# Grassland Project Protocol V1.0

Public Overview Webinar

August 6, 2015

CLIMATE
ACTION
RESERVE

# Agenda

1. Introduction
2. Background
3. Project Definition & Eligibility
4. GHG Assessment Boundary & Quantification
5. Monitoring
6. Reporting & Verification
7. Questions & Discussion

*Please submit questions in writing through the webinar interface*

# Introduction

- Technical consultants:
  - WSP
  - Colorado State University
- Stakeholder workgroup:
  - The Climate Trust
  - Colorado State University *(separate from consultant)*
  - Ducks Unlimited
  - Environmental Defense Fund
  - ESI Inc.
  - The Nature Conservancy
  - SES Inc.
  - USDA Natural Resources Conservation Service

# Climate Action Reserve

- 501(c)3 not-for-profit carbon offset registry and standards development organization based in Los Angeles
- Founded in 2001 as the California Climate Action Registry
- Committed to rigorous, market-based GHG reductions
- Accredited Offset Project Registry for the CA compliance offset program
- Over 65 million CRTs & ROCs issued (tonnes $CO_2e$)
  - ***C**limate **R**eserve **T**onnes & **R**egistry **O**ffset **C**redits*
- 426 projects Listed, Registered, or Completed
- 15.4M credits retired and 15.8M credits transferred to CA

# Project protocols

- Forest (IFM, Avoided Conversion, Reforestation)
- Mexico Forest
- Urban Forest Management
- Urban Tree Planting
- Livestock Manure Management (U.S. & Mexico)
- Landfill Gas Destruction (U.S. & Mexico)
- Organic Waste Digestion
- Organic Waste Composting
- Ozone Depleting Substances Destruction (U.S., Article 5, & Mexico)
- Nitric Acid Production
- Coal Mine Methane Destruction
- Rice Cultivation
- Nitrogen Management
- **Grassland Avoided Conversion**
- ***Coming soon**: Mexico Boiler & Furnace Efficiency*

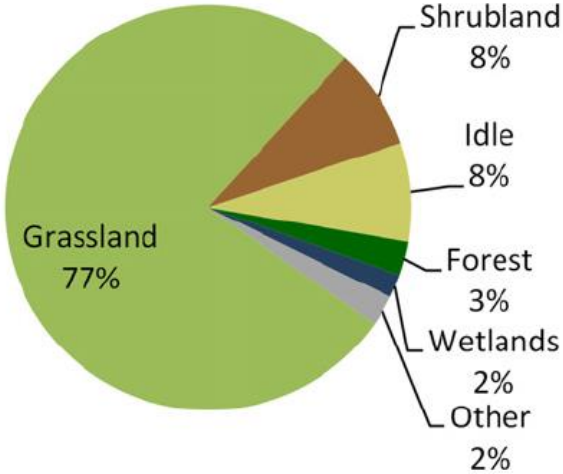
# Background

- The Reserve has previously explored multiple options for project protocols related to cropland and rangeland GHG emission reductions
- Grassland conversion highlighted as best candidate for protocol development
- Published issue paper in 2012
  - Avoided conversion as well as conversion of cropland to grassland
- Received grant from Packard Foundation in 2014 and commenced protocol development

# Why a Grassland protocol?

- High commodity prices driving expansion of crop cultivation, mostly at the expense of grassland
- 5.7M acres of grassland converted to cropland 2008-2012 (i.e. NH)
- Conversion results in loss of organic carbon stored in soil and biomass, as well as increased emissions from cultivation
- Massive stakeholder interest in a streamlined methodology

**Sources of new croplands, 2008-2012**




*Lark, Salmon, and Gibbs (2015)*

# Process overview

- May 2014: workgroup formed and contractor hired
- June 2014 – April 2015:
  - protocol drafting
  - technical contractor efforts
  - workgroup meetings and reviews
- April – June 2015: public comment periods
- July 2015: Board adoption of final protocol

# Protocol organization

- Section 1: Introduction
- Section 2: Project Definition
- Section 3: Eligibility
- Section 4: GHG Assessment Boundary
- Section 5: Quantification
- Section 6: Monitoring
- Section 7: Reporting
- Section 8: Verification
- Section 9: Glossary of Terms
- Appendices

# PROJECT DEFINITION

# Project definition

## Avoided conversion of grassland to cropland

- Perpetual protection through either a conservation easement or ownership transfer to the federal government
- "Grassland"
  - An area of land dominated by native or introduced grass species with little to no tree canopy. Other plant species may include legumes, forbs, and other non-woody vegetation. Tree canopy may not exceed 10% of the land area on a per-acre basis. Grassland may include managed rangeland or pastureland, but not cultivated cropland.
- **Allow** grazing, haying, recreation, organic fertilizers
- **Prohibit** irrigation, artificial drainage, and synthetic fertilizer

# Project area

- Only includes land that passes all eligibility screens
- Common ownership for the entire area
  - Single deed
  - Allow multiple parcels if they can be protected by the recording of a single conservation easement
- Pre-project ownership:
  - Private lands; or,
  - Non-federal public lands managed for profit and able to be converted

# Ownership terminology

- Grassland Owner (**GO**): an individual or entity with fee ownership of the project area

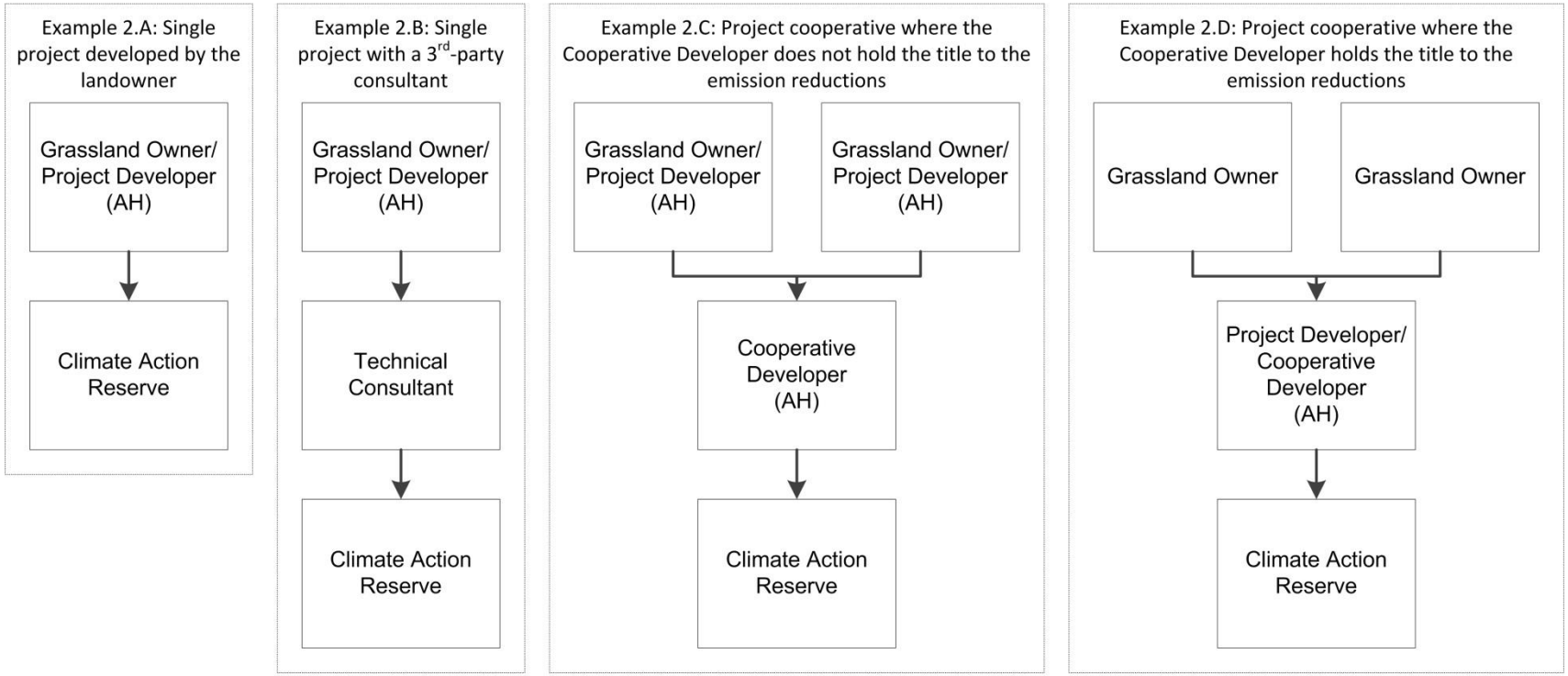
- Project Developer (**PD**): an individual or entity with ownership of the emission reductions, and that undertakes a GHG project. The project developer may be a GO, the easement holder, or a 3rd party; *must have a Reserve account*

- Cooperative Developer (**CD**): an individual or entity which submits and manages a cooperative (may be one of the GOs of the project cooperative or may be a 3rd party); *must have a Reserve account*

# Project cooperatives

- Multiple projects managed together as a cooperative
- Each individual project will be submitted through the PD's account, which is where CRTs will be issued
  - Will have unique project IDs
- The CD may combine effort and processes related to monitoring, reporting, and verification
- Single verification process and report that covers the entire cooperative (i.e. similar to joint reporting under a single multi-project OPDR, as in ARB Rice Protocol)
- It is possible to trace specific CRTs to specific projects
- Projects may join, leave, or transfer cooperatives

# Ownership structures




*(AH) denotes an entity which must have an account with the Climate Action Reserve*

# Required legal instruments

- GHG reduction rights contract (determines PD)
- Cooperative contract (where applicable)
- Qualified Conservation Easement
- Project Implementation Agreement (signed by PD)
- Reserve attestations (signed by PD)
- Indemnification agreement (if multiple Grassland Owners)
- Other (e.g. contracts for other programs, where relevant)

# ELIGIBILITY

# Eligibility Requirements

1. Location (conterminous U.S., incl. tribal lands)
2. Project Start Date
3. Additionality
   a. Performance Standard Test
   b. Legal Requirements Test
   c. Ecosystem Services Credit and Payment Stacking
4. Project Crediting Period
5. Requirements for Permanence
6. Regulatory Compliance

# Start date

Options for determining start date:

1. Date of recordation of a qualified conservation easement (discussed later); or,
2. Date of transfer to federal government ownership; or,
3. Alternatives for the initial projects in a cooperative:
   a) Date of notarized execution of cooperative contract; or,
   b) Date of notarized execution of carbon rights contract (for projects where the Cooperative Developer is the Project Developer)

# Performance standard test (PST)

- Two parts:
  1. **Financial threshold**

     *Proxy for financial pressure to convert to cropland*
  2. **Suitability threshold**

     *Evidence that land is able to be used for cultivation, which serves to validate the baseline scenario*

# PST: financial threshold

- Apply the difference in county-level cropland and pastureland rental rates as a proxy for the financial pressure to convert grassland to cropland
  - National Agricultural Statistics Service (NASS) data, 3-yr average
- Eligible without discount if cropland premium **>100%**
- Eligible with sliding scale discount (0-50%) if cropland premium is between **40%** and **100%**
- Ineligible if cropland premium is **<40%**
- Appraisal option remains as an alternative if can't meet standard, or if no data were available
- New table will be issued by Reserve in Q4 of every year

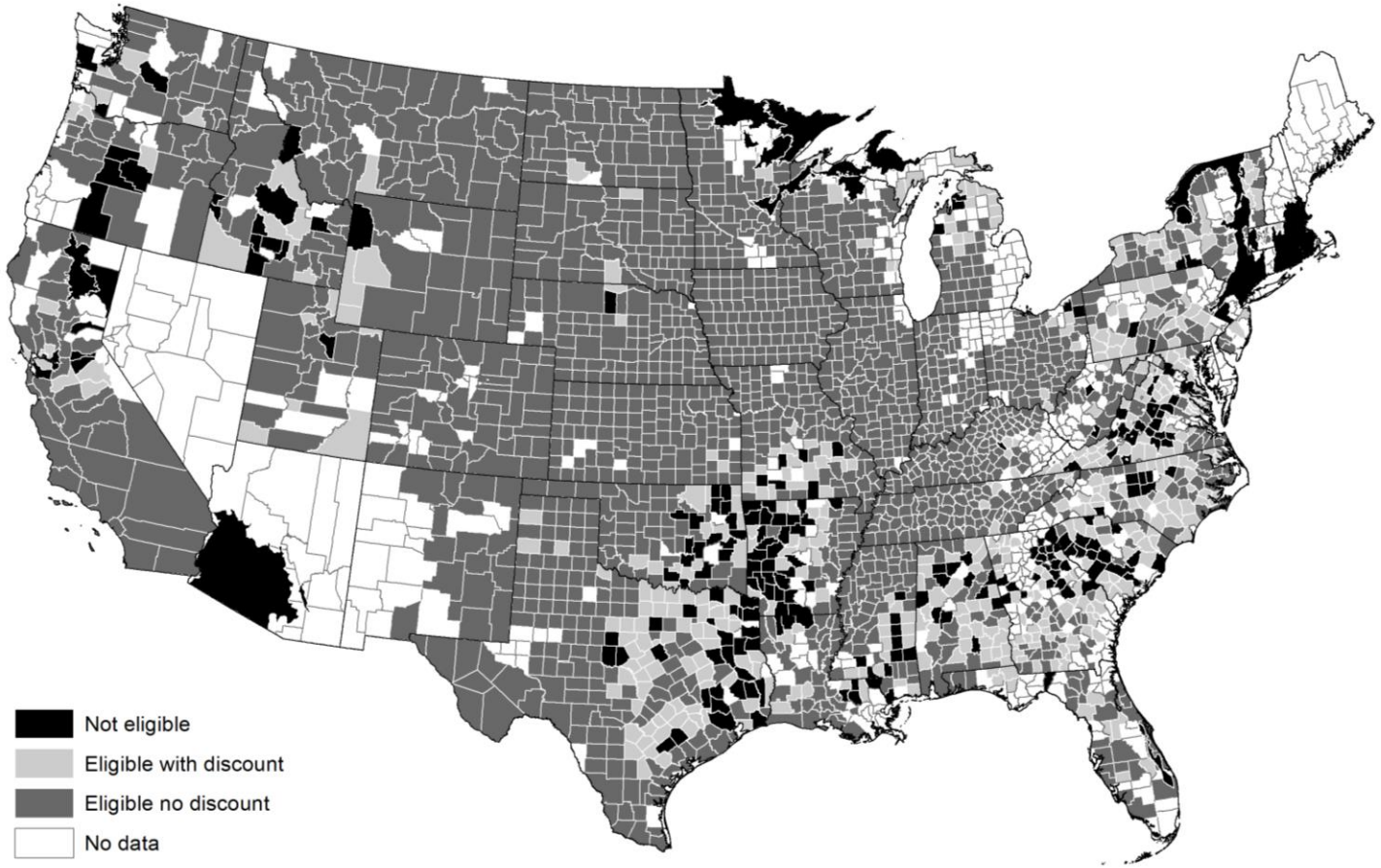
# PST: financial threshold

Example:
**Sonoma County, CA**

Cropland Premium:
134%

Eligible?:
Yes

Discount:
None



# PST: Suitability threshold

- Must be able to show that the project area is suitable for conversion to cropland
- Using the Land Capability Classification (LCC) identified in the SSURGO database
- At least 75% of area must be LCC I-IV (non-irrigated)
  - May have minor components of Class V or VI (up to 25%)
- If project wants to apply the irrigated LCC, they must prove that the baseline conversion scenario would be able to include irrigation

# Legal requirement test

- Legal Requirement Test:
  - No pre-existing or subsequent legal requirement to maintain Project Area as grassland, and
  - No legal obstacle to convert Project Area to cropland.

- *Concurrent* agreements may be permitted under LRT (Section 3.3.2.1):
  - HCPs and SHAs up to 6 months prior to the start date
  - Easements, subject to start date requirements
  - Other ecosystem services payment or credit programs, subject also to Section 3.3.3

# Credit & payment stacking

- Opportunities for landowners to receive multiple payments for ecosystem services that grasslands provide
- Protocol addresses specific opportunities:
  - Credit stacking: Endangered species habitat credits and wetland credits
  - Payment stacking: USDA NRCS and Farm Service Agency conservation programs, NGO payments
- Policies driven by key questions:
  1. Which program was entered first?
  2. Is stacking allowed by both programs? If yes, then...
  3. Can you maintain additionality while providing multiple payments?
- ALL credits or payments must be disclosed on an ongoing basis

# Credit stacking

- Can *concurrently* seek to establish a conservation bank or a wetland mitigation bank on the project area, subject to requirements
- Cannot *subsequently* start a carbon project where the project area is already committed to conservation under another program
- Generally, other conservation programs will not allow participation by land that is already conserved through a carbon project, but this is not prohibited by the Reserve

# Payment stacking

- Landscape-scale payment programs
  - Can *concurrently* seek conservation easement support from NGOs and *can* initiate grassland project on enrolled lands
    - Any easement/agreement on the project area is subject to start date requirements and other protocol requirements
  - Recordation of a conservation easement to support grassland project apparently disqualifies the land from participation in government payment program, so no opportunity to stack
- Enhancement payment programs
  - Can seek enhancement payments without restriction
  - Recordation of a conservation easement to support grassland project apparently disqualifies the land from participation in government payment program, so no opportunity to stack

# ELIGIBILITY: CREDITING PERIOD & PERMANENCE

# Crediting Period

- Maximum of 50 years from project start date
- Modeled emission factors are in 10-year increments
- Crediting period ends if no baseline soil carbon emission reductions
- May be ended early as long as permanence is maintained
- Example: Stratum A has 50-yr crediting period, B has 30-yr period

| Emission Factor Table | Stratum A | Stratum B |
|---|---|---|
| Years 1-10 | 1.0 | 0.8 |
| Years 11-20 | 1.0 | 0.7 |
| Years 21-30 | 0.8 | 0.5 |
| Years 31-40 | 0.6 | **0** |
| Years 41-50 | 0.4 | **0** |

# Permanence

- CRTs related to carbon that must be stored in the project area ("reversible emission reductions") are subject to permanence requirements
- Release of stored carbon less than 100 years following CRT issuance is considered a reversal
- Significant reversals lead to project termination
- 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

# Reversals

- The main threat to a grassland project is land use change, which is mitigated by a conservation easement with ongoing monitoring and enforcement
- 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)

# Qualified Conservation Easement

- Required for all projects except where the land is owned by the Federal Government as part of the project activity
- Must be perpetual
- The easement terms must prevent the conversion of the project area from grassland

- Protocol includes additional *recommended* provisions:
  - Make ownership of GHG reduction rights explicit
  - Make future encumbrances subject to the PIA

# Project Implementation Agreement

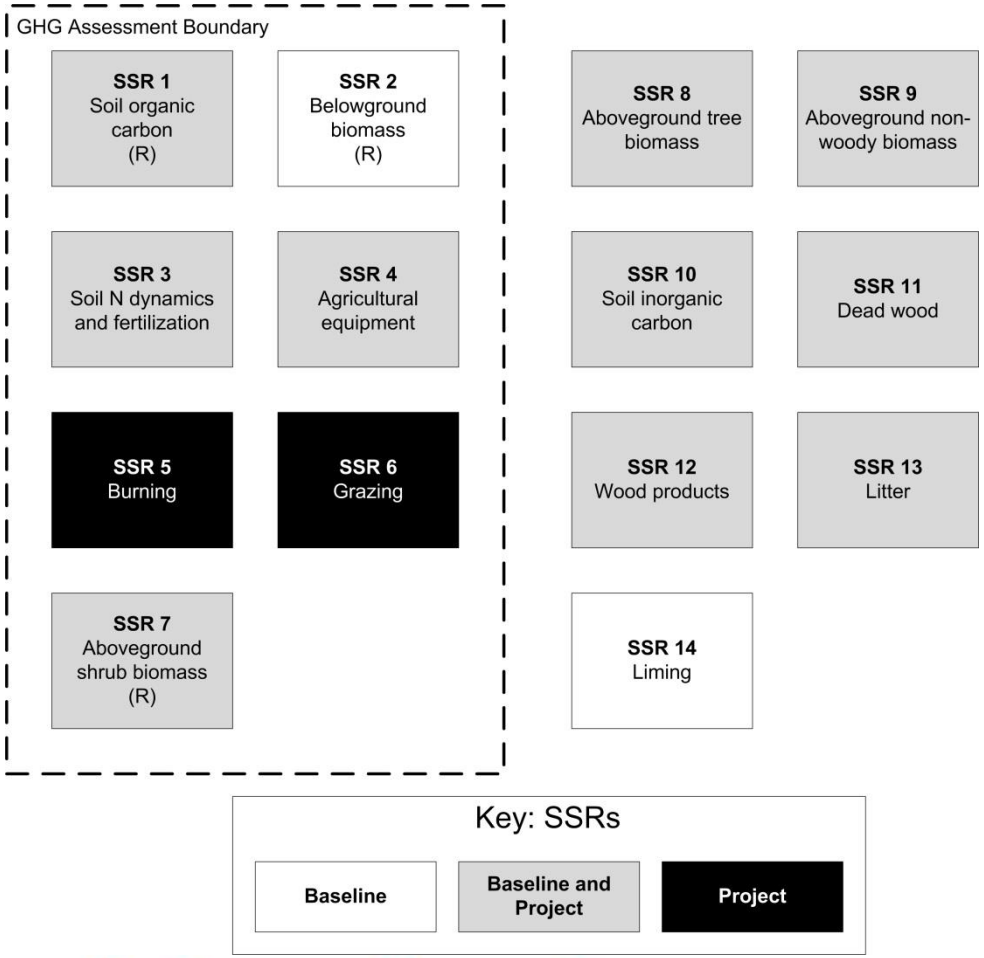
- An agreement between the Project Developer and the Reserve to maintain the permanence of the Grassland project
- Covers entire project area
- Two options:
  1. **Contract PIA**: a contract with the Reserve; subject to additional buffer pool contribution related to the risk of financial failure
  2. **Recorded PIA**: when the Grassland Owner is the Project Developer, they may elect to record the PIA on the land. If this PIA is not subordinated to subsequent contracts, there is no additional buffer pool contribution

# Regulatory compliance

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

# QUANTIFICATION

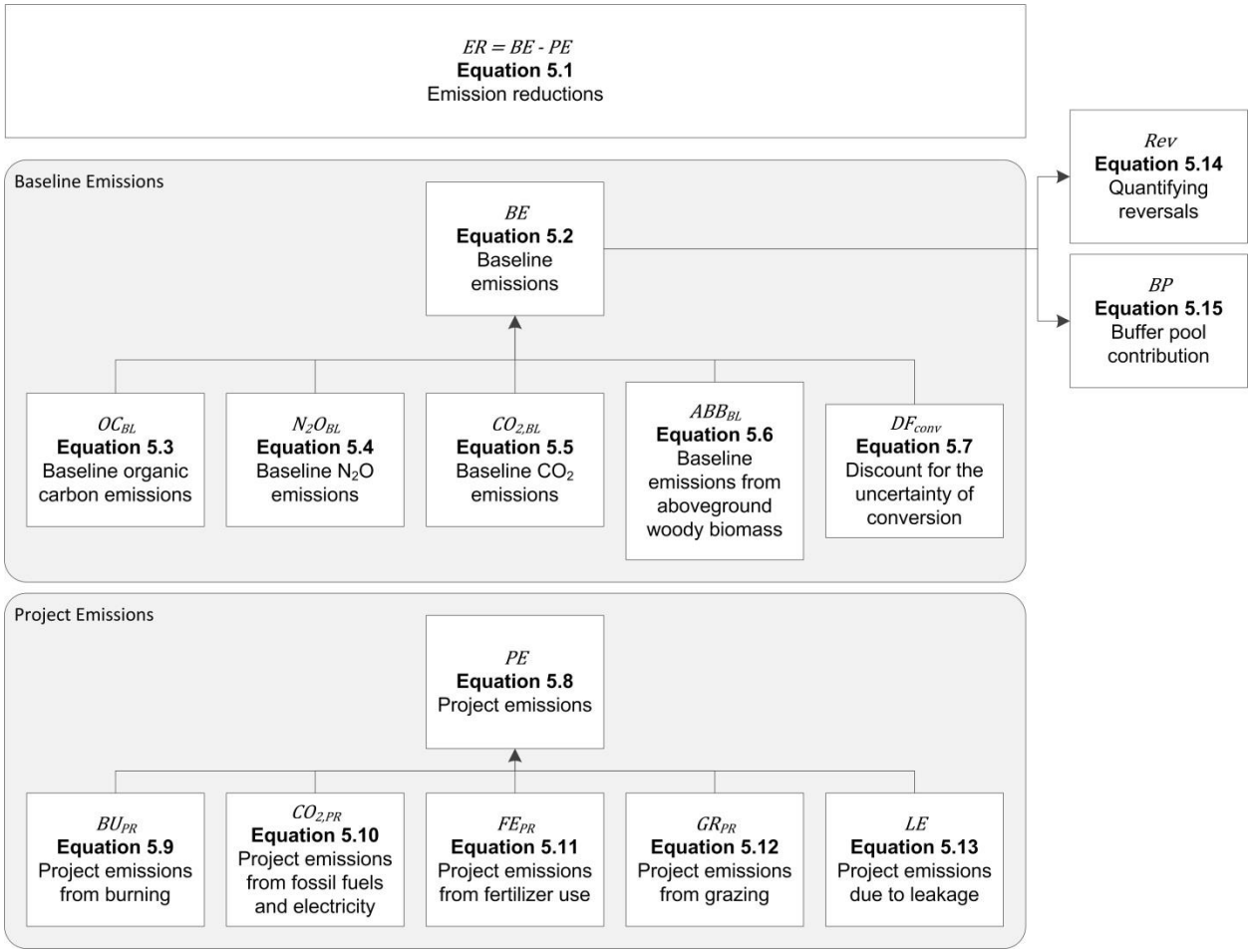
# GHG assessment boundary



# Quantification

- Emission reductions are equal to the avoided belowground organic carbon emissions that would have occurred in that period, plus the avoided $N_2O$ and $CO_2$ emissions that would have occurred in that period, minus the project emissions that actually occurred in that period.
  - Optional accounting for avoided loss of non-tree woody biomass
- Discounts
  - Uncertainty of baseline conversion ($DF_{conv}$)
  - Uncertainty of modeling future practices and climate ($DF_{\sigma}$)
- Buffer pool contribution for reversal risk

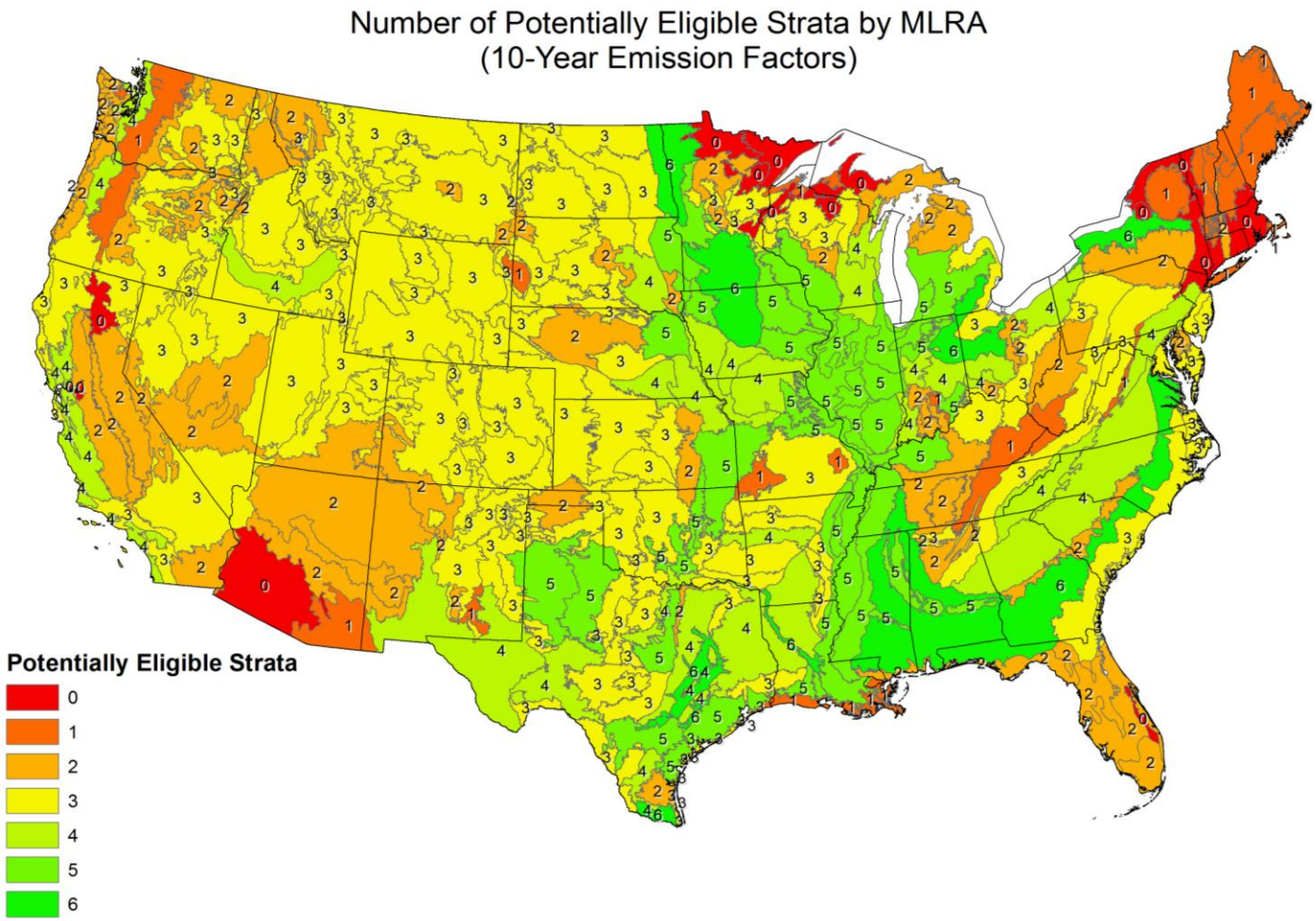
# Equations


$ER = BE - PE$
Equation 5.1
Emission reductions
Baseline Emissions
$BE$
Equation 5.2
Baseline emissions
$OC_{BL}$
Equation 5.3
Baseline organic carbon emissions
$N_2O_{BL}$
Equation 5.4
Baseline $N_2O$ emissions
$CO_{2,BL}$
Equation 5.5
Baseline $CO_2$ emissions
$ABB_{BL}$
Equation 5.6
Baseline emissions from aboveground woody biomass
$DF_{conv}$
Equation 5.7
Discount for the uncertainty of conversion
$Rev$
Equation 5.14
Quantifying reversals
$BP$
Equation 5.15
Buffer pool contribution
Project Emissions
$PE$
Equation 5.8
Project emissions
$BU_{PR}$
Equation 5.9
Project emissions from burning
$CO_{2,PR}$
Equation 5.10
Project emissions from fossil fuels and electricity
$FE_{PR}$
Equation 5.11
Project emissions from fertilizer use
$GR_{PR}$
Equation 5.12
Project emissions from grazing
$LE$
Equation 5.13
Project emissions due to leakage

# Stratification

- Quantification is carried out by stratum
- Three steps to identify stratum:
  1. Geography & climate (Major Land Resource Area, MLRA)
  2. Soil texture
     - Sand
     - Loam
     - Clay
  3. Prior land use
     - 10-30 year grassland
     - 30+ year grassland
- Example = 1_Loam_10

# Stratification



# Demonstrating prior land use history

- To justify the stratification as either 10-30 year grassland or 30+ year grassland
- Protocol includes a list of options for evidence (not comprehensive)
- We are flexible with these options, but the evidence must cover the relevant time period

| Independently sufficient | Require corroborating evidence |
|---|---|
| • Site visit(s)<br>• Time-stamped, geotagged photos<br>• Time-stamped aerial photos | • Satellite data products<br>• Contracts<br>• Records generated or accepted by a regulatory body<br>• Affidavits from unaffiliated parties<br>• Some combination of these or other options |

# Baseline emissions

- Most baseline emission equations rely on default, area-based emission factors (by stratum)
  - Organic carbon loss
  - Avoided $N_2O$ from fertilizer use
  - Avoided $CO_2$ from fossil fuels used for cultivation
- Determine acreage in each stratum and use lookup tables to identify appropriate emission factors
- SOC and $N_2O$ factors are provided in 10-year groups
- Fossil fuel use rate is constant for each stratum
- Non-tree woody biomass has a separate approach

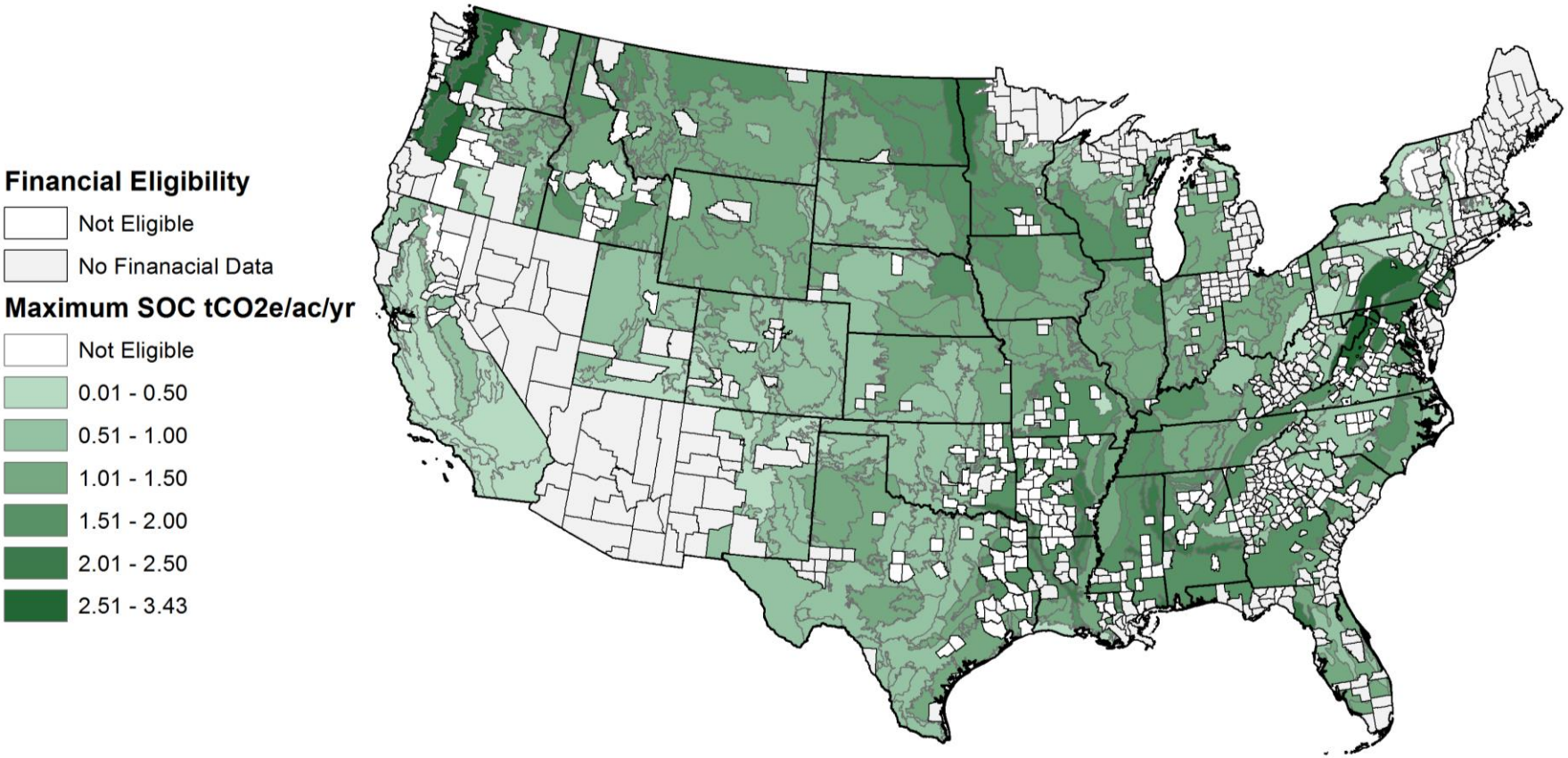
# Protocol companion tables

- Separate Excel spreadsheet available online
  - Paper copy available upon request
- Parameters by stratum
  - Baseline soil organic carbon (10-year factors)
  - Baseline $N_2O$ (10-year factors)
  - Baseline fuel use
  - Project dry matter (10-year factors)
- Parameters by county
  - Financial threshold eligibility (updated annually)
  - Value for $DF_{conv}$ (updated annually)
  - $N_2O$ leaching status

# Stratum variability

- Baseline organic carbon loss correlations
  - MLRA: Most fertile areas of the country generate higher emission reductions, especially where irrigation is not required
  - Soil texture: loam and clay tend to generate higher emission reductions than sand
  - Prior land use history: 30+ year grasslands will generate higher emission reductions

# Maximum SOC factor by MLRA



# Aboveground non-tree woody biomass (optional)

- Some sites may have significant carbon in woody shrubs
- Determine initial carbon inventory at project start date and then assume baseline decay following conversion
- Based on approach in the Reserve's Quantification Guidance for Urban Forest Management Projects
  - Remote sensing to determine % canopy coverage
  - On-ground survey to identify species
  - Use published studies to identify carbon-to-canopy ratio for each species
  - Credit for carbon contained in initial inventory based on decay over time, then monitoring to identify reversals

# Discount factors

- $DF_{conv}$: Uncertainty of baseline conversion (lookup table)

$$\boldsymbol{DF_{conv} = \left(1 - \frac{CP - 40\%}{100\% - 40\%}\right) \times 50\%}$$

*Where*,

| | | Units |
|---|---|---|
| $DF_{conv}$ | = Discount factor for the uncertainty of baseline conversion | % |
| CP | = The cropland premium for the county where the project is located | % |
| 40% | = The lower threshold for financial additionality (Section 3.3.1.2) | % |
| 100% | = The upper threshold for financial additionality (Section 3.3.1.2) | % |
| 50% | = The maximum value of $DF_{conv}$ | |

- $DF_{\sigma}$: Uncertainty of modeling future practices and climate

| Reporting Year | 2015-2019 | 2020-2024 | 2025-2029 | 2030-2034 | … |
|---|---|---|---|---|---|
| Discount Factor ($DF_{\sigma}$) | 1% | 2% | 3% | 4% | … |

Quantification:

# PROJECT EMISSIONS

# Project emissions

- Burning
- Fossil fuel and electricity use
- Organic fertilizer application
- Grazing
- Baseline leakage

# Project emissions from burning

- Monitor area burned during each reporting period (acres identified by stratum)
- Estimate of grass dry matter per acre is provided in the stratum lookup tables
- Woody biomass dry matter based on baseline inventory (if applicable)
- Quantification based on IPCC emission factors for $N_2O$ and $CH_4$ from savannah burning

# Project emissions from fossil fuels and electricity

- Monitor fossil fuel and electricity sources and usage
  - For example, emissions from harvesting hay, or spreading compost
- Default emission factors from the EPA
  - National factors for fuels
  - Regional factors for electricity
  - Updated periodically
- Projects may avoid the detailed monitoring requirements and provide a basic estimate if they can show it is reasonable to assume the emissions are *de minimis*
  - Less than 5% of the total baseline emissions

# Project emissions from fertilizer use

- Monitor the type, N-content, and quantity applied for all fertilizers (other than grazing manure)
  - E.g. compost, off-site manure, etc.
- Quantification based on IPCC default factors
- Determine whether to account for leaching by using county lookup tables

# Project emissions from grazing

- $CH_4$ from manure and enteric fermentation, plus $N_2O$ from manure
- Monitor the category, population, and grazing days for all livestock
- Quantification for manure $CH_4$ is based on Reserve Livestock protocol
- Quantification for manure $N_2O$ is based on fertilizer quantification and nitrogen estimates from EPA
- Quantification for enteric $CH_4$ uses state-level estimates developed by the EPA

# Leakage

- Default leakage emissions equal to 20% of baseline emissions for all projects
- Composite baseline scenarios do not lend themselves to project-specific determinations of leakage
- Determining leakage for AGC projects is complex and highly uncertain

# Quantifying reversals and buffer pool contribution

- The quantity of baseline organic carbon tonnes already issued to the specific acres that experienced the reversal
- There are deadlines for notifying the Reserve, quantifying the reversal, and surrendering CRTs (if avoidable reversal)
- Unavoidable reversals compensated from the buffer pool
- Buffer pool contribution is a percentage of organic carbon tonnes to be issued in the current period

| PIA | Site Visit | Default Risk | $Risk_{FF}$ | $Risk_{SV}$ | $Risk_{rev}$ |
|---|---|---|---|---|---|
| Contract PIA | Yes | 0.02 | 0.1 | 0 | **11.8%** |
| Contract PIA | No | 0.02 | 0.1 | 0.05 | **16.2%** |
| Recorded PIA, Subordination Clause Type 1 | Yes | 0.02 | 0 | 0 | **2%** |
| Recorded PIA, Subordination Clause Type 1 | No | 0.02 | 0 | 0.05 | **6.9%** |
| Recorded PIA, Subordination Clause Type 2 | Yes | 0.02 | 0.1 | 0 | **11.8%** |
| Recorded PIA, Subordination Clause Type 2 | No | 0.02 | 0.1 | 0.05 | **16.2%** |

# MONITORING

# Monitoring ongoing eligibility

- For verifications without a site visit
- Follow same procedure as the documenting of prior land use history

# Monitoring grazing

- Legal limitations on grazing intensity
  - If project easement contains enforceable provisions to limit grazing, then not required to have prescribed grazing management plan
- Prescribed grazing management plan
  - Required if no legal limits on grazing intensity
  - Follow NRCS Practice Standard 528: Prescribed Grazing
  - Must identify protection of soil carbon as a management goal
- Monitoring of grazing activities
  - Must document Animal Grazing Days by livestock category
    - AGD = population x grazing days
    - The form of documentation is flexible

# Monitoring woody biomass (optional)

- Only used by projects which elect to quantify emission reductions from baseline loss of woody biomass
- Initial inventory:
  - Use remote sensing to estimate canopy coverage
  - Use ground sampling and scientific literature to develop a ratio of $CO_2e$ per area
- Ongoing monitoring:
  - Annual remote sensing to confirm canopy coverage

# Monitoring project emissions

- Acres burned
- Animal grazing days by livestock category
- Mass and N-content of fertilizer applied
- Fossil fuel and electricity usage

# REPORTING & VERIFICATION

# Reporting & verification cycle

- **Reporting period (RP)** = the period of time over which emission reductions are quantified
  - Initial RP may cover up to 24 months
  - Subsequent RPs may cover no more than 12 months
- **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 6 RPs
- Calendar year cycle is recommended, but not required

# Joint reporting of cooperatives

- Cooperative developer shall coordinate monitoring, reporting, and verification activities
- Monitoring and documentation may be combined for efficiency, but must maintain traceability of CRTs to individual projects
- Single verification report for cooperative
- CRTs will be issued to the project developer for each project (which may be the cooperative developer)

# Cooperative verification cycle

- Single verification period for cooperative
- For a project's first VP with the cooperative, it may start reporting at a date later than the other projects, but all projects end reporting on the same date
- Suggest CD use initial VP to get all projects coordinated on a single schedule for RPs and VPs
- If individual projects cannot meet protocol requirements, they can report zero CRTs and continue to be verified with the cooperative

# Verification activities

- Site visits are optional, but projects must apply 10% buffer pool contribution until the VP where a site visit occurs
- Verifications without site visits may rely on the documentation options for evidence of land use
  - Remote data will confirm maintenance of woody canopy
- Review documentation for project emissions
  - Burning, grazing, fertilizer use

# Monitoring for permanence

- The 100 years following the crediting period is the "permanence period"
- Monitoring required to identify reversals
  - Periodic monitoring reports to document absence of reversals, status of site activities, and status of ownership relating to the site, the easement, and the belowground carbon
- Two options:
  1. Monitoring through easement activities where the ongoing monitoring of the conservation easement can be documented. Reports at least every 6 years, verification not required.
  2. Monitoring for carbon separately. Reports due at least every 3 years, verification required at least every 15 years.

# IMPLEMENTATION

# Outlook

- Most likely regions are Upper Midwest, Great Plains, West
- Expect individual projects to generate 0.5-2.0 CRTs/ac/yr (maximum ~3.4 CRTs/ac/yr)
- Expect projects to be thousands of acres
- Most CRTs in the first 10-20 years, then tapering off
- Project developers are evaluating projects now
- Staff believes that the policies will be amenable to ARB

# Protocol implementation

- Projects may be submitted immediately
- Changes still needed in Reserve software to accommodate cooperatives
  - We can work with you if you are ready to submit a co-op now
- GrassTool Beta v1.0a is available (request via e-mail)
  - Designed for individual projects, not entire cooperatives
  - Please provide any comments or feedback, it is a work in progress
- Unless there is more pressing need identified, verifier training will be in early 2016
- Reserve is seeking funding to develop additional tools and resources, and conduct stakeholder outreach

# Contact Information

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# THANK YOU!

http://www.climateactionreserve.org/how/protocols/grassland/