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# Thad Cochran Marine Aquaculture Center

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Infrastructure, Research, Demonstration  
and Partnership Opportunities

Kelly Lucas, Reg Blaylock, Angelos Apeitos and Brian Cuevas



# Overview

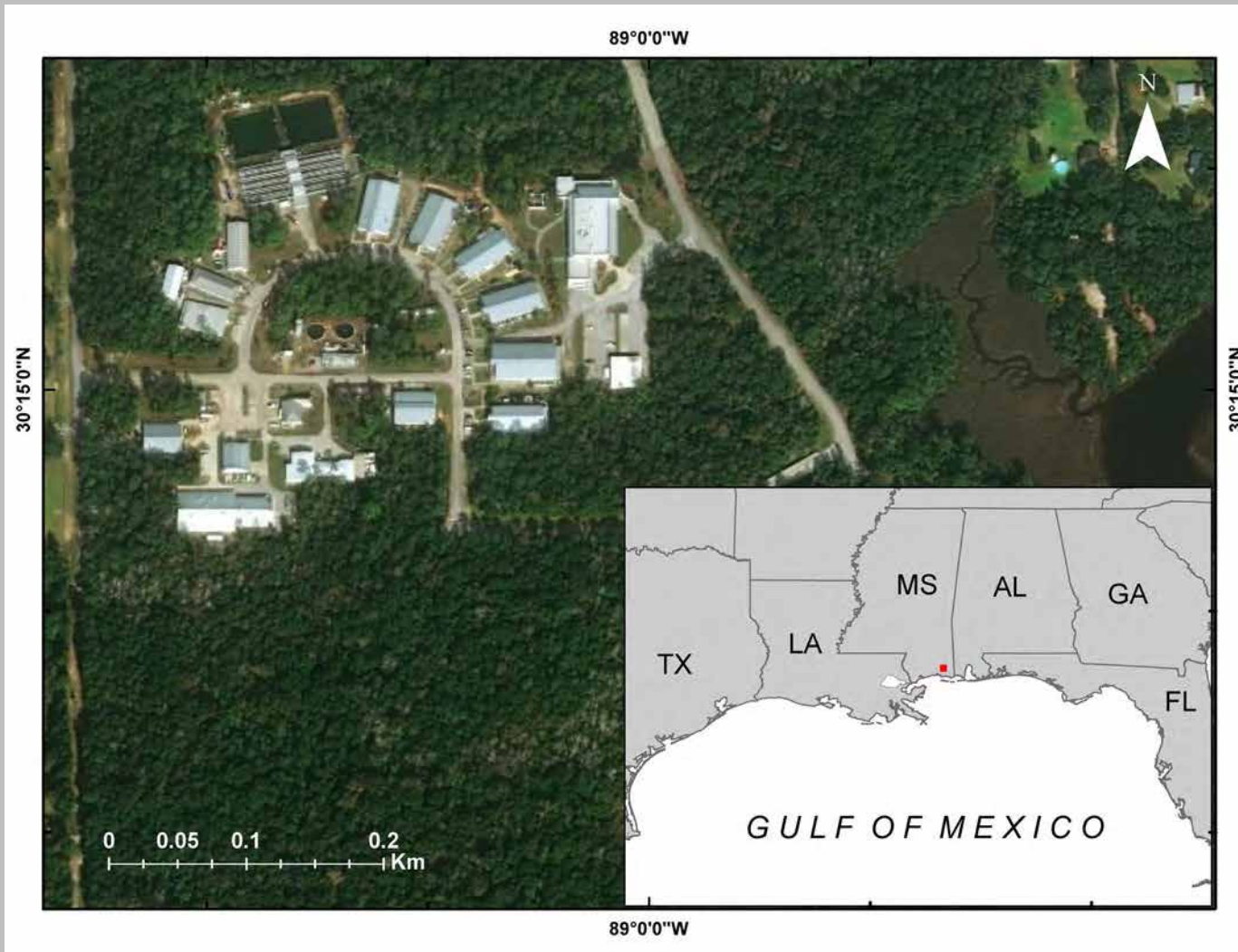
- Location
- Infrastructure
- Research and Development
- Species
- Partnerships, Services and Agreements



TCMAC

We work with industry, government and non-profit organizations to alleviate the bottlenecks that constrains the production of marine species.

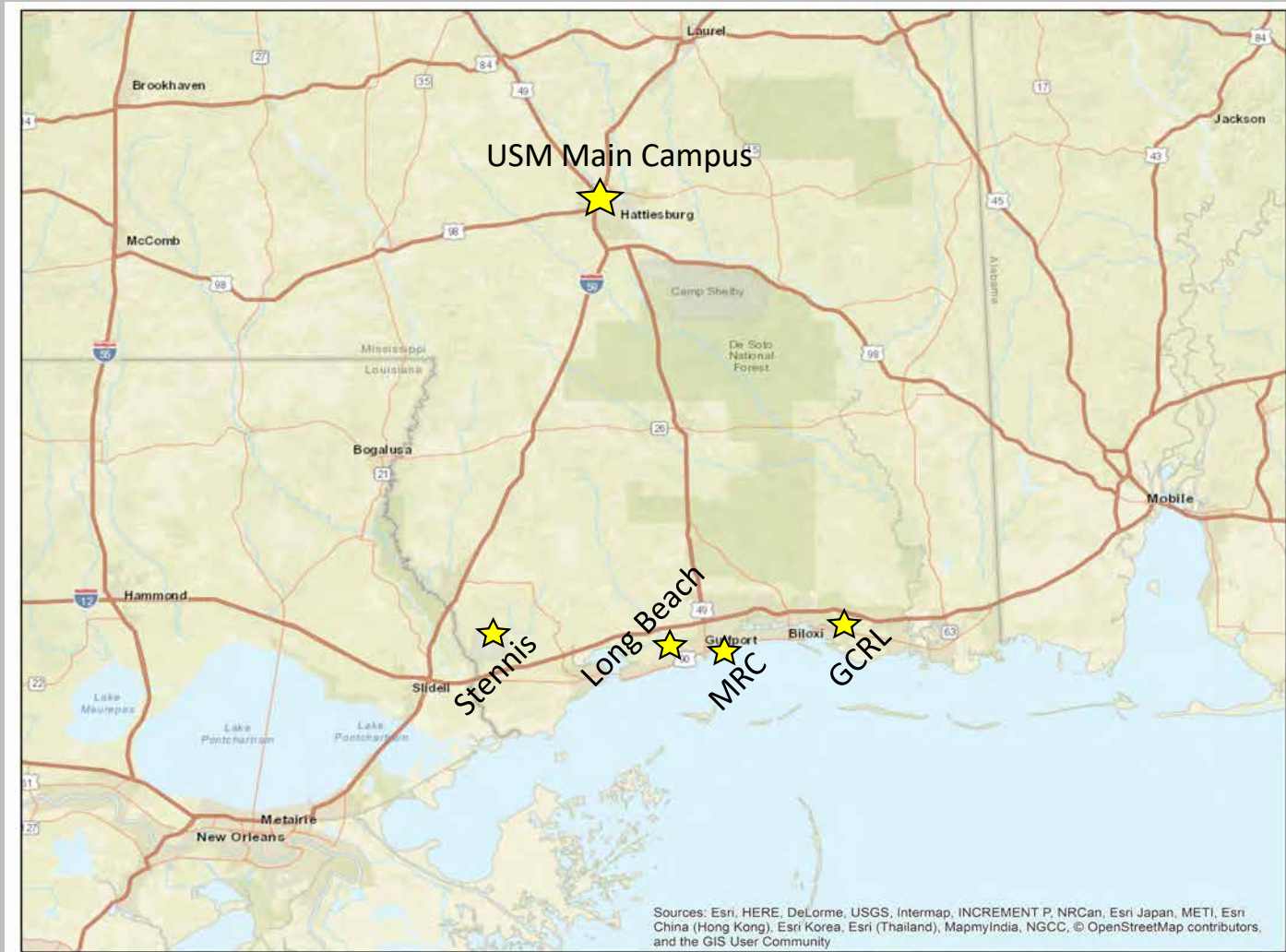
# Located: Central Gulf of Mexico



# Ocean Springs Research Sites



# Distributed Facilities and Resources



# Facilities

- 13 Buildings
- 9,300 m<sup>2</sup>
- 4,600 m<sup>2</sup>
  - culture space for animals and live feeds
- 930 m<sup>2</sup>
  - Experimental space
    - isolated and replicated disease, nutrition, and genetics/reproductive physiology research
- contains isolated small-, medium-, and large-scale systems with single-pass climate control



# Systems

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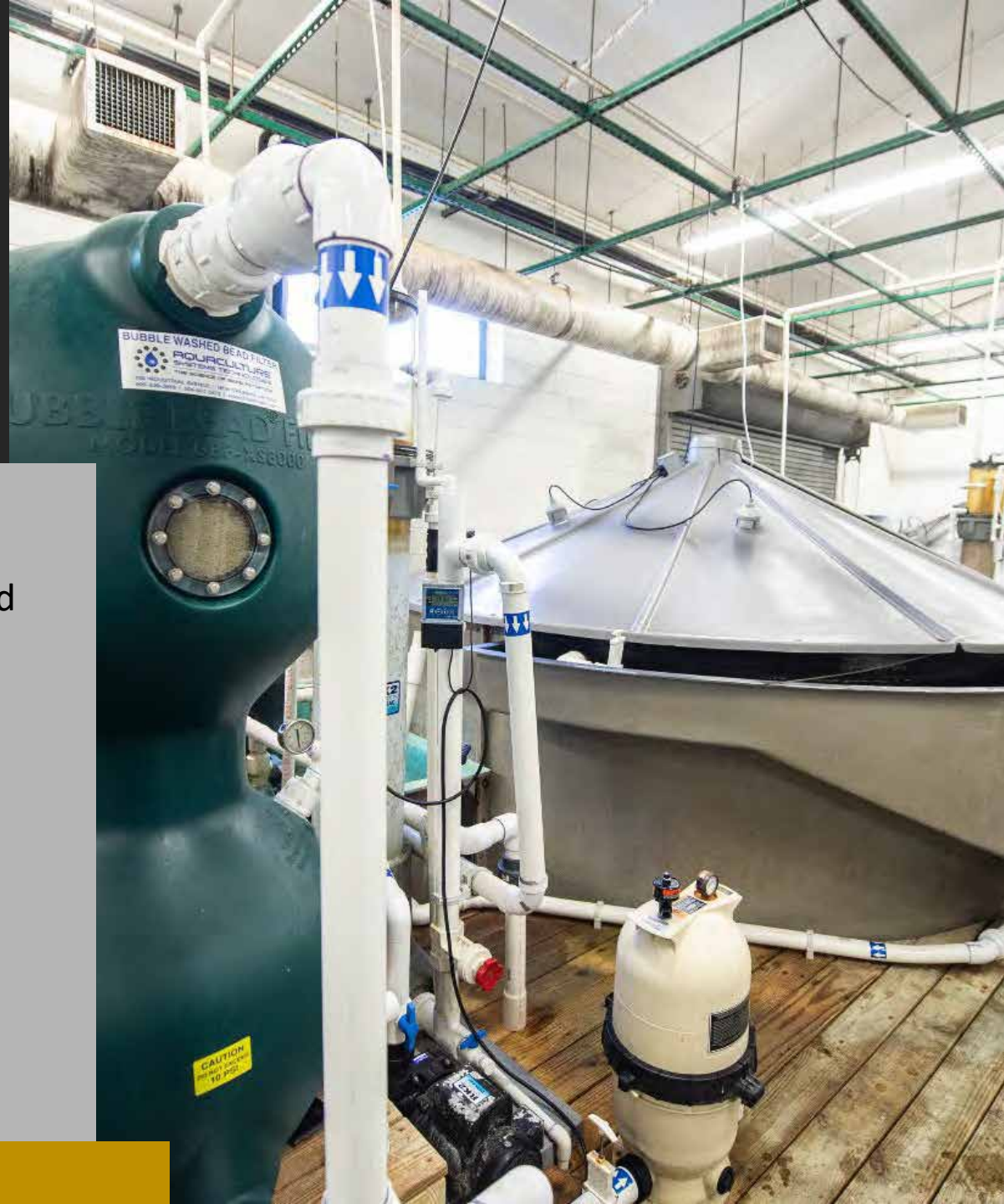
- RAS technology
- Artificial seawater or raw seawater
- Filtration and water quality
  - Propeller-washed bead filters
  - Moving bed bioreactors
  - Protein fractionators (with ozone)
  - Heat pumps
  - Oxygen cones (5,000-gal liquid Oxygen backup)
- Biosecure
- Climate controlled
- Customizable tanks and systems
- Generator backup
- Gated/ Secure facility





# Finfish Brood Systems

- 5 areas for brood holding and maturation
- 571,000 L tank space
  - 3 – 6 m diameter tanks
  - Photo-thermal control
  - Dedicated generator and oxygen backup
  - Remote monitoring





# Incubation & Hatching Systems

- 3 systems for egg incubation and hatching
- 3,720 L tank volume
  - RAS Systems
  - Thermally controlled

# Live Feeds Systems

- Copepods
  - 148,000 L of culture volume available
  - 20 million Nauoplii produced daily
- Rotifers
  - Static water systems
  - 100 to 200 L tanks
  - 2200 L culture volume available
  - 800 million to 1.2 billion rotifers produced daily
- Artemia
  - 400 L static systems
  - 3200 L volume available
  - 800 million Instar 2 produced daily





# Algae

- Systems
  - Semi-continuously operated photobioreactors
    - PureBiomass PBR
      - 1,375 L and 250 L
    - Industrial Plankton
      - 1,000 L
  - Hanging bag system
- Production Capability
  - Productivity:  $0.20\text{g L}^{-1}\text{ day}^{-1}$ 
    - Current
      - Yield  $240\text{ g day}^{-1}$
    - Yr. 2021
      - $1,100\text{ g day}^{-1}$
- Species
  - *Chaetoceros calcitrans*, *Chaetoceros muelleri*, *Nannochloropsis oculata*, *Pavlova lutheri*, *Rhodomonas salina*, *Tetraselmis sp.*, *Thalassiosira weissflogii*, *Tisochrysis lutea*.



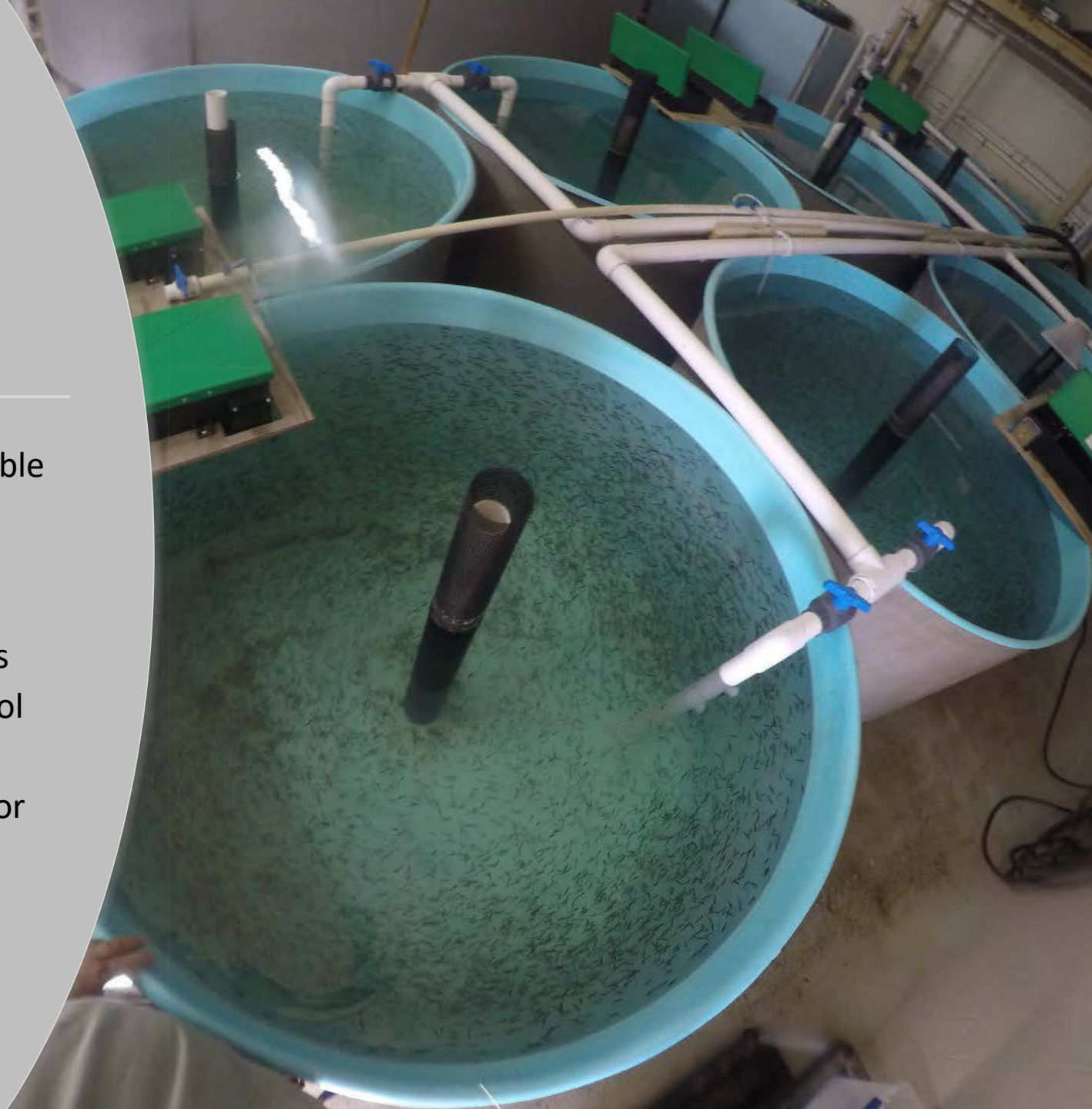


# Larval Rearing Systems

- 7 areas available for rearing larvae
- 120,000 L culture volume
- RAS & static systems
  - 400 – 4000 L tanks
  - FRP or HDPE
  - Photo-thermal control

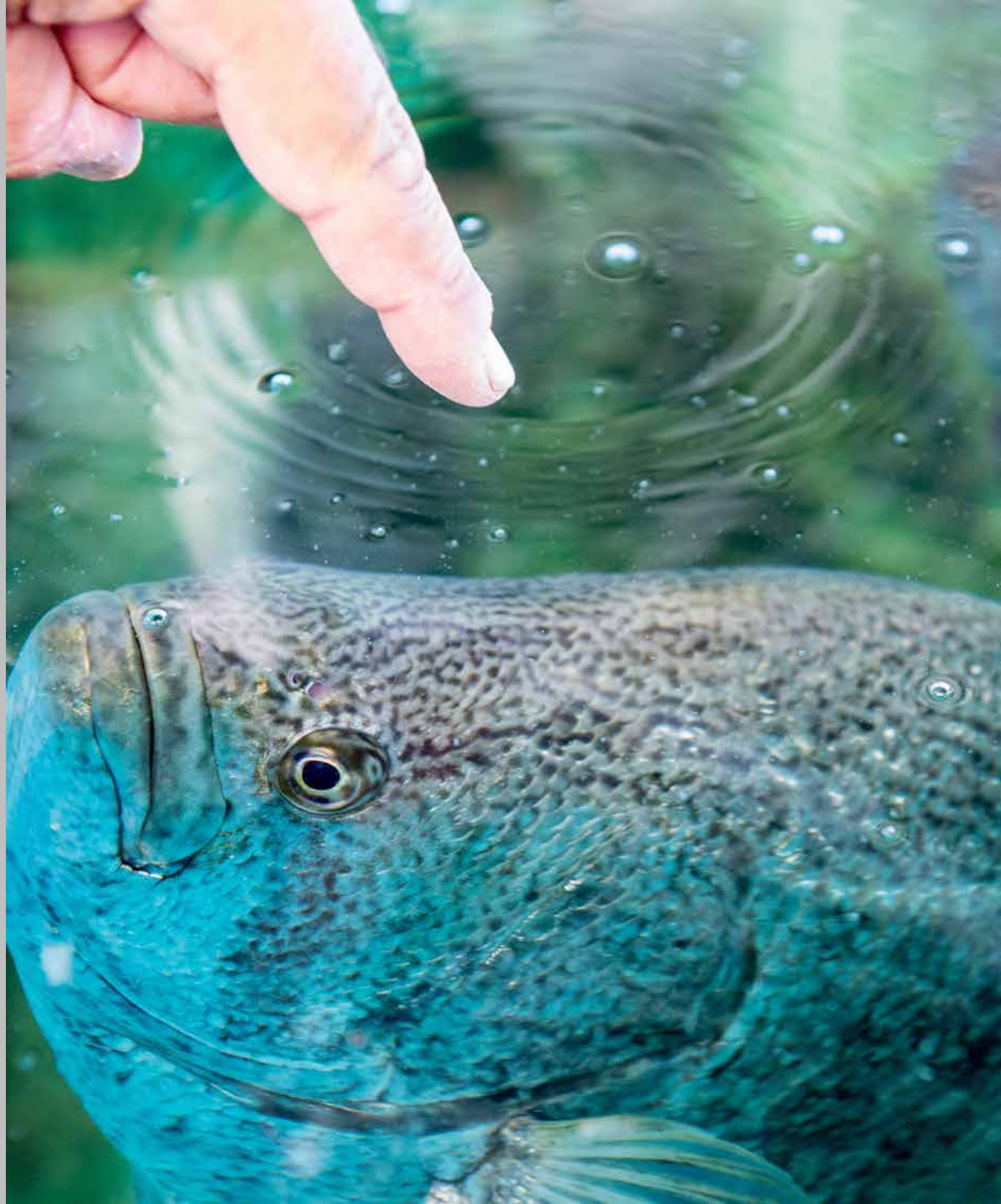
# Nursery Systems

- 2-3 systems available
- 92,000 L culture volume
  - 1.5 to 5.5 m diameter tanks
  - Thermal control
- Operated at a 40 kg/m<sup>3</sup>, designed for higher loads



# Growout Systems

- 8 systems available
- 1.1 million L available culture volume
  - 1.5 – 5.5m tanks
  - Thermally controlled





# Oyster Hatchery

- Artificial Seawater
- Recirculating closed systems
- Temperature control
- Volume ASW
  - Current: 87,000 L
  - YR 2021: 450,000 L
- Capacity
  - Current: 300 Million larvae
  - YR 2021: 5 Billion larvae





## Research and Development

- Aquatic Health
- Genetics
- Larviculture
- Reproductive Physiology
- Live Feeds
- Recirculating Aquaculture Systems Design
- Nearshore and Offshore Aquaculture

# Species

- Current
  - Spotted sea trout (*Cynoscion nebulosus*)
  - Tripletail (*Lobotes surinamensis*)
  - Blue crab (*Callinectes sapidus*)
  - Oyster (*Crassostrea virginica*)
- Collecting in 2020
  - Red drum (*Sciaenops ocellatus*)
  - Gray snapper (*Lutjanus griseus*)
- Previous
  - Red snapper (*Lutjanus campechanus*)
  - Atlantic croaker (*Micropogonias undulates*)
  - Striped bass (*Morone saxatilis*)
  - Cobia (*Rachycentron canadum*)
  - Marine shrimp (*Litopenaeus vannamei*)
  - Pompano (*Trachinotus carolinus*)



# Foster aquaculture technology development and commercialization



Industry Partnership

Partnership Agreements

Licensing Agreements



Develop Strategic Partnerships

Confidentiality and Material Transfer Agreements



Services Agreement



Sponsored Research  
Research Subaward



Technology is transferred to Industry collaborator through **Option, Licensing and Joint Partnership Agreement**

## Available Services:

- Analytical and Biological Testing
- Research and Development Lease Space
- Sponsored Research
- Technology License
- Aquaculture Consulting



OFFICE OF TECHNOLOGY  
**DEVELOPMENT**  
AND COMMERCIALIZATION

# Bridging the innovation gap for early stage aquaculture companies to increase speed to market and revenue growth



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## Blue Tech Accelerator



### INVESTING IN TRANSFORMATIVE TECHNOLOGY TO CREATE A RESILIENT KNOWLEDGE-BASED ECONOMY

The **Blue Accelerator** addresses the challenges of job and economic growth by **bridging the gap between technology innovation and commercialization**. Based on a proven process that has demonstrated success across markets, industries, and geographies, this bridge is created by providing early stage companies with the necessary **commercialization infrastructure, resources, partners, and investments** to increase speed to market and revenue growth.

### THE PROCESS FOR GROWING A KNOWLEDGE-BASED ECONOMY



**Early Stage Company** → **Bridging the Innovation Gap** → **Jobs & Economic Growth**

 <p><b>Investment Committee</b> Select the companies to enter the Center</p>	 <p><b>Mentoring</b> Create a robust commercialization plan</p>	 <p><b>Program Management</b> Ensure companies are meeting development and commercial goals</p>	 <p><b>Seed Fund</b> Provide funds to allow risk mitigation and jump start growth</p>	 <p><b>Infrastructure</b> Access to prototyping, testing, office space, and light manufacturing</p>	 <p><b>Metrics</b> Track Center success and economic impact</p>
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### Measures of Our Success

 <p># Funded Startups</p>	 <p># Licenses to Industry</p>	 <p>Commercial Product Launches</p>	 <p>Jobs Created</p>	 <p>Follow-on Funding Multiple</p>
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118 College Drive #5012 • Hattiesburg, MS 39406-0001  
601.266.1000 • usm.edu



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**DEVELOPMENT**  
AND COMMERCIALIZATION

Kelly Lucas, PhD.

Director

Thad Cochran Marine  
Aquaculture Center

School of Ocean Science and  
Engineering

The University of Southern  
Mississippi

228-818-8028

[Kelly.lucas@usm.edu](mailto:Kelly.lucas@usm.edu)



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