CLIMATE ACTION RESERVE

Soil Enrichment Protocol Second Public Comment Meeting

August 18, 2020

Housekeeping

- All attendees are in listen-only mode
- We will be happy to take questions throughout the session
- We will follow up via email to answer 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. Next Steps

I) INTRODUCTIONS

Introductions

Reserve Staff:

- Craig Ebert, President
- Sami Osman, Policy Director
  - Protocol development lead
- Heather Raven, Senior Project Coordinator
  - Development process coordinator
- Jon Remucal, Senior Manager
  - Protocol development
- Sarah Wescott, Senior Manager
  - Protocol development
- Bety Zavariz, Manager
  - Protocol development

Workgroup Members

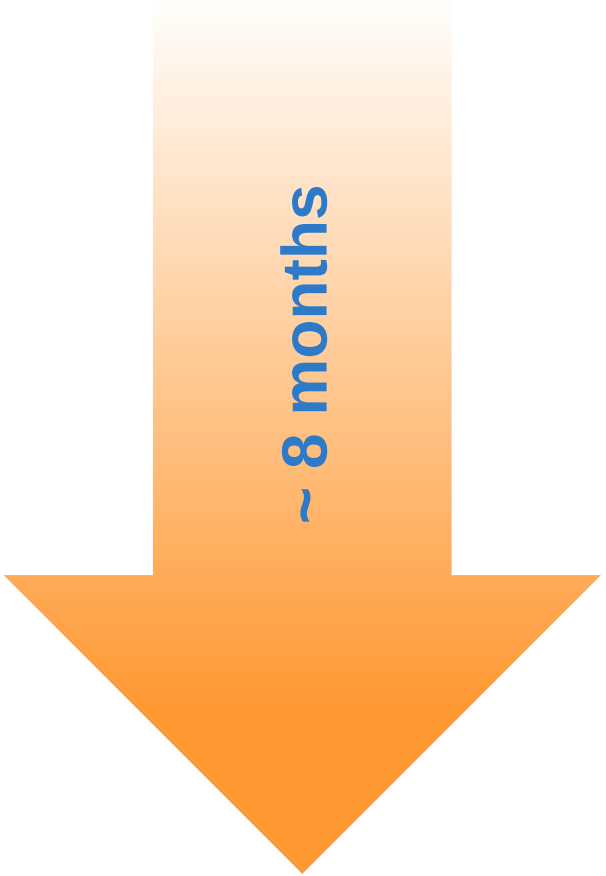
Name (alphabetical)	Organization
Adam Chambers	USDA Natural Resources Conservation Service
Amrith Gunasekara	California Department of Food & Agriculture
Dan Kammen	UC Berkeley
Dorn Cox	Wolfe's Neck Center for Agriculture & the Environment
Christian Davies	Shell
Jacqueline Gehrig-Fasel	TREES Consulting LLC
Grayson Badgley	Columbia University
Jon Sanderman	Woods Hole Research Center
Justin Allen	Salk Institute of Biological Studies
Karen Haugen-Kozyra	Viresco Solutions
Keith Paustian	Colorado State University

Name (alphabetical)	Organization
Ken Newcombe	C-Quest Capital
Matt Ramlow	World Resources Institute
Max DuBuisson	Indigo Ag
Mitchell Hora	ContinuumAg LLC
Nicholas Goeser	Alliance of Crop, Soil and Environmental Science Societies
Patrick Splichal	SES, Inc.
Robert Parkhurst	Sierra View Consulting
Stephen Wood	The Nature Conservancy
Tom Cannon	Goodson Ranch
Tom Stoddard	NativeEnergy
William Schleizer	Delta Institute

II) PROCESS OVERVIEW

Protocol Development Timeline

1. *Scoping meeting (January 2020)*
2. *Workgroup process (Jan – Aug 2020)*
   - *Formation (Jan 2020)*
   - *Meeting 1 (Feb 6, 2020)*
   - *Meeting 2 (Mar 6, 2020)*
   - *Meeting 3 (April 3, 2020)*
   - *Meeting 4 (Jun 19, 2020)*
3. *Public comment process*
   - *1st Public comment period (Apr 17 – May 18, 2020)*
     - Public comment meeting (April 29, 2020)
   - **2nd Public comment period *(Aug 11 – Aug 25, 2020)***
     - ***Public comment meeting (Aug 18, 2020)***
4. *Board adoption (Sep 30, 2020) - TBD*



Public Comment Process

- Extensive feedback during first public comment period
  - 23 formal sets of public comments
  - Also a lot of informal feedback via email / calls
- Extensive further deliberations with workgroup members and public commenters – some ongoing – follow-up discussions with most public commenters
- Extensive changes made throughout the protocol and supporting documents – highlight some key changes in red throughout slides
- Feel free to reach out anytime to provide informal feedback, to discuss, and NOTE: Public comments due by end of day Tuesday, August 25 for this second public comment period

III) PROTOCOL OVERVIEW

Protocol Overview

1) Introduction
2) Project Definition
   - Activities, area, aggregation, ownership, leakage
3) Eligibility
   - Start date, crediting period, additionality, permanence, payment stacking
4) GHG Assessment Boundary
5) Quantification
   - Baseline modeling, reversible/non-reversible emission reductions
6) Monitoring
   - Permanence, grazing, project emissions, soil sampling/testing, modeling, parameters
7) Reporting
   - Documentation, reporting periods
8) Verification
   - Monitoring plan, verification activities
9) Glossary
10) References

Appx A) Rationale for Additionality

Appx B) Illustrative List of Practices

Appx C) Assessing Leakage

Appx D) Quantifying Uncertainty

Project Definition

- Cropland or grassland – must not have been cleared of native ecosystem *or other restored or protected areas* within prior 10 years
  - The project may contain tile-drained fields *or surface drainage, as long as the drainage was in place during the baseline period (i.e., not installed for the purposes of the project)*
- Adopt one or more new practices which result in change(s) to:
  - Fertilizer (organic or inorganic) application
    - Including things like biosolids – also other amendments such as compost
  - Water management/irrigation
    - Evapotranspiration covered by models
    - Where irrigation increases in project – will also need to account for any significant increases in N from water source
  - Tillage and/or residue management
  - Crop planting and harvesting (e.g., crop rotations, cover crops, etc.)
  - Fossil fuel usage
  - Grazing practices and emissions

Ownership & Aggregation

- 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
    - Projects encouraged to ensure landholder is fully informed about offset project and has contractually consented, but this is not required
  - 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 aggregated project
- CRTs issued to the aggregated project as a whole, not differentiated by field

Additionality

- Practices must not be legally mandated
- Growers must implement at least one ***new*** practice change
  - Existing practices will be considered as the baseline
  - Growers adopt sustainable practices one at a time, so we cannot scale to many growers doing multiple practices if we don't start with growers adopting one new practice
- **Negative list Performance Standard Test**
  - **County-based data used to assess existing uptake rates of single practices in given county**
  - **Where above 50%, such practice in such county excluded by default**
- **Project-specific means to demonstrate additionality for excluded fields**
  - **Stack further new practices – within 3 years**
  - **Demonstrate adoption of long-term no-till is not common practice in given counties**

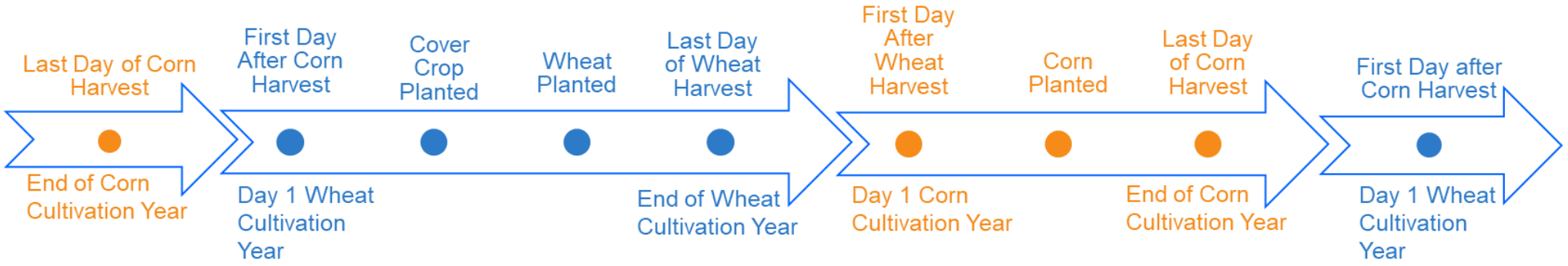
Additionality – Common Practice Assessment Results

- Exclusions
  - Reduced tillage (57 counties)
  - No tillage (290 counties)
  - Cover crops (2 counties)
  - Rotation or intensive grazing (9 counties)

- Specific results available in an Excel-based SEP Additionality Tool

Start Date & Crediting Period

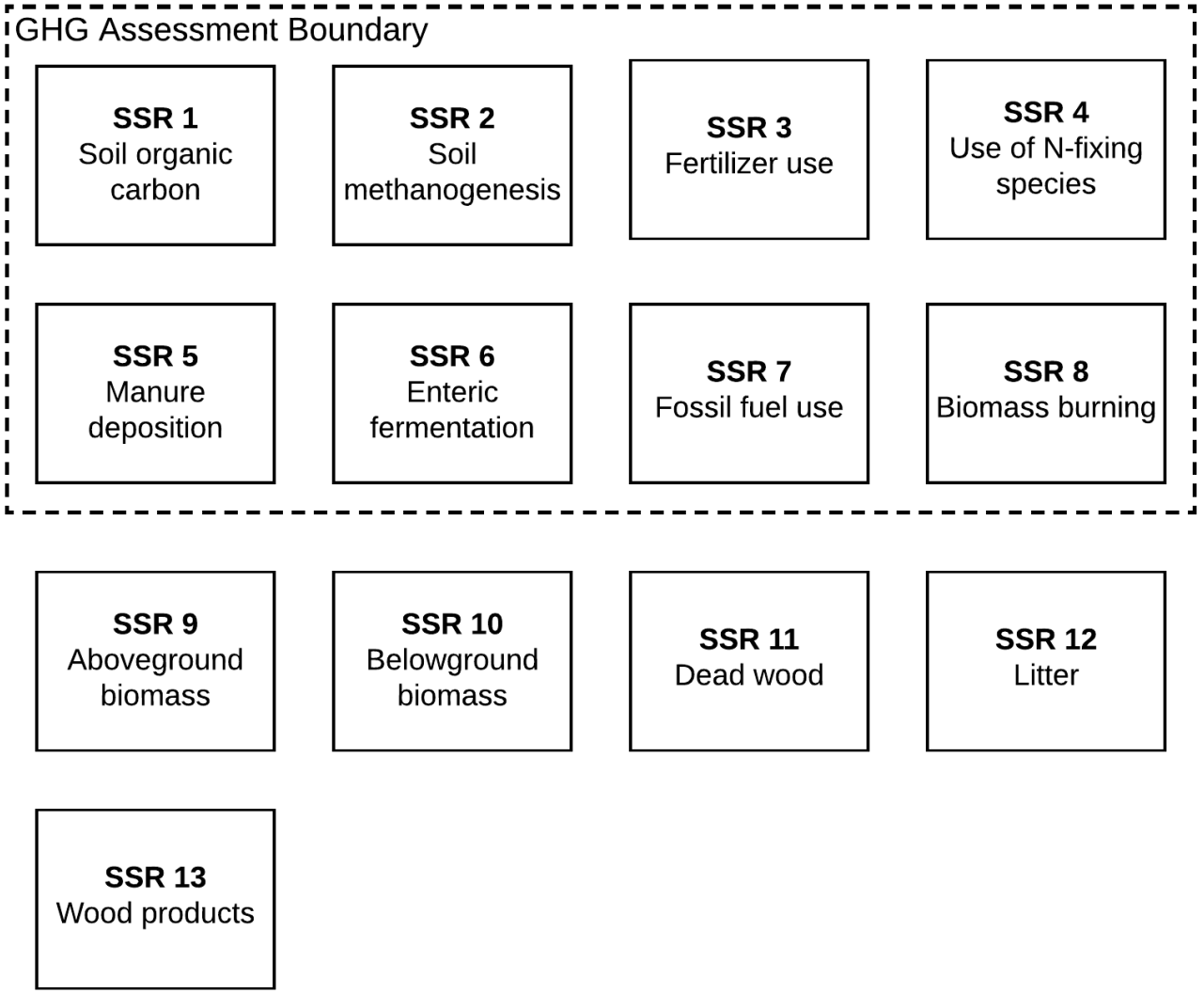
- **Start date** = initiation of growing season within which the initial practice change occurred
  - Typically the day after the harvest/termination of the previous growing season
  - Defined separately for each field within the project
- **Crediting period = 10 years (for each field), with potential to renew 2 times, for total 30 years**
- **Cultivation cycle** = all growing seasons within approximately 12 months
- Initial **reporting period** may include multiple cultivation cycles
- **Verification period** may include multiple reporting periods



Permanence

- Assess permanence at the **project level**
  - Risk and liability are placed on the aggregator, rather than the grower
- Buffer pool contributions for unavoidable reversals range from 5% to 16.8%
  - Unavoidable reversals = 7.5% contribution or 5% if project geographically dispersed
    - Exception to 7.5% requirement for smaller projects
  - "Risk of financial failure" ($Risk_{FF}$) = 0 or 9% contribution
  - $Risk_{FF}$ mitigated through use of guarantor or financial protection (e.g., surety bond)
- Avoidable reversals compensated by the project developer
- Legal commitment via Project Implementation Agreement (PIA)
- Tonne-year accounting **option** to only credit atmospheric benefit for the term of the PIA
- If PIA term is <100 years after crediting, and tonne-tonne accounting used, then at end:
  - PIA is extended; or,
  - Reserve declares reversal
  - ***Removed optional alternative mechanisms to demonstrate permanence***

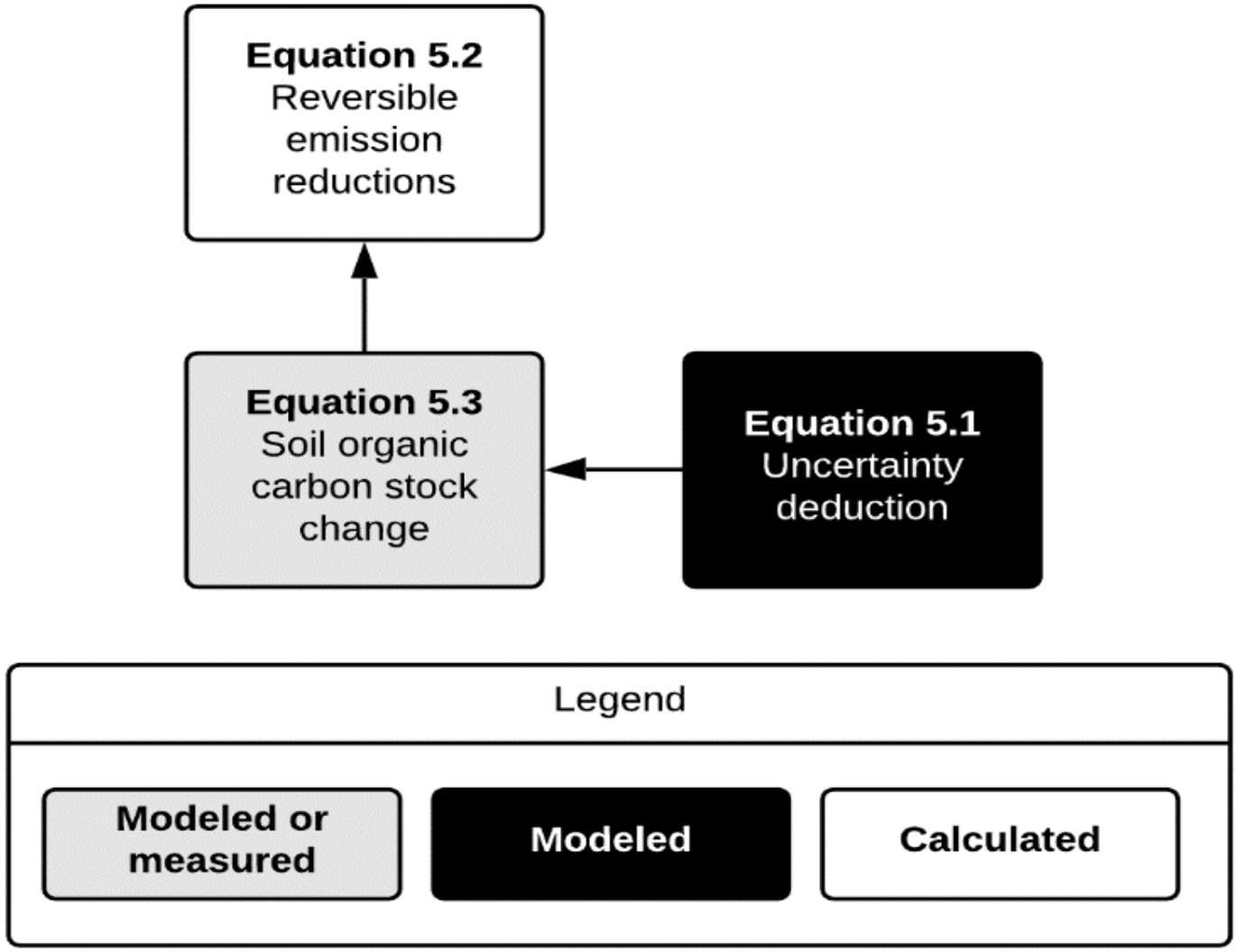
GHG Assessment Boundary



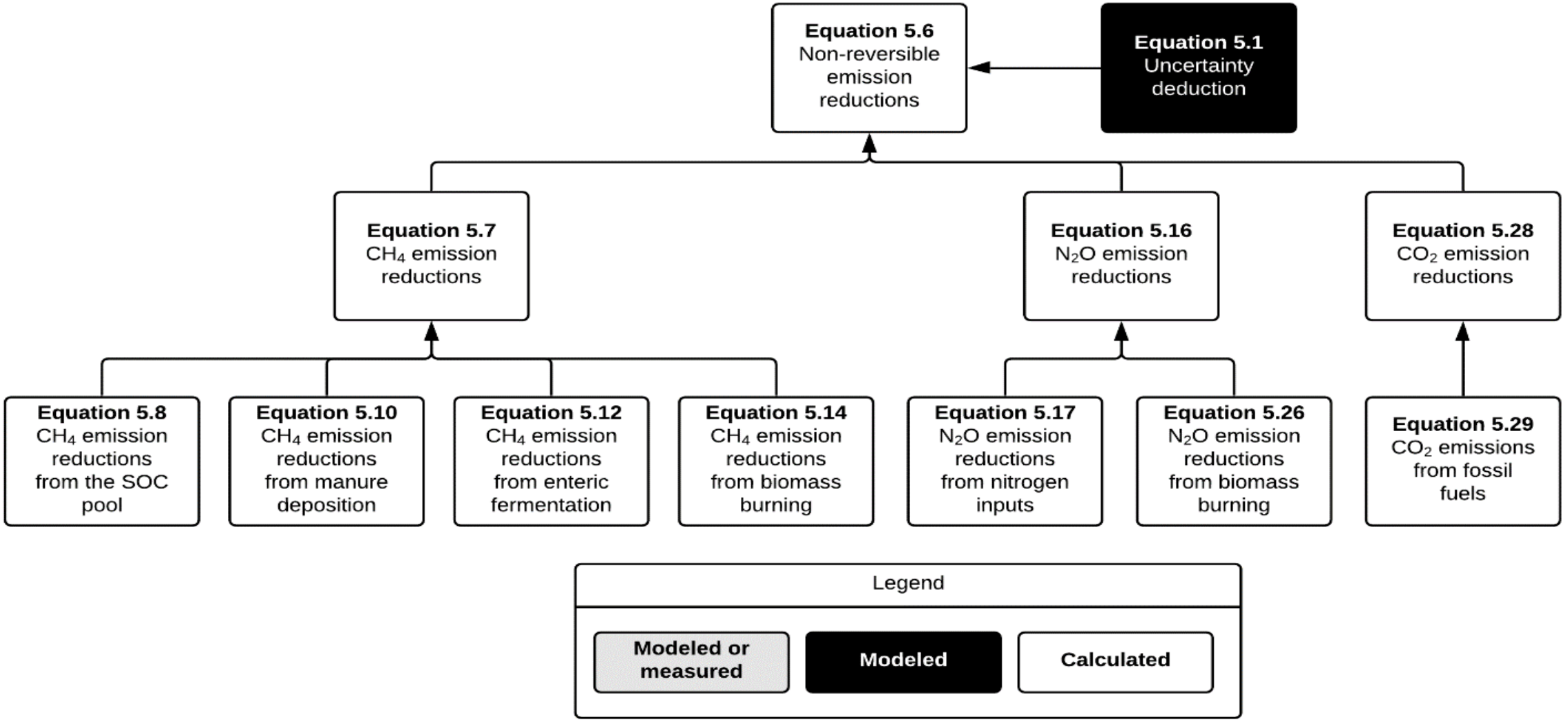
Quantification Overview

- **Hybrid of modeling and direct measurement**
- ***Baseline***
  - Initial SOC is directly measured
  - Historical baseline period used to set the crops and management activities that defines baseline
  - Baseline SOC is modeled for each reporting period – using reporting period weather data
- ***Reporting period***
  - Project SOC may be modeled or directly measured
  - Other project GHG sources may be either modeled or quantified using default equations
  - At least every 5 years must directly measure SOC
- Projects may employ a mix of modeling, measurement, and default equations
- Separate quantification of reversible and non-reversible emission reductions
- Comprehensive quantification of uncertainty, with deduction applied to reversible and non-reversible emission reductions

Quantification Overview



Quantification Overview



Reversible vs. Non-Reversible Emission Reductions

- Goal: have these issued separately in the registry
- Reversible emission reductions
  - SOC stock increases
  - Source of buffer pool contribution
- Non-reversible emission reductions
  - Fertilizer use
  - Grazing
  - Use of N-fixing species
  - Biomass burning
  - Fossil fuel combustion
- Uncertainty deduction is applied across both categories

Quantification Approaches

Table 5.2. Acceptable Quantification Approaches by Source and Gas

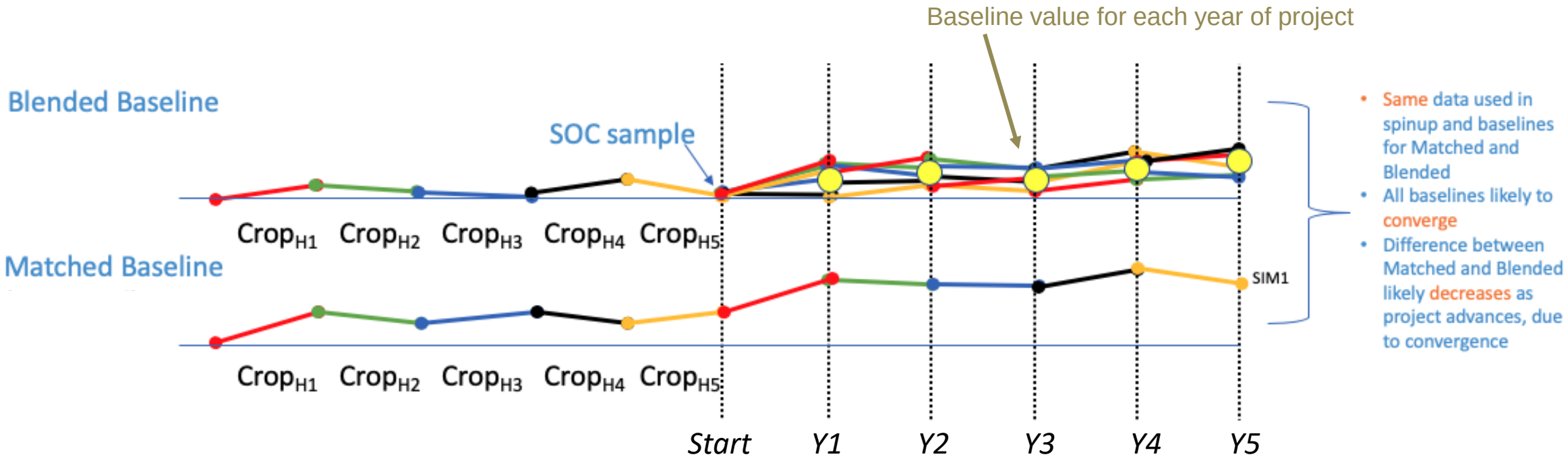
GHG	Source	**Modeled** (external to protocol equations)	**Directly Measured**	**Calculated**
CO_2	Soil organic carbon	X	X	
	Fossil fuel use			X
CH_4	Methanogenesis	X		
	Enteric fermentation	X		X
	Manure deposition	X		X
	Biomass burning			X
N_2O	Nitrification/denitrification	X		X
	Manure deposition	X		X
	Biomass burning			X

Defining the Historical Baseline

- Determine length of historical baseline period
  - Minimum of 3 years prior to start date
  - Include additional years so that the baseline period contains full rotation of crops and management practices
    - E.g., in a corn-soy rotation, the baseline period should be 4 years, meeting the 3 year minimum and keeping to complete rotations
- Two options for baseline modeling: *(illustrated on next slide)*
  - **Matched baseline**: *may be used* where the project scenario crop rotation matches up with the baseline crop rotation, the modeling will be "like-for-like"
    - If multiple years of the same crop in the baseline, then average the results of two separate, continuous model runs
  - **Blended baseline**: where the project scenario crop doesn't match the baseline crop pattern, the baseline is a blend of each year of the historical baseline period
    - Includes the entire historical baseline period, through separate, continuous model runs for each year, with the results averaged together
    - *May* be used from the start by any project
  - It's foreseeable that cropping patterns will diverge from baseline rotations at some point during the crediting period, at which point that field would need to use the blended baseline approach

Modeling the Baseline

- Each project year, conduct model runs appropriate to either matched or blended baseline, as appropriate, using current weather, then average the results
- Applies to SOC, N_2O, and CH_4
- Same approach employed for use of default equations

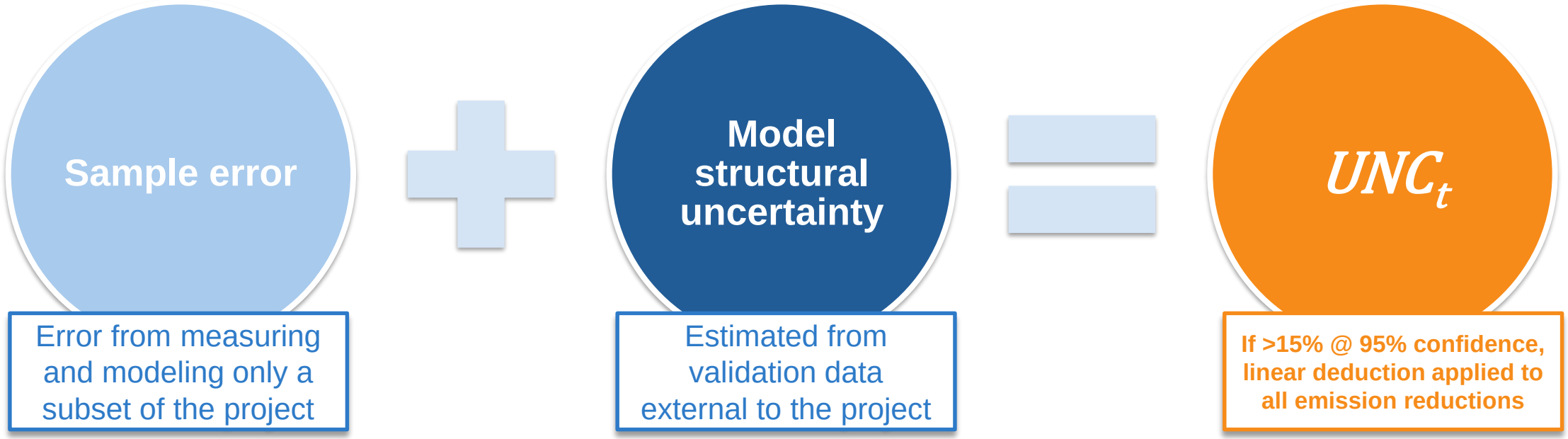


Default Equations

- Modeling is needed for SOC stock change and soil methanogenesis
- For other sources/gases, the protocol offers default equations derived from two sources

Reserve Grassland Protocol	IPCC Guidelines
• CH_4 emissions from livestock manure deposition and enteric fermentation	• N_2O emissions from fertilizer, crop residue, and burning • CH_4 emissions from burning

Uncertainty



- More robust approach than employed in other soil methodologies
- Uncertainty deduction applied if total uncertainty exceeds 15% at 95% confidence
- Design-based approach, with flexibility in:
  - Choice of sample units (and, relatedly, whether to cluster sampling at the level of fields or farms)
  - How to stratify
- Thorough appendix provided to walk the user through the uncertainty calculations

Leakage

- ***What is leakage?***
  - If there is a reduction in productive output (i.e. crop yield or livestock grazing), the reduced supply could emerge outside of project area – increasing emissions outside of project area
  - Therefore we treat reduced production as source of emissions – but we normalize assessment of productive output based on regional conditions, to make sure we account for any regional drops in output
  - field/project level declines in output must be accounted for via deduction to overall credit issuance
- ***Leakage for cropping***
  - Approach uses crop insurance data from USDA, as disaggregated as is available – such data is transparent, verifiable and strong incentive not to game
  - we are advised to expect yield stabilization/increase over a crediting period
- ***Leakage for livestock grazing***
  - leakage mechanism accounts for animal population and time spent grazing
  - compares baseline levels to project reporting period levels

Monitoring

- Monitoring for land use change
  - Use remote sensing or other means to identify land use change
- Monitoring for project emissions
  - Direct data collection from grower
  - Allow for machine data and remote sensing where available and reliable
- Monitoring for permanence
  - Assess land use and tillage
  - Allow for remote sensing
- Additional guidance for soil sampling, testing, and modeling
- *Remote sensing only used to detect practice change, not to quantify GHG impacts of such changes*

Soil Sampling Guidance

- Sampling requirements include guidance for:
  - Sample units and stratification
  - Verifying samples
  - Site location
  - Site preparation
  - Sample depth
    - Minimum sample depth 30 cm
      - Can sample to deeper depth and retain results to remodel later when models are capable
      - *If field used deep tillage in baseline, will not be eligible for SOC credits if shifting to no-till in project – due to concerns regarding upwards migration of SOC*
- Sample error goes into the quantification of uncertainty

Soil Testing Guidance

- Monitoring plan must provide detail on soil testing procedures used
- Laboratory Analysis requirements include guidance for:
  - Proficiency of the laboratory
    - Refer to North American Proficiency Testing Program (NAPTP) for laboratories that provide soil sampling analysis, in particular, the voluntary Performance Assessment Program (PAP)
  - Sample preparation
    - Specific guidance with respect to bulk density
    - Handling of aggregates – using manual or mechanical means
  - Analysis technique

Modeling Guidance

Models must be:

- Publicly-available (free or for a fee)
- Peer-reviewed by a recognized, competent organization, or an appropriate peer review group
  - *2 models identified as meeting minimum requirements: DNDC and COMET-Farm*
- Able to support repeating the project model simulations. This includes clear versioning of the model use in the project, stable software support of that version, as well as fully reported sources and values for all parameters used with the project version of the model.
- Incorporate one or more input variables that are monitored *ex post*
- Calibrated and validated according to requirements set forth in an external guidance document (next slide)
- PD must provide sufficient evidence to VB to demonstrate validation was done appropriately – declare what datasets they used – provide model sensitivity analysis

Model Calibration & Validation Guidance Document

- Provided as external guidance document to allow for updates over time
- Four step process
  - 1) Select suitable model – according to guidance in protocol
  - 2) Calibrate model
  - 3) Validate model
    - Independent third-party assessment of validation report – using peer-reviewed publications
      - Practice effects
      - Project domain
      - Validation data
      - Assessment of bias
      - Assessment of Model prediction error
    - Employ model – according to guidance in protocol
  - 4) Verification
    - Provide verifier with raw data, copy of model, model results, digital signatures, sensitivity analysis of model inputs

Reporting Periods

- Each field will have a defined cultivation year
  - More or less than 12 months, with start/end dates that align with agronomic cycles in order to most accurately capture full growing seasons
  - May include multiple growing seasons in single cultivation cycle
- Initial reporting period may include multiple cultivation cycles
- Verification period may include multiple reporting periods (up to 5)

Verification

- Risk-based sampling approach
- Site visits selected using combination of risk-based assessment / random sampling
  - *Minimum of ½ square root, or 2.5%, of all Field Managers receive site-visit – selected first using risk-based assessment*
  - Allow the use of proxies for site visits or to otherwise supplement verification activities
    - Existing government programs that involve third-party reviews
    - Leverage expertise of trusted 3rd parties (e.g., university extension, NRCS)
    - Remote sensing
    - Existing data capture systems/tools
- Verification of modelling
  - If project developer uses expert third-party model operator, such as developers / hosts of DNDC, verifier will not themselves be mandated to re-run model – provided model expert provides verifier with sensitivity analysis on model inputs, and evidences model results have not been altered

Verification Activities

- Key verification activities
  - Confirmation of eligibility
  - Assessment of soil sampling and testing practices (for years when relevant)
  - Assessment of use of biogeochemical models (where relevant)
  - Assessment of use of default factor-based equations (where relevant)
- Desk review
  - Recalculation of subset of project data
  - Data from square root of all Field Managers subjected to review
    - Site visit fields not eligible for selection during the same reporting period

IV) NEXT STEPS

Remaining Development Process & Timeline

Milestone	Date
Public comment period	August 11 – August 25
Public comments due	**COB August 25**
Protocol presented to Reserve Board for approval	*Expected September 30*

Next Steps

- **Stakeholders:**
  - **Email written comments, organized by protocol section,** to policy@climateactionreserve.org by **COB Tuesday, August 25**
  - Reach out if you would like to set up 1:1 discussion with staff
  - Note: Workgroup members may also submit comments during the public comment period
- **For Reserve staff:**
  - Respond to public comments
  - Update protocol as needed

Key Contacts

- General questions or assistance:

  Policy@climateactionreserve.org

- Protocol development lead:

  Sami Osman, Policy Director

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