



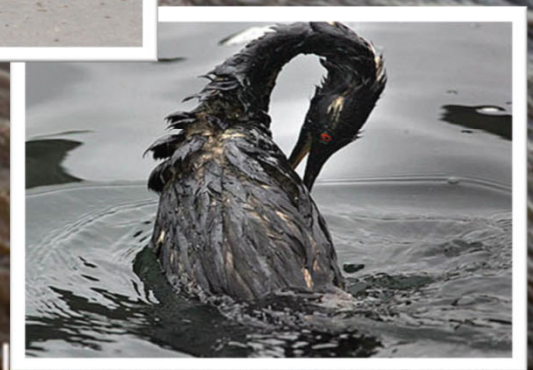
Coastal Industry Week  
Webinar Series

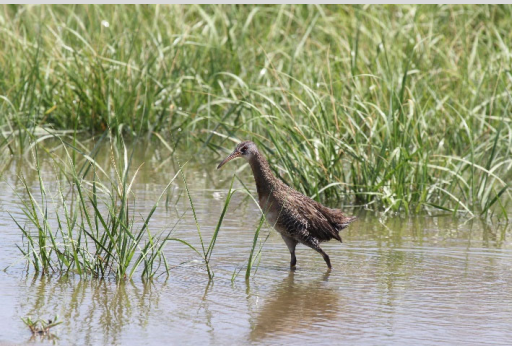


# Louisiana Coastwide Avian Restoration, Monitoring and Adaptive Management: Beginning with the End in Mind

## *Deepwater Horizon*

- Large-scale and pervasive bird injuries were documented within coastal Louisiana and the broader northern Gulf of Mexico (nGOM)
- **Commensurate resource restoration** would prove to be **equally challenging**.
- Where to begin?
- **Our team made an intentional decision ... to begin with the end in mind**





## *Goals and Objectives*

- **Provide** specific and detailed information on designing ecosystem restoration projects to support nesting birds.
- **Generate** real-world guidance for restoration teams for all project phases.
- **Develop** comprehensive, rigorous, and repeatable monitoring methods to support programmatic and project scale planning, adaptive management and reporting.



*Critical Elements*

*Understand your history !!!*

*Clearly distinguish between NEEDS vs. WANTS*

*J. P. H. L.*

A photograph of two oystercatchers standing on a rocky shore. The birds have black heads and necks, white chests, and brown wings. They have long, bright orange beaks and a small orange spot around their eyes. The background is a sandy beach with some low-lying vegetation.

*Present a clear and concise roadmap*

*with consistent messaging throughout*

*Thereby ensuring that the need(s) is being addressed and not just discussed*

**Louisiana Trustee Implementation Group**



**Regionwide Trustee Implementation Group**



**Collaborators**





*Checks and Balances*

**Identify**

**Invest**

**Address**

# Identified a Historic Challenge

**Ineffective communication** amongst principal stakeholders has historically been a significant limiting factor in accomplishing avian restoration

**Why?** Each stakeholder utilizes distinct language and terminology ... much of which does not translate or cross over well.

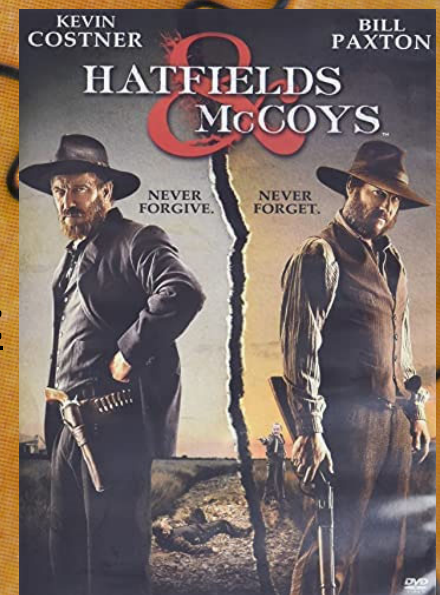




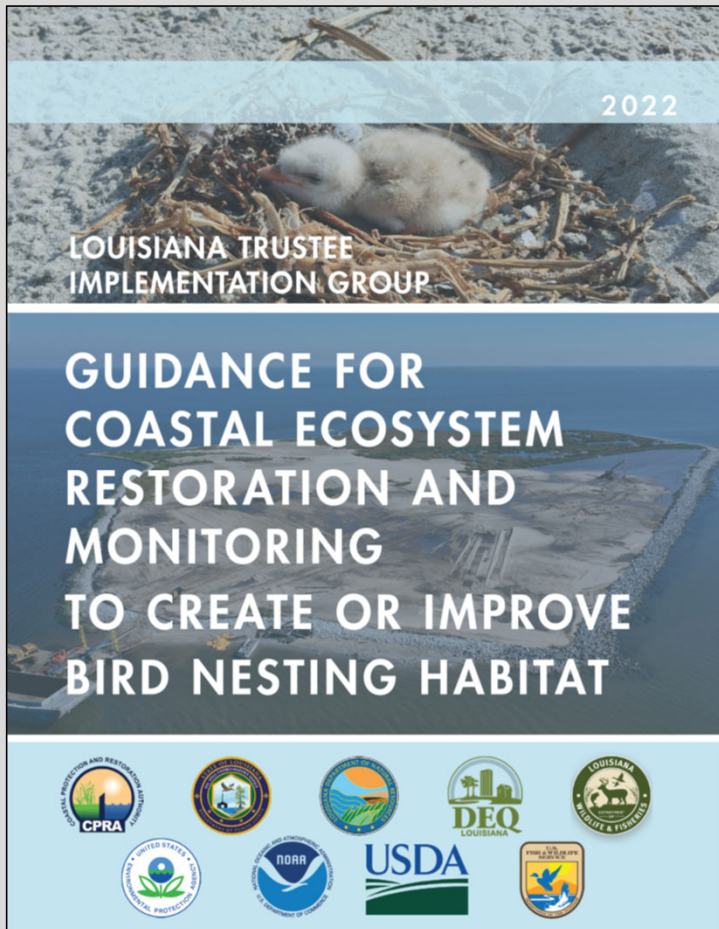
*Invest*  
***Stakeholder Engagement: Not a Spectator Sport!!!***

- Brought together Subject Matter Experts (SMEs) in avian ecology and coastal engineering
- Challenged SMEs (*early and often*) to put aside past interactions and preconceived notions
- Everyone had an equal voice
- Requested deliberate and targeted input
- **End Result**

**Avian Guidance Document**



# Address – Avian Guidance Document DIVER 248



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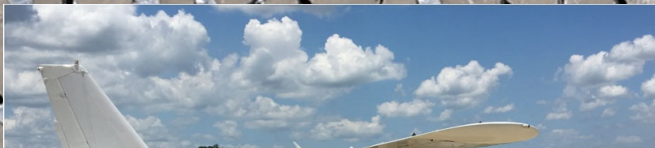


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## *Identify Comprehensive, Rigorous, and Repeatable Monitoring Methods*

- Document **individual** and **coastwide** CWB performance
- Document CWB **habitat utilization**
- Inform future **project design and construction**
- Inform need and effectiveness of **adaptive management strategies**
- Facilitate Trustees' ability to **easily convey restoration benefits** to resource stakeholders **emphasizing the general public**



## Oiled Wildlife Response



**ERMA<sup>®</sup> | Gulf of Mexico**

**Resource Management / Restoration**

**Barrier Island Comprehensive Monitoring (BICM): History, Framework, & Future**



# Address – DIVER 257







## AVIAN DATA MONITORING PORTAL

Project Information

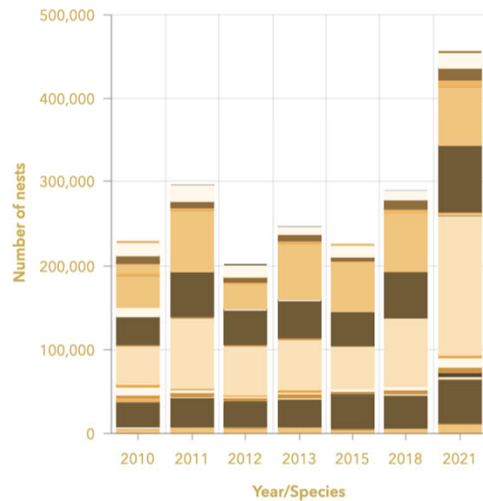
Data Management

Dashboard

### Filters

-  Year  
All
-  State  
All
-  GeoRegion  
All
-  Colony  
All
-  Species  
All
-  Watershed (HUC8)  
All

### Total nests observed



- |  |   |
|--|---|
|  American Oystercatcher |  American White Pelican                |
|  Anhinga                |  Black Skimmer                         |
|  Black Tern             |  Black-crowned Night Heron             |
|  Black-necked Stilt     |  Brown Noddy                           |
|  Brown Pelican          |  Canada Goose                          |
|  Caspian Tern           |  Caspian/Royal Tern (used for certain) |



Total nests

 1,911,000

Total birds

 11,000,000

Total nests

Total birds

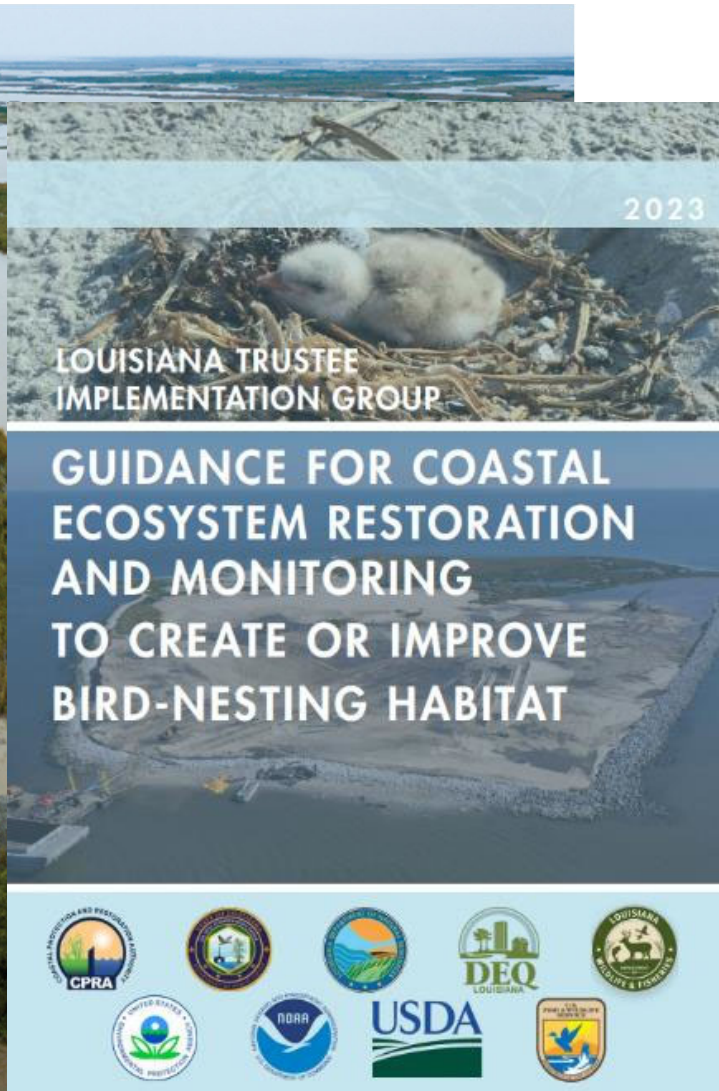
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For a detailed explanation of how these

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ers.

- Identifying programmatic goals and objectives is an intentional action.
- It requires thoughtful assessment, understanding and implementation of YOUR critical elements.
  - ✓ Know your history!!
  - ✓ Difference between Needs vs. Wants
  - ✓ Clear and concise roadmap
  - ✓ Consistent messaging
- Which continues to facilitate **our team's ability to clearly identify, invest in and address** ongoing and future avian restoration priorities.

## *Parting Thoughts*



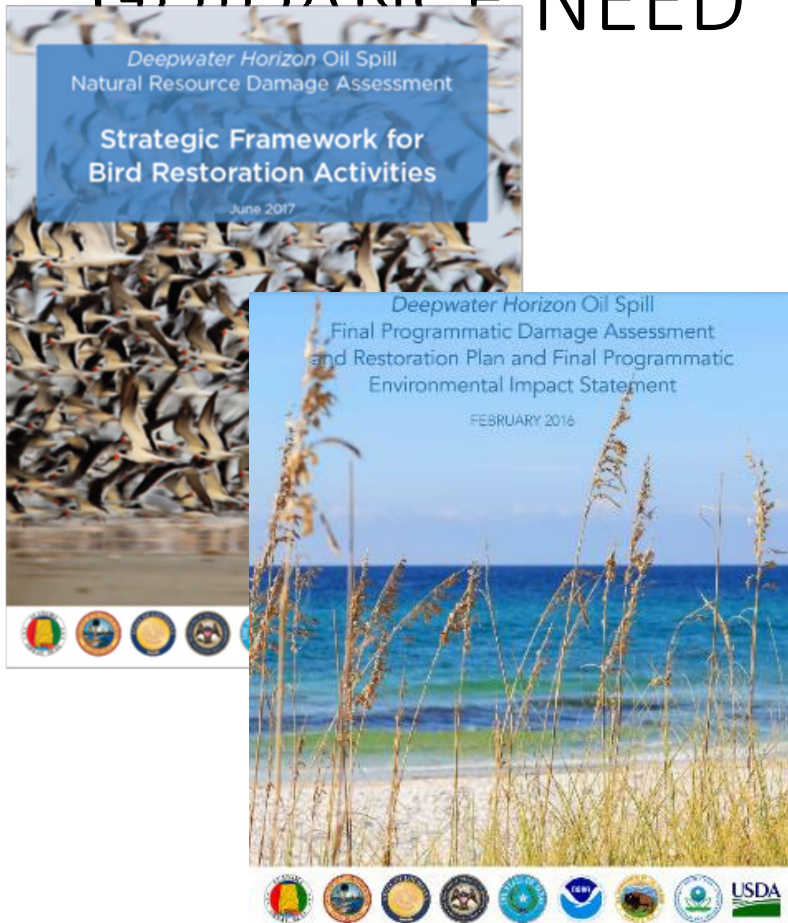


# An overview of the Guidance Document for Avian Habitat Restoration and Monitoring

**Coastal Week 2024**

Eva Windhoffer

# GUIDANCE NEED



Target audience are **ecosystem restoration project teams**

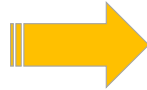
Answering: *“How can coastal ecosystem restoration projects more effectively benefit bird nesting habitat?”*



# Guidance based on nesting type to maximize utility for project Design

BIODIVERSITY-BASED GROUPING

NESTING HABITAT-BASED GROUPING



Colonial Waterbirds	
Laughing Gull	<i>Leucophaeus atricilla</i>
Brown Pelican	<i>Pelicanus occidentalis</i>
Royal Tern	
Black Skimmer	
Least Tern	
Sandwich Tern	
White Ibis	
Cattle Egret	
Great Blue Heron	
Forster's Tern	
Common Tern	
Roseate Spoonbill	
Tricolored Heron	
Casplan Tern	
Great Egret	
Snowy Egret	
Black-crowned Night Heron	
Green Heron	
Yellow-crowned Night Heron	
Little Blue Heron	
Gull-billed Tern	
Reddish Egret	
Neotropic Cormorant	
Glossy Ibis	

Secretive Marshbirds		
Clapper Rail	<i>Rallus crepitans</i>	
American Coot (w)	<i>Fulca americana</i>	
Pied-billed Grebe	<i>Podilymbus podiceps</i>	
Mottled Duck	<i>Anas fulvigula</i>	
Least Bittern	<i>Ixobrychus exilis</i>	
American Bittern (w)	<i>Botaurus lentiginosus</i>	
Yellow Rail (w)	<i>Coturnicops noveboracensis</i>	
Black Rail	<i>Laterallus jamaicensis</i>	
Virginia Rail (w)	<i>Rallus limicola</i>	
Sora (w)	<i>Porzana carolina</i>	
Black-necked Stilt	<i>Himantopus mexicanus</i>	
King Rail	<i>Rallus elegans</i>	
Purple Gallinule	<i>Porhynchus martinicus</i>	

Breeding Shorebirds		
Black-bellied Whistling Duck	American Oystercatcher	<i>Haematopus palliatus</i>
Boat-tailed Grackle	Killdeer	<i>Charadrius vociferans</i>
Red-winged Blackbird	Wilson's Plover	<i>Charadrius wilsonia</i>
Seaside Sparrow	Snowy Plover	<i>Charadrius nivosus</i>
Fulvous whistling Duck	Willet	<i>Tringa semipalmata</i>
Belted Kingfisher	Sanderling	
	Ruddy Turnstone	
	Dunlin	

34 species of Pelicans, Gulls, Tern Cormorants were injured per the Laughing Gull (n = 36,642), Brown Am. White Pelican (n = 6,587) had injury among these Taxa Groups a

25 species of Rails, Waterfowl, Landbirds, R.C. Clapper Rail (n = 10,034), Pied-billed Grebe estimated injury among 28 species of shorebirds were injured per the TDARP Table 4-7.3 Sanderling (n = 124), Dunlin (n = 131), and Ruddy Turnstone (n = 132) had highest estimated injuries; these 3 spp. are staging/delisting

Shrub-nesting Birds	Marsh-nesting Birds	Ground-nesting Birds
Brown Pelican	Purple Gallinule	American Oystercatcher
Reddish Egret	Common Gallinule	Gull-billed Tern
Great Blue Heron	Least Bittern	Royal Tern
Green Heron	King Rail	Sandwich Tern
Cattle Egret	Pied-billed Grebe	Caspian Tern
Roseate Spoonbill	Mottled Duck	Wilson's Plover
Tricolored Heron	Black Rail	Common Nighthawk
Little Blue Heron	Black-necked Stilt	Forster's Tern
Great Egret	Clapper Rail	Laughing Gull
Snowy Egret	Seaside Sparrow	Least Tern
Black-crowned Night Heron		Black Skimmer
Yellow-crowned Night Heron		Snowy Plover
Neotropic Cormorant		
White Ibis		
White-faced Ibis		
Glossy Ibis		

# FINAL BIRD GROUPINGS

## SHRUB-NESTING

primarily nest on, in, or among woody vegetation



## MARSH-NESTING

inhabit and nest exclusively on coastal wetlands



## GROUND-NESTING

primarily nest on the ground (bare ground or lined with vegetation/organic materials)



# Language was linked across ecological, geological, and engineering terminologies

Detailed	CPRA Proposed	New BICM	C-CAP	CRMS Veg
Beach	Beach	Beach	Unconsolidated Shore	N/A
Unvegetated dune	Barrier Island/Headlands	Unvegetated Flat	Unconsolidated Shore	N/A
Vegetated dune		Bare Land		
Unvegetated flat		Unvegetated Dune	Bare Land	
Meadow	Dunes	Vegetated Dune	Unconsolidated Shore	N/A
Intertidal	Meadow	Meadow		
Estuarine emergent marsh	Scrub/Shrub Wetlands	Forest	Estuarine Forested Wetland	
Mangrove		Scrub/Shrub	Estuarine Scrub/Shrub Wetland	
Bare land	Saline Marsh	Estuarine Emergent Marsh	Estuarine Emergent Wetland	Saline

- CRMS Site
- Vegetation
  - Saline
  - Brackish
  - Intermediate
  - Fresh
  - Swamp
  - Water
  - Other
- Mixed Forest
- Scrub / Shrub
- Palustrine Forested Wetland
- Palustrine Scrub / Shrub Wetland
- Palustrine Emergent Wetland
- Estuarine Forested Wetland
- Estuarine Scrub / Shrub Wetland
- Estuarine Emergent Wetland
- Unconsolidated Shore
- Bare Land
- Water
- Palustrine Aquatic Bed
- Estuarine Aquatic Bed
- Tundra
- Snow / Ice

Prepared in cooperation with the Louisiana Coastal Protection and Restoration Authority

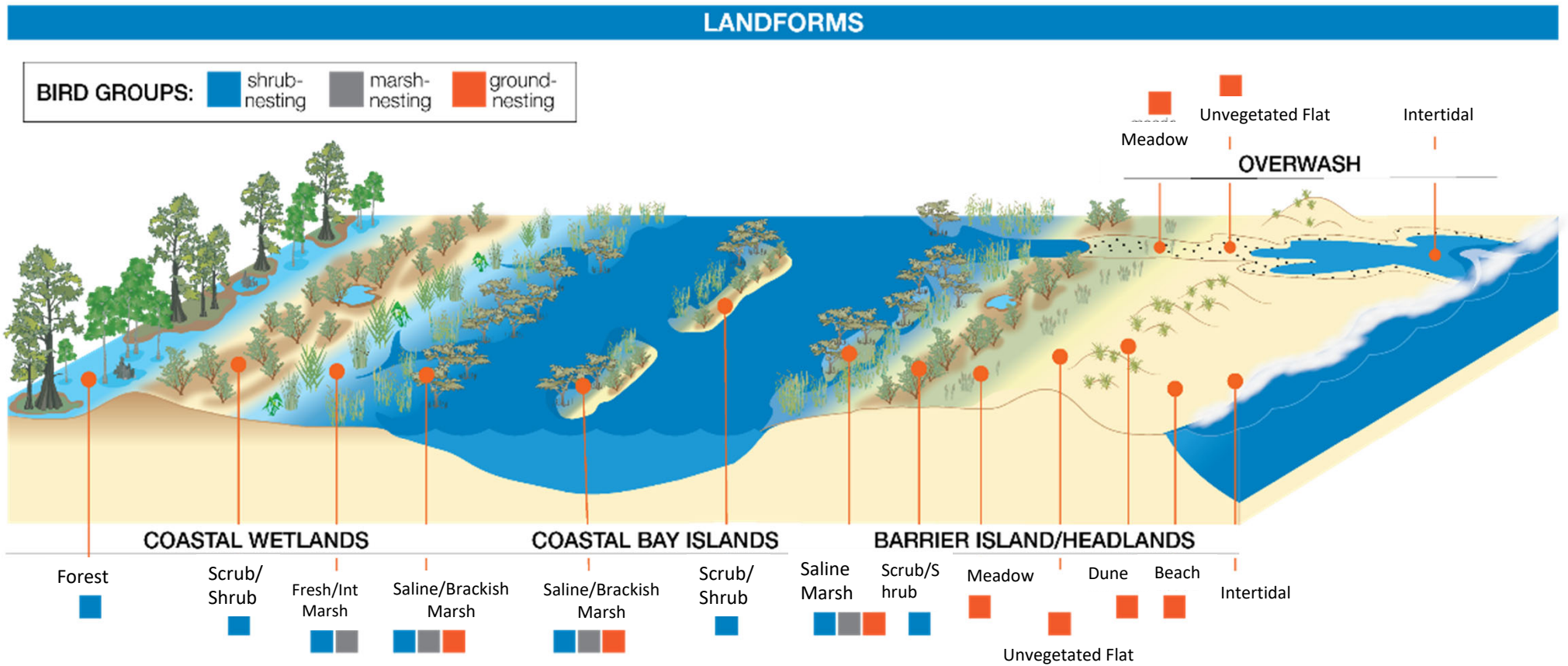
**Louisiana Barrier Island Comprehensive Monitoring Program: Mapping Habitats in Beach, Dune, and Intertidal Environments Along the Louisiana Gulf of Mexico Shoreline, 2008 and 2015-16**



Landform	Habitat
Coastal Wetland	Forest
	Scrub/shrub
	Fresh-intermediate marsh
	Brackish-saline marsh
Coastal Bay Islands	Saline marsh
	Scrub/Shrub
Barrier Islands / Headland	Saline marsh
	Scrub/Shrub
	Meadow
	Dune
	Beach
Overwash Fans (within Barrier Islands/Headlands)	Intertidal
	Unvegetated flat
	Meadow

# Birds Across Coastal Habitats

Three Nesting Bird Groups Identified across Coastal Louisiana:



# Document Structure

## **1.0 Background and Context**

## **2.0 Habitats and Bird Groups**

- 1) habitat characteristics for target bird nesting groups
- 2) design considerations necessary to achieve target bird nesting habitat characteristics
- 3) lessons learned from previously implemented projects or conceptualized coastal ecosystem restoration projects; and
- 4) bird data gaps and information needs

## **3.0 Supporting Information: Bird Ecology**

## **4.0 Supporting Information: Bird Monitoring for Ecosystem Restoration**

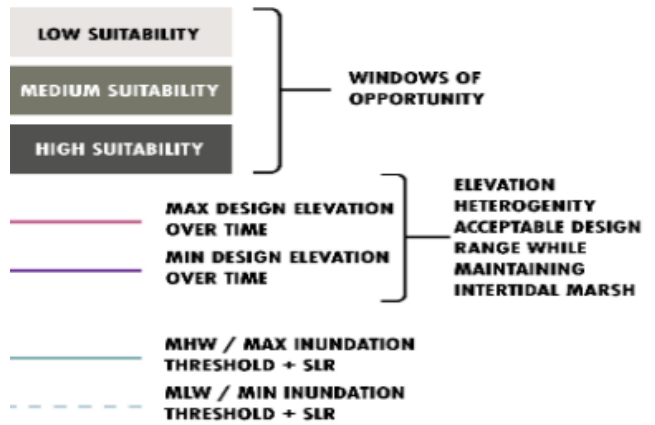
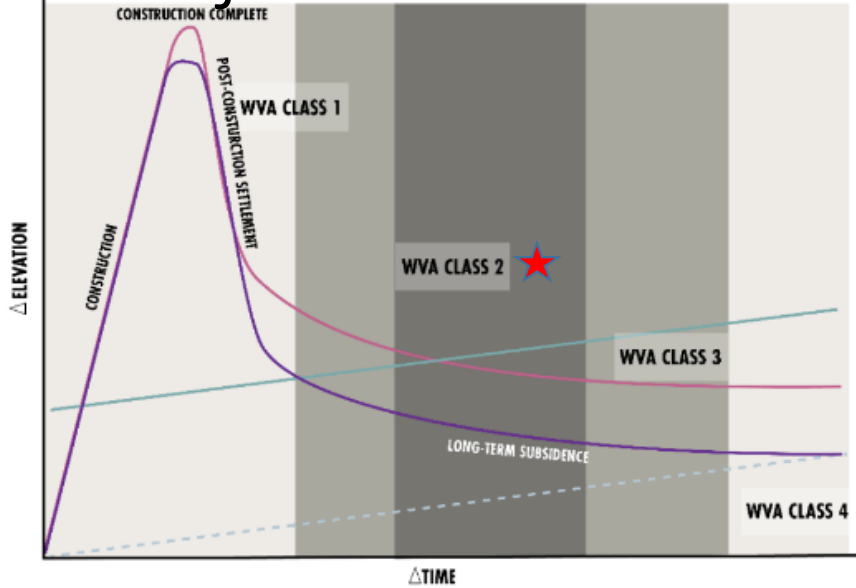
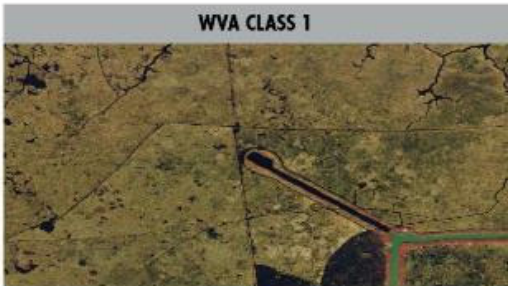
## **5.0 Literature Cited**



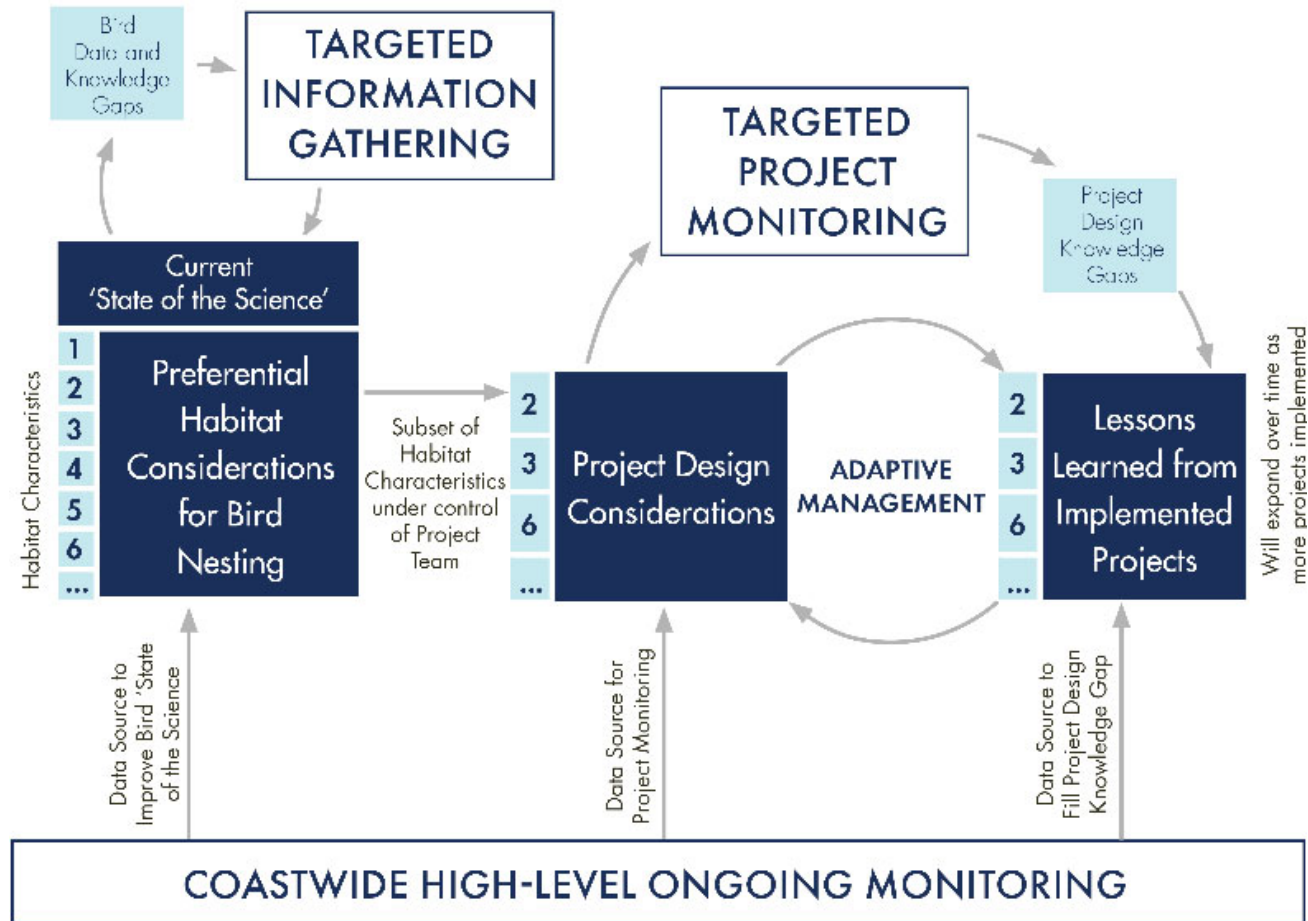
## Examples of Habitat and Design Considerations

- Island Size
- Sediment Structure
- Substrate & Nesting Materials
- Ground Elevation, Slope, Topography
- Vegetation Cover
- Land/Water Interspersion
- Habitat and Hydrologic Connectivity

# Nesting Habitat Variation Across Project Life



# High level programmatic and targeted project monitoring





# Summary

- To be used by restoration project teams during planning, design, implementation, and monitoring
- Document will be a living document
- Active adaptive management process



# Contributors

**Funding Source: Louisiana Trustee Implementation Group (LA TIG)**

Subject Matter Experts (Avian and Restoration)

## **Department of Interior (DOI)**

*Primary contributors:* Jeff Gleason, David Hewitt, William Vermillion

*Additional contributors:* Jon Hemming, John Tirpak, Benjamin Frater

## **Coastal Protection and Restoration Authority (CPRA)**

*Primary contributors:* Katie Freer, Jacques Boudreaux, Darin Lee

*Additional contributors:* Todd Folse, Todd Baker, Maury Chatellier

## **Louisiana Department of Wildlife and Fisheries (LDWF)**

*Primary contributors:* Jon Wiebe, Robert Dobbs

*Additional contributors:* Casey Wright, Michael Seymour, Annie Howard

## **U.S. Geological Survey**

*Primary contributors:* Sammy King

*Additional contributors:* Nicholas Enwright, T.J. Zenzal

## **LSU AgCenter**

*Primary contributors:* Andy Nyman

*Additional contributors:* Phil Stouffer, Leah Moran, Aylett Lipford, Joseph Youtz

## **The Water Institute of the Gulf**

*Primary contributors:* Eva Windhoffer, Brett McMann, Tim Carruthers

*Additional contributors:* Erin Kiskaddon, Charley Cameron, Berva Noone, Soupy Dalyander, Mike Miner

Audubon Louisiana: Erik Johnson

Barataria-Terrebonne National Estuarine Program: Delaina LeBlanc

University of Maryland Center for Environmental Sciences: Jane Hawkey (Graphics)





*Baton Rouge*  
1110 RIVER ROAD SOUTH, SUITE 200  
BATON ROUGE, LA 70802

[WWW.THEWATERINSTITUTE.ORG](http://WWW.THEWATERINSTITUTE.ORG)  
 @THEH2OINSTITUTE

*New Orleans*  
2021 LAKESHORE DRIVE, SUITE 310  
NEW ORLEANS, LA 70122

# Bridging the Gap between Biologists and Restoration Project Teams

Katie Freer

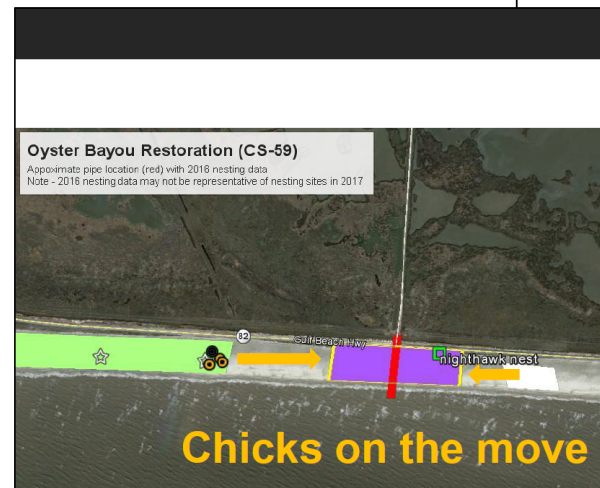


# Historical Focus

- How restoration project teams consider birds is evolving:
- 1. If we build it, they will come
- 2. How do we keep birds from disrupting construction activities?
- 3. Are long-construction projects negatively impacting T&E species?

## Protocol for MBTA Alignment

1. Avoid work during the nesting season (note potential issues with Endangered Piping Plovers and Red Knots during the non-nesting season).
2. Develop a **Bird Abatement Plan** with USFWS/LDWF



Chicks on the move

## Flightless young can rove >1/2 mile from nest



# DWH NRDA Bird Island Restorations

- DWH NRDA bird island restoration projects forced a dramatic rethinking of how we set project goals and design criteria
- Started with “bring me a rock”



# Gap Bridging - Clarified Design Criteria

- **Desired habitat types**
  - Acres scrub/shrub nesting, acres ground nesting, acres EFH/marsh nesting
- **Key elements of restored habitats**
  - Mostly dry nests -> probability of exceedance
  - Vegetation specifics by habitat type - > scrub/shrub, marsh, bare
- **Constraints**
  - Can be built without working during nesting season -> no heavy equipment 2/15-9/14
  - Balance elevation (project lifespan) with habitat quality (vegetation)

E&D Phase Goal 1: Create/restore pelican, tern, and skimmer nesting and brood rearing habitat with at least a 20-year lifespan		
E&D Objectives	Supporting E&D Activities	Associated Design Parameters/Evaluation Criteria
<b>A. Design/construct 21 to 32 acres of pelican habitat to which pelicans will return within zero to three years</b>	<ul style="list-style-type: none"> <li>▪ Establish target construction and settled elevations                             <ul style="list-style-type: none"> <li>○ Balance elevation/project lifespan with habitat quality/vegetation</li> <li>○ Incorporate the following factors in establishing elevation targets: inundation (including mean high/mean low, probability of exceedance, relative sea level rise), geotechnical settlement curves, bird habitat research, vegetation research, target nest height &gt;30-36" NAVD88</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Target construction elevation range: (TBD through settlement curve analysis to support 5- and 20-year targets)</li> <li>▪ Target settled elevation range (year 5): (lowest elevation should be at the high end of intertidal range)</li> <li>▪ Associated 20-year elevation range: (low: still intertidal; high: still supratidal)</li> <li>▪ Suitable vegetation types supported in target elevation range: marsh elder (1-3'), groundsel bush (1-4'), <u>lycium</u> (1-4'), black mangrove (at/near MHW)</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Plant pelican habitat with suitable vegetation to provide nesting substrate within 3 years of construction</li> </ul>	<ul style="list-style-type: none"> <li>▪ Suitable vegetation types: marsh elder, groundsel bush, <u>lycium</u>, black mangrove</li> <li>▪ Time needed to establish suitable vegetation:                             <ul style="list-style-type: none"> <li>○ Marsh elder:</li> <li>○ Groundsel bush:</li> <li>○ <u>Lycium</u>:</li> <li>○ Black mangrove: 5 years after intertidal elevation is reached for dense mangroves</li> </ul> </li> </ul>
<b>B. Design/construct 4 to 15 acres of tern/skimmer habitat to which terns and skimmers will return in the first season following construction</b>	<ul style="list-style-type: none"> <li>▪ Establish target construction and settled elevations                             <ul style="list-style-type: none"> <li>○ Balance elevation/project lifespan with habitat quality/vegetation</li> <li>○ Incorporate the following factors in establishing elevation targets: inundation, relative sea level rise projections, geotechnical settlement curves, bird habitat research</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Target construction elevation range: (high enough to significantly reduce risk of nests being washed out)</li> <li>▪ Target settled elevation range (year X):</li> <li>▪ Associated 20-year elevation range: (still above SLR+X% exceedance)</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Top fill material with rock/shell over geotextile fabric suitable to provide tern/skimmer habitat and support maintenance</li> </ul>	<ul style="list-style-type: none"> <li>▪ Acres:</li> <li>▪ Geographic distribution: (Perimeter? Concentrated location? Both?)</li> </ul>
<b>C. Identify/design a borrow source/area that supports the established parameters</b>	<ul style="list-style-type: none"> <li>▪ Ensure fledglings can access water</li> </ul>	<ul style="list-style-type: none"> <li>▪ Material: (shell, limestone, size?)</li> <li>▪ Slope and material of rip rap and ramps can be traversed by fledglings</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Investigate BBWW and Bayou <u>Rigaud</u> material</li> <li>▪ Obtain sandy material from USACE-approved river quarry</li> </ul>	<ul style="list-style-type: none"> <li>▪ Is design constructible with selected material?</li> <li>▪ Will desired vegetation grow in selected material?</li> <li>▪ Will selected material stay in place sufficiently</li> </ul>

# Leg Up for Next NRDA Bird Island Restoration E&D Projects

Habitat	Acreage	Estimated Coverage %	Key Materials	Inundation Regime	Benefited Species
Shrub Nesting Habitat	Appx 30 acres	Appx 60%	Mangroves, Lycium, marsh elder, resilient woody vegetation.	Very low annual probability of nest washout due to storms for ~20 years.	Pelicans, Herons, Egrets, Ibis
Marsh Habitat	Appx 7.5 acres	Appx 15%	Native grasses (Spartina sp.)	Appropriate for healthy marsh as designed.	Clapper rail and laughing gull
Beach Nesting Habitat (Shoreline / Sand / Oyster Rake)	Appx 12.5 acres	Appx 25%	No vegetation: Small limestone expanses will be deposited creating a low maintenance, beach-like feature	Low annual probability of nest washout due to storms, ponding.	Tern and black skimmer
Calm water for loafing	TBD acres	TBD %	Protected shallow waters	N/A	Pelicans, fish

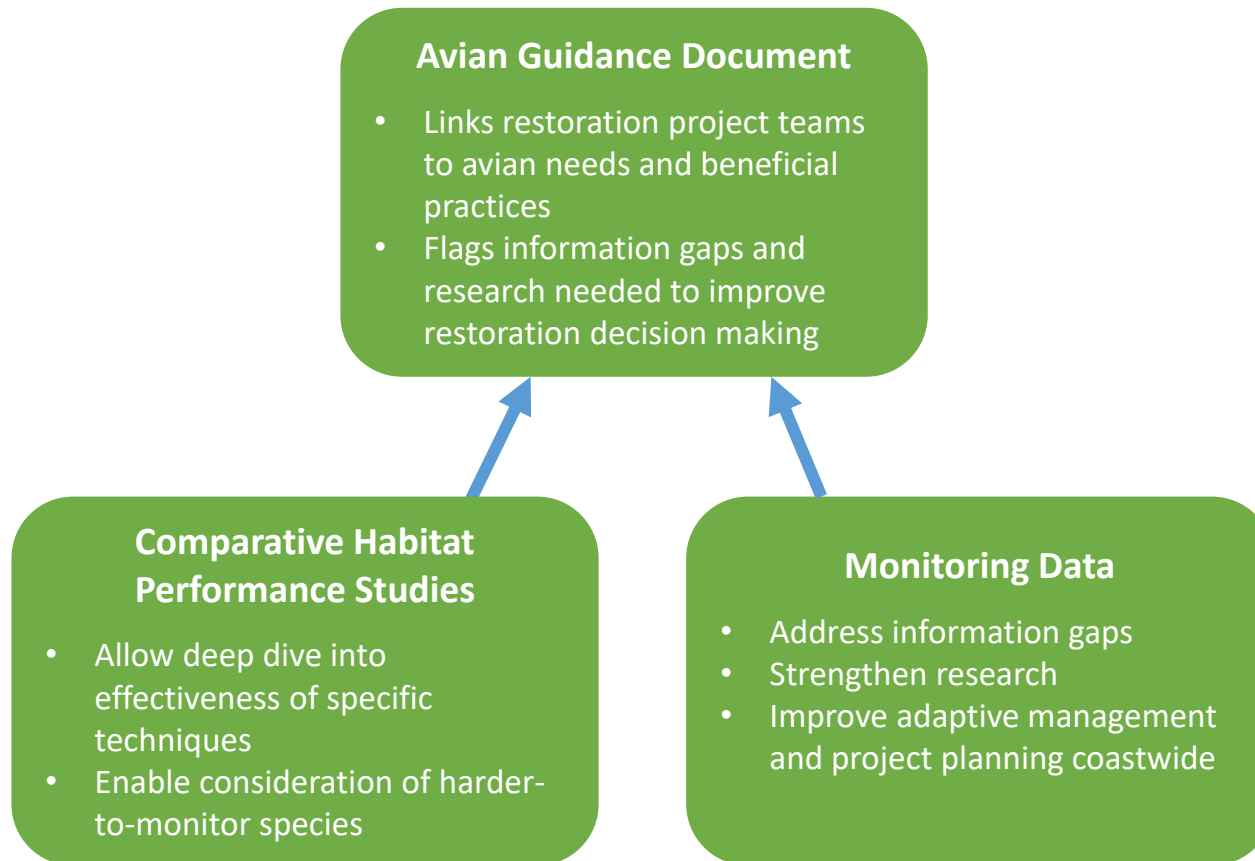


# Newer Restoration Project Considerations

- Learning to tweak general marsh and barrier island restoration projects to enhance bird benefits
  - Planting types, methods, and performance expectations
  - Opportunity to leverage alignment between needs of some marsh nesting birds and aquatic species
  - Must also value benefits to birds who need higher/dryer nesting areas
  - Hearing and thinking through request from biologists that we better maximize edge habitat...in balance with project longevity requirements



# Strengthening the Bridge



# Collaboration Takeaways

- Sit at the table together regularly to better understand the nuances of each perspective, how to define measurable goals
- Boundaries of requirements tolerances are fuzzy, trade offs likely need to be rebalanced throughout E&D
- Landscape heterogeneity is a win
- Sometimes it's best to embrace restored habitat succession and the associated shift in nesting populations served

