A History of Avian Habitat Creation Through Dredged Material Deposition by the U.S. Army Corps of Engineers

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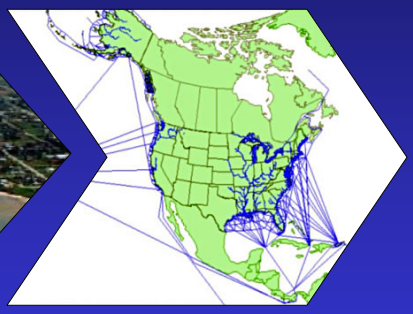
Over 100 Years of Dredging Operations by the Corps and States Agencies

1) Over 2,000 man-made islands throughout U.S. Coastal, Great Lakes, and Riverine waterways

2) **Majority of islands created during development of the Intracoastal Waterway System in the 1930-1940's**



Gulf Intracoastal Waterway

Purpose of the Intracoastal Waterways system:

1) Promote navigation for the development of national and international commerce
2) Flood control
3) Fisheries management
4) Recreation

Atlantic Intracoastal Waterway

Dredged-material Disposal Sites for Birds

Status: 1970 – 1990s

Originally, the value of dredged material islands as wildlife habitat was not a concern.

With increases in human population along coastal areas, natural habitats for many birds were lost, and dredged material islands became vital habitat for many breeding, migrating, and wintering birds.

U.S. Army Corps of Engineers
Dredged Material Research Program (DMRP)

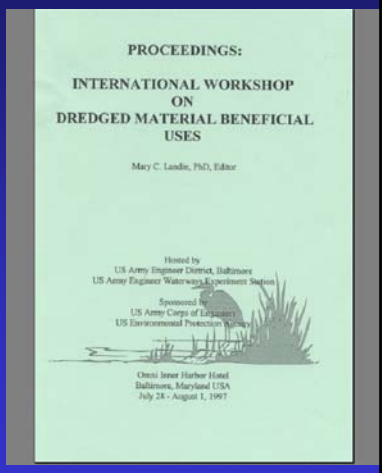
Research objectives during the 1970s

1) Document use of dredged material islands by colonial nesting birds
2) Document succession of vegetation on these islands
3) Compare vegetation and bird use on diked and undiked islands
4) Compare vegetation and bird use of natural and man-made islands
5) Study year-round use of dredged material islands by nesting, migratory and wintering birds

Summary of Results: Soots and Landin 1978

Study Sites 1974-1977:

- Entire coastal and estuarine areas of New Jersey, North Carolina, Florida, Texas, and Oregon/Washington;
- Entire U.S. shoreline and islands of the Great Lakes;
- Sandbars and islands along the Upper Mississippi River from Alton, IL to St. Paul, MN


PROCEEDINGS:

INTERNATIONAL WORKSHOP ON DREDGED MATERIAL BENEFICIAL USES

Mary C. Landin, PhD, Editor

Hosted by
US Army Engineer District, Baltimore
US Army Engineer Waterways Experiment Station

Sponsored by
US Army Corps of Engineers
US Environmental Protection Agency

Omni Inner Harbor Hotel
Baltimore, Maryland USA
July 28 - August 1, 1997

Summary of Results: Soots and Landin 1978

Approx. 600,000 colonial nesting waterbirds of 35 species, and 59 species of non-colonial birds were detected

Majority of colonial species were tree nesters (Herons, Egrets, Ibises, Cormorants, Pelicans, and Spoonbills)

Majority of individuals were ground nesters (Gulls, Terns, and Skimmers)

Summary of Results: Soots and Landin 1978

Colonial Nesting Waterbirds

Areas	Ground Nesters			Tree Nesters		
	Dredge Islands	Totals	%	Dredge Islands	Totals	%
Texas	122,554	203,387	**60**	33,604	54,012	**62**
Florida	171,050	311,000	**59**	80,438	241,000	**52**
North Carolina	64,66	86,072	**75**	15,130	15,362	**99**
New Jersey	--	93,246	--	--	11,164	--
Great Lakes	65,088	272,166	25	32	5,062	**0.2**
Pacific N.W.	1,554	17,214	10	0	750	**0**
Upper MS River	0	68	0	0	9,668	**0**
Totals	**445,110**	**994,317**	**45**	**137,578**	**337,018**	**30**

Habitat Requirements of Colonial Waterbirds

(From: Soots and Landin 1978; data from 35 nesting species)

Substrate	No. Species
Bare ground – sparse herb	16
Medium Herb – dense herb	22
Herb/shrub – shrub thicket	21
Shrub/forest - forest	17

Summary of Results: Soots and Landin 1978

Importance of Dredged Material Islands	
Critical	**Marginal**
Gull-billed Terns	Double-crested Cormorant
Common Tern	Anhinga
Least Tern	Glaucous-winged Gull
Sandwich Tern	Great Black-backed Gull
Royal Tern	Western Gull
Brown Pelican***	Roseate Tern
Caspian Tern***	Black Tern

Summary of Results: Soots and Landin 1978

General Findings and Management Implications:

Texas	More habitat needed for ground nesters in northern part; Habitat for tree nesters needed in southern part.
Florida	Ground nesters need habitats of bare ground, sparse and medium herb cover.
North Carolina	Shrub/forest habitat needed for tree nesters at river mouths and inlets; bare substrate needed for terns.
New Jersey	Habitat needed for both ground and tree nesters
Great Lakes	Common Terns and Herring Gulls need sparse habitats; habitat needed for tree nesters.
Upper MS River	Isolated, bare substrate islands needed to restore Least Terns.

Summary of Results: Soots and Landin 1978

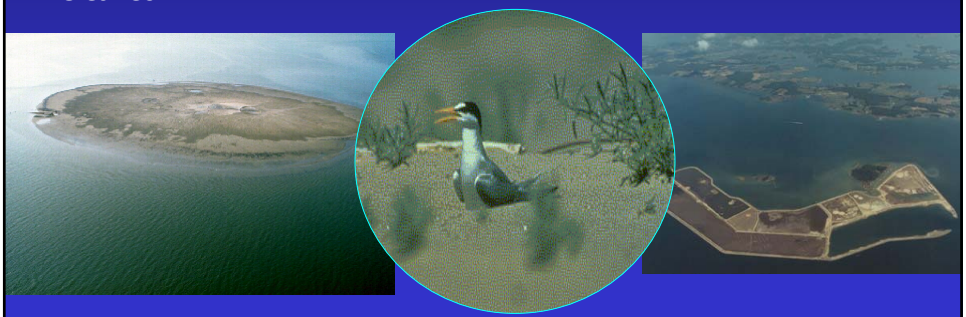
Existing Dredged Material Island Management:

1) Maintain or re-establish habitats
2) Increase size of islands/ stabilize islands
3) Change configuration, elevation, vegetation, or other features for more desirable habitats

Summary of Results: Soots and Landin 1978

New Habitats/Islands are Needed When:

1) Nesting habitat is lacking
2) Alterations to islands have removed important habitats
3) Undesirable nesting habitat (e.g., thick vegetation) must be cleared



Summary of Results: Soots and Landin 1978

Additional Concerns:

1) Islands or other dredged material sites are connected to the mainland; colonies are subjected to high levels of predation.
2) Nesting areas are subjected to excessive disturbance (e.g., Corps operations, recreational activities); colonies need protection.

Summary of Results: Soots and Landin 1978

Basic Concepts of New Island Creation:

1) Island should be isolated from predators and humans
2) Island should be created during fall or winter months
3) Island should be at least 2 –20 ha in size, few or no steep slopes, sand/ shell substrate
4) ~ 2 m in elevation (high enough to limit flooding, low to avoid wind erosion).

Current Status 2005: Dredged-material Disposal Sites for Birds

Problem

Habitat loss has made many bird species, some of which are federally endangered, dependent on dredged-material disposal sites

Disposal and management of dredged-material at some sites has caused conflict with nesting of several species, especially T&E.

Some species have shifted use of existing dredge islands due to changing conditions, and may nest on man-made structures like bridges and buildings (Erwin et al 2003)

Current Status 2005

Dredged material islands continue to provide vital habitats:

Queen Bess Island, Louisiana Coast

Important Findings of DMRP Research: Landin 1997

1) Each waterbird/ shorebird species have life-history requirements compatible with dredging operations and island creation when timing and locations concerns are accounted for.
2) Habitats for nesting species can be accommodated through placement of dredged material using a rotational strategy for maintenance dredging scheduled operations.
3) Islands between 2 – 20 ha are optimal; however, larger and smaller islands can be successful if isolation, location, topography, elevation, and substrate requirements are met.
4) Slopes of more than 3-ft rise over 100 ft distance are too steep.
5) Colonies on undiked islands are much more successful than nesting colonies on diked islands.
6) Sand/shell cobble substrates are more desirable than silts and clays.

Important Findings of DMRP Research: Landin 1997

7) New dredged material should be placed several months before breeding season to permit wind sorting of material that will provide a firm substrate for nesting.
8) Nesting species can affect vegetation by killing plants through feces accumulation.
9) Undisturbed bare ground habitats are the scarcest in supply in all U.S. waterways, forcing some species to use undesirable habitats including roof tops and parking lots.
10) Islands should be at least 6 – 10 ft above mean high water or flood stage during the breeding season.
11) Islands should not be closer than 0.5 miles from the shore to prevent predators and discourage recreational boaters from using island.
12) Some species will only nest in close proximity to other species (e.g., Royal and Sandwich Terns).

Important Findings of DMRP Research: Landin 1997

13) Birds vary in their site tenacity: tree nesting species will persist in area even when nesting failure is likely; ground nesting species often move from island to island from year-to-year or within a year.
14) Rock, riprap, and steep dike structure are deadly to young birds: young birds need an unimpeded access to the open water, beach habitats.
15) Shallow water feeding habitat in close proximity to island for breeding adult birds aids in nesting and fledging success.
16) Exotic vegetation will likely require vigorous control to protect nest site integrity.
17) Colonizing nest predators will need to be controlled.
18) Human use of islands will need to be discouraged during the breeding seasons and islands should be posted with no trespassing signs.

Important Findings of DMRP Research: Landin 1997

19) Islands can be actively repaired and upgraded using more dredged material during the breeding season if birds can be enticed to relocate to safer parts of the island.
20) Erosion control on islands can be accomplished using maintenance dredged material with positive effects on the active bird colonies.
21) Coordination with and education of all interested parties, including local fisherman and environmental groups, should be on-going throughout the planning, design, construction, and monitoring phases of wildlife island development.

Where do we go from here?:

1) More than 200,000 m^3 of uncontaminated coastal sediments are dredged each year for port maintenance:
   a) Numerous opportunities exist to use this material for new island creation and coastal wetland/marsh and beach restoration.
   b) Management techniques on habitat creation for colonial and non-colonial waterbirds are well developed, but poorly implemented.
2) We need increased cooperation *and* communication between government agencies, state and local governments, and environmental organizations to promote active management of dredged material habitats for birds.

New Research Directions:

1) Conditions on many dredged material islands have changed since the 1970's: Do dredged material islands continue to support majority of breeding colonial waterbirds? Have any changes occurred on dredged material islands in the Pacific Northwest? Upper Mississippi River?

New Research Directions:

2) Need to determine the best way to include management and creation of dredged material islands into regional shorebird management guidelines.
   a) Establish monitoring efforts on dredged material islands/ beach nourishment operations?

New Research Directions:

3) Need considerable research on the impacts of beach nourishment on shorebird use of beach habitat for nesting and foraging.
   a) Are impacts short-lived? (lag-time effects?)
   b) What are the long-term impacts?
   c) Landscape level impacts?

New Research Directions:

4) **Need better understanding of local and regional impacts of human disturbances to determine best long-term management strategies for sustainable colonial and non-colonial waterbird populations.**