

Finite Carbon - Windrock Land Company IFM

ACR 701

December 2, 2022

WINDROCK
— LAND CO. —
ESTABLISHED 1872

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A.

PROJECT OVERVIEW

A1. PROJECT TITLE

The project title is “Finite Carbon - Windrock Land Company IFM.”

A2. PROJECT TYPE

This project is an Improved Forest Management (IFM) project, under the American Carbon Registry Standard¹ and the Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal Forestlands.²

A3. PROOF OF PROJECT ELIGIBILITY

Eligibility for this Improved Forest Management project has been determined with reference to the ACR Standard Version 7.0 and Improved Forest Management for Non-Federal U.S. Forestlands Version 1.3. Finite Carbon - Windrock Land Company IFM project meets all relevant eligibility requirements as described in Table A3.1 below. Additionally, the project has not applied for and been listed, registered, and/or been issued GHG emission reduction or removal credits through any other GHG emissions program

TABLE A3.1: PROJECT ELIGIBILITY REQUIREMENTS

Eligibility Criterion	Proof of Eligibility	Reference
Start Date	The project has a start date of June 16, 2021, the date on which a Carbon Development Services Agreement between the Project Proponent and a purchaser of the ERTs was fully executed.	H1. START DATE
Minimum Project Term	The Project Proponent commits to project continuance, monitoring, and verification for at least for the required Project Term of 40 years.	H2. PROJECT TIMELINE
Crediting Period	In compliance with ACR Standard Version 7.0, the	H2. PROJECT TIMELINE

¹ ACR. 2020. American Carbon Registry Standard, Version 7.0. American Carbon Registry, Arlington, VA, USA.

² ACR. 2018. Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal Forestlands, Version 1.3, April 2018, American Carbon Registry, Arlington, VA, USA.

TABLE A3.1: PROJECT ELIGIBILITY REQUIREMENTS

	crediting period for the project is 20 years.	
Real	GHG removals are quantified based on inventory of the standing carbon stocks in the project area (ex post).	D. MONITORING PLAN and E. QUANTIFICATION
Emission or Removal Origin	Emissions reductions or enhanced removals created by the project activity are generated from forest carbon sources and sinks over which the Project Proponent has control.	G1. PROOF OF TITLE and Appendix A. Ownership Documentation
Offset Title	Emissions reductions or enhanced removals created by the project activity are owned directly by the Project Proponent.	G1. PROOF OF TITLE
Additional	Additionality for the project has been demonstrated through a regulatory surplus test, a common practice test, and an implementation barrier test.	C. ADDITIONALITY
Regulatory Compliance	The Project Proponent has adhered to all laws, regulations, and other legally binding mandates directly related to Project Activities.	ACR701 Regulatory Compliance Attestation
Permanent	Permanence is addressed by the project through ongoing assessment of risk using the ACR Tool for Risk Analysis and Buffer Contribution and	B8. PERMANENCE

TABLE A3.1: PROJECT ELIGIBILITY REQUIREMENTS

	contributions to the ACR buffer pool.	
Net of Leakage	Possible leakage effects are accounted for in accordance with the ACR IFM Methodology.	E3. LEAKAGE
Independently Validated/Verified	The project will be independently validated and verified by an ACR-accredited Validation and Verification Body.	
Environmental and Community Assessments	Impacts on community and environment were assessed in accordance with the ACR Standard and net positive impacts were confirmed.	F. COMMUNITY & ENVIRONMENTAL IMPACTS
Ownership Type	The project ownership is private non-federal U.S. forestland.	G1. PROOF OF TITLE
Project area meets the definition of Forestland condition as per USFS FIA program definition	The project area meets the ACR definition of forestland with a minimum of 10% forest cover (or equivalent stocking) by live trees of any size.	A4. LOCATION

A4. LOCATION

The project is located in eastern Tennessee, spanning Campbell, Anderson, Morgan and Roane Counties.

Detailed maps describing the project location, hydrology, canopy cover, topography, roads, and ownership boundaries are provided in Appendix C. Project Maps.

A5. BRIEF SUMMARY OF PROJECT

Founded in 1872, the Windrock Land Company owns and manages 73,000 acres of forest in eastern Tennessee. The forest is composed primarily of mature and mixed age class native oaks, yellow poplar, pine, hickory, cherry and maple. Windrock's forest ownership certified by the Forest

Stewardship Council program, demonstrating sustainable management. The IFM carbon project supports Windrock in maintaining timber harvest levels below the growth rate to encourage the health and value of the forest, while increasing carbon stored. Project objectives also include sustainable forest management for long-term income, and restoration forestry.

A6. PROJECT ACTION

The Project Proponent's management provides significant recreational, ecological, and environmental benefits, including the maintenance of large blocks of forest and wildlife habitat. In the early 20th century, this area became dependent on the coal industry and began operating coal mines since 1904. Several decades later, the property shifted from non-renewable resource extraction sites to a sustainably managed land dedicated to forestry and recreation, such as camping, mountain biking and OHV riding. Through a commitment to maintaining and enhancing forest carbon stocks above the baseline level, the project will provide significant climate benefits through carbon sequestration. The project will achieve GHG removals by sequestering more atmospheric CO₂ than a baseline scenario in live aboveground biomass, belowground biomass, and standing dead wood. Actions include, but are not limited to, deferred harvesting, lengthened rotations, timber stand improvement, retention of standing dead wood during timber harvests, and protection of riparian areas, wetlands, and significant natural communities. Forest management will maintain and enhance habitat for a variety of wildlife through snag retention, retention of mast-bearing species, recruitment of coarse woody debris, and the maintenance of wildlife corridors. Water and soil quality will be protected through management that meets or exceeds best management practices in Tennessee

A7. EX ANTE OFFSET PROJECTION

Total projected GHG removal is 6,488,524 mtCO₂e (before risk buffer contribution) over the first crediting period of 20 years (including GHG removal from long-term wood products). Table E5.1 lists the estimates of GHG emissions reductions per year.

A8. PARTIES

The project was implemented by Windrock Land Company, the landowner and Project Proponent, and Finite Carbon, the carbon offset project developer. Project validation and verification was completed by SCS Global Services. The forest carbon inventory was conducted by Landmark Forestry LLC.

PROJECT PARTICIPANTS	POINT OF CONTACT	ROLES AND RESPONSIBILITIES	CONTACT INFORMATION
Windrock Land Company	Claudia Depew	Project Proponent	300 Windrock Park Lane Oliver Springs, TN 37840 (865) 435-7158

PROJECT PARTICIPANTS	POINT OF CONTACT	ROLES AND RESPONSIBILITIES	CONTACT INFORMATION
Finite Carbon	Sunny Qiao	Project Developer / Technical Consultant	435 Devon Park Drive 700 Building Wayne, PA 19087 (763) 744-7556
Landmark Forestry, LLC	Chad Westfall	Inventory Contractor	PO Box 205 691 Stalnaker Addition Horner, WV 26372 (304) 269-4831 ext 307
SCS Global Services	Christie Pollet-Young	Validation / Verification Body	2000 Powell Street, Ste. 600 Emeryville, CA 94608 (510) 452-8000

B.

METHODOLOGY

B1. APPROVED METHODOLOGY

The Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal Forestlands (hereafter referred to as the “methodology”).

B2. METHODOLOGY JUSTIFICATION

Note the project does not occur on tribal land or a public non-federal ownership. Therefore, those applicability conditions are not considered here. All applicability for private forestland under the selected methodology are fulfilled by the project.

APPLICABILITY CONDITION	DEMONSTRATION OF COMPLIANCE
Applicable only on non-federally owned forestland within the United States	The project area is non-federally owned private forestland.
Applies to lands that can be legally harvested by entities owning or controlling timber rights on forestland	The forestland owner/Project Proponent controls the timber rights on the project area and can legally harvest.
Sustainable harvest requirements	The project area has been actively enrolled in the FSC program (Certificate Code NC-FM/COC-000091) throughout all commercial harvest activities, which meets the criteria established in the IFM Methodology and the 2021 Errata and Clarifications.
Use of non-native species is prohibited where adequately stocked native stands were converted for forestry or other land uses after 1997	There is no use of non-native species where adequately stocked native stands were converted for forestry or other land uses after 1997.
Draining or flooding of wetlands is prohibited	There is/will be no draining or flooding of wetlands on or after the project Start Date.
Project Proponent must demonstrate its ownership or control of timber rights at the project start date	See Appendix A. Ownership Documentation
The project must demonstrate an increase in on-site stocking levels above the baseline condition by the end of the Crediting Period	Stocking levels increase well above the baseline conditions for the duration of the project and by the end of the Crediting Period (E. QUANTIFICATION)

B3. PROJECT BOUNDARIES

The physical project boundaries include 63,980.1 acres of forestland, shown in the maps in Appendix C. Maps and in the geodatabase "ACR701_RP1.gdb."

See H2. PROJECT TIMELINE for the temporal boundaries of the project.

B4. IDENTIFICATION OF GHG SOURCES AND SINKS

CARBON POOLS	INCLUDED / OPTIONAL / EXCLUDED	JUSTIFICATION / EXPLANATION OF CHOICE
Above-ground biomass carbon	Included	Major carbon pool subjected to the project activity.
Below-ground biomass carbon	Included	Major carbon pool subjected to the project activity.
Standing dead wood	Included/Optional	Major carbon pool in unmanaged stands subjected to the project activity. Project Proponents may also elect to include the pool in managed stands. Where included, the pool must be estimated in both the baseline and with project scenarios. For this project, standing dead wood will be included in all stands for both scenarios
Lying dead wood	Optional	Project Proponents may elect to include the pool. Where included, the pool must be estimate in both the baseline and with project cases. For this project, lying dead wood will not be included.
Harvested wood products	Included	Major carbon pool subjected to the project activity.
Litter/Forest floor	Excluded	Changes in the litter pool are considered de minimis

CARBON POOLS	INCLUDED / OPTIONAL / EXCLUDED	JUSTIFICATION / EXPLANATION OF CHOICE
		as a result of project implementation.
Soil organic carbon	Excluded	Changes in the soil carbon pool are considered de minimis as a result of project implementation.

GAS	SOURCE	INCLUDED / EXCLUDED	JUSTIFICATION / EXPLANATION OF CHOICE
CO ₂	Burning of biomass	Excluded	However, carbon stock decreases due to burning are accounted as a carbon stock change.
CH ₄	Burning of biomass	Included	Non-CO ₂ gas emitted from biomass burning.
N ₂ O	Burning of biomass	Excluded	Potential emissions are negligible.

LEAKAGE SOURCE		INCLUDED / OPTIONAL / EXCLUDED	JUSTIFICATION / EXPLANATION OF CHOICE
Activity-Shifting	Timber harvesting	Excluded	Project Proponent must demonstrate no activity-shifting leakage beyond the <i>de minimis</i> threshold will occur as a result of project implementation.
	Crops	Excluded	Forestland eligible for this methodology do not produce agricultural crops that could cause activity shifting.

LEAKAGE SOURCE		INCLUDED / OPTIONAL / EXCLUDED	JUSTIFICATION / EXPLANATION OF CHOICE
	Livestock	Excluded	Grazing activities, if occurring in the baseline scenario, are assumed to continue at the same levels under the project scenario and thus there are no leakage impacts.
Market Effects	Timber	Included	Reductions in project outputs due to project activity may be compensated by other entities in the marketplace. Those emissions must be included in the quantification of project benefits.

B5. BASELINE

The baseline scenario represents an aggressive industrial harvest regime, targeted to maximize net present value at a discount rate of 6%, typical of practices in the project region on industrial private lands. More information on the baseline scenario is provided in E1. BASELINE.

B6. PROJECT SCENARIO

The project scenario consists of managing the forestland to sustainably generate timber products while providing significant recreational, ecological, and environmental benefits, including the maintenance of large blocks of forest and wildlife habitat. See A6. PROJECT ACTION for more information.

B7. REDUCTIONS AND ENHANCED REMOVALS

The project will achieve greenhouse gas reductions by increasing stocking relative to the baseline, via improved forest management practices previously described in A6. PROJECT ACTION.

B8. PERMANENCE

Project Proponents must conduct their risk assessment using the ACR Tool for Risk Analysis and Buffer Determination. Forest project types must claim a value from all eight risk categories.

1. Management and Governance Risks: All project types must select one value from each risk category that applies:

- | | |
|--|--|
| A Financial | <ul style="list-style-type: none"> • 4% Default Value • 3% US Public and Tribal Lands |
| B Project Management | <ul style="list-style-type: none"> • 4% Default Value • 3% US Public and Tribal Lands |
| C Social/Policy | <ul style="list-style-type: none"> • 2% Default Value • 5% if project is located outside of the US • 3% if project is located outside of the US and demonstrates community engagements through ACR-approved mechanism |
| D Conservation Easement Deduction | <ul style="list-style-type: none"> • -2% Default value • -3% if there is regular onsite monitoring of activities related to carbon-specific conservation activities |

2. Natural Disaster Risks: Select one value from each risk category that applies:

- | | |
|--|--|
| E Fire | <ul style="list-style-type: none"> • 8% if project is located in an area where fire greater than 1000 acres has occurred within 30 mile radius of project area in prior 12 months • 4% if project is located in high fire risk region • 2% if project is located in low fire risk region (verifiable evidence must be provided) • 1% for agriculture and grassland projects only |
| F Diseases and Pests | <ul style="list-style-type: none"> • 8% if epidemic disease or infestation is present within project area, or within 30 mile radius of project area • 4% Default Value |
| G Levee Failure and Water Table Changes | <ul style="list-style-type: none"> • 2% Default for all wetland projects (and for forest projects where more than 60% of the project area is a forested wetland) |
| H Other Natural Disaster Events | <ul style="list-style-type: none"> • 2% Default Value for all sequestration projects |

Calculated Risk Score:

1. Section 1 (A + B + C + D) + Section 2 (E + F + G + H) = Total Risk score %
2. Section 1 (4 + 4 + 2 + 0) + Section 2 (2[‡] + 4[§] + 0 + 2) = 18%

The Minimum Buffer Percentage for the project is 18%, and the projected Buffer Contribution amount for the initial 20-year crediting period is **1,167,945** mt CO₂e.

[‡] <https://www.firelab.org/project/wildfire-hazard-potential> and Wildfire Map in Appendix C. Project Maps.

[§] <https://www.fs.fed.us/foresthealth/applied-sciences/mapping-reporting/national-risk-maps.shtml>

C.

ADDITIONALITY

C1. REGULATORY SURPLUS TEST

Relevant laws, regulations, statutes, legal rulings, and other regulatory frameworks that affect the project and baseline activities:

National laws, regulations and policies:

- Clean Water Act
- Endangered Species Act
- National Environmental Policy Act
- National Wild and Scenic Rivers Act

State and local laws (Tennessee):

- Best Management Practices in Tennessee
- Forest Practice Guidelines for Tennessee

None of the above or any other existing law, regulation, statute, legal ruling, or other regulatory framework in effect as of the project Start Date of June 16, 2021 effectively requires the project activity and its associated GHG emissions reductions/removal enhancements. Therefore, the project passes the Regulatory Surplus test. Further detail on these laws and regulations and how they were incorporated as constraints on the modeled baseline scenario can be found in E1. BASELINE.

C2. COMMON PRACTICE TEST

The project is located in eastern Tennessee. Demand for wood, including sawtimber and pulpwood, from mills throughout the Southeast drives investment in timberland, with industrial forestland owners seeking to maximize the NPV of their investments through intensive management practices. Investment return requirements can lead to significantly higher harvest levels and were the project not implemented the intensive management and resulting lower onsite carbon stocks associated with that level of harvest activity could very well occur within the project area. As described in A6. PROJECT ACTION the project will exceed common practice in the region.

C3. IMPLEMENTATION BARRIERS TEST

The project activity faces a financial barrier. The net present value of the baseline scenario and its intensive management is calculated in the 'NPV_Model' tab of the 'ACR701 GHGPP Calculations v1.0.xlsx' workbook. Revenue generated by the carbon project will always fall short of the NPV-maximizing baseline scenario. However, the carbon revenue will be a key driver of the financial viability of the project's action and the landowner's long-term sustainability goals.

C4. PERFORMANCE STANDARD TEST

Not applicable.

D. MONITORING PLAN

D1. MONITORED DATA AND PARAMETERS

The following parameters, specified in the Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands v1.3, will be monitored. More information on specifications for data or parameters monitored through field inventories is available in Appendix B. Inventory Specifications. Additional information on updating and archiving of these parameters for annual updates to forest carbon stocks in in section D.2. Personnel involved in monitoring the project include Chad Westfall and his staff at Landmark, with remote sensing support from Adam Trenholm and staff at Finite Carbon. The required re-inventory of data or parameters below will be conducted by Landmark or another inventory contractor every 10 years or less, except for carbon in harvested wood products, which will be quantified from scaled volumes by species and product class on an annual basis in years when timber harvesting occurs.

<i>Data or Parameter Monitored</i>	Sample Plot Area
<i>Unit of Measurement</i>	Acres (fixed)
<i>Description</i>	1/15 th acre (30.4 foot radius) fixed radius sample plot for all stems 5.0 inches DBH and larger, 1/150 th acre (9.6 foot radius) fixed radius plot for all stems equal to or greater than 1.0 inch DBH and less than 5.0 DBH
<i>Data Source</i>	Appendix B. Inventory Specifications.
<i>Measurement Methodology</i>	Following inventory specifications detailed in Appendix B. Inventory Specifications, the inventory employs nested fixed-radius plots. Plot centers are permanently monumented in the field.
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Reported in project monitoring reports.
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Tree – Diameter at breast height (DBH)
<i>Unit of Measurement</i>	Inches (to 1/10th an inch)
<i>Description</i>	Tree diameter measured 4.5 feet above ground
<i>Data Source</i>	Field measurement
<i>Measurement Methodology</i>	Measured with a diameter tape
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Tree – Total height (THt)
<i>Unit of Measurement</i>	Feet
<i>Description</i>	Total height of tree
<i>Data Source</i>	Field measurement
<i>Measurement Methodology</i>	Measured with laser hypsometer
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Tree – Species
<i>Unit of Measurement</i>	FIA species code
<i>Description</i>	Species of tree
<i>Data Source</i>	Field measurement
<i>Measurement Methodology</i>	Recorded in accordance with the USDA FS FIA numerical three-digit species codes for all live and dead stems.
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Tree – Live/Dead status
<i>Unit of Measurement</i>	N/A
<i>Description</i>	Live or dead
<i>Data Source</i>	Field measurement
<i>Measurement Methodology</i>	Recorded for every tallied dead tree.
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Tree – Decay class
<i>Unit of Measurement</i>	Classes 1 – 4

<i>Description</i>	Decomposition class of the dead tree, following the four decomposition classes in the IFM Methodology.
<i>Data Source</i>	Field measurement
<i>Measurement Methodology</i>	Qualitative assessment of dead tree into 1 of 4 decay classes based on class descriptions.
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Tree – Defect
<i>Unit of Measurement</i>	Percent missing
<i>Description</i>	Assessment of missing biomass.
<i>Data Source</i>	Field measurement
<i>Measurement Methodology</i>	See ‘Soundness Deduction’ in ‘Inventory Sample Design.’
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	$C_{P,TREE,t}$
<i>Unit of Measurement</i>	Metric tons CO ₂
<i>Description</i>	Carbon stored in above and below ground live trees at the beginning of the year t
<i>Data Source</i>	Forest inventory
<i>Measurement Methodology</i>	Consistent with field measurement protocols specified in Appendix B. Inventory Specifications and quantification methods specified in Woodall et al (2011), further described in E1.3.6.1 of the GHG Project Plan.
<i>Data Uncertainty</i>	To be calculated as the mean +/- 90% confidence interval
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	$C_{P,DEAD,t}$
<i>Unit of Measurement</i>	Metric tons CO ₂
<i>Description</i>	Carbon stock stored in dead wood at the beginning of the year t
<i>Data Source</i>	Forest inventory
<i>Measurement Methodology</i>	Consistent with field measurement protocols specified in Appendix B. Inventory Specifications and quantification methods specified in Woodall et al (2011), further described in E1.3.6.1 of the GHG Project Plan.
<i>Data Uncertainty</i>	To be calculated as the mean +/- 90% confidence interval
<i>Monitoring Frequency</i>	Re-measured every 10 years or less.
<i>Reporting Procedure</i>	Hand-held data recorder and/or cruise tally sheet
<i>QA/QC Procedure</i>	Consistent with procedures described in Appendix B. Inventory Specifications.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Harvested Wood Products (CP,HWP,t)
<i>Unit of Measurement</i>	Metric tons CO ₂
<i>Description</i>	Carbon remaining stored in wood products 100 years after harvest for the project in year t .
<i>Data Source</i>	Monitored from recorded harvest volumes.
<i>Measurement Methodology</i>	Scaled mill receipts.
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Annually
<i>Reporting Procedure</i>	Total volume harvested by species group and product class summed for the reporting period.
<i>QA/QC Procedure</i>	N/A
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Project Area (A)
<i>Unit of Measurement</i>	Acres
<i>Description</i>	Area of forest carbon project
<i>Data Source</i>	GIS shapefile
<i>Measurement Methodology</i>	Stratified shapefile
<i>Data Uncertainty</i>	None
<i>Monitoring Frequency</i>	Every 10 years or less, coinciding with inventory update. Annual updates as needed, see D2. MONITORING AND UPDATING FOREST CARBON STOCKS AND ENVIRONMENTAL IMPACTS
<i>Reporting Procedure</i>	Handheld GPS, ArcGIS
<i>QA/QC Procedure</i>	Boundary checks with handheld GPS, review of publicly available parcel boundary information.
<i>Notes</i>	

<i>Data or Parameter Monitored</i>	Time (T)
<i>Unit of Measurement</i>	Year
<i>Description</i>	Number of years between monitoring time t and t1 ($T = t_2 - t_1$)
<i>Data Source</i>	Monitoring repots
<i>Measurement Methodology</i>	N/A
<i>Data Uncertainty</i>	N/A
<i>Monitoring Frequency</i>	Yearly
<i>Reporting Procedure</i>	N/A
<i>QA/QC Procedure</i>	N/A
<i>Notes</i>	

D2. MONITORING AND UPDATING FOREST CARBON STOCKS AND ENVIRONMENTAL IMPACTS

This section details the process for tracking, updating and archiving forest carbon stocks and monitoring environmental impacts. There are two major inputs for updating forest carbon stocks: activity data and emissions factors. Though harvest activity is currently being deferred in the project area, this section details the process for updating onsite carbon stocks following harvesting. Lastly, the procedures for monitoring of additional environmental impacts are described.

Activity Data

Activity data is defined as the aerial extent of a land-use category. It is the “area data” in units of acres. In this case, land-use will be stratified across the property in order to classify forest versus non-forest, and within forests, the forest type based on the characteristics including the representative vegetative community and regulatory environment (i.e., the State where the stratum is located). These strata are described in Section E.1.2, and all changes to the activity data should follow these stratification criteria.

Activity data can change for several reasons including growth, timber harvests, natural disturbances and succession or selling property within the project area; these changes in activity data are collectively labeled as *events*. Events can affect the proportion of strata within the project area; however, the total aerial extent of the project area cannot change. For this project, activity data will be monitored and reported over time using spatially explicit datasets, also known as a Geographic Information System or GIS. On a continuous basis throughout the year, changes in activity data will be mapped, attributed and recorded by professional foresters during timber harvest operations and timber cruises. Changes will be submitted to and edited by the forest owner’s GIS controller. Edits to the activity data will be compiled and delivered to the project developer at the end of each reporting period. The project developer will store and archive all activity data by year in the project’s geodatabase in the “stands” feature class, which will also serve as the activity data change log.

Emissions Factors

Emissions factors are defined as the emissions/removals of greenhouse gases per unit area. In this case, metric tons of CO₂ equivalents (tCO₂e) will be used to express emission factors as a result of changes in forest carbon stocks. Emission factors vary based on the category of activity data (i.e. strata) and are derived from forest inventory plots.

Forest inventory plots will be conducted according to the Sampling Methodology and processed by Finite Carbon using the data management and analytical systems outlined under Analytical Methods and Biomass Equations. The forest owner will use permanent and temporary inventory plots as needed, to annually update the project’s forest carbon stocks. Measuring the same plots through time will reduce sampling variability and provide reliable estimates of actual growth through time. New temporary and/or permanent plots will be used where previous plots or continual forest inventory (CFI) plots are not able to accurately represent a particular change in activity data. Inventory plots input to growth & yield modeling, as well as tracking harvest volumes, will be used to assess the changes in carbon stocks. No forest inventory plot data greater than 10-years old will be used.

Events

Events are activities that occur within the project area that affect activity data or emission factors.

Events will require spatial and tabular updates to the carbon database. A list of events including harvest volume summaries will be submitted by the Forest Owner to Finite Carbon at the end of each reporting period for the previous year and prepared for verification by completing a monitoring report.

1. Just Growth

Just growth events are assumed to occur in all areas of the project where no other event is assumed to occur. In this event, the activity data and emissions factors are updated by projecting inventory data using FVS growth and yield software, or with new plot data, assuming that accretion and mortality are only a function of the stand's structure and condition from the previous reporting period. Furthermore, growth also occurs in other areas where other events take place, e.g. a timber harvest. In this case, the activity data and emissions factors are updated in the same fashion as just growth events, but accretion and mortality are adjusted based on the other event's effects, e.g. timber harvesting will reduce the carbon stocking, but may increase growth rates while reducing mortality because crop trees are free to grow.

Annual growth increments are determined using the method described under Data and FVS Setting. The annual height and diameter growth increments specific to each tree record are added to those records at the end of each reporting period.

2. Land Sales

Land sales activity has a tremendous bearing on every carbon project. Should all or a portion of the area committed to the carbon project be sold while under the project's commitment terms, Finite Carbon will need to be notified as soon as possible. The forest owner will be required to provide digital mapping and possibly other documentation for the area affected by the sale. Please note that any Land Sales taking place on the Project Area will remain subject to the ACR IFM Methodology and Standard, and therefore remain part of the Project. Should any portion of the Project Area be sold and wish to terminate the Project, the whole project will be considered terminated, as there is no provision which currently allows the Project Area to be divided into multiple projects. Once the Project Area for Improved Forest Management Projects has been verified, the Project Area cannot be changed for the duration of the Project's lifetime.

3. Natural Disturbances

Natural disturbance events can include beaver dams, wind storms, tornadoes, ice storms, floods, landslides, earthquakes, insect or disease infestations, or other impacts of weather or nature on the forest carbon stocks. Finite Carbon must be notified immediately following an event of this type. The forest owner will be required to supply mapping of the damaged area, and in some cases, a re-inventory of the original sample locations affected by the event performed to the specifications attached.

4. Harvests and Land Use Conversions

IFM projects typically encounter planned timber harvests, thinning, clearing for roadways, log yards, decks, or other uses on a regular basis. When these events occur, the forest owner is required to provide

Finite Carbon with a digital (GPS or GIS) polygon file of the affected area. If harvest activities affect permanent plots, a complete re-inventory of those samples affected by the action may be required. All points re-inventoried will conform to the original specifications and shall be freshly flagged and painted for relocation. Finite Carbon shall also be informed if the activity produces or is expected to produce a forest type conversion. If the conversion is to non-forest use, such as new road construction, these areas will be mapped and the correct adjustment to the project acreage and total carbon stocks will be made. All new inventory plot data should be submitted electronically in Excel or Access formats. All areas of timber harvest will be associated with a harvest volume summary.

Harvest volume summaries will be submitted to the project developer by species group (Hardwood/Softwood) and product (Sawtimber/Pulpwood), at a minimum. All harvest volume summaries must be verifiable from mill/contractor receipts (pay-as-cut sales) and/or prospectus cruises (lump-sum sales).

Monitoring of Additional Environmental Impacts

There are several procedures the Project Proponent currently implements to ensure that all relevant environmental impacts are monitored, documented, and reported. First, the property is routinely monitored by hired consulting foresters. These team members visually inspect the forest conditions and can report unplanned environmental impacts they were not aware of such as significant natural disturbances or soil erosion. For planned events, the Project Proponent will employ contractors appropriately licensed and dedicated to project coordination, maintaining deeds and records, and mapping/engineering. The Project Proponent will ensure that planned activities with respect to impact on carbon stocks and other environmental values are reported in a manner that conforms to the project's inventory methodology.

On-going monitoring by the forest owner and its forest managers will ensure Unintentional Reversals will be reported to ACR and where necessary, an inventory of affected portions of the forest will be inventoried to account for unintentional reversals that create a need for ERT replacement from the Forest Buffer Account. Inventory design to account for losses from unintentional reversals will depend on the extent and intensity of the reversal should they occur.

The conservation of natural forest habitat and protection of plant and animal species is a priority for forest management in the project area. On-going monitoring of the carbon project along with future harvest management and monitoring of these activities will drive the net positive impacts identified in F1. Future updates to management and stewardship plans will assess these impacts and prescribe additional actions as necessary.

The implementation of management that meets or exceeds best management practices in Tennessee will be monitored by professional foresters during and after harvests to ensure the protection of water quality and soil resources. The primary driver to mitigate adverse impacts on water quality is the protection of soil from erosion and degradation, which is achieved through adherence to those BMPs in harvest planning, especially in the establishment of skid trails, haul roads and landings.

Document Control

The Project Proponent and Finite Carbon will be responsible for maintaining critical documents and files that support forest carbon project management, data collection and processing. All documents will be stored on company computers and back-up servers, as well as cloud-based data sharing folders, for a minimum of 15 years following the issuance of ERTs related to each reporting period. The most critical documents and files necessary to be maintained include:

1. GHG Project Plan;
2. Monitoring Reports
3. Project Inventory Methodology
4. Project geodatabase (GIS file geodatabase);
5. Baseline/Project models (including FVS inputs, growth and yield curves);
6. Harvest volume data; and
7. Calculation Worksheets;

Central Data Repository

The ESRI file geodatabase format will be used to store spatial and tabular project data. Built-in features of the geodatabase structure, such as domains (i.e. field value validation) and relationships, will help control data quality. Edits and updates will occur at the beginning of each reporting period to account for activities in the previous year unless an event such as a reversal occurs, in which case updates will take place and be reported to ACR in the required time frame. All results will be summarized in the Monitoring Reports.

E. QUANTIFICATION

E1. BASELINE

E.1.1 Inventory

The carbon inventory of the project area was conducted in November and early December 2021. The inventory employed a sample of 159 nested, fixed-radius circular plots installed in a random distribution across the project area. The nested plots consist of a 1/15th acre (30.4 foot radius) fixed radius sample plot for all stems 5.0 inches DBH and larger and a 1/150th acre (9.6 foot radius) fixed radius plot for all stems equal to or greater than 1.0 inch DBH and less than 5.0 DBH. Complete inventory specifications are documented in Appendix B. Inventory Specifications.

E.1.2 Stratification

The goal of the project area stratification was to provide an unbiased stratification of the project area's vegetative communities and to remove non-forested areas. Finite Carbon used a combination of forest owner data, on-the-ground observations, historical forest typing data, imagery, and experience with regional forest cover types.

Prior to sampling the project area, Finite Carbon assessed the overall quality and integrity of the mapped boundaries and underlying spatial data. Ancillary spatial data was taken from a variety of sources including publicly available data, landowner shapefiles, and files created from site visit field work. In all cases, GIS shapefiles are projected to the proper coordinate system, checked against publicly available shapefiles for ownership and boundary issues, ground-truthed using GPS and other field equipment, and then stored in geodatabases to ensure compatibility with outside data and data integrity. Tools used include ESRI ArcMap and Geodatabase, GPS devices with at least 3 to 5 meter accuracy, and orthorectified aerial photography.

Following sampling of the project area, the project area was post-stratified for purposes of defining biologically consistent strata which met targeted levels of statistical precision. Supported by plot data collected in the inventory, stratification of the defined project area utilized stand outlines based on general forest types that were either dominated by hardwoods (yellow-pop, oak species), or fairly mixed of hardwoods and softwoods. Physiognomic characteristics observed from aerial imagery at a typed plot's location was also used to delineate unique stratum polygons and define strata polygons in areas proximal to the observed plot conditions. Multiple years of imagery contribute additional physiognomic information when assigning delineated areas to a stratum. The process was completed using publicly available and privately acquired orthorectified aerial imagery at "eye elevation" or approximately 3,500 feet.

The final inventory strata and acreages are shown below. The project employs the same stratification for the baseline and with-project scenarios.

Table E1.2.1 Inventory Strata

Inventory Strata Name	Description	Project Acreage
HW	Hardwood-dominant forest types	59,389.5
MX	Mixed forest types	4,590.6

E.1.3 Baseline Data Creation

E.1.3.1 Data Management and Analytical Systems

Once field measurements have been collected, the raw inventory data will be compiled by the inventory contractor. A database is then transferred to Finite Carbon in an MS Excel worksheet and/or MS Access database. The database contains multiple tables with the plot and individual tree measurements recorded by the cruisers. After receiving the data, Finite Carbon reviews it and executes a quality control/assurance process for validation. Keys are also setup to standardize relations between spatial and tabular data. Once the raw data has been assured for quality, it is formatted into a MS Access database for input to the Forest Vegetation Simulator (see below) using Finite Carbon's proprietary *Carbon Modules*. The Carbon Modules are a set of proprietary MS Access relational databases setup to process and compile raw inventory data, prepare FVS input tables, and calculate carbon stocks from FVS Output. The carbon modules are built upon a series of queries that select data and perform the calculations necessary to summarize onsite and harvested carbon stocks.

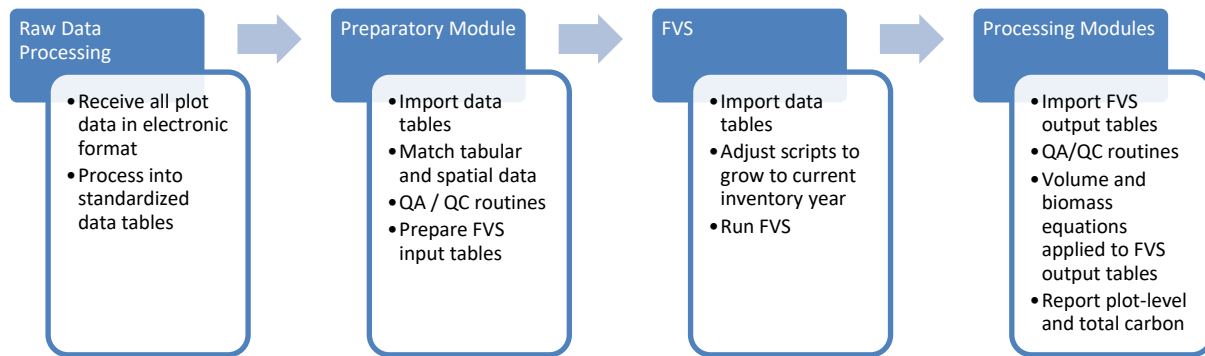


Figure E1.3.1. Schematic of Carbon Modules and Data Processing Flow

E1.3.2 Forest Vegetation Simulator (FVS)

Finite Carbon uses the Forest Vegetation Simulator (FVS) model to accept processed inventory data from the preparatory Carbon Module and to output tree lists for the current inventory year so that carbon can be calculated in downstream processing Carbon Modules. The growth functions of FVS are applied, if necessary, to grow carbon stocks forward to the current reporting period end date.

The Forest Vegetation Simulator (FVS) is a family of forest growth simulation models supported and maintained by a special unit of the USDA Forest Service (www.fs.fed.us/fmcs/fvs/). Since its initial development in 1973, it has become a system of highly integrated analytical tools. These tools are based upon a body of scientific knowledge developed from decades of natural resources research.

The FVS is an individual-tree, distance-independent growth and yield model (Dixon 2002). It has been calibrated for specific geographic areas (variants) of the United States. FVS can simulate a wide range of silvicultural treatments for most major forest tree species, forest types, and stand conditions. The Southern (SN) Variant has been used for this project (Keyser 2008).

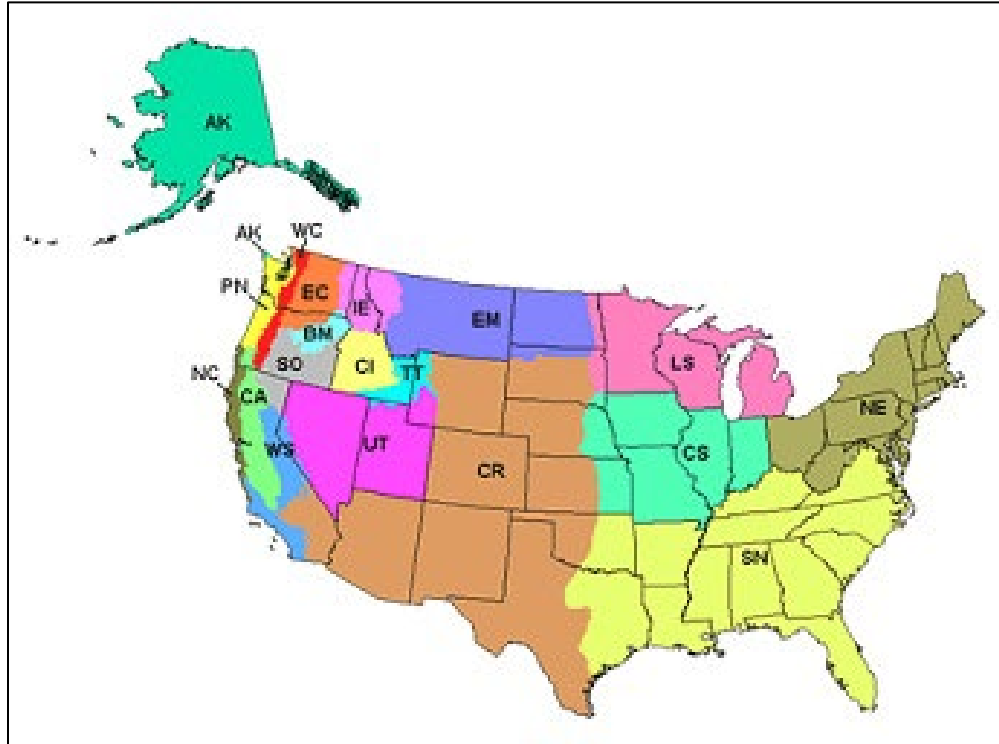


Figure 1. FVS Variants

The following summarizes basic FVS operation and the major model execution steps. Specific operation details will vary for different variants.

1. Process keywords and input data - FVS begins by reading keywords to establish location, environment, and stand parameters; then reads the tree record file.
2. Compute initial stand characteristics - FVS computes stand characteristics for the initial year (cycle 0). This is typically the inventory date or the stand regeneration date. Input tree records with missing heights or crown ratios have these dubbed in.
3. Backdate densities and compute calibration statistics - If sufficient large tree diameter increment data is contained in the input tree data (and/or small tree height increment data), FVS back-dates the stand one default cycle length. FVS then “grows” the stand back to the inventory date, compares the values from the actual inventory date with simulated values, and computes scale factor adjustments to account for differences in actual and model values.
4. Check event monitor (pre-treatment) - FVS continues with the steps it repeats every cycle. FVS checks the Event Monitor keywords and functions to see if the user scheduled any activities

based on existing stand conditions at the start of the cycle. Event Monitor capabilities are powerful and very useful for modeling situations and creating variables not covered in standard FVS output. Crookston (1990) describes Event Monitor functions and processes along with several good examples.

5. Perform treatment - Almost any silvicultural operation imaginable can be structured using one or more treatment keywords in a direct or conditional (If..Then) context.
6. Check event monitor (post-treatment) - FVS Event Monitor checks for conditions and scheduled operations that are based on post-treatment activity conditions within the same cycle.
7. Grow large trees - If "large" trees exist in the tree-list, FVS estimates their new diameter (first) and height (second) one growth cycle into the future. The user can specify a different time interval length.
8. Grow small trees - FVS estimates small tree height (first) and diameter (second) one growth cycle into the future. FVS uses a weighting procedure to compute tree height increment to obtain a smooth height-growth transition from small to large tree models.
9. Mortality - Following growth estimation, FVS estimates mortality based on individual tree variables such as diameter and crown ratio, and on stand variables such as maximum stand density index or basal area ("BA").
10. Insect and disease impacts - If the variant has available extensions to cover specific disease or insect agents, and if the user calls for these, FVS estimates and incorporates these effects.
11. Regeneration - FVS adds new seedlings to FVS tree-lists in the regeneration step. Some FVS variants have natural regeneration routines, but most variants depend on the user to specify the species and number of trees to plant. Some variants have a stump sprouting algorithm, whereby certain species will sprout after a harvest.
12. Crown change - FVS estimates crown ratio change for all trees based on stand density and the trees position in the density distribution.
13. Update stand characteristics and compute volume - After projecting the stand for the growth cycle, FVS computes, summarizes, and records the stand attributes, including volume. Volume is computed using corporate equations from the National Volume Estimation Library.
14. Test for more cycles to be projected - FVS repeats the sequence from the initial "Check Event Monitor", per Figure 2, to this point for each cycle until the specified number of cycles is completed.
15. Final FVS Output file reports and post-processor files - After FVS completes the scheduled cycles, it prints final output file reports and generates files specified by the user for running post-processors, including SVS.

The FVS growth model is used in this project to estimate growth and mortality based on field measurements and management activities over time. Finite Carbon uses the Database Extension of FVS (Crookston 2003) to read FVS input database tables created by the carbon modules into the FVS program.

E1.3.3 Data and FVS Settings

E1.3.3.1 FVS Input Data:

The FVS input database is comprised of three tables: FVS_GroupAddFilesAndKeywords; FVS_StandInit; and FVS_Treelnit.

Table E1.3.1 FVS Input Data

Table Name	Field Name	Description
FVS_GroupAddFilesAndKeywords	Groups	Used to assign keywords to all strata or a specific stratum
	AddFiles	Not used
	FVSKeywords	A list of FVS Keywords which define the FVS run (described further below)
FVS_StandInit	Stand_CN	Stand Control Number: Used for the FVS yield curve ID number
	Stand_ID	Stratum
	Variant	"SN" Southern Variant
	Inv_Year	"2021" - The inventory year of the plots associated with the Stand_CN.
	Location	"80404" – Cherokee National Forest – Tellico District. Indicates the closest National Forest Region and Forest Number to the project area.
	ECOREGION	"M221Cd" - This is the Ecological Unit Code (EUC). In the FVS SN variant, EUC codes affect species site index transformation, large tree diameter growth and the initialization of live surface fuels. This code was determined by overlaying the project area shapefile over the USDA Forest Service EcomapSubsections 2007 layer, available online at https://data.fs.usda.gov/geodata/edw/datasets.php?dsetParent=EcomapSubSections_2007
	PV_Code	Not used
	Basal_Area_Factor	"-15" - The inverse of the fixed plot size in acres (1/15 acre) using negative value to indicate fixed radius rather than Basal Area Factor.
	Inv_Plot_Size	"150" - The inverse of the fixed plot size in acres (1/150 acre fixed radius plot) – used for subplots, in this case to measure trees less than 5.0" DBH.
	Brk_DBH	"5.0" – indicates that all tree records ≥ 5.0 " DBH are processed using the Basal Area Factor (1/15-acre plot in this design), all trees less than 5.0" DBH are processed using the subplot.
	Num_Plots	Total number of plots associated with Stand_CN.
FVS_Treelnit	NonStk_Plots	Number of non-stockable plots associated with Stand_CN (not used because total number of plots used).
	Site_Species	Not used. See section "Site Index, Site Class, and Growth Determination" below for further details.

	Site_Index	Not used. See section “Site Index, Site Class, and Growth Determination” below for further details.
FVS_TreeInit	Stand_CN	Stand Control Number: Used for the FVS yield curve ID number
	Stand_ID	Stratum
	Tree_ID	Tree identification code for plot
	Plot_ID	Plot identification code
	Tree_Count	The number of trees on plot with the exact same measurements (always 1, no repetition counts used).
	History	Tree history code, e.g. alive, recent mortality, “older” mortality
	Species	Tree species
	DBH	Diameter at breast height
	Ht	Total height in feet
	HtTopK	Height to top kill in feet
	Damage1	“25” - Percent defect of tree’s merchantable cubic foot volume
	Severity1	“1-99” (99 = 100%) – percent defect
	Damage 2	“55” – Custom code
	Severity 2	Product code (if dead tree then dead tree decay class)
	TreeValue	Tree value class, in this case it is used to distinguish live cull trees (using a code value of “3”). “8” is used to indicate a no-tally plot. All other values indicate a live tree or dead tree, e.g. “1”.

E1.3.3.2 FVS Settings

The FVS model has many program options to control the inputs and variables which affect growth and yield. These options are typically set using “FVS Keywords.” They are programmed in the FVS input tables or selected in Suppose⁵. The following keywords are used for this project:

NOTRIPLE (No tripling) – Random effects are incorporated in the Forest Vegetation Simulator in the manner originally described by Stage (1973), and subsequently updated to reflect changes in program control variables. The program assigns all random effects to the distribution of errors associated with the prediction of the logarithm of basal area increment. Basal area increment was selected to reflect the stochastic variation because the effects of differing diameter growth rates extend in highly nonlinear ways through most of the remaining components of the model. This distribution of errors is assumed to be Normal, with a mean of zero. The variance of this Normal distribution is computed as a weighted average of two estimates; the first estimate is derived from the regression analysis that developed the prediction function, and the second estimate is the standard deviation of the differences between the recorded growth for the sample trees in the population (transformed to the logarithm of basal area increment) and their corresponding regression estimates. The weights assigned to these two estimates are (1) the number of observations by species and/or habitat type in the database for the model for the

⁵ Suppose v2.02 is the FVS graphic user interface (GUI).

prior component of error, and (2) the number of growth-sample trees in the stand for the second component of error (Mehta 1972).

The random component of change in tree diameter is treated in two ways, depending on how many tree records make up the stand being projected. When there are many tree records, the effects of any one random deviation on the growth rate of one tree would be blended with many other trees, and the stand totals should be quite stable estimates. Accordingly, a random deviate from the specified distribution is added to the logarithm of basal area increment.

When relatively few sample trees represent the stand, however, a different strategy is used. In order to increase the number of replications of the random effects, two additional records augment each tree record. These new records duplicate all characteristics of the tree except the predicted change in diameter and the number of trees per acre represented by the source tree record. The trees per acre value of the original tree record are reduced to 60 percent of its current value. The two new records are given 15 and 25 percent of the original value; thus, the three records together still represent the same number of trees per acre. This process is known as tripling.

Because each stratum in the project area contains an adequate number of tree observations, tripling is not used in this modeling; it is turned off with the NOTRIPLE keyword.

SPGROUP - Defines a group of species that can be referenced by a single name, or FVS sequence number, and will be treated as a group in management actions or event monitor functions. Users may define up to 10 species groups with each group containing up to 50 species codes. If the species group name is entered in the species field of a keyword, the keyword action will apply to all species in the group. One or more supplemental records are required that contain the FVS species codes or FVS species sequence numbers.

The SPGROUP keyword was used to define the species group “CONIFER”, containing all coniferous species. This species group was used in the calculation of naturally seeding conifers following certain harvest events.

MINHARV (Minimum Harvest) - Specifies minimum acceptable harvest standards for board-foot volume, merchantable cubic-foot volume, basal area per acre, or total cubic foot volume. The accumulated removals across all thinnings in a cycle must exceed the standards for all the units of measure (fields 2, 3, 4, and 5), or none of the thinnings in that cycle will be implemented.

This keyword was used in thinning treatments to ensure that a silvicultural treatment (harvest) satisfies a minimum harvest level for financial and operational feasibility. The minimum harvest volume was set to 3,000 board feet per acre for heavy thins, used in upland stand harvests and 600 merchantable cubic feet per acre for light canopy thins used primarily in SMZ buffer areas based on Finite Carbon’s previous experience in similar forest types in the region.

THINABA (Thin from Above to Basal Area target)- Schedules a thinning from above to a basal-area-per-acre target. Only trees with DBH’s and heights within the user-defined ranges are considered for

removal. The tree record with the largest diameter within the specified range is considered for removal first, and the proportion of that tree record specified in field 3 is removed. The tree record with the next largest diameter is considered next, then the next largest and so on until the residual basal area target is met or all records in the specified range have been considered. The residual target basal area is specified only for the user-defined range of DBH and height and does not represent the total residual unless the range of DBH's and heights includes all trees in the stand.

The THINABA keyword was used to simulate heavy thins from above in upland stands. The target residual basal area was set to 40 square feet per acre.

THINCC (Thin to Canopy Cover target) Schedules a thinning from a specified dbh range for any, or all, species to a percent canopy cover target. Canopy cover is corrected for crown overlap. If the target canopy cover is nonzero and the cutting control flag is zero, thinning occurs uniformly throughout the specified dbh range until the target is met (the cutting efficiency parameter is ignored and the cutting efficiency needed to complete the thinning is automatically calculated by the program). If the target canopy cover is nonzero and the cutting control flag is nonzero, then the cutting efficiency parameter is used along with the Removal Priority Algorithm. If the cutting efficiency parameter is set so low that the target cannot be reached, the cutting efficiency is recalculated so that the target is met. Only trees of the user-specified species that are within the user-defined dbh range are considered for removal. The residual target canopy cover is specified only for that species and dbh range, and does not represent the total residual unless the dbh range includes all trees of all species in the stand.

The THINCC keyword was used to simulate light canopy thins, primarily in SMZ buffer areas, although this prescription was also allowed in upland stands. The residual target canopy cover was set at 50%, and the keyword was parameterized to thin from above to reflect extraction of larger commercial trees.

ESTAB (Establishment Model) – signifies the beginning of keywords for the Regeneration Establishment extension. The ESTAB keyword sequence must be terminated with an END keyword. All keywords between ESTAB and END are considered Establishment extension keywords.

Eastern FVS variants contain a partial establishment model which may be used to input regeneration and ingrowth into simulations. Sprouts are automatically added to the simulation following harvest for sprouting hardwood species, which applies for all hardwood trees sampled in the inventory. Regeneration of conifer seedlings however must be simulated following the ESTAB keyword with additional keywords as described next.

NATURAL (Natural regeneration) – Specifies natural regeneration that will be added to the stand.

This keyword was used to simulate natural regeneration of conifer following thinning treatments based on FVS-predicted hardwood. Natural regeneration was invoked in the cycle immediately after the treatments occurred with a species-specific distribution in each stratum and with a specific total trees per acre for each treatment.

In all treatments, seedlings have an 100% expected survival rate, an average seedling age of 2 (default) in years for the year specified in Field 1, and a shade code of 0 (seedlings occur more uniformly on plots throughout the strata). The average seedling height was calculated automatically by FVS.

COMPUTE - allows the user to define variables expressed as mathematical expressions containing constants, Event Monitor variables, Event Monitor functions, and variables previously defined using the COMPUTE keyword. Variables are defined using mathematical equations in supplemental records, which are up to 80 characters long. The Event Monitor feature of FVS allows users to specify a set of conditions that must occur, or thresholds that must be reached in order for FVS to simulate a management activity or set of management activities. The COMPUTE keyword is used to define variables that are evaluated by the Event Monitor to determine if necessary conditions or thresholds have been met.

The COMPUTE keyword was primarily used, in conjunction with FVS Keyword SPMCDBH to define the amount of naturally regenerating conifer seedlings following thinning harvests, depending on the amount of sprouting that FVS predicted. The following variables were defined:

Table E1.3.2 Variables calculated using COMPUTE keywords in FVS simulations

Variable	Definition	Usage
TPALT5	Total trees less than 5" per acre present in the FVS simulation.	Used to calculate the number of conifer seedlings to be added to the simulation one cycle after thinning.
SWTPALT5	Total conifer trees, defined by the CONIFER species group (SPGROUP), less than 5" per acre present in the FVS simulation	Used to detect the total amount of conifer trees present to calculate the number of conifer seedlings to be added to the simulation one cycle after thinning.
HWTALT5	= TPALT5-SWTPALT5	Used to calculate the number of hardwood sprouts in the FVS simulation following a clearcut
JUTPA SPTPA WPTPA VPTPA HMTPA	<u>"HW" STRATUM</u> JUTPA=0.002*HWTALT5 WPTPA=0.003*HWTALT5 VPTPA=0.002*HWTALT5 HMTPA=0.002*HWTALT5 <u>"OTHER" STRATUM</u> SPTPA=0.004*HWTALT5 WPTPA=0.213*HWTALT5 VPTPA=0.205*HWTALT5 HMTPA=0.004*HWTALT5	Number of Juniperus spp. (JU), e.g. redcedar, seedlings predicted, based on number of hardwood sprouts (HWTALT5) following thinnings: 0.2% for the HW stratum, based on analysis of prevalence of JU TPA in project inventory relative to total hardwood BA for the HW stratum. Similarly for shortleaf pine (SP), eastern white pine (WP), Virginia pine (VP), and Eastern hemlock (HM). No JU seedlings were present in the "OTHER" project stratum inventory, and no SP seedlings were present in the "HW" project inventory.
SW2HWLT5	= SWTPALT5/HWTALT5	The ratio of softwood saplings to hardwood saplings in the FVS simulation. Used to govern the addition of conifer seedlings following harvests to prevent too many conifer seedlings from being added in regimes with frequent harvests. If SW2HWLT5 in the simulation falls below 50% of SW2HWLT5 of the initial conditions of the FVS simulation (i.e. the project inventory), conifer seedlings are added.

IF-THEN-END IF - also known as scheduling by condition, the IF-THEN-END IF code block is used to execute FVS actions once certain conditions are met. The Event Monitor keyword sequence must begin with an IF keyword. The next record must be a condition statement that evaluates to true or false. The next record is a THEN keyword. The sequence ends with an ENDIF keyword. All keywords contained between the THEN and ENDIF keywords will be executed whenever the condition is true. The condition is checked every cycle, unless that cycle falls within the minimum waiting time since the last time the condition was true.

A record of how all keywords were used in the modeling can be found in the FVS input databases delivered as part of the baseline modeling package with this project.

NUMCYCLE - Specifies the number of cycles to run the projection. A cycle is the period of time for which tree characteristics are predicted, and for which inventories are reported (see TIMEINT).

TIMEINT - Specifies the length, in years, of any or all projection cycles. This keyword is used to ensure that an action can be implemented in the same year that it is scheduled rather than the FVS default, which is the first year of a cycle. The default projection cycle for the SN variant of FVS is 5 years. TIMEINT was used in conjunction with NUMCYCLE and IF-THEN-END IF code blocks to offer different timing possibilities of silvicultural actions throughout the 100-year planning horizon for each stand type. Having multiple prescriptions available for each stand in which different sequences and timing of harvest events and other silvicultural events occur ensures that property-level constraints, such as upper or lower limits on harvest volumes, can be met in the baseline planning model described below.

RESETAGE - Sets the stand age to zero to make FVS model output correspond to the actual age of the stand. Age is strictly for reporting purposes and has no effect on growth or survival prediction. Its only effect is on the calculation of mean annual increment. This keyword is useful when average stand age has changed due to thinnings and plantings.

This keyword was used to reset stand age after certain harvest types so that the timing of subsequent harvests could be calculated and controlled programmatically as necessary. A record of how all keywords were used in the modeling can be found in the FVS input databases delivered as part of the baseline modeling package with this project.

SITECODE - Sets species-specific site index values. If a SITECODE keyword is present, all species for which site index values were not explicitly set will be assigned site index values derived from the site index of the specified site species. If no SITECODE keyword is present, default site index values are assigned. Site index can be described for the site species of an entire stand, which is equivalent to entering a species code in the "Site_Species" field in the FVS_StandInit table, and for all other species in the stand. This keyword was used to assign site index values derived from the site index estimation procedures described below.

A record of how all keywords were used in the modeling can be found in the FVS input databases.

E1.3.4 Site Index and Growth Determination

The Yield - Soils Overlay method determines the potential productivity of each Assessment Area (MAI in Cubic Feet per Acre per Year) within the Project Area from soil survey data obtained from the USDA Natural Resources Conservation Service (NRCS). These results are then used to estimate Site Index values to calibrate growth rates within FVS.

The NRCS provides soil survey data at no cost from their *Web Soil Survey (WSS)* platform for almost all the contiguous United States. The data can be delivered in SSURGO format, which has spatial and tabular components allowing users to group and report soils data for a focus area.

The steps to perform this method using NRCS SSURGO soils overlay data are as follows:

1. Download soil dataset and coverage for Project Area (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>).
2. Use ArcGIS Overlay Identity Analysis Tool to attribute Project Area with soil survey Mapping Unit Key (mukey).
3. Relate soil mapping units with soil series components.
4. Relate soil series components with site index values (Carmean et al 1989) and determine the average site index for all suggested species.
5. Aggregate species site index by strata and soil mapping unit weighted by component representative percent (i.e. weighted average method).

The results of the site index analysis are shown below. The site species for each stratum was determined by ranking the basal area percentage of each species.

Table E1.3.2 Site Index by Strata

Inventory Strata	Species	FVS Code	Acre-Weighted Average Site Index	Site Species
HW	pin oak	PN	100.0	Y
HW	yellow-poplar	YP	94.0	
HW	eastern white pine	WP	90.7	
HW	eastern cottonwood	EC	86.6	
HW	black walnut	WN	84.0	
HW	loblolly pine	LP	79.8	
HW	sweetgum	SU	77.5	
HW	chestnut oak	CO	72.7	
HW	northern red oak	RO	71.6	
HW	southern red oak	SK	70.7	
HW	white oak	WO	70.5	
HW	black oak	BO	68.9	
HW	scarlet oak	SO	68.6	
HW	Virginia pine	VP	67.4	
HW	shortleaf pine	SP	62.2	
MX	pin oak	PN	100.0	Y
MX	yellow-poplar	YP	95.6	
MX	eastern white pine	WP	90.5	
MX	loblolly pine	LP	90.0	
MX	eastern cottonwood	EC	87.8	
MX	black walnut	WN	84.0	
MX	northern red oak	RO	79.3	
MX	white oak	WO	77.6	
MX	black oak	BO	77.4	
MX	chestnut oak	CO	76.7	
MX	Virginia pine	VP	76.5	
MX	sweetgum	SU	75.7	
MX	scarlet oak	SO	73.4	
MX	shortleaf pine	SP	67.7	

E1.3.5 Annual Growth and the Initial Project Inventory

The initial project inventory was conducted in the field November and early December 2021, assumed to effectively represent growth through the end of growing season 2021. The initial reporting period start date is June 16, 2021. According to growing season data compiled online by the Farmer's Almanac for Oak Ridge (accessed their website in early March), the nearest reported locale to the project site, the average growing season (as indicated by the last freeze of the year) commences annually on April 16⁶

⁶ <https://www.almanac.com/gardening/frostdates/TN/Oak%20Ridge#>

and averages 190 days in length. The timespan from June 16 to October 24 (the end of the growing season) represents 68.42% of the annual growing season.

Average annual growth was modeled by growing the inventory forward five years (the default cycle length for the SN variant) and determining the annual diameter and height increment for each individual tree record. A fraction of the annual increment (68.42%) was subtracted from each tree's height and diameter in the inventory tree list (November 2021 vintage) to create a 6-16-2021 tree list. Plot-level carbon results representing the start of RP1 were then calculated from this tree list.

E1.3.6 Estimation of Initial Carbon Stocks

E1.3.6.1 Carbon quantification methodology

The quantification methodology of Woodall et al (2011) was used to quantify above ground and below ground biomass for live trees. Missing bole biomass due to defect was applied to trees with recorded defect as a percentage of total bole volume.

For standing dead trees, the decomposition class of each dead tree was categorized into one of four decomposition classes:

1. Tree with branches and twigs that resembles a live tree (except for leaves)
2. Tree with no twigs but with persistent small and large branches
3. Tree with large branches only
4. Bole only, no branches

Biomass was estimated following the Woodall et al (2011) methodology as per live trees except for decomposition class 4. For decomposition class 4, the biomass estimate was limited to the main stem of the tree. For standing dead trees with missing tops, the top and branch biomass were assumed to be zero. In addition to the application of recorded defect as per the live trees, further reductions in biomass by dead wood density classes were taken for dead trees as follows: Class 1 – 97% of live tree biomass; Class 2 – 95% of live tree biomass; Class 3 – 90% of live tree biomass, and Class 4 – 80% of live tree biomass.

Total project carbon (in metric tons CO₂) by summing the biomass of each stratum for the project area and converting biomass to carbon by multiplying by 0.5, kilograms to metric tons by dividing by 1000, and finally carbon to CO₂ by multiplying by 3.664.

E1.3.6.2 Estimation of project carbon stocks

The initial and end-of-reporting period carbon stocks for this project are shown below.

Table E1.3.3 Initial Carbon Stocks

Strata	Acres	Live Above Ground CO2e per acre	Live Below Ground CO2e per acre	Standing Dead CO2e per acre	Total Onsite CO2e per acre	Total Onsite Carbon Stocks, mtCO2e
HW	59,390	114.37	22.19	2.20	138.75	8,240,414
MX	4,591	100.18	21.57	5.84	127.58	585,679
Totals:	63,980	113.35	22.14	2.46	137.95	8,826,093

Table E1.3.4 End-of-reporting period Carbon Stocks

Strata	Acres	Live Above Ground CO2e per acre	Live Below Ground CO2e per acre	Standing Dead CO2e per acre	Total Onsite CO2e per acre	Total Onsite Carbon Stocks, mtCO2e
HW	59,390	116.50	22.60	2.20	141.30	8,392,040
MX	4,591	103.05	22.19	5.84	131.08	601,724
Totals:	63,980	115.54	22.57	2.46	138.11	8,993,763

E.1.3.7 Determining the Baseline

Per the ACR IFM protocol, the baseline represents the theoretical maximum net present value (NPV) that would be obtained from harvesting all available timber products existing on the subject property pursuant to applicable operational and regulatory constraints. Detailed below are the steps we used to quantify the timber revenues and associated expenses required for the NPV model.

E.1.3.7.1 Harvest Prescriptions

We utilized the USFS FVS growth and yield program to establish yield estimates for each applicable harvest method within each strata across the subject property. Input data, settings, and keywords used in the simulation of the harvest prescriptions have been described previously in section E.1.2.3.

Two essential harvest prescriptions / silvicultural regimes were simulated.

Heavy Thin: The “Heavy Thin” regime simulates a value-extracting removal of merchantable overstory trees to a residual target of 40 square feet of basal area. The thinning is specified as a thin-from-above treatment where the largest diameter classes are harvested first until the target BA is met. The stand is allowed to regenerate naturally and grow until the next overstory tree removal. The treatment does not discriminate against any particular species, so trees retained at harvest will maintain relatively the same species composition as the before treatment species composition. A stand was eligible for this type of treatment if removable harvest volume was at least 3000 board feet per acre. Hardwood regeneration was simulated with natural sprouting in the model. Advanced regeneration from conifer

species in the softwood strata was simulated in FVS. For more information about how conifer regeneration was simulated see the 'FVS Settings' section of this appendix.

This treatment type was only applicable for unencumbered (non – SMZ) upland stands.

Canopy Thin: A “Canopy Thin” was defined as a thin-from-above cutting designed to simulate removal of merchantable trees in areas where a heavy thin was not applicable, primarily in riparian (Stream Management Zone) areas. A residual canopy cover of 50% is specified to adhere to best management practices. The treatment does not discriminate against any species, so trees retained at harvest will maintain relatively the same species composition as the before treatment species composition. A stand was eligible for this type of cutting if the harvest volume was at least 600 cubic feet per acre’

This treatment type was designed primarily for SMZ buffer areas but could be utilized in upland stands as well.

E1.3.8 Timber pricing

To formulate estimates of timber revenues associated with each merchandized product, we obtained recent timber price data directly from the Project Proponent in addition to the data on TimberMart South. Price data was then formatted to approximate representative stumpage values for each timber product.

E1.3.9 Cost assumptions

As part of the NPV optimization, relevant management and administrative costs were also included in the cash flow formulation. Variable and fixed costs associated with timber harvesting and property ownership, such as timber marking, road maintenance, and property taxes, were provided from the Project Proponent.

E1.3.10 Legal and market constraints

Model constraints were employed in the NPV optimization. Harvest “flow” constraints where total harvest volumes over the first 10 years were not allowed to exceed 1 million green tons per year, and where the highest multiple-year flow of sawlogs could not be greater than 4x the lowest multiple-year flow of sawlogs over the first 10 years of the modeling horizon ensured that volumes do not dramatically vary year-over-year in pursuit of NPV maximization.

E1.3.11 Maximizing NPV of timber harvests in baseline

FVS and the carbon modules were used to create yield tables representing a variety of 100-year harvest prescriptions / silvicultural regimes for each of the project strata. Over 40 regimes consisting of 100-year FVS simulations were run, and their FVS Outputs processed through the modules to create a series of yield curves based on the timing options specified by the FVS Keywords used to simulate each regime. These yield curves were then loaded into a proprietary Excel workbook in which the yield curves are interpolated to provide annual values of key carbon metrics. The final, annualized set of yield curves are next imported into Remsoft’s Woodstock planning model to evaluate and allocate acres to each FVS yield table to help determine a final baseline harvest schedule that maximizes NPV while complying with all relevant legal constraints and operational considerations. Combining inputs for yields, economic

metrics, and constraints, Woodstock uses linear programming, a forest industry standard for solving resource allocation problems, to find the optimal set of harvest prescriptions over the 100-year timeframe to maximize NPV. Baseline modeling assumes a real discount rate of 6% per ACR IFM protocol for industrial timberland owners. The results of this solution process are found in on the 'NPV_Model' tab of the 'Calculations' spreadsheet

Within the model, as typical with most harvest optimization exercises, the underlying preference was to first harvest stands exhibiting ages beyond the typical rotation age. Embedded in the logic of NPV-maximization is the "opportunity cost" of not harvesting low-growth stands that have reached or surpassed the age of financial maturity, thus inciting the model to select such stands for harvest first in favor of retaining younger, more vigorously growing stands. Harvest volume and acreage constraints were especially "binding" in the early years of the model given the higher rates of harvest activity.

E1.3.12 Harvested wood products

Long-term carbon storage in harvested wood products (HWP) were calculated in accordance with ACR IFM protocol section 3.2. The following steps were used:

Step 1:

HWP volumes were converted to CO₂, without bark. Product classes included hardwood pulpwood, hardwood sawtimber, softwood pulpwood, and softwood sawtimber.

Step 2:

HWP carbon equivalents were multiplied against the associated mill efficiency coefficients, in this case the South Central region, as specified in the "Regional Mill Efficiency Data" database.

Table E1.3.5 USFS Mill Efficiency Coefficients, South Central Region

Mill Efficiency: South Central		
Species	Product	Coefficient
Hardwood	Saw Log	0.587
Hardwood	Pulpwood	0.581
Softwood	Saw Log	0.629
Softwood	Pulpwood	0.570

Step 3:

Adjusted HWP carbon equivalents were then divided across the applicable Wood Product Class proportions per the most recently available ARB Assessment Area data file.

Table E1.3.6 Wood Product Class Proportions, Allegheny & North Cumberland Mountains Supersection

Wood Product Class	Harvest Wood Product %
Softwood Lumber	3.6%
Hardwood Lumber	68.8%
Softwood Plywood	0.0%
OSB	12.2%
Non Structural Panels	4.6%
Misc. Products	3.4%
Paper	7.4%

Step 4:

Wood product classes were then multiplied against the applicable 100-year storage factors for in-use products and landfill portions, per ACR IFM protocol.

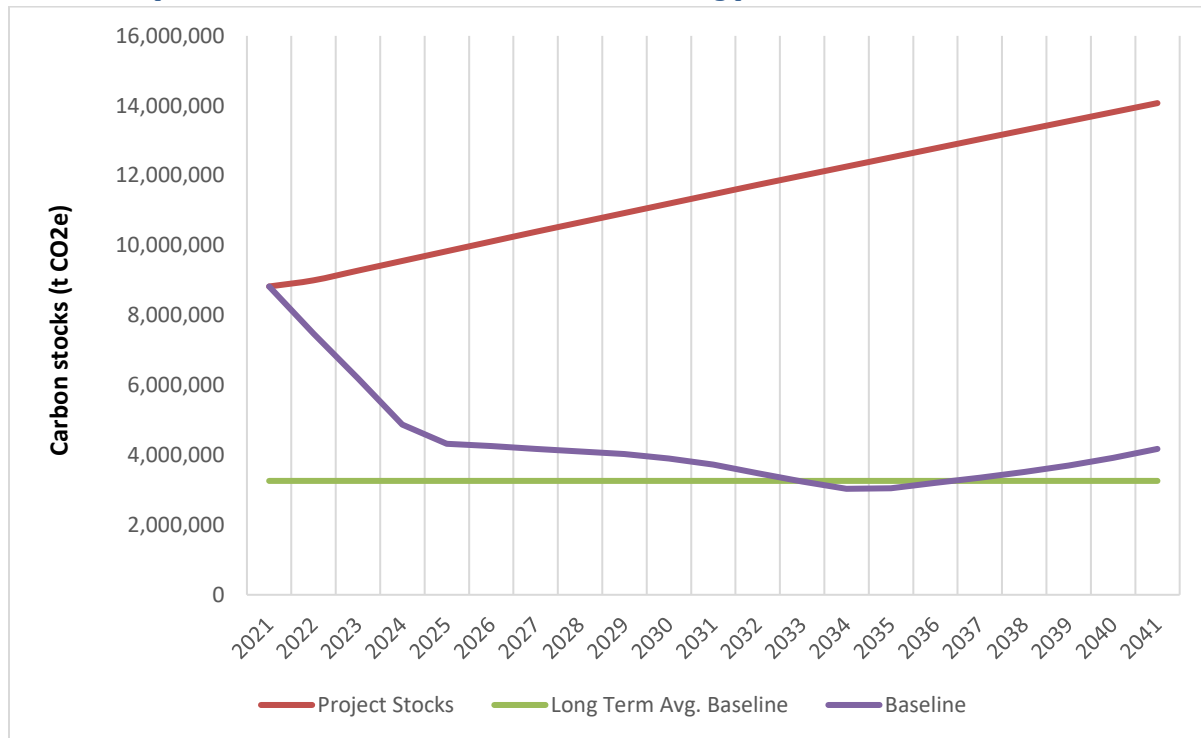
Table E1.3.7 Wood Product 100-year Storage Factors

Wood Product Class	100-year storage factors	
	In-Use	Landfills
Softwood Lumber	0.234	0.405
Hardwood Lumber	0.064	0.49
Softwood Plywood	0.245	0.4
OSB	0.349	0.347
Non Structural Panels	0.138	0.454
Misc. Products	0.003	0.518
Paper	0	0.151

Step 5:

Long-term carbon storage from both in-use and landfill portions were combined for all harvest activities in the model within a given year to formulate the total stored CO₂e after 100 years from when harvesting occurred.

E1.3.13 Graph of baseline carbon stocks for first crediting period



E2. PROJECT SCENARIO

The actual project scenario is measured through future inventories over the course of the project lifetime. We produce an ex-ante projection of the project scenario assuming the landowner will conduct regular timber harvests over the next 20 years (A6. PROJECT ACTION). These calculations are detailed in the 'HWP_PRJ_Calcs' tab in ACR701 GHGPP Calculations v1.0.xlsx.

The quantification methodology follows the same approach described for the relevant carbon pools in the Baseline section above.

E3. LEAKAGE

No activity-shifting leakage is allowed by the ACR IFM methodology beyond de minimis levels. The project includes a moderate level of harvest activity within the first reporting period, and moderate levels are projected for future reporting periods, as well. Forest management plans and historical records provided for verification demonstrate no deviation from management plans or from historical trends.

The quantification of leakage for the project is limited to market leakage. Where project activities decrease total wood products produced by the project relative to the baseline by 25% or more over the Crediting Period, the market leakage deduction is 40%.

E4. UNCERTAINTY

Project and baseline carbon stock uncertainty was calculated in accordance with equations 10 and 18 of the ACR IFM protocol. The associated metrics are included in the 'ERTs_UNC' tab of ACR701 GHGPP Calculations v1.0.xlsx. Per ACR IFM protocol, the error terms of standing live and dead CO₂, e_{TREE} and e_{DEAD} , are estimated from the most recent inventory data (i.e. the project inventory) for both the project and baseline carbon stocks. Given that log slash burning is not an applicable practice for the subject property, greenhouse gas emissions (GHG) are estimated to be zero in both the baseline and project scenarios. The total uncertainty of combined live and dead CO₂e baseline stocks is 7.82%.

Table E4.1 Live and Dead mtCO₂e Statistics

Strata	Plots	Avg Live CO ₂ /acre	Std Dev Live CO ₂ /acre	Avg Dead CO ₂ /acre	Std Dev Dead CO ₂ /acre	Std Error Live CO ₂ /Acre	Std Error Live CO ₂ /Acre
HW	154	139.11	85.81	2.20	4.74	61.69%	215.43%
MX	5	125.24	29.71	5.84	10.64	23.72%	182.28%

Table E4.2 Uncertainty Calculations, 90% Confidence Interval

$e_{\text{TREE}, t=1}$	7.94%
$e_{\text{DEAD}, t=1}$	28.13%
UNC	7.82%

E5. REDUCTIONS AND REMOVAL ENHANCEMENTS

Table E5.1 shows estimated net reductions and removal enhancements attributable to the project over the first 20-year crediting period (2021 - 2041). Annual project-level uncertainty remains below the 10% threshold required by the ACR protocol, therefore no uncertainty deduction was applied to the annual Emission Reduction Tons (ERTs) generated by the project. ERTs presented in Table E1.n incorporate the assumed 40% market leakage.

Table E5.1 Estimate of Net ERT's by Year (Including Buffer)

Reporting Period	Year	Estimated GHG emissions reductions (mt CO ₂ e)
1	2021	752,021
2	2022	769,733
3	2023	781,838
4	2024	406,620
5	2025	170,375
6	2026	174,971
7	2027	172,182
8	2028	168,295
9	2029	191,933
10	2030	220,427
11	2031	255,881
12	2032	234,263
13	2033	128,468
14	2034	128,468
15	2035	128,468
16	2036	128,468
17	2037	127,042
18	2038	127,042
19	2039	127,042
20	2040	127,042

E6. EX-ANTE ESTIMATION METHODS

Table E6.1 shows projected CO₂e stocks under the project scenario described in Section E2. Project Scenario.

Table E6.1 Estimate of Ex-Ante Project Stocks

Year	Live Trees (mtCO ₂ e per acre)	Standing Dead (mtCO ₂ e per acre)	HWP (mtCO ₂ e per acre)
2021	138.1	2.5	0.8
2022	142.1	2.6	1.1
2023	146.0	2.8	1.1
2024	150.0	3.0	1.1
2025	153.9	3.2	1.1
2026	157.9	3.4	1.1
2027	161.8	3.6	1.1
2028	165.6	3.7	1.1
2029	169.5	3.9	1.1
2030	173.3	4.0	1.1
2031	177.2	4.2	1.1
2032	181.0	4.3	1.1
2033	184.8	4.3	1.1
2034	188.7	4.4	1.1
2035	192.5	4.4	1.1
2036	196.3	4.5	1.1
2037	200.1	4.5	1.1
2038	203.9	4.6	1.1
2039	207.8	4.6	1.1
2040	211.6	4.6	1.1

F.
COMMUNITY & ENVIRONMENTAL
IMPACTS

F1. NET POSITIVE IMPACTS

The environmental and community impacts of the Project Activity have been assessed in accordance with the ACR Standard. The five ACR requirements for environmental and community impact assessments are addressed below.

Net positive community and environmental impacts have been identified. See A6. Project Action for more information on past and current management of the project area. In addition to carbon sequestration, the sustainable management of the project area will provide additional benefits in the form of conservation of natural forest habitat, protection of plant and animal species, water quality protection, and the protection of soil resources from erosion and degradation. The project actions include deferred harvesting, lengthened rotations, timber stand improvement, retention of standing dead wood during timber harvests, and protection of riparian areas, wetlands, and significant natural communities. All of these actions have been shown to provide net positive benefits to local communities and the environment.

No negative community or environmental impacts are foreseen from the Project Proponent's commitment to long-term sustainable forest management. Environmental impacts are entirely positive. Any negative economic impact on communities from enrollment of 63,980.1 forested acres in an Improved Forest Management program is effectively de minimis, particularly given the size of the larger wood basket in which the project is located.

1. Overview of Project Activity and geographic location

See A5. BRIEF SUMMARY OF PROJECT and A4. LOCATION.

2. Applicable laws, regulations, rules, and procedures and the associated oversight institutions

See C1. REGULATORY SURPLUS TEST.

3. A description of the process to identify community(ies) and other stakeholders affected by the project and, as applicable, the community consultation and communication plan

No formal stakeholder consultation was conducted prior to the commencement of project activities. The project area is privately held property and no stakeholder consultation was any required. If Project Proponent is contacted by any persons or entities regarding the project, Project Proponent will provide references to the publicly available documentation for the project.

4. An assessment of the project's environmental risks and impacts

<i>Impact</i>	Carbon Sequestration – Enhanced carbon sequestration from deferred harvesting and long-term sustainable forest management (SDG Goal 13, Climate Action)
<i>Risk Category</i>	Positive - The combination of management actions described above and in A6. Project Action will lead to increased carbon sequestration relative to business-as-usual management.

<i>Measure(s) to avoid, reduce, mitigate, or compensate negative impacts</i>	N/A
<i>Monitoring Plan</i>	See D. MONITORING PLAN for how biomass/onsite carbon stocks will be monitored for the project term.

<i>Impact</i>	Conservation of natural forest habitat; protection of plant and animal species (SDG Goal 15, Life on Land)
<i>Risk Category</i>	Positive - The combination of management actions described above and in A6. Project Action will protect forest habitat and species found in the project area. Important habitat components found on this forest include early successional habitat, hard and soft mast, seeps, standing dead trees (snags), coarse woody debris, deer winter areas, vernal pools. Maintaining these attributes is a part of the ongoing sustainable management of the property. Harvest deferrals and long-term sustainable management of the project area will create more late successional habitat, while future harvest activity will maintain areas of early successional habitat. Sensitive habitat and riparian areas will be protected.
<i>Measure(s) to avoid, reduce, mitigate, or compensate negative impacts</i>	N/A
<i>Monitoring Plan</i>	See D. MONITORING PLAN

<i>Impact</i>	Water quality protection (SDG Goal 6, Clean Water and Sanitation)
<i>Risk Category</i>	Positive - Water-quality degradation on managed timberlands is commonly the result of erosion and sedimentation from roads, skid trails, or landings. Tennessee has developed a set of management practices for maintaining water quality on logging jobs to protect the waters of the states from these risks (see Evaluation of Rules and Regulations subject to the Project Area in E.1.3). Forest management in the project area will meet or exceed these practices. Stream crossings will be limited. Increasing forest cover in riparian areas and upland forests adjacent to riparian areas and wetlands will moderate stream temperatures and mitigate flooding impacts.
<i>Measure(s) to avoid, reduce, mitigate, or compensate negative impacts</i>	N/A
<i>Monitoring Plan</i>	See D. MONITORING PLAN.

<i>Impact</i>	Soil quality – Protection from erosion and degradation (SDG Goal 15, Life on Land)
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<i>Risk Category</i>	Positive – Soils will be protected from erosion and degradation by application of the best management practices referenced above. Harvests will be appropriately timed to minimize unnecessary disturbance to soils.
<i>Measure(s) to avoid, reduce, mitigate, or compensate negative impacts</i>	N/A
<i>Monitoring Plan</i>	See D. MONITORING PLAN.

5. *For community-based projects, an assessment of the project's community risks and impacts*
Not applicable.

F2. STAKEHOLDER COMMENTS

Not applicable.

G.

OWNERSHIP AND TITLE

G1. PROOF OF TITLE

Emissions reductions or enhanced removals created by the project are owned directly by the Project Proponent, Windrock Land Company, who holds full legal title in fee or in some cases through timber rights and thus have long term control of the land. The relevant deeds are provided separately for verification (Appendix A. Ownership Documentation).

G2. CHAIN OF CUSTODY

Not applicable.

G3. PRIOR APPLICATION

The project has not previously applied or been registered under any GHG emissions trading system or program.

H.

PROJECT TIMELINE

H1. START DATE

The project “Finite Carbon – Windrock Land Company IFM” has a project start date of June 16, 2021, the date on which a Carbon Development Services Agreement between the Project Proponent and a purchaser of the ERTs was fully executed. This start date is appropriate and consistent with the ACR Standard v.7.0.

H2. PROJECT TIMELINE

Below is a schedule of the project activities in chronological order for important aspects of the project.

PROJECT ACTIVITY	DATE	SOURCE/NOTES
Project start date and start of crediting period	June 16, 2021	The date on which a Carbon Development Services Agreement between the Project Proponent and a purchaser of the ERTs was fully executed.
Forest carbon inventory	November, 2021	
Validation and registration of the project	Anticipated 2022	
Frequency of monitoring, reporting and verification		Every 5 years or less, or at request for ERT issuance
End date of first crediting period	June 15, 2041	20 years
End date of project term	June 15, 2061	40 years