



CLIMATE
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The US Grassland Carbon Experience

CFGAs Annual Conference

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November 14, 2018

Climate Action Reserve: a nonprofit dedicated to market-based solutions to climate change



Carbon Offsets Registry

- **Voluntary Program: primary GHG accounting standard used for voluntary carbon market**
 - Issued 78 million credits
 - Valued at \$13M** in North America in 2016 transactions alone
 - 18 project types, plus user-friendly accounting tools and guidance documents
- **Compliance Program: helped develop and currently support California's pioneering cap-and-trade program**
 - Approved by CA Air Resources Board to issue carbon credits eligible for compliance use
 - All five ARB protocols are based on Reserve protocols, in whole or in part

Beyond GHG Offsets

- GHG policy consulting: Mexico, Ontario, Quebec, World Bank, USDA, USAID, other California agencies, and more
- Climate Impact Score: Climate finance impact assessments
- Climate Forward: crediting registry for ex ante GHG mitigation projects

How does our registry work?

The Reserve develops standardized offset protocols (methodologies)

- Engage with government, industry, academia, and technical stakeholders, plus public comment



ADDITIONAL

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

VERIFIABLE

- *Ex-post* third-party verification prior to credit issuance

REAL

- GHG accounting is conservative, comprehensive, and scientifically credible

PERMANENT

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

OWNED UNAMBIGUOUSLY

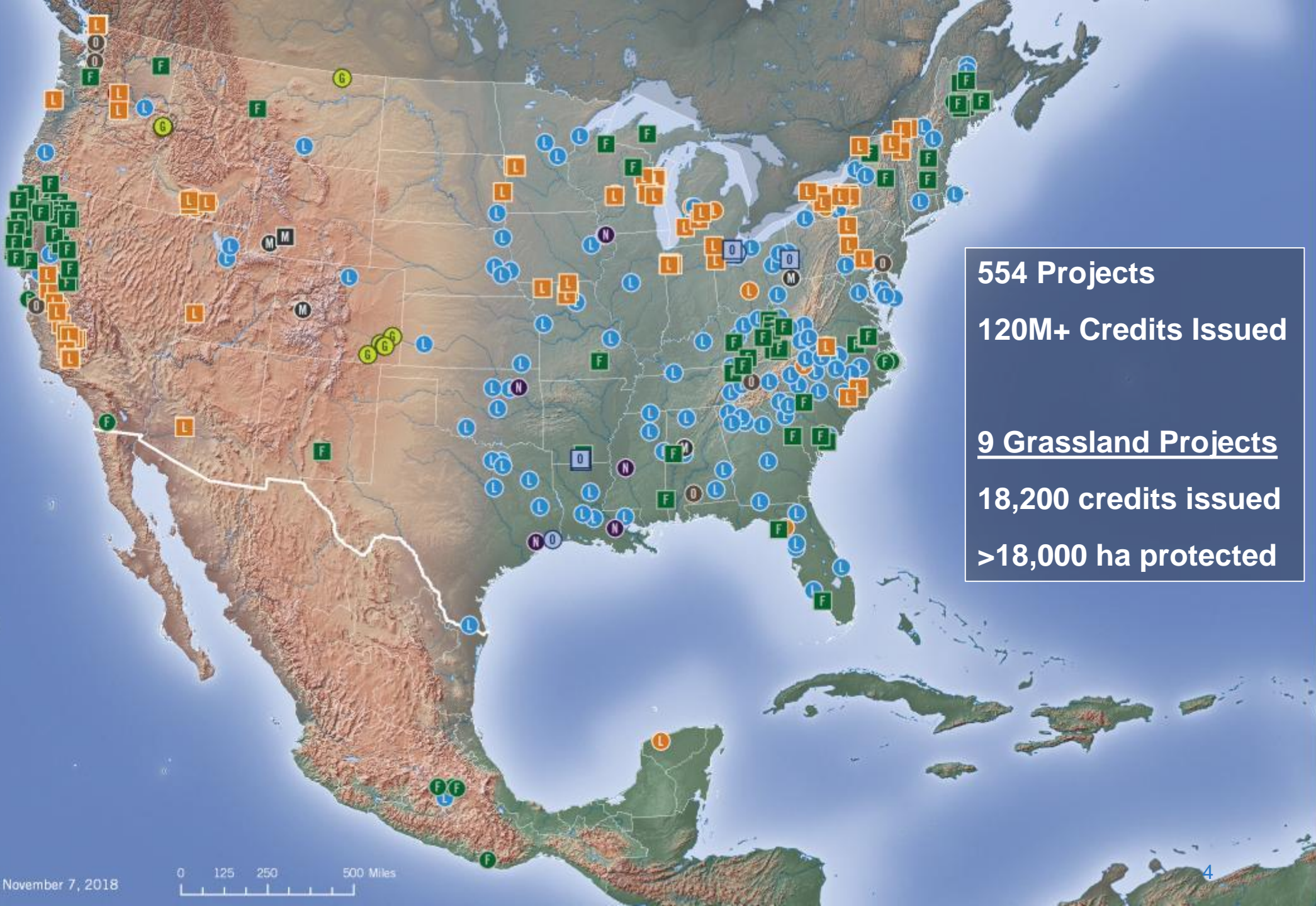
- No other parties may reasonably claim ownership of GHG reductions resulting from project



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- Forest (ARB)
- Livestock (ARB)
- Mine Methane (ARB)
- Ozone Depleting Substances (ARB)
- Forest
- Grassland
- Landfill
- Livestock
- Mine Methane
- Nitric Acid Plants
- Composting
- Organic Waste Digestion
- Ozone Depleting Substances

Listed, Registered & Completed Projects as of November 7, 2018



554 Projects
120M+ Credits Issued
9 Grassland Projects
18,200 credits issued
>18,000 ha protected

US voluntary vs compliance carbon markets

Compliance Market

End Buyer	Large businesses and utilities required to reduce emissions by law (California, Quebec, Ontario)
Standard	CA Air Resources Board approved protocols
Project Types	6 project types, only Forest, MMC, ODS, Livestock used to date
Credit Price	\$10-\$12, depends on allowance prices
Cost	Variable by project type; includes: project feasibility study, installation, on-going monitoring & reporting, verification, business development for credit sales
Risks	<ul style="list-style-type: none"> • Policy uncertainty re: Cap and Trade Program implementation • ROC to ARBOCs conversion risk • Invalidation

VS

Voluntary Market

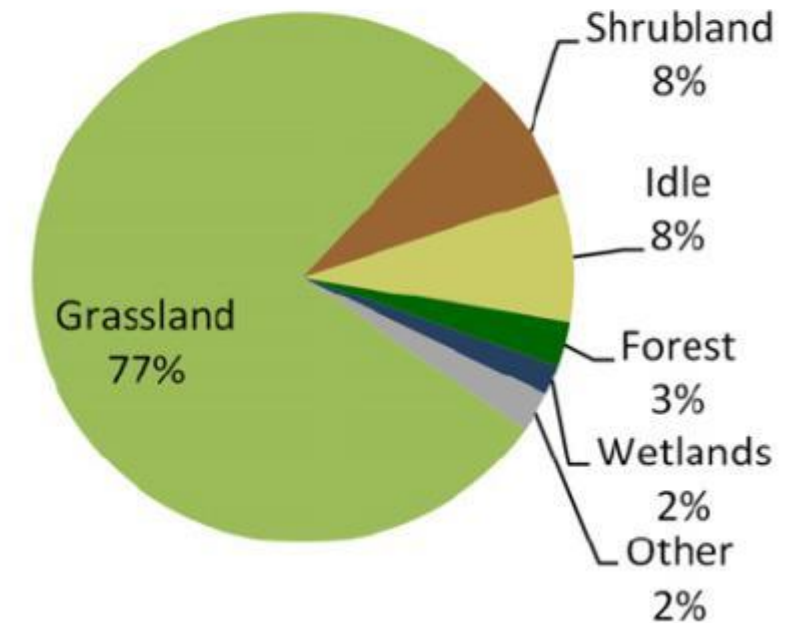
End Buyer	Any individual, business, nonprofit, municipality, utility voluntarily reducing emissions
Standard	Climate Action Reserve protocols, other carbon registries
Project Types	18 projects types
Credit Price	\$1-\$45+, depends on project type, location, buyer needs, co-benefits
Cost	<p>Generally lower than compliance</p> <p>Variable; includes: project feasibility study, installation, on-going monitoring & reporting, verification, business development for credit sales</p>
Risks	<ul style="list-style-type: none"> • Finding buyers • Price uncertainty overtime



Why a US Grassland protocol?

- High commodity prices driving expansion of crop cultivation, mostly at the expense of grassland
- 5.7M acres (2.3M ha) of grassland converted to cropland 2008-2012
- 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)

Background on policy development

- **2011:** USDA Conservation Innovation Grant (CIG) to create ACR ACoGS methodology
- **2012:** Reserve received a grant from the Packard Foundation for issue paper
- **2014:** Reserve received a grant from the Packard Foundation for protocol development
- **2015:** Reserve GPP v1.0 developed and adopted
- **2015:** USDA NRCS Conservation Innovation Grant awarded for outreach and implementation
- **2016:** First 3 grassland projects are listed in the registry, commenced protocol update
- **2017:** GPP v2.0 is adopted, additional projects listed in the registry. MOECC protocol began in earnest, only to be put on hold for many months by the Ministries
- **2018:** First grassland CRTs issued to Ducks Unlimited, then to Southern Plains Land Trust. ACR methodology update released for public comment. MOECC development revived, only to be quashed by the Ontario elections. CFGA picks up the grassland protocol.

Protocol development process

2012

1. Consultants develop issue paper

2013

2. Conduct public scoping meetings

2014

3. Form stakeholder workgroup (NGOs, academia, verifiers, land trusts, government, project developers)

4. Hire technical consultant for quantification (Colorado State University)

5. Work with CSU and workgroup to flesh out policy and technical decisions

6. Work with CSU to develop Excel-based calculator

2015

7. Workgroup reviews full draft protocol

8. Public comment on revised draft protocol

9. Reserve Board of Directors adopts final protocol

Basic overview

- Protection of existing, unprotected grassland threatened by conversion to cropland
- Standardized assessment of conversion threat based on financial pressure & soil suitability
- Credit for up to 50 years of avoided emissions (belowground carbon + N₂O from cultivation)
- Requires new conservation easement
- Permanence maintained at least 100 years following credit issuance
- Quantification based on pre-modeled emission factors unique to geography, climate, land use history, and soil texture
 - We provide an easy calculation tool
- Deduct project emissions from grazing and other sources
- Shared risk buffer pool
- Verification at least every 6 years, credits issued upon successful verification
- Multiple projects may be managed together as “cooperatives”

Quantification development

- CSU conducts the annual US GHG inventory for land use emissions
- Data for grassland and cropland sites are referenced from the inventory database, built from the US Natural Resources Inventory (NRI)
- All modeling conducted using DAYCENT:
 1. Grassland and cropland sites identified within each stratum
 2. Grassland sites are “spun up” for either 10 or 30 years to determine baseline carbon pool
 3. Grassland sites are probabilistically paired with cropland sites in the same stratum to define the most likely characteristics of the conversion to cropland
 4. DAYCENT models the fluxes that would occur following conversion
 5. Daily outputs are smoothed into 10-year averages, which are used for baseline emission factors

Modeling results

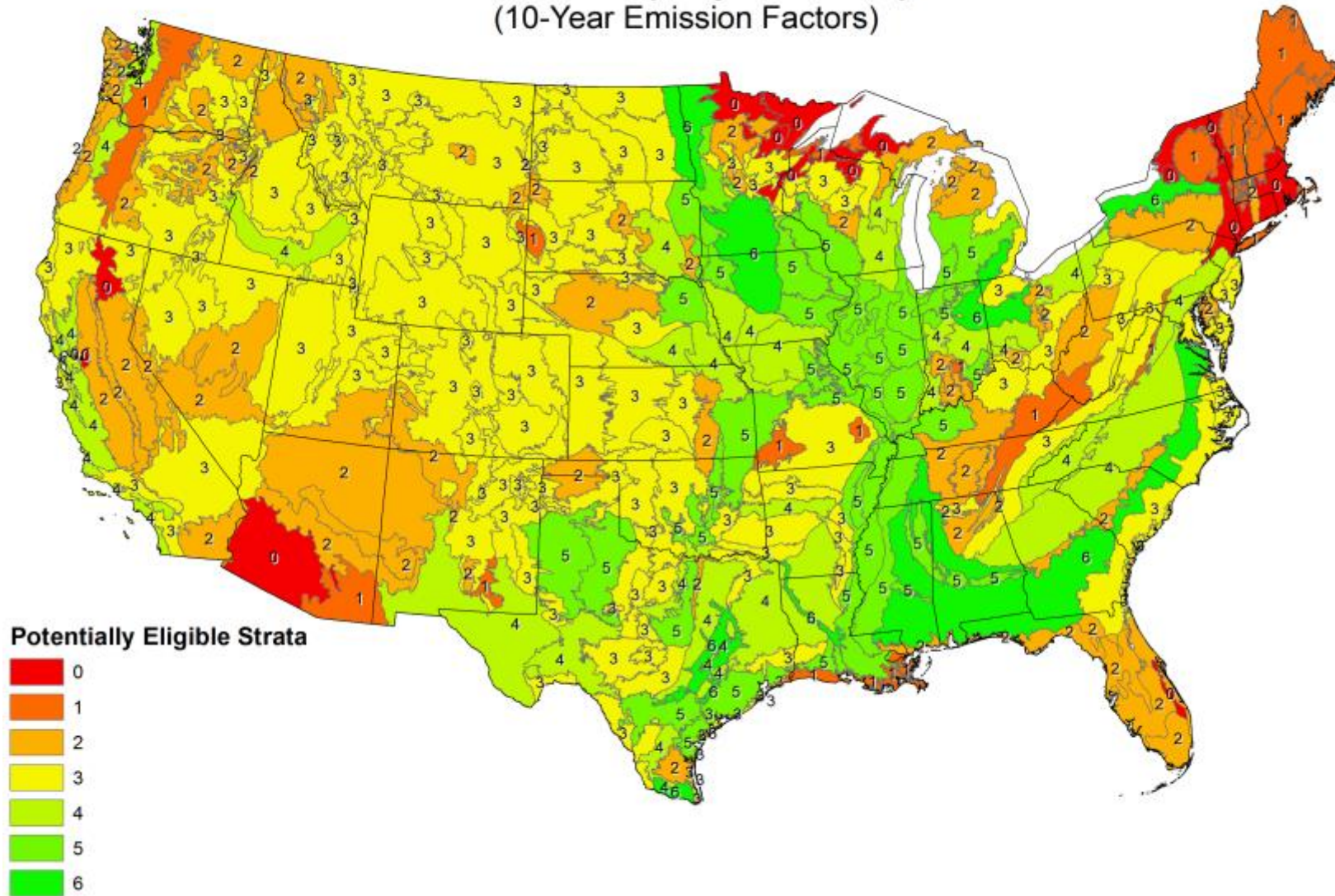
- Outputs:
 - Annual factors for avoided loss of belowground carbon (change every 10 years)
 - Annual factors for avoided N₂O emissions from cultivation activities (change every 10 years)
 - Annual factors for avoided CO₂ emissions from diesel use
 - Annual factors for expected mass of aboveground dry matter in grassland scenario (used for estimating emissions from fire; change every 10 years)
- Strata are eligible if there is a positive GHG impact to *avoiding* cropland conversion
- Potential reasons for stratum ineligibility
 - Insufficient grassland or cropland sites for modeling
 - Negative emission factors (i.e., there is a GHG *benefit* from cropland conversion)
 - Arid regions where irrigation would potentially put more carbon back into the soil
 - Regions with very low starting soil carbon, such that cultivation may improve soil carbon, at least in the first 10 years

Potentially eligible strata



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Number of Potentially Eligible Strata by MLRA
(10-Year Emission Factors)



GrassMap



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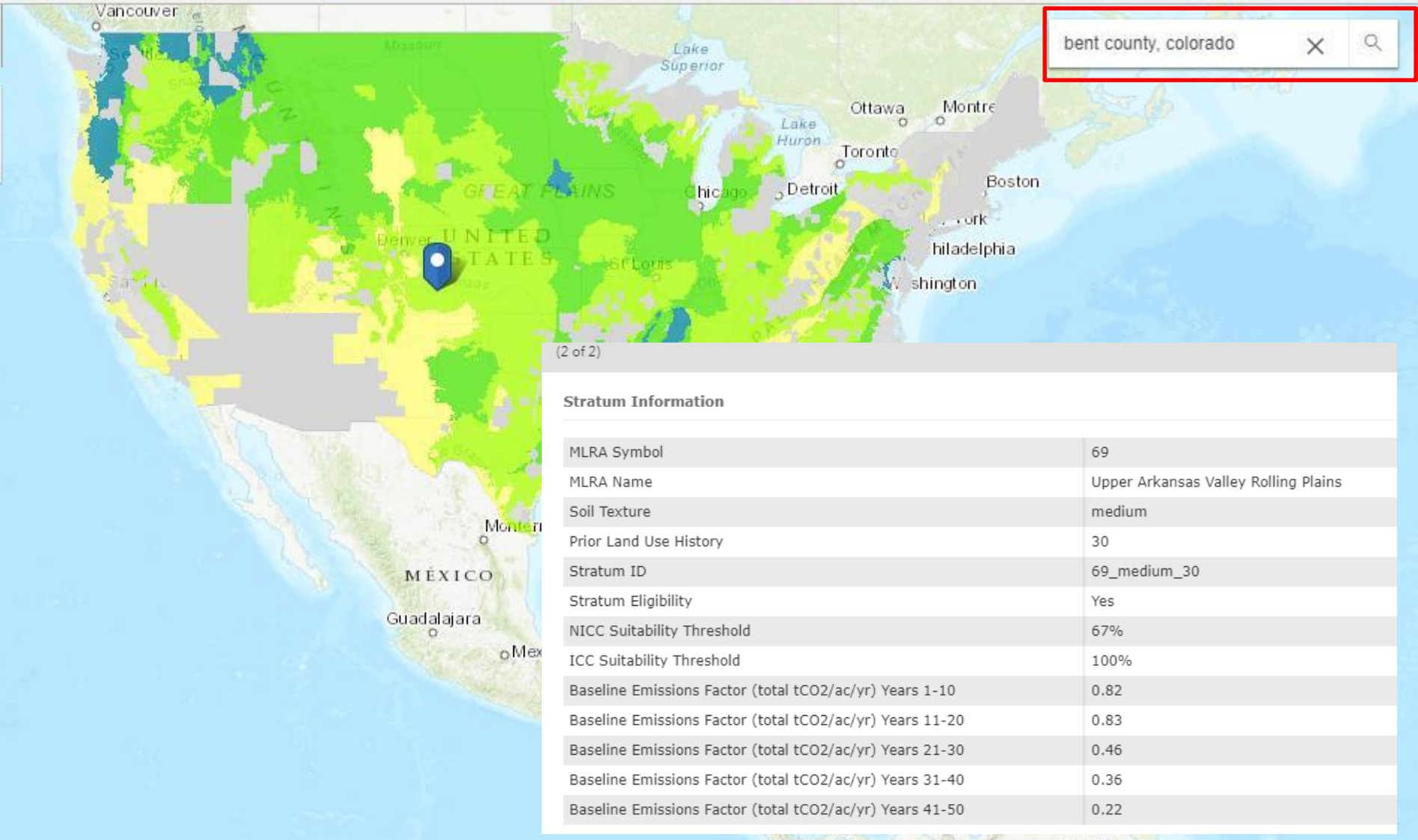
Legend Details

- U.S. State Boundary
- Financial Suitability
- MLRA Fine 10
- MLRA Fine 30
- MLRA Medium 10
- MLRA Medium 30

Baseline Emissions Factor (total tCO2/ac/yr) Years 1-10

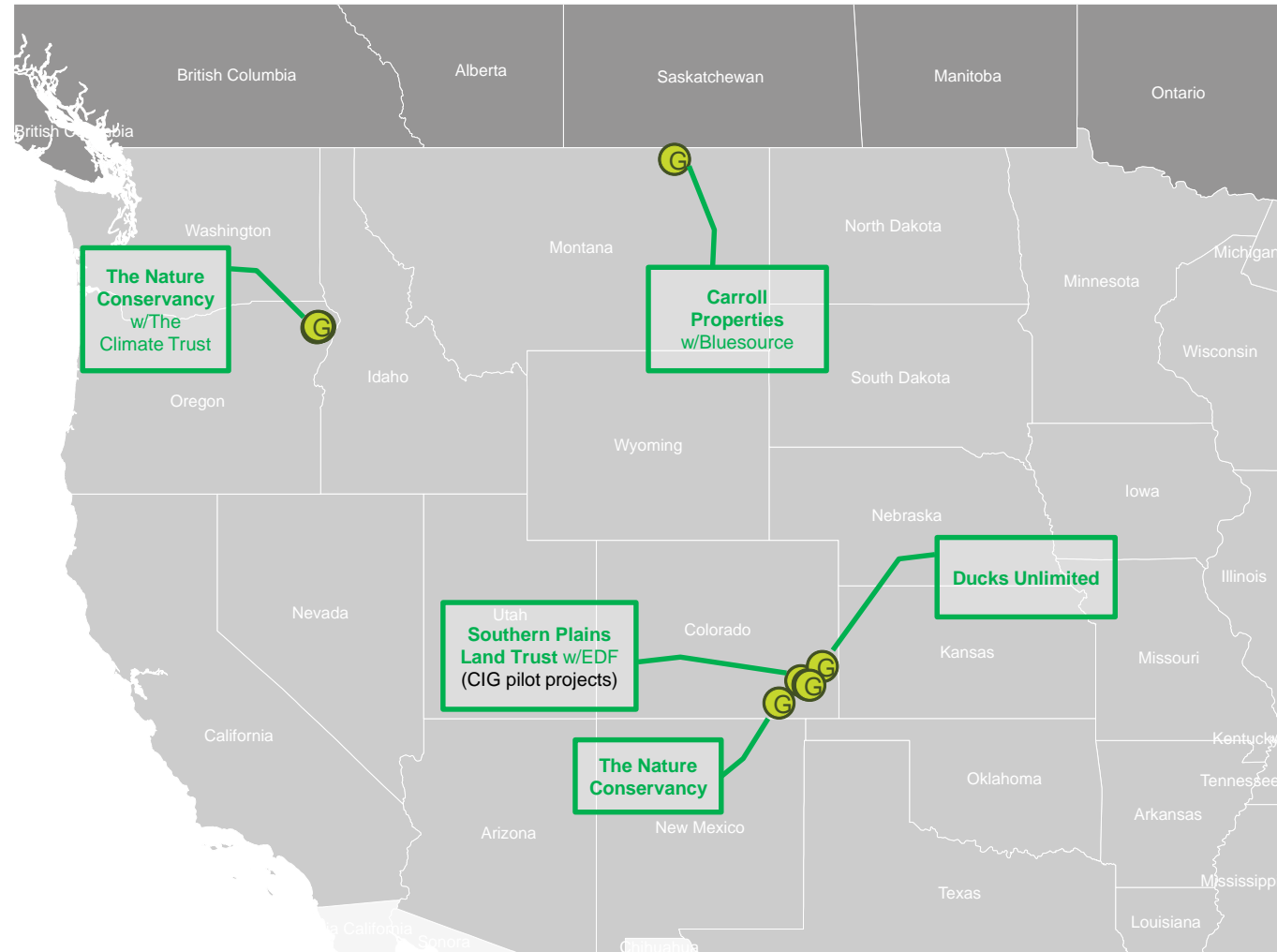
- Ineligible Stratum
- 1.74 - 3.50
- 1.07 - 1.74
- 0.54 - 1.07
- 0.02 - 0.54

- MLRA Coarse 10
- MLRA Coarse 30



Existing projects

- Registered (verified) projects (3):
 - Southern Plains Land Trust, Colorado (2, co-op)
 - Developed by EDF, ca. 8,200 CRTs/yr
 - May Ranch, Colorado (1)
 - Developed by Ducks Unlimited, ca. 10,000 CRTs/yr
- Listed projects (6):
 - Southern Plains Land Trust, Colorado (1, co-op)
 - Developed by EDF, ca. 2,000 CRTs/yr
 - The Nature Conservancy, Oregon (3, co-op)
 - Developed by The Climate Trust, ca. >6,300 CRTs/yr
 - Carroll Ranch, Montana (1)
 - Developed by Bluesource, ca. 12,100 CRTs/yr
 - JE Canyon Ranch, Colorado (1)
 - The Nature Conservancy, ca. 6,500 CRTs/yr



Example 1: pilot cooperative (CARC0001)

Project ID	CAR1237	CAR1238	CAR1299
Project name	Raven's Nest Nature Preserve	Heartland Ranch Phase 1	Heartland Ranch Phase 2
Landowner	Southern Plains Land Trust (SPLT)		
Easement holder	Colorado Open Lands		
Project Owner	Southern Plains Land Trust (SPLT) (landowner)		
Technical assistance	Provided by Environmental Defense Fund under USDA NRCS grant		
Start date	December 21, 2015	July 20, 2016	February 26, 2018
Project area	265 acres (107 ha)	1,895 acres (767 ha)	2,698 acres (1,092 ha)
Estimated annual credits	2,000 tCO ₂ e	6,300 tCO ₂ e	2,500 tCO ₂ e
Project land use activities	Bison grazing, outdoor education		
Status	Verified June 2018. Undergoing 2 nd verification.	Verified June 2018. Undergoing 2 nd verification.	Undergoing 1 st verification.

Example 2: May Ranch

Project ID	CAR1261
Project name	May Ranch Avoided Grassland Conversion
Landowner	May Farms
Easement holder	Colorado Cattleman's Agricultural Land Trust
Project Owner	Ducks Unlimited, Inc. (third party)
Technical assistance	N/A
Start date	December 14, 2016
Project area	14,546 acres (5,887 ha)
Estimated annual credits	10,000 tCO ₂ e
Project land use activities	Livestock grazing
Status	Verified June 2018.

Example 3: Carroll Properties

Project ID	CAR1247
Project name	Bluesource - Carroll Avoided Grassland Conversion Project
Landowner	Carroll Properties
Easement holder	The Nature Conservancy
Project Owner	Carroll Properties (landowner)
Technical assistance	Bluesource
Start date	June 16, 2016
Project area	~16,000 acres (6,475 ha)
Estimated annual credits	12,000 tCO ₂ e
Project land use activities	Livestock grazing
Status	Nearing completion of 1 st verification.

Example 4: TNC cooperative (CARC0002)

Project ID	CAR1259	CAR1260	CAR1284
Project name	Lightning Creek Ranch	BNW West	BNW Ranch
Landowner	Probert Ranches, LLC	The Nature Conservancy	BNW Ranch Properties, LLC
Easement holder	The Nature Conservancy	TBD	TBD
Project Owner	The Nature Conservancy (easement holder & landowner)		
Technical assistance	The Climate Trust (Cooperative Developer)		
Start date	March 31, 2017	May 9, 2017	
Project area	4,112 acres (1,664 ha)	1,327 acres (537 ha)	4,098 acres (1,658 ha)
Estimated annual credits	TBD	1,625 tCO ₂ e	4,780 tCO ₂ e
Project land use activities	Livestock grazing		
Status	Preparing for 1 st verification.		

Example 4: JE Canyon Ranch



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Project ID	CAR1307
Project name	JE Canyon Ranch
Landowner	The Nature Conservancy
Easement holder	Colorado Cattlemen's Agricultural Land Trust
Project Owner	The Nature Conservancy (landowner)
Technical assistance	N/A
Start date	November 14, 2017
Project area	7,235 acres (2,928 ha)
Estimated annual credits	6,500 tCO ₂ e
Project land use activities	Livestock grazing
Status	Not yet entered initial verification

CAVEAT: the Reserve is not an exchange, and does not have visibility to financial transactions

- Estimated carbon credit prices:

Market	Scope	Price Range
Compliance	California ARB <i>allowances</i>	US\$15.45 (CA\$20.29) ¹
Compliance	California ARB <i>offsets</i>	Up to US\$14+ (CA\$18+) ¹
Voluntary	Global	US\$0.50 – \$50 (CA\$0.66 – \$66) ²
Voluntary	US Grassland	US\$4 – \$8 (CA\$5 – \$10) ³

1. *Californiacarbon.info, November 2018 (offsets prices extrapolated from quoted discount of 7.6%)*
2. *Ecosystem Marketplace 2018*
3. *Personal communications with grassland project developers*

More information

climateactionreserve.org/how/protocols/grassland

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