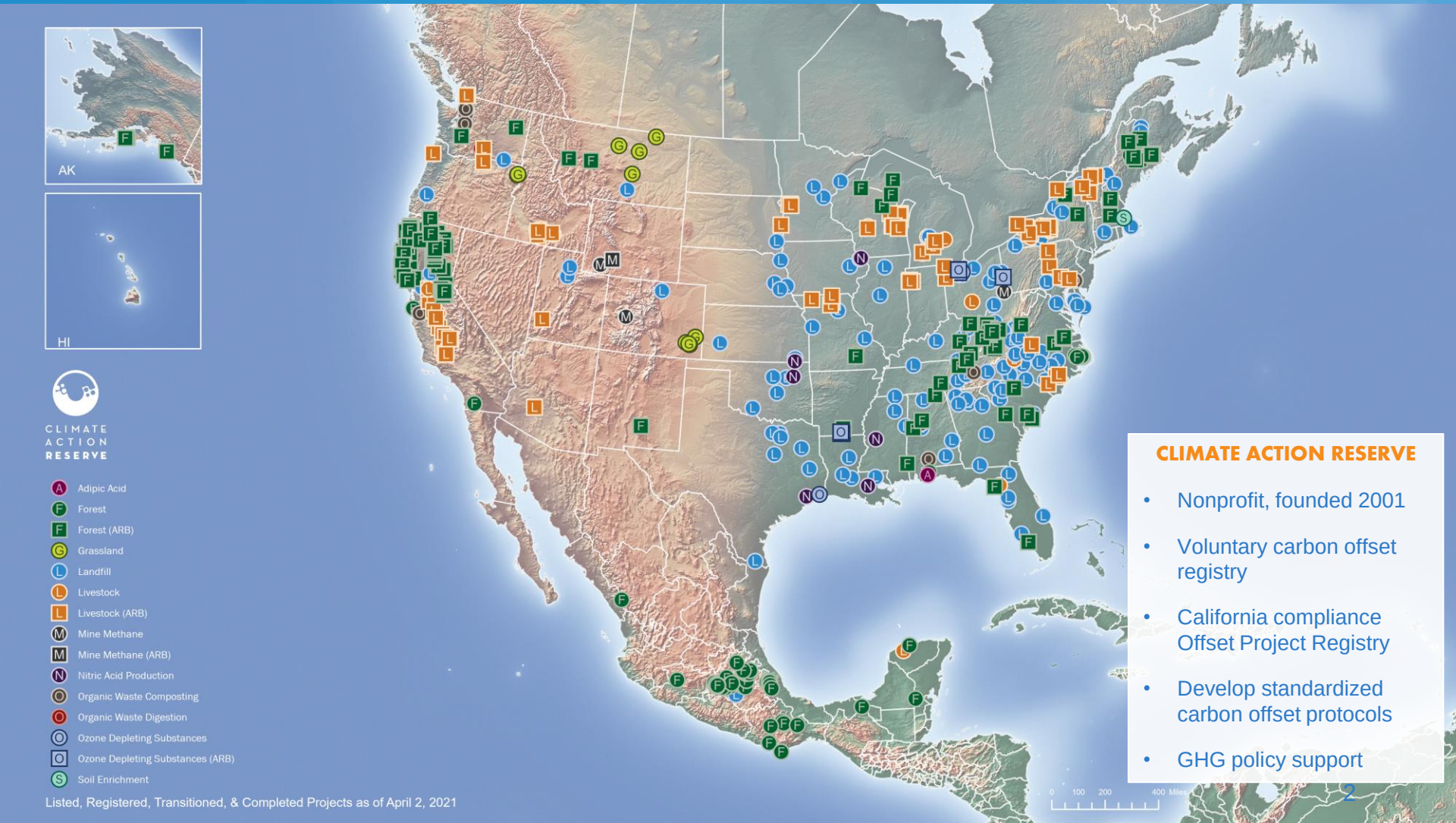
CLIMATE ACTION RESERVE

Soil Enrichment Protocol v1.0

Public Overview Webinar

May 2021



CLIMATE ACTION RESERVE

- Nonprofit, founded 2001
- Voluntary carbon offset registry
- California compliance Offset Project Registry
- Develop standardized carbon offset protocols
- GHG policy support

Ensuring Offset Quality

Real

- GHG accounting is conservative, comprehensive, and scientifically credible

Additional

- GHG reductions would not have occurred in the absence of the carbon market

Permanent

- GHG reductions or removals persist for at least 100 years, accounting for any reversals

Verifiable

- Methods are replicable
- Third-party verification occurs prior to credit issuance

No Double Counting

- No other parties may reasonably claim ownership of GHG reductions

Reserve Protocol Development Team

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Soil Enrichment Protocol v1.0 Workgroup Members

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PROTOCOL OVERVIEW

PROJECT DEFINITION AND ELIGIBILITY

Project and Ownership Overview

- **Project Definition**
  - Any practices are eligible, provided we can quantify GHG impacts using:
    - For SOC: Direct measurements & models
    - For other emission sources: Default equations / models
  - For soil carbon: Initial direct soil measurements will be critical in setting initial SOC and periodic direct measurements will be critical to ensure interim modelling results are 'trued-up'
  - Several protections for specific sensitive land types
- **Project Ownership**
  - Farmer assumed to own credits – can then contract freely with project developer
  - Protocol allows for any number of fields, and any combination of practices or regions, to be included in a single project. Single farm approaches have been a significant barrier to previous attempts to develop a protocol.

Basic Eligibility Rules

- **Location:** Non-federal lands in the US, US territories, and on US tribal lands
- **Start Date:** The first day of the cultivation cycle during which the project activity was implemented
  - Each field has its own start date
  - Submittal must be within 24 months of the start date or by 9/30/22 – whichever is later
- **Crediting period:** 10 years, renewable up to 2 times
  - Crediting periods are assessed at the field level
  - Projects may keep enrolling new fields, so the project may receive credits for longer than 30 years (since crediting period is tied to each of the enrolled fields, which may enter at different times in the project life)
  - Crediting will cease if the practice becomes legally required

Additionality

- Projects must pass a **performance standard test** and a **legal requirement test**, like any of our protocols
- Performance standard test is a two-stage common practice assessment
  - First step: application of a *negative list* of specific activities that are already deemed "common practice" – and therefore non-additional – by county
  - Second step: projects may propose project-specific measures to demonstrate fields on the *negative list* should actually be deemed additional – Reserve approval required
- Performance standard test applied at the field level
- Practices must not be legally mandated
  - (only aspect of the legal requirement test, plus signing of the Attestation of Voluntary Implementation)

Performance Standard Test

- Growers must implement at least one ***new*** practice change
  - Existing practices will be considered as the baseline
  - A change in practice may be:
    - Adoption of a new practice (e.g., implementing cover crops for the first time)
    - Cessation of an existing practice (e.g., stopping tillage)
    - Adjustment of a pre-existing practice (e.g., reduction of nitrogen fertilizers)
  - A change in practice may be qualitative (e.g., changing crop rotations) or quantitative (e.g., reducing nitrogen fertilizers)
  - **Note: If a project is only implementing nitrogen management, and no other practice, then we require them to use the Nitrogen Management Protocol*

SEP Additionality Tool

	A	B	C	D	E	F	G	H	I	J
1	State name	County name	County Code	Total cropland acres	Total pasture operations	Practice	Acr	Operations	Uptake rate	Eligibility
165	ALABAMA	LIMESTONE	0110083	151108	NA	Cover crops	6,100	NA	4%	Eligible
166	ALABAMA	LIMESTONE	0110083	151108	NA	No-till	82,515	NA	55%	Ineligible
167	ALABAMA	LIMESTONE	0110083	151108	NA	Reduced tillage	32,670	NA	22%	Eligible
168	ALABAMA	LIMESTONE	0110083	151108	777	Rotation or intensive grazing	NA	131	17%	Eligible

- Projects can filter by state and county, and see which practices are eligible for their location (by field)
  - includes no-tillage, reduced-tillage, cover crop adoption, rotational grazing, and intensive grazing
- Anything with an adoption rate above 50% is ineligible by default
- Project-specific means for overriding this are discussed in the protocol. One simple way to do this is to stack practices, but there are other options.

Regulatory compliance

- Projects must be in compliance with applicable regulatory requirements
  - Water quality
  - Livestock management
  - Other
- Project Owner signs Attestation of Regulatory Compliance

PROTOCOL OVERVIEW

ENSURING PERMANENCE

Permanence

- CRTs related to carbon that must be stored in the project area ("reversible emission reductions") are subject to permanence requirements
- Ongoing monitoring required for 100 years following credit issuance for carbon stored in soil or biomass
  - E.g. credit issued in year 10 is not "permanent" until year 110
  - Exceptions to 100 years of monitoring:
    - Early project termination
    - The project opts to be issued credits based on a tonne-year accounting basis
- Assess permanence at the **project level**
  - **Risk and liability are placed on the project owner, rather than the grower**
  - Decreases of SOC on individual fields will not affect permanence, so long as the project as a whole has had a stable or increasing SOC pool over the relevant time period

Mechanisms to ensure permanence

- **Project Implementation Agreement (PIA):** a contract between the Project Owner and Reserve, whereby the Project Owner agrees to the requirements of the protocol, including but not limited to monitoring, verification, and compensating for reversals.
- **Buffer pool**: a holding account for CRTs from sequestration-based projects, which is administered by the Reserve. CRTs in this account are used to compensate for unavoidable reversals (i.e., releases of sequestered carbon caused by natural disturbances)
- **Monitoring, reporting, & verification (MRV):** Project Owner efforts to collect, compile, and verify project data. During the crediting period, this happens for the sake of CRT issuance. During the permanence period, this happens to ensure no reversals have taken place.

Reversals

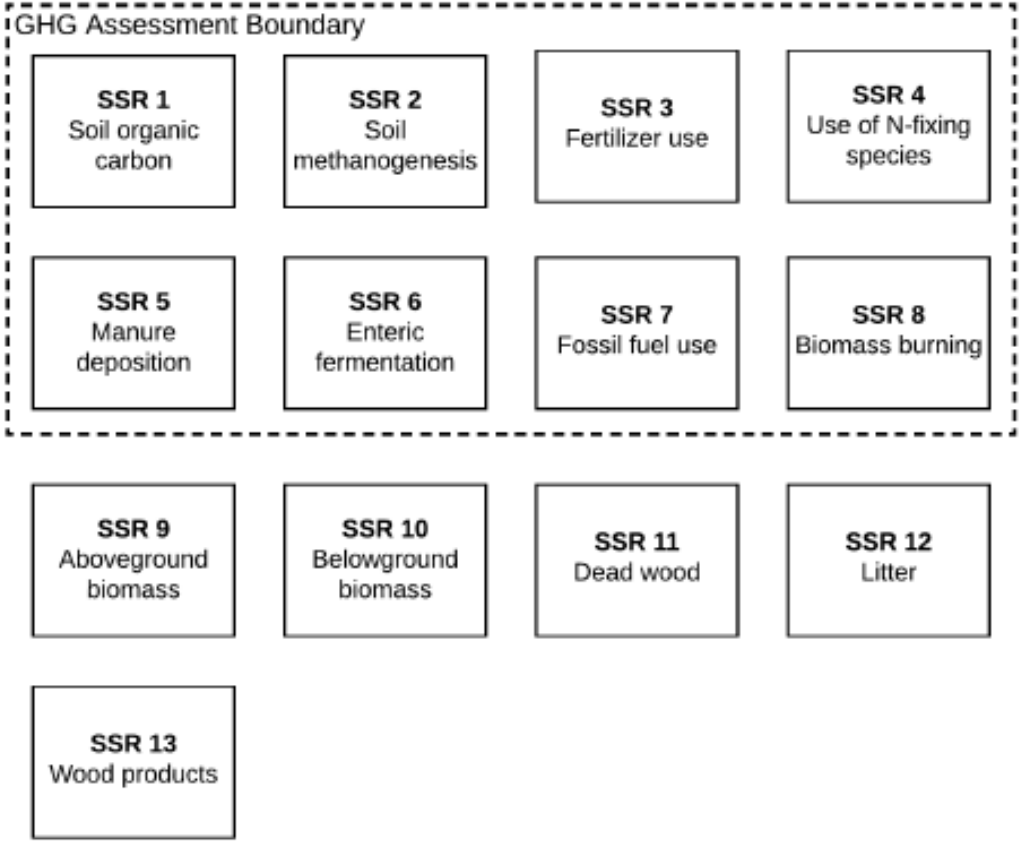
- Release of stored carbon less than 100 years following CRT issuance is considered a reversal
- Two types:
  - Avoidable reversals: those due to human actions or reasonably avoidable natural events
    - Project Developer must compensate the Reserve
  - Unavoidable reversals: those due to uncontrollable natural forces
    - Compensation comes from the shared risk buffer pool
    - All projects contribute to the buffer pool (discussed later)
- overall credit balance is assessed at project level rather than individual field level
- The main threat to a soil enrichment project is reverting to intensive tillage or conversion of the land to another use

PROTOCOL OVERVIEW

QUANTIFICATION

GHG assessment boundary

- SSRs within the dotted line are included in the GHG assessment boundary
- All SSRs are applicable to both baseline and project emissions



Quantification

- ***Emission reductions*** - are quantified by comparing SOC and GHG emission changes between project and baseline scenarios
  - ***Reversible emission reductions***
    - Modelled / directly measured SOC changes
  - ***Non-reversible emission reductions***
    - Modelled and calculated trace GHG emission reductions

- **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**

- If multiple approaches identified, projects choose - same approach must be used for BL / project

Baseline emissions

- For each field must first establish historical baseline period (s.3.4.1.3)
  - In all cases must be at least 3 years
  - Must be long enough to capture complete rotation of crops and management practices
    - Ex: If same crop grown every year but field management practices change every 4 years – historical baseline must be 4 years
    - If complete rotation extends beyond 5 years, baseline period must be at least 5 years
- Baseline SOC/emissions are modeled
- Historical baseline can be extended farther back in time if desired or if required by model being used
  - Longer baseline period always encouraged as improves modeling

Reversible Emission Reductions

- SOC is the only sequestered portion of project ERs, therefore it is the only “reversible” ER
- SOC based on direct soil sampling (discussed later) and modeling
- Buffer pool used to cover reversals – therefore, contributions are based just on reversible ERs from the project
  - Each time credits are issued for “reversible ERs” – a portion of credits goes to the buffer pool
  - Uniform default buffer contribution level is applied
    - Geographically concentrated (more than 50% of fields in single Land Resource Region) projects apply a higher default
    - Additional contributions may be applicable based on Project Owner entity type – see protocol for details

Non-Reversible Emission Reductions

- Potentially includes (depending on project activities):
  - **CH_4** – SOC pool, enteric fermentation, reductions in biomass burning
  - **N_2O** – SOC pool, changes/reductions of fertilizer inputs (inc. manure from any grazing), reductions in biomass burning
  - **CO_2** – fossil fuels
- Non-reversible ERs are quantified using a mix of modeling and equations
  - For biomass burning and fossil fuels, default equation is the only option
  - For soil methanogenesis only modeling is used
  - All other sources - quantified using either modeling or equations
    - Per source - must use same quant approach (modeling or equations) for both BL & project

Discounts

- Uncertainty deduction
  - Projects must calculate the uncertainty of estimated emissions reductions based on the guidance in Appendix D
  - If the margin of error exceeds 15% of the average emissions reduction, then a discount applies (the amount of the margin of error that exceeds 15%)
- Leakage deduction
  - Projects must demonstrate that the project activity has not caused the displacement of livestock, or a sustained decline in crop yield
  - If one of these scenarios happen
    - For livestock displacement, projects must continue accounting for emissions from those livestock.
    - For significant crop yield declines, a deduction is applied to ERs – the protocol provides guidance for calculating this based on crop yield ratios.

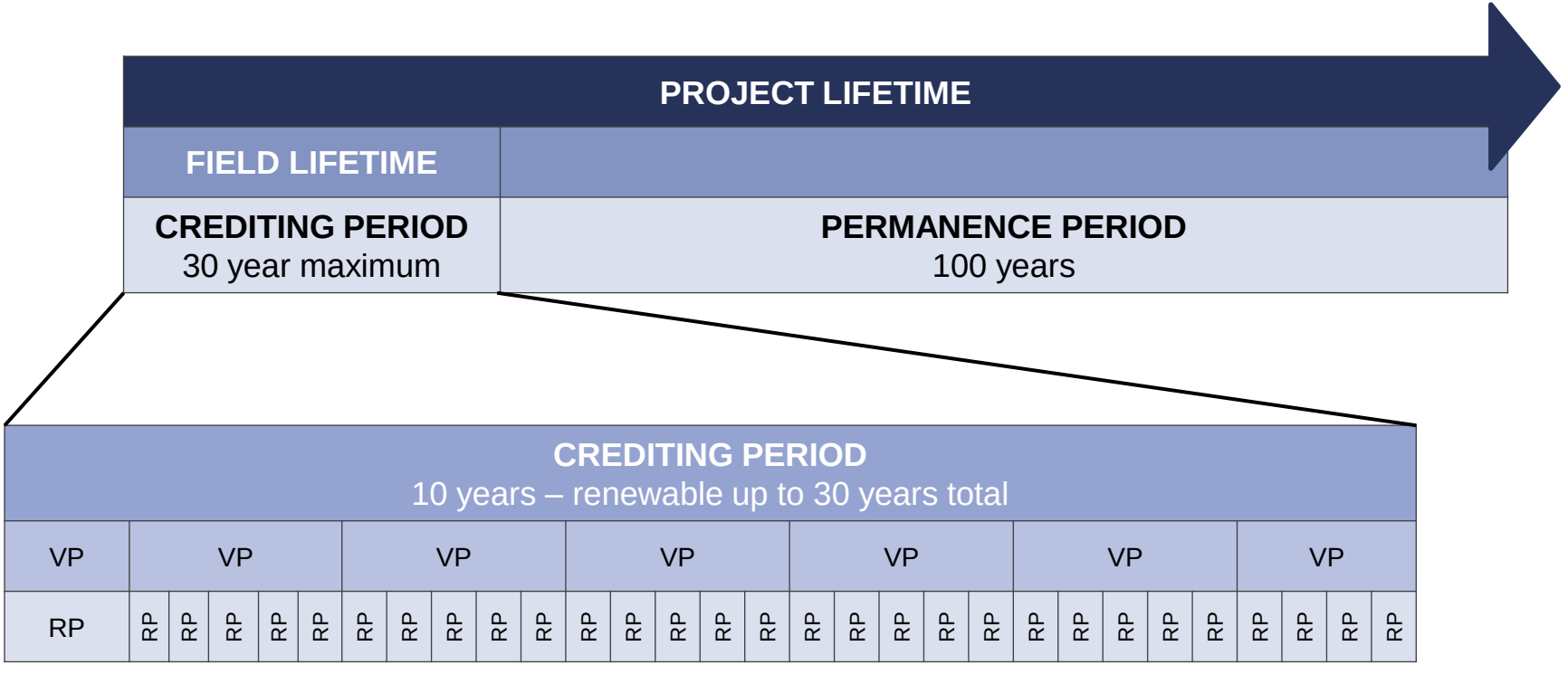
PROTOCOL OVERVIEW

MONITORING, REPORTING, AND VERIFICATION

Soil sampling, lab analysis, and modeling

- Direct soil samples used to establish starting SOC levels for baseline modeling, and to track ongoing progress for project sequestration
- Specific models not prescribed – model(s) must be identified in the Monitoring Plan
  - Models like COMET-Farm and DNDC are likely to be commonly used
  - Projects may change models or update to a new version provided these requirements are met
- Models must be validated by an independent third party
  - SEP Model Requirements and Guidance v1.0a
- The protocol does not prescribe a specific sampling methodology or lab analysis approach, but rather dictates a set of minimum standards
  - Project Owners must describe their sampling methodology in the Monitoring Plan
  - Spatial locations of sample units and sample points must be described, as well as control sites
- The motivation is to provide flexibility to project developers in terms of implementing the project, while still maintaining quality via the minimum standards

Soil Enrichment Project Lifetime

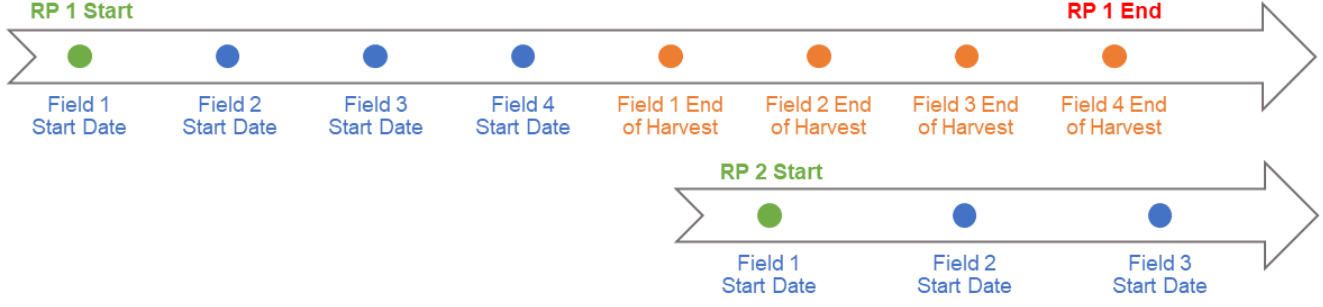


Note: project lifetime will be variable, as fields can end their crediting period early, renew their crediting period, and new fields may be added

VP = Verification Period RP = Reporting Period

Reporting Cycle

- **Reporting period (RP)** = the period of time over which emission reductions are quantified
  - Typical RP is one complete cultivation cycle, may be defined differently for different crops
  - Cultivation cycle is generally defined as the period between the first day after harvest of the last crop on a field and the last day of harvest of the last crop on a field during the reporting period. May be greater or less than a year
- Initial RP may comprise of either one or two cultivation cycles
  - Multiple eligible crop fields with initial RP of 2 cycles



Verification Cycle

- **Verification period (VP)** = the period of time over which emission reductions are verified
  - Initial verification period is one reporting period, beginning with the project start date
  - Subsequent VPs may cover up to 5 RPs
- Calendar year cycle is recommended, but not required
- If an avoidable reversal occurs, the VP may be required to be shortened to fulfill the compensation requirements
- VB has 12 months after end of the reporting period to review project documentation and submit the verification report and statement – or submit Monitoring Report if deferring verification

Documentation

- **Required for listing:**
  - Project Submittal form – inc list of fields (noting fields also have submittal deadlines)
  - Project ownership documentation
  - Public project area map (general overview of where fields are)
  - Private project map (detailed KML file with precise field locations)
- **Required for registration:**
  - Signed Attestation of Title, Attestation of Regulatory Compliance, and Attestation of Voluntary Implementation
  - Updated project maps (if applicable)
  - Monitoring plan (initial reporting period) and monitoring report (later RPs)
  - Verification Report and Verification Statement
  - List of Findings, if applicable
  - Final GHG contracts; PIA

Protocol resources

- Soil Enrichment Protocol v1.0
- SEP Model Requirements and Guidance v1.0a
- SEP Parameters v1.0a
- SEP Additionality Tool v1.0a
- SEP Uncertainty Example Spreadsheet v1.0a
- Monitoring Plan/Monitoring Report Template
- Project Implementation Agreement (coming soon)
- Offsets marketplace
- Expert modeler contacts upon request
- Online list of approved verifiers

AUDIENCE QUESTIONS

Thank you!

http://www.climateactionreserve.org/how/protocols/soil-enrichment

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