

Carbon Sequestration & Wetlands Meeting
July 21, 1-4 pm
BCDC – McAteer Petris meeting room
San Francisco

MEETING NOTES

In attendance: Jay Chamberlain and Josh Mediev-DWR; Gary Knoblock-Gordon and Betty Moore Foundation; Diana Stralberg-PRBO Conservation Science; Stuart Siegel -Wetlands & Water Resources; John Callaway-USF; Dave Schoellhamer- USGS; Arthur Feinstein-Citizens Committee to Complete the refuge; Lynne Trulio-San Jose State; Diane Ross-Leech and Wendy Pulling -PG&E; Mendel Stewart-USFWS; Michele Jespersen & Nadine Hitchcock-State Coastal Conservancy; David Lewis- Save the Bay; Jeff McCreary & Chris Unkel- Ducks Unlimited; Craig Wilson – water branch DFG; Campbell Ingram-TNC; Peter Jacobsen-Metropolitan Water District of So. CA; Suzanne Olyarnik-CA Audubon, Richardson Bay; Adam Parris- BCDC; Amy Merrill-Stillwater Sciences; Craig Wilson-CDFG; By phone (352-3627): Robin Miller- USGS, Ellie Cohen- PRBO Conservation Science.

BETH HUNING - Welcome, introductions and overview

Upon request from the JV management board to address climate change and sea level rise, it was determined that the JV should develop a white paper with recommendations from and for our partners on planning and managing wetland restoration in an era of climate change. During the development of the white paper, it was determined that one of the top priorities should be to take the necessary steps to add wetlands, particularly tidal wetlands, to the CA Climate Action Registry to allow them to receive carbon credits if they qualify for the registry. It became clear that there were emerging data gaps in our understanding of carbon sequestration and related issues in varying wetland habitats and that we would all benefit from having a better understanding of what is known and what still needs to be determined. The purpose of the meeting is to convene some of the area's scientists and other leaders studying the impacts of climate change on different wetland habitats, with a particular focus on carbon sequestration and what it might take to gain credit for carbon in the CA Climate Action Registry.

PRESENTATIONS - Carbon sequestration in varying habitats

1. STEVE CROOKS, PWA - ESTUARINE/SALT MARSH SYSTEMS

Steve Crooks provided a presentation on the carbon sequestration potential of tidal marsh restoration projects. Vegetated wetlands generally sequester carbon from the atmosphere. This carbon is accumulated as below ground biomass within the soils. Over time some of this biomass is broken down by bacteria but the remainder is stored within the soils. Because tidal wetlands have the potential to accrete sediment with sea level rise they offer potential continual sequestration and burial of carbon.

However, tidal wetlands also naturally produce greenhouse gases as part of the carbon and nitrogen cycle, these gases include carbon dioxide (CO₂), methane CH₄ and nitrous oxide (N₂O). While methane and nitrous oxide occur in the atmosphere in much lower concentrations than carbon dioxide these two gasses are 21 and 310 times more effective warming green house gases than carbon dioxide, respectively. For this reason the carbon sequestration budget for tidal wetlands (balancing storage of carbon with production of green house gasses) needs to be quite carefully calculated.

Early evidence from the few studies ongoing in San Francisco Bay, the Delta and estuaries elsewhere suggest that freshwater tidal wetlands offer potential to sequester large amounts of carbon, more so than in saline salt marshes. That said, freshwater wetlands are most likely much more prolific producers of methane and nitrous oxide than saline wetlands. Differences are also found in the capacity of freshwater and saline wetlands to respond resiliently to sea level rise. Further studies, specific to the ranging wetland environments of the San Francisco Estuary are required to calculate the net benefits of restoring wetlands to mitigate global warming.

Some information highlights

Methane is 21 times more destructive than CO₂ as a green house gas (GHG)

As tidal marshes transition to brackish and fresh water systems, methane production increases substantially.

Tidal wetlands do not sequester as much carbon as do managed freshwater systems, nor do they release as much methane.

N₂O is determined by supply of nitrate to the marsh and is variable across the landscape

Production of GHG in aerobic near-surface wetland sediments is low in high saline water table, and high in well drained sediments.

Estuaries overall are very effective at stripping nitrates

Several studies around the world are being done to study restoration in relation to saline environments

Conclusions/questions:

Wetlands sequester carbon as well as recycle nutrients

Storage is much easier to calculate than the emission of gases

How should we account for N₂O production/emission?

There is substantial variability within a marsh – the more oxygen & flushing, the more breakdown of carbon.

Sandy areas don't store carbon well

Recommendations:

Need better quantification of carbon sequestration and habitat type

Need to understand spatial, temporal variation in GHG production with salinity

Develop coastal management approaches that support Carbon sequestration

Plan for sea level rise – predict the future landscape – strategic restoration

Deeper sediment = more storage – center of marsh good storage, when there is oxygen supply in shallower areas, more break down of carbon.

Q Where is the carbon that is being sequestered coming from? i.e.: is it just a relocation of carbon or actual storage?

A What they are seeing so far is mostly local, in situ carbon production

Q Does creating lots of edge decrease sequestration values?

A Potential for sequestering carbon in the delta is greater, but so are the emission rates.

2. ROGER FUJII, USGS - THE DELTA/TWITCHELL ISLAND

The impetus for this study was to look at reversal of subsidence:

When land subsides:

Increases levee vulnerability due to increase in hydraulic gradients across levees

Increases volume to be filled if levees break causing water quality problems for the Delta and can reduce/stop water diversions from the Delta

Leaching of Dissolved Org Carbon from Delta peat soils causes Drinking Water Quality problems

Emits CO₂ – peat oxidation

THE PROJECT

Twitchell Island has been studied from 1997-present and is comprised of two 7 ½ -acre wetlands, which are continuously flooded with water siphoned from the San Joaquin River. The flooded conditions cause anaerobic conditions that greatly reduce CO₂ emissions and result in a slow rate of natural organic material (NOM) decomposition. Shallowly flooded conditions combined with nutrient-rich water from the San Joaquin River result in flourishing vegetation resulting in greater biomass inputs. The large amount of biomass input and slow rates of NOM decomposition result in accretion of land surface elevation that reverses subsidence through sequestration or Carbon.

The study measures: emergent vegetation, biomass accretion, land surface elevation change, rates of NOM decomp, CO₂ fluxes, water quality, water quantity – inflow/outflow, spatial variability

SUMMARY DATA:

reversal of subsidence: due to the shallow flooding subsidence was essentially stopped and the growth of wetland plants produced biomass resulting in accretion of land surface by as much as much as 17.2 inches (median for the deeper wetland cell) in 8 years, which averaged 2.15

inches/year. But over the period between 2003 and 2005, the land surface accretion was 3.9 inches (median for the deeper wetland cell).

CO₂ Sequestered by different land uses (approximate median values) in metric tons of CO₂ equivalents per acre per year:

- Twitchell Wetland: ~ 8 to 38
- Twitchell corn field: ~ -4 to -12
- Prairies*: ~ 0 to 7
- Forests*: ~ 1 to 6
- Marshes*: ~ 2 to 9

*ranges taken from the literature

UP AHEAD:

Further research needs to be done to address:

emission of GHG – methane (CH₄) and Nitris Oxide (N₂O)

Dissolved organic carbon (DOC) (DOC forms disinfection byproducts when the water is disinfected for drinking water)

Methylation of mercury (Hg)

Water use

As of July 1 2008 – USGS: Universities of CA, Davis and Berkeley; University of Maine; Wetlands & Water Resources, Hydrofocus, and Bachand and Associates have signed a 3 year agreement/contract with DWR to develop a farm-scale demonstration project involving 300 to 400 acres of wetlands and research cells at Twitchell Island, with ground breaking next spring.

In the meantime plans are to:

Develop and test research tools to assess

- NOM decomposition
- DOC sources
- CH₄, N₂O – measurement techniques
- MeHg formation/demthylation

Understand processes (biogeochemical)

Quantify loads/fluxes

Apply tools to the demonstration wetland

GOALS:

Maximize biomass accretion, minimize decomp of NOM

Min GHG emissions

Min DOC-DBP precursor loads

Min methylation of mercury

Missing pieces

No baseline comparisons for carbon sequestration

- Need to look at delta agriculture row crops, pasture
- Tidal wetlands

- Northern and southern delta – salinity and temp diff
- Others

Feasibility of wetlands restoration for the Carbon market

Question:

- Q** What kind of timeline is in store, before there is conclusive data:
A could have some estimates as soon as the end of this summer/early fall with respect to methane, but nitrous oxide may take longer

TNC and many others, including USGS, Wetlands and Water Resource,s plan to submit an RFP to the CA registry by the August 1, 2008 deadline

3. GARY GERO, PRESIDENT CA CLIMATE ACTION REGISTRY

KEY CONCEPTS for establishing a protocol

REDUCTIONS must be real, additional, quantifiable and permanent
 ACCOUNTING - there is a range of considerations that need to be looked at beyond quantification and verification of carbon amounts sequestered – this is the accounting framework around which the quantification methodology is built
 QUANTIFICATION process must address/remove any uncertainty about the fact that the system has removed a ton of carbon. “REAL” = a ton of carbon is a ton of carbon

PROTOCOL COMPONENTS:

- **Define the GHG reduction project**
- **Determine eligibility** (additionality issue: **additionality** is central to the accounting system for a project. It involves determining whether the project is above and beyond business as usual and therefore the emission reductions/sequestration are ‘additional’ to what would have happened anyway.
- **Identify the baseline.** Key is to identify what would happen if the project were not implemented. . For example, if looking at how a wetland sequesters nitrates and carbon, a baseline assessment would take into account what would have happened to those emissions without that wetland.
- **Establish the accounting boundary** (all factors included, for instance emissions generated from creating the wetland, in addition to the timeframe it will sequester carbon, etc.)
- **Assess leakage** potential for agricultural activities to shift to other lands if restored to a wetland, so need to consider for determining baseline emissions
- **Calculate GHG reductions** – reductions= baseline emissions - project emissions + emission removals.

- **“permanence”** must be established, for example if a utility burning coal emits 1 ton of carbon, the wetland that offsets the 1 ton needs to be able to show that the carbon will be sequestered for 100 yrs
- **Monitoring and verification requirements** – we require regular independent, third-party verification of the project according to specific standards
- **Register GHG reductions** w/ the Climate action reserve to create unique serial numbers for each ton of reduction for tracking purposes

PROTOCOL DEVELOPMENT PROCESS

- Preliminary project scoping
- Literature review and discussion paper
- Convene multi-stakeholder workgroup
- Draft protocol
- Workgroup review and comment
- Public review and comment period
- Adoption by Registry board of directors

QUESTIONS & ANSWERS

Q Are Public Lands creditable?

A This is being worked on, and is complex. We can write standards for how projects are implemented and measured, but the question of ownership is one that the state and federal governments need to decide for projects on public lands. For example, the California State Parks Department is now trying to determine who owns those credits? Public, state park, get a private investor to come in and reforest to then get the credit.

Q What are the differences between Chicago Climate Exchange and the Clean Development Mechanism (CDM) under the Kyoto Protocol

A CDM –some say their thoroughness in addressing the issue of additionality is questionable, but key difference is they conduct project by project analyses and the California Registry sets a single, performance-based standard for a project type or category
Chicago Climate Exchange – is similar to the California Registry, but one key difference is that they don’t develop their protocols in a public, stakeholder driven process nor do they serialize each ton of reduction for tracking purposes

Q How to gauge uncertainty of sea level rise when addressing the protocol components?

A This will affect the baseline calculation and any technical workgroup that is formed to help write the protocol will need to consider this issue, but it is clearly very difficult.

Q How long will it be before a protocol for wetlands is established?

A At least 18 months and possibly as long as 36 months depending on the state of the science.

Q Wondering if there will be any consideration for the relative certainty around a project. For instance less or more than 40% certainty relative to wetlands is quite different than that same amount when considering something more measurable / finite such as livestock digestion.

A That will be something the workgroup will have to take a position on.

RECAP: The RFP serves to solicit proposals to then flush out the possible protocols. Deadline is August 1 for the RFP. Those will be reviewed and selected by the end of August. Then the selected proposals will have 2 months to flush out all the details. And finally a work group will review those and determine whether or not they can be established into a protocol. A proposal/ project probably wouldn't get assigned a workgroup if it wasn't likely to happen.

OTHER final NOTES of interest:

CA Climate registry is working with "REGI" – regional green house gas initiative which is a northeastern states model in development

ON the website (www.climateregistry.org) there is an intake form for new ideas to consider for establishing a protocol

A key recommendation is to narrow ranges of uncertainty and ability to quantify

Crediting period and start phase:

Permanent projects that qualify will receive credit back to 2001 (the implementing legislation date of the registry)

Further questions should be directed to Gary Gero:

gary@climateregistry.org

4. DISCUSSION AND NEXT STEPS

In response to the RFP:

Do any of the participants intend to submit a proposal in response to the RFP for the AUGUST 1 deadline?

Campbell Ingram and Stuart Siegel and others intend to submit on behalf of the USGS project in the Delta

Steve Crooks and John Callaway expressed interest in submitting a proposal for estuarine wetlands. BCDC (Adam Parris) also expressed interest in participating as did Nadine Hitchcock with Coastal Conservancy.

We need to ensure that whoever is selected (most likely multiple contractors) are aware of and include tidal and coastal wetlands and SF Bay in the fact-finding.

When the working groups are established, it is imperative that our interests are represented (i.e.: SF Bay and tidal wetlands)

Information in response to additional questions:

If a cap and trade system is developed, the metric/rating system will be of benefit to the entire Western Region Climate Association (as well as the Eastern, Midwestern and Southern Associations)

Salinity changes will be more significant most likely than metabolic changes due to temperature rise.

The estuary is part of a watershed. Sediment cores will be important to study.

Q Have there been studies on the ability of restored vs. natural wetland environments to sequester carbon?

A Yes, albeit limited, and the results are highly variable. Restored sites are likely to accumulate/accrete quickly. Until restored sites are well established - meaning the sequestration rates are quantifiable and verifiable - they are not going to be given credit.

The group requested that the JV

Express concern to Gary/the Registry about submitting RFP's before data is conclusive and if that could potentially result in a longer delay moving the process forward

Keep in touch with the Registry regarding the protocol process and who has been selected and keep the group aware of those developments

Serve as a convening, coordinating, and strategy body for this process as it develops and ensure that attendees are kept apprised of the process, and they, in turn will provide the JV new information for distribution.

Concluding message:

It is important to remember that we are in the business of protecting and restoring wetlands for wildlife and ecosystem function. Our purpose for being involved is to deliver on our habitat goals. Carbon sequestration is one of the benefits of wetlands just like flood control, pollution filters, etc. This is one of the messages in an outreach campaign to inform the public about the values of wetlands, it is not the only message. The ability of wetlands to sequester carbon should not supplant the ecosystem values for their restoration. Habitat and ecosystem function should remain prominent and should be communicated to the Carbon Registry and carbon offset market.

Please let the Joint Venture know of others who should be included in future communications on the subject of carbon sequestration and the Registry.