

Exempted Fishing Permit (EFP) Application

Submitted by: Cultimar Technologies, Inc

Project Title: Collection of American Red Snapper (*Lutjanus campechanus*) Broodstock for Marine Aquaculture Research and Hatchery Fingerling Production

Applicant Information

Name: Cultimar Technologies, Inc

Point of Contact: Charles McGuigan, PhD

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Email: cjmcguigan@cultimartechnologies.com

1. Proposed Activity Summary

Cultimar Technologies, Inc seeks authorization to collect 200 sexually mature American red snapper (*Lutjanus campechanus*) from federal waters off the Atlantic coast of Florida for the purpose of establishing a dedicated broodstock population at a newly constructed hatchery research facility in Arecibo, Puerto Rico. The objective of this project is to establish a genetically diverse and robust breeding population that will enable the resolution of persistent research questions around the biology, physiology, and aquaculture potential of the species. As Cultimar seeks to facilitate the expansion of the aquaculture industry, more work is needed to develop scalable broodstock maturation and larval rearing protocols that can support domestic grow-out operations. Cultimar's hatchery will continue research into these essential topics while developing a genetically robust population capable of providing fingerlings to multiple stakeholders within the marine aquaculture sector.

Under the requested Exempted Fishing Permit (EFP), all fish will be used exclusively for spawning and larval production in a controlled, biosecure hatchery environment. Cultimar will not be engaging in intensive aquaculture growout activities (the farming of fish from ~5 grams through market size) as a result of this EFP application. Instead, fish collected will be transported to Cultimar's hatchery facility, where the team will research the development of scalable broodstock maturation and larval rearing protocols. Fingerlings produced as the result of these research efforts will be distributed and or sold to academic institutions and pilot-scale aquaculture operations for further testing and performance analysis.

The primary goals of the project are:

- To collect and transport 200 healthy, sexually mature American red snapper broodstock from the Federal waters off the Atlantic coast of Florida to a hatchery research facility in Arecibo, Puerto Rico.
- To ensure minimal stress and mortality during capture and transport.
- To optimize post-transportation acclimation and spawning success within a controlled Recirculating Aquaculture System (RAS).
- To build upon foundational sustainable aquaculture research by providing a high-quality, high-demand species to farmers throughout the region

- To continue the refinement of protocols to consistently produce red snapper fingerlings, with scientific, commercial, and/or governmental applications.

This facility will not engage in grow-out or commercial harvest of market-size red snapper; all production and research efforts will be limited to protocol development for fingerling production (seed stock). Establishing the capacity for large-scale seed production is an essential catalyst to build a more robust U.S.-based marine aquaculture industry that, together with wild fisheries, can foster local sustainable seafood production and help displace seafood imported from overseas markets.

2. Purpose and Justification for the Proposed Activity

The reliable production of large quantities of high-quality seeds and fingerlings has been critical to the successful expansion of aquaculture for prolific species including salmon, tilapia, and shrimp; however, there is a notable absence of fingerling providers for warmwater marine species within the US. To address this need, Cultimar is constructing the first private American red snapper, *Lutjanus campechanus*, hatchery and research institute in the United States.

Attempts at developing aquaculture technology for the American red snapper began in the late 1970's and received significant attention throughout the early 2000's, with federal and state-funded projects enabling several academic milestones, including the first volitional and induced captive spawns, larval rearing and weaning trials, and preliminary forays into the potential for stock enhancement programs. However, most of these early attempts at expanding aquaculture around the species were hampered by inconsistent spawning and difficulties at early developmental stages of the larvae. Since 2017, multiple projects at the University of Miami and University of Florida have facilitated the development of early protocols for the reliable production of American red snapper fingerlings through metamorphosis with success. Having directly participated in these foundational efforts, the Cultimar team aims to continue this work and establish truly scalable and reliable red snapper fingerling production protocols that one day could facilitate a more dynamic and diverse U.S.-based marine aquaculture industry.

The purpose of this EFP is to continue and expand upon the outcomes of the early research conducted over multiple decades by the University of Florida, University of Miami, and other U.S. institutions investigating the feasibility of American red snapper aquaculture. This work established the foundational husbandry, nutrition, reproduction, larval rearing, and animal welfare protocols required for commercial-scale fingerling production. Cultimar aims to build upon these findings by establishing the first dedicated American red snapper hatchery and research institute capable of establishing reliable and scalable fingerling stock production protocols to support future growout farming operations in the United States and abroad.

Cultimar Technologies is an entirely independent organization with no formal affiliation with NOAA and/or any other Federal or State government agency, and the development of its research facility has not been financed using federal or state funding.

3. Relevance and Importance to the South Atlantic Region

The proposed activity benefits the South Atlantic Fishery Management Council (SAFMC) and stakeholders in several meaningful ways:

- **Strengthening Domestic Seafood Production:** This proposal is closely aligned with the priorities outlined in both Executive Order 13921 (*Promoting American Seafood Competitiveness and Economic Growth*, 2020) and the more recent 2025 Executive Order 14267, titled *Restoring American Seafood Competitiveness*. Together, these directives underscore the federal commitment to revitalizing domestic seafood production, reducing dependency on imports, and promoting the development of innovative, sustainable aquaculture systems. These initiatives by the Federal Government aim to restore America’s leadership in seafood production, expand regional aquaculture capacity, and invest in species with strong commercial potential and ecological fit—such as American red snapper. This initiative directly supports national objectives to:
 - Strengthen U.S. seafood competitiveness,
 - Reduce reliance on low-quality imported snapper,
 - Increase domestic marine aquaculture capacity, and
 - Advance the scientific understanding of capture impacts on spawning performance.
- **Minimal population impact:** This one time effort to collect 200 mature individuals will enable Cultimar to establish self-sustaining genetic families and will not require subsequent collections of broodstock. This initial collection of 200 wild individuals will allow Cultimar to establish 10 distinct breeding cohorts of 20 fish each, thereby providing suitable genetic variability for future breeding, allowing for year-round volitional spawning, and significantly reducing (i.e. almost eliminating) the need for future collections.
- **Data generation:** The project will provide new, presently scarce data on the effects of capture depth, handling, and transport on subsequent captive spawning performance—which has implications for hatchery production and generates a more comprehensive understanding of the impacts of the catch-and-release fishery on overall spawning stock health.
- **Community engagement:** Cultimar will prioritize working directly with the local commercial and charter fishing community in Florida to conduct collections efficiently, safely, and responsibly. Cultimar’s team has worked with these fishing communities to conduct broodstock capture during university-based broodstock collection efforts and plans to hire local fishermen to inform specific collecting locations and techniques for this project. In Puerto Rico, Cultimar’s hatchery research efforts aim to foster economic development by creating 25-30 quality technical and non-technical jobs in a highly-distressed area of the US Caribbean.
- **Long-term domestic supply chain benefits:** By promoting U.S.-based hatchery production of red snapper, the project intends to reduce the high volume of imported marine finfish entering the U.S. market, stabilizing domestic competitiveness and relieving competition with local fisheries.

4. Catch Information

Target Species: American red snapper (*Lutjanus campechanus*)

Capture Protocol: Fishing will be conducted using spinning and conventional hook and line gear outfitted with single-hook circle hook rigs. The vessel is expected to actively fish 3-4 hooks at any given time. Proper dehooking and descending devices will be used for any bycatch and discards, although past

collections have yielded minimal, if any, unintended species. Fishing efforts will focus in the shallowest possible depths to ensure minimal barotrauma effects. Fish that are landed with signs of barotrauma will be vented using hypodermic needles to release gas pressure in the swim bladder. After capture, fish will be transferred to acclimation live wells with supplemental oxygenation before being reassessed and stocked into large 1000-2000 gallon recirculating systems for transport to Puerto Rico. Of note, the transport and recirculating systems to be used have been previously tested and validated to ensure animal survival and welfare.

Incidental Species: Past red snapper collections in similar areas yielded minimal bycatch; there is potential for the capture of other snapper/grouper species, which will be released through proper use of descending devices. Vessels will be equipped with multiple approved descending devices.

Quantity: Red snapper = 200 total, 5-15 lbs each

Anticipated Discard: Previous collecting efforts in the proposed project areas have resulted in zero American red snapper discards (i.e. individuals that were captured but not deemed fit for transport or acclimation). In the event that individual American red snapper are collected that do not meet criteria (non-sexually mature, showing signs of disease, etc.) for broodstock selection (i.e. deformities, compromised health, etc.), these fish will be immediately released following the protocols described above for incidental species.

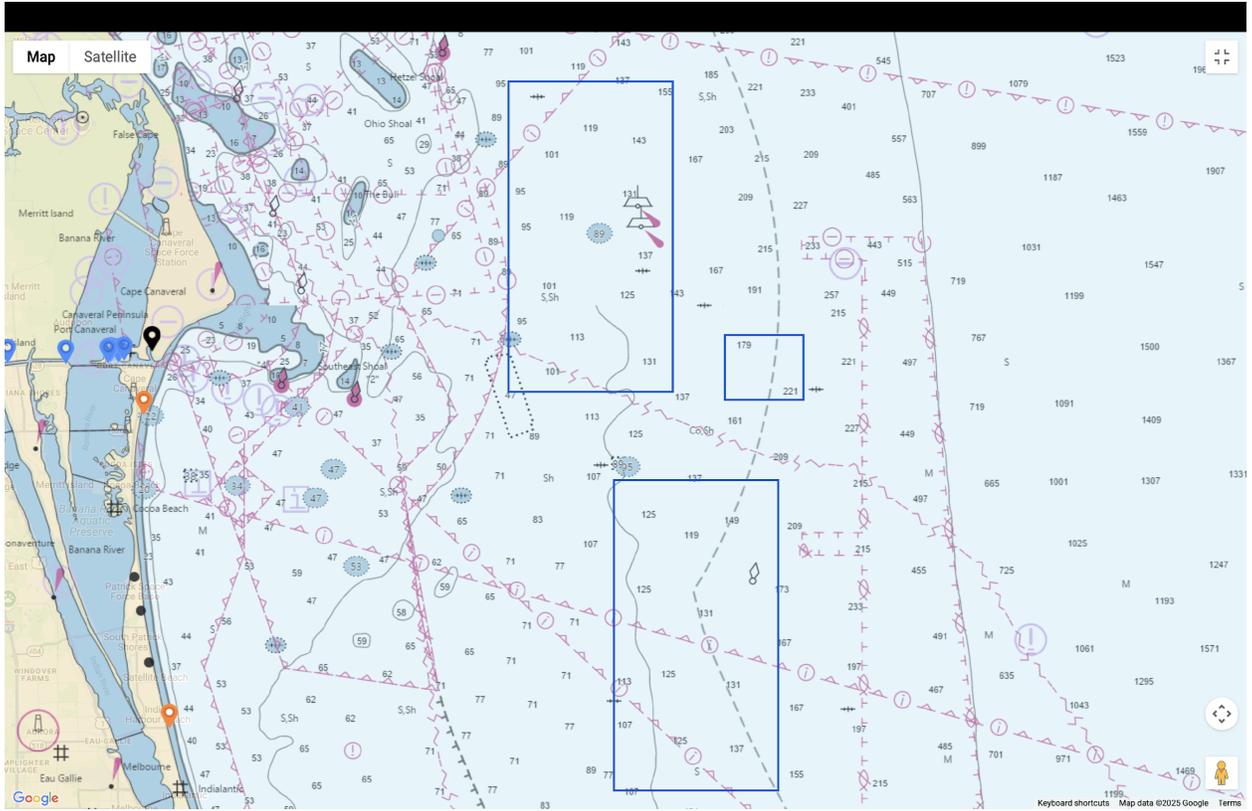
Anticipated Fisheries Impacts: The total number of red snapper requested for collection under this permit is not expected to meaningfully impact the South Atlantic red snapper fishery with a total proposed harvest <<1% of the annual commercial quota. This collection effort is not anticipated to generate any interaction with species managed under the ESA or MMPA.

Project Lead: Fishing will take place under the supervision of Dr. Charles McGuigan, who holds a Ph.D. in Marine Aquaculture from University of Miami-RSMAES and has been actively involved in the capture and transport of broodstock obtained for initial research efforts at the University of Miami. As part of his doctoral thesis, Dr. McGuigan participated in 5 broodstock capture expeditions in similar Florida locations collecting red snapper with no mortality during transport from N. Florida to Miami. Dr. McGuigan has also conducted the capture, transport, and acclimation of other highly sensitive marine fish species including mahi-mahi (*Coryphaena hippurus*), grouper (*Epinephelus spp.*), hogfish (*Lachnolaimus maximus*), cobia (*Rachycentron canadum*), blackfin tuna (*Thunnus atlanticus*) and others with transport times commensurate with this proposal.

Project Duration: Suitable collection dates are requested May 1, 2026 – March 30, 2027 to account for potential uncertainty around transportation schedules and favorable weather conditions. The endeavor to collect and transport 200 mature individuals is expected to be completed in 1 – 2 total trips. Each trip is anticipated to account for 4 days of fishing and 5 days of transit for a total of 9 days. Under ideal circumstances, collection is proposed to occur in November 2026. Once 200 individuals are collected, no additional collecting trips are anticipated, as these 200 broodstock will ensure sufficient genetic diversity to facilitate spawning at the facility for many years. Results of transportation, acclimation, and spawning success will be reported and shared with all relevant stakeholders, as described, 12 months post collection. Project completion will be marked by successful capture, transport, and acclimation for 200 red snapper broodstock.

Location: Fishing will occur in federal waters off Florida using approved capture methods. Sampling Locations: Hard-bottom areas in federal waters off the coast of Cape Canaveral, FL with known quantities of mature red snapper. Depth will likely range from 50 – 200 feet. Because of the potential impacts of barotrauma, shallower depths are favored.

- Proposed Collection Polygon
NW corner 28 51.740N 80 25.061W
NE corner 28 34.088N 80 02.000W
SW corner 27 51.955N 80 11.565W
SE corner 27 41.552N 79 58.311W



5. Vessel, Transport, and Disposition Information

To carry out the proposed research activity, Cultimar Technologies, Inc will be utilizing a **research vessel** and associated equipment to be provided by Bluetide, a grant-funded non-profit organization that facilitates maritime research activities through a fleet of research vessels and highly trained captains and crew. In particular, the research vessel to be used is the **R/V Bluemanta (O.N. 1312254)**, a 77' United States Coast Guard-designated oceanographic research vessel, as an ideal vessel for the completion of this project (*See Appendix*). The R/V Bluemanta is highly suitable for long-range open-ocean research activities and has a wide range of scientific support capabilities including multiple wet/dry laboratory spaces and ample capacity to transport requisite quantities of water for transport. The R/V Bluemanta is routinely employed in marine research, education, and conservation work year-long in the US and broader Caribbean. This vessel was identified and selected because of its capacity as a research vessel which will allow over 6,000 gallons of tank volume for transportation. Please see Appendix A for full vessel specifications.

For reference, the captain and first mate of this vessel are Benny Bonnet Santiago and Elman Montes Ríos, respectively [Address: 482 Av. Manuel Fernandez Juncos, San Juan, PR 00901, Phone Number: (787) 922-5800]. Both have overseen the vessel since 2020 and will be responsible for day-to-day maintenance and upkeep. Principal investigator (PI) of this research activity will be Charles McGuigan, PhD. Dr. McGuigan has more than 15 years working in aquaculture settings and fish welfare, and thus will be responsible for fish health during transit. Dr. McGuigan and his team will continuously monitor water chemistry and animal behavior during the entirety of transit.

Fish survival and wellbeing are essential for the success of our broodstock maturation and fingerling research efforts, and for that reason, Cultimar will designate and provide-out-of-pocket all necessary resources and staff for this project.

All red snapper harvested under this EFP will be assessed for relevant biological and animal welfare indicators while held within on-vessel transportation systems consisting of a holding tank, oxygenation supply, and recirculating system. Of note, Cultimar has designed and tested the portable recirculating system to be used during transport, which will enable fish survival and welfare by providing mechanical filtration, constant oxygenation, and consistent control over ammonia and pH levels. Any effluent water from the system will be passed through mechanical filtration to prevent the release of any waste material during collecting/transport. After collecting of the 200 individual red snapper is completed and preliminary health inspections are performed, the vessel will depart directly from the fishing grounds and offloaded at Cultimar's hatchery in Puerto Rico, where further welfare examination will take place before being introduced to their designated maturation systems.

6. Regulatory Exemptions Requested

Cultimar requests the following exemptions under the EFP:

622.170 (a) Commercial Vessel Permits

- ***South Atlantic snapper-grouper.*** For a person aboard a vessel to be eligible for exemption from the bag limits for South Atlantic snapper-grouper in or from the South Atlantic EEZ, to sell South Atlantic snapper-grouper in or from the South Atlantic EEZ, to engage in the directed fishery for golden tilefish in the South Atlantic EEZ, to use a longline to fish for South Atlantic snapper-grouper in the South Atlantic EEZ, or to use a sea bass pot in the South Atlantic EEZ between 35°15.19' N. lat. (due east of Cape Hatteras Light, NC) and 28°35.1' N. lat. (due east of the NASA Vehicle Assembly Building, Cape Canaveral, FL), either a commercial vessel permit for South Atlantic Unlimited Snapper-Grouper Permit or a trip-limited permit for South Atlantic snapper-grouper must have been issued to the vessel and must be on board. A vessel with a trip-limited commercial permit is limited on any trip to 225 lb (102.1 kg) of snapper-grouper. See [§ 622.171](#) for limitations on the use, transfer, and renewal of a commercial vessel permit for South Atlantic snapper-grouper.

- We request exemption to this rule because our collecting vessel is a USCG documented research vessel and does not conduct commercial fishing operations. This vessel was selected because of its unique capacity to transport large quantities of fish across long distances.

622.183 (b)(5) Closures of the commercial and recreational sectors for red snapper

- The commercial and recreational sectors for red snapper are closed (*i.e.*, red snapper may not be harvested or possessed, or sold or purchased) in or from the South Atlantic EEZ, except as specified in [§ 622.193\(y\)](#). Each year, NMFS will announce the season opening dates in the Federal Register. The commercial season will begin on the second Monday in July, unless otherwise specified. The recreational season, which consists of weekends only (Fridays, Saturdays, and Sundays) begins on the second Friday in July, unless otherwise specified. NMFS will project the length of the recreational fishing season and announce the recreational fishing season end date in the Federal Register. See [§ 622.193\(y\)](#), for establishing the end date of the commercial fishing season.

-We request exemption from this rule because our single collecting effort proposed for this project will rely on extended periods of favorable weather and may take place outside the established Red Snapper commercial or recreational seasons. This flexibility to operate outside of established seasons is critical to safe and effective transportation from the fishing grounds to Puerto Rico as the total fishing and transit time is expected to be ~10 days.

622.191 (a)(9) Commercial trip limits

- **Red snapper.** Until the commercial ACL specified in [§ 622.193\(y\)\(1\)](#) is reached, 75 lb (34 kg), gutted weight.

-We request exemption to this rule because our intended one-time collecting trip will seek to capture and transport 200 adult red snapper (approximately 1500 pounds whole weight) from the South Atlantic region to the Cultimar hatchery.

622.192 (b) Restrictions on sale/purchase

- South Atlantic snapper-grouper harvested in or from the EEZ or adjoining state waters by a vessel that has a valid commercial vessel permit for South Atlantic snapper-grouper may be sold or transferred only to a dealer who has a valid Gulf and South Atlantic dealer permit, as required under [§ 622.170\(c\)\(1\)](#).

-We request exemption from this rule because we do not intend to sell or transfer the fish collected under this proposal to any third party. Fish will be collected and transported by Cultimar Technologies via the Blue Tide vessel and offloaded directly at Cultimar's hatchery in Puerto Rico. No sale or transfer to a third party of any fish collected during this project will occur.

622.193 (y) Annual catch limits (ACLs) and accountability measures (AMs).

- **Commercial sector.** The commercial ACL for red snapper is 102,951 lb (46,698 kg), round weight. See [§ 622.183\(b\)\(5\)](#) for details on the commercial fishing season. NMFS will monitor commercial landings during the season, and if commercial landings, as estimated by the SRD, reach or are projected to reach the commercial ACL, the AA will file a notification with the Office of the Federal Register to close the commercial sector for red snapper for the remainder of the year. On and after the effective date of the closure notification, all sale or purchase of red snapper is prohibited and harvest or possession of red snapper is limited to the recreational bag and possession limits and only during such time as harvest by the recreational sector is allowed as described in [§ 622.183\(b\)\(5\)](#). This bag and possession limit and the prohibition on sale/purchase apply in the South Atlantic on board a vessel for which a valid Federal commercial or charter vessel/headboat permit for South Atlantic snapper-grouper has been issued, without regard to where such species were harvested or possessed, *i.e.*, in state or Federal waters.

-We request exemption from this rule because our collecting dates will rely on extended periods of favorable weather and may take place outside the established Red Snapper commercial or recreational seasons.

7. Applicant Qualifications and Institutional Capacity

Cultimar Technologies, Inc is a research-focused corporation founded in 2023 with the goal of investigating applied technologies and advanced aquaculture practices that contribute to the local and sustainable production of seafood in the United States. Cultimar has received grant funding from the Puerto Rico Science, Research, and Technology Trust. Cultimar's founding team is composed of research scientists, including Dr. Charles McGuigan, who holds a Ph.D. in Marine Aquaculture from University of Miami-RSMAES, and Dr. David Miranda, who holds a Ph.D. in Biomedical Engineering in the Harvard-MIT Program in Health, Sciences and Technology (see CVs attached). Cultimar Technologies has no affiliation with NOAA and/or any other Federal or State government agency nor has it received government funding.

The findings from previous projects established key methodologies that resolve some of the original barriers to the cultivation of American red snapper, including the environmental conditioning of broodstock to produce reliable, volitional spawns and the development of viable methods to incubate embryos and rear larvae. Downstream research during these projects revealed information about the captive growth rates, feed conversion efficiencies, and environmental tolerances that are intrinsic to the species. These results also demonstrated that red snapper can be grown in a wide array of culture conditions including differing salinities (2 – 36 ppt), temperatures (16 – 31°C), and culture systems which have included brackish ponds, flow-through tanks, and semi-recirculating systems. The proposers have also conducted multiple market trials exploring the palatability, filet yield, and ideal market sizes for farm-raised red snapper. Cumulatively, these data indicate a broad suitability of the red snapper for immediate aquaculture development and are the impetus for Cultimar's decision to fund and build this facility.

The proposed fishing activity to collect red snapper brood is the outgrowth of years of federally and state-funded research projects awarded to the University of Miami and the University of Florida (NOAA-OAR-SG-2017-2005176) aimed at bolstering domestic aquaculture production. The results of these projects have shown, through peer-reviewed scientific studies, that the domestic aquaculture production of red snapper should be highly prioritized and outlines several key areas that require further scientific exploration. With a founding team that was intimately involved in these projects, Cultimar has

the opportunity to efficiently and rapidly build upon this foundation and advance the scientific understanding of this critical species without the need for further government funding. In addition, the Cultimar team's ongoing collaborative relationship will allow findings from this project to be shared with key academic researchers at the University of Florida and the University of Miami, who are still actively engaged in research around red snapper (*See Letter of Support – 1 & 2*).

Cultimar Technologies, Inc is uniquely positioned to successfully implement this project due to:

- A founding team that conducted seven years of research related to red snapper hatchery protocols, broodstock maturation, and reproductive biology.
- A state-of-the-art and permitted hatchery under construction (expected inauguration June 2026) in Arecibo, Puerto Rico, with exceptional oceanic water quality ideal for broodstock conditioning and larval culture. This location was selected due to its favorable proximity to extremely high-quality seawater and the necessary environmental conditions to facilitate year-round spawning. See Appendix for hatchery design and location.
- An experienced, multidisciplinary team with extensive backgrounds in marine biology, fisheries science, aquaculture engineering, fish health, and broodstock management.
- The capacity to utilize fully U.S.-origin genetics, supporting any future domestic grow-out operations.
- Established partnerships with leading academic institutions and federal agencies to ensure scientific rigor and transparent reporting.
- Strong mission of fostering sustainable aquaculture and domestic seafood production in the US.

Given these qualifications, Cultimar is well prepared to safely execute, monitor, and report on broodstock capture and spawning performance.

8. Data Collection, Reporting, and Collaboration with the South Atlantic Fishery Management Council

The results of this project will be disseminated through a combination of targeted presentations, publicly accessible reports, and peer-reviewed publications to ensure broad visibility and utility across scientific, management, and industry audiences. Key findings will be presented at relevant Regional Fishery Management Council (RFMC) meetings upon request, particularly those under the jurisdiction of the South Atlantic, Gulf of America, and Caribbean Fishery Management Council, to inform discussions on red snapper population dynamics, discard mortality, and the potential role of aquaculture in supporting fishery goals.

In addition, publicly available white papers summarizing each trial's objectives, methodologies, and outcomes will be prepared and made available upon request to any NOAA office, ensuring transparency and accessibility for use in policy development or program planning. These white papers will be formatted to emphasize management-relevant results and practical applications.

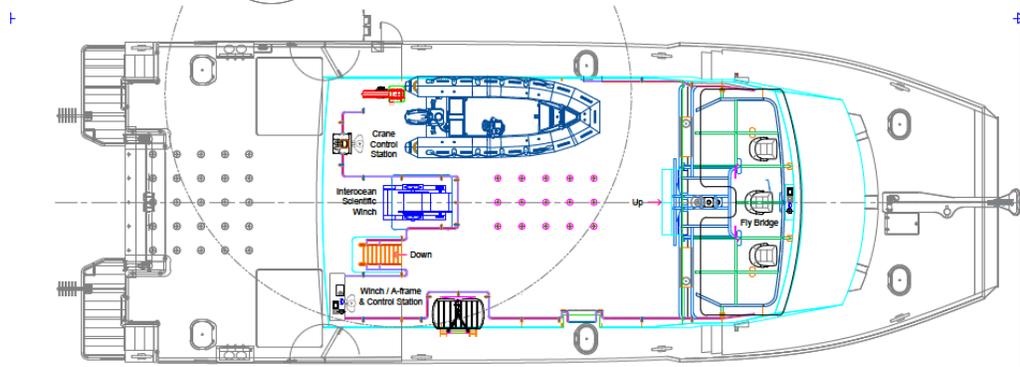
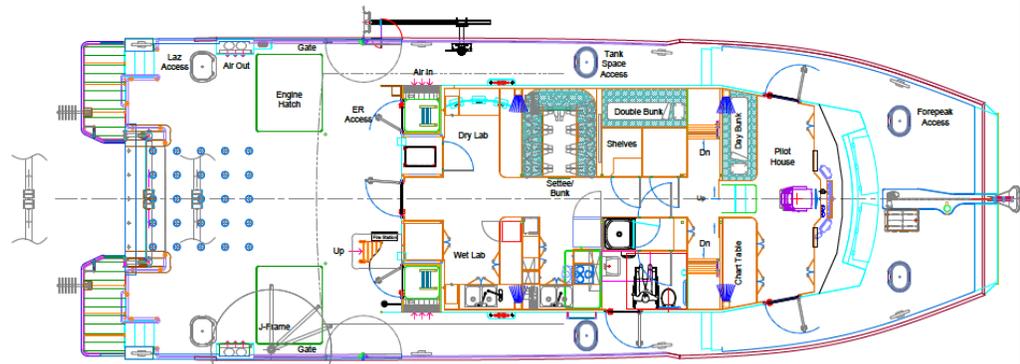
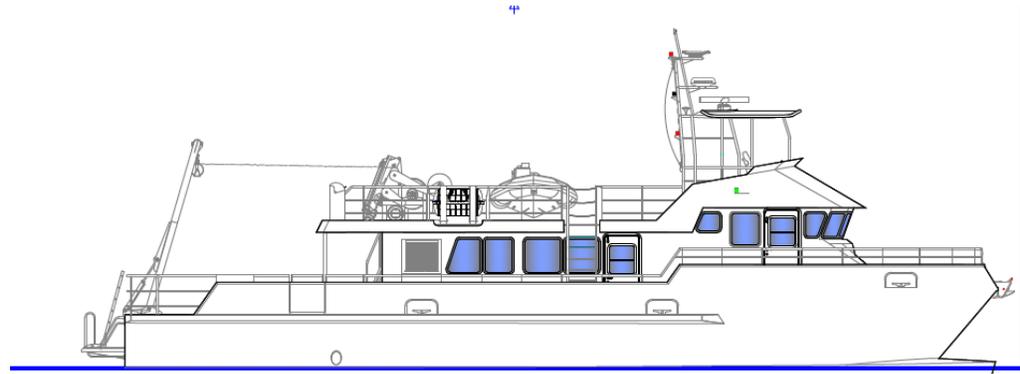
Finally, detailed findings will be submitted for publication in peer-reviewed scientific journals and relevant aquaculture or fisheries trade publications to contribute to the broader body of knowledge and support further research and development in red snapper biology and aquaculture. This multi-channel dissemination strategy ensures that stakeholders across research, management, and industry sectors benefit from the project's outcomes.

Cultimar commits to providing NOAA Fisheries and the SAFMC with the following:

- Detailed spawning performance metrics, including fecundity, spawning frequency, egg quality, and larval survival for broodstock originally captured under the EFP.
- Capture-impact analyses, including correlations between depth, handling practices, and long-term reproductive outcomes.
- Annual white papers or technical presentations summarizing hatchery performance and broodstock condition.
- Open collaboration with NOAA scientists to refine future broodstock capture permitting pathways and streamline the process for future applicants.
- Immediate reporting of any unanticipated mortality or issues arising during the project.

These data will support improved understanding of red snapper population dynamics and inform future stock assessments and management decisions.

Appendix. Cultimar Technologies' Hatchery and Research Institute



LEADING PARTICULARS	
Length (hull)	72.5'
Length (overall)	76'
Beam (moulded)	26.7'
Draft (navigation)	~5.8'
Engines (2)	Cat C18
Rated Power	803 bhp/2100 rpm
Transit Speed	~24 knots, 85% Rating
Propulsion	Fixed Pitch Propeller
Fuel capacity	1500 gal
Construction	Marine Grade Aluminum
Compliment (Live aboard)	8
Compliment (Day)	30
Crew	Up to 3
Hull type	Foil Assisted Catamaran
Construction standard	USCG, Subeh T



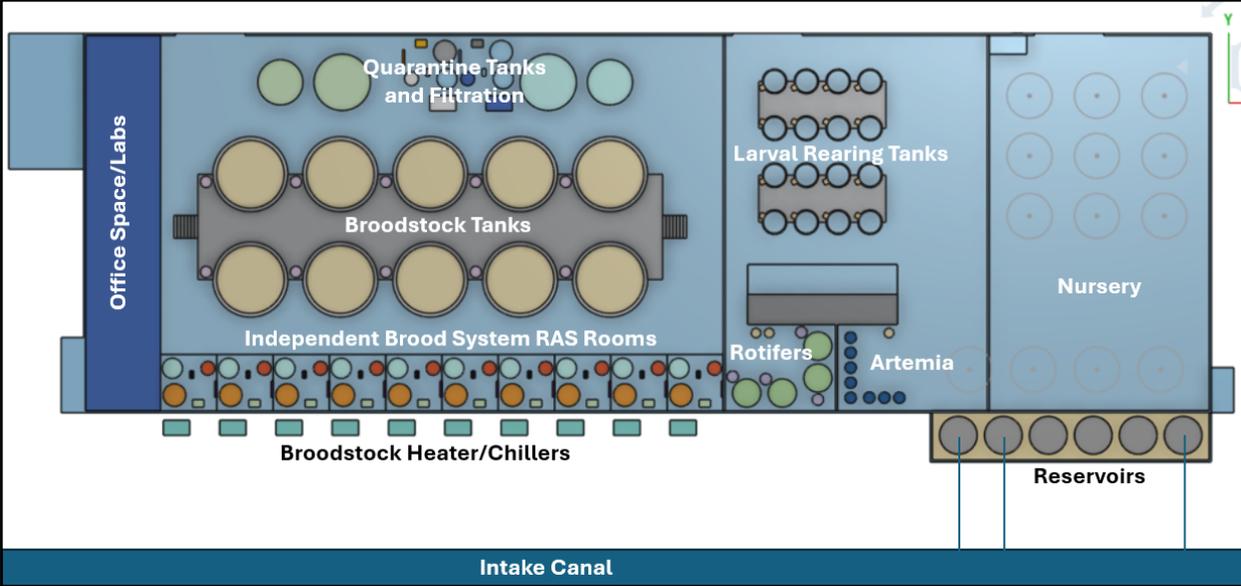
Teknicraft Design
 PO Box 160, Beachlands
 Auckland 2147, New Zealand
 design@teknicraft.com
 www.teknicraft.com

PROJECT: 73' Research Vessel: Blue Manta
 TITLE: General Arrangement

DRAWING No:	REV:	SCALE:	PLOT SIZE:
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Curriculum Vitae

Charles J. McGuigan, Ph.D.

Miami, FL 33135 | 240-313-0711 | cjm McGuigan72@gmail.com

Education

University of Miami – RSMAS, Virginia Key, FL

Ph.D. Marine Biology and Ecology – Aquaculture

Defended October 2023

University of Miami – RSMAS, Virginia Key, FL

M.S. Marine Ecosystems and Society - Aquaculture

December 2018

Eckerd College, St. Petersburg, FL

B.S. Marine Science – Biology

May 2014

Work Experience

2023- Present

Chief Operating Officer, Cultimar Technologies, INC

- Develop production plans, system designs, and business models for domestic and foreign projects, while incorporating relevant regulatory frameworks for each location
- Provide active fundraising through investors, financing, and grants to construct a land-based marine research facility in Arecibo, Puerto Rico
- Develop, test, and analyze novel technologies for enhancing marine science and marine research efficacy
- Scale business from current 8 employees to >24 to facilitate ongoing and upcoming research efforts

2023- 2024

Senior Director of Animal Husbandry, Frost Science Museum

- Managed staff of 24 employees to ensure proper animal care and husbandry practices were instituted across 2 Museum locations
- Developed, oversaw, and operated 29 living exhibitions and quarantine facility
- Implemented new research projects to improve quality and care for all living exhibitions
- Propose, implement, and oversee \$2.4 million budget across two museum locations

2021-2023

Mentor, IMPACT Program

- Develop summer science curricula for high school students who will be first in their family to attend college
- Provide mentorship and lab experience for students from underserved backgrounds
- Develop and conduct two month research project with select students and oversee preparation of presentation for annual symposium

2016- 2023

Graduate Research Assistant, University of Miami – RSMAS

Department of Marine Ecosystems and Society (Aquaculture)

- Prepare, submit, and oversee federal and state grants at research design and budgetary levels with limited end-stage validation from director of Aquaculture Program
- Oversee development of protocols for novel aquaculture species, specifically northern Red Snapper, and incorporate new methodologies and feeding strategies to optimize production

- Design and conduct research trials across a range of high-value marine finfish species including cobia, mahi-mahi, hogfish, red snapper, olive flounder, shrimp, etc.
- Collect, package, and ship fertilized embryos and newly metamorphosed fingerlings of cobia, red snapper, and other species to industry collaborators
- Collaborate with industry and government stakeholders to assist with site selection, production planning, protocol development, and marketing research
- Design and assist with oil toxicology research involving captive-raised mahi-mahi
- Conduct and supervise complex daily tasks associated with timely completion of research goals, maintenance of all tanks and recirculating systems, and husbandry of all species at facility
- Write and publish scientific articles in peer-reviewed journals
- Disseminate research findings to industry collaborators, public, and scientific audiences at conferences, symposia, and through various media streams

2015-2016 **Biological Scientist, Fish and Wildlife Research Institute**
Fisheries Independent Monitoring

- Served as chief scientist and managed data collection, scientific team, and research vessel crews for trips conducting side scan sonar, fisheries monitoring, and biodiversity trawls
- Prepared sampling trips throughout Florida and the Gulf of Mexico for extended periods of time (4 - 18 days at sea)
- Conducted laboratory analysis of fish and invertebrate samples through microscopy, assays, necropsies and morphometrics
- Developed working relationships with commercial fishermen, state and federal scientists, and regulating bodies

2014-2015 **Biological Scientist, Fish and Wildlife Research Institute**
Crustaceans Fisheries

- Aided in the data collection and writing project summaries for multiple research projects throughout state and federal waters
- Aided in design of institute-wide manual for operation of scanning fluorescent microscopy
- Prepared financial and budgeting statements

2012-2014 **Laboratory Technician, Fish and Wildlife Research Institute**
Histology

- Prepared slides and other sampling material for a wide range of research projects
- Maintained a clean and organized laboratory space in the histology department
- Aided the planktonic research group in the use and programming of electron microscopes

Publications

McGuigan, C.J., Buchalla, Y., Tudela, C. E., Starkman, S., Benetti, D. D. "Using Multi-Model Inference to Determine the Growth Rates of Red Snapper, *Lutjanus campechanus*, Through Ontogeny." *Aquaculture Reports*. 2023.

McGuigan, C.J., Buchalla, Y., Darville, K. G., Tudela, C. E., Stieglitz, J. D., Hoenig, R. H., Benetti, D. D. "Effect of replacing darkness with dim light in the larviculture of red snapper, *Lutjanus campechanus*". *Aquaculture Reports*. 2021.

McGuigan, C.J., Schlenker, L. S., Stieglitz, J. D., Benetti, D. D. & Grosell, M. "Quantifying the Effects of Pop-up Satellite Archival Tags on the Swimming Performance and Behavior of Young-Adult Mahi-Mahi (*Coryphaena hippurus*)" *Canadian Journal of Fisheries and Aquatic Sciences*. 2020.

McGuigan, C.J., Buchalla, Y., Tudela, C. E., Dantzler, D., Raymo, G., Bellapigna, Z., Benetti, D. "Feeding Strategies and the Effects of Compensatory Growth in Red Snapper, *Lutjanus campechanus*." *Aquaculture (in review)*.

Benetti, D. D., Suarez, J., Camperio, J., Hoenig, R. H., Tudela, C. E., Daugherty, Z., **McGuigan, C. J.**, Mathur, S., Anchieta, L., Buchalla, Y., Alarcón, J., Marchetti, D., Fiorentino, J., Buchanan, J., Artiles, A., & Stieglitz, J. D. "A review on cobia, *Rachycentron canadum*, aquaculture." *Journal of the World Aquaculture Society*, 52(3), 691– 709. 2022.

Buchalla, Y., **McGuigan, C. J.**, Stieglitz, J. D., Hoenig, R. H., Tudela, C. E., Darville, K. G., ... & Benetti, D. Advancements in hatchery production of red snapper *Lutjanus campechanus*: Exclusive use of small strain rotifers as initial prey for larval rearing." *Journal of the World Aquaculture Society*. 2023.

Carvalho-Neta, A., Torres-Junior, J., **McGuigan, C. J.**, Benetti, D., "Genomic Tools to Improve Cobia Breeding." *Journal of Ocean Technology*. 2023

Miranda, D., **McGuigan, C. J.**, Chaiton, J., Henderson, A., Frisch, B., Nieves, C., Martinez, C., Benetti, D. "The Next Step Towards Commercialization: Validating the Market Potential of American Red Snapper, *Lutjanus campechanus*." *World Aquaculture Society*. 2021

Pasparakis, C., Wang, Y., Heuer, R. M., Zhang, W., Stieglitz, J. D., **McGuigan, C. J.**, ... & Grosell, M. Ultraviolet avoidance by embryonic buoyancy control in three species of marine fish. *Science of the Total Environment*, 806, 150542. 2022.

Schlenker, L. S., Stieglitz, J. D., Greer, J. B., Faillettaz, R., Lam, C. H., Hoenig, R. H., **McGuigan, C. J.**, ... & Grosell, M. Brief Oil Exposure Reduces Fitness in Wild Gulf of Mexico Mahi-Mahi (*Coryphaena hippurus*). *Environmental Science & Technology*, 56(18), 13019-13028. 2022.

Torres-Junio, J., Carvalho-Neta, A., **McGuigan, C. J.**, Benetti, D., "Genomic Challenges to Improve Marine Fish Breeding: An Overview." *Aquaculture Reviews (in review)*

Presentations and Professional Meetings

McGuigan, C.J. "Overview of Red Snapper Aquaculture at the University of Miami Experimental Hatchery." *Florida Sea Grant Annual Symposium*. 2021

McGuigan, C.J., Buchalla, Y., Darville, K. G., Tudela, C. E., Stieglitz, J. D., Hoenig, R. H., Benetti, D. D. "Effect of Photoperiod on Growth, Development, Feed Consumption, and Survival of Red Snapper, *Lutjanus campechanus*." *Aquaculture America Conference*. 2020.

McGuigan, C.J. "Quantifying the Effects of Carrying Pop-up Satellite Archival Tags (PSATs) on the Swimming Performance of Young Adult Mahi-Mahi, *Coryphaena hippurus*." *Gulf of Mexico Research Initiative Conference*. 2018.

Buchalla, Y., **McGuigan, C. J.**, Stieglitz, J., Hoenig, R., Tudela, C., Darville, K., Benetti, D. "Maturation, Spawning, Larval Rearing, and Fingerling Production of Red Snapper, *Lutjanus campechanus*." *Latin American & Caribbean Aquaculture Conference*. 2019.

Skills

- Research design and analysis, particularly for marine science and aquaculture
- Working knowledge of broad skills related to aquaculture including system engineering and electrical engineering
- Proficiency in oral and written communication (both scientific and prosaic)
- Strong interpersonal and managerial skills
- Ability to work independently and produce high-quality content with minimal need for oversight or editing
- Ability to multi-task complex work streams and meet timelines across a range of simultaneous projects
- Proficiency in R, Microsoft Office, and Adobe Products

Honors and Awards

- Best Student Publication Nominee (2021: University of Miami)
- Research to Application Award Nominee (2021: National Sea Grant Office)
- TA of the Year Nominee (2019: University of Miami)
- Best Offshore Crew Member (2016: Florida Fish and Wildlife)
- Rookie of the Year (2015: Florida Fish and Wildlife)
- Eckerd College Writing Excellence Award Finalist (Class of 2014)
- National Merit Scholar (2010)
- Eckerd College Honors Program (2010-2014)
- Eckerd College Lacrosse Captain (2011-2014)
- Presidential Scholarship – Eckerd College, 4 Years
- College Board – AP Scholar with Honor 2010
- Eckerd Student Senate (2010 – 2014)
- Scholarship – Eckerd College Leadership Institute, Jan 2011
- Prefect – St. James Episcopal High School, 2009-2010

DAVID MIRANDA, PH.D.

787-646-2097 | dmiranda@alum.mit.edu

SUMMARY

Entrepreneur and innovator with years of experience in medical devices, foodtech, digital transformation, and problem solving. My education and experience have given me the ability to identify challenges and turn them into opportunities.

EDUCATION

Harvard-MIT Program in Health Sciences and Technology Sept 2013 – Sept 2020
Ph.D. in Medical Engineering, fully funded by fellowship from Department of Defense (awarded to top 10% of applicants), GPA: 4.8/5.0

Massachusetts Institute of Technology (MIT) Sept 2009 – June 2013
B.S. in Materials Science and Engineering, GPA: 4.7/5.0 (Average GPA: 4.2), selected to the Tau Beta Pi Engineering Honor Society (top fifth of engineering students) and Sigma Xi Research Honor Society (top 1% of undergraduates).

SELECTED PROFESSIONAL EXPERIENCES

Founder and CEO, Cultimar Technologies Apr 2023 – Present

- Developing aquaculture enabling technologies that increase sustainable seafood sourcing.

Consultant Sept 2020 – Present

- Assisted with project management, grant writing, technology development and implementation of lean methodologies and digital transformation for projects in pharma, healthcare, hardware, and government.

Fellow, Legatum Center for Development & Entrepreneurship, MIT Aug 2019 – May 2020

- Selected to the highly competitive Legatum Fellowship, which aims to help aspiring entrepreneurs with access to mentors, special seminars, and financing. (Contact: Megan Mitchell, meganmit@mit.edu)

Graduate Research Associate, Beth Israel Deaconess Medical Center (BIDMC) Sept 2013 – Dec 2020

- Worked at the interface of materials science, bioprinting, and stem cell biology to engineer blood vessel substitutes for coronary and peripheral bypass surgery. (Contact: Dr. Elliot Chaikof, echaikof@bidmc.harvard.edu)
- Designed and operated closed loop bioreactor systems for the ex-vivo culturing of living tissues, collaborated with research groups from other universities, and mentored undergraduate students.
- Patented bioprinter and biofabrication process used to engineer blood vessel substitutes (WO 2017015750).

SELECTED LEADERSHIP EXPERIENCES

Founder and Course Director, Harvard Surgical Program in Innovation (SPIN) June 2016 – May 2020

- Co-designed and directed an initiative to teach innovation to over 60 general surgery residents from the BIDMC residency program.

Director and Lead Organizer, MIT Global Startup Workshop (GSW) Conference Sept 2016 – May 2018

- Co-organized a three-day entrepreneurship conference in Bangkok, Thailand with over 1,000 attendees (\$500,000 budget), and recruited 30 thought leaders for tech-related panels, including two Thai ministers.

SELECTED PATENTS & PUBLICATIONS

- Miranda-Nieves, D. et al. The Next Step Towards Commercialization: Validating the Market Potential of American Red Snapper *Lutjanus campechanus*. World Aquaculture Society. (2021)
- Miranda-Nieves, D. et al. Continuous Formation of Ultrathin, Strong Collagen Sheets with Tunable Anisotropy and Compaction. ACS Biomater. Sci. Eng. (2020).
- Miranda-Nieves, D. et al. Bioinspired Vascular Grafts. Chapter in Organ Tissue Engineering. Springer (2020).

To Whom It May Concern,

I am writing to offer my support for the red snapper (*Lutjanus campechanus*) broodstock collection efforts being carried out by Cultimar Technologies, Inc. As a professor of marine biology at the University of Florida with over 25 years of experience studying the reproductive biology and aquaculture of marine finfish, I recognize the critical importance of such initiatives in advancing our understanding of this economically and ecologically significant species.

Red snapper remains one of the most valuable reef fish in the Gulf of Mexico and Caribbean regions; yet, substantial gaps persist in our scientific knowledge of its reproductive physiology, optimal environment throughout ontogeny, and aquaculture potential. Cultimar's work to responsibly collect and establish domesticated broodstock represents a significant step forward in addressing these gaps and will meaningfully advance the scientific community's understanding of the species.

Collaborations between academic institutions and R&D companies, such as Cultimar Technologies, enable the translation of academic research into real-world solutions for food security, conservation, and sustainable aquaculture. I commend Cultimar's scientific approach and commitment to ethical collection and husbandry practices, and I look forward to the opportunities that their endeavor will provide.

Please do not hesitate to contact me should you require any additional information or clarification.
Sincerely



Leonardo Ibarra-Castro, PhD

Assistant professor in Aquaculture

Reproduction and Larval Rearing of Marine Fish

University of Florida/IFAS-SFFGS/Whitney Laboratory

9505 Ocean shore Blvd, St Augustine, Florida, USA

Phone: +1 (904)2018421

<https://www.whitney.ufl.edu>

<https://www.whitney.ufl.edu/conservation--sea-turtle-hospital/fish-aquaculture/>



June 17, 2025

To Whom It May Concern,

I am writing to express my full support for the scientific research efforts proposed by Cultimar Technologies, Inc. As a Professor and Director of the University of Miami's Academic and Research Aquaculture Program, I have been fortunate to lead research and development initiatives that have catalyzed commercial interest in numerous high-value marine fish species. In this capacity, I have collaborated closely with private-sector partners advancing projects centered on novel aquaculture species. These collaborations are highly synergistic – bridging academic inquiry with commercial innovation – ultimately accelerating progress in aquaculture technologies and sustainable seafood production.

Under funding from NOAA and my leadership, our program began working with red snapper (*Lutjanus campechanus*) in 2017. The primary objective of that initial grant was to evaluate the commercial aquaculture feasibility of multiple high-value finfish species native to the southeastern United States. Among those species, red snapper clearly emerged as one of the most promising candidates for continued development. As a result, we secured subsequent funding to expand our research. These projects achieved important milestones in captive reproduction and larval rearing for red snapper.

Cultimar's proposed research directly builds on this foundational work. Their efforts to resolve remaining bottlenecks in large-scale fingerling production will be critical to moving red snapper aquaculture toward commercial viability. Establishing a genetically diverse, domesticated broodstock is essential for optimizing spawning protocols, improving larval rearing success, and ensuring the sustainability of future production models. The data generated—on maturation, fecundity, larval development, and fish health—will provide invaluable insights for academic researchers, resource managers, and commercial producers alike.

Furthermore, enabling Cultimar to develop a selective breeding program using U.S.-based, wild-spawning red snapper populations has broader implications. It will significantly advance NOAA's and regional stakeholders' capacity to evaluate the feasibility and ecological impact of potential stock enhancement programs.

Cultimar's research agenda represents a natural and necessary continuation of the work initiated at the University of Miami through NOAA support. The formation of the company reflects the successful translation of publicly funded research into real-world solutions. Their team is well-qualified to lead this next phase of development, and I strongly endorse their efforts to advance the R&D necessary to commercialize red snapper aquaculture.

Please do not hesitate to contact me should you need any additional information or clarification.

Sincerely,

Daniel D. Benetti, Ph.D.
Professor & Director of Aquaculture



May 15, 2025

Mr. Andrew Richard
Regional Aquaculture Coordinator
Southeast Regional Office
NOAA Fisheries
U.S. Department of Commerce

SUBJECT: Letter of Support for Cultimar Technologies

Dear Mr. Richard:

The Puerto Rico Science, Technology and Research Trust (PRSTRT) was established in 2004, as a private non-profit organization dedicated to advancing innovation, technology transfer, and commercialization while fostering job creation in Puerto Rico's tech sector. We are entrusted with providing support in driving the public policy agenda for science, technology, research, and development on the island.

As part of our mission to increase technological and research development in Puerto Rico we would like to express our support for **the red snapper (*Lutjanus campechanus*) broodstock collection efforts being carried out by Cultimar Technologies, Inc.**

Cultimar Technologies is a research-focus organization operating in Puerto Rico that we have been actively supporting since 2022 through research grants, mentoring, and in-kind contributions. They have participated in various of the PRSTRT program offerings, including Advanced Research Grants, BioLeap, Pre18 and Acércate al Grant.

To increase the seafood competitiveness of the United States, we understand the critical need for research focused on the development of novel aquaculture technologies for the sustainable production of popular fish species. R&D companies like Cultimar Technologies enable the continuation of academic research into real-world solutions, which is much needed in Puerto Rico, the Caribbean, and the World.

Please do not hesitate to contact me if you have any questions or require additional information in this regard.

Cordially yours,

Luz A. Crespo Valentín

Luz A. Crespo Valentín
Chief Executive Officer

U.S. Department of
Homeland Security

United States
Coast Guard



Commander
United States Coast Guard
Sector San Juan

5 Calle La Puntilla
San Juan, PR 00901-1800
Phone: (787)729-2374
Fax: (787) 729-2364
sjprevention@uscg.mil

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P 128-22
May 2, 2022

Benny Bonet
Blue Tide Puerto Rico, Inc.
482 Av. Manuel Fernandez Juncos
San Juan, PR 00901

Subj: Letter of Designation as an Oceanographic Research Vessel, BLUE MANTA, 1312254

Dear Mr. Bonet:

In accordance with the provisions of Title 46, United States Code, 2101 (18), the BLUE MANTA, (O.N. 1312254) is hereby designated an oceanographic research vessel. This designation shall remain in effect until May 31, 2024, provided the vessel does not change employment or deviate from engaging exclusively in oceanographic research operations. It should be noted that in prior administrative rulings the study of celestial navigation, seamanship, scuba diving, etc., in conjunction with oceanographic research or instruction, has voided a vessel's claim of exclusive employment. Any such changes or deviations may constitute violations of inspection laws and must be reported to this office by the master, owner, or agent of the vessel. A determination will then be made regarding the vessel's eligibility to retain this designation.

A request for renewal of this designation should be made by May 01, 2024. This letter shall be maintained on board the vessel.

Sincerely,

CHRISTOPHER M. O'CONNOR
Lieutenant Commander, U.S. Coast Guard
Chief, Prevention Department

S

San Juan Domestic Vessels <D07-SMB-SecSanJuan-DomesticInspect... Mon, May 20, 2024, 1:10 PM



to San, Benny, Elman, Danixa ▾

Good afternoon All,

Thank you for contacting our office. Your new letter is currently in our internal process. Once it is completed and approved, it will be sent to you. As a reminder, as long as the information and operations remain the same as established in 43 CFR 3.10-5, there is no need to submit any other information for designation renewal.

Thank you,

Respectfully,

Kevin J Martinez, MKC
Apprentice Marine Inspector (AMI)
USCG Sector San Juan Prevention Department
5 Calle La Puntilla
San Juan, P.R. 00901

Office: (787) 729 - 2065

Teams Number: (727) 824-7623



CERTIFICADO DE REGISTRO DE COMERCIANTE

Nombre de localidad:

CULTIMAR TECHNOLOGIES
MUELLE DE ARECIBO CARR 655 KM 1.3
ARECIBO PR 00614

Nombre legal:

CULTIMAR TECHNOLOGIES INC
559 CALLE CUEVILLAS
SAN JUAN PR 00907-2535

1500255-0021

Agente retenedor

Fecha de emisión:

17-jun.-2025

Fecha de expiración:

28-feb.-2027

Tipo de certificado: Comerciante

Código NAICS:

11251

54171

Actividad comercial:

Acuacultura

Investigación y Desarrollo en las Ciencias Físicas, Ingeniería y de Vida

Certifico que este comerciante está inscrito en el Registro de Comerciantes del Departamento de Hacienda.



Secretario Auxiliar
Área de Rentas Internas

Este certificado no es transferible y deberá exhibirse en todo momento en un lugar visible al público en la localidad indicada.
Para verificar si este certificado es válido, acceda a <https://suri.hacienda.pr.gov> y presione el enlace "Valide certificados y licencias".



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