Workgroup Meeting 2

Grassland Project Protocol

CLIMATE ACTION RESERVE

September 3, 2014

12:30 – 3:00 pm PDT

Agenda

Time	Item #	Description
12:30	1	Introduction and scheduling
12:45	2	Development update
1:30	3	Stratification
2:00	4	Baseline determination and modeling
2:45	5	Next steps

Item 1

INTRODUCTION & SCHEDULING

Attendance

Reserve Staff & Contractors	Workgroup Members	
Max DuBuisson	Adam Chambers	
Anna Schmitz	Richard Conant	
Heather Raven	Joe Fargione	
	Billy Gascoigne	
Tim Kidman (WSP)	Teresa Koper	
Dr. Keith Paustian (CSU)	Robert Parkhurst	
	Richard Scharf	
	Patrick Splichal	
	Joel Brown	

Upcoming meetings

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- **Tuesday, Oct 21st, 9:00-3:00** (week 25)
  - Los Angeles
  - Date is confirmed unless there are serious issues
  - Discuss a rough outline of the full protocol
- **Thursday, Dec 4th, 12:30-3:00** (week 31)
  - Webinar
  - Discuss any remaining issues prior to finishing a draft for the official workgroup comment period

Item 2

DEVELOPMENT UPDATE

Timeline

- Now
  - Reserve staff working on protocol structure
  - Contractor developing approach to stratification and baseline modeling
- September – October
  - Develop rough protocol outline and discuss at in-person meeting
  - Baseline modeling
- November – December
  - Develop workgroup draft for comment

Applicability

- Geographic eligibility will be limited by the data available for development of default values
  - MLRAs that contain both cropland and grassland NRI sites
- California?
  - No clear threat of conversion from grassland to annual cropland, so the model output would not be relevant. Need suggestions for specific baseline conversion scenarios that may be possible to model.

Performance standard

- “Cropland premium” = the difference between crop and pasture rent, compared to the pasture rent
- Current approach: full appraisal from certified professional
  - Cropland premium of X-Y% is eligible with Z% discount
  - Cropland premium of >Y% is eligible, no discount
- Possible hybrid approach: threshold based on rental rates at the ag district level to set default determinations of eligibility
  - Compare cash rent rate of grassland and non-irrigated* cropland
  - Cropland premium of X-Y% is eligible with Z% discount
  - Cropland premium of >Y% is eligible, no discount
  - Appraisal option remains as an alternative
  - ** could also compare irrigated values at higher threshold (some areas don’t have non-irrigated cropland)*

Irrigation

- Irrigated cropland has a much higher value than non-irrigated cropland.
  - Therefore it would need a separate, higher PS threshold
- In some cases, the value as pasture will lie somewhere between irrigated and non-irrigated cropland (i.e. arid regions)
- What about areas where access to water is limited? PD must prove ability to secure rights?

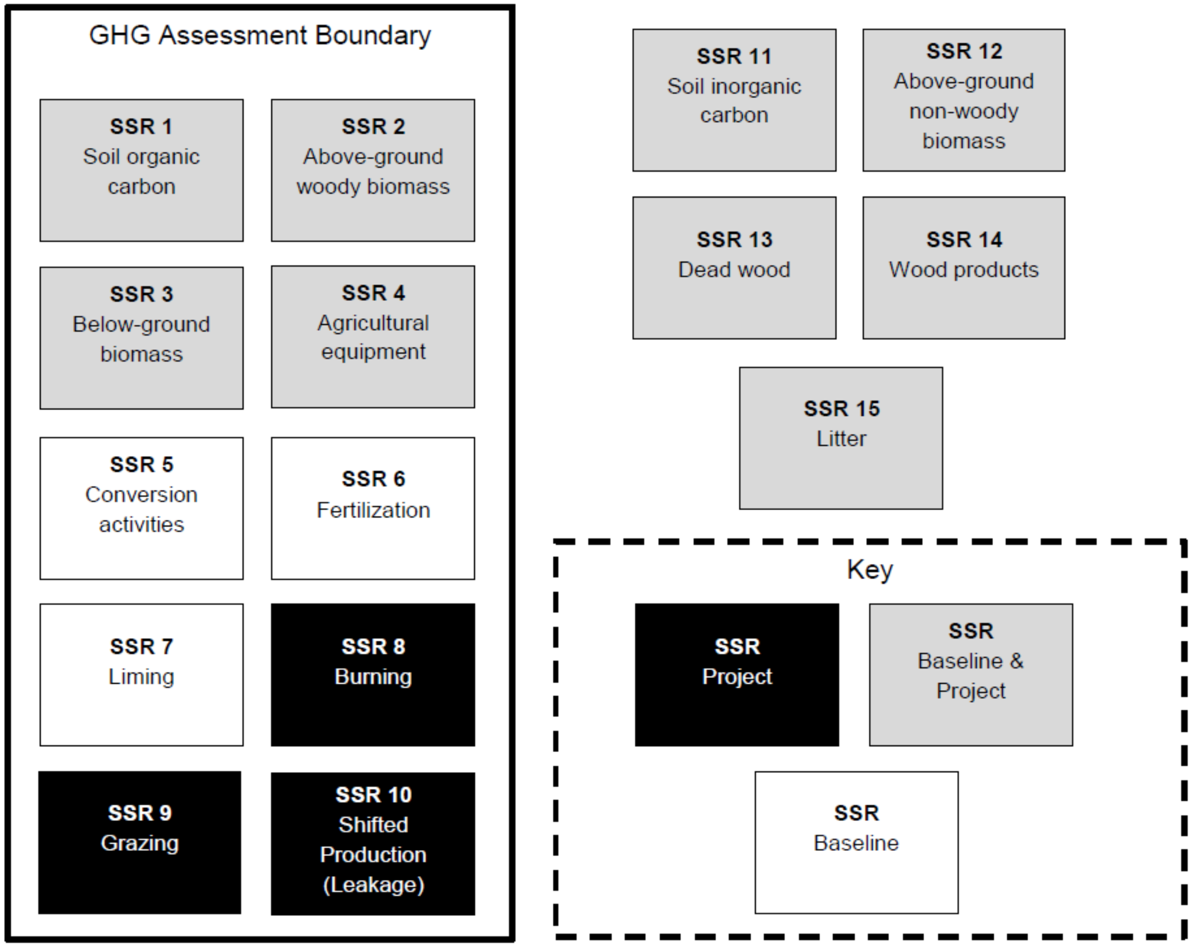
Legal requirement test

- Crop insurance eligibility letter
  - It appears that this requires specific details of the crop system to be used (which may not be known), and does not necessarily assess any legal barriers to conversion
  - Not clear that it will be a useful or feasible tool

Item 3

STRATIFICATION

GHG assessment boundary



Stratification approach

- Geography and associated climate
  - 278 MLRAs
  - Not all will be included
- Soil texture
  - Sandy, loamy, clayey
- Previous land use
  - Grassland for 10-30 yrs, or grassland for 30+ yrs

Results of stratification

2.4 Results of Stratification

In total, this protocol stratifies the U.S. into X unique strata based on the three variables previously discussed. The naming convention for each strata is defined as follows:

X_Y_Z

where,

		range
X =	the numbered designation of the MLRA in which the stratum is found	1 – 278
Y =	the soil texture classification	sandy, loamy, clayey
Z =	the minimum year threshold for the previous land use	10, 30

Table 2 demonstrates this naming convention for two sample strata:

Table 2. Naming convention for project eligible strata

Stratum	MLRA	Soil Texture	Previous Land Use
1_Loamy_10	1 - Northern Pacific Coast Range, Foothills, and Valleys	Loamy	Greater than 10, but less than 30 years continuous grassland or pastureland
150A_Clayey_30	150A - Gulf Coast Prairies	Clayey	Greater than 30 years continuous, long-term permanent grassland or pastureland

Define project area by stratum

- Projects will determine which strata are contained within the project area, then identify the number of acres in each stratum
- Reserve will provide GIS shapefiles of strata
- Projects will use GIS to determine areas
- Each stratum will have its own default emission factors

Item 4

BASELINE DETERMINATION & MODELING

Model & data sources

- DAYCENT model
  - Same approach as US GHG inventory
- SSURGO: soil texture
- NRI: land use status, condition, trends over time
- CTIC: tillage practices
- ERS: crop and livestock management practices
- NASS: crop area and yields (for QC)

MLRAs

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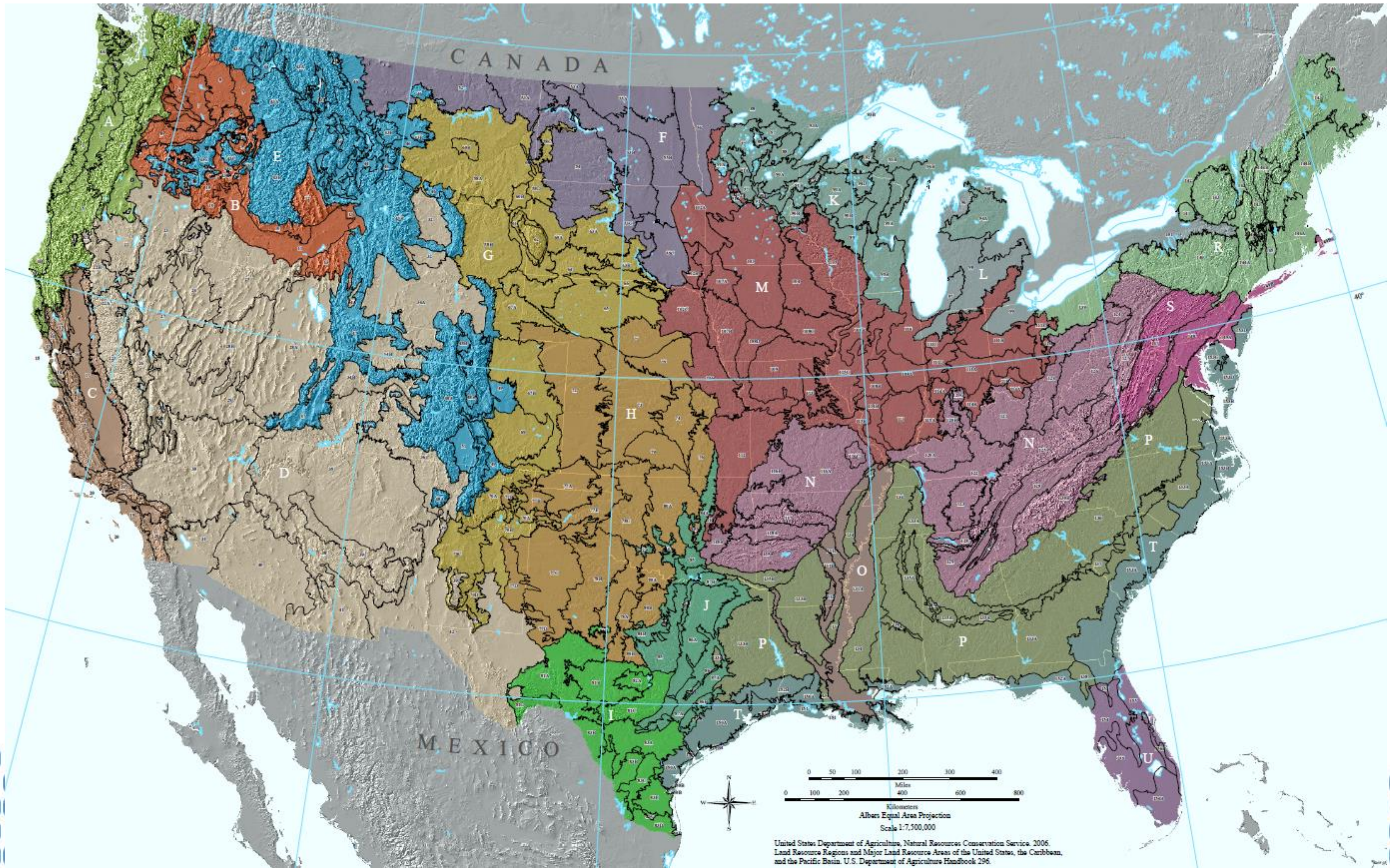

Geographic coverage

- MLRA = major land resource area
  - Geographically associated land resource units
- Some MLRAs will be excluded
  - Too few grassland or cropland sites to allow for modeling certainty
  - Too few grasslands for projects (grassland below Y%)
    - Comments?
  - No threat of conversion (cropland below X%)
    - Comments?

Conceptual overview

- No single baseline scenario for project
  - Multiple potential baseline scenarios form a composite baseline for each super-strata (unique combination of MLRA and soil texture)
  - Potential baselines defined based on actual practices within super-stratum
  - Super-strata divide U.S. based on suitability for different crops
- Modeling performed for each stratum, evaluating multiple grassland data points each modeled with randomly drawn potential baseline scenarios

Adjustments for future changes

- Assume advances in fertilizer use efficiency
  - 1% annual decline in application rates
  - This is conservative, as fertilizer application rates have not showed this type of improvement
- Assume continued adoption of conservation tillage
  - 1.5% annual increase in use of conservation tillage
  - This is the average increase found by USDA ERS

Baseline modeling approach

- For each stratum, all NRI grassland points are modeled independently:
  - Carbon pools are spun-up using historical data
  - Baseline practice is pulled from potential baseline scenarios based on probabilities, then combined with weather data
- Model run for 25 years (crediting period)
- Extract outputs in 5 year increments to smooth inter-annual variability, then divide by 5 to get annual factor
- All NRI points within stratum are combined to obtain composite emission factor

Example

Table 2. Example crop systems and resulting probabilities in baseline

NRI Data Point	Tillage Practice	Irrigation Practice	Cropping System	Expansion Factor	Probability
#1	No Till	Irrigated	corn, soy, corn, soy, fallow	100	20%
#2	Conservation Till	Not Irrigated	corn, soy, fallow, wheat, soy	150	30%
#3	Conservation Till	Irrigated	wheat, fallow, wheat, wheat, fallow	50	10%
#4	Standard Till	Not Irrigated	corn, soy, fallow, wheat, soy	200	40%

- Grassland NRI data points: A, B, C,…
- Cropland points randomly assigned, weighted by the probability above, to the grassland data points
- Model runs: A3, B2, C4,…
- Outputs are averaged together to create a single emission factor

Quantification

Table 3. Sample output of emission factors

Stratum	MLRA	Soil Texture	Previous Land Use	Annual Emission Factor ($mtCO_2e/acre$)				
				Year 1-5	Year 6-10	Year 11-15	Year 16-20	Year 21-25
A				B				

If a project has 1,000 acres in stratum A:
Annual baseline emissions = 1,000 * B

Benefits

- Objectivity. No need to demonstrate uncertain counterfactual baseline scenario. No need for verifier to confirm validity of baseline scenario.
  - Reductions in subjectivity also reduce opportunities for “gaming” the selection of a baseline scenario
- Simplicity. Emission factor approach results in streamlined quantification.
- Reduced costs. Reduced effort for project development and verification.

Drawbacks

- Reduced project specificity
  - While the approach will be accurate in the aggregate once there are multiple projects, it will not give the same result as a single baseline scenario
  - May contradict the baseline scenario that the project developer believes is most likely
  - *However, the composite approach does account for the distinct possibility that the cropping system and management for a project area may have changed over time in the baseline scenario*

Item 5

NEXT STEPS

Next steps

- Any written comments related to today's discussion should be submitted by next Wednesday (Sept 10th)
  - E-mail Anna (aschmitz@climateactionreserve.org)
- Make arrangements for in-person meeting
  - Look out for e-mail with additional details
  - Expect to receive materials for that meeting at least a week in advance

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