Total Carbon Storage in Peatlands of the Great Lakes Region of North America

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Introduction
Forest Inventory Analysis (FIA) wants to estimate carbon storage of peatlands in the Great Lakes Region. In order to determine carbon storage, sampling techniques need to be developed.

Sampling Procedure
We used a tile probe before sampling to determine best coring placement in order to avoid large woody debris and other impermeable layers and to determine peat thickness. The top 50 cm of peat was collected by hand using a 4 inch PVC tube and a long bread knife. Peat below 50 cm was cored with one of the following: Russian peat corer, Livinston piston peat corer, or a piston interface peat corer, in 50 cm increments.

Peatlands were categorized into 3 main types for sampling:
• Sedge Fens (Figure 1 and Figure 6)
• NW Cedar Swamps (Figure 3)
• Sphagnum Bog (Figure 2)

Cores were subjected to:
• von Post degree of humification tests
• Bulk density
• Percent carbon
• Macrofossil analysis
• Specific conductivity
• pH
• Carbon and nitrogen content
• FTIR testing

Hypothesis and Objectives

Hypothesis: Is it possible to use a cost effective and field practical method to estimate percent carbon of a peatland profile.
Objectives:
1) develop a cost effective and efficient way to sample peatlands within the FIA framework
2) construct an estimation tool for estimating total carbon stored in peatlands
3) develop training tools that can train FIA technicians

Locations
We used a stratified approach to select peatlands that span the Northern Lakes and Forests Ecoregion (Upper Great Lakes spanning across northern MN, northern WI, the Upper Peninsula of MI and northern Lower MI). During the summer of 2011, 27 sites were sampled within the Upper Peninsula of Michigan, and included both eastern and western areas of the peninsula. Sampling in summer 2012 will occur mostly in Minnesota and Wisconsin.

Preliminary Results
Bulk density and depth correlations were found in sedge peatlands (Figure 5). The bulk density of the first 50 cm accurately estimated the bulk density of the whole core.

Future Analysis and Booklet
Future Analysis:
• Bulk Density and %OM relationships
• %OM and % Carbon Relationships
• Carbon and Nitrogen Ratios
Booklet:
1) Background of Wetlands
2) Methods of collection and analysis detailed
3) Pictures