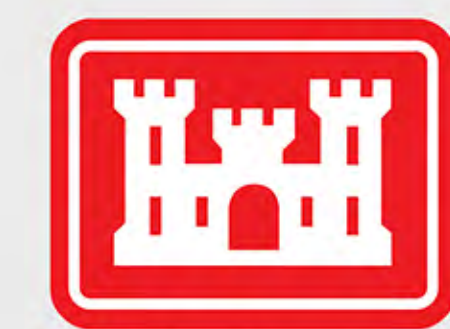


# Environmental Applications of Additive Manufacturing Featuring Nature-Inspired Design using Natural Materials

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## INTRODUCTION

- “GREY” infrastructure conflicts with natural environments
- Design focusing solely on engineered functionality misses opportunities to realize natural resource enhancements
- Traditional manufacturing generates geometrically simple structures that fail to mimic nature
- Artificial materials provide unsuitable substrates

## SOLUTIONS & BENEFITS

- Design freedom of 3D Printing (3DP) using bio-polymers and natural materials to mimic natural aesthetics
- Locally natural materials (sand, clay) offer sustainable solutions (e.g., beneficial use of dredged sediments)
- Geometrically complex habitat creation for storm dissipation, erosion reduction (e.g., mangrove roots)
- Composite materials for contaminant, antifouling reduction, nutrient sequestration
- Leverage work and ideas: Reef Design Lab®, D-Shape®, Living Seawalls Project®, academic partners, etc.



## OBJECTIVES & PATH FORWARD

- Environmental applications of 3DP not realized
- Engineering With Nature (EWN)® principles and collaborations provides right conditions for 3D nature-inspired community of practice

OBJECTIVES:

- (1) Establish interagency partnerships to unlock benefit of 3DP nature inspired-infrastructure
- (2) Establish process controls and demonstrate use of natural material as feedstocks
- (3) Iteratively improve geometrically complex habitat design with hydrodynamic simulation
- (4) Roadmap feasible technology strategy for scale-up and cross stakeholder benefit



- Scale-up
- Large format printing
- Field deployable

