgence of economic development, jobs and workforce development in Wakulla and beyond.

We are seeking \$19.2M in funds to develop a complete farm to fork, multi-trophic aquaculture ecosystem for successful business development within Wakulla County. The project will provide transferable, sustainable workforce skills to participants and offer future occupations and careers through K-20 institutions in the STEM areas, particularly within minority and disconnected communities. Our efforts will also promote eco-tourism by providing a cluster of leading-edge aquaculture activities and will position Florida as the country’s leader in aquaculture.

The jobs created through this effort will have pay grades above the regional and national average and generate maximum economic benefits both directly for Wakulla county and indirectly for the Bay, Escambia and Gulf counties. The project proposes to utilize property currently owned by Panacea Co-Op, within the city limits of Panacea as well as its existing headquarters in Crawfordville to develop a dedicated nursery, hatchery, algae farm and expand the co-op’s post-harvesting operations using innovative technologies.

Our vision is that these facilities will also serve to draw eco-tourism, public education and training related to aquaculture into Wakulla County. FAMU has pledged its facilities and Agricultural Extension programs to meet education and training purposes, including the development of innovated technologies applicable to the aquaculture industry among minority populations within the region. Other fund sources will include private investment and utilizing existing Co-Op assets. Our partnerships with local governments will further extend the economic and environmental impacts of the project. Our proposal enjoys the support of local elected officials, the local chamber of commerce, as well as local businesses and we will engage local visitor bureaus and tourist councils. We also intend to leverage our local assets by enhancing

research and innovative technologies in the region. The timeline for this project will be five years to build the facilities, launch the educational programs at the K-20 level and realize a profitable and sustainable enterprise.

## **Objectives**

### **Objective A: Education Curriculum**

National security and global competitions to address food security for an ever-growing world population are creating new forces in the educational pathways for a well-trained workforce. This is especially needed in areas requiring additional ecosystems restoration, as the gulf region. EnergyWaterFoodNexus™, is a new science enterprise established at FAMU through a global public-private partnership that seeks to provide sustainable and innovative solutions for energy, water and food security. FAMU has established a scholars-in-residence program to examine the resources needed to sustain the EnergyWaterFoodNexus™. This program is focused on solutions that simultaneously address all three areas of sustainable energy, water and food security. The scholars-in-residence program provides eligible students with scholarship and mentorship opportunities that will contribute to building a well-trained workforce ready to solve the issues in their communities. Through funding from DuPont Foundation, we have already begun a Pathway-to-College initiative with Wewahitchka high school at Port St. Joe (Gulf county). This program will be expanded to include new scholars who understand oyster ranching as a business and for job creation.

Additionally, the FAMU Center for Environmental Equity and Justice (CEEJ), along with the FAMU Cooperative Extension Program (Community Resource Development), will serve as a resource base for the Educational and Training programs. The CEEJ was established in 1994 through a Florida Legislative Act (Florida Law CH 94-219) to assist communities with disproportionate impacts from environmental hazards. Additionally, FAMU's Cooperative Extension Program has had a presence in the north Florida region for many years in areas including agriculture & natural resources. 4-H and youth development, family resource management, and community resource development. FAMU will utilize the expertise of faculty and staff in the Cooperative Extension Program, specifically the Community Resource Development extension program. The Community Resource Development program aids with initiating and implementing strategic development opportunities designed to promote community and economic growth through interaction with residents and organizations. The primary objective will be to facilitate community engagement and training of citizens and community leaders on local actions in response to coastal disasters. Such efforts will include but not limited to: ensuring integration of local advice into long-term decisions about projects and priorities; providing the public access of restoration information; and training of community leaders on ecosystem approaches to coastal disasters

The new focus on oyster ranching, will require training of students who understand the challenges in optimizing sustainable food production, new methods for pest control, technologies to mitigate nitrogen and phosphate, ensuring sustainable water supply for agriculture; “closing the loop” for nutrient life cycles; innovations to prevent waste of food and energy; and maximizing biomass conversion to fuels, chemicals, food, and materials. These research areas have been identified by the National Science Foundation (NSF) as topics with knowledge gaps, requiring student training (NSF-FEW Report, 2014).

Through this funding opportunity, we will recruit a Research Scientist, and Post-Doctoral Fellows that can enhance research and teaching across STEM and Business disciplines. It is important that the individuals contribute to activities that will transform existing programs to meet desired outcomes of recruiting students for a trained workforce and increasing the pipeline of new students who will ultimately contribute to creating new jobs through oyster ranching. To sustain this program beyond the life of this funding, two new faculty lines, which initially will be funded through this program will be absorbed by FAMU. Additionally, FAMU has pledged matching funds totaling, **\$1,472,246** and the support of the Agricultural Extension programs to meet education and training needs. FAMU will also work with area vocational and community colleges to develop curriculum aimed at enabling students to successfully participate in the burgeoning aquaculture industry within and outside the region.

### **Objective B: Nursery/Hatchery**

Currently, oyster seed is in short supply for the ranchers in the Panhandle. Without an adequate supply of oyster seed, ranchers will not be able to grow and expand their businesses successfully. The cornerstone of the proposed project will be the creation of a commercial nursery and hatchery on a property currently owned by the Panacea Oyster Co-Op in Panacea (Wakulla county) and another one under contract for purchase in Crawfordville (Wakulla county).

Furthermore, oyster seed is not currently grown in our bay and comes predominantly from outside the state. This results in a higher mortality rate than if the seed is “home grown”. This is important because having the highest quality local seed, not only prevents high mortality as the oyster grows, but also helps to produce a clean and fresh tasting oyster, resulting in a higher market price and higher market demand.

With the nursery and hatchery, we will be able to grow the needed supply of seed to ranchers in the region. Our property in Panacea, is strategically located on Dickerson Bay, where we will be able to set-up operations for both a nursery and hatchery that will be able to ultimately produce hundreds of millions of oyster seed for the region year-round.

### **Objective C: Algae Farm**

**(scaling up of new isolated strains of microalgae as a feedstock for high-yield oyster production)**

The microalgae production at FAMU-School of the Environment will be focused on the scaling-up of the use of several newly isolated (patent pending) strains of microalgae, cyanobacteria and bacterial groups of microorganisms (hereafter referred to as consortia). Using genetic techniques, our isolates have been identified as mainly belonging to *Scenedesmus/Volvox* and *Chlamydomonas* groups of microalgae. These consortia have been screened for their natural abilities to produce higher, neutral lipids relative to industry gold standard strains. Moreover, our consortia have a strong potential to sequester wastewater-associated nutrients, thereby, making their production environmentally sustainable. We have developed enhanced algal-bacterial biomass through biostimulation, using electromagnetic frequency energy (EMF). As a result there is significant increase in the biomass relative to control treatments, such that algae can be produced in more abundant numbers for procurement of biobased products (lipids, single cell proteins, biomethane, aquaculture feedstock, pharmaceuticals, vitamins, etc.). This technology has been exclusively licensed by Microsystems First Inc. (Microsystems), a Tallahassee based small business, who will be providing the necessary instrumentation and support for the algal farm.

#### **Objective D: Innovative Processing**

##### **(Live Pasteurization – microwave assisted processes for pasteurization of raw shellfish processing)**

Pathogenetic Shiga-toxin-producing *E. coli* (STEC) may cause human illnesses such as hemorrhagic colitis and life-threatening haemolytic-uremic syndrome. Although a wide range of serotypes have been implicated in human STEC infections, five major serotypes are responsible for the vast majority of sporadic cases and outbreaks in Europe and the USA. It has been reported in literature that widely varying *E. coli* concentrations were found in shellfish. Although the National Shellfish Sanitation Program is designed to ensure that shellfish harvest from certified waters do not contain these naturally occurring toxins, the increasing availability of raw oysters at restaurants has led to a dramatic increase in the rates of shellfish food poisoning in recent years. FAMU has developed a unique (patent pending) pasteurization process that uses microwave energy to ensure the microbial safety and shelf life of raw shellfish. Moreover, the shellfish (oyster) remains alive after the pasteurization process in its shell as well as the taste and texture are unchanged. FAMU has exclusively licensed this technology to Microsystems, who will be providing the necessary instrumentation and support for this process. This process is highly cost-effective and results in the highest degree of food safety and acceptability to consumers. This will open new markets for oysters and increase the consumption of raw oysters at existing markets such as restaurants and oyster bars.

#### **Objective E: Innovative Processing – Flash Freeze**

Until recently frozen oysters were not in great demand due to the degradation of the taste. However, with the newer technologies available, frozen oysters have very little degradation of taste. Frozen Oysters can be preserved and stored while still maintaining the freshness of the oysters using the flash freezers. This will completely freeze the oysters while not changing the original integrity of the product. The ability to freeze the oysters, will enable the oysters to have a shelf life of more than a year. This will open up new and larger markets for the Florida Gulf Coast oysters. The Co-Op will also be able to maintain a steady supply of product throughout the year.

The Co-Op will use liquid nitrogen in a tunnel freezer for the freezing process. This is the most used technology at the present time. It is simple and effective, and results are an un-shucked oyster with a one-year frozen shelf life. Costs average around 10 cents per oyster in operational costs excluding labor which will enable the Co-Op to competitively price the oysters for global distribution. Figure 1 shows the visual appeal of the frozen oysters using this technology.



*Figure 1 Visual appeal of flash frozen seafood, after thawing!*

## **Objective F: Use of Leading-Edge Drone Swarm Technology**

An important step in the development of new autonomous eco-friendly environmental monitoring and control systems is made possible by improvements in artificial intelligence. This holds open the possibility that groups of micro-drones (less than 6 inches) could act together under human direction. Such drone swarms would be cheap to produce. The micro-drones have already demonstrated advanced swarm behaviors such as collective decision-making, adaptive formation flying and self-healing.

These drones are synchronized individuals acting together like a collective organism, sharing one distributed brain for decision-making and adapting to each other like swarms in nature. They communicate and collaborate with every other and the swarm has no leader. Hence, they can gracefully adapt to other drones entering or exiting the team.

By integrating solid state SASER – Sound Amplification by Stimulated Emission of Radiation (a device using the stimulated emission of sound waves to amplify or generate coherent sound waves in the ultrahigh frequency range) and generating short pulses, any biological entity can be sterilized (made non-reproductive) or disabled (or even destroyed) instantaneously by applying SASER pulses in a targeted fashion. Integrating bio-sensors with SASER would act as a real-time data acquisition, monitoring and eco-systems control tool. Laboratory studies have also



identified that SASER pulses although not effective to kill all the larger aquatic living thing, they sterilize them effectively. Moreover, by integrating night vision into the systems, invasive species which do not have the ability to be motile at night, can be easily targeted and destroyed. This technology is also exclusively licensed by Microsystems, who will be providing the necessary instrumentation and support for its implementation.

### **Objective G: Ecosystem Restoration and Water Quality Monitoring**

A direct result of this program will be its impact on the restoration of the area's ecosystem from the devastation caused by the BP oil spill. Restoration of our waters is critical, and aquaculture will be key to helping to restore these waters. We have already begun to see the results as the supply and variety of fish are being seen around the oyster farm areas. Numerous articles and research have been conducted on the successful restoration of waters through the creation of oyster bays and farms.

In support of these ecosystem restoration efforts, FAMU -School of the Environment and the students in the scholars-in-residence program has over the past two years conducted water quality monitoring at the Panacea spring creek location. This involves correlating water quality improvements to oyster ranching at the creek. **(See attachment A for further details).**

### **Objective H: Outreach and PR**

Our vision is to have the Panacea facilities, from the nursery, to the hatchery as well as the processing plant, draw eco-tourism to the area. We will also expand our existing partnerships with local governments, community organizations and businesses to explore unique ways to bring related investments to the area to further support the project and the overall aquaculture industry.

**The following key personnel will be leading the overall program effort (see Attachment C for resumes):**

1. **Katherine Waldron**, CEO and Chair of Panacea Oyster Co-Op - Resume attached
2. **Victor Ibeanusi, Ph.D.** FAMU- Dean School of the Environment - Resume attached

### **#2 Quantitative evidence demonstrating how the proposed project will promote economic recovery, diversification, and enhancement of the disproportionately affected counties:**

The creation of a thriving, self-sustained oyster farming facility will have a positive long-term economic impact on Wakulla County, Franklin County and surrounding areas. The population growth for Wakulla County has increased from 2000 – 2010 at an annual rate of 3.02%. Currently 33,078 residents live in Wakulla County. However, between 2010 and 2018, the growth rate has declined to 0.88% annually and projections indicate that for the next five years the growth rate will be a modest 1.17%.

The population growth for Franklin County has increased from 2000 – 2010 at an annual rate of 0.44%; and between 2010 and 2018, the growth rate has declined to 0.05%. Projections indicate that over the next five years, the growth rate will be relatively flat at 0.20% annually.

Based on information obtained by Esri, Wakulla County has 800 active businesses that employ approximately 6,100 employees; and Franklin County has 763 active businesses that employ approximately 4,700 employees.

As indicated in the attached appendices, the Panacea Co-Op project will play a vital role in establishing catalytic economic development in both Wakulla and Franklin County. The Co-Op itself will generate a large employee base within its operations as well as spurring ancillary businesses development through the means outlined below:

- Establishment of a commercial scale oyster hatchery and nursery
- Oyster processing plant
- Development of an algae farm
- Implementation of live pasteurization
- Flash freezing processing
- Eco system restoration and water quality monitoring
- Facilitation of ecotourism
- Incubation and acceleration of oyster ranching businesses
- Incubation and development of ancillary businesses

Furthermore, construction and rehabilitation activities of the hatchery, nursery and processing plant will have an immediate impact on the local economy as the Co-Op will seek to engage locally based contractors and subcontractors to perform construction activities. Some of the immediate spending injections include:

- \$3,900,000 for construction and renovations
- Approximately \$7,200,000 in wages and salaries of Co-Op staff over a six-year period
- Over the 5-year span of the project, FAMU will allocate nearly \$1,500,000 in wages, salaries and infrastructure cost share match.
- Other injections include the purchase of equipment, supplies, and fees and permits

This project will generate the following types of economic benefits in the regional economy:

- **Direct Benefits.** Direct benefits relate to: a) the short-term business activity associated with project construction, and b) the ongoing business activity associated with the businesses that are located within the developed mixed-use project.
- **Indirect Benefits.** Indirect benefits will result when local firms directly impacted by the project in turn purchase materials, supplies or services from other firms.
- **Induced Benefits.** Induced benefits relate to the consumption and spending of employees of firms that are directly or indirectly affected by the project. These would include all of the goods and services normally associated with household consumption (i.e., housing, retail purchases, local services, etc.).

The total economic impact of the proposed Panacea Oyster Co-Op project is estimated to total 345 jobs, nearly \$13 million in income or wages and approximately \$42 million in total



economic output. The construction impacts are estimated to total 65 jobs, more than \$2.8 million in income or wages and more than \$9.5 million in total economic output (sales/revenue).

### **Project Timeline**

Years 1-5 will be supported by Triumph Gulf Coast Inc., with matching funds provided by the Panacea Oyster Co-Op and FAMU. Beyond Year 5, the processing plant, the nursery/hatchery/algae farm will be self-sustaining and managed by the Co-Op as presented in our financial projections. The FAMU educational programs and associated vocational training programs will continue beyond the five year as indicated in their letters of institutional commitment.

**The disproportionately affected counties that will be impacted by the proposed project:** Wakulla, Bay, Escambia and Gulf Counties will be impacted by this project.

### **#3 Explain how the proposed project or program is considered transformational and how it will affect the disproportionately affected counties in the next ten (10) years.**

In the most recent Ibis World Industry Report on the Fish and Seafood Aquaculture Industry, industry research experts indicate that the Fish and Seafood Aquaculture industry has grown sluggishly over the five years to 2018. The majority of industry revenue is derived from sales of fish and shellfish used to produce seafood, the consumption of which has grown over the past five years. Seafood is generally more expensive than substitutes such as chicken, meaning that an increase in seafood consumption can be primarily attributed to the falling price of seafood over the five years to 2018. However, an influx of inexpensive imports has hurt the industry, with imports accounting for an increasing share of domestic demand over the past five years. Despite import competition and declining seafood prices, the industry has still grown, albeit slightly. Declining productivity in the Fishing industry (IBISWorld report 11411) due to depleted fish stocks and the lingering legacy of the Deepwater Horizon oil spill has also shifted demand for seafood toward the Fish and Seafood Aquaculture industry. Finally, rising seafood demand has tempered the effect of declining seafood prices. As a result, IBISWorld expects industry revenue to grow at an annualized rate of 0.3% to \$1.5 billion during the five-year period, including expected growth of 0.7% in 2018. The report goes on to say that despite strong competition from imports, the industry is expected to grow at an annualized rate of 1.1% to \$1.6 billion over the five years to 2023. Growth in disposable income is expected to raise aggregate demand for industry products. The industry has the potential to grow at a much faster rate if legislation is passed to allow aquaculture farms to operate in the open ocean, an activity that is currently banned. Since the Florida Legislature has allowed aquaculture activity in the Apalachee Bay, the Co-Op is uniquely positioned to be an active producer in the Seafood Industry supply chain. Financial projections for the Co-Op's operations forecast revenue generation of approximately \$61 million for the six years from 2019 through 2024. (See attached pro forma)

Panacea Oyster Co-Op's proposed oyster ranching program and initiative to resurrect aquaculture in Apalachee Bay, will be transformational beyond ten years as it will provide for sustainable long-term job growth for Wakulla and the surrounding counties while also restoring the ecosystem within the Bay, resulting in an improved ecosystem. The improved ecosystem will lead to further indirect benefits to the region.

## **Sustainable Career Paths**

Solid career paths will be created both directly and indirectly as a result of the success of the program. Potential career paths will include aquaculture ranching, mollusk processing, research, marketing, selling, distribution and logistics. Metrics will be established to determine the number of direct and indirect jobs immediately impacted by this program.

Long-term, both workforce and infrastructure will be promoted leading to a broader economic recovery and offering diversification, and thus, resilience, for Wakulla and beyond. There will be resulting ongoing innovations as the demand for aquaculture increases worldwide. By setting the stage for a complete ecosystem – from hatchery to harvesting of the oysters, increased innovations will be able to be incubated by those participating. In fact, many innovations are likely to be “home grown” and made outside the R&D labs, thereby further enabling the community to benefit from business off shoots as the market grows and the expertise and knowledge base within the community increases.

(A recent USDA study of innovation in rural areas found that “rural areas are actually an ideal testing ground for innovation, as effective as their urban counterparts”. A large number of advances are made outside R&D labs without the aid of highly trained scientists or dedicated R&D budgets. Instead, these innovations arise the way they always have, by individuals confronting problems and finding creative solutions, often described as grassroots or user innovation.” (USDA, “Innovation in the Rural Nonfarm Economy: Its Effect on Job and Earnings Growth, 2010-2014, Tim Wojan and Timothy Parker, September 2017.))

## **Restored Ecosystem**

There will be broad scale, long term, benefits to the economy in the region as a result of the restored habitat developing from the aquaculture industry expanding through this grant. Enhancements to both commercial and recreational fisheries will occur throughout the region.

As shown in a recent report from Northern Economics, beyond merely improving the health of the bay and overall ecosystem, new opportunities for revenues will develop. In the study of two oyster reefs in Mobile Bay, Alabama, the reefs, “which have a combined project length of 3.64 miles, would lead to additional fish and crab harvests of approximately 6,900 pounds lbs per year. This additional catch would generate profits for harvesters, processors, wholesalers, distributors, retailers, and restaurants, and net economic benefits for consumers, both from seafood consumption and recreational fishing. (“Assessment of the Value of Shellfish Aquaculture in the Gulf of Mexico as Habitat for Commercial and Recreational Fish Species”, March 2014).

In summary, the transformational potential of our program lies in the broad scale impact to the community from the diverse career paths afforded by the aquaculture sector as whole.

## **#4. Describe data or information available to demonstrate the viability of the proposed project or program.**

We are actively engaged with the Wakulla Community and the project is enthusiastically supported by major stakeholders in the Co-op and the community. Several letters of support are attached,

including from the Wakulla Chamber of Commerce, our Co-Op ranchers, the Co-Op Board, Co-Op investors, the Wakulla County Commissioners among others. (See Attachments E, F and H.)

There is significant interest throughout Northwest Florida to restore the Apalachee Bay in order to restore the economy and the environment. The restoration of ecosystems is vital throughout the United States as is evidenced by the numerous programs and funds being devoted to recovery of oyster habitats as a means to restore the ecosystems of bays. (Attachment D: See attached article, “How Oysters are Cleaning New York’s Polluted Harbors”, World Economic Forum, January 25, 2019.)

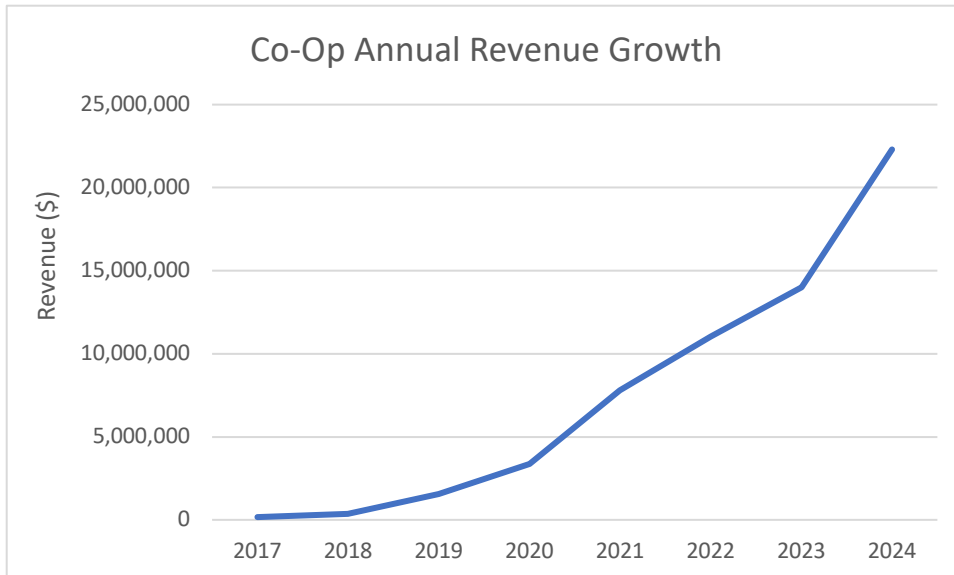
#### **#5 Describe how the impacts of the disproportionately affected counties will be measured long-term**

The Apalachee Bay estuary is vitally important to the local community, where over 2,500 people are employed in the oyster industry. The Bay supports an oyster fishery that historically has accounted for 90% of oysters sold in Florida and over 10% of oysters sold in the continental USA. In fall 2012, there was a sudden collapse in the Apalachee Bay oyster fishery which led to significant under employment of fishery workers in the community. A federal fisheries disaster declaration was granted; however, the community continues to face recovery issues both economically and environmentally.

This project supports several years of research that is focused on oyster aquaculture, coastal research, and ecosystem services. The project will evaluate the contribution of the current and potential future aquaculture operations on water quality in the area, particularly the ecosystem services, such as nutrient removal, provided by the oysters. The socio-economic benefits of the aquaculture operation will be assessed and the effects of oyster culture on the local environment will be evaluated. Environmental data including water chemistry, nutrient concentrations and oyster production data will be used to parameterize two models that will quantify ecosystem services provided by the oyster aquaculture operation, and assess the economic impacts in the immediate area and the broader region of the Florida panhandle.

#### **#6. Describe how the proposed project or program is sustainable. (Note: Sustainable means how the proposed project or program will remain financially viable and continue to perform in the long-term after Triumph Gulf Coast, Inc. funding.)**

As the operations of the Co-Op stabilize and gain traction in the coming 5 years, the Co-Op will be in the position to be a major supplier of oysters in the Seafood Industry supply chain. The Co-Op’s two primary revenue streams, spat production and oyster sales will experience a high rate of growth (185%) between 2019 and 2020 and then as operation transition from the ramp up phase to stable production, it is forecast that production of spat and oyster sales could double year over year as a result of the utilization of technology and research. Figure 2 shows projected revenues (using 2017 and 2018 actuals) and based on receiving the Triumph funds in the first half of 2019 shows the financial projections of the co-Op. This is based on number of oysters we will be able to hatch, the increased addressable market due to live pasteurization and flash freezing processing opening up new and wider markets. It is also based on the staffing assumptions presented later in section 5.



Because the Co-Op produces a superior oyster, anticipated demand for the product is great. As IBIS World indicates, The Fish and Seafood Aquaculture industry is likely to endure intense competition from imports over the next five years. Due to declining global fishing stocks, aquaculture is expanding in many parts of the world as a substitute source of fish and shellfish. Global aquaculture productivity is also improving as a result of new technologies and production techniques. As aquaculture grows globally and becomes increasingly cost-effective, imports are anticipated to continue to grow. However, the value of the US dollar, as measured by the trade-weighted index (TWI), is projected to decline over the next five years, meaning that imported aquaculture products will be relatively more expensive, thereby tempering growth in imports. As a result, IBISWorld expects industry imports to grow at an annualized rate of 1.2% to \$3.1 billion over the five years to 2023, satisfying 67.6% of domestic demand.

While industry operators will continue to compete with imports, exports are expected to grow. Seafood demand abroad, particularly in Asia, is expected to increase, expanding the export markets to where industry operators can sell their products. Additionally, the TWI is projected to decline over the next five years, meaning that US aquaculture exports will be more price-competitive. As a result, exports are anticipated to grow at an annualized rate of 5.5% to \$87.3 million over the five years to 2023, accounting for an estimated 5.5% of industry revenue.

The Co-Op's utilization of technology through its proprietary pasteurization process coupled with the implementation of flash freezing provides a unique selling proposition for the Co-Op. These two factors position the Co-Op to take full advantage of the global demand for oysters for the foreseeable future. The Co-Op is committed to reinvesting at least 15% of the net profit into the business to enable growth and financial sustainability.

### Environmental Viability:

The proprietary technology for algal biomass production is based on the premise of using **electromagnetic bio-stimulation**, which can **significantly decrease the algal production costs** and **is an environmentally sustainable technology**, such that algal growth can be coupled with wastewater remediation. In doing so, **freshwater use is also minimized, thus saving additional hatchery running costs.** (See attachment A for details)

## #7 Describe how the deliverables for the proposed project or program will be measured

### Integrated Evaluation Strategy

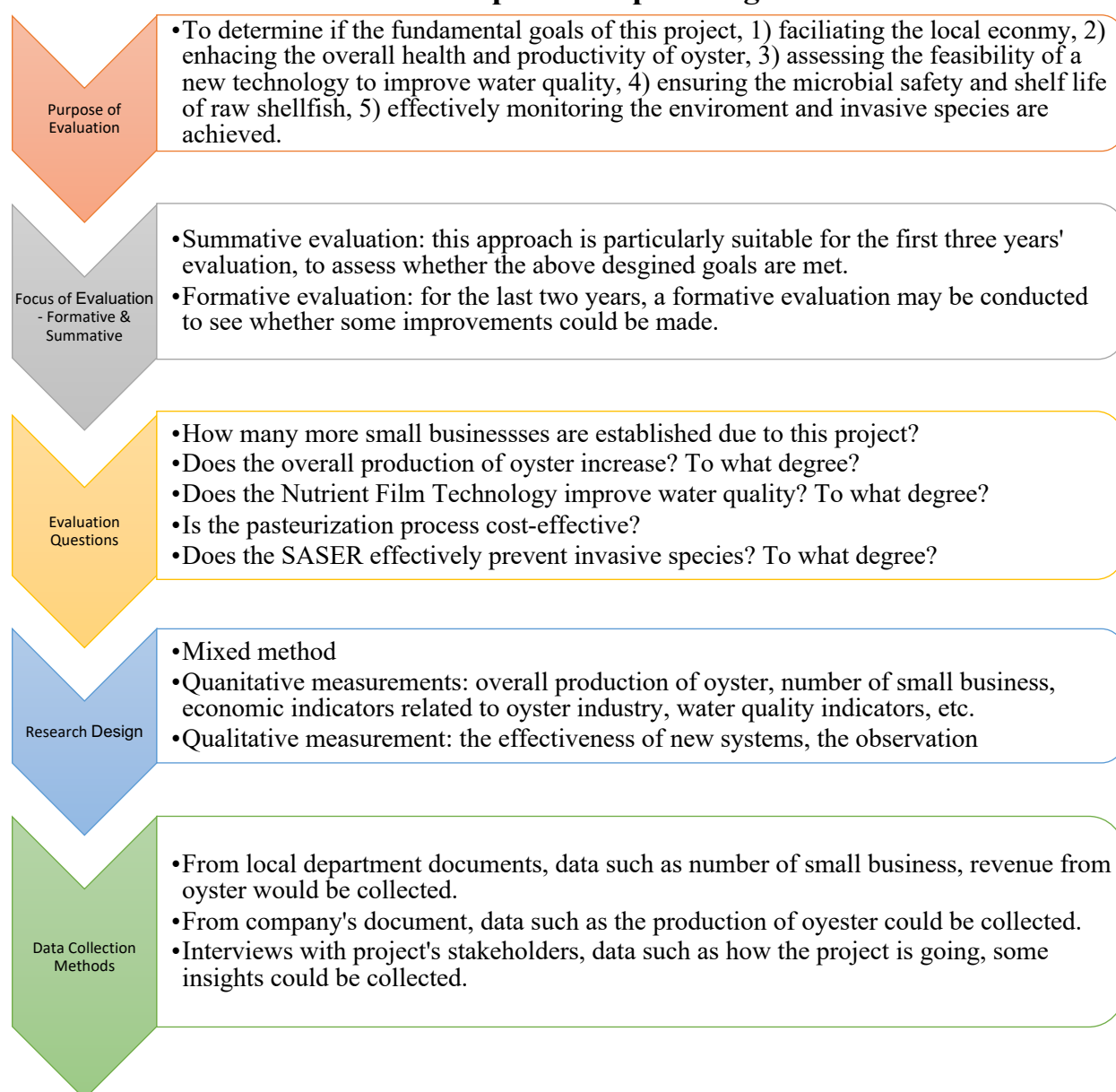
**Annual summative evaluations as well as ongoing, formative assessment:** The external evaluation team would be led by Dr. Lara Perez-Felkner, Assistant Professor of Higher Education and Sociology at Florida State University. Dr. Perez-Felkner has experience and expertise in K-20 education, including a decade of research on STEM pathways for underrepresented students as well as research and staff positions in secondary and postsecondary settings. She has been an investigator on federally supported research on broadening capacity in STEM. In addition, she is leading multiple research-practitioner partnerships in her research and teaching – largely to higher education administrative leaders and professionals – to communicate actionable steps and solutions and build evidence around impacts.

**Additional broad impacts: Building capacity in education research on broadening participation.** Dr. Perez-Felkner will draw on the highly diverse FAMU and FSU education and sociology doctoral programs to mentor a Ph.D. student on this research, who would initially focus on project management tasks, communication, and descriptive analyses, and would increasingly be engaged in and co-author and present on advanced analysis of project data. Another Ph.D. student who has completed multiple evaluation courses pursuing the evaluation certificate in Higher Education program may contribute as well. Dr. Perez-Felkner will also mentor an undergraduate student through Florida State University's Undergraduate Research Opportunity Program. Formative assessment meetings and discussions will occur throughout, in addition to summative evaluations on an annual and final basis. Deliverables include: contributions to reports, presentations, peer-review articles, and broad dissemination.

| Tier 1: Analyzing Effectiveness of Project Goals  |   |
|---|---|
| Data source   | Evaluation metrics and activities   |
| Local departments' economic data  | Dr. Perez-Felkner will leverage her professional evaluation skills to analyze the data of economic indicators by comparing after vs. before the project, in order to see whether the project promote its local oyster industry.   |
| Site visits and interviews of key personnel/stakeholders (mentors)                      | As oyster production is the highlight of the project, multiple stakeholders such as oyster farmers, sellers in different sites would be involved. It is also important to identify and report on their goals, perceptions of how the project is going, whether they feel the project increase the oyster production in Wakulla county, whether students behave well in their summer internships. These include: <ul style="list-style-type: none"><li>• 2 new oyster firms in Wakulla area or nearby, FL e.g., Panacea Oyster Co-Op</li><li>• The Small Business Development Center at Florida A&amp;M University - The Florida Small Business Development Center</li></ul> |
| Surveys of undergraduate and graduate students who participate in this project (annual) | Surveys will be used to assess quantitative and qualitative indicators of FAMU and/or partner school students' (1) science identity and (2) interest and intention to pursue aquaculture careers, before and after participating in this project.   |
| Research output and productivity  | Measures for project-supported undergraduate, graduate, postdoctoral, junior, and senior faculty. Annual reporting (author lists  |

|  |  |
|--|--|
|  | by project with name, position, dissemination outlet, impact measures) by investigators to evaluation team.  |
| Documents from private firms   | Data of annual harvest of oyster, annual oyster income could be obtained to analyze whether there is a significant difference between before and after the project.  |
| <b>Tier 2 Metrics for Subgroup Analyses and Potential Scale-Up and Replication</b> |  |
| Aquaculture-specific relevance for scale-up and sustainability                     | <p>The evaluation team will investigate:</p> <ul style="list-style-type: none"> <li>• Relative impacts, to guide long-term sustainability at Wakulla county and other coastline counties.</li> <li>• Identifiable dimensions of these innovated approaches which particularly enhance oyster production as well as foster future talented students into aquaculture fields.</li> </ul> |

### Evaluation Proposal Graphic Organizer



### **Section 3: Triumph Gulf Coast Fund Priorities Met by the Project**

- a) Generate maximum estimated economic benefits, based on tools and models not generally employed by economic input-output analyses, including cost-benefit, return-on-investment, or dynamic scoring techniques to determine how the long-term economic growth potential of the disproportionately affected counties may be enhanced by the investment.**

This project will assist in the expansion of existing and burgeoning business by providing consulting services and technical assistance delivered by certified business consultants employed at the FSBDC at FAMU. Assist in the incubation of start-up businesses that engage directly in oyster ranching or that indirectly support the operations of the Co-Op and associated research and development activities.

- b) Increase household income in the disproportionately affected counties above national average household income.**

Average household income in the U.S. for 2018 was \$62,175. (<https://seekingalpha.com/article/4193310-june-2018-median-household-income>)

Within Wakulla County the average annual income for males was \$29,000 and for females was \$24,330 ([www.mywakulla.com/visitors/about\\_wakulla/population\\_and\\_demographics.php](http://www.mywakulla.com/visitors/about_wakulla/population_and_demographics.php)).

All jobs offered through this program will be above the average income for Wakulla County and will help to bring the average household income for Wakulla county above the national average.

There will be direct jobs associated with the program. Within the first year, 5 personnel will be employed with the Co-Op. By year 5 there will be 32 personnel employed by the Co-Op. In addition, there will be 5 managerial and above personnel will be employed by the Co-Op. The majority of the employees will be pulled from the region's labor pool and/or from students participating in the FAMU and vocational programs that will be able to be offered from BP Triumph grant funds.

In addition, indirect jobs will be created that will be associated with the program, including jobs related to shipping, logistics and distribution, marketing, advertising etc. Additional indirect jobs will be created from the improvement to the ecosystem, resulting from this project – such as jobs related to the fishing industry, restaurants, ecotourism among others. There will also be staff associated with the educational programs with FAMU. Funding will support two faculty lines, a Research Scientist, two Post-Docs, and two support staffs. Additionally, students receiving scholarships, especially those from Port St. Joe, will add to the economic activities of Wakulla county.

- c) Leverage or further enhance key regional assets, including educational institutions, research facilities and military bases.**

This project is in partnership with FAMU and will also reach out to and incorporate vocational training schools as well as community colleges, to offer students training in all aspects of the aquaculture business.

**d) Benefit the environment, in addition to the economy**

The long-term economic recovery beyond the Triumph Fund will require investment opportunities with the private sector, including international partners. The Apalachee Bay is the sanctuary for over 131 fish species, which include a special breed of mullets and oysters. The proposed project will actively pursue investment opportunities with the private sector so that projects derived from the Triumph Funds will translate to high growth industries that provide new jobs for the communities. The proposed project will utilize FAMU's Small Business Development Center to disperse short-term loans, training, partnership agreements, and commercialization of products from research and development that are derived from research efforts.

**e) Partner with K-20 educational institutions or school districts located within the disproportionately affected counties as of January 1, 2017.**

Both undergraduate and graduate students as well as students from Wakulla high school in Wakulla county, Franklin school at Franklin county, and Wewahitchka high school, and Port St Joe at Gulf county will be trained in in the K-20 educational program. The training will provide laboratory, field and literary educational experience. Students will examine the intersection of each other's work and benefit from collective inquiry and crosspollination of solutions. This integration effort is designed to lead students to develop scientific habits that result in model student scholars as well as to prepare them for successful careers through academia.

**f) Are recommended by the board of county commissioners of the county in which the project or program will be located.**

The Wakulla County Commission is in support of this project.

(See **Attachment E - Wakulla County Commission Letter**):

**g) Partner with convention and visitor bureaus, tourist development councils, or chambers of commerce located within the disproportionately affected counties.**

The Panacea Co-Op, since its inception, has been involved with Florida tourism, local visitor bureaus and local chambers. We are currently active members of the Wakulla Chamber of Commerce and our application is supported by the Chamber. (See attachment F) We work closely with Fresh From Florida as well (see Attachment G and the Addendum on tourism.) We premiered our Oyster Tourism outreach in 2017. Since then guided tours have been booked by dozens of organizations. Certified "Green Guides" have been in the water hosting travelers from around the world. These are nature-based Outfitters mostly kayak oriented but can be electric powered crafts. We are partnered with the top Airbnb in the county and are tied to their supply of international tourists seeking adventure as well as the great "Fresh From Florida" Seafood. Fishing tours, oyster tours and an on-water shucking tour is under development. Marine biology and the ties to terrestrial habitats are explained experienced and enjoyed. We are "Fresh From Florida" certified and co-promote our brands with the Florida brand.



**3. Please explain how the proposed project or program meets the discretionary priorities identified by the Board.**

**a) Are considered transformational for the future of the Northwest Florida region.**

This project would serve as a catalyst in creating a vibrant regional aquaculture industry that drives sustainable economic development. The Co-Op would create ten permanent jobs in the first year itself representing over \$600,000 annually. This project would employ three patent pending technologies proven in the lab scale, for the commercial production scale. The synergistic combination of these technologies will lead to high yielding oyster ranching through state-of-the-art algal biomass production for oyster feeding as well as innovative drone swarm technology for environmental monitoring and control for protecting and nourishing the oysters. Moreover, a novel microwave pasteurization technique for live oysters will be implemented for the first time in the entire world. All of these will create a ripple effect in the community and encourage oyster ranchers in the Northwest Florida region and beyond to consider adopting such technological advances in their oyster production/processing leading to transformation of this industry in this region.

**b) May be consummated quickly and efficiently.**

Within the first year, we will be creating new jobs, in the processing as well as hatchery/nursery components of the oyster production. As shown in the timeline, within the first 4-6 months, we will be able to hire personnel to manage the nursery as well as some of the processing.

**c) Promote net-new jobs in the private sector with an income above regional average household income**

All of the jobs created from this program will pay above the median annual income for Wakulla County.

**d) Align with Northwest Florida FORWARD, the regional strategic initiative for Northwest Florida economic transformation.**

The proposed project is part of a comprehensive effort that is aimed at providing economic and ecosystem restoration in line with Northwest Florida FORWARD. The project will combine the resources at Wakulla County, private sector partners, and FAMU to ensure a long-term economic recovery of all citizens while ensuring a sustainable future for the region's ecological resources. The project will be leveraged through collaborations that include the USDA Forest Service-Florida Forest Service, Florida Fish and Wildlife Conservation Commission, Florida Institute of Oceanography, and Panacea Oyster Co-Op such that the outcome will provide tangible solutions that create new jobs and ecosystem restoration.

The K-20 educational program is designed to achieve the following phased outcomes:

**Phase 1)** Undertake a comprehensive ecosystem observing, monitoring, and mapping of spring creek and surrounding ecosystems to establish baseline spatial hydrologic assessment and water quantity/quality models for improved coastal ecosystem restoration; train students for new jobs in oyster production; and generate new datasets that examine prospects of wastewater re-use, water quality improvements to advance reduction in fresh water demands and improvements to coastal wetlands and estuaries and

**Phase 2)** Using data from Phase 1 to begin the feasibility of establishing a ***Center of Excellence*** to promote science and technology that supports long-term ecosystem education approaches for managing Gulf Coast recovery and sustainability; support educational activities to train next generation of scientists and engineers required for Gulf Coast ecosystem sustainability; and community engagements to advance Gulf Coast resilience; As described, every phase of this project is aimed at promoting new partnerships, advancing science innovation, and improving the local economy through creating new jobs.

- e) Create net-new jobs in targeted industries to include: aerospace and defense, financial services/shared services, water transportation, artificial intelligence, cybersecurity, information technology, manufacturing, and robotics.**

The innovative technologies implemented through this project involves installation of a fully autonomous drone swarm that incorporates artificial intelligence (deep learning) algorithms for robotic automation in data collection and environmental protection. The manufacturing of these drones will be outsourced to small businesses based in the Bay and Escambia counties, thereby enhancing economic growth in those counties as well.

- f) Promote industry cluster impact for unique targeted industries**

This program will drive the aquaculture industry cluster in the Northwest Florida region. It will include, but is not limited to, ranching, logistics and shipping, aquaculture support services, marine vehicle maintenance and building, processing and education and training. Figure 2 below demonstrates the anticipated impact from the development of the aquaculture cluster.

- g) Create net-new jobs with wages above national average wage.**

Net-new jobs will be added providing wages at or above the national average for those in the agricultural industry sector. [https://www.bls.gov/oes/current/naics2\\_11.htm#45-0000](https://www.bls.gov/oes/current/naics2_11.htm#45-0000)

In the first year, the median salaries from the net-new jobs will be approximately \$46,000, above the national annual median income of \$44,564.

- h) Are located in a Rural Area of Opportunity as defined by the State of Florida (DEO)**

The entire project will take place in Wakulla County which is within DEO's Northwest RAO.

- i) Provide a wider regional impact versus solely local.**

The program will have job and economic impacts throughout the entire Florida Gulf Coast and will ensure that Florida retains its solid footprint in the mollusk industry while taking a leading role in the nation's aquaculture growth. As noted previously, Florida's oyster industry used to represent 10% of the total supply of oysters in the country and our goal is to reach this level again. Moreover, the transformational nature of the is project would attract investments into this region for implementing these cutting-edge technologies leading to further regional impact in allied industries such as drone manufacturing, microwave processing equipment manufacturing etc.

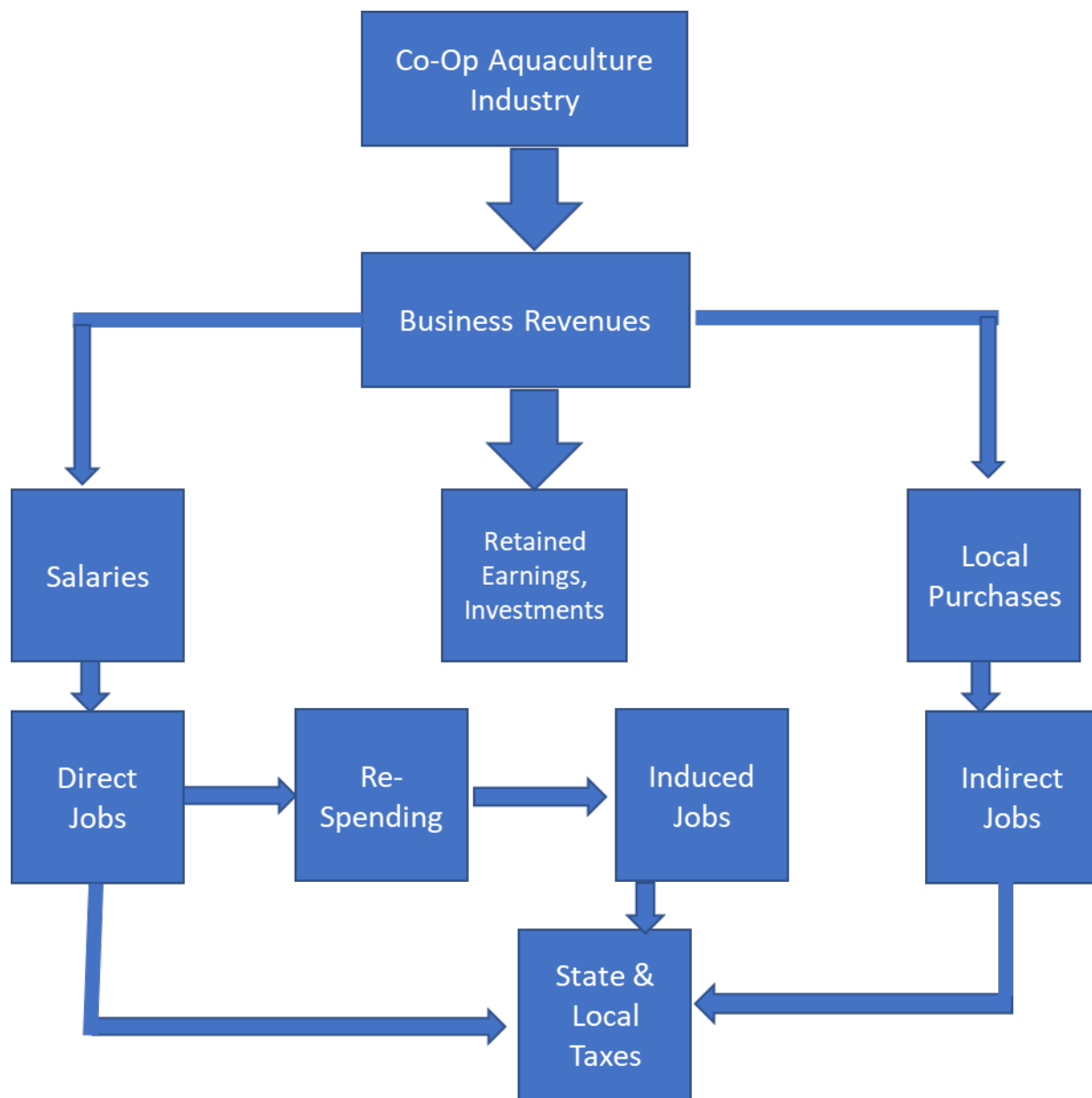


Figure 2: Flow of Impacts from Aquaculture Cluster

- j) Align with other similar programs across the regions for greater regional impact, and not be duplicative of other existing projects or programs.**

Our co-op will be working with other ranchers and associated businesses across the panhandle. There are no other programs trying to accomplish identical goals. Nonetheless it aligns very well with the goals of many other programs targeting the resurrection of aquaculture and bolster economic growth in the affected counties that are supported by the Triumph Gulf Coast's grants.

- k) Enhance research and innovative technologies in the region**

Through FAMU's partnership, this project will implement three new patent pending technologies to boost the oyster industry. (See Attachment A for details)

**l) Enhance a targeted industry cluster or create a Center of Excellence unique to Northwest Florida.**

The overarching objective of this project will be in providing comprehensive educational workforce development programs and preparing students from K-20 to receive training in relevant disciplines from FAMU. FAMU School of the Environment already has a long history of successful research and presence at Apalachicola through funding from the National Oceanic and Atmospheric Administration (NOAA). These research programs range from: Ecosystem Characterization, Forecasting and Modeling, Policy and Decision Making, Ecological Processes, and Social and Economical Processes. FAMU's College of Agriculture and Food Sciences (CAFS) has had a presence in the north Florida region through its Research Centers and the Cooperative Extension Program for many years. Specific to this initiative, CAFS will utilize the expertise of faculty (Dr. Dev) in the Center for Water and Air Quality. This will serve as an extension unit that ensures that the outcomes of these research efforts make concrete and tangible impacts in the lives of the communities. This proposal will spur an invigorated science, technology, engineering, and mathematics (STEM) that will prepare students to advance in their careers. Through this project, FAMU will offer year-round and summer courses, on-line programs, undergraduate programs, and educational and field exploration programs for K-12 students and teachers.

**m) Create a unique asset in the region that can be leveraged for regional growth of targeted industries**

The program will create a vertical business structure for the oyster industry, that may be leveraged beyond oysters to include other mollusks such as clams and help drive a more robust aquaculture industry for the region. The ripple effect of technology implementation would promote growth of allied industrial sectors such as robotics and processing equipment manufacturing.

**n) Demonstrate long-term financial sustainability following Triumph Gulf Coast Inc. funding**

The worldwide market for oysters, the degradation of most of the world's oyster bays and the increasing demand for food production undergird the importance of this program. It also ensures the long-term financial sustainability for this program, due to the continued demand and growth rate anticipated for our oysters. This, in conjunction, with the training and educational programs being led by FAMU, will solidify the long-term sustainability of this program.

**o) Leverage funding from other government and private entity sources**

Our program will serve as a nucleus for the oyster industry in the region. As a result, we will develop outreach initiatives with other potential partners, including federal and state governments as well as commercial entities to build upon the successes of this program.

**p) Provide local investment and spending**

Most of the jobs created from this program will use the local labor force or those students involved in the FAMU educational programs. This will result in further local investment and spending within the eight impacted counties, particularly Wakulla County, where the oyster program will be based.

**q) Are supported by more than one governmental entity and/or private sector companies, in particular proposed projects or programs supported by more than one county in the region**

As shown in the Letters of Support attachment, our program has broad support from government entities as well as the private sector. (See Attachments G & H.)

**r) Provide clear performance metrics over duration of project or program**

A full detail of the evaluation method and performance metrics can be found in the Eligibility Section #7.

We will have a dedicated person from FAMU who will be measuring the deliverables of this project. She will be using the logic model as it relates to this project. She will evaluate the milestones as it is stated in the timeline. A more detailed explanation of the evaluation method can be found in the Eligibility Section, #7.

**s) Include deliverables-based payment system dependent upon achievement of interim performance metrics.**

As detailed in our Eligibility section, #7, our program will have definitive measurements from which we can develop a deliverables-based payment system.

**t) Provide capacity building support for regional economic growth**

As the program develops, the growth in jobs and market impact will build significant support to impact regional growth, besides opening up opportunities for the allied business sectors.

**u) Are environmentally conscious and business focused**

This program is both environmentally conscious and business focused. A major objective of the program is to develop immediate jobs and develop careers in aquaculture. In addition, the program focuses on ecosystem restoration in the Bay through the growth of oysters.

**v) Include Applicant and selected partners/vendors located in Northwest Florida**

The Panacea Oyster Co-Op and our partner, FAMU, are located in Northwest Florida.

**4. In which of the eight disproportionately affected county/counties is the proposed project or program located?**

Wakulla County

**5. Was this proposed project or program on a list of proposed projects and programs submitted to Triumph Gulf Coast Inc. by one (or more) of the eight disproportionately affected Counties as a project and program located within its county?**

Yes – Wakulla County

**6. Does the Board of County Commissioners for each County listed in response to question 5, above, recommend this project or program to Triumph?**

Yes, please see attached letter from the Wakulla County Commissioners. (See Attachment E.)

## **Section 4: Approvals and Authority**

### **1. Authority for executing agreement with Triumph Gulf Coast Inc.**

CEO and Chair of Panacea Oyster Co-Op Corporation, Katherine Waldron  
and Victor Ibeanusi, Ph.D., FAMU, Dean, School of the Environment  
(See Attachment I.)

### **2. If approval of a board, commission, council or other group is needed prior to execution of an agreement between the entity and Triumph Gulf Coast: N/A**

### **3. Timeline for the proposed project, including milestones that will be achieved is shown below.**

| Activities                          | Year 1 |  |  |  | Year 2 |  |  |  | Year 3 |  |  |  | Year 4 |  |  |  | Year 5 |  |  |  |
|-------------------------------------|--------|--|--|--|--------|--|--|--|--------|--|--|--|--------|--|--|--|--------|--|--|--|
| Construct Commercial Nursery        |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Construct Commercial Hatchery       |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Construct Algal Farm                |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Build Flash Freezing Facility       |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Build Pasteurization facility       |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Entrepreneurial Program Development |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Student Recruitment                 |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| K-20 Outreach                       |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Summer internships                  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Computational IT Upgrades           |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Core Lab Enhancements               |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Environmental Restoration Symposia  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |
| Reporting                           |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |        |  |  |  |

### **4. Approval Authority** – Please see attachment I that shows letter from Panacea CEO and Chair, Katherine Waldron and a letter from FAMU providing evidence of authority.

## **Section 5: Funding and Budget**

**Identify the amount of funding sought for Triumph Gulf Coast Inc., and the time period over which funding is requested.**

The Co-Op is requesting \$19,241,000 from Triumph Gulf Coast Inc. spread out over a period of five years as follows: Year 1 = \$6,108,420, Year 2 = \$3,642,008, Year 3 = \$1,470,900 and Year 4 = \$1,741,700. FAMU is requesting: \$6,277,972 (See Attachment J for the 5-year breakup)

**What percentage of total program or project costs does the requested award from Triumph Gulf Coast Inc. represent?**

The total estimated project cost for this is \$27,320,000 of which 70 % is requested from Triumph Gulf Coast Inc. Panacea Oyster Co-op will contribute \$6,557,040 and FAMU will contribute \$1,521,960 in total contributions over the five years.

**Please describe the types and number of jobs expected from the proposed project or program and the expected average wage.**

| Budget Narrative for FTE Staffing Needs |                   |          |           |           |           |           |           |
|---|-------------------|----------|-----------|-----------|-----------|-----------|-----------|
|   |                   | 2019*    | 2020      | 2021      | 2022      | 2023      | 2024      |
| Incremental Job Creation                |                   | Forecast | Forecast  | Forecast  | Forecast  | Forecast  | Forecast  |
|   | Starting Salaries |          |           |           |           |           |           |
| Nursery/Facility Manager                | \$60,000/year     | 1        | 1         | 1         | 1         | 1         | 1         |
| Nursery Personnel                       | \$30,000/year     | 0        | 2         | 3         | 3         | 4         | 4         |
| Hatchery Director                       | \$85,000/year     | 0        | 1         | 1         | 1         | 1         | 1         |
| Hatchery Personnel                      | \$40,000/year     | 0        | 3         | 4         | 4         | 5         | 5         |
| Production/Processing Supervisor        | \$60,000/year     | 1        | 1         | 1         | 2         | 2         | 2         |
| Processing Personnel                    | \$30,000/year     | 1        | 2         | 3         | 3         | 4         | 4         |
| Admin                                   | \$30,000/year     | 1        | 1         | 1         | 2         | 3         | 3         |
| Shipping/Freight Logistics              | \$30,000/year     | 0        | 2         | 2         | 3         | 4         | 4         |
| Flash Freezing Manager                  | \$50,000/year     | 1        | 1         | 1         | 1         | 1         | 1         |
| Flash Freezing Personnel                | \$30,000/year     | 0        | 2         | 2         | 3         | 4         | 4         |
| Pasteurization Personnel                | \$35,000/year     | 0        | 2         | 2         | 3         | 3         | 3         |
| <b>Total Job Creation</b>               |                   | <b>5</b> | <b>18</b> | <b>21</b> | <b>26</b> | <b>32</b> | <b>32</b> |

\*Assumption for 2019 is for partial year – up to 6 months. In addition, there will be 2-5 contractors, included accounting for \$150,000 in the first year, \$250,000 in the second year, and \$350,000 in the third year.



**Does the potential award supplement but not supplant existing funding sources?**

This award will supplement existing resources from the Panacea Co-Op and from FAMU. Triumph Gulf Coast's funding will enable the Co-Op to undertake this project and for FAMU to develop these incremental and highly needed educational programs.

**Project Budget with Project Narrative:**

The budget narratives for each component are attached in Attachment J

Applicant understands that the Triumph Gulf Coast, Inc. statute requires that the award contract must include provisions requiring a performance report on the contracted activities, must account for the proper use of funds provided under the contract, and must include provisions for recovery of awards in the event the award was based upon fraudulent information or the awardee is not meeting the performance requirements of the award.

Applicant understands that awardees must regularly report to Triumph Gulf Coast, Inc. the expenditure of funds and the status of the project or program on a schedule determined by Triumph Gulf Coast, Inc.

Applicant acknowledges that Applicant and any co-Applicants will make books and records and other financial data available to Triumph Gulf Coast, Inc. as necessary to measure and confirm performance metrics and deliverables.

Applicant acknowledges that the Triumph Gulf Coast, Inc. reserves the right to request additional information from Applicant concerning the proposed project or program.

## **Section 6: Addendum for Workforce Training Proposals**

### **A. Program Requirement**

This proposal supports programs that prepare students for future occupations and careers at K-20 institutions that have campuses in the disproportionately affected counties.

Wakulla – Wakulla High School  
Franklin- Franklin School  
Gulf- Port St Joe, and Wewehitchika High School

### **B. The proposed program will:**

Increase students' technology skills and knowledge

The K-20 Educational Program proposed here will introduce the Scholars-In-Residence-In-STEM Program (S-STEM) to Port St. Joe High School students as a pathway to college. The program is designed to introduce students to STEM fields through hands-on experiences; laboratory experiments; exploratory field trips; seminars by STEM professionals; and student conference participation. The goal is to inspire intellectual engagement of high school students and their teachers that manifest the vibrant expression of the legacy of academic excellence at FAMU. The FAMU S-STEM program has four primary objectives: 1) Increase undergraduate student enrollment in the FAMU SoE from underrepresented students, with particular emphasis on low-income, educationally disadvantaged students in grades 9 through 12; 2) Increase the number of underrepresented students prepared to matriculate high school on-time and who pursue postsecondary education targeting STEM courses and careers; 3) Provide students access to rigorous coursework, advising/counseling, and STEM enrichment activities; and 4) Better prepare STEM students to compete globally.

### **Encourage industry certifications**

#### **Learning from the Work**

The S-STEM educational program employs support industry certification that include on-line courses, evaluation of research, and best practices. The program gathers qualitative and quantitative data (including data on challenges, lessons learned and best practices). These efforts will lead to tangible evaluation interpretations, recommendations, and reports that will assist in designing effective strategies for not only program improvement and development, but also for local, regional and national standards. Based on information learned from evaluation efforts, we will be able to identify critical issues and realizations during operations; and identify the elements and extent to which the program has been implemented with fidelity that meets industry requirements.

### **Provide rigorous, alternative pathways for students to meet high school graduation requirements**

During the academic year, graduate students at FAMU will engage with Port St. Joe students a total of 8 times. There will be four (4) instructional and research events that will occur at Port St. Joe High School. Three (3) such events will occur at the FAMU campus where S-STEM students will conduct experiments at the state-of-the-art School of the Environment (SoE)-Core Laboratory alongside resident scientist. Students will perform experiments and making sure all environmental health and safety compliance measures are met. A field day will occur at Spring Creek and Apalachicola Bay for a full day of exploration research. This will occur in the summer months. The intent of the "Introduction" of the FAMU S-STEM program is to begin engaging Port St. Joe high school students and acclimating them to an institution of

higher learning with the express purpose of recruiting students from the Port St. Joe area, and establishing scholarship opportunities upon matriculating from high school.

Strengthen career readiness initiatives

### **Activities and Organizational Capacity**

*Scholars-In-Residence-In-STEM Program activities also include:*

**Mentoring:** FAMU has effective experience in mentoring students at all levels. This depth of experience has exemplified the importance of good mentoring to the success of FAMU students. We expect to have this same success with Port St. Joe high school students. Graduate students will assist in training and mentoring of Port St. Joe students, and as S-STEM scholars they will benefit from interacting in structured activities with graduate students in an environment that fosters creative, independent, yet interactive thinking and collaborative approaches to problem solving.

**Community Building and Support:** The overarching goal for establishing a program with Port St. Joe students, is to provide a global experience and nourish the development of a new generation of environmentally sustainable conscious students that are prepared to demand a better quality of healthy living. The participation of the Port St. students as S-STEM scholars provides the experience needed to gain a greater understanding of how the environment plays an integral part in our lives and around the world. With minimal employment opportunities that provide a living wage in the Port St. Joe area, it is likely that students will seek to bring their knowledge of environmental issues to their immediate community and contribute to the economic development of the area.

**Career Support:** A centralized unit of FAMU staff is dedicated to fulfilling the mission of the FAMU School of Environment by connecting talented students with meaningful career opportunities, experiential educational opportunities, and partner relationships with employers, administrators, faculty, and alumni. S-STEM students will be invited to attend a variety of career fairs, special events and special programs. S-STEM scholars will gain first-hand knowledge of all of the opportunities that are available to them upon admission to Florida A&M University.

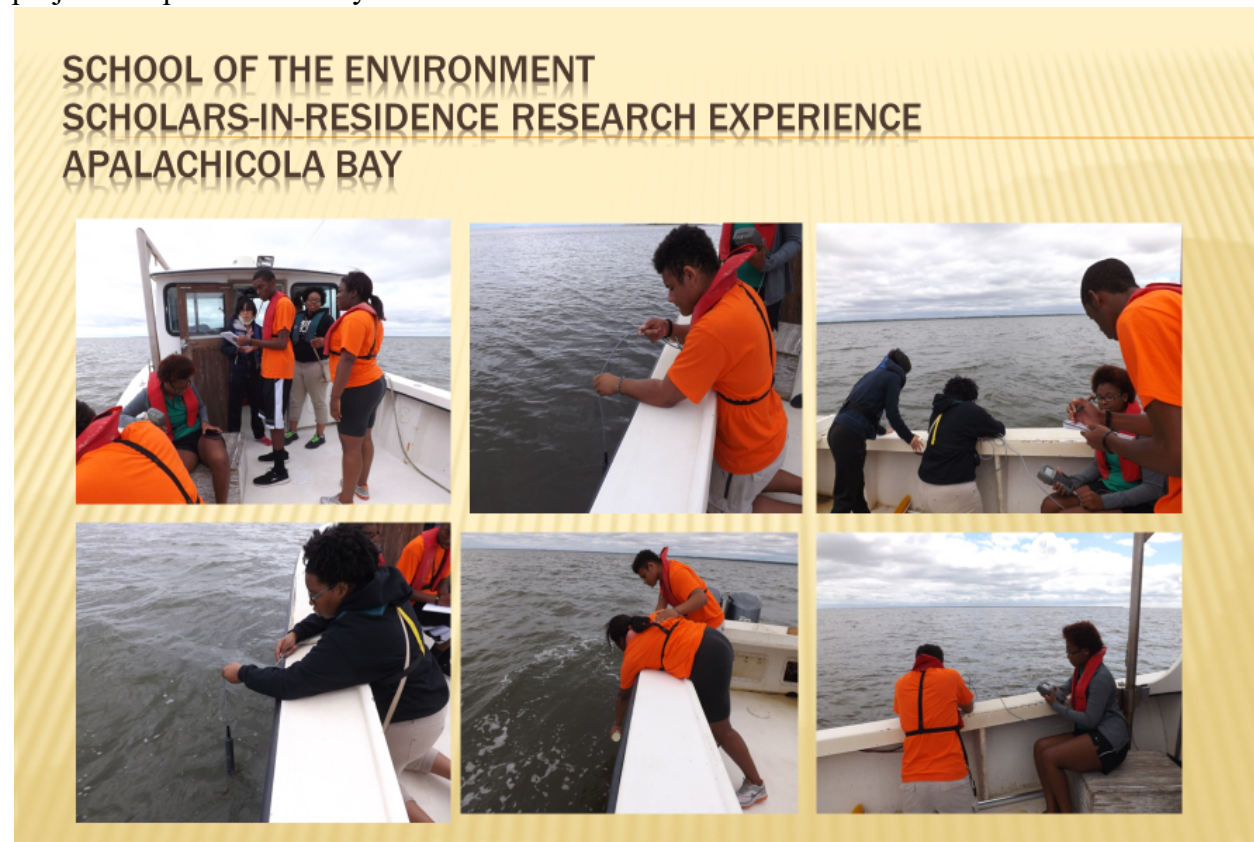
### **Fund high-demand programs of emphasis at the bachelor's and master's level designated by the Board of Governors**

Funding is requested for a total of 100 undergraduate students and 14 master's students in STEM Areas that include Environmental Science, Agriculture and Food Sciences, Business, Engineering, and Computer Science.

Encourage students with interest or aptitude for science, technology, engineering, mathematics, and medical disciplines to pursue postsecondary education at a state university or a Florida College System institution within the disproportionately affected counties (similar to or the same as talent retention programs created by the Chancellor of the State University Systems and the Commission on Education). To cultivate a progressive retention and graduation within 4-years for BS degrees and 2-years for MS in each of the degree areas in science, engineering, mathematics, and engineering (STEM), a set of well-structured research, education, and professional development activities will be developed. Students will identify one faculty teams as his/her main direction and perform a self-assessment. The PI and Co-PIs will then provide an orientation to the students on policies and project expectations. This orientation will familiarize the students with the available opportunities. Each student will meet his/her faculty mentor weekly to discuss research progress and project management and participate in the project's biweekly meetings. The trainees are required to attend and present at the seminar every semester. Each trainee will be provided with opportunities to network with leading collaborators and visiting scholars through periodic

conferences and project meetings. Progress reviews will be conducted for each student. Feedbacks and retention decisions will be made through trainee self-assessment and meetings with the faculty team.

Additionally, students will be required to engage in a mandatory first year field and laboratory projects to inspire interests in scientific research. The field exploratory research will include water quality monitoring at the Panacea Oyster Ranch at spring creek. Shown below are students from the FAMU-School of the Environment in on of such water quality monitoring project at Apalachicola Bay



**C. The proposal will provide participants in the disproportionately affected counties with transferable, sustainable workforce skills but not confined to a single employer.**

Aquaculture is the fastest growing food-producing sectors and now accounts for 50 percent of the world's fish, according to the United Nations Food and Agriculture Organization (FAO) July 2018 report. As a result, there is a growing need for jobs in this sector throughout the world. Thus, participants in the workforce training will not be confined to a single employer and will in fact, have skills that will be in demand, worldwide as this sector continues to grow.

**D. The disproportionately affected counties where the proposed program will operate or provide participants with workforce skills**  
Gulf and Wakulla counties

**E. The proposed project will promote economic recovery, diversification, enhancement of the disproportionately affected counties and enhancement of the targeted industries.**

Aside from the 32 direct jobs that will be created within the Co-Op, other jobs in the affected counties will benefit from the increased available labor pool that results from the training programs. These jobs in turn will benefit the entire area due to increased tax base, increased indirect job creation leading to an enhancement of the disproportionately affected counties and targeted industries.

Diversification of the economy will take place to a significant degree automatically as the aquaculture sector becomes more significant. Studies have shown that targeting related industries, such as the development of a vertical aquaculture industry, leads to more profound diversification. (<https://phys.org/news/2018-04-optimal-diversify-economy.html>)

In addition, through the creation of a friendly business environment for small enterprises and the potential tourism industry, framework policies can be developed to aid in the economic diversification of the area.

**Additional Information**

- A. This will be an expansion of the existing training programs FAMU currently has and will be expanded and improved through the use of field training and lab exposure. Additionally, internships will be available with the Co-Op to provide hands on training at the processing and nursery plants.
- B. Training will be delivered at the campuses, in the field and in labs.
- C. The number of enrolled students and completers is estimated to be 100
- D. The length of the program will be 1 semester and will include summer programs. The anticipated beginning and ending dates will be the same as semester beginning and end dates of the FAMU.
- E. The program will be sustainable because of the program income generated.
- F. Certifications and degrees resulting from the completion of the program will include high yield oyster ranching, water quality monitoring, unmanned underwater vehicle operator certifications
- G. There is no local match
- H. Any additional information (broader impacts, intellectual merits, curriculum, existing FAMU programs and partners that could leverage the project.

## **Section 6: Addendum for Advertising/Promotion**

**A. Is the applicant a tourism entity created under s. 288.1226, Florida Statutes?** No

**B. Does the applicant advertise and promote tourism and Fresh From Florida?** Yes.

The Panacea Co-Op works closely with state and local agencies to promote tourism, including Fresh From Florida. Since our inception we have conducted outreach programs to assist Florida in developing a strong ecotourism segment as well as supported their efforts nationally. We are also involved with Florida tourism, local visitor bureaus and local chambers.

We are currently active members of the Wakulla Chamber of Commerce and our application is supported by the Chamber. Letters of support are attached from Fresh From Florida. We are also active members of the Florida Restaurant and Lodging Association. (See Attachments F and G.)

We have partnered with Fresh From Florida to represent Florida's oyster industry for more than a year at the nation's largest seafood expo (<https://www.seafoodexpo.com/north-america/attend/>). We also participated with them in the annual Florida Tourism Day in Tallahassee held annually by the Florida Restaurant and Lodging Association.

We premiered our Oyster Tourism outreach in 2017. Since then guided tours have been booked by dozens of organizations. Certified "Green Guides" have been in the water hosting travelers from around the world. These are nature based Outfitters mostly kayak oriented but can be electric powered crafts.

We are partnered with the top Airbnb in the county and are tied to their supply of international tourists seeking adventure, ecotourism and oyster tours. An on-water shucking tour is under development.

**C. The proposed award will promote workforce and infrastructure on behalf of the disproportionately affected counties by providing increased service jobs related to aquaculture tourism (eco-tourism).**

D. Indirectly with oysters being a keystone species, there has been a corresponding reintroduction to the marine system - essentially reinvigorating the marine ecosystem. As a result, fishing has become very widespread around the oyster leases. These game and food fishes are both a joy and challenge to land and certainly a delicacy to consume.

The improvement to the marine ecosystem will help revitalize the fishing industry as a whole. This coupled with a healthy, growing aquaculture industry will aid in the broader economic recovery and diversification of the area.

E. Quantitative evidence of economic recovery, diversification and enhancement of the affected counties and targeted industry.

According to studies, for every eight to ten tourists, one job is created. And much of the incomes generated will go back into the local economy.

Because eco-tourism is one of the fastest growing sub-sectors today, our ability to create an eco-tourism focus around the aquaculture industry will lead to faster economic recovery, while further diversifying the region's economy. (<http://www.tourismupdate.co.za/news/column/184033/Ecotourism-a-sustainable-driver-of-socio-economic-growth+&cd=4&hl=en&ct=clnk&gl=us>)

## 2. Additional Information

- A. Much of the advertising and promotional mediums will occur in association with our sales and marketing of the Co-Op oysters. The Co-Op's story and each rancher's story is included when selling to distributors and direct to restaurants. Thus, the predominant marketing and advertising will be in the southeastern U.S. As our oyster market expands, this marketing reach will expand.

We will continue to participate with the Florida Restaurant and Lodging Associations' activities as well as with Fresh From Florida and other organizations to advertise our aquaculture activities. In addition, there are several major seafood conferences in the U.S. some of which we have been attending that have helped increase the visibility of Wakulla County as an oyster and aquaculture center.

All of these activities will help drive eco-tourism to the area.

- B. Currently, we market our products through our distributors, our activities with various organizations of which we are members (e.g. chambers of commerce, aquaculture and seafood organizations among others) and by reaching out directly to the restaurants selling our oysters.

As a result, we have been hosting various groups across the southeast. These visitors include chefs, executives from the seafood industry and a variety of school groups. For example, in April we will be hosting a group of 10-14 year olds from a camp in South Carolina which provides services to at risk children.

We anticipate a significant increase in interest in eco-tourism with the opening of our nursery/hatchery/algae and processing plants. We have included in our building designs the ability to host groups and provide tours. We ultimately plan to have an area to sample the oysters.

I, the undersigned, do hereby certify, that I have express authority to sign this proposal as on my behalf or on behalf of the above-described entity, organization, or governmental entity.

Name of Applicant: Panacea Oyster Co-Op Corporation

Name and Title of Authorized Representative: Katherine Waldron, CEO and Chair

Representative Signature: 

Signature Date: January 31, 2019

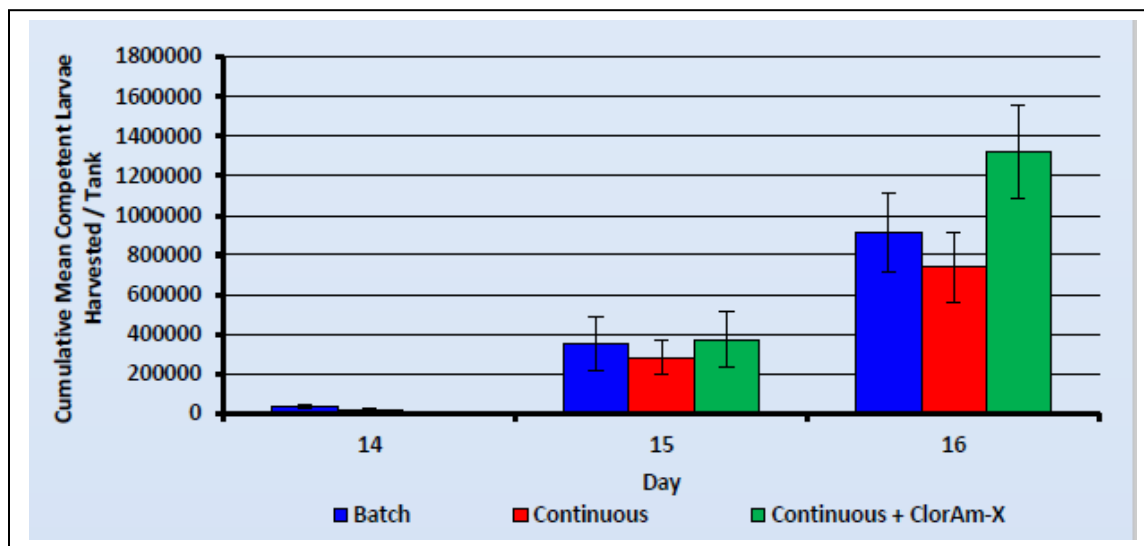


# Attachment A

Research Data

### Research Data and Evidence of Technological Feasibility

Microalgal feedstocks form the basis of nutritional requirements for successful oyster production. There are several algal strains and methods used by oyster hatch. We have through our research isolated special strains. These include the algal strains *Chaetocerus gracilis*, *Isochrysis galbana*, *Pavlova* spp., and *Nannochloropsis* spp. These algal feeds have to be supplied to the oysters at a density that facilitates the oysters to filter-feed at an appropriate rate for successful commercialization production. **However, culturing algae is labor intensive, and culture crashes can occur that can impede with the sustainable and continuous oyster production.** As a rule of thumb, to begin the larval production, algal density has to be approximately 25,000 cells per ml and continuously feeding the oysters with appropriate algal feedstock augmented with ClorAm-X ammonia control additive provided the maximum oyster production (Fig. 1).



**Fig. 1.** Comparison of batch, continuous and continuous modes + ClorAm-X feeding of algal cultures (taken from Rikard and Walton, publication # MASGP-12-048)

The research being conducted in the Chauhan laboratory at FAMU is largely focused on the use of several newly isolated strains of microalgae, cyanobacteria and bacterial groups of microorganisms (hereafter referred to as consortia). Using genetic techniques, our isolates have been identified as mainly belonging to *Scenedesmus/Volvox* and *Chlamydomonas* groups of microalgae.

- These consortia have been screened for their natural abilities to produce comparable, if not higher, neutral lipids relative to industry gold standard strains.
- Moreover, our consortia have a strong potential to sequester wastewater-associated nutrients, thereby, making their production environmentally sustainable.

**Regardless of algal strains or feeding strategies, high production costs associated with the microalgal growth continue to pose a significant constraint to many oyster hatcheries.** Towards this end, Drs. Chauhan and Ibeanusi from FAMU's School of the Environment in

collaboration with the Gulf Breeze located company AlgaStar (<http://algastar.com/>), have obtained significant findings to enhance algal biomass productivity by using a novel technology for biostimulation, that produces algal growth in excess of 300% over current methods without using additional nutrients or fertilizers (Fig. 2).

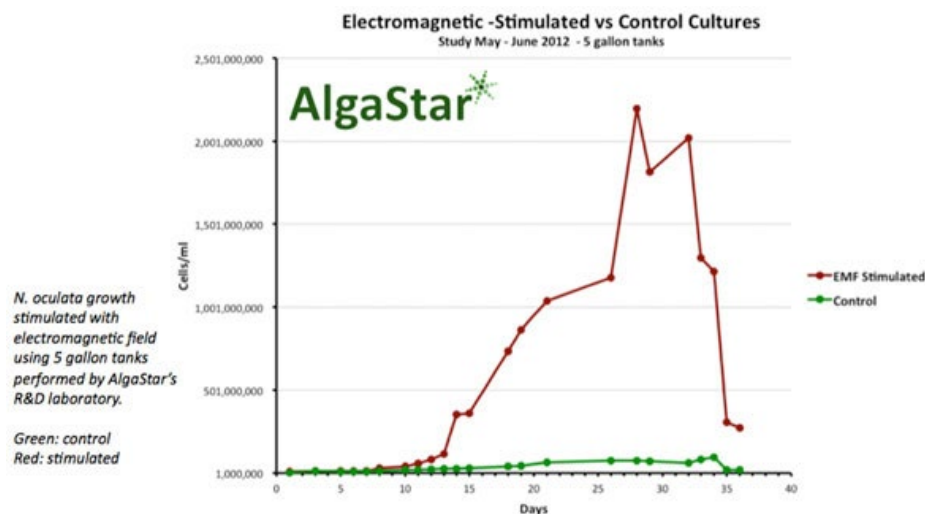


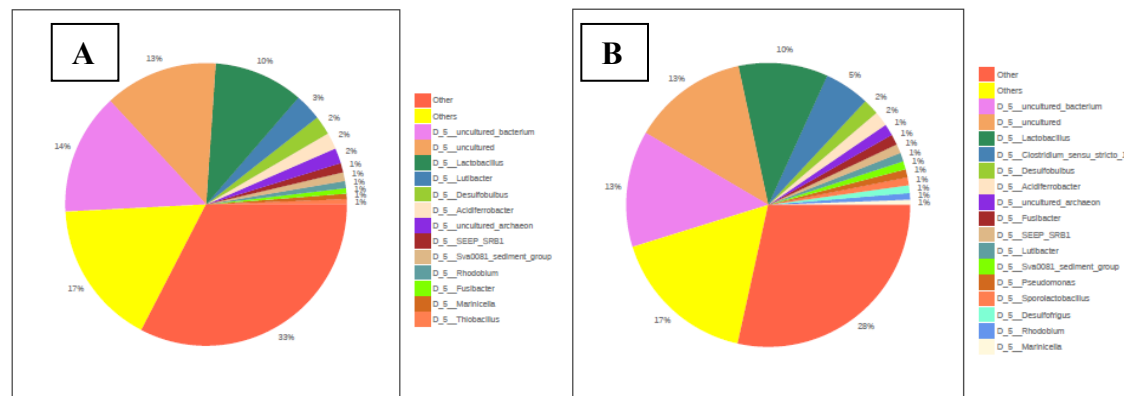
Fig 2. Effect of EMF on algal cell growth

Growth of microalgae *Nanochloropsis oculata* stimulated with electromagnetic field (red line) compared with un-stimulated controls (green line).

Furthermore, our consortia also can be effective as antibacterial agents. **Note that aquaculture tanks can harbor a myriad of bacteria and viruses that can serve as pathogens against fish and shellfish, and thus potentially devastate aquaculture farms.** However, microalgae have developed biochemical mechanisms for self-defense to include, but not limited to, secretion of compounds that inhibit bacterial growth or viral attachment. For instance, compounds synthesized by *Scenedesmus costatum* exhibited antibacterial activity against aquacultured bacteria mainly owing to their fatty acids being longer than 10 carbon atoms in chain length- which has the property of inducing bacterial protoplast lysis.

**And finally, the Chauhan laboratory has obtained critical findings on the Eastern oyster associated symbiotic bacteria in oysters collected from Apalachicola Bay, FL.** It is now beginning to be understood that the endosymbiotic bacteria from the oyster gut and mantle fluids can facilitate oyster health and productivity by performing a myriad of ecosystem services. In fact, a single oyster has the potential to filter as much as 30 liters of water per hour, siphoning estuarine microorganisms into the nutrient-rich oyster mucosa and the digestive organs, which harbor a diverse assemblage of marine microorganisms (Colwell and Liston 1960; Kueh and Chan 1985; Murchelano and Brown 1968; Prado et al. 2005; Pujalte et al. 1999; Romero et al. 2002). Overall, it has been demonstrated for a variety of aquatic organisms that the resident microbiota provides beneficial services, including maintaining functions of the host gastrointestinal tract, providing

host nutrition (vitamins, enzymes and essential fatty acids), and influencing immune responses and disease resistance (Prieur et al. 1990; Harris 1993; Moriarty 1997).



**Fig. 3.** Deep sequencing and bioinformatics analyses revealed microbiomes of cultured diploid (A) and triploid (B) oysters.

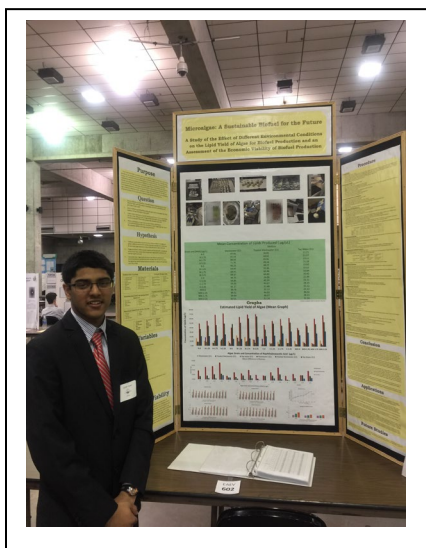
**Our recent study (Chauhan et al. 2014) has indicated that the oyster microbiome contained a total of 28 bacterial phyla along with a significant number of unclassified bacteria, suggesting that the filter-feeding oysters are likely a rich bacterial repository that has not been adequately studied.** More recently, we compared the oyster microbiome of aquacultured diploid vs. triploid oysters which also **revealed up to ~71-77% of the bacterial communities remain taxonomically unresolved, and by inference, potentially novel (Fig. 3).** It has been shown that certain oyster endosymbionts, such as those belonging to Proteobacteria phylum, can degrade organic matter and/or fix nitrogen in bivalves (Zehr et al., 2003; Trabal et al., 2014), thus promoting digestion of ingested food by their host oyster species. **Note that the Chauhan laboratory houses a plethora of oyster endosymbionts (Thomas et al., 2014), which are available to be used along with the algal cultures so that bioremediation of toxic contaminants can be accomplished while enhancing oyster production in local hatcheries.** In fact, our publications on this seminal area of research (Chauhan et al., 2013; Chauhan et al., 2014; Thomas et al., 2014) have been cited collectively over 65 times (Fig. 4) and we recently filed a pre-patent on our existing technology.

In summation, our technologies can significantly enhance the overall health and productivity of oysters and hence be economically and environmentally cost-effective relative to existing shellfish processes pertaining to feedstocks, remediation of waste and water use.

|   |    |      |
|---|----|------|
| Metagenomic assessment of the Eastern oyster-associated microbiota<br>A Chauhan, D Wafula, DE Lewis, A Pathak<br>Genome announcements 2 (5), e01083-14  | 24 | 2014 |
| A survey of deepwater horizon (DWH) oil-degrading bacteria from the eastern oyster biome and its surrounding environment<br>JC Thomas IV, D Wafula, A Chauhan, SJ Green, R Gragg, C Jagoe<br>Frontiers in microbiology 5, 149 | 20 | 2014 |
| Phycoremediation Coupled with Generation of Value-Added Products<br>L Collins, D Alvarez, A Chauhan<br>Microbial Biodegradation and Bioremediation, 341-387   | 1  | 2014 |
| Whole-genome sequences of five oyster-associated bacteria show potential for crude oil hydrocarbon degradation<br>A Chauhan, S Green, A Pathak, J Thomas, R Venkatramanan<br>Genome announcements 1 (5), e00802-13            | 21 | 2013 |

**Fig. 4.** Citations on the Eastern oyster associated bacterial assemblages that were shown to possess significant environmentally relevant functions such as nitrogen sequestration and degradation of pollutants such as crude gulf oil.

**Our Student Accomplishments on the ongoing algal projects:** Of major note were recent accomplishment of three K12 students from Chiles Lawton High School who participated in Dr. Chauhan's lab on a short research project. These students presented their findings in the Capital Regional Science Fair held in February 2018. Following are the details on these student accomplishments:

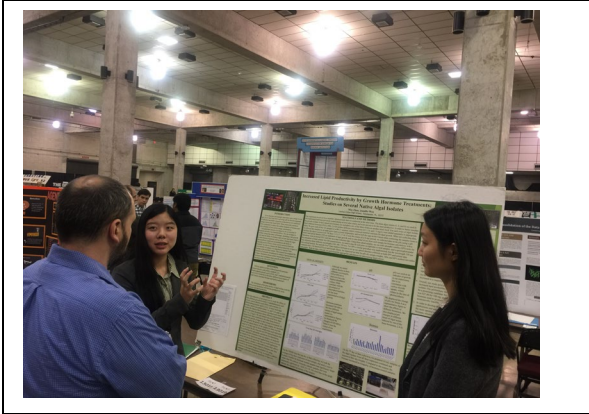


**Mr. Zuhair Ahmed:** won several awards for his poster titled “Microalgae: A Sustainable Biofuel for the Future”, as follows:

- The Society for In Vitro Biology Award-county
- Ricoh Sustainable Development Award
- US Stockholm Junior Water Prize Regional Award
- 2nd place Earth and Environmental Sciences
- Entry to State Competition
- Best of Show Award: Physical Sciences
- Ricoh Sustainable Development Award-State
- 4th place State Science and Engineering Fair Earth and Environmental Sciences Award

**Ms. May Zhou and Jennifer Wen:** won several awards for his poster titled “Increased Lipid Productivity by Growth Hormone Treatments: Studies on Several Native Algal Isolates”, as follows:

- Student Awards for Geoscience Excellence



- Certificate of Outstanding Achievement
- Best of Show- Senior Division – Biological Science

Finally, the above three qualified for the Florida State Science fair in Lakeland, Florida in late March. These students will represent FAMU well and the Chauhan laboratory will continue working with them, so they can make it to the nationals.

**Trainees from local high school shown with the awards they won at the Capital Regional Science Fair. These students pursued short research projects at Dr. Chauhan's lab in 2017-2018.**

**Water Quality Monitoring Data: Correlating Water Quality to Oyster ranching at Spring Creek Panacea Oyster Ranching**

#### **Fall 2016**

| Sample Sites | DO (mg/L) | Cond (ms/cm) | TDS (mg/L) | Salinity (psu) | Temp (C) | pH   |
|--------------|-----------|--------------|------------|----------------|----------|------|
| Station 1    | 2.53      | 3.2          | 10.25      | 20.87          | 25.36    | 7.98 |
| Station 2    | 2.51      | 8.81         | 44.21      | 4.91           | 21.95    | 7.51 |
| Station 3    | 2.52      | 6.79         | 6.79       | 3.58           | 22.35    | 7.43 |
| Station 4    | 2.51      | 7.81         | 7.81       | 3.92           | 25.20    | 7.87 |

#### **Fall 2017**

| Sample Sites | DO (mg/L) | Cond (ms/cm) | TDS (mg/L) | Salinity (psu) | Temp (C) | ORP (mV) | pH  |
|--------------|-----------|--------------|------------|----------------|----------|----------|-----|
| Station 1    | 2.4       | 42.8         | 36.8       | 27.4           | 17.6     | 67.8     | 8.4 |
| Station 2    | 2.4       | 43.5         | 21.7       | 28.1           | 17.4     | 51.5     | 8.7 |
| Station 3    | 2.4       | 43.2         | 21.6       | 28.0           | 17.2     | 25.5     | 8.5 |
| Station 4    | 2.7       | 42.5         | 21.3       | 27.5           | 17.6     | 67.5     | 7.7 |

**Fall 2018**

| Sample Sites | DO (mg/L) | DO (%) | Cond (ms/L) | TDS (mg/L) | Sal (psu) | Temp (C) | pH  |
|--------------|-----------|--------|-------------|------------|-----------|----------|-----|
| Shore line   | 2.4       | 29.6   | 18.3        | 9.1        | 10.2      | 22.2     | 7.9 |
| Creek Water  | 2.5       | 29.6   | 11.5        | 9.8        | 7.0       | 21.6     | 7.8 |

These results show that the water quality did not depreciate as a result of the oyster ranching at spring creek; but rather remained the same or improved.

-The special algal strains described in our Microalgal Feedstocks will be supplied to the oysters at a density that facilitates the oysters to filter-feed at an appropriate rate for successful commercial production. This scale-up process would involve significant research and development to optimize the commercial production systems for this proven process. The commercial scale application of drone swarms to monitor and protect the oyster nurseries and hatcheries would enhance innovation in aquatic drone swarms, which is an emerging technology. The manufacturing of these drones in the region would make the Northwest Florida, a pioneer in aquatic drone swarm production. The Microwave pasteurization of live oysters is another innovative technology that was developed in this region and commercialization of the same would benefit the region by generating revenues for regional economic growth and development.

These new innovative technologies will be leveraged by a new **Center for Geospatial Ecology and Restoration (CGER)**. Through our partnership with the USDA Forest Service we have received funding from the Restore Act that focuses on the development and distribution of applied geospatial technology and solutions for restoration and conservation of terrestrial and aquatic ecosystems as well as training the next generation of geospatial scientists and professional. This center could provide geospatial data describing oyster ranching over geographical regions across the gulf coast region, identifying contaminant hot spots to expand the research frontier for new discoveries that integrate systems-based research and education for aquaculture solutions.

**Center for Coastal and Marine Ecosystems (CCME)**-Funded by NOAA, and led by President Larry Robinson. FAMU is the recipient of a \$15.4M award over five years to establish the Center for Coastal and Marine Ecosystems (CCME). This will allow FAMU partnership to make profound impacts on coastal and marine ecosystems research and policy.

**EnergyWaterFoodNexus**. A new science enterprise addressing the integration of energy, water, and food security. Through this program, we are providing research describing the resources and solutions for solving this vexing global challenge, including preparing students for a trained workforce. These efforts have allowed us to organize the EnergyWaterFoodNexus International Summits that attract participants globally. This summit will be used to showcase the oyster industry and serve as tourism opportunity as well.

## OYSTER RANCHING AND WATER QUALITY





# Attachment B

## Financials



Carr, Riggs & Ingram, LLC  
2633 Centennial Boulevard  
Suite 200  
Tallahassee, Florida 32308  
  
(850) 878-8777  
(850) 878-2344 (fax)  
CRLcpa.com

January 24, 2019

Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

I have represented the Panacea Oyster Co-Op Corporation (Co-Op) as its CPA since 2017. Subsequent to my professional involvement, I was provided with the opportunity to serve on their Board of Directors, which I accepted and began doing in 2018. In these roles I have been able to observe the historical and planned performance and growth of the Co-Op over the last 2 years.

The Co-Op was incorporated in November 2016, with sales first beginning in early 2017. Under the prior management team, in 2017 the Co-Op incurred a net loss of approximately \$750,000 in its first full start-up year. During the first half of 2018, still under the prior management team, sales grew moderately, but the gross margin continued to be an area of concern, leading to a loss of approximately \$250k.

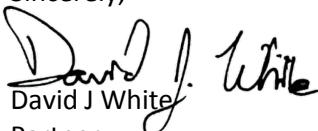
It was around this time, in the middle of 2018, that the Board of Directors realized that a more experienced management team was needed. The foundation of the Co-Op had successfully been laid, but to reach profitability a more experienced staff, with a more complete business proficiency and background, was necessary. At the beginning of July 2018, Katherine Waldron was elected as the Co-Op's new Chief Executive Officer. Katherine contributes over 30 years of business management and experience, and she immediately began to recruit an experienced team to move the Co-Op forward.

The sales footprint was expanded with the integration of marketing experts in the seafood industry, and total sales grew to nearly double that of the first half of 2018. A cost of sales management program was created by surveying the lease owners/ranchers in order to establish a consistent sales price that would lead to an acceptable gross profit for the Co-Op.

At the end of September 2018, the Co-Op was trending towards meeting targeted projected sales and gross profit. Tragically, at the beginning of October, Hurricane Michael arrived, destroying the majority of oysters in the Co-Op's area. With damage to inventory, sales dropped dramatically. However, an abundance of oysters will be available again in April 2019, and sales at the Co-Op should resume at projected levels.

Based on the capability and performance of the Co-Op and its new management team's proven ability to grow sales, decrease costs, and overall manage a successful business, I would like to urge the members of the Board of Triumph Gulf Coast, Inc. to approve the grant funding.

Sincerely,

  
David J White  
Partner

# Income Statement

## Panacea Oyster Co-Op Corporation

|   | Jul-Dec 2018     | Jan-Jun 2018     | AR ENDED 2018    | AR ENDED 2017    |
|---|------------------|------------------|------------------|------------------|
| <b>Income</b>                               |                  |                  |                  |                  |
| <b>Total Income</b>                         | <b>206,546</b>   | <b>160,730</b>   | <b>367,276</b>   | <b>164,854</b>   |
| <b>Cost of Goods Sold</b>                   |                  |                  |                  |                  |
| <b>Total Cost of Goods Sold</b>             | <b>159,056</b>   | <b>179,046</b>   | <b>338,102</b>   | <b>226,803</b>   |
| <b>Gross Profit</b>                         | <b>47,490</b>    | <b>(18,316)</b>  | <b>29,174</b>    | <b>(61,949)</b>  |
| <b>Operating Expenses</b>                   |                  |                  |                  |                  |
| Bad Debt (Recovery)                         | 0                | 3,985            | 3,985            | 0                |
| Bank Service Charges                        | 557              | 44               | 601              | 457              |
| Business Meals                              | 1,674            | 993              | 2,667            | 8,665            |
| Car and Truck Expenses                      | 6,860            | 0                | 6,860            | 335              |
| Complimentary Oysters                       | 3,864            | 540              | 4,404            | 0                |
| Computer and Internet Expenses              | 4,751            | 1,568            | 6,319            | 4,017            |
| Employer Payroll Taxes,                     | 374              | 7,277            | 7,651            | 13,111           |
| Equipment Rental                            | 8,311            | 0                | 8,311            | 2,000            |
| Equipment Rental - Cooler                   | 0                | 12,670           | 12,670           | 17,120           |
| Federal Unemployment                        | 0                | 48               | 48               | 0                |
| Forfeited deposits                          | 0                | 0                | 0                | 44,600           |
| Gasoline Fuel and Oil                       | 7,888            | 3,867            | 11,755           | 5,675            |
| Insurance Expense                           | 0                | 26,802           | 26,802           | 42,402           |
| Interest Expense & Fees                     | 6,815            | 0                | 6,815            | 0                |
| Landscaping/Lawn Services                   | 0                | 409              | 409              | 1,224            |
| Meals & Entertainment 100%                  | 1,936            | 379              | 2,315            | 0                |
| Miscellaneous                               | 906              | 0                | 906              | 1,132            |
| Nursery supplies and maintenance            | 0                | 0                | 0                | 1,851            |
| Office Supplies                             | 1,760            | 788              | 2,549            | 4,913            |
| Parking & Tolls                             | 229              | 100              | 329              | 141              |
| Paypal-Square fees                          | 430              | 123              | 553              | 365              |
| Payroll Expenses                            | 0                | 317              | 317              | 1,136            |
| Postage and Delivery                        | 157              | 140              | 297              | 479              |
| Prime Meridian Bank Loan - Loan Fees        | 8                | 2,600            | 2,608            | 0                |
| Prime Meridian Loan Interest Expense        | 14,922           | 19,717           | 34,639           | 18,584           |
| Printing & Copying                          | 1,109            | 914              | 2,023            | 5,552            |
| Professional Accounting, Legal, Consultants | 43,919           | 8,283            | 52,202           | 105,030          |
| Real Estate Taxes                           | 8,481            | 0                | 8,481            | 4,253            |
| Repairs and Maintenance                     | 24,885           | 374              | 25,259           | 8,603            |
| Salaries and Benefits                       | 4,919            | 108,774          | 113,694          | 182,113          |
| Sales and Marketing/Advertising             | 36,922           | 6,888            | 43,810           | 52,986           |
| Small Tools & Equipment                     | 2,276            | 113              | 2,389            | 989              |
| State Unemployment                          | 15               | 741              | 756              | 0                |
| Storage and Warehousing                     | 0                | 39               | 39               | 770              |
| Subcontract Labor                           | 1,716            | 7,148            | 8,864            | 12,862           |
| Supplies                                    | 737              | 3,456            | 4,193            | 4,559            |
| Taxes and Licenses                          | 5,092            | 928              | 6,020            | 1,007            |
| Telephone Expense                           | 901              | 357              | 1,258            | 324              |
| Travel Expense                              | 3,039            | 12,169           | 15,208           | 13,282           |
| Utilities (62300)                           | 1,886            | 3,217            | 5,103            | 5,070            |
| <b>Total Operating Expenses</b>             | <b>197,340</b>   | <b>235,768</b>   | <b>433,108</b>   | <b>565,606</b>   |
| <b>Operating Income</b>                     | <b>(149,850)</b> | <b>(254,084)</b> | <b>(403,934)</b> | <b>(503,657)</b> |
| <b>Other Income / (Expense)</b>             |                  |                  |                  |                  |
| <b>Total Other Income / (Expense)</b>       | <b>0</b>         | <b>0</b>         | <b>0</b>         | <b>7,411</b>     |
| <b>Net Income</b>                           | <b>(149,850)</b> | <b>(254,084)</b> | <b>(403,934)</b> | <b>(558,195)</b> |

# Balance Sheet

## Panacea Oyster Co-Op Corporation As of December 31, 2018

DEC 31, 2018

### Assets

#### Current Assets

##### Cash and Cash Equivalents

|  |                   |
|--|-------------------|
| PMB - Operating Account                | 26,789.72         |
| PMB - Money Market Account             | 100,112.61        |
| PMB - Seed Account                     | 4,452.16          |
| <b>Total Cash and Cash Equivalents</b> | <b>131,354.49</b> |

|                             |                   |
|-----------------------------|-------------------|
| Accounts Receivable         | 87,465.60         |
| Petty Cash                  | 1,000.00          |
| Prepaid Expenses            | 2,955.00          |
| Undeposited Funds           | 3,300.00          |
| Inventory - Spat            | 17,469.98         |
| <b>Total Current Assets</b> | <b>243,545.07</b> |

#### Fixed Assets

|   |                   |
|---|-------------------|
| Accumulated Depreciation                          | (168,452.00)      |
| Land and Buildings: Processing Plant              | 4,200.00          |
| Land and Buildings: Spring Creek Marina           | 287,422.63        |
| Office Equipment, Furniture & Fixtures            | 435.39            |
| Machinery and Equipment - Processing Equipment    | 16,090.00         |
| Land and Buildings: Crab Plant - 1599 Coastal Hwy | 88,357.87         |
| Machinery and Equipment - Nursery                 | 58,057.75         |
| Spring Creek Marina Improvements                  | 78,103.00         |
| Machinery and Equipment - Icemaker                | 15,437.12         |
| Machinery and Equipment - Cooler                  | 45,000.00         |
| Machinery and Equipment - Truck                   | 37,642.00         |
| Machinery and Equipment - SEPA                    | 31,389.20         |
| Machinery and Equipment - Oyster Gro              | 44,471.80         |
| Panacea Property Improvements                     | 9,643.00          |
| <b>Total Fixed Assets</b>                         | <b>547,797.76</b> |

#### Long Term Assets

|                               |                  |
|-------------------------------|------------------|
| Accumulated Amortization      | (549.00)         |
| Deposits                      | 28,314.00        |
| Loan Closing Costs            | 32,943.70        |
| <b>Total Long Term Assets</b> | <b>60,708.70</b> |

|                     |                   |
|---------------------|-------------------|
| <b>Total Assets</b> | <b>852,051.53</b> |
|---------------------|-------------------|

**Liabilities and Equity****Liabilities****Current Liabilities**

|                                  |                   |
|----------------------------------|-------------------|
| Accounts Payable                 | 68,163.00         |
| Accrued Expenses                 | 45,839.87         |
| Credit Card Payable              | 721.36            |
| Rounding2                        | (75.00)           |
| PMB - Petty Cash                 | 2,886.58          |
| PayPal                           | 1,305.68          |
| <b>Total Current Liabilities</b> | <b>118,841.49</b> |

**Payroll Liabilities**

|                                  |                 |
|----------------------------------|-----------------|
| Salaries and Wages Payable       | 0.06            |
| Payroll Liabilities              | 913.90          |
| Employee Deductions Payable      | 1,100.41        |
| <b>Total Payroll Liabilities</b> | <b>2,014.37</b> |

**Long Term Liabilities**

|                                    |                   |
|------------------------------------|-------------------|
| Mortgage Payable                   | 100,000.00        |
| Notes Payable                      | 127,770.00        |
| PMB Loan Payable                   | 644,659.68        |
| <b>Total Long Term Liabilities</b> | <b>872,429.68</b> |

|                          |                   |
|--------------------------|-------------------|
| <b>Total Liabilities</b> | <b>993,285.54</b> |
|--------------------------|-------------------|

**Equity****Capital Accounts**

|                                 |            |
|---------------------------------|------------|
| A.I.S.G., Inc.                  | 56,000.00  |
| AJJ-Jackson, L.P.               | 308,000.00 |
| Allen K. Nobles                 | 57,500.00  |
| Arctic Champion, LLC            | 53,000.00  |
| Cheryl Alford                   | 10,600.00  |
| Chester Murray, III             | 26,500.00  |
| Deborah W. Bunnell              | 54,500.00  |
| F.I.C.P.R.                      | 336,000.00 |
| Frank Rudd                      | 26,500.00  |
| Jack Romberg                    | 26,500.00  |
| James Baugh                     | 265,000.00 |
| James G. Balaschak, TTEE        | 43,900.00  |
| Jerry Moore                     | 10,000.00  |
| Johnson Magrath & Partners, LLC | 107,500.00 |
| Len Romberg                     | 15,900.00  |
| Liz McFadden                    | 10,600.00  |
| Millard Pate                    | 5,000.00   |
| Robert Seidler                  | 10,000.00  |
| Robin Olin                      | 10,000.00  |
| Salty Shores, LLC               | 33,600.00  |

DEC 31, 2018

|                                       |                     |
|---------------------------------------|---------------------|
| Todd H. Sperry                        | 70,400.00           |
| Vic Cormier                           | 15,900.00           |
| <b>Total Capital Accounts</b>         | <b>1,552,900.00</b> |
| Current Year Earnings                 | (403,933.92)        |
| Retained Earnings                     | (1,157,300.09)      |
| Series A Dividend Payments in Arrears | (132,900.00)        |
| <b>Total Equity</b>                   | <b>(141,234.01)</b> |
| <b>Total Liabilities and Equity</b>   | <b>852,051.53</b>   |



# Florida Agricultural and Mechanical University

Tallahassee, Florida 32307-3200

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*Excellence with Caring*

OFFICE OF THE VICE PRESIDENT  
DIVISION OF RESEARCH  
410 FOOTE-HILYER ADMINISTRATION CENTER

Telephone: (850) 599-3531  
Fax: (850) 599-3952  
Email: [sponsor@famuedu](mailto:sponsor@famuedu)

January 31, 2019

Ms. Katherine Waldron  
Chief Executive Officer and Chair  
Panacea Oyster Co-op Corporation  
102 Ben Willis Road  
Crawfordville, FL 32327

Dear Ms. Waldron:

The purpose of this letter is to confirm Florida A&M University's commitment to Dr. Victor M. Ibeanusi to participate as a Principal Investigator on behalf of the Board of Trustees for Florida Agricultural and Mechanical University (FAMU), as a sub-recipient with Panacea Oyster Coop the project entitled "Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay". We are committed to carrying out the responsibilities as indicated in the Statement of Intent to Establish a Consortium Agreement, and in administering the sub-award in accordance with the rules, regulations, and requirements of the sponsoring agency.

This proposal has been reviewed and approved by Florida A&M University's Office of Sponsored Programs, Division of Research. FAMU is prepared to negotiate and enter into any subsequent consortium/subcontract agreement resulting from this proposal.

This letter certifies that Florida A&M University is not delinquent on any federal debt, nor is the university presently debarred, proposed for debarment, declared ineligible or voluntarily excluded from any covered transaction by a federal department or agency.

Sincerely,

Charles A. Weatherford, Ph.D.  
Interim-Vice President for Research

# Attachment C

## Resumes



**Katherine Waldron**  
703-371-7910  
waldron.katherine@gmail.com

***Professional Experience:***

**CEO and Chair, Panacea Oyster Co-Op Corporation (June 2018-present):** Manage the Oyster Co-Op, based in Wakulla County, for approximately 20 ranchers to provide them with the processing, distribution and sales vehicle to help them succeed in their oyster business. Within six months was able to turn from a negative gross profit to a positive gross profit, bring processing in-house, become the first Florida oyster farm to be certified by Whole Foods, as well as build the sales channel from two distributors to five, while also decreasing costs of delivery.

**Co-owner Northway Coastal Industries Inc. (2017-present):** Manager of three aquaculture leases in Oyster Bay, Wakulla County, Florida. One of largest oyster ranchers in Florida and member of Panacea Co-op growing more than one million oysters per year.

**Palm Beach Port Commissioner (2017-present):** Appointed Chairwoman, January 2019. Elected in four-way, district wide race to office of Palm Beach Port Commission in August 2016. The Port of Palm Beach is the fourth busiest container port of Florida's 14 deepwater ports, the most efficient port in the U.S. and the 18<sup>th</sup> busiest container port in the U.S.

**Florida Realtor, Scuttina Signature Realty, Boca Raton (June 2015 – Present):** Commercial and luxury real estate agent with Illustrated Properties.

**Co-founder and CMO, Gamxing® Inc., January (2013-2016):** Co-founded regulatory online training games for multiple industry sectors, including healthcare. Data analytics system provided with the games, provided managers with in-depth employee statistics, customizable games and general trend analysis.

**Founder and CEO, Waldron and Associates (formerly RW Consulting): MOWB, 2002-2015:** Business Development for small to mid-size information technology clients, including assisting small security related businesses in business development and growth initiatives.

**Director/Vice President Wholesale Services, Sprint 1999-2002:** Directed national sales force and grew department to \$500 million a year in sales revenues from beginning annual revenue of under \$30 million within four years. Sales included retail and wholesale voice and data services. Sales team exceeded revenue and margin targets every year, including receiving highest sales honor, President's Award in 2000 and 2001 and the Bronze Award in 1999.

**Executive Assistant Program, Sprint 1998-1999:** Placed in high profile executive assistant program for select group of rising executives.

**Senior Marketing Manager, Sprint 1991-1998:** Directed marketing programs for the Government Sales Division.

**Marketing Manager, Nortel Networks, 1987-1991:** Managed various outside agencies, including advertising agencies and suppliers.

**Senior Editor/Reporter, Phillips Publishing, 1983-1987:** Responsible for editing and managing reporting for newsletters and magazines devoted to the wireless industry.

***Awards – most recent:***

**Puerto Rican/Hispanic Chamber Palm Beach Countywide 2017 Community Service Award**

**Keiser University Community Outreach Award** for post hurricane efforts to aid Puerto Rico and USVI (2017)

**Gamxing® Plug and Play Finalist** (2013) for most promising young high-tech companies.

**Gamxing® Tech Coast Angels** Finalist (2103). Top ten finalist of more than 200 new tech companies in southern California. TCA is one of the largest angel fund groups in the U.S.

**Gamxing® CONNECT Fall 2013 Springboard** Awardee: Competed and awarded opportunity to participate in this program out of field of more than 100 start-up companies.

**Athena Pinnacle Award** Finalist 2014 -- <http://athenasd.org/pinnacle-awards/>

***Community Activities – most recent:***

Co-founder and co-chair of **Palm Beach County Cares** (2017) with incoming Dominican Republic Ambassador Robin Bernstein. Led countywide, public/private/community group to assist in relief efforts for Caribbean victims of 2017 hurricane season. Shipped 100 tons of supplies, 10 desalination units (providing 300,000 people with clean water for 15 years) and three large generators to service rural communities.

Founding vice president of **COMTO** (Conference of Minority Transportation Officials) in Palm Beach County (2017-2018).

Appointed by WPB Mayor to **WPB Parks & Recreation Advisory Committee** (2015-2017).

***Education:***

**MBA, Palm Beach Atlantic University**

**BA Economics/Minor Psych, University of Virginia.**



Victor M. Ibeanusi, PhD  
 Professor and Dean School of the Environment  
 Florida Agricultural & Mechanical University  
 Tallahassee, FL 32307-6600  
 Telephone: (850) 599-3500  
 Cell: 404-642-3295  
 Email: [vmibean@gmail.com](mailto:vmibean@gmail.com)  
[twitter@DeanIbeanusi](#)  
[LinkedIn](#)

**As the Dean, Professor Ibeanusi is the Academic Administrator of the undergraduate and graduate degrees at the School of the Environment. The academic degree areas include:**

- ❑ PhD Environmental Science
- ❑ MS Environmental Science
- ❑ BS Environmental Science
- ❑ BS Environmental Studies
- ❑ BA Environmental Studies

**Education:**

Ph.D. Molecular Biology (Research area: Applied Environmental Microbiology).  
 Atlanta University, Atlanta, GA. 1988; Thesis title: “Mechanisms of Heavy Metal Uptake in Microbial System” (Research Advisor include Dr. Joe Gould, Georgia Tech)  
 Ms. Biology (Area of Research: Environmental Biology). Atlanta University, Atlanta, GA. Thesis: “Water Purification Using Cyanobacteria” 1986  
 B.Sc. Microbiology (Area of research: Environmental Microbiology)  
 University of Lagos, Lagos Nigeria; Thesis: “Evaluation of *Escherichia coli* and *Bifidobacterium bifidus* as indicators of Fecal Pollution of Water in the Tropics” 1979

**Experiences at US Government National Laboratories**

- ❑ U.S. Environmental Protection Agency, Region 5. *Putting Microbes to Work on Subsurface Contaminants: A Focus on LNAPLs*. USEPA Land and Chemical Division, Region 5, EPA Publication Number 905-B-11-001
- ❑ U.S. Environmental Protection Agency, Region 5, Superfund Division, Innovative Systems and Technology Branch, Field Services Section, Chicago, IL Investigation on vapor/volatile intrusions and assessments of water quality policies
- ❑ National Exposure Research Laboratory, Research Triangle Park, Durham North Carolina. Investigation on bacterial degradation of Perflourinated Compounds (PFC) and Methods Development of PFCs in biological and environmental matrixes (Summer 2007).
- ❑ Space and Naval Warfare Systems Center (SPAWAR) Summer 2006, San Diego CA [Developed a research proposal in collaboration with the Applied Environmental Branch on 1,2,3-Trichloropropane, titled “ Extraction, Kinetics and Biodegradation Studies of 1,2,3-Trichloropropane in Soil and Sediments: A Comprehensive Studies of An Emerging Contaminant”]
- ❑ Oak Ridge National Laboratory, summer 2005, Oak Ridge, TN. Worked on Micro-array analysis project of bacterial communities and bacterial film formation
- ❑ Oak Ridge Institute for Science and Education. Fellow. Summer 2004, Chicago, IL. [Through this fellowship, I had the opportunity as the primary author to prepare the **Radionuclide Biological Remediation Resource Guide for the U.S. EPA**. This *guide* is part of a series of technology-focused documents prepared by the EPA, designed to address specific contaminants. The present guide outlines various potential phytotechnology and bioremediation methods for treating radioactive wastes.

- ❑ EPA National Exposure Research Lab, Athens, GA, 2000. Used the opportunity to conduct a field-based bioremediation demonstration using my patented bioremediation system developed in my lab at Spelman
- ❑ Department of Energy Savannah River Site, Aiken, SC, 1995-1999. This was the site for the field demonstration of my patent on bioremediation of toxic metals and hazardous wastes

### Job Experiences and Employment

|                         |   |
|-------------------------|---|
| Aug 1, 2013-present     | Dean School of the Environment, Florida A&M University  |
| Aug, 1998-July 30, 2013 | Founding Chair Environmental Science and Studies Program, Spelman College   |
| Aug, 2005-2013          | Professor of Biology, Spelman College   |
| Aug, 1998- July, 2005   | Associate Professor of Biology, Spelman College   |
| Aug, 1991-July 1998     | Assistant Professor of Biology Spelman College  |
| Aug. 1990-July, 1991    | Lecturer, Biology Department. Spelman College   |
| May 1988-July 1990      | Research Associate/Post Doc. Biology Department, Morehouse College  |
| Jan, 1981- July, 1982   | Microbiologist. United Nations-UNICEF Assisted Rural Drinking Water Supply and Sanitation Project for Developing Countries. Nigeria.        |
| June 1979-June 1980     | Epidemiological Studies on the spread of meningitis through portable water supplies. A World Health Organization sponsored project. Nigeria |

### Scholarly and Programmatic Achievements

#### Programmatic

- ❑ Program Director - Promoting the EnergyWaterFoodNexus as a new science enterprise
- ❑ Founding Chair Environmental Science and Studies Program Spelman College
- ❑ Initiated and led the efforts for developing the Environmental Health Minor at Spelman College
- ❑ Senior Fulbright Fellow
- ❑ Fulbright Fellow

### Funded Grants

- ❑ Center for Geospatial Ecology & Restoration- A partnership with US Forest Service, funded through the RESTORE Act  
Period: 2017-2022  
Amount \$1M
- ❑ Development of Innovative Predictive Models to Predict Biomineralization of Uranium Using Batch and Column Studies  
Agency- Department of Energy  
Period: 2017-2022  
Amount: \$1.2M
- ❑ Program Director and Summit Chair: EnergyWaterFoodNexus International Summits Source: DOE-ARPA-E, DOW Chemicals, DuPont Foundation, and other private sectors  
Amount: \$200,000
- ❑ Advancing Graduate Studies in Environmental Sciences and Policy through Interdisciplinary Research Programs  
Agency: Department of Education  
Amount: \$1,065,000M (approx.)  
Period: Aug. 2013- Aug. 2019
- ❑ The Atlanta University Center Sustainable Campus Community Initiative (ASCCI)  
Clark Atlanta University, Spelman College and Morehouse College  
Agency: Department of Energy  
Subcontract award: 12,500  
Period: 2010-2012
- ❑ Enhancement of Environmental Management Technology Using an Engineered Microbial Bioremediation System  
Agency: US Department of Energy  
Amount: \$200,000  
Period: Aug 2008-Sept 2010
- ❑ Enhancing Interdisciplinarity through an Environmental Sciences and Studies Program  
Agency: Andrew W. Mellon Environmental Post-Doctoral Fellowships for the Associated Colleges of the South  
Amount: \$123,145  
Period: 2009-2011
- ❑ Assessment of Environmental Impacts in Coal Mining Sites Using a Predictive GIS-Based Environmental Mining Decision Support System (EMDSS)

Agency: Office of Surface Mining

Amount: \$229,367

Period: Sept 2008-Aug 2010

- ❑ Enhancing Quality Undergraduate Training Through Advanced Mass Spectrometry

Agency: US Department of Defense/Department of the Army

Amount: \$217,286

Period: August 1, 2007-July 31, 2008

- ❑ Degradation of Munitions Waste Using a Consortium of Bacterial Strains

Agency: US Department of Defense/Department of the Army

Amount: \$103,678

Period: June 2004-June 2006.

- ❑ International Conference on Safe Water, South Africa

Agency: Exxon Mobil

Amount: \$20,000;

Period: Sept 1, 2004-August 2005

- ❑ Senior Fulbright Fellow. March 2004 - 2008

- ❑ Center for Environmental Sciences

Agency: US Department of Energy

Amount: \$500,000;

Period: June 2000-June 2002

- ❑ Providing a Scientific Base for the Combined Use of Bioremediation and Phytoremediation Processes in Removing Contaminants from Soil and Water

Agency: USEPA

Amount: \$20,000; Period: January 5-May 31, 2000

- ❑ Center for Environmental Sciences

Agency: US Department of Energy

Amount: \$2.5M; Period: June 1996-June 2000

- ❑ Enhancing Environmental Science Education at Spelman College

Agency: Rockefeller Foundation

Amount: \$124,680;

Period: June 1999- June 2000

- ❑ Bioremediation of heavy metals in coal pile runoffs.

Agency: US Department of Energy

Amount: \$363,010; Period: 1995-1999

- ❑ Enhancing Environmental Science Education and Activities

Agency: Xerox Corporation;

Amount: \$5,000;

Period: 1997-1998

- ❑ Bioremediation of Heavy Metals from Contaminated Soil and Water Using an Integrated Mixed Microbial System: A Cost-Effective Ecosystem Approach.

Agency: AT&T Foundation;

Amount: \$100,000;

Period: 1993-1995

- ❑ Undergraduate Research Opportunity Program

Agency: US EPA

Amount: \$1.58M;

Period: 1993-2012

- ❑ Enhancing Environmental Education

Agency: US EPA

Amount: \$20,000;

Period: 1993-1994

## Refereed Publications

- Ibeanusi Victor, Ashish P, Ashvini C, Jada H-G, Tyrik C, Landon T, Harley H, Oluchukwu O, Gang C, John S. Genome-Centric Evaluation of *Bacillus* sp. strain –ATCC55673 and Response to Uranium Biomineralization. Significances Bioeng Biosci.2 (3). SBB.000539.2018.
- Thasya Campbell and Ibeanusi Victor. Natural Droughts and Implications to Water Quality through Increased use of Fertilizers and the need for Public Policy to Support Ordinance changes in the Chesapeake Bay Watershed J Geogr Nat. Disaster 2016, 6:1
- Ibeanusi V, Microbial Responses to Long-Term Restoration and Sustainability of Sub-Surface Contaminants. J Bioremed Biodeg 2014, 5:4
- Ibeanusi VM, Jackson E, Coffen J, Jeilani Y (2012) Assessing Bioremediation of Acid Mine Drainage in Coal Mining Sites Using a Predictive Neural Network-Based Decision Support System (NNDSS). J Bioremed Biodegrad 3:148. doi:10.4172/2155-6199.1000148. .
- Ibeanusi, Victor (October 2011) *Putting Microbes to Work on Subsurface Contaminants: A Focus on LNAPLs*. USEPA Land and Chemical Division, Region 5, EPA Publication Number 905-B-11-001
- Yassin Jeilani, Beatriz Cardelino, and **Ibeanusi**, Victor. *Ring-Cleavage Rearrangement Reactions of Progesterone by Density Functional Theory and Triple Quadrupole Mass Spectrometry*. Journal of Mass Spectrometry April 2011.
- N. Ravi, V. Ibeanusi, Y. Jeilani. “Gas Phase Fragmentation Reactions of Phthalates” Book Chapter in “Phthalates: Chemical Properties, Impacts on Health and the Environment,” Invited contribution, *manuscript accepted March 2012*.
- Yassin A. Jeilani, Beatriz Cardelino and Victor Ibeanusi “Density Functional Theory and Mass Spectrometry of Phthalate Fragmentations Mechanisms: Modeling Hyperconjugated Carbocation and Radical Cation Complexes with Neutral Molecules,” *Journal of the American Society of Mass Spectrometry* **2011**, 22(11), 1999-2010.
- Yassin A. Jeilani, Beatriz Cardelino and Victor Ibeanusi “Hydrogen and Ring-Cleavage Rearrangement Reactions of Progesterone by Density Functional Theory and Triple Quadrupole Mass Spectrometry,” *Journal of Mass Spectrometry* **2011**, 46 (7), 625-634.
- Yassin A. Jeilani, Beatriz H. Cardelino and Victor M. Ibeanusi “Positive Chemical Ionization and Collision Induced Dissociation of Phthalates by Triple Quadrupole Mass Spectrometry: Multipathway Fragmentation Mechanism and Ab Initio Computational Studies.” *Journal of Mass Spectrometry* **2010**, 45( 6), 678-685.
- Victor Ibeanusi, Y. Jeilani, Samantha Houston, Danielle Doss, and Bianca Coley Sequential anaerobic–aerobic degradation of munitions waste, *Biotechnol Lett* (2009) 31:65-69, Springer Science-Business Media
- Spelman College Recycling Inventory . Victor Ibeanusi, Bridgette Fountain, Charita Montgomery, Elizabeth Adeyemi, Tiara Cunningham, and Topaz Sampson. *environmental biology (2009) 1: 1-6 Environmental Science & Studies Program, Spelman College Received November 24, 2009 /Accepted November 24, 2009 – This is a special in-class publication written by students in my Environmental Biology class (fall 2009)- attached*
- Jeilani, Y., and Ibeanusi VM. (2008) Advances in Sample Extraction Methods of Endocrine Disrupting Chemicals in Aquatic Environmental Matrices” In review
- **Editor** – Safe Water and Health: Rural Communities at Risk- Published as a special edition of the Journal of Environmental Monitoring and Restoration. ISSN 1542-7102;ISBN 0-9724579-0-9

- Ibeanusi Victor and Bernice Scott. 2004. A Cost-Analysis of a Bioremediation System Used in the Treatment and Removal of Metals from Wastewater. *Journal of Environmental Monitoring and Restoration*. Volume 1:139-144
- Ibeanusi VM, and Grab, DA. August 2004. *USEPA Radio nuclide Remediation Resource Guide*. EPA-905-B-04-001. Superfund Division. [www.epa.gov/region5superfund](http://www.epa.gov/region5superfund)
- Ibeanusi, V., April Hines, Adriana Solar, Laotian Hannon, Erica Garry, and E. Archibald. "Bioremediation of Metals from an Acid Mine Drainage at Cane Creek, Coal Valley Site". *Bioremediation of Inorganic Compounds* pp 53-59.
- Ibeanusi, V., Piney, D., Thompson, M., Jones, S., Gist, L., Buzzer, D., Smith, A., and Wilburn, B. 1999. "Assessment of Metal Recovery from Coal Pile Run Off Waters". *In Environmental Remediation Science and Technology*. ISBN 1-57477-069-1. PP 81-88. *Battle Press*.
- Ibeanusi, V.M. "Biological Process of Remediation Chemical Contamination of a Pond". 1998. *U.S. Patent NO 5,736,048*.
- Ibeanusi, V.M., and E.W. Wilde. 1998. "Bioremediation of Coal Pile Runoff Waters Using an Integrated Microbial Ecosystem" *Biotechnology Letters*. 11:1077-1079
- Ibeanusi, V.M., and E.R. Archibald. "Mechanisms of Heavy Metal Uptake in Mixed Microbial Ecosystem". *Bioremediation of Pollutants in Soil and Water*. American Society for Testing of Materials (ASTM) Publication. PP 191-203. 1995
- Ibeanusi, V.M., and E.R. Archibald. "Coupled Reduction and Removal of Heavy Metals from a Wastewater Using a Mixed Microbial Ecosystem". *Biodeterioration Research* 4:403-407. 1994.
- Ibeanusi, V.M., and E.R. Archibald. "Chromate Reduction and Removal from Simulated Pond Systems". *World Environment*. A Publication of the International Association of Science and Technology for Development. PP 140-142. Acta Press. Anaheim, Calgary, and Zurich. ISBN 0-88986-143-9. 1991.
- Bender, J., E. Archibald, V. Ibeanusi, and J. Gould. "Lead Removal from Contaminated Water by a Mixed Microbial Ecosystem" *Water Science and Tech.* 22:1661-1664. 1989
- Archibald, E, V. Ibeanusi, J. Bender, and J. Gould. "Use of Mixed Microbial Systems for the Removal of Metals from Contaminated Water" *Biodeterioration Research* 2:161-174. 1988
- Bender, J., and Ibeanusi, V.M. "Effects of Supplements on the Bioaccumulation of Lead in *Anabaena spp*" *Environ. Contam. Toxicology* 33:209-213.

#### SELECTED SCHOLARLY PAPERS PRESENTED

- Investigation of the Growth Response of Microbial Communities to Uranium Contaminated Environments, Victor Ibeanusi, Jada Hoyle-Gardner\*; Harley Howard; Landon Tucker, and Benjamin Mwashote, *American Society for Microbiology (ASM 2018)*, June 7-11, Atlanta, GA.
- Development of Microbial Mechanisms to Predict Mineralization of Uranium of Nuclear Sites and the Impacts to the Environment, Victor Ibeanusi, Tyrik Cooper\*, Jada Hoyle-Gardner, Haley Howard, Landon Tucker, and Benjamin Mwashote , *The International Conference on Solid Waste Technology and Management*, March 11-14, 2018, Annapolis, Washington, D.C. \*Student Presenters.
- "Omics" to the Rescue: Evaluation of Microbial Community Structure and Functions in Uraniferous Soils of the Savannah River Site (SRS), USA

- Ashvini Chauhan<sup>1</sup>, Ashish Pathak<sup>1</sup>, Rajneesh Jaswal<sup>1</sup>, Victor Ibeanusi<sup>1</sup>, Charles Jagoe<sup>1</sup>, John Seaman<sup>2</sup>, <sup>1</sup>Environmental Biotechnology Laboratory, School of the Environment, Savannah River Ecology Laboratory, University of Georgia, Aiken, SC- 29802, USA
- Analysis of Growth Dynamics and Protein Expressions of Microbial-Mediated-Biomineralization of Uranium Contaminated Soils at Savannah River Site, Aiken SC, Victor Ibeanusi<sup>1</sup> Jada Hoyle-Gardner<sup>1</sup>, Haley Howard<sup>1</sup>, Ashvini Chauhan<sup>1</sup>, Ashish Pathak<sup>1</sup>, Rajneesh Jaswal<sup>1</sup>, Charles Jagoe<sup>1</sup>, John Seaman<sup>2</sup>  
International Conference on Heavy Metals, University of Georgia, Athens, GA, July 22, 2018 - Wednesday, July 25, 2018
  - Improved Water Quality Treatment and Purification Using Signature Microbial Proteins: Enhancement based on a Predictive Artificial Neural Network Decision Support System. Presentation at Johnson Space Center Presentation, January 9, 2014, Houston TX
  - Innovative Water Quality Management Systems in Africa. Presented at the Africa Science, Technology & Entrepreneurship Systems Support Workshop. Sponsored by the International Council for Science. Palapye, Botswana, November 25-27, 2013
  - The Water Crisis: The Challenges and Opportunities for Increased Access to Safe Drinking Water in Africa. A plenary speaker presentation At the International Water Nexus Summit March 5-7, 2013. A presentation in commemoration of United Nation's 2013 Year of Water, North Eastern University, Illinois , Chicago
  - The Role of Microbial Systems in Environmental Restoration and Sustainability After Natural Disasters, A plenary speaker presentation at the International Conference on Clinical Microbiology & Microbial Genomics, Nov 11-14, 2012, San Antonio, TX
  - Sustainable Development Thematic Clusters: Transport, Mining Chemicals, Waste Management, Sustainable Consumption and Production, Forests and Natural Resources, Water. 2011. Presented at Capacity Building for the Environmental Protection Agency of Liberia. Organized by the National Council for Science and the Environment
  - The High Level National Economic Forum: Liberia's Transformation: Exploring Strategic Option for Inclusive Economic Growth and Sustainable Development in Liberia. Monrovia, Liberia, 2011
  - Remediation Technologies and Environmental Management of Groundwater Contaminants, 10<sup>th</sup> Annual U.S. Department of Energy Small Business Conference, August 11-14, 2009, Long Beach CA
  - V. Ibeanusi and Y. Jeilani, Mechanistic Insight in Fragmentation Characteristics of Macrolide Antibiotics, Oral Presentation, Georgia Academy of Science Annual Meeting, Atlanta (GA), April 3-4, 2009.
  - J. Coffen, Y. Jeilani, V. Ibeanusi, Fragmentation Pathways of Flurotelmor Alcohols by Triple Quadrupole Mass spectrometry, Oral Presentation, Georgia Academy of Science Annual Meeting, Atlanta (GA), April 3-4, 2009.
  - S. Mohammed , Y. Jeilani, and V. Ibeanusi, Tandem Mass Spectrometric Fragmentation of Erythromycin by Direct Insertion Probe: a Study of *m/z* 158 Precursors, Poster Presentation, Georgia Academy of Science Annual Meeting, Atlanta (GA), April 3-4, 2009.
  - M. LaFrance, Y. Jeilani, and V. Ibeanusi, Collision Induced Dissociation of Fenbutatin Oxide using Triple Quadrupole Mass Spectrometry, Poster Presentation, Georgia Academy of Science Annual Meeting, Atlanta (GA), April 3-4, 2009.



- ❑ Y. Jeilani, M. Allen, V. Ibeanusi “Tandem Mass Spectrometric Fragmentation of Phthalate Esters,” Oral Presentation, 60th Southeastern Regional Meeting of the American Chemical Society (SERMACS), Nashville (TN), November 12-15, 2008.
- ❑ Y. Jeilani, V. Ibeanusi “Collision Induced Dissociation of Fluorotelomer Alcohols” Poster, 60th Southeastern Regional Meeting of the American Chemical Society (SERMACS), Nashville (TN), November 12-15, 2008.
- ❑ Y. Jeilani, V. Ibeanusi “Implementation of Precursor Ion Scanning in the Identification of Multi Pathways in Mass Spectrometric Fragmentation,” Oral Presentation, Southeast Region Meeting NOBCCChE, Atlanta (GA), November 7-8, 2008.
- ❑ J. Coffen, Y. Jeilani, V. Ibeanusi “Fragmentation of Fluorotelomer Alcohols by Triple Quadrupole Tandem Mass Spectrometry,” Poster Presentation, Southeast Region Meeting NOBCCChE, Atlanta (GA), November 7-8, 2008.
- ❑ Y. Jeilani, V. Ibeanusi “Laboratory Infrastructure to Enhance Undergraduate Education,” Oral Presentation, HBCU-UP National Research Conference, Atlanta (GA), October 23-26, 2008.
- ❑ J. Coffen, Y. Jeilani, V. Ibeanusi “Negative-ion Chemical Ionization Tandem Mass Spectrometry of Fluorotelomer Alcohols,” Poster, HBCU-UP National Research Conference, Atlanta (GA), October 23-26, 2008
- ❑ V. M. Ibeanusi, Y. A. Jeilani, D. Doss, S. Houston ., Identification of shock stress proteins in response to RDX. Poster, *Southern Regional Meeting of the American Chemical Society*, Augusta (GA), November 2007.
- ❑ V. M. Ibeanusi, D. Doss, S. Houston, Y. A. Jeilani,. Improved degradation of RDX with an RDX-tolerant bacterial isolate. *Southern Regional Meeting of the American Chemical Society*, Augusta (GA), November 2007.
- ❑ V.M. Ibeanusi and Y. A. Jeilani. Correlation of shock stress proteins with RDX degradation in bacteria, Oral presentation, *Safewater 2006*, Rio de Janeiro (Brazil), October 23-27, 2006.
- ❑ Victor M. Ibeanusi, Bianca M. Coley, Yassin A. Jeilani. Bioremediation of RDX with a Consortium of Bacteria Isolated from Activated Sludge. Poster, *2006 Society for Industrial Microbiology Annual Meeting*, Baltimore (MD), July/August 2006.
- ❑ Yassin A. Jeilani, Deanna D. Cochran, Victor M. Ibeanusi. Anaerobic Degradation of RDX with Activated Sludge. Poster, *EPA Region 4 Symposium*, Atlanta (GA), April 2006.
- ❑ Y. A. Jeilani, V. M. Ibeanusi. Degradation of Munitions Waste Using a Consortium of Metal Resistant Bacterial Strains, Poster, International Conference of *Safewater 2005*. San Diego, CA, October 2005.
- ❑ Microbiological Examination of Water and Wastewater: A laboratory and field techniques workshop conducted at Mangosuthu Technicon, Durban, South Africa, January 24-Feb 2, 2003
- ❑ Tertiary Linkage Program; faculty training workshop for faculty and students at Manghosithu Technicon (MANTEC) Durban, South Africa, April, 2002
- ❑ Ibeanusi, V. Fares Elkatri, April Hines, Adrienne Harris, and Adriana Sola. “Use of an Integrated Bioremediation System in Metal Removal from Wastewater.” Presented at the **6<sup>th</sup> International Symposium on Environmental Geotechnology and Global Sustainable Development**. Seoul, Korea July 2-5, 2002.
- ❑ Ibeanusi, V., Hines, A, Sola, A., Griffin, M., Jones, C., Harris, A., Garry, E., and Hannon, L. National Council for Science and the Environment, Dec. 7-8, 2001. Washington DC.
- ❑ Ibeanusi, V., Hines, A, Sola, A., Jones, C., Harris, A., Garry, E., and Hannon, L. National Council for Science and the Environment, Dec. 7-8, 2001. Washington DC.

- National Council for Science and the Environment (NCSE) Dec. 7-8, 2000. Washington DC.
- ❑ Environmental Career Organization. Atlanta, October 26-28, 2000.
  - ❑ Model of Excellence Conference, Atlanta, GA. April, 2000. Student participants: LaToya Hannon and Adrienna Sola
  - ❑ Ibeanusi, V., Phinney, D., Thompson, M., Smith, A., and Wilborn. "Assessment of Metal Removal from Coal Pile Run off Waters". National Conference on Environmental Remediation Science and Technology. Greensboro, NC. Sept. 9-10, 1998.
  - ❑ Ibeanusi, V.M., Goodwin, S., and Brandon Wilborn. "The Impact of Coal Pile run-offs on Agricultural Crop Development". 97th General Meeting of the American Society for Microbiology. Atlanta, GA. May 17-21, 1998.
  - ❑ Ibeanusi, V.M., Michelle Thompson, and Amy Smith "Bioremediation of Coal Pile run-off Basins Using an Integrated Microbial Ecosystem". 97<sup>th</sup> conference of the American Society for Microbiology. Atlanta, GA. May 17-20, 1998.
  - ❑ Model Institution for Excellence (MIE) Conference, April 3—May 2, 1998. San Juan, Puerto Rico.
  - ❑ "Reduction, Treatment, and Disposal of Hazardous Wastes". Visiting Professor, University of Wisconsin - Madison. November 10-14, 1997.
  - ❑ Ibeanusi, V.M., and Michelle Thompson. "Bioremediation of Heavy Metals". Savannah River Site (SRS), Aiken, SC. August 1997.
  - ❑ Ibeanusi, V.M. "In-Situ Bioprecipitation of Heavy Metals from Sediment and Water by a Sulfate-Reducing Metal Resistant Bacterium". International Association and Technology for Development Conference. May 6-9, 1996. Gold Coast, Australia.
  - ❑ Ibeanusi, V.M., L.Gist, S. Jones, and E. Wilde. "Restoring Ecosystem Integrity of Heavy Metal Contaminated Sites Using an Integrated Ecosystem. International Conference on Bioremediation. European Society for Microbiology. Aberdeen, Scotland. September 10-12, 1995.
  - ❑ Ibeanusi, V.M., T. Heinemann, S. Jones, K. Eastern, and D. Cash. "Regression Analysis of Major Environmental Parameters Support Enhanced Bioremediation of Conglomerate of Heavy Metals Using an Integrated Ecosystem". Special Symposium on Emerging Technologies in Hazardous Waste Management".
  - ❑ Ibeanusi, V.M., T. Heinemann, and NaTakie Osborne. "Regression Analysis Supports Enhanced Bioremediation". 95th General Meeting of the American Society for Microbiology. May, 1995. Washington, D.C.
  - ❑ Ibeanusi, V.M., and Bernice Scott "Concepts in Industrial Ecology" AT&T Industrial Ecology Symposium. AT&T Bell Laboratories, Newark, NJ. June 5-6, 1995.
  - ❑ Ibeanusi, V.M., and Bernice Scott. "Mechanisms of Bioremediation of Toxic Metals: A cost-effective Approach" AT&T Bell Laboratories, Murray Hill, NJ. June 8-9, 1994.
  - ❑ Ibeanusi, V.M. "Concepts for Developing a Center for Environmental Studies at Spelman". 1994.
  - ❑ Ibeanusi, V.M., and Lynette Thomas\* (student presenter). "Bioremediation of Lead and Organic wastes using an Integrated Mixed Microbial Ecosystem" American Society for Testing and Materials (ASTM). October 14-15, 1993. Fort Worth, Texas.
  - ❑ Ibeanusi, V.M., and E. Archibold. "Coupled Reduction of Metal-Organic Pollutants by a Pb-Resistant Bacterium". May 1992. New Orleans. Presentation made at the national meeting of American Society for Microbiology.
  - ❑ Ibeanusi, V.M., and E. Archibold. "Detoxification and Removal of Hexavalent Chromium from Metal-Contaminated Effluents". World Environmental Conference. April 8-10, 1991. Calgary, Canada.

- ❑ Ibeanusi, V.M., and E. Archibold. “Removal of Lead from Contaminated Soil and water using a Mixed Microbial Ecosystem”. A national meeting of American Society for Microbiology (ASM). Anaheim, Ca. May 13-17, 1990.

**Sample of Student Presentations. Over 300 undergraduate students have completed research in my laboratory**

- ❑ Fragmentation mechanisms of steroid hormones using tandem mass spectrometry. Elizabeth I. Adeyemi\*, Shanon Belle, Yassin A. Jeilani, and Victor M. Ibeanusi
- ❑ Lead Removal with Metal Resistant Bacterial Strain in an Aquatic Environment. Samaira Dumpson, Shanon Belle, Yassin Jeilani, and Victor Ibeanusi
- ❑ Detoxification and Removal of Selenium from Aquatic Systems. Asia Bright, Shanon Belle, Yassin Jeilani, Victor Ibeanusi (Advisor)
- ❑ Mechanisms of Arsenic Detoxification and Removal from the Environment. Cheryl Triplett, Shanon Belle, Yassin Jeilani, and Victor Ibeanusi (Advisor)

**Awards, Recognitions, and Honors Related to Area of Expertise**

- ❑ Founder and Director: EnergyWaterFoodNexus – A new science enterprise
- ❑ The ***Fannie Lou Hamer Achievement Award*** – For significant contributions to the community beyond the Spelman Gates made in the spirit of service, justice, love and progress exemplified in the life of activist Fannie Lou Hamer, April 11 2006
- ❑ ***African-American Pioneer in Water & Environmental Sciences***. Exhibition on displayed at the Atlanta City Hall Atrium. March 8, 2005. Honored by the Mayor of Atlanta, Shirley Franklin and the City of Atlanta Department of Watershed Management. An honor in celebration of Black History Month, highlighting the accomplishments of African-Americans who have made significant contributions to the water and wastewater industries and environmental sciences.
- ❑ Senior Fulbright Fellow, 2004-2009
- ❑ Conference Chair, ***4<sup>th</sup> International Conference on Safe Water: Protecting the Watersheds in South America***. Oct 23-25, 2006, Rio de Janeiro, Brazil
- ❑ Conference Chair, ***3<sup>rd</sup> International Conference on Safe Water: Safe Water and Health: Exploring the Impacts of Global Demands and Natural Disasters***, Oct 20-21, San Diego Hilton Resort, San Diego, California.
- ❑ Conference Chair ***2<sup>nd</sup> International Conference on Safe Water*** Johannesburg, South Africa, November 4-7, 2004
- ❑ Conference Chair ***1<sup>st</sup> International Conference on Safe Water***, Atlanta, October 30-November 1, 2003.
- ❑ Member Council of Environmental Deans and Directors, National Council for Science and the Environment.
- ❑ Research presentation at the American Society for Microbiology (ASM) entitled “Removal of Metals from an Acid Mine drainage using a pH-Redox- Driven Bioremediation Process”. Released to the Press for its contributions to the scientific and general communities, May 2001
- ❑ Presidential Scholarly Award. Spelman College. 1999
- ❑ Fulbright Scholar. “Environmental Protection and Alternative Forms of Energy” Germany and Austria. June 1999
- ❑ Ibeanusi, V.M. “Biological Process of Remediating Chemical Contamination of a Pond”. 1998. **U.S. Patent NO 5,736,048.**
- ❑ Faculty Development Award. EPA National Exposure Research laboratory, Athens Georgia. 2000.

- ❑ Advisory Board Member, Savannah River Environmental Sciences Field Station, Aiken South Carolina. Managed by the US Department of Agriculture, the Forest Service, and Department of Energy. 1996-present.
- ❑ Invited to chair a special session on marine ecology at Denmark International Studies Program, with Special Emphasis on Environmental Studies. June 4-12, 1997
- ❑ AT&T Foundation Industrial Ecology Fellow. 1993-1995
- ❑ Research Paper Titled “Removal of Lead from Contaminated Soil and water using a Mixed Microbial Ecosystem”. 1990. [Selected by the American Society for Microbiology as a press release to scientific and lay press]

### Editorship

- ❑ Editor-in-chief, International Journal of EnergyWaterFoodNexus
- ❑ Radionuclide Biological Remediation Resource Guide  
US Environmental Protection Agency, Region 5
- ❑ Editor – Safe Water and Health – a special edition of the *Journal of Environmental Monitoring and Restoration*.
- ❑ Editorial Board Member – Journal of Environmental Monitoring, Restoration, and Sustainability (JEMRES)
- ❑ Editor, Science and the Environment, *The African Quest*

### Global and International Programs

These are summaries of global and international efforts that I initiated and directed:

- ❑ Advancing EnergyWaterFoodNexus as a new science enterprise, Initiated 2015 and still in progress
- ❑ **ECOWAS 2007.** *The International Conference on Safe Water: Building Sustainable Communities through Networks.* Abuja, Nigeria. This conference was focus on the ECOWAS (Economic Communities of West African States) region, where as in many parts of the world, open streams still serve as a one-stop-shop for drinking water, laundry, and recreational activities. This forum was to promote the Oguta Lake Watershed Project as a Model of Excellence for Lake Revitalization in Africa.
- ❑ **Safe Water 2006.** Rio de Janeiro, Brazil. Through VISION 21, the world community hopes by 2025 to have achieved a universal access to hygiene, sanitation and water services. We believe that this goal could only be attained through increased global awareness of the magnitude of the problem and finding regional solutions. The *Safe Water 2006* International Conference in, titled “*Safe Water and Health: Protecting Watersheds in South America*” was focused on protecting the watersheds in South America while addressing the impacts of the lack of access to safe water on public health.
- ❑ **Safe Water and Health:** Exploring Global Demands and Impacts of Natural Disasters, San Diego, California 2005. Focused on the increase in populations, global conflicts, and natural disasters, such as the Tsunami, which have compounded existing problems in many rural and urban communities of the world. Solutions to these issues were addressed.
- ❑ **Safe Water and Health:** Water for Life Water for all People. 2004, Johannesburg, South Africa. A focus on regional African problems on access to safe water and health
- ❑ **Safe Water and Health:** Rural Communities at Risk. 2003. Atlanta. Focused on global assessments of safe water issues of various regions of the world. Recommendations of solutions to solving these problems were presented and suggestions for creating a model for regional implementation were addressed.

### **Published Articles for the General Audience**

- ❑ *Endangered Ecosystems: The Impact of the New Millennium on the Environment* November 1998. Vol. 2 No 10, page 12  
[A review of global environmental challenges in this new millennium]
- ❑ *Cherry Blossoms in Winter: From El Nino With Love*. Jan. 1998. Issue 10, page 12.
- ❑ *Cloning and the Human Spirit: Have Scientists Crossed the Ethical Boundary* Feb. 1998 Issue 11, page 12.
- ❑ *The Global Environment: Africa Faces a Race Against Time*. Sept.15, 1997. p9
- ❑ *Greenhouse Gases and Global Warming: The African Dimension*. Issue 6, p 9.
- ❑ *The Final Countdown to Tokyo Global Warming Conference*. Nov. 15 1997. Issue 8, Page 9.
- ❑ *Climate Changes: The El Nino Fury*. Dec. 1, 1997. Issue 9. Page 9
- ❑ *River Blindness: An Ancient Scourge Continues to Devastate Africa*. April 1998. Vol. 2. No 4, page 9
- ❑ *Providing Good Water Quality in Africa: The Challenges and Solutions*. May 1998. Vol. 2 No 5, page 12.
- ❑ *Water Quality in Africa: African Villages and Rural Communities at Risk*. June 1998. Vol. 2 No. 6, pages 12.
- ❑ *Availability of Good Water Quality: African Villages and Rural Communities at Risk*. July 1998, page 12.
- ❑ *Human Ancestor from Africa – DNA*. August 15, 1997.

### **Invited Professional Presentations and Recognitions**

- ❑ Aspen Institute Leadership Seminar, 2016
- ❑ Special Lecture and IMAX Film Presentation. Fernbank Museum of Natural History. Life After Hurricane Katrina. February 7, 2007
- ❑ Discussant, *Climate Change and Hurricane Katrina*, Annual Conference of the National Conference for Science and the Environment, Washington DC, January , 2007
- ❑ Panel Presenter at the Annual Conference of the National Council for Science and the Environment. **Water for a Sustainable and Secure Future** . Washington DC Jan. 29-30, 2004
- ❑ Denmark International Education Conference. Copenhagen, Denmark. June 5-11, 1997.
- ❑ Ibeanusi, V.M., “Interdisciplinary Curriculum Development in Industrial Ecology” **AT&T Foundation Industrial Ecology Symposium** June 5-6, 1995.
- ❑ “Preserving our Future Today” Campus Executive Forum Academic Relations Program. USA EPA. Virginia, April 26-27, 1994.
- ❑ “Blueprint for a Sustainable Future with a Focus in Making Environmental Education a Top Priority. **Campus Earth Summit**. Yale University. January 18-20, 1994.
- ❑ “Protecting the Environment: Politics and Policies. Sao Paulo, Brazil. June 1993.
- ❑ “Chromate Reduction and Removal in Simulated Pond Systems” World Environment. Calgary, Canada. April 8-10, 1991.

### **Workshops/Seminars Conducted**

- ❑ Environmental Awareness Week “Safe Water and Health: Rural Communities at Risk”. April 18, 2004
- ❑ Creating Change: Environmental Studies and the Arts. April 4-5, 2003–
- ❑ Environmental Justice and Urban Development. April 2002
- ❑ Energy Demand: Politics and Policies. April, 2001
- ❑ Societal Impact on Energy and Climate Change. April 17-21, 2000

- ❑ Information and Technological Applications in Environmental Science Research and Education. April 23-24, 1999.
- ❑ Enhancing Liberal Arts Education through Environmental Sciences. April 21, 1998.
- ❑ Environmental Awareness Week. April 21-26, 1997.
- ❑ “Spelman College Environmental Leadership and Organizing Training Session. March 9, 1996.
- ❑ Population Growth and Development: The Role of African American Women April 3-7, 1995.
- ❑ Environmental Awareness Week. March 20-25, 1994.
- ❑ Enhancing Environmental Education. February 25, 1993.
- ❑ Spelman College Environmental Task Force Day”. October 21, 1992.

### **Reviews/Consultations**

- ❑ Nazarbayev University Research Review, 2018 ORAU
- ❑ National Science Foundation NRT Review, May 10-12, 2017
- ❑ U.S. Agency for International Development review to manage the Partnerships for Enhanced Engagement in Research (PEER) Program, which allows scientists in developing countries to apply for funds to support research and capacity-building activities in partnership with U.S. Government-supported colleagues on topics of importance to **USAID**. Since 2011, the program has awarded 254 grants totaling about \$55 million in more than 40 countries worldwide, June 2017
- ❑ Review Panelist. EPA GRO Program/STAR Program. 1993-2007
- ❑ Review Panelist. The Jack Kent Cooke Graduate Fellowship Program. March 15-17, 2002.
- ❑ Representative. Udall Foundation. Review of Scholarship applications for Environmental Science and Policy awards. 2001-Present
- ❑ Chapter reviews from *Conservation Biology: Concepts and Application* by George Cox. October 1996.

### **Teaching Effectiveness**

#### **Courses Developed and Taught**

- ❑ General Biology 112 – a second tier course for Biology majors
- ❑ Cell and Molecular Biology – a senior-level core course requirement for Biology majors
- ❑ Environmental Biology – a junior-level course – cross registered in Biology and Environmental Science
- ❑ Ecology – a core requirement for Environmental Science majors and an elective for Biology students
- ❑ Principles of Bioremediation – a field-based course on hazardous waste management and treatment
- ❑ Industrial Ecology
- ❑ Introduction to Environmental Science – a core requirement for Environmental Science majors
- ❑ Applications in Environmental Science
- ❑ Global Environmental Change
- ❑ Sustainability in the 21<sup>st</sup> Century

#### **Courses Reviewed**

- ❑ Sustainable Development
- ❑ Global Environmental Change
- ❑ Introduction to Environmental Health
- ❑ Introduction to Toxicology

- ❑ Toxicology – an elective course for environmental science and chemistry majors
- ❑ Environmental Chemistry – a core requirement of Environmental Science majors and as an elective for Chemistry students
- ❑ Soil and Atmospheric Science – an elective for Environmental Science majors, and elective for all science majors
- ❑ Introduction to Geosciences- an elective course for Environmental Science majors

**Professional Memberships**

- ❑ American Society for Microbiology
- ❑ Society for Industrial Microbiology
- ❑ International Society for Industrial Ecolog

# Attachment D

Published Article



# Hope on the Half Shell

Caretakers of a generations-old seafood business in the historic Georgia community of Harris Neck, a father and son look toward the promise of modern oyster farming to preserve a legacy—and a way of life—inextricably tied to the water

by André Gallant



photo: Bill Phelps

The team's farmed oysters almost ready for market.

**A Harris Neck morning rouses at its own pace.**

**Pine tops silhouette against a peach dawn slipping west over the salt marsh. Oak limbs droop over unpaved roads and delay daybreak like bedcovers pulled over sleepy heads. Nothing wakes**

faster than it must.

Silence and slowness so infuse this isolated corner of coastal Georgia, McIntosh County, roughly an hour south of Savannah, that tufted titmice trills overpower the sporadic grunt of diesel engines trucking workers to labors elsewhere. Hustle unfolds here in studied fashion, embodied full form by the slim frame of oysterman Earnest McIntosh Sr., who, at 7:00 a.m. on a mid-August Friday, sounds worried about losing minutes in the day but strides forward confident he can make up the time.







photo: Bill Phelps

Left to right: Earnest McIntosh Jr., Najay White, and Earnest McIntosh Sr. of E.L. McIntosh

"We're going to have to hurry," he says midglide across fescue surrounding his low-slung mint-green-colored home, passing a jon boat on his way to a backyard workshop. He wears a Prussian blue T-shirt tucked into jeans; a gold chain loops his neck and accentuates rich curls of gray hair. His call stirs his crew. His son, thirty-four-year-old Earnest Jr., trails behind, clutching a Styrofoam cup of molten gas station coffee. The resemblance to his father is uncanny, although an adolescence spent under football pads has yielded a tight end's shoulders. A nephew, twenty-year-old Najay White, the newest addition to the shellfishing team, is also about; he stretches after snatching a few extra winks in the passenger seat of his maroon sedan. They gather under a roof extending off a

walk-in cooler—a way station for market-bound oysters and crabs—to grab the work gloves and hip waders necessary for the day's labor.

“We won’t have much tide,” Earnest Sr., who is sixty-six, instructs. He knows that his shellfish investment—thousands and thousands of oysters stored in wire mesh cages cached along the maze of creeks that snake through the Lowcountry’s spartina expanses—requires his attention today, and most likely tomorrow, too. Officially, these will be the first farmed Georgia oysters to come to market. They also represent a sea change in how E.L. McIntosh & Son Seafood does business, a wholesale transition away from the wild harvest techniques of old to aquaculture, as science-based seafood farming is called.







photo: Bill Phelps

A view of the marsh.

Virginia, the Carolinas, and some Gulf of Mexico states have all seen oyster farming bolster their fishing industries in recent years. Throughout the twentieth century, overharvesting and environmental degradation decimated natural oyster populations around the country. Aquaculture has revived the ailing trade, especially over the last decade in the South, where new oyster farms now serve a proliferation of high-end raw bars opened in tandem with the bivalves' growing abundance.



Still, the renaissance has not benefited all equally. Some states have adopted aquaculture practices far more slowly than their neighbors. Georgia has taken a cautious approach as regulators attempt to balance the interests of sportfishermen and others who use the waterways. To start their operation, the McIntoshes advocated to the state's Department of Natural Resources and obtained a provisional oyster farming permit. Furthermore, African Americans, who made up much of the oyster industry's traditional workforce in the South, have been noticeably absent from the new boom. Historically, black watermen harvested oysters, and black women shucked and packed them for shipping to white-owned seafood businesses. Today black oyster farmers are as rare as natural pearls.





photo: Bill Phelps

Spraying off oyster cages.

**"Earnest has a real possibility to be a mentor to a lot of people who are interested in keeping their family legacy alive," says Mashama Bailey, chef at the Grey in Savannah, which opened in late 2014. Bailey first met the McIntoshes while working with the Southeastern African American Farmers' Organic Network, an organization dedicated to preserving African American agricultural heritage, to find local producers to feature on her menu. She found little in the way of black seafood providers beyond the McIntoshes. "There's so much possibility and potential," she says.**



The shift away from wild harvesting necessitates resourcefulness and attention to detail, but that's been de rigueur McIntosh practice for decades.

Earnest Sr. tosses gear into the bed of his truck and notes that the tide won't drain the river as low as it should. What's more, water will surge back from Sapelo Sound faster than he'd like. This limits the team's access to the cages and ability to get work done. So today's tasks—raising the cages and shaking and pressure washing the oysters to clean them of mud, barnacles, and seaweed—must be concluded in record time. Najay and Earnest Jr. accept their orders with a nod, and soon Earnest Sr.'s hunter-green pickup carries the men toward the water.





photo: Bill Phelps

The team at work.

**They've made this commute innumerable times, but there's a heightened urgency now as October approaches, when regulators open the oyster season and the McIntoshes can legally begin delivering the crop to keen restaurants, including the Grey and Decatur, Georgia's Kimball House.**

**The wild oyster harvests of old haven't delivered riches to the family. Harvesting a wild bushel—muddy, craggy clusters (oyster glommed on to oyster) native to the region's salt marshes and integral to Lowcountry roasts—requires hours bent over in the**

elements, cracking clusters apart with a metal tool. The tasks of farming, by contrast, can be planned, managed. What's more, a farmed oyster, single and beautiful, suitable for half-shell service at the finest restaurants, can fetch as much as four times the price.



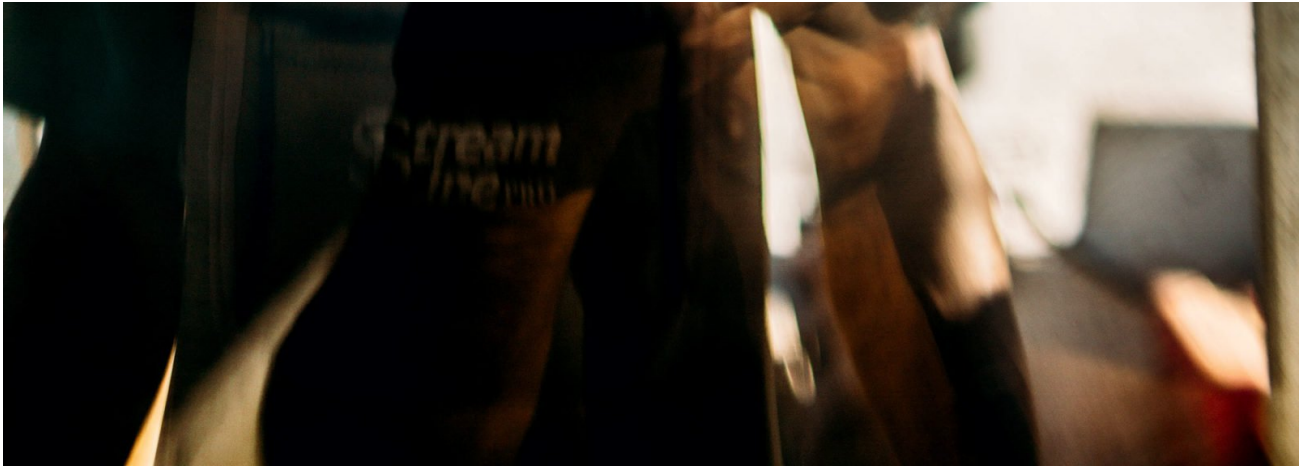


photo: Bill Phelps

Earnest Jr. surveys the water.

A better payday entices, of course, but there's a grander plan drawn up. Earnest Sr. believes oyster farming will lift him "above the fray," set him apart from the hardscrabble, cutthroat competition of chasing wild crabs and bushel oysters and create something that can last for decades to come. Earnest Jr. also casts his hopes ahead. He left Harris Neck—historically a community populated by the descendants of enslaved people—on a college football scholarship but returned after a few semesters. He rose through the ranks at Sea Tow, a boater's assistance service, but the job often kept him away from his wife and children, and he decided instead to join his father in the family business. There are worse ways to make a living, he says, than working alongside your old man. Now he's eager to help create a legacy that he can nurture and pass on to his seven children. Better yet, he says, "those oysters could put all my kids through college. Out there, that's my destiny."

The two-mile drive east on Harris Neck Road from Earnest Sr.'s house to where the McIntoshes dock their boats along the Barbour



River passes landmarks in family and community history. The path recalls ways of life that once were—ways of life that the family hopes to continue, if in a new way.





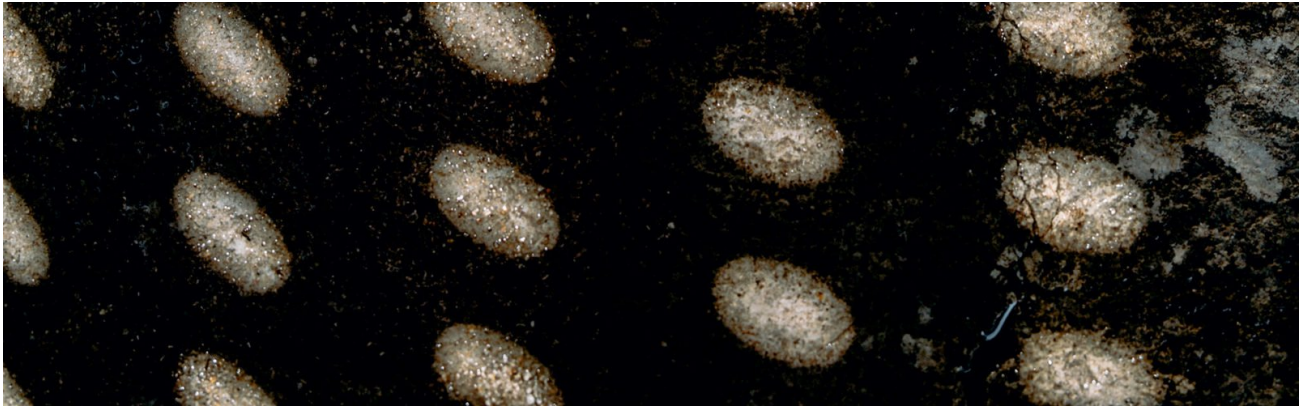


photo: Bill Phelps

Half-shell beauties.

Peer down Blue Crab Lane and a cinder-block building, painted red and in need of new shingles, is all that remains of the McIntosh Crab Plant, the life's work of Earnest Sr.'s father, Christopher McIntosh. At the plant's apex in the 1970s, the McIntoshes employed fifty area residents hauling crabs back to shore and picking meat. Earnest Sr. was the only one of seven sons to accept the inheritance, but he was not bequeathed the same prosperity. The plant closed in the early 1990s as demand for picked crab meat decreased, and as the century turned, fewer residents looked to the water for work. In response, Earnest Sr. added wild oysters to his business, long a part of Harris Neck culture. The old oyster canneries once employed many residents, and harvesting the shellfish for subsistence has been a community tradition for generations, part of a portfolio of catches—including shrimp, fish, and crabs—that people relied on to pad savings and fill bellies.



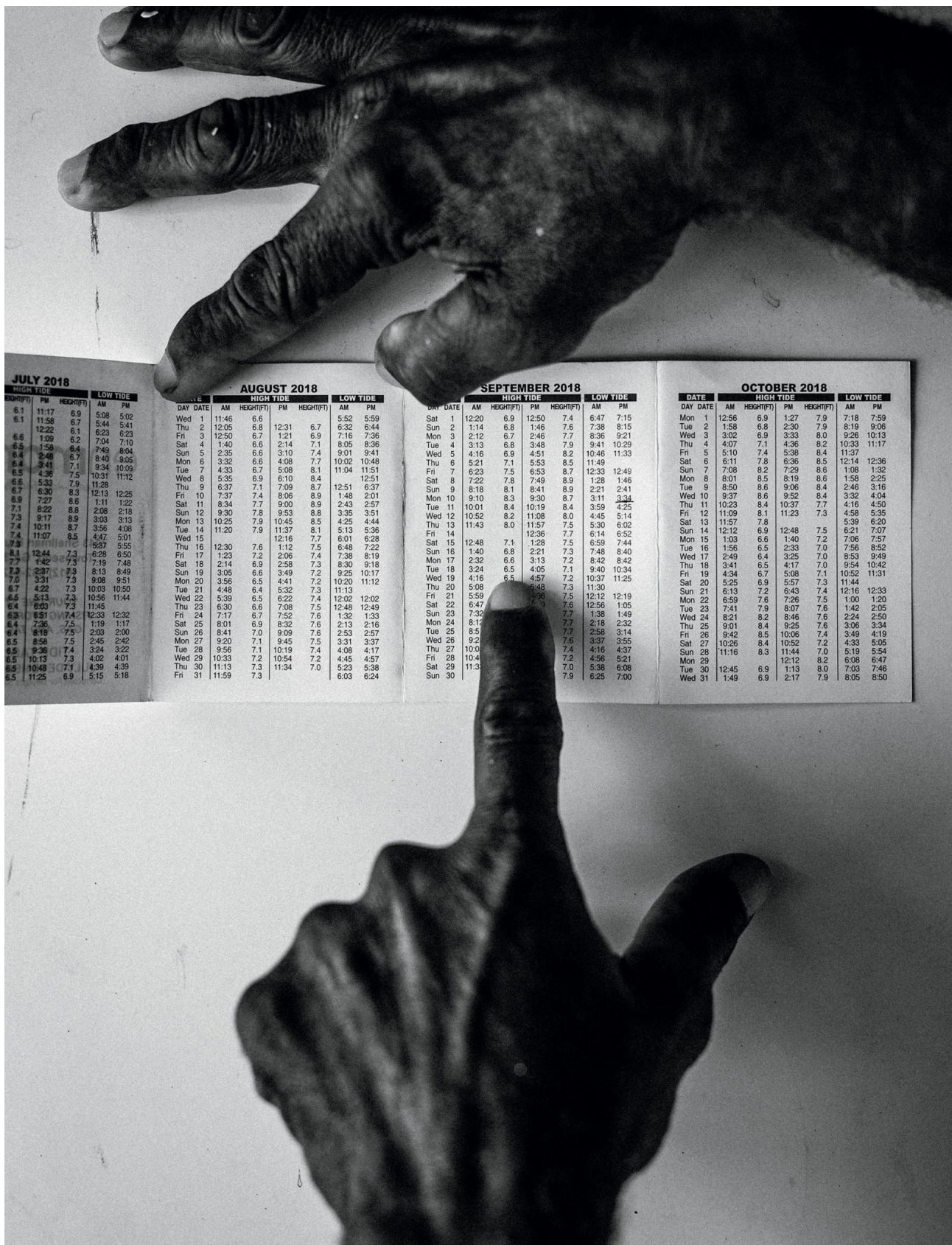


photo: Bill Phelps



Checking the tide charts.

“Around here, that’s all that’s ever been—seafood,” Earnest Sr. says. But sustaining a livelihood in places roiled by wave action, hurricanes, and human interference demands incredible effort. People in Harris Neck know that better than most.

The last stretch of the drive regularly reminds the community’s black residents what they’ve lost. The truck veers left through gates marked Harris Neck National Wildlife Refuge, an expanse of wetlands, ponds, and forests maintained by the U.S. Fish & Wildlife Service on land that the McIntoshes’ ancestors once called home. After the Civil War, Margaret Ann Harris, the property’s owner, willed the land now bounded as this refuge to a previously enslaved man she had owned, and soon a free community of fishermen and farmers thrived in relative peace for decades.

During World War II, the U.S. Department of War used eminent domain to acquire almost three thousand acres of Harris Neck to build an air base, paying owners a pittance for their loss. Churches and homes were destroyed to make way for barracks and hangars. Harris Neck’s residents believed that land would be returned to them once the warplanes left. Instead, when the war ended, federal officials offered the land to the McIntosh County government to use as an airport. County leaders, whose corruption the author Melissa Fay Greene documented in *Praying for Sheetrock*, a National Book Award finalist, used it for their own purposes, including turning one of the military buildings into a private club. The federal government eventually stepped in again, usurping the land and refashioning it as the current refuge in 1962. A long legal battle to return it to the



displaced families continues to this day.



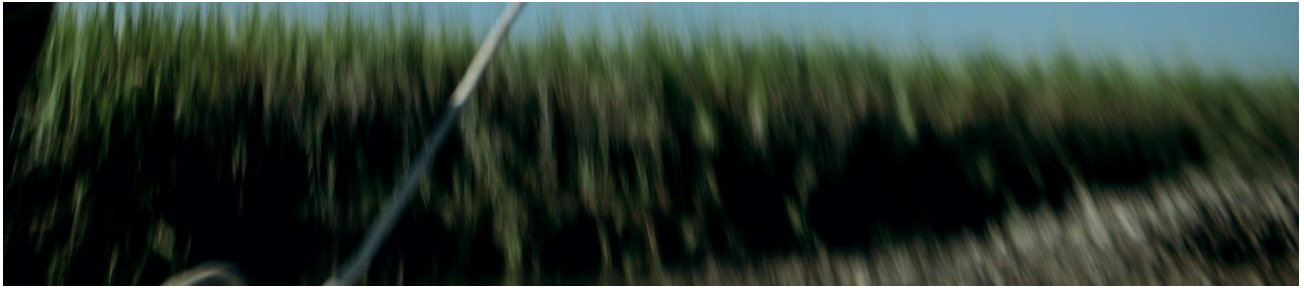


photo: Bill Phelps

Anchoring up.

The McIntoshes begin their labor each morning in the shadow of this history, but they have little time to be burdened by it. Work on the water promises freedom, self-determination, independence. Whatever struggle leads them to the river's edge is a crucible worth enduring.

"Nobody can take this away from us," Earnest Jr. says, surveying the marsh after his father parks the truck at the crest of a bluff overlooking the Barbour. He speaks as a man who chose a waterman's life and entrepreneurial toil beside his father instead of a salary or benefits. He speaks as a man for whom there is no other place to be. Auric threads of cordgrass unfurl before him, interrupted by the flow of tidewater egressing to the Atlantic Ocean a few miles beyond. "This is God's gift."

Free from a no-wake zone, the McIntoshes' fiberglass boat gains speed as it skims forward into the salt marsh toward their lease, known locally as Julienton Plantation. Low tide exposes the sloping banks of spartina islands and the tips of wild oyster clusters, razor sharp and gleaming white. Earnest Jr. decelerates, curves west into a narrow creek, and draws the motor to a halt. The boat's wake splashes against the edges of black rectangular cubes, now

surfacing as the water ebbs. "There they are," says Earnest Sr., green eyes alight like a father separated too long from his family: There are his oysters, secure in their cages.

He and Najay leap over the gunwale with a splash while Earnest Jr. remains on board, setting up a gas-powered pressure washer. Feet sinking into pluff mud, the men haul up a cage—roughly four feet by two feet—unhook a latch, and draw out mesh bags stuffed with oysters. These oysters have been growing here for more than a year after beginning their lives in a hatchery run by the University of Georgia. The McIntoshes buy young oysters from the hatchery when the shells are a quarter to a half inch long, then set them out in cages on their leased waterways in locations chosen for tide access and wave action. It's the McIntoshes' job to keep them safe and clean, shaking and washing the cages while the animals filter feed and fatten on phytoplankton.







photo: Bill Phelps

Oysters grow inside mesh bags.

**Earnest Jr. mans the washer nozzle and sprays glops of mud and small crabs off the oysters within the bags. The rinse reveals plump shells more than two inches long, tinged bronze by sediment flushed from upriver, coppery jewels encasing a briny gift. Each bag contains around 150 oysters. Each cage holds six bags, and there are fourteen cages in this particular creek. In a manner that defends details as an industry secret, Earnest Jr. casts his eyes**

over acres of marsh to the west and offers a vague population estimate. "From here to the tree line," he says, "we've got oysters everywhere."

Najay continues to spray as Earnest Jr. rests to inspect a wild oyster bed in the central part of the creek. This bed has been worked. Typically, wild Lowcountry oysters root like leaden bouquets reaching from the mud toward the sky. The McIntoshes broke down these clusters on previous trips, whittling off small exterior shells with metal bars to reveal a long, choice bivalve at the cluster's stem, then leaving it to fatten. The watermen call this a wild single. "It's a wild oyster we make look like it's farmed," Earnest Jr. says. While the McIntoshes were working to establish their farmed oysters, wild singles provided sustenance to the family: Mashama Bailey offered them a prized spot on her menu at the Grey. When the chef Sean Brock opened the Savannah location of his Husk restaurant in 2017, he did the same. But the process is tedious and difficult and less consistent, akin to chiseling gems out of the rough. If all goes according to plan, they'll now have thousands of beautiful oysters ready to ship to clients waiting in Atlanta and as far away as Detroit.

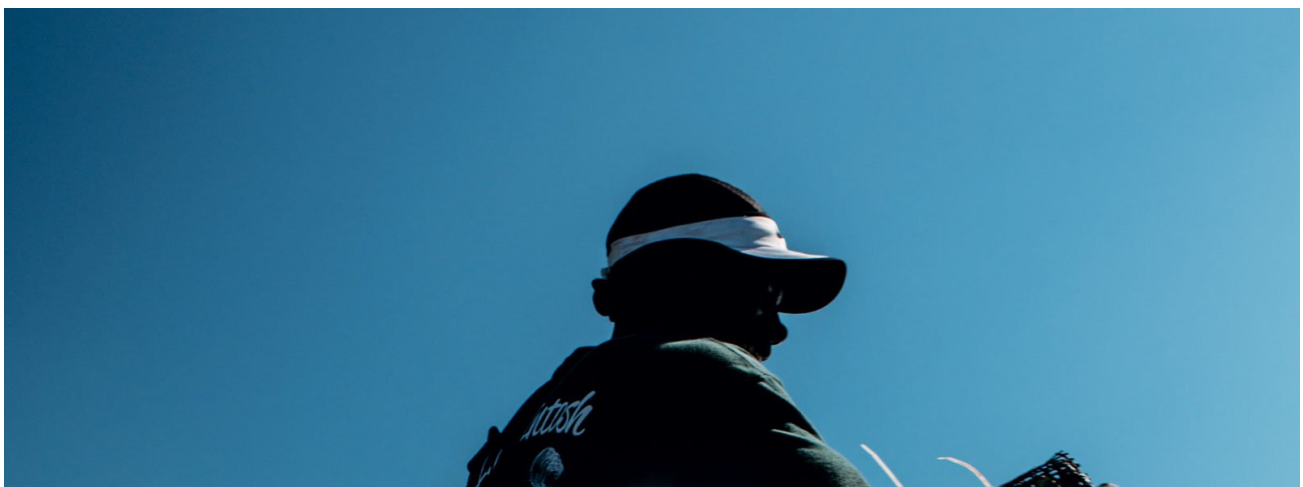






photo: Bill Phelps

Hoisting oysters for cleaning.

**They're also doing Harris Neck a promotional favor. Few foods travel bound with narrative as an oyster does. Perhaps a diner**

peruses a raw-bar menu, notes the appellation of Harris Neck, and asks herself where that place might be. An oyster communicates a story to the world in a slurp and invites eaters to visit its birthplace, even if only in their minds. The experience undergirds heritage in a world with scant interest in the past.

No matter what, there are no other oysters like Harris Neck oysters, the McIntoshes say, salty, with brilliant vegetal hints absorbed from the spartina. Aficionados call this the oyster's merroir, an analogue to wine's terroir, its flavor a representation of the particular environment in which it grows. "They're briny and then there's a sweetness too," Bailey says, and you can taste the marsh, a distinguishable "Lowcountry funk."

The boat returns to the dock with one bag of oysters, not for sale, just for care. Earnest Sr. thought the bag looked overfilled, which could stifle the animals' growth in the last weeks before market. Back at the workshed, the McIntoshes loose the oysters onto a metal table, cull for mortality, and divide the lot into two collections. They'll be refrigerated overnight here until the team heads back out to the sea farm tomorrow. Earnest Sr. then diverts his thoughts to other matters of the Hill—the waterman's term for dry land, anyplace where a boat can't float. Engines need greasing, as do customer relations.







photo: Bill Phelps

Earnest Jr. at the boat.



The water won't stray far from his thoughts. Harris Neck marshes have always been a source of peace for Earnest Sr., an escape where his mind settles into labor's calm. Though he oversees a nursery now, not a wilderness, his vigilance increases in step with his pride.

"You see oysters out there looking that good," he says, "it's hard to leave them."

The McIntoshes are sentinels of this estuary and its catch, be it wild or farmed. Their role abides. The chores and duties may change, but this family is determined not to.

# Attachment E

County Commission Support



December 5, 2018

Ms. Susan Skelton, Executive Director  
Triumph Gulf Coast, Inc.  
Post Office Box 12007  
Tallahassee, Florida 32317

Dear Ms. Skelton,

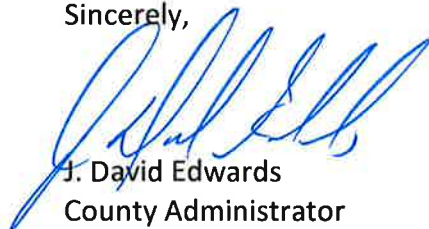
Wakulla County appreciates your understanding and consideration of projects that support pre-and post-disaster recovery efforts due to the devastating effects of Hurricane Michael. Like many other rural, coastal counties our emergency communication system and facilities are inadequate and not constructed for category 3 or higher hurricanes. As we assess our damage and observe the damage to our neighboring panhandle counties it becomes more evident that we must be prepared for such future catastrophic events.

Therefore, on December 3, 2018, the Board approved updates to its list of County priority projects and supported Triumph projects. Enclosed is the updated listed as well as a summary of the updates.

The Board also directed staff to schedule a workshop in February 2019, for discussion and citizen input on new or revised projects as well as prioritization of supported projects. Triumph will be advised as soon as possible should the Board make any future changes to our list of supported and priority projects.

Again, thank you for Triumph's support as we move forward on the road to recovery as well as preparing for the future.

Sincerely,



J. David Edwards  
County Administrator

Enclosures

/stk

C: Wakulla County Board of County Commissioners  
Mr. Bob Ballard, Executive Director, WEI-TCC  
Mr. Rob Olin, Panacea Oyster Co-op  
Ms. Sheree T. Keeler, Director of Intergovernmental Affairs

**BOARD OF  
COUNTY COMMISSIONERS**

**Charles Hess, Ph.D.**  
Chairman, District 5

**Mike Stewart**  
Vice-Chairman, District 3

**Ralph Thomas**  
District 1

**Randy Merritt**  
District 2

**Quincee Messersmith**  
District 4

**J. David Edwards**  
County Administrator

**Heather J. Encinosa**  
County Attorney  
(850) 224-4070

Office of Intergovernmental Affairs  
Post Office Box 1263  
Crawfordville, FL 32326  
(850) 926-0929 x 705  
[www.mywakulla.com](http://www.mywakulla.com)

**SUMMARY OF DECEMBER 3, 2018 UPDATES TO  
WAKULLA COUNTY'S LIST OF SUPPORT TRIUMPH GULF COAST, INC. PROJECTS**

**Updated Top Three County Projects**

| Priority and Project Title              | Applicant                   | Status   |
|---|-----------------------------|--|
| #1 First Responder Communication System | Wakulla County              | Pre-application was approved, and staff are developing final application.  |
| #2 New County Library                   | Wakulla County              | Pre-application was approved, and staff are developing final application. Project scope is being expanded to construct Library as a <b>Disaster Risk Shelter</b> . |
| #3 Wakulla County Learning Center       | Wakulla County School Board | The application was submitted, and discussions are ongoing between WCSB and Triumph staff regarding application revisions.   |

**Projects Removed and Reason:**

| Project Title   | Applicant                      | Status  |
|---|--------------------------------|---|
| Wakulla Career and Technical Education Center (was County Priority #1)        | Wakulla County School Board    | Removed from List of Supported Project due to Triumph approved funding agreement executed, and project is underway. |
| ADA Compliant Kayak/Canoe Launch St. Marks City Park (was County Priority #5) | City of St. Marks              | Application was not approved.   |
| St. Marks Board Walk Marine Manufacturing Training Center                     | City of St. Marks<br>WEI – TCC | Application was not approved. Project was withdrawn and new refined applications submitted.                         |

**Supported Projects Added**

| Project Title   | Applicant                        | Status   |
|---|----------------------------------|--|
| WEI Ocean Shellfish Nursery / Hatchery and Processing Facility  | WEI – TCC                        | Board supported and County list of supported Triumph Projects updated. |
| WEI Environmental and Technical Training Center <ul style="list-style-type: none"> <li>• Electric and Communication Utilities Training</li> <li>• Oyster Boat, Composite, and Mechanics Training</li> <li>• Unmanned Vehicle Systems (aka Drones) Training</li> </ul> | WEI – TCC                        | Board supported and County list of supported Triumph Projects updated. |
| Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay  | Panacea Oyster Co-op Corporation | Board supported and County list of supported Triumph Projects updated. |

WAKULLA COUNTY LIST OF SUPPORTED PROJECTS FOR TRIUMPH GULF COAST, INC. FUNDING  
Revised on December 3, 2018, (Original Submitted on November 6, 2017, Updated on January 8, 2018)

| <i>Organization</i>                          | <i>Project Title/Brief Description</i>  | <i>Est. Project Cost</i> | <i>Board Priority</i> |
|--|---|--------------------------|-----------------------|
| Wakulla County Board of County Commissioners | First Responder Communication System: Replace existing aging and unrepairable first responder communication system with one that can communicate with all federal, state and local first responder agencies as well as extending the range of communication within the County, i.e., national/state forest, metal building, etc. Our County is working with other 7-counties for potential regional project – with each County submitting their own application. (Updated to Priority #1 12-3-2018)   | \$2 M                    | #1                    |
|  | <b>New Library:</b> Construct a new, larger more centrally located library at the community center to meet the growing demands for new programs and provide space for participation at current and new events. The existing library will be repurposed and used for a much-needed Fire/EMS station in the Medart area, south of Crawfordville. A new library also has the potential to provide virtual classes not provided elsewhere in the County and could target underprivileged populations needing workforce skills. The County owns the property. Funds are needed for design, permitting, construction and furnishings. The Library will be designed and constructed to serve as a category 4 Risk Shelter (Pre-Disaster). <b>(Revised and updated to Priority #2 12-3-2018)</b>  | \$3.5 M                  | #2                    |
|  | <b>Medart Rec Park Improvements:</b> Improve the parking lot, restroom and concession facilities, and sports fields of Wakulla County's only recreation park for organized outdoor youth and adult sports. The County owns the Park. Funds are needed for any design, permitting and construction.  | \$2.0 M                  |                       |
|  | <b>Realignment of County Road 61/Shell Point:</b> The County has only two north-south bound highways from Capital Circle (Leon County) to US 98 (Wakulla County): US 319 is on the eastern side of the County and US 27 is on the western side. High traffic on both of these highways is attributed mainly to travelers working in Tallahassee and living in Wakulla. Internal arterial roads off of these highways leading to residential areas become clogged at peak times creating extremely hazardous conditions. Additionally, these highways provide the only access to Wakulla's coast, rivers, forest, etc. creating heavy traffic conditions on weekends and holidays. This proposed realignment would provide a north-south bound County Road centrally located in Wakulla County and would ease congestion and increase safety conditions. Funds are needed for design, permitting and construction. | \$2.5 M                  |                       |
|  | <b>Camp Indian Springs Campground Partnership:</b> This project proposes a partnership with Department of Environment Protection (DEP), in the event they purchase the Camp Indian Springs Property. The County proposes seeking funds for the improvement of existing buildings on the Camp Indian Springs Campground property and the design, permitting and construction of a RV/Tent camp ground.   | TBD                      |                       |
|  | <b>New Rec Park – US 319:</b> The County is in need of land to design, permit and construct a larger outdoor multi-use recreational Park on the north side of the County. This park has the potential to serve the region for youth and adult outdoor sports, i.e., softball tournaments, soccer tournaments, etc. Funds are needed for land acquisition, planning, design, construction and furnishings.   | \$20 M                   |                       |

WAKULLA COUNTY LIST OF SUPPORTED PROJECTS FOR TRIUMPH GULF COAST, INC. FUNDING  
Revised on December 3, 2018, (Original Submitted on November 6, 2017, Updated on January 8, 2018)

|  |   |          |           |
|--|---|----------|-----------|
| Wakulla County School Board                | <p><del>Wakulla Career and Technical Education Center: This project would provide training and job skills for the non-degree seeking student for emerging or high-demand jobs. WCSB owns the property and will staff the center once constructed. Funds are requested for design, permitting, construction and furnishings. (Removed from List 12-3-2018)</del></p> <p><b>Wakulla County Learning Center:</b> This project proposes a partnership with TCC for a campus in Wakulla County where students and adults may pursue an AA degree. WCSB owns the property and will staff the center once constructed in partnership with TCC. Funds are requested for design, permitting, construction and furnishings. <b>(Updated 12-3-2018, changed from Priority #2 to Priority #3)</b></p>   | \$5.7 M  | FUNDED    |
|  |   | \$3.4 M  | <b>#3</b> |
| City of St. Marks,                         | <p><del>ADA Compliant Kayak/Canoe Launch: To provide kayak/canoe access to the Wakulla River via the City Park. Increase recreational opportunities and enhanced visitor experience. Will also relieve kayak/canoe launching at the St. Marks Boat Ramp. The City of St. Marks owns the property. Funds are requested for design, permitting and construction. (Removed from List 12-3-2018)</del></p> <p><b>St. Marks WWTP</b> – Conversion of Grinders to Gravity Sewer: First a feasibility study (i.e., preliminary engineer report) will need to be conducted to determine if conversion is feasible and probable cost. Funds are needed for feasibility study/preliminary engineering report.</p> <p><del><b>St. Marks Board Walk:</b> Construct a boardwalk that will connect to the terminus of the St. Marks Bike Trail and provide an off-road multi-use pedestrian to the Fort, St. Marks Board Ramp, and back to the St. Marks Bike Trail terminus. The City of St. Marks own the property and the project is designed and permitted. Funds are requested for construction. (Removed from List 12-3-2018)</del></p>       | \$65 K   | Denied    |
|  |   | \$350 K  |           |
|  |   | \$900 K  | Denied    |
| Wakulla Commercial Fishermen's Assoc, Inc. | <p><b>A Partnership Reviving Apalachee Bay Oyster Reefs:</b> Shoreline restoration on oyster reefs to enhance commercial and recreational fishing; provide tidal, storm surge and coastal erosion protection, improve water quality; strengthen economy, social and environmental capital. Funds are requested for all stages of the project.</p>   | \$2.6 M  |           |
| Wakulla Environmental Institute            | <p><del><b>Marine Manufacturing Training Center:</b> A state-of-the-art multi-purpose facility that will function as an auditorium, conference center, manufacturing center, oyster seed hatchery and commercial kitchen for processing local Gulf Coast seafood products. WEI owns the property. Funds are needed for design, permitting, construction and furnishings. Total estimated project cost is \$22.7 M, seeking \$15M Triumph funds. (Removed from List 12-3-2018)</del></p> <p><b>WEI Ocean Shellfish Nursery / Hatchery and Processing Facility</b> that would provide the seed and education to entrepreneurs on how to grow shell fish crops, and provide the basis for safe, fresh shellfish processing to ensure the best product in available to customers worldwide. According to the WEI project summary there is no other facility of this kind available in Florida at an educational institution. Through planned partnerships, this program would offer an unparalleled ability to seed hundreds of entrepreneurs' operations and process them using revolutionary pasteurization technology. Funds would</p> | \$15 M   | WITHDRAWN |
|  |   | \$13.5 M |           |



WAKULLA COUNTY LIST OF SUPPORTED PROJECTS FOR TRIUMPH GULF COAST, INC. FUNDING  
Revised on December 3, 2018, (Original Submitted on November 6, 2017, Updated on January 8, 2018)

|  |  |         |  |
|--|--|---------|--|
|  | be used for professional engineering and architectural services, construction and furnishings. <b>(Added to List 12-3-2018)</b>  |         |  |
|  | <b>WEI Environmental and Technical Training Center</b> that would provide three distinct and separate training programs with the goal of creating small businesses and preparing talent for in-demand occupations that pay higher than state average wages. The programs would revolve around the three equal spokes of education (job training), conservation and recreation. The three separate programs are as follows and a separate Triumph application will be required for each:<br><br><ol style="list-style-type: none"> <li>1. Electric and Communication Utilities Training</li> <li>2. Oyster Boat, Composite, and Mechanics Training</li> <li>3. Unmanned Vehicle Systems (aka Drones) Training</li> </ol><br>Funds would be used professional engineering and architectural services, construction and furnishings of the classrooms. Each training is estimated to cost \$1.5 million. <b>(added to List 12-3-2018)</b>   | \$4.5 M |  |
| Gulf Specimen Marine Laboratories, Inc. (GSML) | <b>GSML expansion of infrastructure and operations</b> for adding courses that will lead to technical certificates in an array of marine subjects as well as marking new local marine products. Funds will be used to upgrade/expand the existing facilities, purchase of two vessels, and salaries and benefits for 11 planned new positions. It is anticipated that after three-years the course will be self-sustaining <b>(Added to List 1-8-2018)</b>   | \$3.9 M |  |
| Panacea Oyster Co-Op Corporation (Co-op)       | <b>Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay.</b> This project proposes the utilize property currently owned by the Co-op located in Panacea to develop a dedicated nursery, hatchery, algae farm and expand the Co-ops current post-harvesting operations through the use of innovative live pasteurization and flash freeze technologies. It is anticipated that this expansion could include training, education and support for more than 100 ranchers involving more than 150 acres of state water leases producing more than 190 million oysters per year within 7 years. This project proposes to provide transferable, sustainable workforce skills to participants, with a positive and profound impact especially among minority and disconnected communities with the County. FAMU has committed to helping the Co-op meet its K-20 education needs by providing a cadre of support, including contractual support and financial control. Funds would be used for professional engineering and architectural services, construction, furnishings and classroom instruction. <b>(Added to List 12-3-2018)</b> | \$19 M  |  |

# Attachment F

Chamber of Commerce Support



# WAKULLA COUNTY CHAMBER OF COMMERCE

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P. O. Box 598/23 High Drive, Crawfordville, FL 32326

Telephone: (850) 926.1848

January 22, 2019

Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

The Wakulla County Chamber of Commerce appreciates the opportunity to comment on the projects being considered for funding through Triumph Gulf Coast, Inc. The Panacea Oyster Co-op, Inc. is a member of our Chamber of Commerce.

Our Chamber of Commerce submits this recommendation to request that you support the Panacea Oyster Co-op in its efforts to obtain funding through the BP Triumph Grant. The Chamber has a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen the plant known as the "Panacea Crab Company" building. Opening the plant will aid in the expansion of oyster production and sales in our area. The oyster industry is expected to play a major economic role in Wakulla County with improved technology for cultivation.

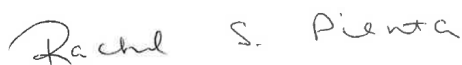
The reopening of this building for production and sales of oysters will create a variety of jobs, including high-level positions and a wide range of production-level jobs.

Coupled with the efforts of Florida A&M, the projects and research will help our environment, in addition to benefitting the economy of our county.

We feel that the partnership effort between Panacea Oyster Co-op and Florida A&M University will help our area to recover from the effects of Hurricane Michael, while supporting the emerging oyster industry and improving the nascent science of oyster cultivation.

Again, the Wakulla Chamber of Commerce would like to urge the approval of the BP Triumph Grant to the Panacea Oyster Co-op in partnership with Florida A&M University.

Sincerely,



Rachel S. Pienta, President

# Attachment G

Fresh From Florida Support



## FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

COMMISSIONER NICOLE "NIKKI" FRIED

---

January 30, 2019

Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear BPTriumph,

I am writing in support of the Panacea Oyster Co-Op Corporation (POCC) and Florida Agricultural and Mechanical University (FAMU) grant application for funding to develop a dedicated program to expand the oyster ranching industry in Apalachee Bay.

Since its inception, the Co-Op has been an active participant in working with Fresh From Florida and has been a member of the Fresh From Florida program for more than a year. They have participated in several of our key events and represented Florida's growing oyster aquaculture business in the Panhandle.

We believe their proposed project will help Florida remain in the forefront of the aquaculture industry and more specifically, the oyster market.

We look forward to continuing to work with the Co-Op to find ways to promote this important economic and environmental sector.

Sincerely,

**Paul Balthrop**  
Development Representative II  
Division of Marketing and Development  
Florida Department of Agriculture and Consumer Services

# Attachment H

## Other Letters of Support

## **Letters of Support**

### **1. Panacea Co-Op Board Members – seven members**

Dillon Hazel – Board member and Rancher

Robert Seidler – Board member and Rancher

Other Board members, Jim Baugh (sent in letter of support as an investor, see below), Keith Bowers (FAMU employee), Devon Northway (signed as Rancher), Katherine Waldron (applicant and contact), David White (see Carr, Riggs letter in Attachment B)

### **2. Panacea Co-Op Investors**

Jane Teague - Florida Institute, Executive Director

Frank Rudd

James Balaschak

Jim Baugh

Millard Pate

Robin Olin – Investor and Rancher

Vic Cormier

Len Romberg

Amy Recht

Deborah Bunnell

Liza McFadden

Matt Johnson

Todd Sperry – Oliver Sperry Renovation, Vice President

### 3. Oyster Ranchers

Letter attached with 13 signatures – this does not include those ranchers who signed as Board members and/or investors.

### 4. Community and Industry Support Letters

Florida Restaurant and Lodging Association

Pearl Oceans – Seafood Consultant

Wakulla County Commission (see Attachment E)

Wakulla Chamber of Commerce (see Attachment F)

Fresh From Florida (see Attachment G)

### 5. FAMU Letters of Commitment

President Robinson

Provost Edington

VP Weatherford



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As a member of the Board of Directors of the Panacea Oyster Co-op, I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Co-op.

I would like to urge you to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen two former plants in order to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor in Wakulla County.

With your support, we are sure that the Panacea Co-op will be major contributor to the economic development and job creation in this area.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Hazel", is written over a horizontal line.

Dillon Hazel

Member of the Board of Directors  
Panacea Oyster Co-op Inc.



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As a Founding member of the Board of Directors of the Panacea Oyster Co-op, I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Co-op.

I have been an active witness for 5 years ongoing watching the recovery of the bays ecosystem due to the reintroduction of the keystone species, the oyster, *Crassostrea virginica*. It alone has fueled the comeback of the entire bay ecosystem. We are in our work doing something that has never been done here, we are adding oysters not just taking them. Our oysters are grown in hatcheries and put out to grow, they spawn by the trillions a few times a seasons and show up as food, habitat and cover for hundreds of marine creatures. We sell our product but that is a small part of its life cycle, we employ residents, residents are starting support businesses. These oysters are keystone species deeply connected to the entire habitat, the humanized and natural one. Both ecosystems are being regenerated as it should be now and forever.

We are desperate for hatcheries and nurseries, desperate to hatch and grow those baby oysters that do their jobs so efficiently. There is a big window of hope with this all now but it will not last forever.

I would like to urge you to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen two former plants in order to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor in Wakulla County.

With your support, we are sure that the Panacea Co-op will be major contributor to the economic development, job creation and habitat restoration in this area.

Sincerely, *Robert Seidler*

Robert Seidler  
Founding member, Board of Directors  
Panacea Oyster Co-op Inc.





January 25, 2019

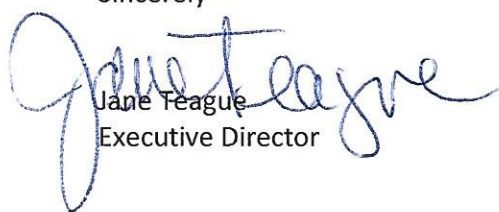
Board of Directors  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc., the Institute for Commercialization of Florida Technology appreciates the opportunity to express support for the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I encourage you to strongly consider the Panacea Oyster Co-op application to obtain funding through the BP Triumph Grant. As a part of the Florida innovation and economic development community, we have a strong interest in the creation and expansion of businesses the region and throughout the state. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in the area, and the oyster industry is expected to become a major economic driver for Wakulla County.

Sincerely

  
Jane Teague  
Executive Director



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

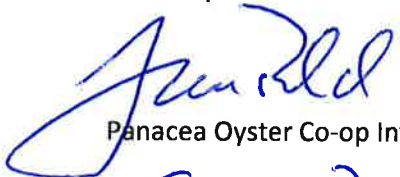
Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

  
Panacea Oyster Co-op Investor  
Frank Rudd



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

A handwritten signature in black ink, which appears to read "James Balaschak".

James Balaschak, Trustee  
Panacea Oyster Co-op Investor



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

A handwritten signature in black ink, reading "James C. Baugh". The signature is written in a cursive style with a large, stylized "J" and "B".

Panacea Oyster Co-op Investor



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

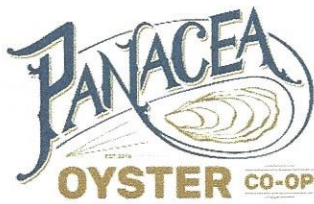
I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

I am sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

A handwritten signature in blue ink that reads "Millard E. Pate". The signature is fluid and cursive, with a small "ES" monogram at the end.

Millard E Pate  
mpate@lucravalde.com  
Panacea Oyster Co-op Investor



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

A handwritten signature in black ink, appearing to be "R. J. L.", written in a cursive style.

Panacea Oyster Co-op Investor





Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

Panacea Oyster Co-op Investor

A handwritten signature in black ink, appearing to be "K. Almon".

A handwritten signature in black ink, appearing to be "K. Almon".



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

A handwritten signature in cursive script, appearing to read "Leonard Phony".

Panacea Oyster Co-op Investor



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

A handwritten signature in blue ink, reading "Amy Jackson Recht". The signature is fluid and cursive, with the first name "Amy" being particularly prominent.

Amy Jackson Recht  
Panacea Oyster Co-op Investor



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

A handwritten signature in blue ink that reads "Deborah W. Bunnell". The signature is written in a cursive style with a large initial "D".

Panacea Oyster Co-op Investor





Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

*Liza McFadden*  
Panacea Oyster Co-op Investor

*Liza McFadden*



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

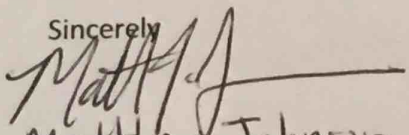
Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community, we have a major interest in the creation and expansion of businesses in our county. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely

  
Matthew Johnson  
Panacea Oyster Co-op Investor

1/27/19





401 Office Plaza Drive/Tallahassee, FL 32301/p (850) 386-6383/f (850)325-1186/Lic# CGC1515431

Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As an investor in the Panacea Oyster Co-op Inc. I appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Panacea Oyster Co-op.

I would like to urge your Board to support the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Big Bend community, we have a major interest in the creation and expansion of businesses in Wakulla county. Having been an employer for over twenty-five years in this region, I truly appreciate the challenges of job creation. The funding will allow the Panacea Co-op to renovate and reopen facilities in Wakulla County to expand the production and sale of oysters in our area. The oyster industry is expected to become a major economic factor for Wakulla County.

We are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely,

A handwritten signature in blue ink, appearing to read "Todd Sperry".

Todd Sperry  
Vice President  
Panacea Oyster Co-op Investor



Triumph Board Members  
Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Board Members,

As local oyster ranchers farming in the bays of Wakulla County and the adjacent areas and members suppling oysters to the Panacea Oyster Co-op for distribution, we appreciate the opportunity to comment on the project being considered for funding through Triumph Gulf Coast Inc. to the Co-op.

We would like to urge your support of the Panacea Oyster Co-op, in its efforts to obtain funding through the BP Triumph Grant. As a part of the Wakulla community and leaseholders in the bay area, we have a major interest in the expansion and stability of the oyster industry. The funding will allow the Panacea Co-op to renovate and reopen two former plants in order to expand the production and sale of oysters in our area. The efforts of the Co-Op to sell and distribute our oysters throughout Florida is essential to our future in the oyster industry. After Hurricane Michael, the ranchers in the Wakulla County area need the support of our Co-op in order to survive as an industry.

With your support, we are sure that the Panacea Co-op will be a major contributor to the economic development and job creation in this area.

Sincerely,

Rancher Member of  
Panacea Oyster Co-op Inc.

x *Colin Stenkewicz*  
Colin Stenkewicz

x *Aaron Corbin*  
Aaron Corbin

x *Devon Northway*  
Devon Northway

x *Jack Davis*  
Jack Davis

x *Jimmy Cassidy*  
Jimmy Cassidy

x *Dillon Hazey*  
Dillon Hazey

x *Matthew S. Michalski*  
Matthew S. Michalski

*GARY SEILER*  
GARY SEILER

x *DOUGLAS C NORTHWAY*  
DOUGLAS C NORTHWAY

x *Barbara Miller*  
Barbara Miller

x *Colleen Connell* CFE

x *Star Caulton*

x *Brian Lockwood*



# FLORIDA RESTAURANT & LODGING ASSOCIATION

---

January 30, 2019

Florida Triumph Gulf Coast, Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear BPTriumph,

I am writing in support of the Panacea Oyster Co-Op Corporation (POCC) and Florida Agricultural and Mechanical University (FAMU) grant application for funding to develop a dedicated program to expand the oyster ranching industry in Apalachee Bay.

Since its inception, the Co-Op has been an active participant with our organization and has helped promote Florida tourism, in their role as the largest a pioneering aquaculture co-op in Florida.

They have participated in several of our key events and represented Florida's burgeoning oyster aquaculture business in the Panhandle.

We believe their proposed project, will help the Florida tourism sector as they grow and continue to promote ecotourism for our state.

We look forward to continuing to work with the Co-Op to promote tourism in our state.

Sincerely,

A handwritten signature in black ink that reads "Carol B. Dover". The script is cursive and fluid.

Carol B. Dover, FMP  
President/CEO  
Florida Restaurant & Lodging Association



January 25, 2019

Meghan Russell  
Panacea Co-Op Consultant  
3255 N Williams St.  
Denver, CO 80205



Dear BPTriumph,

I am writing in support of the Panacea Oyster Co-Op Corporation (POCC) and Florida Agricultural and Mechanical University (FAMU) grant application for funding to develop a dedicated program to expand the oyster ranching industry in Apalachee Bay.

I have been in the seafood industry for more than 10 years and am the founder of Pearl Oceans. Pearl Oceans' focus is to help build brands of sustainable seafood products, while bringing them to the North American market place through innovative sales and marketing campaigns.

I currently work with the POCC on their sales to major distributors throughout the country. They are currently distributing or have been approved to distribute into several major high-end markets throughout the Southeast. These markets include Lucky's Markets and Whole Foods stores. In fact, POCC is the first and only oyster aquaculture producer to be approved for sales into Whole Foods.

The oysters being produced from Apalachee Bay are some of the best oysters available today and the demand for oysters of this quality is and will continue to be high. The demand for aquaculture products is increasing rapidly due to worldwide population growth and the declining availability of wild mollusks and fish.

According to a recent market research report "Aquaculture Products Market by Rearing Product Type, Culture, Species, Production Type, and Region - Global Forecast to 2023", published by MarketsandMarkets, the aquaculture market is projected to grow at a CAGR of 7.2%, to reach \$42.56 billion by 2023 from \$30.10 billion in 2018.

Thus, the demand and quality of the product, will ensure their proposed grant program not only is sustainable but will ensure that Florida continues to have a footprint in both the oyster industry and the aquaculture sector.

Sincerely,

A handwritten signature in black ink, appearing to read "m Russell", written over a horizontal line.

Meghan Russell



# Florida Agricultural and Mechanical University

TALLAHASSEE, FLORIDA 32307-3100

LARRY ROBINSON, Ph.D., PRESIDENT

TELEPHONE: (850) 599-3225  
FAX: (850) 561-2152  
TDD: (850) 561-2784

OFFICE OF THE PRESIDENT

January 26, 2019

Triumph Gulf Coast Fund  
BP Oil Spill Restoration Board  
Letter of Commitment

To Whom it May Concern:

I am pleased to provide our Letter of Commitment in strong support of Panacea Oyster Cooperative's proposed project entitled: *Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay*.

Florida Agricultural and Mechanical University (FAMU) has a long and rich history of educating students at the undergraduate, graduate, doctoral and professional levels and preparing them to have profound impacts on society after graduation. Further, FAMU offers a wide array of skills and capabilities to assist our clients in meeting their research, technology and workforce needs. It is precisely because of our comprehensive faculty base, our extensive operational support for research and our growing graduate student population that makes our partnership on this proposal unique.

For example, for the past fifteen years FAMU has been awarded funding from the National Oceanic and Atmospheric Administration (NOAA) that established the Environmental Cooperative Science Center (ECSC), which supports research areas in Ecosystem Processes, Forecasting and Modeling, Human Dimensions, and Ecosystem Characterizations. Established in 2001 as part of the NOAA Educational Partnership Program, ECSC was charged to address ecological and coastal management issues at specific National Estuarine Research Reserves (NERR) and the Florida Keys National Marine Sanctuary.

In 2016, NOAA approved FAMU to lead an interdisciplinary and multi-institutional team and establish the NOAA Center for Coastal and Marine Ecosystem (CCME). CCME is funded at \$15 million over a five- year period which will allow the FAMU-led partnership to make profound national impacts on coastal and marine ecosystem education, science and policy. Additionally, we have years of research and outreach experience in the gulf coast region including issues associated with the BP oil spill.

Most recently, we have established the Center for Geospatial Ecology and Restoration (CGER). Through a partnership with the USDA Forest Service, we have received funding from the Restore Act that focuses on the development and distribution of applied geospatial technology and solutions for restoration and conservation of terrestrial and aquatic ecosystems as well as training the next generation of geospatial scientists and professionals. This center could provide geospatial data describing oyster ranching across the gulf coast region, identify contaminant hot spots and integrate systems-based research and education for aquaculture solutions

The experiences described above form the basis of my full support of this project.

Sincerely,

Larry Robinson, Ph.D.  
President

FAMU IS AN EQUAL OPPORTUNITY/EQUAL ACCESS UNIVERSITY





# Florida Agricultural and Mechanical University

TALLAHASSEE, FLORIDA 32307-3100

OFFICE OF THE PROVOST AND  
VICE PRESIDENT FOR ACADEMIC AFFAIRS

TELEPHONE: (850) 599-3276  
FAX: (850) 561-2551

January 26, 2019

Triumph Gulf Coast Fund  
BP Oil Spill Restoration Board

RE: Letter of Commitment:

As the Provost and Vice President of Academic Affairs at Florida Agricultural and Mechanical University (FAMU), I am pleased to provide our letter of Commitment in strong support of Panacea Oyster Cooperative's proposed project entitled: *Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay*,

As the fiscal entity and partner, FAMU as a Land Grant Institution, is uniquely positioned to leverage this funding source to improve the economic condition at Wakulla by targeting K-20 education improvements, developing a dedicated science-based marine research and education center of excellence that will spur the resurgence of economic development – vis-à-vis oyster ranching and jobs. FAMU has extensive knowledge skills and abilities to meaningfully address K-20 educational needs, extensive legal depth to examine the efficacy of future federal policies regarding environmental restoration, as well as extensive scientific acumen in areas of water quality, marine systems and estuary propagation.

To ensure the sustainability of the proposed project beyond the life of this funding, FAMU will be committed to absorbing the two faculty lines requested in this proposal, and providing resources to leverage the K-20, and research programs described in this proposal.

Please feel free to contact me if you have any questions regarding our role on this important environmental and economic proposal, led by Dr. Victor Ibeanusi, FAMU-Dean, School of the Environment.

Sincerely

Maurice Edington, Ph.D.  
Provost and Vice President of Academic Affairs





# *Florida Agricultural and Mechanical University*

Tallahassee, Florida 32307-3200

*Excellence with Caring*

OFFICE OF THE VICE PRESIDENT  
DIVISION OF RESEARCH  
410 FOOTE-HILYER ADMINISTRATION CENTER

Telephone: (850) 599-3531  
Fax: (850) 599-3952  
Email: [sponsor@famou.edu](mailto:sponsor@famou.edu)

January 30, 2019

Triumph Gulf Coast Fund  
BP Oil Spill Restoration Board

RE: Letter of Commitment

To Whom It May Concern:

I am pleased to provide this Letter of Commitment for strong support of the Panacea Oyster Cooperative for their proposed project entitled: *Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay*

As the fiscal entity on this proposed project, and as a Land Grant Institution with decades of history in aquaculture research and programs, and especially on the Florida's Gulf Coast, we are convinced that this project will increase the rate of ecosystem restoration and serve to advance economic growth and diversification in Wakulla County and surrounding areas with profound positive impacts among minority and disconnected communities in the county through new jobs.

As the fiscal entity on this project, Florida Agricultural and Mechanical University will provide contractual support and financial control to ensure the overall success of this project. As part of our commitment, we would provide matching funds totaling \$1,446,246 in support of this proposed project.

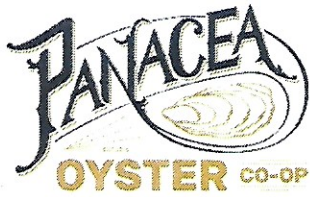
Please feel free to contact me if you have any questions regarding our role on this important environmental and economic proposal, led by Dr. Victor Ibeanusi, FAMU-Dean School of the Environment.

Sincerely,

Charles Weatherford, Ph.D.  
Interim Vice President for Research

# Attachment I

## Authority



January 28, 2019

Triumph Gulf Coast Inc.  
P.O. Box 12007  
Tallahassee, Florida 32317

Dear Triumph Gulf Coast,

This is to verify that as the CEO and Chair for the Panacea Oyster Co-Op Corporation, I have full authority to execute an agreement with Triumph Gulf Coast should we be awarded funds for our proposed project.

Sincerely,

A handwritten signature in black ink, appearing to read "Katherine Waldron", is written over a horizontal line.

Katherine Waldron  
CEO and Chair Panacea Oyster Co-Op Corporation  
102 Ben Willis Rd.  
Crawfordville, FL 32327  
703-371-7910

**Attachment 3B**  
**Research Subaward Agreement**  
**Subrecipient Contacts**

Subaward Number:

**Subrecipient Place of Performance**

Name: Florida A&M University  
Address: 400 Foote-Hilyer Administration Center  
1700 Lee Hall Drive

City: Tallahassee

State: Florida

Zip Code + 4: 32307-3200  
(Look up)

EIN No.: 59-09977035

Institution Type: Public/State Controlled Inst. of Higher E

Is Subrecipient currently registered in SAM.gov? ☒ Yes ☐ No

Is Subrecipient exempt from reporting compensation? ☒ Yes ☐ No

If no, please complete 3B page 2

DUNS No.:

623751831

Parent DUNS No.:

623751831

Congressional District:

FL-005

Congressional District:

FL-005

**Subrecipient Administrative Contact**

Name: Mrs. Glory Brown  
Address: 400 Foote-Hilyer Administration Center  
1700 Lee Hall Drive

City: Tallahassee

State: Florida

Zip Code: 32307-3200

Telephone: (850) 599-3531

Fax: (850) 599-3952

E-mail: glory.brown@fam.u.edu

**Subrecipient Principal Investigator (PI)**

Name: Dr. Victor Ibeanusi  
Address: 1515 S. Martin Luther King Street

City: Tallahassee

State: Florida

Zip Code + 4: 32307-3100

Telephone: (850) 599-3550

Fax:

E-mail: victor.ibeanusi@fam.u.edu

**Subrecipient Financial Contact**

Name: Ms. Pamela Blount  
Address: 414 Foote-Hilyer Administration Center  
1700 Lee Hall Drive

City: Tallahassee

State: Florida

Zip Code: 32307-3200

Telephone: (850) 412-5072

Fax: (850) 599-3952

E-mail: pamela.blount@fam.u.edu

**Subrecipient Authorized Official**

Name: Dr. Charles A. Weatherford  
Address: 410 Foote-Hilyer Administration Center  
1700 Lee Hall Drive

City: Tallahassee

State: Florida

Zip Code: 32307-3200

Telephone: (850) 412-5102

Fax: (850) 599-3952

E-mail: sponsor@fam.u.edu

FDP Version 08-31-2015



# Florida Agricultural and Mechanical University

Tallahassee, Florida 32307-3200

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*Excellence with Caring*

OFFICE OF THE VICE PRESIDENT  
DIVISION OF RESEARCH  
410 FOOTE-HILYER ADMINISTRATION CENTER

Telephone: (850) 599-3531  
Fax: (850) 599-3952  
Email: [sponsor@famuedu](mailto:sponsor@famuedu)

January 31, 2019

Ms. Katherine Waldron  
Chief Executive Officer and Chair  
Panacea Oyster Co-op Corporation  
102 Ben Willis Road  
Crawfordville, FL 32327

Dear Ms. Waldron:

The purpose of this letter is to confirm Florida A&M University's commitment to Dr. Victor M. Ibeanusi to participate as a Principal Investigator on behalf of the Board of Trustees for Florida Agricultural and Mechanical University (FAMU), as a sub-recipient with Panacea Oyster Coop the project entitled "Dedicated Program to Expand Oyster Ranching in Wakulla County and Resurrect Aquaculture in Apalachee Bay". We are committed to carrying out the responsibilities as indicated in the Statement of Intent to Establish a Consortium Agreement, and in administering the sub-award in accordance with the rules, regulations, and requirements of the sponsoring agency.

This proposal has been reviewed and approved by Florida A&M University's Office of Sponsored Programs, Division of Research. FAMU is prepared to negotiate and enter into any subsequent consortium/subcontract agreement resulting from this proposal.

This letter certifies that Florida A&M University is not delinquent on any federal debt, nor is the university presently debarred, proposed for debarment, declared ineligible or voluntarily excluded from any covered transaction by a federal department or agency.

Sincerely,

Charles A. Weatherford, Ph.D.  
Interim-Vice President for Research

# Attachment J

## Budget Narrative



| A. Project/Program Costs  |              |
|---|--------------|
| Renovations to existing buildings (including furnishings, IT, etc.) | \$4,255,008  |
| Commercial Hatchery/Nursery/Algae Farm                              | \$960,000    |
| Associated Costs (truck, shipping etc.)                             | \$118,000    |
| Live Pasteurization Processing System                               | \$1,500,000  |
| Flash Freeze Processing System                                      | \$800,000    |
| FTE Staffing for Co-Op  | \$4,510,020  |
| FAMU Educational Programs   | \$6,277,972  |
| Drone Technology  | \$700,000    |
| Water Quality Monitoring  | \$120,000    |
|   |              |
| Total Amount Requested  | \$19,241,000 |
|   |              |
| B. Project/Program Other Funding Sources                            |              |
| City/County   | 0            |
| Private Sources   | 0            |
| Other (Co-Op)   | \$6,606,754  |
| Other (FAMU)  | \$1,472,246  |
| Total Other Funding   | \$8,079,000  |
| C. Total Project Costs  |              |
| Funding request + Other funding                                     | \$27,320,000 |

## Panacea Co-Op Matching Funds Narrative

The Co-Op will provide matching funds through three venues:

- Its processing building in Panacea valued at- \$174,281
- The use of some of its current executives' salaries at the Co-Op. A portion of their salaries will be used for matching funds. These people will contribute a significant amount of their time during the first three years towards ensuring the success of the program (2019-2021)

2019 - \$45,000 (1/3 of year, CEO @\$100,000/year and ¼ year, CFO @ \$60,000/year)

2020 - \$90,000 (50% of CEO (\$110,000/year and CFO salaries (\$70,000/year) 2019)

2021 - \$175,000 (50% of CEO \$120,000/year, CFO \$80,000/year and 75% Director salary @\$100,000/year)

- A portion of the profits for years 2020-2023

2020 – \$397,238 (91%)

2021 - \$2,045,051 (87%)

2022 - \$2,288,700 (60%)

2023 - \$1,391,035 (51%)

## Panacea Oyster Co-Op Corp

Financial Projections  
Annual Summary

|  | 2018<br>Actuals     | 2019<br>Forecast  | 2020<br>Forecast  | 2021<br>Forecast    | 2022<br>Forecast    | 2023<br>Forecast    | 2024<br>Forecast    |
|--|---------------------|-------------------|-------------------|---------------------|---------------------|---------------------|---------------------|
| Total number of spat purchased or produced   | 4,200,000           | 7,000,000         | 20,000,000        | 30,000,000          | 50,000,000          | 100,000,000         | 300,000,000         |
| Total number of oysters sold by co-op        | 350,000             | 2,100,000         | 3,500,000         | 10,000,000          | 15,000,000          | 25,000,000          | 50,000,000          |
| <b>Revenues</b>                              |                     |                   |                   |                     |                     |                     |                     |
| Total Sales (oysters, spat, other)           | \$ 367,277          | \$ 1,548,000      | \$ 3,377,500      | \$ 7,785,000        | \$ 11,050,000       | \$ 13,987,500       | \$ 22,300,000       |
| <b>Cost of Goods Sold</b>                    |                     |                   |                   |                     |                     |                     |                     |
|  | \$ 338,103          | \$ 1,299,200      | \$ 2,155,975      | \$ 4,123,850        | \$ 5,810,500        | \$ 7,426,180        | \$ 11,811,000       |
| <b>Metcalf and Raker Production Team</b>     |                     |                   |                   |                     |                     |                     |                     |
| Nursery/Facility Manager                     |                     | 30,000            | 75,000            | 80,000              | 90,000              | 100,000             | 120,000             |
| Nursery Personnel Total Budget               |                     |                   | 50,000            | 75,000              | 100,000             | 150,000             | 200,000             |
| Hatchery Director                            |                     |                   | 100,000           | 110,000             | 120,000             | 130,000             | 140,000             |
| Hatchery Personnel Total Budget              |                     |                   | 120,000           | 140,000             | 150,000             | 170,000             | 200,000             |
| Production/Processing Supervisor             |                     | 30,000            | 60,000            | 65,000              | 70,000              | 75,000              | 80,000              |
| Processing Personnel Total Budget            |                     | 26,000            | 50,000            | 75,000              | 100,000             | 150,000             | 200,000             |
| Flash Freezing Manger                        |                     | 25,000            | 60,000            | 65,000              | 70,000              | 75,000              | 80,000              |
| Flash Freezing Personnel                     |                     |                   | 50,000            | 75,000              | 100,000             | 150,000             | 200,000             |
| Pasteurization Personnel                     |                     |                   | 50,000            | 75,000              | 100,000             | 150,000             | 200,000             |
| Administrative costs                         | -                   | 25,000            | 50,000            | 75,000              | 85,000              | 90,000              | 100,000             |
| Shipping/Freight Total Budget                |                     |                   | 50,000            | 75,000              | 100,000             | 150,000             | 200,000             |
| Benefits, ER taxes                           |                     | 24,420            | 154,000           | 196,900             | 238,700             | 305,800             | 378,400             |
|  |                     | 160,420           | 869,000           | 1,106,900           | 1,323,700           | 1,695,800           | 2,098,400           |
| <b>Gross Profit</b>                          |                     |                   |                   |                     |                     |                     |                     |
|  | \$ 29,174           | \$ 88,380         | \$ 352,525        | \$ 2,554,250        | \$ 3,915,800        | \$ 4,865,520        | \$ 8,390,600        |
| <b>Selling Expenses</b>                      |                     |                   |                   |                     |                     |                     |                     |
| Advertising & Promotion                      | \$ 13,810           | 4,000             | 100,000           | 150,000             | 200,000             | 250,000             | \$ 300,000.00       |
| Royalties and commissions                    | 30,000              | 63,000            | 105,000           | 300,000             | 225,000             | 300,000             | 450,000             |
|  | <u>\$43,810</u>     | <u>\$ 67,000</u>  | <u>\$ 205,000</u> | <u>\$ 450,000</u>   | <u>\$ 425,000</u>   | <u>\$ 550,000</u>   | <u>\$ 750,000</u>   |
| <b>General &amp; Administrative Expenses</b> |                     |                   |                   |                     |                     |                     |                     |
| Computers, software & IT                     | \$ 6,319            | 2,000.00          | 45,000.00         | 25,000.00           | 30,000.00           | 35,000.00           | \$ 40,000.00        |
| Insurance                                    | 26,801.00           | 15,000.00         | 20,000.00         | 60,000.00           | 65,000.00           | 70,000.00           | \$ 105,000.00       |
| General office expenses                      | 7,500.00            | 3,000.00          | 10,000.00         | 15,000.00           | 15,000.00           | 15,000.00           | \$ 20,000.00        |
| Professionals, contractors & consultants     | 38,864.00           | 150,000.00        | 250,000.00        | \$ 300,000.00       | \$ 350,000.00       | \$ 450,000.00       | \$ 550,000.00       |
| Legal and Accounting                         | 52,202.00           | 12,000.00         | 60,000.00         | 85,000.00           | 90,000.00           | 95,000.00           | \$ 100,000.00       |
| Rent (Cooler/processing)                     | 13,338.00           |                   |                   |                     |                     |                     |                     |
| Reefer truck lease & assoc costs             | 16,242.00           | 18,000.00         | 28,000.00         | 34,000.00           | 38,000.00           | 42,000.00           | \$ 50,000.00        |
| CEO, COO, CFO etc.                           | 114,450.00          | 40,000.00         | 180,000.00        | 350,000.00          | 400,000.00          | 500,000.00          | \$ 550,000.00       |
| Taxes & licenses                             | 18,908.00           | 19,000.00         | 30,000.00         | 50,000.00           | 60,000.00           | 70,000.00           | \$ 80,000.00        |
| Travel and Entertainment                     | 15,207.00           | 12,000.00         | 50,000.00         | 80,000.00           | 110,000.00          | 160,000.00          | \$ 200,000.00       |
| Other, Misc.                                 | 26,310.00           |                   | 30,000.00         | 50,000.00           | 70,000.00           | 85,000.00           | \$ 100,000.00       |
|  | <u>\$336,141</u>    | <u>\$ 271,000</u> | <u>\$ 703,000</u> | <u>\$ 1,049,000</u> | <u>\$ 1,228,000</u> | <u>\$ 1,522,000</u> | <u>\$ 1,795,000</u> |
| <b>Financing Costs</b>                       |                     |                   |                   |                     |                     |                     |                     |
| Loans  | 38,618.00           | \$ 75,000         | \$ 155,000        | \$ 145,000          | \$ 160,000          | \$ 66,000           | \$ 66,000           |
| Adjustment for Applied BP Triumph Funds      |                     | \$ (328,420)      | \$ (1,147,000)    | \$ (1,440,900)      | \$ (1,711,700)      |                     |                     |
| <b>Net Profit</b>                            | <u>\$ (403,933)</u> | <u>\$ 3,800</u>   | <u>\$ 436,525</u> | <u>\$ 2,351,150</u> | <u>\$ 3,814,500</u> | <u>\$ 2,727,520</u> | <u>\$ 5,779,600</u> |

Assumptions for Budget:

Building Renovations

**Panacea/Metcalf Property**

|  |                   |
|--|-------------------|
| DESIGN AND PERMITTING                    | \$ 225,000        |
| SITE WORK                                | \$ 400,000        |
| EXISTING BUILDING RENOVATION             | \$ 500,000        |
| NEW BUILDING CONSTRUCTION                | \$ 880,000        |
| GENERAL CONDITIONS                       | \$ 175,750        |
| CONTRACTOR'S OH & P                      | \$ 227,000        |
| CONTINGENCY                              | <u>\$ 250,000</u> |
| CONSTRUCTION BUDGET                      | \$2,657,750       |
| Furnishings, Office Equipment, Computers | \$150,000         |

**Crawfordville Processing Property**

**Building Purchase - \$150,000**

**Build-Out**

|                       |                  |
|-----------------------|------------------|
| DESIGN AND PERMITTING | \$ 96,500        |
| SITE WORK             | \$ 251,500       |
| EXTERIOR RENOVATION   | \$ 268,000       |
| INTERIOR RENOVATION   | \$ 328,750       |
| GENERAL CONDITIONS    | \$ 105,300       |
| CONTRACTOR'S OH & P   | \$ 112,200       |
| CONTINGENCY           | <u>\$ 80,000</u> |
| CONSTRUCTION BUDGET   | \$1,242,250      |

**Furnishings, Office Equipment, Computers**      \$55,008

Total Building Costs:    \$4,255,008

## Assumptions for Budget:

### **Hatchery –**

\$300,000 Hatchery tanks, pumps, filters, pvc, etc.  
\$50,000 Electrical upgrades  
\$25,000 Contingency/Building upgrades

### **Nursery –**

\$200,000 Tanks, bins, pumps, upwellers, filters  
\$50,000 Electrical upgrades  
\$25,000 Contingency/Building upgrades

### **Algae farm –**

\$260,000 Equipment, installation, pumps, electrical

\$50,000 - Other, building permits, fees, insurance

Total - \$960,000



**Microsystems**

(850)765-0563  
1030 E Lafayette Street Suite 3  
Tallahassee, FL 32301  
info@microsystems.pro

**QUOTE**

For: Panacea Oyster Co-Op  
102 Ben Willis Road  
Crawfordville, FL 32327  
Attn: Kathryn Waldron, CEO

Invoice number: 1000243  
Date:

| S.No | Product/Service Description  | No. of Units | Unit Price    | Total              |
|------|--|--------------|---------------|--------------------|
| 1)   | Custom Designed Microwave Pasteurization Unit for Oysters                          | 1            | \$1,000,000   | \$1,000,000        |
| 2)   | Engineering and Supervision of Installation and Operation                          | 1            | \$200,000     | \$200,000          |
| 3)   | On-Site Installation and Demonstration   | 1            | \$150,000     | \$150,000          |
| 4)   | Limited Manufacturer’s Warranty (6 Months – Parts and Labor)                       | 1            | \$100,000     | \$100,000          |
| 5)   | Training of Personnel on Standard Operating Procedures (1 – Day Training Sessions) | 5            | \$10,000      | \$50,000           |
|      |  |              | <b>Total*</b> | <b>\$1,500,000</b> |

*\*Total Price, includes all applicable local, state and federal taxes*

**Terms and conditions:** *Terms and conditions Apply\**

**Contact:** Camille Brockman, COO

This quote is valid through July 2019 and is based on information provided to date. We reserve the right to modify any part of this quote, based on change orders received.

- See Microsystems First, Inc. *Terms and Conditions* for details





## **Budget Details for Flash Freeze Processing System**

### **Flash Freeze Processing System**

#### ***Year 1***

Holding tanks, pipes and heating cooling system - \$280,000

Details: Suggested are holding tanks with UV for bacteria removal to produce the best options and best frozen products includes adjustability for other seafoods and foodstuff. All frozen products of the highest quality available today.

Machinery Model KQF-20AL-2000M \$250,000

Engineering and installation: \$100,000

Warranty - \$100,000

Oyster cleaning equipment: \$50,000

Nitrogen Gas - \$20,000

Total - \$800,000

## **Assumptions for the Budget**

### **Water Monitoring**

Yearly cost of monitoring water quality in Apalachee Bay - \$30,000/year x 5 years = \$150,000

### **Drone Swarm Technology (environmental monitoring and control)**

Cost for drones, training, monitoring and control - \$400,000 in year 1 and \$300,000 in year 2.  
Costs for monitoring and maintenance will be borne by FAMU.

### **Associated Costs for trucking, distribution and logistics**

Cost for leasing a reefer truck for the first four years

Y1 - \$18,000 (half a year)

Y2 - \$28,000 (includes lease, gas, insurance, maintenance)

Y3 - \$34,000 (includes lease, gas, insurance, maintenance)

Y4 - \$38,000 (includes lease, gas, insurance, maintenance)

Total - \$118,000

# Budget Narrative for FTE Staffing

## Incremental Job Creation

## Starting Salaries

|                                  |               |
|----------------------------------|---------------|
| Nursery/Facility Manager         | \$60,000/year |
| Nursery Personnel                | \$30,000/year |
| Hatchery Director                | \$85,000/year |
| Hatchery Personnel               | \$40,000/year |
| Production/Processing Supervisor | \$60,000/year |
| Processing Personnel             | \$30,000/year |
| Admin                            | \$30,000/year |
| Shipping/Freight Logistics       | \$30,000/year |
| Flash Freezing Manager           | \$50,000/year |
| Flash Freezing Personnel         | \$30,000/year |
| Pasteurization Personnel         | \$35,000/year |
| Total Job Creation               |               |

# Needs

| 2019*    | 2020     | 2021     | 2022     | 2023     | 2024     |
|----------|----------|----------|----------|----------|----------|
| Forecast | Forecast | Forecast | Forecast | Forecast | Forecast |
| 1        | 1        | 1        | 1        | 1        | 1        |
| 0        | 2        | 3        | 3        | 4        | 4        |
| 0        | 1        | 1        | 1        | 1        | 1        |
| 0        | 3        | 4        | 4        | 5        | 5        |
| 1        | 1        | 1        | 2        | 2        | 2        |
| 1        | 2        | 3        | 3        | 4        | 4        |
| 1        | 1        | 1        | 2        | 3        | 3        |
| 0        | 2        | 2        | 3        | 4        | 4        |
| 1        | 1        | 1        | 1        | 1        | 1        |
| 0        | 2        | 2        | 3        | 4        | 4        |
| 0        | 2        | 2        | 3        | 3        | 3        |
| 5        | 18       | 21       | 26       | 32       | 32       |

## **FAMU Budget Justification**

### **Entrepreneurial Development Programs**

Funding will be used to develop customized business activities including workshops to support oyster ranchers based on where the business owner or entrepreneur falls using three classifications: 1) Start-up Businesses-defined as new businesses, but not necessarily a new type of business, in business for less than three years.; 2) Experienced Businesses - defined as established businesses, in business for three or more years with fewer than 5 FTE employees; and 3) Small and Medium Sized Enterprises (SMEs) - defined as early to late-stage businesses who have been in-business for three or more years and have 5 or more FTE employees.

### **Ecosystem Research Infrastructure: Building Innovation for High Yield Oyster Ranching**

Computational IT Upgrades and Core Lab Enhancements- Funding will support deployment of automated real-time monitoring of water quality. This will require enhancements in the core lab to support autonomous network of sensors capable of monitoring the spatial and temporal distributions of water quality and environmental parameters. The following items will be purchased from these funds: smart water data recorder; powerful PC & PDA; software; rugged water quality monitoring system sensors, and remote communication units

### **K-20 Educational and Training Operations**

Yearly educational activities will be organized to support curriculum developments, recruitment materials, on-campus recruitment fairs, site visits, field and laboratory demonstrations of environmental and ecosystem analysis at the oyster ranch.

### **Participant Support Costs**

Through the scholars-in-residence program, eligible students with a minimum GPA of 3.0 will receive scholarships and mentorship opportunities that will contribute to building a well-trained workforce. Support for 20 undergraduate students/year for a total of 100 will receive \$5,000 during their first year. Seven graduate students (MS)/year for a total of fourteen will receive \$19,000/year for two years. Funds are also budgeted for travels for students to FAMU and for personnel meetings at Panacea Coop.

### **Senior Personnel**

Dr. Victor Ibeanusi - Principal Investigator - will work to ensure the necessary institutional commitment that is needed to coalesce the various university resources that will support the project. PI will devote 10% time as part of the matching funds. The PI will work with two Co-PIs, who will assist in providing the framework for achieving several related objectives: 1) Coordinate the selection of key personnel and execution of the educational and research plans, 2) Facilitate development of courses, 3) Integrate student trainees into the research areas, 4) Promote the synergy of interdisciplinary research, and 5) Enhance the vibrancy of the project by engaging stakeholders. Keith Bowers - Co-PI - will devote 10.028% of time \$10,000 also as a matching funds. Dev Satyanarayan - Co-PI - Assistant Professor at the BASE program will receive 5 weeks of summer salary (i.e., 200 hrs. based on current Pay \$12,006 + 13% Fringe Benefits = \$14,288.

### **Research Scientist, Post Docs, and Faculty Lines**

Funding is requested to hire a Research Scientist, and Post-Doctoral Fellows. These individuals will support the day-to-day research and educational activities. To sustain this program beyond the life of this funding, two new faculty lines, which initially will be funded through this project will be absorbed by FAMU.

#### Other Matching Funds

- Core Lab Manager (10%)- 0.15; FTE out of \$55,000 annual salary (\$8,250)- The core lab manager will devote time in water quality analysis.
- Recruiter - 0.2FTE- out of \$56,667 annual salary(\$11,334)- will devote time on recruitment and outreach activities
- Maintenance and service contracts \$13,500 - describes 50% of the cost towards service contracts
- Core Lab Instrumentation , 20,000/year- describes the values of depreciation on use of equipment Total \$265,420



[illegible]

**Attachment 5**  
**Cost Reimbursement Research Subaward Agreement**  
**Statement of Work, Cost Sharing, Indirects & Budget**

Subaward Number:

**Statement of Work**

Below ☒ or ☐ Attached  pages

If award is FFATA eligible and SOW exceeds 4000 characters, include a *Subrecipient Federal Award Project Description*

FAMU will serve as the fiscal entity targeting K-20 education improvements, developing a dedicated science-based marine research that incorporates water quality and estuary propagation education center of excellence that will spur the resurgence of economic development, jobs, and workforce development. These objectives will be achieved through:

- 1) Developing a business framework to support small business clients in order to create jobs, investments, and economic growth for communities throughout northwest Florida;
- 2) Scaling-up and advancing research on new isolated strains of microalgae (patent pending) to significantly enhance the overall health and productivity of oyster production that are economically and environmentally cost-effective relative to the existing algal feedstock;
- 3) Implement a unique (patent pending) pasteurization process that uses microwave energy to ensure the microbial safety and shelf life of raw shellfish as well as the taste, and
- 4) Using geospatial tools to implement an Aquatic SASER Drones Swarms for effective environmental monitoring and control of invasive species that could potentially impact oyster production. The PI will work to ensure the necessary institutional commitment that is needed to coalesce the various university resources that will support the project. PI will devote 10% time as part of the matching funds. The PI will work with two Co-PIs, who will assist in providing the framework for achieving several related objectives: 1) Coordinate the selection of key personnel and execution of the educational and research plans, 2) Facilitate development of courses, 3) Integrate student trainees into the research areas, 4) Promote the synergy of interdisciplinary research, and 5) Enhance the vibrancy of the project by engaging stakeholders.

Co-PIs: Keith Bowers, and Dev Satyanarayan.

**Indirect Information** Indirect Cost Rate (IDC) Applied  %

☐ TDC ☒ MTDC ☐ OTHER ☐ de minimus rate of 10%

**Cost Sharing** ☒ Yes ☐ No

If Yes, include Amount: \$

**Budget Information** ☐ Below ☒ Attached,  pages

Direct Costs \$

Indirect Costs \$

Total Costs \$

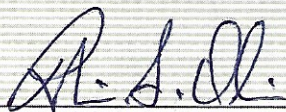
*All amounts are in United States Dollars*

# Attachment K

## Licenses & Certifications

**1890679**

AUDIT NO.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION  
P.O. BOX 6150 • TALLAHASSEE, FLORIDA 32314-6150 • PHONE (850) 487-3122**LICENSE TO RETAIL SALTWATER PRODUCTS**  
PURSUANT TO CHAPTER 379, F.S.SIGNATURE OF LICENSEE  
(NOT VALID UNTIL SIGNED)**THIS LICENSE IS VALID FROM JULY 1, 2017 TO JUNE 30, 2018**PANACEA OYSTER COOPERATIVE CORPORATION  
PO BOX 341  
PANACEA, FL 32346CENTRAL DEALER NO.:  
STORE NO.:

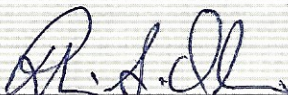
RC-215157

ISSUE DATE:  
FEE PAID: RESIDENT7-5-17  
\$ 75.00PHYSICAL LOCATION:  
102 BEN WILLIS RD  
CRAWFORDVILLE, FL 32327

This license is not transferable, non-refundable, and is revocable for cause at any time. It is required to be available for inspection at all times when engaged in the activities for which it was issued. It may not be reproduced. The location as

**861527**

AUDIT NO.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION  
P.O. BOX 6150 • TALLAHASSEE, FLORIDA 32314-6150 • PHONE (850) 487-3122  
**LICENSE TO WHOLESALE SALTWATER PRODUCTS**  
PURSUANT TO CHAPTER 379, F.S.**THIS LICENSE IS VALID FROM JULY 1, 2017 TO JUNE 30, 2018**SIGNATURE OF LICENSEE  
(NOT VALID UNTIL SIGNED)PANACEA OYSTER COOPERATIVE CORPORATION  
PO BOX 341  
PANACEA, FL 32346DEALER NO.:  
SCOPE:  
STORE NO.:WD-190419  
STATEISSUE DATE:  
FEE PAID: RESIDENT7-5-17  
\$ 550.00PHYSICAL LOCATION:  
4379 CRAWFORDVILLE HWY  
CRAWFORDVILLE, FL 32327

This license is not transferable, non-refundable, and is revocable for cause at any time. It is required to be available for inspection at all times when engaged in the activities for which it was issued. It may not be reproduced. The location as listed on this license and all required records for which this license is issued must be available for inspection.

**Current Licenses****RC-215157****License Term: 7/1/2018 - 6/30/2019**  
**Issued Date : 3/27/2018****Physical Location:**  
102 Ben Willis Rd  
Crawfordville, FL 32327**WD-190419****License Term: 7/1/2018 - 6/30/2019**  
**Issued Date : 3/27/2018****Physical Location:**  
102 Ben Willis Rd  
Crawfordville, FL 32327**Physical Location:**  
33 Ben Willis Rd





ADAM H. PUTNAM  
COMMISSIONER

Florida Department of Agriculture and Consumer Services  
Division of Aquaculture

## **SHELLFISH PROCESSING CERTIFICATION**

Rule 5L-1005, F.A.C

**CERTIFICATION LICENSE  
NUMBER 2067-SS**

This is to Certify, that PANACEA OYSTER CO-OP CORP. operating a Shellstock Shipper establishment for the handling and sale of Oysters under the name of PANACEA OYSTER CO-OP CORP. located at 33 BEN WILLIS ROAD, CRAWFORDVILLE, FL 32327 in the county of Wakulla has complied with all the rules prescribed by Chapter 597 F. S., as of this date, for processing shellfish and shellfish products and has agreed to ship or otherwise process and offer for sale products produced in conformity with the Department's rules governing shellfish products.

This certificate is non-transferable and may be revoked at any time by the Department for non-compliance with the rules pertaining to the operation of such an establishment.

Inspected and Certified by Nancy Horton as of June 06, 2018 and automatically expires June-30-2019.

Hal Knickerbocker  
Director

6/6/18  
Date

**Whole  
Foods  
Market  
Quality  
Standards  
for Farmed  
Bivalve  
Molluscs**

CERTIFICATE NO:  
MRAG-1443

CERTIFICATE ISSUE DATE:  
AUGUST 30, 2018

CERTIFICATE EXPIRY DATE:  
MAY 30, 2022

MRAG Americas, INC.  
8950 MLK JR. St N, Ste 202  
St. Petersburg, FL 33702  
Tel: 727-563-9070  
Fax: 727-563-0207  
[www.mragamericas.com](http://www.mragamericas.com)

**This Certifies that**  
***Panacea Oyster Co-op Corporation***  
***102 Ben Willis Road***  
***Crawfordville, FL 32327***  
**Meets the Whole Foods Market Quality  
Standards for Farmed Bivalve Molluscs**

**Certified Farm site Details**

**Species:** Eastern Oyster (*C. virginica*)

**Authorizations:**

Estuary Oyster Farm (Leases 103, 115, 139)  
Northway Coastal Industries (Lease 138)

Signature  \_\_\_\_\_



This schedule is the property of MRAG Americas, and its use is subject to conformance with the standards of the Whole Foods Market.