



VERIFICATION REPORT FOR BETHLEHEM AUTHORITY IMPROVED FOREST MANAGEMENT PROJECT



Document Prepared by Ruby Canyon Environmental, Inc.

Project Title	Bethlehem Authority Improved Forest Management Project
Version	2.0
Report ID	2020_RCE_VCS_9

Report Title	Verification Report for Bethlehem Authority Improved Forest Management Project
Client	Bluesource
Pages	14
Date of Issue	8-December-2020
Prepared By	Ruby Canyon Environmental, Inc.
Contact	743 Horizon Ct. Suite 385 Grand Junction, Colorado 81506 1-970-241-9298

	www.rubycanyonenv.com
Approved By	Phillip Cunningham
Work Carried Out By	Zach Eyler Christian Eggleton Tim Facemire Christopher Cartwright

Summary:

The Bethlehem Authority Improved Forest Management Project (Project) is located on 17,527 acres in Monroe County and Carbon County, Pennsylvania. The Project extends the rotation age of the timber resource on the property by approximately 70 years compared to Common Practice, thereby reducing carbon emissions and increasing carbon sequestration. The project activities result in the reduction of greenhouse gases (GHG) including carbon dioxide (CO₂).

Bluesource contracted with Ruby Canyon Environmental, Inc. (RCE) to perform the verification of emission reductions during this monitoring period from 1 January 2019 to 31 December 2019. Bluesource manages the Project regarding the calculation of emissions reductions for Bethlehem Authority.

The purpose of the verification is to ensure that the Project Proponent implemented the project activity according to the monitoring plan, that the emission reduction assertion submitted by Bluesource and Bethlehem Authority is materially correct and free of errors and omissions, and that the Project meets all criteria requirements. Specifically, RCE assessed the Project against the Approved VCS Methodology VM0003 Methodology for Improved Forest Management through Extension of Rotation Age, Version 1.1 (Methodology). RCE assessed the Project Monitoring Report, including the Project's monitoring plan, based on the above criteria documents as well as relevant VCS criteria and guidance documents.

During the verification process, RCE completed a site visit to the Project area as well as a desk review of the monitoring report and supporting documents to confirm that Project Proponents implemented the project activity as stated in the validated VCS Project Description (PD). This included a review of data and information control systems and interviews with key personnel. During the verification, RCE issued Corrective Action Requests (11), Non-material Findings (1), and Clarification Requests (7) which are described in Appendix A. Bluesource and Bethlehem Authority provided adequate responses to all requests. RCE did not find any significant uncertainties associated with the verification.

RCE concludes, to a reasonable level of assurance, that the Project's GHG assertion of 20,745 metric tonnes of CO₂ equivalent emissions for the period of 1 January 2019 to 31 December 2019 is fairly stated.

1	Introduction	4
1.1	Objective	4
1.2	Scope and Criteria	4
1.3	Level of Assurance	4
1.4	Summary Description of the Project	5
2	Verification Process	5
2.1	Method and Criteria	5
2.2	Document Review	6
2.3	Interviews	6
2.4	Site Inspections	7
2.5	Resolution of Findings	7
2.5.1	Forward Action Requests	7
2.6	Eligibility for Validation Activities	7
3	Validation Findings	8
3.1	Participation under Other GHG Programs	8
3.2	Methodology Deviations	8
3.3	Project Description Deviations	8
3.4	Grouped Project	9
4	Verification Findings	9
4.1	Project Implementation Status	9
4.2	Safeguards	10
4.2.1	No Net Harm	10
4.2.2	Local Stakeholder Consultation	10
4.3	AFOLU-Specific Safeguards	10
4.4	Accuracy of GHG Emission Reduction and Removal Calculations	10
4.5	Quality of Evidence to Determine GHG Emission Reductions and Removals	11
4.6	Non-Permanence Risk Analysis	11
5	Verification conclusion	11
	APPENDIX A: verification findings	13

1 INTRODUCTION

1.1 Objective

The objective of the verification is to ensure that the GHG emission assertion made by Bluesource and Bethlehem Authority is materially correct and that the data provided are accurate, complete, and transparent. Additionally, RCE ensured that the Project is in conformance with the criteria as stated in Section 1.2.

1.2 Scope and Criteria

The scope of the Project includes the boundary of the Project area which includes 17,527 acre split-parcel situated in Monroe County and Carbon County, Pennsylvania. The GHGs included in the scope of the Project are CO₂.

RCE conducted the verification based upon the following criteria:

- Verified Carbon Standard Version 4.0 (19 September 2019);
- VCS Program Guide Version 4.0 (19 September 2019);
- Validation and Verification Manual Version 3.2 (October 19, 2016);
- Approved VCS Methodology VM0003 Methodology for Improved Forest Management through Extension of Rotation Age, Version 1.1
- Validated VCS Project Description, dated 18 March 2013;
- ISO 14064-3:2006 Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions.

Additionally, RCE reviewed the Project's monitoring period-specific Monitoring Report Version 4.0 dated 12 November 2020, including the monitoring plan, during verification activities.

1.3 Level of Assurance

RCE conducted the verification to a reasonable level of assurance.

The VCS Standard defines materiality as errors, omissions, or discrepancies resulting in misstatement of greater than five percent of the Project's GHG assertion. Additionally, RCE considered qualitative non-conformances with criteria requirements as material during the verification process.

1.4 Summary Description of the Project

The Project extends the rotation age of the timber resource on the property by approximately 70 years compared to Common Practice, thereby reducing carbon emissions and increasing carbon sequestration. The Project area has been put under a 60-year term conservation easement with The Nature Conservancy (TNC) with the intention of conserving the property and managing its forest resources sustainably into perpetuity. The Project area has ecological, scientific, educational and aesthetic value in its present state as a natural area that has not been subject to development or severe exploitation. The Project area is comprised of primarily native forest types characteristic of the region and surrounds the headwaters of Tunkhannock Creek and Wild Creek that flow into the Delaware Basin. Interspersed with the hardwood forests are significant stands of mixed conifers and special habitat types including wetlands that provided habitat for a multitude of rare species and natural communities.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification process involved the following independent and objective activities:

- Select a Verification Team;
- Perform a Conflict of Interest Review;
- Conduct a kickoff meeting with Bluesource and Bethlehem Authority;
- Review the validated Project Description;
- Review the Validation Report;
- Review the current Monitoring Report, current version;
- Develop a verification plan and risk-based sampling plan;
- Conduct a site visit to the Project;
- Review the Project information control systems and quality control procedures;
- Review the Project's emission reduction calculations;
- Issue corrective action requests, additional documentation requests, and clarification requests, as necessary;
- Issue a verification report and verification representation; and

- Conduct an exit meeting with Bluesource and Bethlehem Authority.

2.2 Document Review

RCE selected the verification team according to its GHG Verification Policies & Procedures to ensure team members are qualified to perform verification activities pertaining to the Project.

The verification team consisted of the following individuals:

Lead Verifier: Zach Eyler

Technical Experts: Christian Eggleton (Professional Forester, FRST Corp), Tim Facemire (FRST Corp), Christopher Cartwright (Professional Forester, TLM Management)

Internal Reviewer: Phillip Cunningham

Prior to verification activities, RCE performed a Conflict of Interest Assessment to determine whether any potential conflicts exist with the project developer. No issues were discovered that would affect the impartiality or independence of the verification team.

RCE held a kickoff call with Bluesource on 18 June 2020. The purpose of the kickoff call was to introduce the Bluesource and the RCE verification team, review verification objectives and process, review VCS requirements, and to confirm the verification schedule.

RCE developed a verification plan and sampling plan that were used throughout the verification of this monitoring period. RCE created the plans after reviewing the Project Monitoring Report, validated Project Description, the VCS Standard (Version 4.0), and the methodology and methodology module. RCE performed a risk assessment based upon the criteria listed above and evidence provided to RCE by Bluesource and Bethlehem Authority for the current monitoring period.

RCE used the verification plan throughout the verification as a basis for assessing the completeness, consistency, accuracy, and transparency of the Project's GHG emission reductions. RCE's subcontractor, Christopher Cartwright, completed a site visit to the Project area from August 18-21, 2020 as described in Section 2.4.

2.3 Interviews

RCE held discussions with the following personnel during the verification:

- Liz Lott, Director, Bluesource
 - o Liz is responsible for the management of project data as well as the development and maintenance of the Project Monitoring Report and emissions reductions calculation. She also addressed all items noted in the list of findings.

- Robin Wildermuth, Owner, forester, Woodland Management Services, Inc.
 - o Robin is responsible for the forest management of the Project area as well as completing the Project inventory. Robin was present during the field visit.
- Steve Rapasch, Executive Director, Bethlehem Authority
 - o Steve is the Executive Director of the Project Proponent and was present for portions of the field visit.
- Dan Meixell, Security Manager, Bethlehem Authority
 - o Dan is the Security Manager of the Project Proponent and was present for portions of the field visit.

2.4 Site Inspections

RCE's subcontractor, Christopher Cartwright, conducted a site visit to the Project area from August 18-21, 2020. Christopher completed plot remeasurements in three strata (1, 5, 7) and a paired t-test was run against the Project's original plot measurements to confirm the accuracy of the inventory. In addition, Christopher performed reconnaissance on the Project area boundaries, stand boundaries as well as any areas where harvests were conducted. The three strata all eventually passed the paired t-test. Initially, stratum 7 failed, but was re-inventoried by Bethlehem Authority and then passed. No other issues were discovered during the site visit.

2.5 Resolution of Findings

During the verification process, RCE issued material corrective action requests (11), non-material findings (1) and clarification requests (7). RCE documented these requests in the List of Findings. Bluesource and Bethlehem Authority sufficiently addressed all material requests as documented in Appendix A.

2.5.1 Forward Action Requests

There were no forward action requests during the verification of the previous monitoring period nor during the verification of this monitoring period.

2.6 Eligibility for Validation Activities

RCE did not perform validation activities as part of the verification process.

3 VALIDATION FINDINGS

No validation activities took place during the verification of this monitoring period.

3.1 Participation under Other GHG Programs

The Project does not participate in any other GHG offset programs.

3.2 Methodology Deviations

There are two methodology deviations that have been present during previous verifications and monitoring periods. They are not identified in the validated PD. First, the procedures for measuring standing dead wood in the project's forest inventory slightly deviate from those prescribed in the VM0003 methodology as stumps were not included in the project's field measurements. The exclusion of stumps increased both model accuracy and ensured conservatism.

The second deviation is a five-class system was initially used to identify level of decay in standing dead trees. However, after data was recorded, classes 4 and 5 were merged to represent one class of dead trees with only the bole and no branches remaining. This left four total classes conforming to the descriptions of each class laid out in VM0003 v1.1.

3.3 Project Description Deviations

Bluesource and Bethlehem Authority identified and appropriately justified three Project description deviations in the Monitoring Report. These same deviations were identified and approved by a different verification body during previous monitoring periods.

1. The original PD only used three decay classes but was modified to a four-class approach in the updated project inventory to better align with the methods described in VM0003 v1.1.
2. During a forest inventory update it was discovered that a minor roads component that was erroneously omitted from the original forested Project area. The 63.4 acres occupied by these roads are no longer included as "forested acres" in the project scenario. Quantitative evidence was provided to the verification body demonstrating that the reduction of project acres did not have a material effect on the number of VCUs issued to the Project.

3. The PD erroneously showed -15,897 tCO₂e as the baseline emissions for 2013. The -15,897 value was calculated by subtracting the to-date GHG emission reductions and removals at year t1 (2012) from t2 (2013). However, the removals for year t2 (2013) in the original VCU calculations were incorrect. In the original calculations, year t2 (2013) was computed as two full years of baseline emissions (-12,086 x 2), but the first reporting period (2012) was 7 months, not 12 months. Therefore, the 2nd reporting period should be calculated as -12,086 x 1.58 for onsite stocks plus the sequestration from baseline wood products. The edit to baseline stocks results in baseline emissions of -10,821 tCO₂e for 2013 instead of -15,897 tCO₂e. This edit does not affect the number of credits issued for 2012, and only conservatively impacts the 2013 calculations.

RCE approves these deviations because they do not impact the applicability of the methodology, additionality, or appropriateness of the baseline scenario, and the Project remains in compliance with VCS rules.

3.4 Grouped Project

N/A, this is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The Project start date is 14 April 2011, as stated in the validated Project Description. The crediting period is for 100 years, beginning on 29 May 2012 and ending on 28 May 2112. RCE found that the Project was implemented in conformance with the validated Project Description except for the deviations noted above. RCE verified the previously validated methodology deviations noted above and confirmed that the Project continues to meet the requirements of the VCS Standard Version 4.0.

RCE confirmed that there were no changes to the project proponents for this monitoring period. The Project Proponent— Bethlehem Authority —is identified in the Monitoring Report. Bluesource is involved as the project developer and to provide technical assistance. Project ownership was assessed during the validation and the Project Proponent continues to hold the rights to the Project area and activities that generate GHG emission reductions. Additionally, Bethlehem Authority has not sought or received any other form of environmental credit.

The Project activities have been fully implemented as documented in the validated PD. The project is extending the rotation age of the forest resource, as compared to the common practice baseline scenario, using sustainable forest management practices. Management practices are being applied across the landscape to enhance local ecological features, remain in compliance with the conservation easement, follow the forest management plan, and maintain the FSC certification. Stratum 7 was re-inventoried during the course of the verification and this inventory update was confirmed by RCE and FRST.

RCE and FRST confirmed that the Project met all monitoring requirements as outlined in the validated PD, monitoring Plan and methodology. RCE confirmed that the Monitoring Report was accurate and up to date.

4.2 Safeguards

4.2.1 No Net Harm

The Project was validated prior to this requirement being implemented in VCS and is exempt. However, negative environmental impacts are not expected since the Project holds a Forest Stewardship Council (FSC) certification.

4.2.2 Local Stakeholder Consultation

The Project was validated prior to this requirement being implemented in VCS and is exempt.

4.3 AFOLU-Specific Safeguards

This Project was validated prior to this requirement being implemented in VCS and is exempt.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Bluesource and Bethlehem Authority calculated the Project's emission reductions in accordance with the equations in the Methodology, validated PD and any approved deviations. RCE and FRST reviewed all data, parameters, inputs and calculations provided by Bluesource for this monitoring period.

The primary Project data includes per-plot tree measurements and harvest information, resulting in quantification of above and below ground net change in carbon in live trees and above ground carbon in dead trees.

Any requests for corrective actions, non-material findings and additional documentation/data, as documented in RCE's List of Findings (Appendix A) were addressed by Bluesource and Bethlehem Authority.

RCE and FRST completed a full recalculation of the emission reductions for the monitoring period to assess manual transposition errors and the accuracy of the Project's emissions reductions. RCE and FRST found the baseline emission, project emission, and GHG emission reduction calculations to be in conformance with the Methodology, validated PD and to be free of material misstatement. RCE and FRST also confirmed that uncertainty was assessed correctly using the updated inventory and no confidence deduction was required.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Bluesource and Bethlehem Authority provided sufficient documentation for the emission reduction calculations as well as the Project's information control systems, data management processes, and data quality assurance procedures. RCE reviewed the Project's Monitoring Report, GIS data, FSC Certification, harvest information, and emission reduction calculations. RCE verified that the Project Proponent ensures that project documents and records are secure and retrievable for at least two years after the crediting period.

RCE found the information provided to be transparently documented and in accordance with requirements of the Methodology and the validated PD.

4.6 Non-Permanence Risk Analysis

The AFOLU Non-Permanence Risk Tool was used by Bluesource and Bethlehem Authority to assess overall project risk. RCE and FRST reviewed the Non-Permanence Risk Report 2019 provided with supporting documentation and confirmed that the Project adheres to the requirements set out in the VCS AFOLU Non-Permanence Risk Tool. RCE and FRST confirmed the final score of 3.75%, requiring the minimum 10% contribution to the buffer pool.

5 VERIFICATION CONCLUSION

RCE conducted a risk-based verification of the Bethlehem Authority Improved Forest Management Project including a strategic review and analysis of the Project data, documentation, and emission reduction calculations. RCE concludes to a reasonable level of assurance that the GHG assertion is free of material misstatement. The emission reductions for the monitoring period 1 January 2019 to 31 December 2019 can be considered in conformance with the following criteria:

- Verified Carbon Standard Version 4.0 (19 September 2019);
- Validation and Verification Manual Version 3.2 (October 19, 2016);
- Approved VCS Methodology VM0003 Methodology for Improved Forest Management through Extension of Rotation Age, Version 1.1

- Validated VCS Project Description, dated 18 March 2013;
- ISO 14064-3:2006 Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions

Verification period: From 1 January 2019 to 31 December 2019

The non-permanence risk rating was determined as 3.75%, requiring 10% contribution to the buffer pool. Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)	Buffer pool allocation	VCUs eligible for issuance
2019	12,301	17,336	5,927	23,709	2,964	20,745
Total	12,301	17,336	5,927	23,709	2,964	20,745

Lead Verifier Signature



Zach Eyler

Internal Reviewer Signature



Phillip Cunningham

APPENDIX A: VERIFICATION FINDINGS

Corrective Action Request, Non-Material Finding, Additional Documentation Request, or Clarification Request ID#	Finding	Project Response	RCE response	Additional Project Response	Additional RCE response	Open or Closed
CAR 1	Please review the following discrepancies identified in VCU Calculations Vintage 2019_5_8_2020.xlsx FVS Grow-output tab (see attached list).	All issues were corrected.				Closed
CAR 2	Please review the following discrepancies identified in VCU Calculations Vintage 2019_5_8_2020.xlsx VerPerCalcs tab (see attached list).	All issues were corrected.				Closed
CAR 3	Please review the following discrepancies identified in VCU Calculations Vintage 2019_7_17_2020.xlsx FVS Grow-output tab (see attached list).	All issues were corrected.				Closed
CAR 4	Please review the following discrepancies identified in VCU Calculations Vintage 2019_7_17_2020.xlsx VerPerCalcs tab (see attached list).	All issues were corrected.				Closed
CAR 5	Please review the following discrepancies identified in VCU Calculations Vintage 2019_8_7_2020.xlsx FVS Grow-output tab (see attached list).	All issues were corrected.				Closed
CAR 6	Please review the following discrepancies identified in VCU Calculations Vintage 2019_8_7_2020.xlsx VerPerCalcs tab (see attached list).	All issues were corrected.				Closed
CAR 7	Please review the following discrepancies identified in VCU Calculations Vintage 2019_8_12_2020.xlsx FVS Grow-output tab (see attached list).	All issues were corrected.				
CAR 8	Please review the following discrepancies identified in VCU Calculations Vintage 2019_8_12_2020.xlsx VerPerCalcs tab (see attached list).	All issues were corrected.				
CAR 9	Please review the following discrepancies identified in VCU Calculations Vintage 2019_9_9_2020.xlsx FVS Grow-output tab (see attached list).	All issues were corrected.				
CAR 10	Stratum 7 failed the field sampling.	Stratum 7 was reinventoried and the new values pass sampling.				
CAR 11	The Monitoring Report has the following errors: -Section 3 notes 2018 related to harvesting -Section 4.3 references AFOLU requirements 3.4 which have been superseded by Standard 4.0 section 3.2.7 -Section 4.3 does not mention Standard 4.0 Monitoring Plan Records requirement of: "The project proponent shall ensure that all documents and records are kept in a secure and retrievable manner for at least two years after the end of the project crediting period."	Sections 3 and 4.3 have been corrected. For the last bullet, we state the two year storage requirement in the first paragraph on page 38. We amended it slightly to clarify that this is to be kept after the crediting period.	Updated Monitoring Report correct.			Closed
NM 1	In 'VCU Calculations Vintage 2019_8_13_2020.xlsx' VerPerCalcs tab: EH71 is using the 2013 value not the 2018 value.	Ignored.				Closed
ADR 1						
CR 1	Please clarify why there is a single ton of CO2e emissions as a result of this project in RP8 (cell E49) of the 'AnnualNetStocks' tab? There are 0 emissions in every other reporting period.	Appears to be a drag down error. That has been corrected.	Thank you, verified and can be closed.			Closed
CR 2	In Strata 5 and 7, why are there two RP3 sets of values in the 'VerPerCalcs' tab of the 'VCU Calculations Vintage 2019_5_8_2020'? It does not appear to be because of harvests as this method is not used in other strata.	This was a relic from SIG's previous modeling. I am unsure why it is broken out, for simplicity in maintaining the original worksheet as much as possible we have kept as is.	Thank you for the clarification, this may be closed.			Closed
CR 3	Once harvested wood products are removed from the property, they should be included in the 'Cumulative long/medium live' products over successive RPs, correct? Please clarify why there are '0s' like in strata 5, Q35:V35, or strata 7, Q45:V45?	Unsure why these were cleared. They have been added back in.	The Q45:V45 values have not been filled back in.	This has been filled in.	Thank you, closed.	Closed
CR 4	Please clarify the discrepancy between the FVS-identified stratum and GIS-stratum for the following plots: Plot 135 is str 1 in FVS and 2 in the GIS Plot 211 is str 2 in FVS and 7 in the GIS Plot 253 is str 5 in FVS and 3 in the GIS	When the data was originally recorded - the field team recorded these strata as were originally present in the calculations. However, we confirmed this disagrees with the spatial files, and these plots have been re-assigned into the correct strata.	Thank you for making this change.			Closed
CR 5	The stratum identified in the harvest GIS layer does not match the GIS strata layer. Is there a reason for this?	The harvest boundary shapefile has been corrected to reference the correct project strata.	Thank you for this resolution.			Closed
CR 6	In the provided 'Worldwide_Governance_Indicator_calcs_2019' the combined tab only uses data up until 2018, but the Worldbank has current data into 2019 and 2020. What is the schedule for updating this data for the project?	The data is downloaded following every reporting period. This dataset was downloaded from WGI on April 22, 2020 and had not been updated by WGI yet to reflect 2019 values.	Thank you for this clarification, this item may be closed.			Closed
CR 7	In 'Beth_PermPlotNetwork_Final_Inventory' in the case of a plot falling close to a boundary or road, "if a plot straddles a property line or road, it will be moved at least one chain in a cardinal direction so that the entire plot falls within the property boundary or avoids the road." There are two plots that fall within 10 feet of a boundary, 254 and 288, as identified in the GIS. 1) How was does the word "straddling" assessed in the field? 2) For instances of plots close to roads, are offsets performed only in the case where a road is also a project boundary or where roads are included in the project acreage? Was this clarified to cruisers?	According to Robin Wildermuth who oversaw the inventory, "I pulled the notes and tally sheet for the 2 plots. Plots # 254 and #288 could have been flagged when the random plot layer was created and apparently were not, so the forester (in this case Josh Flad) may not have picked up on the proximity based on the scale of the field map. He therefore would make a judgement in the field as to whether they were wholly within the stand/strata. Looking at the sheet for #254 and Strata layer on an aerial, I can see the project boundary for a barrens stand to the west that was not part of the project. A projection of this barrens type comes very close to the plot but on the aerial it certainly looks like forest stocking is present in this area. Josh notes on the sheet that the plot is surrounded by red maple poles. Therefore, I believe the plot is completely within the type represented [...]. Although this should have been designated for moving, I don't believe it is affected by a stand edge. Plot #288 is along the Interstate highway. In this area, the footprint of the Interstate is typically obvious in the field by a woven wire fence that was constructed by the Highway Department. Josh's notes on the sheet don't indicate that it was moved and the plot has relatively full stocking of trees. [...] I can only say at this point that in Josh's judgement he was completely within the stand and it contained 12 "in trees" which is typical of the hardwood type on the property." 1. Guidelines for keeping plots within the sampled type was a chain or 66 feet. 2. Plots were only moved for project boundaries, such that internal roads within the project boundaries did not necessitate moving the plot.	Thank you for the clarification, this may be closed.			Closed