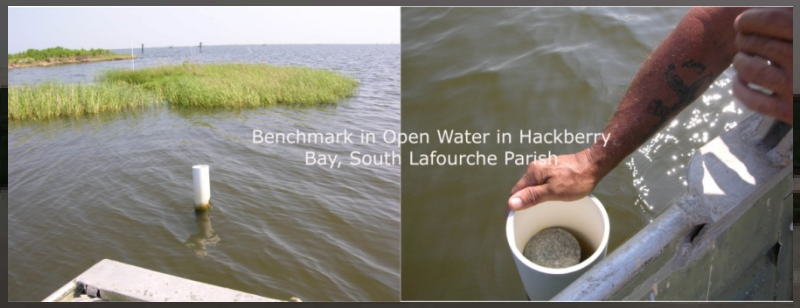
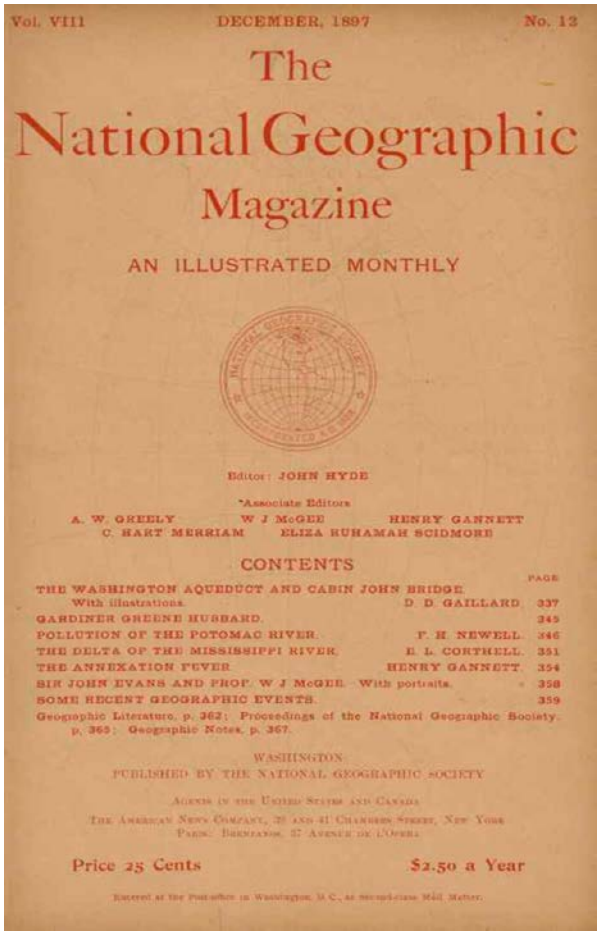
Considerations and Effects of Changing Elevations and Sea Level Rise on the Northern Gulf- Coastal Louisiana

Tim Osborn – NOAA Office of Coast Survey





Vol. VIII DECEMBER, 1897 No. 12

The National Geographic Magazine

AN ILLUSTRATED MONTHLY

Editor: JOHN HYDE

Associate Editors

A. W. GREELY W J McGEE HENRY GANNETT
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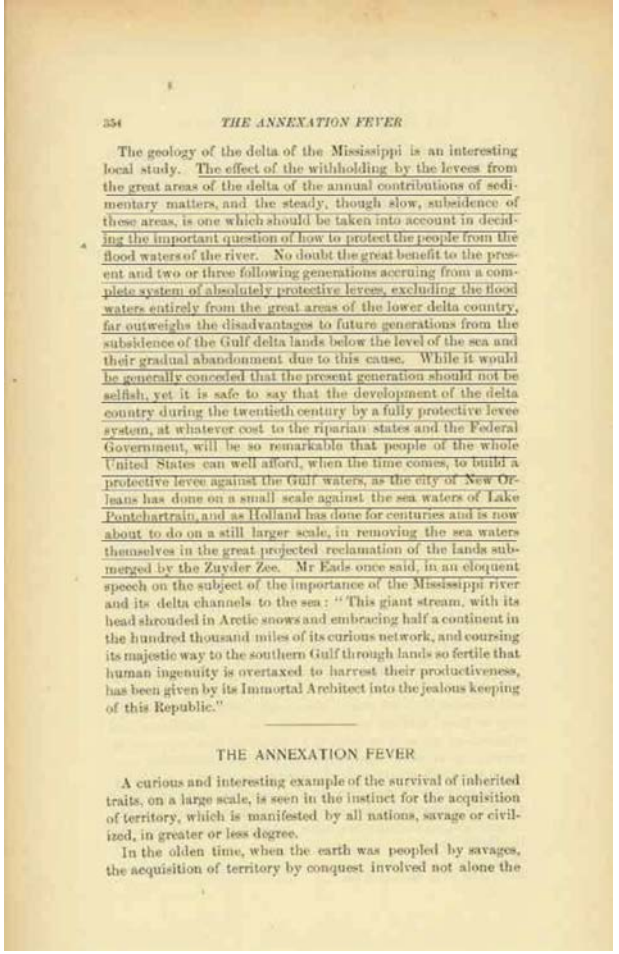


354 THE ANNEXATION FEVER

The geology of the delta of the Mississippi is an interesting local study. The effect of the withholding by the levees from the great areas of the delta of the annual contributions of sedimentary matters, and the steady, though slow, subsidence of these areas, is one which should be taken into account in deciding the important question of how to protect the people from the flood waters of the river. No doubt the great benefit to the present and two or three following generations accruing from a complete system of absolutely protective levees, excluding the flood waters entirely from the great areas of the lower delta country, far outweighs the disadvantages to future generations from the subsidence of the Gulf delta lands below the level of the sea and their gradual abandonment due to this cause. While it would be generally conceded that the present generation should not be selfish, yet it is safe to say that the development of the delta country during the twentieth century by a fully protective levee system, at whatever cost to the riparian states and the Federal Government, will be so remarkable that people of the whole United States can well afford, when the time comes, to build a protective levee against the Gulf waters, as the city of New Orleans has done on a small scale against the sea waters of Lake Pontchartrain, and as Holland has done for centuries and is now about to do on a still larger scale, in removing the sea waters themselves in the great projected reclamation of the lands submerged by the Zuyder Zee. Mr Eads once said, in an eloquent speech on the subject of the importance of the Mississippi river and its delta channels to the sea: "This giant stream, with its head shrouded in Arctic snows and embracing half a continent in the hundred thousand miles of its curious network, and coursing its majestic way to the southern Gulf through lands so fertile that human ingenuity is overtaxed to harrest their productiveness, has been given by its Immortal Architect into the jealous keeping of this Republic."

THE ANNEXATION FEVER

A curious and interesting example of the survival of inherited traits, on a large scale, is seen in the instinct for the acquisition of territory, which is manifested by all nations, savage or civilized, in greater or less degree.

In the olden time, when the earth was peopled by savages, the acquisition of territory by conquest involved not alone the

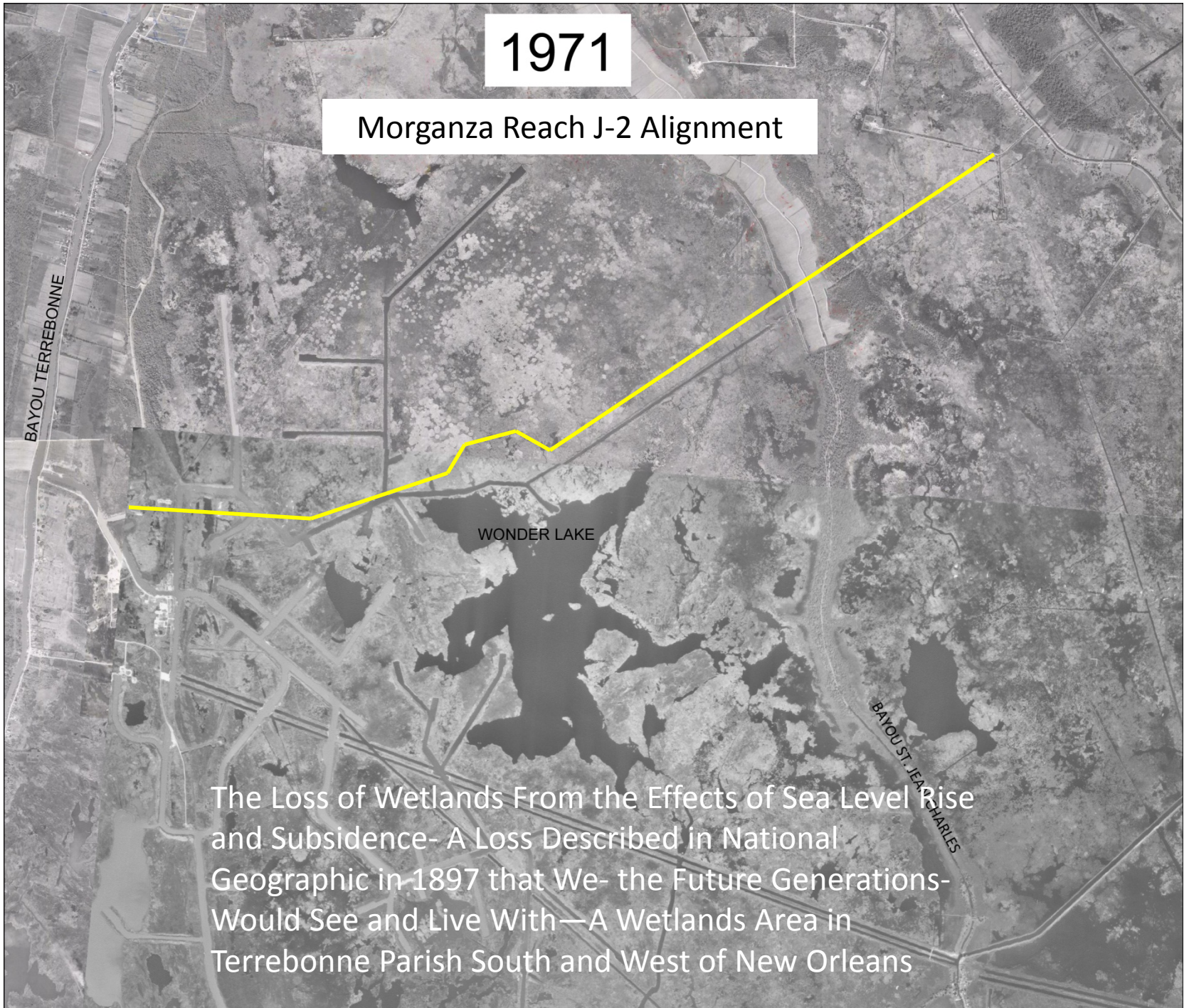
1897—"The effects of the withholding by the levees from the great areas of the delta of the annual contribution of sedimentary matters and the steady, though slow, subsidence of the theses areas, is one which should be taken in account in deciding the important question of how to protect the people from the flood waters of the river….No doubt the great benefit to the present and two or three following generations accruing from a complete system of absolutely protective levees*…far outweighs the disadvantages to future generations from the subsidence of the Gulf delta lands below the level of the sea and their gradual abandonment due to this cause…"*

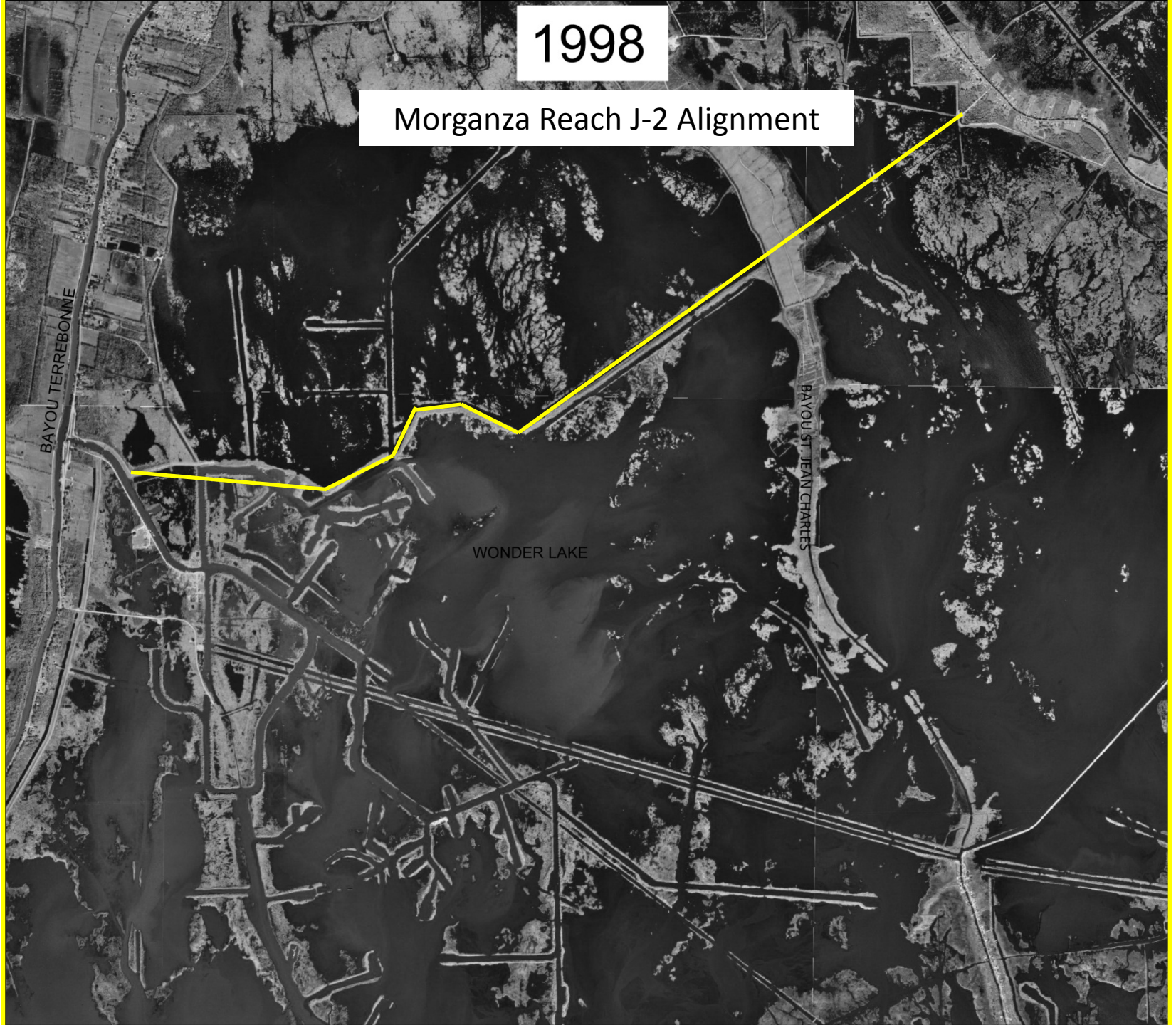

We Are Now the Future Generations Facing a Rising Sea Level
Rate Coupled with One of the Highest Subsidence Rates in the
World---A Living Classroom of the Impacts to Coastal Populatio
nfrastructure, and the Economy---The Leading Edge to the Wh
he Rest of the Coastal U.S. will be Facing

A Cross Section of New Orleans- A City Below Sea Level and Subsiding Daily

New Orleans
a Passing Cru
Mississippi R

New Orleans And Surrounding Water and Sea Levels


1971
Morganza Reach J-2 Alignment
BAYOU TERREBONNE
WONDER LAKE
BAYOU ST. JEAN CHARLES
The Loss of Wetlands From the Effects of Sea Level Rise and Subsidence- A Loss Described in National Geographic in 1897 that We- the Future Generations- Would See and Live With—A Wetlands Area in Terrebonne Parish South and West of New Orleans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WONDER LAKE
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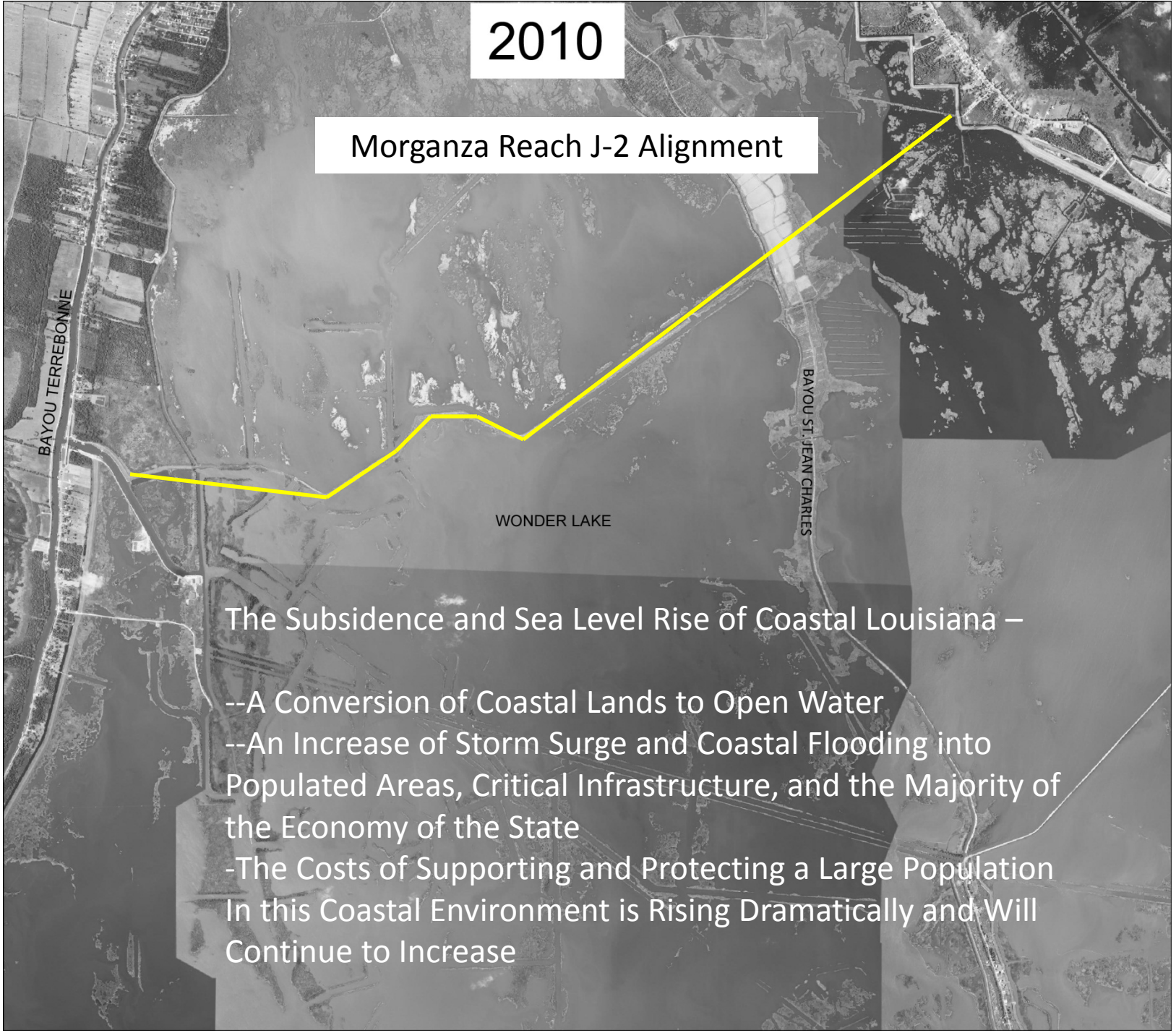


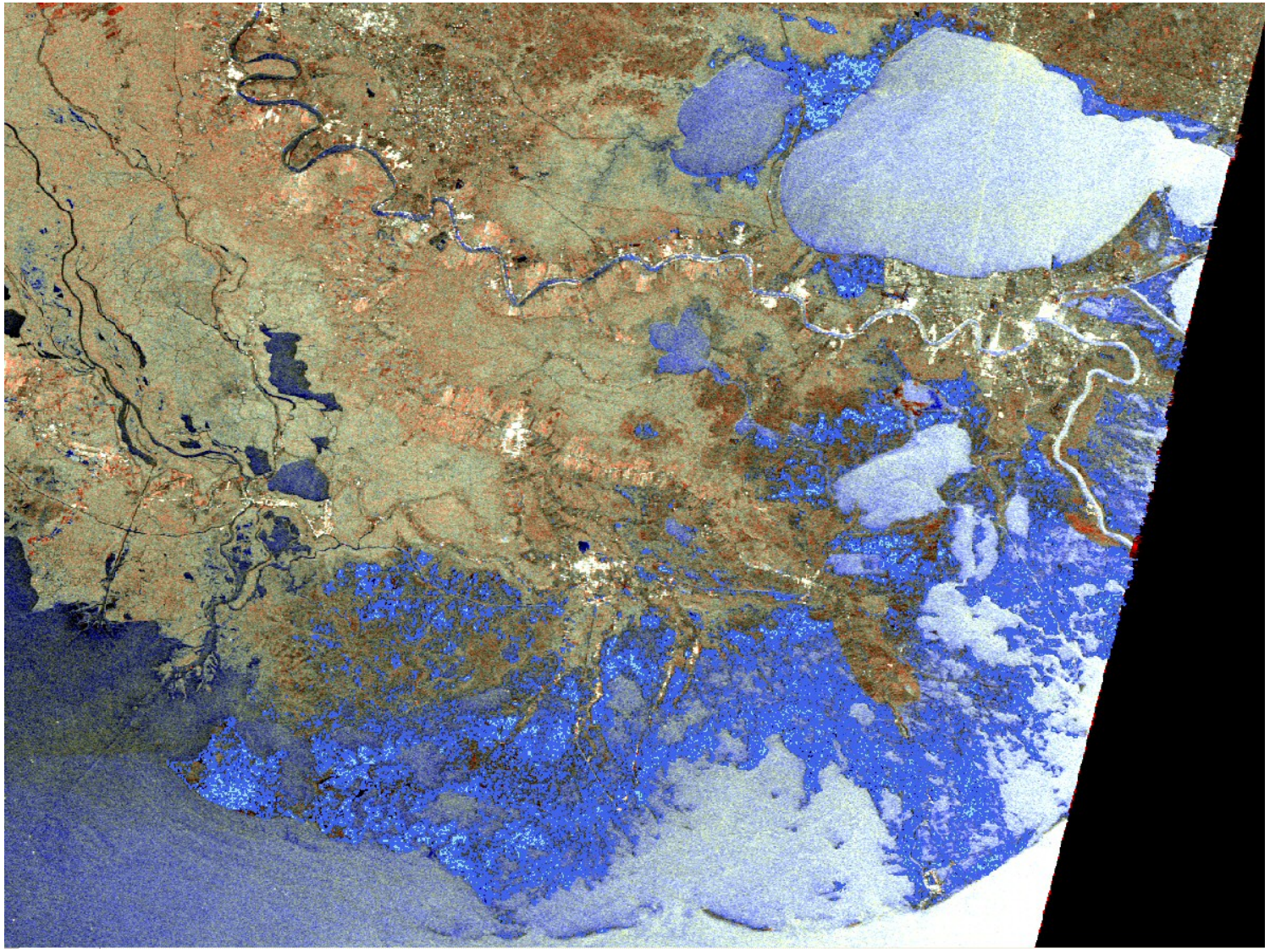
The Subsidence and Sea Level Rise of Coastal Louisiana –

--A Conversion of Coastal Lands to Open Water
--An Increase of Storm Surge and Coastal Flooding into Populated Areas, Critical Infrastructure, and the Majority of the Economy of the State
-The Costs of Supporting and Protecting a Large Population In this Coastal Environment is Rising Dramatically and Will Continue to Increase

Our Coast Today--Interior of the Caminada Headland and Open Water that is Growing Yearly Threatening Infrastructure as Port Fourchon and Grand Isle

The Same Caminada Headland Inundated
by a Minimal Tropical System Far Away
from the Coast of Louisiana-- July 2010

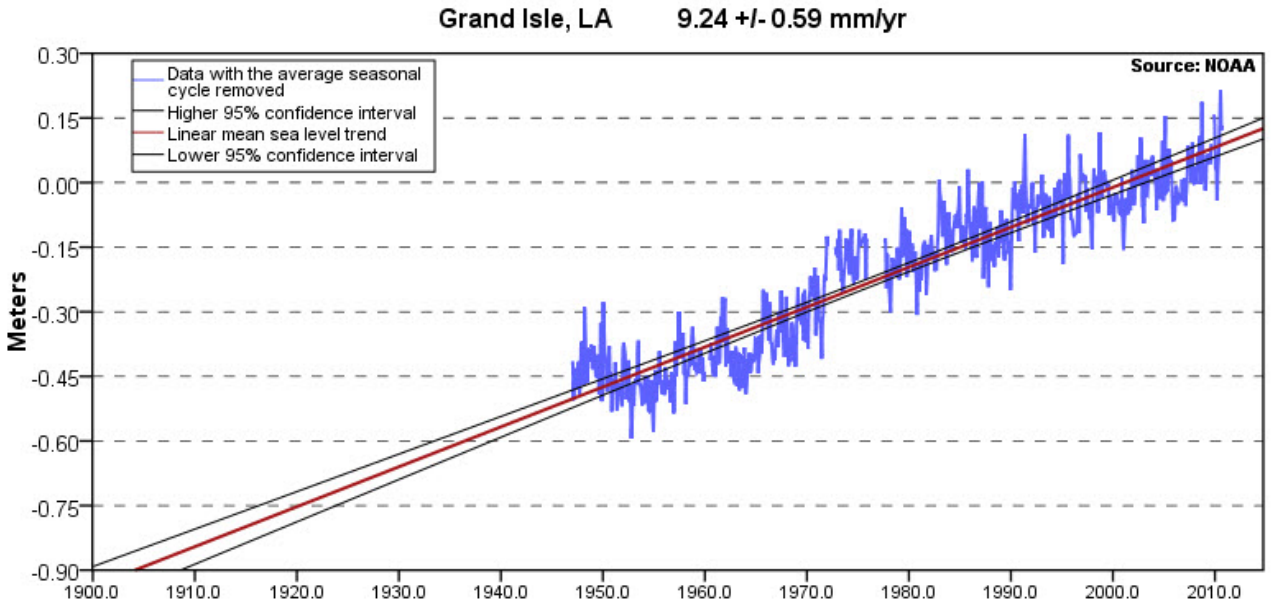
Hurricane Ike Flooding Eastern Louisiana- A Category 2 Storm that Made Landfall in Texas but Flooded Every Costal Parish in Louisiana



Hurricane Ike Inundation South Lafourche Parish

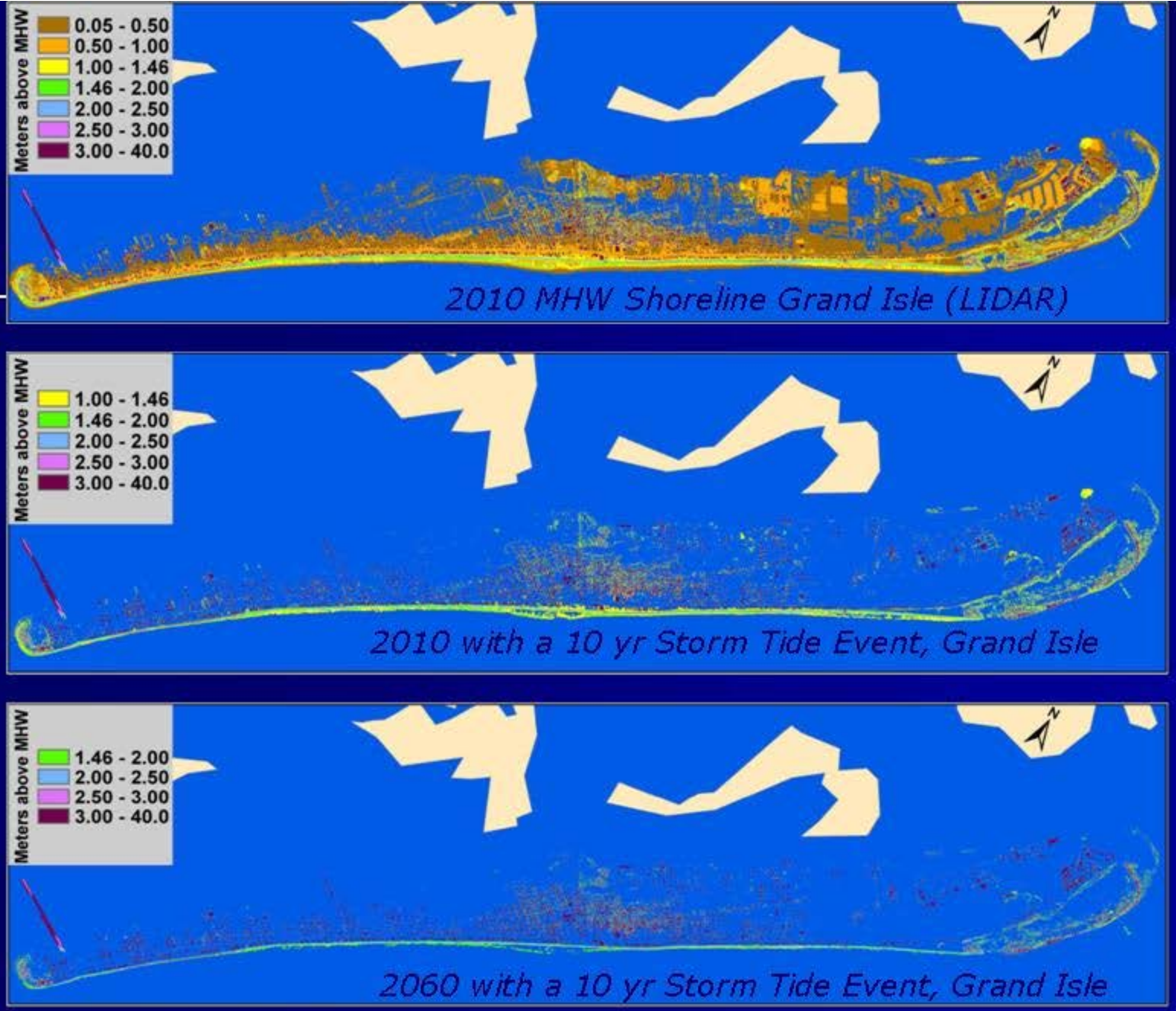
A Rate Amongst the Highest in the World on a Coastal Landscape with an Average Elevation of 3 Feet or Less Today Across 12,000 Square Miles of Coastal Zone

Mean Sea Level Trend
8761724 Grand Isle, Louisiana



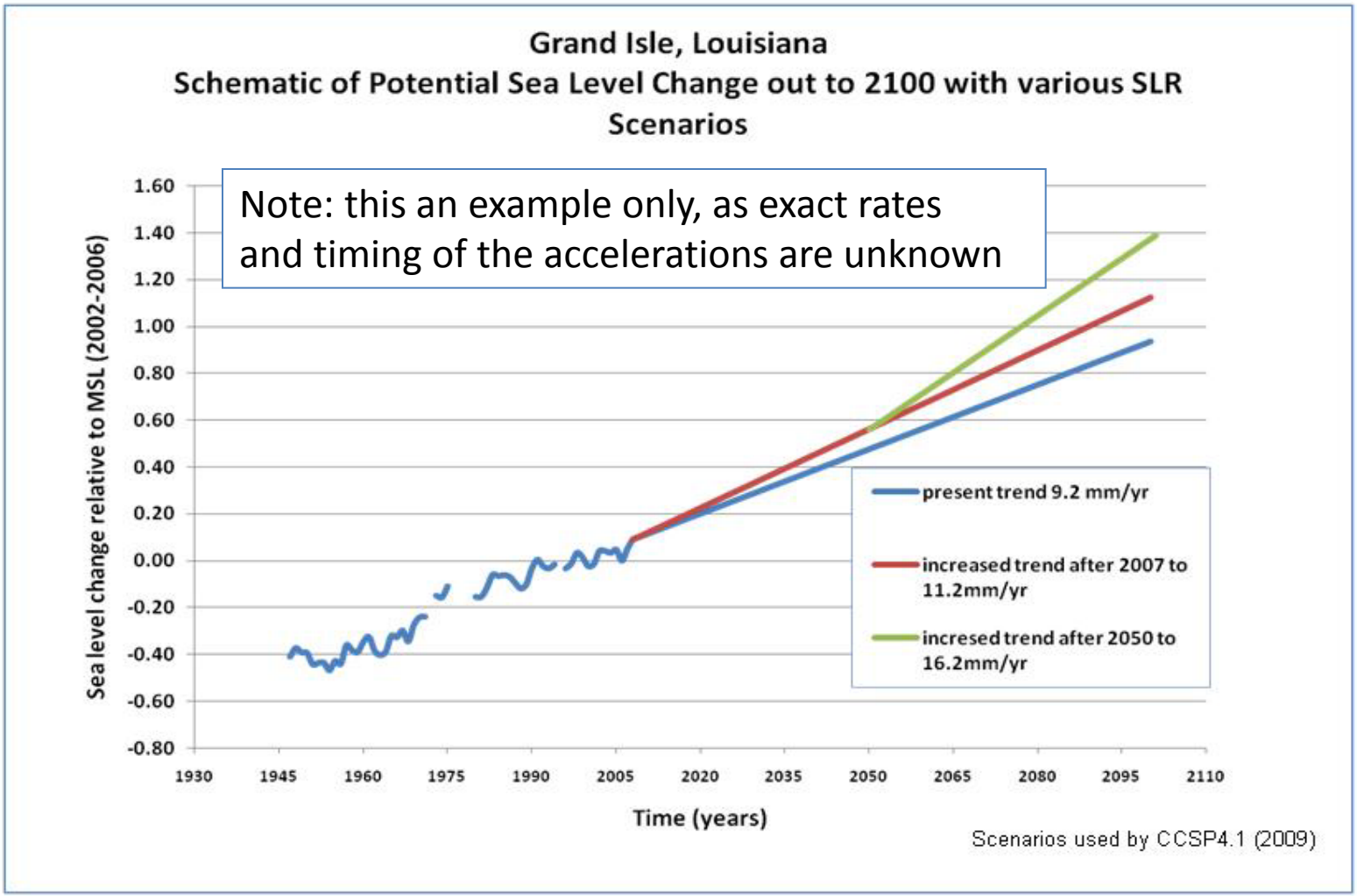
The mean sea level trend is 9.24 millimeters/year with a 95% confidence interval of +/- 0.59 mm/yr based on monthly mean sea level data from 1947 to 2006 which is equivalent to a change of 3.03 feet in 100 years.

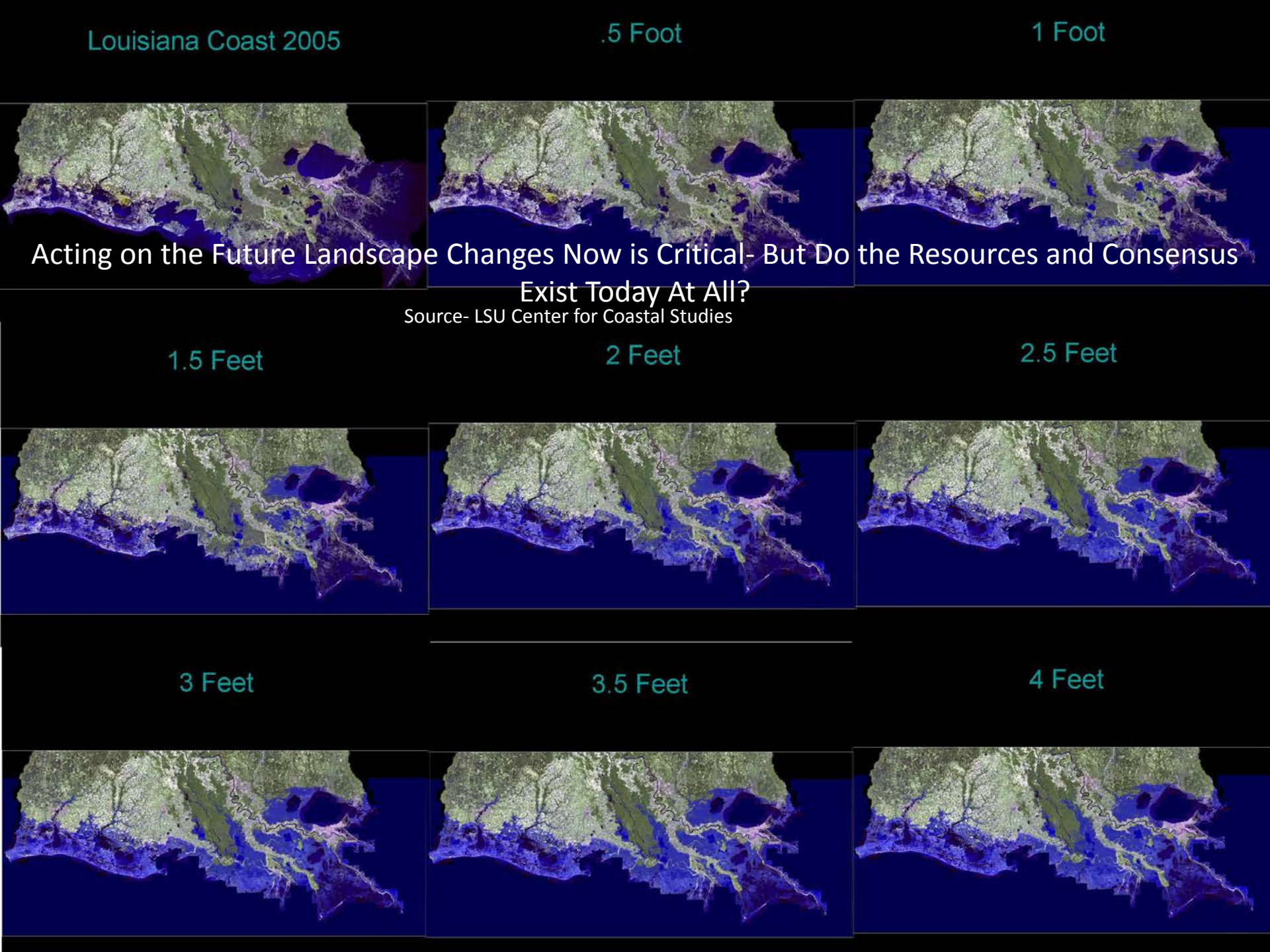
Note: The tide gauge record at Grand Isle contains components of global sea level rise, regional oceanographic change, and regional local vertical land motion.



Grand Isle Louisiana, Sea Level Rise 2010-2060 and Growing Inundation by the same 10 year storm tide event

Climate models project acceleration in Sea Level Rise starting before 2100 due to climate change—A Growing Rise Rate Accelerates the Conversion of the Coast to Open Water and a Great Impact on Populations, Infrastructure and the Economy

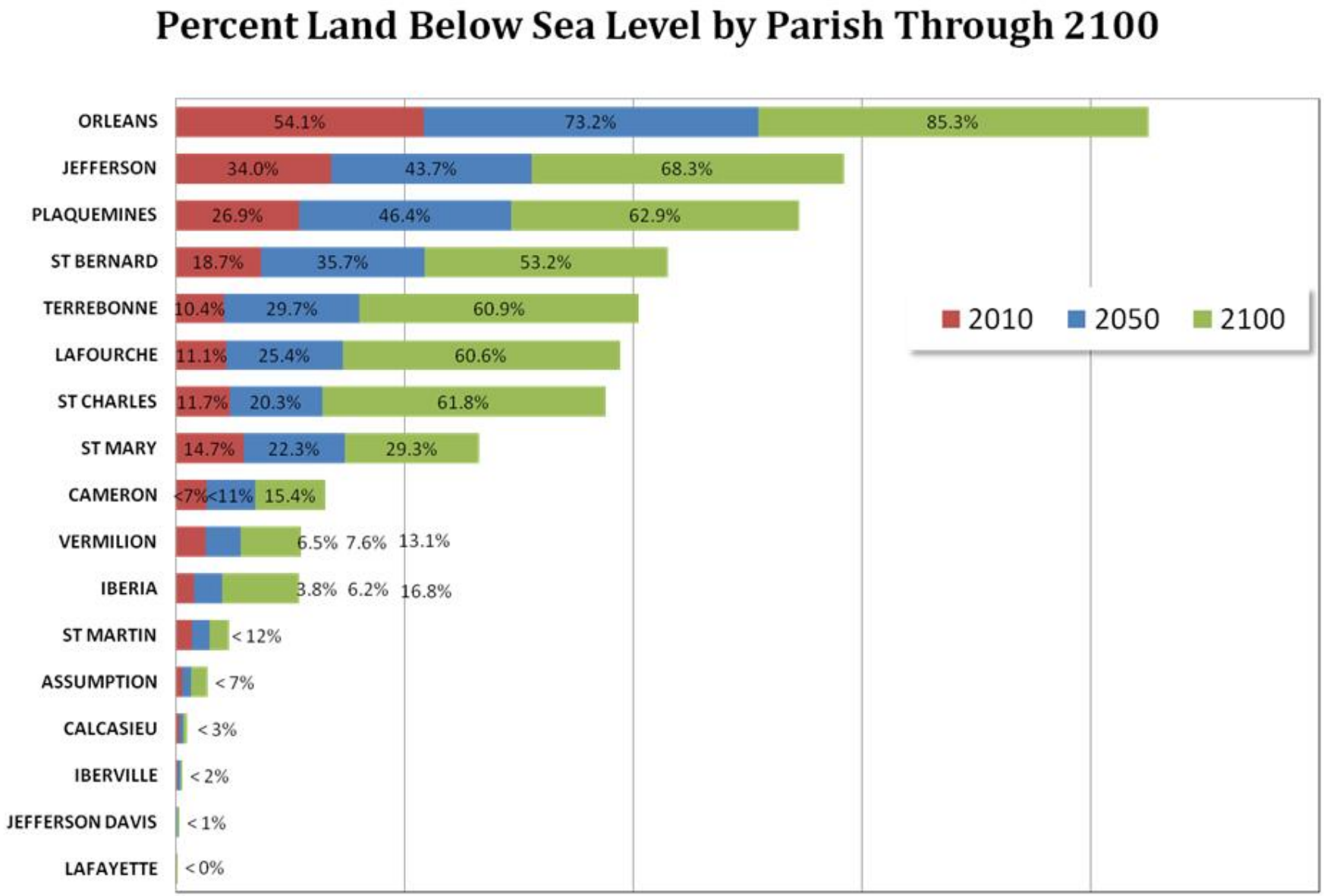




Acting on the Future Landscape Changes Now is Critical- But Do the Resources and Consensus Exist Today At All?

Source- LSU Center for Coastal Studies

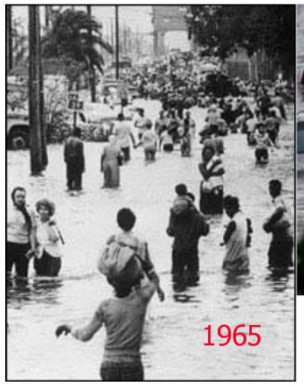
Looking At Our Populated Coastal Parishes Now and to the Year 2100- A Rapidly Growing Impact on the Majority of the Population of the State and the Large Majority of It's Economy



Source- LSU Center for GeoInformatics

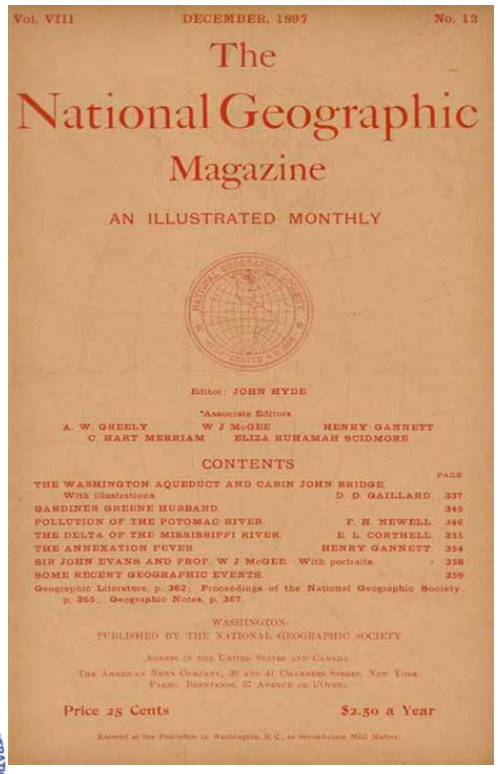
From 1965 Betsy to 2005 Katrina

11 foot surge (up to 9 foot flooding in city)
13,000 houses flooded
57 deaths in New Orleans



16.5foot surge (up to 14 foot deep flooding in city)
95,000 houses flooded
1292 deaths in S. Louisiana

R M S



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In Summary-

-The Processes and Rates of Change Have Been Described for Over 100 Years as Well As Their Impacts

-Our Own Development Activities Have Made the Coast, Our Populations and Infrastructure Even More Vulnerable to Present and Future Relative Sea Level Rise (SLR and Subsidence)

-An Open Question Exists On the Affordability of Being Able to Continue to Live and Work in A Landscape Changing More Quickly Than Almost Anyplace on the Planet

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE