THE FIRST BLUE CARBON LAW SYMPOSIUM: A THRESHOLD FOR PRACTITIONERS, REGULATORS, AND STAKEHOLDERS

Brita J. Jessen[1]

I. INTRODUCTION

Solutions to current and future impacts of climate change are complex, transdisciplinary, and multi-sector. Social and physical sciences are needed to determine effective and long-term outcomes; regulations and policies depend on accurate interpretation of law and integration of societal values; and ground-level management actions require multi-agency partnerships and combined investments of public and private assets, not to mention support and guidance from the communities that would be impacted. *Coastal natural resources management* therefore exists at the interface of public and private spheres of influence and depends on productive and trust-based relationships among practitioners of science, policy, law, economics, and social justice.

With these intersections in mind, cross-sector partnerships and information-sharing anchored the first **Sea Grant Blue Carbon Law Symposium** (Symposium), hosted by the University of Georgia in May 2023 and cooperatively developed through the University of Georgia's Marine Extension Program, School of Law, Carl Vinson Institute of Government, and South Carolina Sea Grant Consortium. While centered on legal needs and challenges, the Symposium convened multiple sectors involved with Blue Carbon research,

---

[1] Interdisciplinary Research and Partnerships Lead, South Carolina Sea Grant Consortium. The concept of the Symposium was sparked by a white paper, *Legal Issues Affecting Blue Carbon Projects on Publicly-Owned Coastal Wetlands*, co-authored by Read Porter, Cody Katter, and Cory Lee, through the Rhode Island Sea Grant Law Program. The Symposium would not have been possible without the commitment and support of its Steering Committee (David Eady, David Golden, Marilyn Hemmingway, Katie Hill, Catherine Janasie, Adam Orford, Romany Webb, along with the author), planning team, featured speakers, dedicated participants, and sponsors. The Symposium was supported through a National Sea Grant Law Center award (NA18OAR4170079) with additional grants from First Horizon Bank, Wicker-Brammell PLLC, and The Nature Conservancy. I gratefully acknowledge Natalie Bock, Eleonora Machado, Crystal Narayana, Sara Karlsson, the University of Georgia's Delta Innovation Hub, the Georgia Climate Conference, Mark Risse, Susan Lovelace, and Shana Jones for their support and expertise. Additional gratitude is extended to Queen Quet of the Gullah Geechee Nation and to Barbara Mann, artist-in-residence to the Georgia Sea Grant program, for connecting not only our minds but also our hearts with the inspirational beauty and intrinsic value of natural coastal ecosystems.

federal and state policy, private investment, and equitable decision-making through co-production with community stakeholders.

This special issue of the SEA GRANT LAW & POLICY JOURNAL highlights the legal frameworks and challenges associated with carbon offsetting on private and publicly held lands along coastal regions of the U.S. This introduction article presents the attributes of coastal Blue Carbon ecosystems and introduces the socio-ecological context that supports the following legal and policy articles within this special issue. More information on the Symposium speakers and conference proceedings can be found on the webpage. While the 2023 Symposium was a successful event, we recognize that two days of collective learning is not nearly enough time to cover all topics and case studies in detail; thus, we hope to reconvene the Blue Carbon Law Symposium in years to come.

II. ABOUT BLUE CARBON

A rapid and holistic global effort is necessary to prevent an average global temperature exceeding 1.5° C above pre-industrial levels, which the Intergovernmental Panel on Climate Change has established as a tipping-point for extreme regional climate impacts that likely include "warming of extreme temperatures in many regions … increases in frequency, intensity, and/or amount of heavy precipitation in several regions … and an increase in intensity or frequency of droughts in some regions."[2] The industrial era's greenhouse gas emissions to the atmosphere have raised the concentration of carbon dioxide (CO_2) from approximately 280 to 420 ppm,[3] with noticeable effects that include sea level rise in some regions,[4] shifting ranges of habitats and wildlife,[5] and stronger hazardous storms.[6] Coastline and coastal watershed communities, which

---

[2] Intergovernmental Panel on Climate Change, *Summary for Policymakers*, *in* GLOBAL WARMING OF 1.5°C. AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5°C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GLOBAL GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY 7 (Masson-Delmotte, V. et al. eds. 2018).
[3] Rebecca Lindsey, *Climate Change: Atmospheric Carbon Dioxide*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (May 12, 2023).
[4] Sönke Dangendorf et al., *Persistent acceleration in global sea-level rise since the 1960s*, 9(9) NATURE CLIMATE CHANGE 705 (2019)
[5] I-Ching Chen et al., *Rapid Range Shifts of Species Associated with High Levels of Climate Warming*, 333(6045) SCIENCE 1024 (2011).
[6] Thomas R. Knutson et al., *Science Brief Review: Climate change is probably increasing the intensity of tropical cyclones*, *in* CRITICAL ISSUES IN CLIMATE CHANGE SCIENCE (Corinne LeQuéré, Peter Liss & Piers Forster eds., 2021).

comprise 52% of the U.S. population, face some of the most significant risk in terms of safety, economies, and cultural identity.[7] Other national assets such as ports and military installments are also at increased risk from climate change-driven coastal hazards.[8]

In an effort to mitigate both drivers and impacts of climate change, some science and policy practitioners look to natural resources such as productive coastal habitats that can function as net *sinks* of greenhouse gases while providing critical ecosystem services (e.g., contaminant sequestration, storm buffering, wildlife habitat, and other socio-economic values). Carbon sinks are defined through the net balance of the ecosystem's metabolism: Primary producers (plants and microorganisms) convert atmospheric carbon dioxide into biomass through photosynthesis; while some of this biomass is then consumed or exported, the majority may be stored within sediments at timescales of hundreds to thousands of years.[9] *Coastal Blue Carbon Ecosystems* – marine, coastal, or tidal freshwater ecosystems that produce and store more organic carbon than that which is consumed or exported – are naturally performing an inverse function of fossil fuel combustion.

It must be noted at the outset that there is a critical mismatch of timescales: The release of greenhouse gases through oxidation of fossil fuel stores, sequestered over millennia through ancient primary production and storage, cannot be reversed in equal measure through natural sequestration within a comparatively fractionable timescale (years to decades). In his presentation at the Symposium Dr. Daniel Friess noted that the sequestration of greenhouse gases by global coastal wetland conservation is estimated to offset approximately 3% of

---

[7] Paul Sandifer & Geoffrey I. Scott, *Coastlines, Coastal Cities, and Climate Change: A Perspective on Urgent Research Needs in the United States*, 8 FRONTIERS IN MARINE SCI. no. 631986 (2021)

[8] *Id.*; KATE GUY ET AL., CTR. FOR CLIMATE AND SEC., A SECURITY THREAT ASSESSMENT OF GLOBAL CLIMATE CHANGE: HOW LIKELY WARMING SCENARIOS INDICATE A CATASTROPHIC SECURITY FUTURE (2020).

[9] Not all well-functioning coastal ecosystems are carbon sinks: For example, oyster reefs may be sinks or sources. F. Joel Fodrie et al., *Oyster reefs as carbon sources and sinks*, 284(1859) PROC. OF THE ROYAL SOC'Y B: BIOLOGICAL SCI. 20170891 (2017). Seasonal or inter-annual conditions can also impact carbon gains and losses, as do upstream inputs such as nutrient and sediment supply. Catherine E. Lovelock & Ruth Reef, *Variable Impacts of Climate Change on Blue Carbon*, 3(2) ONE EARTH 195 (2020). This variability is an important reason why local monitoring is essential for greenhouse gas accounting.

annual GHG emissions (around 300 Tg of CO_2 equivalents (CO_2e)[10] avoided emissions each year[11]). Yet with a high risk of negative climate impacts on both local and global scales, this is a non-negligible piece of the necessary solution that comes with decades of research[12] and a portfolio of beneficial outcomes for the resilience and socio-economic sustainability of coastal communities.[13]

Scientists studying the earth's carbon cycle can expound on the complexities and variations of a *carbon budget* (containing gains, losses, and storage) among and within habitats, regions, seasonal cycles, and inter-annual periods. Reducing uncertainties at decadal-to-centennial timeframes and geographic scales requires a national investment in programs such as the Smithsonian Environmental Research Center's Coastal Carbon Network,[14] the U.S. Carbon Cycle Program,[15] state-level greenhouse gas inventories, federal wetlands inventories, and place-based work through the National Estuarine Research Reserve System. The Sea Grant network is investing in blue carbon research and education at national and program levels.[16] Despite these multiple investments, the science will not be complete before law and policy actions are needed; therefore, using best practices of risk analysis and buffering for unknowns (e.g., whether a newly restored system will be set back by a major storm) must be part of the strategy going forward.

The field of carbon crediting and offsets has been highly scrutinized, often with fair measure.[17] For reasons described above, true climate change mitigation

---

[10] While CO_2 is the most abundant greenhouse gas product from anthropogenic activities, other greenhouse gases (methane, nitrous oxides, perfluorocarbons, hydrofluorocarbons, and sulfur hexafluoride) contribute different levels of 'forcing,' or radiative heat capture, and will break down at different timescales. "CO_2 equivalents" is a unit to standardize the level of heat capture by these different molecules over a set time period.

[11] Peter I. Macreadie et al., *Blue carbon as a natural climate solution*, 2 NATURE REV. EARTH & ENV'T 826 (2021).

[12] Carlos M. Duarte, *Reviews and syntheses: Hidden forests, the role of vegetated coastal habitats in the ocean carbon budget*, 14(2) BIOGEOSCIENCES 301-310 (2017).

[13] Edward B. Barbier, *The Value of Coastal Wetland Ecosystem Services*, *in* COASTAL WETLANDS 947 (Gerardo M.E. Perillo et al., eds., 2d ed. 2019).

[14] *Coastal Carbon Network*, SMITHSONIAN ENV'T RSCH. CTR. (last visited Mar. 1, 2024).

[15] U.S. CARBON CYCLE SCIENCE PROGRAM (last visited Mar. 1, 2024).

[16] Brita J. Jessen & Katie Hill, *Sea Grant at the Blue Carbon Frontier: Integrating Law, Science, Community Values, and Economics*, OCEANOGRAPHY (in review).

[17] Phillip Williamson, & Jean-Pierre Gattuso, *Carbon Removal Using Coastal Blue Carbon Ecosystems is Uncertain and Unreliable, With Questionable Climatic Cost-Effectiveness*, 4 FRONTIERS IN CLIMATE no. 853666 (2022).

will not be enabled through "business as usual" actions of fossil fuel use offset by natural lands conservation or enhancement.

Additionally, unregulated and non-transparent crediting systems have the potential to hype untested methods of greenhouse gas quantification or restoration practices without credible science and legitimate gains (factors of *additionality* and *permanence*, as described by Orford in this issue). Finally, practices that are not grounded in social equity have the potential to exploit land holders through carbon rights transactions at less than true value.[18] Highly mindful of these cautionary issues, the Steering Committee for the Blue Carbon Law Symposium conducted extensive interviews of blue carbon practitioners, land managers, scientists, social equity advocates, and law and policy experts to curate a selection of panelists for the Symposium.

III. OBJECTIVES AND THEMES

The Blue Carbon Law Symposium was designed around a framework for cross-sector sharing among representatives of climate law, carbon markets, corporate decision-makers, scientists, accreditation practitioners, community representatives, and international speakers. The value of this Symposium was in the opportunity for sector representatives to share out the vision, constraints, information syntheses and gaps, and trusted resources available. The objectives of the Symposium were to:

- Understand the legal and policy context of carbon credit markets and how blue carbon fits with these markets;
- Discuss the state of blue carbon science;
- Assess the quality of claims about blue carbon project potential under qualification conditions;
- Learn about specific blue carbon projects being developed in the U.S. and internationally; and
- Identify challenges, barriers, and social equity needs to determine successful blue carbon projects.

The first half-day session of the Symposium was held concurrently with the Georgia Climate Conference, allowing policy makers and business leaders

[18] CONSERVATION INTERNATIONAL ET AL., HIGH-QUALITY BLUE CARBON PRINCIPLES AND GUIDANCE (2022).

from southeastern states to cross-register. To this end, David Golden led a panel of corporate and legal representatives to identify and share the reasoning and needs of the private sector in order for sustained natural capital investments. Notable special addresses were made by Dr. Sarah Kapnick, Chief Scientist with the National Oceanic and Atmospheric Administration (NOAA) and Jocelyn D'Ambrosio, Senior Counsel at the Council on Environmental Quality within the Executive Office of the President. Dr. Kapnick and Ms. D'Ambrosio shared the vision under the current Biden administration to incorporate coastal blue carbon ecosystems within the Administration's *Ocean Climate Action Plan*[19] and the cooperative agency initiative *America the Beautiful*, which aims to conserve 30% of U.S. lands and waters by 2030.[20]

Stephanie Simpson and Nikki Rovner, both with The Nature Conservancy, shared the process to develop the country's first coastal blue carbon crediting effort through seagrass restoration in Virginia. This effort is based on partnerships from academic and state scientists and policy-makers willing to create a pathway for blue carbon credit sharing between the state and a private partner (i.e., The Nature Conservancy) and can serve as a model for future efforts.[21]

Braided throughout the panels was an emphasis on the role of community equity and stakeholder engagement. Queen Quet, chieftess of the Gullah Geechee Nation that extends from North Carolina through northeast Florida, and Gullah Geechee Nation representative Glenda Simmons-Jenkins, delivered a special address and facilitated a discussion focused on the cultural significance and critical resources derived from coastal ecosystems of the southeast U.S. Bryan van Stippen of the National Indian Carbon Coalition was joined by Tannia Frausto of WILDCOAST based in Mexico and Tonna-Marie Surgeon Rogers and Aitza Pabón of Waquoit Bay and Jobos Bay National Estuarine Research Reserves, respectively, to share their experiences of blending community perspectives with ecosystem management for enhanced carbon storage. By sharing the stories of their local community's identity, needs, and existential connection to the land, each stakeholder representative gave weight and realness to the value of inclusive decision-making.

---

[19] OCEAN CLIMATE ACTION PLAN, OCEAN POL'Y COMM., WHITE HOUSE (2022).
[20] *America the Beautiful*, U.S. DEP'T OF THE INTERIOR (last visited Mar. 1, 2024).
[21] Jill Bieri, *Virginia Seagrass Restoration Project Establishes a Model for Similar Action Worldwide*, U.S. NATURE4CLIMATE (Nov. 6, 2022).

IV. THE BLUE CARBON FRONTIER – FROM VISION TO PRACTICE

The articles presented in this special issue will cover key policy needs to bridge together national and state climate strategies (Orford); allowances with current compensatory mitigation policies (Hill & Spivack); state-level frameworks (Black et al.); and policy needs for the development of blue carbon crediting on federal and state-held lands (Porter). Along with other policy and research guidance,[22] the information assembled and evaluated by these authors better positions our collective and cross-disciplinary field of practice to develop coastal blue carbon policy, legislation, and project implementation.

Adding to the reviews contained in this special issue, the following recommendations were collected during the Symposium and through follow-up conversations with blue carbon practitioners in governmental and private sector roles:

1) Implementation of pilot projects are needed on U.S. state lands with a robust research and monitoring component to learn from unanticipated outcomes. While many restoration practices have been developed for coastal ecosystems, this new era of public-private partnerships, with the involvement of multiple regulatory and crediting agencies, creates a new system. Thus social, economic, and ecological monitoring and evaluation are paramount.

2) Projects will have multiple objectives and stakeholders; therefore, clarity of how success is defined and measured needs to be set through equitable and transparent co-production.[23] As one government administrator at the Symposium stated, "It's not [only] about the blue carbon; it's how we do this equitably."

3) There is strong interest for a federal authority to drive investments into coastal blue carbon project development, implementation, and monitoring. Both academic professionals and non-governmental groups look to the U.S. agencies, including NOAA, U.S.

---

[22] *See e.g.,* RESTORE AMERICA'S ESTUARIES, A NATIONAL BLUE CARBON ACTION PLAN: OPPORTUNITIES AND RECOMMENDATIONS (2021); JEAN BRODEUR ET AL., NAT'L OCEANIC & ATMOSPHERIC ADMIN., NOAA BLUE CARBON WHITE PAPER (2022).

[23] *See* Paul Beier et al., *A How-to Guide for Coproduction of Actionable Science*, 10(3) CONSERVATION LETTERS 288 (2017).

Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S. Securities and Exchange Commission, to lead national-level policy and regulations for coastal blue carbon enhancement while protecting and sustaining other critical ecosystem services and provisions.

4) Not all coastal blue carbon projects will enter the marketspace for credits. For those that will, investors and practitioners require: (i) a robust understanding of market certainties and risks and (ii) an understanding of which coastal blue carbon-associated rehabilitation and conservation projects will be directed to state or national greenhouse gas inventories and which will be allocated to the market-based crediting system. Both efforts require further coordination among a diverse range of stakeholders.

V. CONCLUSION

Responding to current and future impacts of climate change requires an "all hands-on deck" approach. The conservation, stewardship, and rehabilitation of marine, coastal, and tidal ecosystems that promote greenhouse gas sequestration is a platform to bring together a new network of communities, private partners, state and federal decision-makers, and inter-disciplinary research-to-management practitioners. Further, it is an opportunity for boundary-spanning organizations such as the National Sea Grant Law Center and partner Sea Grant programs to enable a neutral space for cross-sector pollination and examination of new methods and outcomes.

The articles in this special issue serve as a guide for all parties involved, regardless of experience in law and policy. To build a sustainable and equitable path forward we must first learn the challenges faced for each sector.