



OCEAN & CLIMATE
PLATFORM

“Challenges, Opportunities and Risks of marine Carbon Dioxide Removal” – Part 2

Tuesday 10 September 2024
11.00 AM - 1.00 PM (EDT) / 5.00 - 7.00 PM (CEST)

Minutes of the Meeting

Participants: Alexis Grosskopf (Ocean Hub Africa), Andreas Hansen (The Nature Conservancy), Ann Dom (Seas At Risk), Anna-Marie Laura (Ocean Conservancy), Celine Liret (Oceanopolis), Charlie Mathiot (Pure Ocean), Charlotte Vigne (Kresk), Chris Bowler (Tara Ocean Foundation), Danielle McCaffrey (Waves of Change), David Ho (University of Hawaii), Emilie Siguier (IOPR), Fabien Kufel (French of Committee of IUCN), Fabrice Pernet (Ifremer), Fiorenza Micheli (Stanford University Center for Oceans Solutions), Heidi Weiskel (IUCN), Jean-Pierre Gattuso (CNRS), Jill Hamilton (Conservation International), Joachim Claudet (CNRS), Johanna Berger, Ken Buesseler (WHOI), Ken Kostel (WHOI), Laurent Bopp (CNRS-ENS), Lisa Levin (Scripps Institution of Oceanography), Madeline Piscetta (Oceana), Martin Alessandrini (Tara Ocean Foundation), Nadine Le Bris (Sorbonne Université), Nicole Zanesco, Romu Hentinger (Tara Ocean Foundation), Sara Wanous (Ocean Conservancy), Sarah Cooley (NOAA, formerly Ocean Conservancy), Shannon Cosentino-Roush (Sustainable Ocean Alliance), Torsten Thiele (Global Ocean Trust), Will Hackman (Pew Trusts), William Cheung (University of British Columbia), Yunne Shin (IRD).

Secretariat: Anaïs Deprez, Cyrielle Lam, Gauthier Carle, Marine Lecerf, Maud Chevalier, Loreley Picourt, Maud Chevalier, Olivia Le Gouvello, Roberta Milo, Sarah Palazot, Victor Brun.

Opening Remarks – Loreley Picourt, Executive Director, OCP

Loreley Picourt opened the session by emphasising the growing relevance of mCDR in climate discussions. While mCDR offers promising mitigation potential, concerns remain about uncertainties and risks. OCP aims to facilitate constructive debate on this evolving field. This second workshop builds upon a first workshop that took place on 25 June, which convened experts to review the current state of knowledge on mCDR and identify research gaps and opportunities concerning mCDR.

Presentation 1: What is mCDR? – Dr. Victor Brun, Science-Policy Coordinator, OCP

Victor Brun provided an overview of mCDR techniques, categorising them into:

1. Photosynthesis-based techniques: enhancing natural processes like blue carbon methods, macroalgae cultivation, and ocean iron fertilisation.
2. Engineered systems: facilities capturing CO₂ directly from the atmosphere or ocean.
3. Geochemical techniques: altering ocean chemistry, such as ocean alkalinity enhancement.

Victor Brun emphasised the need to consider costs, carbon capture potential, location, technical readiness, and risks associated with each technique. He noted that while some techniques are well understood, others remain experimental and present uncertainties concerning their impacts.

Presentation 2: Evaluating efficiency and cost of mCDR techniques – Dr. Sarah Cooley, former senior director of climate science at Ocean Conservancy

Sarah Cooley discussed the current state of techno-economic evaluation of mCDR. She emphasised that while technical readiness, efficiency, scalability, and costs are being assessed, social and ecological impacts remain understudied. She pointed out the need for robust Monitoring, Reporting, and Verification (MRV)

protocols to measure the effectiveness and additionality of mCDR techniques. The NOAA's 2023 strategy categorised mCDR methods based on their cost-effectiveness and efficiency, but uncertainties regarding verification and broader impacts persist. Dr. Cooley called for comprehensive research to address these gaps and inform equitable decision-making.

Presentation 3: Evaluating observed and potential impacts on ecosystems – Dr. Laurent Bopp, Research Director, CNRS

Laurent Bopp focused on evaluating the impacts of mCDR on ecosystems. He highlighted the co-benefits of conventional mCDR techniques like blue carbon restoration, which offer significant environmental and local benefits. Conversely, he noted the potential negative side effects of non-conventional techniques, such as iron fertilisation, which can disrupt ecosystems. He highlighted the vast knowledge gaps regarding the impacts of techniques such as macroalgae cultivation and stressed the need for further research to understand potential negative effects on deep-sea ecosystems and overall ocean health.

Presentation 3: Governing mCDR – Dr. Joanna Post, Head of the Ocean Observations and Services Section, IOC-UNESCO

Dr. Post addressed the governance challenges surrounding mCDR. She noted that existing frameworks are insufficient and fragmented. Current governance primarily falls under the London Convention and Protocol (hosted by the International Maritime Organisation) but is constrained by overlapping international and national regulations (e.g., CBD, UNFCCC, UNCLOS). Dr. Post emphasised that a critical issue with mCDR is that it is often viewed solely as a technical solution for climate mitigation, while potential ecological impacts are often neglected. In light of this, she argued that the governance structures need to be updated to adequately address the complexities of mCDR, considering both the technical and ecological aspects.

Open Discussion

Industry (The role of the industry in the context of a fragmented policy landscape)

Research (Debating the worth of continued research)

Definition (Lack of clear definition)

Timeline & Impact (Timelines and impact concerns)

Risk (Risks associated with scaling up coastal and marine nature-based solutions)

Governance (Governance of mCDR)

Equity & Justice (Issues of equity and justice)

Risks associated with scaling up coastal and marine nature-based solutions

- Patricia Ricard raised concerns about whether scaling up coastal and marine nature-based solutions, such as mangrove restoration, would alter their effectiveness, and how large-scale testing of mCDR techniques could be conducted to ensure their effectiveness.
- Sarah Cooley explained that scaling up nature-based solutions is supported but noted the limitations of developing these solutions outside their natural regions. While the vast ocean theoretically allows for large-scale implementation of mCDR, it is crucial to balance experimental scale with modelling to ensure reliable results and avoid potential negative outcomes.
- Laurent Bopp advocates for the use of a cautious, step-by-step approach combining modelling, in situ experiments, and lab studies for assessing the impacts derived from scaling up nature-based solutions, noting that these approaches have advanced our understanding of certain techniques like iron fertilisation.
- Jean-Pierre Gattuso questions the ability of nature-based solutions to have significant positive effects, while also highlighting that their implementation could be very expensive in certain environments.

Issues of equity and justice

- William Cheung questioned whether the development and initiatives for (non-nature-based) mCDR techniques, primarily driven by the Global North, might have unequal costs, benefits, and impacts for the Global South and whether this issue has been addressed in research and policy discussions.
- Laurent Bopp noted that lessons from land-based CDR could inform ocean-based efforts on this matter, as the issue has not yet been fully addressed within mCDR discussions.
- Sarah Cooley agreed with the importance of addressing equity issues, noting that existing financial structures could perpetuate inequities. She stressed the need for economic experts to help address these fundamental issues and work towards more equitable solutions.

Governance of mCDR

- Andreas Hansen enquired about the potential of the BBNJ Agreement as a broader framework for addressing the ecological impacts of mCDR techniques, given their transboundary and long-distance effects. He questioned if the BBNJ Agreement might offer a more comprehensive framework compared to the London Protocol, which may not encompass all mCDR approaches.
- Lisa Levin noted that the treaty is still in the ratification phase, requiring 60 nations to ratify it before it becomes effective. Currently, only nine nations have ratified it.
- On another note, Rob Steenkamp noted that the International Tribunal for the Law of the Sea could be leveraged to further explore mCDR, as a new advisory opinion might provide actionable insights. He also enquired about the implications of the 2013 amendments to the London Protocol and whether these amendments might be advancing mCDR regulation prematurely.
- Johanna Post noted that while the 2013 amendments to the London Protocol are pushing forward mCDR regulation, their ratification is still pending. She pointed out the complexities in policy coordination between UN bodies like the IMO and UNFCCC, which can hinder progress. Effective cross-convention collaboration and identifying the best forums for discussions on mCDR are crucial.

Lack of clear definitions

- Natalie Andersen emphasised the need for the scientific community to differentiate between natural blue carbon methods and artificial geoengineering techniques. She warned that inadequate distinctions could lead to poorly informed investments and governance issues.
- Jill Hamilton agreed on the importance of distinguishing between NBS and engineered mCDR approaches. She pointed out that NBS offers co-benefits such as increased resilience and adaptation for coastal communities, which engineered solutions do not inherently provide. Clarifying these distinctions is crucial for supporting blue carbon NBS and ensuring informed decision-making.
- Yunne Shin raised concerns about the need for clearer definitions and principles for nature-based solutions in the context of mCDR. She pointed out that rapid advancements in mCDR techniques require refined definitions to better align with developments and ensure informed decision-making.
- Joanna Post acknowledged the confusion surrounding NbS definitions within mCDR and highlighted the need for clarity. She noted that while some countries include blue carbon ecosystems in their GHG inventories, there is still significant potential to integrate these ecosystems into climate strategies.

Timelines and impact concerns

- Andreas Hansen raised questions about the implementation timeline of mCDR technologies and their potential effectiveness within the internationally agreed timeframe for climate mitigation.
- Marine Lecerf responded by emphasising this as a key concern raised during discussions with the scientific committee. There is a worry that focussing too much on mCDR could divert attention from critical priorities like decarbonisation and the energy transition.
- Lisa Levin noted that while deep-sea ecosystems require extensive research due to their slow biological processes, mCDR should be seen as a temporary measure rather than a complete solution. Levin raised concerns about the precautionary principle, suggesting that the urgency of the climate crisis might outweigh the time needed to fully assess the environmental risks associated with mCDR technologies.
- Laurent Bopp shared the view that mCDR is unlikely to make a significant impact on emission reductions by 2030 due to the short timeframe. Bopp and Levin agreed that mCDR might become

more relevant for achieving net zero targets by 2050, which would allow more time for studying and developing these techniques.

- Joanna Post highlighted the need to assess mCDR in relation to the goals set by Article 4.1 of the Paris Agreement, which calls for reaching global peaking of greenhouse gases as soon as possible and rapid reductions thereafter. She argued that mCDR is unlikely to progress beyond the research phase by 2030, stressing the importance of focussing on immediate emission reductions.

Debating the worth of continued research

- David Ho argues that recent studies suggest iron fertilisation might not be a viable climate solution due to potential negative effects, especially on a large scale. He questions why research continues if it is likely to have detrimental outcomes, suggesting that it would be probably better to divert funds on something else.
- Ken Buesseler agrees that while some effects are acknowledged, the understanding of how iron affects different nutrients and ecosystems is still limited. He emphasises the need for thorough research to prevent harmful large-scale implementations and to regulate practices effectively.
- Chris Bowler questions Ho's point, stressing the importance of continued research despite long timelines to prepare future scientists with better knowledge and tools.

The role of the industry in the context of a fragmented policy landscape

- Andreas Hansen emphasised that the development of marine geoengineering technologies will be influenced not only by scientific advancements but also by industry and political decisions. He stressed the need to integrate both scientific and political/economic considerations into discussions about marine geoengineering.
- Jean-Pierre Gattusso expresses concern that without science guiding development, the industry could advance in harmful or inefficient ways. He criticised certain companies for poor industry practices and misleading carbon credit sales. His key message is that science needs to lead industry rather than lag behind it, as is currently the case.
- Mark Haver notes that the scientific understanding of mCDR is way behind industry advancements. Financing science, especially in the absence of direct industry funding, is a pressing issue, and establishing clear guidelines for investors in these technologies is critical.
- Joanna Post notes that in the context of a fragmented regulatory framework governing mCDR, the involvement of businesses that aim to profit from these technologies is a real risk, as businesses move far faster than regulatory bodies.
- Marine Lecerf emphasised the need for strong civil society mobilisation to address mCDR issues and ensure that governance frameworks keep pace with scientific and industry developments.
- Patricia Ricard highlighted the financial appeal of MCDR within the broader blue economy framework, drawing parallels with deep-sea mining and underscoring the need for careful governance and oversight as the sector develops rapidly.

Conclusion and Next Steps

The workshop highlighted the urgent need for informed and responsible practices in mCDR. As the climate crisis intensifies, collaboration among scientists, policymakers, and stakeholders is essential to navigate the complexities of mCDR and develop effective solutions. The discussions emphasised the importance of prioritising emission reductions, establishing robust monitoring systems, and ensuring that governance frameworks are inclusive and equitable.