Blue Source – Great Mountain Forest IFM Project Modeling

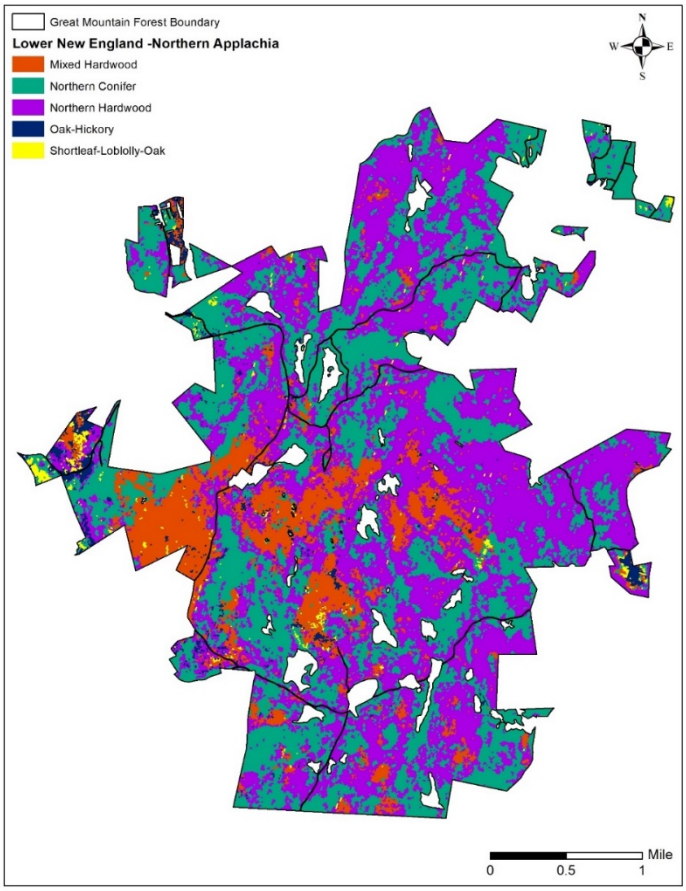
Inventory Metholodgy

For all applicable carbon pools, the following inventory methodology will be employed:

Inventory Standard: The inventory methods and sampling procedures, once established and approved at verification, must be consistent over the life of the project. If new methodologies are adopted, they must achieve an equal or greater accuracy relative to the original sampling design. Any changes to inventory methods or calculations must be documented and justified in the change log.

Project Boundary: The offset Project Area was determined using the most recent geospatial file of the of the property. Non-forested areas including roads, right-of-ways, and major water bodies were removed from the Project Area.

Stratification: The Project was stratified into two distinct strata. The stratification is based on the most recent stands geospatial file and inventory in order to reduce the sampling error below 5.1%. Stratification was conducted post-inventory using remote sensing techniques described in the "Great Mountain Forest Stratification Report" provided separately for verification. The resulting strata acres and spatial distribution are shown below. The minimum mapping unit for the project area was 2.5 acre (or approximately 1 hectare) (Knight and Kunetta 2003).



Plot Number and Locations: A network of permanent inventory plots were installed across the project area. Using the Fishnet Grid tool in ArcGIS, a total 148 plots were sampled across the entire project area, placed at least 74.4 feet apart, ensuring no overlapping plot boundaries. The final 148 plots sampled were the number needed to reach <5.1% sampling error.

Monumentation: Permanent inventory plot centers were monumented with a rebar pole pounded into the ground and topped with a small rebar cap flush with the ground.

Sampling Method: Permanent, fixed-radius plots were established across the Great Mountain Forest, LLC property to facilitate precise tracking of individual tree growth and ease of verification. At each plot location, a 1/10th-acre (37.2' radius) fixed-radius plot will be established to measure all trees greater than or equal to 5.0" in diameter at breast height (DBH); and a 1/100th-acre (11.8' radius) sub-plot will be taken to capture woody trees and saplings less than 5" (1.0 to 4.9" DBH). This plot design gave forest managers the opportunity to consistently track the growth and development of specific trees over an extended timeline and will allow for improved ease of plot location during field work and site verifications. Plots that fell in non-forested areas were noted as to why they were non-forested and were dropped with GPS points denoting the forest boundary. Non-forested acres were removed from the project area to a 2.5 acre minimum mapping unit. Plots that were devoid of forest carbon but were not explicitly non-forest (e.g. water, rocky outcrop, etc) were taken in location and measured as is.

The protocol defines trees as "A woody perennial plant, typically large and with a well-defined stem or stems carrying a more or less definite crown with the capacity to attain a minimum diameter at breast height of 5 inches and a minimum height of 15 feet with no branches within 3 feet from the ground at maturity." As a result, inventory crew measured all species >=1" DBH that met this definition, regardless of merchantability. For all trees in the fixed-radius plot, species, status, DBH (to the nearest tenth of an inch), 4" top height (to the nearest foot or +/- 5' for difficult to measure trees), phantom 4" top height (using nearby live trees of same species and DBH), and decay class (for snags) were measured. In the subplot, species and DBH were recorded for each eligible tree. Defect for live trees was estimate by dividing the tree into thirds based on total original height and weighted according to the protocol. Defect for dead trees used the same method except considered defect in the bole only instead of the whole tree. Measurements for DBH and height of irregular trees used the methods outlined in the Forest Inventory and Analysis National Core Field Guide Version 7.1. Further specification for field measurements are provided in the "Great Mountain Forest_Carbon_Plot_Methodology_11_7_17" document.

Statistical Standard: Mean volume estimates (e.g. above ground carbon per acre) for the ownership will be reported with a minimum statistical precision of +/– 5% of the mean at the 95% confidence level. These objectives may be adjusted for more or less precision based on a property-specific analysis of data collection cost relative to return.

Sampling Frequency: Full project-level inventories of the carbon project will be conducted at 6-12 year intervals. Inventories of select portions of the Project Area will be updated periodically in response to natural disturbance or significant forest management activities. Traditional pre-and post-harvest monitoring techniques will be employed to inform land managers of potential needs to implement a more comprehensive monitoring of carbon pools (refer to Pearson, Brown, Birdsey 2007).

Harvest Re-Measurement: If a plot is harvested, the plot will be re-measured within 6 months of yarding to assess which trees will be taken out so that the inventory can be updated for the current reporting period. Blue Source will work with Great Mountain Forest to determine which plots have been harvested during the reporting period.

Data Collection Materials: Data was collected on hand held electronic data recorders. If data recorders were not available, field data was collected on paper tally sheets and manually entered into a computer for data analysis. All data sheets were scanned and sent to Blue Source.

Field personnel used the following equipment for obtaining forest-carbon inventory data: 75' or longer Logger's Tape designed to measure in 10ths of feet and 10ths of inches for diameter, clinometer capable of measuring height in feet and slope angle, laser rangefinder capable of measuring height to the nearest +/- 1', as well as distance (+/-1'), electronic data recorder (EDR), compass, GPS handheld unit (capable of 3 meter accuracy) with point locations, Distance Measuring Equipment (DME) or rangefinder, cover type maps and aerial Photographs, pencils and permanent marker, flagging, aluminum tree tags, aluminum nails (cannot contain iron as this may damage the tree), hammer, tube paint or spray paint for marking DBH measurement and tree number, rebar poles and caps for marking plot centers (.5 in diameter, 2 ft. length), species code list, paper tally sheets (in case EDR fails), overview and point location maps.

QA/QC Field Procedures: At least 5% of the plots will be checked by a different forester than cruised the plot, preferably by someone senior to the field crew. This will involve full plot measurement to identify any problems with determining in/out trees, species calls, defect measurements, DBH measurements, and height measurements. Any consistent height, species, DBH, or defect errors will be resolved by talking with the foresters.

QA/QC Desk Procedures: The following QA/QC approach is designed to ensure that field data, once input, is appropriately managed and maintained, and that subsequent calculations using that data to determine onsite carbon stocks and associated ARBOC issuance are correctly implemented. A three-stage QA/QC process with a defined review group for the project will be established, engaging both personnel intimately familiar with all project files and documentation, as well as independent reviewers are able to bring "fresh eyes" to key outputs.

Independent Forester Review: The project implementation team (Blue Source) has a team of foresters with intimate knowledge of the files, models and documents. The development of quantitative components, such as Access databases, FVS model runs and Excel workbooks, are led by one of these foresters. Prior to finalization, a second forester who did not lead development of that component is tasked with a QA/QC review including random examinations and data checks to identify and fix any errors.

Technical Review: Once quantitative outputs are finalized, exported from Access/FVS to Excel, and are ready to be transferred into the Offset Project Data Report (OPDR) and other project documents, an independent manager reviewed these outputs. This individual performs data checks by tracing key outputs back from final ARBOC calculations though the chain of Excel documents to the underlying Access/FVS database.

Senior Management Review: Once outputs have been transferred from Excel to the OPDR and other project documents, a senior manager reviews these documents and checks that all quantitative elements have been correctly exported from the underlying workbook. At this stage, the senior manager (or other individual not involved in document preparation) also reviews text, grammar and formatting for presentation and accuracy.

Data Processing and Storage: Manually and electronically filed data are stored and archived. Backup copies of all electronically stored data are maintained in a separate data center with scheduled archiving to assure data protection. Future revisions to project documents after initial verification and registration will be clearly identified by saving them as separate files and including the date of revision in any modified documents. All data will be stored on Dropbox or similar online cloud storage service as well as on an external hard drive and kept by Blue Source for a minimum of 15 years.

For all applicable carbon pools, the following modeling procedures were employed:

Projected Growth

The Northeast variant of the Forest Vegetation Simulator (Keyser 2015) was used to model forest growth, mortality and harvest over 100 years.

Legal Constraints

There are no Federal or Local laws that restrict timber harvesting in the project area. In Connecticut, Forestry Best Management Practices (BMPs) for timber operations as set forth by " Best Management Practices for Water Quality While Harvesting Forest Products" (CT DEEP 2007) are required through the Forest Practices Act (CGS Title 23, Chapter451a 23-65f through 23-65q) for any property where "wood products harvested from a tract of forest land [are] in excess of fifty cords or one hundred fifty tons or twenty-five thousand board feet, whichever measure is appropriate, in any twelve-month period." If these conditions are met, the landowner must utilize certified forest practitioners who are required to follow state forest practice regulations; however, these regulations do not restrict silvicultural treatments or impose harvest limits.

Additionally, because the conservation easement on the project area was recorded more than one year prior to the commencement date (recorded 12/9/2003), all constraints as listed in the conservation easement on the property will be modeled into the baseline, which states that "clear-cuts on GMF will not exceed 15 acres in area with the exception of salvage operations resulting from natural disaster, forest pests or disease; no more than 10% of the total Forest Legacy easement area will be clear-cut within a 10-year period; and at least 50% of the crown canopy shall be maintained when 34 harvesting timber within 100 feet of a stream or water body. These restrictions specifically apply to the Forest Legacy easement portion of GMF."

Constricting to the baseline:

- The recommended riparian management zone widths for lakes and streams are:

RMZ Width	Applies to:
RMZ = 100 feet	Lakes, Trout Streams, Streams 3ft wide+

To model these restrictions into the baseline, no clearcuts were implemented, and harvests within 100 feet of lakes and streams were restricted to either the "Let Grow" prescription, or the single tree selection to 75 square feet basal area, ensuring that adequate crown canopy be retained in these areas.

There are no known RTE species on the Great Mountain Forest. Management has "conducted its own independent inventory to determine which endangered, threatened, and species of special concern may be present on the property." GMF will monitor for such species and if at any point RTE are discovered in the Project Area, management will develop new procedures for managing such species to incorporate into the management plan. As a result, no constraints were implemented due to RTE species.

Baseline Constraints Table

Constraint	Narrative	Silvicultural Method	Acreage
Conservation Easement	The conservation easement requires that clear-cuts on GMF will not exceed 15 acres in area, no more than 10% of the total Forest Legacy easement area will be clear-cut within a 10-year period; and at least 50% of the crown canopy shall be maintained when 34 harvesting timber within 100 feet of a stream or water body.	Applies to SMZ areas restricted to "let grow" and single tree selection prescriptions.	639 acres

Adjustments for Start Date

Since the inventory was conducted immediately after the Start Date of 3/10/2017 in March and April of 2017 (before the growing season), no adjustments for the Start Date were needed. The unmodified data measured in the inventory was used to estimate the start date CO_2.

Adjustments for End of Reporting Period

To determine CO2 stocks at the end of the reporting period, the tree data collected in March and April of 2017 was grown forward to 9/09/2017.

GMF Forest Site Index and Site Class Determination

NRCS SSURGO data were obtained from NRCS for Litchfield County, Connecticut (CT600). This information was used to determine a site index species and value for every plot. Eastern Hemlock was chosen as the indicator species if it was listed for a given soil type. If Yellow Poplar was not listed, Northern Red Oak was next to be chosen. If a soil was missing data, the average Eastern Hemlock site index and productivity values across all plots was applied.

FVS Calibration

All FVS defaults for the Northeast variant were used besides the following calibration components:

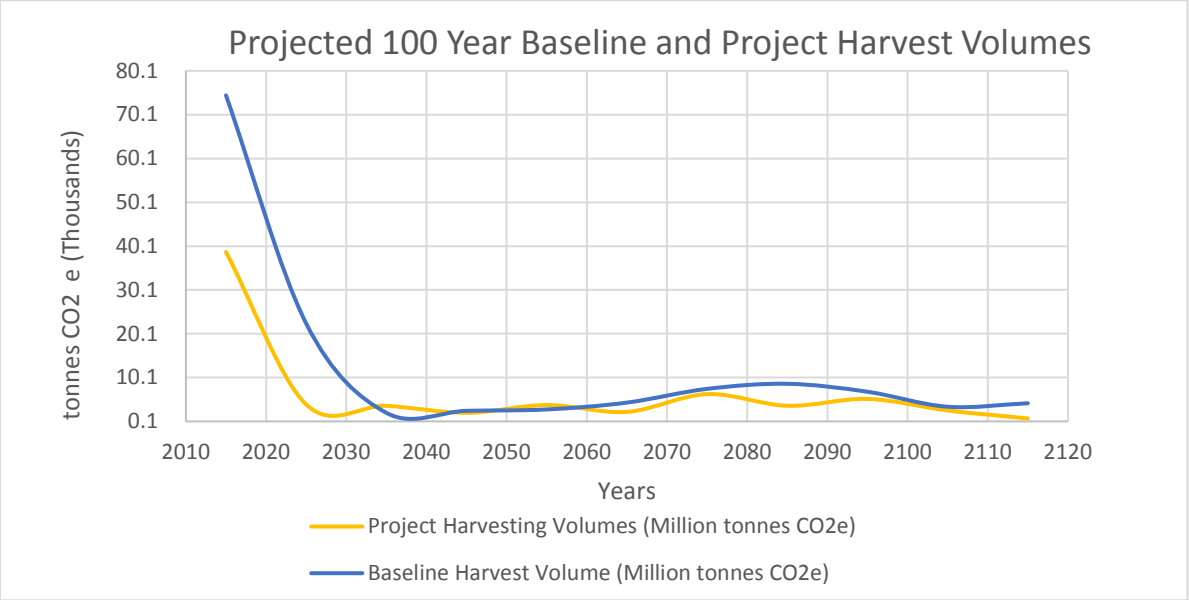
- The location code for Green Mountain-Finger Lakes (920)
- Site index values derived from NRCS soils data (see site index section)
- The minimum acceptable harvest volume was set to 600 cubic feet per acre based on the minimum harvest volumes for the property
- The minimum and maximum DBH for harvestable trees in the single tree selection and shelterwood harvests was set to 5”-32” based on property specifications for harvestable timber
- Regeneration was modeled following the methods outlined in the Regeneration section below

Silvicultural Prescriptions

Below is a description of the silvicultural prescriptions used in the modeling. To determine the amount of additional regeneration after certain types of harvests, regeneration model input ratios from Nunery and Keeton 2010 were used ("Forest carbon storage in the northeastern United States: Net effects of harvesting frequency, post-harvest retention, and wood products", Table 4).

Prescription	**Regime Description**
Grow	Default FVS “let-grow” scenario with no harvest activities.
Single-tree selection	10-year re-entry period with no species preferences.
Shelterwood	Two-stage cut: Shelterwood cut to a residual basal area target of 50 square feet basal area followed by overstory removal with no species preferences. Minimum 40-year re-entry period; 80 square feet stocking trigger.
Variable Retention Harvest	Variable basal area retention targets with no species preferences. 40-year re-entry period.

Attachment L: Baseline and Project Harvests



The graph above represents the baseline and project harvesting scenarios. The main prescriptions in the project scenario over 100 years were individual tree selection, shelterwood, clearcuts (for red pine plantations), strip clearcuts (for conifer bogs), and let grow. Most harvests in the project scenario were carried out with the single tree selection prescriptions with a minimum re-entry time of 10 years down to 75 sq. ft. basal area. In the baseline, the main prescriptions were shelterwood, and individual tree selection.

The shelterwood prescriptions were implemented using a 2-stage shelterwood approach. Five years after the shelterwood cut, an overstory removal was simulated. After the first overstory removal, the next shelterwood cut was implemented when the stand had grown to at least 80 square feet of basal area, with a minimum time of 40 years in between the overstory removal and the next shelterwood cut.