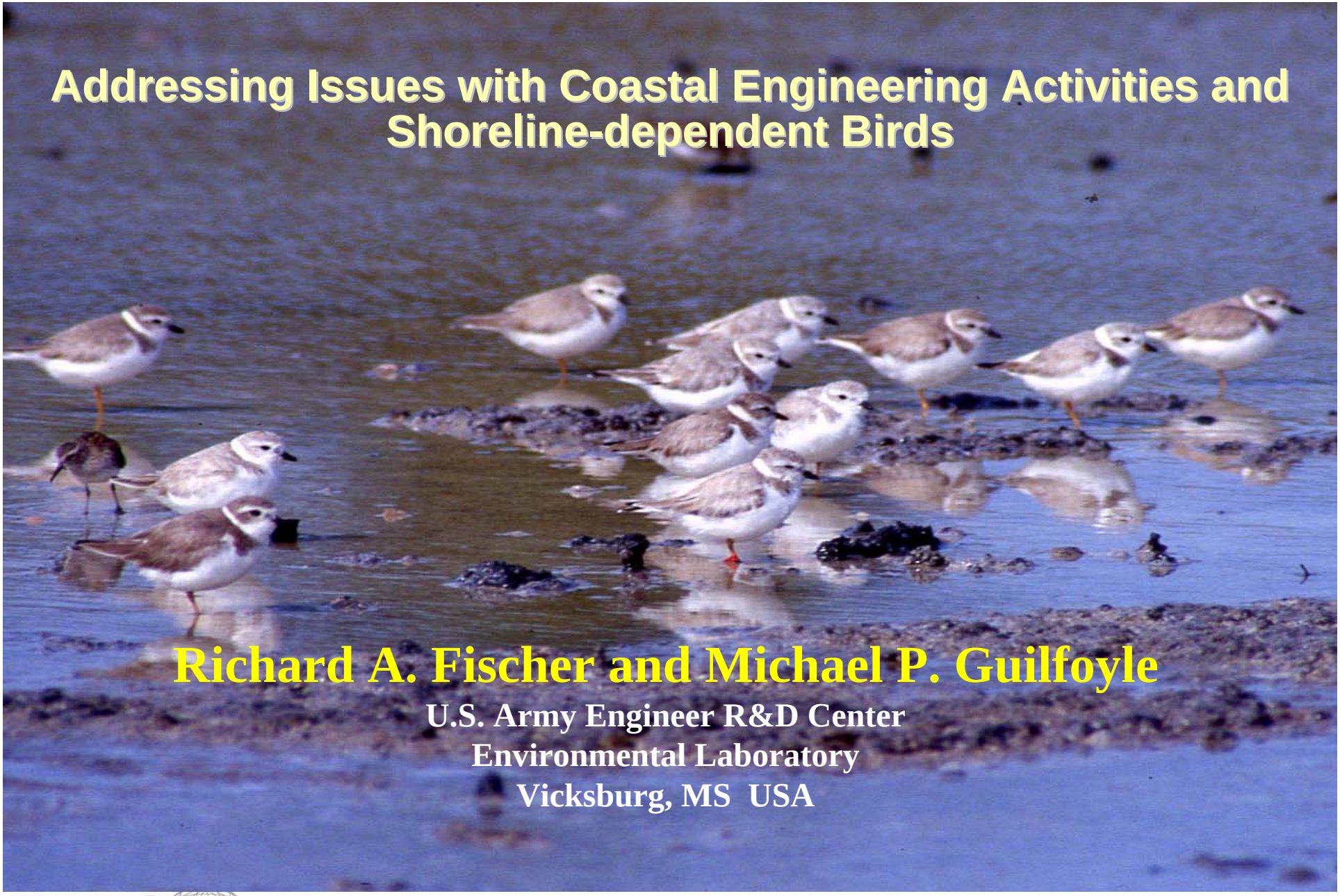
Addressing Issues with Coastal Engineering Activities and Shoreline-dependent Birds



Richard A. Fischer and Michael P. Guilfoyle

U.S. Army Engineer R&D Center
Environmental Laboratory
Vicksburg, MS USA

Dredged Material Assessment and Management Seminar
15-17 April 2008, Sacramento, CA

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

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.

Current Status 2008:
Dredged-material Disposal and Birds

Problems

Habitat loss has made many bird species, some of which are state or federally listed as threatened or endangered, dependent on dredged-material disposal sites. Habitats on some of these sites are in a state of decline.

Disposal and management of dredged-material (e.g., beach nourishment) at some sites causes conflicts with several species, especially T&E.

Interior river navigation and water control often are in conflict with ecology of federally-endangered interior least terns.

Coastal

Snowy Plover

Piping Plover

Red Knot

Inland

Interior Population of
The Least Tern

Decision, Planning and New Research Directions:

1) **Identify conflicts between coastal and inland engineering projects and target bird species, and identify ways to reduce the impacts associated with these conflicts**

Collaborative Activities

Coastal engineering and bird conservation

Corps of Engineers

American Bird Conservancy

Three regional workshops on coastal engineering and bird conservation

- **South Atlantic Coast (Jekyll Island, GA) – Feb 2005**
- **North Atlantic Coast (Long Island, NY) – Oct 2006**
- **Gulf Coast (Corpus Christi, TX) – Mar 2006**

American Bird Conservancy

Objectives of Regional Workshops

(1) to expand capabilities of the Corps to contribute to various bird conservation efforts,

(2) to make the bird conservation community aware of opportunities that exist through working with the Corps, and

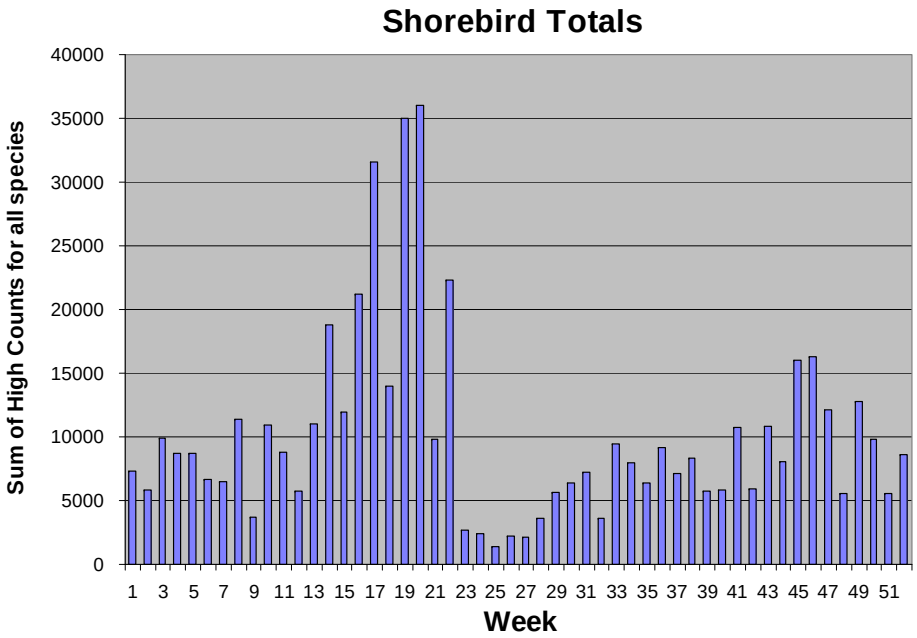
(3) to address and hopefully reduce some areas of conflict.

Decision, Planning and New Research Directions:

1) Identify conflicts between coastal and inland engineering projects and target bird species, and identify ways to reduce the impacts associated with these conflicts

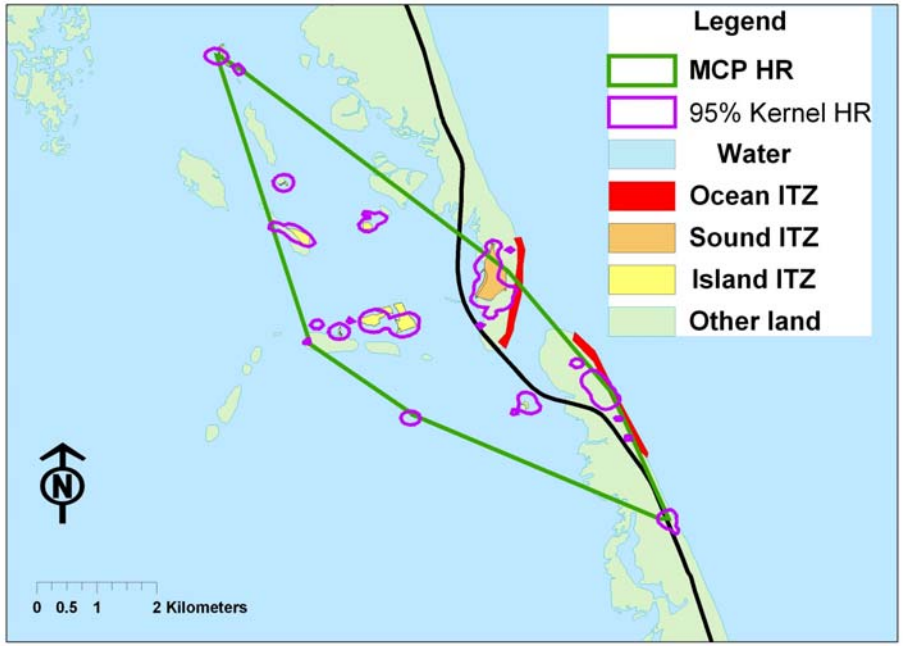
2) **Huge amounts of uncontaminated coastal sediments are dredged each year. Numerous opportunities exist to use this material for new island creation, coastal wetland/marsh and beach restoration, and improvement of habitats in CDF's.**

Savannah River CDF



- Known for attracting birds
- 289 species documented
- Rare species
- Large numbers of shorebirds and waterfowl

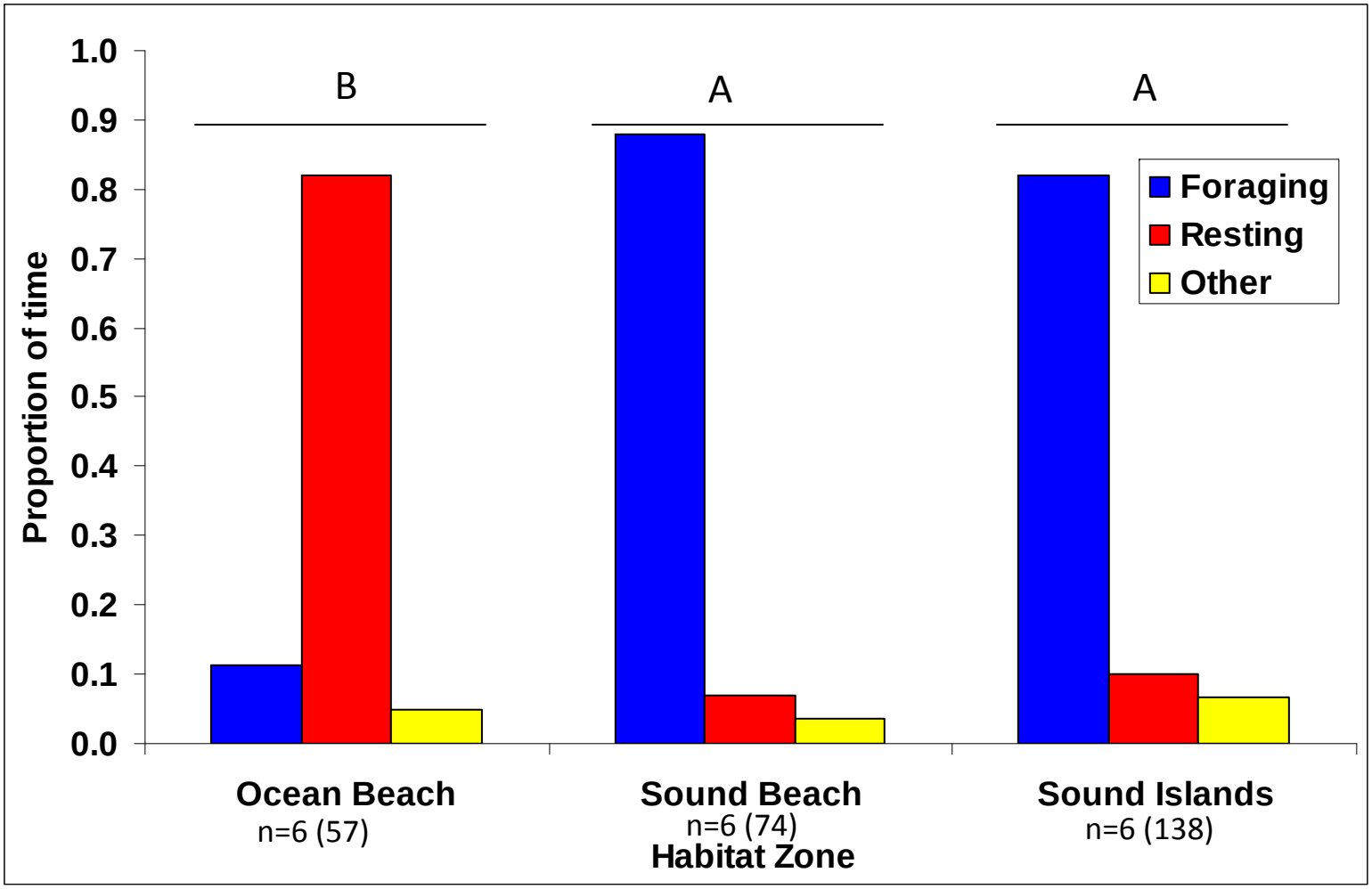
Winter Ecology of Piping Plovers at Oregon Inlet, North Carolina



Collaborative research between ERDC and Department of Fisheries and Wildlife Sciences, Virginia Tech University

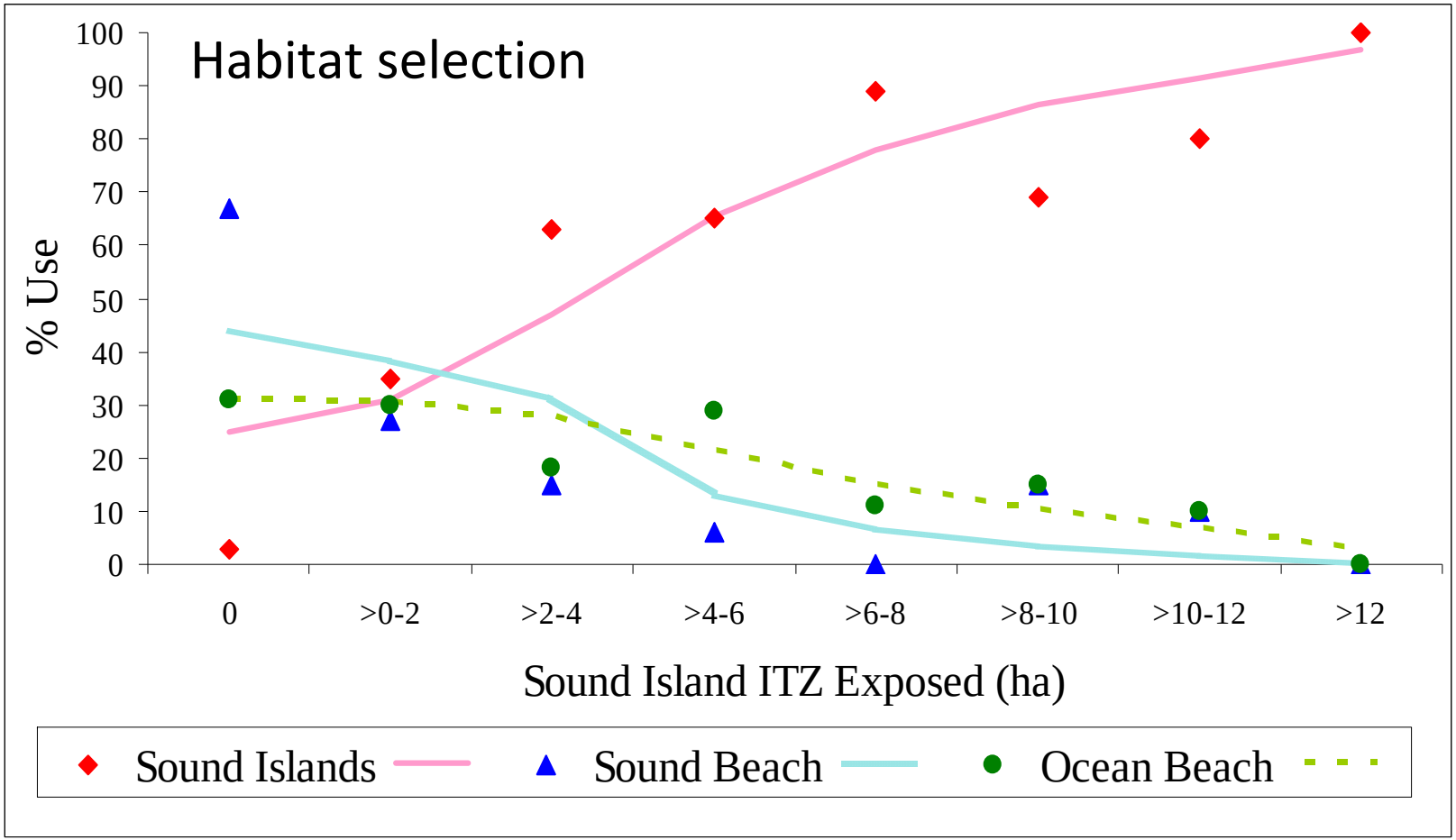
Results - Oregon Inlet, North Carolina

Piping Plover Activity Budgets



Multiresponse Blocked Permutation Procedure: *P = 0.003*

Results - Oregon Inlet, North Carolina



Multinomial Logistic regression: **Wald's χ^2_2 = 24.0, *P* < 0.001, N = 197**

Decision, Planning and New Research Directions:

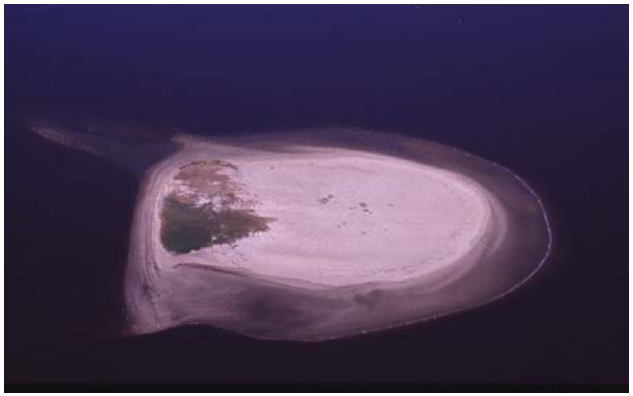
1) Identify conflicts between coastal and inland engineering projects and target bird species, and identify ways to reduce the impacts associated with these conflicts

2) Huge amounts of uncontaminated coastal sediments are dredged each year. Numerous opportunities exist to use this material for new island creation and coastal wetland/marsh and beach restoration.

3) Conditions on many dredged material islands have changed since the 1970's. How much maintenance is needed to improve populations of dependent birds?


Photo by Tom Murphy, SCDNR

Succession on dredged-material Islands



Year 0-1

Year 3-4

Year 4-5

Year 7-10

Slide courtesy of Walker Golder, National Audubon Society

Technical Notes and Publications

ERDC_TN-DOER

Dredged Material as a Tool for Management of Tern and Skimmer Nesting Habitats

Walker Golder, David Allen, Sue Cameron, and Trudy Wilder

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PURPOSE: This technical was written at the request of the U.S. Army Engineer Research and Development Center (ERDC), Environmental Laboratory (EL) following a presentation made at a workshop coordinated by American Bird Conservancy (ABC) working with ERDC, held February 1-4, 2005 at Jekyll Island, Georgia (Guilfoyle et al. 2006). This report, which provides guidance on how to create and manage dredged-material islands as early-successional bird habitat, supports the objectives of a research work unit under the Dredging Operations and Environmental Research (DOER) program titled, "Reducing conflicts between coastal engineering projects and bird habitat needs." (http://el.erdc.usace.army.mil/dots/coastalbirds.html).

BACKGROUND: Navigable waterways and channels in the United States are maintained at appropriate depths through the process of dredging. This is primarily the responsibility of the US Army Corps of Engineers (USACE), and to a lesser extent the State Ports and Departments of Transportation. The material removed during dredging projects can be used to create, restore, and maintain early successional habitats preferred by most species of terns and some solitary

Decision, Planning and New Research Directions:

1) Identify conflicts between coastal and inland engineering projects and target bird species, and identify ways to reduce the impacts associated with these conflicts

2) Huge amounts of uncontaminated coastal sediments are dredged each year. Numerous opportunities exist to use this material for new island creation and coastal wetland/marsh and beach restoration.

3) Conditions on many dredged material islands have changed since the 1970's. How much maintenance is needed to improve populations of dependent birds?

4) Need considerable research on the impacts of beach nourishment on shorebird use of beach habitat for nesting, wintering and foraging.

Beach Nourishment

- **Beach nourishment has the potential for both negative and positive impacts on bird populations.**

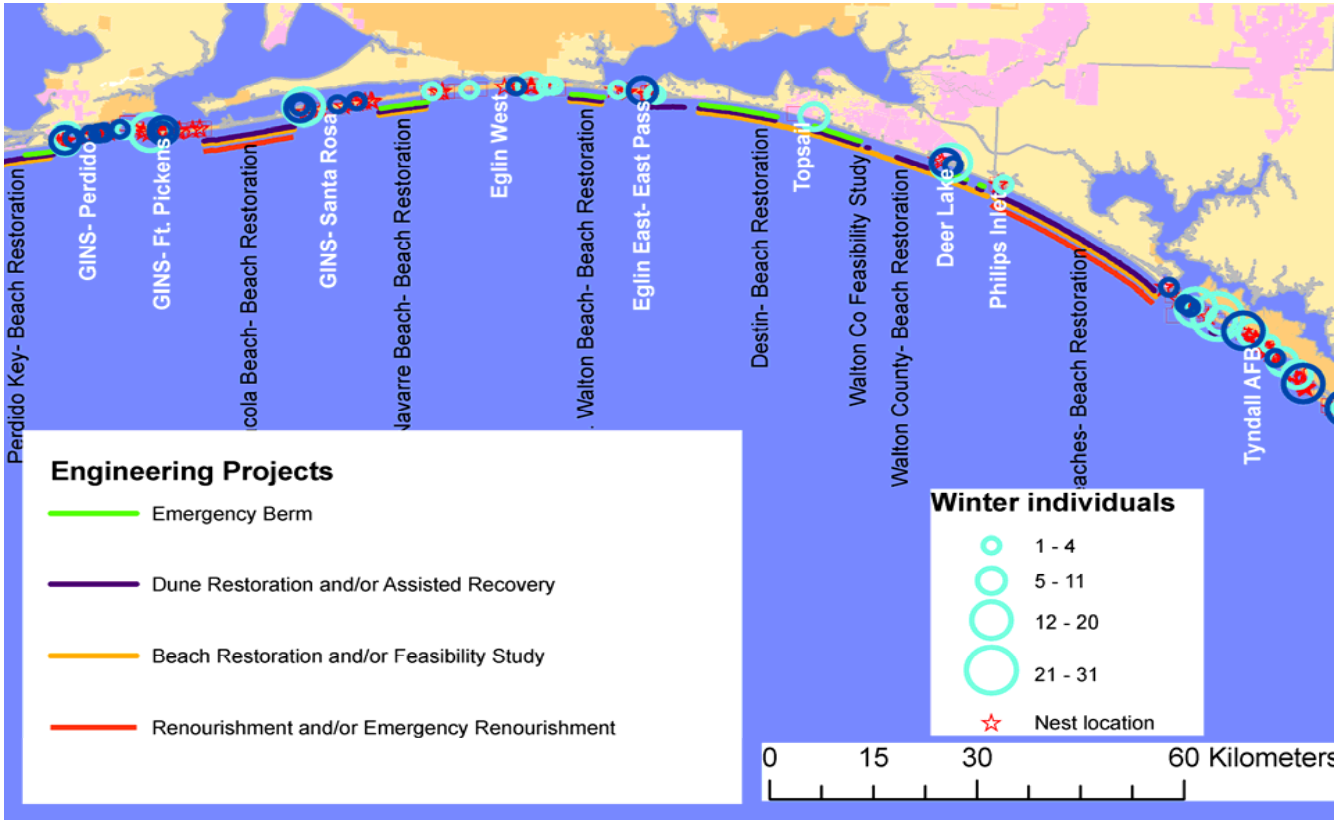
- In some cases, without beach nourishment, beach habitat would be non-existent. In these situations, beach nourishment projects create habitat that could potentially be used for nesting by many shoreline-dependent birds.

- Not all dredged materials are appropriate for disposal on beaches. Dredged sediments that do not match grain size characteristics of local beach sediments can negatively affect beach, inter-tidal, or near-shore invertebrate communities which are relied on heavily as food by both fish and bird populations.

- Although beach nourishment has great potential for habitat creation for birds, specific bird nesting or foraging habitat considerations need to be more regularly incorporated into project designs with input from ornithologists.

- The direct or indirect effects of beach nourishment on coastal birds have received little attention in the peer-reviewed literature

Factors that Limit Presence of Snowy Plovers in Florida



- **SNPL not present in engineering project areas**
- **Is this due to habitat loss and/or disturbance?**

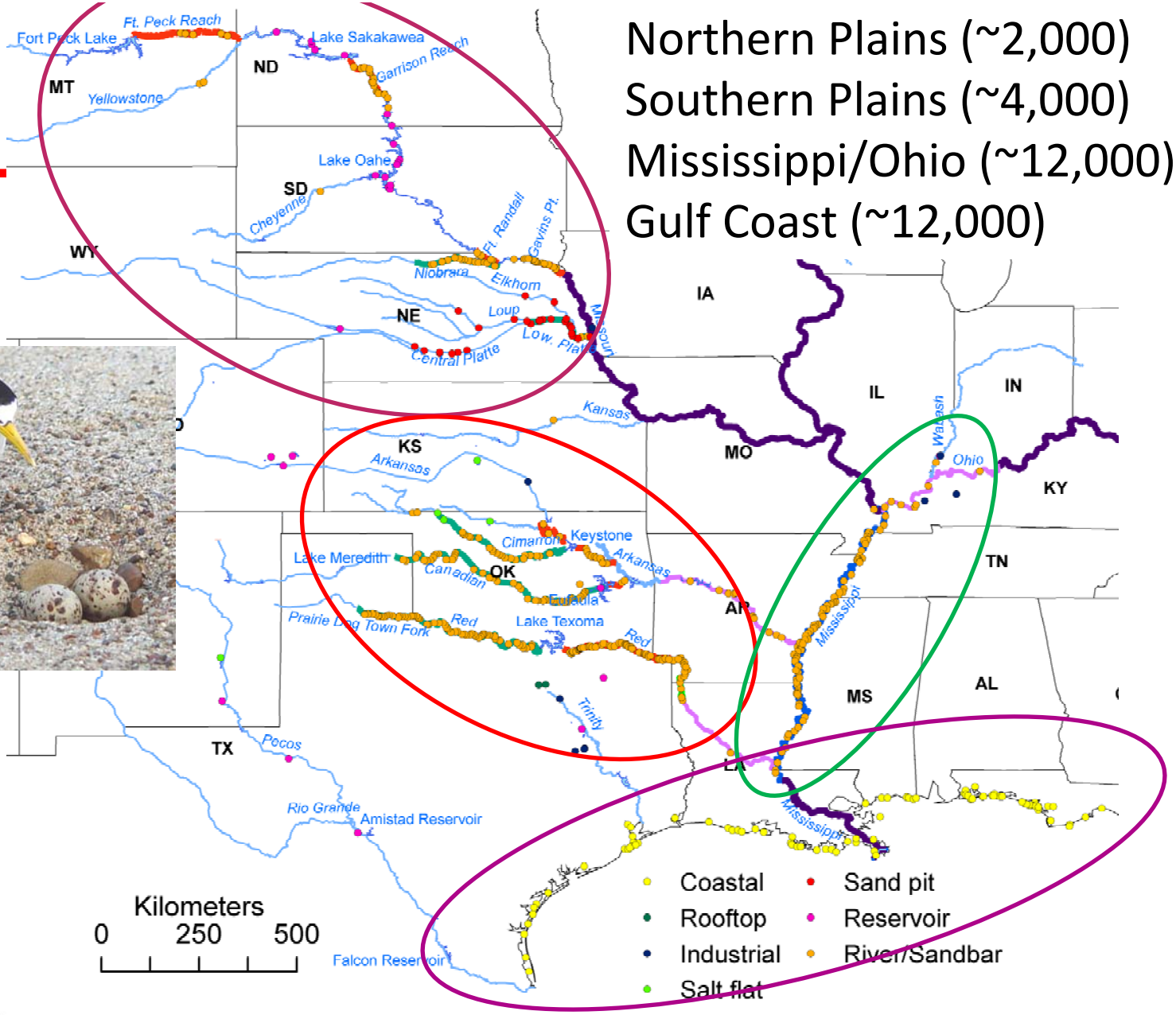
How do coastal engineering and human disturbance affect the distribution of nesting Snowy Plovers in the Florida Panhandle?

Collaborative research by ERDC and Dr. Julie Heath, Boise State University

Decision, Planning and New Research Directions:

5) **Interior population of the Least Tern is Federally Endangered and this creates conflicts with river management along thousands of miles of inland waterways**

Northern Plains (~2,000)
Southern Plains (~4,000)
Mississippi/Ohio (~12,000)
Gulf Coast (~12,000)



Developing a habitat-based population model for Interior Least Terns

Evaluating Least Tern Management Efforts within a Metapopulation Context

Develop a spatially-explicit, habitat-based, population model for Interior Least Terns to evaluate population status under a range of weather and flow conditions. The model will also be designed to evaluate the effects of different management strategies (including no action) on least tern habitat and populations.