CLIMATE ACTION RESERVE

Soil Enrichment Version 2.0

Workgroup Meeting 5
January 22, 2025

Housekeeping

- Please keep yourselves muted unless / until you would like to speak
- Please use the raise your hand function when answering a question
- All other attendees/observers are in listen-only mode
- Observers are free to submit questions in the question box
  - **All attendees will be able to see questions submitted to the Q&A section, as well as comment on questions / up-vote questions**
- **For workgroup members submitting comments and questions via chat: Please change your message settings to send comments to Everyone**
- The slides and a recording of the presentation will be posted online

AGENDA

- Update Summary
- Items still needing feedback
- Overview of Technical Task Force Discussion Items
- Items for Further Discussion
  - Baseline Scenarios
  - SOC Removals/Reductions calculation
  - Measure/Re-measure approaches
  - PST – Negative list
  - Reporting Period & Verification Cycle

PROTOCOL UPDATE SUMMARY

Summary of SEP 2.0 Update

Protocol Section	Workgroup Discussion	Task Force Review
Section 2.2 Project Definition	Complete	N/A
Section 3.2 Project Start Date	Complete	N/A
Section 3.4.1 Performance Standard Test	Complete	N/A
Section 3.4.3 Ecosystem Services Stacking	Complete	N/A
Section 3.5.1 Defining Reversals	Complete	Complete
Section 4 GHG Assessment Boundary	Ongoing	N/A
Section 5.0 Quantifying GHG Emission Reductions	Ongoing	Complete
Section 5.1 Modeling the Baseline	Ongoing	Ongoing
Section 5.3 Reversible Emission Reductions	Complete	Complete
Section 5.4 Non-reversible Emission Reductions	N/A	Ongoing
Section 5.5 Emissions from Leakage	Ongoing	N/A
Section 6.2 Monitoring Ongoing Eligibility of Permanence	Complete	Complete
Section 6.5 Soil Sampling & Testing Guidance	Ongoing	Ongoing
Section 6.6 Modeling Guidance (with SEP Model Guidance Document)	Ongoing	Ongoing
Section 7.3 Reporting Period and Verification Cycle	Ongoing	N/A
Section 7.6 Reporting and Verification of Permanence	Complete	N/A
Section 8.3 Core Verification Activities (Sampling & Modeling)	N/A	N/A
Section 8.4.1 Verification Site Visit Requirements	N/A	N/A
Appendix A Development of Performance Standard Test	Ongoing	N/A
Appendix B Illustrative List of Soil Enrichment Practices	Complete	N/A
Appendix C Assessing Leakage for SEP Projects	Ongoing	N/A
Cumulative Accounting Addition	Ongoing	Complete
Measure / Re-measure approaches (Section 5 & 6 updates)	Ongoing	Ongoing

CLIMATE ACTION RESERVE

CURRENT ITEMS STILL NEEDING FEEDBACK

Future items for feedback

- Soil Sampling – follow up over email with specific edits
  - Missing sample guidance
  - Allowance for emerging technologies (i.e. Spectroscopy, etc.)
  - Sampling timing
  - Sample depth
  - Lab analysis requirements
- QA/QC – mostly administrative, follow up over email with any updates
  - Process for handling missing data (missing soil sample data, missing full grower management data)
  - Minimum thresholds for soil sampling points
  - Improving QA/QC guidance (review template)
- Leakage – follow up over email with specific additions/edits

TECHNICAL TASK FORCE DISCUSSION ITEMS

Technical Task Force Meetings

- **3 Meetings Held – July 31, Sept 3, Nov 7**
- **Meetings covered the following topics:**
  - **Requirements and Guidance for Model Calibration, Validation, Uncertainty, and Verification Document**
    - Model Calibration & Validation Process
    - Verification of Model Usage
    - Validating and Reporting Model Performance and Uncertainty
  - **Permanence & Accounting for Reversals**
    - Requirements for Permanence (Section 3.5 of the SEP)
  - **Application of SOC re-measurement (Section 5 of the SEP)**
  - **Cumulative Accounting**
  - **Soil Sampling and Testing Guidance (Section 6.5 of the SEP)**

Model Cal/Val Guidance Document

- **Model Calibration & Validation Process**
  - Independent 3rd party review vs. Peer-reviewed publication pathways
    - Require independent reviewers of Model Validation Report (MVR) – increase number of reviewers to 2, improve administrative process so that reviewers meet minimum requirements to be approved
  - Types of Model Validation Reports (MVR)
    - Confusion over MVR types: Project-specific (Type 1) vs generalized reporting (Type 2) vs. Type 3
      - Clarify projects employing models validated through a generalized (Type 2) report still must only include domains represented in validation dataset. Re-name report types to avoid confusion (alternatives for Type 2 report: Independent model report, Project-neutral, Project-agnostic, Cross-project report)
    - Update reporting requirements for projects using models validated through Type 2 report – sensitivity analysis requirements, ensuring project domain not overly concentrated in a subset of the validated model domain
    - MVRs, including summary tables, for all models are provided publicly online: https://www.climateactionreserve.org/how/protocols/ncs/soil-enrichment/models-validated-for-sep/

Model Cal/Val Guidance Document

- **Validating and Reporting Model Performance and Uncertainty**
  - Create a pathway for datasets to be used that are not yet peer-reviewed
    - Include attestations from model developer identifying any non-peer-reviewed datasets – model validation and report must be updated if dataset changed during peer-review process
    - Require an appendix in model validation report with unpublished datasets
  - Model validation of SOC using newer methods of SOC stock monitoring
    - Allow if there is peer-reviewed support for newer methods AND independent expert support approved by the Reserve
    - Independent model expert should evaluate use of newer method and confirm that model developers have accounted for any additional biases and uncertainty that may be introduced
  - Allow grouping of practice categories (PC) and crop functional groups (CFG) by Emission Source (ES) to reach required number of land resource regions (LRRs) – **with restrictions**
    - Thresholds for ensuring all LRRs with X% of project area are represented in validation dataset
    - Require performance for each PC x CFG x LRR combination be reported in MVR

Permanence & Accounting for Reversals

- Discussed feasibility of using models to quantify SOC amount following observance of reversal events
  - Concern that confidence in these predictions would be low
  - Agreement that conservative approach should be taken for cases of reversals at field level
  - Continue current protocol guidance of subtracting all CRTs issued to a field that has left the project and has an observed reversal event
  - Will include a draft framework for defining observed practice change threshold that would trigger accounting for a reversal at the field level.
- Add guidance in protocol around reversals at field level and how CRTs should be accounted for
- Will discus SOC removals/reductions in a later slide – but overall regardless of whether SOC is identified as a removal or reduction, all SOC is subject to reversal and buffer pool contributions.

Application of SOC Re-measurement

- Issues with current 5-year SOC re-measurement requirement (i.e.“true-up” language) in Section 5
  - 5-year re-measurement only reflects project scenario, no equivalent “true-up” for baseline scenario – would create problems with different modeling errors between project and baseline scenarios
  - Issue with sample timing – initial soil sample starts the model run but re-measurement sample may occur at any point during RP of the re-sample year. Would still need to model SOC until end of RP
- Model Forecast Evaluation - Proposal for projects to first use re-measurement data as a check on model performance and have this be a reporting requirement so that projects are transparent about model’s accuracy.
- Use of re-measurement data in improving quantification still under review
  - Would need to require model validation to assess certainty of temporal change, since most models are validated based on SOC stock ***change (between baseline and project)***, not absolute stock
  - Need to determine what statistical tests should be applied to model performance assessment
  - Update model validation applying re-measurement data and additional baseline datasets to improve baseline predictions and/or include model performance tests for just the baseline

Cumulative Accounting

- Overall members supported adoption of cumulative accounting
- Benefits included ability to account for uncertainty over larger time frame where SOC impacts are better understood – would then allow for more accurate accounting of uncertainty
- Would incentivize model developers to continually improve their models
  - Language around applying cumulative accounting needs to ensure against possibility for gaming – such as selectively applying model improvements that may ignore negative consequences to projects with updated models
- Would also apply to other emission sources, not just SOC
  - In cases where default equations for N_2O or CH_4 had been used by project, would be accounted for as well under cumulative accounting
- Determination of Vintages – review internally on how this will be allocated.

ITEMS FOR FURTHER DISCUSSION

Baseline Scenarios

- Section 3.4.1.3 Defining the Baseline Scenario
- Section 3.4.1.4 Modeling the Baseline
  - Matched vs. Blended Baseline
  - Example question: How to accurately account for SOC & NM interventions on same field?
  - Currently projects will need to sacrifice accuracy of nutrient management interventions if they want to include SOC, due to required use of blended baseline throughout project
  - Proposal: dual baselines by isolating blended for SOC and matched for N_2O and CH_4
- Section 5.1 Modeling the Baseline
  - Section 5.1.1 Transitioning from the Matched Baseline to the Blended Baseline
  - Expectation that projects will all move to a blended baseline, but should this be the case?
- We will send draft language to the Task Force and Workgroup for comment

SOC Removals/Reductions calculation

- Section 5.3 Reversible Emission Reductions
  - Reversible emission reductions for SEP projects are those related to changes in SOC stocks
  - Question for Task Force was if we could define reductions and removals within the reversible SOC emission quantification
  - Their feedback was not at this time as we would need to change the current Model Calibration and Validation guidance to look at the absolute value instead of/or in addition to the delta between the baseline and the project
  - Current path forward: label all non-reversible emissions (N2O and CH4, and other CO2) as reductions but remove tag on registry for SOC credits
  - Agree? Review via written edits or needs further discussion?

Measure/Re-measure approaches

- Table 5.2 Acceptable Quantification Approaches by Source and Gas
  - Propose adding Measure/Re-measure to the table for SOC
  - Also include when sources/gases need to be considered
- Section 6 Project Monitoring
  - Add guidance and language throughout to describe specific requirements of measure/re-measure in parallel with updated soil sampling guidance in this section
- Other items
  - add language that confirms CRTs are not issued until verification of a re-measurement.
  - Should there be a limit – no more than 5 years – but can every year if a project wants to?
  - Should a project have to show lack of model data to do measure/re-measure or any other required safeguards?
  - Other questions or considerations?

Incorporating Measure-Remeasure into SEP 2.0

Who we are

Grassroot Carbon [GRC] is a project developer active in the USA to generate nature-based carbon removal credits based on soil carbon storage due to additional regenerative land management practices on US grazing lands.

Our interest in measure – remeasure

- GRC is very interested to explore the use of control sites in its project to enhance the quality of data to determine the dynamic baseline.
- A measure-remeasure program will also lead to the development of diachronic data sets used for implementing measure-model programs in the future.
- Some stakeholders appreciate a measurements-based approach to crediting.

Our proposal

- Bring a pragmatic proposal to the CAR-SEP Working Group for the inclusion of a Control site method into SEP 2.0
- Our proposal builds off existing approaches (i.e. VM0042), and updates some of the aspects of those example methodologies to fit the broader CAR SEP structure.
- We wish to collaborate with Working Group members to develop robust measure-remeasure protocol language for SEP 2.0

Incorporating Measure-Remeasure into SEP 2.0

Over the coming weeks:

1. CAR will email the draft proposal text to the Working group participants

2. Working group participants are invited to provide written feedback (email or in document) with comments, suggestions for improvements, and feedback

3. Based on the Working group feedback CAR will decide if and how to modify the draft proposal text, and whether additional steps are required to obtain Working group feedback

Appendix:

Summary of proposed measure-remeasure language for SEP 2.0

Proposals for SEP 2.0 Measure–Remeasure, 1 of 3

VM0042 Section	VM0042 Text	Proposed Text for SEP 2.0
Section 8.2 – Soil texture to depth of project boundary	"Average soil texture must be in the same FAO soil textural class as the average soil texture of the linked quantification unit. Note that where significant textural differences are evident within 0–30 cm depth, texture should be determined separately for the different soil horizons within that depth range."	"Major soil texture, averaged across crediting depth, must be in the same FAO soil textural class as the modal soil texture of the linked quantification unit."
Section 8.2 – Historical ALM activities	"Historical ALM activities must be the same as in the linked quantification unit for at least five years prior to project start date: • Tillage (Y/Nd) and type of tillage practice (no tillage, conservation tillage, or conventional [full] tillage) • Crop residue removal (Y/N) • Crop planting and harvesting (crop type) • Manure application (Y/N) • Compost application (Y/N) • Irrigation (Y/N)"	*Add to the bulleted list of practice changes:* "• Grazing practices, such as, but not limited to, those that affect grazing frequency, duration, and intensity"

Proposals for SEP 2.0 Measure–Remeasure, 2 of 3

VM0042 Section	VM0042 Text	Proposed Text for SEP 2.0
Section 8.2 – Historical land cover	"For lands converted up to 50 years prior to the project start date, the site must be converted from the same major land cover type (e.g., forestland, grassland, savanna) as the linked quantification unit within ±10 years."	*Ignore above text from VM0042 and add to SEP Section 2.2, Project Definition (page 3):* "Projects, ***including measure-remeasure projects and their control sites,*** shall not include areas which have been cleared of native ecosystems or other restored or protected areas (i.e., restored grassland) within the 10 years prior to the project start date.
Section 8.2 – Baseline Emissions / Quantification Approach 2	"Under this approach at least three control sites are required across the entire project area, but more will decrease uncertainty, particularly where the total number of control sites is less than ten. Note that with increasing variability and heterogeneity of the project area, a higher number of control sites is necessary to ensure that similarity criteria are met. Since stratified random sampling is the required sampling strategy for this methodology (see Section 8.2.1), there must be at least one control site per stratum, or the control site must be divided into the same strata as the corresponding quantification unit. Baseline SOC stocks must be reported for the baseline control sites and for each stratum within the project area.**"**	"Protocol similarity criteria must be met and sampling must occur according to the Protocol's sampling guidance. Baseline SOC stocks must be reported for the baseline control sites and for each stratum within the project area."

Proposals for SEP 2.0 Measure–Remeasure, 3 of 3

VM0042 Section	VM0042 Text	Proposed Text for SEP 2.0
Section 8.2.1.2 – Sampling Design	"Compositing or bulking soil samples may better represent spatial variability, but may reduce ability to detect SOC stock changes over time. Therefore at least 3–5 composite samples should be taken within each stratum for model true-up or when using Quantification Approach 2."	*Remove this wording (sampling will follow CAR SEP guidance).*
Section 8.5.1 – Carbon Stock Changes	"For Quantification Approach 2, SOC stock changes for quantification unit i in year t are compared to the estimated SOC stock change in baseline control sites. The mean SOC stock per hectare of each "project site-baseline control site" combination should be used. Where measurements are conducted less frequently than every year, results must be divided by the number of years to calculate an annual SOC stock change."	"Where measurements are conducted less frequently than every year, ***results will be allocated to the year in which credit issuance occurs.***"

PST – Negative list

- Appendix A Development of the Performance Standard
  - Update and expand additionality tool to include:
    - all eligible practices (fertilizer, water management, etc)
    - all emission sources (CH4, N2O, etc)
    - and all crop types (i.e. rice, etc)
  - Change the idea of the negative list from assuming if it isn't in the tool then it is eligible to if it isn't in the tool then it is ineligible unless other data is provided
  - Use other protocols to support these updates – i.e. nitrogen and rice

Reporting Period & Verification Cycle

- Section 7.3 Reporting Period and Verification Cycle
  - Projects may submit for verification for up to 5 reporting periods at a time, and verification for each field may include up to 5 reporting periods for the given field.
  - If a field is unable to get into the project verification process by the Reporting Deadline for its initial Reporting Period, but the overall Project does undergo verification, the field may be included in the subsequent verification cycle.
  - For additionality purposes, should a field have a deadline for initial verification? 30 months from it's field start date?
- Administration – project vs. field start dates
  - Should projects have annual dates if possible?
  - Field dates remain as the last day of harvest of previous cultivation cycle?
  - Vintage is current cultivation year?
  - Add this guidance to Section 7 of the protocol

NEXT STEPS

Next Steps

- Email us with any feedback on topics discussed today
- Reach out any time to discuss protocol topics or process
- *Reserve Staff to identify priorities for discussion at next WG meeting*
- ***Next Workgroup Meeting TBD***

Key contacts

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THANK YOU!