

# Invasive Earthworm Presence, Absence and Relative Abundance in Tettegouche State Park

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## Introduction

Earthworms are not native to the Great Lakes Region. The last glaciations about 12,000 years ago wiped out any native earthworms and left the glaciated areas of North America earthworm free.

For the last decade earthworm ecological effects on Northern Hardwood forest types has been documented. The research finds that European earthworms, such as *Lumbricus terrestris*, commonly known as the Night Crawler, are changing the way these forests operate. Earthworms speed up nutrient cycling, change the soil structure and relocate the duff layer of these native forests through their feeding and burrowing behaviors.

European earthworms are established in many areas of the Great Lakes Region and there is no method for large scale removal once established. We do have areas that are still earthworm free or minimally invaded...

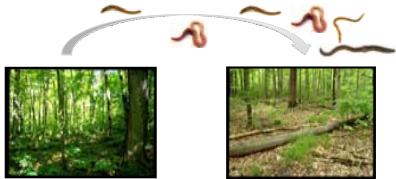


Fig 1. Earthworm-free hardwood forest. Fig 2. Heavily earthworm invaded hardwood forest.

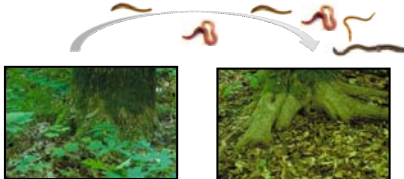


Fig 3. Base of a Sugar Maple (*Acer saccharum*) in an earthworm-free hardwood forest. Fig 4. Base of a Sugar Maple (*Acer saccharum*) in a heavily earthworm invaded hardwood forest.

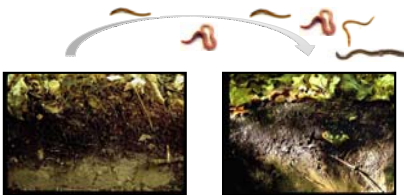


Fig 5. Earthworm-free soil horizon. Fig 6. Heavily earthworm invaded soil horizon.

## Methods

Little data exists on the distributions of invasive earthworms and their impacts in different forest types...So, Great Lakes Worm Watch conducted research in 2009 to broadly survey hardwood forest areas along the Minnesota North Shore. Surveys were conducted at North Shore State Parks to identify earthworm-free and minimally impacted areas. Furthermore, to provide a tool for future assessments of the level of impacts in different hardwood forested areas of the Great Lakes region.



>Data was collected June – October 2009 in 9 North Shore State parks and 2 waysides.

>Sample points surveyed in each park were: Jay Cooke (247), Gooseberry Falls (64), Split Rock (73), Tettegouche (175), George Crosby Manitou (162), Temperance River (124), Cascade River (108), Judge C. R. Magney (157), and Grand Portage (8); Waysides include: Caribou Falls (4) and Kodonce (5). Total sample points = 1127

>Sampling at each point included:

✓Walk through surveys of 1127 sample points across 4+ major Hardwood Forest types provided distributional data on earthworm presence and absence.



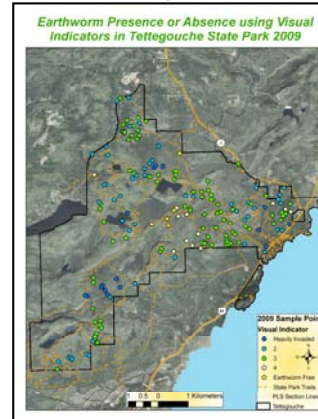
✓Measured relative abundance, diversity of earthworm populations and the level of impact earthworm invasions are having on forest soils in a range of forested habitat and soil types.



>The major hardwood forest cover types surveyed included: Aspen/Birch, Sugar Maple, Mixed Hardwood and Mixed Hardwood /Coniferous.

## Tettegouche State Park

What have we learned about Tettegouche...



### Tettegouche State Park

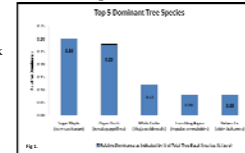


Fig 1. The dominant tree species in the park was the Sugar Maple (*Acer saccharum*) and Paper Birch (*Betula papyrifera*).

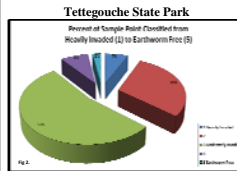
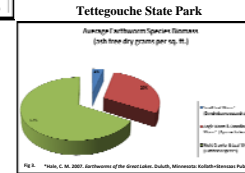


Fig 2. According to the visual indicators 90% of the sample points were classified as moderately invaded to heavily invaded, with 53% moderately invaded and 10% earthworm free or minimally invaded.

Fig 3. The species that accounted for 67% of the average biomass of the samples was the *Lumbricus* species, such as, the Leaf Worm and the Night Crawler.



## What's Next?

Can earthworms be eliminated from forests?

- There are currently no economically feasible methods to remove established earthworm populations.
- As the number of earthworm species increases, so does their impact, so preventing invasions of new species into areas that are already invaded by one or a few earthworm species can minimize the long term impacts to the site.
- The most destructive species include the Night Crawler and Leaf Worm (*Lumbricus* species) which are commonly sold as fishing bait.
- Proper disposal of un-used fishing bait (or using no live bait) can greatly reduce the introduction and spread of invasive earthworms.

What can I do to help?

Unlike many exotic plant species that can be dispersed by the wind or animals, earthworms are spread primarily by human activities. So even simple action on your part can make a big difference when it comes to containing the spread of exotic earthworms.

Prevent introductions of earthworms by avoiding activities that we know spread earthworms:

- If you use earthworms as fishing bait, throw any unused earthworms in the trash not in the water or on land. It's illegal to release exotic species into the wild (Minnesota Statutes §4D.09).
- Tell others "the dirt" on invasive earthworms in Minnesota.
- If you use earthworms for composting, before you use the compost, freeze it solid for at least 1 week. If you live in an area that gets sub-freezing temps for at least a month straight each winter, you can do this by putting a bucket of the compost in an unheated building for the winter.
- Do not transport leaves, mulch, compost or soil from one place to another unless you are sure that there are no earthworms or their cocoons present.
- If you use ATV's or other vehicles with tire treads that can hold soil, be sure to wash all soil from treads before transporting the vehicle from one place to another.



## Great Lakes Worm Watch

Join the Great Lakes Worm Watch citizen science effort:

- Document earthworm occurrences in your area
- Learn to identify different earthworm species
- Conduct earthworm, soil or habitat surveys and submit your data to add to our growing citizen science database, now over 1000 points strong!



GLWWcontact:  
[www.greatlakeswormwatch.org](http://www.greatlakeswormwatch.org)  
 Email:  
[greatlakeswormwatch@gmail.com](mailto:greatlakeswormwatch@gmail.com)

Mission:  
 Great Lakes Worm Watch is committed to increasing public understanding and appreciation of the role of exotic earthworms in ecosystems change across the region.

The scientific objectives of Great Lakes Worm Watch are to:  
 >Document the distributions and spread of exotic earthworms in the Great Lakes region.  
 >Increase knowledge on the impacts of exotic earthworms in the Great Lakes region.

The conservation objectives of Great Lakes Worm Watch are to:  
 >Engage educators and the public in efforts to prevent further spread of exotic earthworms  
 >Identify currently earthworm-free habitats and support policy and management efforts to protect these areas.

The educational objectives of Great Lakes Worm Watch are to:  
 >Inform educators and the public about the role of exotic earthworms in ecosystems change.  
 >Increase scientific skills and literacy among citizen scientists.  
 >Provide the tools and resources for citizens, educators and students to actively contribute to the development of a database documenting the distributions of exotic earthworms and their impacts across the region.



This project was funded in part by the Coastal Zone Management Act, by NOAA's Office of Ocean and Coastal Resource Management, in cooperation with Minnesota's Lake Superior Coastal Program and the Minnesota Environmental and Natural Resources Trust Fund. Support for the Great Lakes Worm Watch program has been provided by: The National Science Foundation (ESI-0455860), The Minnesota Department of Natural Resources, The Northeast Regional Sustainable Development Partnership, The Natural Resource Research Institute, The Coastal Management Act, Minnesota Environment and Natural Resources Trust Fund, Boulder Lake Environmental Learning Center

