9.8.5 Widely Spaced Tree Plantings

9.8.5.1 General Provisions

CCX Members and Participant Members may earn Carbon Financial Instruments for widely spaced tree planting projects initiated on or after January 1, 1990, on land not forested, or on land that had been degraded or unforested condition on December 31, 1989. The determination of density specifications for widely-spaced will be determined by the CCX Forestry Committee.

CCX aggregators must maintain a detailed database documenting planting dates and establishing that landowners with significant direct greenhouse gas emissions must be CCX Members in order to earn Carbon Financial Instruments for widely spaced tree planting projects. CCX aggregators must provide contractual evidence with each individual landowner regarding the permanence of maintaining the tree plantings into the future.

9.8.5.2 Quantification

The coefficients in Appendix Table 9.2B shall be applied for widely spaced tree planting Projects, including urban and suburban tree planting programs, undertaken in the U.S. and Canada. The CCX Forestry Committee may recommend modifications to the Tables provided in Appendix 9.2.

Appendix 9.2B Methods for Quantifying Carbon Accumulation for Urban and Suburban Tree Planting Programs

Step 1: Determine the number and species of qualifying live trees standing at the end of 2002 (or upon Project registration) on lands included in the CCX-registered Project. Qualifying trees are those planted after December 31, 1989 on sites not forested at that time.

Annual carbon sequestration values are calculated **per one hundred trees**.

Step 2: Reference Table 9.3B to determine how many trees in the Project (rounded to the nearest hundred) correspond to the tree types listed below (species: H = Hardwood, C = Conifer) and growth rates (S = Slow, M = Moderate, F = Fast).

Do not include trees with diameters less than 1 inch at breast height.

Step 3: Apply the annual carbon accumulation values provided in Table 9.3C to determine annual metric tons of CO_2.

For the purpose of calculating Tree Age in order to use Table 9.3C, zero-year trees are 1 inch in diameter at Breast Height (total diameter at Breast Height of all trunks for multi-trunk trees).

To calculate Tree Age for trees with a diameter greater than 1 inch, use the following formula:

(Tree diameter (in inches) – 1) multiplied by 3. Round the result to the nearest whole number.

Retain all worksheets, calculations, field assessments and other information on tree counts.

Calculation Example:	A city planted 10,000 two-inch diameter White Ash trees in 1996. Those trees were therefore age 3 in 1996, so they are age 10 during 2003. The city concludes that 90% of the trees survived through 2002 (9,000 remain alive).

The carbon sequestration calculation is as follows:

Tree type:	White Ash
Tree count:	9,000
Tree types, growth rate:	H, F
Carbon accumulated during 2003	90 x 2.25 = 202.5 metric tons CO_2 (round up to 203 metric tons).

Appendix Table 9.2B1 Tree Types and Growth Rates Applied to Urban and Suburban Tree Plantings[30]

Species	Type	Growth Rate	Species	Type	Growth Rate
Ailanthus, *Ailanthus altissima*	H	F	Maple, bigleaf, *Acer macrophyllum*	H	S
Alder, European, *Alnus glutinosa*	H	F	Maple, Norway, *Acer platanoides*	H	M
Ash, green, *Fraxinus pennsylvanica*	H	F	Maple, red, *Acer rubrum*	H	M
Ash, mountain, American, *Sorbus americana*	H	M	Maple, silver, *Acer saccharinum*	H	M
Ash, white, *Fraxinus americana*	H	F	Maple, sugar, *Acer saccharum*	H	S
Aspen, bigtooth, *Populus grandidentata*	H	M	Mulberry, red, *Morus rubra*	H	F
Aspen, quaking, *Populus tremuloides*	H	F	Oak, black, *Quercus rubra*	H	M
Baldcypress, *Taxodium distichum*	C	F	Oak, blue, *Quercus douglasii*	H	M
Basswood, American, *Tilia americana*	H	F	Oak, bur, *Quercus macrocarpa*	H	S
Beech, American, *Fagus grandifolia*	H	S	Oak, California black, *Quercus kelloggii*	H	S
Birch, paper (white), *Betula papyrifera*	H	M	Oak, California White, *Quercus lobata*	H	M
Birch, river, *Betula nigra*	H	M	Oak, canyon live, *Quercus chrysolepsis*	H	S
Birch, yellow, *Betula alleghaniensis*	H	S	Oak, chestnut, *Quercus primus*	H	S
Boxelder, *Acer negundo*	H	F	Oak, Chinkapin, *Quercus muehlenbergii*	H	M
Buckeye, Ohio, *Aesculus glabra*	H	S	Oak, Laurel, *Quercus laurifolia*	H	F
Catalpa, northern, *Catalpa speciosa*	H	F	Oak, live, *Quercus virginiana*	H	F
Cedar-red, eastern, *Juniperus virginiana*	C	M	Oak, northern red, *Quercus rubra*	H	F
Cedar-white, northern, *Thuja occidentalis*	C	M	Oak, overcup, *Quercus lyrata*	H	S
Cherry, black, *Prunus serotina*	H	F	Oak, pin, *Quercus palustris*	H	F
Cherry, pin, *Prunus pennsylvanica*	H	M	Oak, scarlet, *Quercus coccinea*	H	F
Cottonwood, eastern, *Populus deltoides*	H	M	Oak, swamp white, *Quercus bicolor*	H	M
Crabapple, *Malus spp.*	H	M	Oak, water, *Quercus nigra*	H	M
Cucumbertree, *Magnolia acuminata*	H	F	Oak, white, *Quercus alba*	H	S
Dogwood, flowering, *Cornus florida*	H	S	Oak, willow, *Quercus phellos*	H	M
Elm, American, *Ulmus Americana*	H	F	Pecan, *Carya illinoensis*	H	S
Elm, Chinese, *Ulmus parvifolia*	H	M	Pine, European black, *Pinus nigra*	C	S
Elm, rock, *Ulmus thomasii*	H	S	Pine, jack, *Pinus banksiana*	C	F
Elm, September, *Ulmus serotina*	H	F	Pine, loblolly, *Pinus taeda*	C	F
Elm, Siberian, *Ulmus pumila*	H	F	Pine, longleaf, *Pinus palustris*	C	F
Elm, slippery, *Ulmus rubra*	H	M	Pine, ponderosa, *Pinus ponderosa*	C	F
Fir, balsam, *Abies balsamea*	C	S	Pine, red, *Pinus resinosa*	C	F
Fir, Douglas, *Pseudotsuga menziesii*	C	F	Pine, Scotch, *Pinus sylvestris*	C	S
Ginkgo, *Ginkgo biloba*	H	S	Pine, shortleaf, *Pinus echinata*	C	F
Hackberry, *Celtis occidentalis*	H	F	Pine, slash, *Pinus elliottii*	C	F
Hawthorne, *Crataegus spp.*	H	M	Pine, Virginia, *Pinus virginiana*	C	M
Hemlock, eastern, *Tsuga canadensis*	C	M	Pine, white eastern, *Pinus strobus*	C	F

30 "Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings," in Energy Information Administration, U.S. Department of Energy, *Voluntary Reporting of Greenhouse Gases*, April 1998.

Species	Type	Growth Rate	Species	Type	Growth Rate
Hickory, bitternut, *Carya cordiformis*	H	S	Poplar, yellow, *Liriodendron tulipifera*	H	F
Hickory, mockernut, *Carya tomentosa*	H	M	Redbud, eastern, *Cercis canadensis*	H	M
Hickory, shagbark, *Carya ovata*	H	S	Sassafras, *Sassafras albidum*	H	M
Hickory, shellbark, *Carya laciniosa*	H	S	Spruce, black, *Picea mariana*	C	S
Hickory, pignut, *Carya glabra*	H	M	Spruce, blue, *Picea pungens*	C	M
Holly, American, *Ilex opaca*	H	S	Spruce, Norway, *Picea abies*	C	M
Honeylocust, *Gleditsia triacanthos*	H	F	Spruce, red, *Picea rubens*	C	S
Hophornbeam, eastern, *Ostrya virginiana*	H	S	Spruce, white, *Picea glauca*	C	M
Horsechestnut, common, *Aesculus Hippocastanum*	H	F	Sugarberry, *Celtis laevigata*	H	F
Kentucky coffeetree, *Gymnocladus dioicus*	C	F	Sweetgum, *Liquidambar styraciflua*	H	F
Linden, little-leaf, *Tilia cordata*	H	F	Sycamore, *Platanus occidentalis*	H	F
Locust, black, *Robinia pseudoacacia*	H	F	Tamarack, *Larix laricina*	C	F
London plane tree, *Platanus_X_acerifolia*	H	F	Walnut, black, *Juglans nigra*	H	F
Magnolia, southern, *Magnolia grandifolia*	H	M	Willow, black, *Salix nigra*	H	F

Type: H = Hardwood, C = Conifer Growth Rate: S = Slow, M = Moderate, F = Fast

Appendix 9.2B2 Annual CCX Carbon Accumulation Quantities for Urban and Suburban Tree Plantings (Metric tons CO_2) per One Hundred Trees by Tree Type and Age

Annual Sequestration Rates by Tree Type and Growth Rate *(metric tons CO_2 per one hundred trees)*							
		Hardwood			Conifer		
Tree Age*	Tree diameter (at 4.5 feet height)	Slow	Moderate	Fast	Slow	Moderate	Fast
0	1 inch	0.15	0.22	0.31	0.08	0.12	0.16
1	1.33"	0.19	0.31	0.47	0.10	0.17	0.26
2	1.66"	0.23	0.41	0.63	0.13	0.23	0.36
3	2.0"	0.28	0.50	0.80	0.16	0.29	0.48
4	2.33"	0.33	0.61	0.99	0.19	0.36	0.61
5	2.66"	0.37	0.71	1.18	0.22	0.43	0.75
6	3.0"	0.43	0.83	1.38	0.26	0.51	0.89
7	3.33"	0.48	0.94	1.59	0.29	0.59	1.04
8	3.66"	0.54	1.06	1.81	0.33	0.68	1.19
9	4.0"	0.58	1.19	2.03	0.36	0.77	1.36
10	4.33"	0.64	1.31	2.25	0.41	0.86	1.54
11	4.66"	0.70	1.43	2.48	0.44	0.96	1.71
12	5.0"	0.76	1.57	2.72	0.49	1.06	1.90
13	5.33"	0.82	1.70	2.96	0.54	1.15	2.09
14	5.66"	0.87	1.84	3.21	0.57	1.26	2.28
15	6.0"	0.94	1.97	3.46	0.62	1.38	2.49
16	6.33"	1.00	2.11	3.72	0.66	1.48	2.70
17	6.66"	1.06	2.26	3.97	0.71	1.60	2.91
18	7.0"	1.13	2.40	4.23	0.77	1.71	3.14
19	7.33"	1.19	2.55	4.50	0.82	1.83	3.36
20	7.66"	1.26	2.70	4.78	0.86	1.95	3.59
21	8.0"	1.33	2.84	5.05	0.92	2.07	3.82
22	8.33"	1.40	3.01	5.33	0.97	2.20	4.07
23	8.66"	1.46	3.16	5.61	1.03	2.33	4.31
24	9.0"	1.53	3.31	5.90	1.07	2.46	4.56
25	9.33"	1.60	3.47	6.19	1.13	2.59	4.81
26	9.66"	1.67	3.64	6.48	1.19	2.73	5.07
27	10.0"	1.75	3.79	6.77	1.25	2.87	5.33
28	10.33"	1.82	3.95	7.08	1.31	3.01	5.59
29	10.66"	1.89	4.11	7.38	1.36	3.15	5.86

Appendix 9.2Ci CCX Approved Certification Schemes for Sustainable Forest Management[31]

Country	Name	Schemes
Australia	Australian Forestry Standard Limited	Australian Forest Certification Scheme
Austria	PEFC Austria	Austrian Forest Certification Scheme (2006)
Belarus	Belarusian Association of Forest Certification	
Belgium	WoodNet - Commission PEFC Belgique	Belgian Forest Certification Scheme
Brazil	National Institute of Metrology, Standardization and Industrial Quality	Cerflor - Brazilian Program of Forest Certification
Canada	CSA International; SFI, Inc.	CSA Sustainable Forest Management Program SFI – Sustainable Forestry Initiative
Chile	CertforChile Forest Certification Corporation	CertforChile
Czech Republic	PEFC Czech Republic	Czech Forest Certification Scheme (2006)
Denmark	PEFC Denmark	Danish Forest Certification Scheme
Estonia	Estonian Forest Certification Council	Estonian Forest Certification Scheme
Finland	Finnish Forest Certification Council	Finnish Forest Certification Scheme
France	PEFC France	French Forest Certification Scheme (2006)
Gabon	PAFC Gabon	PAFC Gabon Forest Certification Scheme
Germany	PEFC Germany e.V	Revised German Forest Certification Scheme (2005)
Ireland	PEFC Council of Ireland	
Italy	PEFC Italy	Italian Forest Certification Scheme
Latvia	PEFC Latvia Council	Latvian Forest Certification Scheme
Lithuania	PEFC Lietuva (PEFC Lithuania)	Lithuanian Forest Certification Scheme
Luxembourg	PEFC Luxembourg	Luxembourg Certification Scheme for Sustainable Forest Management

[31] http://www.pefc.org/internet/html/members_schemes/4_1120_59.htm

Malaysia	Malaysian Timber Certification Council	
Norway	PEFC-Norway	Norwegian Living Forest Standard and Certification Scheme
Poland	PEFC Polska	Polish Forest Certification Scheme
Portugal	Portuguese Forestry Sector Council	Portuguese Forest Certification Scheme
Russia	Partnership on the Development of PEFC Forest Certification	
Slovakia	Slovak Forest Certification Association	Slovak Forest Certification Scheme
Slovenia	Institute of Forest Certification Slovenia	Slovenian Forest Certification Scheme
Spain	PEFC España	Spanish Forest Certification Scheme
Sweden	Swedish PEFC Co-operative	Swedish Forest Certification Scheme
Switzerland	PEFC Switzerland and HWK-Zertifizierungsstelle	Swiss Q-label certification scheme
United Kingdom	PEFC UK Ltd.	UK Scheme for Sustainable Forest Management
	-	PEFC UK certification scheme for sustainable forest management (revised 2006)
United States	Sustainable Forestry Inc. American Forest Foundation (AFF)	SFI - Sustainable Forestry Initiative American Tree Farm System Group Certification
International	Forest Stewardship Council (FSC)	Forest Stewardship Council (FSC)

Appendix 9.2Cii . Selected CCX factors for Average Disposition Patterns of Carbon as fractions of Roundwood by Region and Roundwood Category (assuming no bark on roundwood and excluding fuel wood)[32]

Region	Softwood Sawlog	Softwood Pulpwood	Hardwood Sawlog	Hardwood Pulpwood
Northeast	0.318	0.09	0.316	0.261
North Central	0.346	0.092	0.297	0.304
Pacific Northwest (East)	0.337	0.337	0.265	0.265
Pacific Northwest (West)	0.409	0.076	0.477	0.477
Pacific Southwest	0.355	0.355	0.265	0.265
Rocky Mountain	0.367	0.367	0.265	0.265
Southeast	0.336	0.141	0.304	0.188
South Central	0.334	0.162	0.285	0.176

Appendix 9.2Ciii . Volume Multipliers for Converting Timber and Chip Units into Thousand Cubic Feet (MCF)[33]

Unit	Factor
Bone Dry Tons	0.0713
Bone Dry Units	0.0825
Cords	0.075
Cubic Meters	0.0353
Cunits-Chips (CCF)	0.1
Cunits-Roundwood	0.1
Cunits-Whole tree chip	0.126
Green Tons	0.0315
MBF-Doyle	0.222
MBF-International 1/4"	0.146
MBF-Scribner ("C" or "Small")	0.165
MBF-Scribner ("Large" or "Long")	0.145
MCF-Thousand Cubic Feet	1
Oven Dried Tonnes	0.0758

[32] Source: Technical Guidelines for Voluntary Reporting of Greenhouse Gas Program. Part I Appendix Forestry. Table 1.6 Average disposition patterns of carbon as fraction in roundwood by region and roundwood category. Pages 36-48 March 2006

[33] American Forest & Paper Association, Sustainable Forestry Initiative Program Annual Progress Reporting Form.

Appendix 9.2Civ Basic Factors for Converting Merchantable Wood Yield to Carbon Yield by Species[34]

		Specific Gravity	Lbs. per Dry cu. foot	Percent Carbon	Lbs C per Cubic foot
Region	Forest Type				
SE	Loblolly Pine	0.47	29.33	0.531	15.57
SE	Longleaf Pine	0.54	33.70	0.531	17.89
SE	Oak-Hickory (SI = 79)	0.61	38.06	0.479	18.23
NE	Pines	0.41	25.58	0.521	13.33
NE	Spruce-fir	0.37	23.09	0.521	12.03
NE	Oak-hickory (all)	0.61	38.06	0.498	18.96
NE	Maple-beech-birch	0.61	38.06	0.498	18.96
NC	Pines	0.41	25.58	0.521	13.33
NC	Spruce-fir	0.37	23.09	0.521	12.03
NC	Oak-hickory	0.61	38.06	0.498	18.96
NC	Maple-beech	0.58	36.19	0.498	18.02
NC	Aspen-birch	0.46	28.70	0.498	14.29
West	Douglas-fir	0.45	28.08	0.512	14.38
West	Ponderosa pine	0.38	23.71	0.512	12.14
West	Fir-spruce	0.35	21.84	0.512	11.18
West	Hemlock-Sitka sp.	0.43	26.83	0.512	13.74
West	Lodgepole pine	0.42	26.21	0.512	13.42
West	Redwoods	0.42	26.21	0.512	13.42
West	Hardwoods	0.38	23.71	0.496	11.76

[34] Birdsey 1996 (See also Appendices 2 & 3, Sampson and Hair 1996)

Appendix 9.2Di. CCX Forest Project Summary Form

CCX Forest Project Summary Form	
CCX Aggregator	
Project Name	
Geographic Region	
CCX Forest Offset Project Type	
Estimated Annual Metric Tons	
CCX Program Years	
Were Subaggregators Used on Project?	
Project Verifier	
Description of Consulting Services Utilized in Project Proposal Development	