



U.S. ARMY

What are Opportunities for NBS Retrofitting within an Existing/Aging Infrastructure Portfolio?

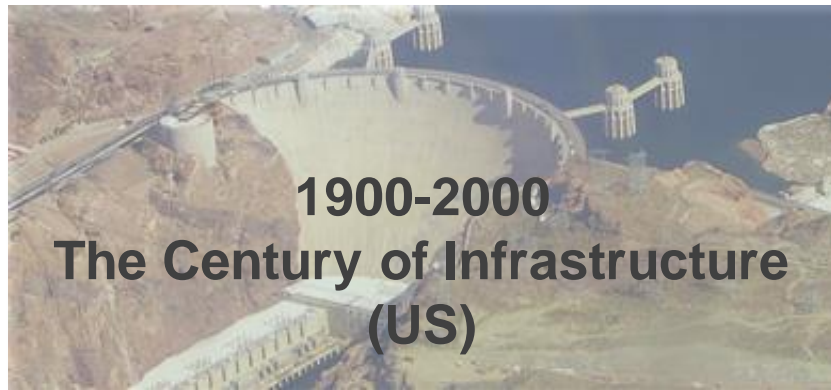
Jeffrey King, PhD, PE
Deputy National Lead and Program Manager,
USACE Engineering With Nature Program
US Army Corps of Engineers

Jeffrey.K.King@usace.army.mil
May 18, 2022

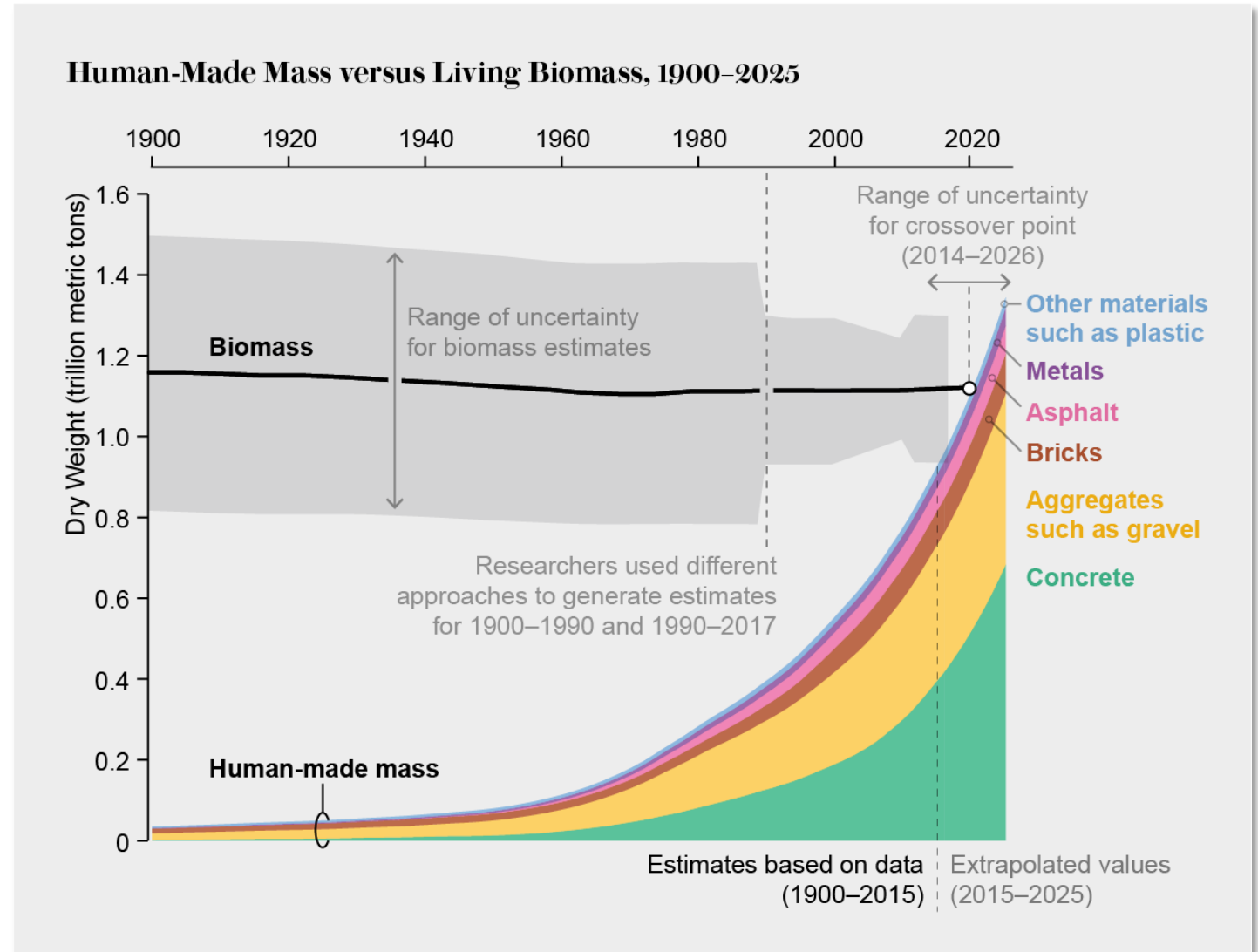


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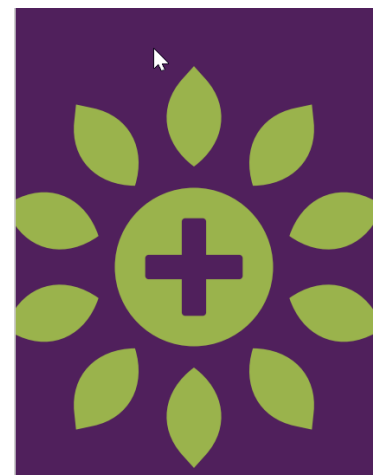
- 4,071,000 miles of roadway
 - 47,182 miles in the Interstate system
- 149,136 miles of mainline rail
- 640,000 miles of high-voltage transmission lines
- 614,387 bridges
- 90,580 dams
- >30,000 miles of flood levee
- 155,000 public drinking water systems
- 4,500 military installations
- 926 ports; 25,000 miles of navigation channel



Elhacham et al. 2020. **Global human-made mass exceeds all living biomass.** Nature 588:442-444

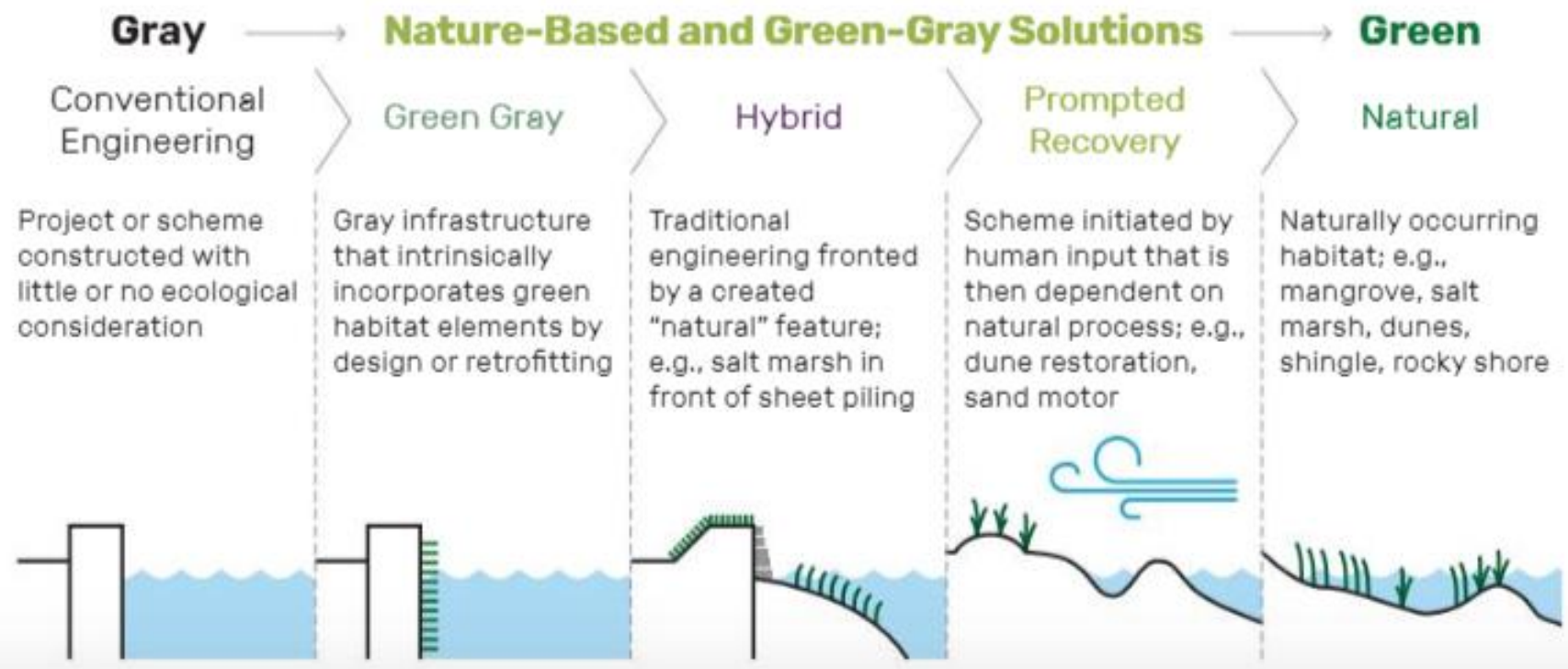
International Guidelines for Use of NNBF for FRM

https://ewn.erdc.dren.mil/?page_id=4351



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Enhancing Structural Measures for Environmental, Social, and Engineering Benefits



Reasons to apply NBS to existing infrastructure

- Create habitat and other environmental benefits
- Create social benefits
- Repair damaged infrastructure
- Reinforce existing/aging infrastructure



Deployment of EConcrete armor units

Create habitat and other environmental benefits



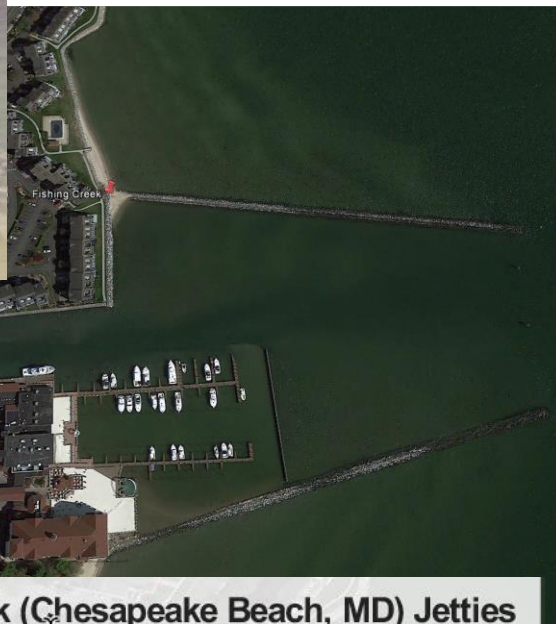
ECOncrete® Tidal Pools

Tidal Pools Installed at Brooklyn Bridge Park, NY



Designs for jetties

https://ewn.erdc.dren.mil/?page_id=81

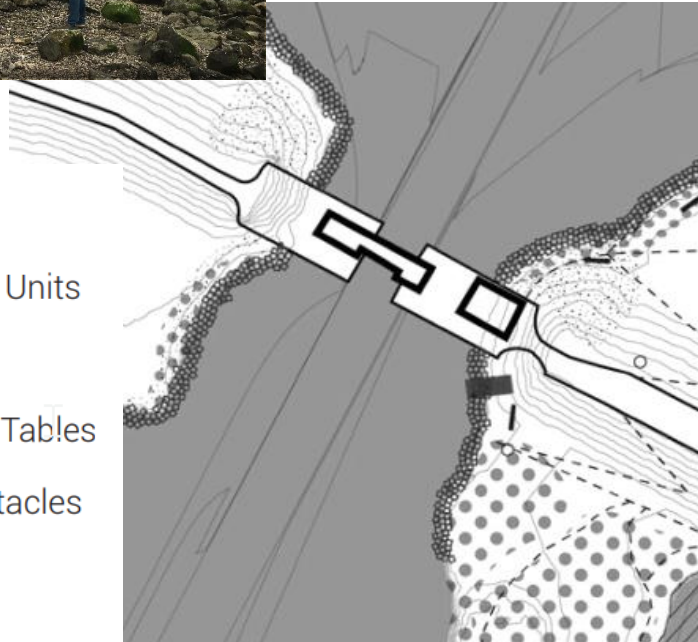


Fishing Creek (Chesapeake Beach, MD) Jetties








2016 Imagery



Create social benefits



Legend

-  Concrete Eco Units
-  Fishing Piers
-  Benches and Tables
-  Waste Receptacles
-  Paths
-  Marsh Fringe
-  Vegetation



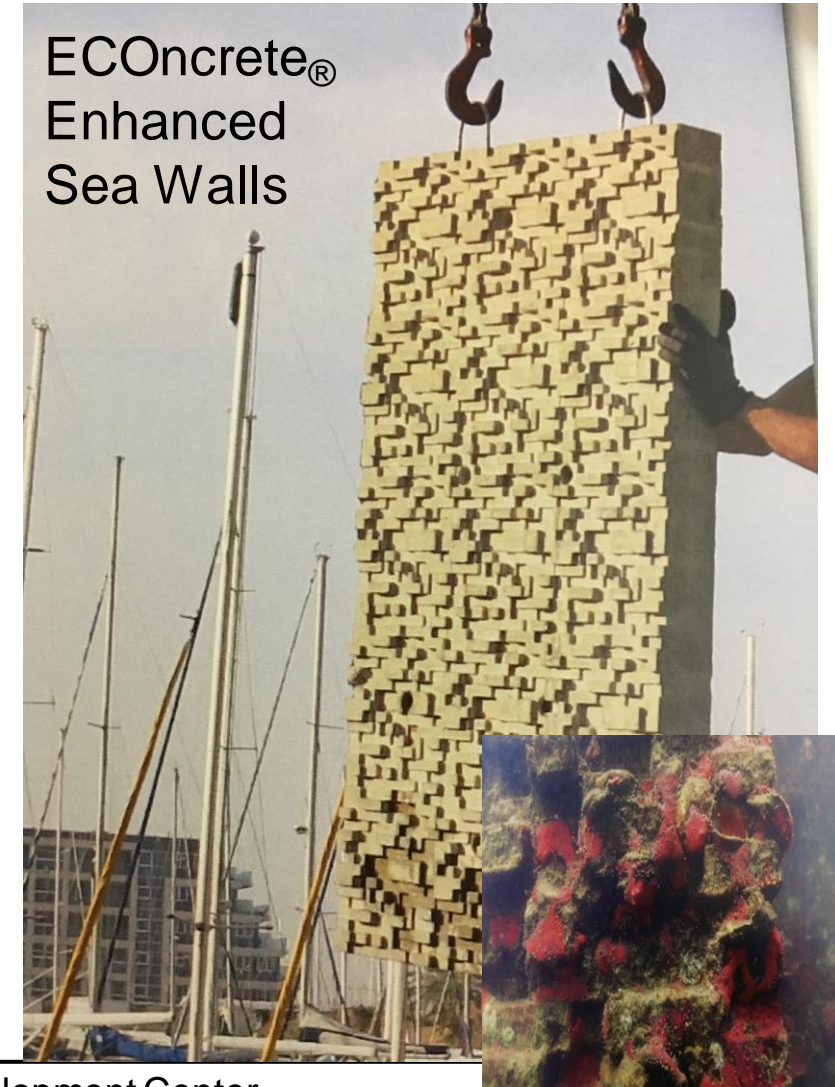
<https://ewn.el.erdc.dren.mil/designs.html>

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Repair damaged infrastructure



Coal Creek Drive long-term bank protection project



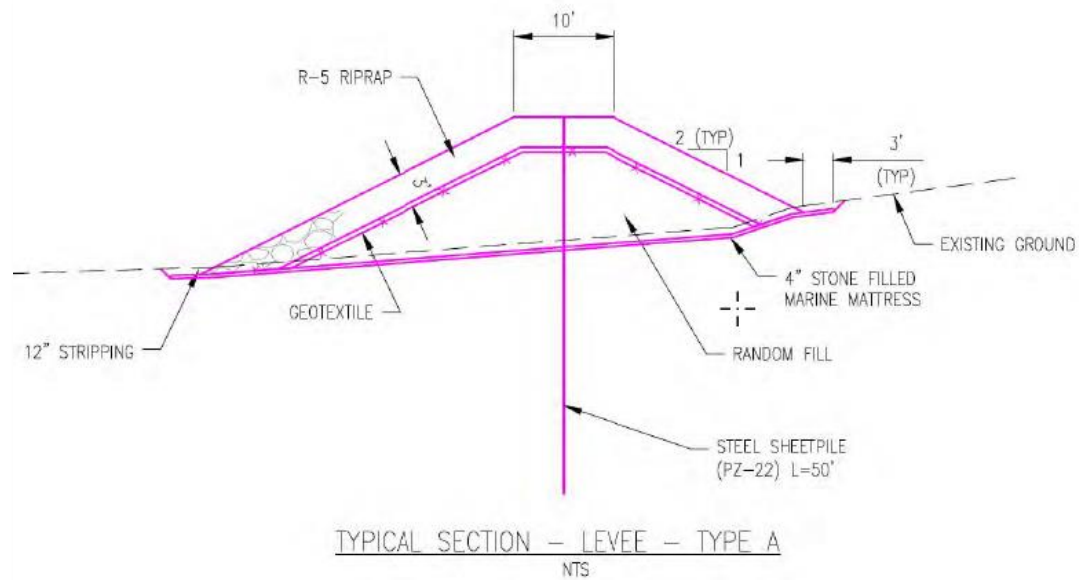
Reinforcing existing/aging infrastructure



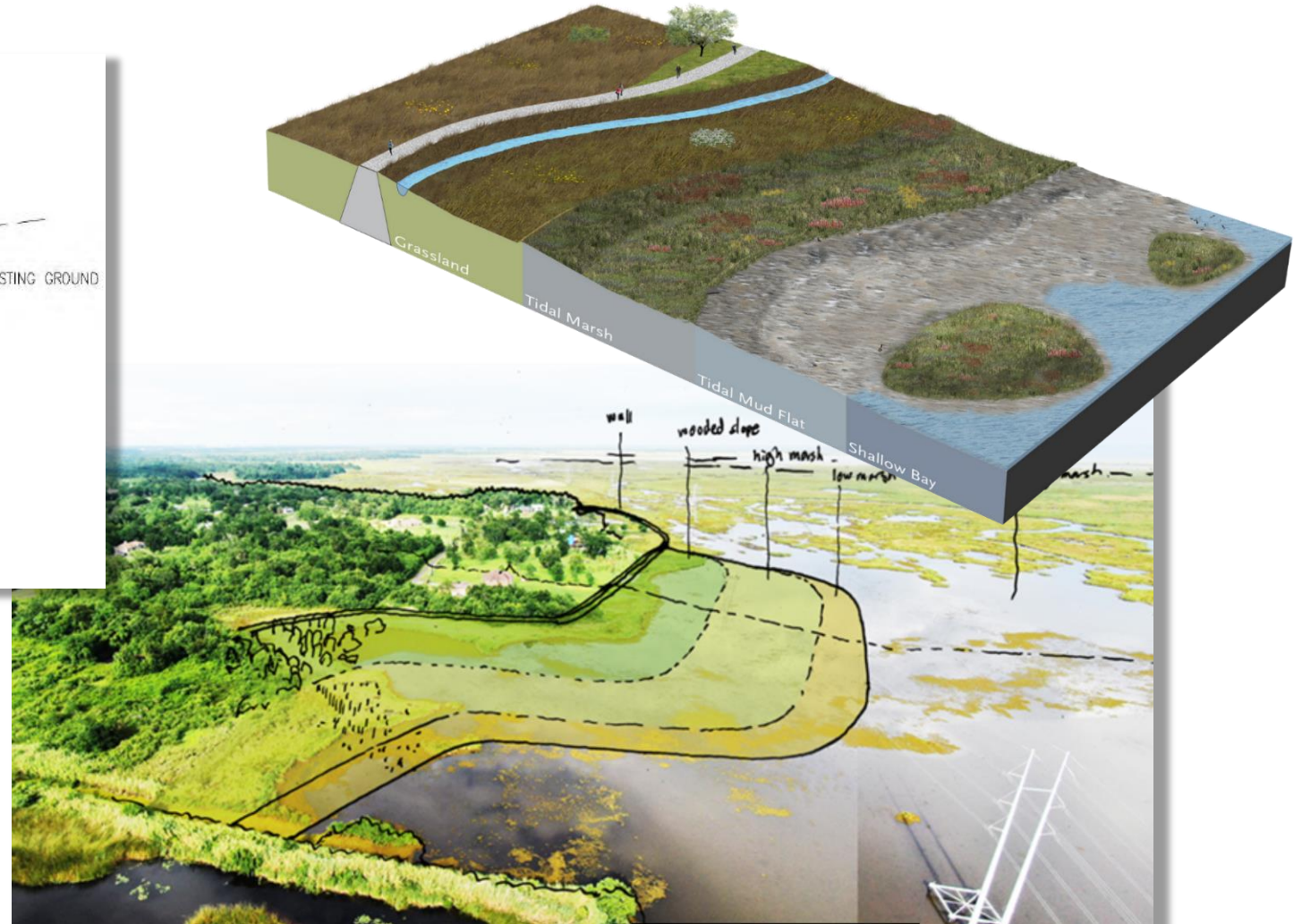
Sand Reinforcement of the Houtribdijk Dam



Reinforce with horizontal levees



Traditional Levee



Closing Thoughts

- Many reasons to pursue integration of NBS with existing conventional infrastructure
- Consider NBS first when repairing or reinforcing existing conventional infrastructure
- Explore NBS opportunities in the surrounding landscape to produce more benefits

THANK YOU



www.engineeringwithnature.org

Email: jeffrey.k.king@usace.army.mil

