Blue Carbon Market Opportunities & Science Needs

Stefanie Simpson
NASA CMS Applications Policy Speaker Series
February 16, 2017

RESTORE AMERICA'S ESTUARIES
www.estuaries.org

Who we are

Restore America's Estuaries is dedicated to the protection and restoration of bays and estuaries as essential resources for our nation.

www.estuaries.org

Coastal Blue Carbon

Greenhouse gases (GHGs) stored in, sequestered by, and released by coastal marine ecosystems such as seagrasses, mangroves, salt marsh and other tidal wetlands.

Recognizing the GHG values of these systems can lead to new incentives for restoration/conservation.

RESTORE AMERICA'S ESTUARIES

Relevant Greenhouse Gases (GHGs)

CO_2: Sequestered by plants and stored in plant material and soil

N_2O: Production is anthropogenic in wetlands and estuaries, x300

CH_4: Highly variable at <18 ppt salinity

Insignificant above 18-20 ppt, x 21 - 34

RAE Blue Carbon Strategy

Introduction into <u>Carbon Markets</u>
> VCS Requirements
> Restoration Methodology
> *Conservation Methodology*
> *Demonstration projects*

Support <u>Science</u>
> Snohomish Estuary Assessment
> Tampa Assessment

Explore <u>Policy and Regulatory</u> Options
> e.g. 'Carbon reserves'

<u>Coordinate</u> Blue Carbon Initiatives
> e.g. National/Regional Working Groups

Raise <u>Awareness</u> and Build <u>Capacity</u>
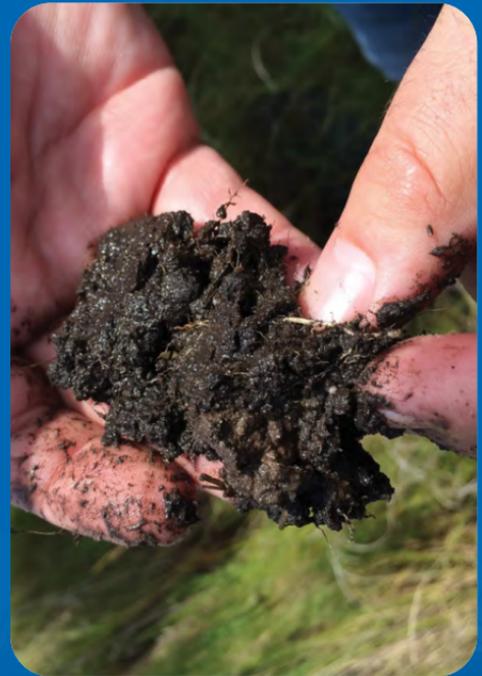
Carbon Offsets

Carbon Offsets

Offsets represent emission reductions that have been achieved outside of the capped sector.

1 Company A needs to meet its emissions cap
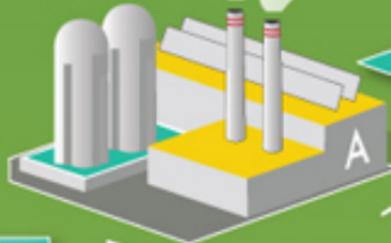
2 Company A invests in an emission reduction project that produces carbon offsets

INVESTMENT

CREDITS

CARBON OFFSET

3 Company A receives carbon credits for its investment

One carbon credit = One tonne of greenhouse gas emission reductions

Carbon offsets programs can include:
• Reforestation
• Renewable energy
• Methane capture/combustion

Compliance Markets

**REQUIRES private sector participation by capping emissions**

➢ California Global Warming Solutions Act

➢ Regional Greenhouse Gas Initiative (New England states)
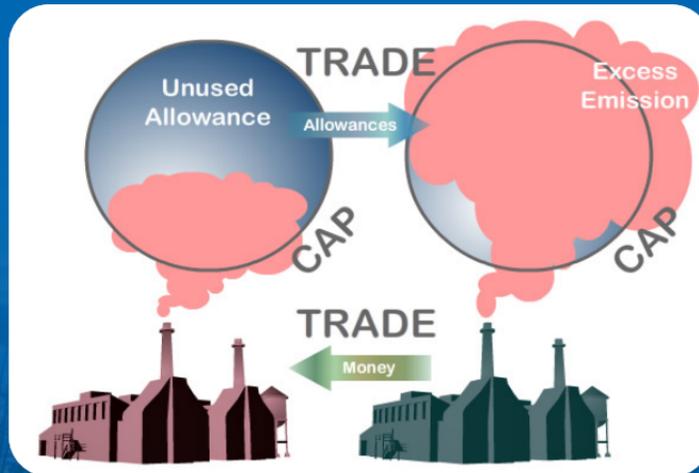
Voluntary Carbon Market

- 84 mil tonnes offset in 2015 with market value of $278 mil

- Most supply/demand of any country originated from US (15.4 MtCO2e, up 71% from 2014)

- 98% offsets sold to private-sector buyers – energy, transportation, finance/insurance, events/entertainment and service sectors

- relations)

- Verified Carbon Standard largest issuer, 49% market share

- Top reasons cited for offsetting:

  Demonstrating climate leadership within industry;

  Pursuit of a GHG emissions target (CSR/public relations)

Figure 7: Transacted Volume by Project Type, 2015

All values are in MtCO$_2$e.

Rising Ambition: State of Voluntary Carbon Markets 2016. Ecosystem Marketplace.

Voluntary Market
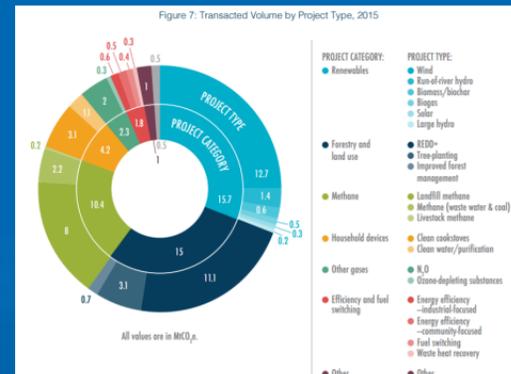
Standards ensures quality and integrity of carbon offsets
- General requirements & guidance on GHG accounting
- Procedures for validation and verification

Methodologies provide step-by-step requirements for quantifying GHG benefits following scientific good practice

Wetlands Requirements

Agriculture, Forestry and Other Land Uses (AFOLU) Category

- Wetlands Restoration and Conservation (WRC) – new category approved in 2012

"The WRC project category provides a framework for accounting emission reductions in mangroves, freshwater tidal coastal wetlands, salt marshes, seagrasses, floodplains, peatlands and potentially other areas. These groundbreaking requirements are the first for crediting restoration and conservation activities across wetland ecosystems." -- www.v-c-s.org

Wetlands Requirements

- Shall not directly connect hydrologically to adjacent (non-project) areas or do not cause negative impact within the area that could cause significant inc GHG
- Or where they may, projects should establish a buffer zone that ensure potential impacts are mitigated

- Include CO_2, CH_4 and N_2O within project boundary
- Current and historical hydrological characteristics
- Climate variables influencing water table depths
- Planned water management activities
- Soil depletion time (SDT) included in quantifying GHGs

Restoring Wetland Ecosystems (RWE) – reducing emissions and/or inc sequestration in a degraded wetland

Conservation of Intact Wetlands (CIW) – reduce GHGs by avoiding degradation/conversion

Scenarios for GHG Benefits

Baseline versus with-project scenario

Source: Forest Trends
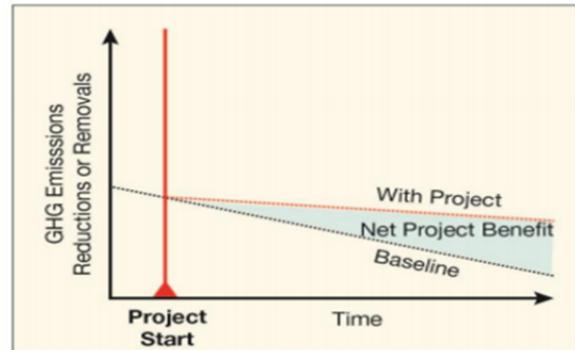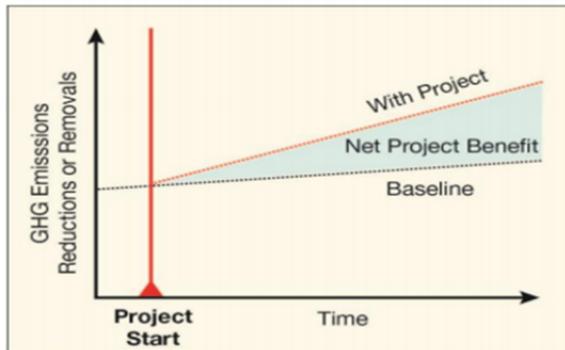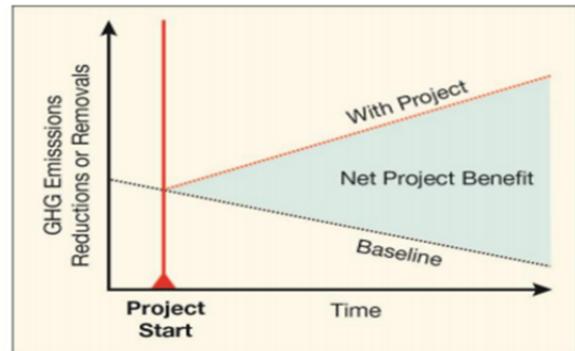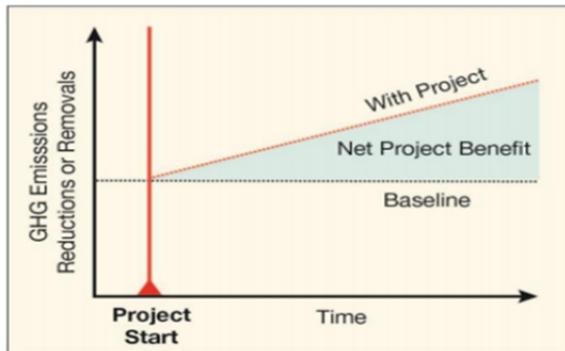
Project Requirements

Real	Demonstrate that reductions have actually occurred
Additional	Ensure reductions result from activities that would have not happen in absence of GHG market
Permanent	Mitigate risks of reversals
Verified	Provide for independent verification that emissions are real
Not harmful	Avoid negative externalities
Practicality	Minimize project implementation barriers
Ownership	Ownership of GHG reductions must be clear

RESTORE AMERICA'S ESTUARIES

WRC Requirements

Methodology Development

Project Development

GHG Emission Reductions and Removals

Coastal Wetland Methodologies

- Coastal Wetland Creation (VCS) – LA CPRA
- Restoration of Degraded Wetlands of the MS Delta (ACR) – Tierra Resources
- **Global Tidal Wetland and Seagrass Restoration Methodology (VCS) – RAE**
- Global Conservation Methodology - submitted to VCS by RAE

Global Restoration Methodology

Tidal Wetland and Seagrass Restoration Methodology

Habitats – all tidal wetlands and seagrasses, globally

- Marshes, all salinity ranges
- Mangroves
- Seagrasses
- Forested tidal wetlands

Eligible Activities

- Restoration via enhancing, creating and/or managing hydrological conditions, sediment supply, salinity characteristics, water quality and/or native plant communities.

All three GHGs: N_2O, CH_4, CO2

Standardized approach to additionality for US-based projects

Global Restoration Methodology

Approved by Verified Carbon Standard Nov 2015

Access online at www.v-c-s.org or
www.estuaries.org/bluecarbon-resources

Authors
- Dr. Igino Emmer, Silvestrum
- Dr. Brian Needelman, University of Maryland
- Steve Emmett-Mattox, RAE
- Dr. Stephen Crooks, ESA
- Dr. Pat Megonigal, Smithsonian Env. Research Center
- Doug Myers, Chesapeake Bay Foundation
- Matthew Oreska, University of Virginia
- Dr. Karen McGlathery, University of Virginia
- David Shoch, Terracarbon

Methodology – Table of Contents Highlights

RESTORE AMERICA'S ESTUARIES

Feasibility Study

- Evaluate the market, technical, financial, legal, and organizational aspects of developing a carbon project.
- Account for baseline and with-project scenarios:

  CO_2
  - Biomass
  - Soils
  - Fuel emissions

  Methane (CH_4)

  Nitrous Oxide (N_2O)

Greenhouse Gas Flux

CO_2 N_2O CH_4

Greenhouse Gas Accounting

RESTORE AMERICA'S ESTUARIES
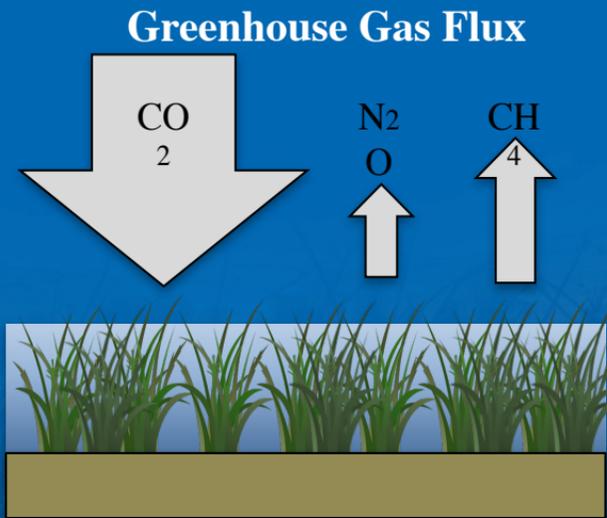
- Published data
- Default values
- Emission factors
- Field-collected data
- Proxies
- Models

Where science is insufficient, burden of proof is on project developers to demonstrate

Greenhouse Gas Accounting

- Soil Carbon default value:
  - 1.46 t C / ha / year for marshes and mangroves (Chmura et al. 2003)
- Methane default value:
  - Only for salinity ave or low point > 18 ppt (Poffenbarger et al. 2010)

Fate of C upon Submergence

- Carbon stocks from aboveground biomass
  - Where biomass is submerged, assumed all c is lost
- Soil carbon stocks
  - Apply models to assess time/rate of submergence
  - Conservative assumptions (none lost in baseline, all lost in with-project)

Summary of process

✓ Identify appropriate methodology

✓ Feasibility Study to verify carbon benefit

| **Evaluate potential opportunities** *What are my options?*	**Feasibility Assessment** based on *VCS Restoration Methodology* *Is this a good offset project? What do we need to do?*	**Implement Project** *Promote GHG benefits of project. Make it happen! Get credit!*

Blue Carbon Toolbox
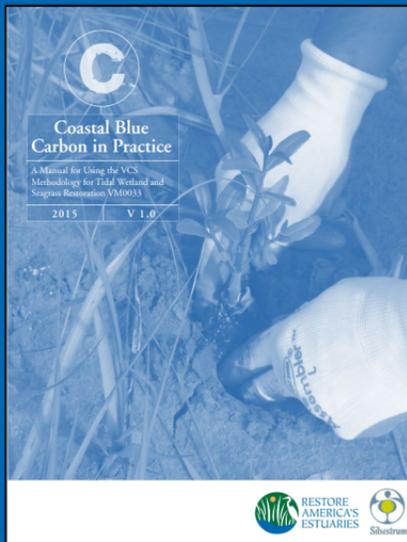
Restoration Methodology

Project Guidebook

Field Manual

These resources and more at
www.estuaries.org/bluecarbon-resources

Blue Carbon Finance Considerations

Motives are two-fold:
1. Achieve real, additional and measurable GHG emission reductions or removals (in support of any other overall purpose, ecological, social or other)
2. Tap into additional funding

Optimizing the carbon finance component should inform the project from the start.

Remaining Science Needs

- Emissions in degraded wetlands, especially impounded former tidal wetlands, and restored conditions such as tidal reintroduction
- Quantifying c sequestration from market perspective (long-term autochthonous)
- Regionally and locally relevant baseline data (tier 2 & 3)
- Better understanding of fate of c following submergence and erosion
- Models and proxies
- Better understanding of annual restoration rate in US
- Mangrove productivity link to soil accumulation
- Ability to monitor tidal wetland primary prod

RESTORE AMERICA'S ESTUARIES

Recognition and Opportunities

Existing Networks:

U.S. National Working Group

International science and policy working groups

Commission for Environmental Cooperation

Regional working groups

National Coastal Wetland Carbon Working Group

Incorporating coastal wetlands into the U.S. National Greenhouse Gas Inventory, following IPCC Wetland Supplement.
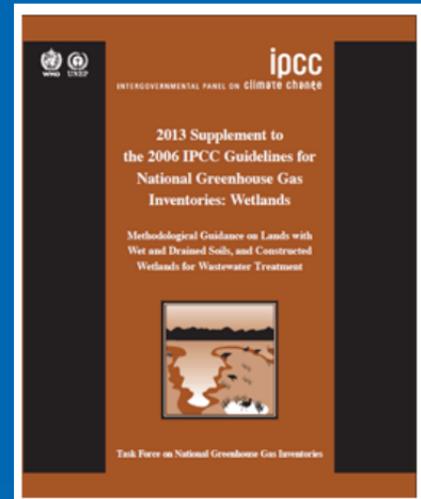
Open Public Comment Period

2017 Inventory of US GHG Emissions and Sinks
- Methods, data and results for LULUCF in Chapt 5 and 6
- Submit by March 17, 2017
- Comments can be sent to GHGInventory@epa.gov
- Information online at https://www.epa.gov/ghgemissions/how-submit-comment-draft-us-greenhouse-gas-inventory-report-1990-2015

Global Conservation Methodology
- Public comment period opening today or tomorrow
- http://www.v-c-s.org/open-for-public-comment/

Thank you!

Stefanie Simpson
Blue Carbon Program Manager
ssimpson@estuaries.org

www.estuaries.org/bluecarbon

RESTORE AMERICA'S ESTUARIES