Life on the edge: Louisiana Seaside Sparrows

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THANKS!

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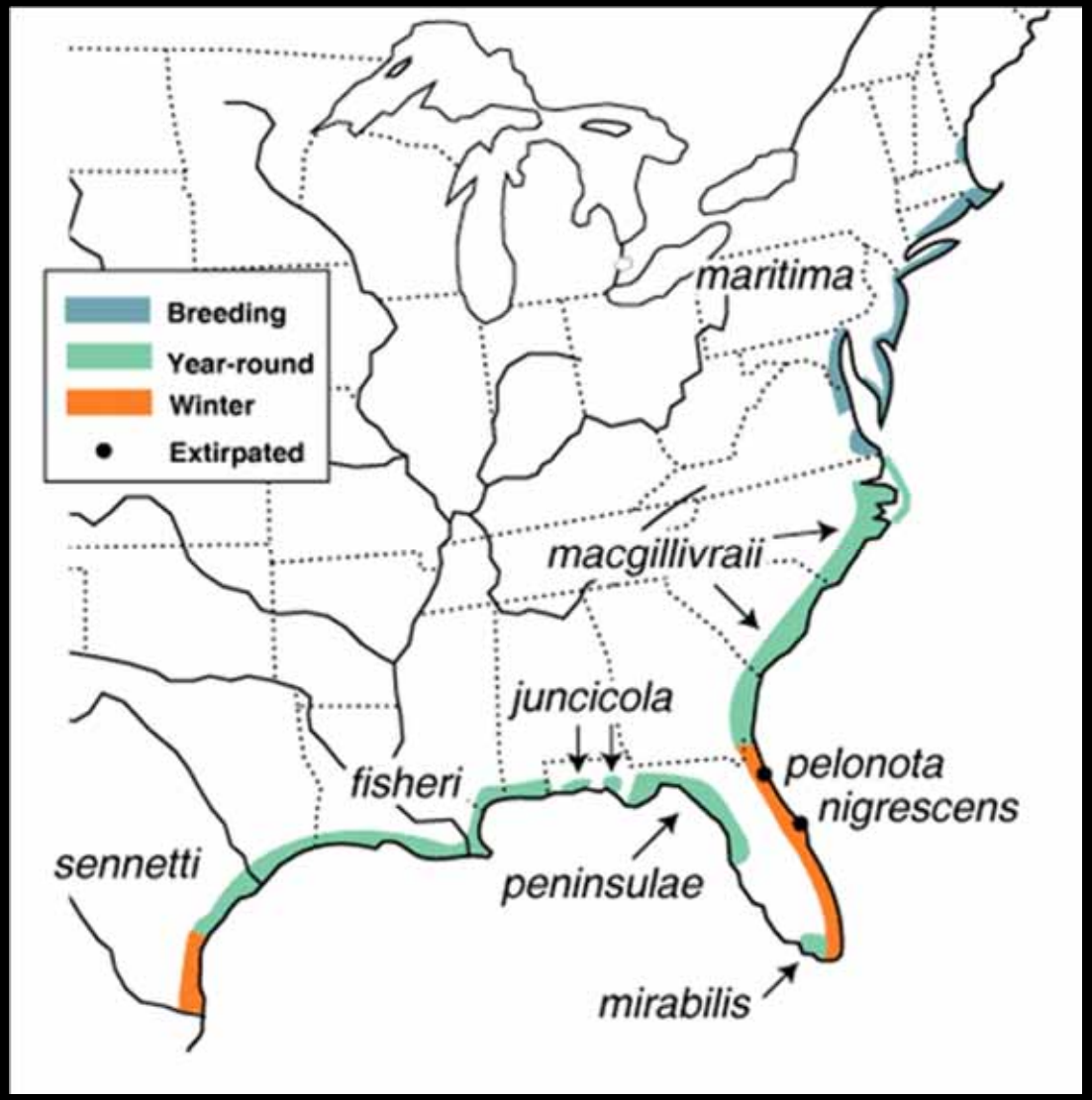
CWC
COASTAL WATERS CONSORTIUM

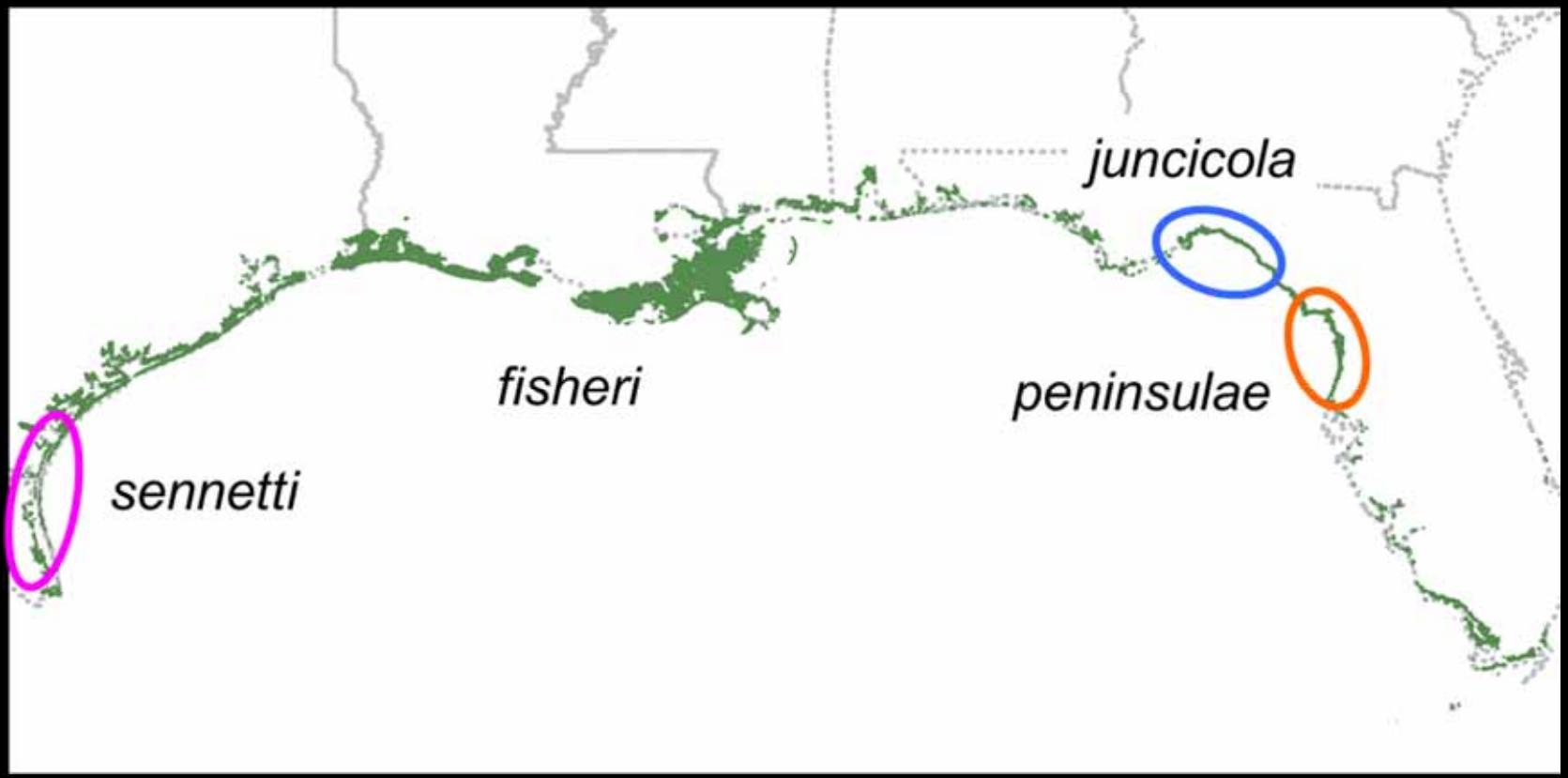

Seaside Sparrow
Ammodramus maritimus



Seaside Sparrow distribution and subspecies

From Post, W. and J.S. Greenlaw. 2009. Seaside Sparrow (*Ammodramus maritimus*), The birds of North America online: http://bna.birds.cornell.edu/bna/species/127doi:10.2173/bna.127

Coastal Louisiana is the stronghold of Gulf populations



Threats to Seaside Sparrows

Dynamic geomorphology

Storms

Relative sea level rise

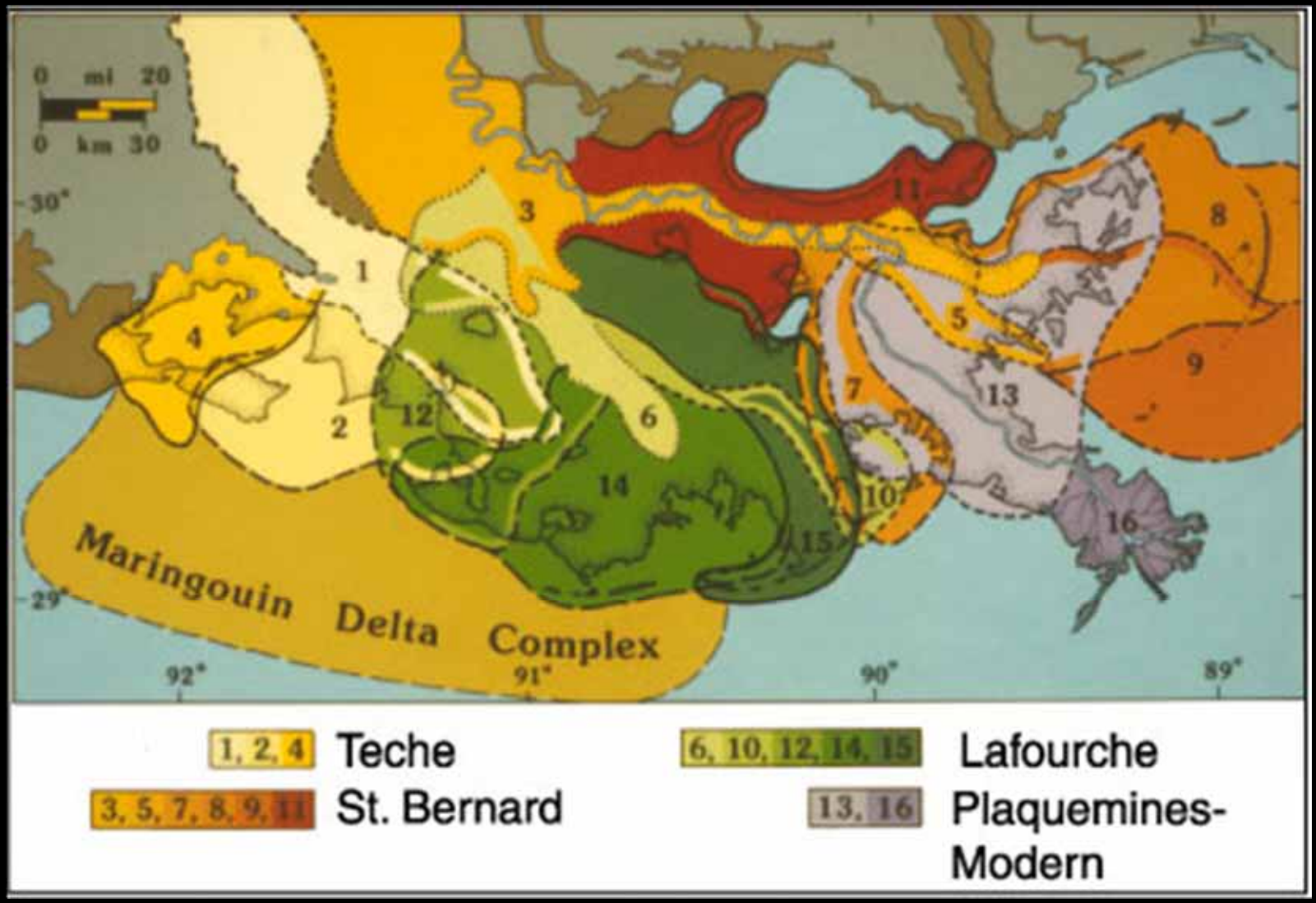
Mangrove establishment

Freshwater diversion

Contamination-

- Oil spills
- Mercury

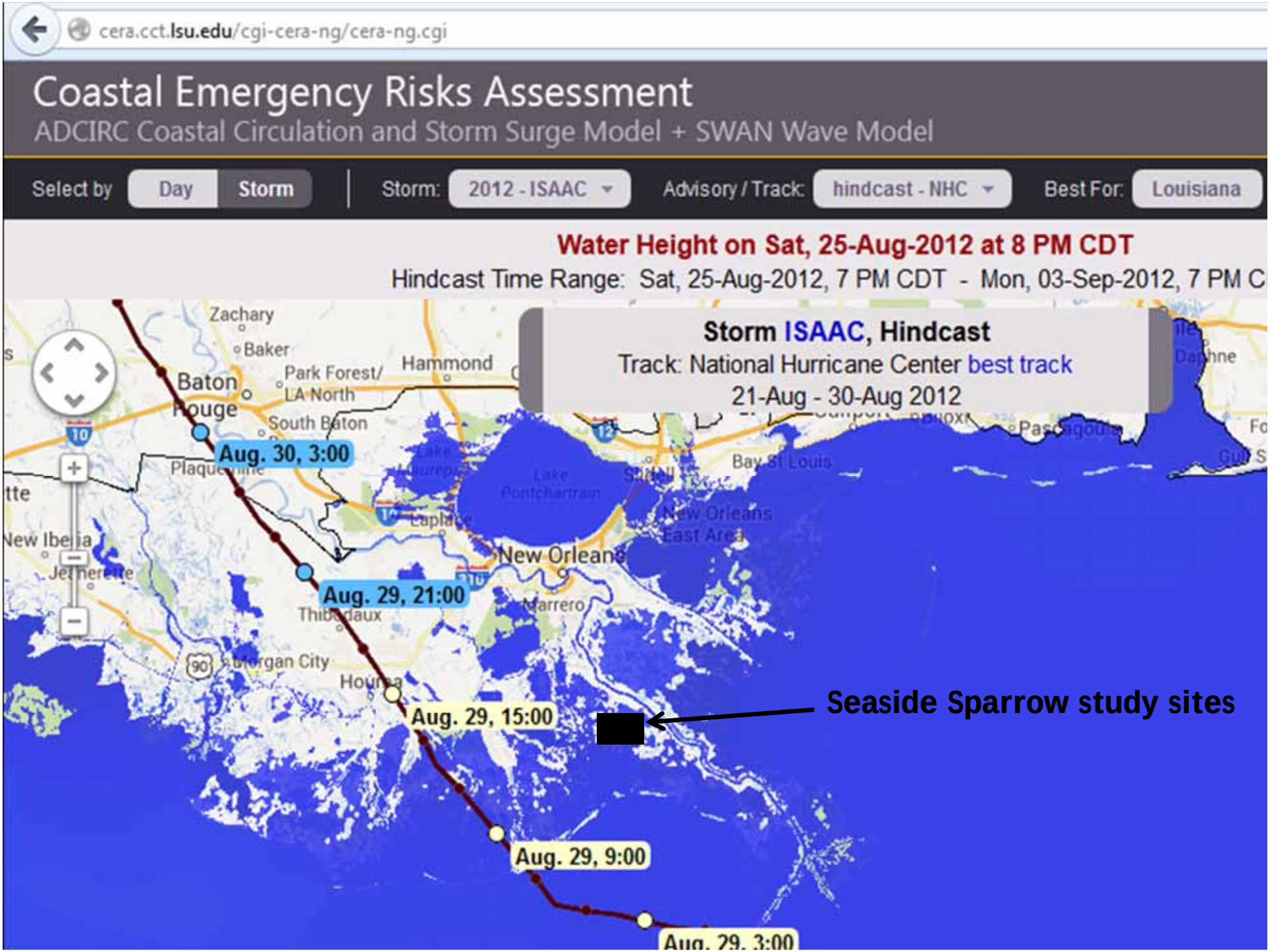
The Mississippi delta over the past 4600 years

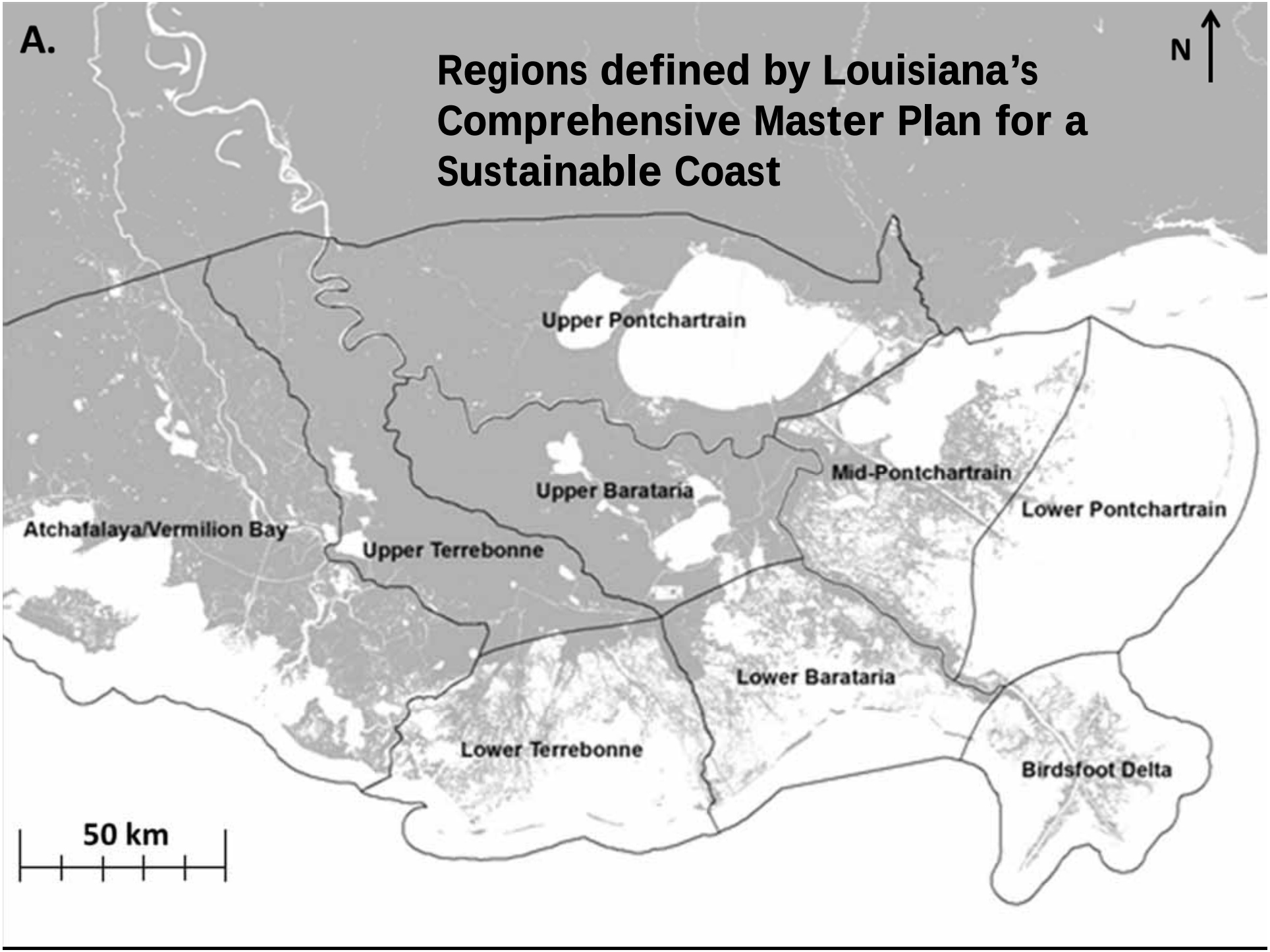


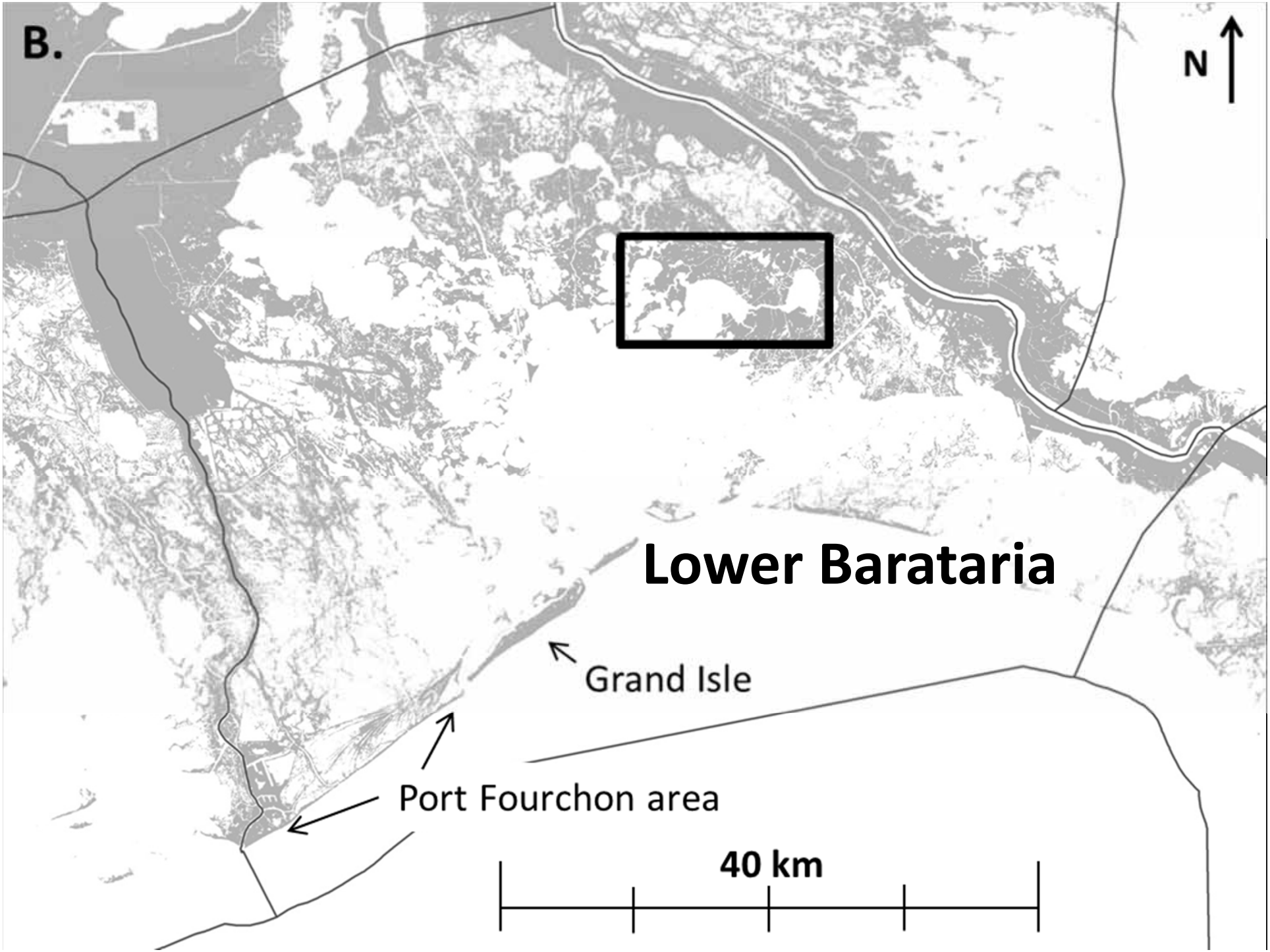
http://pubs.usgs.gov/of/2002/of02-206/env-overview/geomorphology-fig6.html
from Frazier 1967

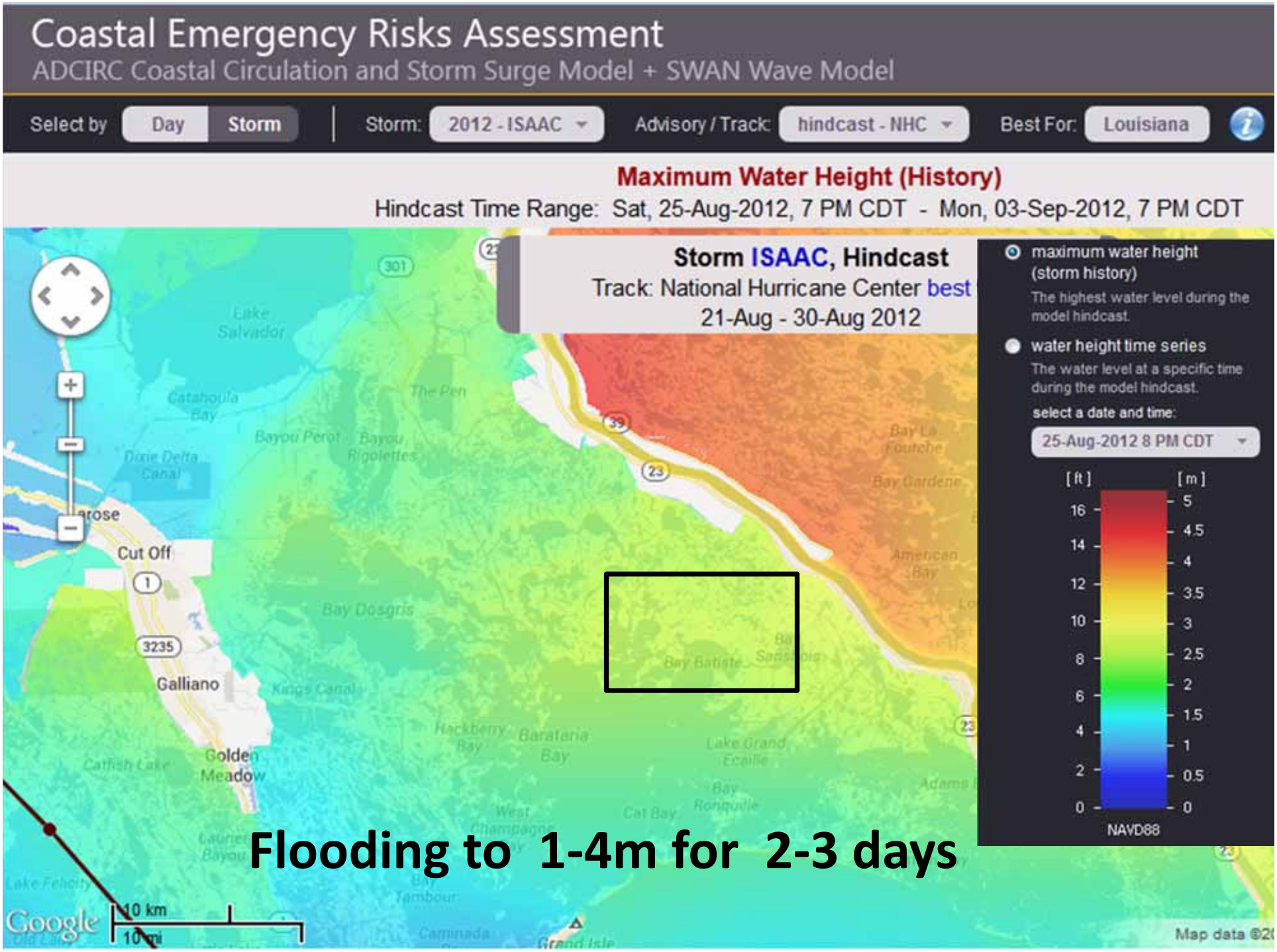
Hurricane Isaac
28-30 August 2013

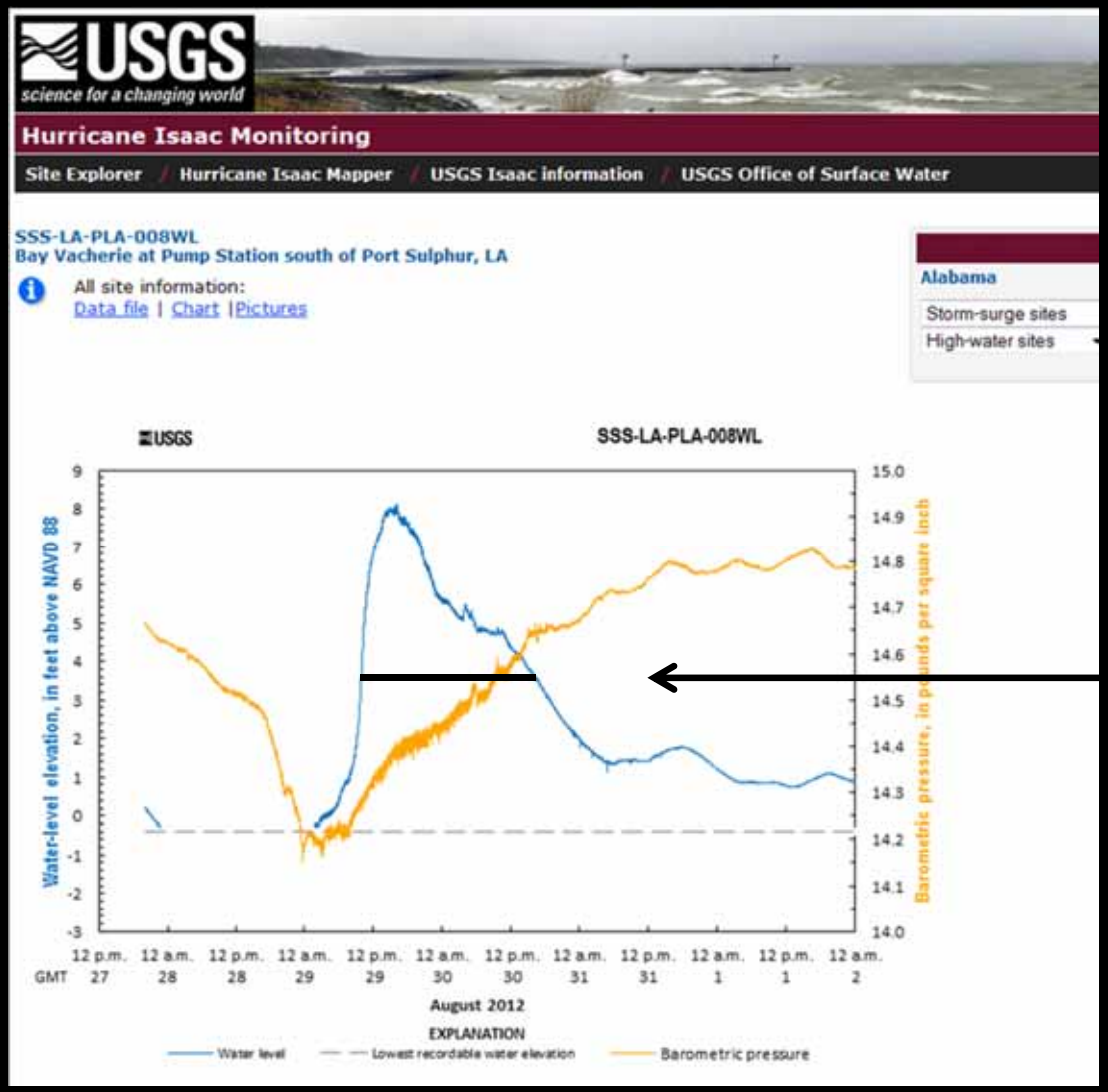
NWS image prepared by the University of Wisconsin Cooperative Institute for Meteorological Satellite Studies


cera.cct.lsu.edu/cgi-cera-ng/cera-ng.cgi
Coastal Emergency Risks Assessment
ADCIRC Coastal Circulation and Storm Surge Model + SWAN Wave Model
Select by
Day
Storm
Storm:
2012 - ISAAC
Advisory / Track:
hindcast - NHC
Best For:
Louisiana
Water Height on Sat, 25-Aug-2012 at 8 PM CDT
Hindcast Time Range: Sat, 25-Aug-2012, 7 PM CDT - Mon, 03-Sep-2012, 7 PM C
Storm ISAAC, Hindcast
Track: National Hurricane Center best track
21-Aug - 30-Aug 2012
Zachary
Baker
Baton Rouge
Park Forest/ LA North
Hammond
South Baton
Aug. 30, 3:00
Lake Pontchartrain
Bay St Louis
New Orleans East Area
New Orleans
Aug. 29, 21:00
Thibodaux
Morgan City
Houma
Aug. 29, 15:00
Seaside Sparrow study sites
Aug. 29, 9:00
Aug. 29, 3:00


A.
Regions defined by Louisiana's Comprehensive Master Plan for a Sustainable Coast
N
Upper Pontchartrain
Upper Barataria
Mid-Pontchartrain
Lower Pontchartrain
Atchafalaya/Vermilion Bay
Upper Terrebonne
Lower Barataria
Lower Terrebonne
Birdsfoot Delta
50 km


B.
N
Lower Barataria
Grand Isle
Port Fourchon area
40 km

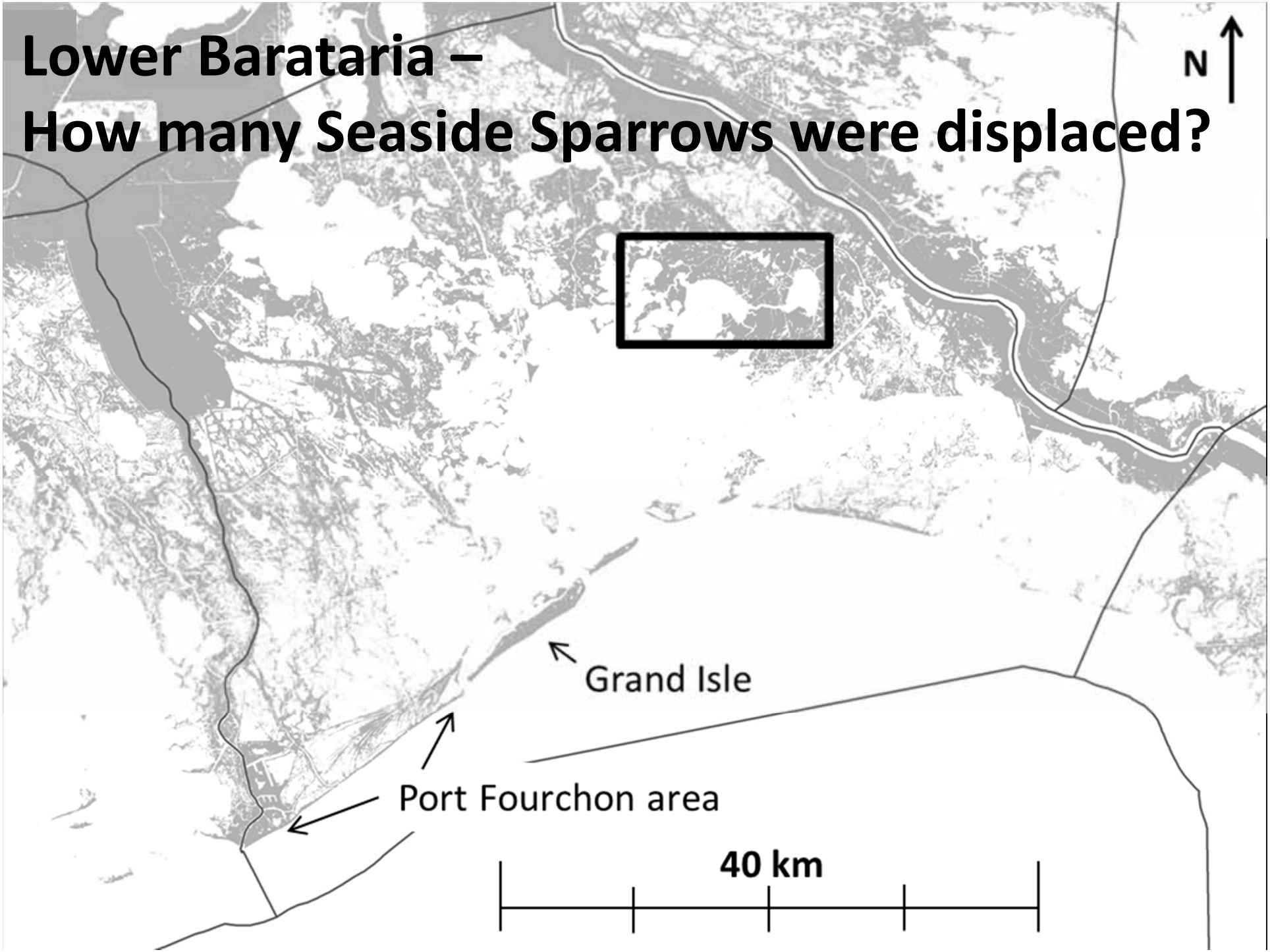

Coastal Emergency Risks Assessment
ADCIRC Coastal Circulation and Storm Surge Model + SWAN Wave Model
Select by
Day
Storm
Storm:
2012 - ISAAC
Advisory / Track:
hindcast - NHC
Best For:
Louisiana
Maximum Water Height (History)
Hindcast Time Range: Sat, 25-Aug-2012, 7 PM CDT - Mon, 03-Sep-2012, 7 PM CDT
Storm ISAAC, Hindcast
Track: National Hurricane Center best
21-Aug - 30-Aug 2012
maximum water height (storm history)
The highest water level during the model hindcast.
water height time series
The water level at a specific time during the model hindcast.
select a date and time:
25-Aug-2012 8 PM CDT
[ft]
[m]
16
14
12
10
8
6
4
2
0
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
NAVD88
Cut Off
Galliano
Golden Meadow
Lake Salvador
Bayou Perot
Bayou Rigolettes
Dixie Delta Canal
Bay Dosgris
Bay Batiste
Bay La Fourche
Bay Gardene
American Bay
Lake Grand Ecaille
Barataria Bay
Hackberry Bay
Kings Canal
Catfish Lake
Lake Felicity
Bay Tambour
Grand Isle
Flooding to 1-4m for 2-3 days
Google
10 km
10 mi
Map data ©2



USGS storm surge monitoring

36 hours > 1 m at this site

Lower Barataria –
How many Seaside Sparrows were displaced?



Lower Barataria Vegetation from Coastal Master Plan

Veg Group ID	Vegetation Name (ID)	2012
Bare Ground	Bare Ground (BGR)	7
Swamp Forest	Swamp Forest (SFR)	1
Fresh Marsh	Cattail (CTT)	2
Fresh Marsh	Cutgrass (CTG)	2
Fresh Marsh	Delta Splay (DSP)	3
Fresh Marsh	Maidencane (MDN)	10
Fresh Marsh	Sawgrass (SWG)	0
Fresh Marsh	Thinmat (TMT)	27
Fresh Marsh	Waxmyrtle (WXM)	1
Intermediate Marsh	Bulltongue (BTN)	6
Intermediate Marsh	Bullwhip (BWP)	0
Intermediate Marsh	Roseaucane (RSC)	72
Intermediate Marsh	Scrub-shrub (SHS)	1
Brackish Marsh	Brackish Mixture (BMH)	44
Brackish Marsh	Paspalum (PSP)	0
Brackish Marsh	Wiregrass (WIG)	247
Saline Marsh	Mangrove (MNG)	3
Saline Marsh	Needlebrush (NDG)	1
Saline Marsh	Oystergrass (OYG)	307
Saline Marsh	Saltgrass (SLG)	0
Open Water	Open Water (WTR)	2,414
Open Water	Submerged Aquatic Vegetation (SAV)	0
Not Modeled	Not Modeled (NOT)	15

Units: Square Kilometer

Seaside Sparrow habitat

Visser, J. M., S. M. Duke-Sylvester, W. P. Broussard, III, and J. Carter. 2012. Appendix D-4 Vegetation model technical report. In: Coastal Protection and Restoration Authority, Louisiana's Comprehensive Master Plan for a Sustainable Coast.

How many birds in this area of marsh?

Point count estimates from June 2012:

low: 7.3 birds/ha (mean – sd)
medium: 9.7 birds/ha (mean)
high: 12.0 birds/ha (mean + sd)

N= 6 plots

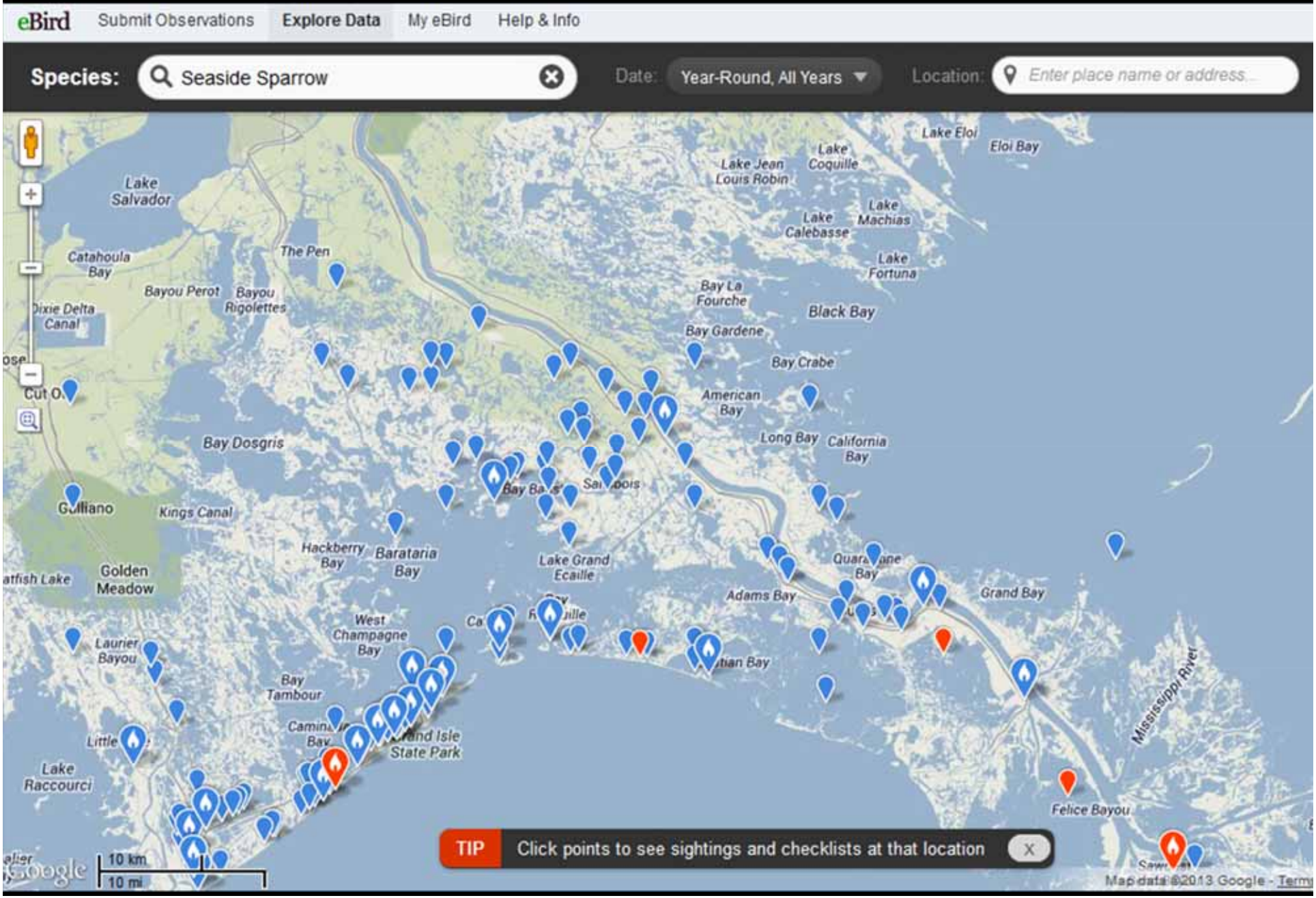
Lots of birds in Lower Barataria:

low:	550,000
medium:	735,000
high:	915,000

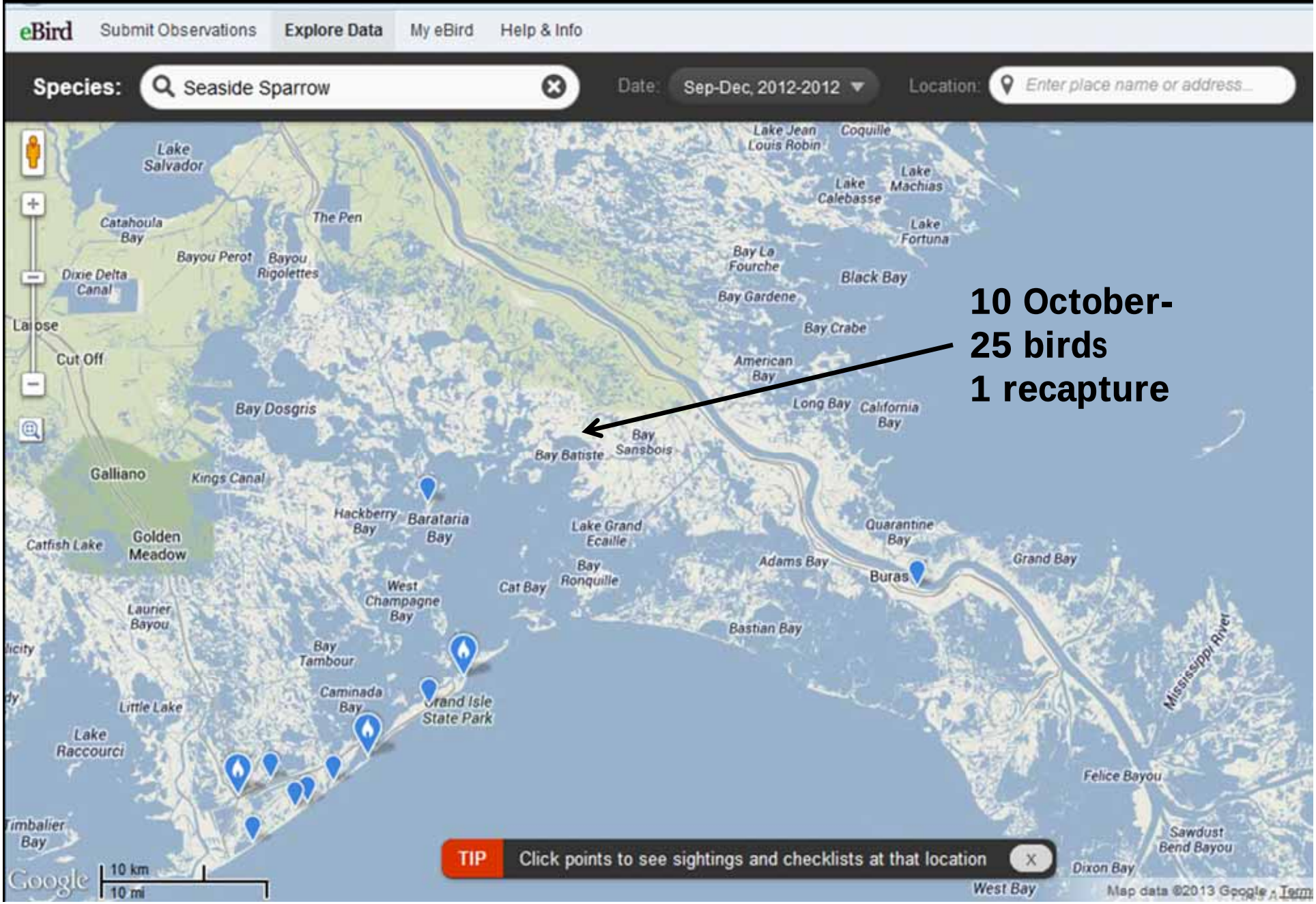
What happened to them when the marsh flooded?

Where did they go?

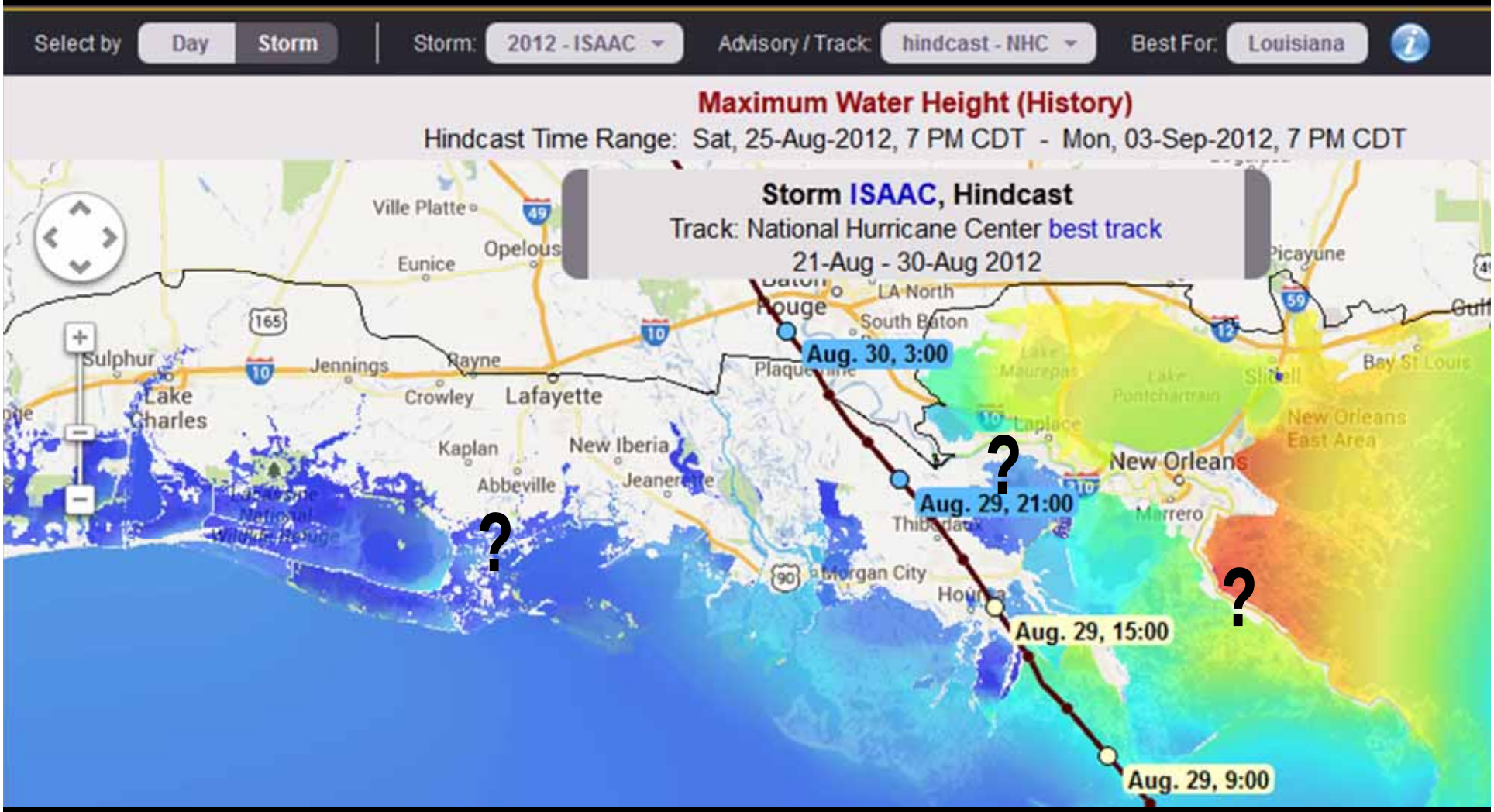
Location data during and after the storm available from eBird



Observations September – December 2012: Birds are back

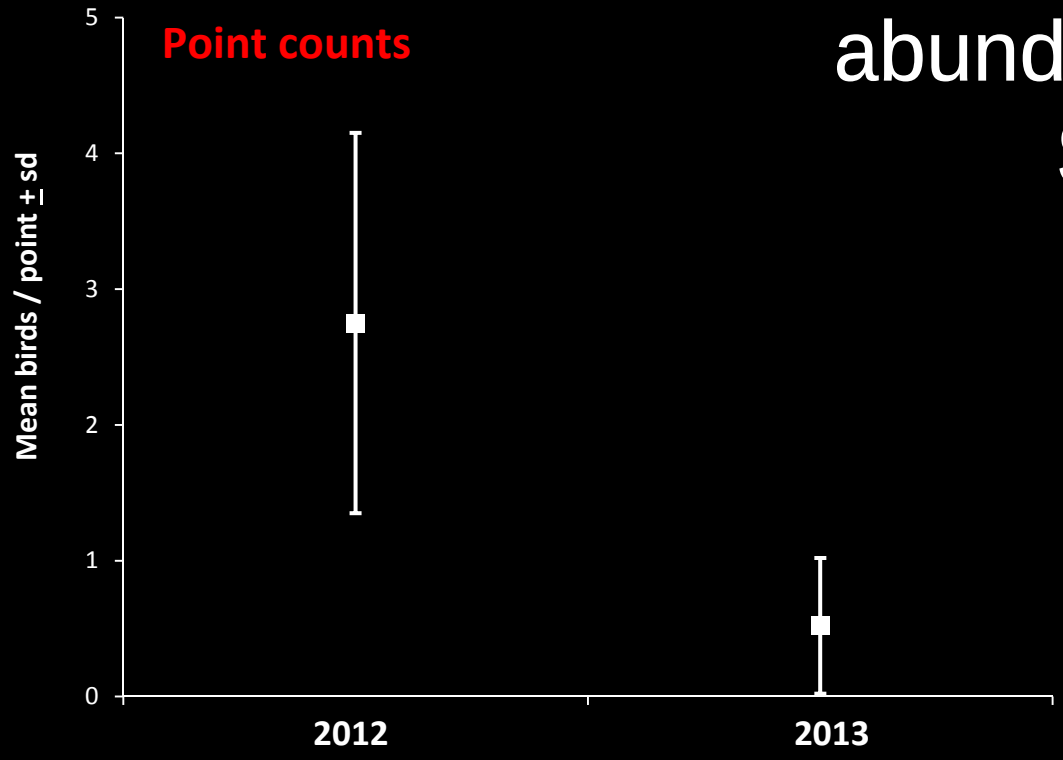


Where did they go? Not many good options

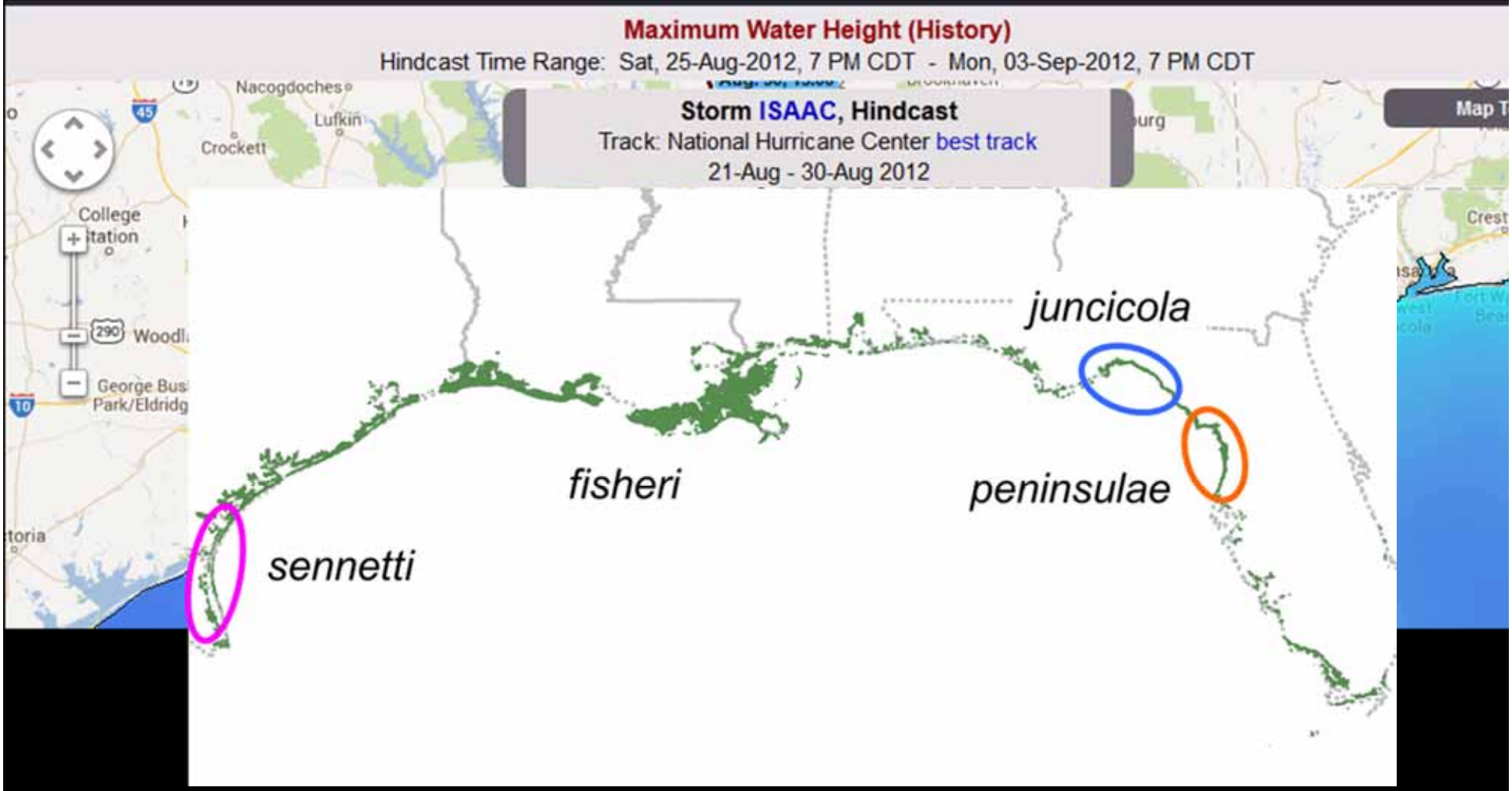


Abundance changes between 2012 and 2013- Data from sweep samples and point counts

Dramatic reduction in abundance of breeding Seaside Sparrows following Isaac



Seaside Sparrow populations took a tremendous hit




Many birds returned,
sometimes to the exact same spot


They can find suitable habitat
following disturbance

Hurricanes are old news to Seaside Sparrows

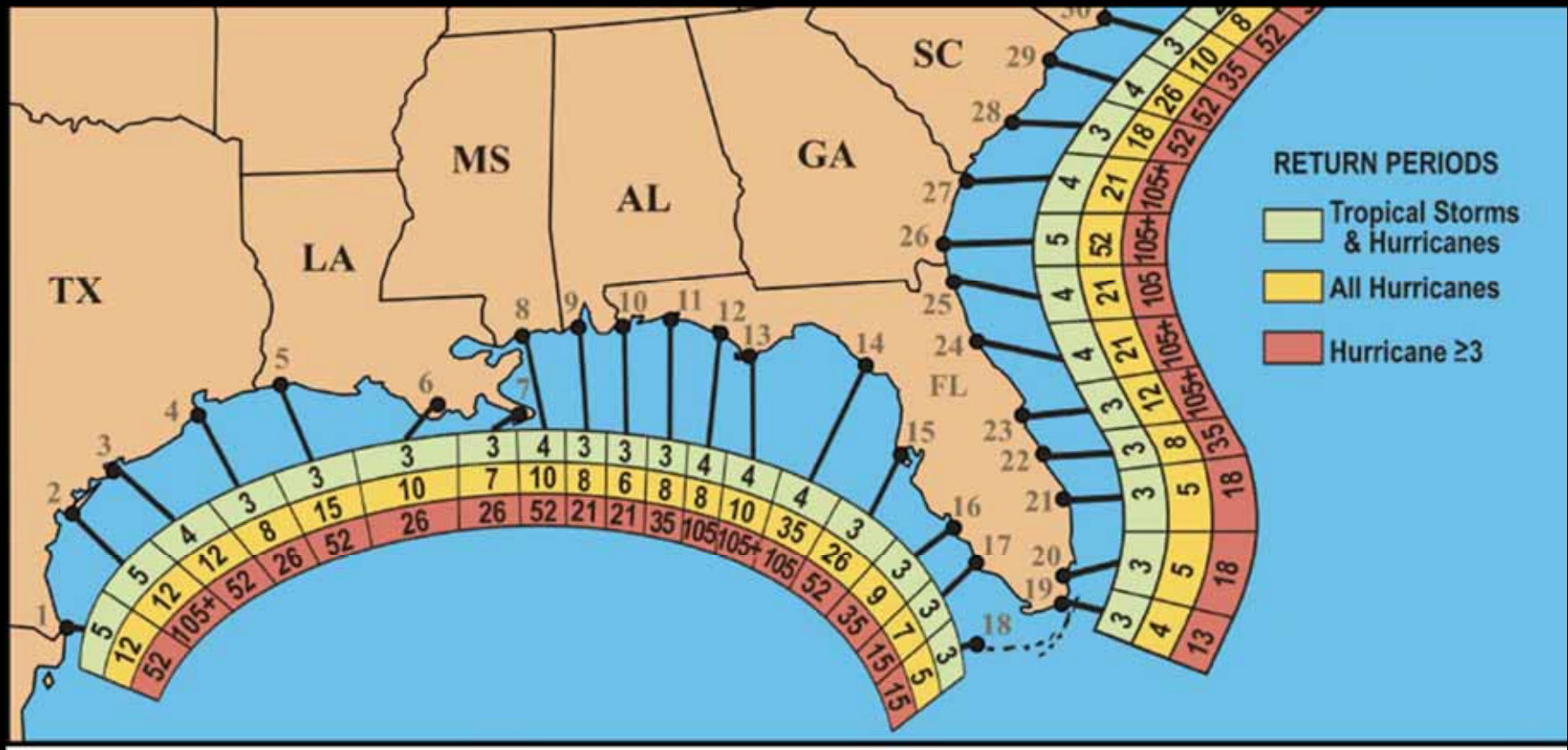
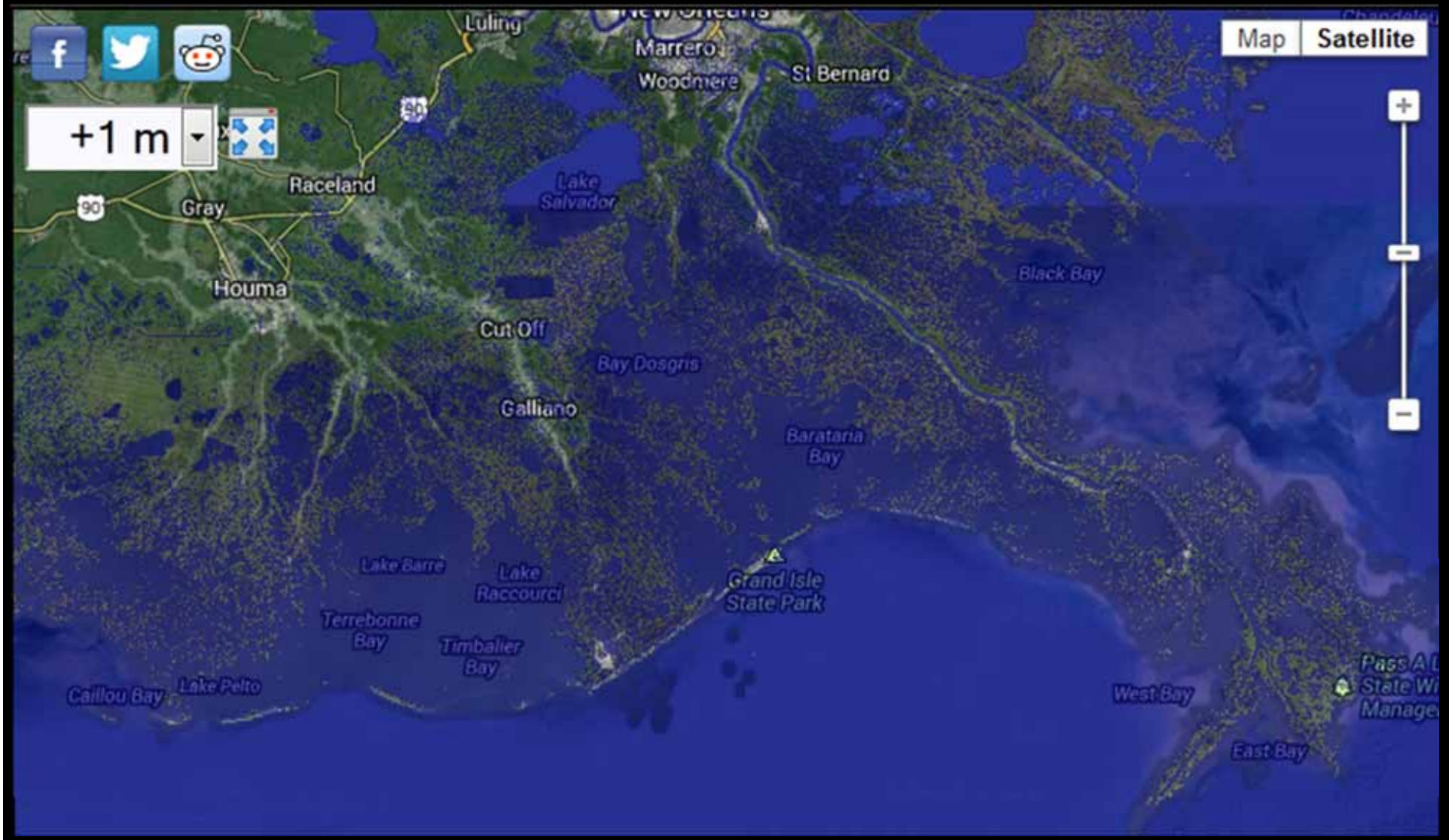


FIG. 5. Average return periods for tropical storms, hurricanes, and severe hurricanes (category 3–5).

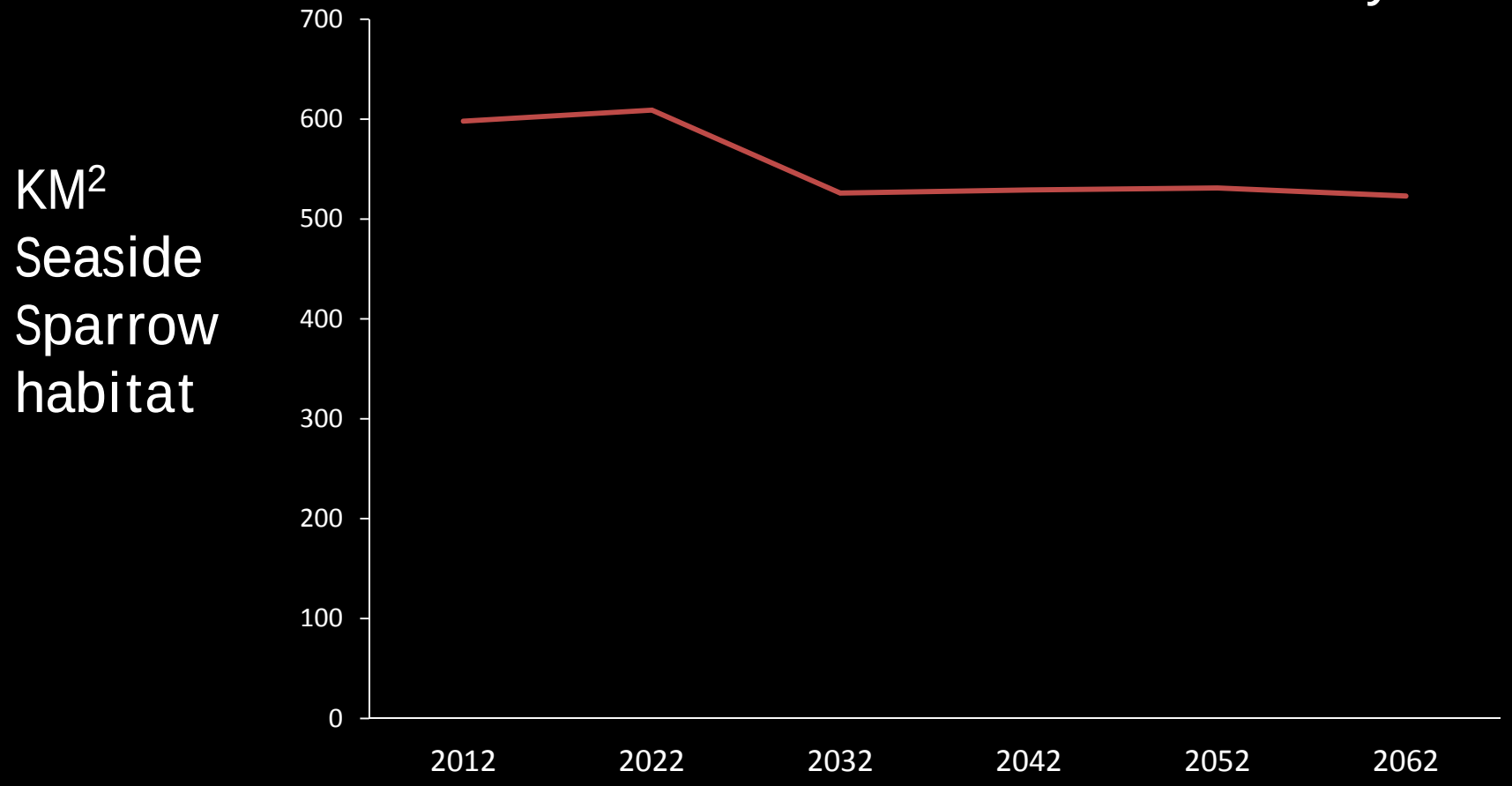
Keim, B. D., R. A. Muller, and G. W. Stone. 2007. Spatiotemporal patterns and return periods of tropical storm and hurricane strikes from Texas to Maine. Journal of Climate 20:3498-3509.

But… Salt marsh will replace other vegetation at the coastal interface



http://Geology.com/sea-level-rise

Seaside Sparrow habitat in Lower Barataria for 50 years



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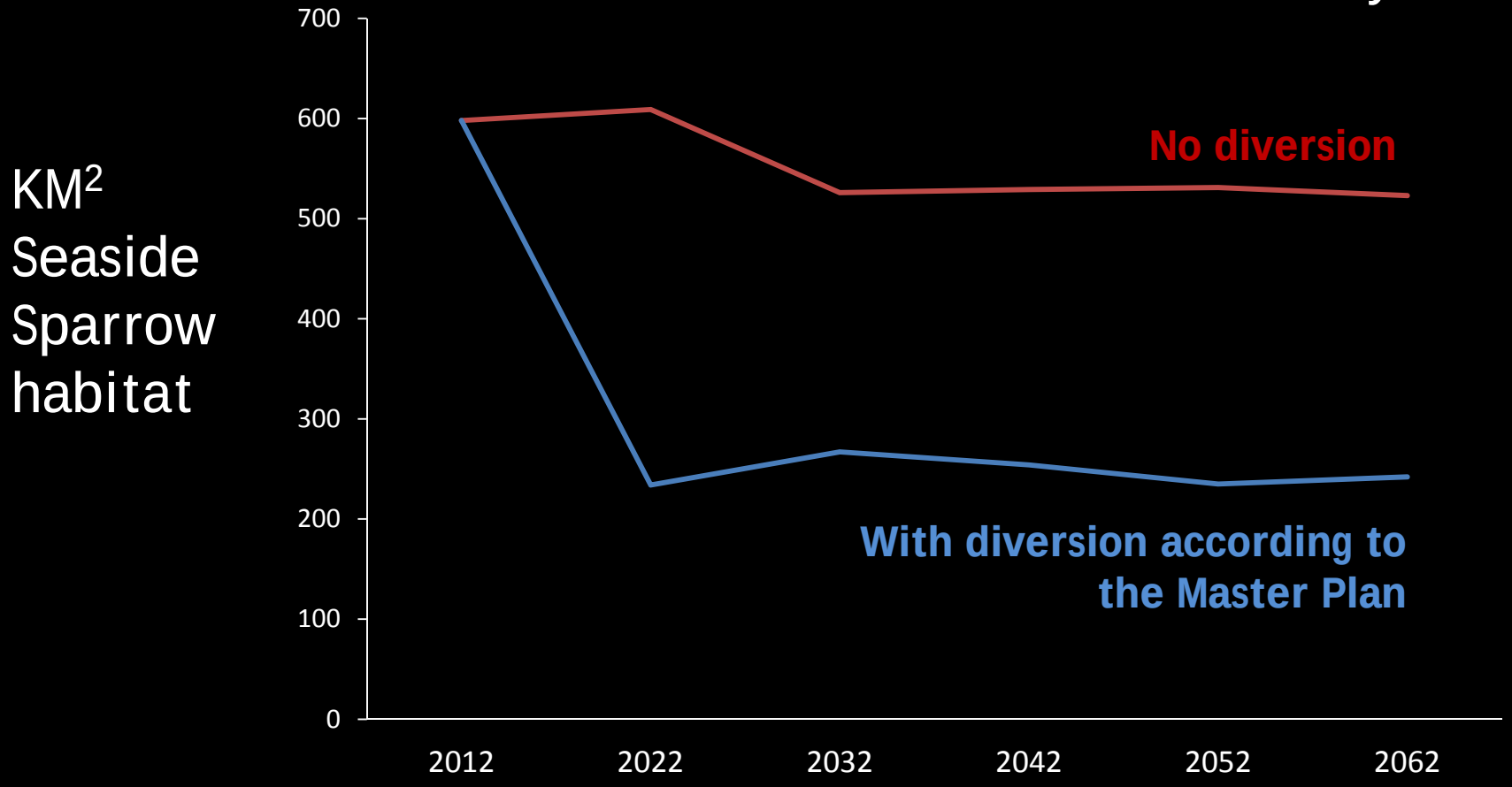
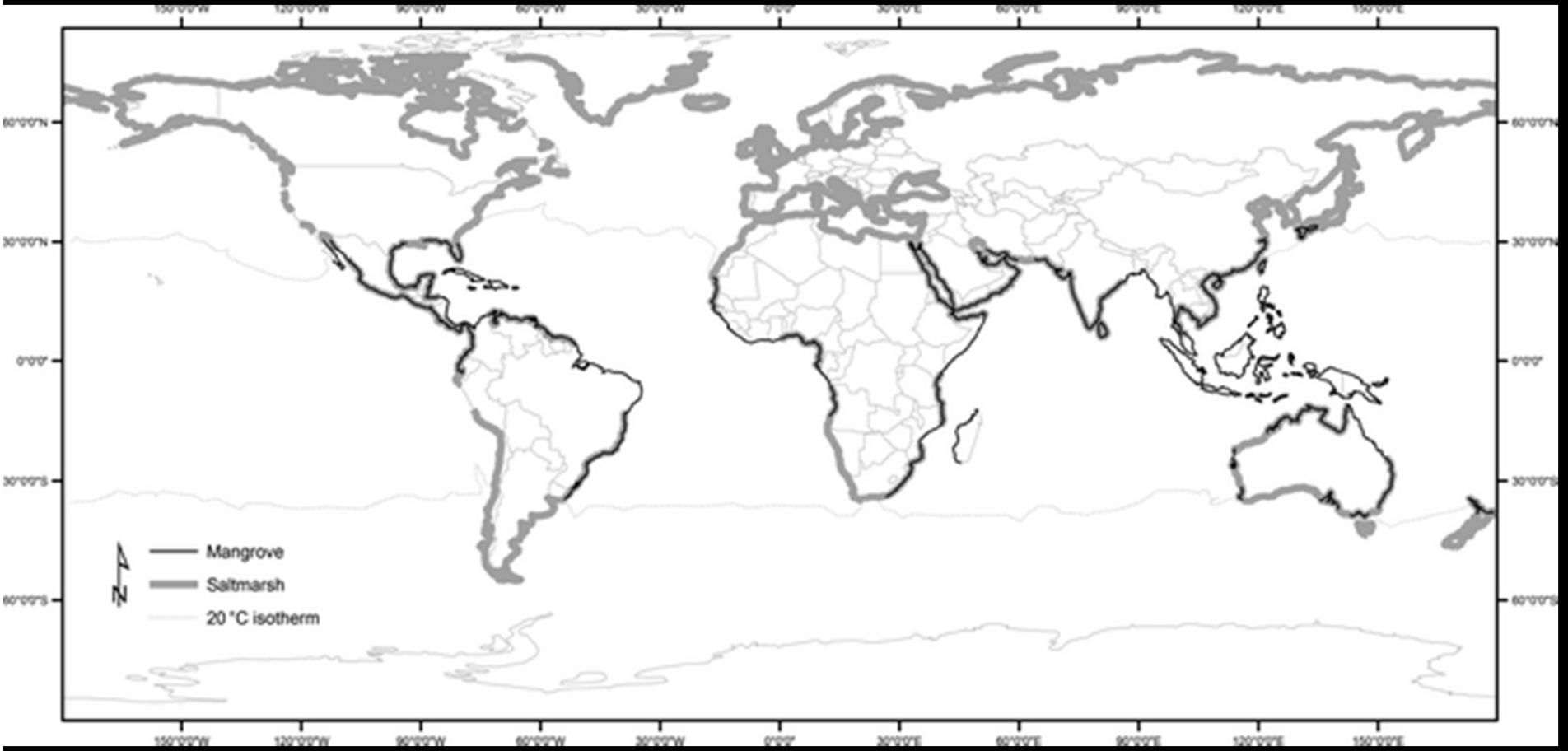


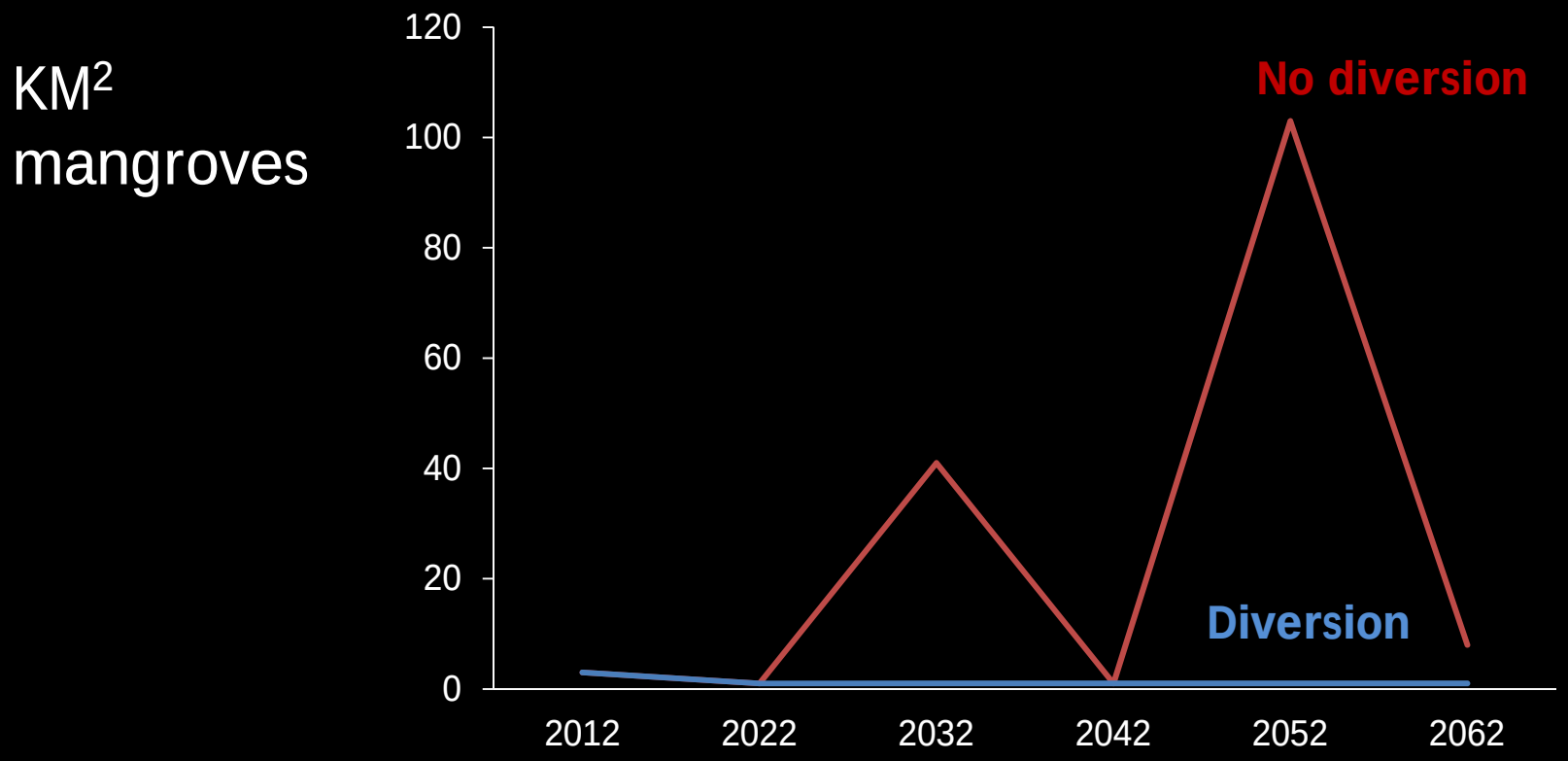
Mangroves replace salt marsh in warmer water

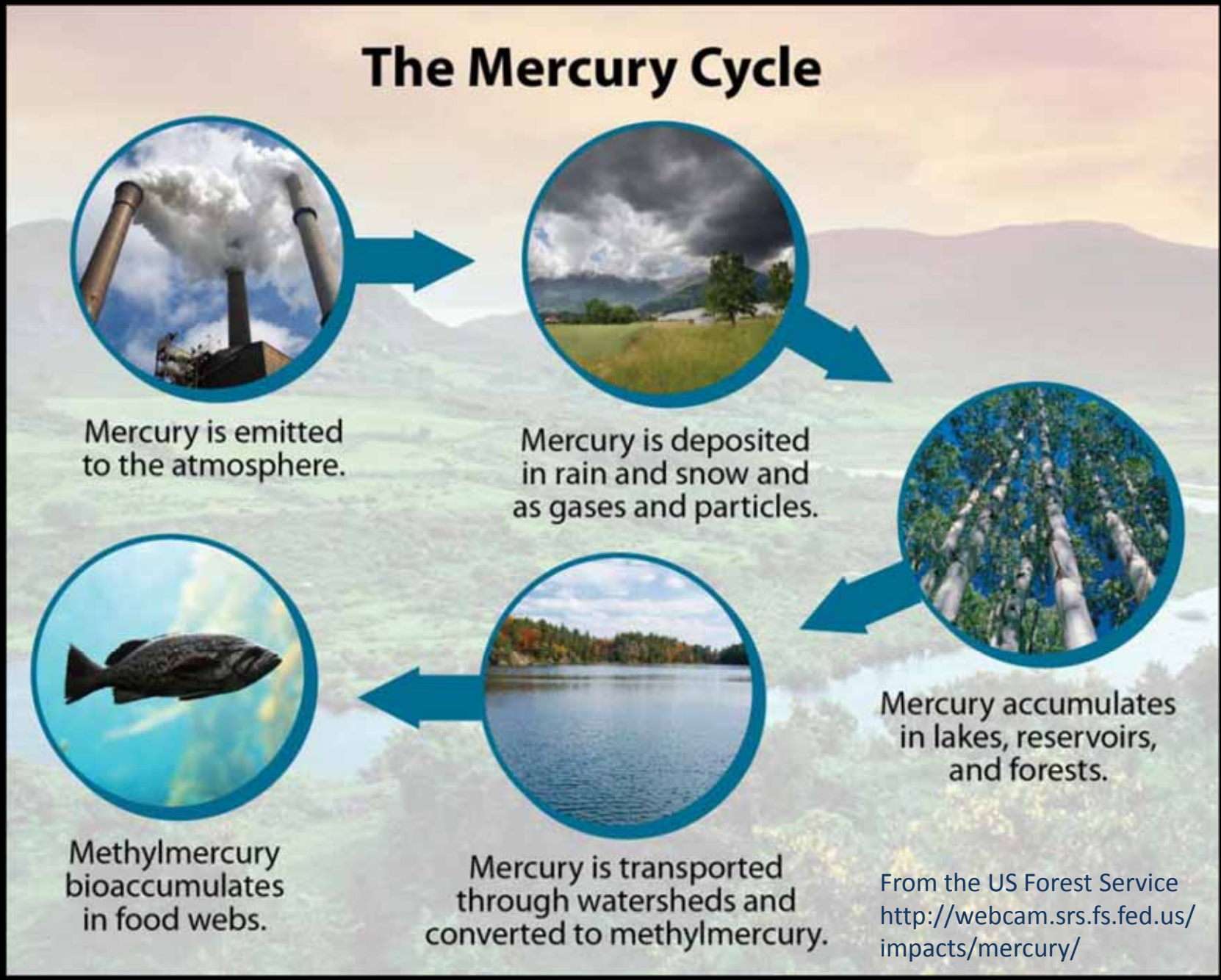
Mangrove expansion and salt marsh decline at mangrove poleward limits

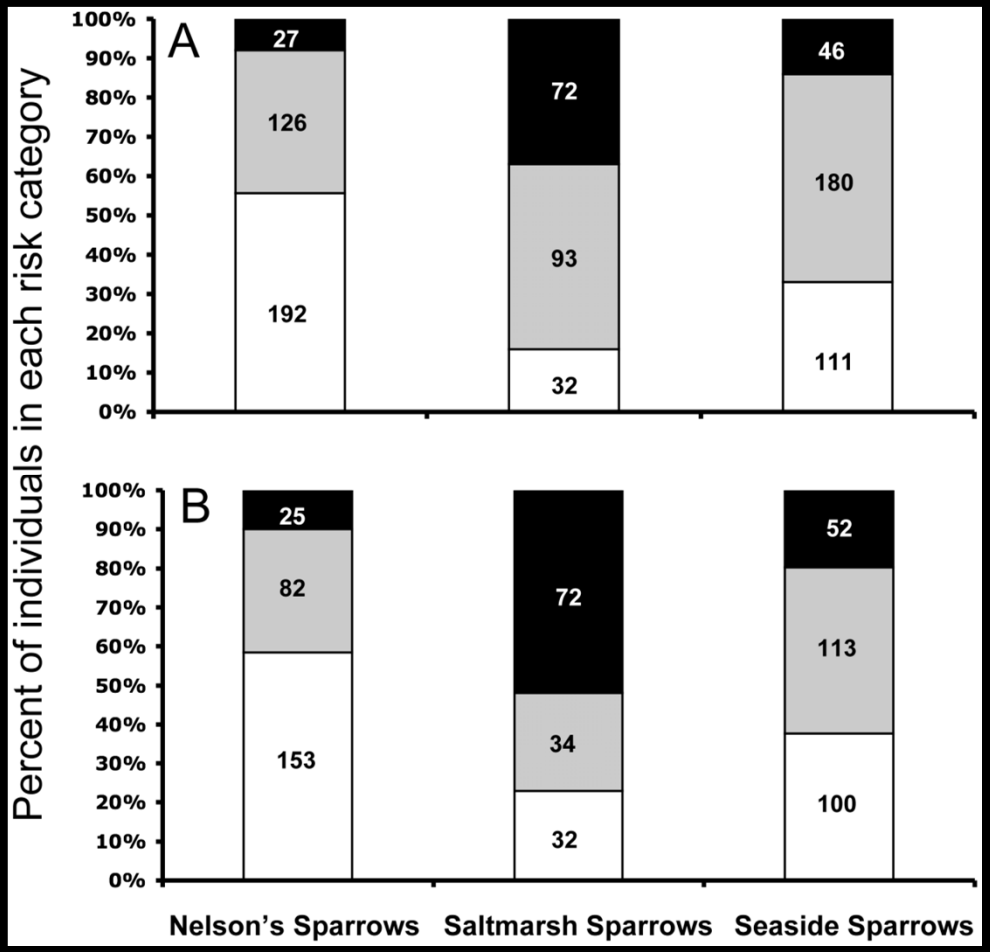


Saintilan, N., N. C. Wilson, K. Rogers, A. Rajkaran, and K. W. Krauss (2014). Mangrove expansion and salt marsh decline at mangrove poleward limits. Global Change Biology 20:147-157.

Mangroves in Lower Barataria for 50 years




The Mercury Cycle
Mercury is emitted to the atmosphere.
Mercury is deposited in rain and snow and as gases and particles.
Mercury accumulates in lakes, reservoirs, and forests.
Mercury is transported through watersheds and converted to methylmercury.
Methylmercury bioaccumulates in food webs.
From the US Forest Service
http://webcam.srs.fs.fed.us/impacts/mercury/



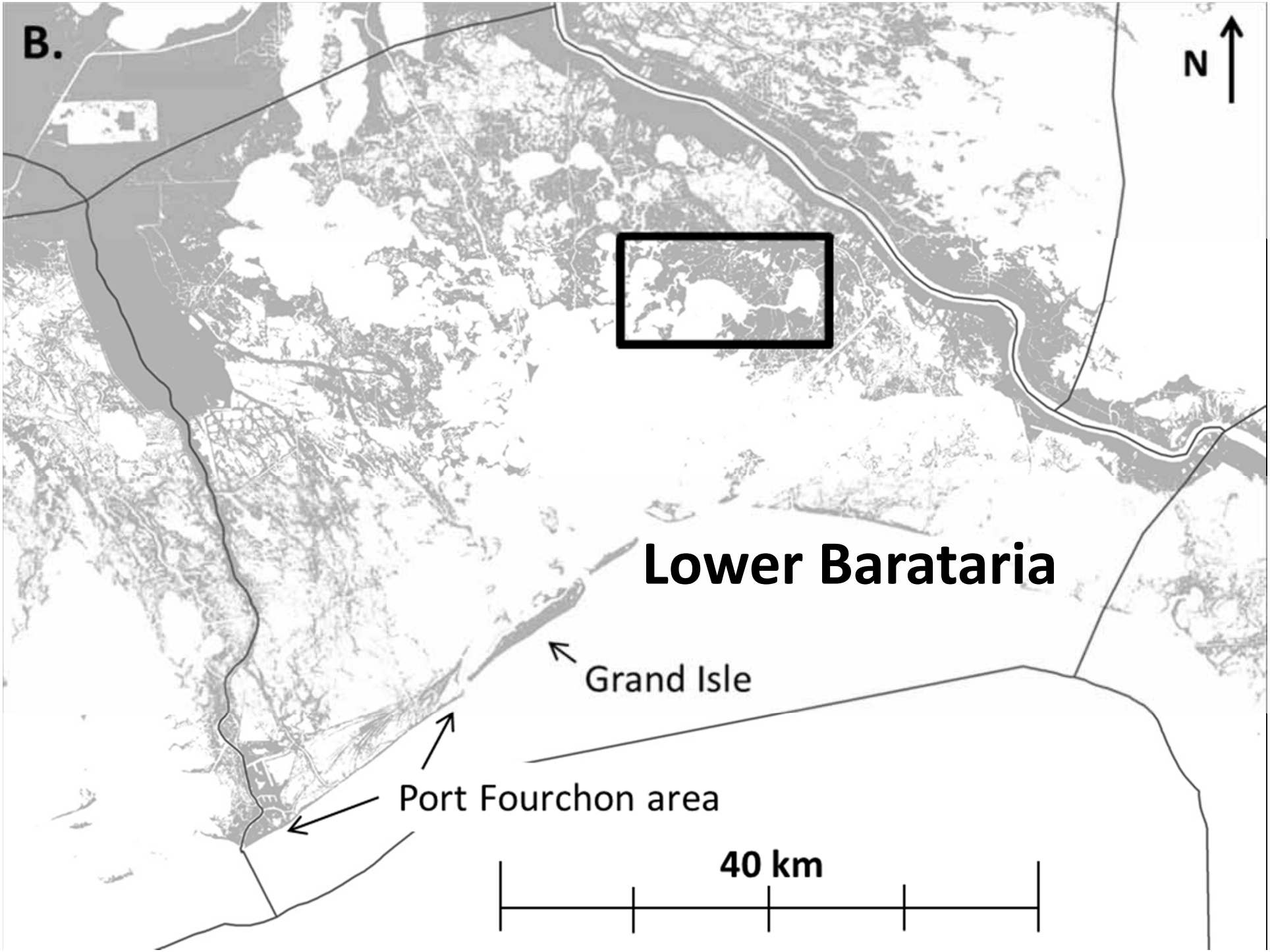
>60% reduction

10-60% reduction

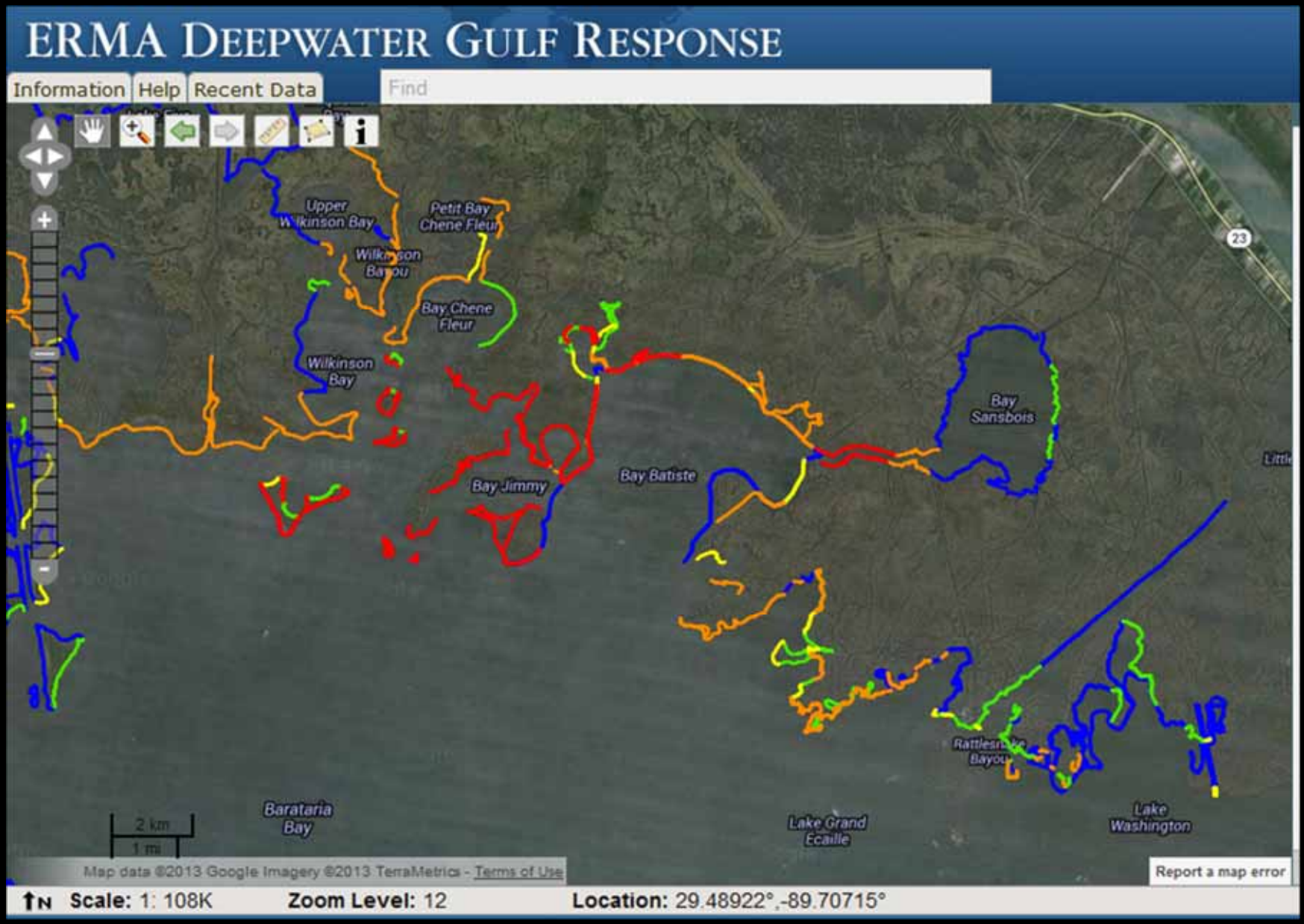
A word about mercury from North Carolina- Potential costs to salt marsh sparrows

Winder, V. L. (2012). Characterization of Mercury and Its Risk in Nelson's, Saltmarsh, and Seaside Sparrows. Plos One 7:10.1371/journal.pone.0044446.

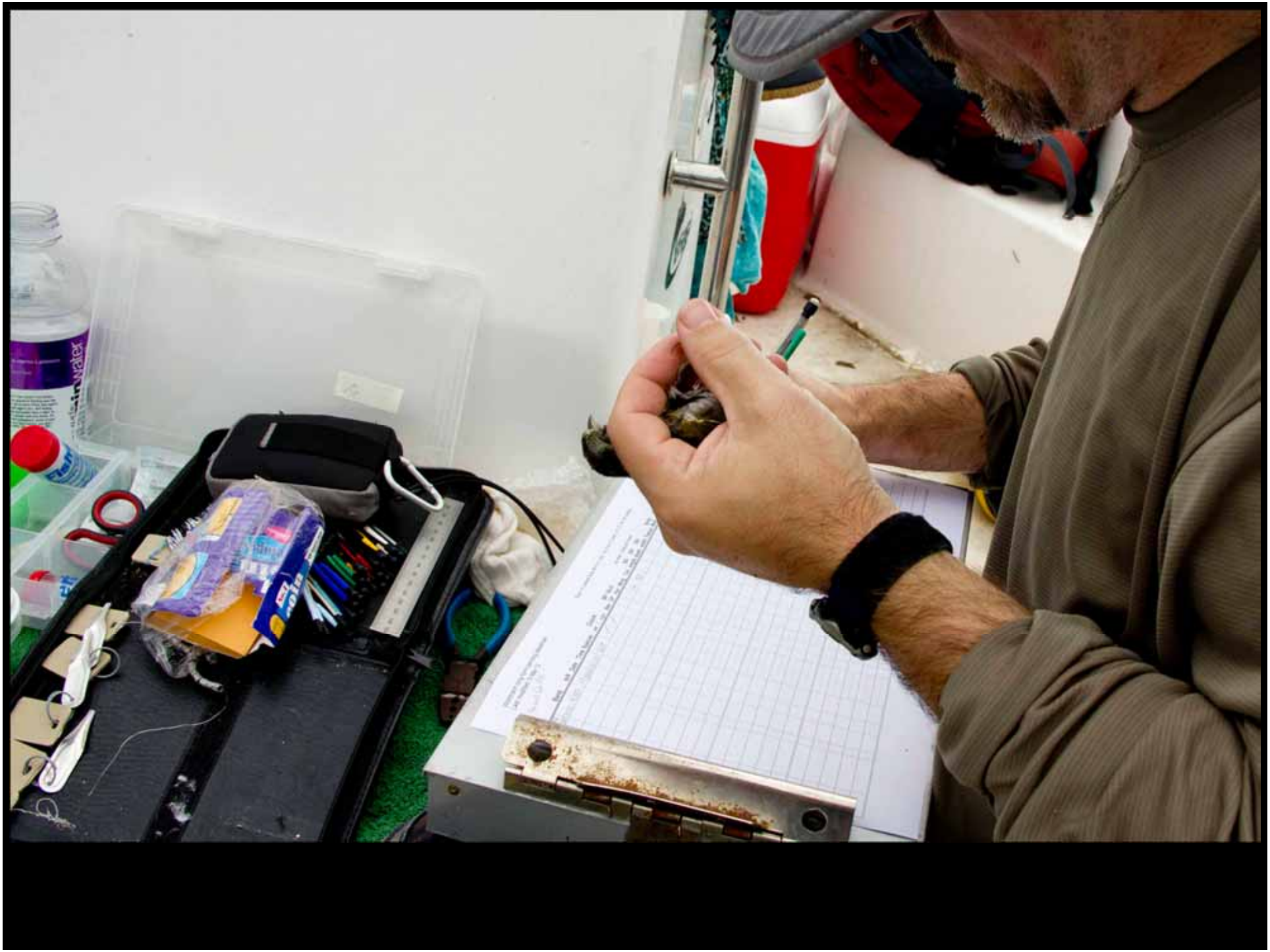

Disasters pay the bills
Wikipedia

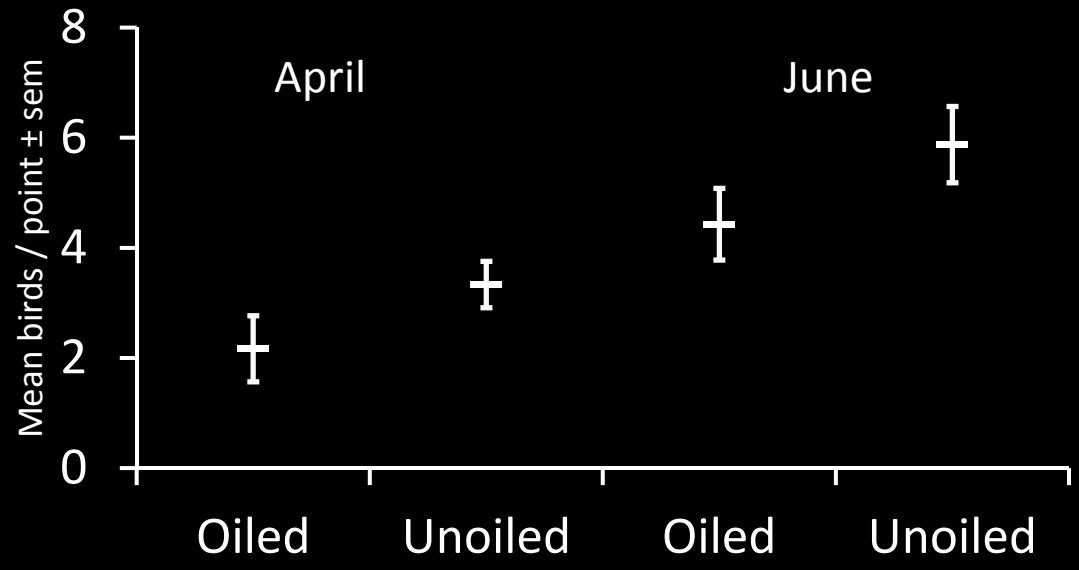

B.
N
Lower Barataria
Grand Isle
Port Fourchon area
40 km

Contamination in Lower Barataria

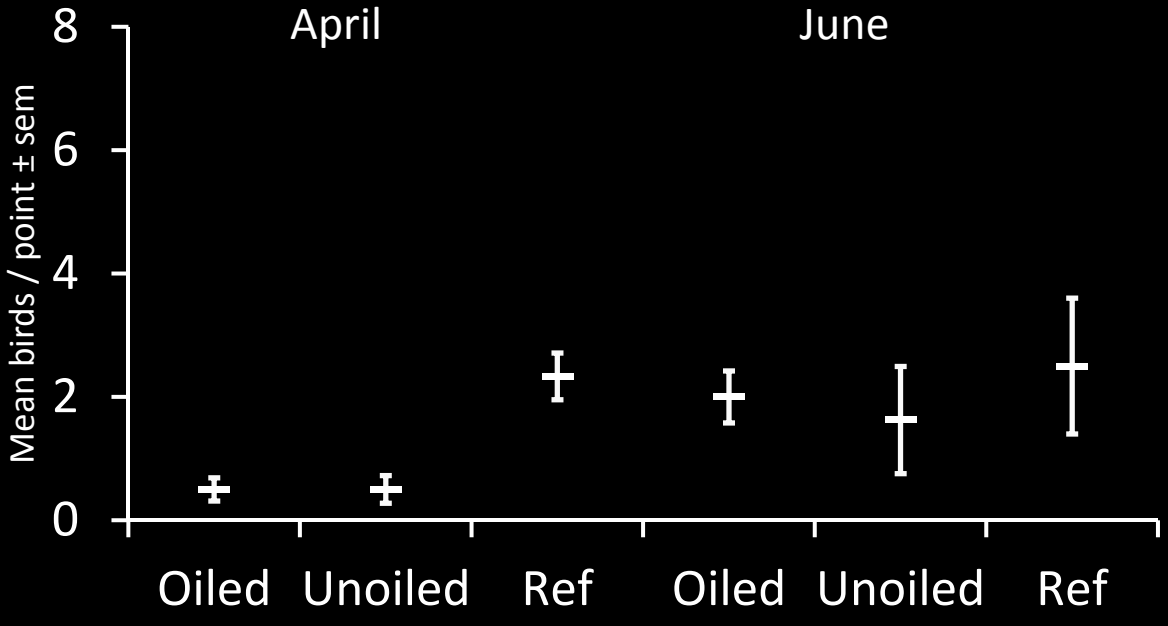


Oil reached the marsh

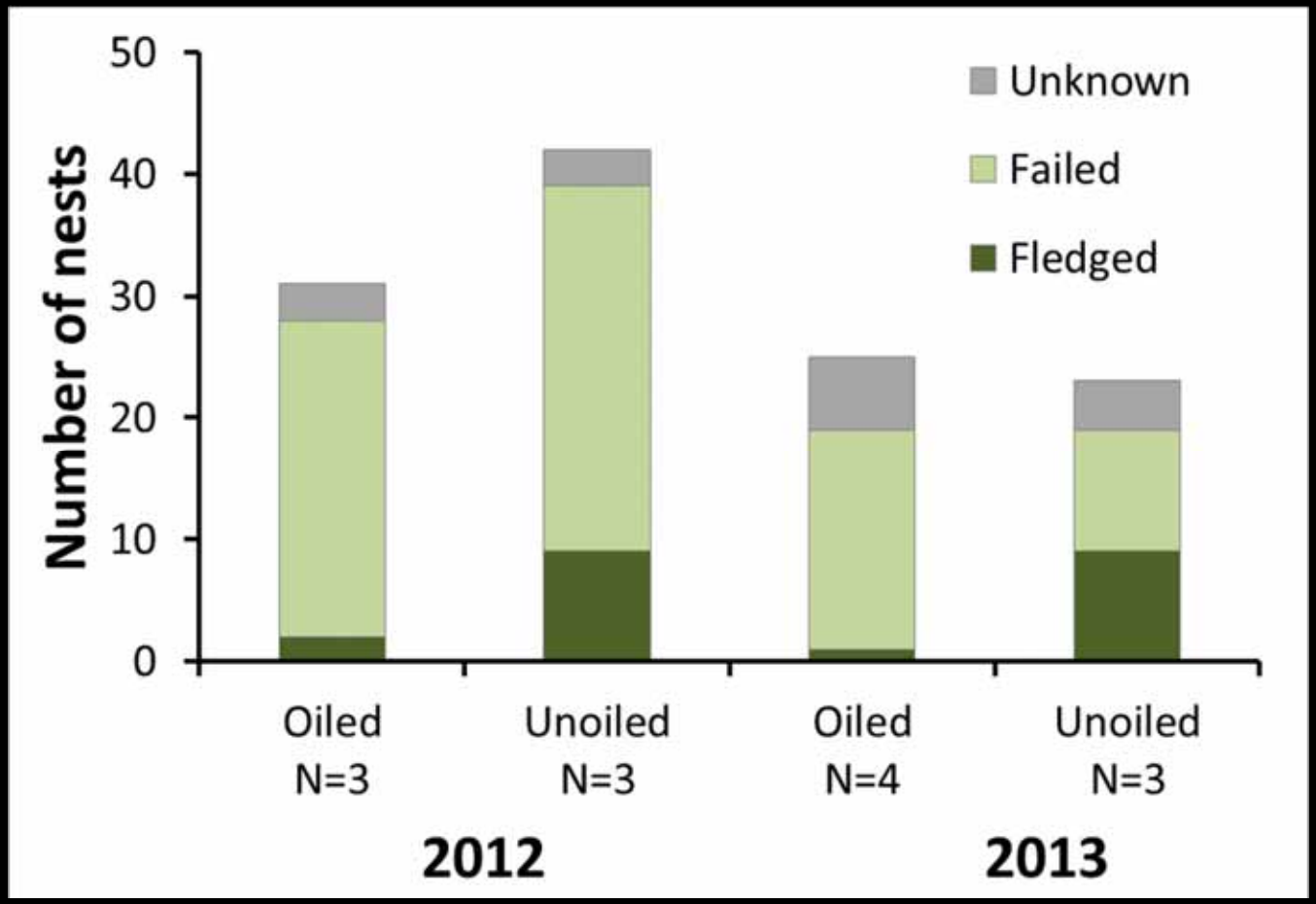




2012 data suggest an effect of oiling on abundance



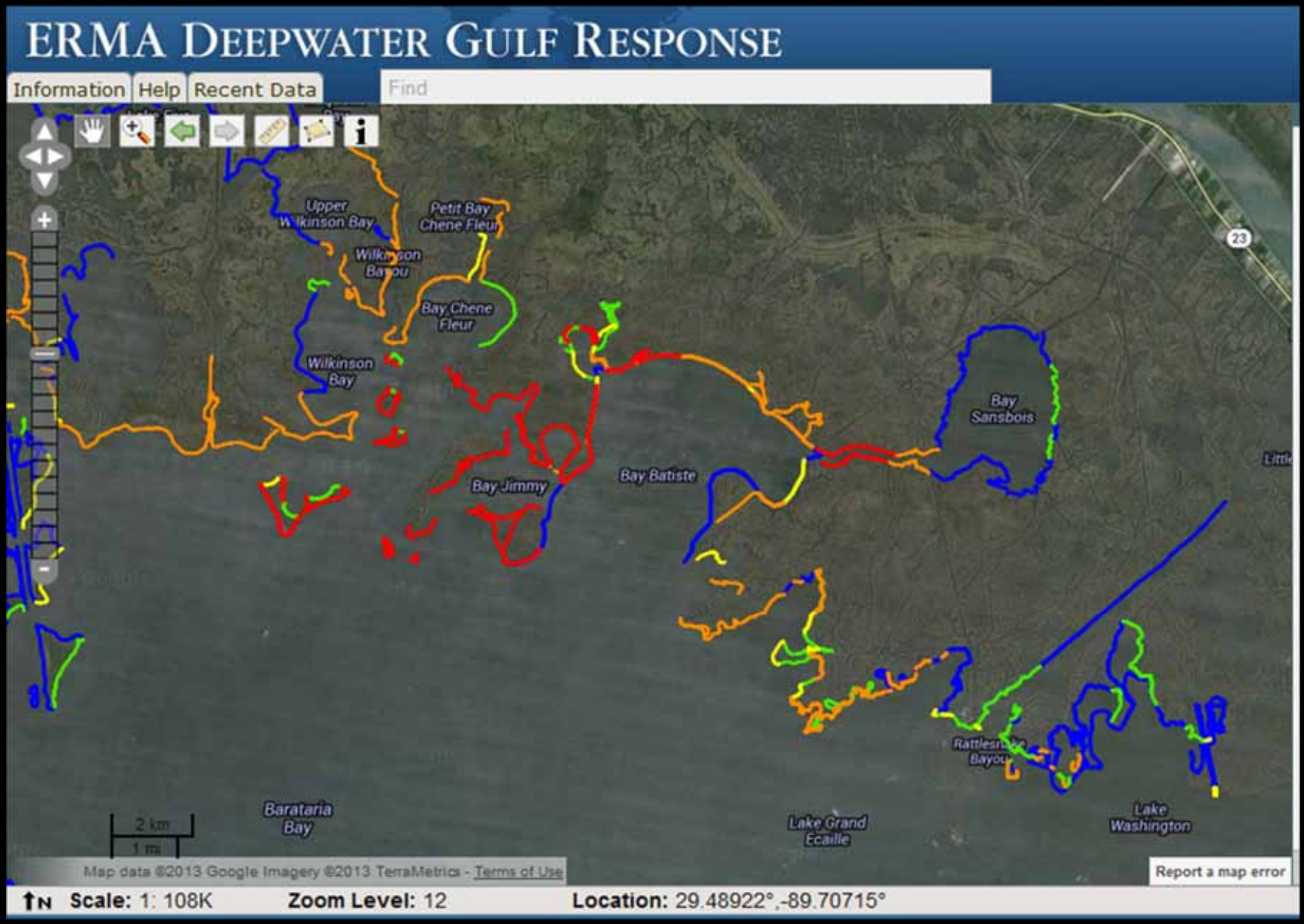
2013 data also suggest an effect of Isaac



Nest success data-

Maybe total productivity was not affected by Isaac?

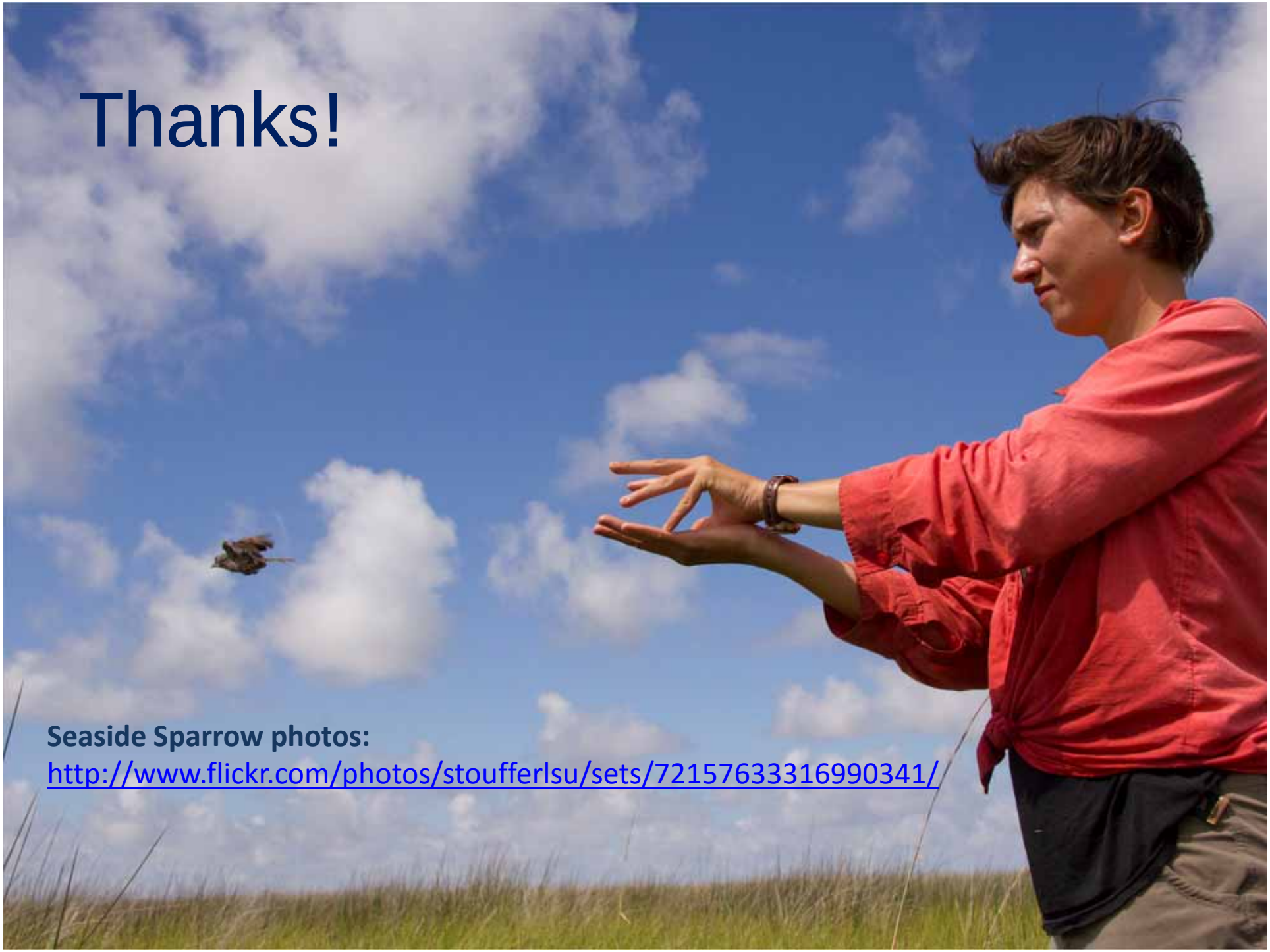
Risk of repeated exposure to oil?



If Seaside Sparrows were rodents, they would be Marsh Rice Rats


These birds are made for life on the edge
Good thing, because the edge is getting thinner

Thanks!



Seaside Sparrow photos:
http://www.flickr.com/photos/stoufferlsu/sets/72157633316990341/