Mt. Ararat High School (MTA) Forest Carbon Study 2024

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Materials used for gathering information
(angle gauge, flagging tape, tape measure)

Problem/Purpose:

To estimate the amount of carbon sequestered annually and the amount stored in the forested areas surrounding MTA, to help answer the question of MTA's ability to mitigate annual CO2 emissions from its energy use.

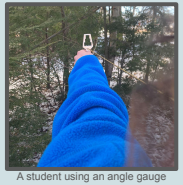
Aerial view of land owned by MTA
with plot areas marked

Background:

- Multiple methods for measuring carbon in forests are heavily based on permanent sample plots laid out in a statistically secure design.
- Measurements on trees in these plots can be converted to above ground biomass using either biomass expansion factors or allometric regression equations. Carbon stocks in land ecosystems can be measured using remote sensing and field measurements/sampling.
- Data includes extensive individual tree and site inputs.
- Data inputs beyond the physical area being assessed often include tree species, DBH (Diameter at Breast Height), height, rate of annual growth, and below-ground roots.

Process:

1. Thirteen plot areas in the Mt. Ararat woods surrounded by trees were chosen.
2. Staying in the same spot, an angle gauge was used to find trees to be measured. All trees that fit into the area marked "10" on the gauge for each plot were included in calculations.
3. Turning clockwise, all "in" trees were flagged.
4. Flagged trees were identified by the tree species and measured for their DBH (diameter at breast height).
5. The acres of forest on the MTA land parcel were estimated by aerial view.
6. Using an online calculator (Forest Carbon Estimators and Calculators), Metric Tons of Carbon and Metric Tons of CO2 Equivalents stored by the Mt. Ararat forest were calculated.
7. Using by-hand calculations, Metric Tons of Carbon Sequestered per Acre per Year and Metric Tons of CO2 Equivalents Sequestered per Acre per Year for the Mt. Ararat forest were determined.
8. Finally, the total amount of Carbon and CO2 Equivalents Sequestered Annually by the Mt. Ararat forest were calculated.



A student using an angle gauge

A student marking a tree with flagging tape

Two students measuring DBH

A student recording data

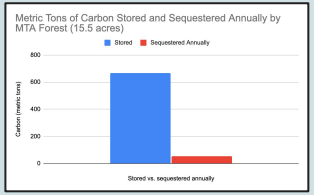
Data:

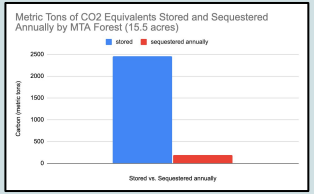
Number, Avg. DBH, & Tree Species per Plot

Plot #	# of Trees	Avg. DBH per plot (inches)	Tree Species
1	22	11.2	White pine, Red Oak
2	23	13.4	White Pine, Red Oak, Balsam Fir, Birch, Hemlock
3	19	13.5	White Pine, Red Oak
4	20	13.5	White Pine, Red Oak, Hemlock
5	21	13.0	White Pine, Red Oak
6	18	13.1	White Pine, Red Oak, Beech
7	14	13.1	White Pine, Red Oak, Balsam Fir
8	12	11.3	White Pine, Birch, Red Maple
9	16	15.5	White Pine, Red Oak
10	17	11.5	White Pine, Red Oak, Beech
11	11	11.5	White Pine, Red Oak, Hemlock, Red Maple
12	20	10.6	White Pine, Red Oak, Balsam Fir, Beech, Red Spruce
13	8	11.9	White Pine, Red Oak, Hemlock, Red Maple
Average:	17	12.6	Most Common: White Pine

Calculation numbers for annual Carbon sequestration

- Average 17 trees per plot
- Average 196 trees per acre
- Average 3.5 metric tons of carbon sequestered per acre/per year
- About 15.5 acres of forest on MTA high school land
- 54 metric tons of carbon sequestered per year





Conclusions:

- Total carbon stored by 15.5 acres of Mt. Ararat forest: 668.36 metric tons of carbon or 2,452.88 metric tons of CO2 equivalent.
- Total carbon sequestered by 15.5 acres of Mt. Ararat forest per year: 54 metric tons of carbon or 190 metric tons of CO2 equivalents per year.

Big Thanks To:

Steve Pelletier (Mentor)
Mr. Evans (MTAHS)
Mr. Gibson (MTAHS)

References:

- "Forest Carbon Estimators and Calculators." *Securing Northeast Carbon Program*, 2024
- Maven Web Design, www.northeastforestcarbon.org/forest-carbon-estimators-and-calculators/. Accessed 2024.