

IMPACTS OF EARTHWORMS ON SOIL CARBON DISTRIBUTION IN NORTHERN GREAT LAKES REGION



Michigan Tech
School of Forest Resources
and Environmental Science

A McIntire-Stennis supported project

Invasive earthworms have been shown to be a critical driver of change in forest communities, providing a micro-environment that is suitable for invasive plant species; these can lead to broader changes in forest ecosystems. The earliest and most obvious impact of earthworm invasion in the northern Great Lakes region was the reduced layer of organic matter on the forest floor. Longer-term impacts include a change in the soil surface, which can influence species regeneration, including harmful impacts on rare species.

Soil and earthworm data from the Ottawa National Forest was used to analyze the change over time in order to help monitor earthworm population in that area. The sample points for the study were designed to integrate with other ONF data that has been collected over the previous 40 years.

The objective of this study was to understand the presence or absence of earthworms and their impact on soil carbon distribution. We hypothesized that a spatial relationship exists between earthworms and soil carbon and that relationship varies with soil depth. A greater earthworm presence increases soil carbon at depth and decreases soil carbon closer to the soil surface. Surface nutrients which are moved lower in the soil layers alters the nutrient levels necessary for many plant species, threatening their existence.



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.



COLLABORATION



This research is conducted in collaboration with the Ottawa National Forest and has allowed us to use additional funding for more detailed carbon analysis – an ongoing project with both the ONF and the USDA Northern Research Station.

IMPACT

LMAR 5- Protection of forest land and resources against fire, insects, diseases, or other destructive agents. Understanding the impacts of earthworm invasion will help us mitigate their impact.



993,000 acres
of Forest Service land in the Ottawa National Forest used to collect earthworm and soil data



1 MS
student trained



LMAR 5
A geospatial model based on Random Forest modeling that predicts earthworm presence and absence based on widely available data in the Upper Great Lakes region.