SUMMERFALLOW REDUCTION QUANTIFICATION PROTOCOL SCIENCE CONSULTATION WORKSHOP – RECORD OF DISCUSSION

NOVEMBER 18, 2008 9:00 – 3:00PM

- Workshop focus on and achieve, either during the one-day workshop or through follow-up work, the desired workshop outcomes listed below. These will be used to support the developing Prairie-wide, GHG offset opportunities related to summerfallow reduction operations.
    - Acceptable GHG reductions that can be confidently advanced for summerfallow reduction opportunities building upon established knowledge and science;
    - GHG reductions that can be achieved with confidence, using methodology already identified (with uncertainty ranges), and addressing areas of similarity with current Government Approved Protocol(s) within the Alberta Offset System (i.e. Tillage System Protocol);
    - Assessing and addressing risk of reversal related to practice changes, within the ISO 14064-2 framework;
    - Discussion on a preferred baseline approach;
    - Identification of and priority for areas where research gaps exist and must be addressed.

General Process:

- Use a combination of a literature review in the form of a Technical Seed Document, sharing recent research results, researcher experience and group discussion of ideas and recommendations to achieve the workshop outcomes.
- The day will be spent on understanding the synthesis science and work towards consensus on proposed options for quantification science and links to summer-fallow reduction practices.

LOCATION:
JG O'Donoghue Building
7000 - 113 Street
Boardrooms A&B
Edmonton, Alberta

9:00 **WELCOME AND INTRODUCTIONS** – Review and Confirm agenda
Karen Haugen-Kozyra, Climate Change Central

9:15 **SETTING THE SCENE** – Carbon Offsets and the Policy Approaches in Alberta
Karen Haugen-Kozyra, Climate Change Central

- ***See Presentation***

NOTES:

3 main objectives for today:

- Comfort around inventory methodology
  - Accounting is reflective of the national inventory
- Assess if this protocol is a stand alone or coimplementation with Tillage management protocol
- Discussion of additionality
- Approaches to Quantification

Context

Alberta Offset System Main Requirements:

Projects taken on or after Jan 1, 2002
Must occur in Alberta
Must be quantifiable and measurable
Over and above by law, clearly owned
Must be verified by 3rd party, PEng or CA

Guidance Document (Projects, Verification, Protocols)

Currently 23 approved protocols
Majority of protocols are being adapted into the National system
9 more protocol in review process
Under development
Lots of interest in Agricultural offsets

Gov't Approved Protocols:

Science Based
International compatibility

AB Protocol Development Process:

Phase 1: Planning and complication of technical seed document(s)
Phase 2: Development of protocol

Quantification protocols

Identifying preferred methodologies to quantify GHG reductions/removals
ISO 14064-2 audible Standard general process requirements

ISO 14064-2

Principles: (six)

1. Relevance: select GHG sources and sinks, emission factors, formulate appropriate to environmental integrity

2. Completeness: consider all relevant GHG emissions
3. Consistency: ensure meaningful comparisons
4. Accuracy: reduce bias and uncertainty
5. Conservativeness: conservative assumptions
6. Transparency: to follow the development of the entire process for the public to view and scrutinize

ISO14064-2 quantification framework:

Project:

Describe project
ID GHG Emission sources and sinks

Baseline:

Select baseline scenario (HIstorical, comparison, projection)
ID GHG Emission sources and Sinks

GHG Project Quantification Resources

Canada's National Emissions Inventory:

National GHG accounting and verification system (NXGAVs) for Agriculture
CanAg-Mars for Forestry/Agriculture
Tier I and Tier II Development
2006 Milestone with continuous improvement

Tillage Protocol:

Developed from 2003-2006, adoption rates controversial
Criticism: farmers are getting paid for what they are already doing
Reduce Tillage: is business as usual (no addtionality viewed)
Tillage Protocol uses a reduce rate

Assuring Permanence

Current sequestration protocols use and assurance factor

Questions:

Comment: Commenting on the essence of additionality with the tillage, increases the capture of carbon

10:15 **OVERVIEW OF THE NCGAVS-NATIONAL EMISSIONS INVENTORY WORK** – How the Summerfalllow Coefficients were Derived; Canada's Quantification Approach
Brian McConkey, AAFC

- ***See Presentation***

Presentation: Estimating SOC Chance for Summerfallow reduction in Canada:

Inventory methodology UNFCC on climate change and Kyoto protocol
International reporting CanAG-MARS
Calculates carbon change, bottom up approach
SLC polygons, map able unit, polygon exact location

Basic C Accounting Method:

Annual C stock chng= activity X factor

Above and below ground biomass (plants) not used in summerfallow

Activity: amt of specific land use or mngt change resulting in change in C stocks

See presentation for system schematic for overall function of CanAG-MARS

Canada has ecostratification is a hierarchy

Reporting zone: smallest area for which C chng reported

Close to the ecozone boundaries

Calculated Unit: soil component SLC polygon

ESTIMATORS OF GHG

Basic equations for Factors

$S_{y2}=S_{y1} + {}_{Fy1\text{-}2} * A_{LUMC}$

Key assumption of no C chng with no LUMC

Inherent in IPCC Good Practice Guidance

Calculate factor as relative C chng

Factor is the C chng with LUMC of interest less the C chng without the LUMC

More confidence in relative

Empirical Factors:

Limited number of studies

Fallow reduction has best data

Few measurements of C chng

Difficult to determine duration effect

CENTURY based FACTORS

Consistent approach possible

Long history of use

Open source code

Gives time dependence and duration of affect

Question:

Does the model equal or measure the change from real grass in to cropping?

Response: the models do capture this in the description of the base mix

Century model is not a projection into the future but rather the anthropogenic changes

Results:

Exponential equation fit well generally
Wide variation in simulated change among soil components and SLC polygons
Info used to assess uncertainty at reporting zone scale
Offset system: creation of generalized zone
Parkland: sub humid soil zones, boreal forest, mtn cordillera
Area weighted based on soil texture values

IPCC:
Recommends chg. in C LUMCMax for fallow increase/decrease of 21.1+/- 14.3 Mg/ha for Black/Gray soil zone and 5.6+/-14.3 Mg/ha for Brown/Dark Brown soil zone

Re- analysis of Canadian empirical values:
Brown/Dk Brown soil zone
Cng in C LUMCmax = 23/3 Mg/ha (n=51) rotation

Linearity assumption needed to deal with area chng required the effect of frequency

Thoughts on Quantification for Offset System:
Inventory factors useful for default protocols
    Have effective baseline of no LUMC
    Ensure project emission reductions represent what counted in national inventories
Additivity:
    Means no interaction btwn C change due to summerfallow chng and tillage
        No consensus on this observation that there is no interaction

Questions: Site specific aspects of summerfallow.
Response: Tillage factors include any changes in summerfallow. If you were changing from 50 summerfallow to tillage reduction you have to account for two types of interactions.

Question: Co-implementing
Response: No problem in co-implementing them separately or together

Comments:
- looking at some of the 3-D models, however there is some discontinuity, as there is a challenge to connect the variables involved.
The water and tillage studies do display SOC losses there are no really good wind erosion data models and currently there is no landform data.

- there is an underestimation of soil carbon due to the translocation losses; therefore the SOC (soil organic carbon) would actually be higher in some essence in a real field situation.

Summary:

- Inventory factors useful for default protocols
- Have effective baseline of no LUMC
- Ensure project emission reductions represent what counted in national inventory
- Project-specific factors
- If verified data could be specific to project
- Summerfallow can be reliably detected with thematic (NIR, R, G) images from July

10:45 **N20 CHANGES WITH SUMMERFALLOW REDUCTION –** Comparison with Cropped Conditions

Reynald Lemke, AAFC

- ***See Presentation***

Summary comments:

- Emissions factor now calculated for each year and each ecodistrict based on a relationship with P/PE (precipitation/ potential evaporation)
- Emissions for summer fallow assumed equal to cropped situation (N_2O from "crops" a proxy for N_2O from fallow)
- Emission factor adjusted for landscape position and a modifier included for tillage
- Leaching losses calculated based on relationship with P/PE

11:15 **BUILDING ON EXISTING KNOWLEDGE –** The Summerfallow Technical Seed Document

Rob Janzen, ClimateCHECK

- ***See Presentation***

Correction to the information presented by Brian this morning
New draft values:

	TSOC/ha/yr	TCO2e/ha/yr	TCO2e/ac/yr
Parkland & Semi Arid	0.30	1.101	0.45
Brown, Dk Brown	0.53	1.95	0.79
Grey Black	0.17	0.65	0.26

These values are a clarification to the modeling data.
Most summerfallow is in the Brown, Dk Brown zone, the factor is 0.53 these are draft values.

Slide #43 from Brian McConkey's presentation: value of 0.30 applies to all prairies, Alberta confined to zones to tillage

- at some point these coefficients will diminish over time.
- Coefficients after 20 yrs maybe lower afterwards

1:00 **DEALING WITH BASELINE CONDITIONS, ADDITIONALITY, AND PERMANENCE –** Proposed Approach

Karen Haugen-Kozyra and Rob Janzen

- ***See Presentation***

- Agriculture offset providers have expertise in the demand by investors in the carbon market
- Offsets are not physical, so quality is a function of the rules
- AB and Canada offsets are a quality initiative
- CCAR (California Climate Action Registry) this is voluntary
- Environmental NGO's are quick to criticize lack of credibility
- Public relations require professional credentials and verifiable depth/breadth of technical competence
- Carbon offsets are (like) financial instruments
- Investors are publicly traded companies with more stringent regulatory requirements

Due diligence:

- Tillage offset are only the start as there can be
    - Larger reductions/removals opportunities
    - Integrated projects/protocols
    - Emergence of clean technology

Key Messages:

Use well established science to quantify GHG removal from reduced summerfallow:

- Based upon empirical data implemented in the National inventory report
- Protocol development to focus on implementing science
- Project condition to determine relationship of proposed summerfallow

Canada's National Inventory Report

Canada's GHG Farm and Holos

Holos: computer model for farmers to use to estimate their carbon footprint

Comments:

Wanted to access Holos

Notes that there is a supply chain which connects the base supplier (farmer)

Protocol Design:

GHG reduction = coefficient x activity

Canada's emission inventory is used in the Tier 2 approach

Scope:

Sequestration of carbon
Energy use
N2O emissions (determined are the same from fallow and non fallow)

Project Condition:

Co-implementation with Tillage system protocol

Running both practices
Cannot go from a full summer fallow to chem. Fallow

Acknowledgement of the importance of No Till to facilitate reduced summer fallow
Decrease risk of reversal
No Till results in more water, more cover
No till refers to reduced till as well

Practices:
Change in area of farm in summerfallow,
Summerfallow is from the definition in the Tillage Systems Protocol

Ownership:
As addressed in the Tillage system protocol

Verification:
As addressed in the Tillage system protocol

Tillage System Protocol Approach

- Adjusting Baseline coefficients ensures incremental carbon is rewarded
- Quantification science uses a discounted or adjusted baseline to subtract out carbon accrued to date (2002 to start year), resulting in decreased carbon coefficients
- Focus on the new carbon removals, not the new activities
- Financial additionality must demonstrate that the project would not have occurred
- Baseline condition

  Spatial scale: using the soil zones results in:
  less project development effort needed
  - less likely to incur criticisms concerning additionality
  - single Farmers/sellers
- if project were at the regional level there would be some discounting involved

Questions and Comments:

Q. Clarification on farm specific projects
Response: use the farm specific activity data to use for the protocol

Q. Tillage protocol: there are no specifics on data requirements
1. Will there be more specifically identified in the protocol?
2. Will this constitute more data?

Response:
- Project specific
- Need 3 years of baseline (farm level summer fallow
- 3 years is the best accepted practice, this is the same data that you should already have
- this protocol is designed from technical basis

Comment:
Baseline: tried to find a general reduction , tried to find a frequency
It's a good idea for the farm to use this data

**Poll at this point to consider 5.2.3.1 (see end of record)

Permanence/Reversibility
Must ensure carbon stays in the ground

Federal Context:
Reversal coefficients
Permanent Offset Credit (20-25 yr liability period)
Producer liable (last allowable tonne sequestered)
Temporary Credits (expires after one year), buyer liable

Other options:
Government back the liability with assurance factor based on expert opinion

Risk Assessment:
Frequency of reversal of tillage practices in Dry Prairie and Parkland
Reversal Risk: shaves off carbon discount every tonne created
Reserve holdback enabled by government policy
Backs the liability of soil carbon

Comment: Is there a possibility to re-introduce a sector of farmers that use sweeps? As this qualifies as a reduced till practice therefore can be used for summerfallow?

Comment: Permanence: these are live credits we don't have reversal
Issue of reversibility of an annual basis there is no issue of reversibility
Proposal: Summer fallow protocol to be a Summerfallow Reduction Protocol
Reversibility/reversibility

Assessing Reversal Risk:

No equipment investment
Market and weather factors influence practice
Link to tillage system management practice

Addressing reversal risk:

Government assurance factors
Pooled reserve, buffer etc

Summerfallow definition: no planting, not crops grown

Comment: Is Summerfallow addressed differently than in the tillage?
Response: NO

Clarification: assurance factor is not a good case with this
Comment by Wayne Pettapiece: Risk issue with summerfallow, with the increased dry conditions would this not increase the summerfallow system?

Look into the frequency of summerfallow
ACTION ITEM: get data on summer fallow/ long term trends, by country for Brown/ Dk Brown zone

There is no replacement of tonnes if you stop the practices of summerfallow
Comment: Drier years may increase summerfallow practices and may need to consider a buffer.

Comment: Regional amount of summerfallow found, increase summerfallow in a 5 yr period.

**Vote on recommendation 5.1.5.2 (see end of record)

2:15 **DISCUSSION AND RATIFICATION OF FINAL OPTIONS**

4:15 **SUMMARY AND WORKSHOP CLOSE**
Karen Haugen-Kozyra, Climate Change Central

- Productive session
- Now move to phase 4
- Adaptation into the standard protocol template
- Action item for Susan to get information

DISCUSSION AND RATIFICATION OF OPTIONS

POLLING RESULTS

DECISION POINT
On determining N20 emissions from fertilized fields and summerfallow fields (to be supported by research presented at the workshop): R. Lemke – presentation; on average emission from sf equivalent to fertilized continuous crop; N2O loss from summerfallow – N2Ocrop=N2Osummerfallow = N2Ofallow_effect = N2O N inputs

- **Consideration 5.1.2.1:** Emissions of N_2O from fertilized fields are similar to those from summerfallow fields. (restriction for the Canadian Prairies)

Polling results – ACCEPTED
67% Accept, 19% Accept more work, 14% Hold for now

DECISION POINT
On determining the interactivity between Summerfallow and Tillage Intensity:

- **Recommendation 5.1.3:** The Summerfallow Reduction Protocol should require co-implementation of the Tillage System Protocol.

Polling Results: ACCEPTED
78% Accept, 17% Accept more work, 4% Hold

DECISION POINT
On determining the most appropriate approach to ensure permanence of soil organic carbon:

- **Consideration 5.1.5.2:** A 'market' approach, such as a pooled buffer or reserve hold-back, should be used to address permanence in the Summerfallow Reduction Protocol.

Polling Results: ACCEPTED with more work to make determination
61% Accept, 30% Accept more work, 9% Hold

DECISION POINT
On determining the baseline approach:

- **Recommendation 5.2.3.1:** The scale to determine the activity baseline of the Summerfallow Reduction Protocol should be farm-specific.

Polling Results: ACCEPTED FARM SPECIFIC BASELINE
96% Accept, 4% Accept with work, 0% Hold

DECISION POINT
On establishing the baseline:

- **Recommendation 5.2.3.2:** Best practice guidance is to set the time period to determine the baseline of the Summerfallow Reduction Protocol the average of three years prior to the project.

Polling Results: ACCEPTED BASELINE AVERAGE 3 YEARS
82% Accept, 18% Accept more work, 0% Hold

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