Soil Enrichment Protocol Workgroup Meeting 2

Friday March 6th, 2020
Housekeeping

• Workgroup members have the opportunity to actively participate throughout the meeting
  – Ask that you keep yourselves muted unless / until would like to speak
• We will ask and take questions throughout the session
• All other attendees/observers are in listen-only mode
• We will follow up via email to answer any significant questions not addressed during the meeting
• The slides and a recording of the presentation will be posted online
Agenda

I. Introductions
II. Process Overview
III. Protocol Overview
IV. Key Issues
V. Open Discussion
VI. Next Steps
INTRODUCTIONS
Introductions

Reserve Staff:

• Sami Osman, Senior Policy Manager
  – Protocol development lead
• Heather Raven, Senior Project Coordinator
  – Development process coordinator
• Jon Remucal, Senior Forest Policy Manager
  – Protocol development
• Sarah Wescott, Senior Forest Program Manager
  – Protocol development
<table>
<thead>
<tr>
<th>Name (alphabetical)</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam Chambers</td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td>Amrith Gunasekara</td>
<td>California Department of Food &amp; Agriculture</td>
</tr>
<tr>
<td>Dan Kammen</td>
<td>UC Berkeley</td>
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<tr>
<td>Dorn Cox</td>
<td>Wolfe’s Neck Center for Agriculture &amp; the Environment</td>
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<tr>
<td>Christian Davies</td>
<td>Shell</td>
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<tr>
<td>Jacqueline Gehrig-Fasel</td>
<td>TREES Consulting LLC</td>
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<tr>
<td>Grayson Badgley</td>
<td>Columbia University</td>
</tr>
<tr>
<td>Jon Sanderman</td>
<td>Woods Hole Research Center</td>
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<tr>
<td>Justin Allen</td>
<td>Salk Institute of Biological Studies</td>
</tr>
<tr>
<td>Karen Haugen-Kozyra</td>
<td>Viresco Solutions</td>
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<tr>
<td>Keith Paustian</td>
<td>Colorado State University</td>
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<tr>
<td>Ken Newcombe</td>
<td>C-Quest Capital</td>
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<tr>
<td>Matt Ramlow</td>
<td>World Resources Institute</td>
</tr>
<tr>
<td>Max DuBuisson</td>
<td>Indigo Ag</td>
</tr>
<tr>
<td>Mitchell Hora</td>
<td>ContinuumAg LLC</td>
</tr>
<tr>
<td>Nicholas Goeser</td>
<td>Alliance of Crop, Soil and Environmental Science Societies</td>
</tr>
<tr>
<td>Patrick Splichal</td>
<td>SES, Inc.</td>
</tr>
<tr>
<td>Robert Parkhurst</td>
<td>Sierra View Consulting</td>
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<tr>
<td>Stephen Wood</td>
<td>The Nature Conservancy</td>
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<tr>
<td>Tom Cannon</td>
<td>Goodson Ranch</td>
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<tr>
<td>Tom Stoddard</td>
<td>NativeEnergy</td>
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<tr>
<td>William Schleizer</td>
<td>Delta Institute</td>
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PROCESS OVERVIEW
Protocol Development Overview

➢ **GOAL**: To create a robust Soil Enrichment Protocol that provides best practices for GHG accounting, in particular for increases in soil organic carbon stocks, and reductions in other GHGs, in order to generate Climate Reserve Tonnes (CRTs)

- Adhere to high quality offset criteria and Reserve’s principles
- Leverage lessons learned from emerging technologies, other offset protocols and projects, other regulatory programs, other conservation programs
- Solicit and incorporate expert stakeholder feedback
Protocol Development Timeline

1. Scoping meeting (January 15, 2020)
2. Workgroup process (Jan – Feb 2020)
   - Formation (Jan 2020)
   - Meeting 1 (Feb 6, 2020)
   - Meeting 2 – this meeting (Mar 6, 2020)
   - Meeting 3 (Friday April 3rd 2020)
   - 30-day public comment period (Apr – May 2020)
3. Board adoption (Jun 10, 2020)

5 months
PROTOCOL OVERVIEW
Protocol Overview

I. Eligibility & Additionality

II. Ownership, Aggregation & Permanence

III. Quantification
   I. Direct measurement & modelling
   II. Sampling & stratification

IV. Monitoring, Reporting & Verification
ELIGIBILITY – ADDITIONALITY

OWNERSHIP – AGGREGATION – PERMANENCE
Eligibility & Additionality

Project definition: the adoption of agricultural management practices that are intended to increase soil organic carbon (SOC) storage and/or decrease net emissions of CO\textsubscript{2}, CH\textsubscript{4}, and N\textsubscript{2}O from agricultural operations, as compared to the baseline.

- **Growers must adopt at least one new practice change**
  - Adoption of multiple regenerative ag practices is not common practice
  - Adoption of a single regenerative ag practice, where none already occurring, requires demonstration such practice is not common practice in given region (perhaps looking at specific combination crop / activities / region)

- **Provide an “indicative list,” but not a “positive list”**

- **Practices must be different than the baseline management, and must be able to be quantified with the chosen model**
  - Model validation requirements will ensure quantifiability
Aggregation & Ownership

• Two options for project development:
  – Individual grower = individual project
  – Multiple fields/growers aggregated together = individual project

• Allow for decoupling GHG rights from land rights
  – Assume the grower owns GHG rights *unless* contractually transferred to an aggregator
  – Don’t require grower to produce deed/title to the property
  – Single aggregator would own all GHG rights for any field within the project, meaning “*project*” would have a single point of ownership

• No limit on number of fields or combos of crop/region/practice in an aggregate
  – Relative size threshold to avoid single field biasing the whole project

• CRTs issued to the aggregated project as a whole, not differentiated by field

• Quantification allows for a sampling approach, accounting for introduced uncertainty
## Permanence – Assessing Reversal Risk

<table>
<thead>
<tr>
<th>Activity</th>
<th>Unavoidable / avoidable</th>
<th>Incidence</th>
<th>Impact on SOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return to intensive tillage</td>
<td>Avoidable</td>
<td>?</td>
<td>Medium?</td>
</tr>
<tr>
<td>Other mechanical disturbance</td>
<td>Avoidable</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Erosion from exposed soils</td>
<td>Avoidable</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Less efficient use of synthetic N fertilizer</td>
<td>Avoidable</td>
<td>?</td>
<td>Low?</td>
</tr>
<tr>
<td>Overly intensive grazing</td>
<td>Avoidable</td>
<td>?</td>
<td>Low?</td>
</tr>
<tr>
<td>Catastrophic fire?</td>
<td>Unavoidable</td>
<td>?</td>
<td>Low?</td>
</tr>
<tr>
<td>Catastrophic flood?</td>
<td>Unavoidable</td>
<td>?</td>
<td>Medium?</td>
</tr>
<tr>
<td>Financial failure of the aggregator</td>
<td>Avoidable</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Land use change</td>
<td>Avoidable</td>
<td>?</td>
<td>High?</td>
</tr>
<tr>
<td>Other?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
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Permanence

Total emission reductions

Non-reversible ERs

Reversible ERs

Quantifying risk
- Scientific evidence
- Default risk factors

Mitigating risk
- Legal commitment
- Financial tools (insurance/bond)
- Deeper SOC

Reversals
- Monitoring for reversals
- Quantifying reversals
- Compensating for reversals
Permanence

• We want to **manage the risk** of reversal over 100 years, while reducing the burden on growers and project developers to make long-term commitments

• Assess permanence at the project level
  – Risk and liability are placed on the aggregator, rather than the grower

• Key mitigation measures
  – Contracts between Reserve / aggregator (Project Implementation Agreement or PIA)
  – Buffer pool contributions – risk-based %
  – Optional tonne-year accounting
  – Also explore insurance / surety bonds
Mitigating Reversal Risk

• Allow for PIA (the legal commitment) of **any length**, so long as, at the end of the PIA term, one of the following occurs:

  1. The Project Owner signs an amendment to **extend the PIA**; or,

  2. The Project Owner receives Reserve **approval for some form of risk mitigation** that relieves them of any further obligation
     • Including options such as assessing recidivism, buying insurance, etc.

  3. The Reserve declares a **reversal** and the Project Owner complies with the requirements of the protocol as regards quantifying and compensating for the reversal.

• **Assessing reversals**
  
  – Development of a remote monitoring platform with an algorithm trained to recognize changes that could indicate reversals (e.g., sustained poor crop health, tillage, etc.), allowing independent identification of reversals
  
  – Assessment of farmer recidivism rate with a performance threshold (e.g., if 95% of farmers maintain practices after 30 years, the SOC is considered permanent)
Double Counting & Crediting Period

• Generally open to credit and payment stacking
  – Allow NRCS practice payments since the eligible activities have to be new to be included as additional
  – Avoid payments for practice change that are specifically targeting GHG reductions and/or SOC storage and are delineated in tCO$_2$e

• Crediting period proposed as 30 years, nonrenewable
  – Forest protocol: 100 years
    • Too long for agricultural land management projects
  – US Grassland protocol: 50 years
    • Unlikely that SOC gains would be worthwhile this far into the future
    • Concern around validity of baseline management practices this far into the future
  – Canada Grassland protocol: 30 years
    • Long enough to capture the significant SOC gains of cropland management changes
QUANTIFICATION
GHG Assessment Boundary

**CO₂**
- SOC stock change
- Fossil fuels

**CH₄**
- Soil methanogenesis
- Grazing
- Biomass burning

**N₂O**
- Fertilizer application
- N-fixing species
- Grazing
- Biomass burning
Quantification – Overview

• Quantify emission reductions on fields chosen through stratification & sampling – extrapolate
• Hybrid quantification approach including direct measurement of soil samples + modelling
  – Take initial direct SOC measurement – some flexibility as to when first sample taken
  – Allow for modelling of emission reductions for multiple reporting periods
  – Periodically take further SOC measurements (at least every 5 years)
    • Could choose to do direct sampling for any given year
• Set minimum standards for
  – Frequency of and methods for soil sampling
  – Types of Biogeochemical model – how model must be validated / calibrated – securing info integrity
• Baseline set by:
  – Baseline practices determined using historical data (at least 2 years prior to start date)
  – Baseline SOC directly measured
  – Baseline business-as-usual modelled into future
• Emission reductions calculated separately for reversible and non-reversible reductions
This focuses on year 1, but subsequent years are similar

Initial SOC may be set differently for different models (e.g., DayCent vs DNDC)
Model Validation

- Example model guidance:
  - Publicly-available (free or for a fee)
  - Peer-reviewed by a recognized, competent organization, or an appropriate peer review group
  - Validated with data from paired modeled and direct-re-measured sample sites subject to control and treatment scenarios. Model validation must demonstrate that predictions are consistent with observations across the range of biophysical and management-based scenarios included in the Project. Validation assessment must be based on standard metrics such as coefficient of determination ($R^2$), Nash-Sutcliffe model efficiency, and root mean square error (RMSE), following FAO (2019)
  - The model must incorporate one or more input variables that are monitored *ex post*
  - guidance for verifiers on model sensitivity to inputs
Soil Sampling & Stratification

• Flexibility in sampling design, with minimum standards to ensure consistency and avoid gaming or intentional bias
• Minimum number of samples per field
• Minimum standards for randomization and field-level stratification
• Consistent approach for quantifying uncertainty
Uncertainty

• Draft VCS methodology
  – Account separately for sample error, model input error, and model structural uncertainty
  – Wrapped up into an overarching uncertainty value at 95% confidence
  – No deduction for uncertainty below 15% error (VCS Standard), linear deduction for uncertainty above 15% (e.g. total uncertainty of 20% would lead to a 5% uncertainty deduction)

• Reserve Forest Protocol
  – Focus on sample error
  – Goal of +/- 5% at 90% confidence, linear deduction for uncertainty exceeding +/- 5%

<table>
<thead>
<tr>
<th>Number of Participating Projects in the Aggregate</th>
<th>Target Sampling Error (TSE)</th>
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<tbody>
<tr>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>3</td>
<td>8%</td>
</tr>
<tr>
<td>4</td>
<td>9%</td>
</tr>
<tr>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>6</td>
<td>11%</td>
</tr>
<tr>
<td>7</td>
<td>12%</td>
</tr>
<tr>
<td>8</td>
<td>13%</td>
</tr>
<tr>
<td>9</td>
<td>14%</td>
</tr>
<tr>
<td>10</td>
<td>15%</td>
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<tr>
<td>11</td>
<td>16%</td>
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<tr>
<td>12</td>
<td>17%</td>
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<tr>
<td>13</td>
<td>18%</td>
</tr>
<tr>
<td>14</td>
<td>19%</td>
</tr>
<tr>
<td>15+</td>
<td>20%</td>
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MONITORING – REPORTING – VERIFICATION
Monitoring & Reporting

• Flexible reporting periods to align with **agronomic cycles**
  – Start with earliest field post-harvest and end with latest field harvest

• Rely on grower attestation for **qualitative data** (e.g., crop rotation, tillage, type of fertilizer) where independent sources unavailable

• Hierarchy of data sources for **quantitative inputs** to model baseline
  a. Direct grower records or data sources
  b. Written agronomic plans
  c. Grower attestation, if value align with evidence-supported values from similar fields
  d. Published regional average values

• Leverage remote sensing and machine data where possible

• Rely on remote sensing for monitoring for reversals after crediting
  – E.g., catastrophic flooding, prolonged conventional tillage, land use change
Verification

• Risk-based sampling approach
  – No need to visit thousands of fields or review 100% of data/evidence

• Explore the use of proxies for site visits or to otherwise supplement verification activities
  – Existing government programs that involve outside review and/or records of farm activities
  – Leverage expertise of trusted 3rd parties (e.g., university extension, NRCS)
    • Consider COI review for such 3rd parties
  – Remote sensing
  – Existing data capture systems/tools

• Look for ways to avoid need for specialized expertise on the verification team
  – BGC model results and input files packaged with a digital signature to verify they have not been tampered with since the model run; thus avoiding need for verifier to rerun the model
    • Provide verifiers guidance as to which input parameters are most sensitive
Data Security

- Each box shows the data generated and passed along to the next stage
- Sensitive and/or personally-identifiable (SPI) info is highlighted in orange text
- Dashed line shows point at which personally-identifiable info no longer viewable
- Contracts between parties to left of dashed line used to manage (SPI) info
NEXT STEPS
# Protocol Development Process & Timeline

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
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<tr>
<td>Second workgroup meeting (webinar)</td>
<td>Today, March 6&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>Third workgroup meeting (webinar)</td>
<td>Friday, April 3&lt;sup&gt;rd&lt;/sup&gt;,  8:00 am – 12:00 pm PT</td>
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<tr>
<td>Workgroup comment period</td>
<td>First week of April</td>
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<tr>
<td>Public comment period</td>
<td>April – May</td>
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<tr>
<td>Protocol presented to Reserve Board for approval</td>
<td>Expected June 10</td>
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Next Steps

• Workgroup members:
  – Email any feedback
  – Reach out if you’d like to setup 1:1 chat with staff
  – Prepare for next full workgroup meeting

• For Reserve staff:
  – Protocol drafting!!
  – Full draft to workgroup prior to 3rd workgroup meeting
  – Prep for 3rd workgroup meeting
Key Contacts

• General questions or assistance:
  – Policy@climateactionreserve.org

• Protocol development lead:
  – Sami Osman, Senior Policy Manager, Climate Action Reserve
  – sosman@climateactionreserve.org