WASTE ASSESSMENT GUIDANCE

River Island Building using Engineering With Nature Principles

Submitted by the United States

SUMMARY

Executive summary: This document provides a summary report of an Engineering With Nature (EWN) approach being applied to a USACE New Orleans District project where the strategic placement of dredged material is nourishing a small island in the Atchafalaya River, Louisiana, United States

Action to be taken: Paragraph 7

Related documents: None

Introduction

1 Over the past several years, the US Army Corps of Engineers (USACE) New Orleans District has been using dredged material to nourish a small island that began forming naturally in the Atchafalaya River, Louisiana, USA. This effort has involved placing sediment dredged from a Federal navigation channel during routine maintenance in low relief mounds upriver of the island since 2002. The mounded material has been dispersed by natural river currents to self-design the island. Prior to 2002, dredged material was being placed directly into shallow depressions along the river's banks to nourish existing wetlands, but continued placement into these areas was not sustainable because high quality wetlands would be converted into upland habitat. Consequently, the alternative beneficial use to place material upstream of the small natural island was conceived.

2 Until recently, only visual inspections have been conducted of the developing biological community on the island, thus benefits the island was creating remained largely unknown. As part of the USACE Engineering With Nature (EWN) initiative, an investigation has recently begun to use the island as a demonstration project to quantify the biological benefits and otherwise improve our understanding of the physical maturation of this beneficial use of dredged material within the basin.
Discussion

3 To help understand how and why the island was formed over the last 10 years, the USACE is conducting a series of studies to better understand the hydrology of the river used to transfer the mounded material onto the island. In addition, multiple moderate and high resolution aerial photographs are available from prior to 2002 to the present, documenting the island's growth. These photographs will be examined for documenting the island's formation and maturation and for determining the effectiveness of this individual project in terms of restoring, creating, enhancing and protecting the coastal landscape.

4 Future research is focusing on further quantifying the many benefits being provided by the island within the river basin. Efforts will focus on comparative investigations of a reference island in the basin, surveys of bird and mammal usage, determinations of biogeochemical functions and benefits, species management for habitat improvement, and the hydrodynamic characteristics of the river in the area. These investigations, further quantifying the multiple benefits of using dredged material to create such riverine islands, will provide a more complete understanding of the formation of the island so this concept can be integrated into other dredging projects locally and broadly, thereby providing substantial environmental, social and economic benefits as part of maintenance dredging activities.

5 The approach being applied along the Gulf of Mexico coast, United States, is summarized in the attached publication.

6 The point of contact is Mr. Burton Suedel, burton.suedel@usace.army.mil.

Action requested of the Scientific Groups

7 The Scientific Groups are invited to note the information provided and to comment as they deem appropriate.

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ANNEX

World DREDGING

Mining & Construction

Dania Cut-off Canal Deepening Project - Broward County, Florida -
The contractor loaded dredged material from the bottom of the DCC,
via an environmental clamshell into barges for transport via push
boats to the DMMA. (See story on pg. 6)

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COVER: Dania Cutoff Canal Deepening Project - Broward County, Florida.
The contractor loaded dredged material from the bottom of the DCC, via an environmental clamshell into barges for transport via push boats to the DMMA. (See story on pg. 6)
Island Building in the Atchafalaya River, Louisiana USA
An Engineering with Nature Demonstration Project

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Introduction
Over the past several years, the US Army Corps of Engineers (USACE) New Orleans District has been using dredged material to nourish a small island that began forming naturally in the Atchafalaya River, Louisiana (LA). This effort has involved placing sediment dredged from a Federal navigation channel during routine maintenance in low relief mounds upriver of the island since 2002 (Figure 1). The mounded material has been dispersed by natural river currents to self-design the island. Prior to 2002, dredged material was being placed directly into shallow depressions along the river’s banks to nourish existing wetlands, but continued placement into these areas was not sustainable because high quality wetlands would be converted into upland habitat.

Consequently, the alternative beneficial use to place material upstream of the small natural island was conceived. Until recently, only visual inspections have been conducted of the developing biological community on the island, thus benefits the island was creating remained largely unknown. As part of the Engineering With Nature initiative within the USACE, we have recently begun an investigation to use the island as a demonstration project to quantify the biological benefits and otherwise improve our understanding of the physical maturation of this beneficial use of dredged material within the Atchafalaya Basin.

![Dredged Material Mounds](image_url)

**Figure 1:** December 2011 aerial infrared photograph of the Atchafalaya River island after multiple years of upstream mounding of dredged material. The island's formation has reduced the overall cross sectional area of the river, increasing river flow through the navigation channel to the east sufficient to reduce shoaling and maintenance dredging requirements.
The USACE Engineering With Nature Initiative
Engineering With Nature (EWN) is a USACE initiative that seeks to support more sustainable practices, projects, and outcomes. As an approach to developing, engineering, and operating projects, EWN intentionally aligns natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaborative processes.

The elements of the EWN approach are to:
- Use science and engineering to produce operational efficiencies supporting sustainable delivery of project benefits;
- Use natural processes to maximum benefit, thereby reducing demands on limited resources, minimizing the environmental footprint of projects, and enhancing the quality of project benefits;
- Broaden and extend the base of benefits provided by projects to include substantiated economic, social, and environmental benefits; and,
- Apply science-based collaborative processes to organize and focus interests, stakeholders, and partners to reduce social friction, resistance, and project delays while producing more broadly acceptable projects.

The Atchafalaya River island project is a positive example of what can be achieved through the application of EWN concepts and practices. Current EWN activities include documenting current USACE projects exemplifying the approach and communicating across the technical community and with USACE partners and stakeholders.

A River Island is Formed
To help understand how and why the island was formed over the last 10 years, the USACE is conducting a series of studies to better understand the hydrology of the river used to transfer the mounded material onto the island. In addition, multiple moderate and high resolution aerial photographs are available from prior to 2002 to the present that clearly document the growth of the island.

These will be examined in greater detail to catalog the island’s formation and maturation for determining the effectiveness of this individual project in terms of restoring, creating, enhancing, and protecting the coastal Louisiana landscape.

Island Benefits
Previous studies of the island only provided qualitative documentation of the fauna and flora of the island. Our recently initiated study will conduct quantitative surveys of the plant communities that have developed on the island. Observations from the first of these survey visits in 2013 indicated a healthy island habitat (Figure 2).

The island currently encompasses 100 acres (40 ha) consisting of forested,
Island Building in the Atchafalaya River, Louisiana USA
An Engineering with Nature Demonstration Project

from pg. 15

scrub-shrub, emergent, and aquatic bed habitats supporting development of a variety of plant and animal species. The island supports multiple species, with over 80 plant and 20 animal species observed to date. Preliminary work on the island therefore suggests that the area has been colonized by a diverse assemblage of faunal and floral species. Signs of human activity were also noted on the island, as the presence of shotgun shells signified that the island was being used for hunting. Economic benefits are being realized as the enlarging island has reduced the overall cross sectional area of the river, increasing the river's flow through the navigation channel to velocities that were sufficient to reduce shoaling and maintenance dredging requirements. Intentionally aligning natural processes in the river with engineering processes via strategically mounding dredged material is realizing tangible environmental, social, and economic benefits.

Figure 2: A diverse assemblage of native plant life has colonized the island. In this photo is an extensive stand of the native American lotus (Nelumbo lutea) growing on the island.

What the Future Holds
Going forward, research is focusing on further quantifying the many benefits being provided by the island within the Atchafalaya Basin. Efforts will focus on comparative investigations of a reference island in the basin, surveys of bird and mammal usage, determinations of biogeochemical functions and benefits, species management for habitat improvement, and the hydrodynamic characteristics of the river in the area. These investigations further quantifying the multiple benefits of using dredged material to create such riverine islands will provide a more complete understanding of the formation of the island so this concept can be integrated into other dredging projects in southern Louisiana and elsewhere, thereby providing substantial environmental, social, and economic benefits as part of ongoing USACE maintenance dredging activities.

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