

Mike J. Badzmierowski, PhD
Postdoctoral Research Associate
646 River Valley Dr. Apt 213
Salem, OR 97304
C: (401) 585-8554
mikejb7@vt.edu

16 August 2020
Climate Action Reserve
818 W. 7th Street, Suite 710
Los Angeles, CA 90017

Dear Climate Action Reserve:

This comment is regarding the Soil Enrichment Protocol (SEP) open for a second public comment period. My background is in soil chemistry with a current focus on determining the potential carbon sequestration of land-applied biosolids. I see that biosolids has at least been included as an intervention method based on the first round of comments. I would like to say this is an important first step. Biosolids are produced in significant quantities with three end pathways in the United States: land application, landfill, and incineration. Improving the recycling rate to land is especially important as it can offset fertilizer production and use, while reducing the environmentally deleterious effects of landfilling and incinerating biosolids. I am sure the lack of greater detail in your protocol is a result of lack of quantitative numbers regarding biosolids and resulting soil organic carbon (SOC) stocks. Two other faculty (Dr. Greg Evanylo and Dr. W. Lee Daniels) and I at Virginia Polytechnic Institute and State University are currently working to address this knowledge gap through meta-analysis. We hope that we can partner with you come the new year upon completion of our work.

I also have opinions regarding SOC:

First,

I am a little discouraged by the lack of inclusion for preservation of SOC as it is harder to build SOC than it is to preserve it. This is particularly true for the middle of the United States where their topsoil contains much greater levels of SOC than in other parts of the United States. Increasing carbon levels in these sites can be more difficult to achieve but preserving this carbon from being lost via destructive management should be valued greatly.

Second,

With it being refined to agricultural lands, I still think there is much to question about how focusing on sequestering C will affect yields. The literature is still unclear on this topic and if it decreases yields it may just result in the need more farmland. Is there a way to account for how acreage in agriculture may shift as a result of adopting these management practices?

Third,

It would also be nice to see a protocol for going beyond measuring total SOC. Ideally, measurements of SOC would be fractionated into particulate and mineral associated organic matter. It gives a better proxy (though not bullet-proof) about the "potential" longevity of the carbon.

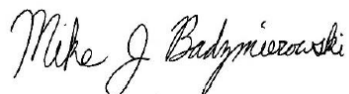
Lastly, the protocol states in section 2.4:

"The Reserve requires project developers to demonstrate that their GHG projects will not undermine progress on other environmental issues such as air and water quality, endangered species and natural resource protection, and environmental justice." I understand this is merely "guidance", but I think this does not illustrate the complexity of soils. Increasing SOC in agricultural soils comes with environmental trade-offs, not just positives. For example, just looking at water quality,

1. Reducing tillage and disturbance of soil should improve soil structure and aggregates, but conversely can lead to increased vertical preferential flow, meaning it will leach elements and contaminants and reduce water quality.
2. Cover crop increases soil organic carbon and may increase soil hydrophobicity in dry summer, which may favor the development of finger flow.
3. The greater amount of organic substances also promotes soil fauna activities, likely producing more macropores and enhancing the abundance of macropore flow.

If farmers take up practices to improve SOC but still apply pesticides it could compromise water quality, therefore making the farmer ineligible to receive credits. I think there needs to be clear goals and understand that trade-offs should be expected. Is the goal to increase SOC? Is the goal to increase mineral associated organic matter (the soil carbon fraction thought to last longer in soils (though this once again is not always true)? Should the goal be to preserve the most soil carbon (i.e., preserve soils with high SOC stocks in the central U.S.)? I just feel like this protocol does not include the full picture when it comes to the complexity of soils. Overall, this protocol is much needed to move soil carbon policy forward and I am glad to see this initiative.

Best,

A handwritten signature in black ink that reads "Mike J. Badzmirowski". The signature is written in a cursive, flowing style.

Mike Badzmirowski, PhD