

NON-PERMANENCE RISK REPORT



Blue Source LLC

Project Title	Bethlehem Authority IFM
Version	1.0
Date of Issue	December 2012
Project ID	N/A
Monitoring Period	29-05-2012 to 31-12-2012
Prepared By	Blue Source LLC
Contact	3165 E. Millrock Drive, Ste 340, Holladay, UT, 84121

1 INTERNAL RISK

Project Management		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a) Species Planted	Planting within the project area will not be extensive and all species planted will be native or proven to be adapted to the same or similar agro-ecological zone(s) in which the project is located. Additionally, the Pennsylvania Department of Conservation and Natural Resources (DCNR) will approve all planted trees species.	0
b) Ongoing Enforcement	No history of illegal activities exists in the region. No supplemental enforcement is required to protect forests within the project area.	0
c) Management Team	The management team has significant experience conducting forest carbon projects and possesses the skills necessary to successfully undertake all project activities. Blue Source been involved in carbon project development since 2002 and has staff with expertise in all areas of forest project development. Staff capabilities include: project evaluation, project description document drafting, geospatial analysis, carbon modeling, forest mensuration, project financial analysis, and ghg offset marketing. TNC is an internationally respected NGO that has been active in environmental management for over 60 year. TNC's Pennsylvania chapter has a staff of qualified natural resource managers and is responsible for Pennsylvania's Working Woodlands forest conservation program designed to protect the states forests while improving private forest management, providing revenue for forest landowners, and fighting climate change. Woodland Management Services (WMS) specializes in forest management, timberland investment, and land conservation services. WMS staff holds professional degrees in Forestry, Environmental Management, Biology, and Environmental Studies, and collectively bring 45 years of forest management experience to the organization.	0
d) Management Team Location	All three organizations comprising the management team have offices in the US and both TNC and WMS have offices in the vicinity of the project area. WMS - 308 Egypt Road, Tafton, PA 18464 TNC - Hauser Nature Center, Long Pond Road, Long Pond, PA 18334	0
e) Mitigation: AFOLU/Carbon expertise	Blue Source has deep experience in forest carbon project development and has more publicly registered third-party verified GHG offsets than any other company in North America. TNC has a long history working with forest based carbon projects and has been the Project Proponent for two of the four VCS AFOLU projects to be completed in the US to date.	-2
f) Mitigation: Adaptive Management Plan	The project's Forest Management Plan includes measures to identify, asses, and address threats to forest health and vitality. The plan was written in accordance with FSC principle 8, which requires the project proponent to "monitor achievement of management objectives, impacts and condition of management unit in order to implement adaptive management".	-2

	[The Forest Management Plan is provided separately for validation and verification purposes]	
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		-4

Financial Viability		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Project cash flow breakeven point is greater than 10 years from the current risk assessment	N/A
b)	Project cash flow breakeven point is between 7 and up to 10 years from the current risk assessment	N/A
c)	Project cash flow breakeven point between 4 and up to 7 years from the current risk assessment	N/A
d)	Project cash flow breakeven point is less than 4 years from the current risk assessment. Based on the cash flow analysis provided for validation and verification purposes (See the RiskTool_Financials, <i>Breakeven</i> tab in the <i>Project Financials</i> folder), the Bethlehem IFM project reaches breakeven in year one. Forest carbon offset prices were based on private and public data and are sighted in the financial model provided for verification and validation purposes (See the RiskTool_Financials, <i>Breakeven</i> tab in the <i>Project Financials</i> folder). Due to data uncertainties associated with datasets on PA stumpage values, we applied an extensive dataset covering the years 2004 to 2010 on stumpage values from NY and MA mills (NorthernWoodLands 2012). Hardwood forests in PA, NY and MA are dominated by variations of the beech-birch-maple type which justifies the substitution of NY and MA stumpage values for PA conditions concerning timber species assessed. From 2004 to 2010, hardwood sawtimber averaged at \$162/mbf and softwood sawtimber averaged at \$52/mbf. We assumed an average hardwood pulp stumpage at \$2 per green short ton as well as a nominal price increase of 1.1% per year for sawlogs (Sendak et al. 2003) and 2.0% for pulp. The discount rate was set at 5%. Hardwood pulpwood was converted from cubic feet to green short tons at a rate of 51 pounds/cubic foot based on the average density of hardwoods in the Northeast (USDA 2008). An annual discount rate of 5% was applied to the project based on the average 10-year US treasury rate since January 2000¹.	0
e)	Project has secured less than 15% of funding needed to cover the total cash out before the project reaches breakeven	N/A
f)	Project has secured 15% to less than 40% of funding needed to cover the total cash out required before the project reaches breakeven	N/A
g)	Project has secured 61% (\$75,932) of funding needed to cover the total cash out required	1

¹ <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=longtermrateAll>

	before the project reaches breakeven. See invoices and contractual agreements provided separately for validation and verification purposes. These documents can be found in the <i>Invoices</i> subfolder within the <i>Project Financials</i> folder.	
h)	Project has secured 80% or more of funding needed to cover the total cash out before the project reaches breakeven. Blue Source and The Nature Conservancy have supplied sufficient funding to cover all project costs prior to breakeven.	N/A
i)	Mitigation: Project has available as callable financial resources at least 50% of total cash out before project reaches breakeven.	N/A
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] Total may not be less than zero.		1

Opportunity Cost		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	NPV from the most profitable alternative land use activity is expected to be at least 100% more than that associated with project activities; or where baseline activities are subsistence-driven, net positive community impacts are not demonstrated	N/A
b)	NPV from the most profitable alternative land use activity is expected to be between 50% and up to 100% more than from project activities	N/A
c)	NPV from the most profitable alternative land use activity is expected to be between 20% and up to 50% more than from project activities	N/A
d)	NPV from the most profitable alternative land use activity is expected to be between 20% more than and up to 20% less than from project activities; or where baseline activities are subsistence-driven, net positive community impacts are demonstrated	N/A
e)	At \$9,267,446, NPV (5% discount rate) from the Legal Common Practice Baseline is projected to be 33% greater than the NPV from Project Activities (\$6,962,391). (See RiskTool_Financials, <i>Opportunity_Cost</i> tab in the <i>Project Financials</i> folder provided for validation and verification purposes).	2
f)	NPV from project activities is expected to be at least 50% more profitable than the most profitable alternative land use activity	N/A
g)	Mitigation: Project proponent is a non-profit organization	N/A
h)	Mitigation: The project is protected by a legally binding easement, committing the land owner to continue management practices that protect the credited carbon stocks over the length of the project crediting period	N/A
i)	Mitigation: Project is protected by legally binding commitment to continue management practices that protect the credited carbon stocks over at least 100 years	N/A
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g or h)] Total may not be less than 0.		2

Project Longevity		
a)	Without legal agreement or requirement to continue the management practice	N/A
b)	With legal agreement or requirement to continue the management practice	$30 - (100/2) = 0$
Total Project Longevity (PL) May not be less than zero		0

Internal Risk	
Total Internal Risk (PM + FV + OC + PL) Total may not be less than zero.	$(-4+1+2+0) = 0$

2 EXTERNAL RISKS

Land Ownership and Resource Access/Use Rights		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a) Ownership	The Bethlehem Authority holds both ownership rights and resource access/use rights.	0
b)	Ownership and resource access/use rights are held by different entity(s) (eg, land is government owned and the project proponent holds a lease or concession)	N/A
c)	In more than 5% of the project area, there exist disputes over land tenure or ownership	N/A
d)	There exist disputes over access/use rights (or overlapping rights)	N/A
e) Mitigation: Legal commitment	The Project area is protected by a legally binding easement requiring the continuation of management practices that protect carbon stocks over the length of the project crediting period	N/A
f)	Mitigation: Where disputes over land tenure, ownership or access/use rights exist, documented evidence is provided that projects have implemented activities to resolve the disputes or clarify overlapping claims	N/A
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e+ f)] Total may not be less than zero.		0

Community Engagement		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Less than 50 percent of households living within the project area who are reliant on the project area, have been consulted (No households are located within the	N/A

	project area)	
b)	Less than 20 percent of households living within 20 km of the project boundary outside the project area, and who are reliant on the project area, have been consulted	N/A
c)	Mitigation: The project generates net positive impacts on the social and economic well-being of the local communities who derive livelihoods from the project area	N/A
Total Community Engagement (CE) [where applicable, (a+b+c)] Total may be less than zero.		0

Political Risk																																
Risk Factor	Risk Factor and/or Mitigation Description			Risk Rating																												
a)	Governance score of less than -0.79			N/A																												
b)	Governance score of -0.79 to less than -0.32			N/A																												
c)	Governance score of -0.32 to less than 0.19			N/A																												
d)	Governance score of 0.19 to less than 0.82			N/A																												
e)	The average World Governance Indices (WGI) score for the United States, based on the WGI's six governance categories, for 2007-2011 = 1.22 <table><tr><th colspan="4">Average Combined Ranking for all 6 WGI Categories</th></tr><tr><th>Year</th><th>Percentile Rank</th><th>Governance Score</th><th>5-year Average Governance Score</th></tr><tr><td>2011</td><td>84.50</td><td>1.23</td><td>1.22</td></tr><tr><td>2010</td><td>83.71</td><td>1.20</td><td></td></tr><tr><td>2009</td><td>83.12</td><td>1.18</td><td></td></tr><tr><td>2008</td><td>85.49</td><td>1.28</td><td></td></tr><tr><td>2007</td><td>83.94</td><td>1.23</td><td></td></tr></table>			Average Combined Ranking for all 6 WGI Categories				Year	Percentile Rank	Governance Score	5-year Average Governance Score	2011	84.50	1.23	1.22	2010	83.71	1.20		2009	83.12	1.18		2008	85.49	1.28		2007	83.94	1.23		0
Average Combined Ranking for all 6 WGI Categories																																
Year	Percentile Rank	Governance Score	5-year Average Governance Score																													
2011	84.50	1.23	1.22																													
2010	83.71	1.20																														
2009	83.12	1.18																														
2008	85.49	1.28																														
2007	83.94	1.23																														
f) Mitigation per sec. 2.3.3	The U.S. has an established FSC standard body. This qualifies the project for a mitigation deduction based on 2.3.3. d)			-2																												
Total Political (PC) [as applicable ((a, b, c, d or e) + f)] Total may not be less than zero.				0																												

External Risk	
Total External Risk (LT + CE + PC) Total may not be less than zero.	(0+0+0) = 0

3 NATURAL RISKS

Natural Risk - Fire	
Significance	Insignificant – Over the last century, no more 4% of Pennsylvania's forests have been exposed to fire damage in a single year and over the last 50 years human fire prevention efforts have kept fire outbreaks far below historic levels (no more than 1% of PA's forests have been exposed to fire in a single year since 1952) ² .
Likelihood	Every 25 to 50 years (This is conservatively chosen as the reduced number of fires in recent decades have lead to higher than average fuel load within PA forest understories. Though large-scale fires are not likely to occur, this fuel load increases the potential of a fire event in the future.)
Score (LS)	1
Mitigation	0.5 – The Pennsylvania Bureau of Forestry has an active professional fire crew responsible for suppressing forest fires throughout the region. Additionally, a wildfire response plan is currently under development by TNC for the entire project area.

Natural Risk - Pest and Disease outbreaks	
Significance	Major - Beech bark disease, gypsy moth, and hemlock wooly adelgid have been sporadically present within the project region since the early 1980s. Beech bark disease has had an impact in many of the northern hardwood species, resulting in crown dieback, and some mortality. Gypsy moth caterpillars have periodically exhibited population explosions, which stress the oak forests of the region.
Likelihood	Every 10 to 25 years
Score (LS)	5
Mitigation	0.25 – Both TNC and Woodland Management Services (WMS) have a proven history dealing with forest pests and disease mitigation. Throughout the project inventory, notes were taken at high conservation value plots defining plot condition in relation to forest stressors. Sites of concern will be regularly monitored to promote improved health and insure conditions do not worsen. As is stated in the project Forest Management Plan, an adaptive approach involving the use of FSC approved pesticides will be implemented to prevent pest/disease outbreak. [The Forest Management Plan is provided separately for validation and verification purposes]

² http://www.dcnr.state.pa.us/ucmprd1/groups/public/documents/document/dcnr_004230.pdf

Natural Risk - Extreme Weather	
Significance	Minor – Hurricane's rarely hit Pennsylvania with enough force to cause significant tree mortality. According to the National Oceanic and Atmospheric Administration (NOAA) only one "level rated" hurricane has directly hit PA since 1851 ³ . Tornadoes do strike PA with some regularity, but academic research has shown that the highest-powered tornadoes in the region do not typically cause tree mortality above 32% to forests directly within a tornado's path ⁴ . Studies of ice storm impacts in the northeastern United States reveal that ice storms occur in the region ~twice a century. Unlike hurricanes and tornadoes, ice storms do not cause significant tree blow-down, instead they tend to damage tree crowns, an injury that doesn't typically lead to mortality unless total crown damage is >50% ⁵ .
Likelihood	Every 25 to 50 years
Score (LS)	1
Mitigation	1

Natural Risk – Geological Risk	
Significance	Insignificant - No major volcanic activity has occurred in Pennsylvania in >200 million years, and earthquakes powerful enough to cause significant forest mortality are absent in the region ⁶ .
Likelihood	Once every 100 years or more
Score (LS)	0
Mitigation	1

Natural Risk – Other Risk	
Significance	No Loss – No other natural risks are of serious concern to the project area.
Likelihood	N/A
Score (LS)	0
Mitigation	1

³ <http://www.aoml.noaa.gov/hrd/tcfaq/E19.html>

⁴ Peterson, Chris J. *Damage and recovery of tree species after two different tornadoes in the same old growth forest: a comparison of infrequent wind disturbances*. Forest Ecology and Management. Volume 135, Issues 1–3, 15 September 2000, Pages 237–252

⁵ http://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs60.pdf

⁶ Personal communication with Helen Delano, Sr. Geologic Scientist, PA Department of Conservation and Natural Resources

Score for each natural risk applicable to the project (Determined by $LS \times M$)	
Fire (F)	$1 \times 0.5 = 0.5$
Pest and Disease Outbreaks (PD)	$5 \times 0.25 = 1.25$
Extreme Weather (W)	$1 \times 1 = 1$
Geological Risk (G)	$0 \times 1 = 0$
Other natural risk (ON)	$0 \times 1 = 0$
Total Natural Risk (as applicable, $F + PD + W + G + ON$)	2.75

4 OVERALL NON-PERMANENCE RISK RATING AND BUFFER DETERMINATION

4.1 Overall Risk Rating

Risk Category	Rating
a) Internal Risk	0
b) External Risk	0
c) Natural Risk	2.75
Overall Risk Rating (a + b + c)	3

4.2 Calculation of Total VCUs

At the minimum risk rating of 10, a total of 94,337 credits will be deposited in the AFOLU pooled buffer based strictly on the change in carbon stocks. This results in a total project issuance of 849,033 VCUs prior to any buffer reimbursement.