

# Update on Other Forestry Protocols

Improved Forest Management  
&  
Direct Reduction

# Introduction

- A couple of definitions
- Improved Forest Management Protocol
  - What is it
  - Where is it
- Forestry Direct Reduction Protocol
  - What is it
  - Where is it

# Definitions

- From the Marrakesh Accord which defined forestry activities under the Clean Development Mechanism of the Kyoto Protocol on Climate Change

# Afforestation

- “Afforestation
  - “is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.”

# Reforestation

- “Reforestation
  - “is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989.”

# Improved Forest Management

From Climate Action Reserve Forest Project Protocol 3.1 December, 2009

An Improved Forest Management Project involves management activities that maintain or increase carbon stocks on forested land relative to baseline levels of carbon stocks, as defined in Section 6.2 of this protocol. An Improved Forest Management Project is only eligible if:

1. The project takes place on land that has greater than 10 percent tree canopy cover.
2. The project employs natural forest management practices, as defined in Section 3 of this protocol.
3. The project does *not* employ broadcast fertilization.
4. The project does not take place on land that was part of a previously registered Forest Project, unless the previous Forest Project was terminated due to an Unavoidable Reversal (see Section 7).

# Improved Forest Management Protocol

- Under development
  - Funding from AFGO, ANC, CANFOR, MDFP
  - Funding being sought from FPIinnovations – Alberta Innovation Fund

# Improved Forest Management Protocol

- Substantial parallels with Afforestation Protocol
  - Quantification using total stem volume handing off to merchantable volume at harvest
  - Storage in HWP



# True-up Example

Example 2. Lodgepole pine planting - planned for dimension lumber and sold for newsprint.

### Step 1 - Biological Determination

#### Carbon Dioxide Capture (t/ha)

Interval (yr)	Volume Type	Volume (m <sup>3</sup> /ha)	Above Ground	Below Ground	Area (ha)	Actions
10	Total	8	15.4	3.1	100	1. Convert above ground volume into tonnes of carbon dioxide per ha.
20	Total	18	34.7	6.9	100	2. Derive below ground capture from above ground biomass.
30	Total	41	79.0	15.8	100	
40	Total	79	152.2	30.5	100	
50	Total	125	240.8	48.2	100	
60	Merchantable	156	300.5	60.1	100	300.5396364

Vol X Expansion Factor X Conversion to C X Conversion to CO<sub>2</sub>  
 Vol X Root:Shoot Ratio X Conversion to C X Conversion to CO<sub>2</sub>

Expansion factor = 1.05 (Total Volume)  
 = 1.13 (Merchantable Volume)  
 Conversion to C = 0.5

Conversion to CO<sub>2</sub> = 3.67

Root:Shoot Ratio = 0.21 (Total Volume)

= 0.23 (Merchantable Volume)

### Step 2 - Determine Permanence of Storage in HWP

Product Mix (%)				Permanence Factor Determination			
Interval (yr)	Pulp/Paper	Lumber	OSB	Pulp/Paper	Lumber	OSB	Weighted
10	15	80	0	0.058	0.43	0.58	0.427
20	15	80	0	0.058	0.43	0.58	0.427
30	15	80	0	0.058	0.43	0.58	0.427
40	15	80	0	0.058	0.43	0.58	0.427
50	15	80	0	0.058	0.43	0.58	0.427
60	15	80	0	0.058	0.43	0.58	0.427

#### Actions

1. Determine allocation of mill furnish to forest products.
2. Determine storage factor for harvested wood products. (Used CA numbers here for illustration purposes.)
3. Proportionally weight storage factors based on allocation of mill furnish.

### Step 3 - Determine Incremental Carbon Dioxide Capture and Sales

Interval (yr)	Gross Offset Pool (t)	Contribution to Buffer Pool (10%)	Contribution to Reserve Pool (30%)	Available for Sale (t)	Actions
10	966.5	65.8	483.2	417.4	1. Determine Gross Offset Pool = ((Above Ground * Weighted Permanence) + Below Ground) * Area - Previous Gross Offset Pool Value
20	1208.1	148.1	604.0	455.9	2. Determine Contribution to Buffer Pool = Gross Offset Pool * Area * 0.1
30	3743.0	337.3	1872.5	1333.2	3. Determine Contribution to Reserve Pool = Gross Offset Pool * 0.3
40	5802.9	650.0	2901.4	2251.5	4. Determine Sale = Gross Offset Pool - (Contribution to Buffer Pool + Contribution to Reserve Pool)
50	9298.0	1028.4	4649.0	3620.6	
60	9544.8	1283.1			

### Step 4 - True Up Calculations

Merchantable Volume at End of Accrual Period (m <sup>3</sup> /ha)	156.0
Total Merchantable Volume (m <sup>3</sup> )	15600.0
Total Above Ground Carbon Offsets	1888.5
Total Below Ground Carbon Offsets	6593.0
Total Offsets at End of Period	8281.5
Total Offsets Sold	8280.7
Total Reserve Pool	10510.2
Reconciliation	-10509.4
Imbalance	0.8
Imbalance plus Reserve Pool	10511.1

Volume \* Area

Total Merchantable Volume \* Expansion Factor \* Conversion to C \* Conversion to CO<sub>2</sub> \* Permanence Factor \* Assurance Factor

Total Merchantable Volume \* Root:Shoot Ratio \* Conversion to C \* Conversion to CO<sub>2</sub>

Total Above Ground + Total Below Ground

Total Offsets - (Total Offsets Sold + Reserve Pool)

Change Permanence Factor to 0.01

### Break-even Points when Switching from Dimension Lumber to Paper Production

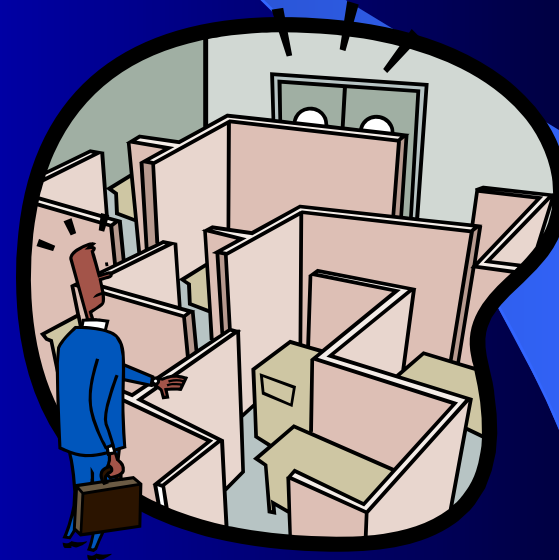
Reserve Pool	Weighted Permanence Factor
0%	0.058
10%	0.09
20%	0.135
30%	0.2
40%	0.28
50%	0.427

# Improved Forest Management Protocol

- Some differences with Afforestation Protocol
  - Storage in HWP somewhat changed by appurtenancy
  - Need to determine fiber flows around chip trading to set product mixtures for HWP quantification

# Improved Forest Management Protocol

- Timeline to completion
  - Seeking synergies with Afforestation Protocol
  - Much technical work to do thereafter on quantification methods, fiber flows, verification



# Direct Reduction Protocol

- Focus on reduction of GHG emissions arising from changes in harvesting process
- Funded by DMI



# Direct Reduction Protocol

- Being built generically to permit application to other changes in forest operational processes
- Linkages to existing protocols
  - Biomass Quantification Protocol
  - Modal Freight Shift Protocol

# Direct Reduction Protocol

- Technical Seed Document under development
  - Technical Review Committee met on May 5, 2010 to review
  - Revisions by end of May

# Direct Reduction Protocol

- Technical Protocol Plan developed by end June
- Posting soon thereafter
- Goal is to meet 5<sup>th</sup> Round Submission