

# Blue Carbon: Wetlands in Carbon Markets

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President and CEO  
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# Tierra Resources

- Nationally and internationally recognized as the pioneers in the monetization of blue carbon contained in coastal wetland ecosystems.
- The first to introduce wetland restoration to carbon markets in 2012.
- Tierra Foundation: 501(c)3 to expand research and practices that increase resilience through wetland and water management.



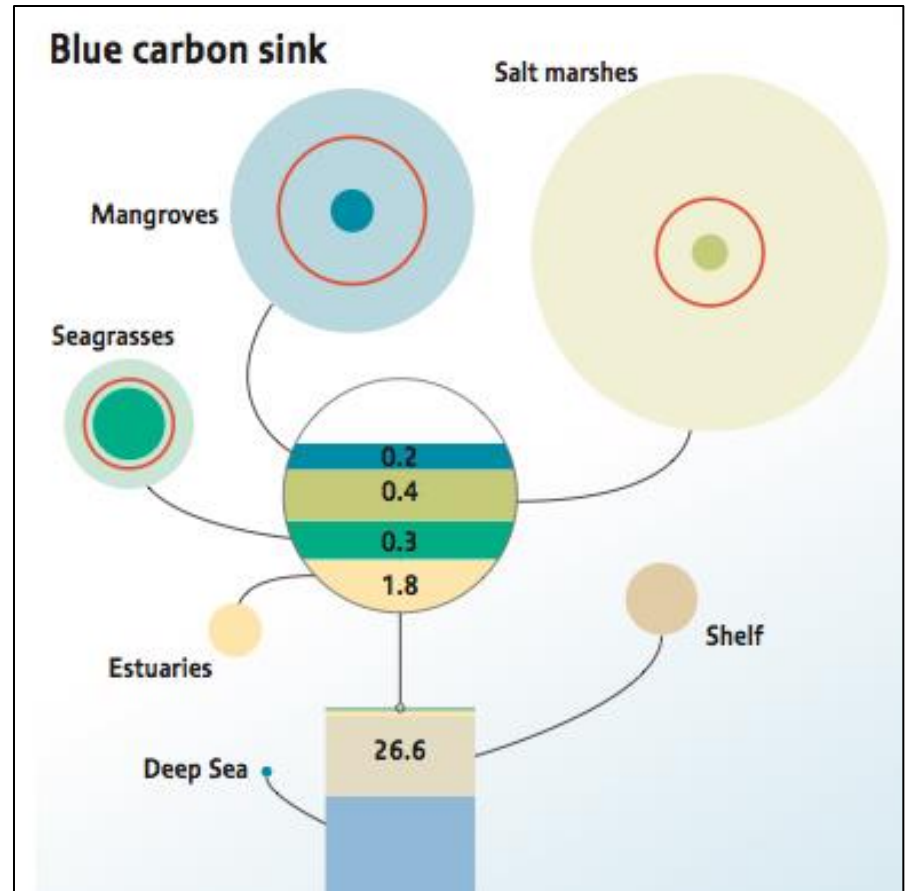
# Outline

- Blue carbon
- Carbon markets
- Global developments
- Wetland carbon project requirements
- Carbon and nutrient pilot project
- Pilot benefits
- Factors influencing blue carbon
- Next steps



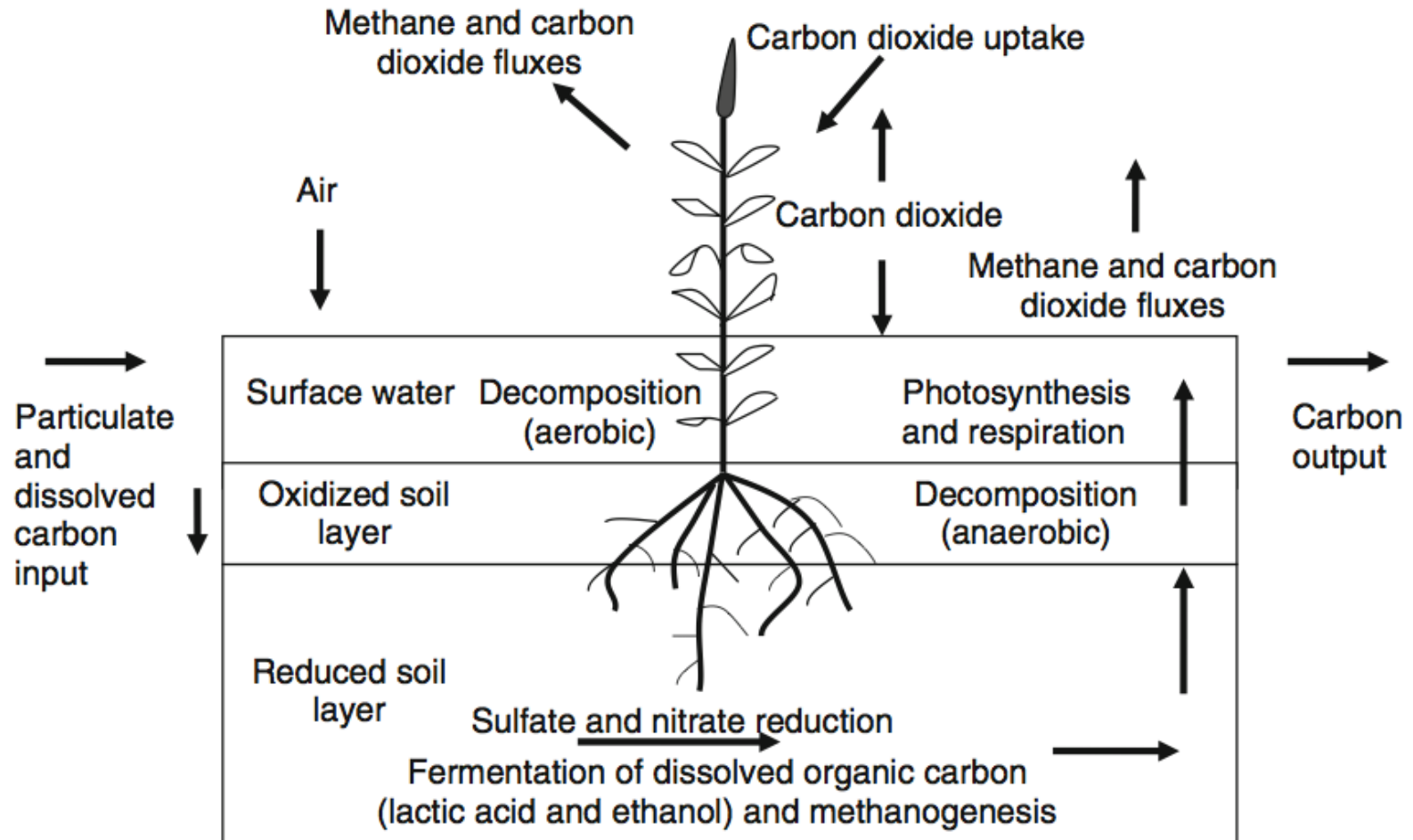
# Blue Carbon Sinks

The carbon stored through photosynthesis in mangroves, seagrasses and coastal wetlands – as well as tidally influenced cypress tupelo swamps.



from Nellemann et al. 2009

# Carbon Sequestration



# What happens to carbon during wetland loss?



Wetland loss refers to vegetation death followed by conversion to open water



The carbon bound in the soil organic matter becomes susceptible to decomposition and release as  $\text{CO}_2$  and  $\text{CH}_4$



# What is an offset?

- Reduction, avoidance, or removal of one metric ton of carbon dioxide equivalent emissions resulting from a specific project activity
- Used to compensate for an equivalent emission occurring elsewhere
- In compliance programs an offset comes from sectors not bound by the regulatory limit



# Emissions Trading

- **Voluntary Markets**
  - Testing ground
  - Influence compliance markets
  - Prices highly variable
  - Corporate Social Responsibility
  - ACR, Verra, CAR
- **Compliance Markets**
  - California, RGGI
  - Auction - \$14.65
  - Offset – 10-20% lower (\$12-13)
- **Carbon Credit / Offset**
  - 1 mtCO<sub>2</sub>e





# Global Developments to Watch

- Politics may cause corporations to step up!
  - Lack of national climate action may drive climate action
  - Insetting and supply chain initiatives
  - 262 companies set science-based emissions reductions targets
- Paris Agreement
  - Negotiations and commitments continue to evolve
  - Royal Dutch Shell, ExxonMobil and BP support Paris Agreement
- International Civil Aviation Organization (ICAO)
  - Carbon Offsetting and Reductions Scheme for International Aviation (CORSIA)
  - First sector-wide cap-and-trade
  - Aviation sector meet carbon-neutral growth in 2020
  - 2.5 billion offsets & \$40 billion in climate finance 2021-2035



# Offset Criteria

- Real
  - It can be accurately measured
  - Can be accomplished without “leakage”
- Permanent
  - Will retain stored carbon for the life of the project
- Additional
  - Occurs outside a regulatory requirement
- Verifiable
  - It can be independently verified
- Enforceable
  - Its ownership is undisputed
  - No double counting

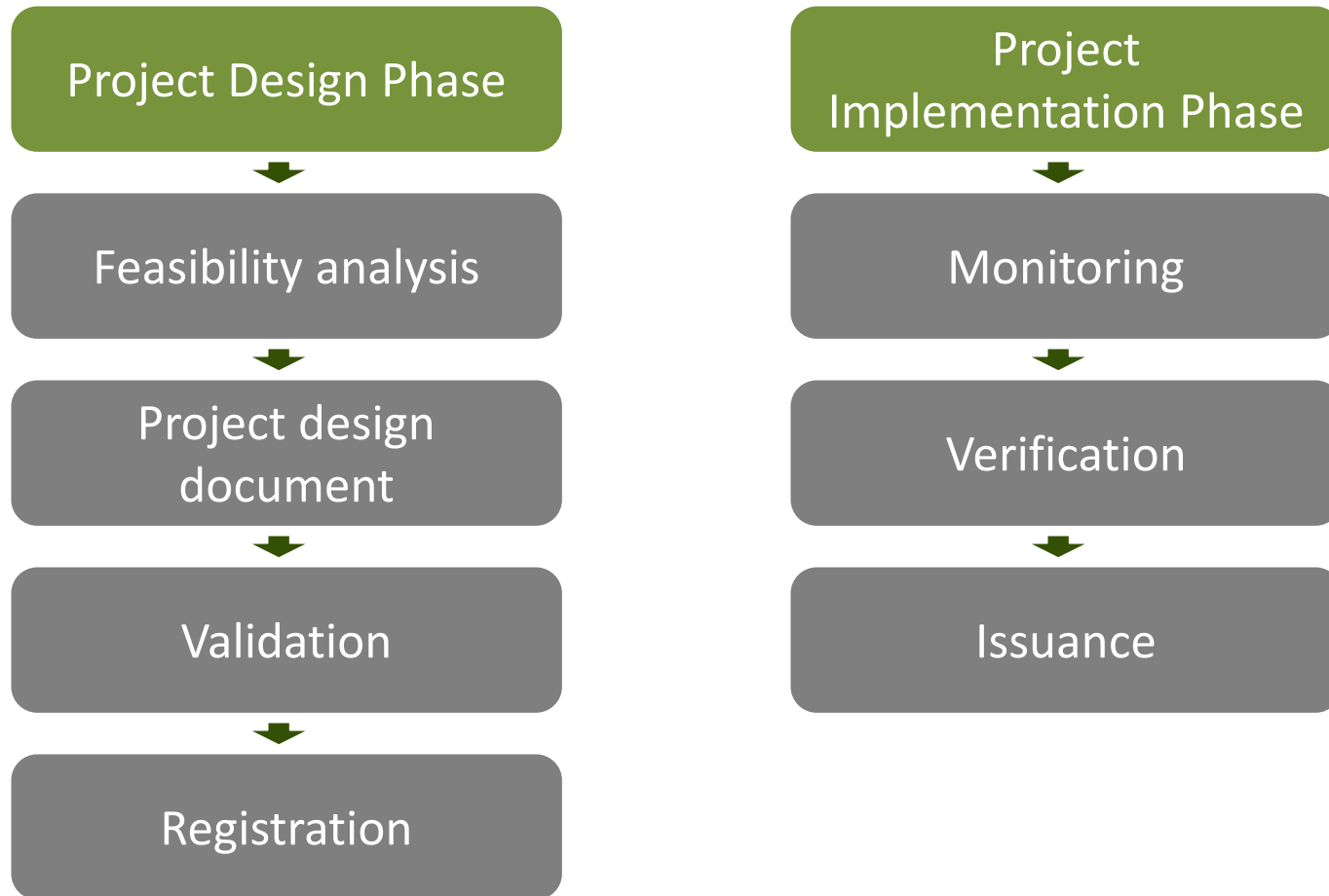


# Wetland Carbon Methodologies

- Restoration of Degraded Deltaic Wetlands of the Mississippi Delta
  - 2012 (ACR)
- Methodology for Coastal Wetland Creation
  - 2014 (Verra)
- VM0033 Methodology for Tidal Wetlands and Seagrass Restoration
  - 2015 (Verra)
- Restoration of California Deltaic and Coastal Wetlands
  - 2017 (ACR)
- Restoration of Pocosin Wetlands
  - 2018 (ACR)
- VM0007 REDD+ Methodology Framework
  - 2020 (Verra)



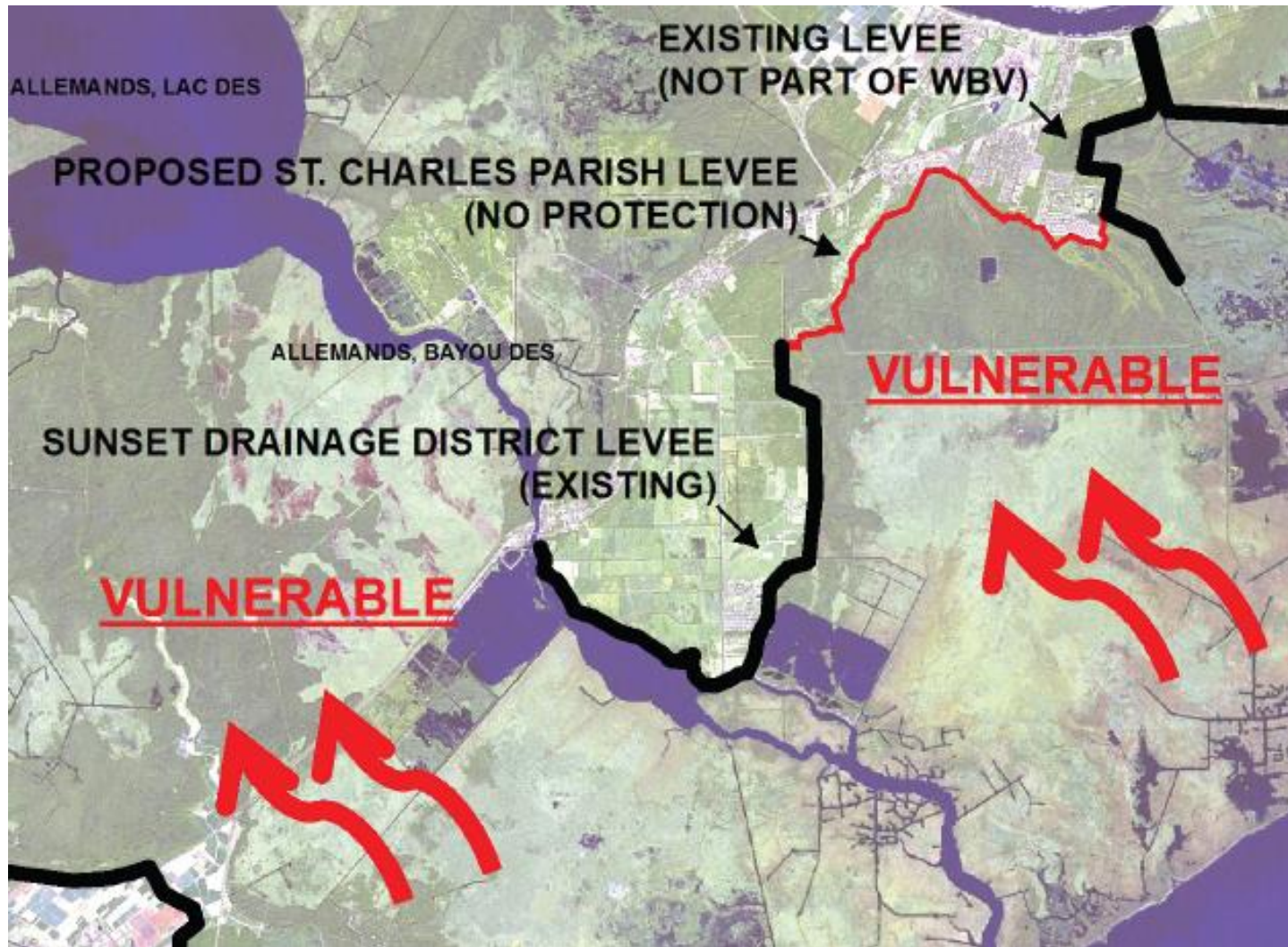
# Project Development Cycle



# St. Charles Parish

- *Mission to provide high quality, efficient services to sustain and enhance the quality of life for all residents*
- Population of approximately 53,000
- Subject to hurricane-related flooding and tidal surges due to wetland loss
- 18 hurricanes in the last 30 years
- 10 federal disaster declarations
- Compensate landowner for the use of their land without additional cost to parish or citizens

# St. Charles Parish at Risk!











# ***Restoration of Degraded Deltaic Wetlands of the Mississippi Delta***

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Robert R. Lane, PhD

John W. Day, PhD



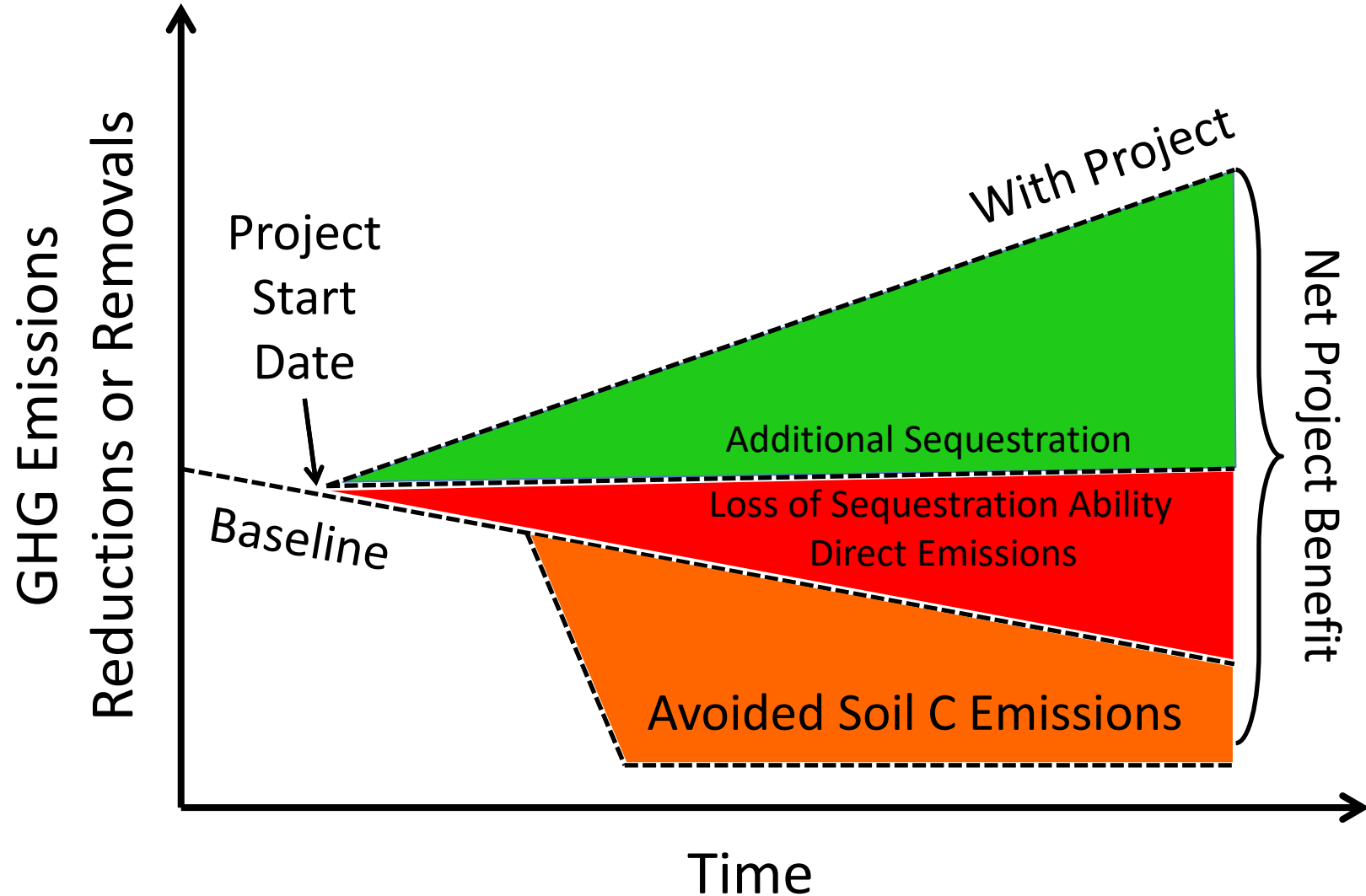
# Wetland Carbon Restoration Techniques

- River Diversions
- Hydrologic Restoration
- Marsh Creation
- Wetland Assimilation
- Mangrove Plantings

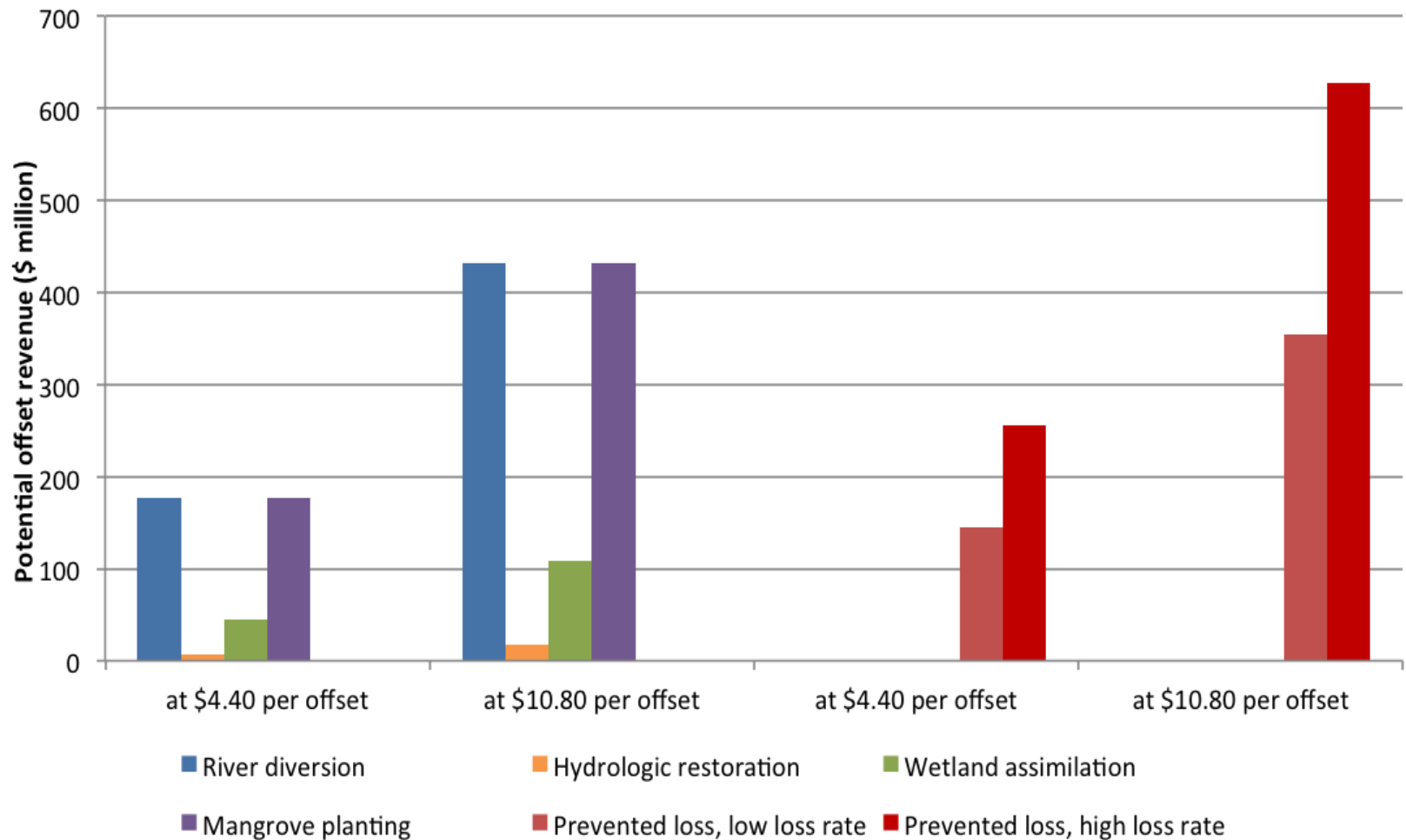


# Carbon Market Challenges

## *Optimizing Offset Yields*



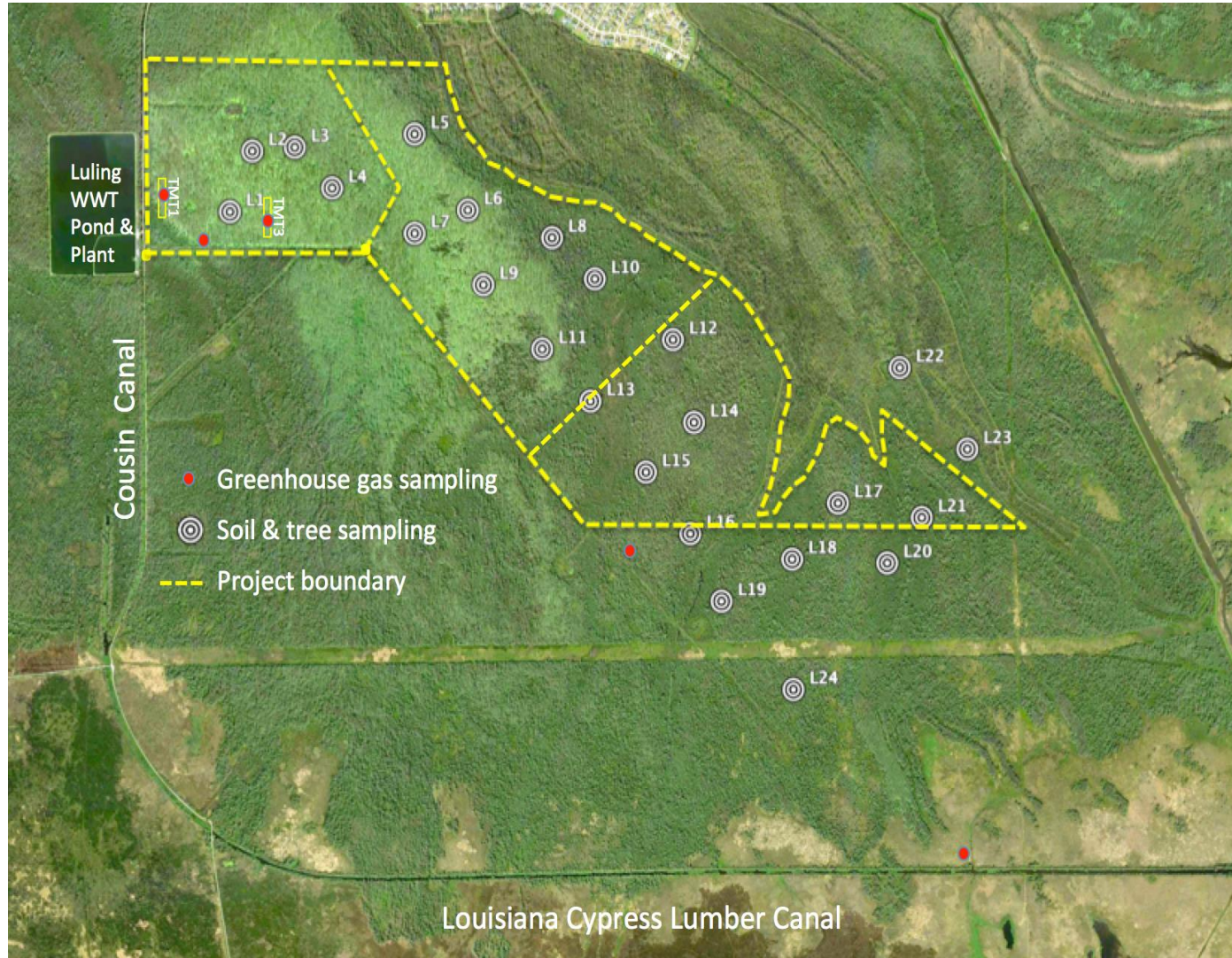
# Restoration vs. Prevented Loss



**Over 1.8 million offsets per year – almost 92 million offsets over 50 years!  
(20% buffer deduction)**



# Luling Wetland Carbon (and Nutrient) Pilot!



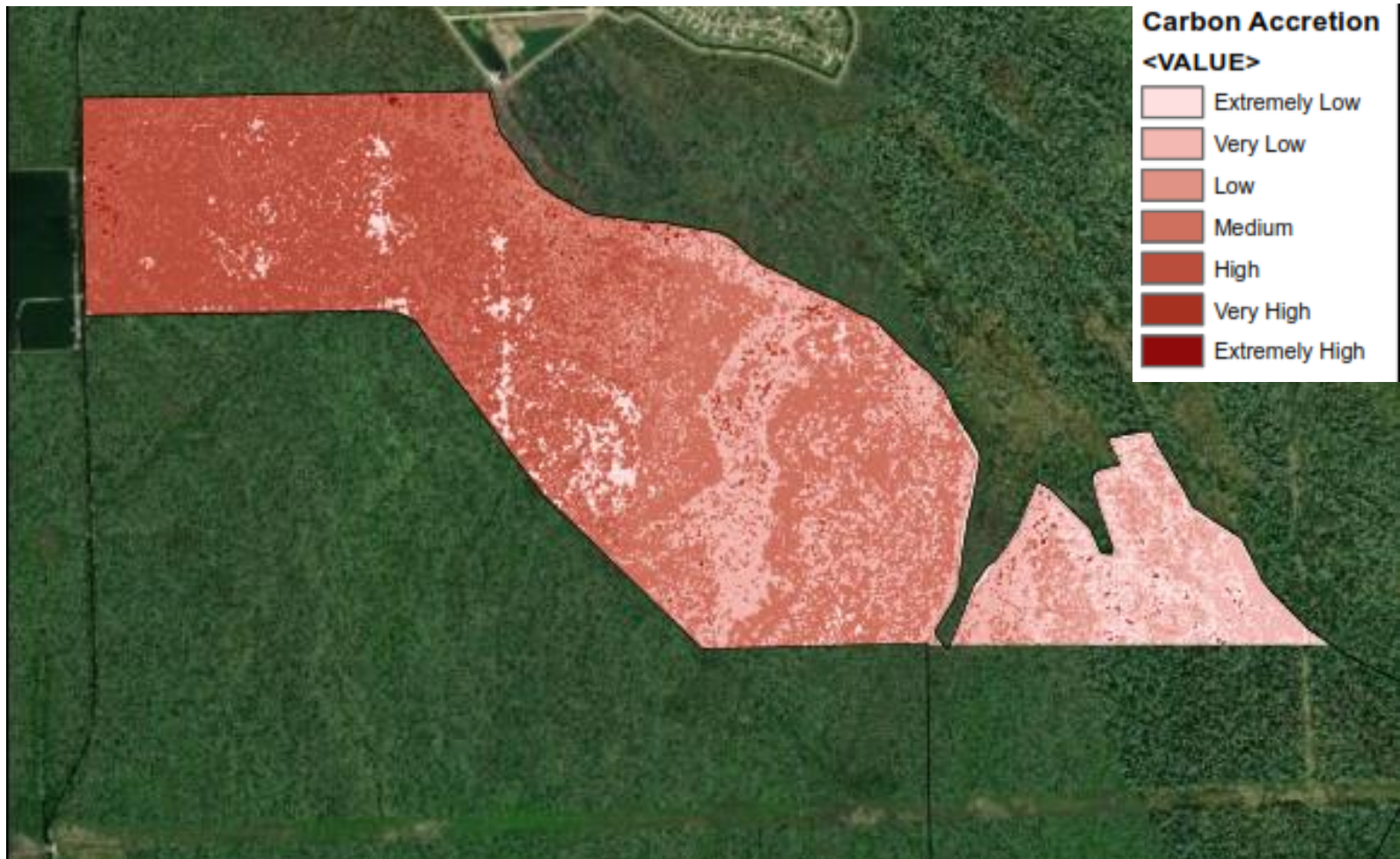


# Luling Wetland Carbon (and Nutrient) Pilot!





# Carbon Results





# Water Quality Credits

Year	TN lbs removed	TP lbs removed
2006	13,150.8	5,208.9
2007	13,389.3	4,234.6
2008	27,947.2	9,765.9
2009	28,929.9	9,730.3
2010	26,885.6	8,795.6
2011	25,728.3	8,162.4
2012	42,246.6	12,277.6
2013	48,072.8	12,598.4
2014	49,788.2	10,621.8
2015	81,424.6	12,091.5
2016	42,484.1	9,976.1
2017	36,224.7	7,119.6
2018	47,644.5	12,188.7
<b>Total lbs</b>	<b>483,916.7</b>	<b>122,771.5</b>
<b>- 5% UNC</b>	<b>24,195.8</b>	<b>6,138.6</b>
<b>Total credits</b>	<b>459,720.8</b>	<b>116,632.9</b>

# Carbon Pilot Benefits

- Metrics over 40 years;
  - 280,000+ tons CO<sub>2</sub>e
  - 1.7 million lbs Nitrogen removed
  - .5 million lbs Phosphorus removed
- Habitat – buffer saltwater & drought impacts
  - biodiversity
  - Nursery ground for fisheries
  - Recreation
  - Culture
- Storm protection and resilience
- Demonstrate public-private partnerships
- Prove viability of wetland offsets to CORSIA

# Factors Influencing Funding

- Price of the carbon offset
- Inclusion of wetlands in CORSIA
- Incorporating prevented wetland loss in carbon accounting
- The amount of wetlands that can be successfully restored for the project life
- \*Costs for developing a project
- Eligibility rules
  - Start date
  - Easement type
  - Use of federal funds
  - Buffer deductions



# Carbon Market Challenges

- Fully accounting for carbon during wetland loss
- Monitoring
  - Access
  - Cost
  - Remote sensing?
- Models
- 40-100 year commitment
- Public-private partnerships (additionality)
  - Revenue share
  - Roles
- Quantifying co-benefits / credit stacking



# Policy Recommendations

## **Advocate with carbon standards**

- Use of federal funds,
- Environmental credit stacking,
- Eligible types of conservation easements,
- Crediting period length for wetland restoration.

## **Publish lessons learned from existing pilots**

- Analyses of costs and benefits
- Examples of public-private paradigms



# TNC Grant

- Gaps assessment – legal analysis
- Carbon modeling:
  - Restoration project types
  - Identify projects
- Advanced monitoring analysis:
  - State guidance to improve state monitoring initiatives
- Public-private finance model
- Aggregation guidance
- Implementation strategy



# Final Conclusions

- Global pressure remains to curb greenhouse gas emissions
- Growing recognition of wetlands' role in climate change mitigation.
- Significant offset supply along the Gulf Coast
- Tierra Resources is staged to transact the first blue carbon offsets globally.





# Thank You

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# Josephine Leigh Mack Bozzelle

*Our newest team member;-)*

