Blue Carbon National Working Group

Final Report: January 2, 2019

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Restore America's Estuaries (RAE) led a Blue Carbon National Working Group (BCN) meeting October 16-17, 2018. This second meeting of the BCN was hosted by the Chesapeake Bay Foundation and the Smithsonian Environmental Research Center (SERC). Funding was provided by NOAA's Office of Habitat Conservation (OHC) and the Curtis and Edith Munson Foundation. The meeting was attended by 38 experts in their fields, representing state and federal government, nonprofits, foundations, research institutions, and consultants.

The first meeting of the BCN occurred May 20-21, 2015, with the following objectives: 1) Increase communication on past, current, and future blue carbon work (at the national, regional, and local scales); 2) Increase coordination on future blue carbon projects, including identifying funding opportunities and pilot projects; and 3) Provide a platform for discussion of science needs, information gaps, and blue carbon priorities.

This first meeting resulted in the identification of three priority recommendations for advancing blue carbon nationally:

1. Develop a database of blue carbon storage, sequestration, and emission factors that can support landscape level carbon accounting on coastal lands;
2. Develop pilot projects that demonstrate how to implement blue carbon projects and policy, and develop lessons learned from these actions; and
3. Integrate blue carbon benefits into existing and emerging ecosystem service models and descriptions to more fully account for the full suite of benefits provided by these ecosystems.

After three years, and with a growing community of professionals engaged in blue carbon work, it was the right time to bring together a second meeting of the Blue Carbon National Working Group to discuss progress made, remaining challenges, and strategies to address them. RAE worked with consultants, NOAA OHC staff, and other partners to organize and host a second meeting of the BCN. Objectives of the meeting included expanding the network, to share progress, check in on the status of priority recommendations produced from the first meeting, and to plan an approach ahead. The collective knowledge of this group will continue to benefit the national blue carbon community and NOAA OHC by increasing understanding of blue carbon ecosystem services, how this service can support fisheries habitats, and how stakeholders are using this information to enhance management and support restoration and conservation efforts.

This meeting was organized as a two-day, in-person event. Day One's agenda began with a focus on presentations from experts across the country working in the field of blue carbon science and/or application. Presentations included:

- Welcome and Introductions – Stefanie Simpson, Restore America's Estuaries
- The Future of Blue Carbon and the Role of Partnerships – Dr. Jennifer Howard, Conservation International
- Blue Carbon in the U.S. Greenhouse Gas Inventory – Dr. Steve Crooks, Silvestrum Climate Associates
- Blue Carbon in the Voluntary Carbon Market – Amy Schmid, Verra/Verified Carbon Standard
- Early Lessons Learned from Blue Carbon Feasibility Studies in the U.S. – Scott Settelmyer, TerraCarbon
- NASA: How the Blue Carbon Monitoring System Effort Moves the Ball Forward – Dr. Lisamarie Windham-Myers, U.S. Geological Survey
- Coastal Carbon Research to Support Budgets, Inventories, and Offset Projects – Dr. Kevin Kroeger, U.S. Geological Survey
- Impacts of Land Use on Mangrove Carbon Stocks and GHG Fluxes – Dr. Richard MacKenzie, U.S. Forest Service
- Feasibility Planning for Pacific Northwest Blue Carbon Finance Projects – Craig Cornu, Institute for Applied Ecology

After a networking lunch break, attendees then participated in two, expert-facilitated breakout strategy sessions. Session topics included: a) Policy: "How can we improve the connection of science to policy?" facilitated by Steve Emmett-Mattox, Strategic Collaborations, LLC; b) Science: "How can we better coordinate science efforts and improve access to existing data?" facilitated by Dr. Patrick Megonigal, SERC; c) Markets: "How to support the identification and development of blue carbon market projects?" facilitated by Scott Settelmyer, TerraCarbon; and d) Management & Restoration: "How to improve application of blue carbon data to support management and restoration goals?" facilitated by Dr. Steve Crooks, Silvestrum Climate Associates. Presentation and breakout session notes are included below.

Day Two included a site visit to the Smithsonian Environmental Research Center. SERC's Dr. Pat Megonigal and Dr. David Klinges presented on SERC's LEED designed research facility and the newly created Coastal Carbon Research Coordinating Network and database (RCN). The short presentation was then followed by a tour of the Global Change Research Wetland, where attendees could observe ongoing marsh greenhouse gas research.

Morning presentations by blue carbon researchers, carbon market experts, and project developers highlighted progress made since the 2015 BCN meeting. In summary, good progress is being made to address priority recommendations identified in 2015; however, in addition to remaining science gaps, new needs have been identified.

Priority Recommendation from 2015 Meeting	Progress as Reported at 2018 Meeting	Next steps
Develop a database of blue carbon storage, sequestration, and emission factors that can support landscape level carbon accounting on coastal lands.	Coastal wetlands are now included within the U.S. GHG Inventory, and the newly developed Coastal Carbon Research Coordinating Network is working to advance data synthesis.	RCN working to expand their network and to model and map coastal carbon sequestration rates across the contiguous US
Develop pilot projects that demonstrate how to implement blue carbon projects and policy, and develop lessons learned from these actions.	A few blue carbon offset pilot projects have been initiated but are still in the feasibility stage. Lessons learned thus far include a need for: 1) Guidance on legality of carbon offsets on government-owned land, and 2) Approaches for streamlining/reducing project development and monitoring costs.	RAE proposes to develop a legal guidance document for government agencies interested in pursuing carbon project development. RAE is working with the Pacific Northwest Working Group as they assess market feasibility, including using a grouped approach.
Integrate blue carbon benefits into existing and emerging ecosystem service models and descriptions to more fully account for the full suite of benefits provided by these ecosystems.	Remaining science needs to be addressed/incorporated into monitoring efforts include: Methane at various salinities, fate of submerged carbon, emission factors and stock in degraded systems, mapping of impounded wetlands and seagrass, model development, etc.	SERC is leading the CCRCN effort to collate existing blue carbon research, identify data gaps, and develop data accessibility for stakeholders.

Discussions from the 2015 BCN meeting included forming a collaborative body that could synthesize and house blue carbon data. After subsequent meetings and proposals, the Coastal Carbon Research Coordinating Network (RCN) was created. The RCN is hosted by the Smithsonian Environmental Research Center, and “will accelerate scientific discovery, advance science-informed policy, and improve coastal ecosystem management by: (1) Developing a community dedicated to coastal wetland carbon science for basic research, policy development, and management, (2) Exploring the ecological links between coastal wetlands, estuaries, and the atmosphere, and (3) Sharing data and analysis tools that support the diverse needs of scientists, policy makers and managers.” The RCN will be a valuable partner in advancing blue carbon nationally.

From the 2018 BCN meeting, the following needs were identified:

- Protect policies that conserve existing wetlands and restore drained wetlands
- Identify national restoration potential and quantify the subsequent blue carbon potential

- Model development and data refinement for blue carbon finance projects, including: Local and baseline data, transferability of regional models, etc.
- Host trainings for scientists and project developers on VCS methodologies, supporting the need for validators and project developers
- Develop legal guidance for developing carbon offset projects on government-owned land
- Engage with diverse funding groups on blue carbon early and often
- Develop additional outreach tools: Videos, infographics, briefings, etc.

Referencing this ‘needs’ list and the meeting discussion, a set of next steps was created (page 17). In the near-term (and contingent on continued program funding), RAE will develop a BCN webpage to share resources, draft a 2-4 page BCN summary for members to use in communicating blue carbon, and plan Congressional and agency briefings, as appropriate, to continue federal government engagement and garner support for blue carbon research and pilot projects. RAE will continue to lead the BCN, address identified needs and next steps, and lead discussions nation-wide to identify blue carbon pilot projects.

Oct 16, 2018 Meeting Notes & Next Steps

<u>Presentations</u>

Opening Remarks (Stefanie Simpson, RAE)

- Why are we here?
  - Accounting for blue carbon supports:
    - Informed management and policy decisions
    - Understanding ecosystem health
- 2015 BCN Meeting Priority Recommendations – progress has been made on both
  - Develop database of blue carbon storage, sequestration, and emission factors
  - Develop pilot projects that demonstrate carbon storage
- 2018 BCN Meeting Agenda
  - Science – new papers every month
  - Policy – inclusion of blue carbon into national inventory
  - Markets – methodologies and pilot projects
  - Management and restoration – linking data to application
- Concerns: seagrass restoration; utilizing tools for seagrass restoration; how do we kick start big carbon market projects with new management tools; how to streamline project development process

Jen Howard, Conservation International: "The Future of Blue Carbon and the Role of Partnership"

- Backs BC Initiative at international level
- Tropical forest, peat and mangrove carbon is concentrated in 3 global regions (Indonesia, Brazil, DRC, Peru, Malaysia, Columbia)
- How can we help countries incorporating ecosystems into mitigation strategies? Work in Peru, Bolivia, Mexico
- S&T Policy and building local economies; Innovative financing; Restoration
- Countries now have methodology approved by IPCC to measure carbon mitigation benefits
- International partnership for blue carbon is more focused at national government scale; looks at government that could benefit from wetland restoration; break through barriers
- Global mangrove alliance – increase global area of mangrove habitat 20% over current extent by 2030; spent past fall on fundraising
  - 20% had been lost; attempt to return to baseline
- CI goals:
  - Securing tropical forest for climate
  - Sustainable landscapes and seascape
  - Ocean conservation at scale
  - Innovations in science and finance
- Cispata, Colombia (Caribbean side) – 11,000 hectares of mangrove where BC is implemented
  - Funded in part by Apple; first 17,000 tons will be <u>retired</u> in Apples name
    - Columbia cannot use these credits, Apple takes them out of market

    - Provide sustainable ecotourism
    - Columbia already has internal national carbon credit market

Steve Crooks, Silvestrum Climate Associates: "Blue Carbon in the US GHG Inventory"

- More than dozen blue carbon papers and books coming out this year
- 2013 IPCC supplement for GHG Inventories- added coastal wetlands; allowed for countries to recognize improvements that can be made to wetlands
- US Emissions of interest:
    - Emissions and removal of CO_2 and CH_4 on intact and restoring wetlands
    - Drainage and excavation activities
    - Conversion of wetlands to open water
    - Forestry activities on wetland soils
    - CH_4 emissions from impounded waters
    - Aquaculture
- US Analysis: 3 methodological tiers:
    - Tier 1: Simple first order approach
    - Tier 2: country specific approach- land cover change, soil carbon stocks, C sequestration
        - Lots of data at this level
    - Higher order methods – potential future improvements
- Very little data for seagrass systems
- Considerations for management:
    - Amount of C sequestration would be much smaller if not for policies put into place
    - Current restoration accounts for only 0.02 MMTCO2e/yr of new C sequestration
    - Restoring wetlands on drained organic soils (non dev) would avoid emissions of 4 MMTCO2e/yr
- Main sources of error: soil C erosion losses; based upon Tier 1 assumption of 1 m depth of soil erosion and 100% of eroded C returns to atmosphere
- Improvements:
    - Inclusion of biomass
    - Refined tidal boundary
    - Refined uncertainty analysis
    - Further integration with NWI and FIA datasets
    - Inclusion of seagrass meadows (Potential)
    - Improved CO_2 and CH_4 influxes from palustrine wetlands (Potential)
- Australia, Abu Dhabi, interested in BC monitoring activities

Amy Schmid, Verra/Verified Carbon Standard: "Blue Carbon in the Voluntary Carbon Market"

- Verra: nonprofit originally founded as VCS (Verified Carbon Standard)
    - # of different programs that implement enviro standards
    - VCS is one of those standards
- VCS: standard and program for certification of greenhouse gas emission reduction projects
    - Most widely used GHG program, 1400 projects registered

    - Approved methodologies: coastal wetland creation; tidal wetland and seagrass restoration; revision to include tidal wetland restoration and conservation (under dev)
- Increase in GHG credits issued in 2017 and 2018 compared to previous years
    - Both from VCS and other projects
    - Especially by large forestry projects
- 28 countries include a reference to coastal wetlands in their NDCs for GHG mitigation (Paris Agreement)
- 59 countries include coastal ecosystems and the coastal zone in adaptation strategies
- Sees Paris agreement as way for more finance to be integrated with mitigation and adaptation
- Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)
    - Emissions from international aviation are not covered under Paris Agreement
    - Agreement between countries to reduce emissions associated with international travel
    - Could represent a large increase in demand for voluntary GHG credits
- Current work being done by Verra to reduce barriers to blue carbon projects in VCS program
    - Exploring streamline monitoring options to reduce burden of going to individual plots
    - Forward crediting mechanism
    - Wants to hear other possible suggestions for changes
- Blockchain based registry being explored for carbon credits
- Standards are developed with number of experts and technical experts, projects go through analysis that make sure that they are designed to meet requirements and are sound, and monitoring occurs throughout project timeline. Number of checks from experts to make sure that project is sound

Scott Settelmyer, TerraCarbon LLC: "Early Lessons Learned from Blue Carbon Feasibility Studies in the US"

- Blue Carbon Feasibility Studies: Herring River MA; Delaware Bay; Goodland FL; Port Fourchon LA
    - Delaware Bay – focused on looking at compounded areas, idea was to restore tidal flows and salt marsh habitat
    - SW FL – looked at restoring mangrove basin, hydrology alterations disrupted tidal flow resulting in die off
    - LA – active port that has to dredge, looked at taking dredge material and making a marsh or potential mangrove habitat for coastal protection services
    - Key insights from 4 studies: measuring methane; operating at scale; importance of public lands
- Measuring methane: important where hydrology (salinity) has changed
    - Low CH_4 emissions in high salinity. Measure salinity and use default values
    - High CH_4 emissions in low salinity; variable, no default; degraded, little research, hard to apply, problem from accounting standpoint
    - A lot of literature in natural systems, but less so in degraded systems
    - Opportunities around modeling methane that is more broadly applicable
- Importance of scale (Illustrative Example)
    - 5 generic project types:

        - Marsh restoration (revegetation)
        - Marsh restoration (tidal restoration, low and high CH4)
        - Mangrove restoration
        - Seagrass restoration
    - Offsets/acre/year: highest amount for tidal restoration in high CH4 scenarios, low for seagrass restoration and tidal restoration in low CH4
        - Large range illustrates opportunity to generate carbon revenue
    - $5 a ton is average
        - Does not include restoration costs
    - Scale to break even (from c development cost) at $5/ton:
        - 1900 acres for marsh restoration vegetation
        - 500 acres for marsh restoration high CH4
        - 727 for mangroves
        - 6000 acres for seagrass
        - Forestry typically 5000 acres
    - Scale to break even at $10/ton (still considered pretty low):
        - Range stays pretty similar
    - Another way to address scale: **pull multiple projects together**. This could include different landowners and different efforts by those landowners at different times. This process is termed "grouping".
    - Another consideration – funders interested in innovative c approach to pay for upfront c cost (e.g. Apple-CI project)
- Role of public lands:
    - Can serve as anchor parcels in a grouped project
    - Often past or ongoing research to support GHG accounting
    - Restoration is mission aligned.
    - However, state and fed land management agencies often unclear if they can enter into carbon transactions despite precedents and missions alignment
    - There are precedents from terrestrial carbon
- Summary recommendations
    - Work at scale and consider grouped approaches
    - Consider projects with methane avoidance
    - Leverage existing research and coordinate new research with C project
    - Engage with land management agencies on role of carbon in co-funding restoration (include long-term monitoring costs, generally not funded); framing carbon finance is becoming more mainstream
- Q&A:
    - Q: Explain Break Even Point
    - A: There is a cost (not including restoration cost) to develop a carbon project. At what point do we recover from cost and start contributing to restoration monitoring/ management.

    - There can be contribution from companies such as Apple do cover up front costs. This way up front cost is covered and c revenue can go to project.

Lisa Windham-Myers, U.S. Geological Survey: "NASA: How the Blue Carbon Monitoring System Effort Moves the Ball Forward"

- Initial goal: can we get more confidence in our numbers from national accounting. We should be able to move from tier 1 to tier 3. What happened was stepped from use of national datasets into monitoring of projects
- BCMS goal: reduce uncertainty
    - Need to understand uncertainty in national layers
    - How much better do they need to be to improve GHG accounting
    - Where are biggest data gaps
    - Is there uncertainty with maps, data, or modeling
- Big difficulties were with modeling – C Accretion rates could not be applied at continental scale; data limitation for methane flux
- Holmquist et al. (2018): "Uncertainty on CONUS GHG Inventory"
    - In the period analyzed loss of C associated with erosion
    - Not a lot of data on the right number for methane and salinity (currently set at 18 ppt)
    - Hard to see when riverine system becomes tidal system
    - Products: soil maps, flux maps, national and state levels
        - Tidal Boundary: had not been made before, probabilistic version created; provided ability for individual decision to create boundary
- Byrd et al. (2018): Created universal model for annually reproducible maps at 30 m resolution for tidal marsh peak biomass based on LandSat and automated 1m NAIP water/soil/vegetation classification
    - No strong effect of salinity/site/plant type
- Really strong consistency down core and no major effect of climate, vegetation type, salinity
- Morris et al (2016): ideal mixing model and virtual marsh model constrain potential accretion and C sequestration.
    - Levels at which you might gain or lose a marsh depending on sea level rise
- Drexler et al (2018): measures confidence in rates of C accretion
- National maps = high uncertainty. Need to improve:
    - tidal zone/connectivity
    - Salinity
    - Relative elevation
        - Overwhelmingly biased positive. Think that marshes are much higher than they are. Crossover time to marsh sinking is much sooner than expected
- Q&A
    - Q: We are excluding brackish and freshwater systems?
    - A: Usually have problems getting methane in the baseline.

Kevin Kroeger, U.S. Geological Survey: "Coastal Carbon Research to Support Budgets, Inventories, and Offset Projects" (Bringing Wetlands to Market project, aka BWM)

- Developed plan to improve understanding of C dynamics and biogeochemical processes and create new tools for managers and policymakers
- First step is to innovate science. Then able to predict C storage. Next step to is carbon markets and financing and finally economic analysis
  - Important for collaboration to exist throughout all steps
- Soil C: Vegetation response to flooding results in an increase in vertical accretion rate and in C storage, as sea level rises. Rate of elevation loss declines through century.
  - There was no difference among N gradient sites
  - Implication: might not lose marshes as quickly as expected
- High to low marsh transition is happening widespread and quickly. may underestimate C storage.
  - Looking at old data
  - Comparing 1984 marsh extent to 2013
- Spoken to audience: **"If anyone has instantaneous gas flux data, looking to collaborate. Looking for tier 2 providers"**
- Synthesizing data on lateral fluxes. Hypotheses:
  - Rate of lateral flux is related to rate of C cycling within wetland
  - Rate of lateral flux related to rate of aquatic exchange
- During BWM1, through end user engagement, identified tidally restricted, impounded wetlands as important coastal feature with significant BC potential.
- BWM2: looked at herring river system; incredibly challenging with large area
  - Range of drained and impounded landscapes within system
- New study:
  - National salt marshes in Cape Cod – robust elevation response to sea level rise over time
  - Shrub – slightly steep slope
  - Recent years elevation gained more rapidly due to groundwater rise, promoting C storage
  - Loss of C stock
- *Climate benefits of avoided diking, draining, or impounding of wetlands is substantial*
  - Total emissions to atmosphere in 100 years since Herring river was diked = 1.3 billion of automobile emissions
- Summary
  - Extremely productive to do all alongside each other: new data collections, mapping, policy dev, project dev, inventory and assessment.
  - Best opportunities may be related to hydrological management: avoiding and restoring restricted wetlands
  - Updates to VCS and IPCC guidance:
    - Methane reduction do not have non-permanence risk, therefore it is sensible to exempt from risk pool (Verra: confirmed these can be exempted)

        - Methane reductions do not require extended time to be impactful: reduced project lifetimes could reduce barriers
    - Working with team to map impacted/impounded wetlands to identify possible project sites, provide quantification of wetland contribution to state and fed inventories
    - Gas fluxes alone cannot measure C storage
- Q&A:
    - Q: Want to make point that we don't have data collections for methane emissions for different types of land use. Would be useful to have model to estimate CO_2 and methane?

Richard Mackenzie, US Forest Service Pacific Islands: "Impacts of land use on mangrove carbon stocks and GHG fluxes"

- Sustainable Wetlands Adaptation and Mitigation Program (SWAMP): provide info to developing countries to make sound decisions relating to role of tropical wetlands in climate change adaptation and mitigation strategies
    - Quantify GHG emissions
    - Quantify C stocks
    - Dev ecosystem modeling tools
    - Quantify role of tropical wetland systems in CC adaptation
    - Dev capacity building and outreach activities
- Cambodia project:
    - C stock assessment of mangrove forests
    - Laid grid over entire country and estimated 48 mangrove plots with 5 subplots
    - Researched how land use impacts C stocks and GHG emissions of mangroves
        - Forest structure impacted by cutting were classified as degraded
        - Identified intact, degraded, deforested, and restored areas
    - Results:
        - C stock twice as much in mangroves in North than in South. Most C stored in soil depth 2m
        - Deforested has sig lower C stocks than restored
        - Degraded sites had similar levels C stock as intact
        - Restored mangrove (25 yr) had same amount of C stock as intact
        - 25 yr is when total ecosystem C stock reaches backdrop of intact
        - Higher co_2 fluxes in mangrove forests are likely due to respiration. In contrast, only heterotrophic respiration occurs in ponds due to no vegetation
        - Higher average CH_4 flux from ponds was due to 1 site. Ch_4 fluxes greater from intact forests
        - Intact mangroves release more CO_2 than ponds and restored
- Pacific Sea Level Rise Monitoring Network
    - Can scan mangrove plot in 5 minutes; want to apply same methodology to salt water as well
    - Can also quantify biomass

- Q&A
    - Q: You didn't have a lot of sensitivity in the soil, do you have elevation and will you be getting surface loss?
    - A: Didn't account for that, but thought about it. After a mangrove is deforested, it loses C, but there is still some residual C that is remaining. As a result, when you restore the site, you are not necessarily starting from square 1 and it may only take 25 years to restore C stocks in those systems.

Craig Cornu, Institute for Applied Ecology: "Feasibility Planning for Pacific Northwest Blue Carbon Finance Projects"

- Focus: fill data gaps that have been mentioned with collab. effort
- Developed social media presence to reach end users and policy makers
- 1st Project: C Stock Assessment and C Database Dev. (3 yr project)
    - Both supported by same funding source: NERRS Science Collab.
    - Want people to be able to use local data in local projects
    - Meet with community interest through workshops (happening this winter) then create feasibility assessment components.
    - Important: create description of data needs and timeline/budget for project development (1 year timeline)
    - Develop table of contents for project outline (1 year timeline)
- Q&A:
    - California C market is mostly into forestry project, wetland sit in voluntary market. Regulatory system in NE can in the future approach regulators for entrance
    - Q: Is this whole aggregation thing being done within 1 agency?
    - A: Looking like it's all over the map and all 3 project sites pretty interested in how this aggregation works at the site level and organization level; hoping that we can add up to enough acreage to pencil out.
        - Biggest project we did was 20 acres, this is much larger. As new programs come online in these states in would be great to get blue carbon on the table early on, should look at it at a landscape scale and see opportunity in voluntary markets see who else is doing.
        - In terms of grouping, started thinking about single estuary scale, Puget Sound should be 1 project, go by estuary by estuary (case by case).
        - Putting this project in place puts in infrastructure that makes it more cost effective for guys that come after it.
    - Q: It seems like that it's important that as fast as we're trying to identify these dead or dying areas, that it's those areas that are stressed around each of those dead areas that it's important for us to find the funding and truly identify stressed areas. This could be taken to land agencies. If there is a way to keep an area from losing its areas (conservation) we should scale up on that ability to help out and show carbon market potentials.

- Q: Can someone comment on stacking and where we are with formalizing projects like this that have multiple benefits?
- A: We (Verra) operate a number of certification programs one is for exactly those co benefits and you can eco label your carbon certification projects.

Key Takeaways

(As submitted by participants after morning presentations.)

Science-related:

- Advances in science – LIDAR overestimating elevation in marshes; cesium dating may not be accurate in coastal systems; and low marsh accretion is accelerating (counteracting SLR).
- There were many exciting advances in relevant carbon science, but from an end-user perspective, it seems the science community has introspection and work to do before the science will adequately support carbon feasibility projects and other applications.
- Models are a way of lowering project costs.
    - How transferrable are they to different regions/systems?
    - What key variables must be measured on site (if any) to make models work?
- NWI data shows some non-tidal areas that are actually below the high tide line.
- MacKenzie presentation – mangrove lack of soil effect from deforestation = important message.
- PNW Blue Carbon Working Group – 34 sites should be correlated to the USDA-NRCS "soil series" level further leveraging the NWI database to ID these soils with carbon storage that is high, low, and moderate. Soil carbon stocks based on soil series/soil types.
- Need for methods related to carbon measurement and accounting in degraded systems.
- What is the price of carbon that is needed to scale?
- Need for trainings for scientists on VCS methodologies so we get validators and projects.

Market-related:

- Increasing importance of how to bring more blue carbon projects to the market.
- How can identification and mapping of stressed areas of mangroves help to scale-up and "break-even"?
- Multiple benefits can be monetized!
- We have the science, we need demonstration projects.
- Crediting projects that avoid wetland degradation.
- Cost barriers – need for innovative partnerships with corporations.
- Potential for forward crediting mechanisms through VCS.
    - How would this work? Sounds like it would be *really* helpful for blue c projects.
- Airlines (international) potential market – awesome!
- Price of carbon is too low!
- The size of typical projects is quite small, placing an emphasis on the successful grouping of projects.

Restoration and Management:

- Where are the best places for restoration? CZSS can help you make these decisions on implementing successful projects. Good/quality soil survey data and maps can greatly assist as soils are inherently the focus of the project.
- Climate benefits of avoided diking, draining, or impounding of wetlands is substantial.
- Avoided methane projects are the most cost-effective.

Policy:

- 30% of our emission target can be achieved by natural ecosystems – how much from estuarine systems?
- Blue carbon projects have multiple co-benefits – important to value too.
- First – stop losses of blue carbon habitats.

Breakout Sessions

Science:

(Notes and summary provided by David Klinges and Pat Megonigal)

- As scientists, how can we improve our work to cater to the needs of users?
    - Provisions that can reduce monitoring costs
    - Modelling work of historic baselines and future projections (can be expensive initially but cheaper in long term)
    - Surveillance of not just impacted sites but also more control/baseline scenarios
        - This was surprising for scientists to hear
        - Challenge: may be due to bias of funding sources
    - Better spatial representation both on regional and global scale
        - Challenge: What is the price of precision?
- Scientist are looking for permanent databases
    - Opportunity: Coastal Carbon Research Coordinating Network, aka CCRCN
- During project design, keep the carbon market end-users in mind
    - Opportunity: Translate the data into economic measures

Markets:

(Notes and summary provided by Leland Moss and Janine Harris)

- Bring in other ecosystem services into context with carbon
    - Opportunity: Verra developing a co-benefits program - sustainable development impact credits (SDIC?)
    - Consider also the quality of acres being restored
- Need/opportunity: educate funders!
    - When to reach out? Earlier the better.
    - Multiple funding streams needed to support projects.
- Challenge: Need more cost-effective ways to monitor
- Challenge: Approaches to address risks and permanence

- Challenge: Price of carbon
    - What price per ton do we need to reach?
    - There may be subsidies undercutting this price.
        - E.g. RECs (renewable energy credits) are usually not additional and may compete with offset sales
- Opportunity: As compliance markets emerge, make sure offsets are part of it and coastal wetlands/blue carbon
- Policy issues when on public land? Need education for agencies on precedence.

Restoration & Management:

(Notes and summary provided by Ken Krauss and Kevin Kroeger)

- Challenge: A lot of restoration projects are not successful, emphasize need for longer term management and monitoring support
    - missing out on the bigger story when don't have long term monitoring. Example of success - Tampa Bay seagrass
- Communication - need to relate to people where they are; tell our stories to connect with them
    - Lots of interest in "blue carbon" as a branding term
    - Keep focus on cause of stress in habitats (e.g. we often tend to blame degradation on a big storm/hurricane when in reality the habitat was already stressed by anthropogenic causes)
    - Need more tools: videos, infographics, etc.
    - People need to feel confident enough to have stake in project
    - Avoid jargon. Water Words that Work training - helpful training.
- Need: better access to data; e.g. SSURGO
    - Opportunity: CCRCN
- Small-scale restoration projects are important for getting community buy-in and support - highlight these to keep momentum going and build on projects.
- Define research initiatives that agencies understand and have a stake in
    - E.g. USGS mandated to support DOI lands, carbon is justified in providing support to land decisions
    - FWS mandate is about species habitat, carbon is part of healthy ecosystem services
- Include the human-impact component of projects - fisheries, resilience to storms, etc. to relate to community. Blue carbon is part of that strategy.

Policy:

(Notes and summary provided by Ariana Sutton-Grier and Kevin Kroeger)

- What does policy mean? What does success look like?
    - Informing policy and decision-makers; decision-makers not always Congress, also agency leadership
    - US National Inventory inclusion of coastal wetlands
    - WA climate initiative - connecting coastal restoration with climate finance from auction allowances

- Need to align our messaging/communication with target audience and their interest
    - E.g. jobs from restoration; salmon habitat/fisheries; coastal protection; water quality; etc,
    - ROI - where is data on this?
    - Scientists not always the best messengers
    - When involving stakeholders and end-users, also include lawmakers and legislative staff
- Challenge: Price of carbon is low; need compliance markets to drive price
- Challenge: Current admin pushing back on supporting mitigation/no net loss policy - this is where the biggest climate benefit is (keep it in the ground)
- Opportunity: NOAA policy analysis: need for funding to research carbon in wetlands; grow the constituency for blue carbon ES
- Opportunity: Policy at state level
    - Roughly half coastal states are part of US Climate Alliance - need more engagement with how they can include blue carbon into their emission reduction strategy
    - State could be logical place to aggregate projects - scale up beyond the break-even point for market/carbon finance projects.

Discussion Summary

Overarching themes:

- Communication - targeting messaging and relating to audience interest
    - “All restoration is good to do”
    - Build in blue carbon to suite of benefits communicated
    - Consumers/practitioners need to communicate to agencies where data gaps are; need a collective effort
    - 1) Funding for new initiatives and 2) Maintain funding for reliable datasets and inventory
    - Infographics - simple roll up of information and have confidence that based on good science (without being too technical)
    - Customization of visualizations?
    - Unify and coordinate stories from project level and promote at national level (like trade association); get the network to be the advocate (RAE role?)
        - Projects are a mechanism for communicating stories
- Barriers
    - Modelling needs to bring down monitoring costs
    - Scale of projects
    - Price of carbon
    - Simplifying data requirements
- Opportunities
    - Blue carbon manual exist, but need guidance on what are top priorities for measuring that would be useful for practitioners. E.g. salinity, control sites, etc.
    - Guidance on practices that enhance carbon management

- Science - need more baseline data - USGS and other agencies?
- Place-based approaches; fed/state partnerships (NERRS, NEPs, Refuges)

- Who is missing from the discussion?
  - Coastal state wetland managers (ASWM); land managers
  - Help them tell their stories to funders, agencies, etc.

Next steps:

- Short-term: Keep the networking going to further collaborations
  - RAE to create 2-4 page summary of BCN meeting, outcomes, successes, and road map going forward (to share with BCN members and partners)
  - RAE to create BCN webpage with resources, links (initiatives, databases, etc.), and contacts
  - Strategize on agency and Hill briefings (esp after election, early winter before FY ends and when planning next year budgets)
    - Identify 3-5 talking points from BCN meeting to carry forward
    - "All restoration is good to do" – not a risk associated with it, policy-win
- Mid-term:
  - Keep the networking going – Cross-sector volunteer opportunity in DC region: coordinate with BCN members in the region to volunteer together for a restoration/volunteer event
  - Strengthen and communicate a united message on blue carbon – Organize agency briefings on research needs and priorities; bring blue carbon scientist to agency and hill staffers
  - Connect the dots on existing resources – studies/analysis combining ES (e.g. jobs and blue carbon; blue carbon and restoration; etc.) and one pagers tying blue carbon back to restoration and ES
  - Engage with more funders, agencies, Hill staffers
- Long-term:
  - Development of additional resources/trainings as identified by BCN members
    - Trainings – e.g. Water Words that Work
    - Resource/infographic development
    - VCS methodology training
  - Funding for modelling needs
  - Study on the national restoration potential (especially on federal lands) and the corresponding blue carbon potential/stock
  - Guidance for federal agencies on pursuing carbon crediting on federal lands