

International Blue Carbon Scientific Working Group 14th Annual Meeting

At the 2nd Mangroves of the Americas Congress
October 10th – 14th, 2022
Mérida, México

Meeting report



Coordinating organizations:



Workshop partner organizations:



Funding organizations:



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**At the 2nd Mangroves of the Americas Congress
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1. Executive Summary

The overarching goals of the IBCSWG are to advance blue carbon (BC) science, particularly as needed to facilitate climate-relevant policy and management, to expand blue carbon research collaboration, and to ensure the integration of blue carbon into international climate change actions. To that end, the IBCSWG held its 14th annual meeting in Merida, Mexico, in parallel with the II Mangroves of the Americas Congress on October 10-14, 2022. The meeting had a record in person attendance of over 100 people from 16 countries throughout the week (over 40 % of them were Mexican researchers and 58 % were women). The meeting was also streamed live, with a minimum of 36 additional remote attendees (56 % of them were women).

The meeting focused on discussing current scientific issues related to blue carbon's role in climate action and what new information is needed to integrate blue carbon science in policymaking processes worldwide. Given the importance of Mexico as a blue carbon country, the meeting provided a unique opportunity for the IBCSWG to support blue carbon science, policy and project development in that country and, more broadly, across the American continent through the overall with the Mangroves of the Americas Congress.

The first part of the meeting highlighted salient research by both young and established Mexican scientists. Then, the Working Group learned about recent global research and work being done to integrate blue carbon into national initiatives, including nascent work being done to clarify the potential feasibility of including macroalgae as a new blue carbon ecosystem. The Group also discussed approaches under development for blue carbon accounting and project development and associated challenges. This then led to conversations on bridging blue carbon priorities across UN conventions (UNFCCC, CBD, RAMSAR, SDGs, etc.) and linking global and national policies. During the last session the Working Group identified priorities for the next decade and specific activities for the working group for the next 2-3 years and a field site visit to active restoration and long-term research and monitoring sites in and around the Celestún Biosphere Reserve.

2. Background on the Blue Carbon Initiative

Mangroves, tidal marshes, and seagrass meadows provide numerous benefits and services that are essential for climate change adaptation along coasts globally. Additionally, these ecosystems sequester and store significant amounts of coastal blue carbon from the atmosphere and ocean and are now recognized for their role in climate action. Despite these benefits and services, coastal blue carbon ecosystems are some of the most threatened ecosystems on Earth, it is estimated that up to 67% of mangroves, at least 35% of tidal marshes, and at least 29% of seagrass meadows have been lost. If current trends continue nearly all unprotected mangroves could be lost in the next 100 years. When degraded or lost, these ecosystems can become significant sources of carbon dioxide collected and stored over millennia and which cannot be replaced on a climate-relevant timescale.

The Blue Carbon Initiative (BCI) is a global program working to promote the restoration, conservation and sustainable use of coastal and marine ecosystems. The BCI brings together governments, research institutions, non-governmental organizations and communities from around the world. The Initiative is coordinated by Conservation International (CI), the International Union for Conservation of Nature (IUCN), and the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific, and Cultural Organization (IOC-UNESCO).

Established in 2011, the International Blue Carbon Scientific Working Group identifies priority research areas, synthesizes current and emerging blue carbon research, and provides the robust scientific basis for coastal carbon conservation, restoration, management, and policy development. The Working Group consists of experts in coastal carbon science, carbon assessment, remote sensing, and international climate change policy. The Working Group meets annually in blue carbon-rich countries and collaborates closely with local experts and government officials to identify or expand activities supporting the conservation and restoration of blue carbon ecosystems. More on the BCI and its working groups can be found at its website: <https://www.thebluecarboninitiative.org/>.

Some key contributions of the Blue Carbon Scientific Working Group include:

- A [manual for measuring blue carbon](#) (now available in 5 languages) that provides managers, scientists and other practitioners with standardized recommendations for carbon measurements and analysis.
- Due in large part to the IBCSWG and its policy counterparts, 71 countries currently include coastal wetlands in their NDCs, 46 address mitigation and 70 include coastal wetlands and adaptation.
- Leading authorship of several IPCC reports, such as the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate¹ the 2019 Refinement to the 2006 IPCC Guidelines

¹ www.ipcc.ch/report/srocc/

for National Greenhouse Gas Inventories², the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands³, the Verified Carbon Standard VM003 Methodology for Tidal Wetland and Seagrass Restoration⁴ and updated the VM007 REDD Methodological Modules.

- The IBCSWG serves as technical advisor to the International Partnership for Blue Carbon (IPBC), launched in 2015 at the UNFCCC Paris Climate conference.
- Hundreds of technical and scientific publications since 2011

3. About the meeting

The Working Group chose to meet in México because it has extensive areas of blue carbon ecosystems: mangroves (7,700 km²), salt marshes (150 km²), and seagrasses (9,200 km²) that provide a wide variety of ecosystem services. However, these ecosystems are under immediate threat - between 1980 and 2015, 10% of Mexico's mangrove area was lost, resulting in emissions of up to 1 Tg C per year. While recent conservation and restoration projects throughout the country appear to be reversing this trend in some locations, lack of coordinated data collection and carbon cycle analysis across geographies and between institutions prevents development of a coordinated conservation approach, including development of a national blue carbon inventory and other climate policy actions. Recent interest from the Mexican Government to integrate blue carbon into their national GHG accounting, national commitments to the UNFCCC and other federal instruments, have sparked further discussions regarding much needed scientific data to properly develop these initiatives.

In addition, by hosting of the 2nd Congress of Mangroves of America in Mérida, México, the IBCSWG was offered a unique opportunity to scale its impact to the entire American continent and influence the direction of blue carbon scientific research and policy development and implementation in the near term. For example, María Claudia Diazgranados, CI's Blue Carbon Director, was one of the Congress' keynote speakers, other IBCSWG scientists and members from their research networks also delivered public seminars during the event, and IBCSWG members were part of the Congress' steering committee. In addition, the Global Mangrove Alliance (GMA), to which the IBCSWG provides technical support, launched its new Mexican Chapter during the Congress.

The IBCSWG is thankful for the financial support from the David and Lucile Packard Foundation, NASA and MAC3 Impact Philanthropies, which enabled us to organize and run this very successful meeting. The Group is similarly grateful for the close and positive interactions with the Centro de Investigación y de Estudios Avanzados (CINVESTAV) and Universidad Nacional Autónoma de México (UNAM), the institutions leading the Congress and hosting this annual

² www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/

³ www.ipcc-nggip.iges.or.jp/public/wetlands/

⁴ <https://verra.org/methodology/vm0033-methodology-for-tidal-wetland-and-seagrass-restoration-v1-0/>

meeting in México. Through them, the Working Group was able expand its collaborations with local IUCN, TNC and WWF offices, The Ocean Foundation, Universidad Espíritu Santo (UEES, Ecuador), the State Government of Yucatán, México's Federal Protected Areas Commission (CONANP) and close to a dozen other local and regional partner organizations in attendance.



The International Blue Carbon Science Working Group during a field visit to the Celestún Biosphere Reserve long-term ecological restoration research sites.

4. Meeting summary

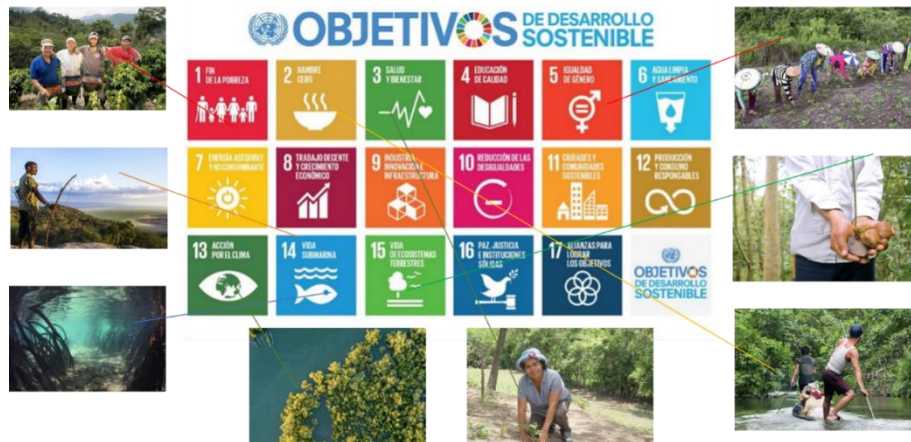
4.1. Day 1 – Monday, October 10th – [Welcome and Blue Carbon Science in México](#)

The IBCISWG meeting's inaugural ceremony was opened with the kind welcoming words from Ms. Yadira Gómez Hernández (Regional Director for the federal Natural Protected Areas Commission - CONANP) and from the meeting's host, Dr. Jorge Herrera-Silveira (CINVESTAV Mérida). Then Drs. Norma Arce (CI México Vicepresident), Kisten Isensee (IOC-UNESCO), Emily Pidgeon and Steve Crooks (IBCISWG co-chairs) addressed the attendees before facilitating everyone's personal introductions. Dr. Pidgeon closed that session with a talk about the current state of the art for blue carbon.

The following session focused on highlighting key blue carbon research areas and priorities in Mexico, linking local-level and country-wide initiatives. Dr. Fernanda Adame opened the session with a talk about the lessons learned from developing a blue carbon project at La Encrucijada Biosphere Reserve, in Chiapas. She highlighted the importance of community involvement for the success of the project. Drs. Joan Albert Sánchez Cabeza and Carolina Ruiz Fernández shared their research on using radioisotopes to quantify the age, burial rates and fluxes among blue carbon ecosystems. Not surprisingly, mangroves have the highest carbon burial rates compared to seagrasses and saltmarshes.

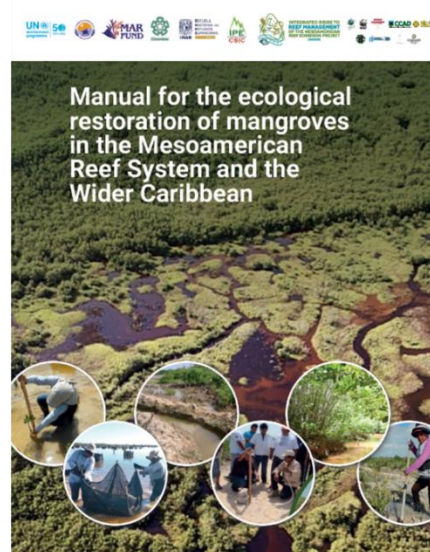
Ms. Joanna Acosta and SiuLing Cinco elaborated on the conservation and restoration actions currently under way in México to build a national blue carbon roadmap and the need to bridge across academia, government and communities to ensure the feasibility of blue carbon projects. Ms. Acosta also made a case for improved land use/land cover categories that address Mexico's high heterogeneity of mangrove ecotypes and thus improve mangrove ecosystem mapping and carbon accounting. She also pointed out the lack of robust methods for identifying and quantifying degradation of blue carbon stocks and the need for economic valuation studies that would allow for cobenefits to be adequately quantified and used to strengthen market-based blue carbon conservation and restoration mechanisms.

Ms. Rosalía Andrade complemented the previous talks with a review of blue carbon projects under development in Yucatán using Plan Vivo and Verra standards, where community involvement and a landscape-scale approach has also been of paramount importance in their success. She also pointed out the need for adaptive management of mangrove restoration projects and how this may (or may not) fit with current certification standards. Finally, she emphasized how blue carbon projects can be designed and implemented to improve the livelihoods of local communities and address global development goals.



Mangrove restoration and blue carbon projects designed and executed under quality standards bring multiple benefits to communities and contribute to achieving sustainable development goals (Credit: Rosalía Andrade).

Dr. Claudia Teutli shared her decade-long experience developing and testing conceptual models for mangrove restoration in a series of long-term projects in Yucatán. Dr. Teutli is the lead author of the most recent and salient ecological restoration guidelines and standards being used across México, Central and South America and the Caribbean. She highlighted the importance of having a strategy in place to ensure restoration processes are successful. This entails combining solid science (and long-term monitoring), developing pilot projects with strong local participation and capacity building. She also pointed out the key role that “forensic ecology” plays in diagnosing the causes of mangrove loss and designing the right interventions to rehabilitate ecosystem functioning and mangrove recovery, and how ecological restoration of mangroves should be thought of as “ecological engineering” under a new global change paradigm.



Working Group members lead efforts to improve ecological restoration science and practice across the Americas by publishing best practice guidelines and methods (Credit: Dra. Claudia Teutli)

Later, Dr. Jony Torres Velázquez shared the methodological challenges of quantifying carbon stocks in dwarf mangroves in hypersaline soils in the northern dry region of México. Because of their short structure and environmental constraints, these mangroves have larger belowground biomass stocks than other mangrove forests with the actual aboveground:belowground ratio being controlled by pH, redox potential and temperature. Finally, Dr. Carlos Troche highlighted México's nation-wide efforts to accurately identify, map and monitor mangrove cover and associate them with carbon stocks and historical fluxes.

The experts who presented highlighted the following among the challenges that México faces to further develop blue carbon science and policy: the need for greater coordination among institutions (federal, state, local and NGOs), the lack of a cohesive monitoring of all blue carbon ecosystems (despite having good national guidelines for mangroves), challenges remain for properly mapping coastal wetlands at the national level

4.2. Day 2 – Tuesday, October 11th – [Blue Carbon Globally and Emerging Methodologies and Accounting Issues](#)

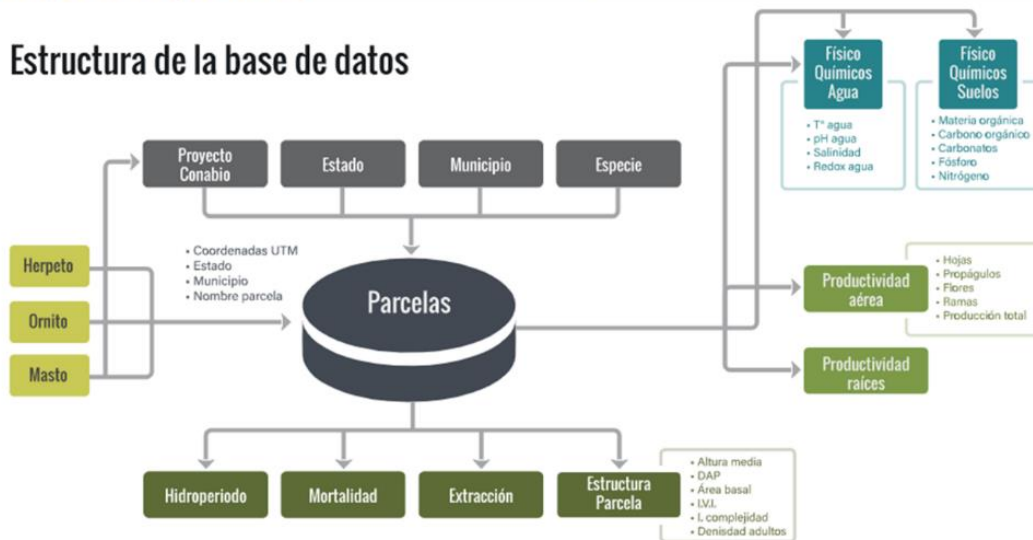
The second day of the meeting had two sessions; the first was designed to help the group review recent global blue carbon research with application to blue carbon projects and policy design, while the goal for the second one was to identify salient commonalities and challenges in blue carbon methods development and refinement, and their application for project development and national accounting.

Iniciativas (inter)institucionales Manglares (SMMM)

Avances en la agenda de carbono azul

Retos } - Salud de metadatos (homologación de resultados, BD)

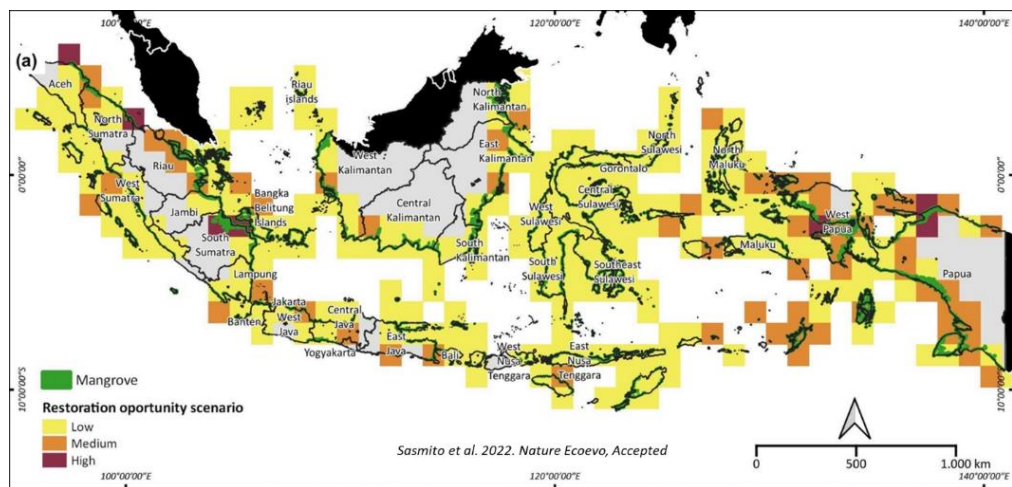
Estructura de la base de datos



Mexico's national framework for monitoring mangrove cover, community dynamics, NPP and other variables related to ecosystem functioning and carbon sequestration potential or degradation (Credit: Dr. Carlos Troche).

The first session started with an overview and discussion of the UN's Global Ocean Decade Programme for Blue Carbon (GO-BC), by Dr. William Austin. The GO-BC will serve as a global platform for scientific promotion, knowledge exchange and capacity building. The BCI members will play a leading role in providing technical assistance, strategic guidance and training materials for the Programme. An update on the BCI's new seagrass scientific working group was provided by Drs. Núria Marba, Hilary Kennedy, Jim Fourqurean, Dan Friess, Catherine Lovelock and Clint Cameron. The team is working on updating the science on these ecosystems and identifying and prioritizing research needs. Prof. Daniel Murdiyarso shared an update on his work with BC inventories in Indonesia and how it is supporting management decision-making, setting priorities for restoration and development of national and international policy instruments such as the country's NDC.

Indonesia has a large potential for mangrove restoration country (Credit: Prof. Daniel Murdiyarso)



Mr. Jose Quirós presented on CI's groundbreaking experience with ecological restoration in the Pacific of Costa Rica. This is the largest ecological engineering and mangrove restoration project in all Central America and the Caribbean and used bleeding edge technology (including UAVs and satellite-guided heavy machinery) during its design and implementation. Prof. James Morris then shared his latest modeling results showing the potential responses of mangroves and salt marshes to sea level rise.



In Costa Rica, satellite-guided machinery and community involvement were combined to restore more than 300 ha of mangroves that had been converted to agriculture within a protected area (Credit: Jose Quirós).

The next talks in this session had a global focus and dealt with international technical assistance platforms for blue carbon accounting and integration into national GHG inventories (by Dr. Steve Crooks), open-source tools for mangrove mapping and assessment (by Ms. Leah Glass), and how geomorphology can be used globally to predict blue carbon stocks distribution and restoration potential (by Dr. André Rovai). Representatives from INVEMAR, Colombia, closed this session with a review of Colombia's multiple efforts to develop and implement blue carbon projects, including the Vida Manglar project, the first blue carbon project selling credits under the new Verra methodologies for blue carbon.



Article

The Google Earth Engine Mangrove Mapping Methodology (GEEMMM)

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Remotely sensed data have a proven record for successfully mapping and monitoring mangroves; new open tools such as GEEMMM can facilitate local assessments and accounting.

The second session of the day focused on 1) sharing the latest approaches under development for blue carbon accounting and project development, 2) identifying common areas across different accounting and project design approaches, 3) examining pathways for scaling carbon accounting from projects to national reporting, 4) identifying gaps or challenges facing the implementation of methods and methodologies on the ground, and 5) setting priorities and identifying BCI supporting avenues to address the latter. To do so, Dr. Jennifer Howard presented on a new proposal (to be officially released at COP27) for high quality standards for blue carbon projects, Ms. Amy Schmid discussed upcoming changes to Verra's VM0033 methodology and how voluntary market



standards may be simplified in the future, and Ms. Leah Glass discussed Plan Vivo’s new blue carbon standard. In addition, Prof. Catherine Lovelock described the development of Australian methods for quantifying blue carbon and integrating it into national environmental accounts, while Dr. Steve Crooks shared details of a new seascapes methodology under development.

4.3. Day 3 – Wednesday, October 12th – [Macroalgae Working Group and Bridging Science, Policy and Finance for National Implementation](#)

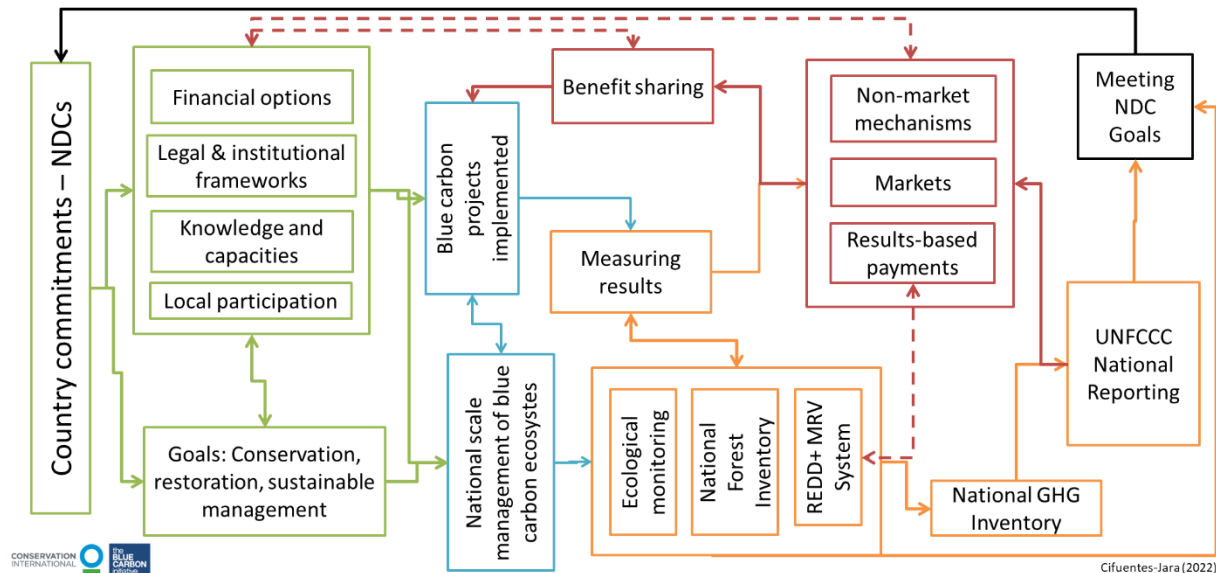
During the third day of the meeting the Working Group first discussed research on the carbon sequestration potential of macroalgae (led by Dr. Albert Pessarrodona). The Group’s knowledge and expertise was used to help advance kelp science and overcome issues required to include these ecosystems as blue carbon in policy and finance (quantifying areas, permanence, fingerprinting, independent verification). Remaining methodological challenges to quantify lateral flows, DOC, alkalinity generation/consumption and other blue carbon ecosystem fluxes and stocks were also discussed.

The following discussion focused on 1) highlighting the opportunities for using blue carbon to bridge priorities across UN conventions (UNFCCC, CBD, RAMSAR, SDGs, etc.), 2) exploring the processes and challenges behind linking global and national policies, with examples from México and Costa Rica, and 3) linking implementation with local economic data. First, Ms. Jill Hamilton shared an update on her leading work in building a common framework for blue carbon across UN Conventions and mechanisms (UNFCCC, CBD, RAMSAR, SDGs). Ms. Elisabetta Bonotto then described how the International Partnership for Blue Carbon (IPBC) is helping to link global-scale policies, mechanisms and scientific knowledge with local implementation.



A blue carbon policy framework is being developed and supported by the Blue Carbon Initiative leading institutions (Credit: Jill Hamilton)

As case studies, Dr. Gloria Cuevas and Dr. Miguel Cifuentes-Jara shared how Mexico and Costa Rica, respectively, are building their national frameworks and institutional arrangements to allow for blue carbon projects to become a reality. Finally, Ms. Emily Landis shared preliminary results of her research into finding the optimal pricing for blue carbon credits. During the rest of the day, the Group was given time to participate of the 2nd Mangroves of the Americas Congress sessions on restoration and ecosystem services and on community knowledge and other social issues.



Roadmap for national blue carbon implementation (Credit: Dr. Miguel Cifuentes-Jara).

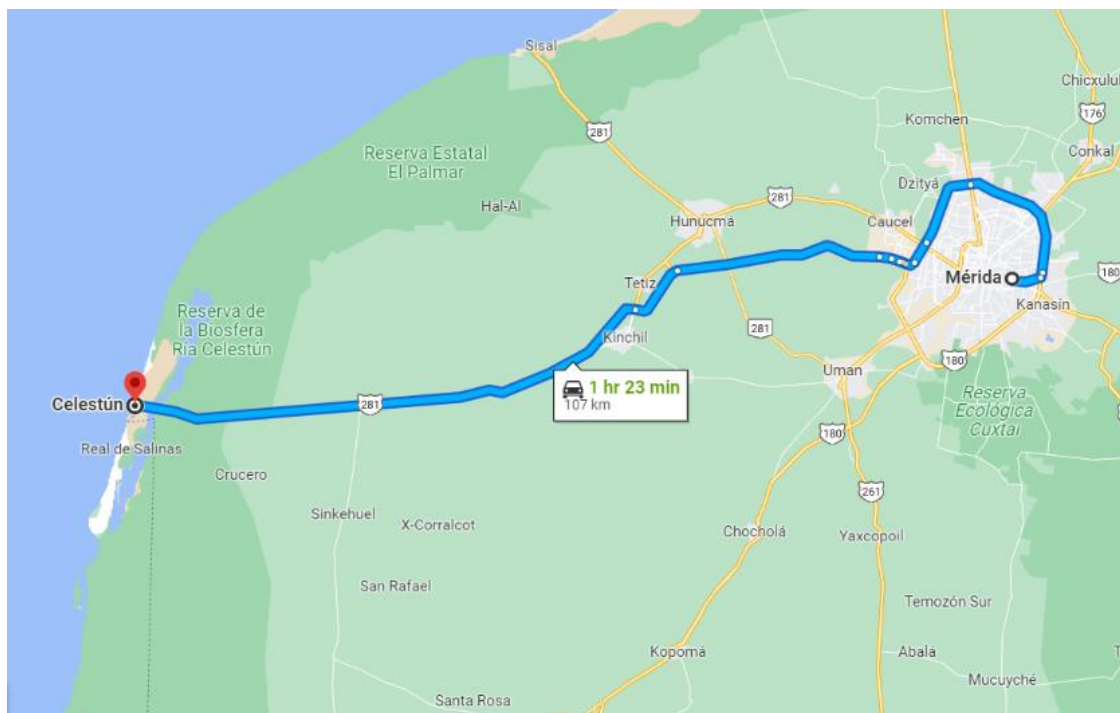
4.4. Day 4 – Thursday, October 13th – [The Next Decade for the Blue Carbon Initiative](#)

Drs. Emily Pidgeon and Steve Crooks moderated the final session of the week, which was focused on identifying priorities for the next decade and specific activities for working group for the next 2 to 3 years. The discussion focused on five main topics: 1) a critical analysis of the Working Group’s original objectives and whether they remain relevant or need updating, 2) what are the emerging topics for blue carbon that may be addressed by the Working Group, 3) how might the Working Group remain relevant given the accelerated pace at which blue carbon science and implementation is moving, 4) how can the Group continue to support policy development at the global and national levels, and 5) what might be the Working Group’s role in supporting communities with improved science and project development. During the rest of the day, Working Group members were invited to participate in Congress sessions focusing on climate change and extreme events.

4.5. Day 5 – Friday, October 14th – Field Trip

The “Ría Celestún Biosphere Reserve”⁵ is one of the most important wetlands in the Yucatán Península in México. The reserve has a great diversity of ecosystems, ranging from a shallow continental marine shelf, coastal dunes, mangrove forests, seagrass meadows, marshes and terrestrial forests. In combination with that, it’s high biological diversity ([almost 1427 species identified in the area](https://en.unesco.org/biosphere/lac/ria-celestun)) and its ecological role for resident and migratory bird species (including the threatened plumbeous kite -*Ictinia plumbea*, the endangered Muscovy duck -*Cairina moschata*- and the pink flamingo -*Phoenicopterus ruber*- has placed Celestún on the map as a prime birdwatching and ecotourism destination.

For over a decade now, researchers from CINVESTAV-IPN Unidad Mérida and over 15 other research centers, NGOs and government institutions, led by Dr. Jorge Herrera-Silveira, a long-standing member of the IBCSWG who has spent considerable efforts to restore the diverse ecosystems in Celestún. This team of scientists have established a wide network of restoration sites and are actively monitoring the effects of a suite of restoration methods on NPP. Dr. Herrera-Silveira led the Working Group on a scientific tour of his ecological mangrove restoration and long-term monitoring research sites in Celestún. The visit included observations along the lagoon ecosystems and some of the surrounding mangroves using small boats that are owned and operated by a local community group.



Google map showing the relative location of Mérida and Celestún.

⁵ <https://en.unesco.org/biosphere/lac/ria-celestun>

5. Daily agenda

Day 1 – Monday, October 10 th	
8:00 AM	Check-in and registration
9:00 – 10:45	Congress Opening Ceremony
10:45 – 11:00	Coffee break
11:00 – 13:00	<p>Welcome session</p> <ul style="list-style-type: none"> • Welcome by Mexican authorities – Yadira Gómez Hernández (Directora Regional CONANP) • Welcome by congress hosts – Dr. Jorge Herrera (CINVESTAV) • Welcome by Conservation International-México Vice President – Dr. Norma Arce (Conservation International) • Welcome words by IOC-UNESCO – Dr. Kirsten Isensee (IOC-UNESCO) • Welcome address to the International Blue Carbon Scientific Working Group meeting <ul style="list-style-type: none"> ○ Chairs: Dr. Emily Pidgeon (Conservation International) & Dr. Steve Crooks (Silvestrum Climate Associates) • Personal introductions • Introduction to Blue Carbon – global inflection point – Dr. Emily Pidgeon (Conservation International)
13:00 – 14:00	Lunch
14:00 – 15:45	<p>Session 1: Blue carbon science in México Moderator: Dr. Miguel Cifuentes-Jara (Conservation International) Goal: Highlight key blue carbon research areas and priorities in Mexico</p>
	<p>Science talks – Part 1:</p> <ul style="list-style-type: none"> • Lessons from developing a Blue Carbon project in La Encrucijada Biosphere Reserve, Chiapas – Dr. Fernanda Adame (Griffith University) • Radiochronology and fluxes of blue carbon in mangroves and saltmarshes from Mexico – Dr. Joan Albert Sánchez Cabeza & Ana Carolina Ruiz Fernández (UNAM-Unidad Académica Mazatlán) • Current instruments for mangrove conservation in Mexico: toward a blue carbon strategy - Joanna Acosta • Feasibility of blue carbon projects in México - bridging academia, government and communities – SiuLing Cinco (CINVESTAV Mérida) • Blue carbon projects in Yucatán under Plan Vivo and Verra standards - challenges and opportunities – Rosalía Andrade (A.C. Resiliencia Azul)
15:45-16:00	Coffee break

16:00 – 17:00	Session 1 (continued)
	<p>Science talks – Part 2:</p> <ul style="list-style-type: none"> • Lessons learned from a decade of mangrove restoration in Yucatán – Dra. Claudia Teutli (ENES-Mérida-UNAM) • Measuring carbon stocks in mangroves of the dry Northwestern region of Mexico – Dr. Jony Torrez Velázquez (Universidad del Valle del Yaqui) • Coastal wetland monitoring – advancing the blue carbon agenda in México – Dr. Carlos Troche y Verónica Aguilar (CONABIO) • Synthesis and discussion • Other talks to be confirmed
17:00 – 18:00	Closed – Working Group Only – “Our brave new Blue Carbon challenge” Dr. Emily Pidgeon (Conservation International) & Dr. Steve Crooks (Silvestrum Climate Associates)
18:00	Congress Social Mixer

Day 2 – Tuesday, October 11th

9:00 – 10:45	<p>Session 2: Blue carbon globally Moderator: Dr. Boone Kauffman (Oregon State University) Goal: Review recent global blue carbon research with application to blue carbon project and policy design</p>
	<p>Global updates – Part 1:</p> <ul style="list-style-type: none"> • Global Ocean Decade Programme for Blue Carbon – Dr. William Austin (University of St Andrews) & Dr. Miguel Cifuentes-Jara (Conservation International), Co-chairs • Seagrass subgroup synthesis – Dr. Núria Marba (Institut Mediterrani D'estudis Avançats), Dr. Hilary Kennedy (Bangor University), Dr. Jim Fourqurean (Florida International University), Dr. Dan Friess (National University of Singapore), Prof. Catherine Lovelock (University of Queensland) • Blue carbon inventories in Indonesia – Prof. Daniel Murdiyarso (Center for International Forestry Research - CIFOR) • Ecological restoration at scale, making it happen in the mangroves of Costa Rica – Jose Quirós (Conservation International-Costa Rica) & Jorge Pineda (SINAC) • Mangrove and saltmarsh grasses responses under rapidly under high rates of sea-level rise – Distinguished Professor Emeritus James Morris (University of South Carolina)
10:45 – 11:00	Coffee break

11:00 – 13:00	Session 2 (continued)
	<p>Global updates – Part 2:</p> <ul style="list-style-type: none"> • NOAA/EPA Transparency Accelerator – Dr. Steve Crooks (Silvestrum Climate Associates) • GEM, an open-source mangrove mapping tool designed for site-level mangrove assessments – Leah Glass (Blue Ventures) • How geomorphology can inform mangrove restoration and blue carbon distribution – Dr. André Rovai (Louisiana State University) • Aportes de Colombia al diseño e implementación de iniciativas de carbono azul en manglares – Selene Rojas & Lina Vásquez (INVEMAR) • Synthesis and discussion
13:00 – 14:00	Lunch
14:00 – 16:00	<p>Session 3: Emerging methodologies and accounting issues Moderator: Leah Glass (Blue Ventures), Amy Schmid (Conservation International) Goal: Identify salient commonalities and challenges in blue carbon methods development and refinement, and application for project development and national accounting</p>
	<p>This discussion will focus on 1) sharing the latest approaches under development for blue carbon accounting and project development, 2) identifying common areas across different accounting and project design approaches, 3) examining pathways for scaling carbon accounting from projects to national reporting, 4) identifying gaps or challenges facing the implementation of methods and methodologies on the ground, and 5) setting priorities and identifying BCI supporting avenues to address the latter.</p> <p>Discussion will include review of the following:</p> <ul style="list-style-type: none"> • High quality standards for blue carbon projects – Dr. Jennifer Howard (Conservation International) • Changes to VM0033 and simplifying voluntary standard methods – Amy Schmid (Conservation International) • Australian methods and integration of blue carbon into national environmental accounts – Prof. Catherine Lovelock (University of Queensland) • Seascapes methodologies – Dr. Steve Crooks (Silvestrum Climate Associates) • New Plan Vivo Blue Carbon Standard – Leah Glass (Blue Ventures)
15:45-16:00	Coffee break
16:00 – 17:00	Session 3 (continued)
	<ul style="list-style-type: none"> • Session 3 continued
18:00	Dinner

Day 3 – Wednesday, October 12 th	
9:00 – 10:45	<p>Session 4: Kelp working group discussion Moderator: Dr. Albert Pessarrodona (University of Western Australia)</p>
	<p>Research on the carbon sequestration potential of macroalgae is currently where research on the established wetland blue carbon ecosystems was 10 years ago. The aim of this interactive discussion session is two-fold:</p> <ul style="list-style-type: none"> • Gather the group’s knowledge and expertise on how to advance kelp science to overcome issues required to establish these ecosystems as blue carbon in policy and finance (quantifying areas, permanence, fingerprinting, independent verification) • Discuss remaining methodological challenges to quantify lateral flows, DOC, alkalinity generation/consumption and other blue carbon ecosystem fluxes and stocks
10:45 – 11:00	Coffee break
11:00 – 12:00	<p>Open to congress participation - sessions:</p> <ul style="list-style-type: none"> • Restoration, ecosystem services • Community knowledge exchange
13:00 – 14:00	Lunch
14:00 – 15:45	<p>Open to congress participation - sessions:</p> <ul style="list-style-type: none"> • Restoration, ecosystem services • Community knowledge exchange
15:45 – 16:00	Coffee break
16:00 – 17:00	<p>Session 5: Bridging science, policy and finance for national implementation Moderator: Kirsten Isensee (IOC – UNESCO) & Dr. Dan Friess (National University of Singapore) Goal: To identify challenges and lessons learned in linking global policy with national implementation</p>
	<p>This discussion will focus on 1) highlighting the opportunities for using blue carbon to bridge priorities across UN conventions (UNFCCC, CBD, RAMSAR, SDGs, etc.), 2) exploring the processes and challenges behind linking global and national policies, with examples from México and Costa Rica, and 3) linking implementation with local economic data. Discussion will include review of the following:</p> <ul style="list-style-type: none"> • Global Blue Carbon Policy Framework, Ocean-Climate Nexus – Jill Hamilton (Conservation International) • IPBC: Linking science, global policies and mechanisms to national implementation – Elisabetta Bonotto (IOC-UNESCO) • Mexican blue carbon policy development – Dra. Gloria Cuevas (SEMARNAT) • From global to local, remaining challenges linking global and national policy – Dr. Miguel Cifuentes-Jara (Conservation International) • Carbon market pricing and the need for better restoration and conservation price data – Emily Landis (TNC)
17:00 – 18:00	Discussion on science needs for policy
18:00	Dinner

Day 4 – Thursday, October 13 th	
9:00 – 10:45	Session 6 (Closed – Working Group only): The next decade for the Blue Carbon Initiative Moderators: Dr. Emily Pidgeon (Conservation International) & Dr. Steve Crooks (Silvestrum Climate Associates)
	<ul style="list-style-type: none"> Discussion on identifying priorities for next decade and specific activities for working group for next 2-3 years.
10:45 – 11:00	Coffee break
11:00 – 13:00	Session 6 (continued)
	<ul style="list-style-type: none"> Discussion, next steps
13:00 – 14:00	Lunch
14:00 – 15:45	Open to congress participation <ul style="list-style-type: none"> Climate change and extreme events
15:45-16:00	Coffee break
16:00 – 18:00	Open to congress participation <ul style="list-style-type: none"> Climate change and extreme events
18:00 – 20:00	Closing ceremony
20:00	Dinner

6. List of invited participants

The meeting had a record in person attendance of over 100 people from 16 countries throughout the week (over 40 % of them were Mexican researchers and 58 % of all attendees were women). The meeting was also streamed live, with 36 additional remote attendees (56 % of them were women). The following list contains the names, contact information and country of origin of IBCISWG members and additional core meeting guests.

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