RESTORE ACT Center of Excellence for Louisiana Research Grants Program
FY2024 Annual Report to the RESTORE Council

Executive Summary

In the 2024 financial year (FY24), the RESTORE ACT Center of Excellence for Louisiana (LA-COE) successfully closed out the period of performance for its second Request for Proposals (RFP2 cycle). This included the completion of four graduate assistantship awards and four research awards. In addition, the LA-COE initiated its third Request for Proposals cycle (RFP3 cycle). This included developing RFP3 in collaboration with the Louisiana Coastal Protection Authority (CPRA), soliciting and reviewing letters of intent and full proposals, and the selection of three Graduate Assistantship awards and nine Research Awards. During FY24, LA-COE hosted a kickoff webinar for RFP3 award recipients and continued ongoing program operations according to the standard operating procedures (SOPV4), which were updated in December 2023. The details of the RFP3 awards, as well as how this research can inform the Louisiana Coastal Master Plan is routinely updated on the LA-COE RFP3 cycle webpage: https://thewaterinstitute.org/la-coe/funded-research-rfp3-cycle.

Programmatic Elements

Given the provisions of the RESTORE Act requiring that Centers of Excellence must focus efforts on a selected set of disciplines[1], LA-COE focuses on the following:

- Coastal and deltaic sustainability, restoration, and protection including solutions and technology that enable citizens to live in a safe and sustainable manner in a coastal delta in the Gulf Coast region;
- Coastal fisheries and wildlife ecosystem research and monitoring in the Gulf Coast region;
- Sustainable and resilient growth, economic, and commercial development in the Gulf Coast region;
- Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.

Key accomplishments during the FY24 reporting period include: (1) successful conclusion of the RFP2 funding cycle, including the review and approval of eight final reports, (2) approval of a third Cooperative Endeavor Agreement (CEA3) between CPRA and The Water Institute, (3) refinement and release of RFP3, (4) sponsoring the Gulf of Mexico Conference (GOMCON) 2024 and coordinating with other RESTORE Act-funded programs on a session, (5) review of 41 letters of intent and 23 full proposals submitted for RFP3, (6) managing 12 new research subawards for RFP3, including awards selection and contracting, (7) hosting a kickoff webinar to provide training on program and data management requirements and best practices for subawardees, (7) assessing

[1] https://www.treasury.gov/services/restore-act/Pages/COE/Centers-of-Excellence.aspx

and reporting on progress using defined metrics that address federal reporting requirements, including reports to the U.S. Department of Treasury was also conducted, and (8) operating the LA-COE according to the Standard Operating Procedures (SOPs), including website management, data management, coordination with other Centers of Excellence, and dissemination of information.

The RFP2 funding cycle concluded on December 31, 2023. Ahead of the end of this cycle, all RFP2 subaward recipients were to submit their final reports by November 30, 2023. The LA-COE reviewed these final reports and corresponded with PIs on requested revisions needed to approve them. All final reports were submitted to CPRA by December 31, 2023. As data deriving from LA-COE funded projects must be made publicly available within one year of the end of the period of performance, the LA-COE Data Manager corresponded with all RFP2 funding recipients quarterly during FY24 to confirm their plans to make their project data publicly available by October 31, 2024. In addition, the RFP2 draft success metrics technical memorandum was revised and will continue to be updated as final data and deliverables are received through October 31, 2024.

An amendment to the grant award for Phase 3 of LA-COE was received from the U.S. Department of Treasury in July 2023. A CEA between CPRA and The Water Institute was completed and approved by the Office of State Procurement in January 2024.

Beginning in January 2024, LA-COE worked with CPRA to refine and release RFP3, which was released on January 25, 2024. A live and recorded RFP3 question and answer webinar was held on February 1, 2024, which was posted to LA-COE website after the webinar. To streamline the RFP3 process, CPRA and The Water Institute agreed to remove the Collaborative Awards category for RFP3 and only include two categories, Graduate Assistantships and Research Awards. For RFP3, CPRA and The Water Institute decided to include more specific research activities under each of the five general and broad topical areas of the Research Needs document to obtain more targeted proposals. A total of 19 research activities were developed and included in Section 3 of the RFP document. An additional way in which the process was streamlined was a change to require Letters of Intent (LOIs) for both award categories. A total of 41 LOIs were submitted with 6 for Graduate Assistantships and 35 for Research Awards. CPRA and The Water Institute met on March 11, 2024, to discuss the LOIs based on review criteria of "relevance" and "scientific merit" developed for RFP3. LOI review feedback was sent to Primary Investigators (PIs) on March 18, 2024, with a total of 24 LOIs invited for full proposals.

On February 18–February 22, 2024, three members of the LA-COE team attended the Gulf of Mexico Conference (GOMCON) in Tampa, Florida. The LA-COE was a sponsor of this conference and hosted a booth where information about the LA-COE was made available to conference attendees. This served as a useful platform to advertise for and answer questions on RFP3. The Director of the LA-COE also presented on the LA-COE and highlighted how the

research the LA-COE funds is used to support the implementation of Louisiana's Coastal Master Plan. During the conference, the LA-COE Director and Chief Scientist attended a meeting with representatives from all the RESTORE Act Centers of Excellence from across the Gulf of Mexico. During this meeting, each of the Centers provided an update on their work, and the development of a collaborative special journal issue centered around co-production was discussed. In addition, the Deepwater Horizon Science Coordination forum hosted a meeting during the conference that the LA-COE Director and Chief Scientist attended.

In March 2024, CPRA and LA-COE developed a list of potential External Review Board (ERB) members and subject matter experts (SMEs) for RFP3 proposal review, based on the research activities addressed by the proposals. LA-COE then checked for conflicts of interest based on a list of collaborators from each LOI submission and sent ERB and SME invitations for RFP3. In total, LA-COE invited seven nominated ERB members, five of whom were on the ERB for RFP2.

A total of 23 full proposals were submitted for RFP3. These were assigned to anonymous reviewers in the LA-COE electronic review portal system including members of the LA-COE ERB members, SMEs, and SMEs from CPRA. Each proposal had four independent evaluations, which were submitted by reviewers on May 13, 2024. The LA-COE then coordinated with CPRA and the ERB chair, and conducted a 2-day full proposal Review Panel Meeting (held virtually) on May 22–23, 2024 to discuss the proposal review comments for each proposal with ERB members. The ERB made final funding recommendations (based on a scale of 1–3) for each proposal at the end of the panel meeting based on review and discussion of the proposals, the SME reviews, and the CPRA reviews. A recommendation meeting was subsequently held on May 28, 2024 with CPRA and LA-COE staff. In this meeting, the staff discussed the ERB's recommendations and developed a potential list of projects to fund, subject to concurrence by CPRA and LA-COE leadership. An award concurrence document was developed by the LA-COE and approved by CPRA to finalize which Graduate Assistantship and Research Awards would be granted. PIs were notified of the awards on June 17, 2024, and a public announcement was made via a joint LA-COE and CPRA press release on June 24, 2024. A total of 12 awards were announced including three Graduate Assistantship awards, and nine Research Awards (see list below).

Subaward contracting for RFP3 began in June 2024, and by August 15, 2024, all 12 subawards for RFP3 had been executed. An RFP3 kickoff webinar was held on September 5, 2024, to share RFP3 timelines, program requirements, and resources with the awarded PI's and graduate students. A total of 13 participants attended the webinar. For the two PIs who were not able to attend, a recording of the webinar was shared.

Following the selection of RFP3 awardees and projects, LA-COE and CPRA selected and assigned one Technical Point of Contact (TPOC) and one CPRA Liaison to each project. The role of TPOCs and CPRA Liaisons is to work with the project PIs to ensure research results will help implement the Louisiana Coastal Master Plan.

LA-COE quantifies the impacts of its research. Since 2016, LA-COE has supported 108 undergraduate students, graduate students, and post-docs, generated 19 theses and dissertations, 27 journal article publications, and 30 publicly available datasets. Additionally, LA-COE hosts a Google Scholar webpage noting all publications resulting from LA-COE funded research and sends out Quarterly Newsletters by e-mail, which provide updates on LA-COE activities and funded research projects. The most recent newsletter was sent out in August 2024.

LA-COE will continue to operate the Center according to the SOPV4, including regular meetings with CPRA (monthly and/or bi-monthly depending on schedules) and phone calls as needed, website maintenance, data management, coordination with other Centers of Excellence, and addressing federal reporting requirements, including reports to the U.S. Department of the Treasury and other dissemination of information.

RFP3 Award Subrecipient(s) Selected for Funding:

Graduate Assistantships

1. Louisiana State University, Dr. Matthew Hiatt
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
    - Research project undertaken: Salinity dynamics between the Mississippi River and adjacent estuaries.
    - Subaward executed in July 2024
    - Summary: The project aims to address river-estuarine hydrological connectivity from the Mississippi River, across coastal wetlands, to open water estuarine systems impacting porewater salinity dynamics in marshes. The work is intended to lay a foundation for understanding the extent of river-estuarine connectivity through multiple pathways, including surface-groundwater exchange, and the salinity dynamics of marsh porewater subject to hydrological perturbation.

2. Louisiana State University, Dr. Junhong Liang
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
    - Research project undertaken: Projecting future estuarine hypoxia and habitat in Louisiana.
    - Subaward executed in July 2024

- Summary: This project will generate high-resolution hindcast and projection simulations of physical and dissolved oxygen conditions in Barataria Bay for the 21st century (2001 to 2100) using a coupled-hydrodynamic-biogeochemical model (coastal and Regional Ocean Community Model). It will explore the use of an eco-physiological framework to map temperature-dependent hypoxic zones for selected species in Barataria Bay. The goal is to systematically characterize and map temperature-dependent hypoxic conditions over Barataria Bay for each decade under the context of climate warming.

3. University of Louisiana at Lafayette, Dr. Robyn Zerebrecki
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Coastal and deltaic sustainability, restoration, and protection, including solutions and technology that enable citizens to live in a safe and sustainable manner in a coastal delta in the Gulf Coast region.
    - Research project undertaken: Quantifying small-scale genetic variation in *Spartina alterniflora*.
    - Subaward executed in August 2024
    - Summary: This project will conduct field surveys across the Louisiana coastline to assess Spartina genetic diversity, plant production, sediment properties, and the associated plant and invertebrate community between restored and natural salt marshes. The project will also investigate how different restoration techniques influence diversity and ecosystem function. Spartina genetic diversity will be assessed using microsatellite markers that allow for the identification of individual genotypes, and statistical comparisons will include population and community response variables between restored and natural marshes.

<u>Research Awards</u>

4. Louisiana State University AgCenter, Dr. Ayat Al Assi
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Coastal and deltaic sustainability, restoration, and protection, including solutions and technology that enable citizens to live in a safe and sustainable manner in a coastal delta in the Gulf Coast region.
    - Research project undertaken: Wind resilience in coastal Louisiana: a social equity approach to enhanced building code practices.
    - Subaward executed in July 2024
    - Summary: This project aims to incorporate wind risk assessment and risk reduction through enhanced code practices into the Louisiana Coastal Master Plan. The project will examine how various social equity factors influence individuals' direct experience of economic impacts from wind events, while also evaluating the effectiveness of enhanced building code practices in reducing wind risk. In doing so, it will establish a comprehensive library for wind-risk metrics, both before and after fortifying resilience efforts in Coastal Louisiana.

5. Louisiana State University, Dr. Corina Barbalata
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
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    - Research project undertaken: An automated tool for water quality assessment in Louisiana's watersheds and basins.
    - Subaward executed in July 2024
    - Summary: This project will develop autonomous water parameter data collection and analysis in watersheds and basins as new spillways and diversions are created. Using optical and environmental sensors integrated with an autonomous surface vehicle will allow the detection and tracking of Harmful Algal Blooms and will enable the design of predictive modelling techniques for water quality assessment. The goal is to create a set of affordable and accessible tools for large-scale water quality monitoring that can be widely used by project managers and the community to understand the impact of both natural and human factors on the environment.

6. Chenier Environmental Consulting, Patrick Bradley
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
    - Research project undertaken: Reconnaissance geophysical and geotechnical investigations to characterize Ship Shoal
    - Subaward executed in July 2024
    - Summary: To better understand Ship Shoal's sediment characteristics, volume, and geomorphology, and address data gaps, this project will develop and conduct reconnaissance full-suite geophysical and geotechnical investigations across the entire shoal. Samples will be extracted from vibracores at irregular intervals to ground truth the subbottom data. The data will provide sediment characterization and an estimate of total available volume and accessible volume of restoration quality sediment. The data collected during the surveys will serve as baseline data for future shoal migration studies.

7. Louisiana State University, Dr. Muriel Brückner
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
    - Research project undertaken: An analysis of vegetation establishment and its feedback with coastal inundation via modeling.
    - Subaward executed in July 2024
    - Summary: The goal of this project is to create an exploratory eco-hydrodynamic delta model to spatially refine hydrodynamics and vegetation establishment. The

project will identify establishment criteria for wetland vegetation on newly developed deltaic land, including water levels, inundation frequency and period, and flow velocities. This will be achieved with a straightforward and easy to implement Python code and framework implementation that is flexible and can be incorporated in a variety of models. The results will also include recommendations on where and how the approach can be applied to improve the estimation of hydrodynamic and ecological properties in various numerical models and coastal areas.

8. University of New Orleans, Dr. Madeline Foster-Martinez
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
    - Research project undertaken: Determining vegetation establishment thresholds with custom-built sensors.
    - Subaward executed in July 2024
    - Summary: This project aims to deploy a network of custom-built water level loggers across two deltaic wetland environments and one marsh creation site, all with newly developed land, to directly measure the water level and enable an accurate calculation of inundation time. Studying land that originated in different manners allows researchers to assess a fuller range of establishment criteria relevant to the Louisiana coast. The project findings will be used to develop species-specific establishment thresholds based on inundation time, salinity, and any other factors determined from the analysis, that can be used as criteria for vegetation growth on newly developed land.

9. Comite Resources, Rachael Hunter
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
    - Research project undertaken: Measurement of greenhouse gas emissions and carbon dynamics across a hydrologic gradient in Louisiana coastal freshwater forested wetlands.
    - Subaward executed in July 2024
    - Summary: This project utilizes the extensive Coastwide Reference Monitoring System (CRMS) datasets and field measurements of carbon dynamics in coastal freshwater forested wetlands to quantify greenhouse gas emissions and carbon dynamics in forested wetlands converting to emergent marsh and open water. Carbon modelling will be carried out to quantify the potential carbon stock accruals and the resulting carbon sequestration and GHG emission rates. The sequestration rates can be applied to specific habitat types and/or restoration footprints to determine baseline and project carbon stock accrual rates for various Coastal Master Plan restoration scenarios.

10. Louisiana State University, Dr. Navid Jafari
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Coastal and deltaic sustainability, restoration, and protection, including solutions and technology that enable citizens to live in a safe and sustainable manner in a coastal delta in the Gulf Coast region.
    - Research project undertaken: Instrumented settlement plates enhancement for marsh creation monitoring.
    - Subaward executed in July 2024
    - Summary: This project aims to develop sensor technology to track the mudline at Instrumented Settlement Plates (ISPs) and facilitate in-situ effective stress estimates, which are crucial for construction monitoring. Research tasks will involve synergistic lab experiments, field demonstrations, and computational validations. The focus will be on compiling and evaluating post-construction ISP data from marsh creation projects to develop best-available science guidance and protocols for ISPs in tracking long-term marsh slurry geotechnical properties and improving marsh fill consolidation estimates for future projects.

11. Nicholls State University, Dr. Gary LaFleur
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.
    - Research project undertaken: Developing methods to measure flotant marsh extent and stability in the Barataria-Terrebonne estuary system.
    - Subaward executed in July 2024
    - Summary: The project will develop remote sensing-based, non-invasive methods for assessing marsh mat cohesiveness in a range of flotant sites. Geospatial analysis and vegetative assessment from aerial imagery, conventional vegetative sampling, and eDNA analysis will be used to determine plant identification and composition within flotant mats. Researchers will score marshes on whether the flotant mat is stable, threatened, or unstable, allowing better predictions on whether sites are in danger of mat separation.

12. Louisiana State University AgCenter, Dr. Jeffrey Plumlee
    - Researcher role: Help implement Louisiana's Coastal Master Plan.
    - Eligible discipline: Coastal fisheries and wildlife ecosystem research and monitoring in the Gulf Coast region.
    - Research project undertaken: Does propagation of Roseau cane (*Phragmites* sp.) alter the efficacy of restoration to enhance saltmarsh fisheries production?
    - Subaward executed in July 2024
    - Summary: The research team will use a hypothesis-driven approach to: 1) investigate long-term changes in the distribution of Phragmites across the

southwestern Terrebonne Basin; 2) compare long-term fish production in the southwest Terrebonne Basin in restored areas vs. non-restored areas; and 3) sample fish communities adjacent to marsh-edge across two treatments. The goal of this project is to identify Phragmites propagation and enable prediction for future Phragmites expansion or loss in southwest Terrebonne Basin. This will enable large-scale and fine-scale prediction of changes to estuarine secondary production of ecologically and economically important fishes and invertebrates.

Financial Elements

Award Recipient

The RESTORE Act Center of Excellence Research Grant Program award to CPRA was amended in July 2023. A Cooperative Endeavor Agreement dated January 10, 2024, was executed between CPRA and The Water Institute (the Institute) to administer the award with a current contract value of $5,800,000. Invoices from the Institute total $374,031.67 through the period ending August 31, 2024, including subaward expenditures.

Award Subrecipient(s)

As a result of a competitive and peer-reviewed request for proposal process, subrecipients of research awards were selected. The subrecipients and associated subaward amounts are provided below:

Number	Subrecipient	Subaward Amount
1	Louisiana State University	$131,588
2	Louisiana State University	$135,684
3	University of Louisiana at Lafayette	$100,260
4	University of Louisiana AgCenter	$349,995
5	Louisiana State University	$341,597
6	Chenier Environmental Consulting	$667,258
7	Louisiana State University	$344,917
8	University of New Orleans	$345,194
9	Comite Resources	$346,243
10	Louisiana State University	$348,810
11	Nicholls State University	$521,837
12	Louisiana State University AgCenter	$345,011

Gulf Coast Ecosystem Restoration Council Elements

Leveraging Multipliers

LA-COE participates in bimonthly conference calls with the Gulf of Mexico Restoration and Science Programs Coordination Forum that allows for funding organizations in the Gulf region to discuss their programs, share ideas, and promote collaborations. In addition, coordination meetings with the RESTORE Council staff, NOAA RESTORE Act Science Program, National Academy of Sciences Gulf Research Program and others were scheduled at the Gulf of Mexico Conference (GOMCON) 2024 to facilitate discussions to leverage resources.