Soil Enrichment Protocol
Version 1.1
ERRATA AND CLARIFICATIONS

The Climate Action Reserve (Reserve) published its Soil Enrichment Protocol Version 1.1 (SEP V1.1) in May 2022. While the Reserve intends for the SEP V1.1 to be a complete, transparent document, it recognizes that correction of errors and clarifications will be necessary as the protocol is implemented and issues are identified. This document is an official record of all errata and clarifications applicable to the SEP V1.1.[1]

Per the Reserve's Program Manual, both errata and clarifications are considered effective on the date they are first posted on the Reserve website. The effective date of each erratum or clarification is clearly designated below. All listed and registered SEP projects must incorporate and adhere to these errata and clarifications when they undergo verification. The Reserve will incorporate both errata and clarifications into future versions of the protocol.

All project developers and verification bodies must refer to this document to ensure that the most current guidance is adhered to in project design and verification. Verification bodies shall refer to this document immediately prior to uploading any Verification Statement to assure all issues are properly addressed and incorporated into verification activities.

If you have any questions about the updates or clarifications in this document, please contact Policy at policy@climateactionreserve.org or (213) 891-1444 x3.

[1] See Section 4.4.4 of the Climate Action Reserve Program Manual for an explanation of the Reserve's policies on protocol errata and clarifications. "Errata" are issued to correct typographical errors. "Clarifications" are issued to ensure consistent interpretation and application of the protocol. For document management and program implementation purposes, both errata and clarifications are contained in this single document.

Errata and Clarifications (arranged by protocol section)

Section 2

1. Assessment of Past Land Conversion (CLARIFICATION — October 21, 2025)

Section: 2.2.2 (Defining the Project Area)

Context: Section 2.2.2 of the protocol states:

"The project area must adhere to the following criteria:

- Projects may not include areas which have been cleared of native ecosystems, including established and restored grasslands, within the 10 years prior to the project start date. The prohibition on clearing native ecosystems does not include the removal of a small numbers of trees, such as the removal of trees along fence rows that is immaterial respective to project emission reductions."

This language is ambiguous about the land conversion start date for aggregated projects. The intent is that no fields should have been cleared of native ecosystems within 10 years prior to the beginning of field crediting. The update clarifies the requirement at the field level.

Clarification: The first sentence of the cited section above now states (bold text indicating addition, strikethrough text indicating deletion):

"Projects may not include areas which have been cleared of native ecosystems, including established and restored grasslands, within the 10 years prior to ~~the project start date~~ **each field's start date**."

Section 3

2. Stacking Multiple Practices (ERRATUM – October 21, 2025)

Section: Section 3.4.1.2 (Defining the Baseline Scenario)

Context: Section 3.4.1.2 of the protocol states:

"Practices implemented on a field and deemed ineligible by default at its start date are considered additional if any of the following conditions are met:

1. Stacking multiple eligible practices:

a. A combination of two or more eligible practices are implemented during the initial year of reporting, notwithstanding any such individual practice being on the negative list.
b. A single practice that is on the negative list is initially implemented but:
    i. at least one other eligible practice is implemented before the end of the 3rd year following its start date in which case credits will be issued at the point of adopting the further practice(s) based on increased SOC and/or emission reductions achieved by the single practice adopted initially in addition to those achieved by the implementation of a further eligible practice(s). In other words, fields that fall into this category will have to wait until they add an additional eligible practice before they can then get credited, but they will be issued credits earned as of their start date. A field will be allowed to have up to 3 reporting periods of single practice adoption, before they must include a further eligible practice.
    ii. at least one other eligible practice is implemented after the first 3 years but within its first crediting period, in which case the field will be able to retain its start date and baseline and be able to generate credits starting from the reporting period when that project adopts a further eligible practice(s)."

The allowance for stacking multiple practices that meet the conditions outlined in 1b. are no longer permitted. This update removes the option to apply either scenario 1b (i) or (ii) to gain eligibility for practices that have be identified as ineligible per the performance standard test. Instead, stacking multiple practices to gain eligibility is only permitted if condition 1a is met.

Correction: This section now states (strikethrough text indicating deletion):

"1. Stacking multiple eligible practices:

a. A combination of two or more eligible practices are implemented during the initial year of reporting, notwithstanding any such individual practice being on the negative list.
~~b. A single practice that is on the negative list is initially implemented but:~~
    ~~i. at least one other eligible practice is implemented before the end of the 3rd year following its start date in which case credits will be issued at the point of adopting the further practice(s) based on increased SOC and/or emission reductions achieved by the single practice adopted initially in addition to those achieved by the implementation of a further eligible practice(s). In other words, fields that fall into this category will have to wait until they add an additional eligible practice before they can then get~~

~~credited, but they will be issued credits earned as of their start date. A field will be allowed to have up to 3 reporting periods of single practice adoption, before they must include a further eligible practice.~~

ii. ~~at least one other eligible practice is implemented after the first 3 years but within its first crediting period, in which case the field will be able to retain its start date and baseline and be able to generate credits starting from the reporting period when that project adopts a further eligible practice(s).~~"

3. Baseline Assumptions (CLARIFICATION — October 21, 2025)

Section: Section 3.4.1.3 (Defining the Baseline Scenario)

Context: Section 3.4.1.3 of the protocol in the first paragraph states:

"To assess how a project performs relative to a performance threshold, a baseline scenario must first be established. The baseline scenario assumes the continuation of pre-project agricultural management practices. For each sample unit (e.g., field), practices applied in the baseline scenario are determined by defining an historical baseline period during which crop rotation and management practices will be illustrated…"

This language does not include justification for why pre-project agricultural management practices were chosen as the baseline scenario. Appendix A.1 provides further rationale on farmer decision-making and barriers to adopt soil enrichment practices, however this is not referenced in this section. The update adds justification in this section to the determination of the baseline scenario and provides a reference to Appendix A.1 for further explanation.

Clarification: The first paragraph of this section has been amended to now state (bold text indicating addition):

"To assess how a project performs relative to a performance threshold, a baseline scenario must first be established. The baseline scenario assumes the continuation of pre-project agricultural management practices. For each sample unit (e.g., field), practices applied in the baseline scenario are determined by defining an historical baseline period during which crop rotation and management practices will be illustrated. **Historical agricultural management practices was chosen as the most appropriate baseline scenario following an extensive literature review and discussions with experts. From this discussion, particularly regarding farmer decision making, it was determined that given farmers' risk aversion and reliance on past experiences to inform future decisions, under a business-as-usual scenario it is most likely that farmers will continue to use the same agricultural management practices as they have in the past. Recent literature supports that farmers without a history of practice adoption will likely continue their historical practices given the complex social, financial, and logistical risks associated with a practice change.[2] Further analysis and explanation on farmer decision making that informed the baseline scenario can be found in Appendix A.1.** The length of the historical period…**"**

[2] Han, G., & Niles, M. T. (2023). An adoption spectrum for sustainable agriculture practices: A new framework applied to cover crop adoption. Agricultural Systems, 212, 103771.

4. Enhancement Payments Clarification (CLARIFICATION – October 21, 2025)

Section: Section 3.4.3.2 (Payment Stacking)

Context: Section 3.4.3.2 under "Enhancement Payments" of the protocol states:

"Enhancement payments provide financial assistance to landowners in order to implement discrete conservation practices that address natural resource concerns and deliver environmental benefits… The practices that are compensated for by the programs mentioned above are based on minimum, standardized definitions, and do not require monitoring and reporting on GHG benefits. Payments are tied to activity, but not performance. Because of this, Field Managers may pursue enhancement payments without restriction. Because every available enhancement payment is not comprehensively addressed by the protocol at this time, the Project Owner must still disclose any such payments to the verifier and the Reserve on an ongoing basis."

This language does not sufficiently clarify how enhancement payments should be assessed for their impact on additionality. Enhancement payments may have the potential to impact additionality by providing sufficient incentive out of carbon revenue for farmers to adopt management practices. The update adds additional justification to clarify the limited impact of enhancement payments on project additionality.

Clarification: The second paragraph of the "Enhancement Payments" section now states (bold text indicating addition, strikethrough text indicating deletion):

"The practices that are compensated for by the programs mentioned above are based on minimum, standardized definitions, and do not require monitoring and reporting on GHG benefits. ~~Payments are tied to activity, but not performance.~~ **These payment programs are often short-term payments (1-5 years) which only provide a fraction of the cost required to adopt practices.**[3] Because of this, Field Managers ~~may~~ **are generally allowed to** pursue enhancement payments~~ without restriction~~. **However,** because every available enhancement payment is not comprehensively addressed by the protocol at this time, the Project Owner must still disclose any such payments to the verifier and the Reserve on an ongoing basis."

[3] Wongpiyabovorn, O., & Plastina, A. (2023). Financial support for conservation practices: EQIP and CSP. Iowa State University Extension and Outreach. Available at https://www. extension. iastate. edu/agdm/crops/pdf/a1-39. pdf.

Section 4

5. Greenhouse Gas Assessment Boundary (CLARIFICATION — October 21, 2025)

Section: 4 (The GHG Assessment Boundary)

Context: Section 4 of the protocol in the second paragraph states:

"Figure 4.1 illustrates all relevant GHG SSRs associated with soil enrichment project activities and delineates the GHG Assessment Boundary."

And the caption to Figure 4.1 of the protocol states:

"Figure 4.1. General Illustration of the GHG Assessment Boundary
All SSRs are relevant in both the baseline and project scenarios."

The text introducing Figure 4.1 and the Figure's caption do not explicitly state the level at which project GHG SSRs are assessed. The project and baseline scenarios are defined at the field level, therefore the location of SSRs should be identified at the location of the field, not the broader project boundary. The update clarifies in the text that SSRs are identified at the field level.

Clarification: The second paragraph of this section now states (bold text indicating addition):

"Figure 4.1 illustrates all relevant GHG SSRs associated with soil enrichment project activities and delineates the GHG Assessment Boundary. **All SSRs are relevant in both the baseline and project scenarios and are determined at the field level."**

Section 5

6. Calculation of Compensation for Reversals (ERRATUM — October 21, 2025)

Section: 5.3.2 (Reversals)

Context: The Reserve requires that all credited reversible GHG reductions and removals be effectively "permanent." For SEP projects, a reversible emission reduction is considered permanent if the quantity of carbon associated with that reduction is stored for at least 100 years following the issuance of a credit for that reduction.

However, Section 5.3.2 of the protocol in the third paragraph also states:

"…The quantity of CRTs that must be retired to compensate for the amount of reversed soil carbon is determined using Equation 5.5, which recognizes the time-value of the CO_2 held out of the atmosphere and in sequestered soil carbon stocks prior to the time of the reversal, relative to the time remaining in the permanence time commitment for each area causing the reversal. As such, Equation 5.5 is not only applicable to all reversible emission reductions calculated using tonne-tonne accounting (Equation 5.2a), but also to those reversible emission reductions calculated using tonne-year accounting (Equation 5.2b) that are secured through the term of enforcement for the PIA since they are still considered reversible…"

And Equation 5.5 of the protocol states:

"Equation 5.5. Calculation of Compensation for Reversals

$$\boldsymbol{Rev} = \sum_{\boldsymbol{pc}} \left(\frac{\Delta \boldsymbol{CO2\_soil}_{\boldsymbol{rev,pc}}}{\sum \Delta \boldsymbol{CO2\_soil}_{\boldsymbol{rev,pc}}} \times \boldsymbol{ER}_{\boldsymbol{Rev}} \times \boldsymbol{Y}_{\boldsymbol{rp}} \times \mathbf{1}\% \right)$$

Where,			Units
Rev	=	Quantity of emission reductions affected by the reversal, summed for all cultivation cycles for which emission reductions have been credited in relation to the soil organic carbon pool	tCO_2e
$\Delta CO2\_soil_{rev,pc}$	=	Carbon dioxide emissions from soil organic carbon pool in the area of the project affected by the reversal (reported during the current reporting period) and with the same length of time remaining in the permanence commitment period *pc*	tCO_2e
ER_{Rev}	=	Net project reversal, as indicated by Equation 5.2	tCO_2e
Y_{rp}	=	Number of years remaining in the permanence time commitment for a given project area affected by the reversal at the time the reversal occurs	years
1%	=	Annual climate impact relative to 100-year permanence timeframe	%/year"

To further ensure conservative accounting of project-level net reversals, the Reserve is updating Equation 5.5 to remove accounting for the time-value of the CO_2 held out of the atmosphere and in sequestered soil carbon stocks prior to the time of the reversal. The quantity of emission reductions that must be compensated for will instead be equal to the total net loss of soil carbon across the project.

Correction: The third paragraph of this section now states (strikethrough text indicating deletion):

"If the project area is subject to a net reversal, then the quantity of soil carbon reversed is considered to be equal to the total net loss of soil carbon across the project (if any), as quantified in Equation 5.2. The quantity of CRTs that must be retired to compensate for the amount of reversed soil carbon is determined using Equation 5.5~~, which recognizes the time-value of the CO_2 held out of the atmosphere and in sequestered soil carbon stocks prior to the time of the reversal, relative to the time remaining in the permanence time commitment for each area causing the reversal. As such, Equation 5.5 is not only applicable to all reversible emission reductions calculated using tonne-tonne accounting (Equation 5.2a), but also to those reversible emission reductions calculated using tonne-year accounting (Equation 5.2b) that are secured through the term of enforcement for the PIA since they are still considered reversible~~. Furthermore, Equation 5.5…"

And Equation 5.5 is replaced as follows:

"Equation 5.5. Calculation of Compensation for Reversals

$$\boldsymbol{Rev = ER_{Rev}}$$

Where,			Units
Rev	=	Quantity of emission reductions affected by the reversal, summed for all cultivation cycles for which emission reductions have been credited in relation to the soil organic carbon pool	tCO_2e
ER_{Rev}	=	Net project reversal, as indicated by Equation 5.2	tCO_2e"

7. Indirect Nitrous Oxide Emissions from Manure Deposition – Equation 5.24 (ERRATUM — October 21, 2025)

Section: 5.4.2 (Nitrous Oxide Emissions)

Context: The equation for Indirect Nitrous Oxide Emissions from Manure Deposition (Equation 5.24) is missing a conversion factor to convert the final units from kilograms to metric tonnes.

Correction: A conversion factor has been added to Equation 5.24. The updated equation now reads (bolded term indicating addition):

Equation 5.24. Indirect Nitrous Oxide Emissions from Manure Deposition

$$N2O\_md_{indirect,s,t} = \sum_{l} \left[\left(AGD_{l,s,t} \times Nex_{l} \times Frac_{GASMD} \right) \times EF_{Nvolat} + \left(AGD_{l,s,t} \times Nex_{l} \right) \times Frac_{LEACHMD} \times EF_{Nleach} \right] \times \frac{44}{28} \times \frac{GWP_{N2O}}{\mathbf{1000}}$$

Where,			Units
$N2O\_md_{indirect,s,t}$	=	Indirect nitrous oxide emissions due to manure deposition in stratum *s* in cultivation cycle *t*	tCO_2e
$AGD_{l,s,t}$	=	Animal grazing days for livestock category *l*, in stratum *s*, during cultivation cycle *t* (see Box 5.3). Per Section 5.5.1, the minimum value allowed for the project scenario is equal to the average value from the historical baseline period	animal days
Nex_l	=	Nitrogen excreted by grazing animals in livestock category *l*	kg N/head/day
$Frac_{GASMD}$	=	Fraction of manure N added to soils that volatilizes as NH_3 and NO_x	tNH_3–N + NO_x–N) / tN applied or deposited
EF_{Nvolat}	=	Emission factor for nitrous oxide emissions from atmospheric deposition of N on soils and water surfaces	tN_2O-N /(tNH_3-N + NO_x-N volatilized)
$Frac_{LEACHMD}$	=	Fraction of manure N added to soils that is lost through leaching and runoff, in regions where leaching and runoff occurs. Equal to 0 where average annual precipitation is less than potential evapotranspiration, unless irrigation is employed.	tN / tN additions or deposition by grazing animals
EF_{Nleach}	=	Emission factor for nitrous oxide emissions from leaching and runoff	tN_2O-N / tN leached and runoff
44/28	=	Molar mass ratio of N_2O to N	kg N_2O/kg N_2O-N
GWP_{N2O}	=	Global warming potential for N_2O (Table 5.1)	tCO_2e/tN_2O
1000	**=**	**Conversion factor**	**kg/t**

8. Leakage from Livestock Displacement (CLARIFICATION — October 21, 2025)

Section: 5.5.1 (Accounting for Leakage from Livestock Displacement)

Context: Section 5.5.1 of the protocol in the first paragraph states:

"To avoid crediting for emission reductions which correspond with emissions leakage (i.e., lowering of CH_4 and N_2O emissions from grazing within the project area relative to the baseline, resulting in increased grazing activities elsewhere to maintain overall production levels within the greater market), the level of grazing activity used to quantify project emissions may not be lower than the average level of grazing activity in the historic baseline period…"

And the second paragraph of Section 5.5.1 states:

"For projects using the default equations, this is monitored as animal grazing days (or AGD). The average AGD for the historical baseline period shall represent the minimum bound for the value of AGD used when calculating the project scenario emissions in Equation 5.11b, Equation 5.13b, Equation 5.23, and Equation 5.24. This mechanism should…"

This language is unclear as to how historic baseline grazing levels should be used. The intent of this section is to prevent leakage from livestock displacement by requiring projects to use the average AGD value in the historical baseline period if the average AGD value in the project decreases below the baseline value. Additional language has been added to this section to clarify this intent.

Clarification: The second paragraph of this section now states (bold text indicating addition):

"For projects using the default equations, this is monitored as animal grazing days (or AGD). The average AGD for the historical baseline period shall represent the minimum bound for the value of AGD used when calculating the project scenario emissions in Equation 5.11b, Equation 5.13b, Equation 5.23, and Equation 5.24. **In other words, if the project scenario AGD value is lower than the baseline period AGD value, the baseline period AGD value must be used in calculating the project scenario emissions**. This mechanism should…"

Appendix A

9. Development of the Common Practice Assessment (CLARIFICATION — October 21, 2025)

Section: A.2 (Development of the Common Practice Assessment)

Context: Section A.2 of the protocol in the first paragraph states:

"…During development of the protocol Reserve staff received advice from agronomic experts that bolstered the notion a single practice adoption, including the adoption of a single change in tillage practices, is likely to be the safest and most practical means by which agricultural land managers can move towards adoption of more sustainable farming systems. Further factors taken into consideration included information contained in work performed by the USDA's Economic Research Service (ERS), which indicates that while uptake rates of practices such as no-till may be prevalent in certain counties, data suggests that only 21% of total acres exhibited such practice adoption over multiple years, while other adopters continued to rotate such practices with conventional tillage.[4] Such data also…"

The description of the cited study in this section misleadingly suggests that only tillage practices have been considered in justifying the appropriateness of the performance threshold. However, the study referenced also included evaluation of cover crop adoption and was considered by the Reserve in justifying the performance standard approach for all included practices. To clarify how the cited study was used to inform the Reserve's approach, additional language has been added to this section, as well as an additional reference to clarify that similar trends were seen in other practices, such as rotational grazing.

Clarification: This section now states (bold text indicating addition, strikethrough text indicating deletion):

"…During development of the protocol Reserve staff received advice from agronomic experts that bolstered the notion a single practice adoption, including the adoption of a single change in tillage practices, is likely to be the safest and most practical means by which agricultural land managers can move towards adoption of more sustainable farming systems. Further factors taken into consideration included information contained in work performed by the USDA's Economic Research Service (ERS), which indicates that while uptake rates of practices such as no-till may be prevalent in certain counties, data suggests that only 21% of ~~total~~ **surveyed** acres ~~exhibited such practice adoption~~ **applied no-till** over multiple years, while other adopters continued to rotate such practices with conventional tillage. **This study also found that cover cropping was more uncommon, with less than 12% of all fields surveyed applying this practice, although adoption rates similarly showed regional trends.[4] An additional study on rotational grazing at the national level also showed declining rates of improved grazing practices from 2007 to 2017. Further evaluation of this trend showed significant regional differences relating to regional differences in cattle operations.[5] Together, these**

[4] Economic Research Service, 2018. Tillage Intensity and Conservation Cropping in the United States. United States Department of Agriculture. Available at: https://www.ers.usda.gov/publications/pub-details/?pubid=90200

[5] O'Hara, J.K., Reyes, J., Knight, L.G. and Brown, J., 2023. Why has the adoption of rotational grazing declined in parts of the United States?. Rangelands, 45(5), pp.92-101.

trends support the use of assessing prevalence of all practices at smaller regional levels such as counties to conservatively assess prevalence of a practice. Such data also…**”**