

WETLANDS CONSERVATION AND RESTORATION PROTOCOL DEVELOPMENT March 17 – 18th, 2010



Edmonton, AB

BACKGROUND

Climate Change Central is coordinating protocol development and review on behalf of the Ducks Unlimited Canada and the Prairie Habitat Joint Venture. These organizations have initiated the Wetlands Restoration and Conservation protocol work to develop a protocol quantifying the conservation and restoration of wetlands in the Prairie pothole region of Alberta. This workshop will gather experts to review and assess the science, methods and elements of these protocols for their applicability to prairie conditions.

A technical working group, called the **Wetlands Conservation and Restoration of Wetlands (WCRW)** has prepared two Science Discussion Document to lead the discussion. The group wishes to bring forward a protocol, based on the best available science on GHG emission reductions from wetlands management in the Prairies, and potentially for the rest of Canada, to the Alberta Protocol Development Process. The protocol is following the established process for coordinating scientific information and consensus-building according to the ISO 14064-2 GHG Project-Based Standard.

PURPOSE

To engage key scientific researchers, technical experts and project developers at home and abroad, to provide advice and agreement on the best available quantification methodologies to assess GHG emissions.

General Process:

- Use a combination of a literature and existing protocol review in the form of a science discussion papers, sharing recent research results, researcher experience and group discussion and evaluation of ideas and recommendations to achieve the workshop outcomes.
- The first day will be spent setting the foundation by setting the context for carbon offsets and protocols, examining the state of the science and baselines; the quantification approaches and coming to consensus the framework of the protocol; the second day will focus on identifying and addressing quantification and implementation issues as well as identifying science gaps for future research.

WEDNESDAY MARCH 17, 2010

Focus for the Day

Day One will provide an opportunity to learn about the current policy, quantification and inventory methodologies, various protocol approaches and will suggest proposed options for the best available quantification approaches.

8:30 WELCOME AND INTRODUCTIONS (Introductory Slides) *Tanya Maynes, Climate Change Central*

- Overview of the two days and General Approach of science consultation workshop
- Day 1 will focus on presenting the current state of knowledge and address the foundation of the proposed Wetlands protocol in the Prairie region – whereas day 2 will address the Implementation and Quantification details for the proposed protocol
- Round table introductions (see Participant List)

8:45 SETTING THE SCENE – (I) Carbon Offsets and the Policy Drivers; *Tanya Maynes, Climate Change Central*

- *Introduction of Alberta Offset System and regulations driving offset demand*
- *Fundamental differences between a Regulatory and Voluntary Systems*
- *Options for the regulated facilities in Alberta to meet annual reduction targets – internal reductions, purchase EPCs, pay \$15 into Technology fund, or purchase Alberta Offsets*
- *Key Offset Criteria – must be beyond business as usual practices/after Jan 1, 2002 start dates / independent third party verification / real, quantifiable and measurable*
- *Quantification Protocols are science based, streamlined, rigorous documents that help to minimize the transaction costs of implementing offset projects*
- *Protocol Development process in Alberta is review heavy and proceeds through 3 rounds of technical and stakeholder review – today is only the beginning stage of protocol development in compilation of the science and foundation of a proposed protocol that would be streamlined into the basic Alberta Protocol formatting*
- *Alberta Protocols are developed based on the ISO 14064-2 Project based standard and its principles*
- *ISO principles to follow – Relevance, Completeness, Consistency, Accuracy, Conservativeness, and Transparency*
- *Extra emphasis on principles of Completeness (use of expert judgement) and Conservativeness (underestimation of baseline emissions) for today's workshop and consultation for the wetlands protocol*
- *Critical protocol elements (that will be discussed more detail throughout the day) – Baselines, Permanence, Leakage, Additionality*
- *Beginning steps of the review – we use the framework of the ISO standard with the criteria of the Alberta Offset System to help develop the Protocol for the offset system for application at a project specific level*
- *From Alberta Environment – much learning's over the past two years in this regulated system – accountability from Alberta Environment the Auditor General – must ensure protocols/projects are real and emissions are reduced*
- *Defensible policy and verifiability are critical elements (real and tangible change)*
- *Government has committed to audit percentages of offset projects and have taken learning's to use today*

- *Requirement for more consistency in protocols – data collection / monitoring / also need to ensure there is not a lot of subjectivity*

SETTING THE SCENE – (ii) Overview of Wetlands Conservation and Restoration Protocol; Rob Janzen, Climate-CHECK

- *Everyone here today has been identified as experts in this area – and will be participating in a science based standards setting process (it is a peer review process)*
- *Overlay of science and policy criteria (in the form of the Alberta Offset System) is the beginning and then requirement to address the implementation and quantification of the protocol (and trying to balance practicality – accuracy in aggregate)*
- *In this case, we will address the GHG emissions reductions or removals and the conservation and/or restoration of wetlands and how to measure and quantify*

Presentation

- *APPROACH - For wetlands – there is Emerging Policy momentum (REDD, UNFCCC, and LULUCF) land use issues are becoming part of global discussions and regulatory frameworks*
- *Looking for “accuracy in aggregate” as uncertainty decreases across aggregation – accuracy increases with large numbers*
- *And Existing Protocols (few) that are addressing these aspects of land use change (voluntary carbon standard and climate community and biodiversity association (where DU is already trading avoided grassland conversion credits) these are voluntary programs which is much different than regulatory requirements*
- *Wetlands are small, seasonal, interspersed, in an area highly transformed by agricultural activity – tied very closely with management of upland (80% agricultural land overlaps with the Prairie Pothole Region (PPR))*
- *Today’s and Tomorrow’s goal is to establish a scientific foundation and integrate environmental thinking into an economic system*
- *SCOPE – Must address issues of AB offset system – key issues; permanence (change over management high in Alberta lease rates what will happen in future); quantification; ownership; verifiability*
- *System addresses all GHG (N₂O, CH₄ and CO₂)*
- *Scope - Wetlands on mineral soils (AB) of PPR – Questions and discussions for this protocol; Technical Working Group (TWG) has addresses and makes recommendations for discussion at this workshop:*
 - *Address Class 3 wetlands and higher (3,4,5,6)*
 - *Exclude public lands?*
 - *Include management of upland?*
 - *Require use of conservation easements? (which simplifies the discussion of permanence of a project)*
- *Baseline Estimation: what would happen if don’t implement this project...we need to identify and address the best baseline scenario – involves predictions and consensus*
- *Possible scenarios we will discuss and consider – all wetland in the PPR are degraded (restoration); all wetland will be degraded (conservation and restoration); all wetland already degraded will remain so but no more degradation expected (restoration)*

- *Quantification – most protocols rely on the National Inventory Approach – but there is no method in Canada's National Inventory Report (no mineral wetlands) but there is Extensive Research and Practice in the PPR (region specific research available)*
- *Project Monitoring and Measurement – focus on being prescriptive – room for interpretations are more difficult to verify*

Q. Is there even an option for regulatory offset approach that is feasible for wetlands? Goal is to develop a regulatory protocol.

-hard to see the verifiability that is required for the system

-In general there is never an absolute guaranteed with offset projects – similar to financial audits

-the means that we will reach a consensus on various issues and move forward

-address everything conservatively

-government is looking for best application of best available science to develop the protocol (and project standard)

-the verification will be reviewing the practice had been implemented according to protocol (with eligibility and criteria of the protocol itself with appropriate data and requirements)

Q. how do you address / define wetland permanent – which may have variable cycling 20-45 year - this gets factored into baseline condition and quantification methods – that is where we require this group to discuss what is going on with wetlands and reach a consensus on how to address any variability in the protocol
-for offsets and projects we address all the potential issues of variability

Q. what is a broad scale potential for wetlands and sequestration rate – we are speaking of millions of potholes – there is a lot of potential for emission reductions – offsets and these protocols/project can really accelerate practice change at the farm management level

Q. program link with mitigation like conservation banking – restoration of one wetland leads to drainage of another (reclamation) – generally not in the offset program although we deal with leakage issues or concerns such as tie emission reductions to the project locations for verifiability

10:00-10:30 **REFRESHMENT BREAK**

10:00 **(10:30AM) GREENHOUSE GAS SOURCES AND SINKS IN CANADA: SCIENCE BASED KNOWLEDGE NEEDS**

Rick Bourbonniere, Environment Canada (Dominique Blaine, Environment Canada on the phone)

- *Canada's inventory methodology has no method to quantify emissions. IPCC requires that SS emissions from managed wetlands be quantified – natural wetlands (such as the PPR) are not managed*
- *IPCC guidelines and good practice guidance – are three levels of methodology with different amounts of rigour – Tier 1 is the default; Tier 2 - where have a body of scientific knowledge specialized for development i.e. regional and Tier 3 most rigour – very specific;*
- *How get data for Canada inventory – departments, emission factors, provinces, stats can, NRC*
- *LULUCF Sector – IPCC requires all sources and sinks from managed lands – all GHGs – consistent land categories (definitions) including min area – have to address wetlands drained as well – all inclusive and*

cannot pick or choose – currently for wetlands; flooding, drainage, peat extraction (we are talking about managed lands (anthropogenic emissions reductions/removals)

- *2003-2006 managed peatlands, flooded lands*
- *Post 2012 wetland drainage*
- *Future? All managed lands?*
- *Wetlands/Peatlands Carbon Budget equations...*
- *Two different approaches – delta C or net GHG flux (CO₂e)*
- *Wetlands considerations – consider past in combination with future*
- *Conclusions the national GHG inventory is about anthropogenic emissions – baseline for future domestic policies*
- *There are gaps in knowledge on anthro emissions and removals in Canada's wetlands*

Comment – there is a lot of research conducted on C accumulation in AB peatlands – there is huge variability (in net ecosystem fluxes)

Decisions on whether to use the Flux or Storage approach will be a key detail (government will need to use the C storage on the ground). Discussion of the differences between complete annual carbon balance vs. Net GHG flux – there are huge implications

Agree there are challenges but that is why long term monitoring is critical – don't think there is one method that can be used

****Will also have to address Temporal Variability (important decision and reasonable timeframes for seeing change) these are special systems and require considerations – both natural variability and special variability.**

****Address Potential Cap for mineral-based systems (due to eventual stasis for wetlands) vs. Peatlands that have infinite potential for sequestration**

****In PPR majority will not have climate to favour peat accumulation**

– Recent paper out from student of C accumulation in saline MARSHEs IS SIGNIFICANT BUT DO NOT KNOW WHEN START TO OXIDIZE (the temporal piece of sink)

- Presentation this afternoon will address saturation (although need to consider these mineral soils - influx of mineral soil allows for build up over time and do not reach the saturation)

-also look at difference of soils in different regions. With mineral soils and low organic carbon, can see changes in a short period of time

-Or the annualizing approach to be conservative with emission factors and capture these differences in climate – we can address uncertainty with conservativeness

-Canada inventory definitely uses different approaches to account for changes and long term changes

-need to be careful with historical information not matching current conditions (have to validate your estimate (mean annual/average)) to ensure historical rates are still valid (ongoing validation)

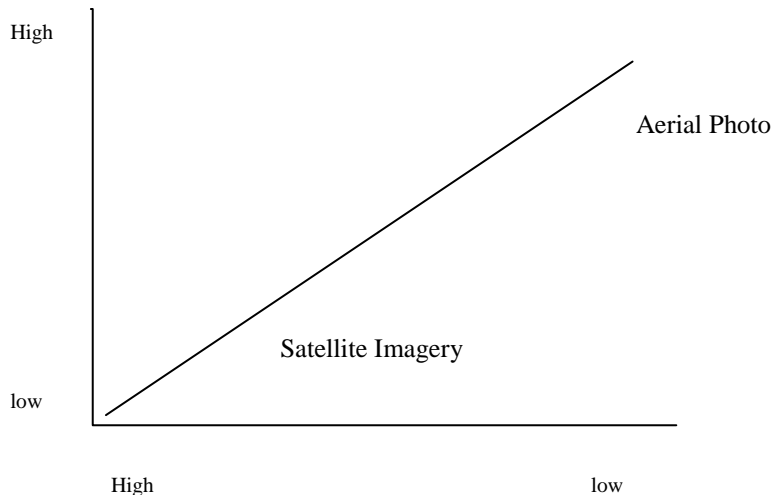
-particular for wetlands which are sensitive to changes

-protocol could require participant to submit data to inventory and perhaps guide and assist in future knowledge and inventory

10:45 **GIS WETLANDS INVENTORY ON THE PRAIRIES – Determining the Baseline; Lyle Boychuk – Ducks Unlimited Canada**

- *Presentation to discuss challenges, current standards, and experiences*

- *Definition of wetlands (Canada definition) and How to map – potential indicators (diff temporal and spatial): periodic flooding, depression storage, vegetation indicators;*
- *Challenges of Climatic Variability (water is sparse and not consistent - Changing flood zone areas per year) therefore not good indicator for mapping*
- *And indicators may change on an annual basis*
- *Challenges target characteristics (size) feature sizes (71% wetland features are less than or equal to 2 hectares and 1.4 hectares and up account for 50% of area) – see pattern over and over across the provinces – can predict size distribution and topography – need to deal with the numerous small features. Large number of small wetlands, few very large wetlands*
- *In addition new mapping features occur – target May condition versus spring – were large run off occur in spring and was trying to cultivate – topography indicator (defined the anomaly in the mapping) – even with rigorous rules and standards to be consistent but need to be adaptive with changing conditions*
- *Challenges target characteristics (wetland drainage) - capacity of storage may be influenced by land management within catchment areas to affect whole area*
- *Spectral – Remote Sensing Options – lots of options out there but try to keep lower cost – focus on optical sensors – require at least moderate spatial resolution – large historical archive (circa 1970s)*
- *DUC experience – more recently – commonly using for landscape level mapping and reporting – DU identification 93% of land area and 85% of basins (small percentage omitted) in Milk River Ridge*



LiDAR is off the page

Q. Could the differences be due to timing differences (net differences 26% agree; 37% Commission; 28% Omission) – could be portion - about year apart but at same timing not one specific cause to the differences – the climatic variability would be a pretty low percentage
 We are told to use a balanced approach for sources and sinks, so what is the target for developing a protocol to embrace this dynamic system and fluxes of GHGs (are we talking about hydrologic features or standard definition of wetlands)
 Comment on of law of big numbers – we can string together pieces of data as near continuous stream of data

Comment on use of elevation layer with spot data (tried approach?) – Yes we have but micro level detail is not accurately represented

Comment – wouldn't a preferred option for the offset system would be – detection of larger sites with greater C accumulation (why worry about mapping inventory of all small when they might not be there in the future)

- *GVI identification comparisons – document wetlands as percentage (comparisons not very accurate)*
- *2001 comparison of multiple mapping methods*
- *What's out there? – The Water for Life Inventories (map historical conditions with current) – 10 year program (2003-2014)*
- *DU platform of choice – ICAS standard – (some experience with the digital cameras) kinematic GPS etc*
- *WFL Components (model make decisions on each wetland – 5 rules)*
- *Project components and standards used*
- *Canadian wetland inventory trying to get standardized product out there that is widely available – Phase 1 - standards for classification, model etc. (higher resolution for prairie is required) but not completed - Current status in progress parts of all provinces*
- *Conclusions – mapping of the wetlands is complex – appropriate data is limited – photogrammetric methods currently are the operationally proven techniques for delineation*

11:45 (12:15PM) LUNCH

12:45 **SUMMARY OF GHG EMISSIONS AND CARBON SEQUESTRATION POTENTIAL IN WETLANDS OF THE CANADIAN PRAIRIE POTHOLE REGION - Pascal Badiou – DU Canada**

- *PPR overview*
- *Wetlands as sinks – anaerobic conditions *(keep in mind better conditions for producing methane)*
- *DU involved in large main projects (exploring C sequestration; implications)*
- *Restored wetlands projects review – goals quantify SOC – CH₄ and N₂O quantification*
- *Net Balance = change C + change N₂O + change CH₄*
- *2006 one first studies conducted by Euliss – C storage sites of prairie wetlands – can sequester 2x C than prairie no-till cropland (did not account for methane emissions)*
- *DU restoration study wanted to fill in that gap – 22 sites class 3, 4, or 5 – 3 wetlands sampled at each site across PPR (AB, SK, and MB)*
- *NOTE *numbers in quantification document are different due to being estimates – only focused on class 3-seasonal (omitted 2) wetlands as easier to work with as earlier to establish a baseline*
- *2003 - Involved a comprehensive landscape approach involving different categories (upland, wetland, down researchers)*
- *Study Design*
- *Statistical Analysis – landscape and basin age position*
- *Results – predictors of SOC*
 - *Uplands (grassland) in restored wetland catchment =116mg SOC per ha*
 - *To Reference(class 5, 4, 3) wetlands 205 Mg SOC per ha*
 - *Estimate SOC change associated with draining and other factors*
- *89 Mg per ha SOC loss due to draining*
- *2 years after restoration SOC increase estimated sequestration rate 2.5 Mg/ha/yr*

- 8 years after restoration SOC increase estimate sequestration rate 6.1 Mg/ha/yr
- The SOC rates fall within range of rates reported for semi aquatic and aquatic ecosystems
- Most of these basins would be classified as eutrophic or hyper-eutrophic
- 3mm is mass accumulation rate – intact wetlands in grassland environments – sedimentation will be higher in cultivated lands right up to wetland margins
- Amount of below ground annual biomass of plants in wetlands ranges from 7 to 17 Mg OC / ha
- Flux chambers accounting for (respiration chambers) methane and nitrous oxide (not methane flux in plants)
- Some stats just over 1 million hectares in AB and SK
- An estimate of potential 200 Million Mg of SOC stored remaining (lost about 93 Million Mg C to atmosphere) in Alberta
- Estimate Current loss rates – percentage lost annually (3000 ha annually release over 1 MT to atmosphere)
- Results (2 data sets)
 - Wetland produces more CH₄ (left hand side) than upland
 - N₂O fluxes no statistical difference between wetland and upland (right hand side)
- CH₄ appeared to increase with basin age (newly restored, 205; long term restore 269, and 457 g CH₄ per ha per year. – higher sulphate means lower methane and vice versa (seen in 2004) versus 2005 lower sulphate levels seen higher methane
- Study rates are on par with other study findings and rates
- Cumulative fluxes – used the intensive sites – daily cumulative flux multiplied by 245 (measurements conducted May 1 – December 31 (245 days))
- Fluxes largely driven by the methane (not N₂O) average for reference wetland *sum of CH₄ and N₂O = 2300 kgCO₂e/ha
- Assumption of cap at 33 years wetland reaches equilibrium carbon cap (being overly conservative) no more sequestration
- Restoring 22 MT of CO₂ over 33 year period – about 130K ha restored in AB
- Many other co-benefits
- Future and ongoing research
 - Need to establish long term monitoring sites (is there an equilibrium)
 - Address diurnal changes in GHG fluxes
 - Account for the effects of chemical enhancement
- GHG benefits seen right away for restoration? These are the cumulative fluxes - initially sequestration rates are lower but then spike dramatically once established (and then approach equilibrium?)

1:30 PROCEDURES & CONTROLS TO DELINEATE, CONSERVE, RESTORE AND MONITOR WETLANDS

Lyle Boychuck - DU Canada

- Defining existing wetlands – recommend photogrametric methods
- Identifying wetlands – compare historically
- Landowner Negotiation
- Physical Construction Phase
- Administrative Close out phase

- *Conservation geo-database – provides verifiability and consistency for reporting/agreements/automated checks*
- *Central Repository considerations (it is becoming standard practise)*
 - *Standards of practise – Can Geospatial Data Infrastructure (CGDI)*
 - *GOA standards*
- *Monitoring – what is DU minimum requirements*
 - *Required wetland geometry, flood contours, ditchplug and project history data is readily accessible by via a GIS repository*
 - *Grazing and haying are acceptable land uses within restored and retained wetlands*
 - *Monitoring of retained wetlands follows current DUC practice for monitoring CE compliance*
- *Monitoring will follow current DUC practice for monitoring CE compliance*
- *CE compliance check done remotely (photography, SPOT 2.5 Pan, WorldView 1&2)*
- *Field visits are only required to inspect potential breeches of contracts (agreements)*

2:30 (2:45PM) **DETERMINING THE FRAMEWORK**

Facilitated Discussion- Plenary

-POLLING FOR DAY 1 – FOUNDATIONAL ISSUES DISCUSSION GUIDE

DEFINITION OF WETLAND BASIN

Original: In the proposed Wetlands Protocol, the **wetland basin** will be defined as the area extending from the centre of the wetland to the outer edge of the wet meadow zone. It is understood that the size and location of the wetland basin fluctuates within and among years depending on hydrologic condition (wet/dry periods), according to Gleason *et al.* (2008) (Figure 1). – (up to and including the overflow spill elevation)...

-Basin – drainage basin – would be wetland pond per this definition

-different for contributing area

-wet meadow different in wet prairie zone (why wet meadow zone instead of low zone (upland), is it because GIS readable?) – Generally it is not seen on cultivated land

- Technological perspective of the definition (vs. biological)

-Restoration will include the upland zone – placement of ditch-plug (wet-meadow elevation) considers elevation and other factors – add this to definition? – The basin is up to and including overflow/spill over elevation

-How are the terms going to be used in the protocol – it's hard to define now until we understand project definitions

-we do have the options to come back once a better understanding and establish other questions

Final Voting Question – In the proposed Wetlands Protocol, the wetland basin will be defined as the area extending from the centre of the wetland to the outer edge of the wet meadow zone. It is understood that the size and location of the wetland basin fluctuates within and among years depending on hydrologic condition (wet/dry periods), according to Gleason et al. (2008) (Figure 1). [... Up to and including the overflow/spill elevation]

VOTING – 94% Acceptable

DEFINITION OF WETLAND MARGIN

- Original: In the proposed Wetlands Protocol, the **wetland margin** will be defined as the area extending 10 m from the outer edge of the wetland basin. *It is understood that the location of the wetland margin fluctuates within and among years depending on hydrologic condition (wet/dry periods).* (...up to and including the toe-slope zone)
 - the 10m is artificial – totally disagree in the 10m
- **VOTING 20% 40% 40%**
- Opinion – relate to forest buffer strip (use a fixed width which is completely inappropriate)
- Should be categorized on morphology (topology)
- Suggestion for defining – terrain analysis – photogrammetric approach –
- Margin plus Basin are the Wetland
- Margin is beyond basin – use photo or satellite – use toe-slope as general line (outer limit) better than an arbitrary # (geomorphic)

Initial: In the proposed Wetlands Protocol, the **wetland margin** will be defined as the area extending 10 m from the outer edge of the wetland basin. It is understood that the location of the wetland margin fluctuates within and among years depending on hydrologic condition (wet/dry periods).

Final Voting Question – In the proposed Wetlands Protocol, the wetland margin will be defined as the area extending from the outer edge of the wetland basin to the outer edge of the toe slope.

VOTING 82% 18% 0%

- Farmers won't apply the definition for wetland margin (within the proposed protocol different application criteria may be applied)
- this definition meets the conservative test as toe-slope GHG fluxes are higher
- not able to define low prairie zone you can do that with the toe slope (ways of measuring)

DEFINITION OF WETLAND

Final Voting Question – In the proposed Wetlands Protocol, the wetland will be defined to include the area of the wetland basin and wetland margin.

VOTING 94% 0% 6%

DEFINITION OF UPLAND

Final Voting Question – In the proposed Wetlands Protocol, the upland will be defined as the area contributing surface runoff to the wetland zone and is composed of three subzones based on landscape position: shoulder-slope, mid-slope, and toe-slope, according to Gleason et al. (2008).

- Definition does not apply now -REPHRASE – everything up-gradient from the toe slope?
- The toe slope in an undulating gradient could be very large –
- How is this determined – how would it be verified
- Back to definition of the wetland – N-S gradient are actually not that large (S SK and AB studies)
- Should we assign a number (up to maximum number) of toe slope – but what is that number? No one knows

- this will also be clarified further once we start discussing implementation
- toe slope would include the wetland in most of the work I have done/seen

Final Voting Question – In the proposed Wetlands Protocol, the upland will be defined as the area contributing surface runoff to the wetland zone and is composed of the landscape that is up-gradient of the toe slope, but does include the foot slope.

VOTING 71% 29% 0%

- **Need better image defining toe slope and foot slope (in between toe and mid) but mid slope is generally referred to as back-slope (Conrickle and Darwinkle or Pennock) *(Anglea to provide new diagram)*

DEFINITION OF WETLAND LOSS

The proposed Wetland Protocol will use the definition of **wetland loss** from Alberta Environment: “**Wetland loss** — includes infilling, altering, or physically draining the wetland, any impact to the riparian area and buffers strips, and any type of interference with the hydrology to and from the wetland”. In the proposed Wetland Protocol, then, wetland loss is interpreted to involve any transitory or permanent degradation to the wetland or upland.

- now into the transition into implementation
- is it loss of area or loss of function?
- question inclusion of upland? You would then lose the functioning of wetland
- practical considerations we will not be restoring the upland
- wetland area or function (infers upland) but function is left to interpretation
- but cannot ignore the function (biochemistry) of the wetland when it is subject to deterioration
- REMOVE last sentence “interpreted”
- keep transitory or permanent degradation –
- there is more open interpretation due to our new definitions – sub buffers strips (with toe slope)
- or could just use the definitions for all as provided by Alberta Environment
- find riparian terms confusing and not definitive
- mid stream without paddle – we need to remain consistent and not mix terms
- i.e. Riparian defined as.... buffer strip is arbitrary
- revise the definition to including previous definitions

Final Voting Question – The proposed Wetland Protocol will define wetland loss as including infilling, altering, or physically draining the wetland, any transitory or permanent degradation of the wetland basin and/or margin, and any type of interference with the hydrology to and from the wetland.

VOTING 81% 19% 0%

CONSISTENCY WITH OTHER PROTOCOLS

Final Voting Question – The premise of the Wetlands Conservation and Restoration Protocol is consistent in logic with recent policy developments in compliance and voluntary GHG programs across the world.

VOTING 67% 33% 0% (5 abstain)

- system as written does not recognize avoided emissions but a review is being conducted to see if avoided emissions will fit within the framework – it is the conservation component that may have issues
- would have changed my vote not comfortable with the question and baselines of existing landscapes/wetlands
- we are needing to address additionality
- why in the question versus other questions – word Conservation is emphasized
- the terms are being used interchangeably
- this is a general statement question
- is there a need to revisit the question – no need to as interpretation may have been different for some responses

APPLICABILITY TO PRIVATE LANDS

Proposed Voting Question – The proposed Wetlands Protocol will be applicable only to private lands.

- clear grazing leases are excluded (the view of SRD is mixed on allowing ownership) – leases do not assume any ownership on offsets

VOTING 50% 17% 33% 2 abstain

- should allow opportunity for aboriginal lands to be managed and project ability
- this needs to be clarified with government for applicability or availability
- statement worded is very final perhaps soften the wording for initially applicable to private lands (as green zone fluxes)

Final Voting Question – Initially, the proposed Wetlands Protocol will be applicable only to private lands.

REVOTING 56% 33% 11%

4:00 **SUMMARY AND CLOSE OF DAY ONE**

Tanya Maynes, Climate Change Central

- Start tomorrow at 8 am as have to catch up

THURSDAY MARCH 18, 2010

Focus for the Day

Confidently advance GHG protocol recommendations that address the desired components of a Wetlands Protocol.

Day two will engage participants in developing, evaluating and recommending criteria for the practical side of the protocol including implementation and quantification.

8:30 **WELCOME** – Recap from Day one and Review agenda for Day Two

Tanya Maynes, Climate Change Central

-GREAT DISCUSSION YESTERDAY

-Need to keep the policy overlay and criteria of the Alberta Offset system while balancing the practical application of the protocol

-also can build upon the experiences and work of Ducks Unlimited

-heard a lot of discussion on dealing with temporal variability

-review of the wetland margin definition – toe and foot slope may be large and variable (may approach the flood plain of the basin (outer extent) – flood plain of the wetland basin is the wetland margin – more language issue for practicality and implementation – this comes back to the temporal referencing and variability and should park the discussion until we have a better idea of how we are dealing with other implementation aspects **

-should remove the Gleason reference (no longer referring to their definitions)

9:00 **DISCUSSION OF CRITERIA TO QUANTIFICATION METHODOLOGY**

Facilitated Discussion – Plenary

SCIENTIFICALLY BASED

Initial Voting Question: Sufficient scientific evidence exists to develop a protocol to quantify GHG emissions reductions and removals associated with functional prairie wetlands and create real and verifiable offsets.

-pre-polling verifiable refers to the development of a protocol that can be reviewed per independent verification using the Alberta Offset System criteria and the protocols to ensure practises are occurring according to each

VOTING 50% 43% 7%

-missing from statement – continually improve – need to make explicit with current state of knowledge and that more research is needed to improve – this needs to be noted

-inherent in the statement is conservativeness

-more uncomfortable with the wording around the statement (functional)

-the government requires comfort in the base science and quantification and not just a series of risk management techniques and discounts

-would like to see the research published in peer review literature to have more comfort

-emphasis on a move towards practise change – and managing any uncertainties are inherent in the ISO standard and the development of the protocol – helpful to take a systems approach

Final Voting Question: Sufficient scientific evidence exists to develop a protocol to quantify net GHG emissions reductions and removals associated with functional prairie wetlands and create real and verifiable offsets.

REVOTING 75% 25% 0%

CONSISTENT WITH POLICY AND PRACTICE

Initial Voting Question: Existing policy and practice concerning wetland mitigation in the Prairie Pothole Region allows the development of a GHG quantification protocol to create real and verifiable offsets.

- don't understand the word mitigation (change)
- policy is very broad word
- this will help form a framework
- does anyone know about a regulation or policy that would prevent these projects from being eligible
- no wetlands policy but there is the reclamation conditions (oil and gas)
- there is policy in place for restoration and not for conservation in AB
- there is a need with for Wetlands Policy in Alberta

Final Voting Question: Existing practice concerning wetland mitigation in the Prairie Pothole Region allows the development of a GHG quantification protocol to create real and verifiable offsets.

VOTING 71% 29% 0%

Any clarifications required in regard to definitions (wetland – wetland loss)

BASELINE DISCUSSION – WE ARE TALKING ABOUT THE CONTINUATION OF WETLAND LOSS WILL OCCUR IN ABSENCE OF THIS PROJECT

Initial Question: A large proportion of wetlands and associated uplands in the Prairie Pothole Region of Canada have been degraded as a result of landscape alteration and therefore it is reasonable to assume the vast majority wetlands in this region are subject to wetland loss.

Q. What would be the baseline date – 2002 per the AB Offset System

For Restoration would be the restoration activity consider apply a time frame date similar to Afforestation to minimize Perverse incentive to drain the wetland just to restore (that can be discussed later)

Are we talking functional loss or physical loss (aerial extent) (temperature variability in dry years where may not be there in one year – consider the hydrology – consider function in the wetland loss definition

Final Voting Question: A large proportion of wetlands and associated uplands in the Prairie Pothole Region of Canada have been degraded as a result of landscape alteration and therefore it is reasonable to assume the vast majority wetlands in this region have been subjected to or are vulnerable to wetland loss.

VOTING 82% 18% 0%

Baseline considerations – under the BAU scenario there would be a continual loss of wetlands – these definitions may be defined different by some (are esoteric)

1. The **historic benchmark approach** (meaning wetlands that used to exist are restored) is the most suitable approach for determination of the baseline for the proposed Wetland Protocol.
 - Would be a project specific approach – using photography – site specific
2. The **performance standard approach** (for example, all wetlands are degraded, or subject to being degraded, etc.) is the most suitable approach for determination of the baseline for the proposed Wetland Protocol.
3. The **projection-based approach** (for example, a probability or rate of degradation or drainage could be calculated) is the most suitable approach for determination of the baseline for the proposed Wetland Protocol.
 - Similar to DU inc usage in US for project – modelling to prevent what would have been converted (compatible with peer conservation approach – fence a wetland it is conserved)

The Historical Approach - takes into account trends (assumptions can be made from the photo – coarse but same scale than the performance standard)

Projection based - how do you come up with the projections (from published data)

Address the Conservation and Restoration elements differently for baseline

Comparison approach for baseline not addressed – addressed in the discussion document as not practical for wetlands

BREAK

BASELINE

Final Voting Question: For conservation, the most suitable approach for determination of the baseline for the proposed Wetlands Protocol would be:

Historical – 17%/ Performance Standard 22%/ Projection based 61%

Final Voting Question: For restoration, the most suitable approach for determination of the baseline for the proposed Wetlands Protocol would be:

Historical – 85%/ Performance Standard 5%/ Projection based 10%

Final Voting Question: For conservation, the most suitable approach for determination of the baseline for the proposed Wetlands C&R Protocol would be:

Historical – 6%/ Performance Standard 11%/ Projection based 83%

Discussion on the Conservation of Wetlands and baseline scenarios – projection more conservative and meet additionality (other decisions are required for this selection – what rates? What applied? How credited?)

Projection based – allows for regional differences and would use modelling – but incomplete wetlands inventory in Alberta – but there are assumptions to make and estimates

NEW POLL QUESTION

Class 3-5 eligibility

Makes sense as we are applying to PPR of Alberta

Clarify the classes as lumped sometimes (not including Class 2?) there is not a lot of data on Class 2 are Potentially very important but do not have the data (including Class 6 – are a lot of them S AB) – AS FUTURE RESEARCH DEVELOPS ON OTHER CLASSES THEY MAY BE INCLUDED IN FUTURE GENERATION PROTOCOLS Comment struggling with including Class 3 – DU analysis used 2-5 Class – still retaining the carbon, hydro ecology remains - Class 3s tend to be the majority drained (Pascal study showed that majority) Q. Semi Permanent – extensive wet meadow margin - these classes will be used in conjunction with the definitions for wetlands and wetland loss

QUESTION

VOTING

94% 6% 0%

QUANTIFICATION ISSUES

Explain Related and Controlled sources and sinks.

Source Livestock Emissions may be introducing a lot of variables and is very limited in data to quantify

Practical considerations if you limit to no grazing uptake of protocol would be minimized

What we are doing right now is identifying the completeness of the identified Sources and Sinks in the Baseline and project conditions

Discussion yesterday about methane release from the wetland

Final Voting Question: The SSs identified and described for the baseline scenario (Figure 1, Table) of the proposed Wetlands C&R Protocol are complete and accurate.

VOTING 79%/ 29%/ 0%

Final Voting Question: The SSs identified and described for the project condition (Figure 2, Table 2) of the proposed Wetlands Protocol are complete and accurate.

Why are we only dealing with the upland components - we are just identifying all SSs

From land managers perspective (additive component of protocol- consider other protocols and how they can be stacked)

Have upland protocol in place (tillage) credits are additive as time goes on to be beneficial

VOTING 75% 19% 6%

Discussion: need to consider vegetation and it can act as a conduit (i.e. cattails). More work needed to be able to explain

Final Voting Question: The decisions stated and justification provided to include or exclude SSs of the baseline scenario and project conditions are complete and accurate (Table 3 of the Quantification SDD).

Discussion – no comments

VOTING 88% 12% 0%

Final Voting Question: The research results reported by Euliss et al. (2006) and Bedard-Haughn et al. (2006) provide a range of gross sequestration values for restored wetlands, and thereby establish a context within which the sequestration coefficient of the proposed Wetlands Protocol should be derived.

VOTING 88% 12% 0%

This is an accurate statement although still noting that future research and tools can be streamlined and improved upon

Final Voting Question: The credibility of the participants in the AWGI, the design and extent of the research, and the preliminary results of the project provide sufficient basis to recommend the net sequestration coefficient of 1.4 – 2.0 Mg CO₂eq ha⁻¹ year⁻¹ for consideration at the Consultation Workshop.

Discussion – Pascal's research – range 1.4-2.0 MgC/ha/yr - 1.4 is the reference wetlands – up to the saturation up to 33 years (which is still up for discussion)

How applied in Southern Alberta (as research is mostly in Parkland region – not much brown)

Problem with 'preliminary results' and not being peer reviewed yet (still in process of)

Include the period of time for study – 33 years – as net accumulation period

- issue with the statement itself - 33 year time frame might become a source (as a land manager that is a liability)

Move forward in appropriate time – peer reviewed means nothing outside this room – be very clear on how this will be moved forward – cannot base on one document

This is not for the protocol but the foundation – and development of technical documentation and the protocol will not be brought forward without addressing all the other issues – permanence

Concern with the blanket statement including all soils (black dark brown and brown)

Reasonable from other studies 30-40 years sequestration of the wetlands – and when does a restored wetland become a conserved wetland?

What can be put in place to ensure the restoration remains for a period of time (i.e. land gets sold)...

VOTING 47% 47% 6%

Issues addressed will be considered in future work in developing protocol

The lowest one appears to be the most conservative

This is not a flip the coin and pick on – we are really looking for expert opinion here.

Consider placing option for project specific sequestration factors if conduct the work on project specific basis.

The Lower range has already been substantially lowered to take into account methane and be conservative

Not comfortable with voting on specific numbers as voting more work on last question

We have heard tending to go towards the lower end but understand that there is some discomfort in regard to how this may change through the peer review process and finalized

Rephrase as general to reach consensus on what emission factor range will be considered for the protocol

Final Voting Question: The net sequestration coefficient will be defined in the lower quartile of the scientifically-defensible range.

VOTING 72% 28% 0%

Discuss what we feel the more work is to determine the lower range....
Pascal needs to publish and peer review

To clarify – we are asking another question to see what else we can work on –

Final Voting Question: Initially, a scientifically-defensible range will be defined by publication of the results of the AWGI project and other existing relevant literature.

VOTING – Initially a scientifically defensible range will be defined by publication of the results of the AWGI project and other existing relevant literature.

Pascal – there is debate of these values and there are already other values reviewed and presented (gross) this project studied and presented net values – are there other projects to include
Comparable projects within PPR? Gleason...

VOTING 95% 5% 0%

1:00PM (11:15 AM) **IMPLEMENTATION DISCUSSION**

Facilitated Discussion - Plenary

-moving into an on-the ground approach to wetland projects and addressing the implementation of this project type

What does this entail – only photogrametric?

Topographical and photogrametric approach to delineate wetlands – on the ground approach for plugs

Does not touch on the temporal issues identified earlier? Yes not yet.

What method used to consistently define the classes – assumption based on depth of basin (contour of bottom)

IMPLEMENTATION ISSUES

1. The procedures, systems, and controls used by Ducks Unlimited (outlined in the “Project Guidance” document circulated) in wetland conservation and restoration projects in the Prairie Pothole Region of Canada **should** be used as the frame of reference to finalize the wetland delineation approach for the proposed Wetlands Protocol.

We can't map class 3 wetlands remotely? And distinguish between 2 and 3 right now? Have tried a lot morphology indicators (depth) infrared and it is not clear right now.

Is depth a good proxy? It is really variable (i.e. for undulating)

Question is do we have enough information to move forward with a reference to start with...

Is this limiting to the average person as DU is ahead of the practice on this?

Not DUs intention there is potential to include this information as an Appendix within the protocol for reference

Alberta Study (LiDAR) wetlands inventory – different initiatives out there and not using the same approach
There is Remote sense component and a field component that need to be considered.
Current methods can change as new data collection techniques become available
Need to look at it as a Standard (set by DU)

Note: the TWG should ensure they consider the other project developers (aggregators) that will want to use this protocol and how they will be able to undertake the project
Ducks is not the only place to get this information but is available to provide this information for use
Will be a standard/minimum requirements per the DU guidance but not just for DU and not only
Question about delineation (agreed upon delineation process)

Final Voting Question: The procedures, systems, and controls used by Ducks Unlimited (outlined in the "Project Guidance" document circulated) in wetland conservation and restoration projects in the Prairie Pothole Region of Canada should be used as the frame of reference to develop the wetland delineation approach for the proposed Wetlands C&R Protocol.

VOTING 88% 12% 0%

Final Voting Question: A Qualified Wetland Aquatic Environment Specialist should be required to approve the delineation of wetlands included in all projects under the proposed Wetlands Protocol.

Definition provided in SDD ... way of pre-verifying the wetlands and practices for eventual verification
Is the check by the WAES able to be revised by them – yes they would have the ability (beyond the remote sensing) to make modifications to sign off
Used for both conserve and restore
Are all delineations going to have to be checked? Per project – per wetland?
How do people receive qualification or designation of QWAES? Not sure should be Alberta Environment
Where does the qualified come from?
Break up the question to determine whether or not we want to require this pre-verification of the delineation and classification of the project
And then discuss the specialist or qualifications or professional designation

Final Voting Question: A qualified and experienced specialist should be required to approve the delineation (and classification) of wetlands included in all projects under the proposed Wetlands

VOTING 80% 20% 0%

Course is an interesting concept but there are no Canadian courses available (commonly in the US)
Still need to consider “all projects” and all wetlands...(conservation and restoration)

12:00 Lunch

12:45PM IMPLEMENTATION DISCUSSION CONTINUED

Facilitated Discussion - Plenary

Under current Water Policy – conservation unauthorized draining but this is not regulated (or heavily enforced) impact wetland mitigate on 3:1 basis

Some draft wetland policy might be expected later this spring – completely unsure when

Restoration – if obligated to mitigate can restore outside

Hearing Conservation will not be additional to regulation (government decisions on policy) – regulation is movement of water – cannot pass your own property – but on own lands

will need to revisit as policy is drafted and/or finalized*

Final Voting Question: To demonstrate that wetland conservation and restoration is not 'business-as-usual', the proposed Wetlands Protocol fulfills the following tests: (Agree/Disagree options)

- a. *Surplus to regulation (private land/white zone/interim)* 100% 0% - note that there is expected policy to be released in draft in spring 2010. Interim policy suggests that conservation is required and restoration is required to mitigate (if you have to get an approval to impact a wetland you need to restore) – will need to re-evaluate in the face of updated policy.
- b. *Investment barriers* 100% 0%
- c. *Technological barriers* 100% 0%
- d. *Institutional barriers* 93% 7%
- e. *Not common practice* 100%

Talking about conservation easements here as one of the norm for ownership and ensure permanence is there anything else that could address

Base this on experience of other protocols or projects as DU does not have the experience with easements – these are two issues and should be addressed separately

Easements currently don't include carbon – puts a lot of extra costs to project – easements are expensive Land trust same as easement – land to trust – in easement

Ownership at high level – the landowner has a wetland and DU comes in to do research or work – where is the ownership of the GHG benefits – DU does not take any ownership of the GHG benefits right now – it is all with the landowner

There are different ways to address permanence (Tillage Protocol)

The issue of ownership is addressed within the offset system criteria itself and has guidance within the offset documentation and must be proven on a project basis

Refrain from voting on this question as it is inherent in the system

Final Voting Question: The proposed Wetlands Protocol should be designed to allow project proponents to use complementary protocols to generate GHG reductions and removals in the wetland margin and associated upland.

VOTING 89% 11% 0%

Final Voting Question: In the proposed Wetlands Protocol, improved management of associated uplands as prescribed under conservation activity should require these uplands to be managed according to approved GHG reduction protocols appropriate for the upland land use. For example, associated cropland could be managed according to the practices prescribed by the Tillage System Management

Protocol and the forthcoming Nitrous Oxide Emission Reduction Protocol. Or, associated grassland should be managed according to a specified grassland management protocol.

Discussion: we are not saying you have to do certain project type in upland – but better management of the upland according to some GHG management protocol

VOTING 27% 53% 20%

Final Voting Question: The procedures, systems, and controls used by agencies such as Ducks Unlimited to monitor permanence of conservation and restoration projects will inform the criteria used in the Wetlands Protocol to monitor permanence.

Discussion:

Necessary - agreement has to run with land – conservation easement legal risk (new and not fully provincially tested in court – vary by province – and barriers to use) profit of prendre (right to take) in forestry.

Are other tools to ensure permanence – monitoring procedures (i.e. central repository – site visits repeat cycle – sampling in field)

Notion of permanence implies landscape doesn't change due to any other factors when we know the anthropogenic changes are occurring (intentional and unintentional changes)

VOTING 47% 47% 7%

Review and determination of the specific procedures to address

Proposed Question: The Wetlands Protocol should require project proponents and/or aggregators to contribute to a database for monitoring of wetlands of the Prairie Pothole Region. This database would be used to assess intra-region leakage in the proposed Wetlands Protocol, conservation will include activity to reverse wetland loss as a result of transitory impacts (Turner *et al.* 1987). Thus, conservation activity involves:

- f. termination of burning, clearing, and cultivating of the wetland margin; and
- g. managed grazing and haying in the wetland margin, and
- h. improvement of management of the associated upland. (implement complimentary protocols)

Does this fit with concept of conservation of wetland

From a carbon perspective in emissions and sequestration does (b) have an issue on the C loss

Question is do we fence each wetland to ensure no disturbance? No that is not practical

Grazing and haying should be dealt with separately (recommended management practises)

This is opening up to major costs to monitoring and prescription in the protocol where there will be no uptake

Grazing has been removed from other protocols that have recently passed – due to lack of science for grazing

Grazing is not a conservation activity – it affects the conservation of the wetland

According to government we need to know what is included in the activity

Is grazing animals currently allowed in current projects? Yes

Is there chance we are going to be excluded new techniques coming in the future

Is accurate to say conservation involves the following...

Final Voting Question: Conservation activity involves :termination of burning, clearing, and cultivating of the wetland margin;

VOTE on A 71% 21% 7%

Conservation activity involves: improvement of management of the wetland margin

Vote : 40% 53% 7%

****Managed grazing is a very contentious issue in wildlife management – the monitoring part - define what management needs to be done – but lack of education and data**

Conservation activity involves: improvement of management of the associated upland

Vote: .60% 33% 7%

Define and think of unintentional impacts

*Final Vote: In the proposed Wetlands C&R Protocol, restoration will include activity to reverse wetland loss as a result of permanent impacts (Turner et al. 1987). Thus, restoration activity involves:
a) All activity prescribed for conservation*

VOTING A 73% 20% 7%

– it is not clear how it is defined (as conservation as farmer) and make clear so we can help sell it to the landowner

In the proposed Wetlands C&R Protocol, restoration will include activity to reverse wetland loss as a result of permanent impacts (Turner et al. 1987). Thus, restoration activity involves:

b) Reversal of drainage and filling

VOTING B 100% 0% 0%

Final Vote Question: The assessment of risk of reversal associated with the proposed Wetlands C&R Protocol, using a process like the Voluntary Carbon Standard guidance, should be completed using data from the conservation and restoration projects of agencies such as Ducks Unlimited Canada.

Does data exist to determine risks of reversal (intentional breach of agreements)
DU has (2004) not had breaches of agreement (low) but not many years of data

VOTING 47% 47% 7%

****Additional work – what is driving the reversal – just breach of agreements**

Careful – will need to go regional if pursuing addressing risk this way to ensure accurate to what is going on in region

NEW QUESTION?

The UNINTENTIONAL assessment of risk of reversal associated with the proposed Wetlands Protocol, using a process like the Voluntary Carbon Standard guidance, should be completed using data from the conservation and restoration projects of agencies such as Ducks Unlimited Canada.

-how do we define permanent loss due to climatic variations

****Require more work to determine what is available**

NO POLLING

2. *The decision concerning strategy to ameliorate risk of reversal associated with the proposed Wetlands Protocol should be based on the results of the assessment of risk of reversal using data from the conservation and restoration projects of agencies such as Ducks Unlimited Canada.*

Final Voting Question: The Prairie Pothole Region should comprise the leakage belt for the Wetlands Protocol.

47%/47%/7%

Where is jurisdiction boundary extend – it technically is global reach but need to realistically look at land scales

Opportunity to benchmark this protocol

Any proposals to how we can account for leakage concerns

Apply a discount factor (like CAR approach)

Propose a whole farm approach (conserve all)

(Need to know what bounds we are dealing)

Final Voting Question: There is a high probability of leakage in the Prairie Pothole Region.

42% agree/ 58% disagree

2:45 **COMPILATION AND PRIORITIZATION OF RESEARCH GAPS/EVALUATION OF WORKSHOP**

Tanya Maynes, Climate Change Central & Rob Janzen, Climate-CHECK

GAPS and WORK IDENTIFIED

3:00 **USE OF WORKSHOP RESULTS AND NEXT STEPS**

Tanya Maynes, Climate Change Central

-Compile notes and work items

-Workshop report

-posting of all information on website

-final polling