

# Cypress Restoration of the Bayou Bienvenue Central Wetland Unit



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Environmental Scientist

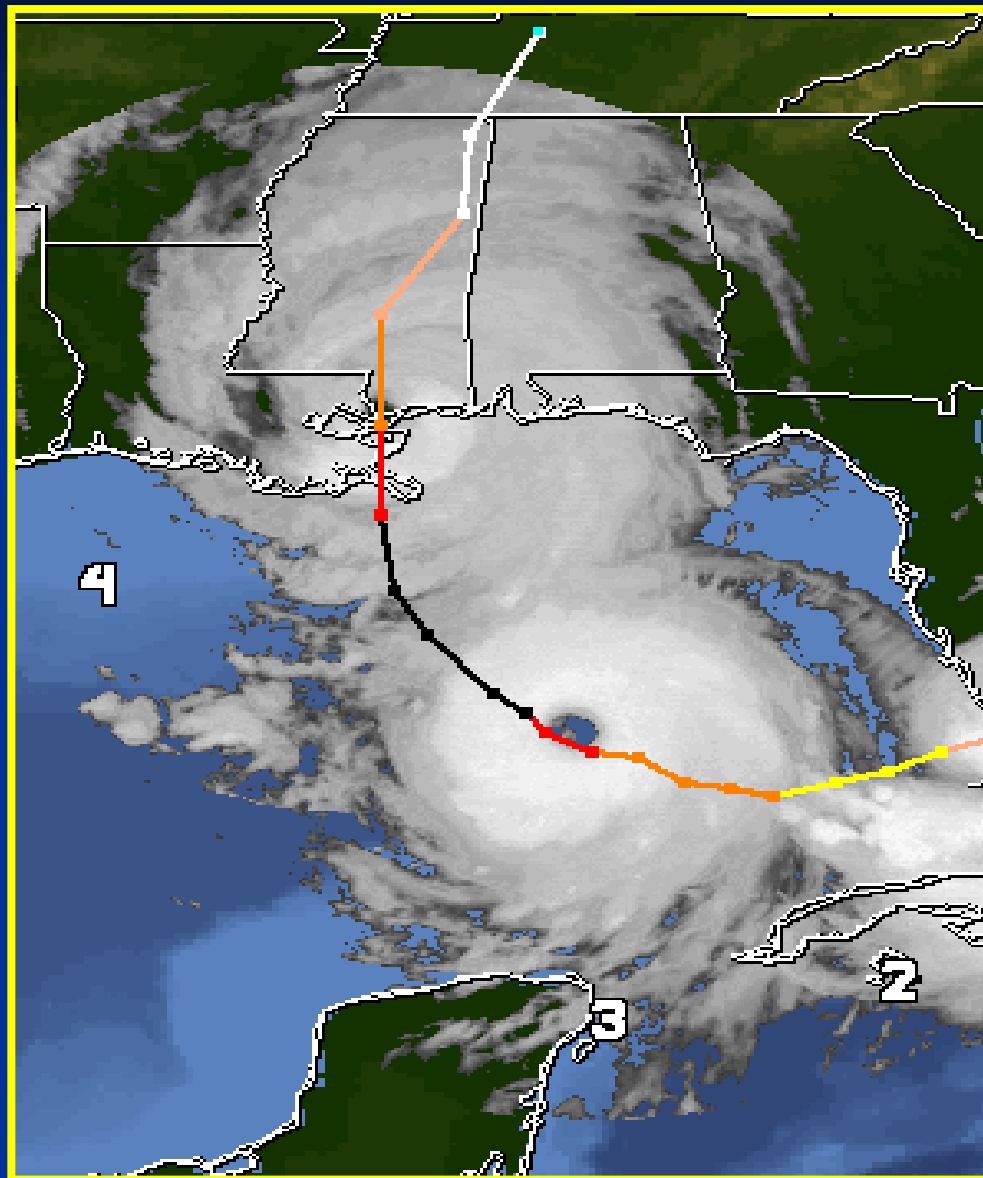
# Wetlands, Wastewater Infrastructure, and the Recovery

- Long Term Planning and Recovery of Critical Infrastructure
- Wastewater Infrastructure Design Using Wetland Assimilation
  - Multiple Benefit / Multiple Stakeholder Approach
  - Enhance 28,000 Acres of Cypress Wetlands
  - Protect Orleans and St. Bernard Parishes



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# Hurricane Katrina August 28-29, 2005



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In the presence of  
extraordinary actuality,  
consciousness takes the  
place of imagination

Wallace Stevens











# East Bank Sewage Treatment Plant

- Urgent Need for Restoration
- FEMA- Pre-Katrina Conditions
- 2 Year Time Frame for Restoration
- Estimated \$70 Million for Restoration



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# Facing the Future

- Population?
- Solids
- Nutrients
- Mitigation
- 50% Less Revenue



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# Driving Factors of Recovery

- Public Safety
- Economic Recovery
- Multi-Objective Management
  - Hazard Mitigation Objectives Coincide with Stakeholder Objectives
  - Multiple Benefit



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# Sustainability

- Disaster- The ability to survive future disasters with minimum loss of life and property
  - Hazard Mitigation
- Environment-Meet the needs of the present without compromising the ability of future generations to meet their own needs
  - Global Climate Change
  - Energy



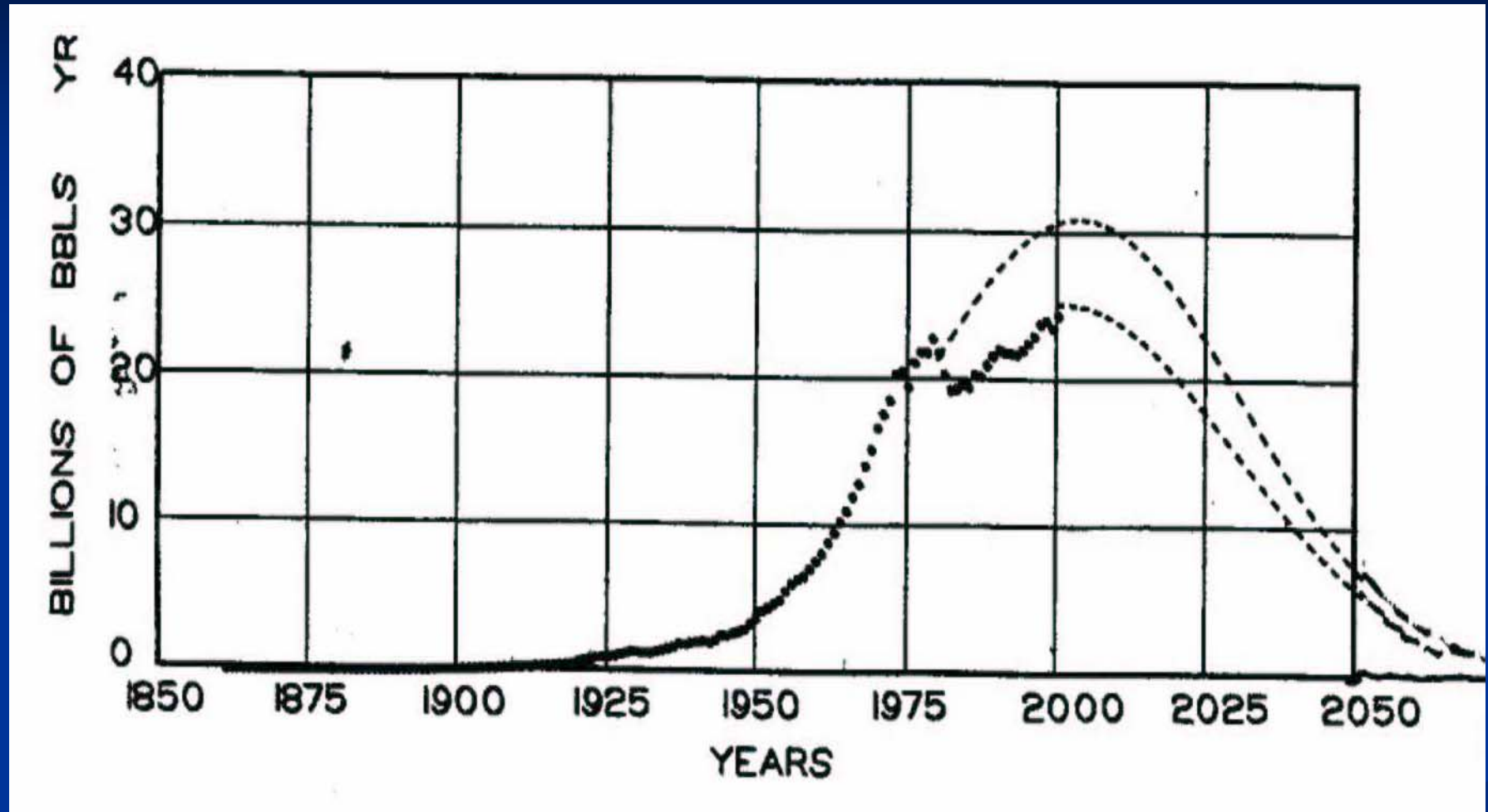
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# Global Climate Change

- Adaptation of vulnerable human systems.
- Need to adapt to an already-changing climate
  - Relative Sea Level Rise (RSLR)
  - Increased Tropical Storms

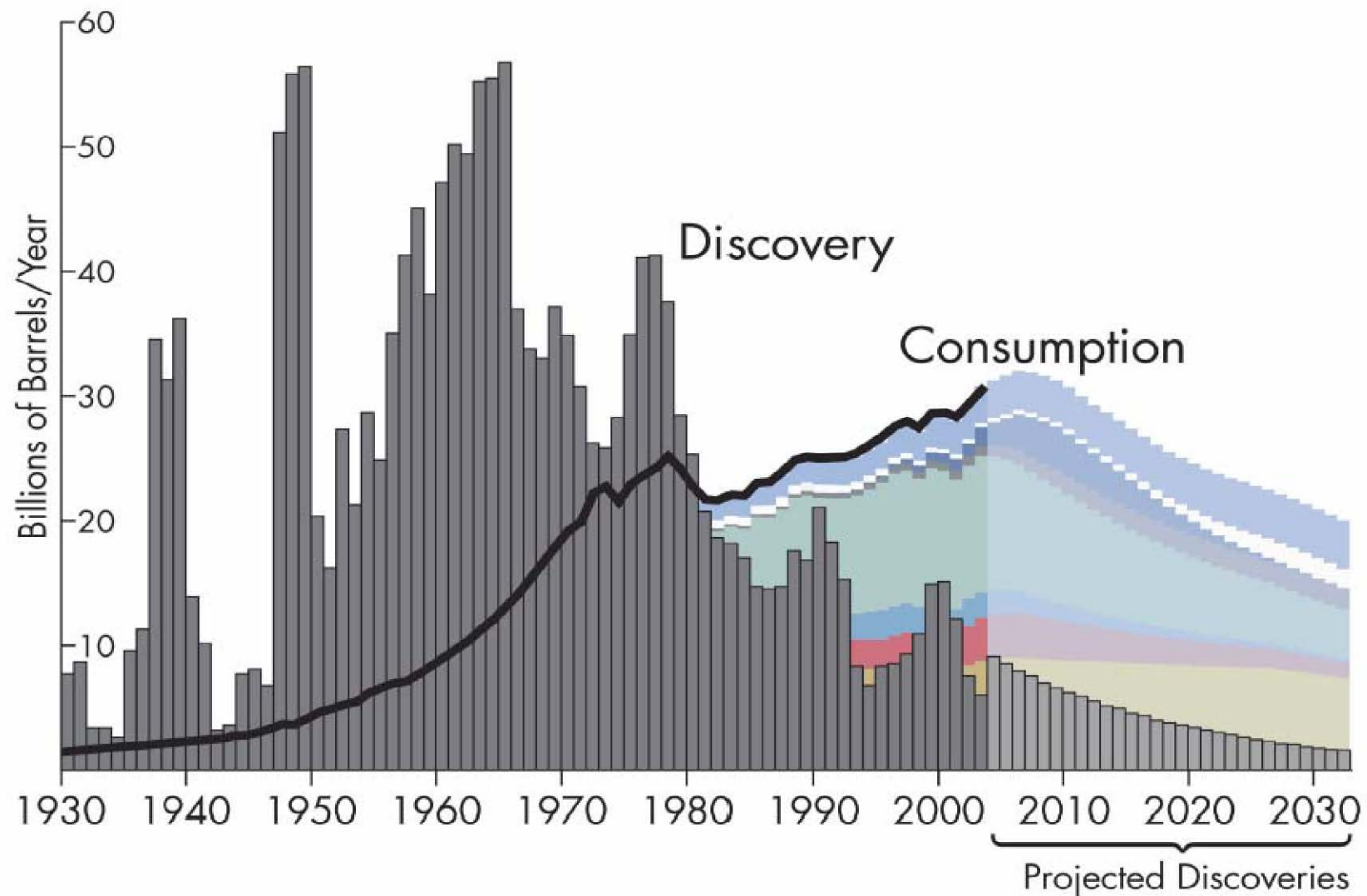


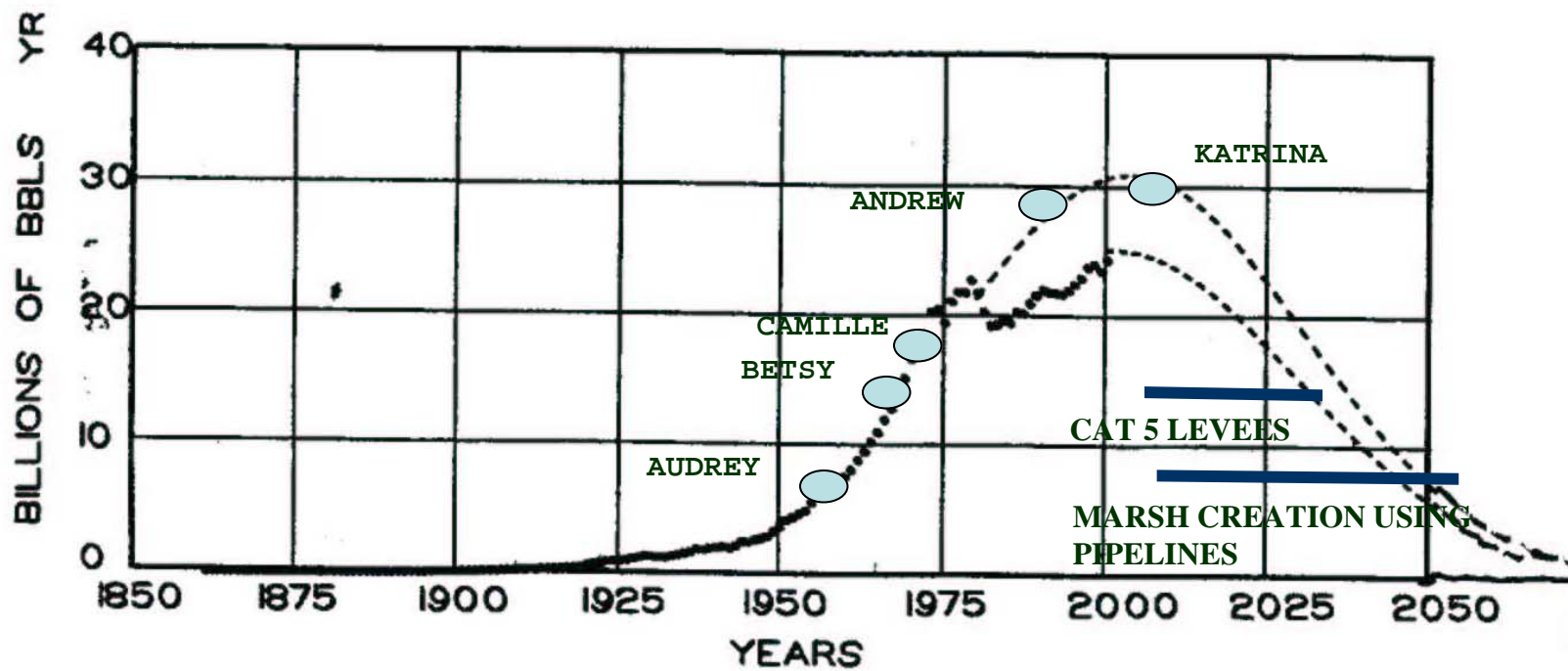
# HUBBERT'S PEAK



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# Peak Oil – The Growing Gap







# Adaptation Measures & the Poor

- Enhanced natural resource measures benefit the poor more than large scale structural measures!
- Poor are the most dependent on natural resources.
- Poor tend to live in more vulnerable locations.

Source: IDNDR



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# NATURE'S SURGE BUSTER

Scientists with the LSU Hurricane Center say Hurricane Katrina provided graphic proof of how marshes and wooded wetlands provide natural armor that can save levees during storms.

## WITHOUT WETLANDS, LEVEES ARE PUMMELED

Large sections of the MR-GO levee that had little or no wetlands separating them from Lake Borgne disintegrated.



## WETLANDS TAKE THE BRUNT OF THE STORM

The 20-Arpent Canal levee remained standing. The difference was the buffer of marsh and wooded wetlands, researchers said.



STAFF GRAPHIC BY DAN SWENSON

Sources: LSU, NASA, staff research





# Environment Is Our Best Asset

- Wetlands most productive ecosystems.
- Will contribute proportionally more to the human economy in the future.
- Offset impacts of global climate change
  - Relative Sea Level Rise
  - Increased Tropical Storms
- As fossil fuels become scarce natural energies will become more important.



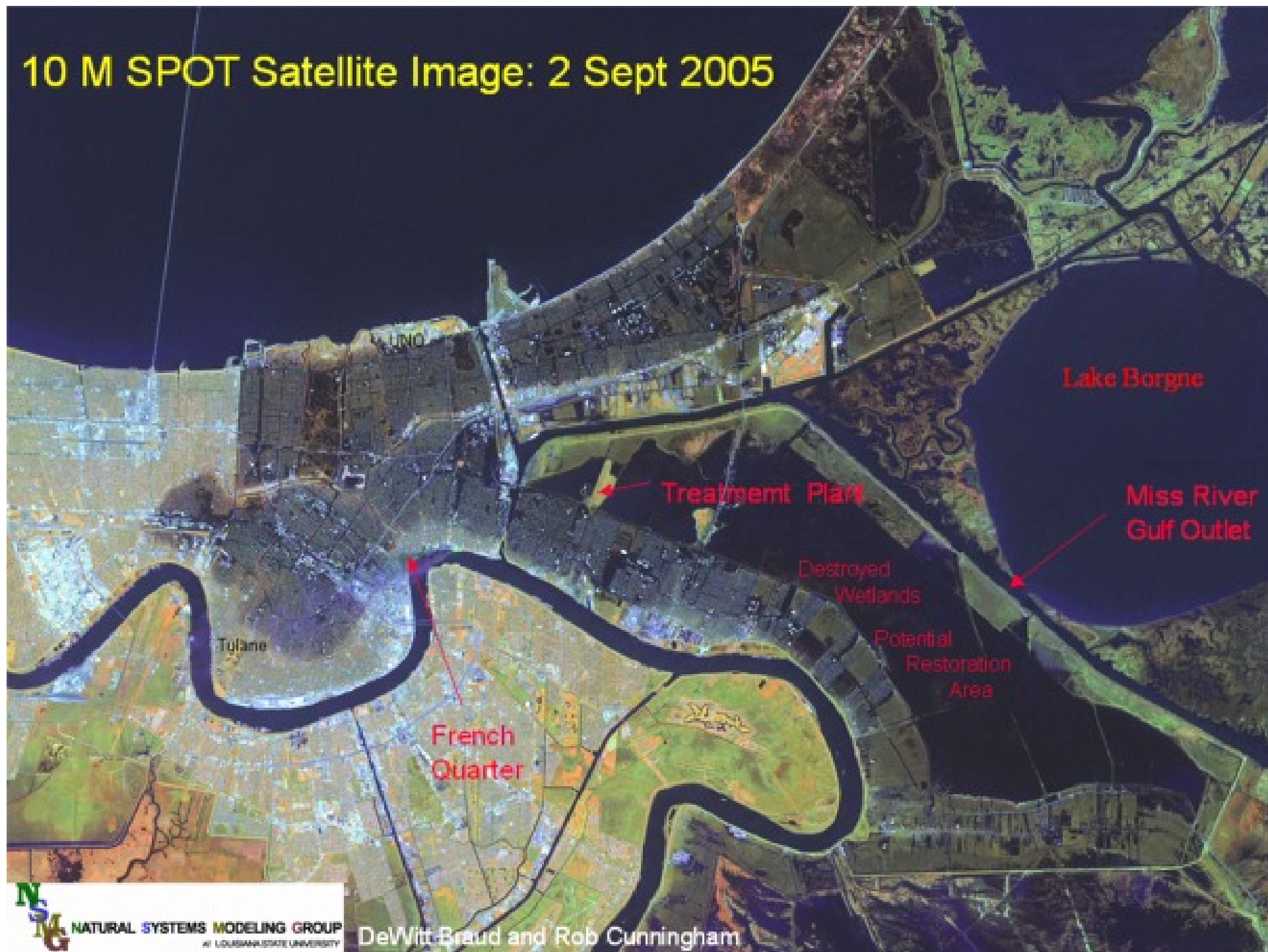
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## 10 M SPOT Satellite Image: 2 Sept 2005



NATURAL SYSTEMS MODELING GROUP  
at LOUISIANA STATE UNIVERSITY

DeWitt Braud and Rob Cunningham

# WETLAND ASSIMILATION

Secondary Treatment-Disinfected

Fertilizer

Freshwater

Cheaper-Natural Energies

Restored Wetlands

Storm Protection



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# Wetland Assimilation

- Waste Assimilative Capacity
- Natural systems have the ability to “clean” waste up to a certain amount.
- Determined in feasibility



# Tertiary Treatment

- TMDL Limits in 2010
- New Infrastructure
- Operation and Maintenance
- Avoid New Spending



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# Thibodaux Wetland Enhancement



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# St. Bernard Parish







**ST BERNARD PARISH. CYPRESS SWAMP AT OUTFALL  
OF THE GORE PUMPING STATION**

# Process

- Funding
- Task Force
- Feasibility
- Design
- Implementation



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# Funding

- Delta Regional Authority
  - \$400,000
  - Feasibility and Preliminary Design
- Coastal Impact Assistance Program-CIAP
  - \$10 Million
  - Phase I Implementation
- Implementation Funding Gap
  - \$30 Million



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**The Nation benefits  
from the Louisiana  
seafood, oil & gas, and  
the port, at the expense  
of our environment!**

Junior Rodriguez  
St. Bernard Parish President

# Carbon Sequestration

- Green plants remove (sequester) carbon from the atmosphere through photosynthesis to make biomass in the form of roots, stems, and foliage.



# Carbon Sequestration

- Biosequestration- above ground biomass in wood  $1\text{kg}/\text{m}^2$  per year
- Carbon Burial and Sequestration Through Wetland Assimilation  $4.6\text{ kg}/\text{m}^2$  per year
- Central Wetland Unit Assimilation/ Year (15,000 acres)
- **300,000 Tons Carbon Sequestration /Yr**
- **Equivalent to 200,000 Automobiles /Yr**



Source: Day et. al & EPA

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# Louisiana Wetland Loss

- 80% of the Nations Wetland Loss is in Louisiana
- 34 Square Miles of Marsh Loss / Year
- 88,000 Tons of Carbon Sequestration
- **Equivalent to Adding 60,000 Automobiles This Year**
- 700 Square Miles of Marsh Loss in 50 Years
- 1.8 Million Tons of Carbon Sequestration
- **1.2 Million Automobiles-Year**



Source: [www.Lacost.gov/LandLoss/Newhistoricalland.pdf](http://www.Lacost.gov/LandLoss/Newhistoricalland.pdf) & EPA

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# Greenhouse Gas Regulation

- Under development by the State of California
- Congress is debating the design of a Federal program
- Develop policy that benefits Louisiana in the greenhouse gas offset market!
- Regional Greenhouse Gas Initiative



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# Multiple Benefits

- Restore Critical Infrastructure
- Restore 10,000-28,000 Acres of Wetlands
- Improve Water Quality
- Protect Orleans and St. Bernard Parish
- Protect Public Health
- Sequester Carbon
- Contribute to the Economy
- Financial and Energy Savings
- Protect the Culture



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# World Model

- Size
- Recovery
- Policy
- Port Cities
  - River-Transportation
  - Sea Level Rise
  - Increased Tropical Storms



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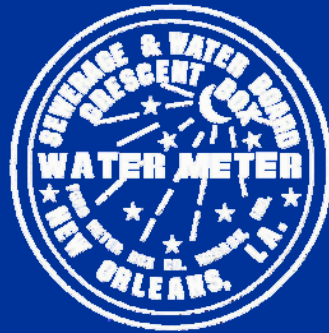
# Recovery Recognition S&WB

- Innovative
- Environmental
- Economic



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# Waste is a Resource Out of Place



# References

- [www.Lacoast.gov/LandLoss/Newhistoricaland.pdf](http://www.Lacoast.gov/LandLoss/Newhistoricaland.pdf)
- [www.epa.gov/otaq/420f05004.htm](http://www.epa.gov/otaq/420f05004.htm)



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