DOES FIRE FREQUENCY AND INTENSITY ALTER CARBON STORAGE IN NORTHERN MICHIGAN FORESTED PEATLANDS?

A McIntire-Stennis supported project

Michigan Tech
School of Forest Resources
and Environmental Science

Fire is an important natural process that structures and controls many basic forest processes, including composition of vegetation, succession, nutrient cycling, soil development and sedimentation, and hydrology. However, some forests grow on organic soils (peatlands), which are very common in Michigan and the northern temperate and boreal regions of the world. Peatlands are wetlands that accumulate an organic soil, or peat, and store about 1/3 of the world's soil carbon.

Fire can be important in forested peatlands where it is influences vegetation structure. In addition, many peatland trees, such as black spruce, are known to be fire adapted and require fire to reproduce. However, fire burns away peat rapidly, which releases carbon back into the atmosphere. If fires are too frequent or too intense, peatlands may become degraded. A good example of this is in Indonesia, which contains the largest area of forested tropical peatlands globally. Drainage has caused an increase in the number and severity of fires in Indonesia, which has led to several meters of peat loss and limited the amount of tree regeneration.

The goal of this research is to determine the relationship between carbon accumulation rates, vegetation composition, and forest fire frequency and intensity in Northern Michigan peatlands.

COLLABORATION

Michigan Tech is collaborating with the United States Forest Service, The Nature Conservancy, and Wisconsin Department of Natural Resources to assess how changing fire frequency has altered forested wetlands.

About McIntire-Stennis

The McIntire-Stennis program, a unique federal-state partnership, cultivates and delivers forestry and natural resource innovations for a better future. By advancing research and education that increases the understanding of emerging challenges and fosters the development of relevant solutions, the McIntire-Stennis program has ensured healthy resilient forests and communities and an exceptional natural resources workforce since 1962.

USDA

IMPACT

Results about the effects of fire frequency on carbon storage and forest type will be used to inform the LANDFIRE model to help with restoring forests in Michigan that have an altered fire regime.

2500
samples to be run on FTIR (Fourier-transform infrared spectroscopy)

1 MS
Student trained to detect char layers in peat

3%
of the global land area is covered by peatlands but stores 30% of the world's soil carbon