EFFECT OF HYDROLOGIC RESTORATION ON COASTAL WETLAND SOIL PROPERTIES

Alina Spera
Louisiana State University – Wetland and Aquatic Biogeochemistry Laboratory

LSU College of the Coast & Environment
Wetland Loss in Louisiana
Louisiana’s Comprehensive Master Plan for a Sustainable Coast

Source: CPRA 2012 Coastal Master Plan
Legacy Diversions

Davis Pond Freshwater Diversion
Caernarvon Freshwater Diversion

Source: NASA/Modis - LSU Earth Lab. Image Date May 17, 2011
Freshwater Diversion – Davis Pond

- Finished in 2002, full capacity in 2006
- 10,650 cfs (1.8% of average river discharge)
- 10,000 acre ponding area
- Salinity management tool

Source: US Army Core of Engineers

Source: Chuck Villirubia and CPRA
Davis Pond Wetland

Nov 29, 2011

Photos: Alina Spera and Eddie Weeks (2018)
Davis Pond Wetland

Photos: Alina Spera and Eddie Weeks (2018)

Nov 29, 2011
Davis Pond Wetland

Photos: Alina Spera and Eddie Weeks (2018)
Past work: soil properties baseline

- Dr. Ron Corstanje’s sampling design
- 142 stations, 0-10 cm
- LOI, BD, TC, TN, TP
- Baseline of nutrient status
- Accretion mechanism

Kral et al. 2012

WABL Photo Library (2007)
Past work: ecosystem functions

• Nutrient removal

• Lisa Gardner (2008)
20 years later, what has changed?
open water $\rightarrow$ emergent vegetation

Nov 29, 2011

March 9, 2018
Continuing Work

• 150 stations, 0-10 and 10-20 cm
• LOI, BD, TC, TN, TP
• Long cores
• Accretion, vegetation changes, nutrient loading
• $^{15}$N study
Preliminary Results: Bulk Density

March 2018

May-June 2007
Nitrogen and Carbon

- Total C (mg/g) vs. Distance from Inflow (km)
  - March 2018
  - May-June 2007

- Total N (mg/g) vs. Distance from Inflow (km)
  - March 2018
  - May-June 2007

Map showing spatial distribution with labeled locations.
Phosphorous

March 2018

May-June 2007
Nitrate concentrations and DEA along flow path

- March 2018 = No treatment
- General DEA trends were high
What I hope to achieve

• How have nutrients and sediments impacted plant health and wetland resilience, accretion mechanism and ecosystem functions?
• More clear cut answers on impact of diversions
Questions?

Acknowledgments

• Advisor: John White
• Eddie Weeks
• WABL Family
• SWS