

**Watershed Nature-Based and Green Infrastructure
Activities Avoiding Emission from Water Management
Gray Infrastructure Construction and Operations
Methodology v1.0
&
GHG & Co-Benefits in Watershed Carbon v1.0**

Public Comment

Virridy Response

January 9, 2024

REVIEWER'S COMMENT <i>Please paste the comment from the reviewer</i>	AUTHOR'S RESPONSE <i>Please describe how the comment was addressed and include new content in quotations</i>
<p>To reduce erosion, I think that planting of trees should be encouraged as it helps reduce kinetic energy of raindrops, also not building anything on waterways.</p>	<p><i>Author's response: Yes, we feel similarly, and expect that this methodology and credit class is well-positioned to catalyze much larger water treatment facility investments in the US in riparian revegetation projects in lieu of cost-inefficient facility upgrades.</i></p>
<p>1. Interests / (our) Perspective Bias</p> <p>We have certain interests in this space. Our perspective stems from certain (i) cultural & biophysical realities within our bio-region, and (ii) our mission to use, learn, develop & demonstrate better tools to achieve water security.</p> <p>Our focus area is the US Great Plains, especially that part extending over the High Plains Aquifer System (HPAS). Largely due to groundwater abstraction for irrigation, our water tables have declined by hundreds of feet and natural discharge that once functioned to "perennialize" streamflows has decreased by over 90% relative to discharge a mere century ago.</p> <p>This is important for two reasons. First, the presence of moisture along our watersheds is drive primarily by groundwater. And, the classification of a watershed depends on said groundwater conditions, as well as land-use driven degradation. Watersheds that are ephemeral today were intermittent or perennial 50-100 years ago.</p> <p>Many of our comments revolve around these concerns. What about groundwater, especially nexus where surface & groundwater interact? And to what extent might the green infrastructure</p>	<p><i>Author's response:</i></p> <p><i>2. "Will the proposed achieve this?" We appreciate the perspective and input. We agree that the utility of this methodology and credit class to achieve the transformative regenerative economy goal is limited, but as you describe, it can be an effective tool early on in an economic transition and is intended as such.</i></p> <p><i>2. "What happens when this approach succeeds and has "mainstreamed" green infrastructure? We think that would disqualify the (avoided emissions) carbon credit incentives. Is that a problem?" That is not a problem! Rather that is what success looks like - and would be a great achievement and one that we would be happy for this methodology and credit class to be a part of. If a green infrastructure solution cannot pass a 'common practice' analysis as defined in the additionality section of the credit class, then that means in that state/region/principality that green infrastructure has become common practice, and we feel that is both a great outcome and also means that carbon credits should not be necessary to catalyze more investment in green infrastructure.</i></p> <p><i>2. "Will the developer take the time to "stack" the carbon grazing contract with the green infrastructure contract?" This is certainly a decision up to an individual developer, based on their business model and practices. In US states with a higher-than-average embedded carbon per kWh in the public</i></p>

incentivized by the markets created by the credit class proponent be applicable to ephemeral watersheds, groundwater and wetlands – excluded from CWA.

2. Limited (Water Quality Markets), not Comprehensive

A functional transformative “regenerative” economy need incentivize structural interventions and practices that improve soil health, water quality, biodiversity, photosynthetic production (biomass) and recreational & aesthetic value – and produce “yield” in the form of food, material & medicine.

Will the proposed achieve this? Clearly not. It is a limited tool that may be effective early on in any such transition. In fact, the additionality requirements demand such – ie that the dominant paradigm rejects green infrastructure in favor of gray.

What happens when this approach succeeds and has “mainstreamed” green infrastructure? We think that would disqualify the (avoided emissions) carbon credit incentives. Is that a problem?

The proposed methodology anticipates mixing & stacking payment for ecosystem service contracts. This is great in theory but rarely happens in practice. The projects we see develop are based around a single approach/methodology. Regen Carbon Grazing for example, where as tract of rangeland may be enrolled in an ecological contract to generate credits via transitioning to adaptive intensive grazing management. This approach is applied to the entire tract. A few percent of the tract may consist of (ephemeral) riparian and/or wetlands. Will the developer take the time to “stack” the carbon grazing contract with the green infrastructure contract?

energy grid, it seems possible for a developer to cover conservation project implementation costs with both carbon credit revenues and payments from utilities, but this will be specific to any individual program.

2. “might a developer mix the green infrastructure Virridy contract with a wetland mitigation banking contract, and perhaps also habitat improvement for an endangered species? Or, will business pressures drive simplified approaches whereby the land is used “for” Green Infrastructure to improve water quality, or to recharge groundwater, or for wetland mitigation banking” It is impossible to tell what business pressures will drive, this methodology is simply intended to provide the ability to monetize the carbon benefits of using green infrastructure for achievement of regional water quality goals in lieu of the standard centralized gray infrastructure upgrades favored in developed countries. Given the long project periods (20-30 years) the authors feel that adaptive management of the watershed programs will be clearly needed, and the focus on instream water quality outcomes will naturally support the use of locally-effective practices which by their nature are ‘complex’.

2. “Thus the question, how incentive embracing complexity?” The authors feel that the focus on instream water quality benefits naturally will incentivize complexity when assessed across regions and countries, as the green infrastructure practices that most cost-effectively achieve instream benefits will be very different in different ecologies, in watersheds dominated by different land practices, etc.

3. “To what degree is the proposed reliant upon demand created by the Clean Water Act?” The Clean Water Act in the US is only one of many national water quality standards that could be used as a driver for the use of this methodology and credit class. Given the following comments, it sounds like the commenter is very familiar with the wetlands aspect of the CWA, but possibly not the 303d and NPDES sections which are meant to drive lower allocations for water quality by all permitted dischargers, of which there are thousands (if not tens of thousands) in the bioregion of the Ogallala Aquifer

Similarly, might a developer mix the green infrastructure Virridy contract with a wetland mitigation banking contract, and perhaps also habitat improvement for an endangered species? Or, will business pressures drive simplified approaches whereby the land is used “for” Green Infrastructure to improve water quality, or to recharge groundwater, or for wetland mitigation banking...

To what degree can these proposed credit classes & methodologies incentivize complexity, optimization and adaptive management? Treat wetlands like wetlands, riparian like riparian, woodlands like woodlands and (historic) grasslands like grasslands. Don't treat a section like grasslands and the next like woodlands... This demands multiple land users and a diversity of agroecologic approaches. Thus the question, how incentive embracing complexity?

3. Novel tools, novel possibilities – don't import systemic biases

There are many problems with the US “rule of law” regarding water. Briefly, the States were allowed to define private property rights as concerns water, on surface & the ground. The foundation of our land use agroeconomies relies upon private property claims to water, and precedent that rewards extraction and penalizes “waste” (water for irrigation not for fish).

To what degree is the proposed reliant upon demand created by the Clean Water Act? The CWA is largely irrelevant to our bioregion. Nearly all of our watersheds are ephemeral and excluded. Similarly, the wetlands that dot the high plains are considered “disconnected” from WOTUS and excluded. The irrelevance of the CWA is true for much of the American West. Does that prevent the adoption, utility & scaling of the “green infrastructure” proposal?

and in the American West. If these permittees can be incentives to consider large-scale investments in watershed health in lieu of centralized treatment technologies, not only will these investments more cost-effectively achieve instream water quality goals but will also have a large and beneficial impact on groundwater supplies, given the known connectivity in nearly all bioregions between surface water and groundwater. When looking at the totality of the CWA and not just the wetlands section, we believe that it is an excellent driver - far from irrelevant - to support the adoption and scaling of regional green infrastructure.

3. “How might a thriving marketplace be achieved if predicated upon demand stemming from regulatory requirements?” This comment again seems to be more tied to wetland protections, which have changed in recent years with different political administrations. However, the NPDES program remains largely unchanged since its creation and seems to be a good regulatory driver (among others) from which to drive a thriving marketplace. The US water sector spends roughly \$30B/yr on water treatment and conveyance upgrades, which is an amount of spending that would more than support much higher investment in green infrastructure.

3. “Are we necessarily exposed to these kinds of political risks, or might this approach be successful in a legal/political agnostic fashion?” This methodology is useful for both regulatory and non-regulatory drivers such as the case where drinking water utilities upgrade their treatment works due to higher risks of catastrophic wildfire. In the regulatory context, yes, it seems that this methodology is exposed to political risk - as are many businesses and practices. In a non-regulatory context it seems that water treatment facilities that want to voluntarily undertake higher levels of treatment could still be able to access carbon finance via this methodology, in a less legal/politically driven context.

3. “This is our largest concern, ie that the proposed is limited to those markets dependent upon regulation and threat of regulatory enforcement.” We find this a valid concern but as above, even with legal and political risks

How might a thriving marketplace be achieved if predicated upon demand stemming from regulatory requirements? Our administrations change every few years. Trump changed a lot. Biden changed it back. The State of Texas decided it doesn't want the EPA to "intervene" with watersheds within its' territory.

Are we necessarily exposed to these kinds of political risks, or might this approach be successful in a legal/political agnostic fashion?

This is our largest concern, ie that the proposed is limited to those markets dependent upon regulation and threat of regulatory enforcement.

Another system bias with potential downsides regards the "Verifier Requirements". To our understanding, the MRV is focused primarily on whether the green infrastructure was implemented and then periodic monitoring, maintenance and reporting, but primarily upon whether the counterfactual gray infrastructure was actually avoided. Why does this require a bachelor's or master's degree in environmental science?

A successful ReFi adoption is hard to imagine without actually activating citizens, locals that don't have environmental science degrees. How to empower citizen science and "decentralized" MRV?

This presents a situation whereby nobody cares if the green infrastructure functions as intended. Does that even matter to the awarding of the carbon credits?

4. Financing New Projects

there are many billions of dollars invested in the US (and other developed countries) that could conceivably be changed from investments in gray infrastructure to investments in green infrastructure with this methodologies. So while this may be a limit, it is a limit shared by many viable business models in developed countries currently, and still seems worth using to catalyze greater public investments in watershed health given all of the co-benefits.

3. "Why does this require a bachelor's or master's degree in environmental science?" This is a requirement meant to partially ensure that Verifiers are well-versed and familiar with water treatment facility operations, life-cycle-analyses and developed country water regulatory regimes. It is not the only requirement for a Verifier.

3. "How to empower citizen science and "decentralized" MRV?" Empowering citizen science and decentralized MRV are worthy goals, but outside of the scope of this methodology and credit class which is focused on changing a very specific 'status quo' in developed country water treatment.

3. "Does that even matter to the awarding of the carbon credits?" In Section 6.6 of the methodology, we write 'The Project Proponent must actively measure water quality within the project boundary to demonstrate either improvement or maintenance of relevant water quality parameters compared to the Baseline and Targets.' Given this inclusion, we think it is clear that achievement of water quality goals matters a great deal to the generation of carbon credits, given that compliance with this methodology includes this achievement.

4. "Who has funds to risk early on, to get the project established at scale sufficient to matter, in the hope that carbon credits will be issued in the quantity desired, and will continue to hold value (\$2, 20, 200) in 10, 20, 30+ years!?" Given the scale of water treatment facility investments in developed countries, the authors find it rational that impact financiers of many types would be interested in providing the upfront funding necessary. In countries

The proposal presents an ex post facto credit issuance scenario. The credits are awarded annually and not unless and until the requirements are met (primarily, avoidance of gray infrastructure alternatives). But a huge portion of the total costs to install, improve, monitor, maintain green infrastructure is necessarily incurred “up front”. Similarly, land users are accustomed to expecting some initial payment of funds to commit to the long term transitions contemplated by the proposal.

Who has funds to risk early on, to get the project established at scale sufficient to matter, in the hope that carbon credits will be issued in the quantity desired, and will continue to hold value (\$2, 20, 200) in 10, 20, 30+ years!?

Projects will still languish in absence of funding. The economics may make sense but the risk/reward ratio doesn't. So how to finance these projects?

5. Who Pays? Robust Demand where/when (and how to know)

Who Pays? I think the answer is, the Wastewater Treatment Facility. Do they made decisions of sufficient time scale for this to be a realistic alternative? Who is typically in charge of these WTF and how is their budget allocated. Do the political realities allow the contemplated proposal to be successful, or might they act as a barrier regardless of the cost efficacy?

What kind of WTF should a project-developer-to-be look for, in order to launch a successful project?

6. Land Use Transition

The “Greening America's Rivers...” article describes a farmer

such as the US where low-interest ‘State Revolving Fund’ loans are available to facilities, the facility itself may well be the funder of capital upgrades.

4. “Projects will still languish in absence of funding. The economics may make sense but the risk/reward ratio doesn't. So how to finance these projects?” The authors expect that the same financing options available to water treatment facilities in developed countries can and will be used to finance these projects, given that in most (not all) cases green infrastructure is cheaper to build and maintain than the conventional gray infrastructure. Indeed, in the US via the Inflation Reduction Act, water treatment facilities can obtain much lower lending rates and even principal forgiveness for selecting ‘sustainable’ projects, the standards for which varies state-by-state but generally would be simple for a green infrastructure watershed program to achieve.

5. “Who is typically in charge of these WTF and how is their budget allocated. Do the political realities allow the contemplated proposal to be successful, or might they act as a barrier regardless of the cost efficacy?” Generally developed-country WTFs are led by managers with engineering backgrounds, and either elected or appointed boards with similar expertise. This reality is actually what this methodology and credit class have been written to influence, as generally these professionals tend to prefer more expensive gray infrastructure but have a fiduciary responsibility to their ratepayers that requires careful consideration of new external funding sources such as carbon revenues.

5. “What kind of WTF should a project-developer-to-be look for, in order to launch a successful project?” A WTF under near-term pressure to upgrade their treatment facility to achieve new more stringent water quality standards for nontoxic pollutants, for which a watershed restoration program would provide an alternative that meets regulatory standards in their state/region/province but is otherwise not ‘common practice’.

payment program, whereby a farmer might get paid \$30/ish / acre / year to agree to transition to constructed wetlands and to perpetuate the green infrastructure approach for the project's life span.

This is great but insufficient in the face of Farm-Bill subsidies. Many of our farmers deal with cashflow of \$700/acre/year, or more, and they're not going to get into a new, complicated business relationship for a "mere" \$30/ac/year.

Has any work been done to ease the transition to green infrastructure that deals with the USDA NRCS FSA etc? The farm bill subsidies need be addressed for any large scale transition to be effective (in our humble opinion).

7. Sequestration?

The credits described are avoided emission credits but the implementation & practices associated with green infrastructure are likely to sequester carbon et al in the soil, in the form of biomass, maybe add some biochar... The "Greening America's Rivers" article describes savings of 15.6 billion USD / year whilst avoiding 29.8 million tons CO₂e, but then mentions "sequestering over 4.2 million tons CO₂e.

Is this figure for sequestration referencing SOC, or additional biomass or riparian forestry? In other words, what does this figure describe?

Conclusion:

This is an awesome development for Regen in particular and ReFi more generally. We at Ogallala Life advocate for water-centered

6. *"Has any work been done to ease the transition to green infrastructure that deals with the USDA NRCS FSA etc?" This is unfortunately out of scope of a methodology and credit class, but clearly for a project developer or water utility to be effective at implementing a watershed restoration program in their region, they must pay competitive rates to the owners of the lands where projects need to happen, and these rates will be influenced by federal and state conservation incentives.*

7. *"Is this figure for sequestration referencing SOC, or additional biomass or riparian forestry? In other words, what does this figure describe?" This figure is an estimate of soil organic carbon as well as the biomass sequestration by trees, shrubs and wetland plants of the watershed project types that would conceivably be necessary to achieve instream water quality goals. Notably however, this methodology cannot be used to generate carbon credits via sequestration - the authors would direct project developers to other methodologies specifically built for quantification of sequestration for that.*

8. *"Finally, might DePin offer an improved paradigm to that of ReFi and the ecological contract?" This is out of scope for this methodology and credit class, but the authors would welcome any improved paradigms to those currently existing. Thank you for your comments.*

approaches to land regeneration (rehydration). This is because, definitionally, the primary constraint to productivity on drylands is access to fresh water.

The water-centered approach is fantastic. We think it a bit regretful that recourse to carbon accounting need be made in order to present a compelling case to repair our watersheds' function. But if thats' what it takes...

Apologies for poor organization and rambling. We applaud your efforts and hope to see a great deal of development in this green, nature-based infrastructure space.

Finally, might DePin offer an improved paradigm to that of ReFi and the ecological contract? We ask this because blockchain-enabled PES markets are hard to describe to farmers, ranchers etc. We imagine the green infrastructure proposal might be similarly hard to "sell" to wastewater treatment facilities. A lot of innovation is happening in DePin that may be relevant here and we'd recommend the proponents look into it if haven't.

Sincerely,

Ogallala Life Conservation Inc.