GOMESA PHASE II PROJECT FUNDING

Request for Funding FY2026

Submission ID: #202509301367

PROJECT SUMMARY

1. Title of Project

Direct Oyster Larval Setting for Accelerated Reef Restoration in Mississippi Sound

2. Location of Project

MDMR owned inshore artificial reef sites

3. Requesting Organization:

Callie Mae Sea Foundation

4. Requesting Agency Representative

a. Name:	Virginia Schweiss
b. Phone:	228-806-8604
d. Email:	ginger.schweiss@calliemaeseafoundation.org
c. Address:	14199 Oakview Circle
	Ocean Springs Mississippi

5. Funding Requested:

$1370000

6. Have any other State or Federal funding sources been identified for the project?

No

7. If yes, enter amount and source of additional funds:

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Source of Additional Funds:

8. Total Project Funds

$1370000

9. Provide Brief Project Description/Overview:

Building on the Callie Mae Sea Foundation's successful demonstration of direct oyster larvae setting at Shearwater Reef under a MDMR Scientific Research Permit, this project will restore and enhance state-owned oyster reefs throughout the Mississippi Sound using a strategic deployment of a total of 225 million pediveligers on top of newly placed substrate at 15 reef sites. The project will coordinate with MDMR's Artificial Reef Bureau's planned 2026 substrate deployment across 64 inshore subtidal artificial reef locations, deploying hatchery-produced larvae onto prepared substrate to accelerate reef establishment at rates faster than natural recruitment alone.
This two-phase initiative will first deploy pediveligers on reef sites selected for optimal salinity, current, water quality, and substrate conditions, with monthly monitoring throughout 2026 to assess settlement success, survival rates, oyster density, and growth. The second phase will develop and field-test deployment technologies from late 2026 through mid-2027, with each technology-deployed plot monitored for one full year post-deployment to refine methods for future large-scale application.
This approach is intended to restore decimated oyster reefs at an accelerated rate, directly supporting Mississippi's commercial oyster industry recovery, while providing critical ecosystem services including water quality improvement, essential fish habitat enhancement, and shoreline stabilization. Timeliness of this project is key as the state continues oyster restoration efforts. The project builds upon proven pilot project success and leverages state infrastructure investments to maximize restoration effectiveness and cost-efficiency.

10. LIST Project Goals/Objectives:

To restore approximately 60 acres of oyster reef habitat through deployment of approximately 225 million pediveligers on state-owned oyster reefs in the Mississippi Sound. CMSF staff, in coordination with MDMR Artificial Reef Bureau, will assess the project area and identify the most suitable sites for oyster restoration across 15 reef locations.

Primary project objectives include:
1. Site identification and larval deployment coordination with MDMR's 2026 substrate placement program
2. Deployment of pediveligers on newly placed cultch material
3. Assessment of oyster settlement, growth, health, and survival across deployment sites
4. Development and testing of enhanced deployment technologies for future restoration scalability

11. Which of the following authorized uses set forth in the GOMESA Act does this project fall under? Explain SPECIFICALLY and in detail how the project meets the required criteria. Check all that apply - At least one must be checked.

☒ (A) Projects and activities for the purposes of coastal protection, including conservation, coastal restoration, hurricane protection, and infrastructure directly affected by coastal wetland losses

Yes: This project will enhance essential fish habitat which plays a major role in the restoration of recreationally and commercially important finfish and invertebrate species in the Mississippi Sound. With the deployment of pediveligers on newly placed reef material, the restored oyster reefs will re-establish a natural physical barrier for hurricane protection that historical reefs once provided. Restoration of oyster reefs in the Mississippi Sound is critical to the protection and stabilization of multiple shoreline types including coastal areas in Hancock, Harrison, and Jackson Counties that have been

impacted by wetland losses and coastal erosion.

☒ **(B) Mitigation of damage to fish, wildlife, or natural resources.**

Yes: This project proposes to restore oyster reefs in the Mississippi Sound, which has experienced man-made and natural disasters over the past 20 years, including Hurricane Katrina, the Deepwater Horizon oil spill, and repeated Bonnet Carré Spillway openings, utilizing direct larval deployment techniques that accelerate oyster population recovery. This project will provide the following benefits: 1) Increase production of oysters in the Mississippi Sound to support commercial harvest recovery 2) Provide ecosystem services by enhancing essential fish habitat for inshore species and improve local stocks of recreational species, and 3) Provide habitat for species critical to the success of Mississippi coastal wetlands.

☐ **(C) Implementation of a federally-approved marine, coastal, or conservation management plan**

☐ **(D) Mitigation of the impact of Outer Continental Shelf activities through funding of onshore infrastructure projects.**

12. Project Timetable/Milestones:

This project is estimated to take approximately 2 years for implementation. CMSF staff, in coordination with MDMR Artificial Reef Bureau, will assess project areas and identify the most suitable sites for oyster restoration based on substrate placement schedules and environmental conditions.

Primary Milestones include:

Phase 1 (2026):
1) Site identification and coordination with MDMR's 2026 substrate deployment program (Q1 2026)
2) Deployment of pediveligers on newly placed cultch material across 15 reef locations (Q2-Q3 2026)
3) Monthly monitoring and assessment of oyster settlement, growth, health, and survival rates (Q2 2026 through Q1 2027)

Phase 2 (Late 2026-Mid 2027):
4) Development, testing, and validation of enhanced deployment technologies with 12-month monitoring of technology-deployed plots (Q4 2026 through Q2 2027)

13. Project Timing

Short-term (3 year or less)

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APPLICATION SUMMARY QUESTIONNAIRE

14. Current status of architectural/engineering plans & specifications for this project (if applicable):

Group 1:

N/A

Group 2:

Funds not budgeted

15. In what way does this project meet the goals and objectives of the Department of Marine Resources, which includes enhancing, protecting and conserving the marine interest of Mississippi for present and future generations.?

Restoration and enhancement of oyster reefs through direct larval deployment will provide coastal protection by increasing shoreline stabilization, restore depleted oyster resources to support commercial harvest recovery, and provide increased habitat for a variety of marine species including recreational and commercially important finfish. This project mitigates losses of historical oyster reef habitat caused by Hurricane Katrina, the Deepwater Horizon oil spill, and Bonnet Carré Spillway openings, and develops innovative oyster restoration techniques that build upon proven pilot project success. This project enhances public oyster resources, protects the public's right to have and enjoy those valuable resources, supports Mississippi's coastal communities and oyster industry, and conserves and promotes the natural resources of the Mississippi Sound for present and future generations.

16. Estimated number of years to completion:

3

17. Estimated Completion Date:

Winter 2028

18. Prioritize if your agency has submitted multiple projects:

N/A

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BUDGET

Category	Total
Salaries	0
Travel	0
Architecture & Engineering	350000
Legal	0
Consulting	80000
Construction	0
Site Work	160000
Equipment	230000
Indirects	0
Other	550000
Total	1370000

Attachments

1. direct-oyster-larval-setting-for-accelerated-reef-restoration-in-mississippi-sound.pdf

☒ I hereby certify under penalty of perjury that all information contained in this application packet is true and correct. I have not knowingly or intentionally provided any false information. I understand that a false statement on this application may be grounds for rejection of my application or termination of the award. In addition, a false statement may be punishable under applicable state or federal laws, which may also result in a fine and/or imprisonment.

☒ I certify that the above referenced agency / entity has given me the authority to submit this application.

Name	Phone	Date
Virginia Schweiss	2288068604	09/29/2025

Direct Oyster Larval Setting for Accelerated Reef Restoration in Mississippi Sound
Submitted by: Callie Mae Sea Foundation
Application Year: 2026
Contact: Dr. Virginia Schweiss

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1. Project Overview
The Callie Mae Sea Foundation proposes to restore approximately 60 acres of oyster reef habitat through deployment of 225 million pediveligers (approximately 15 million per reef) across 15 reef sites in the Mississippi Sound. This project builds directly on CMSF's successful Shearwater Reef pilot project and strategically aligns with MDMR's Artificial Reef Bureau's planned 2026 substrate deployment program.
Project Scale:

- 15 reef sites (~4 acres each)
- 225 million pediveligers total
- 2-year implementation timeline
- Two-phase approach: deployment/monitoring + technology development

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2. Background and Need
Mississippi's oyster harvest has declined from over 400,000 sacks annually in the 1990s to near-zero in recent years due to Hurricane Katrina (2005), the Deepwater Horizon oil spill (2010), and repeated Bonnet Carré Spillway openings. Traditional cultch planting relies on natural larval settlement from depleted wild populations, resulting in insufficient recruitment for restoration timelines. Active restoration through direct larval deployment can establish reproductive populations in 18-24 months versus 3-5+ years for natural recruitment, accelerating recovery and reducing vulnerability to environmental disturbances.

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3. Shearwater Reef Pilot Project: Proven Success
CMSF conducted Mississippi's first direct larval setting demonstration at Shearwater Reef under a MDMR Scientific Research Permit. The pilot project deployed approximately 84 million pediveligers across 9 reef sites during June 2025.
Key Results:

- **Settlement Success:** Both density treatments showed significant spat settlement ($F = 17.82$, $p < 0.0001$). There was no significant difference between low and high density treatments ($t = 0.711$, $p = 0.477$)
- **Restoration-relevant Measurements:** Low Density sites: 76.11 spat per meter squared and High Density sites: 69.18 spat per meter squared

Significance: The pilot conclusively demonstrated that direct larval setting is technically feasible, cost-effective, and achieves settlement and survival rates sufficient for reef restoration in Mississippi waters.

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4. Proposed Project Methodology

Phase 1: Deployment and Monitoring (2026)

Site Selection: Sites will be selected in coordination with MDMR Artificial Reef Bureau based on:

- Salinity ranges of 12-28 ppt
- Bottom current less than 1 m/s
- Substrate stability and surface area
- Historical reef productivity

Deployment Protocol: Pediveligers will be deployed at competent larval stage during optimal environmental windows (April-September 2026). Each of 15 reef sites will receive approximately 15 million larvae, coordinated with MDMR's substrate placement schedule and favorable tidal/current conditions.

Monitoring Program: Monthly monitoring from deployment through Q2 2027 will employ:

- Square meter dive surveys for density and size distribution
- Settlement plates to compare with natural recruitment
- Environmental data loggers (salinity, temperature, DO, turbidity)
- Associated fauna surveys

Phase 2: Technology Development (Late 2026-Mid 2028)

Development and field testing of enhanced deployment technologies to:

- Minimize larval stress during deployment
- Achieve precise density control
- Optimize coordination with environmental conditions
- Improve settlement success rates
- Reduce deployment costs

Multiple experimental plots will test different technological approaches with 12-month monitoring to assess performance and cost-effectiveness versus standard methods.

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5. Expected Outcomes

Restoration Outcomes

- 60 acres of productive oyster reef habitat restored
- Minimum 50 oysters per square meter at deployment sites
- 15-20% survival from pediveliger to juvenile
- Harvestable-size oysters (3+ inches) within 18-24 months
- Increased spawning stock biomass throughout Mississippi Sound

Industry and Economic Benefits

- Enhanced commercial harvest opportunities on state reefs
- Job creation in coastal communities
- Demonstrated techniques adaptable to private aquaculture
- Economic multiplier effects through seafood sector

Ecosystem Services

- Water quality improvement
- Essential fish habitat for red drum, speckled trout, flounder, sheepshead
- Shoreline stabilization and erosion reduction
- Enhanced biodiversity and ecosystem productivity

Scientific Advancement

- Comprehensive dataset on direct larval setting success across environmental gradients
- Scalable deployment technologies with documented cost-effectiveness
- Standardized protocols for future restoration
- Peer-reviewed publications advancing restoration science
- Knowledge transfer to restoration practitioners throughout Gulf Coast

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6. Project Timeline

Q1 2026: Site identification and MDMR coordination
Q2-Q3 2026: Deployment of 225 million pediveligers across 15 sites
Q2 2026-Q1 2027: Monthly monitoring and assessment
Q4 2026-Q3 2027: Technology development, testing, and validation
Q3 2027-Q3 2028: Monthly monitoring and assessment

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7. Alignment with Mississippi's Restoration Priorities

This project directly implements MDMR's Oyster Restoration and Recovery Plan and addresses impacts from Hurricane Katrina, Deepwater Horizon oil spill, and Bonnet Carré Spillway openings. The project meets GOMESA criteria by providing coastal protection through shoreline stabilization, restoring depleted oyster resources, enhancing essential fish habitat, and mitigating damage to marine resources from past disasters.

By leveraging MDMR's 2026 substrate deployment and proven pilot project success, this initiative provides a strategic, cost-effective approach to accelerate oyster population recovery, support commercial harvest, and enhance ecosystem services throughout the Mississippi Sound.