

Watershed Nature-Based and Green Infrastructure Activities Avoiding Emission from Water Management Gray Infrastructure Construction and Operations Methodology v1.0

Expert Peer - R2 Review Round

Reviewer #3

December 5, 2023

CONTENT referenced by reviewer's comment <i>e.g. Section number + paste exact text</i>	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>	Reviewer's Conclusion [PASSED/ REJECTED WITH COMMENTS]
Section 1.0	Maybe add a box before Calculature that is something like "Identify realistic gray infrastructure alternatives and the preferred gray alternative from which to calculate credits?"	Edited as suggested.	PASSED

Section 1.2	Does Capdetworks include enough of the energy use and material amounts needed by TRACI to do the LCA?	Capdetworks does provide complete energy and mass balances to support TEA and LCA.	PASSED
Section 1.3	This definition of additionality is not consistent with the additionality criteria in the Credit Class	<p>The methodology in this section currently says, "Additionality: Please refer to the corresponding Credit Class "GHG & Co-Benefits in Watershed Carbon" document for this definition of additionality specific to this Methodology."</p> <p>This is deliberately to avoid having editing issues between the documents. It is not clear what the reviewer has observed.</p>	PASSED
Section 3.	<p>I think the GHG should just be the avoided cost of the most realistic gray infrastructure alternative. If a green project has a negative GHG value-That should NOT be creditable.</p> <p>If it is, that is a different credit class and needs a different approach.</p> <p>The green project should demonstrate it has a Zero or Negative GHG value as an eligibility criterion.</p>	The claimable GHG benefits of this methodology are the avoided industrial emissions benefits of improved river health. There are clear examples where a watershed project has a slightly positive GHG value but the industrial solution is thousands of times more GHG-emitting. One of these is the conversion of flood irrigation to pressurized irrigation. The pipes, pumps and energy use of pressurized irrigation makes this project type likely slightly GHG-positive. But the overall nutrient benefit to the river then reduces the need for large-scale tertiary treatment of nutrients, and thus the GHG delta is quite large between the two solutions. Thus we do not see the need to require that the green	<p>REJECTED: The definition of a "Credit" in section 3.1.1.7 is inconsistent with the statement in section 4.0 that "credits are only calculated on avoided gray infrastructure".</p> <p>Section 4. Makes that statement because there are</p>

		<p>solution is zero or negative, as long as the GHG difference is negative.</p> <p>Regen allows for a project to stack methodologies. A project developer may use another methodology to claim biomass or soil sequestration benefits.</p>	<p>no guidelines to ensure the GHG sequestration values of the green infrastructure are sustained over time.</p> <p>All I am saying is that the final credit value should just be the value of A) the avoided gray infrastructure GHG emissions, or B) the gray minus the green option if the green option has a slightly positive GHG emissions</p> <p><i>Author response: We agree with this reviewers logic. We have added the following sentence in Section 3 of the methodology to eliminate the</i></p>
--	--	--	---

			<p><i>possibility of generating sequestration credits: "The lowest estimated greenhouse gas impact of a green infrastructure program shall be '0' even in cases where the program sequesters emissions over time - so that these sequestration benefits can be quantified and credited (if the project proponents chooses to do so) via a different methodology."</i></p>
Section 3	<p>There is often a lot of vague references to "a standard life cycle assessment methodology" or "best practice methodology"--I don't like that much left open-ended, but perhaps the REGEN protocols are OK with that?</p>	<p>Section 3 has been updated such that is defined the process for LCA.</p>	<p>PASSED</p>

Section 3.1, Bullet #4	Need a step between 3 and 4 which says how to select the gray alternative from which credits will be calculated	An additional step has been added. The selection of technology is restricted to requiring equivalent performance.	PASSED
Section 3.1.1.1	I don't get what a Functional Unit is? The example is "Amount of water"--But everywhere else talks about pollutant loads--Either as concentrations or mass loads	The functional unit has been defined as the kg of nutrient removed (either N or P, whichever is the limiting nutrient in the design of the technology).	<p>REJECTED: This section got cleared up, but in a way that maybe is too limiting? Section 6.1 defines applicable water quality parameters that are much broader than nutrients.</p> <p>Couldn't the LCA consider all of those parameters? Section 3.1 and 3.1.1.2 talk just about nutrients</p> <p><i>Author response:</i> We agree with the reviewers logic. We've made slight revisions throughout Section 3 to focus more generally as a</p>

			<i>to-be-named water quality pollutant or pollutants as the functional unit - not just kg of N or P.</i>
Section 3.1.1.2	Similarly, this section makes no sense	The section has been updated to specific identify the functional unit.	<p>REJECTED: This section got cleared up, but in a way that maybe is too limiting? Section 6.1 defines applicable water quality parameters that are much broader than nutrients.</p> <p>Couldn't the LCA consider all of those parameters? Section 3.1 and 3.1.1.2 talk just about nutrients</p> <p><i>Author response:</i> We agree with the reviewers logic. We've made slight revisions throughout Section 3 to focus</p>

			<i>more generally as a to-be-named water quality pollutant or pollutants as the functional unit - not just kg of N or P.</i>
Section 3.1.1.4	Not sure what eGRID is–Seems like there should be references and links to all tools. eGRID wasn’t mentioned in section 1.2	The Emissions & Generation Resource Integrated Database (eGRID) is a comprehensive source of data from EPA's Clean Air Markets Division on the environmental characteristics of almost all electric power generated in the United States. It is a database that has the most up to date current electrical emissions for the various US grid regions. We have added a reference. We have also include this in section 1.2	PASSED
Section 3.1.1.4	I don’t know what the ‘displacement method’ is	Section 3.1.1.4 has a detailed description and example of what a displacement method is. Further, this is a standard presented in ISO 14040.	PASSED
3.1.1.4	There is acknowledgement that the grid is getting cleaner–Great. I think it is getting significantly cleaner at a pace that is faster than 5yr intervals. Why not re-run the GHG results every time the model used for GHG from electricity use is updated?	The methodology requires the use of a predictive dataset to estimate the emissions evolution over the life of the project with this estimate revisited every 5 years. This estimate combined with a re-run every five years is expected to be sufficient.	PASSED

<p>3.1.1.7</p>	<p>I disagree that the carbon sequestration for green infrastructure should be creditable under this credit class.</p> <p>That is a different credit class and would need different protocols</p>	<p>Regen allows for a project to stack methodologies. A project developer may use another methodology to claim biomass or soil sequestration benefits.</p>	<p>REJECTED: The definition of a “Credit” in section 3.1.1.7 is inconsistent with the statement in section 4.0 that “credits are only calculated on avoided gray infrastructure”.</p> <p>Section 4. Makes that statement because there are no guidelines to ensure the GHG sequestration values of the green infrastructure are sustained over time.</p> <p>All I am saying is that the final credit value should just be the value of A) the avoided gray infrastructure GHG emissions, or</p>
----------------	---	--	--

			<p>B) the gray minus the green option if the green option has a slightly positive GHG emissions</p> <p><i>Author response:</i> We agree with this reviewers logic. We have added the following sentence in Section 3.1.1.7 of the methodology to eliminate the possibility of generating sequestration credits: "As noted in Section 3.1.5 above, for this methodology the lowest estimated greenhouse gas impact of a green infrastructure program shall be '0' even in cases where the program sequesters</p>
--	--	--	---

			<i>emissions over time - so that these sequestration benefits can be quantified and credited (if the project proponents chooses to do so) via a different methodology. Thus, in the case when the green infrastructure has estimated negative emissions, the total greenhouse gas savings will be the gray greenhouse gas emissions only."</i>
3.1.1.9	Unclear if the Ecoinvent Database has information relative to material and electricity use for water gray infrastructure?	Ecoinvent does have information on water treatment. This database is robust in terms of fundamental flows as well. If the data needed does not exist in the aggregate then the LCA practitioner can use foundational flows to determine the emissions for a custom gray water treatment system. The methodology does not require the use of Ecoinvent either. Practitioners can use other datasets.	PASSED
3.2	The 30 yr temporal resolution seems to contradict needing to	30 years is the expected lifetime of a gray infrastructure installation. 5 years is the	PASSED

	update estimates every 5 yrs. What am I missing?	requirement to re-evaluate emissions factors.	
4.0	<p>I disagree that the carbon sequestration for green infrastructure should be creditable under this credit class.</p> <p>That is a different credit class and would need different protocols</p>	<p>Regen allows for a project to stack methodologies. A project developer may use another methodology to claim biomass or soil sequestration benefits.</p>	<p>REJECTED: The definition of a “Credit” in section 3.1.1.7 is inconsistent with the statement in section 4.0 that “credits are only calculated on avoided gray infrastructure”.</p> <p>Section 4. Makes that statement because there are no guidelines to ensure the GHG sequestration values of the green infrastructure are sustained over time.</p> <p>All I am saying is that the final credit value should just be the value of A) the avoided gray</p>

			<p>infrastructure GHG emissions, or B) the gray minus the green option if the green option has a slightly positive GHG emissions</p> <p><i>Author's response: We agree with this reviewer's logic. Previous sections have been updated as noted above, and now the statement in Section 4 is better supported: "If the green infrastructure solution includes any carbon sequestration benefit (i.e., biomass or soil carbon sequestration), Project Proponents may separately account for and seek issuance of associated potential</i></p>
--	--	--	--

			<i>carbon credits."</i>
5.0	Who are project stakeholders?	<p>Edited From this "The project proponent and project stakeholders must agree to the site selection and obtain appropriate approvals from landowners and any cognizant authorities." to this:</p> <p>"The project proponent and key project stakeholders (water treatment facility staff, regulatory agency staff) must agree to the site selection priorities, and proponent must obtain appropriate approvals from landowners and any necessary authorities."</p>	PASSED
5.0	Need to clarify that "can involve activities such as removing vegetation, grading the land, erosion control" Cannot have negative impacts on water quality and other ecosystem functions. For example, want to make sure you don't cut down a forest in order to build nutrient treatment wetlands	After the sentence "This can involve activities such as removing vegetation, grading the land, and installing erosion control measures." we add the sentence "Any site preparation activities must not have a long term negative impact on water quality or ecosystem function."	PASSED
5.0	"In accordance with best management practice"--Whose practices? Where do I find these?	Edited to The Project Proponent should denote which local, state or federal best management practices they are using to guide implementation of site preparation and project activities. Examples of local/state/federal BMP definitions for riparian restoration are: the Johnson Creek	<p>PASSED--BUT ALL ARE US-BASED EXAMPLES</p> <p><i>Author's response: We have added 8</i></p>

		Watershed Council (https://www.jcwc.org/restorationguidelines/), South Carolina Department of Natural Resources (https://www.dnr.sc.gov/water/river/pdf/guide-riparianlands2020-aug.pdf), and US EPA (https://www.epa.gov/system/files/documents/2021-11/bmp-riparian-forested-buffer.pdf). "	<i>non-US examples.</i>
5.0	"Bi-annual inspections"--But I thought there was no third party validation? It's unclear WHO does these	This has been clarified by adding to the sentence so that it now reads "The Project Proponent must develop a long-term maintenance plan that includes periodic maintenance activities, such as bi-annual or annual inspections performed by Project Proponent or local contractors, and identifies the party responsible for carrying out the maintenance activities."	PASSED
6.0	What is DOM--Please define acronyms	Edited	PASSED
6.1	Why is this section needed? Delete?	We think it's important to reference example standards, as was done earlier in the document. This could be moved to normative references.	PASSED
6.3	Technical Review & Direct Monitoring--Why would you have review by technical expertise and why would you do	The methodology has been revised to strengthen the LCA analysis for the GHG reduction.	PASSED

	<p>direct monitoring?</p> <p>I think this methodology puts a ton of time and effort into documenting the water quality CO-BENEFIT, but not enough into the GHG CREDIT</p>	<p>The methodology requires in stream monitoring because this has been lacking in the existing water quality trading landscape. This rationale has been added to the preamble for the methodology.</p>	
6.6.	<p>Building from the comment just above, this is a lot. Why do you need so much effort on this? Really, it seems like you just need to show A) The green infrastructure exists, B) The modeled or measured WQ benefits are CLOSE to the gray infrastructure alternative, and C) the documentation behind the WQ benefits exists in a way buyers could confirm the WQ benefits if they wanted to</p>	<p>Requiring the levels of transparency that the most successful WQT projects do is logical here, because doing so buffers this methodology from the possibility that less-stringent state regulations won't require much in terms of monitoring/confirmation and then the program is shown to be not effective, environmentally speaking. Setting a robust floor of watershed implementation standards that means that any watershed program implemented with assistance from these credit revenues can hold up to both global and local scrutiny is a tactical choice that makes sure programs built with this methodology are high quality.</p>	<p>PASSED—I SEE WHY, I STILL DON'T THINK IT'S NECESSARY HERE. NO PROBLEM HAVING THE EXTRA DETAIL</p>
6.7.	<p>Same as above. Why is there a reference to “must be reviewed and verified by qualified professionals”</p>	<p>As above</p>	<p>PASSED—I SEE WHY, I STILL DON'T THINK IT'S NECESSARY HERE. NO</p>

			PROBLEM HAVING THE EXTRA DETAIL
6.8	Same as above. Needed?	As above	PASSED-I SEE WHY, I STILL DON'T THINK IT'S NECESSARY HERE. NO PROBLEM HAVING THE EXTRA DETAIL

Post here any additional feedback or comments that are more general:

Generally, the concept behind this credit class (avoided emissions from the construction, operation, and end life of gray infrastructure) is sound—and would be good to encourage. I appreciate and support approving this type of credit class.

There are also a lot of areas that are unclear and confusing about both the credit class report and the methodology report. Here are some assumptions I have + some overall thoughts:

- It is most important to demonstrate A) the gray infrastructure option chosen for GHG calculations is realistic, and B) it is important to demonstrate the likely timing of construction and operations of the gray infrastructure option.

Agreed. This would be reflected in the Project Plan by a Project Owner/Developer. PASSED

- The Credit Class says GHG reductions need to be quantified for each gray infrastructure alternative–But it does not say which alternative should ultimately be the basis for crediting–Would it be the least cost Gray alternative, the one with the most GHG emissions, what

We have added text to make clear that the desk-based choice for the analysis is based on the most probable / least cost technology that meets the regulatory requirements. PASSED

- The authors provide a logic for how to quantify the electricity use and materials use- see specific comments above.
- The water quality benefits A) There is a base eligibility criterion to demonstrate a water quality benefit that is CLOSE to what the gray infrastructure would have provided–using the same parameters the gray infrastructure would have treated for
- There is not a robust methodology or protocol provided to demonstrate Ecosystem Health, Soil Health, or Community Health benefits– If the authors want to claim these co-benefits, there’s a lot more work to do

We have left only the water quality co-benefit. PASSED

- I think the authors are designing water quality modeling, monitoring, and verification requirements that are too extensive (and likely too expensive) for quantifying a water quality co-benefit.

We have explained in the preamble to the methodology the rationale for requiring water quality monitoring. PASSED

- I don’t think the authors provide protocols of methodologies that are clear enough to apply in a global context. These are written through a US-focused lens, and so should be for US-based projects as currently written.

We have added a preamble to address this point, directing Project Developers to use best available data resources in other countries.

REJECTED- SEE CREDIT CLASS COMMENTS

- The Credit Class and Methodology are unclear about drinking water (e.g., defining a ‘water intake’ as a project boundary), wastewater (e.g., most of the regulatory references cited), and stormwater (but there is almost no discussion of this). I think the protocol should not apply to stormwater (or drinking water or wastewater conveyance or storage-just treatment), and should be clearer about differences in application to drinking water treatment and wastewater treatment scenarios.

- *Author's response: Upon review, agree with Reviewer. Stormwater and conveyance references reviewed, and additional language inserted to demonstrate differences in drinking water/wastewater applications.*

We believe this is best left to the project developer in the Project Plan. **REJECTED- every area of detail assumes wastewater treatment. I don't think it should be left to the project developer. Drinking water treatment is much less intensive than wastewater treatment; And water/wastewater conveyance pipe projects are very different than treatment; and stormwater is most often distributed with much of the impact coming from materials use. I still think this version of the credit class and methodology has justified applications for wastewater treatment, but not the requisite detail for other types of infrastructure. Future versions could..**

Author's response: We have deleted the stormwater application. In all five places where the methodology describes applications to 'water and wastewater treatment', we've modified to 'drinking water and wastewater treatment'. There are only 2 places where wastewater is mentioned but not drinking water; and one place where drinking water is mentioned but not wastewater (the New York example). Though drinking water is less emissions intensive, drinking water upgrades and O&M are also less expensive, so the business case is likely similar in its potential impact.

- I don't think any of the carbon sequestration benefits from the green infrastructure benefits should be creditable—I think that is a different class than “Avoided gray infrastructure emissions”. I would encourage an eligibility criterion that only green infrastructure actions that produce zero or net zero carbon emissions are eligible.
- *Author's response: Agree with Reviewer. Life Cycle Analysis section 4 of methodology now has this addition: “If the green infrastructure solution includes any carbon sequestration benefit (i.e., biomass or soil carbon sequestration), Project Proponents may separately account for and seek issuance of associated potential carbon credits.”*

We disagree regarding the requirement for net zero or negative emissions - there are many examples of projects where a nature based solution is used in combination with a much LOWER but not zero emitting technology to achieve the same benefit as a higher emitting technology. Regen allows credit stacking. A project developer may use other methodologies to claim any sequestration benefits.

REJECTED-Hopefully I am being clear in my responses that I support GHG credits for the carbon sequestered by green infrastructure generally. All I am saying is that this credit class and methodology are robust in clarifying the asset value of avoided gray infrastructure GHG and the water quality benefits of green infrastructure- BUT has YET to define the baseline, additionality, methods, and other elements needed to credit GHG reductions. Future versions could.

Upon further review, we concur with the reviewer. We have revised the credit class to credit only avoided GHG and not sequestration, noting that project developers may use other methodologies / credit classes to credit sequestration.

- TIMING: I'm not clear if the CO2 credits have a vintage year? I think there needs to be a credit start date that is equal to something like the realistic start year of a gray infrastructure construction and end date of the expected life of that infrastructure.

The credits are not generated over time, they are generated as of the date the gray infrastructure is not required. **REJECTED- This is for REGEN. I don't support this approach, but it's REGEN's call to be consistent with how it issues credits.**

Upon further review, we concur with the reviewer and have revised the credit class to issue only ex-ante credits, annually.