Grassland Project Protocol
Workgroup Meeting 3

October 21, 2014

Call-in: (646) 307-1706
Code: 712-112-843
Roll call

- Reserve staff
- Contractors
- Workgroup

<table>
<thead>
<tr>
<th>Workgroup Members</th>
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<tr>
<td>Adam Chambers</td>
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<tr>
<td>Richard Conant</td>
<td>Phone</td>
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<tr>
<td>Joe Fargione</td>
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<td>Billy Gascoigne</td>
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<tr>
<td>Teresa Koper</td>
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<td>Robert Parkhurst</td>
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<td>Richard Scharf</td>
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<td>Patrick Splichal</td>
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<td>Joel Brown</td>
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# Agenda

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<tr>
<th>Item #</th>
<th>Expected time</th>
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<tbody>
<tr>
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<td>1:30 – 2:30</td>
<td>Ownership and aggregation</td>
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<td>2:30 – 2:50</td>
<td>Time cushion</td>
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<td>6</td>
<td>2:50 – 3:00</td>
<td>Next steps</td>
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<td>3:00</td>
<td>Adjourn</td>
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Today’s goals

1. Assess the overall direction of the GPP
2. Consider the major policy and technical decisions that we are proposing
3. Begin to evaluate the component parts as a whole
4. Provide feedback on specific items as requested by staff
What we won’t discuss today

Items to be tabled until the next meeting (unless we end up with extra time):

• Monitoring
• Project Implementation Agreement
• Natural grassland management
• Payment stacking
• Reporting and verification details
Process

• Staff will present summary slides covering the agenda items
• We will have specific questions for discussion
• WG members are welcome to raise their own questions or provide relevant feedback
• If an issue comes up that we will discuss later, it will go in the “parking lot”
Development update

• **Next meeting:** 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

• **Now:**
  – Reserve staff building the protocol and finalizing major decisions
  – Contractor developing quantification and preparing to model

• **November – December**
  – Contractor delivers model results and quantification guidance
  – Reserve develops official workgroup comment draft
Protocol table of contents

1. Introduction
2. Project Definition
3. Eligibility
4. GHG Assessment Boundary
5. Quantification
6. Monitoring
7. Reporting
8. Verification
9. Glossary
10. References

Appendices
A. Development of Performance Standard
B. Development of Standardized Parameters and Emission Factors
C. Default Parameters and Emission Factors
D. Example Project Area Map
Agenda Item 3

PROJECT DEFINITION & ELIGIBILITY
Project definition

• A planned set of activities designed to prevent emissions of GHGs to the atmosphere through conserving grassland carbon stocks and avoiding cultivation activities on an eligible project area
• Project area must be grassland that is suitable for conversion
• “Grassland”
  – An area of land dominated by native 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.
Project activities

• Prevent conversion of grassland to cropland through permanent conservation (easement or public ownership)
• Must meet eligibility requirements
• Does not employ synthetic fertilizer amendments
• Does not require artificially-altered drainage or irrigation to be maintained as grassland
• No liquid manure management
• Land not previously registered as a Grassland project
• May involve seeding, organic fertilizer, or grazing
Defining project area

- Meets eligibility requirements
- Project boundaries must be described with a georeferenced map
- Boundaries must exclude areas which do not meet eligibility requirements (e.g. mandatory buffers, easements)
- Contiguous/continuous areas
  - Open question regarding when a single project must be split into multiple projects
Applicability

• Conterminous United States and tribal areas
• “Super strata” where the contractor has enough data to develop default values
  – Super strata = combination of MLRA and soil texture
  – Need sufficient NRI sites for grassland and cropland
• Natural grassland
  – No active management other than grazing below some set threshold (NRCS guidance?)
  – Continuous grassland cover for at least 10 years prior to start
California

- We are attempting to accommodate California and the ARB program wherever possible
- Can develop a field crop emission factor like the rest of the country
- Models are currently unable to handle quantification of orchards and vineyards.
  - Biomass dynamics are not well studied. Need more data to refine allometric equations.
  - Management variables can have a significant impact on direction and magnitude of carbon changes, and are not well studied.
- Perhaps financial and suitability screens will identify pockets of conversion threat
  - Currently the financial additionality threshold map looks promising
Start date and crediting period

• Start date
  – Action of committing project area to conservation through recording of easement or transfer to public ownership

• Crediting period 25-30 years
  – Other grassland (ACR, IPCC) assume 20 years to move from one equilibrium to another
  – Evidence that 20 years is too short for some systems
  – ARB FPP crediting period is 25 years
  – Modeling is run on 5 year increments, so we will be able to see whether the emission factors past 25 years are high enough to justify continued project reporting and monitoring
Permanence

• 100 years from credit issuance for sequestered tonnes
  – E.g. credit issued in year 10 is maintained until year 110
  – Not yet clear whether we can differentiate soil carbon tonnes from avoided emission tonnes

• Reversals: release of stored carbon that has already been credited
  – Avoidable reversals: release that is preventable (i.e. tilling, project termination)
  – Unavoidable reversals: release that is natural or otherwise out of the control of any Grassland Owner

• Avoidable reversals will be repaid by the Project Developer, not a buffer pool
Unavoidable reversals

• What are unavoidable reversal risks to grasslands?
  – Fire, flood, legal change…
• May be insured against through a mandatory buffer pool
• Buffer pool
  – Identify reversal risk for soil carbon tonnes (% of credits)
  – Shared pool among all GPP projects
  – Contributions not returned to projects except in the case of a reversal
• Open question as to whether there are actually significant “unavoidable” reversal risks to grasslands. If not, then no buffer pool will be required
Performance Standard Test (PST)

• Four aspects to determining eligibility
  1. Financial additionality threshold
  2. Suitability determination
  3. Must generate soil carbon emission reductions
  4. Limits on payment stacking
PST: Financial

• Forest avoided conversion protocol requires full appraisal from certified professional
  – Compare forest value to identified conversion value
  – Conversion premium of 40-100% is eligible with 50% discount
  – Conversion premium of >100% is eligible, no discount

• Concerns that this is too expensive and uncertain for grassland projects

• Propose to move to a standardized threshold for additionality
PST: Financial

- Standardized threshold based on rental rate differences
  - Compare cash rent rate of grassland and cropland
  - Non-irrigated cropland premium of $$-$$$ is eligible with 50% discount
  - Non-irrigated cropland premium of >$$ is eligible, no discount
  - Irrigated cropland premium of >$$ is eligible, must prove ability to irrigate
  - Appraisal option remains as an alternative if can’t meet standard

- Likely need to consider impact of additional revenue from payment stacking as part of PST
PST: Updates to financial threshold

- New county rent rate data are issued by the NASS every September
- Propose averaging three years of data at a time to develop each new threshold map
- New maps/tables issued by the Reserve every October and apply to projects in the following calendar year
  - **Example**: October 2015 the Reserve issues a list of eligible counties based on the average rent rates for 2014 and 2015. This list applies to projects with start dates on or after January 1, 2016.
PST: Premium vs conversion rate

Conversion Rate 2008-2012 (% change)

Mean Non-Irrigated Cropland Premium 2008-2012 ($/ac)

y = 0.0976x + 1.8449
R² = 0.1347

y = 4.2086ln(x) - 7.7666
R² = 0.1728
PST: Setting the threshold

<table>
<thead>
<tr>
<th>Equation</th>
<th>Linear trendline</th>
<th>Logarithmic trendline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$y = 0.0976x + 1.8449$</td>
<td>$y = 4.2086\ln(x) - 7.7666$</td>
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<tr>
<td>$R^2$</td>
<td>0.1347</td>
<td>0.1728</td>
</tr>
<tr>
<td>x intercept</td>
<td>($18.90)</td>
<td>$6.33$</td>
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</table>

<table>
<thead>
<tr>
<th>Conversion Rate (%)</th>
<th>Linear Trendline $x$ intercept</th>
<th>Logarithmic Trendline $x$ intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5%</td>
<td>($13.78)</td>
<td>$7.13</td>
</tr>
<tr>
<td>1%</td>
<td>($8.66)</td>
<td>$8.03</td>
</tr>
<tr>
<td>1.5%</td>
<td>($3.53)</td>
<td>$9.04</td>
</tr>
<tr>
<td>2%</td>
<td>$1.59</td>
<td>$10.18</td>
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<tr>
<td>2.5%</td>
<td>$6.71</td>
<td>$11.47</td>
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<td>3%</td>
<td>$11.84</td>
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<td>3.5%</td>
<td>$16.96</td>
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<td>4%</td>
<td>$22.08</td>
<td>$16.38</td>
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<tr>
<td>4.5%</td>
<td>$27.20</td>
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<td>5%</td>
<td>$32.33</td>
<td>$20.77</td>
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<td>5.5%</td>
<td>$37.45</td>
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<td>$42.57</td>
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<td>6.5%</td>
<td>$47.70</td>
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<td>7.5%</td>
<td>$57.94</td>
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<td>8%</td>
<td>$63.06</td>
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<td>8.5%</td>
<td>$68.19</td>
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<td>9%</td>
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<td>$53.73</td>
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<td>9.5%</td>
<td>$78.43</td>
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<tr>
<td>10%</td>
<td>$83.56</td>
<td>$68.14</td>
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</table>
PST: Example financial map 1

- Counties in red represent areas where pastureland is more valuable than cropland.
- Data substitution has been applied. Where available, the value for “Other (Combined) Counties” for that ASD was used to fill in a missing value.
- “No Data” may represent areas where irrigation is required for cropland or where no grazing occurs.
- Can explore some sort of “adjacency” provision to cover “no data” counties in hotspots.
PST: Example financial map 2

- Same map, but without data substitution
PST: Appraisal option

- Appraisal guidelines from Forest Project Protocol
- This would be used for the following circumstances
  - Tribal lands
  - Counties with no data
  - Counties below the eligibility threshold
- Should the appraisal thresholds be the same dollar/acre values as the rental rate thresholds?
  - It seems that land value will have a different magnitude than rental rate, making such a comparison incorrect
  - Could run a similar analysis of land value survey to determine threshold, but those data are only available at state level
PST: Suitability

• Must be able to prove that the project area is suitable for conversion
• Feedback that Land Capability Classification is not sufficient for this purpose
• Request feedback and direction from WG
PST: Emissions

- Project must generate soil carbon emission reductions
- Determined using the emission factor tables
  - Strata with emission factors that would generate a net gain of soil carbon due to conversion are not eligible
  - Tables in Appendix C will list all strata and identify them as eligible or ineligible
Legal Requirement Test

• Must be no legal mandate requiring conservation or preventing crop cultivation
  – See also section on payment stacking

• Programs which may impede legal ability to convert:
  – Habitat Conservation Plan (FWS)
  – Conservation Plan of Operation under Sodbuster Regulations (USDA)
  – State programs (e.g. CA Endangered Species Act permitting)

• Reserve Forest protocol considers these contracted programs to effectively be legal mandates
Regulatory Compliance

- Projects must be in compliance with applicable regulatory requirements
  - Water quality
  - Livestock management
  - Other?
LUNCH BREAK
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Agenda Item 4

GHG ASSESSMENT BOUNDARY & QUANTIFICATION
GHG Assessment Boundary

• Avoided emissions from soil carbon loss
  – Optional woody biomass

• Avoided emissions from conversion and crop production
  – $N_2O$ from fertilizer
  – $CO_2$ from fossil fuels

• Project emissions from grazing (enteric & manure $CH_4$)
  – On a macro scale, it is reasonable to exclude project emissions due to grazing.
  – Assume that the grazing would occur anyway, regardless of project activities, and the overall amount of livestock grazing is not going to change due to project activities
  – Includes limits to grazing intensity
GHG Assessment Boundary

- SSR 1: Soil organic carbon
- SSR 2: Aboveground woody biomass
- SSR 3: Belowground biomass
- SSR 4: Agricultural equipment
- SSR 5: Soil N dynamics and fertilization
- SSR 6: Burning
- SSR 7: Leakage
- SSR 8: Grazing
- SSR 9: Soil inorganic carbon
- SSR 10: Aboveground non-woody biomass
- SSR 11: Dead wood
- SSR 12: Wood products
- SSR 13: Litter
- SSR 14: Liming

Key: SSRs

- Baseline
- Baseline and Project
- Project
Quantification

- Emission reductions are equal to the avoided soil carbon emissions that would have occurred in that year, plus the avoided N$_2$O and CO$_2$ emissions that would have occurred in that year, minus the project emissions that actually occurred in that year.
  - Optional accounting for avoided loss of woody biomass

- Discounts
  - Uncertainty of baseline conversion ($DF_{conv}$)
  - Uncertainty of modeling future practices and climate ($DF_\sigma$)
Equations

\[ ER = BE - PE \]

**Equation 5.1**
Emission reductions

---

Baseline Emissions

- **BE**
  - **Equation 5.2**
    - Baseline emissions

  - \( OC_{RL,PR} \)
    - **Equation 5.3**
      - Baseline organic carbon emissions

  - \( N_2O_{RL,PR} \)
    - **Equation 5.4**
      - Baseline \( N_2O \) emissions

  - \( CO_{2,RL} \)
    - **Equation 5.5**
      - Baseline \( CO_2 \) emissions

  - \( ABB_{RL,PR} \)
    - **Equation 5.6**
      - Baseline emissions from aboveground woody biomass

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Project Emissions

- **PE**
  - **Equation 5.7**
    - Project emissions

  - \( BU_{PR} \)
    - **Equation 5.8**
      - Project emissions from burning

  - \( CO_{2,PR} \)
    - **Equation 5.9**
      - Project emissions from fossil fuels and electricity

  - \( FE_{PR} \)
    - **Equation 5.10**
      - Project emissions from fertilizer use

  - \( LE \)
    - **Equation 5.11**
      - Project emissions due to leakage
Stratification

- Each project area is stratified based on three aspects:
  - Major Land Resource Area (MLRA)
  - Soil texture (Clayey, Loamy, Sandy)
  - Prior land use (10-30 yrs grassland, or >30 yrs grassland)

- Stratum naming
  - “[MLRA]_[SOIL TEXTURE]_[PRIOR LAND USE]”
  - Example: “1_Loamy_10”
    - MLRA 1 (Northern Pacific Coast Range, Foothills, and Valleys)
    - Soil: Loamy
    - Land use: >10 but <30 years continuous grassland cover
Soil carbon emissions

• **Preliminary** estimate by the contractor
  – Used 2012 US GHG Inventory data of sites which were converted from grassland to cropland between 1980 and 1997
  – Extracted estimate of soil carbon loss (or gain) over first 10 years post-conversion

• Midwest, Mid-South, parts of West Coast and Lake States
  – Clayey and loamy soils lost 0.5 – 1.9 tCO$_2$/acre/year
  – Sandy soils were less dramatic, around 0.3 – 0.9 tCO$_2$/acre/year
  – Other regions were less significant, or showed soil carbon gains due to increased productivity from irrigation

• Caveats
  – Methodology to extract this data was much less robust than the systematic modeling that will be performed for final emission factors
  – Subsequent years (10-25) expected to be lower, on average
  – Emission sources other than soil C not included
Discount factors

- **DF_{conv}**
  - Risk of conversion assumption
  - 0% for counties above $$$ threshold
  - 50% for counties between $$ and $$$

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

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<tbody>
<tr>
<td><strong>Discount Factor (DF_{\sigma})</strong></td>
<td>x%</td>
<td>(x+y)%</td>
<td>(x+2y)%</td>
<td>(x+3y)%</td>
<td>(x+4y)%</td>
</tr>
<tr>
<td><strong>Example: x=1, y=1</strong></td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
</tr>
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Woody biomass

• Optional quantification for sites which would have lost a significant amount of woody biomass due to conversion
• Not accounting for sequestration over time
• Question: what is the fate of woody biomass removed from converted grasslands?
  – Non-tree: Shrubs are likely left between fields, burned, chipped, or otherwise disposed in a manner that would release the carbon in a relatively short timeframe (0-5 yrs)
  – Trees: If wood products, then not much carbon release. If chipped or burned, then immediate release. Unlikely trees would be left on fields
• Quantification undetermined at this time
Project emissions from burning

• Reserve would like workgroup input on burning emissions
  – Is prescribed burning likely to occur?
  – What approach is recommended?
  – IPCC default factors are available based on the kg of dry matter combusted in the fire
  
  • Ex. If a fire burns 10 acres with 600 lb/acre dry matter, that would generate project emissions of 4.3 - 5.1 tCO₂e, or about 0.5 t/ac

<table>
<thead>
<tr>
<th>Units in g/kg dry matter combusted</th>
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<tr>
<td>CH₄</td>
</tr>
<tr>
<td>2.3 (±0.9)</td>
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</table>
Leakage

• Composite baseline scenarios do not lend themselves to project-specific determinations of leakage
• Determining leakage for AGC projects is complex and highly uncertain
• Propose to use 20% leakage discount, similar to ACR ACoGS
  – Subtract 20% of calculated BE
• Reserve staff are continuing to research this issue
Agenda Item 5

OWNERSHIP & AGGREGATION
Ownership

• Grassland Owner: an entity with ownership rights to the project area, especially the soil carbon
  – Single project may have multiple owners
  – Open question regarding idea of *de minimis* ownership

• Entities which do not own the land, but who own development rights which could impact the soil carbon must be included as “Grassland Owners”
  – E.g. mining, drilling, wind power
Project Developer/Aggregator

• Propose to set this up similar to Forest aggregation
  – Each project area is a separate project, with separate quantification, but pooled resources when it comes to verification and registry processes

• Project Operator = the grassland owner

• Project Aggregator = a project developer who carries out the carbon work, coordinates the verification, deals with the registry

• Project Developer = the PO if it’s an individual project, or the PA if it’s an aggregate

• Think of the Operator as an “OPO” and the Aggregator as an “APD”

• Find some way to avoid account fees for individual projects and project operators (i.e. one fee for the aggregate and the aggregator)
Ownership structures

Example 2.A: Generic AGC project structure

- Grassland Owner
- Project Operator
- Project Aggregator and/or Project Developer
- Climate Action Reserve

Example 2.B: Individual (non-aggregated) project structure

- Other Grassland Owners
- Grassland Owner/Project Operator/Project Developer
- Climate Action Reserve

Example 2.C: Project aggregate structure

- Other Grassland Owners
- Grassland Owner/Project Operator
- Grassland Owner/Project Operator
- Grassland Owner/Project Operator
- Project Aggregator/Project Developer
- Climate Action Reserve
Aggregates

- VB will visit a certain % of projects each year, subject to a minimum number of sites
- Projects which make up >X% of emission reductions are required to be visited annually?
- Single verification process and report that covers the entire aggregate (i.e. similar to joint reporting under a single multi-project OPDR, as in ARB Rice Protocol)
Agenda Item 6

NEXT STEPS
Next steps

• If you would like to submit written comments on what we have proposed so far, please prepare them as a standalone document, preferably organized by protocol section, and submit them by Oct 31st
  – Email Anna (aschmitz@climateactionreserve.org)

• Reserve staff will prepare the official workgroup comment draft
  – Comment period will be 30 days
  – Expect to receive the draft during the first week of January
  – Staff will respond to all comments

• Public comment period will begin mid-March
Contact Information

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(213) 891-6932

THANK YOU!

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

• Monitoring to prevent overgrazing
  – Updated grazing management plan
  – Monthly monitoring of grazing activities
    • Livestock category
    • Livestock population
    • Description of rotational activities

• Monitoring project emissions (monthly)
  – Acres burned and cause of fire(s)
  – Purpose, type, and quantity of fossil fuels used
  – Purpose, source, and quantity of electricity used
Monitoring

• Monitoring for eligibility
  – Must prove the prior land use stratum that was chosen
  – Historical remote sensing data, conservation program contracts, tax records, etc.

• Monitoring for woody biomass
  – Initial inventory will likely be something similar to the new Urban Forest protocol, combining remote sensing with a carbon-to-canopy ratio
  – If this pool is quantified, it must be maintained
  – Remote sensing for continued verification, updated carbon-to-canopy ratio periodically to account for biomass changes
Project Implementation Agreement

• An agreement between the Project Operator and the Reserve to maintain the permanence of the Grassland project
• Covers entire project area
• Signed by all Grassland Owners
• Recorded with the deed for the property and transfers to subsequent owners
Natural grassland management

- Forest protocol includes provisions to ensure that forests not only sequester carbon, but that they also provide natural ecosystems
- Should we include similar provisions in Grassland?
- Example requirements
  - Native species
  - Species diversity
  - Management limitations
- Need good resources to identify the components of “natural” grasslands for different areas
PST: Stacking: Credits & payments

• Not allowed to participate in a program which give direct credits for avoided GHG emissions
• No known credit programs that would overlap with the GHG quantification for project activities, but some programs provide credits for avoided conversion
• Other than endangered species habitat credits, are there other ecosystem services markets which might provide credits for avoided grassland conversion?
PST: Stacking: Conservation programs

- If you pursue payment concurrent with project initiation, it is not a problem (same year)
  - No discounting of CRTs due to receipt of payments (i.e. RCPP payment stacking policy; not NMPP payment stacking policy)
  - Some conservation programs can support permanence
- Projects that are already participating in conservation programs prior to initiation are either:
  - (a) not eligible?
  - (b) eligible with 50% discount?
- If you exit the conservation program during the project crediting period, should you be able to cease the discount?
- If you were in a conservation program but your participation ends prior to project initiation, it is not a problem
PST: Stacking: Programs to consider

- Grassland Reserve Program (GRP)
- Agricultural Conservation Easement Program (ACEP)
- Conservation Reserve Program (CRP)
- Environmental Quality Incentives Program (EQIP)
- Conservation Stewardship Program (CSP)
- Wetlands Reserve Program (WRP)
- Farm and Rangelands Protection Program (FRPP)
- Wildlife Habitat Incentive Program (WHIP)
- Others…
Reporting

• Annual reporting
  – Option for 24-month cycle for projects/aggregates generating less than 25,000 emission reductions annually

• Reporting should cover exactly 12 months at a time, beginning with the project start date
  – We could be flexible on this requirement, offering sub-annual verification
  – The default emission factors are calculated annually
  – It would be possible to pro-rate for sub-annual reporting, if this is important to include
Verification

• Annual verification
  – Option for 24-month cycle for projects/aggregates generating less than 25,000 emission reductions annually

• Initial verification must include site visit
  – Possibility to employ remote sensing to reduce need for annual site verification
  – Initial verification could cover up to 24 months of reporting

• Remote sensing
  – Remote sensing can be used to confirm that the site has not been converted
  – It could also be used in the inventory of aboveground woody biomass, with some sort of ground-truthing for confirmation