GULF OF AMERICA COASTAL CARBON WORKING GROUP: SUMMARY OF MEETINGS

January 31, 2024 through November 13, 2024

THE WATER INSTITUTE, RESTORE AMERICA'S ESTUARIES, AND STANTEC

Produced for and funded by the Louisiana Coastal Protection and Restoration Authority in Support of Activity 3.1 of Task Order 110.

September 10, 2025

ABOUT THE WATER INSTITUTE

The Water Institute is an independent, non-profit, applied research institution advancing science and developing integrated methods to solve complex environmental and societal challenges. We believe in and strive for more resilient and equitable communities, sustainable environments, and thriving economies. For more information, visit www.thewaterinstitute.org.

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ACKNOWLEDGEMENTS

This report summarizes the work done by the contributors listed above in support of Activity 3.1: "Gulf of America Coastal Carbon Working Group", in close collaboration with Dr. James Pahl of the Coastal Protection and Restoration Authority. Dr Pahl provided guidance and feedback during the planning phase of this work and actively participated in the meetings by giving presentations and other direct engagements with meeting participants.

The authors also acknowledge and are grateful to all who participated in discussions that informed the development of recommendations and findings in this report.

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PREFACE

The Water Institute has supported the Louisiana Coastal Protection and Restoration Authority (CPRA) with its endeavors to better understand the challenges and opportunities to realize the potential of utilizing coastal carbon to support the implementation of its Coastal Master Plan. The potential for a financially viable coastal carbon market, a concept discussed by the state's coastal agencies for years, presents a promising opportunity for the state of Louisiana to increase funding to implement projects that will provide for resiliency of its coastal communities and natural resources. The Water Institute, in collaboration with Restore America's Estuaries and Stantec, continues to support CPRA in its efforts to collaborate with experts across Louisiana, the northern Gulf of America, and the world to reduce scientific uncertainties critical to informing policy updates needed to establish a financially viable carbon accreditation for tidal marshes in Louisiana. This report summarizes continued engagement with this community through a series of workshops in 2024, as funded and directed by CPRA.

Questions about this research should be directed to the Director of Ecology at The Water Institute, Tim Carruthers (tcarruthers@thewaterinstitute.org)

EXECUTIVE SUMMARY

To support the State of Louisiana in its efforts to assess the viability of carbon accreditation as a funding stream to support the coastal program, the Louisiana Coastal Protection and Restoration Authority (CPRA) funded The Water Institute (the Institute) to coordinate focused outreach and targeted engagement efforts with regional experts. The outreach and engagement were designed to ensure that all available resources, including data, ongoing research, and subject matter expertise, were identified and incorporated into CPRA's assessment.

This report is pursuant to Task Order 110, Activity 3.1: "Convene Working Group Meetings". Through this task order, the Coastal Protection and Restoration Authority (CPRA) has provided funding for the Institute, Restore America's Estuaries (RAE), and Stantec to support CPRA in its continued hosting of meetings for the Gulf of America Coastal Carbon Working Group (hereafter referred to as the Gulf Coastal Carbon Working Group, or GCCWG). This is one of five reports developed under this Task Order to assess the potential to develop carbon credits from coastal restoration projects that would be tradeable on the voluntary commodities markets. The other related reports are as follows:

- *Coastal Carbon Policy and Legal Advisory Panel: Summary of Meetings* – The purpose of this report is to summarize the engagement of a 5-person panel of internationally-recognized experts contracted to provide CPRA advice on how to consider the viability of developing a coastal carbon market in Louisiana.
- *CPRA Funding Programs: Legal and Policy Review of CPRA's Ability to Generate Revenue from Carbon Offset Projects Supported by Federal or State Funding* – The purpose of this report is to provide the evaluation of existing relevant federal and state funding programs, a legal and policy review of the potential to generate carbon credits on projects funded by those programs, and recommendations to CPRA for next steps in advancing opportunities.
- *Technical Applicability and Feasibility for Gaining Carbon Credits from CPRA's Coastal Restoration Program: Options for Progressing Towards Implementation* – The purpose of this report is to provide the evaluation of existing crediting frameworks relative to Louisiana's particular challenges and strengths, and to offer recommendations on a path forward for developing a voluntary carbon commodities market in Louisiana.
- *Gulf of Mexico Coastal Carbon Working Group: Data Hosting Needs and Collaboration Web Portal Investigation Summary* – The purpose of this report is to summarize the outputs of an investigation and recommendations on the long-term information sharing needs of the GCCWG.

As engagement of the GCCWG proceeded, Plauché & Carr (a law office hired by CPRA to support development of the legal and policy review) provided support to ensure cohesiveness across all activities associated with this task order. Collectively, this group (referred to herein as the "Project Team") hosted three meetings of the GCCWG in 2024.

The GCCWG meetings funded under this task order followed a kick-off meeting held at the New Orleans Convention Center on May 31, 2023, associated with the State of the Coast conference. Feedback received during the May 2023 meeting indicated an interest in establishing a Gulf of America working

group where scientists, restoration managers, policy and legal experts, land managers, and others could collaboratively and strategically address critical science gaps and policy issues associated with realizing the potential for coastal carbon as a conservation and restoration tool for northern Gulf of America coastal wetlands. The meetings in 2024 were designed to support members in advancing that goal. To that end, the agendas for meetings were designed to progress from being more informational (see Appendix C.1 for the New Orleans, January 31, 2024 meeting agenda), to eliciting input from GCCWG members on key topics to advance the Gulfwide state of knowledge in the field of coastal carbon (see Appendix D.1 for the Tampa, February 19, 2024 meeting agenda). A third, and final, meeting for this task order was by invitation only and organized to elicit information from known subject matter experts and researchers (see Appendix E.1 for the Baton Rouge, November 13, 2024 meeting agenda).

Over 200 scientists and managers with interest or experience in carbon and coastal restoration from across the northern Gulf attended in-person or virtual workshops. Discussions provided refinement and clarifications of knowledge gaps and needs previously identified by CPRA. However, the discussions did not reveal any large additional bodies of knowledge or unidentified expertise or unknown legal or policy pathways to those already identified by CPRA. The output from these engagements informed the development of *Technical Applicability and Feasibility for Gaining Carbon Credits from CPRA's Coastal Restoration Program: Options for Progressing Towards Implementation* .

An additional component of this task order was to create a collaboration space for GCCWG members. Participants in the May 2023 workshop initially identified a significant need for additional online centralized carbon tools, information and data sharing, as well as online space for carbon-specific collaboration and exchange. It is notable that carbon data repositories and opportunities for collaboration and information sharing currently exist at the national level. Through this task order, CPRA made a Gulf-specific online resource available to GCCWG members through the creation of a SharePoint site. However, data and other information sharing, as well as online discussion and engagement were extremely low. The Project Team concluded that, while this could be a useful resource for Gulf coast researchers in the future, investment in the site was not eliciting additional data, knowledge, or expertise to assist CPRA in progressing toward financially viable coastal carbon accreditation.

The outreach and engagement conducted through this project revealed and/or reinforced some major points that are relevant to Louisiana's investigation of effective carbon strategies to support implementation of its Master Plan. The discussions regarding the challenges and opportunities for Louisiana are summarized as follows:

- **Data sharing and aggregation are of high importance.**
    - Compare Louisiana-specific data with Gulf and national default values.
    - Develop methods for information accessibility and data contribution.
    - Compile relevant data and incorporate it into both process-based and empirical models.

- **Prioritize research that reduces uncertainties about carbon flux in Louisiana's dynamic coastal ecosystem.**
    - The benefit-cost should be the decision framework for doing more science. Understand how the potential increase in knowledge and reduced quantification uncertainty could influence creditable units of carbon from the project.
    - Despite Louisiana's data-rich environment, specific data gaps exist, particularly in surface-to-atmosphere fluxes and spatial variability. Address the data gaps through targeted research that are deemed to be most critical to meeting Louisiana's goals for carbon accreditation.
    - Continue to research the relationships between restoration techniques, salinities, hydrodynamics, and other aspects of project design in increasing variability and uncertainty in estimates of carbon flux.
    - Better understand how different project types and techniques influence carbon accounting, including considerations of external factors like herbivory.
    - Highlight the distinctions between habitat preservation and larger-scale hydrological restoration projects.
    - Better understand the interplay between hydrology and vegetation dynamics for advancing both research and restoration planning in the region.
    - Methodologies should include quantification of co-benefits for their potential financial increase by making carbon credits 'high value'.
    - Acknowledge that carbon movement in coastal ecosystems is complex. Current methodologies should be examined and revised as needed to address Louisiana's specific land loss issues.
    - Examine additionality and permanence issues, including the adequacy of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) program's typical 20-year monitoring timeframe, and strategies for data continuity after project funding ends.
- **Continue to prioritize collaboration with stakeholders and potential funders to advance voluntary carbon markets.**
    - Research and invest in partnerships from other regions that could complement Louisiana's existing research infrastructure.
    - Include communities as active participants in project design and implementation and recognize them equitably in benefits.
    - Keep a focus on the objective, to increase investment and types of investors (e.g., private investors) in the Louisiana coastal program.
    - Understand potential clients' needs (e.g., tech companies, oil and gas companies, and large universities who have commitments for net zero) and design the project opportunity around those known needs rather than set up a product or project in the hopes that buyers will be interested.

- **Existing assumptions, policies, and terminology should continue to be reviewed and refined to acknowledge Louisiana's dynamic coastal ecosystem.**
    - Increase the potential revenue opportunity by addressing uncertainties in legal, policy, and scientific aspects of verification on the voluntary carbon market of tidal wetlands.
    - Identify and resolve inconsistencies in terminology that create confusion and limit access to the discussion around coastal carbon.
    - Property rights vary greatly across the northern Gulf states and need to be considered if a Gulf-wide approach is developed.
    - The existing standard is to consider 100 years as the benchmark for permanence. Consider alternative approaches to define longevity within confidence intervals. Allow the market to decide the relative value of these defined lengths and confidence ranges.
    - Defining carbon soil pools and especially soil carbon loss with conversion from emergent marsh to open water as 1 m is used in some instances but is not ecologically relevant in coastal Louisiana. Consider options for coastal wetland-relevant values for a salinity gradient of dynamic wetlands on a large river delta.
    - Movement of carbon into the project area cannot be counted as additional, but carbon that leaves the project area is discounted. Explore whether a larger spatial context and better quantified processes of carbon lateral flux could reduce this uncertainty to justify retention of more of this mobile carbon within the creditable pool.

In summary, the outreach and engagement that the Project Team conducted in this project revealed that the locally relevant expertise and research about the topic of coastal carbon accreditation as a funding stream for habitat restoration is currently held within a relatively small group of people. Further, most of those people currently work in coastal Louisiana. CPRA is encouraged to continue to engage those researchers actively working in the field while also growing the regional community to build the next generation of experts who will continue the work.

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Term
CPRA	Coastal Protection and Restoration Authority
ACR	American Carbon Registry
AI	Artificial intelligence
BSI	British Standards Institute
CCN	Coastal Carbon Network
CPRA	Coastal Protection and Restoration Authority
CRMS	Coastwide Reference Monitoring System
CWPPRA	Coastal Wetlands Planning, Protection, and Restoration Act
FWOA	Future without action
GCCWG	Gulf Coastal Carbon Working Group
GHG	Greenhouse gas
GMx mCDR	Gulf of Mexico Regional Node Working Group on Marine Carbon Dioxide Removal
GOMCON	Gulf of Mexico Conference (later renamed GulfCON)
GWP	Global warming potential
IRA	Inflation Reduction Act
ISO	International Organization for Standardization
ML	Machine learning
NECB	Net ecosystem carbon balance
NGO	Non-governmental organization
NRCS	Natural Resources Conservation Service
NRDA	Natural Resource Damage Assessment
RAE	Restore America's Estuaries
VCM	Voluntary Carbon Market
VCU	Verified Carbon Unit

1.0 BACKGROUND

This report is pursuant to Activity 3.1: "Convene Working Group Meetings", of the Coastal Protection and Restoration Authority's (CPRA's) Task Order 110, "Coastal Carbon Program", with The Water Institute (Institute) and its subcontractors. Through this task order, CPRA has provided funding for the Institute, Restore America's Estuaries (RAE), and Stantec to continue to support CPRA in hosting meetings of the Gulf of America Coastal Carbon Working Group (hereafter referred to as the Gulf Coastal Carbon Working Group, or GCCWG)[1]. This is one of five reports developed under this Task Order to assess the potential to develop carbon credits from coastal restoration projects that would be tradeable on the voluntary commodities markets. The other related reports are as follows:

- *Coastal Carbon Policy and Legal Advisory Panel: Summary of Meetings* – The purpose of this report is to summarize the engagement of a 5-person panel of internationally-recognized experts contracted to provide CPRA advice on how to consider the viability of developing a coastal carbon market in Louisiana.
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- *Gulf of Mexico Coastal Carbon Working Group: Data Hosting Needs and Collaboration Web Portal Investigation Summary* – The purpose of this report is to summarize the outputs of an investigation and recommendations on the long-term information sharing needs of the GCCWG.

As engagement of the GCCWG proceeded, Plauché & Carr (commissioned separately by CPRA to support development of the legal and policy review) and Stantec provided additional support to ensure cohesiveness across all activities associated with this task order. Collectively, this group is referred to herein as the "Project Team" (see Appendix A).

[1] Prior documents and materials associated with this project made reference to the "Gulf of Mexico." With the issuance of Executive Order 14172 by President Trump on January 20, 2025, and the issuance of Executive Order JML 25-027 by Governor Landry on March 13, 2025, all references to the "Gulf of Mexico" associated with this project from those dates forward refer to the waterbody as the "Gulf of America." All references to the "Gulf of Mexico" and the "Gulf of America" throughout this project refer to the same body of water.

In 2024, three meetings were held:

- January 31, 2024: Virtual meeting (see Appendix C for supporting materials)
- February 19, 2024: In-person meeting, Tampa Convention Center, Tampa, Florida (see Appendix D for supporting materials)
- November 13, 2024: In-person meeting, Galvez Building, Baton Rouge, Louisiana (see Appendix E for supporting materials)

An additional requirement of this activity was to establish an initial collaboration space for GCCWG members to communicate and share basic common files and information. This was accomplished via the creation of a SharePoint site, hosted by the Institute. Access to the site is currently by invitation only; therefore, interested participants email a request to GCCWG@thewaterinstitute.org to gain access.

The convening of the GCCWG is one of several related activities funded under Task Order 110. The other two closely related activities are:

- Activity 1.1: Policy and Legal Advisory Panel
- Activity 3.4: Data Hosting Needs and Collaboration Web Portal

More information about the Policy and Legal Advisory Panel activity may be found in *TO110: Coastal Carbon Policy and Legal Advisory Panel: Summary of Meetings* (The Water Institute et al., forthcoming). More information about the Data Hosting Needs and Collaboration Web Portal activity may be found in *Gulf of Mexico Coastal Carbon Working Group: Data Hosting Needs and Collaboration Web Portal Investigation Summary* (The Water Institute, 2025).

2.0 OUTCOMES

2.1. OVERVIEW

2.1.1 Meetings Overview

The GCCWG meetings funded under this task order followed on from a kick-off meeting held at the New Orleans Convention Center on May 31, 2023, as an official side event of the State of the Coast conference. Feedback received during the May 2023 meeting indicated that there was an interest in establishing a Gulf of America working group where scientists, restoration managers, policy and legal experts, land managers, and others who could address critical science gaps and policy issues associated with realizing the potential for coastal carbon as a conservation and restoration tool for coastal wetlands on the U.S. Gulf Coast. The meetings in 2024 were designed to advance that goal. To that end, the agendas for these meetings were designed to progress from being more informational (see Appendix C.1 for the January 31, 2024 meeting agenda), to eliciting input from GCCWG members on key topics to advance the Gulf-wide knowledge in the field of coastal carbon (see Appendix D.1 for the February 19, 2024 meeting agenda). A third and final meeting for this contract was by invitation and organized to elicit information from known subject matter experts and researchers (see Appendix E.1 for the November 13, 2024 meeting agenda).

Attendance and active participation by coastal carbon and restoration experts in the Gulf was considered essential to the success of these meetings. Meetings were advertised in multiple ways including direct emails to participants of the May 2023 meeting and others who indicated interest, other email listservs including the RESTORE Centers of Excellence listserv, advertisement on the Gulf of Mexico Conference (GOMCON) 2024 website, posting the flyer on Institute social media platforms, and during the RAE Blue Carbon National Working Group meeting on January 24, 2024 (see Appendix B).

January 31, 2024 Virtual Meeting and February 19, 2024 Tampa, FL In-Person Meeting

There were a total of 122 registrants for the January 31 virtual meeting (see Appendix C.2). Of the 122 registrants for the January 31, 2024 meeting, 106 were later identified as being from and/or working in Louisiana. Of the 49 attendees of the February 19, 2024 meeting, 33 were later identified as being from and/or working in Louisiana. Further, more than 20 of the participants work for CPRA or were contracted to work with CPRA under this Task Order (including experts contracted for the Policy and Legal Advisory Panel). Between the January 31 and February 19 meeting, a total of 144 individuals were engaged through these meetings.

Attendees at the February 19 in-person meeting were primarily from two groups. Firstly, those who were highly informed about the challenges and opportunities for coastal carbon in tidal wetlands. Within this group 16 people were contracted to work with CPRA under this Task Order, or work for CPRA. The second group was resource managers and restoration practitioners who were interested in learning about coastal carbon, and especially whether it might provide an opportunity for them to access additional funding to implement coastal restoration or conservation projects. Across these two groups, there were a small number of highly informed researchers and a few representatives from non-governmental organizations (NGOs) or for-profit companies from states other than Louisiana.

Notably, most of the known regional and Louisiana-specific experts with ongoing relevant research did not attend either of the meetings in early 2024 despite being invited. This apparently contradicted the interest in the initial meeting at State of the Coast where there was a strong interest in continued development of a coordinated discussion and collaboration on this topic. While it is unclear why attendance was down (e.g., conflicting schedules, lack of interest in the breadth of focus of the GCCWG), finding mechanisms to engage these experts is key to successfully advancing this work. To ensure that the data being collected, the questions being addressed, and the opportunities afforded the State of Louisiana to assess the viability of carbon accreditation as a funding stream to support the coastal program, the Project Team determined that more focused outreach and targeted engagement to these individuals or research groups was needed. Therefore, it was decided to hold the final meeting as an invitation-only event to target these experts. There were 30 in-person participants (not including meeting organizers) in the final in-person meeting held in Baton Rouge, Louisiana on November 13, 2024. Additionally, four people participated remotely in a portion of the meeting.

Early in the planning for these meetings, the Project Team became aware of another blue carbon working group that had recently been established. This working group, called the Gulf of Mexico Regional Node Working Group on Marine Carbon Dioxide Removal (GMx mCDR), is a regional node of a national marine carbon dioxide removal working group. Coincidentally, the GMx mCDR regional node also held an in-person meeting on February 19, 2024 in New Orleans, Louisiana as part of the American Geophysical Union's Ocean Sciences Meeting. During planning for these meetings, there were concerns raised that this conflict might limit attendance at each meeting and/or be duplicative. The Project Team coordinated with the GMx mCDR organizers both before and after each of these February 19, 2024 meetings.

The February 19 GMx mCDR meeting had 16 attendees. The interest and focus of the research scientists attending that meeting was almost entirely ocean and water column (offshore) carbon cycling, and specifically the issue of acidification on carbon cycling and implications to future net greenhouse gas (GHG) flux. That meeting also did not identify a clear need for specific collaboration resources to further carbon research, more simply noting that increased communication could increase collaboration for research proposals amongst researchers. In summary, because of the difference in focus and specific interest of participants in the GMx mCDR meeting on offshore waters and alkalinity, organizers of both working groups felt that the co-occurrence of these two meetings on February 19 did not cause a conflict or reduce the number of participants at either meeting.

After the conclusion of these meetings, the two Planning Teams regrouped to discuss the outcomes and next steps. Below are recommendations developed by The Water Institute, Restore America's Estuaries, and Stantec.

- In all communications to date, through the in person meeting at State of the Coast in 2023, the virtual meeting, the in person meeting at GOMCON in 2024, and communications with members of the National Blue Carbon Working Group, participants consistently stated that the science and legislative and governance framework around carbon for coastal wetlands in Louisiana is further advanced than in any other state. Furthermore, in all those cases, it has been clearly articulated that resource managers and scientists from around the US are watching Louisiana as a leader in

progressing solutions, especially as it relates to financially viable pathways for accreditation of carbon protection (avoided loss) and restoration in tidal wetlands (coastal wetlands).

- There is not currently a unified need or identified groundswell of desire across the northern Gulf coast for a coastal carbon data sharing and collaboration space to further coastal carbon research across all five Gulf states. Additionally, because of its need to identify additional funding streams for implementing its Coastal Master Plan, the level of interest and engagement by the State of Louisiana in assessing the opportunity for coastal carbon to support coastal restoration efforts is greater than other northern Gulf states. While some individuals in other northern Gulf states are interested in additional collaboration opportunities and are currently carrying out relevant research, they are mostly individual researchers or staff implementing restoration, rather than coordinated efforts led by state agencies or the Governor's office.
- Rather than adding resources and broader data, research, and strategic comments to assist CPRA in progressing towards a financially viable carbon accreditation of tidal wetlands (coastal carbon), actively keeping the coastal carbon discussion at the scale of the northern Gulf coast is likely to be seen as an information dissemination mechanism from CPRA rather than a source of information for CPRA, or even a truly two-way transfer of knowledge and information.
- A second component of engagement by CPRA has been with a targeted legal and policy advisory panel who were selected based upon specific knowledge and expertise to advise CPRA on challenges and opportunities as well as potential paths forward towards financially viable carbon accreditation for coastal wetlands. This targeted approach was highly successful and it is recommended that a similarly targeted approach is taken to obtain the science, data, and research input, rather than continuing with an open attendance for interested scientists and managers from all northern Gulf states that has been used to date.
- There are many, and some very large, ongoing efforts in Louisiana collecting data and carrying out research specifically relevant to improving assumptions around quantifying various fluxes of carbon in Louisiana's coastal wetlands. It was, therefore, notable that engagement and participation from carbon researchers in Louisiana was relatively low at both the January and February 2024 meetings. The greatest participation by Louisiana researchers was at the State of the Coast conference in New Orleans in May 2023. There was very little participation in the virtual meeting, and no participation in the survey of data sharing needs for coastal carbon or at the February 2024 meeting in Tampa. By contrast, the May 2023 meeting was well attended and included lively discussion about where to focus future efforts. The participants included students, researchers and practitioners with a range of expertise and organizations represented. Despite the initial enthusiasm about a coastal carbon collaboration, that energy and high level of participation did not persist through the 2024 meetings.
- The above summary of input and engagement to date on the GCCWG stands in stark contrast with the very successful, targeted, and informative input, advice, and direction provided by the Legal and Policy Advisory Panel members (see report *Coastal Carbon Policy and Legal Advisory Panel: Summary of Meetings* forthcoming). To continue its leadership role in advancing the state of knowledge regarding coastal carbon, it is recommended that CPRA targets its future investments and engagement with the carbon policy, legal, and research community within

Louisiana, with specific engagement of known relevant carbon researchers, as appropriate, in other northern Gulf states (e.g., Texas chapter of The Nature Conservancy).

- A list of specific Louisiana researchers working on carbon cycling and fluxes specifically relevant to CPRA's goal of progressing a financially viable blue carbon accreditation for coastal restoration projects should be targeted to request information about their ongoing research and the possibility for those research teams, and that data and research, to be used in a timely manner to support the State of Louisiana in working to utilize carbon as a mechanism for additional investment in the coastal program.

These recommendations were presented and agreed to by CPRA. As a result, a targeted list of researchers was developed for invitation to the final in-person meeting funded under this contract.

November 13, 2024 In-Person Meeting, Baton Rouge, LA

To ensure that known regional experts were engaged through this effort, the Institute and CPRA developed a list of people to invite to the third GCCWG meeting, held on November 13, 2024, in Baton Rouge, Louisiana. The purpose of this meeting was to discuss and receive feedback on critical technical uncertainties and research priorities, discuss and prioritize existing and pending research to address those uncertainties, and to continue to build a collaborative coastal carbon community.

Prior to the meeting, invited participants were sent an overview document describing CPRA's particular interest in coastal carbon and the associated known challenges and opportunities (see Appendix E.1). They also were sent a link to a questionnaire (see Appendix E.2) to provide information regarding their research areas related to coastal carbon and any relevant literature and data links. Thirteen people responded to the questionnaire (see Appendix E.3) and this information was summarized for meeting participants and used to inform discussions.

A total of 40 people attended (see Appendix E.5), including 10 people from the Institute, Stantec, RAE, and CPRA Project Team. The majority of participants worked in Louisiana; however, many additionally worked in other Gulf states. A summary of the discussions is provided in Section 2.2.3. Broadly, the participants discussed different aspects of coastal carbon research and policy, ongoing research, additional needs, and opportunities for future research. Outputs from these discussions have been used to refine investigations of existing data availability and future data and knowledge needs.

2.1.2 Initial GCCWG Collaboration Space

As part of Activity 3.1, the Institute created a GCCWG SharePoint site to serve as an initial collaboration space for GCCWG members. Features include a discussion board and folders to share relevant information (e.g., meetings documents, reports; Figure 1). Access to the site is by invitation only. Anyone interested in joining the site needs to request access by emailing GCCWG@thewaterinstitute.org. The GCCWG members were made aware of the existence of the site and received instructions on how to request access during the January 31 and February 19 meetings, as well as via email. Access to this site has been available since the conclusion of the January 31 meeting. At the time this report was finalized, 31 people have requested and gained access to the site. Of those people, 13 are members of this Project Team. There has been no activity on the site other than materials and comments posted by members of the

Project Team. Specifically, there has been no additional traffic on the discussion board and none of the members have uploaded any data or information resources.

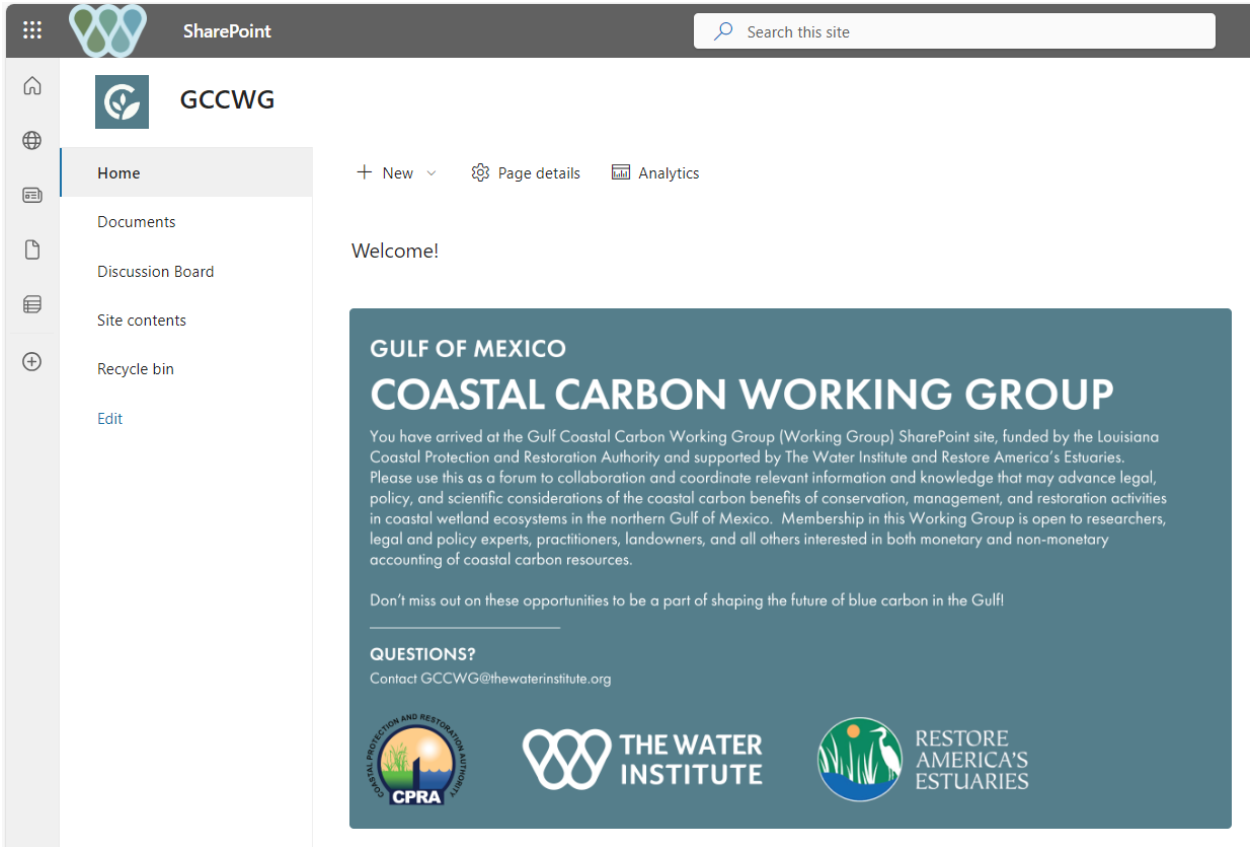

Figure 1. Gulf Coastal Carbon Working Group SharePoint site home page.

As part of Activity 3.4, *Data Hosting Needs and Collaboration Web Portal*, the Institute sought input from GCCWG members regarding long-term information sharing needs. To this end, a survey was developed and shared with GCCWG members to seek input on data sharing and collaboration needs to progress coastal carbon research across the northern Gulf. At the time of finalization of this report, 15 people had completed the survey. The survey was widely advertised and dispersed among research scientists and managers who had already expressed an interest in engaging collaboratively around coastal carbon. Specifically, it was emailed to participants of the May 2023 meeting and others who indicated interest, shared during both the January 31 and February 19 meetings, emailed again to January 31 meeting registrants, and posted to the GCCWG SharePoint site (144 people in total). In addition to this survey, data hosting, sharing and collaboration needs were included in the agenda of the February 19 in-person meeting. More information regarding recommendations for long-term information sharing needs may be found in *Gulf of Mexico Coastal Carbon Working Group: Data Hosting Needs and Collaboration Web Portal Investigation Summary* (The Water Institute, 2025).

2.2. SUMMARY OF DISCUSSIONS

2.2.1 January 31, 2024 Virtual Meeting

The primary purpose of this first meeting was to reorient participants to the GCCWG, and to discuss collaboration pathways and opportunities for future engagement including inviting them to gain access to and utilize the interim collaboration space (GCCWG SharePoint site). Although the meeting was largely informational, it was paced to encourage discussion. Active participation was limited to only 17 comments or questions being posed by 11 attendees. Several procedural or clarifying questions were asked. The remaining questions and comments are shown below.

- **Legal and Policy Questions** (brackets include clarifying language provided by the Institute)
    - Where is the new *[Louisiana]* administration on these challenges?
    - How do you think this might fit into the *[Infrastructure Investment and Jobs Act]*'s climate ready coast? And IRA *[Inflation Reduction Act]*? Are we lacking a framework to catalyze IRA in the Infrastructure Law?
- **Science and Technical Questions and Comments**
    - Smithsonian Environmental Research Center already created a Coastal Carbon Network (CCN) years ago and the Network has been quite active. Are you aware of the CCN and how would you position GCCWG in this coastal carbon field?
    - What level of confidence and accuracy does the Verified Carbon Standard, or other financing support mechanisms, require? And where does science and monitoring stand in relation to those requirements?
    - I do not know of a coastal wetland restoration project that can prove sustainability/permanence given sea level rise predictions over 100 years as required by Verra, ACR, and most other standards. How is this going to be addressed?
        - Excellent question. I will second it, because here at BCarbon we have thought a lot about that with our methodology.
        - Maybe they should be linked to discount rates, because using a 2.5% discount rate for valuation, 100 years becomes less relevant.
        - One consideration for changing the 100-year permanence threshold...this timeframe is tied to the GWP of the GHGs.
    - For the interests of this group, *[LSU]* maintains a 72-hour ocean forecast that includes real-time carbon flux calculation covering the entire Gulf of America (flood.lsu.edu)
- **Other**
    - Are there major industries that are participating/or interested in participating in this effort?
    - Air Products plan to drill wells in Lake Maurepas to inject 5 million tons of carbon dioxide per year about a mile below the lakebed.

2.2.2 February 19, 2024 In-person Meeting, Tampa Florida

To help orient meeting participants to the current state of knowledge, the meeting began with an overview of the challenges, opportunities, and priority next steps from policy, legal, and scientific perspectives (Figure 2).

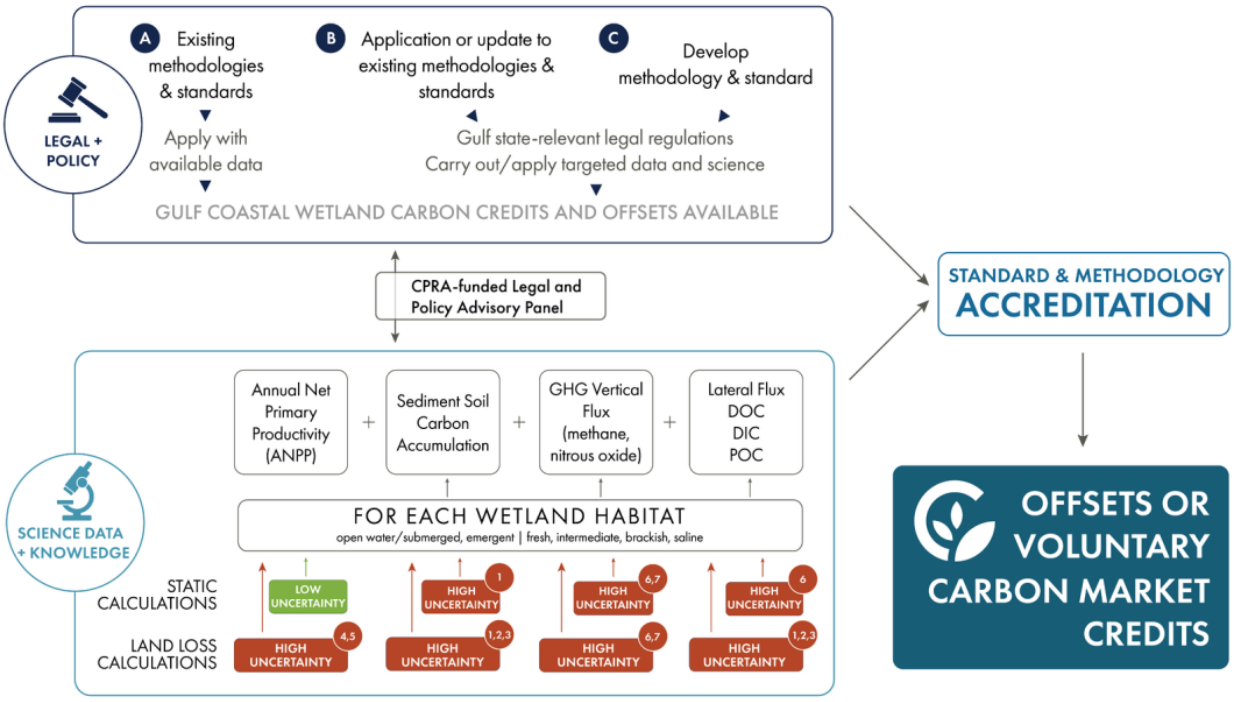

Figure 2: Summary overview of legal, policy, and scientific understanding of challenges and opportunities for achieving the goal of a voluntary carbon market.

This was followed by a Policy and Legal Advisory Panel discussion (for more information see *Coastal Carbon Policy and Legal Advisory Panel: Summary of Meetings*). This segment of the meeting was designed to help frame working group breakout discussions around two main topics:

1. Coastal Carbon Priority Uncertainties and Actions
2. Working Group Information Sharing Needs

Highlights of the input received are provided below.

Coastal Carbon Priority Uncertainties and Actions

This breakout session was interactive with participants self-dividing into three separate groups. A facilitator in each group took notes and kept the discussion focused, openly seeking input from

participants on priorities. To frame the discussion for uncertainty in legal, policy, and scientific understanding the following considerations were provided to each group:

- **Legal or policy considerations:**
    - *Legal or policy offramps that would immediately indicate non-viability of state coastal carbon verification*
    - *Dependencies between legal and policy needs and uncertainties, and science needs*
    - *Costs of various options (using current standards versus developing new standards)*
    - *Opportunities in current legal and policy climate at all governance levels*
- **Science and technical considerations:**
    - *Highest priority scientific or technical uncertainties*
    - *Offramps - any identified uncertainties that are determined not to be critical to solve*
    - *Impact versus effort (cost): the balance of potential to reduce uncertainty vs the cost of pursuit of the additional data/knowledge*

The notes below summarize the input received. As noted in Section 2.2.1, the meeting participants could be broadly divided into those with extensive experience with the topic of coastal carbon and those with little experience in coastal carbon, and whose primary purpose for attending was to learn about carbon and any opportunities it may provide them in their work. As a result, input provided within the breakout groups was provided by a relatively small number of meeting participants.

- **Notes and comments from participants related to legal or policy uncertainties:**
    - **Terminology was clarified on Standard versus Methodology**, as the British Standards Institute uses the terms with respect to a development process, they are the same. This terminology was investigated and found to vary between carbon registries. However, in general a Registry is a repository that keeps account of active carbon units, the registry develops a Standard (Gold Standard and ACR) or Standards (Verra) which are written documents outlining the requirements and guidelines to meet the standard (each project is assessed by an independent body as to attainment of the standard), Methodologies are documents that provide the quantification details for a particular type of project. The greatest diversity of terminology is at the Methodology level, with each registry having a unique approach to nesting these documents for different levels of specificity of project types.
    - **Identifying the potential purchasers or clients for the offsets is critical**, in the international market there are multiple businesses and/or countries/communities that have very diverse goals in attaining offsets (from solely financial to conservation and community resilience). There is demand from industry in terms of meeting net zero goals, but primarily in the context of sellable assets from investment in coastal protection for critical infrastructure. This is seen as a triple win: infrastructure protection, financial return, and community and ecosystem support. Technology companies such as Microsoft and Apple are investing heavily to offset their large carbon footprints. Capital investors

are interested and recognize this as an emerging market, with potential benefits of being first movers in this space. Private landowners also have high interest and want to ensure that they are appropriately compensated for benefits that may be accrued on their land, although this is complicated, not least because much of Louisiana has dual ownership claims. Industrial offset purchasers are demanding high integrity credits as they often come from a place of challenging public relations, so cannot afford the risk of buying credits that are ultimately invalid.

- **The issue of timing of return on investment for carbon credits** is very important, as the flow of income is over a long period of time. If an assumed return is provided immediately upon project completion, then there is high risk being assumed by credit purchasers.
- **Other potential tools than voluntary carbon market** (VCM) include mitigation banks under the Natural Resources Damage Assessment (NRDA), which may not bring in revenue. These have been set up in Louisiana but to date no projects are under consideration. **There has been a lack of consideration of ecosystem services or focus on valuation of co-benefits of ecosystem restoration efforts.** How could multiple ecosystem benefits be incorporated into the legal framework in Louisiana?
- **Louisiana is being developed as a hydrogen hub**, is there an opportunity to engage nature-based carbon storage as a component of that development? A focus on resilience through risk mitigation is important, but this is currently a small market opportunity. A consideration is that in some states they have ended in a situation where environmental benefits cannot be considered in an accounting framework.
- **How can some of the large industrial purchasers that are focused in other states like Texas be incentivized to a Louisiana market?** Perhaps instead of a Louisiana standard (or 'market') it could be conceptualized more as a project at a very large scale (entirety of coastal Louisiana). This would certainly defuse the risk of carbon loss and it would have to navigate land ownership challenges, but those need to be negotiated no matter the mechanism.
- **The opportunity of aggregating projects statewide** could be significant for Louisiana. A larger geographic frame of reference has potential to greatly reduce the risk of loss and makes a more direct linkage to the coast-wide scale of the restoration planning for the coastal program.
-
- **Maximize use of existing frameworks and technologies.**
- **Highlight formulas in those existing frameworks-methodologies that will maximize credit generation for Louisiana projects.**
- **Recognize community benefits and provide a percentage of revenue into community benefits.**

- **Notes and comments from participants related to science or technical uncertainties:**
    - **"Permanence" is a critical uncertainty** in the highly dynamic and eroding coastal wetlands of Louisiana. Participants discussed if permanence for offsets necessarily has to be 100 years, which was established for more stable terrestrial forests. Also noting that permanence is a poor name as 100 years is also not permanent, so is there a reason not to more correctly state the period of time and predicted likelihood of carbon being retained over that period. Noted that BCarbon out of Texas uses 50 years and that the design life of Coastal Wetland Planning Protection and Restoration Act (CWPPRA) Program projects is 20–25 years, so confidence in retention of carbon over that period is quantifiable (engineering prediction within design specifications) but increases greatly after that time frame. If "permanence" was redefined as "present for 20 years" or "present for 50 years," would the market see these offsets as less valuable than "present for 100 years"? That was considered possible, but also something that could be considered directly in a benefits-cost analysis.
    - **Utilizing carbon in the top 1 m of soil is a critical uncertainty** not applicable in coastal wetlands of Louisiana. The 1-m depth was established for carbon projects where mangrove forests were being removed to dig shrimp ponds to 1-m depth, so the carbon was lost from the aboveground biomass and soil down to 1 m. In extreme hurricanes, more than 1 m of soil can be removed and in the more usual gradual submersion of emergent marsh much less soil is usually removed (or none at all), so this assumption is broadly applied but does not have ecological relevance to the coastal wetlands of Louisiana. Revising this would take significant scientific effort but has potential to make a substantive difference to carbon quantifications (especially related to conservation or avoided loss).
- **Additionality of allochthonous carbon (from outside of the project area) cannot be included in accounting**. In a river delta the deposition, accretion, and erosion of sediment is the primary process driving the geology of the system and therefore driving the carbon cycling at geological timescales. Similarly, lateral transport of carbon is an immediate loss to the project, even though this carbon is highly dynamic and constantly being re-worked through the shallow open water areas and on and off the emergent marsh edges. Quantifying and defining these processes (reducing uncertainty) for coastal wetlands in a deltaic system specifically to inform a quantification methodology could make substantive difference to the determined verified carbon units (VCUs).
    - **Frame of reference shift from assumed constancy** (most common current approach) to assumed loss over time and therefore using more of an CMP approach of comparison to Future Without Action (FWOA). Accounting for the differential carbon benefit between FWOA and future with restoration could provide a more meaningful assessment for coastal wetlands in Louisiana, and also could be used to assess the potential financial return of reducing scientific uncertainty. What would the carbon differential over time be calculating using current baseline assumptions (e.g., in VM0033) compared to with maximum scientific effort to increase accuracy of quantification.

- **Cost of monitoring is prohibitive.** Adding the monitoring of carbon to existing monitoring programs to potentially raise additional revenue is currently limited by the high level of monitoring required and the labor-intensive and expensive requirements to achieve that monitoring. Novel and technological approaches including numerical modeling, remote sensing, AI/ML empirical approaches, that greatly reduce the cost of valid and justifiable monitoring could radically change the benefits – cost equation of implementing projects for carbon benefits. The up-front costs often limit accessibility of considering carbon quantification for living shoreline projects.
- **Opportunity of community involvement in monitoring and restoration.** In situations where the community is assisting with plantings and/or monitoring, which may alter the net benefit – cost calculation, and make carbon quantification and accreditation of a project financially viable.

Working Group Information Sharing Needs

For this topic, the February 2024 meeting participants were divided into two breakout groups, with a facilitator in each group who took notes and kept the discussion focused while openly seeking input from participants on priorities from their perspective.

Prior to breaking out, meeting participants were presented with summary information provided through the survey on information sharing needs (more information regarding the survey may be found in *Gulf of Mexico Coastal Carbon Working Group: Data Hosting Needs and Collaboration Web Portal Investigation Summary*, which is a companion report to this report. At the time of the meeting, 12 people responded to the survey, representing a fairly-even split between decision makers, landowners/resource managers, and researchers. The following summary of responses to the survey were shared at the meeting:

- The highest-ranked information sharing needs were related to funding opportunities and project implementation guidance.
- Sharing information about case studies followed as a close second priority.
- Data sharing also ranked highly, with science translation and providing actionable information also high priorities.

To further frame this breakout discussion, participants were asked to provide their perspectives on:

- Three biggest information needs
- Potential opportunities for information sharing:
    - Other existing platforms to consider using.
    - Gaps in information sharing opportunities that might need to be addressed.

The notes below summarize the input received. As noted in Section 2.2.1, the meeting participants could be broadly divided into those with extensive experience with the topic of coastal carbon and those with little experience in coastal carbon whose primary purpose for attending was to learn about carbon and any

opportunities it may provide them in their work. As a result, input provided within the breakout groups was provided by a small number of meeting participants.

- **Information sharing needs**
    - Share scientific data, including capturing metadata, confidence intervals, ancillary data such as locations, habitats, methodologies, etc.
        - Consider biodiversity information, other related ecological data that may provide important context.
        - Establish minimum standards for the data being shared.
    - Maintain a catalogue of other information such as:
        - Funding opportunities
        - Relevant literature
    - Compile a list of restoration projects that support carbon sequestration, including details such as the habitat, restoration techniques, and locations.
        - Conduct/share case studies regarding successes and challenges.
        - Catalogue the roadblocks to successfully implementing carbon projects.
- **Potential mechanisms for information sharing**
    - Create and maintain discussion platforms.
        - Create a chat board with multiple topics/channels within the board.
        - Conduct regular (monthly or quarterly) meetings with standard agendas.
    - Consider potential opportunities to utilize/augment existing platforms for information sharing. Some existing public data platforms noted in the meeting include:
        - Coastal Carbon Network | Smithsonian Environmental Research Center (si.edu): data is publicly available, and researchers can join the network and submit their data.
        - Gulf Open Data Platform: data is publicly available, and researchers can share data through an ArcGIS Online account.
- NOAA's DIVER database: data is publicly available but only data collected or developed with funding from the Deepwater Horizon Oil Spill Natural Resources Damage Assessment are uploaded to the database.
        - Regional platforms such as the Tampa Bay Estuary Program, many of which are open source. The Tampa Bay Estuary Program, for example, is open source and researchers can submit their data through GitHub, following a detailed protocol.
        - State-maintained databases such as Louisiana's Coastal Information Management System (CIMS): data is publicly accessible, but there is currently no mechanism for researchers not associated with CPRA to input data.

- University-associated platforms. (No specific platforms were mentioned.)

- **Cautions or concerns**
  - Make the platform a tool, not a burden. Be mindful of creating what is needed and not more.
  - Be cognizant of and plan for long-term maintenance and curation requirements.
  - This group is comprised of a diversity of professionals including researchers, landowners, resource managers and policy and legal experts. Information and application needs will be different. It could be challenging to create a platform that meets all needs.
  - Data needs are diverse. An important step is to conduct a needs assessment, overlay with a compilation of existing databases, then conduct a gap analysis to determine what needs are currently not met.
  - Consider that some information could be sensitive or proprietary. Consider what should and should not be available on an open platform. An example is legal challenges to realizing a voluntary carbon market. Other examples may include data such as land values.

2.2.3 November 13, 2024 In-person Meeting, Baton Rouge, Louisiana

The meeting commenced with a panel discussion moderated by Valerie Black (the Institute), featuring experts Bessie Daschbach (Adjunct Faculty, Tulane Law School), Jennifer Howard (Conservation International), Lydia Olander (Duke University), Ryan Moyer (TerraCarbon), and Sebastiaan Van Dort (British Standards Institute). The panel's primary goal was to identify data gaps, ongoing coastal carbon research efforts, and obstacles to advancing coastal carbon initiatives.

- Lydia Olander began by addressing federal policies and data considerations. She emphasized that while no specific laws govern carbon accounting or data collection, there are opportunities to leverage federal datasets, particularly the Natural Resources Conservation Service (NRCS) coastal zone soil data. The federal government's primary role was identified as supporting accounting processes and tool development.
- Bessie Daschbach focused on landowner perspectives, highlighting their interest in credit valuation and legal mechanisms. She stressed the importance of aligning any frameworks with existing civil code, mineral code, and statutory frameworks, while keeping an eye on evolving sustainability and disclosure requirements.
- Ryan Moyer provided insight into carbon standards and credit quantification methodologies. He explained how registries like Verra are used to issue credits, noting that methodologies account for variability with allowable uncertainties of 20–30% within a 95% confidence interval without requiring deductions. These methodologies prioritize conservative estimates for carbon sequestration calculations.
- Sebastiaan Van Dort detailed the process for developing standards. Generally, a document developed through a known global or national standards body, like the British Standards Institution (BSI), could give more confidence in to the standard or methodology in the

marketplace. For example, a Registry could develop their own standard documents, but they could develop that through a generic standards body such as BSI or ISO emphasizing its consensus-based nature and the balance between scientific rigor and practical consensus during peer review and public comment periods. He outlined the typical 5-year review cycle for full published BSI standards, however a fast-tracked process is also available with a 1.5–2-year development time.

- Jennifer Howard concluded the panel by discussing science's role in global standard-setting. She emphasized the importance of the Smithsonian Institution Coastal Carbon Atlas in data collection and public accessibility. Howard stressed the need for methodology development across different global landcover types and the critical nature of understanding uncertainty in developing financial models. She highlighted the necessity of both physical and social science research, particularly in developing regions, and the importance of studying transitional or marginal ecosystems. Her discussion concluded with an emphasis on balancing immediate action with ongoing improvement.

Following the panel, Shawn Doyle (the Institute) presented key uncertainties in coastal carbon flux quantification (Figure 3), which set the foundation for subsequent breakout discussions.

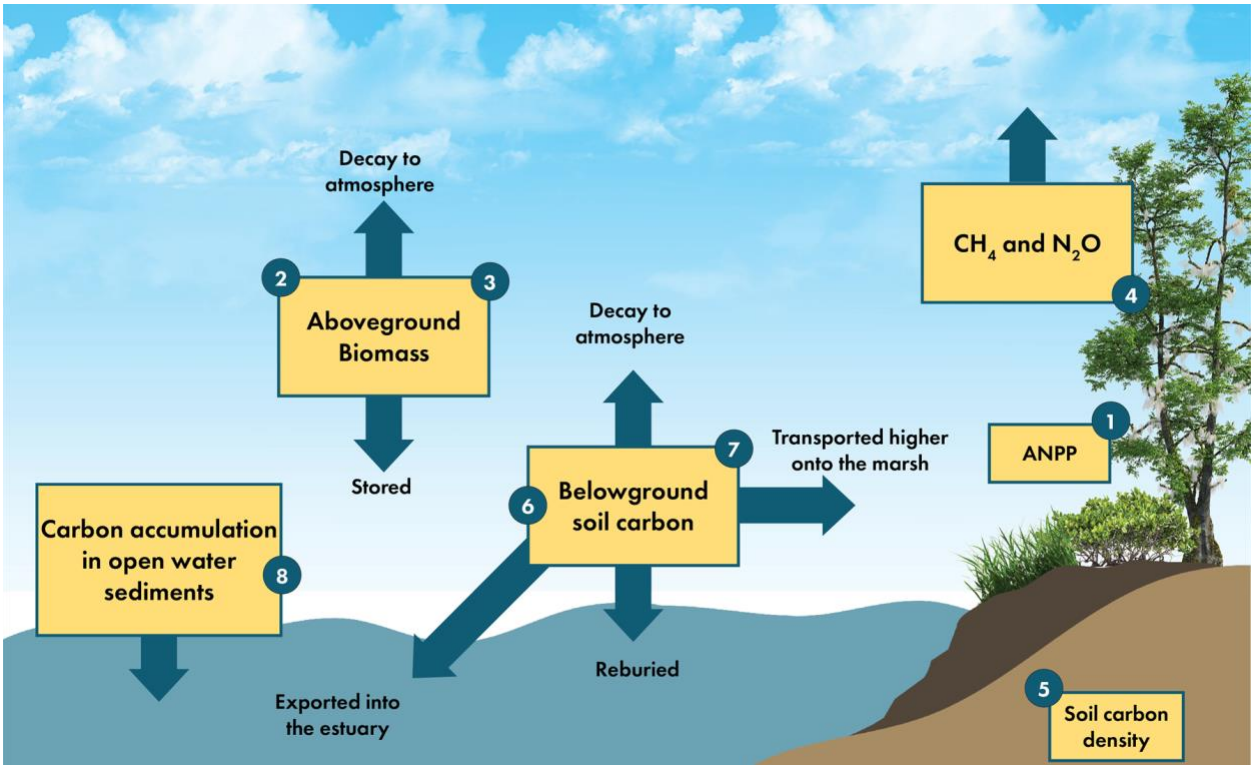

Figure 3. Overview of key uncertainties and assumptions when quantifying coastal carbon fluxes in coastal Louisiana.

The participants then self-divided into three groups, each focusing on different aspects of coastal carbon research and policy.

First Breakout Session

- Group 1 discussed scientific uncertainties and needs in coastal carbon assessment. The discussion began with an examination of vegetation categorization, highlighting the limitations of the current four-category wetland classification system (fresh, intermediate, brackish, and saline marshes). Participants emphasized the need to account for dynamic salinity patterns across Louisiana's coast, suggesting that different timescales of salinity variability should be incorporated into assessments. The group extensively discussed CPRA's Coastwide Reference Monitoring System (CRMS) carbon-density dataset, noting the high variability in measurements and its implications for uncertainty calculations. A significant portion of the discussion focused on ongoing experiments with created marshes, where different sediment types are being tested for their carbon accumulation rates. The group identified the value of historic data from marsh creation sites and ongoing monitoring programs and noted that some of this long-term data is readily available. Their discussion concluded with an examination of lateral carbon flux in and out of project areas, particularly focusing on the data gaps in understanding emergent marsh to open water transitions. The group recognized the importance of incorporating this information into both process-based and empirical models, while also highlighting the distinctions between habitat preservation and larger-scale hydrological restoration projects.
- Group 2 focused on the complexities of carbon movement in coastal systems. Their discussion began with an in-depth examination of lateral flux and deposition processes during wetland-to-open-water conversion, linking these physical processes to policy considerations about permanence and the risk of double-counting carbon accumulation in a system. The group also spoke about credit ownership in the context of wetland retreat, particularly considering the dynamic nature of Louisiana's coastline. A substantial portion of their discussion centered on belowground carbon storage and methane emissions, emphasizing the need for Louisiana-specific scientific data rather than relying on general assumptions. The group concluded with an examination of current methodologies, identifying a significant gap in accounting for the distinction between natural and anthropogenic land loss patterns, advocating for methodology updates to better reflect these differences.
- Group 3 approached their discussion by critically examining the uncertainty diagram that was presented, identifying missing elements and processes. The group discussed the role of phytoplankton in annual net primary productivity (ANPP), noting that current accreditation methodologies do not account for marine removal via phytoplankton. They emphasized the dynamic nature of coastal carbon processes, including reburial, resuspension, and lateral flux, suggesting that these dynamics need better representation in both conceptual diagrams and carbon calculations. The group also spent time discussing salinity impacts, challenging the common assumption that greenhouse gas measurements are unnecessary above 15 ppt, noting this might not be appropriate for Louisiana's conditions. Their discussion of restoration projects examined how different project types and techniques influence carbon accounting, including considerations of external factors like nutria herbivory. While acknowledging Louisiana's data-rich environment, the group identified specific data gaps, particularly in surface-to-atmosphere fluxes and the need for eddy covariance towers to capture spatial variability. They concluded by exploring potential

partnerships and experimental designs from other regions that could complement Louisiana's existing research infrastructure.

The first breakout session was followed by three more presentations and a second breakout session:

- Jim Pahl from CPRA presented on the importance of understanding existing science and data. He emphasized the need to quantify carbon flows and integrate multiple data sources. Pahl stressed the development of Louisiana-specific datasets, noting the limitations of national benchmarks for Louisiana's unique context.
- Tim Carruthers from the Institute presented summary outputs from the Google Form questionnaire that participants were invited to fill out prior to the meeting.
- Brendan Player from Stantec followed with a presentation on translating research into accreditation processes. He discussed financial challenges in monitoring for accreditation and the use of data for site value projection. Brendan also spoke about the relationship between uncertainty levels and monitoring requirements, as well as options for credit value deductions based on uncertainty.

Second Breakout Session

- Group 1 conducted an in-depth exploration of methodology improvements for carbon accounting for coastal restoration projects. They focused particularly on the transition from default factors to more sophisticated modeling approaches, acknowledging the high cost and limitations of field data collection while emphasizing its continued importance for model validation. The group discussed the integration of remote-sensing data with ground-truthing efforts, and how these combined approaches could better predict long-term project outcomes. Their discussion also centered on the challenge of incorporating disturbance events like hurricanes and droughts into predictive models. The group made important distinctions between marsh creation projects built actively with dredged material, which can be carbon-intensive, and process-based (river diversion) projects like Davis Pond that promote natural self-repair and offer better permanence. They devoted considerable attention to the carbon costs of different restoration techniques, highlighting spoil bank gapping as a potentially lower-carbon alternative. The group concluded with a thorough examination of additionality and permanence issues, questioning the adequacy of the typical restoration project 20-year monitoring timeframe and discussing strategies for maintaining data continuity after project funding ends.
- Group 2 took a comprehensive look at strategic implementation aspects, beginning with a discussion of research and monitoring prioritization. They focused on accelerating the timeline from project inception to credit generation, aiming to achieve credit status within one year while maintaining scientific rigor. The group explored market dynamics in detail, particularly examining Louisiana-specific challenges in credit ownership and distribution. Their discussion of co-benefits addressed how biodiversity and resilience benefits could be effectively bundled with carbon credits and recognized by markets. The group spent time examining the relationship between scientific priorities and chosen methodologies, emphasizing the need for both standardized and region-specific approaches. Additional discussion focused on community

engagement and the integration of Traditional Ecological Knowledge (TEK), exploring both the opportunities and limitations of incorporating traditional knowledge into project design and implementation.

- Group 3 spoke about data variability and carbon flux in coastal Louisiana's unique environment. They explored the potential of fine-scale remote sensing and machine learning techniques for improving research accuracy and throughput, with particular attention to vegetation community classification. The group also discussed atmospheric flux issues, addressing specific concerns about flooded forests and methods for scaling carbon measurements from individual trees to ecosystem levels. Their examination of restoration efforts focused on the uncertainties surrounding diversions and marsh creation projects, including initial carbon loss and the impacts of different construction methods. The group also spoke about the role of natural water flows and storm surge deposition in carbon sequestration, integrating these considerations with their discussion of CRMS data utilization. They concluded by emphasizing the critical importance of understanding the interplay between hydrology and vegetation dynamics for advancing both research and restoration planning in the region.

CPRA concluded the meeting by outlining several key next steps:

- Emphasizing the importance of data sharing and aggregation.
- Comparing Louisiana-specific data with Gulf and national default values.
- Developing methods for information accessibility and data contribution.
- Continuing collaboration with stakeholders to advance carbon credit markets.
- Commitment to developing and implementing effective carbon credit strategies for Louisiana.

3.0 SUMMARY TECHNICAL RECOMMENDATIONS

The outreach and engagement conducted through this project revealed and/or reinforced some major points that are relevant to Louisiana's investigation of effective carbon strategies to support implementation of its Master Plan. The discussions regarding the challenges and opportunities for Louisiana are summarized as follows:

- **Data sharing and aggregation are of high importance.**
    - Compare Louisiana-specific data with Gulf and national default values.
    - Develop methods for information accessibility and data contribution.
    - Compile relevant data and incorporate it into both process-based and empirical models.
- **Prioritize research that reduces uncertainties about carbon flux in Louisiana's dynamic coastal ecosystem.**
    - The benefit-cost should be the decision framework for doing more science. Understand how the potential increase in knowledge and reduced quantification uncertainty could influence creditable units of carbon from the project.
    - Despite Louisiana's data-rich environment, specific data gaps exist, particularly in surface-to-atmosphere fluxes and spatial variability. Address the data gaps through targeted research that are deemed to be most critical to meeting Louisiana's goals for carbon accreditation.
    - Continue to research the relationships between restoration techniques, salinities, hydrodynamics, and other aspects of project design in increasing variability and uncertainty in estimates of carbon flux.
    - Better understand how different project types and techniques influence carbon accounting, including considerations of external factors like herbivory.
    - Highlight the distinctions between habitat preservation and larger-scale hydrological restoration projects.
    - Better understand the interplay between hydrology and vegetation dynamics for advancing both research and restoration planning in the region.
    - Methodologies should include quantification of co-benefits for their potential financial increase by making carbon credits 'high value.'
    - Acknowledge that carbon movement within coastal ecosystems is complex. Current methodologies should be examined and revised as needed to address Louisiana's specific land loss issues.
    - Examine additionality and permanence issues, including the adequacy of the typical 20-year monitoring timeframe, and strategies for data continuity after project funding ends.

- **Continue to prioritize collaboration with stakeholders and potential funders to advance voluntary carbon markets.**
    - Research and invest in partnerships from other regions that could complement Louisiana's existing research infrastructure.
    - Include communities as active participants in project design and implementation and recognize them equitably in benefits.
    - Keep a focus on increasing investment and types of investors (e.g., private investors) in the Louisiana coastal program.
    - Understand potential clients' needs (e.g., tech companies and large universities who have commitments for net zero) and design the project opportunity around those known needs rather than set up a product or project in the hopes that buyers will be interested.
- **Existing assumptions, policies, and terminology should continue to be reviewed and refined to acknowledge Louisiana's dynamic coastal ecosystem.**
    - Increase the potential revenue opportunity by addressing uncertainties in legal, policy, and scientific aspects of verification on the voluntary carbon market of tidal wetlands.
    - Identify and resolve inconsistencies in terminology that create confusion and limit access to the discussion around coastal carbon.
    - Property rights vary greatly across the northern Gulf states and need to be considered if a Gulf-wide approach is developed.
    - The existing standard is to consider 100 years as the benchmark for permanence. Consider alternative approaches to define longevity within confidence intervals. Allow the market to decide the relative value of these defined lengths and confidence ranges.
    - Defining carbon soil pools and especially soil carbon loss with conversion from emergent marsh to open water as 1 m is used in some instances but is not ecologically relevant in coastal Louisiana. Consider options for coastal wetland-relevant values for a salinity gradient of dynamic wetlands on a large river delta.
    - Movement of carbon into the project area cannot be counted as additional, but carbon that leaves the project area is discounted. Explore whether a larger spatial context and better quantified processes of carbon lateral flux could reduce this uncertainty to justify retention of more of this mobile carbon within the creditable pool.

4.0 CONCLUSIONS

Through the three workshops conducted in 2024, over 200 scientists and managers with interest or experience in carbon and coastal restoration from across the northern Gulf attended in-person or virtual workshops. Discussions provided refinements of knowledge gaps and needs previously identified by CPRA. However, the discussions did not reveal any large additional bodies of knowledge or unidentified expertise or unknown legal or policy pathways to those already identified by CPRA. The output from these engagements informed the development of *Technical Applicability and Feasibility for Gaining Carbon Credits from CPRA's Coastal Restoration Program: Options for Progressing Towards Implementation*.

An additional component of this task order was to create a collaboration space for GCCWG members. Participants in the May 2023 workshop initially identified a large need for additional online centralized carbon tools, information, and data sharing, as well as online space for carbon specific collaboration and exchange. It is notable that carbon data repositories and opportunities for collaboration and information sharing currently exist at the national level. Through this task order, CPRA made a Gulf-specific online resource available to GCCWG members through the creation of a SharePoint site. However, data and other information sharing, as well as online discussion and engagement were extremely low. This led to the conclusion that, while this could be a useful resource for Gulf coast researchers in the future, investment in the site was not revealing additional data, knowledge, or expertise to assist CPRA in progressing toward financially viable coastal carbon accreditation.

In conclusion, the above-outlined outreach and engagement efforts of this Project Team revealed that the locally relevant expertise and research about the topic of coastal carbon accreditation as a funding stream for habitat restoration is currently held within a relatively small group of people. Further, most of those people currently work in coastal Louisiana. CPRA is encouraged to continue to engage those researchers actively working in the field while also growing the regional community to build the next generation of experts who will continue the work.

REFERENCES

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The Water Institute, Restore America's Estuaries, & Stantec. (forthcoming). *Coastal Carbon Policy and Legal Advisory Panel: Summary of Meetings*. Produced for and funded by the Louisiana Coastal Protection and Restoration Authority under Task Order 110.

APPENDICES

APPENDIX A. PROJECT TEAM MEETINGS

Table A-1. Gulf Coastal Carbon Research Working Group (GCCWG) Project Team planning meetings and attendees.

Date	Attendees	Objectives
December 11, 2024	CPRA: James Pahl, Wes LeBlanc, Michelle Felterman, Brian Lezina The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Laura Talbert Governor's Office of Coastal Activities: Isabel Englehart	Agree to date and topics for first 2024 virtual meeting
January 11, 2024	CPRA: James Pahl, Wes LeBlanc, Michelle Felterman, Brian Lezina The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Laura Talbert RAE: Hilary Stevens	Make progress on planning for first virtual working group meeting. Discuss in-person meeting topics and logistics
January 25, 2024	CPRA: James Pahl, Wes LeBlanc, Michelle Felterman, Brian Lezina, Greg Grandy, David Peterson The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Laura Talbert, Alicia Sendrowski RAE: Hilary Stevens	Continue planning for January 31 virtual, and February 19 in-person meetings
February 5, 2024	CPRA: James Pahl, Michelle Felterman, Brian Lezina The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Laura Talbert, Alicia Sendrowski, Eva Windhoffer RAE: Hilary Stevens Stantec: Jonathan Scheibly Plauché & Carr: Megan Terrell, Amanda Carr	Follow up from January 31, 2024 virtual meeting Continue planning for February 19, 2024 in-person meeting
February 14, 2024	CPRA: James Pahl, Michelle Felterman, Brian Lezina, Skylar Liner The Institute: Tim Carruthers, Jean Cowan, Laura Talbert, Brittany Jensen, Eva Windhoffer RAE: Hilary Stevens Stantec: Jonathan Scheibly Plauché & Carr: Megan Terrell	Final planning for February 19, 2024 in-person meeting

Date	Attendees	Objectives
September 13, 2024	CPRA: James Pahl, Michelle Felterman, Wes Leblanc The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black RAE: Hilary Stevens Stantec: Jonathan Scheibly	Early planning for November 13, 2024 in-person meeting
September 20, 2024	CPRA: James Pahl, Michelle Felterman, Wes Leblanc The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black RAE: Hilary Stevens Stantec: Jonathan Scheibly	Continued planning for November 13, 2024 in-person meeting including list of invitees and overall meeting goals and objectives
September 27, 2024	CPRA: James Pahl, Michelle Felterman, Wes Leblanc, Brian Lezina The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black RAE: Hilary Stevens Stantec: Jonathan Scheibly	Continued planning for November 13, 2024 in-person meeting, including finalization of questionnaire and overview document, and discussions of meeting location
October 3, 2024	CPRA: James Pahl, Wes Leblanc The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black RAE: Hilary Stevens Stantec: N/A	Continued planning for November 13, 2024 in-person meeting, including agenda, run of show, supporting visual aids
October 18, 2024	CPRA: James Pahl, Wes Leblanc The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black RAE: Hilary Stevens Stantec: N/A	Continued planning for November 13, 2024 in-person meeting, including agenda, run of show, supporting visual aids
October 25, 2024	CPRA: James Pahl, Wes Leblanc, Michelle Felterman The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black RAE: Hilary Stevens	Continued planning for November 13, 2024 in-person meeting, including responses to invitations, agenda, and run of show

Date	Attendees	Objectives
	Stantec: Jonathan Scheibly	
November 1, 2024	CPRA: James Pahl, Michelle Felterman The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black RAE: Hilary Stevens Stantec: Jonathan Scheibly, Brendan Player	Continued planning for November 13, 2024 in-person meeting, including responses to invitations, questionnaire responses, agenda, and run of show
November 8, 2024	CPRA: James Pahl, Michelle Felterman, Wes Leblanc The Institute: Tim Carruthers, Jean Cowan, Garvin Pittman, Valerie Black, Erin Kiskaddon RAE: Hilary Stevens Stantec: Jonathan Scheibly, Brendan Player	Final planning for November 13, 2024 in-person meeting

APPENDIX B. ADVERTISING

Meetings were advertised in multiple ways including direct emails to May 2023 meeting participants and others who indicated they were interested in staying informed, other email listservs including the RESTORE Centers of Excellence listserv, advertisement on the GOMCON website, posting the flyer on Institute social media platforms, and during the RAE Blue Carbon National Working Group meeting on January 24, 2024.

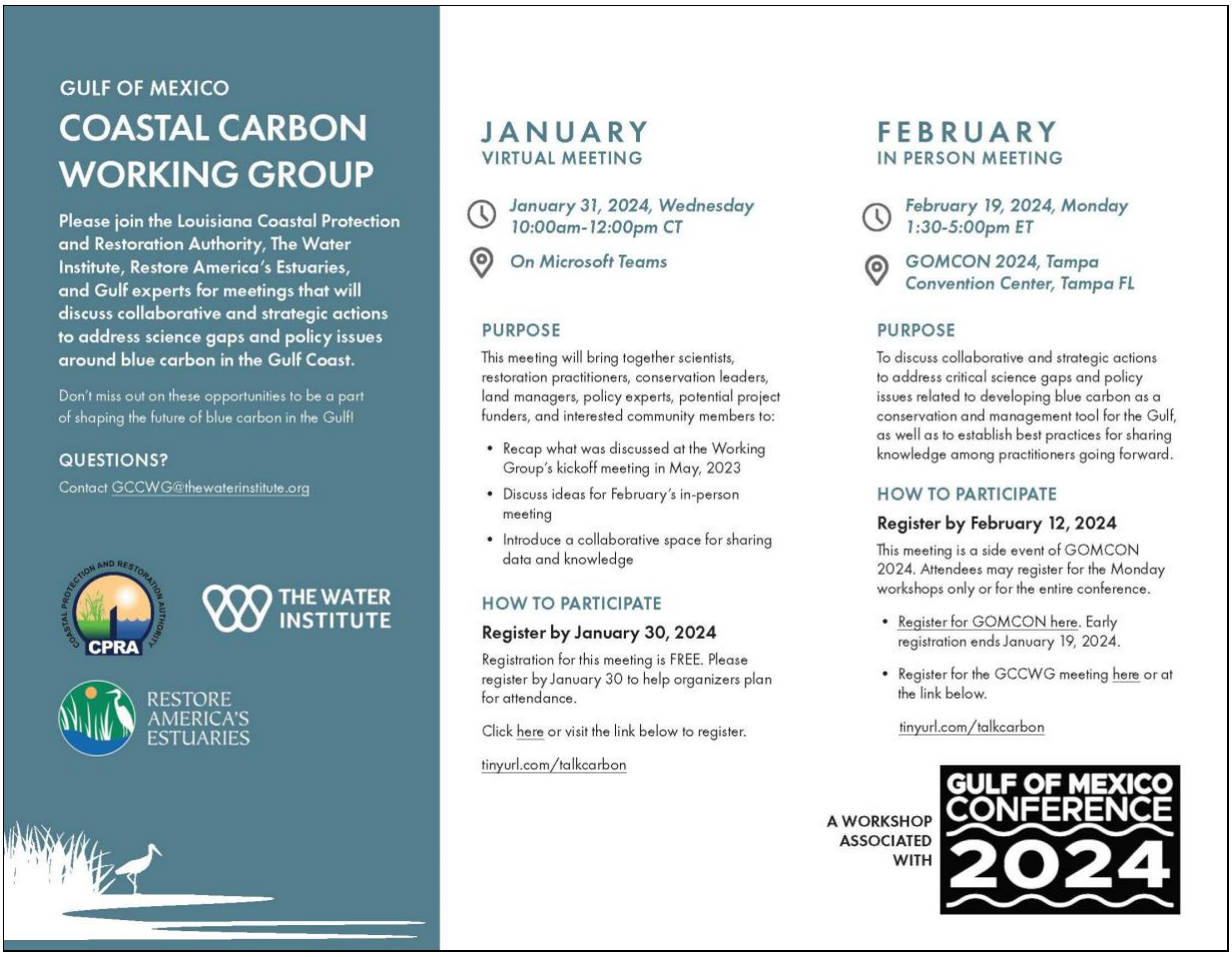

Figure B-1. Flyer advertising the January 31, 2024 and February 19, 2024 Gulf of Coastal Carbon Working Group (GCCWG) meetings.

APPENDIX C. JANUARY 31, 2024 MEETING

The January 31, 2024 meeting was held via Teams. The meeting was intended to provide background and a refresher regarding the GCCWG purpose and discussions to date, orient them to the GCCWG SharePoint site which is intended to serve as a temporary collaboration space, and provide an overview of potential future collaboration opportunities. During this 2-hour meeting, there were no breakout group discussions; however, time was built into the agenda to encourage participant questions and discussions.

Below are the January 31, 2024 virtual meeting agenda, registrants, and presentations.

C.1 JANUARY 31, 2024 MEETING AGENDA

GULF OF MEXICO COASTAL CARBON WORKING GROUP

January 31, 2024 | 10:00 – 12:00 CT

Microsoft Teams Call-in Instructions

Click here to join the meeting

Meeting ID: 220 265 197 586
Passcode: C8YMNn

Download Teams | Join on the web

Or call in (audio only)

+1 225-778-8458,,632136797# United States, Baton Rouge

Phone Conference ID: 632 136 797#

Objectives

- (Re)Orient members to Working Group discussions to date
- Highlight collaboration pathways and opportunities for future engagement

Agenda Items (Times are approximate and include discussion opportunities)

Time	Topic	Speaker
10:00	Welcome & Opening Comments	H. Stevens, RAE
10:10	Louisiana's Interest in Coastal Carbon	J. Pahl, CPRA
10:25	Other Blue Carbon Collaboration Groups	H. Stevens, RAE L. Stieghorst, Basico
10:40	May 2023 GCCWG Meeting Highlights	J. Cowan, TWI
11:00	Information Sharing Needs & Opportunities	J. Cowan, TWI J. Cahail, TWI
11:15	GCCWG February 19, 2024 Meeting Topics	T. Carruthers, TWI
11:25	Open Discussion	H. Stevens, RAE
11:50	Closing Remarks	H. Stevens, RAE

Figure C-1. Gulf Coastal Carbon Working Group January 31, 2024 virtual meeting agenda.

C.2 JANUARY 31, 2024 MEETING REGISTRANTS

Table C-1. List of people who registered in advance for the Gulf Coastal Carbon Working Group January 31, 2024 meeting.

Name	Email	Affiliation
Naveen Adusumilli	nadusumilli@agcenter.lsu.edu	LSU
Marley Allen	mallen5@uno.edu	UNO
Colin Anderson	colin.anderson@hdrinc.com	Consultant
Diane W. Atkins	Datkins1118@gmail.com	Private
Latonia Batiste	Ivyenvironmental@gmail.com	Private
Mike Biros	michael.biros@crcl.org	NGO
Brandy Bones	brandy@franklinassociates.com	Consultant
Rep. Ryan Bourriaque	hse047@legis.la.gov	Government
Josh Breithaupt	jbreithaupt@fsu.edu	FSU
Tom Broom	tomwbroom@gmail.com	Private
Whitney Broussard	whitney.broussard@freese.com	Consultant
David Buzan	david.buzan@freese.com	Consultant
Russell Caffery	russell.caffery@cop.com	Landowner
Jessica Cahail	jcahail@thewaterinstitute.org	TWI
Charley Cameron	ccameron@thewaterinstitute.org	TWI
Fabiola Campoblanco	fabiola.campoblanco@worley.com	Consultant
Tim Carruthers	tcarruthers@thewaterinstitute.org	TWI
Brady Carter	bcarter@wlf.la.gov	LDWF
Jason Chauvin	jason.chauvin@tbsmith.com	Consultant
Alex Christensen	alexandra.l.christensen@jpl.nasa.gov	NASA
Micaela Coner	Micaela.Coner2@la.gov	Government
Jean Cowan	jcowan@thewaterinstitute.org	TWI
Doug Daigle	lahwgroup@gmail.com	LSU
Melissa Daigle	mtrosc2@lsu.edu	LSU
Shubham Datta	shubham.datta@audubon.org	NGO
Steven David	sdavid@geoengineers.com	Consultant
Daniel Dehon	danield@fenstermaker.com	Consultant
Jeff Denham	Jeff@wilcomfg.com	Private
Thomas Douthat	tdouthat1@lsu.edu	LSU
Shawn Doyle	sdoyle@thewaterinstitute.org	TWI
Delaney Dryfoos	ddryfoos@thelensnola.org	Media
Cynthia Duet	Cynthia@coastalconsilium.com	Consultant
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Dexter Ellis	dellis@thewaterinstitute.org	TWI
Christopher Esposito	cesposito@thewaterinstitute.org	TWI
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Monica Farris	mateets@uno.edu	UNO
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Jerome Fournier	jromfour@gmail.com	Private
Dan Friess	dfriess@tulane.edu	Tulane

Name	Email	Affiliation
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Paige Gisclair	paige@louisianactac.org	Consultant
Kim Goodell	goodellk@bellsouth.net	Private
Claude Griffin	griffin@usbcsd.org	NGO
Samantha Haritos	silesametx@gmail.com	Private
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John Helmers	jhelmers@ppgov.net	Government
Jessica Henkel	jhenkel@thewaterinstitute.org	TWI
Johnathan Hill	johnathan@franklinassociates.com	Consultant
Eva Hillmann	erhillmann@gmail.com	Private
Rob Hollis	rhollis@thewaterinstitute.org	TWI
James A. Holmes Jr.	cleangreentech@protonmail.com	Private
Stephanie James	Stephanie@franklinassociates.com	Consultant
Brenton Jenkins	brenton.jenkins@stantec.com	Consultant
Alex Jiles	jilesa@nwf.org	NWF
Michael Joyce	mjoyce@coastalenv.com	Consultant
Sarah Kallgren	kallgrens@nwf.org	NWF
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Cecilia Kjellgren	ceciliakjellgren@outlook.com	Private
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Wamba Andre Le Doux	andre_ledouxcm@yahoo.fr	Private
Matthew Leerkes	matthew.leerkes@gmail.com	Private
Brian Lezina	brian.lezina@la.gov	CPRA
Skylar Liner	skylar.liner2@la.gov	CPRA
Laura Livingston	l.livingston@franklinassociates.com	Consultant
Kanchan Maiti	kmaiti@lsu.edu	LSU
Rachael Mathews	rachael.Mathews@la.gov	LDEQ
Steve Mathies	stevemathies@gmail.com	Consultant
Liz Maxwell	liz@ideavillage.org	Private
Christina May	cperez@res.us	Consultant
Alisha McKinley	amckinley@thewaterinstitute.org	TWI
Earl Melancon	emelancon@lsu.edu	LSU
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Irv Mendelssohn	imendel@lsu.edu	LSU
Leland Moss	lelandcmoss@gmail.com	Consultant
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Branon Muller	bmuller@geoengineers.com	Consultant
Charlotte Nash	charlotte.nash@tnc.org	TNC
Alice Nguyen	Alnguyen@esassoc.com	Consultant
Stacy Ortego	stacy@lawildlifefed.org	NGO
Michael Osland	mosland@usgs.gov	USGS
Yanda Ou	you3@lsu.edu	LSU
Steve Parker	sparker@symbiotic-enterprises.com	Consultant
Amanda Phillips	aphillips@wisnerdonation.com	NGO
Aaron Pierce	apierce@ducks.org	NGO

Name	Email	Affiliation
Garvin Pittman	gpittman@thewaterinstitute.org	TWI
Denise Radaich	dradaich@geoengineers.com	Consultant
Ned Randolph	tnedrandolph@gmail.com	Media
Virginia Richard	virginia@southwings.org	NGO
Amanda Richey	amanda.richey@restorethegulf.gov	RESTORE Council
Dean Roberts	droberts@streamcompany.com	Consultant
Bryan Rousse	bryan.rousse@chouest.com	Private
Jonathan Scheibly	jonathan.scheibly@stantec.com	Consultant
Mark Schexnayder	mschexnayder@batture-eng.com	Consultant
Alicia Sendrowski	asendrowski@thewaterinstitute.org	TWI
Lindsey Sheehan	lsheehan@esassoc.com	Consultant
Suzanne Simpson	ssimpson@galvbay.org	NGO
Ashleigh Sparks	ashleigh@ideavillage.org	NGO
Havalend Steinmuller	hsteinmuller@disl.org	DISL
Hilary Stevens	hstevens@estuaries.org	RAE
Sarah Swackhamer	sarah.swackhamer@bcarbon.org	NGO
Laura Talbert	ltalbert@thewaterinstitute.org	TWI
Megan Terrell	megan@plauchecarr.com	Plauche & Carr
Becca Trueman	trueman@quantifiedventures.com	Consultant
Cyndi Valdes	iobcwa@gmail.com	NGO
Corinne Van Dalen	cvandalen@earthjustice.org	NGO
Jorge Villa	jorge.villa@louisiana.edu	ULL
Zoe Vittur	zvittur@stcharlesgov.net	Government
Ryan Vivian	Ryan.Vivian@la.gov	CPRA
Peter Waggonner	pwaggonner@gnoinc.org	Private
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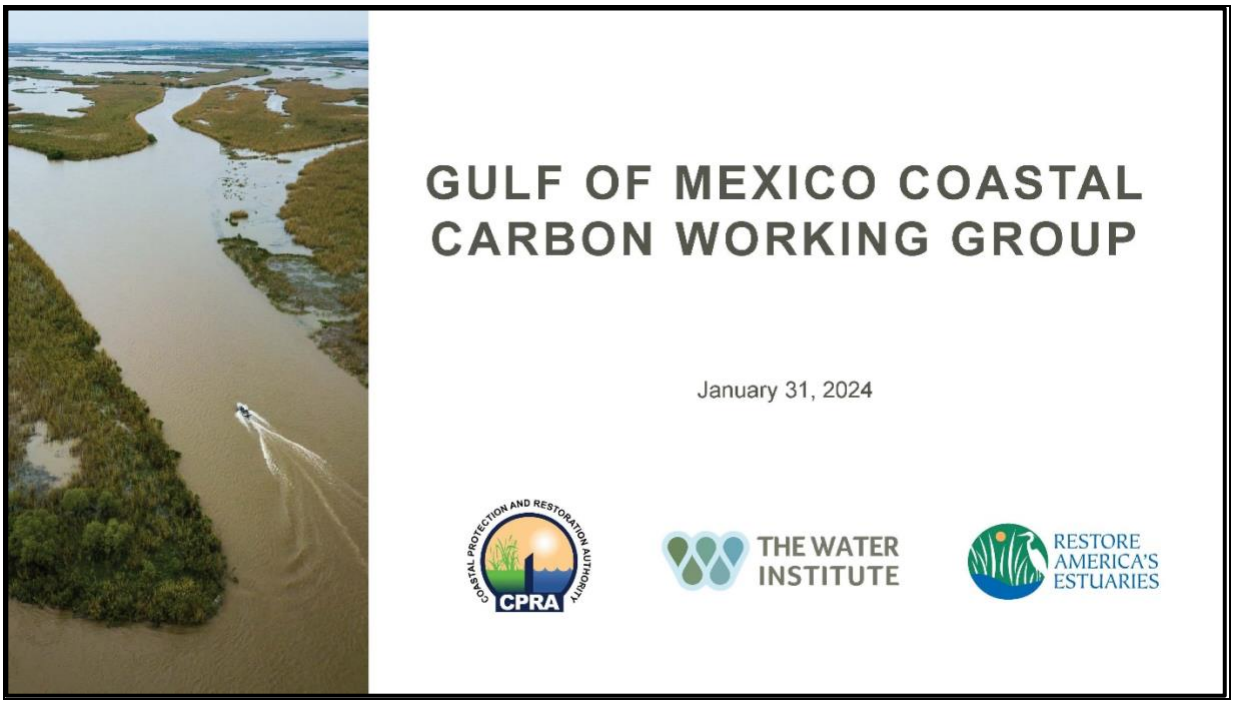
Julie Whitbeck	julie_whitbeck@nps.gov	DOI NPS
Eva Windhoffer	ewindhoffer@thewaterinstitute.org	TWI
Amy Wold	awold@thewaterinstitute.org	TWI
Jun Xu	yjxu@lsu.edu	LSU
Xiaochen Zhao	xzhao24@lsu.edu	LSU

C.3 JANUARY 31 2024 MEETING PRESENTATIONS



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2

COASTAL PROTECTION AND RESTORATION AUTHORITY

31 JANUARY 2024

Louisiana's Interest in Coastal Carbon

Presentation to the Gulf of Mexico Coastal Carbon Working Group

JAMES PAHL, CPRA PLANNING AND RESEARCH DIVISION SENIOR SCIENTIST

Outline

Drivers of Considering Coastal Carbon in Louisiana

- 2020 Executive Order JBE-2020-18
- 2023 Coastal Master Plan and the 2032 Coastal "Fiscal Cliff"

CPRA Considerations for Coastal Carbon

- Louisiana Climate Action Plan
- Uncertainty Bridging the Distance between Capturable Carbon and Credit Sales

Outline

Drivers of Considering Coastal Carbon in Louisiana

- 2020 Executive Order JBE-2020-18
- 2023 Coastal Master Plan and the 2032 Coastal "Fiscal Cliff"

CPRA Considerations for Coastal Carbon

- Louisiana Climate Action Plan
- Uncertainty Bridging the Distance between Capturable Carbon and Credit Sales

Drivers of Considering Coastal Carbon in Louisiana

State Executive Order JBE-2020-18

State of Louisiana

EXECUTIVE DEPARTMENT

EXECUTIVE ORDER NUMBER JBE 2020 – 18

CLIMATE INITIATIVES TASK FORCE

WHEREAS, Louisiana's working coast is a national treasure, exporting over $120 billion in annual goods, servicing 90% of the oil and gas activity in the Gulf of Mexico, producing 21% of all commercial fisheries landings by weight in the Lower 48 states, and providing source habitat for five million migratory waterfowl;

WHEREAS, coastal Louisiana is also a vital regional asset which serves as residence to 2.5 million people and as a historical foundation to our unique cultural heritage;

WHEREAS, Louisiana's coast continues to experience one of the fastest rates of land loss in the world, and parts of our State remain unprotected from or vulnerable to future hurricane and flood event impacts;

WHEREAS, Louisiana and its citizens have suffered catastrophic losses and human, economic, and social harm as a result of increased flood risk due to coastal land loss, and the continued threat of further land loss to Louisiana's most endangered its residents, economy, and native fish and wildlife species;

WHEREAS, beginning in 2007, Louisiana has adopted, revised and, and updated a comprehensive plan for a sustainable coast (the "master plan");

WHEREAS, the master plan integrates coastal protection strategies and coastal restoration strategies to provide increased flood protection for communities and to maximize the amount of land maintained or restored in coastal Louisiana;

WHEREAS, according to the 2017 Coastal Master Plan, without significant action, continued scientific and area level rise over the next fifty years could result in the additional loss of between 2,250 and 4,320 square miles of Coastal Louisiana;

WHEREAS, rising sea levels will reduce the effectiveness of built and planned investments in coastal protection and restoration, threatening the longevity of coastal protection and restoration projects;

WHEREAS as is the case today with natural disasters, impacts from climate change will be disproportionately felt by the residents of our state with the fewest resources;

WHEREAS, in the 2018 Special Report Global Warming of 1.5 Degrees Celsius, the Intergovernmental Panel on Climate Change (the "IPCC") concluded that overall "climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5 degrees and increase further with 2 degrees" above pre-industrial temperatures;

WHEREAS, in the same 2018 Special Report, the IPCC further concluded that reducing greenhouse gas emissions can slow global warming and reduce the magnitude and speed of future sea level rise, enabling greater opportunities for adaptation for human and ecological systems in low-lying coastal and deltaic areas;

NOW THEREFORE, I, JOHN BEL EDWARDS, Governor of the State of Louisiana, by virtue of the authority vested in the Constitution and laws of the State of Louisiana do hereby order and direct as follows:

SECTION 1: The Climate Initiatives Task Force (hereafter the "Task Force") is hereby established within the executive branch, Office of the Governor – Coastal Activities.

SECTION 2: The duties of the Task Force shall include, but are not limited to, the following:

A. Review and comment on ongoing efforts to update the state's greenhouse gas emissions inventory;

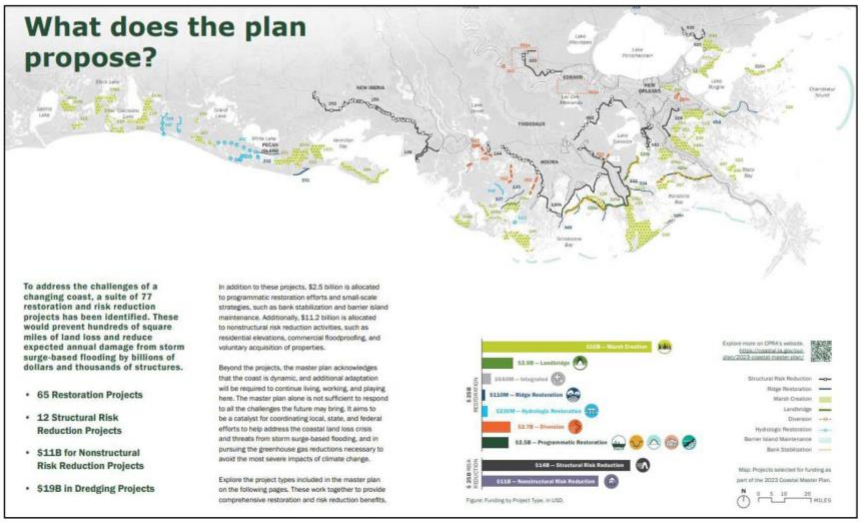
B. Investigate and make recommendations for the reduction of greenhouse gas emissions originating in Louisiana to achieve the following greenhouse gas emissions reduction goals:

1. By 2025, reduce net greenhouse gas emissions by 26-28% of 2005 levels;
2. By 2030, reduce net greenhouse emissions by 40-50% of 2005 levels; and
3. By 2050, reduce greenhouse gas emissions to net zero;

C. Develop policies, strategies, and incentives designed to achieve the net emissions reduction targets established in this Order, while improving the health and welfare of the people of Louisiana and advancing Louisiana's economic and energy profile.

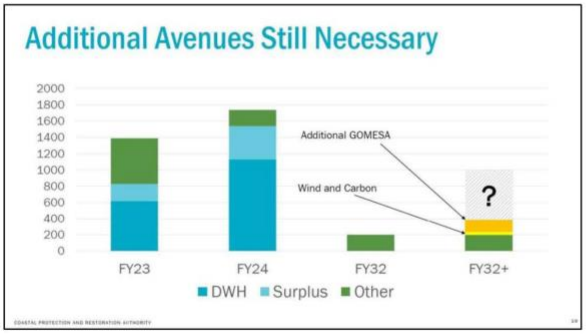
Drivers of Considering Coastal Carbon in Louisiana

2023 Coastal Master Plan



Drivers of Considering Coastal Carbon in Louisiana

2032 Coastal "Fiscal Cliff"



https://www.nola.com/news/environment/coastal-cliff-threatens-louisiana-restoration-projects/article_08fbf0d8-c8f7-11ed-ae7e-9704e56c1787.html

Louisiana coastal projects are funded by an unlikely source. What happens when the money runs out?

State in search of revenue to replace BP spill money

BY MARK SCHLEIFSTEIN | Staff writer
Mar 25, 2023

A dredging pipe is primed before sediment is placed at the site of the $100 million Spanish Pass project in Venice on Wednesday, Nov building a 7-mile ridge and marsh with Mississippi River sediment to buffer Barataria Bay against future storm surge. State officials w projects will be harder to find after 2031, when money from BP Deepwater Horizon oil spill settlements will have run out.

STAFF PHOTO BY SOPHIA GERMER

Outline

Drivers of Considering Coastal Carbon in Louisiana

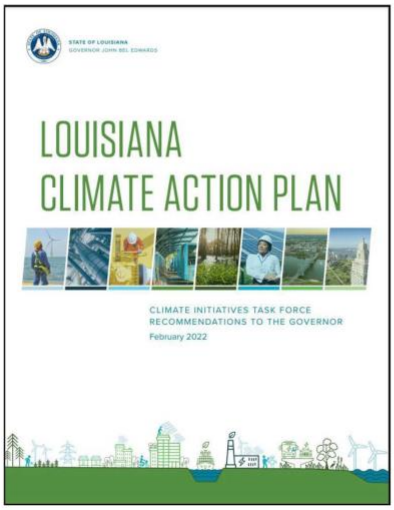
- 2020 Executive Order JBE-2020-18
- 2023 Coastal Master Plan and the 2032 Coastal "Fiscal Cliff"

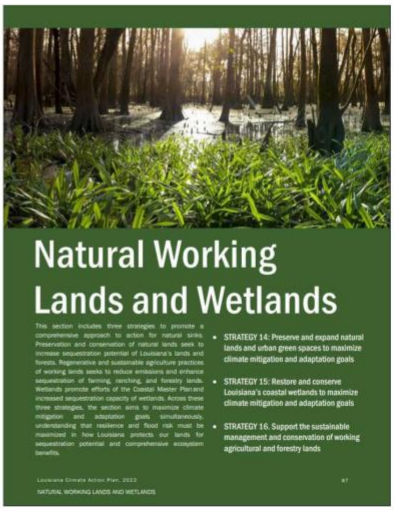
CPRA Considerations for Coastal Carbon

- Louisiana Climate Action Plan
- Uncertainties Bridging Between Capturable Carbon and Credit Sales

CPRA Considerations for Coastal Carbon

2022 Louisiana Climate Action Plan





CPRA Considerations for Coastal Carbon

2022 Louisiana Climate Action Plan

STRATEGY 15. Restore and conserve Louisiana's coastal wetlands to maximize climate mitigation and adaptation goals

As with Louisiana's inland natural lands, our coastal wetlands sequester carbon and provide important ecosystem services, while also serving a critical role in buffering against rising sea levels and severe storms. Restoring and maintaining coastal wetlands for mitigation against these climate change-related threats can benefit Louisiana's vulnerable coastal communities and ecosystems, as realized though implementation of Louisiana's Coastal Master Plan. While sources of GHG emissions are well characterized in the 2021 GHG Inventory, significant knowledge gaps remain related to sequestration of carbon by the diverse ecosystems of Louisiana. Actions in this strategy include mechanisms to fill knowledge gaps and improve the accuracy of our data on natural carbon sinks in Louisiana.

Highlights of how this strategy can realize benefits for Louisiana:

- Resilience to a Changing Environment: Investments in restoration and conservation planning can increase community resilience to the threats of sea level rise and severe storms by providing a natural buffer to these threats.
- Cultural Heritage: The unique cultural heritage of South Louisiana is intrinsically tied to the natural environment of the coast, highlighting the need to protect environments important to traditional living cultures, including Indigenous cultures and traditional fishing communities. Project-by-project considerations are important for understanding how restoration projects impact cultural heritage.
- Economy and Jobs: Louisiana's coast is a working coast, with 20% of U.S. waterborne commerce coming through our ports and coastal wetlands that provide important habitat for commercially important fish and game species. Conservation and restoration of Louisiana's coastal habitats is critical to both our local and national economy.

ACTION 15.1 Optimize the carbon sequestration potential of Louisiana's coastal wetlands through implementation of Coastal Master Plan projects

IMPLEMENTATION PARTNERS	NEAR-TERM ACTION	GOALS
CPRA	Study carbon storage potential of wetland projects	Maximize carbon sequestration of coastal wetland restoration

Implementation of Louisiana's Coastal Master Plan* includes coastal restoration actions to reduce land loss with a focus on risk reduction to support coastal communities. This action proposes that the Coastal Protection and Restoration Authority (CPRA) incorporate climate mitigation goals and measures (e.g., carbon sequestration potential of wetlands) into future iterations of the Coastal Master Plan as well as into project design and prioritization. Carbon sequestration potential should further make the case for investment in Louisiana's coastal program and unlock additional resources for project implementation. (**Associated Submitted Action Proposals: 77**)

Louisiana's Coastal Master Plan

Louisiana's Coastal Master Plan, led by the Coastal Protection and Restoration Authority (CPRA), responds to the loss of the state's coastal land through setting forth and implementing projects that build or maintain coastal wetlands and reduce flood risk for Louisiana communities.

Louisiana Climate Action Plan, 2022 90

NATURAL WORKING LANDS AND WETLANDS

ACTION 15.2 Quantify and monitor the potential coastal blue carbon in Louisiana habitats and Coastal Master Plan projects

IMPLEMENTATION PARTNERS	NEAR-TERM ACTION	GOALS
CPRA	Invest in assessments of net carbon flux of coastal wetlands	Maximize carbon sequestration of coastal wetland restoration

Quantification and monitoring to assess net carbon flux of Louisiana's coastal wetland habitats (fresh, intermediate/brackish, saline, and submerged aquatic vegetation; also known as coastal blue carbon) and open water habitats is a crucial step towards building a robust carbon finance framework. Carbon financing presents an opportunity for the state to partner with industry to expand coastal wetland restoration initiatives. Though a comprehensive understanding of blue carbon requires long-term study, existing efforts should continue through: 1) research and development led by the state, non-profits, the private sector, and/or academic institutions to create accurate models that will allow quantification of Louisiana's coastal blue carbon over time and across variable environmental conditions; and 2) expanded support and monitoring capacity of existing foundational monitoring programs (e.g., System Wide Assessment and Monitoring Program (SWAMP) that includes the Coastwide Reference Monitoring System (CRMS)) to quantify coastal blue carbon across coastal Louisiana over time. (**Associated Submitted Action Proposals: 59, 60, 77**)

ACTION 15.3 Develop crediting mechanism and market specific to blue carbon

IMPLEMENTATION PARTNERS	NEAR-TERM ACTION	GOALS
Universities / CPRA / blue carbon experts and verifiers / coastal ecologists	Collaborate with stakeholders to design a carbon credit and market	Maximize investment in carbon sequestration of wetland restoration

Existing carbon markets are designed primarily for terrestrial forests and have not readily accommodated crediting of coastal wetlands. Specifically, standards for additionality and permanency must be tailored for dynamic coastal wetlands to recognize and account for their GHG benefits while being grounded in the realities of those dynamic systems. The natural carbon sequestration potential of Louisiana's coastal habitats is too valuable to be entirely precluded from market-based systems that can support the conservation and restoration of these important ecosystems. With the assistance of blue carbon experts, carbon verifiers, and coastal ecologists, Louisiana should evaluate the longevity of coastal carbon pools, the design and market interest for the creation of a specialized carbon credit, and the market specific to Louisiana's coastal wetland habitats. This potential Louisiana credit and market would more directly take into account the sequestration potential of coastal wetland habitats as well as the shorter time scales that conservation or restoration efforts would be expected to offer given the dynamic nature of deltaic systems. This credit and market would attempt to match the local and global demand for natural carbon credits with the urgent need to protect and restore Louisiana's wetland ecosystems for the preservation of the state's culture, communities, economy, and environment. (**Associated Submitted Action Proposals: 59, 60, 77**)

DISSENTING VIEW: One member objected to this action, opposing the sale of coastal wetlands as offsets for continued GHG pollution. DISSENTER: Pichon Battle.

Louisiana Climate Action Plan, 2022 91

NATURAL WORKING LANDS AND WETLANDS

CPRA Considerations for Coastal Carbon

2022 Louisiana Climate Action Plan

STRATEGY 15. Restore and conserve Louisiana's coastal wetlands to maximize climate mitigation and adaptation goals

As with Louisiana's inland natural lands, our coastal wetlands sequester carbon and provide important ecosystem services, while also serving a critical role in buffering against rising sea levels and severe storms. Restoring and maintaining coastal wetlands for mitigation against these climate change-related threats can benefit Louisiana's vulnerable coastal communities and ecosystems, as realized though implementation of Louisiana's Coastal Master Plan. While sources of GHG emissions are well characterized in the 2021 GHG Inventory, significant knowledge gaps remain related to sequestration of carbon by the diverse ecosystems of Louisiana. Actions in this strategy include mechanisms to fill knowledge gaps and improve the accuracy of our data on natural carbon sinks in Louisiana.

Highlights of how this strategy can realize benefits for Louisiana:

- Resilience to a Changing Environment: Investments in restoration and conservation planning can increase community resilience to the threats of sea level rise and severe storms by providing a natural buffer to these threats.
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NATURAL WORKING LANDS AND WETLANDS

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Louisiana Climate Action Plan, 2022 91

NATURAL WORKING LANDS AND WETLANDS

CPRA Considerations for Coastal Carbon

2022 Louisiana Climate Action Plan

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Highlights of how this strategy can realize benefits for Louisiana:

- Resilience to a Changing Environment: Investments in restoration and conservation planning can increase community resilience to the threats of sea level rise and severe storms by providing a natural buffer to these threats.
- Cultural Heritage: The unique cultural heritage of South Louisiana is intrinsically tied to the natural environment of the coast, highlighting the need to protect environments important to traditional living cultures, including indigenous cultures and traditional fishing communities. Project-by-project considerations are important for understanding how restoration projects impact cultural heritage.
- Economy and Jobs: Louisiana's coast is a working coast, with 20% of U.S. waterborne commerce coming through our ports and coastal wetlands that provide important habitat for commercially important fish and game species. Conservation and restoration of Louisiana's coastal habitats is critical to both our local and national economy.

ACTION 15.1 Optimize the carbon sequestration potential of Louisiana's coastal wetlands through implementation of Coastal Master Plan projects

IMPLEMENTATION PARTNERS	NEAR-TERM ACTION	GOALS
CPRA	Study carbon storage potential of wetland projects	Maximize carbon sequestration of coastal wetland restoration

Implementation of Louisiana's Coastal Master Plan* includes coastal restoration actions to reduce land loss with a focus on risk reduction to support coastal communities. This action proposes that the Coastal Protection and Restoration Authority (CPRA) incorporate climate mitigation goals and measures (e.g., carbon sequestration potential of wetlands) into future iterations of the Coastal Master Plan as well as into project design and prioritization. Carbon sequestration potential should further make the case for investment in Louisiana's coastal program and unlock additional resources for project implementation. (Associated Submitted Action Proposals: 77)

*Louisiana's Coastal Master Plan

Louisiana's Coastal Master Plan, set by the Coastal Protection and Restoration Authority (CPRA), responds to the loss of the state's coastal land through lasting forth and implementing projects that build, nourish, protect, and restore land mass for Louisiana communities.

Louisiana Climate Action Plan, 2022 90

NATURAL WORKING LANDS AND WETLANDS

ACTION 15.2 Quantify and monitor the potential coastal blue carbon in Louisiana habitats and Coastal Master Plan projects

IMPLEMENTATION PARTNERS	NEAR-TERM ACTION	GOALS
CPRA	Invest in assessments of net carbon flux of coastal wetlands	Maximize carbon sequestration of coastal wetland restoration

Quantification and monitoring to assess net carbon flux of Louisiana's coastal wetland habitats (fresh, intermediate/brackish, saline, and submerged aquatic vegetation; also known as coastal blue carbon) and open water habitats is a crucial step towards building a robust carbon finance framework. Carbon financing presents an opportunity for the state to partner with industry to expand coastal wetland restoration initiatives. Though a comprehensive understanding of blue carbon requires long-term study, existing efforts should continue through: 1) research and development led by the state, non-profits, the private sector, and/or academic institutions to create accurate models that will allow quantification of Louisiana's coastal blue carbon over time and across variable environmental conditions; and 2) expanded support and monitoring capacity of existing foundational monitoring programs (e.g., System Wide Assessment and Monitoring Program (SWAMP) that includes the Coastwide Reference Monitoring System (CRMS)) to quantify coastal blue carbon across coastal Louisiana over time. (Associated Submitted Action Proposals: 59, 60, 77)

ACTION 15.3 Develop crediting mechanism and market specific to blue carbon

Universities / CPRA / blue carbon experts and verifiers / coastal ecologists	Collaborate with stakeholders to design a carbon credit and market	Maximize investment in carbon sequestration of wetland restoration

Existing carbon markets are designed primarily for terrestrial forests and have not readily accommodated crediting of coastal wetlands. Specifically, standards for additionality and permanency must be tailored for dynamic coastal wetlands to recognize and account for their GHG benefits while being grounded in the realities of those dynamic systems. The natural carbon sequestration potential of Louisiana's coastal habitats is too valuable to be entirely precluded from market-based systems that can support the conservation and restoration of these important ecosystems. With the assistance of blue carbon experts, carbon verifiers, and coastal ecologists, Louisiana should evaluate the longevity of coastal carbon pools, the design and market interest for the creation of a specialized carbon credit, and the market specific to Louisiana's coastal wetland habitats. This potential Louisiana credit and market would more directly take into account the sequestration potential of coastal wetland habitats as well as the shorter time scales that conservation or restoration efforts would be expected to offer given the dynamic nature of deltaic systems. This credit and market would attempt to match the local and global demand for natural carbon credits with the urgent need to protect and restore Louisiana's wetland ecosystems for the preservation of the state's culture, communities, economy, and environment. (Associated Submitted Action Proposals: 59, 60, 77)

DISSENTING VIEW: One member objected to this action, opposing the sale of coastal wetlands as offsets for continued GHG pollution. DISSENTER: Pichon Battle.

Louisiana Climate Action Plan, 2022 91

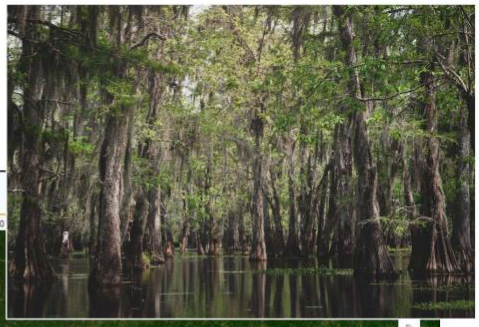
NATURAL WORKING LANDS AND WETLANDS

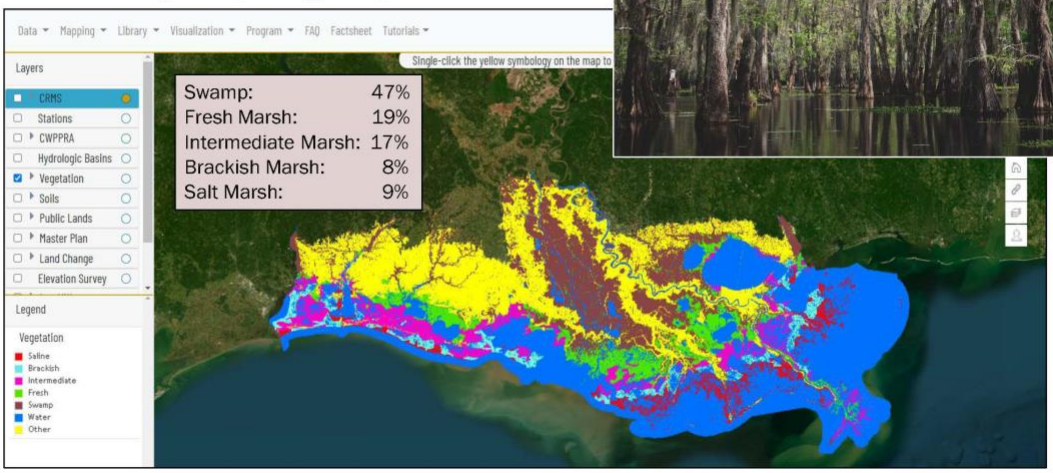
Definitions

Coastal Carbon

- More than seagrasses, mangroves, and salt marshes

Nola.com

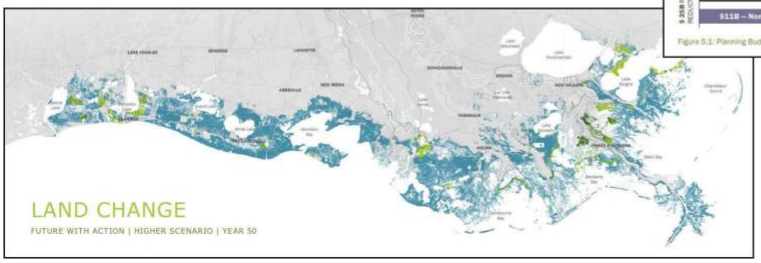


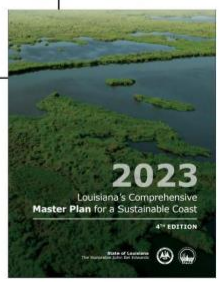


CPRA Considerations for Coastal Carbon

Uncertainties Bridging between Capturable Carbon and Credit Sales

Total Capturable Carbon (metric tonnes CO_2-equivalents)





CPRA Considerations for Coastal Carbon

Uncertainty Bridging the Distance between Capturable Carbon and Credit Sales

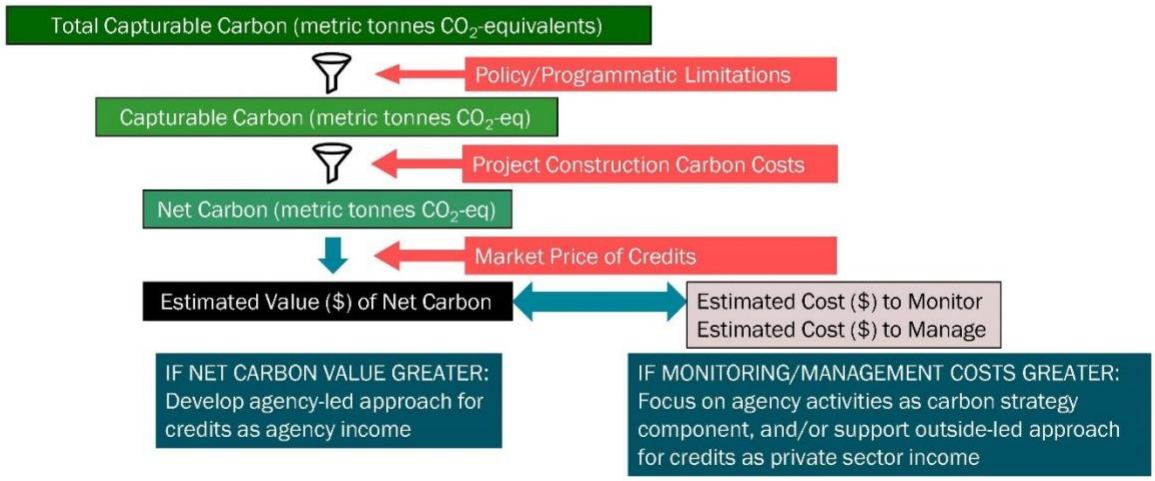
Total Capturable Carbon (metric tonnes CO_2-equivalents)

Policy/Legal/Programmatic Limitations
- Additionality
- Permanence
- Funding Program Rules (28!)
  - Which programs allow credit development? Why not?
- Ownership of credits in program-funded actions?

Capturable Carbon (metric tonnes CO_2-eq)

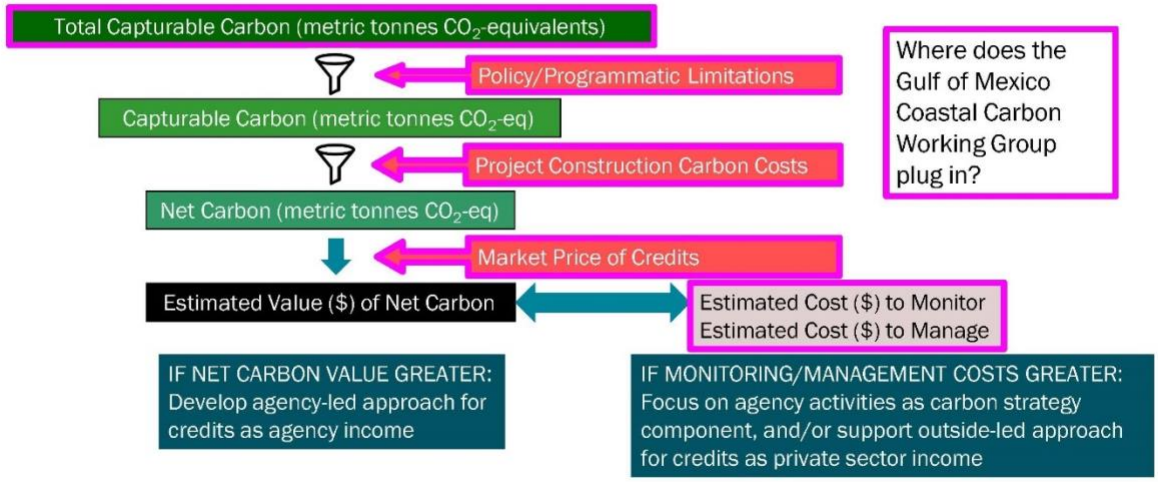
CPRA Considerations for Coastal Carbon

Uncertainty Bridging the Distance between Capturable Carbon and Credit Sales



CPRA Considerations for Coastal Carbon

Uncertainty Bridging the Distance between Capturable Carbon and Credit Sales



Where does the Gulf of Mexico Coastal Carbon Working Group plug in?

COASTAL PROTECTION AND RESTORATION AUTHORITY

CONNECT WITH US!

@LouisianaCPRA

James Pahl james.pahl@la.gov

QUESTIONS?

AGENDA (CT)

Time	Topic	Speaker
10:00	Welcome & Opening Comments	H. Stevens, RAE
10:10	Louisiana's Interest in Coastal Carbon	J. Pahl, CPRA
10:25	Other Blue Carbon Collaboration Groups	H. Stevens, RAE L. Stieghorst, Basico
10:40	May 2023 GCCWG Meeting Highlights	J. Cowan, The Institute
11:00	Information Sharing Needs & Opportunities	J. Cowan, The Institute J. Cahail, The Institute
11:15	GCCWG February 19, 2024 Meeting Topics	T. Carruthers, The Institute
11:25	Open Discussion	H. Stevens, RAE
11:50	Closing Remarks	H. Stevens, RAE

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RAE BLUE CARBON NATIONAL WORKING GROUP

GULF OF MEXICO REGIONAL NODE WORKING GROUP ON MARINE CO_2 REMOVAL

Welcome

The Gulf of Mexico (GMx) Regional Node Working Group on Marine Carbon Dioxide Removal (mCDR) represents a new effort to address climate challenges in the Gulf Coast's unique ecological landscape.

Our Vision & Mission

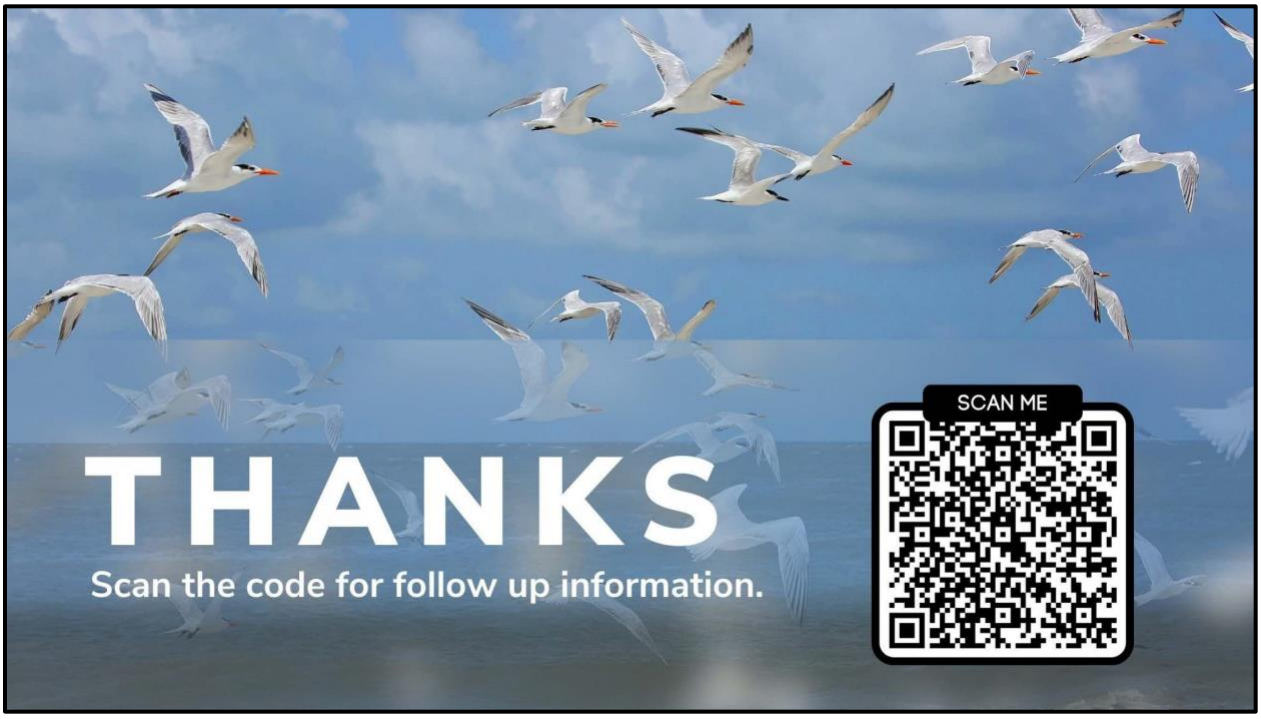
Vision

We envision a hub for local knowledge and innovative practice to help the Gulf Coast meet the challenges of climate change while caring for the community and environemnt we share.

Mission

Central our mission is a spirit of reciprocity, fostering a collaborative and mutually beneficial atmosphere. Our approach is anchored in the pursuit of public goods, with a focus on climate mitigation and environmental protection, aligning the group's efforts with broader global objectives.


OCB x OSM Kickoff Event
The inaugural GMx Regional Node kickoff event will be hosted in in New Orleans during the week of Ocean Sciences Meeting (OSM).
Join co-hosts Ocean Carbon & Biogeochemistry (OCB), Carbon to Sea, Exploring Ocean Iron Solutions (ExOIS), [C]Worthy, and Ocean Visions for an mCDR networking event on **Monday, February 19 from 6:30-9:30 pm at the Audubon Aquarium**. We plan to break out into a regional discussion at around 7:30.


THANKS
Scan the code for follow up information.
SCAN ME

QUESTIONS?

AGENDA (CT)

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10:00	Welcome & Opening Comments	H. Stevens, RAE
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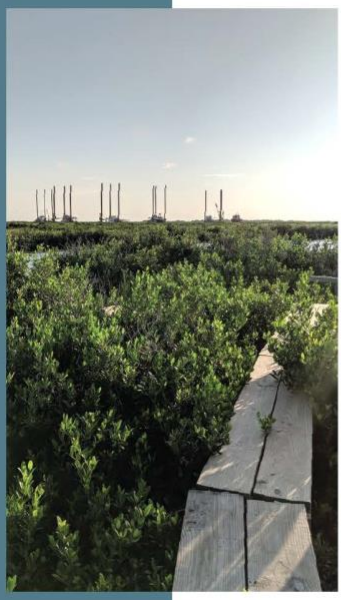
GCCWG MAY 2023
MEETING HIGHLIGHTS



GCCWG

Gulf of Mexico Coastal Carbon Working Group

Mission

- Collaboratively and strategically address critical science gaps and policy issues associated with developing coastal carbon as a conservation and management tool for Northern Gulf of Mexico coastal ecosystems

Participants

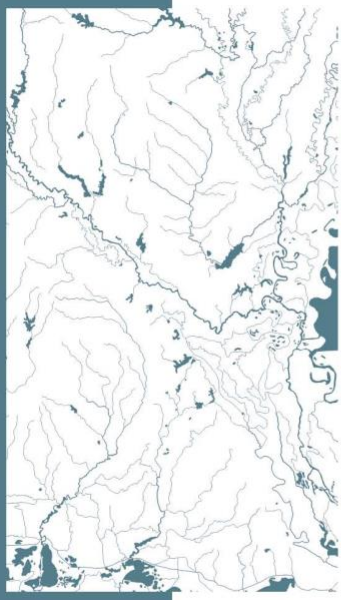
- Open to researchers, resource managers, policy & legal experts, landowners, industry leaders, others

30

KICK-OFF MEETING

- Held on May 30, 2023 at State of the Coast
- 80+ attendees
  - Government, academic, private, NGO, communities
  - Researchers, decision-makers, policy experts, resource managers

31



MAY 2023 MEETING OBJECTIVES

- Reach consensus on the need for a Gulf of Mexico Coastal Carbon Working Group
- Establish interest in participation
- Receive feedback on the mission, objectives, and geographic scope
- Begin discussion of research priorities and critical information gaps
- Set expectations of future engagements

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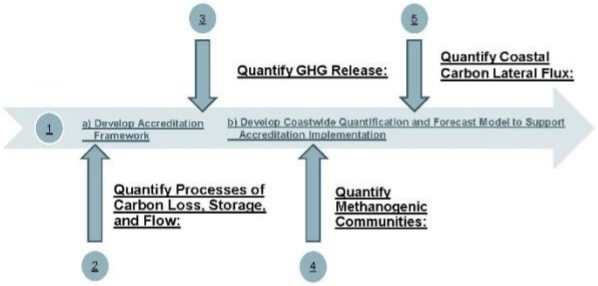
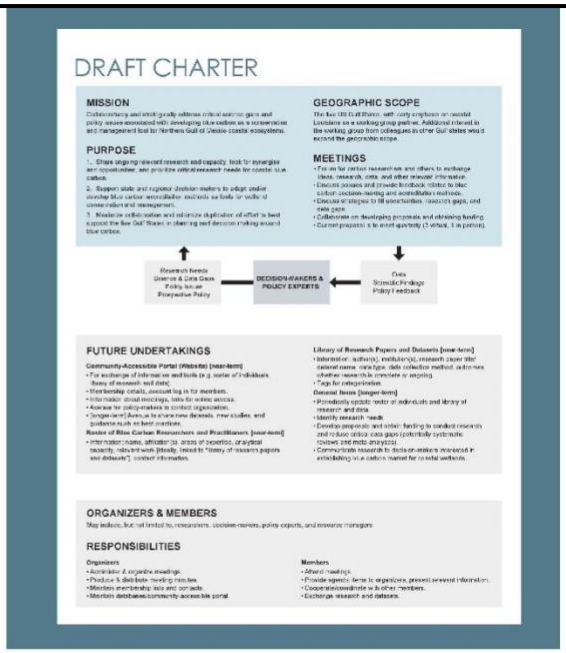
DRAFT CHARTER & RESEARCH NEEDS



tinyurl.com/GCCWG DraftCharter



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PARTICIPANT INPUT

- Working Group
  - Need a "champion" organization to sustain the working group
  - ID targeted science needs and potential pathways to fill knowledge and data gaps
  - Provide opportunities for more in-depth discussion of critical science, legal and policy needs and opportunities
- Communication & Collaboration
  - Clearly identify the end users
  - Work with landowners, industry, and other stakeholders to understand policy and research needs from their perspectives
  - Ensure common use/understanding of terms
  - Create and maintain collaboration/resource platform, and build upon others as appropriate

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GO/NO-GO?

- High level of interest in developing working group or other form of more organized collaboration hub
- Desire for future meeting format that allows for more structured input and communication

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QUESTIONS?

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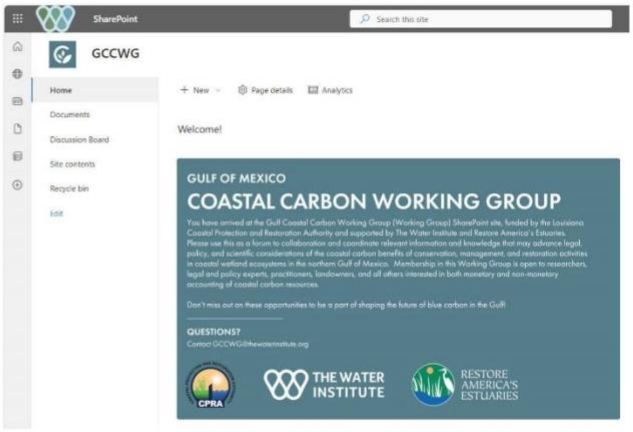
GCCWG
INFORMATION SHARING

GCCWG SHAREPOINT SITE

- Initial collaboration space
- Features
  - Discussion board
  - Share relevant documents
- By invitation only
  - Email to request access: GCCWG@thewaterinstitute.org



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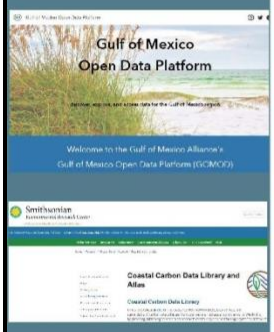
LONG-TERM INFORMATION SHARING



Example potential coordination opportunities

- **Seeking GCCWG member input on the most pressing needs:**
  - How will this Working Group's collaboration space be distinct from others?
  - What information sharing will facilitate the Working Group's progress?
  - How important is Working Group member communication vs. external (or public) communication?
  - Should we consider building upon other platforms (e.g., GOMA Open Data Platform, Smithsonian Environmental Research Center)?
- **Survey**
  - To be sent to meetings registrants - please share with your networks!
  - Results will be shared and discussed during February 19, 2024 meeting in Tampa – please join us if you're attending GOMCON
  - Future focus groups / surveys will inform recommendations to CPRA

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QUESTIONS?

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11:50	Closing Remarks	H. Stevens, RAE

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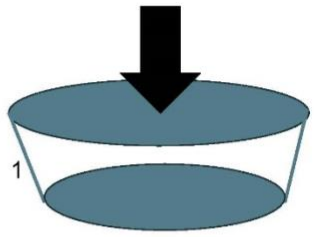
GCCWG
IN-PERSON MEETING

February 19, 2024
Tampa, FL

GULF OF MEXICO CONFERENCE 2024

GOMCON TOPIC 1

- Policy and Legal Needs
  - First level of targeting
  - Current blue carbon policy, legal, accreditation strengths, needs, opportunities
  - Guided by legal and policy expert panel – currently standing up



VERIFIED CARBON STANDARD

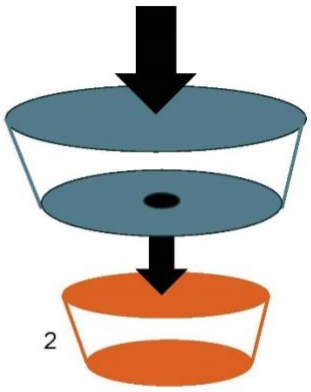
ACR
AT WINROCK INTERNATIONAL

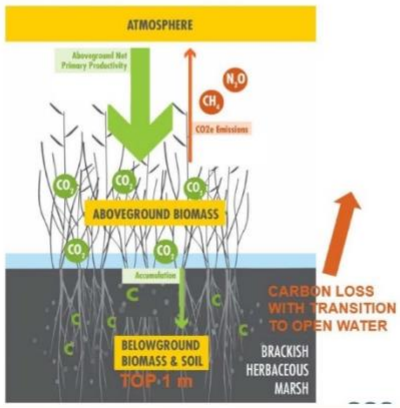
2009 LOUISIANA
LEGISLATIVE ACTS
SUMMARY

44

GOMCON TOPIC 2

- Critical uncertainties and knowledge / data needs
  - Refined by direction and needs / opportunities to advance blue carbon policy and accreditation





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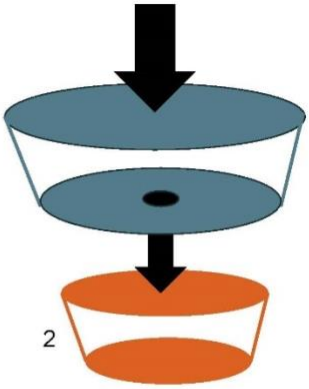
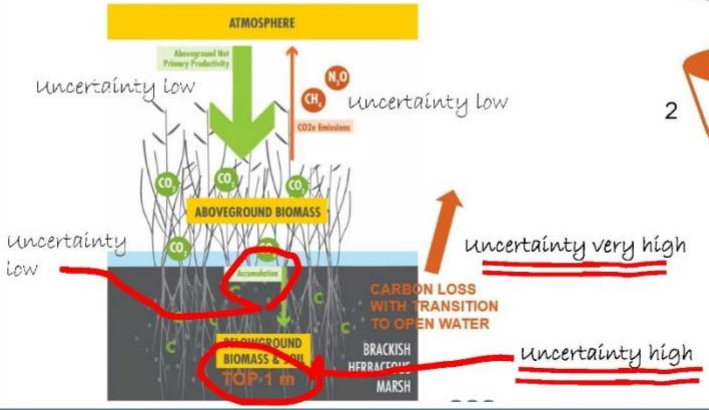
GOMCON TOPIC 2

- Critical uncertainties and knowledge / data needs
  - Participants identify processes and assumptions with greatest uncertainty (to prioritize data/knowledge needs)





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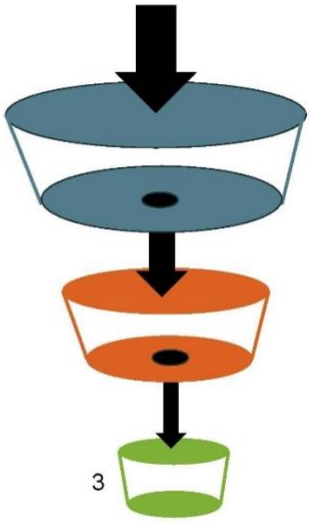
GOMCON TOPIC 3

- Information sharing needs
  - How will we confirm if we have, or when we have, sufficiently filled data / knowledge gaps (succeeded in meeting needs)?
  - Discuss northern Gulf of Mexico specific mechanisms and needs for collaboration to specifically address the prioritized data/knowledge needs



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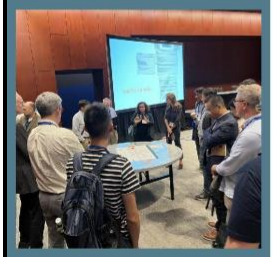


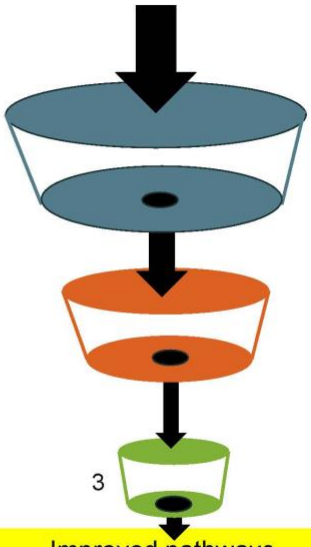
GOAL OF GOMCON IN PERSON

A. Understand legal and policy opportunities and needs to progress tidal wetland blue carbon accreditation and marketability

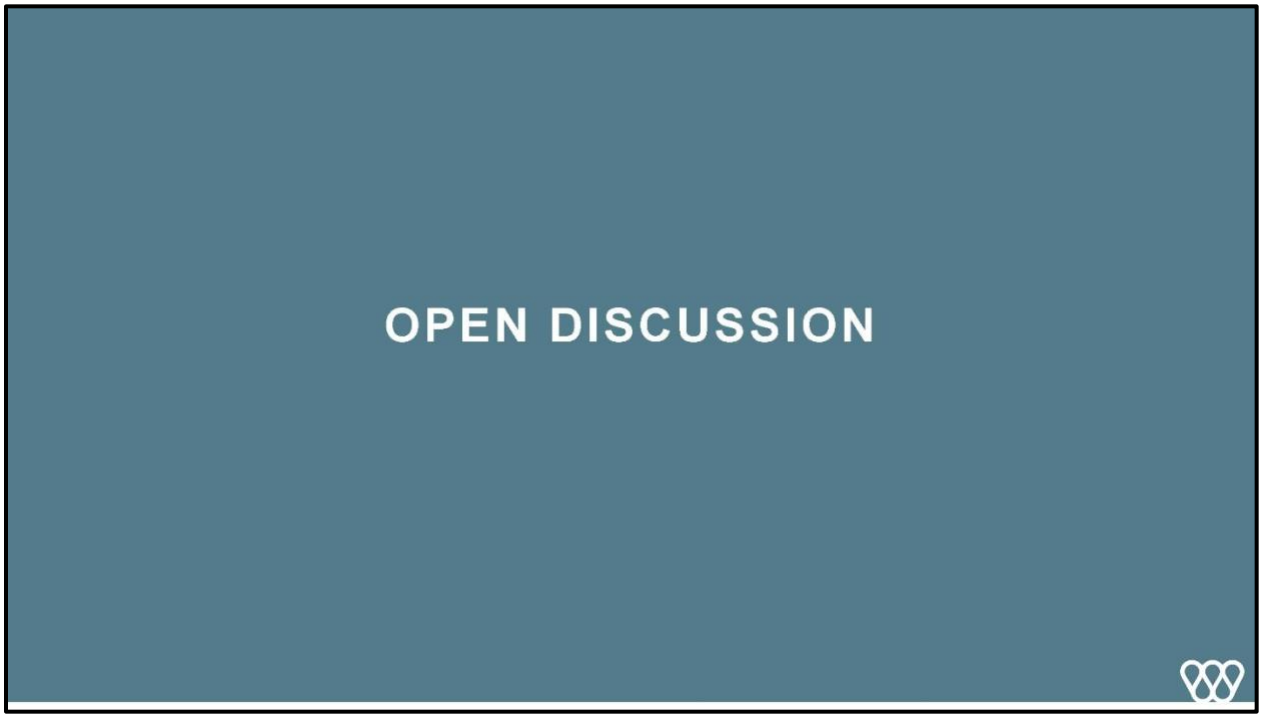
B. Based on A. identify critical uncertainties in science/data to quantify blue carbon in tidal wetlands to support that legal/policy framework (e.g. accreditation)

C. Identify on-line databases /tools / needs to track and discuss the research community rapidly progressing to meet the identified critical needs

D. This will provide the structure and framework for the blue carbon science community to collaboratively support progress towards improving accreditation pathways for blue carbon in tidal marshes




QUESTIONS?


OPEN DISCUSSION

THANK YOU!

COASTAL PROTECTION AND RESTORATION AUTHORITY
CPRA

THE WATER INSTITUTE

RESTORE AMERICA'S ESTUARIES

APPENDIX D. FEBRUARY 19, 2024 IN-PERSON MEETING

The February 19, 2024 meeting was held in-person at the Tampa Convention Center as a side event to GOMCON 2024. The meeting was intended to provide GCCWG members with more context on the state of knowledge of policy and legal challenges as well as priority scientific uncertainties related to realizing a voluntary coastal carbon market. With that context, participants were able to discuss priority science needs and longer-term collaboration needs of the GCCWG.

Below are the February 19, 2024 agenda, meeting attendees, and presentations.

D.1 FEBRUARY 19, 2024 MEETING AGENDA

GULF OF MEXICO COASTAL CARBON WORKING GROUP

February 19, 2024 / 1:30 – 5:00

Tampa Convention Center, Room 118

Objectives

- Discuss critical uncertainties and priority actions to achieving a viable voluntary coastal carbon market
- Discuss information sharing needs and pathways

Agenda Items (Times are approximate and include discussion opportunities)

Time	Topic
1:30	Welcome & Opening Comments
1:45	Coastal Carbon Policy and Legal Advisory Panel Discussion
2:20	Coastal Carbon Priority Uncertainties and Actions Breakout Discussion
3:10	Break
3:30	Priority Uncertainties and Actions Group Discussion
3:50	Information Sharing Needs Breakout Discussion
4:35	Information Sharing Needs Group Discussion
4:55	Closing Remarks

Figure D-1. Gulf Coastal Carbon Working Group February 19, 2024 in-person meeting agenda.

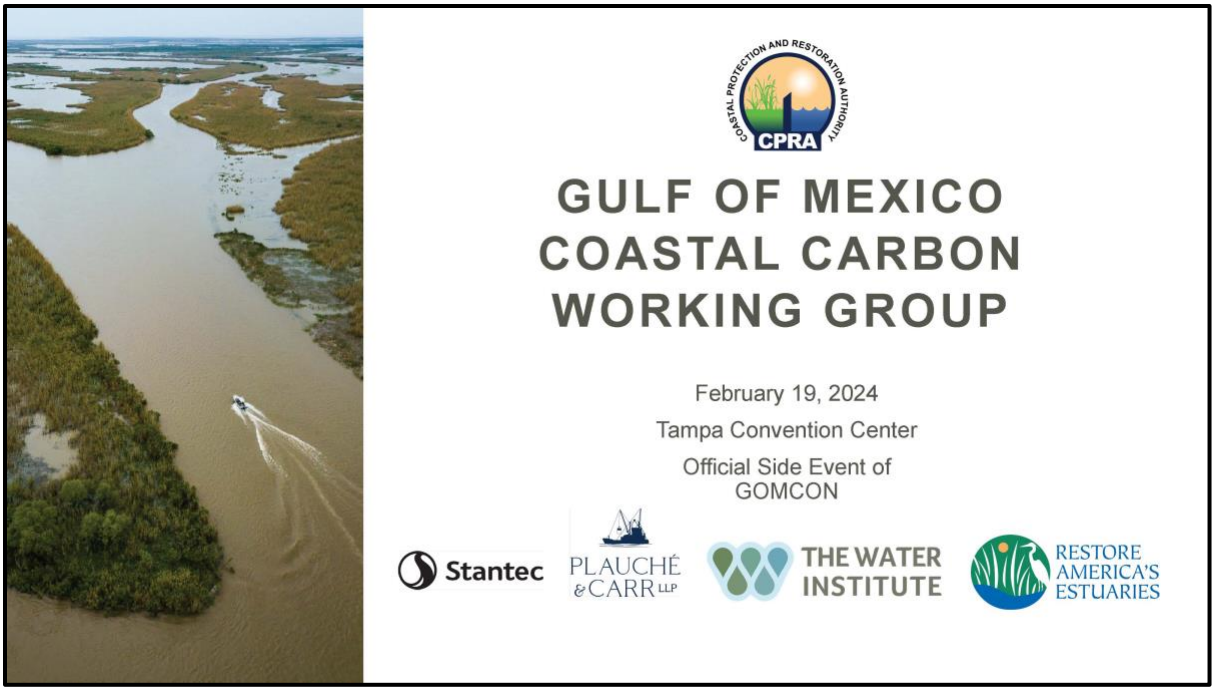
D.2 FEBRUARY 19, 2024 MEETING REGISTRANTS

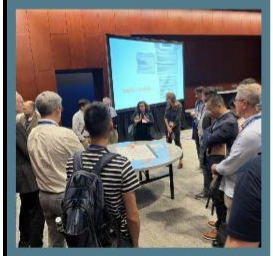
Table D-1. List of people signed in for the Gulf Coastal Carbon Working Group February 19, 2024 meeting.

Name	Email	Affiliation
Mike Biros	michael.biros@crcl.org	NGO
Byron Burrows	btburrows@tecoenergy.com	Private
David Buzan	david.buzan@freese.com	Consultant
Amanda Carr	amanda@plauchecarr.com	Plauche & Carr
Tim Carruthers	tcarruthers@thewaterinstitute.org	TWI
Ashley Cobb	Ashley.cobb@la.gov	CPRA
Jean Cowan	jcowan@thewaterinstitute.org	TWI
Sarah Damron	sdamron@surfider.org	NGO
Bessie Daschbach	bdaschbach@hinshawlaw.com	Private
Shubham Datta	shubham.datta@audubon.org	NGO
Alyssa Dausman	adausman@thewaterinstitute.org	TWI
Daniel Dehon	danield@fenstermaker.com	Consultant
Jeff Denham	Jeff@wilcomfg.com	Consultant
Christopher Esposito	cesposito@thewaterinstitute.org	TWI
Michelle Felterman	michelle.felterman@la.gov	CPRA
Sarah Frantz	education.manager@artistboat.org	NGO
Tiffany Hammond	Tiffany.Hammond@exxonmobil.com	Private
Mohamed Hassan	mhassa9@lsu.edu	LSU
Jessica Henkel	jhenkel@thewaterinstitute.org	TWI
James A. Holmes Jr.	Cleangreentech@protonmail.com	Private
Jennifer Howard	jhoward@conservation.org	NGO
Brittany Jensen	bjensen@thewaterinstitute.org	TWI
Alex Jiles	jilesa@nwf.org	NWF
Syed Khalil	syed.khalil@la.gov	CPRA
Robert Lane	rlane@comiteres.com	Consultant
Julien Lartigue	julien.lartigue@noaa.gov	NOAA
Brian Lezina	brian.lezina@la.gov	CPRA
Skylar Liner	Skylar.Liner@la.gov	CPRA
Heather Maggio	heather.maggio@tampagov.net	Government
Amanda Moore	moorea@nwf.org	NWF
Juan Moya	juan.moya@stantec.com	Consultant
Ryan Moyer	ryan.moyer@terracarbon.com	Consultant
Charlotte Nash	charlotte.nash@tnc.org	TNC
Ray Newby	ray.newby@txdot.gov	Government
Lydia Olander	Lydia.olander@duke.edu	Duke
Stacy Ortego	stacy@lawildlifefed.org	NGO
Steve Parker	sparker@symbiotic-enterprises.com	Private

Name	Email	Affiliation
Garvin Pittman	gpittman@thewaterinstitute.org	TWI
Julie Pollak	julie.pollak@gmail.com	Private
Lauren Pourciau	lauren.pourciau@la.gov	CPRA
Amanda Richey	amanda.richey@restorethegulf.gov	RESTORE Council
Camila Rimoldi	crimoldiiban2021@fau.edu	FAU
Jonathan Scheibly	jonathan.scheibly@stantec.com	Consultant
Hilary Stevens	hstevens@estuaries.org	RAE
Laura Talbert	ltalbert@thewaterinstitute.org	TWI
Megan Terrell	MEGAN@PLAUCHECARR.COM	Plauche & Carr
Sebastiaan van Dort	sebastiaan.vandort@bsigroup.com	Consultant
Wei Wu	wei.wu@usm.edu	USM

D.3 FEBRUARY 19, 2024 MEETING PRESENTATIONS





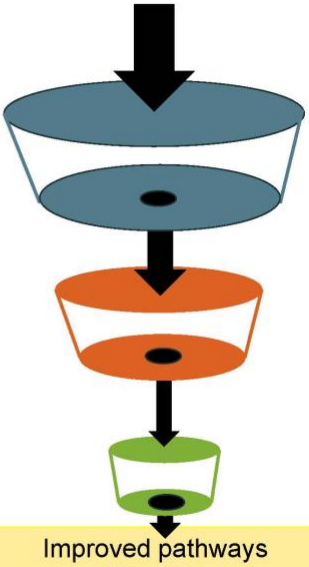
MEETING GOALS

A. Increase understanding of legal and policy opportunities and needs to progress wetland coastal carbon accreditation and marketability

B. Discuss critical uncertainties in science/data to quantify coastal carbon in wetlands to support that legal/policy framework (e.g. accreditation)

C. Advance understanding of information sharing needs and identify on-line databases /tools/needs to track and consider to meet the identified critical needs

D. Continue to build the coastal carbon community to collaboratively support progress towards improving accreditation pathways for coastal carbon in wetlands

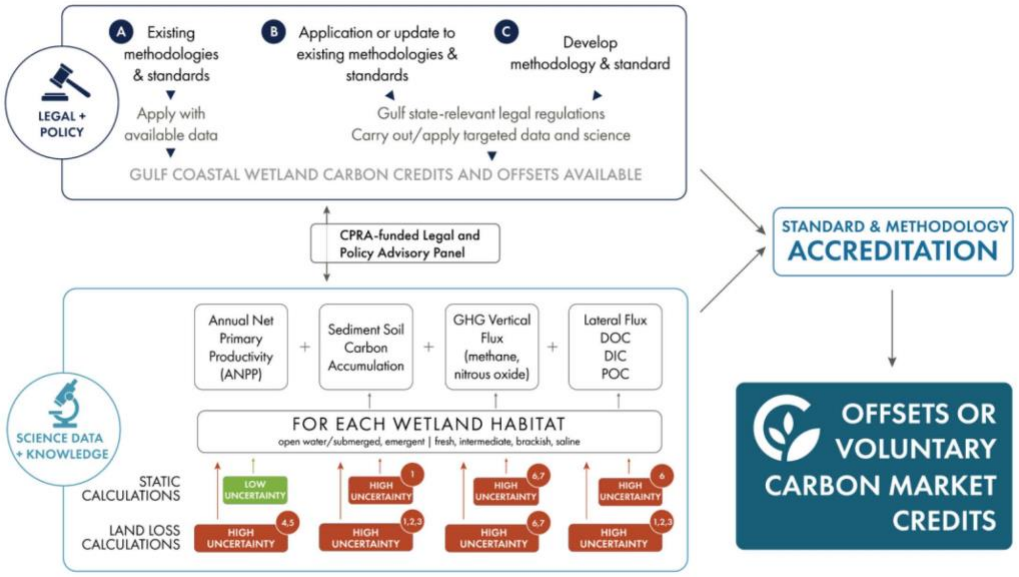


Improved pathways for blue carbon accreditation for tidal wetlands

AGENDA

Time	Topic
1:30	Welcome & Opening Comments
1:40	**Setting the Stage – Pathway to a Voluntary Carbon Market**
1:45	Coastal Carbon Policy & Legal Advisory Panel Discussion
2:20	Coastal Carbon Priority Uncertainties & Actions – Breakout Discussion
3:10	Break
3:30	Coastal Carbon Priority Uncertainties & Actions – Group Discussion
3:50	Working Group Information Sharing Needs – Breakout Discussion
4:35	Working Group Information Sharing Needs – Group Discussion
4:55	Closing Remarks

4



5

AGENDA

Time	Topic
1:30	Welcome & Opening Comments
1:40	Setting the Stage – Pathway to a Voluntary Carbon Market
1:45	**Coastal Carbon Policy & Legal Advisory Panel Discussion**
2:20	Coastal Carbon Priority Uncertainties & Actions – Breakout Discussion
3:10	Break
3:30	Coastal Carbon Priority Uncertainties & Actions – Group Discussion
3:50	Working Group Information Sharing Needs – Breakout Discussion
4:35	Working Group Information Sharing Needs – Group Discussion
4:55	Closing Remarks

6

POLICY AND LEGAL ADVISORY PANELISTS

Bessie Daschbach	Jennifer Howard	Lydia Olander	Ryan Moyer	Sebastiaan Vann Dort
Hinshaw & Culbertson, LLP	Conservation International	Duke University	TerraCarbon	British Standards Institute

7

AGENDA

Time	Topic
1:30	Welcome & Opening Comments
1:40	Setting the Stage – Pathway to a Voluntary Carbon Market
1:45	Coastal Carbon Policy & Legal Advisory Panel Discussion
2:20	**Coastal Carbon Priority Uncertainties & Actions – Breakout Discussion**
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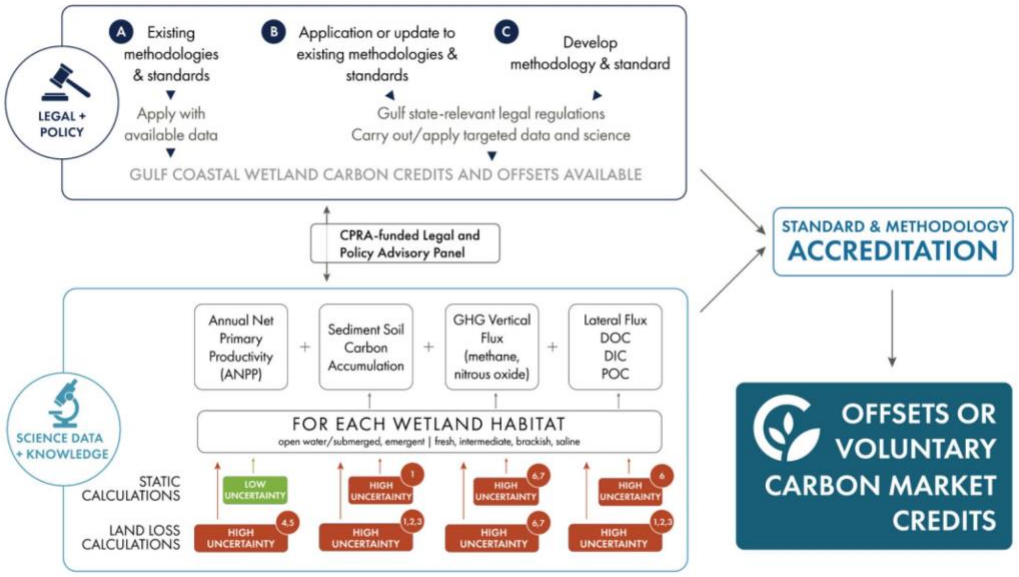
3:30	Coastal Carbon Priority Uncertainties & Actions – Group Discussion
3:50	Working Group Information Sharing Needs – Breakout Discussion
4:35	Working Group Information Sharing Needs – Group Discussion
4:55	Closing Remarks

8



9

CONSIDER PRIORITY NEEDS FROM YOUR PERSPECTIVE!

Student:
Expanding knowledge base

Researcher/Resource Manager:
Exploring/Making connections

Data Manager:
Collecting/building catalogues of resources

Policy Expert:
Planning/designing processes and frameworks

GOALS

- Gather perspectives on priority uncertainties (science/technical/policy)
- Understand relevant work already underway
- Consider priorities we, collectively, should address

10

AGENDA

Time	Topic
1:30	Welcome & Opening Comments
1:40	Setting the Stage – Pathway to a Voluntary Carbon Market
1:45	Coastal Carbon Policy & Legal Advisory Panel Discussion
2:20	Coastal Carbon Priority Uncertainties & Actions – Breakout Discussion
3:10	Break
3:30	Coastal Carbon Priority Uncertainties & Actions – Group Discussion
3:50	**Working Group Information Sharing Needs – Breakout Discussion**
4:35	Working Group Information Sharing Needs – Group Discussion
4:55	Closing Remarks

12

THE WATER INSTITUTE

GULF COASTAL CARBON WORKING GROUP INFORMATION SHARING NEEDS

Brittany Jensen, The Water Institute

PURPOSE

Develop recommendations for the content and format of a Gulf of Mexico Coastal Carbon collaboration space

14

SHAREPOINT SITE

- Created an interim space to start collaborating with other Coastal Carbon enthusiasts
- Additional information about the working group can be found here
- Request access to the temporary collaboration site by sending an email to GCCWG@thewaterinstitute.org.

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WHAT TYPE OF USER ARE YOU?

Researcher/Resource Manager: Exploring/Making connections

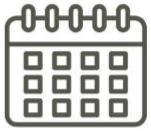
Policy Expert: Planning/designing processes and frameworks

Data Manager: Collecting/building catalogues of resources

Student: Expanding knowledge base

WHAT TYPE OF INFORMATION WOULD YOU WANT TO USE?

Communication & Sharing



Events & Marketing

Resource storage

Science & Policy connections

16

SURVEY RESULTS – DRAFT (WAITING FOR MORE RESPONSES)

Count of Who is the PRIMARY audience for the Working Group collaboration website / tool? (select one) - 12 Responses

17

SURVEY RESULTS - PRIORITIES

- While **data sharing** was ranked highly, **science translation** and providing **actionable information** followed closely behind
- **Funding opportunities** and **project implementation guidance** ranked the highest in terms of specific information, followed closely by **case studies**

18

WHAT TYPE OF USER ARE YOU?

Researcher/Resource Manager: Exploring/Making connections

Policy Expert: Planning/designing processes and frameworks

Data Manager: Collecting/building catalogues of resources

Student: Expanding knowledge base

PURPOSE: Develop recommendations for the content and format of a Gulf of Mexico Coastal Carbon collaboration space

From your perspective:

- 3 biggest information needs
- Potential Opportunities
  - Other platforms for consideration
  - What gaps in sharing opportunities need to be addressed

NEXT STEPS

- This information will be used to develop recommendations on the content and format of a longer-term collaboration space
- Please take the survey (use the QR code below)
- Request access to the temporary SharePoint collaboration site by sending an email to GCCWG@thewaterinstitute.org

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GOMCON SESSION:

COASTAL CARBON UNCERTAINTIES & OPPORTUNITIES

When:

Tuesday 1:30 – 5:00

Where:

Room #123

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COASTAL PROTECTION AND RESTORATION AUTHORITY
CPRA
THANK YOU!
Stantec
PLAUCHÉ & CARR LLP
THE WATER INSTITUTE
RESTORE AMERICA'S ESTUARIES
Email: GCCWG@thewaterinstitute.org

APPENDIX E. NOVEMBER 13, 2024 IN-PERSON MEETING

The November 13, 2024 meeting was held in-person in the Galvez Building in Baton Rouge, Louisiana. The meeting was by invitation only and designed to elicit information from known regional experts on the most critical information gaps, known relevant data, and priority research needs. With that context, participants were able to discuss priority science needs to support Louisiana's investigation of a financially viable coastal carbon market.

Below are the November 13, 2024 preparatory materials including an overview document sent to meeting participants, a questionnaire sent in advance of the meeting and results, the meeting agenda, registrants, and presentations.

E.1 NOVEMBER 13, 2024 COASTAL CARBON WORKING GROUP COASTAL CARBON OVERVIEW

November 2024 Coastal Carbon Working Group Meeting

Coastal Carbon Overview

Coastal carbon is recognized as a potential tool for reducing levels of atmospheric greenhouse gases (GHGs) in a sustainable and long-term way. Coastal wetlands play an important role in the global carbon cycle and have potential to help meet the demand of state, national, and international carbon-neutrality targets, but also have potential to incentivize private investment in coastal restoration through revenue generated from carbon credits. Currently recognized scientific uncertainties are one major barrier to financially viable carbon accreditation of dynamic coastal wetlands. By closing the gaps of scientific uncertainty, it will be possible to better quantify Louisiana's coastal carbon potential and provide input to updated accreditation methods.

The Louisiana Coastal Protection and Restoration Authority (CPRA) is currently investigating the viability and potential opportunity for offset development in the context of integrated coastal protection and restoration project implementation. Project proponents have had limited success in applying existing carbon methodologies and standards to the ecosystem restoration approaches or wetland types of coastal Louisiana. Financial viability will require updates to existing carbon-crediting methodologies, or additional methodologies (and/or standards). Targeted information needs have been identified through past research efforts to address data and knowledge gaps and maximize financial viability of blue carbon crediting to support restoration of Louisiana's wetlands. Figure 1 below shows a summary of CPRA's approach for exploring coastal carbon feasibility.

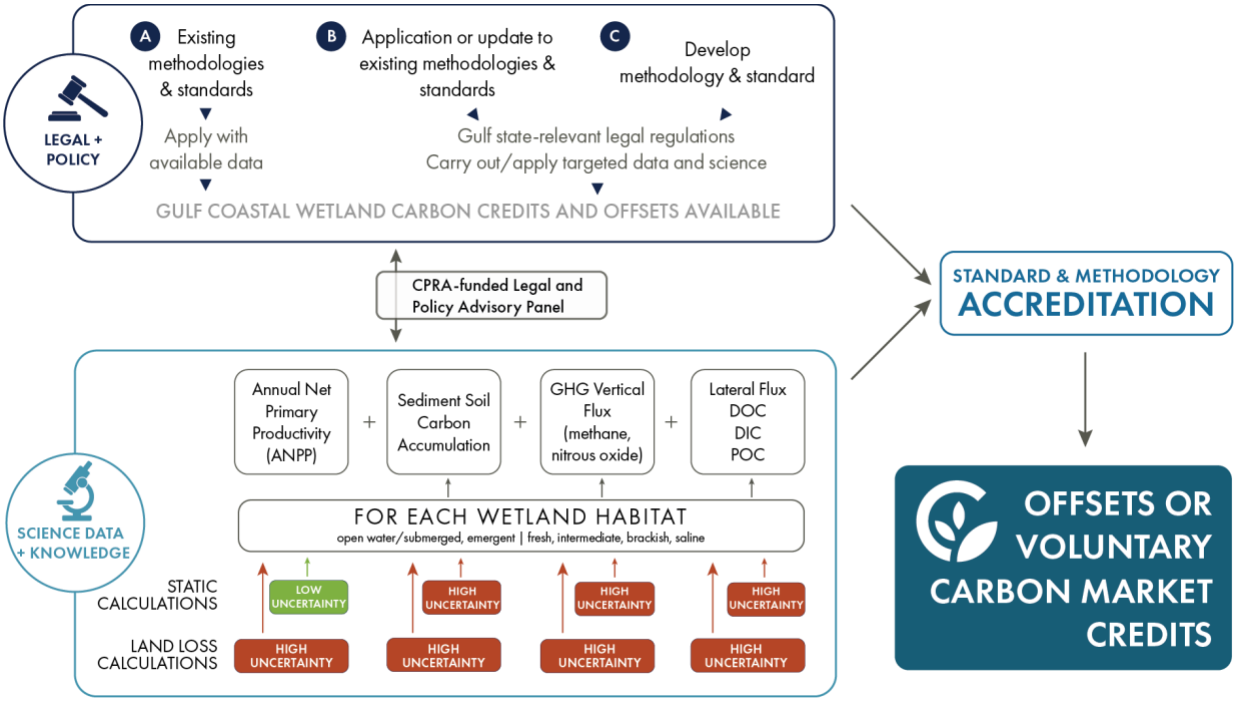


Figure E-1. Overview of legal, policy, and scientific understanding of challenges and opportunities for achieving the goal of a voluntary carbon market.

Earlier work conducted for CPRA identified some of the technical data gaps and uncertainties related to carbon dynamics.

- Carbon dynamics that define Net Ecosystem Carbon Balance (NECB; defined as aboveground net primary production + net soil carbon dynamics + net greenhouse gas emissions) in Louisiana's coastal habitats, including
    - Fresh forested wetlands;
    - Fresh, intermediate, brackish, saline herbaceous marsh;
    - Mangroves;
    - SAV/seagrass;
    - Open water (for all salinity classes); and
    - Oyster reefs.
- Loss of carbon from vegetation and/or sediments & soils during conversion of emergent wetlands to shallow open water.
- The rate at which restored emergent wetlands achieve the NECB of existing habitats.
- Upscaling carbon flux at large spatial scales (e.g., hydrologic basins and watersheds)
- Open water, basin, lake, and channel carbon accumulation rates.
- Proxies and models for greenhouse gas emissions.
- Improved accounting of lateral carbon fluxes.

Figures 2 and 3 below show simplified conceptual models of how the primary processes influence the estimate of NECB. We will provide a suite of similar figures at the November in-person meeting around which we will structure conversations and acknowledge research activities and data availability.

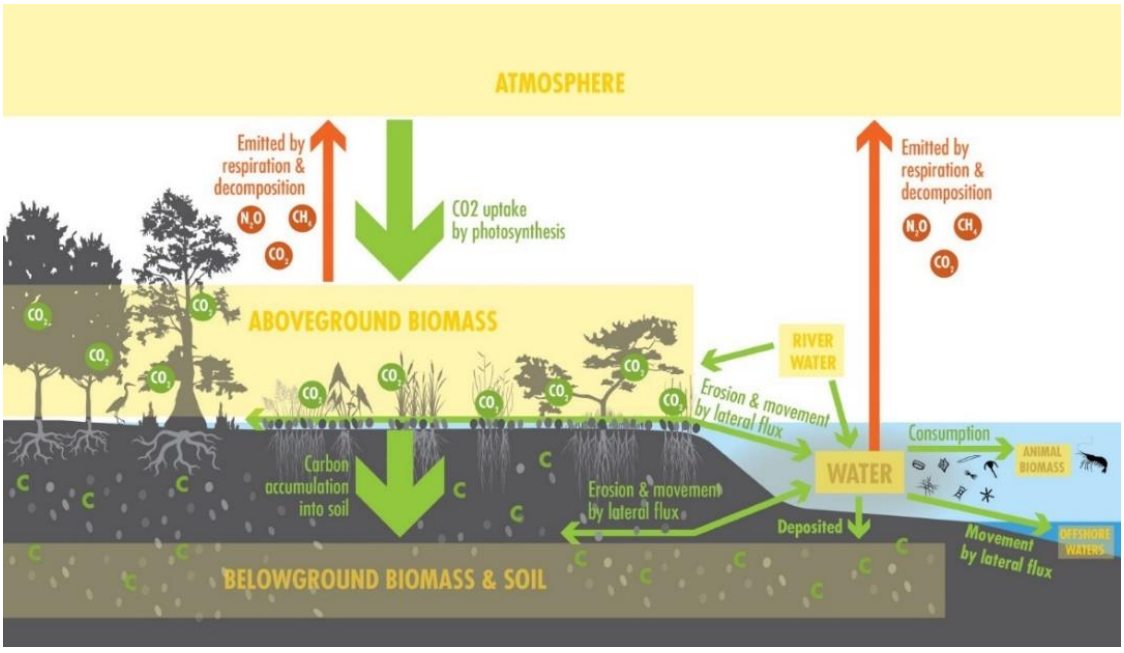


Figure E-2. Conceptual diagram of greenhouse gas cycling in the coastal ecosystem.

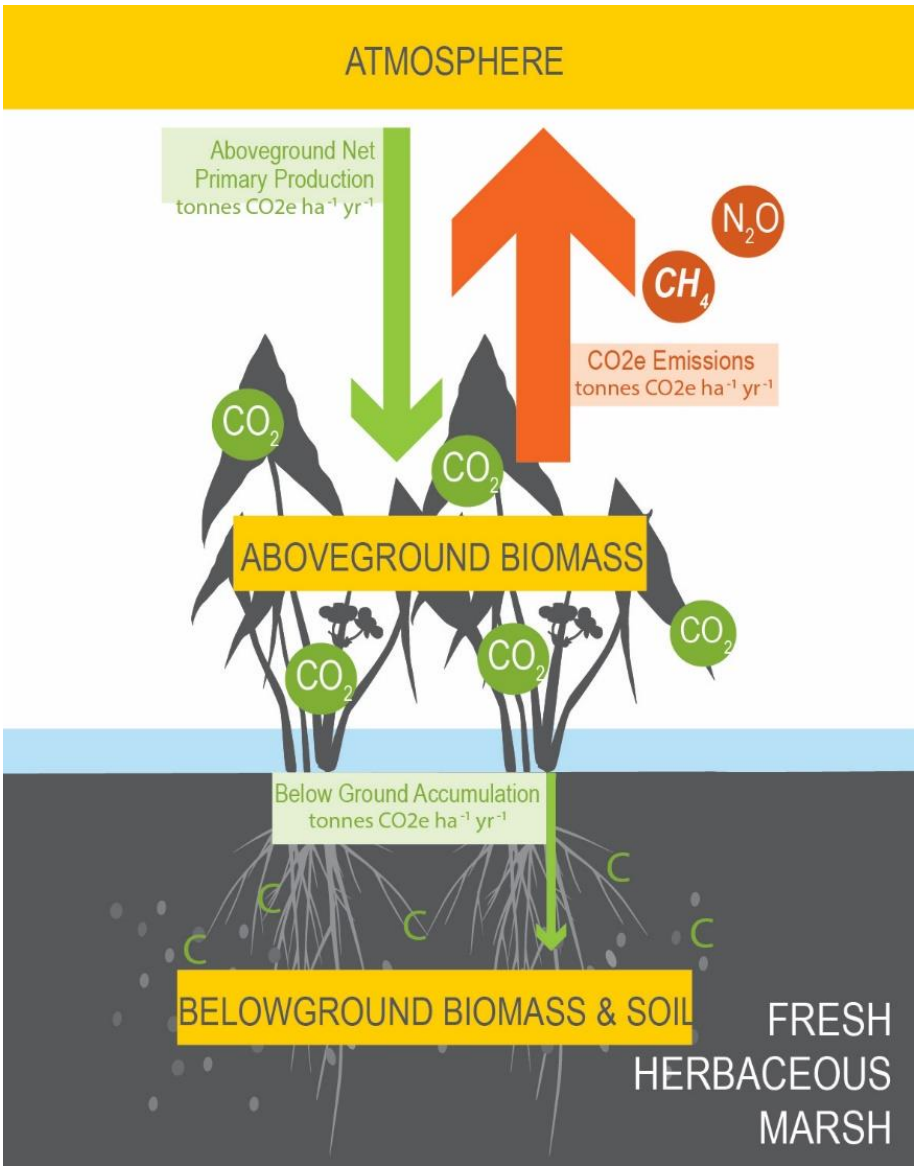


Figure E-3. Conceptual diagram of greenhouse gas cycling in fresh herbaceous marsh habitats.

E.2 NOVEMBER 13, 2024 PRE-MEETING PARTICIPANTS QUESTIONNAIRE

Coastal Carbon Working Group

Louisiana's strong legal, regulatory, and science framework, developed for one of the world's largest coastal wetland systems, provides an opportunity for a programmatic approach to blue carbon accreditation of these ecologically and economically-important coastal wetlands. CPRA is currently investigating the viability and potential opportunity in the context of integrated coastal protection and restoration planning. Prior work suggests that more research will be needed to address data gaps and constrain uncertainties around carbon-relevant processes. This information could decrease the cost of verification, validation and monitoring and additional legal and policy development to update current or generate new market standards and/or methodologies. While our past work has framed initial gaps and uncertainties, we want to make sure that we don't fail to recognize the wide breadth of ongoing research activities and unaccounted-for historical data development.

CPRA is requesting your input and participation! Leading into the Coastal Carbon Working Group in-person meeting on Wednesday November 13, 2024, we are asking you to share details about your research, in particular as it relates to defining carbon benefits of resource management actions and the verification of carbon credits/offsets. The information that you share will help us frame more in-depth discussions during the November 13 meeting.

* Indicates required question

1. What is your name? *

2. What is your affiliation? *

3. What is your email address? *

4. What is your phone number?

5. What is your research/work focus? Primary Carbon research is linked to key uncertainties you can help address. Please check all that apply. *

Check all that apply.

- [ ] Phytoplankton primary productivity
- [ ] Submerged aquatic vegetation primary productivity
- [ ] Emergent wetland plant primary productivity
- [ ] Soil carbon dynamics
- [ ] Greenhouse gas emissions from coastal habitats
- [ ] Other: _____

6. Do you work in Coastal Louisiana? If **Yes,** in **Other,** please specify which coastal hydrologic basin(s) (Pontchartrain, Barataria, Mermentau, etc.). *

Check all that apply.

- [ ] Yes
- [ ] No
- [ ] Other: _____

7. Do you work in the Gulf outside of Louisiana? If **Yes**, in **Other,** please specify where you work. *

Check all that apply.

- [ ] No
- [ ] Other: _____

8. In which of Louisiana's coastal habitats do you work? Please check all that apply. *

Check all that apply.

- [ ] Fresh forested wetlands
- [ ] Fresh herbaceous marsh
- [ ] Intermediate herbaceous marsh
- [ ] Brackish herbaceous marsh
- [ ] Saline herbaceous marsh
- [ ] Mangroves
- [ ] Submerged aquatic vegetation/seagrass
- [ ] Open Water
- [ ] Oyster Reefs
- [ ] Other: _____

9. Please provide links to relevant published research (or citations if not open access)

_____

_____

_____

_____

_____

10. Is your data publicly available? If you selected **Not yet available but plan to make it available,** please specify where and when data will be available in **Other**. *

Check all that apply.

- [ ] Yes
- [ ] No
- [ ] Not yet available but plan to make it available
- [ ] Other: _____

11. If you answered **Yes** to the previous question, please provide link(s) to available data.

12. If there is an associated metadata record (e.g., type(s) of data (metrics); data format), please provide link(s).

13. Additional Information (optional)

E.3 NOVEMBER 13, 2024 PRE-MEETING PARTICIPANTS QUESTIONNAIRE RESPONSES

GCCWG November, 2024 Survey Results

Timestamp	What is your name?	What is your affiliation?	What is your research/work focus? Primary Carbon research is linked to key uncertainties you can help address. Please check all that apply.	Do you work in Coastal Louisiana? If **Yes,** in **Other,** please specify which coastal hydrologic basin(s) (Pontchartrain, Barataria, Mermentau, etc.)	Do you work in the Gulf outside of Louisiana? If **Yes**, in **Other,** please specify where you work.	In which of Louisiana's coastal habitats do you work? Please check all that apply.
10/25/2024 8:27:04	Ioannis Georgiou	The Water Institute	Soil carbon dynamics	Yes	MS, AL, FL, TX	Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves, Submerged aquatic vegetation/seagrass, Open Water, Oyster Reefs
10/25/2024 8:31:57	Andre Rovai	USACE-ERDC	Emergent wetland plant primary productivity, Soil carbon dynamics, Greenhouse gas emissions from coastal habitats	Yes, Atchafalaya, Terrebonne	Galveston TX and Florida (FCE, Sanibel, Rookery Bay)	Fresh herbaceous marsh, Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves
10/25/2024 8:34:08	Natalie Matherne	CPRA	Emergent wetland plant primary productivity, Impacts of SLR and nutrient additions	Yes, Barataria	No	Fresh herbaceous marsh, Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh
10/25/2024 8:50:51	Giulio Mariotti	LSU	Soil carbon dynamics	Yes	No	Fresh herbaceous marsh, Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves, Open Water
10/25/2024 9:29:13	Megan La Peyre	USGS	Submerged aquatic vegetation primary productivity, oyster reefs	Yes	Texas, AL, MS, FL	Submerged aquatic vegetation/seagrass, Oyster Reefs
10/25/2024 15:15:33	Z. George Xue	LSU	carbon modeling	Yes	No	Saline herbaceous marsh, Open Water
10/28/2024 14:14:13	Tracy Quirk	LSU	Emergent wetland plant primary productivity, Soil carbon dynamics	Yes, All	No	Fresh herbaceous marsh, Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves
10/29/2024 12:46:40	Charlotte Nash	The Nature Conservancy	Soil carbon dynamics, Greenhouse gas emissions from coastal habitats	No	Texas coast	Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves, Submerged aquatic vegetation/seagrass
10/31/2024 9:52:52	Rachael Hunter	Comite Resources	Soil carbon dynamics, Greenhouse gas emissions from coastal habitats	Yes, Ponchartrain, Barataria, Mermentau, Calcasiue, Atchafalaya, Terrebonne, Breton Sound, Teche/Vermillion	No	Fresh forested wetlands, Fresh herbaceous marsh, Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves
11/1/2024 11:04:27	Kanchan Maiti	Louisiana State University	Phytoplankton primary productivity, Soil carbon dynamics, Greenhouse gas emissions from coastal habitats, lateral and vertical transport of carbon along land ocean continuum using natural isotope tracers	Yes, Barataria, Wax Lake, Louisiana shelf	Florida coast	Fresh herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Open Water
11/1/2024 17:30:16	Thomas McGinnis	USDA-NRCS	Emergent wetland plant primary productivity, Soil carbon dynamics, I work within CWPPRA and not in primary research	Yes, Coastwide	No	Fresh herbaceous marsh, Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves, Submerged aquatic vegetation/seagrass, Open Water
11/5/2024 6:40:19	Seb van Dort	Panel Member	Standards	No	No	I work in predominantly in the UK - but we have international standards programmes in this area.
11/5/2024 15:36:07	Irv Mendelssohn	Department of Oceanography and Coastal Sciences, Louisiana State University, Professor Emeritus Louisiana State University	Emergent wetland plant primary productivity	Yes	No	Fresh herbaceous marsh, Intermediate herbaceous marsh, Brackish herbaceous marsh, Saline herbaceous marsh, Mangroves

GCCWG November, 2024 Survey Results

<table>
<tr><th>What is your name?</th><th>Please provide links to relevant published research (or citations if not open access)</th><th>Is your data publicly available? If you selected Not yet available but plan to make it available, please specify where and when data will be available in Other.</th><th>If you answered Yes to the previous question, please provide link(s) to available data.</th><th>If there is an associated metadata record (e.g., type(s) of data (metrics); data format), please provide link(s).</th><th>Additional Information (optional)</th></tr>
<tr><td>Ioannis Georgiou</td><td></td><td>Not yet available but plan to make it available</td><td></td><td></td><td></td></tr>
<tr><td>Andre Rovai</td><td>mywux744xhmtcfw8ttlqj3ntr 4hnfyntsxDmdBjs+z xjwByS R Lq| 5FFFFO</td><td>Yes</td><td>https://doi.org/10.3334/ORNLDAAC/2354, https://doi.org/10.25573/serc.21295713.v1, https://doi.org/10.5281/ZENODO.834025, https://doi.org/10.3334/ORNLDAAC/2138, https://doi.org/10.3334/ORNLDAAC/2086, https://doi.org/10.3334/ORNLDAAC/2290, https://doi.org/10.3334/ORNLDAAC/2071, https://doi.org/10.3334/ORNLDAAC/2108, https://doi.org/10.6084/m9.figshare.13570601.v1, https://doi.org/10.5281/zenodo.8414110</td><td>No</td><td></td></tr>
<tr><td>Natalie Matherne</td><td></td><td>Not yet available but plan to make it available</td><td></td><td>N/A</td><td></td></tr>
<tr><td>Giulio Mariotti</td><td>mwux744fxdtuzqx3tsqsjqmfw-3| md-3ntr 4itmk zq465365574qt3669<:</td><td>Yes,</td><td>mwux744fxdtuzqx3tsqsjqmfw-3| md-3ntr 4itmk zq465365574qt3669<:</td><td></td><td>mwux744| | | 3xhnjshjinwjhv3ntr 4xhn jshj4fwdhgj4umX556:<5:6785555 9:</td></tr>
<tr><td>Megan La Peyre</td><td></td><td>Yes, Not yet available but plan to make it available,</td><td>mwux744| | | 3xhnjshjqfxj3t{4hfvfdt14nyjr 4: ==<h6h8j9g57j898>8if=7i</td><td></td><td></td></tr>
<tr><td>Z. George Xue</td><td>Zhang, L.* and Xue, Z., A Numerical Reassessment of the Gulf of Mexico Carbon System in Connection with the Mississippi River and Global Ocean. Biogeosciences. https://doi.org/10.5194/bg-19-4589-2022, 2022</td><td>Not yet available but plan to make it available</td><td>hfwgts3xz3iz</td><td></td><td>carbon.lsu.edu provide realtime 72 hr forecast for carbon condition in the Gulf of Mexico</td></tr>
<tr><td>Tracy Quirk</td><td></td><td>Yes</td><td></td><td></td><td></td></tr>
<tr><td>Charlotte Nash</td><td></td><td>Not yet available but plan to make it available</td><td></td><td></td><td></td></tr>
<tr><td>Rachael Hunter</td><td>https://doi.org/10.1016/j.nbsj.2023.100061
https://doi.org/10.1016/j.ecoleng.2022.106571
https:doi.org/10.1016/j.ecoleng.2023.106922
https://doi.org/10.1016/j.nbsj.2022.100037
https://doi.org/10.3390/w13050642</td><td>No</td><td></td><td></td><td></td></tr>
<tr><td>Kanchan Maiti</td><td>mwux744xhmtcfw8ttlqj3ntr 4hnfvtsxDmdBjs+z xjwB>tIxO5FFFFFO+{nj| dtuBqxyd| twpx+xtw vq~Buzqifyi</td><td>available with publications</td><td></td><td></td><td></td></tr>
<tr><td>Thomas McGinnis</td><td></td><td>Yes, CRMS and CWPPRA data in CIMS</td><td></td><td>Yes</td><td>I have worked within CWPPRA and CRMS. All of my reports and data that I used are within CIMS</td></tr>
<tr><td>Seb van Dort</td><td></td><td>No</td><td></td><td></td><td></td></tr>
<tr><td>Irv Mendelssohn</td><td>mwux744| | | 3wixjfwhmlfvi3zjv4uwtkmj4W{ml2 R jsijqxtms</td><td>No</td><td></td><td></td><td></td></tr>
</table>

E.4 NOVEMBER 13, 2024 MEETING AGENDA

GULF OF MEXICO COASTAL CARBON WORKING GROUP

November 13, 2024 / 9:00 – 1:00

Galvez Building

Oliver Pollock Room

Baton Rouge, LA

Objectives

- Reengage regional experts to support Louisiana's investigation of the feasibility of creating a financially viable coastal carbon market.
- Discuss critical technical uncertainties and research priorities.
- Discuss and prioritize existing and pending research that address critical uncertainties.
- Continue to build a collaborative coastal carbon community.

Agenda (Times are approximate)

Time	Topic
9:00	Welcome & Opening Comments
9:15	Coastal Carbon Policy and Legal Advisory Panel Discussion
9:50	Setting the Stage – Quantifying Spatial and Temporal Coastal Carbon Uncertainty
10:10	Coastal Carbon Priority Uncertainties and Actions Breakout Discussion
11:05	Break
11:20	Priority Uncertainties and Actions Group Discussion
11:40	Information Sharing Needs Breakout & Group Discussion
12:50	Closing Remarks

Figure E-4. Gulf Coastal Carbon Working Group November 13, 2024 in-person meeting agenda

E.5 NOVEMBER 13, 2024 IN-PERSON MEETING REGISTRANTS

Table E-1. List of people signed in for the Gulf Coastal Carbon Working Group November 13, 2024 meeting.

Name	Email	Affiliation
Valerie Black	vblack@thewaterinstitute.org	TWI
Tim Carruthers	Tcarruthers@thewaterinstitute.org	TWI
Jean Cowan	jcowan@thewaterinstitute.org	TWI
Lindsey Dettwiller	lindsey.dettwiller@selu.edu	SELU
Shawn Doyle	Sdoyle@thewaterinstitute.org	TWI
Todd Folse	Todd.folse@la.gov	CPRA
Dan Friess	Dfriess@tulane.edu	Tulane University
Ioannis Georgiou	igeorgiou@thewaterinstitute.org	TWI
Greg Grandy	gregory.grandy@la.gov	CPRA
Jessica Henkel	Jhenkel@thewaterinstitute.org	TWI
Jennifer Howard	jhoward@conservation.org	Conservation International
Rachael Hunter	rhunter@comiteres.com	Comite Resources
Beaux Jones	Bjones@thewaterinstitute.org	TWI
Erin Kiskaddon	Ekiskaddon@thewaterinstitute.org	TWI
Rob Lane	Rlane@Comiteres.com	Comite Resources
Skylar Liner	skylar.liner@gmail.com	CPRA
Giulio Mariotti	gmariotti@lsu.edu	LSU
Natalie Matherne	natalie.matherne@la.gov	CPRA
Thomas McGinnis	thomas.mcginnis2@usda.gov	USDA/NRCS
Irv Mendelssohn	imendel@lsu.edu	LSU
Mike Miner	mminer@thewaterinstitute.org	TWI
Ryan Moyer	ryan.moyer@terracarbon.com	TerraCarbon
Charlotte Nash	charlotte.nash@tnc.org	TNC
James Pahl	james.pahl@la.gov	CPRA
Amber Peterson	amber.peterson@selu.edu	SELU
Sherry Pinell	SherryP_Elect@chitimacha.gov	Chitimacha Tribe Election Board
Garvin Pittman	gpittman@thewaterinstitute.org	TWI
Brendan Player	Brendan.Player@Stantec.com	Stantec
Brian Roberts	broberts@lumcon.edu	LUMCON
Andre Rovai	andre.s.rovai@usace.dren.mil	ERDC
Ryan Seidemann	rseidemann@thewaterinstitute.org	TWI
Gary Shaffer	gary.shaffer@southeastern.edu	SELU
Leigh Anne Sharp	leighanne.sharp@la.gov	CPRA
Havalend Steinmuller	hsteinmuller@lumcon.edu	LUMCON
Hilary Stevens	Hstevens@estuaries.org	RAE
Seb VanDort	Sebastiaan.VanDort@bsigroup.com	BSI
Jorge Villa	jorge.villa@louisiana.edu	ULL
Charles Wallace	cwallace@thewaterinsititute.org	GRP/TWI
George Xue	zxue@lsu.edu	LSU
Xiaochen Zhao	xzhao24@lsu.edu	LSU

E.6 NOVEMBER 13, 2024 MEETING PRESENTATIONS

GULF OF MEXICO COASTAL CARBON WORKING GROUP

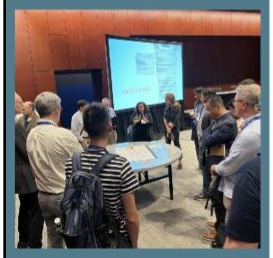
November 13, 2024
Baton Rouge, LA

Stantec THE WATER INSTITUTE RESTORE AMERICA'S ESTUARIES

AGENDA

Time	Topic
9:00	**Welcome & Opening Comments**
9:15	Coastal Carbon Policy & Legal Advisory Panel Discussion
9:50	Setting the Stage – Quantifying Spatial and Temporal Coastal Carbon Uncertainty
10:10	Coastal Carbon Priority Uncertainties & Actions – Breakout Discussion
11:05	Break
11:20	Coastal Carbon Priority Uncertainties & Actions – Group Discussion
11:40	Future Research Needs– Breakout & Group Discussion
12:50	Closing Remarks

2



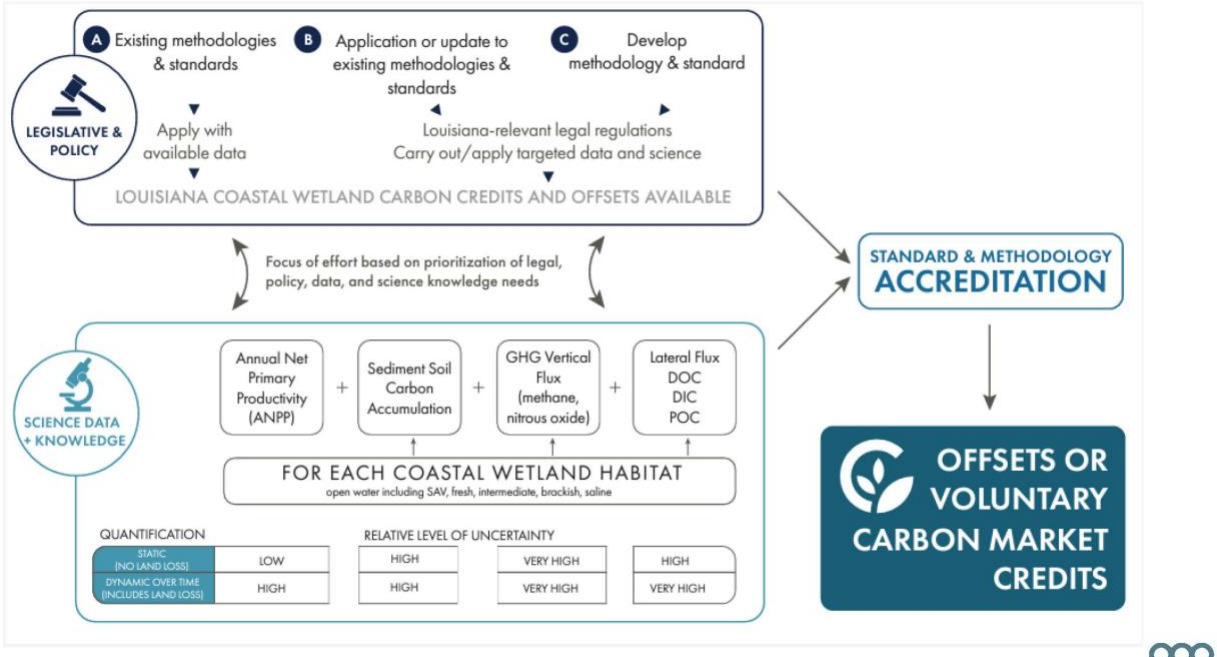
MEETING GOALS

A. Re-engage regional experts to support Louisiana's investigation of the feasibility of creating a financially viable coastal carbon market

B. Discuss critical technical uncertainties and research priorities

C. Discuss and prioritize existing and pending research that address critical uncertainties

D. Continue to build a collaborative coastal carbon community



4

CPRA Considerations for Coastal Carbon

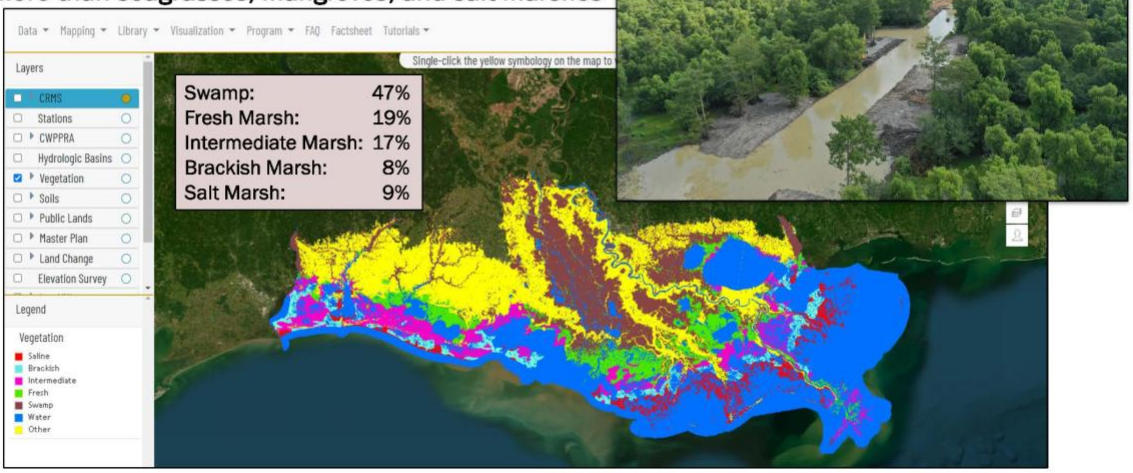
In a nutshell …

Is it feasible for estimates of net coastal carbon benefits from restoration and risk-reduction projects in Louisiana to be submitted to existing carbon-crediting accreditation frameworks to generate and trade carbon credits?

CPRA Considerations for Coastal Carbon

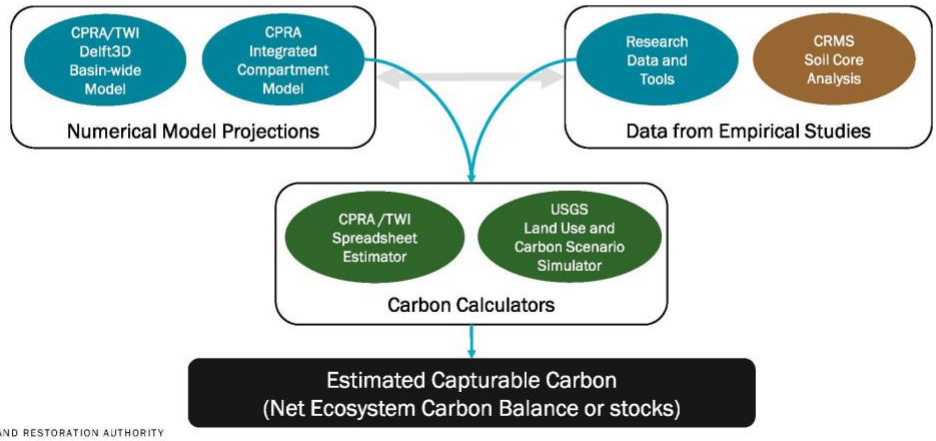
Terminology: Why "Coastal Carbon"?

- More than seagrasses, mangroves, and salt marshes



CPRA's Coastal Carbon Activities

Science-based Estimates of Carbon Benefits of Project Implementation

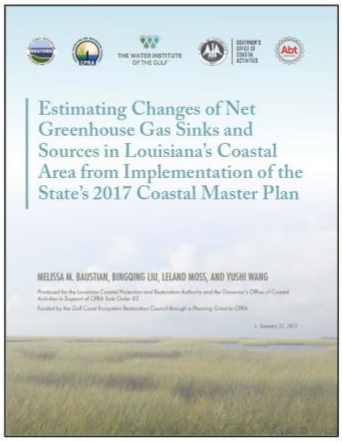


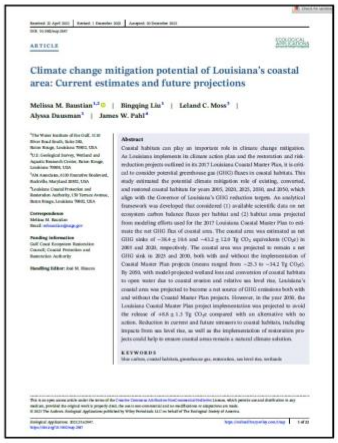
CPRA's Coastal Carbon Activities

Potential Contribution of 2017 Master Plan Projects

Activities

- Literature-driven **algorithms of net ecosystem carbon balance** of Louisiana coastal habitats
- Quantify projected change in habitat extent from **2017 Master Plan Integrated Compartment Model outputs**
- In-process peer review
- Develop **spreadsheet-based estimations** of net carbon emissions
- Publish an open-source, peer-reviewed journal article



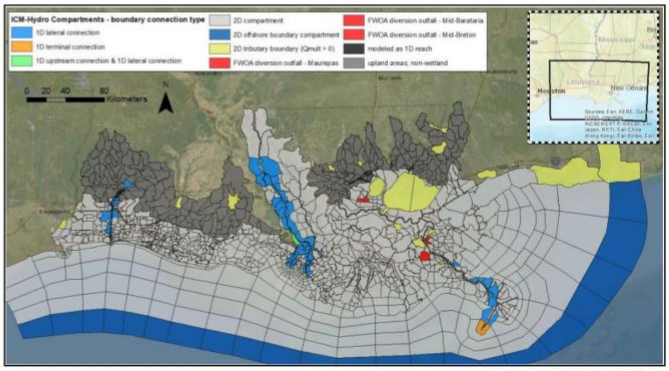


CPRA's Coastal Carbon Activities

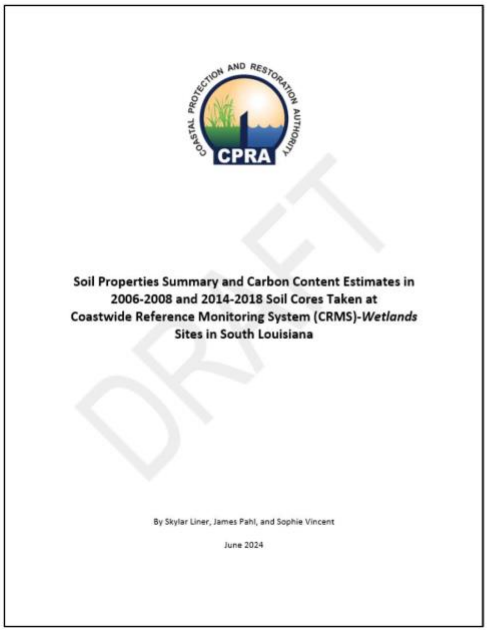
Science-based Estimates of Carbon Benefits of Project Implementation

Building Carbon-related Analyses into CPRA's Coastal Master Plan Model Suite

- Refine Baustian et al. (2022) algorithms for Integrated Compartment Model
- Use Integrated Compartment Model to directly project year-by-year net carbon flux and changes to carbon stocks
- Include estimated construction-related carbon emissions for restoration and risk-reduction projects



Reed and White (2023)



COASTAL PROTECTION AND RESTORATION AUTHORITY

Soil Properties Summary and Carbon Content Estimates in 2006-2008 and 2014-2018 Soil Cores Taken at Coastwide Reference Monitoring System (CRMS)-*Wetlands* Sites in South Louisiana

By Skylar Liner, James Pahl, and Sophie Vincent

June 2024

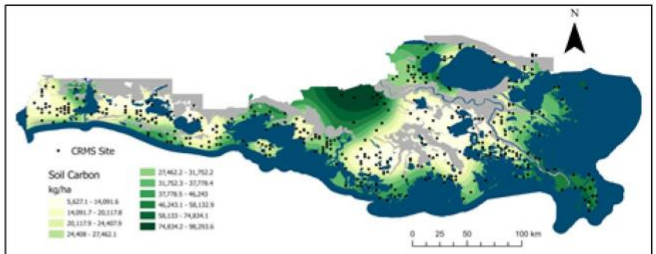


Figure 14. Spatial interpolation of estimated soil surface (24 cm) carbon density (kg/ha) using CRMS reference points (black dots) across the coastal study area. Upland areas and areas behind levee systems (gray) are excluded from the interpolation. Values are represented on a continuous scale where higher density is represented by darker color.

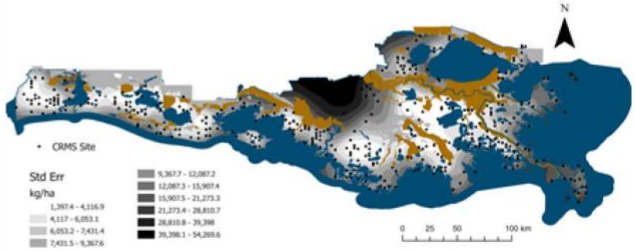
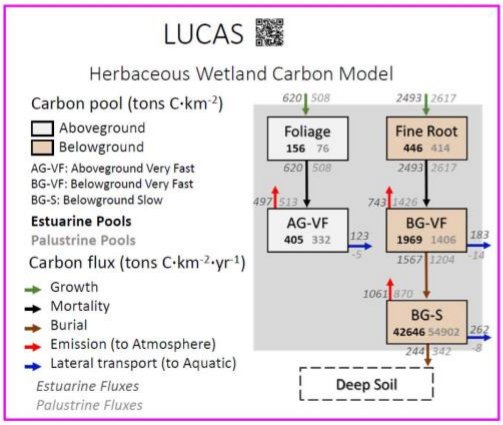


Figure 15. Standard error of the spatial interpolation analysis of estimated soil surface (24 cm) carbon density using CRMS reference points (black dots) across the coastal study area. Upland areas and areas behind levee systems (brown) are excluded from the interpolation. Values are represented on a continuous scale where higher density is represented by darker color.

CPRA's Coastal Carbon Activities

Science-based Estimates of Carbon Benefits of Project Implementation



Coastal Carbon Benefits Estimations

Estimating Mid-Barataria Sediment Diversion Benefits

Activities

- Estimate carbon stocks in
  - vegetation and
  - soils

  from Basin-wide Delft3D Model-based alternatives analyses studied for the Mid-Barataria Sediment Diversion (BA-0153)
- Include calculations of estimated change in stocks for all scenarios for 2020-2070

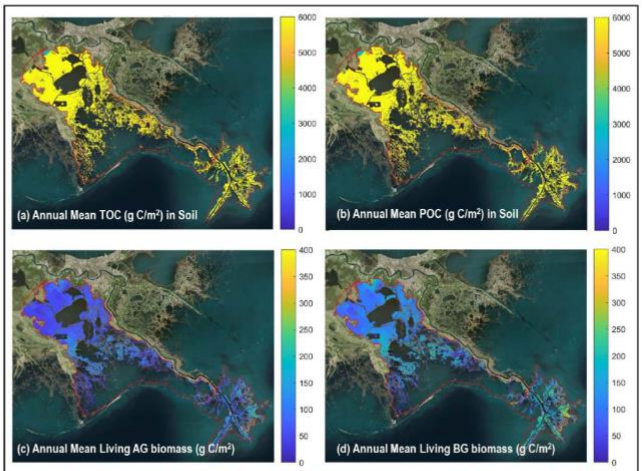


Figure 4. Annual mean TOC (a), POC (b), AG biomass (c), and BG biomass (d) for NAA in 2020. Red lines indicate the polygons representing Barataria Basin and the Mississippi River (MR) Delta.

Coastal Carbon Benefits Estimations

Estimating Mid-Barataria Sediment Diversion Benefits

Key Findings

- With Project, Barataria and full Area of Analysis projected to have more total carbon stocks at both 2050 and 2070 than the No Action Alternative

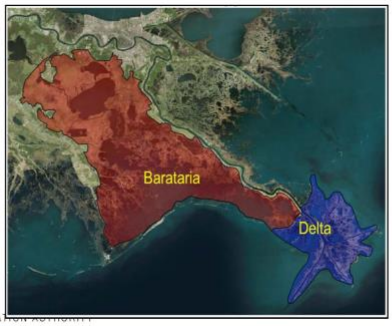


Table 2. Carbon storage changes relative to NAA within the Barataria Basin, Mississippi River Delta, and Area of Analysis (AOA).

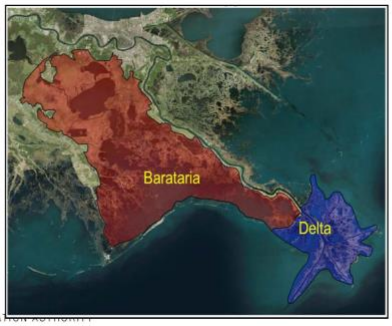
	Year	NAA Total Carbon (metric tonnes C)	Change from NAA Total Carbon (metric tonnes C)	Percent (%) Change from NAA Total Carbon
			FWP-75K	FWP-75K
Barataria Basin (BA)	2020	8,395,434	194,305	2.3%
	2030	7,514,098	504,736	6.7%
	2040	6,239,930	589,473	9.4%
	2050	4,622,717	622,496	13.5%
	2060	2,818,573	523,335	18.6%
	2070	1,233,372	243,032	19.7%
Mississippi River Delta (MRD)	2020	1,696,852	-1,658	-0.1%
	2030	1,007,878	-150,142	-14.9%
	2040	512,279	-22,840	-4.5%
	2050	288,863	-968	-0.3%
	2060	159,323	-12,799	-8.0%
	2070	84,774	-70,180	-82.8%
AOA (BA+MRD)	2020	10,092,285	192,647	1.9%
	2030	8,521,977	354,594	4.2%
	2040	6,752,210	566,633	8.4%
	2050	4,911,580	621,527	12.7%
	2060	2,977,897	510,536	17.1%
	2070	1,318,146	172,852	13.1%

Coastal Carbon Benefits Estimations

Estimating Mid-Barataria Sediment Diversion Benefits

Key Findings

- With Project, Barataria and full Area of Analysis projected to have more total carbon stocks at both 2050 and 2070 than the No Action alternative
- Projected that carbon stocks under all scenarios would peak in 2040/2050, then decline through 2070



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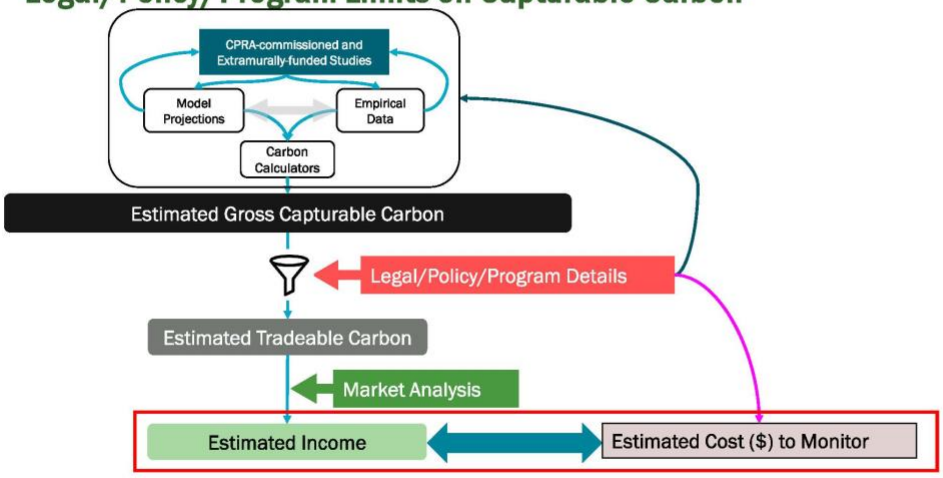
CPRA's Coastal Carbon Activities

Legal/Policy/Program Limits on Capturable Carbon



CPRA Coordination with External Partners

- Louisiana Division of Administration is implementing some priority actions from the 2022 Climate Action Plan
- Restore America's Estuaries National Blue Carbon Working Group provides access to experience of other coastal states implementing carbon-relevant policies and exposes CPRA staff to updated data and tools relevant to Louisiana resources
- Texas General Land Office and The Nature Conservancy – Texas are discussing data, tools, and experience with TGLO and TNC-TX carbon investigations
- US Natural Resources Conservation Service has proposed collecting 2-meter soil cores at all CRMS-Wetlands sites for the national Coastal Zone Soil Survey program
- American Shore and Beach Preservation Association is working with CPRA to determine appropriate coastal carbon activities to conduct

How to leverage other existing carbon science/policy investigations?

Next Steps: Data Sharing

	A	B
1	**Louisiana Coastal Protection and Restoration Authority**	
2	**LA-0341 Coastal Carbon Program**	
3	**Louisiana-specific Data Supporting Habitat-Class Carbon Balance Estimations**	
4	**Table of Contents**	
5		
6	Tab	Contents
7		
8	NPP-FFW	Net (aboveground) Primary Productivity data for Fresh Forested Wetlands (swamps)
9	NPP-FHW	Net (aboveground) Primary Productivity data for Fresh Herbaceous Wetlands (marshes)
10	NPP-IHW	Net (aboveground) Primary Productivity data for Intermediate Herbaceous Wetlands (marshes)
11	NPP-BHW	Net (aboveground) Primary Productivity data for Brackish Herbaceous Wetlands (marshes)
12	NPP-SEW	Net (aboveground) Primary Productivity data for Saline Emergent Wetlands (salt marsh and mangroves)
13	NPP-OW	Net Primary Productivity (phytoplankton) data for Open Water ecosystems
14	NPP-SAV	Net (aboveground) Primary Productivity data for Seagrass and Submerged Aquatic Vegetation
15		
16	S&S-FFW	Net Soils & Sediments carbon flux data for Fresh Forested Wetlands (swamps)
17	S&S-FHW	Net Soils & Sediments carbon flux data for Fresh Herbaceous Wetlands (marshes)
18	S&S-IHW	Net Soils & Sediments carbon flux data for Intermediate Herbaceous Wetlands (marshes)
19	S&S-BHW	Net Soils & Sediments carbon flux data for Brackish Herbaceous Wetlands (marshes)
20	S&S-SEW	Net Soils & Sediments carbon flux data for Saline Emergent Wetlands (salt marshes and mangroves)
21	S&S-OW	Net Soils & Sediments carbon flux data for Open Water ecosystems
22	S&S-SAV	Net Soils & Sediments carbon flux data for Seagrass and Submerged Aquatic Vegetation
23		
24	GHG-FFW	Net Greenhouse Gas emissions data for Fresh Forested Wetlands (swamps)
25	GHG-FHW	Net Greenhouse Gas emissions data for Fresh Herbaceous Wetlands (marshes)
26	GHG-IHW	Net Greenhouse Gas emissions data for Intermediate Herbaceous Wetlands (marshes)
27	GHG-BHW	Net Greenhouse Gas emissions data for Brackish Herbaceous Wetlands (marshes)
28	GHG-SEW	Net Greenhouse Gas emissions data for Saline Emergent Wetlands (salt marsh and mangroves)
29	GHG-F&IOW	Net Greenhouse Gas emissions data for Fresh & Intermediate Open Water
30	GHG-BOW	Net Greenhouse Gas emissions data for Brackish Open Water
31	GHG-SOW	Net Greenhouse Gas emissions data for Saline Open Water
32	GHG-SAV	Net Greenhouse Gas emissions data for Seagrass and Submerged Aquatic Vegetation
33		

	A	B	C	D	E
1	**Louisiana Coastal Protection and Restoration Authority**				
2	**LA-0341 Coastal Carbon Program**				
3	**Louisiana-specific Data Supporting Habitat-Class Carbon Balance Estim**				
4	**Net (aboveground) Primary Productivity (NPP)**				
5	**Brackish Herbaceous Wetlands**				
6					
7	Dominant Vegetation	ANPP		Reference	
8		(g C m^{-2} yr^{-1})	(tonnes CO_2, ha^{-1})		
9	***Louisiana-specific Data***				
10	*Spartina cynosuroides*	609.75	22.38	(Hopkinson et al., 1978)	
11	*Spartina patens*	2719.35	99.8	(Hopkinson et al., 1978)	
12	*Spartina patens*	987.3	36.2	(White et al., 1978)	
13	*Spartina patens*	987.3	36.2	(White et al., 1978)	
14	*Spartina patens*	1871.55	68.69	(Hopkinson et al., 1980)	
15	*Spartina patens*	1558.13	57.18	(Cramer et al., 1981)	
16	*Spartina patens*	1925.78	70.68	(Cramer et al., 1981)	
17	*Spartina patens*	437.6	16	(DeLaune and Smith	
18	*Spartina patens*	1800	66.06	(Sasser & Gosselink,	
19	*Spartina patens*	1793.7	65.83	(Feijtel et al., 1985)	
20	*Spartina patens*	504	18.5	(White & Simmons, 1988)	
21	*Spartina patens*	1654.6	60.7	(Pezeshki & DeLaune,	
22	*Spartina patens*	281.7	10.3	(Nyman et al., 1995)	
23	*Spartina patens*	1514.25	55.57	(Flynn et al., 1999)	
24	*Spartina patens*	575.1	21.11	(Flynn et al., 1999)	
25	*Spartina patens*	521.1	19.12	(Day et al., 2013)	
26	*Spartina patens*	1894	69.5	(Sasser et al., 2018)	
27	*Spartina patens* *Schoenoplectus*	669.15	24.56	(Stagg et al., 2016)	
28	*Spartina patens* *Vigna luteola* *Eleocharis spp.* *Cyperus spp.* *Typha spp.* *Phragmites australis* *Schoenoplectus*	1516.9	55.6	(Sasser et al., 2018)	
29	NAA	1518.7	55.7	(Cardoch et al., 2002)	
30	Summary Statistics				
31	Number of Values	20	20		
32	Mean	1267.0	46.5		
33	Standard Error of the	149.6	5.5		
34	SE as % of Mean	12%	12%		
35	Median	1515.6	55.6		
36	1st Quartile	583.8	21.4		
37	3rd Quartile	1738.4	66.0		
38					
39	***Data from Gulf of Mexico Studies Outside Louisiana***				
40	*Scirpus robustus*	475.2	17.4	(De La Cruz, 1974)	
41	*Spartina cynosuroides*	985.5	36.2	(De La Cruz, 1974)	
42	*Spartina patens*	864.9	31.7	(De La Cruz, 1974)	
43					
44	***Nation-wide data value from USEPA (2021) corresponding to Brackish***				
45	Estuarine Emergent	243.0	8.9		
46					

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POLICY AND LEGAL ADVISORY PANELISTS

Bessie Daschbach	Jennifer Howard	Lydia Olander	Ryan Moyer	Sebastiaan Vann Dort
Adjunct Faculty, Tulane Law School and Tulane Masters of Jurisprudence program	Conservation International	Duke University	TerraCarbon	British Standards Institute

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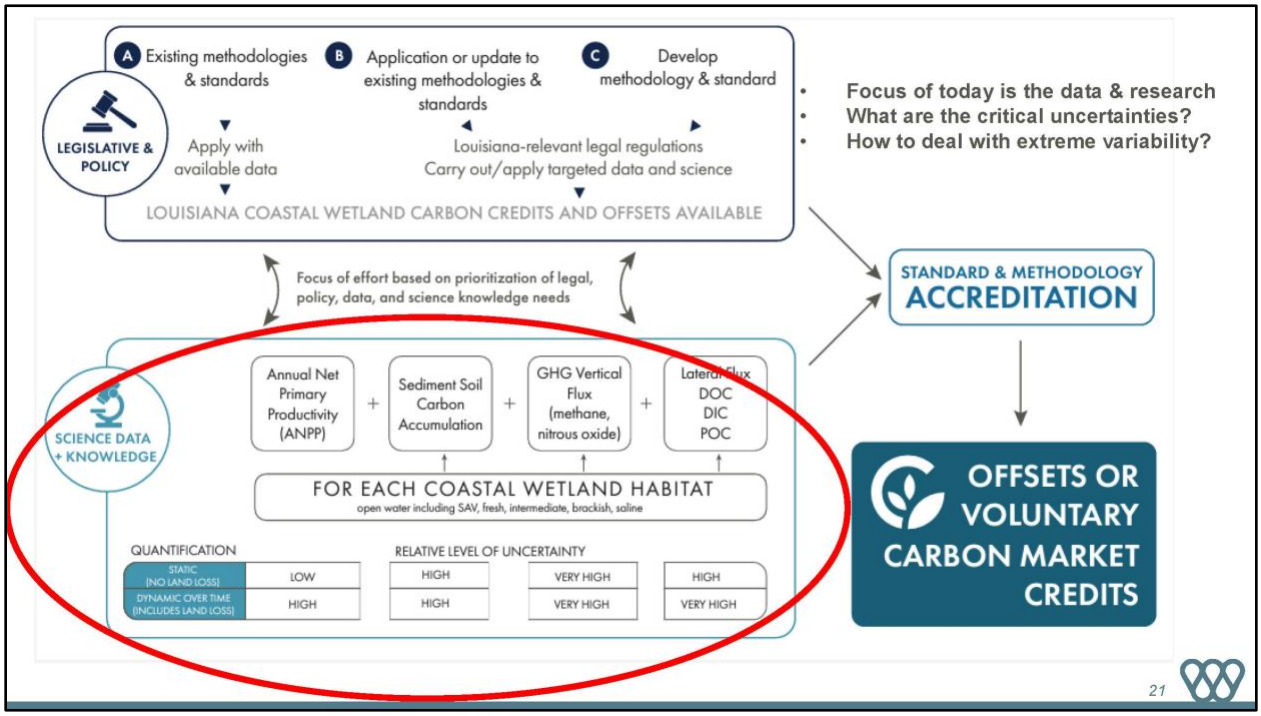
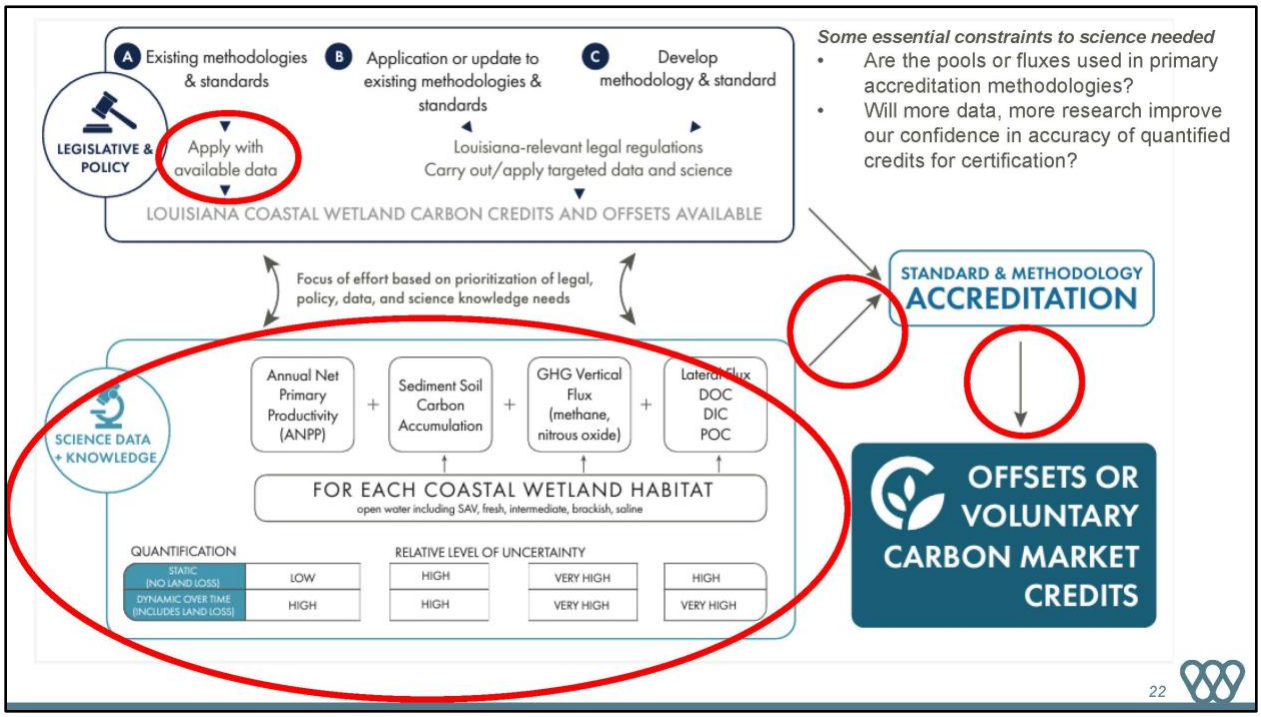

A Existing methodologies & standards
B Application or update to existing methodologies & standards
C Develop methodology & standard
LEGISLATIVE & POLICY
Apply with available data
Louisiana-relevant legal regulations
Carry out/apply targeted data and science
LOUISIANA COASTAL WETLAND CARBON CREDITS AND OFFSETS AVAILABLE
Focus of today is the data & research
What are the critical uncertainties?
How to deal with extreme variability?
Focus of effort based on prioritization of legal, policy, data, and science knowledge needs
STANDARD & METHODOLOGY ACCREDITATION
SCIENCE DATA + KNOWLEDGE
Annual Net Primary Productivity (ANPP)
Sediment Soil Carbon Accumulation
GHG Vertical Flux (methane, nitrous oxide)
Lateral Flux DOC DIC POC
FOR EACH COASTAL WETLAND HABITAT
open water including SAV, fresh, intermediate, brackish, saline
QUANTIFICATION
RELATIVE LEVEL OF UNCERTAINTY
STATIC (NO LAND LOSS)
DYNAMIC OVER TIME (INCLUDES LAND LOSS)
LOW
HIGH
HIGH
HIGH
VERY HIGH
VERY HIGH
HIGH
VERY HIGH
OFFSETS OR VOLUNTARY CARBON MARKET CREDITS
21


A Existing methodologies & standards
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LEGISLATIVE & POLICY
Apply with available data
Louisiana-relevant legal regulations
Carry out/apply targeted data and science
LOUISIANA COASTAL WETLAND CARBON CREDITS AND OFFSETS AVAILABLE
Some essential constraints to science needed
Are the pools or fluxes used in primary accreditation methodologies?
Will more data, more research improve our confidence in accuracy of quantified credits for certification?
Focus of effort based on prioritization of legal, policy, data, and science knowledge needs
STANDARD & METHODOLOGY ACCREDITATION
SCIENCE DATA + KNOWLEDGE
Annual Net Primary Productivity (ANPP)
Sediment Soil Carbon Accumulation
GHG Vertical Flux (methane, nitrous oxide)
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STATIC (NO LAND LOSS)
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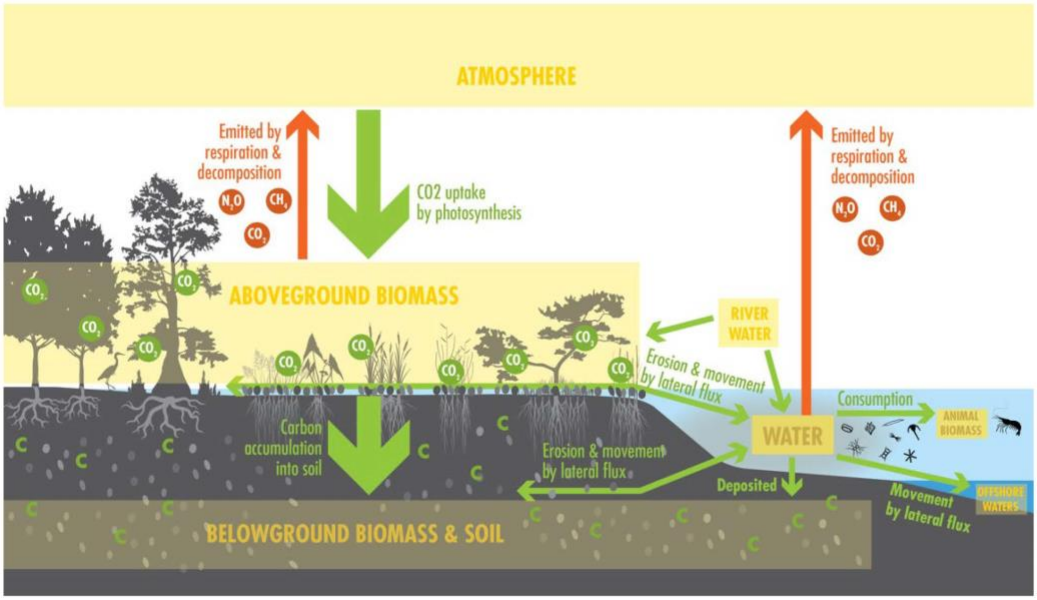
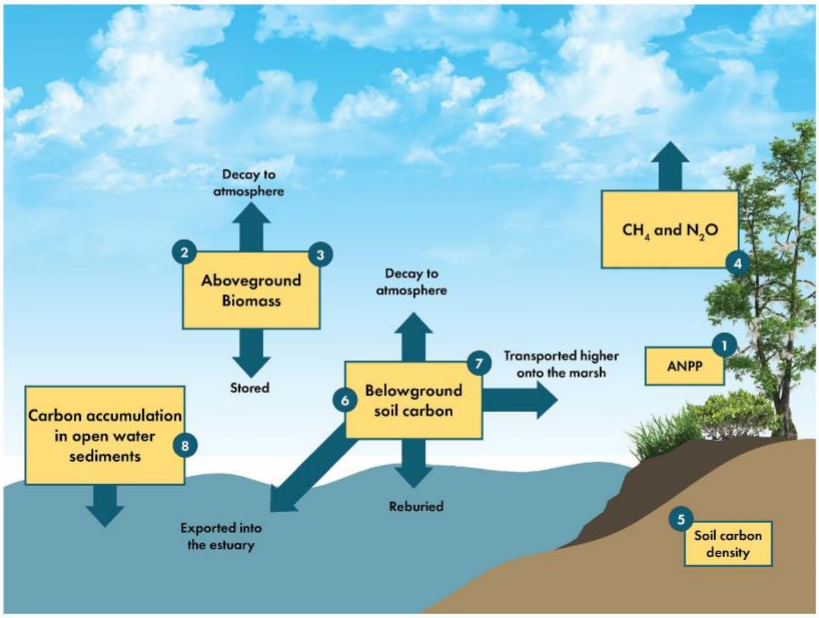
LOW
HIGH
HIGH
HIGH
VERY HIGH
VERY HIGH
HIGH
VERY HIGH
OFFSETS OR VOLUNTARY CARBON MARKET CREDITS
22

CONCEPTUAL SUMMARY OF CARBON FLOWS



23

PRIMARY CARBON POOLS AND FLUXES USED IN NET GHG FLUX CALCULATIONS FOR ACCREDITATION



METRICS USED FOR CERTIFYING CARBON CREDITS

	CRITICAL CARBON METRICS
1	ANPP
2	Herbaceous wetland aboveground biomass loss (%)
3	Woody wetland aboveground biomass loss (%)
4	CH_4 and N_2O fluxes
5	Soil carbon density (g DW C per m_{-3})
6	Herbaceous wetland soil carbon loss (%)
7	Woody wetland soil carbon loss (%)
8	Carbon accumulation in open water sediments

- Multiple options within existing standards for estimating critical carbon metrics for accreditation

VERRA ACR BCarbon Gold Standard

- **Proxies** – expensive and take a lot of primary research
- **Published values** – not at specific project spatial / temporal scales and long lag time from collection to publication
- **Default factors** – highly conservative to avoid double counting
- **Models**
  - Process models limited by the most uncertain variable;
  - Empirical models can be criticized as a 'black box'
- **Field collected data** – often prohibitively expensive
  - E.g. Verra requires 40 years of on-site GHG flux measurements
- **Historical / chronological sequence data** – often limited availability

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HIGH DATA AVAILABILITY: HIGHLY VARIABLE AND REQUIRE PRECISE ESTIMATES AT SMALL SPATIAL SCALES OR SPECIFIC TO ACCREDITATION DEFINITION

	CRITICAL CARBON METRICS	QUESTIONS RELATED TO UNCERTAINTY AND OR VARIABILITY
1	ANPP	How do annual changes in factors such as plant species composition, soil nutrients, temperature, precipitation, and/or extreme weather events influence the amount of atmospheric CO_2 sequestered by aboveground plant growth at multiple spatial and temporal scales?

- Field data summarized by broad wetland type
  - Known high variation within habitats
- Numerical model projections of vegetation type based on empirical model of water temperature, salinity, depth
- Need for increased spatial precision of estimates

5	Soil carbon density (g DW C per m_{-3})	How can integrated depth estimates of soil carbon density be improved at finer spatial scales than can be calculated from available data?

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LOW DATA AVAILABILITY LIMITATION

Herbaceous wetlands

Woody wetlands

2	Herbaceous wetland aboveground biomass loss (%)	What percentage of the aboveground biomass decays to atmospheric CO_2 after conversion to open water?
3	Woody wetland aboveground biomass loss (%)	What percentage of the aboveground biomass decays to atmospheric CO_2 after conversion to open water? What percentage of woody biomass may remain in place as dead trees?

- Percentages of both vegetation carbon biomass and percentage of carbon in top 1 m of soil lost to atmosphere with transition to open water;
  - Currently *default* or based on limited *published data*
- Require quantification and approaches to apply broadly at fine spatial resolution

6	Herbaceous wetland soil carbon loss (%)	When emergent herbaceous wetland converts to open water, what percentage of the carbon stored in the top 1 m of soil decays to atmospheric CO_2?
7	Woody wetland soil carbon loss (%)	When emergent woody wetland converts to open water, what percentage of the carbon stored in the top 1 m of soil decays to atmospheric CO_2?
8	Carbon accumulation in open water sediments	At what rate does carbon accumulate in open water sediments and how does it vary between open bays, semi-enclosed bays, ponds, and tidal creeks?

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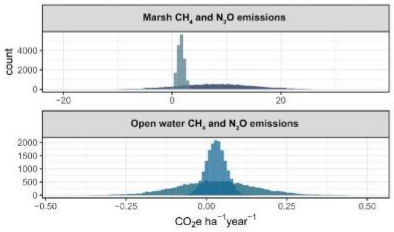
LIMITED UNDERSTANDING OF FUNDAMENTAL CONTROLS AT ALL SPATIAL SCALES, HIGHLY ACCURATE DATA FOR SMALL NUMBER OF LOCATIONS

4	CH_4 and N_2O fluxes	What controls and/or what can support prediction of CH_4 and N_2O emissions? These emissions are highly variable both temporally and spatially across coastal wetland habitats.



- Default factors based on published field measurements
- Salinity a poor predictor of methane release except for very broad ecosystem patterns
- Need for empirical relationships, proxies, based on field measurements to apply broadly at fine spatial resolution

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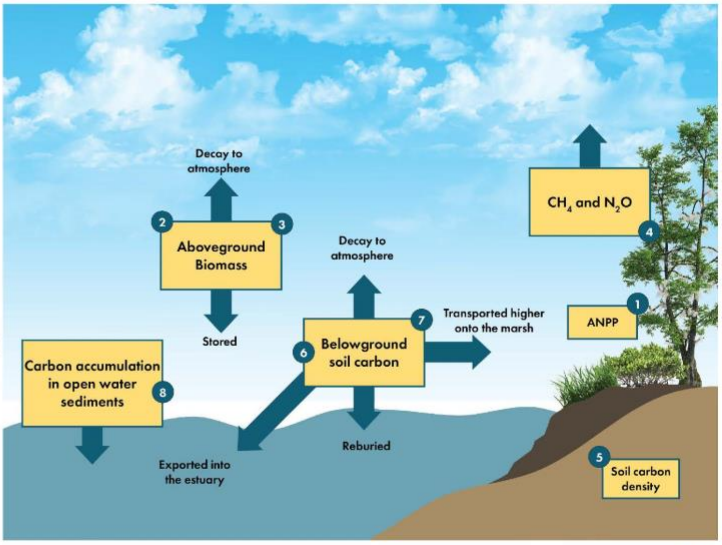
IDENTIFY ADDITIONAL KNOWLEDGE AND DATA, ONGOING WORK AND COST-EFFICIENT OPTIONS TO IMPROVE ESTIMATES

	CRITICAL CARBON METRICS
1	ANPP
2	Herbaceous wetland aboveground biomass loss (%)
3	Woody wetland aboveground biomass loss (%)
4	CH_4 and N_2O fluxes
5	Soil carbon density (g DW C per m_3)
6	Herbaceous wetland soil carbon loss (%)
7	Woody wetland soil carbon loss (%)
8	Carbon accumulation in open water sediments

Options:

- Proxies
- Published values
- Default factors
- Models
- Field collected data
- Historical/ chrono sequence data



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AGENDA

Time	Topic
9:00	Welcome & Opening Comments
9:15	Coastal Carbon Policy & Legal Advisory Panel Discussion
9:50	Setting the Stage – Quantifying Spatial and Temporal Coastal Carbon Uncertainty
10:10	**Coastal Carbon Priority Uncertainties & Actions – Breakout Discussion**
11:05	Break
11:20	Coastal Carbon Priority Uncertainties & Actions – Group Discussion
11:40	Future Research Needs– Breakout & Group Discussion
12:50	Closing Remarks

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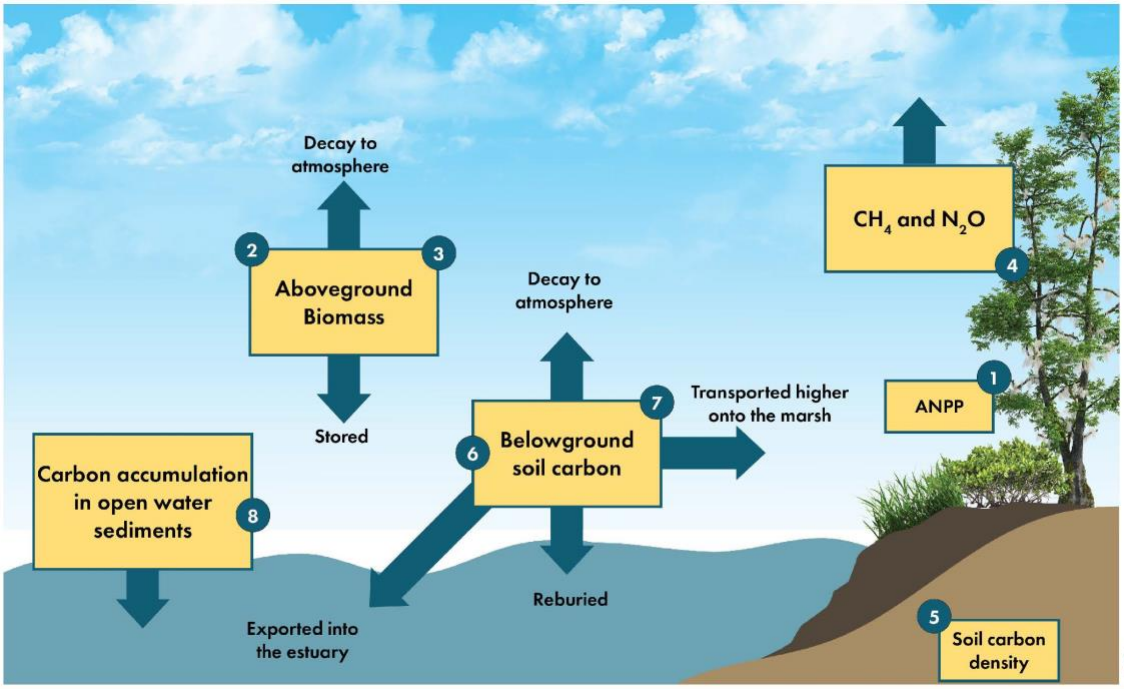

	CRITICAL CARBON METRICS	QUESTIONS RELATED TO UNCERTAINTY AND OR VARIABILITY
1	ANPP	How do annual changes in factors such as plant species composition, soil nutrients, temperature, precipitation, and/or extreme weather events influence the amount of atmospheric CO_2 sequestered by aboveground plant growth at multiple spatial and temporal scales?
2	Herbaceous wetland aboveground biomass loss (%)	What percentage of the aboveground biomass decays to atmospheric CO_2 after conversion to open water?
3	Woody wetland aboveground biomass loss (%)	What percentage of the aboveground biomass decays to atmospheric CO_2 after conversion to open water? What percentage of woody biomass may remain in place as dead trees?
4	CH_4 and N_2O fluxes	What controls and/or what can support prediction of CH_4 and N_2O emissions? These emissions are highly variable both temporally and spatially across coastal wetland habitats.
5	Soil carbon density (g DW C per m_{-3})	How can integrated depth estimates of soil carbon density be improved at finer spatial scales than can be calculated from available data?
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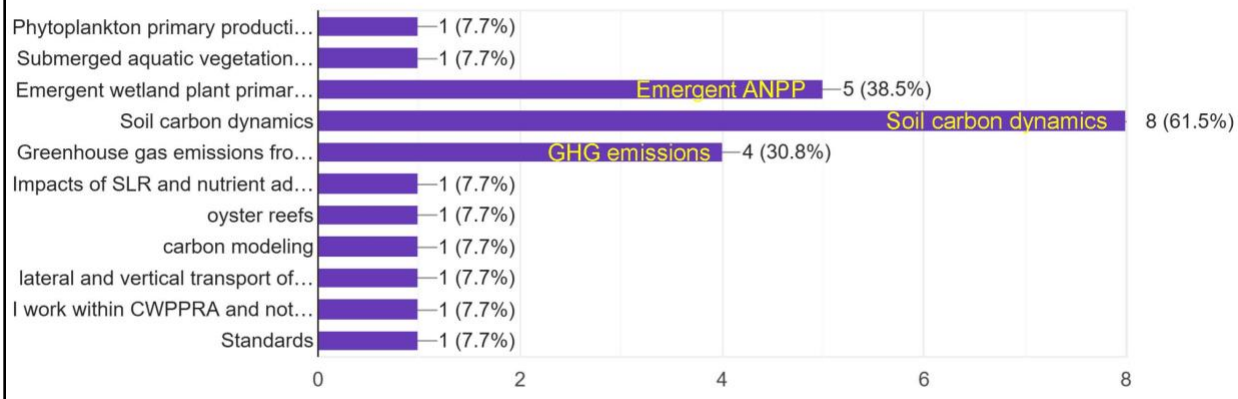
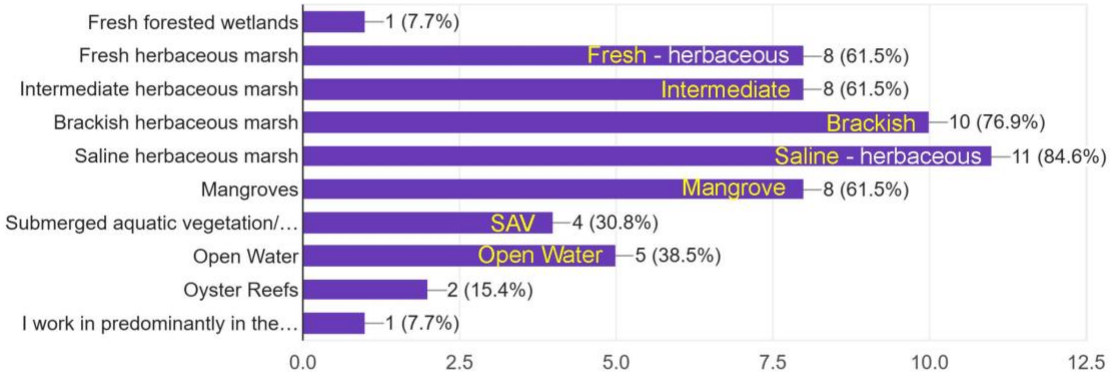
What is your research/work focus? Primary Carbon research is linked to key uncertainties you can help address. Please check all that apply.

13 responses



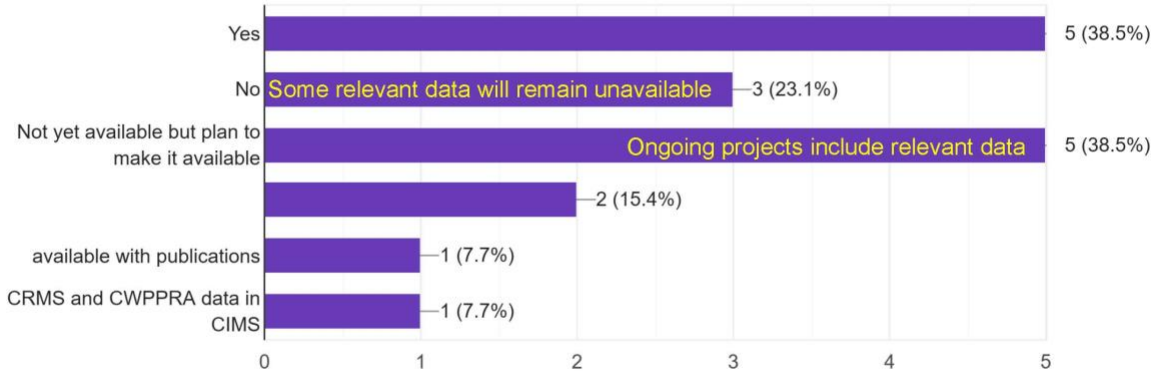
In which of Louisiana's coastal habitats do you work? Please check all that apply.

13 responses



Is your data publicly available? If you selected Not yet available but plan to make it available, please specify where and when data will be available in Other.

13 responses



METRICS USED FOR CERTIFYING CARBON CREDITS

	CRITICAL CARBON METRICS
1	ANPP
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6	Herbaceous wetland soil carbon loss (%)
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8	Carbon accumulation in open water sediments

- Multiple options within existing standards for estimating critical carbon metrics for accreditation

VERRA ACR BCarbon Gold Standard

- **Proxies** – expensive and take a lot of primary research
- **Published values** – not at specific project spatial / temporal scales and long lag time from collection to publication
- **Default factors** – highly conservative to avoid double counting
- **Models**
  - Process models limited by the most uncertain variable;
  - Empirical models can be criticized as a 'black box'
- **Field collected data** – often prohibitively expensive
  - E.g. Verra requires 40 years of on-site GHG flux measurements
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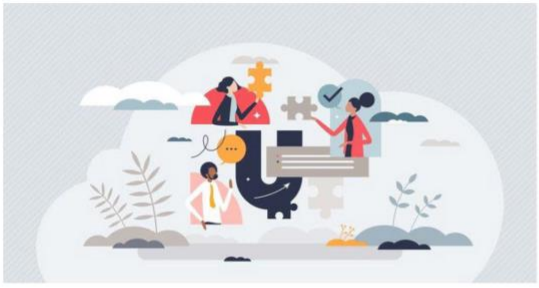
BREAKOUT #2



CONSIDER:

- How to know when the there is enough knowledge for the purposes of accreditation?
- Based upon critical uncertainties/ areas of variability and existing research, what new information is needed?
- What new research is already being planned?
- What are we missing with respect to priorities?

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THANK YOU!

Stantec

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