



SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

# GRADUATE EXIT SEMINAR

BRITTANY MULTER

## Carbon Sequestration via Concrete Weathering in Soil



To keep global temperatures from increasing more than 2° C it is vital to halt greenhouse gas emissions, however CO<sub>2</sub> removal must also be an integral part of the solution. The objectives of this research were to investigate the carbonation of concrete within soil as a viable option to sequester atmospheric carbon, analyze how the carbonation of concrete changes with fragment size, and understand the environmental impacts of adding concrete to soil. Soil samples were collected and placed into columns with different mixtures of concrete. Four total treatments were tested: soil only, soil with small concrete fragments, soil with large concrete fragments, and concrete only. Deionized water was added to each sample every day for 16 weeks. The results from this study show that soil facilitates faster concrete weathering, and smaller concrete fragments weather faster than larger concrete fragments. This study found that for every 1 m<sup>2</sup> surface area of concrete added to soil, 2.1 g of atmospheric carbon is sequestered per year. Adding concrete to soil was found to impact the chemical, biological, and physical characteristics of the soil and water. The addition of concrete caused an increase in soil and water pH. High concentrations of sodium were found in water samples containing concrete and high concentrations of nitrogen were found in water samples containing concrete and soil. Samples with smaller concrete fragments saw negative impacts on the microbial communities, but the samples with larger concrete fragments were not negatively impacted.

Advisor: Dr. Rattan Lal

**Tuesday, March 28, 2023**  
**10:30 A.M.**

**Location:** Kottman Hall 333D

**Join the seminar via Zoom:**

<https://osu.zoom.us/j/92503973133?pwd=MWtNMUhmZkt1U1gxdGNxUzNzMII5UT09>

Meeting ID: 925 0397 3133

Password: 082996

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