



Presidential Initiative

ON URBAN AND PLACE-BASED RESEARCH

2021 Fall Research Showcase

Establishing a Mechanistic Understanding of How Microbial Communities Remediate Groundwater Pollution at an EPA Superfund Site in the Denver Metropolitan Area

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Participants/ team



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Project purpose and objectives

Lowry Landfill

- 508 acres
- Received domestic and industrial wastes until 1990
- Added to National Priorities List (1984) due to health risks
- 1,4-dioxane has reached groundwater



Project purpose and objectives

Using DNA-based sequencing methods (metagenomics), this project will

- ❑ Identify **which microbes** are involved in 1,4-dioxane degradation
- ❑ Identify **how** the microbes are degrading 1,4-dioxane

These objectives will help identify 1,4-dioxane degradation optimization strategies that may be useful at Lowry but also other similarly contaminated sites.

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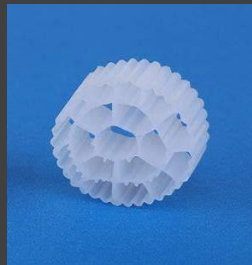
Methods and activities



~ 13,000 gallons



1 cm

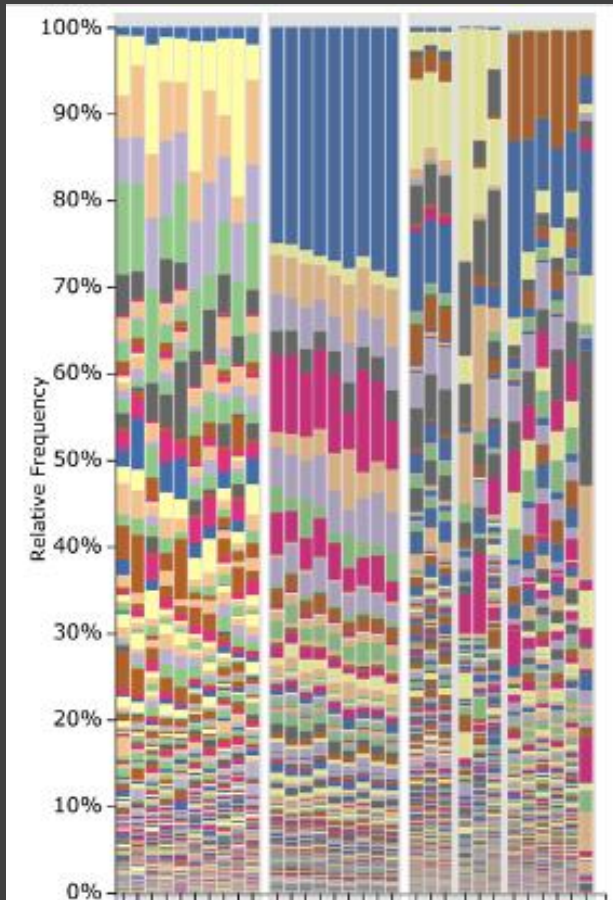


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GCTTC
CTCGAC
ATCCG
CGAGC
CCAGG
GTCAT
CGCGC
GTCCA
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~80,000,000,000 DNA letters / sample

Project results and outcomes to date



From the DNA analyses, found

- Identified 1000's of partial bacterial genomes (some appear to be **new to science**) - **new species and new genes**
- With support of the Lowry Trust, we are adding this project to a Course-based Undergraduate Research Experience (CURE) for **~500 first year undergraduates** Spring 2022 semester (General Biology Labs).
 - Opens up additional future research/funding opportunities