



Blue Carbon Collaborative (BCC)

Meeting #12 -Notes

Thursday, May 9th, 2024

10:00am – 12:00pm Pacific Time

Register in advance for this meeting:

<https://us02web.zoom.us/j/88437601256?pwd=c2VkQURmVUNrUlluYmVhMkYyZnd3UT09>

After registering, you will receive a confirmation email containing information about joining the meeting.

Meeting Objectives:

- 1) Share about latest BCC participant projects and developments.
- 2) Learn from kelp experts across the science, policy, and non-profit sectors who will discuss the current research and opinions around kelp and blue carbon.

Meeting Agenda:

10:00am	Welcome, Roll Call, Review Agenda
10:15am	Panel Presentations “Kelp and Blue Carbon” <ul style="list-style-type: none"> • Kevin Whilden, Executive Director, Sustainable Surf, Sea Trees • Lais Lima, Postdoctoral Researcher, Scripps Institution of Oceanography • Sarah Mastroni, Program Officer, Ocean Visions • Melissa Ward, Blue Carbon Project Developer, Silvestrum Associates
11:00am	Discussion
11:30am	Updates <ul style="list-style-type: none"> • Project updates and developments (all)
11:45am	Next Steps
12:00pm	End of Meeting

Meeting Notes – For a complete recording of the meeting please see [HERE](#).

Kevin Whilden, Executive Director, Sustainable Surf, Sea Trees, “Why carbon markets are a useful tool and how to use them” – Powerpoint presentation available [HERE](#).

- SeaTrees is a program of Sustainable Surf. The goal of this program is to support 100 blue carbon projects by 2030.
- Why blue carbon? 90% of the world’s carbon lives in the ocean.
- There is a funding imbalance for oceans; only 4% of conservation funding goes to the ocean.
- The voluntary carbon markets can scale funding.



- A total of \$2B/yr is contributed to carbon projects, 50% for nature-based solutions and only 0.2% for blue carbon.
- BLUE+ Methodology (not ready yet, the science is not complete):
 - Like, REDD+ for forests, BLUE+ will develop a new methodology for kelp forest conservation that measures the carbon benefit of kelp forests.
- Kelp Carbon Science Study primary goal is to develop the scientific framework for carbon finance to restore kelp forests.
- This study will inform the BLUE+ Methodology.

Lais Lima, Postdoctoral Researcher, Scripps Institution of Oceanography, “Kelp Forests as Emerging Blue Carbon Pathways” – Powerpoint presentation available [HERE](#).

- Kelp forests extend across more hectares and potentially sequester more carbon than marshes, mangroves, or seagrasses (kelp forests extend from 150-203 million hectares and sequester 90-122 Tg C/yr).
- Could carbon credits be a financial mechanism for kelp forest conservation?
 - Kelp Carbon Science Study- Kelp Forest Carbon Budget
 - Kelp draws down CO₂ through carbon fixation. Carbon is not sequestered yet, it has just been brought into the system.
 - 2 major carbon sequestration pathways
 - Particulate organic carbon (POC) pathway- POC is made up of kelp bits and pieces buried in the sediment and immobilized long term.
 - Dissolved Organic Carbon (DOC) pathway- DOC is sequestered via recalcitrance. This carbon is not degraded, it stays in water column and remains there long term.
- Kelp DOC pathway: high potential, low certainty
 - Most seaweed carbon is hypothesized to be sequestered via DOC pathway.
 - Seaweed DOC dynamic is understudied.
 - Refractory DOC (RDOC): resistant to degradation.
- Lais’s lab is starting experiments to see how much DOC is:
 - Produced by kelp? Consumed by microbes? How much of that changes in response to temperature?
- Kelp blue carbon takeaway
 - Kelp carbon sequestration has high potential but also high uncertainty.
 - Kelp DOC pathways is a major knowledge gap.
 - Carbon budget must be better understood regardless of carbon credits.

Sarah Mastroni, Program Officer, Ocean Visions, “Kelp and Carbon Removal: Answering Critical Questions” – Powerpoint presentation available [HERE](#).

- Ocean Visions (<https://oceanvisions.org/>) is a nonprofit working to build capacity and interest in restoring the ocean’s health and climate health.



- Ocean Visions is advancing a strategic agenda to address the interlocking the ocean and climate crisis by analyzing the 4 R's - Reduce, Remove, Repair, Reach.
- Ocean Visions creates Road Maps – Ocean Visions continuously updates these Road Maps
- Blue Carbon Restoration and Carbon Sequestration Road Map
 - Restoring kelp forest habitats, creating new kelp forests, and where they make sense
 - For kelp, where is the carbon? How much is there?
 - The key takeaways: Lots of co-benefits (Increase biodiversity, increased water quality, etc.), Lower carbon sequestration potential (There are only so many suitable kelp habitats, a natural cap)
 - Ocean Visions looked at macroalgae cultivation for carbon sequestration.
- Macroalgae Research Framework (<https://oceanvisions.org/our-programs/macroalgaeresearchframework/>)
 - Detailed design for a set of field trials to answer fundamental outstanding questions about sinking seaweed as a carbon dioxide removal (CDR) pathway.
 - Report contains:
 - List of critical scientific questions
 - Detailed guidance on experimental designs
 - Cost estimates
 - Budgeting tool
 - List of oceanographic assets and infrastructure

Melissa Ward, Blue Carbon Project Developer, Silvestrum Associates – Powerpoint presentation available [HERE](#).

- Seaweed in voluntary carbon markets has challenges and opportunities.
- There are many co-benefits to seaweed and kelp habitat restoration, such as: supporting productive fisheries, Nutrient cycling, Eco-tourism + local industries, Cultural significance, ALSO: carbon removal.
 - There are many other benefits besides carbon removal, so we should still care about kelp regardless!!
- To stay below 2 degrees of global warming We will need to cut emissions but we must also include carbon removal.
- Engineering solutions may have high carbon sequestration value; however, but don't provide co-benefits.
- Nature-based solutions and the voluntary carbon market
 - Some companies would pay money to restore a kelp forest, by doing so they would be able to either claim the carbon reduction or retire the credits.
- Coastal habitats and carbon methodologies
 - There is no seaweed methodology there are methodologies for: mangroves, tidal wetlands, and seagrass.
- Measurement Reporting and Verification



- We need to verify how much carbon is stored or if there are assumptions being made, they must always be conservative assumptions about storage.
- The seaweed methodology is under development.
 - One needs to know the difference between the carbon stored when you would have done nothing versus if you did your restoration activities, that difference is the carbon credits.
 - Kelp is difficult to trace and determine where the carbon is durably sequestered.
- Directly Monitored, defaults, models, proxies?
 - Can we robustly estimate carbon sequestration from the dominant carbon pools for seaweed?
- Future Directions
 - Development of seaweed methodology
 - Seascape level approaches to carbon credits in the coastal zone
 - Many more creative ways to support kelp forests besides carbon credits
- The Coastal Carbon Atlas has new data in it related to this.

Q&A

- *About carbon markets: when a company purchases carbon credits, then sells the credits, does that just shift the CO2 emissions to some other industry or location? Do these markets result in a net decrease in emissions?*
 - Carbon credits are an element to the overall carbon reduction plan but cannot replace a general reduction of carbon. Overall, carbon credits are meant to be retired.
 - In order for a credit to be generated, there has to be a verifiable reduction in advance of the credit. Thus, theoretically the credit generated has already reduced its ton of CO2.
- *Is Lais focusing on other kelp species for her research? How much research on giant kelp can be applied to other species of kelp?*
 - There is not a lot of research comparing kelp species and there are some differences in kelp species' carbon sequestration potential. Lais intends to start focusing on other kelp species if the project can be funded.
 - Kelp species may vary a lot in carbon sequestration, some things might be transferable, but this needs to be answered through research.
- *A ton of carbon is relatively cheap, I've heard, how does that effect the international push to restore these ecosystems? Versus paying others for the generated credits and how that works?*
 - Blue carbon credits are worth 5-10x the value of any other credits out there.
 - The price of carbon is fickle, it depends on what carbon credit is being generated. The carbon credits generated through nature-based solutions projects are worth more. The cost of the carbon is more indicative of the cost of the project. People are willing to invest more in a carbon project that has multiple benefits.
- *There are companies in the blue carbon field that are initiating early on blue carbon credits. Is this dangerous without the proper science being done given the timeframe?*



- There is a need to move as quickly as possible but there also needs to be some certainty that the money given makes a difference. Without science showing that the carbon is stored, it can be risky. The value for the corporate buyer is the story that they can tell after buying the carbon. The innovation is critical for these blue carbon projects. Biodiversity credits may be able to step in here.
- *How much blue carbon including kelp is in private vs public land? How does this affect carbon markets? Policy framework?*
 - There is no privately owned kelp. When we are thinking of blue carbon credits, we are so far excluding the part of the ocean/kelp outside of the EEZ. There are social/legal criteria along with different management regimes that require feasibility assessments to examine how the revenue gets divided up from these carbon credits.
- *Given that there is no IPCC guidance for kelp, how close are we to being able to account for these GHG inventories for states? Do some of the same complexities still apply?*
 - Melissa is working on improving models and goals for knowing how to include kelp and seaweed into CA's GHG inventories – CA is very far from being able to do this. They use models to do all the GHG inventories in California and make them sensitive to any sort of changes. Challenges with durability are also associated with GHG inventories.
- *Is the RDOC you're looking at retained in the water column or are you interested in the potential sediment pools of kelp carbon too? Have decomposition rates been determined for benthic deposits of macroalgal wrack?*
 - RDOC is below the mixing layer, in more stable deep water pockets. As soon as it reaches a high light environment and is exchanging more with the atmosphere you are losing RDOC. There can also be some DOC in the sediments, however, Lais is not currently focused on measuring the DOC in the sediments.
- *What role might long live bioproducts from seaweed play?*
 - There are some interesting projects underway to utilize seaweed to sequester carbon. We can use seaweed for bioplastics and building materials. This means that we can still use the material but keep the carbon sequestered.
- *Given that kelp forests move – can you see remote sensing applications that capture any of the relevant metrics needed in your research?*
 - Remote sensing is essential in most carbon projects. All voluntary carbon markets rely on remote sensing. It will be essential for kelp carbon markets, but at present there are many things to be done that don't have remote sensing involved but overall, it will be required.
 - It is possible to go too far saying remote sensing gives you all the data you need. In reality, a forest where people live, you must have on the ground in the forest data as well. Remote sensing is essential but there is no substitute for on the ground data collection.



- Remote sensing could be used to monitor the standing kelp but not so much the carbon that is being sequestered. Remote sensing can also distinguish between big kelp groups, and can distinguish between different kelp species.
- *Is coastal upwelling being considered when calculating the amount of POC or carbon stored on the ocean floor? Does this work against bottom carbon storage?*
 - For Lais's full proposal, she will be looking at upwelling and would currently guess that upwelling would decrease carbon sequestration. They know that when there is a high amount of nutrients in the water column, this decreases the amount of carbon that kelp is releasing. A hypothesis posed by Lais would be that in the summer the kelp is releasing more of the DOC.
 - This is why kelp carbon is so difficult. The ocean is so dynamic. Need the science.

Project Updates

- *Andrew Barrows*: Masters candidate at the Rower lab at SDSU. Looking at how carbon moves around coral reefs and the microbes that live there. They hypothesize adding carbon to a system through algal biomass could induce more DOC to be available for microbes. They want to ensure that we are not making things worse by giving microbes more food. Looking to collaborate.
- *Sara Hutto - ONMS*: Recently published part 3 of blue carbon and MPAs report series Marine sediment carbon analysis: [Link](#)
 - Attempting to quantify kelp carbon export and whale carbon. Ongoing blue carbon initiative at the sanctuaries.
- *Melissa Ward*: California just released conservation targets for nature-based solutions: [Link](#)
 - And San Diego has a new seaweed farm. <https://www.olafarms.org/>
- *Kaysha Kenney*: Orange County Coastkeeper, living shoreline restoration projects in Orange County. Doing a new project in Seal Beach National Wildlife Refuge addressing coastal erosion in addition to the co-benefits of habitat restoration. Looking to connect on eelgrass restoration, living shorelines, oyster restoration.
- *Sarah Rosenthal*: UC Davis, consulting for the Ocean Science Trust, compiling a data gap analysis, one of the goals for this project is providing some info for what to do once these gaps are closed.

Next Steps

- Next Meeting: Blue Carbon Policy Updates, August 8, 2024