



ESTIMATING CARBON STOCKS: FIELD METHODS

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WHY IS CARBON IMPORTANT?

Carbon is found in all life forms and soils on earth. It is exchanged in the atmosphere and biosphere through carbon sources, which release carbon, and sinks, which absorb carbon.

Carbon moves in a cycle, and when ecosystem carbon sinks are disturbed, the cycle is disturbed, and carbon dioxide and other heat-trapping gases like methane can be released into the atmosphere, accelerating climate change.

Estimating the amount of terrestrial ecosystem carbon in your community provides valuable data that can be used to identify priority regions for protection and secure lasting investment to help mitigate climate change over the long term.

CASE STUDY: PEATLAND SAMPLING IN OMUSHKEGO TERRITORY

During the summer of 2022, 12 trained community members from across Omushkego Territory worked alongside WWF-Canada staff and McMaster University researchers to collect soil samples from peatlands in Ontario surrounding Peawanuck, Attawapiskat, Kashechewan and Moose Factory.

This area, part of the Hudson and James Bay Lowlands, is the second-largest peatland complex in the world and is exceptional at storing carbon over long periods of time. While the region has been stewarded by ongoing Indigenous-led conservation efforts, it remains under threat from mining development.

A total of 14 cores and 47 recorded peat depths were collected to inform carbon stock estimates in the region. This data is available to communities through Mushkegowuk Council's regional CreeGeo Hub and has been included in a published study that reports on peat depth and carbon storage in the Hudson and James Bay Lowlands. The study found that distance to the coast is the most important indicator for peat depth, and that the region stores roughly 30 billion tonnes of carbon in its soils.



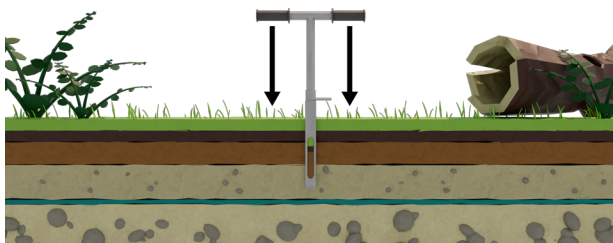
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MEASURING CARBON IN SOILS

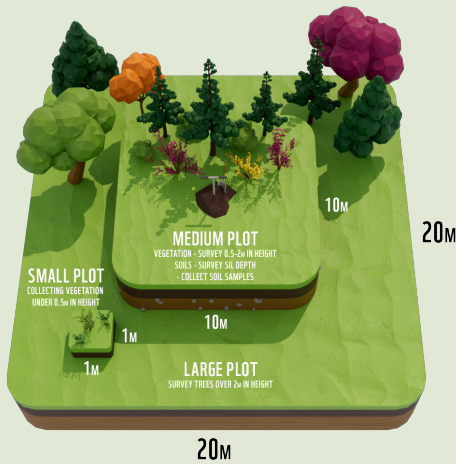
Soils occupy the largest carbon pool in the terrestrial carbon cycle. To effectively measure carbon in soils, soil samples from the field must be analyzed in a lab. Here's an overview of how to measure carbon using soil corers:



- 1. Designate a plot:** Determine where you want to conduct your study and your coring site locations.
- 2. Set up the site:** Take photos to document vegetation and prepare your equipment.
- 3. Take the core:** Insert the corer until the point of refusal or desired depth. Carefully remove the corer once you've captured your core.
- 4. Document the core:** Take photos, notes and measurements of the soil core.
- 5. Send the core for analysis:** Package the core and send it to a lab for carbon analysis.

MEASURING CARBON IN NON-TREE VEGETATION

Plants capture carbon dioxide from the atmosphere and convert it into biomass through photosynthesis. The method to measure carbon in non-tree vegetation depends on the size of the plants themselves:



Designate a plot: Determine where you want to conduct your study and what type of plants should be included.

Identify the plants: Identify the species of each plant in your plot.

For medium vegetation:

- Measure all plants in your plot.
- Using your measurements, you can calculate biomass and carbon stock for individual plants.

For small vegetation:

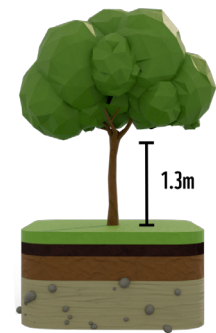
- Set up a quadrat. Clip and bag all plants that fall inside it.
- At a lab, weigh, dry and re-weigh your clippings to calculate biomass. With this value, you can now calculate the carbon stock.

MEASURING CARBON IN TREES

Tree species vary in the amount of carbon they contain. Here's how to get an accurate estimate of the carbon contained within trees across an area of interest:

- Designate a plot:** Determine where you want to conduct your study and set up a 400-metre-square plot.
- Identify the trees:** For each tree in your plot over 2 metres in height, identify the tree species.
- Measure the trees:** Record both the diameter at breast height and tree height for each tree.
- Calculate biomass and carbon:** Using the data recorded, you can now calculate total biomass. With this value, you can determine the carbon stock.

MEASURE THE TREE'S
CIRCUMFERENCE AT
1.3m
ABOVE THE GROUND



**Diameter at breast height =
circumference at 1.3m above ground**

TOTAL CARBON PER TREE

$$\left(\begin{array}{c} \text{ABOVE-GROUND} \\ \text{BIOMASS} \end{array} + \begin{array}{c} \text{BELOW-GROUND} \\ \text{BIOMASS} \end{array} \right) \times \begin{array}{c} \mathbf{0.5} \\ \text{CARBON} \\ \text{CONVERSION} \\ \text{FACTOR} \end{array}$$

RESOURCES

For detailed step-by-step methods on measuring carbon in soils, non-tree vegetation and trees, visit: wwf.ca/carbon-measurement

CONTACT US

Our team is here to help you!

For more information, contact:
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We can work with translators alongside your community to ensure any data generated through carbon stock estimation is accessible.



A Canada with abundant
wildlife, where nature and
people thrive.

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