INNOVATIVE AND BENEFICIAL USE OF DREDGED MATERIAL FOR STORMWATER MANAGEMENT
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BACKGROUND
More than 1.5 million cubic yard (CY) sediment needs to be removed annually from fifteen federal harbors, and smaller ports for recreational navigation along the Ohio’s Lake Erie coast. Devaluation and destabilization of neighborhoods around the unremediated brownfields, and the impervious surface increases flooding concerns in combined sewer overflow areas where many brownfields are located. Green infrastructure (GI), e.g. green roof, rain gardens, emphasizes infiltration and hydrological retention, and could potentially provide a flexible and affordable solution to remediate urban brownfield in Cleveland. The dredged material may supply nutrients for plant growth in GI and raw mineral materials for aggregate production, which has high hydrological retention capacity for GI construction.

In Cleveland there are over 14,000 acres of brownfields with over 90% impervious surface.

Confined Disposal Facility in Cleveland is currently the only place to store dredged material in Ohio.

RESEARCH OBJECTIVES
• To evaluate the suitability of dredged material from Cleveland Harbor for use in green infrastructure e.g. green roof, rain garden etc. in brownfield remediation.
• To prepare and produce “green” aggregate with high porous surface and inner microstructure, which is made from dredged materials and possibly other mineral admixtures such as fly ash.

INNOVATION OF THE PROJECT
The innovation in this study is to sinter (bake) the dredged material under different temperatures, and with different proportions of ingredients.

PRELIMINARY FINDINGS

Heavy Metal Contents | EPA Test Results

Thermal Analysis

Severely Critical - If the sediment is not dredged, it could severely restrict channel and harbor availability within 1-2 years.

Critical - If the sediment is not dredged, it could severely restrict channel and harbor availability within 5 years.

Pressing - If the sediment is not dredged, it could severely restrict channel and harbor availability within 10 years.

NEXT STEPS
The result of this project will be used to educate the public to eliminate the misperception of dredged material being contaminated.

• Test the dredged material in green infrastructure to analyze the efficiency of the material.
• After assessing the performance of the dredged material, the mass production could be implemented in to the industry.
• Solve the storage problem of dredged material by using it, and save the authorities millions of dollars.

MATERIAL
1.5 million cubic yard of sediment must be collected every year.

300.3 million gallons

PROBLEMS
Storage is a huge problem since there is a continuous flow of dredged material.

If the sediment is not dredged, it clogs channels and harbors.

EXISTENT METHODS
Materials are placed at oceans and seas. Deteriorates the water quality.

WHY IS IT BAD?
Materials are placed at landfills. Costly and depletes land sources.

PROPOSED SOLUTIONS
Implementation of dredged material in Green Infrastructure

Implementation of dredged material in agriculture land.

OTHER POSSIBLE OUTCOMES
3D brick printing material

Material for arts & crafts