

# NOAA Restore Marsh Food Web Project Advisory Meeting & Site Visit

*Linking Community and Food-Web Approaches to Restoration: An Ecological Assessment of Created and Natural Marshes Influenced by a River Diversion*



Feb. 7th, 2019, 1:00 – 5:00pm CDT,  
Room “Imperial 5AB”, Hyatt Regency New Orleans

*Join from your computer, tablet or smartphone.*

<https://global.gotomeeting.com/join/580293133>

*You can also dial in using your phone.*

*United States: +1 (571) 317-3122*

*Access Code: 580-293-133*

# Welcome:

The meeting will cover these general topic areas: 1) Research team, 2) Project activities to date, 3) Project activities over the next 12 months, and 4) Project administration.

We also will provide time for questions and feedback from our project advisors & technical monitors.



# Agenda:

## Introduction:

- 1:00 - 1:05 pm: Welcome and introductions – Polito
- 1:05 – 1:10 pm: Brief overview of project goals – Polito

## Research Team:

- 1:10 – 1:30 pm: Research Team Overview
  - 1) Polito, 2) Swenson, 3) Roberts, 4) Engel, 5) Rabalais, 6) Hooper-bui, 7) Martin, 8) Lopez-Duarte, 9) Olin, 10) Jensen
- 1:30 – 1:40 pm: Questions/Feedback

## Looking Back :

- 1:40 – 1:50 pm: Looking Back – Part 1
  - Hydrology & Elevation Mapping –Swenson
  - Primary Producers & Nutrients –Roberts
  - Bacteria, Archaea, Fungi –Engel
  - Infauna – Rabalais
  - Macroinvertebrates & Litterbag Sampling – Polito
- 1:50 – 1:55 pm: Questions/Feedback from Advisors & Monitors

- 1:55 – 2:05 pm: Looking Back – Part 2
  - Insects – Hooper-bui
  - Suction & Trawl Sampling – Martin
  - Minnow Traps – Lopez-Duarte & Olin
  - Biomarkers – Polito, Olin, & Lopez-Duarte
  - Food-web Modeling – Jensen
- 2:05 – 2:10 pm: Questions/Feedback
- 2:10 – 2:15 pm: Looking Back – Part 3
  - End user engagements – Polito & Swenson
- 2:15 – 2:30 pm: Questions/Feedback from Advisors
- 2:30 – 2:40 pm: Short Break

## Looking Forward:

- 2:40 – 2:50 pm: Looking Forward – Part 1
  - Hydrology & Elevation Mapping –Swenson
  - Primary Producers & Nutrients –Roberts
  - Bacteria, Archaea, Fungi –Engel
  - Infauna – Rabalais
  - Macroinvertebrates & Litterbag Sampling – Polito
- 2:50 – 2:55 pm: Questions/Feedback



# Agenda:

## Looking Forward:

- 2:55 – 3:05 pm: *Looking Forward – Part 2 (~2 mins each)*
  - *Insects – Hooper-bui*
  - *Suction & Trawl Sampling – Martin*
  - *Minnow Traps – Lopez-Duarte & Olin*
  - *Biomarkers – Polito, Olin, & Lopez-Duarte*
  - *Food-web Modeling – Jensen*
- 3:05 – 3:10 pm: *Questions/Feedback from Advisors & Monitors*
- 3:10 – 3:15 pm: *Looking Forward – Part 3*
  - *End user engagements – Polito & Swenson*
- 3:15 – 3:30 pm: *Questions/Feedback from Advisors*
- 3:30 – 3:55 pm: *Coffee Break & Small Group Q/A & Discussions*

## Project administration:

- 3:55 – 4:00 pm: *Contingencies & project changes – Polito*
- 4:00 – 4:05 pm: *Budgets, subs, permits, & equipment – Polito*
- 4:05 – 4:20 pm: *Data management – Rabalais, Morrison, Wick*
- 4:20 – 4:25 pm: *Project website & outreach – Rabalais*
- 4:25 – 4:30 pm: *Questions/Feedback from Advisors*

## Summary Feedback:

- 4:30 – 4:55 pm: *Summary Feedback from Advisory Board members & NOAA Restore Team*
  - *Pat Williams – NOAA, Kevin Roy – USFWS, Sharon Osowski – EPA, Stuart Brown - CPRA, Robert Spears - Plaquemines Parish*
  - *Melissa Carle, Shannon Martin, & Frank Parker NOAA Restore*
- 4:55 – 5:00 pm: *Wrap up and next steps – Mike Polito*





# Brief Overview of Project

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**Project Goal:** The primary goal of this research is guide future restoration effort by integrating community and food-webs approaches into management and restoration planning.

## **Translation to Management:**

- Compare with community and species level models commonly used by CWPPRA to evaluate marsh restoration projects.
- Identify the insights managers can gain from metrics of food web structure that can help interpret and refine current models and practices.



# Brief Overview of Project

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## Three Specific Objectives:

1. To examine species composition, relative abundances, and food web structure at created vs. natural marshes.
2. To examine species composition, relative abundances, and food web structure in natural marshes along a salinity gradient.
3. To use the above field data to develop and test an ecosystem model that will be used to predict the outcome of habitat restoration efforts on marsh food web structure, function and resilience.

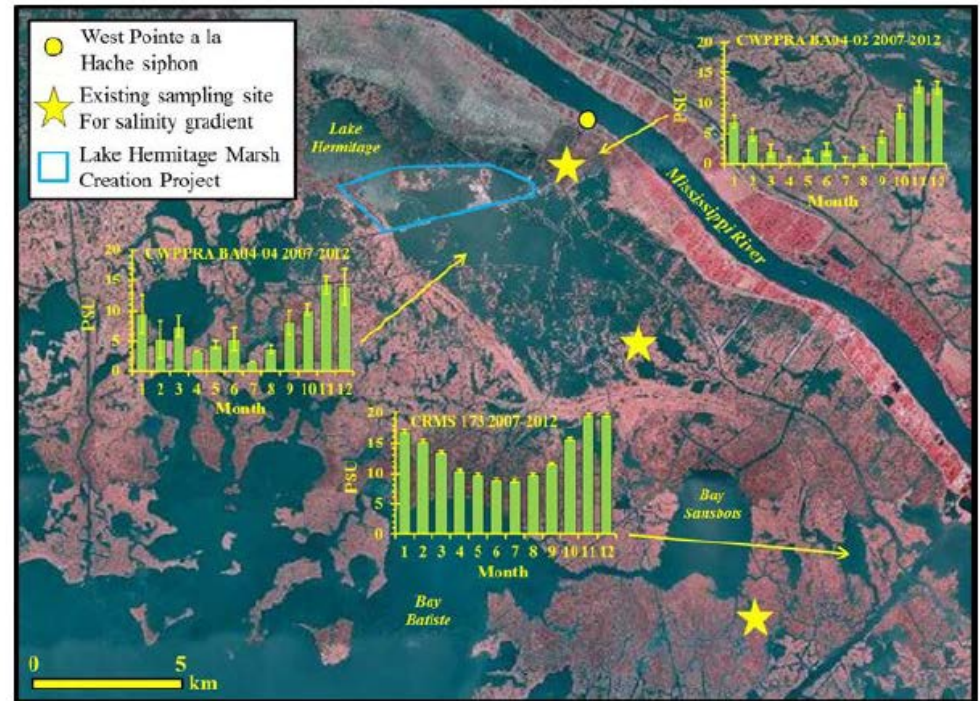


# Brief Overview of Study Design

**Study Area:** West Point a la Hache area and Lake Hermitage Marsh Creation Project within Barataria Bay, in Plaquemines Parish, Louisiana.

**Study Design:** Sample two created marsh sites and one natural site at the Lake Hermitage Marsh Creation Project and three natural marsh sites at varying distances from the WPH siphon over a three year period:

- Spring 2018 (Siphon off)
- Spring 2019 (Siphon recently on?)
- Spring 2020 (Siphon on)



**\*\* Additional Data:** Spring 2016 (siphon on) - Stable isotope data for four natural marsh sites at varying distances from the siphon.



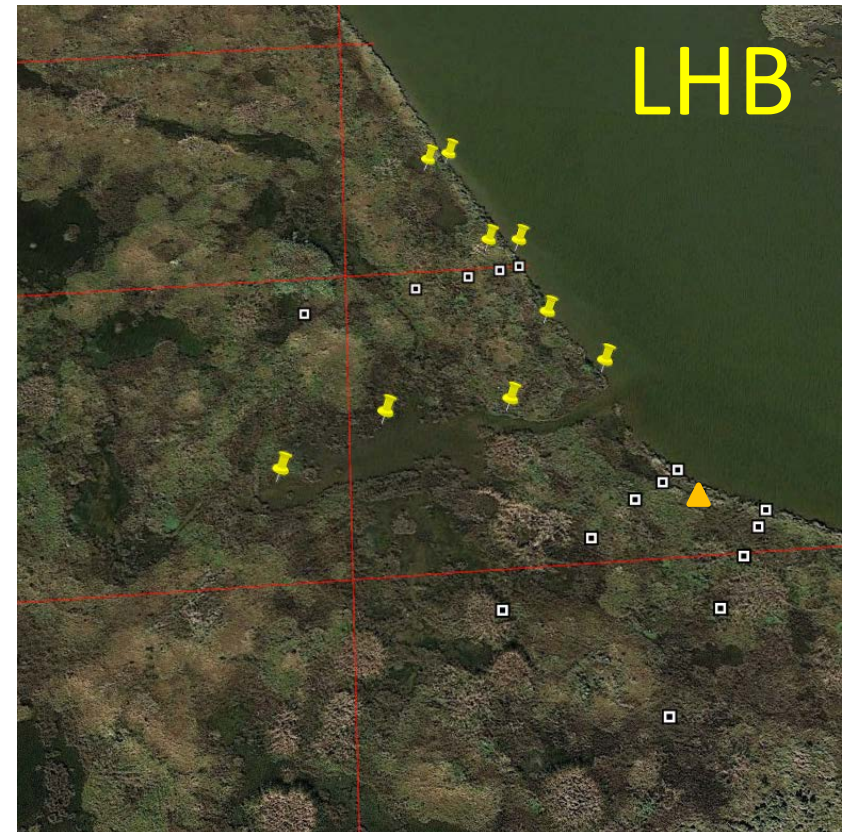
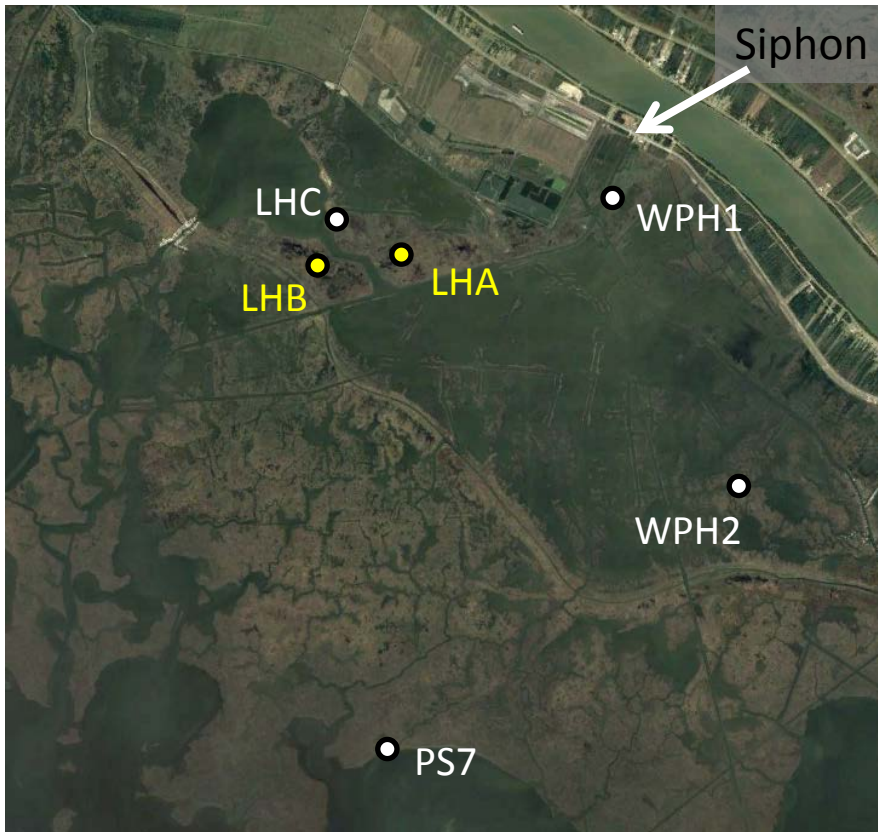
# Brief Overview of Recent Field Work

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**March 2018:** Established sites and deployed water level / salinity recorders

**May 2018:** Project team conducted comprehensive sampling over ~10 days

**July 2018:** Measured marsh elevation, collected litter bags and ancillary data





# Research Team

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# Research Team

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## *Polito & Swenson Labs – Louisiana State University*

- **Dr. Michael Polito:** Lead PI, Overall project administration and direction. Coordinate field work, supervise SIA and CSIA, and contribute to food web analyses.
- **Mr. Erick Swenson:** Research Associate, deployment and servicing data sondes, analysis of sonde data from LSU Food Web sites. Develop water level and salinity data base using LA CPRA CRMS data stations, USGS data stations, and NOAA-NOS data stations.
- **Dr. Sydney Moyo:** Postdoctoral Researcher, using CSIA to trace aquatic and terrestrial resource use along a salinity gradient imposed by a river siphon.
- **Dr. Hayat Bennadji:** Research Associate, oversee SIA & IRMS instrumentation and analyses.
- **Katelyn Lamb:** MS Student, carbon source and trophic structure in created & natural marsh food webs using SIA.
- **Joseph Winston:** BS student, Litter bag decomposition and invertebrate community
- **Allison Benelli, Thinh Huynh, Rohit Kalvakaalva:** BS students, sample dissection, field work
- **LSU Center for Geoinformatics:** Provided instrumentation for RTK surveys, processed survey data to give us latitude, longitude, and elevation in NAVD88

### **Updates:**

- Dr. Bennadji on maternity leave (Nov. 2018 to Feb 2019), R. Kalvakaalva graduated Dec. 2018.
- No vacant positions or other personal changes .

# Research Team

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*Roberts Lab –LUMCON*

- **Dr. Brian Roberts:** CoPI, Supervise and coordinate primary producer and nutrient research, contribute to macroinvertebrate and litter bag decomposition studies.
- **Ekaterina Bulygina:** Research Associate, oversee laboratory processing and analyses of samples.
- **Ryann Rossi:** Postdoctoral Research Associate (not financially supported by NOAA grant), help co-lead field sampling logistics, sample processing and data analyses.

## **Updates:**

- No vacant positions or other personal changes .

# Research Team

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## *Engel Lab –University of Tennessee*

- **Dr. Annette Summers Engel**: PI; participate in field work, supervise microbial DNA analyses from sediment, soils, and water; contribute water chemistry, soil chemistry, and biomass estimates for web analyses; contribute to reports, publications, and other project products.
- **Audrey Paterson**: Laboratory Manager and Research Associate; participate in field work, assist with sample processing and data analysis, coordinate data management.
- **Dr. Susan Pfiffner**: Research Associate Professor, phospholipid fatty acid profiles (lipid biomarker) and biomass estimates from lipid-phosphorus content and functional characterization.
- **Abby Harmon**: Research Coordinator, participate in field work; process samples and contribute to data analysis.
- **Julie Coulombe** : BS student; assisted with sample processing and laboratory work

### **Updates:**

- Abby Harmon and Julie Coulombe no longer part of project (as of Dec. 2018).
- Still searching for a graduate student to continue the research efforts, particularly considering the upcoming field work and sample processing needs; have advertised broadly (internationally)



# Research Team

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*Rabalais Lab – LUMCON & Louisiana State University*

- **Dr. Nancy Rabalais:** PI, Marsh infauna Lead, Project administration, taxonomy, data assimilation *[0.5-1.0 mo/yr]*
- **Wendy Morrison:** Senior Research Associate, assist in administration, field logistics, sample tracking, data management. *[3.5-4 mo/yr]*
- **Gina Woods:** Research Assistant, field work, sample analyses. *[0.5-2 mo/yr]*
- **Jason Weick:** Data Manager, development of data management plan, DIF content, tracking of data, sharing of data, submission of data. *[2 mo/yr, w Morrison and Rabalais]*
- **Undergraduate Research Assistant(s):** Sample processing. *[as available]*

## Updates:

- **Dr. Leslie Smith:** President, Your Ocean Consulting, LLC. Data analysis, web site. *[as appropriate]*

# Research Team

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*Hooper-Bui –Louisiana State University*

- **Linda Hooper-Bùi:** PI, Conduct field work, supervise insect sorting, identify insects, cooperate with Polito lab for isotope analysis, and contribute to food web analyses.
- **Rachel Strecker :** Research Associate, oversee insect collection, sorting, and analyses.
- **Rachel Snider:** PhD Student, field work, oversee insect sorting and analyses
- **Undergraduate Research Assistant(s):** Catherine Smith, 2 to be hired. One recruited and recruiting on-going.

## Updates:

- Rachel Strecker changed jobs Dec 2018, Rachel Snider came on board January 2019. Strecker is available for field sampling in 2019, if needed.
- I must have someone (maybe 2) named Rachel with me at all times.
- Undergraduate student Catherine, moved to a different project in my laboratory on a Presidential Fellowship.

# Reserch Team

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*Martin Lab –University of Florida*

- **Dr. Charlie Martin:** CoPI, Supervise and coordinate nekton research, contribute to community analyses.
- **Whitney Scheffel:** Research Associate, assist with scheduling and logistics, participate in field research, and oversee sample processing.
- **Dr. Ashley McDonald:** Postdoctoral Researcher, Assist with various tasks including processing and statistical analyses as necessary.
- **Scott Alford:** PhD Student, dissertation project focuses on the effects of freshwater discharge on estuarine communities.
- **Sawyer Downey:** BS student, Assist with sample processing as needed.
- **Christina Moreau:** Research Associate, assist with sample processing as needed.

## Updates:

- No vacant positions or other personal changes .

# Research Team

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*Olin Lab – Michigan Technological University*

- **Dr. Jill Olin:** Co-PI, Coordinate and implement minnow trap aspects of field work, supervise sulfur stable isotope analysis, and contribute to community and food web analyses.
- **Kaitlyn Dawson, Hanna Reish:** BS student volunteers, sample dissection, sample preparation for analysis

## **Updates:**

- No vacant positions or other personal changes.



# Research Team

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*López-Duarte Lab – University of North Carolina at Charlotte*

- **Dr. Paola López-Duarte:** Co-PI, Coordinate and implement minnow trap aspects of field work, conduct otolith microchemistry analysis, and contribute to community and food web analyses.
- **Maggie Shaw:** Rutgers technician; coordinate and assist with field sampling and laboratory analyses.
- **Melissa Hatley:** undergraduate research student for spring 2019; sample dissection, otolith preparation for analysis
- **Julia Nelson:** undergraduate Honors student through spring 2020; sample dissection, otolith preparation for analysis, microchemical data analysis.

## Updates:

- No vacant positions or other personal changes.

# Research Team

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*Jensen – Rutgers University*

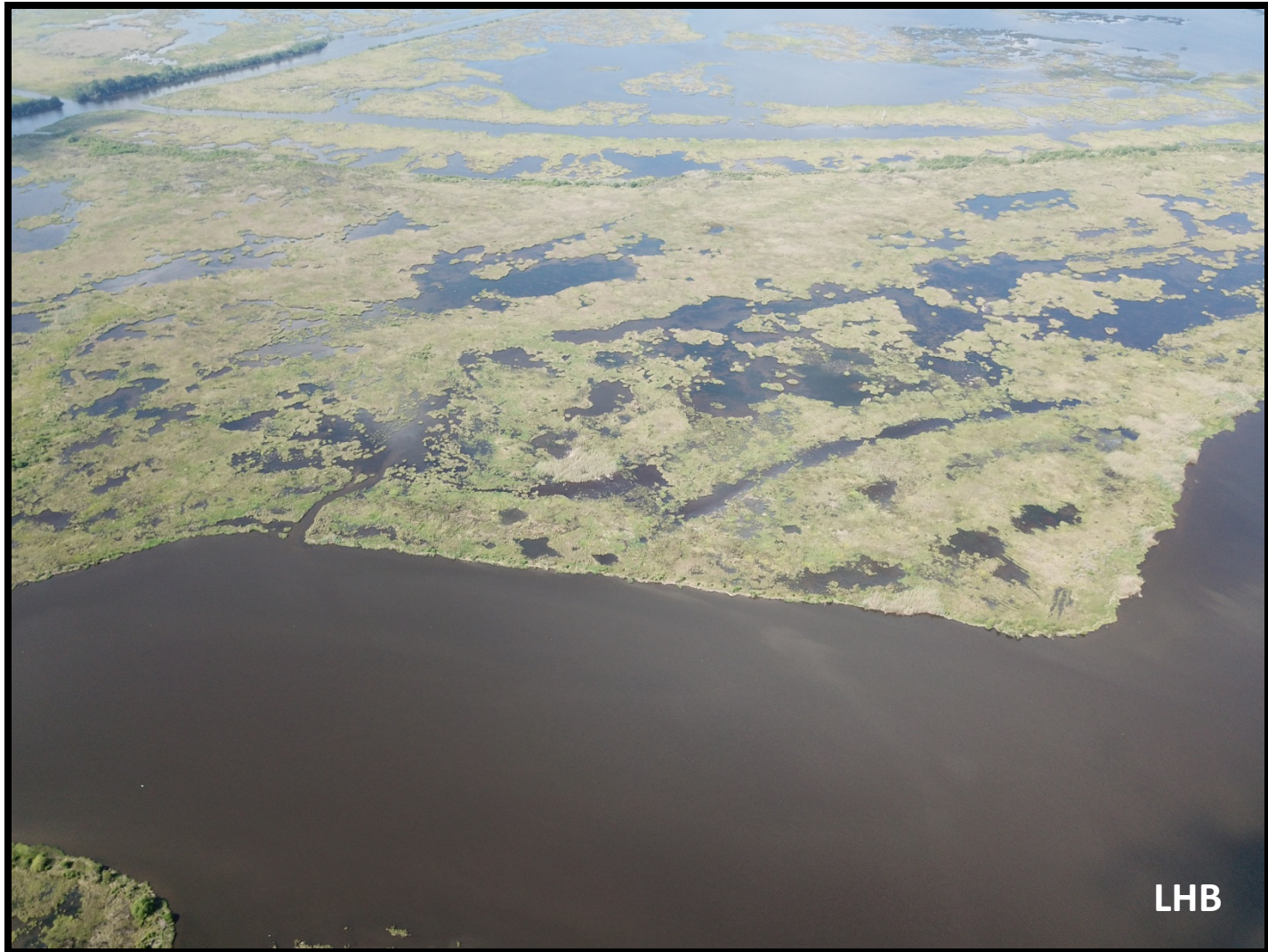
- **Olaf Jensen:** PI, Coordinate and supervise the development of the food web models, and contribute to community and food web analyses.

## **Updates:**

- *Kiva Oken (postdoc) left in November. We're waiting on approval to hire her replacement and I expect we'll have an ad out within the next few weeks. The impact on the project timeline has been minimal as further model development depends on field data which have not yet been collected.*

# Questions and Feedback

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# Looking Back (Part 1)

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Brief summary of major research activities to date, ongoing analyses and preliminary results (*~2 mins each*)

- Hydrology & Elevation Mapping – Swenson
- Primary Producers & Nutrients – Roberts
- Bacteria, Archaea, Fungi – Engel
- Infauna – Rabalais
- Macroinvertebrates & Litterbag Sampling – Polito

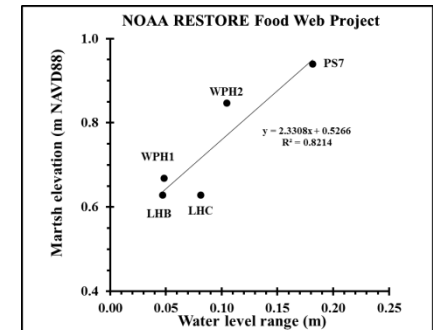
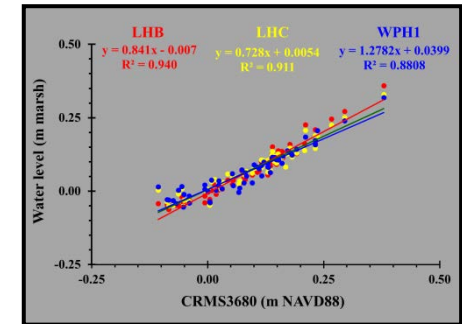
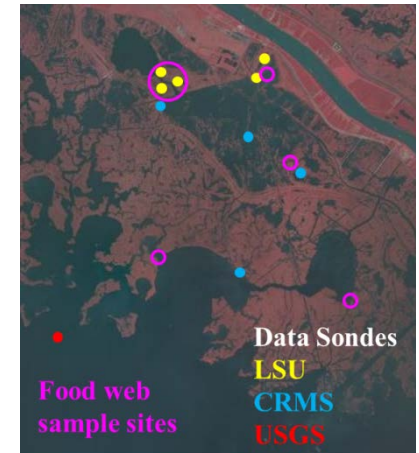




# Looking Back: Hydrology & Elevation Mapping

*Erick Swenson, Michael Polito – LSU*

- Field Work: March to July 2018
  - Install and service data sondes at LHA, LHB, LHC, WPH1, siphon outfall channel
  - RTK elevation surveys conducted
- Lab Work:
  - Preliminary analysis water level and salinity data started
  - Obtained additional data from NOS, USGS, CRMS stations in the project area
  - Summarized elevation data, developed tidal range:elevation relationship
- Results:
  - LSU water levels closely track CRMS station
  - Strong relationship between marsh elevation and observed water level range

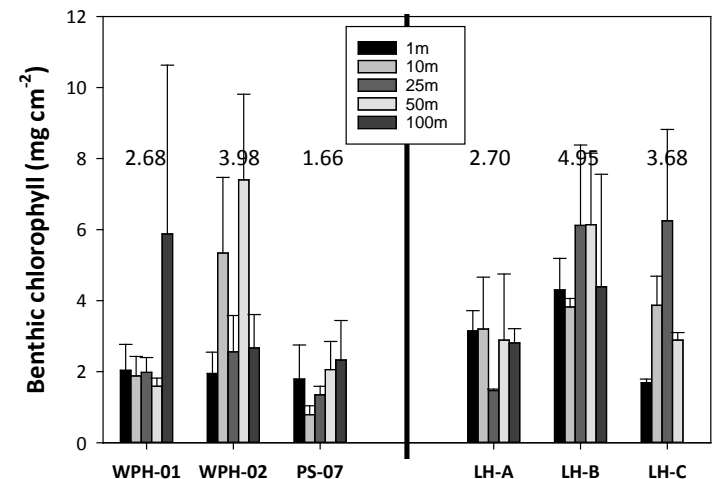
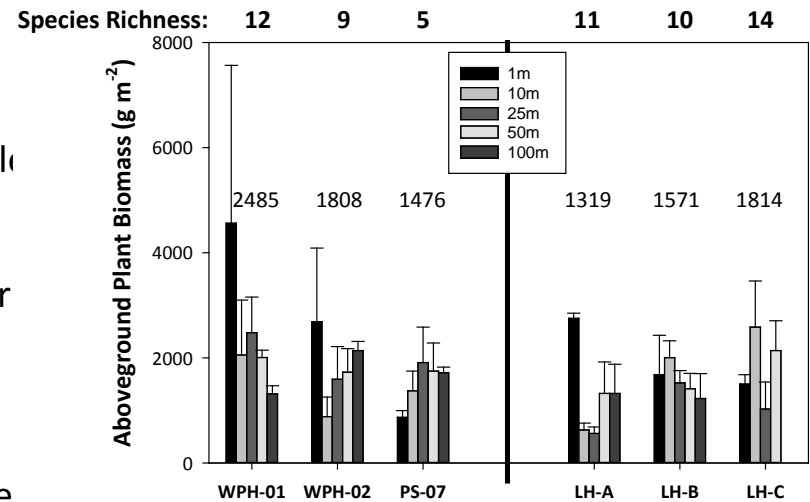


**"On Schedule"**

# Looking Back: Primary Producers & Nutrients

Brian Roberts – LUMCON

- Field Work: spring and summer 2018
  - 3 transects per site, 5 distances from edge (1,10,25, 50, 100m)
  - Clip plot, sorted by species, determine biomass (coll additional species for biomarkers)
  - Benthic chlorophyll
  - Surface soil cores for OM, C/N/P, BD, WC, porewater salinity, pH
  - Water column chlorophyll
- Lab Work:
  - Processing and analyses of samples described above (completed by end of summer 2018)
- Results:
  - *Aboveground Plant Biomass and Species Richness*
    - Biomass decreases along salinity gradient (no clear pattern with distance)
    - Biomass lower in two restored sites than control (no spatial patterns)
    - Richness decreases with salinity and was lower in restored than in controlled sites
  - *Benthic chlorophyll*
    - no clear patterns but lower at PS07



**“On Schedule”**

# Looking Back: Microorganisms (Bacteria, Archaea, Fungi)

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*Annette S. Engel – Univ. Tennessee*

- Field Work: May to July 2018
  - collected 48 soil + 8 water samples (added one more 'control')
  - 1, 10, 100 m inland + 1 m offshore (added more distances & core depths)
  - soil pH, conductivity, temperature; water physicochemistry
- Lab Work:
  - DNA extraction from all samples
  - Soil & sediment samples analyzed for org C & water content & grain size
  - Selected samples (surface, 0-2 cm, and deepest, 8-10 cm, depth chosen for DNA sequencing, lipid biomarker analysis, and biomass estimates
  - Lipid analyses exchanged for proposed qPCR methods to estimate biomass because we can estimate biomass of prokaryotes & eukaryotes, as well as assess metabolic function for some microbial groups, including stress indicators
- Results:
  - Created marsh soils have less org C content than natural marshes (p-value = 0.001); created marsh soils have higher soil pH values, closer to the pH of open water, than natural marshes (p-value = 0.01); created marsh soils have slightly lower conductivity than natural marshes that have values closer to open water (p-value 0.04)
  - Microbial biomass (total lipid pmol/g) is lower in the created marsh soils than the natural marshes (p-value < 0.001), as well as in the sediments (p-value = 0.01)
  - DNA sequencing is still underway for eukaryotic diversity; metagenome results are still pending (this will require months of computational time to complete analyses)

**On Schedule (with the exception of data analysis once the additional sequences and metagenomes return; this effort will probably take through the year)**



# Looking Back: Marsh Infauna

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*Nancy Rabalais, Wendy Morrison, Gina Woods – LSU & LUMCON / LUMCON / LUMCON*

- Field Work: May 2018
  - 1 transect per site, 2 distances from edge (10, 50\*m)
  - \*Coordinated with B Roberts main transect to ensure maximum ancillary data incorporation
  - 5 replicate infauna samples
- Standard Operating Procedure, May-June 2018
  - Developed for field work
  - Will be incorporated into metadata
- Lab Work:
  - Sample tracking (infauna, TOC, GS) and storage
  - Development of standard protocol
- Results:
  - *NA to date, will consolidate spring 2018 and spring 2019 lab work*

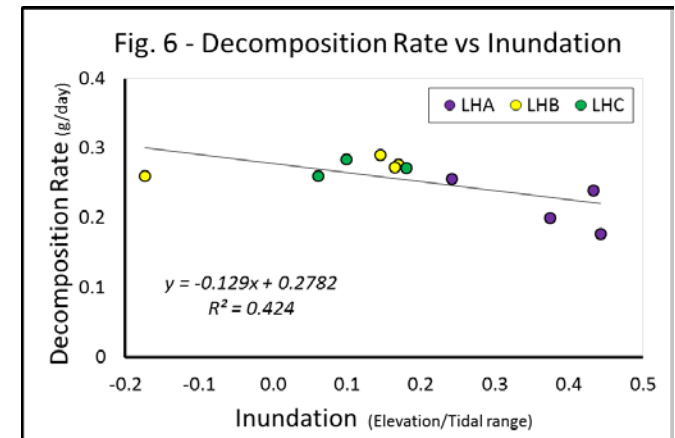
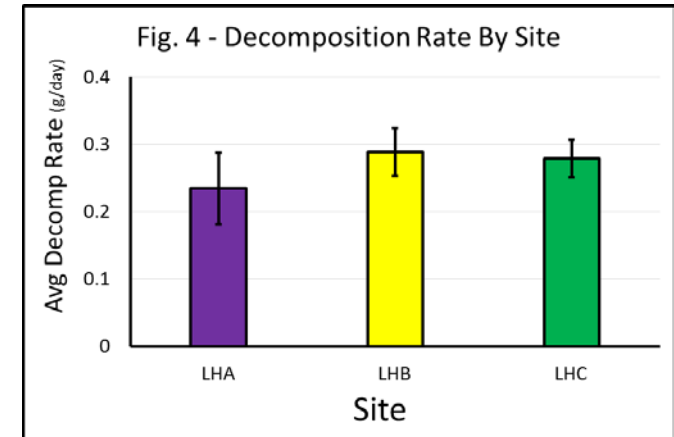


*Somewhat On Schedule*

# Looking Back: Macroinvertebrates & Litterbags

Michael Polito, Brian Roberts, López-Duarte – LSU / LUMCON / UNCC

- Field Work: May to July 2018
  - 1 transect per site, 5 distances from edge (1,10,25,50,100\*m)
  - 5 replicate *S. alterniflora* litter bags per distance deployed for 2 months
- Lab Work:
  - Decomposition rates measured
  - Starting inverts sorting and identification
- Results:
  - *S. alterniflora* decomposition is highest in sites with lower elevation and larger tidal range
  - Invert community results pending



**“On Schedule”**



# Questions and Feedback

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# Looking Back (Part 2)

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Brief summary of major research activities to date, ongoing analyses and preliminary results (*~2 mins each*)

- Insects – Hooper-bui
- Suction & Trawl Sampling – Martin
- Minnow Traps – Lopez-Duarte & Olin
- Biomarkers – Polito, Olin, & Lopez-Duarte
- Food-web Modeling – Jensen





# Looking Back: Terrestrial Insect Sampling

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*Linda Bui & Rachel Strecker – LSU*

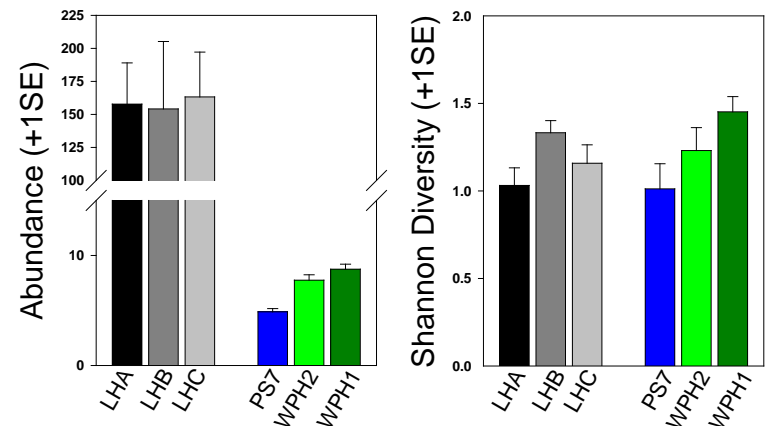
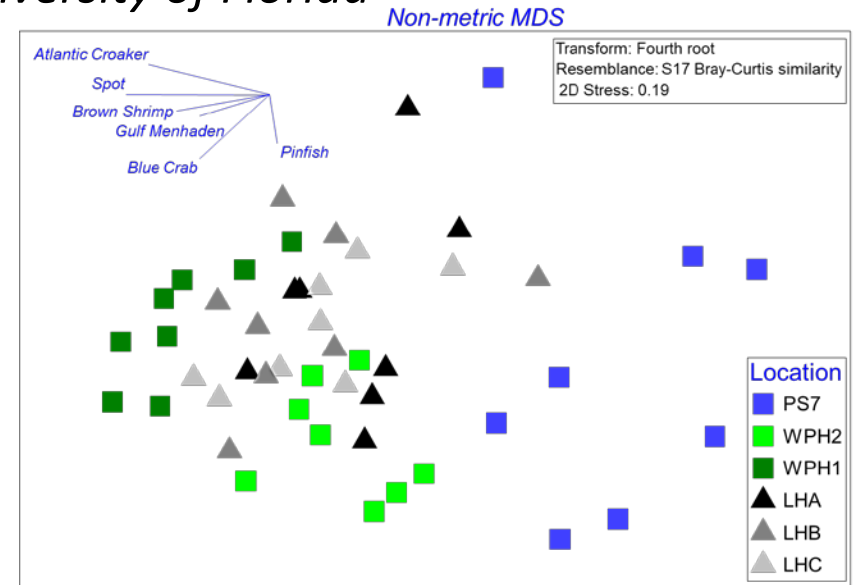
- Field Work: May 2018
  - Sweep samples were taken at each site daily for four days and placed in ethanol
  - Emergence traps were set up in the field and insects were removed daily for three days. They were checked 5 days later.
- Lab Work:
  - Sorting and identifying insects
- Results:
  - Insects in ethanol are  $>1/3$  sorted; SI samples are still frozen
  - Very few insects were found in the emergence traps. Likely because of cold weather and early season sampling



# Looking Back: Nekton Sampling

Charles W. Martin – University of Florida

- Field Work: May to July 2018
  - Trawls – n=8/site, 3 minutes each
  - Suction sampling – n=10/site along salinity gradient
- Lab Work:
  - Suction samples sorted/identified
- Results:
  - *Trawls*:
    - 31 species captured, 9784 total individuals
    - Community:  
LHA=LHB=LHC≠PS7≠WPH2≠WPH1
    - Abundance: LH > PS/WPH
  - Suction samplings community results pending

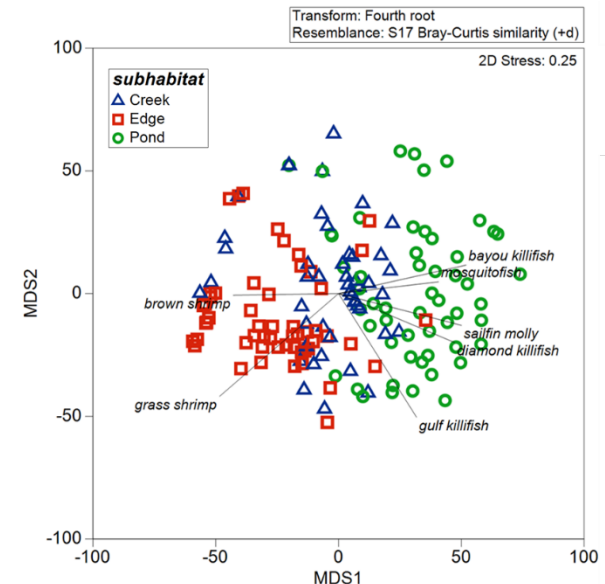


**“On Schedule”**

# Looking Back: On-marsh Nekton Community

López-Duarte, Olin – UNCC / MTU

- **Objective:** To evaluate the on-marsh nekton community across sites (restored vs. natural) and sub-habitats (**edge**, **creek**, **pond**).
- **Methods**
  - 3 minnow trap deployments  $\times$  1 hr  $\times$  6 sites  $\times$  3 sub-habitats
  - Data collected in the field include species composition, abundance, length (mm), weight (g), salinity, and temperature.
  - Sub-samples of field collections frozen and for *biomarker analysis*.
- **Results**
  - Nekton community varies among sub-habitats (ANOSIM, Global R = 0.333,  $p=0.001$ ) across all sites
  - Generally, habitats are characterized by brown and grass shrimp (**edge**) or Cyprinodontiformes (killifish and molly; **pond**)



**“On Schedule”**

# Looking Back: Biomarkers

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*Mike Polito, Jill Olin, & Paola Lopez-Duarte – LSU/MTU/UNCC*

- Samples collected in May 2018
  - Muscle tissue: 42 fish & invert spp. (563 & counting)
  - Plants & SAV: 12 spp. 3+/site/species (~133 total)
  - Algae: 6/site (36 total)
  - Soil organic matter: 5/site (30 total)
  - Particulate organic matter: 6 site (36 total)
  - Benthic microalgae: 3/site (12 total)
- Stable isotope analysis (SIA) of May 2016 complete; May 2018 In progress
- Compound-specific (SIA) of May 2016 in progress
- Fish heads saved during dissections for otolith micro- chemical analysis
  - 100+ & counting

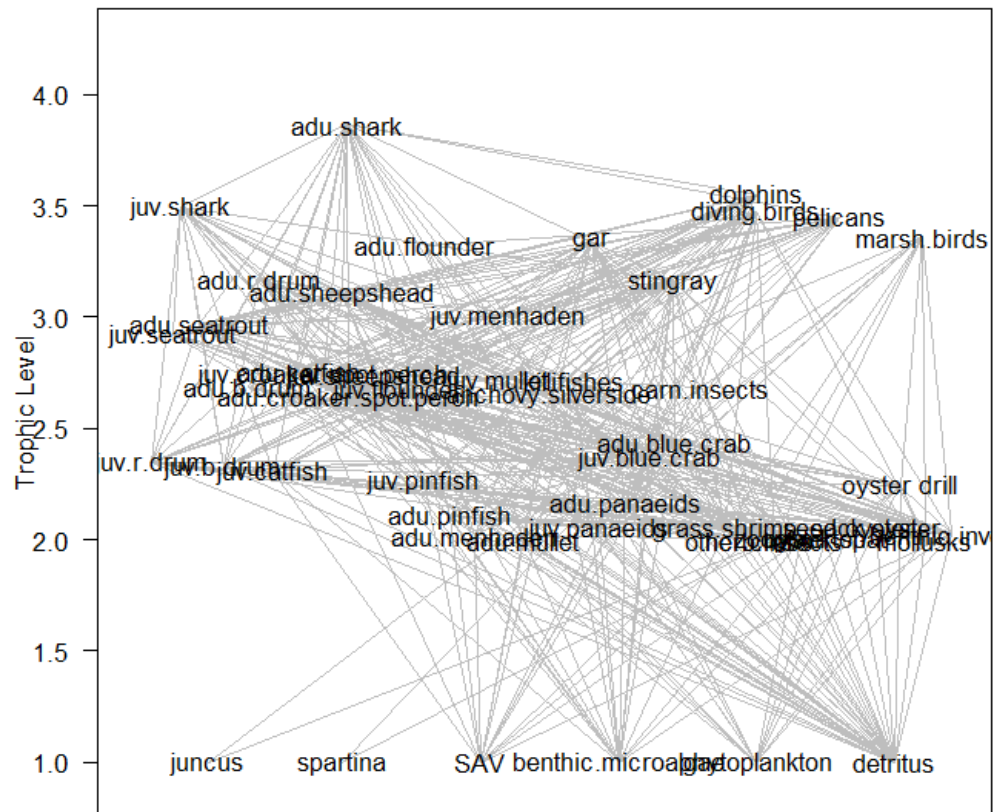


# Looking Back: Food Web Modeling

*Olaf Jensen – Rutgers*

- January 2018 – Food web modeling meeting brings together CWC and RESTORE PIs plus outside experts to initiate development of an Ecopath with Ecosim (EwE) model
- November 2018 – Initial EwE model completed

**On Schedule**





# Questions and Feedback

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# Looking Back (Part 3)

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Brief summary of major research activities to date, ongoing analyses and preliminary results *(5 mins)*

- Communication & End-User Engagements – Polito & Swenson





# Looking Back: Communication

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## Conference Presentations:

- 1) Engel et al. - Additional of microbial community composition in the evaluation of habitat suitability for tidal marsh restoration projects: A case study from the Lake Hermitage Marsh Creation Project, Plaquemines Parish, Louisiana GOMOSES, Feb. 2019, New Orleans, LA.
- 2) Jensen et al. - Why Were Saltmarsh Fish and Invertebrates so Resilient to the Deepwater Horizon Oil Spill? GOMOSES, Feb. 2019, New Orleans, LA.
- 3) Lopez-Duarte et al. - Evaluating Fish Abundance and Composition in Restored vs. Natural Salt Marshes, GOMOSES, Feb. 2019, New Orleans, LA.
- 4) Martin et al. - Effects of River Diversions, Restoration, and Salinity on Nekton Community Structure in Southeast Louisiana Marshes. GOMOSES, Feb. 2019, New Orleans
- 5) Olin et al. - Characterizing energy sources to the saltmarsh food web along the salinity gradient. GOMOSES, Feb. 2019, New Orleans
- 6) Winston et al. - Invertebrate community composition and organic matter decomposition in created & natural brackish marshes in coastal Louisiana. GOMOSES, Feb. 2019, New Orleans, LA.

**“On Schedule”**



# Looking Back: Communication

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## Coordinated Outreach with NOAA:

- Email communication with C. Young (NOAA Restore) Nov. 2018 about providing NOAA NCCOS with media files (video, stills, etc) from May 2018 field work for NOAA NCCOS to produce a short video to be posted on the NOAA restore program website.
- Dropbox Folder provided by NOAA NCCOS for Research Team and is being populated with media files (video, stills, etc).
- Will work with NOAA NCCOS in 2019 to continue this collaboration.

## Other Outreach :

- Hooper-Bui - Two “Skype-a-Scientist” in January 2019 in California and Nevada. Total 11 classrooms 1st-5th graders.

**“On Schedule”**



# Looking Back: End User Engagements

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## *Management Advisory Panel*

### Management Advisory Panel & Site Visit Meetings :

- October 18, 2017. Face to face meeting with Baton Rouge members of the Panel to discuss implications to the project due to the delay in siphon operation follow up with non-Baton Rouge members by email.
- November 14, 2017. Online meeting to introduce study participants, summarize project objectives and obtain Advisory Panel comments.
- October 15, 2018. Online meeting for PI's to present summary of results to date and obtain input from Advisory Panel.
- February 7, 2019. In person "Site Visit" & Advisory Panel meeting.

### Major Feedback & Implementation Activities:

- Discussion on study design changes due to siphon construction. Advisors recommend concentrating in the Lake Hermitage over a three year period
- Identified infauna as a data limitation in ecosystem models. Jenson & Rabalais coordinating efforts to better incorporating the infauna data into EwE models.
- Recommended linking hydrology & elevation data from project with CPRA funded elevation monitoring. E. Swenson working to connect with CPRA to implement this feedback.

**"On Schedule"**



# Looking Back: End User Engagements

## *West Point a la Hache Siphon Stake-Holders*

### Meetings & Communication efforts:

- 9/14/17 - Call with Randy Persica Resident Engineer & Administrative Contracting Officer, New Orleans Area Office, USACE
- 10/25/17 - Conference call with Vincent Frelich Director of Coastal Restoration for Plaquemines Parish, Mr. Robert Spears, & Ms. Krista Clark
- 10/4/18 - Email updates from USACE
- 10/5/18 - Call with Operations Manager Steve Moser, K-Belle Construction.
- 1/28/19 – Email updates from USACE and , K-Belle Construction.
- 1/29/19 - Call with John Helmers, new Director of Coastal Restoration for Plaquemines Parish

### **Updated Construction Timeline:**

- USACE/K-belle estimate project compete in June/July.
- Parish, testing siphon equipment now, would like to turn on siphon earlier than June/July if USACE allows.



**“Behind Schedule”**

# Looking Back: End User Engagements

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## *CPRA Engagment & New End Users 2017-18*

### CPRA & Lake Hermitage End-Users :

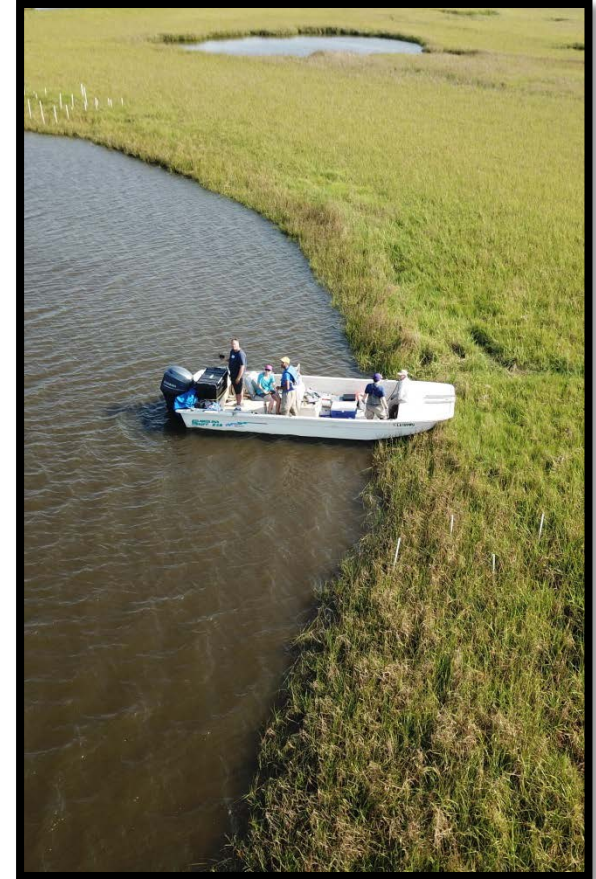
- Mar/Apr 2018 – Calls/Email communication with Danielle Richardi (CPRA) who leads post-construction monitoring for the Lake Hermitage Marsh Creation Project.
- Ray Brandt - Captain Zach's Myrtle Grove Properties LLC

### New Major End Users:

- Vincent Frelich - Plaquemines Coastal Zone Management
- Robert Spears - Plaquemines Coastal Zone Management
- Krista Clark - Plaquemines Coastal Zone Management
- Danielle Richardi - CPRA
- John Helmers - Plaquemines Coastal Zone Management

### New Minor End Users (limited contact):

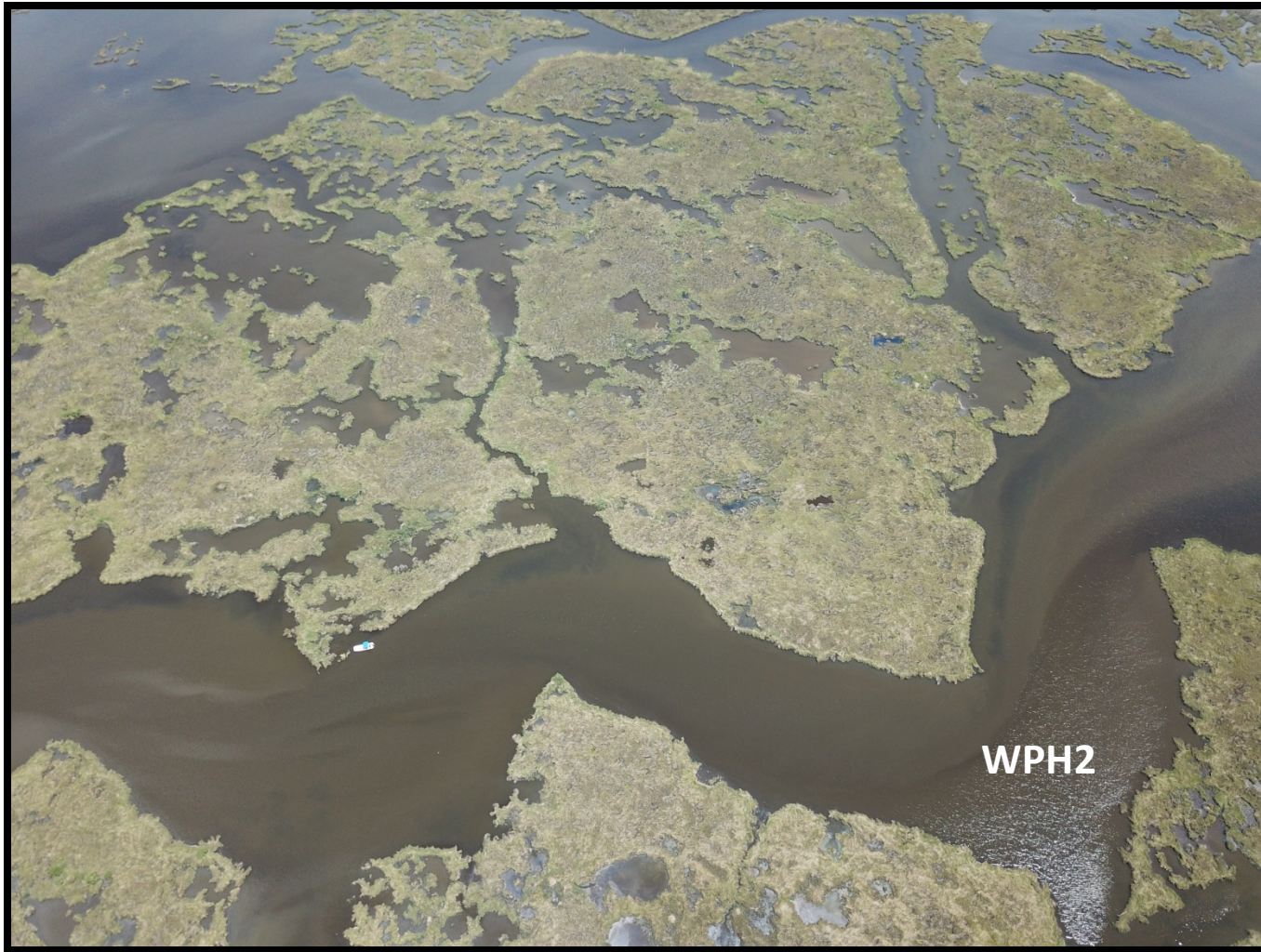
- Amos Comier - Plaquemines Parish President (2017-2018)
- Johnny Bradberry - Governor's Executive Assistant for Coastal Activities (2017-2018)





# Questions and Feedback

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# Break (2:30-2:40pm)

## Next: Looking Forward (FY19)

Task	Status	FY19-Q1			FY19-Q2			FY19-Q3			FY19-Q4		
		Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19
<b>Milestone 1: Project Planning</b>		-	-	-	-	-	-	-	-	-	-	-	-
Subaward/Contract Finalization	On Schedule												
Order Materials/Preparation for Field Sampling and Laboratory Processing	On Schedule												
Completion of Data Management Plan	With NOAA												
Identification of Project Datasets	Delayed												
Calls for Data (internal requests for datasets and updates)	On Schedule												
Submission of data and metadata to NOAA personnel	On Schedule												
<b>Milestone 2: Salinity gradient (objective 1)</b>		-	-	-	-	-	-	-	-	-	-	-	-
Hydroperiod Analyses, Primary Producers & Nutrients, Bacteria, Archaea, Fungi, Infauna, Macroinvertebrates, Insects, Fish & Nekton	On Schedule												
<b>Milestone 3: Natural vs. restored (objective 2)</b>		-	-	-	-	-	-	-	-	-	-	-	-
Hydroperiod Analyses, Primary Producers & Nutrients, Bacteria, Archaea, Fungi, Infauna, Macroinvertebrates, Insects, Fish & Nekton	On Schedule												
<b>Milestone 4: Lab Processing</b>		-	-	-	-	-	-	-	-	-	-	-	-
Species Composition/Abundance	On Schedule												
Tracers	On Schedule												
<b>Milestone 5: Data Analysis</b>		-	-	-	-	-	-	-	-	-	-	-	-
Objective 1: Data Analysis	On Schedule												
Objective 2: Data Analysis	On Schedule												
Objective 3: Model Development, Testing and Analysis	On Schedule												
<b>Milestone 6: Project website</b>		X											
Project website development & publication	Delayed												
<b>Milestone 7: Reporting, Meetings, and Project Planning</b>		-	-	-	-	-	-	-	-	-	-	-	-
Skype Consultations with Mgmt Advisory Board	On Schedule												
In Person Consultation with Mgmt Advisory Board	On Schedule												
Six Month Progress Report Preparation and Submission	On Schedule												
Manuscript Preparation and Submission	On Schedule												
Outreach/Presentation of Results	On Schedule												



# Looking Forward (Part 1)

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Brief summary of major research activities to date, ongoing analyses and preliminary results (*~2 mins each*)

- Hydrology & Elevation Mapping – Swenson
- Primary Producers & Nutrients – Roberts
- Bacteria, Archaea, Fungi – Engel
- Infauna – Rabalais
- Macroinvertebrates & Litterbag Sampling – Polito





# Looking Forward: Hydrology & Elevation Mapping

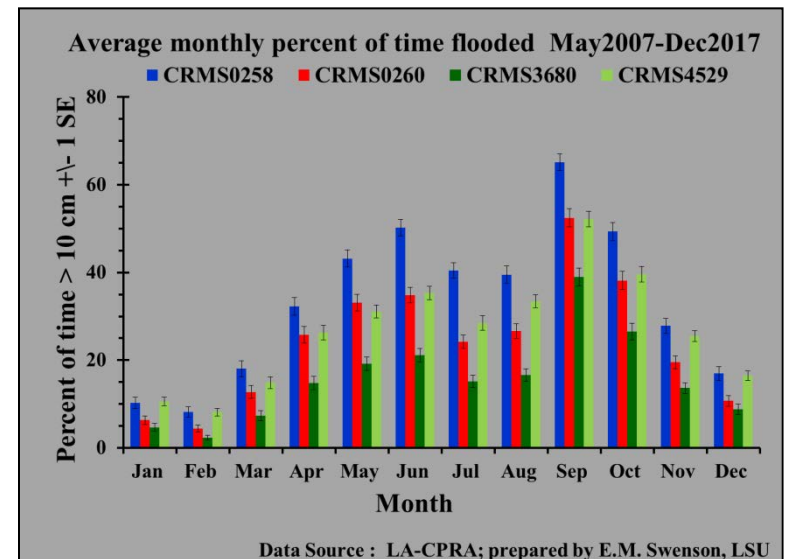
*Erick Swenson, Michael Polito – LSU*

## – 2019 Lab Work & Analyses

- Continue to process LSU data
- Continue to update NOS, USGS, CRMS data files
- Marsh flooding statistics have been calculated for CRMS sites in the project area
- Use elevation data to develop marsh flooding statistics for food web sample sites

## – 2019 Field work

- Continue to service LSU data sondes
- Repeat elevation survey



# Looking Forward: Primary Producers and Nutrients

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*Brian Roberts – LUMCON*

- 2019 Field Work Goals
  - Replicate 2018 sampling in spring 2019
    - May focus more on primary transect and add additional characterizations and possibly distances
    - Added salinity focus if siphon is open
- Analyses
  - Begin looking at inter-annual variation and incorporating results into overall community and food web analyses
  - Conferences: 2019 CERF meeting



# Looking Forward: Microbes

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*Annette S. Engel – Univ. Tennessee*

- 2019 Field Work Goals
  - Replicate sampling in early summer (May) 2019
  - Added salinity focus if siphon is open
- 2019 Lab Work & Analyses
  - Continue with computational microbial diversity and statistical analyses
  - Continue lipid biomarker analysis and comparison
  - Analyze metagenomic data once received
  - Continue comparative analyses
  - Processes new samples collected in May
- Continue recruiting efforts
  - Find graduate and undergraduate students
- Presentations & Publications
  - Conferences: 2019 CERF meeting; 2019 AGU
  - Begin writing up results for publication



## Looking Forward: Marsh Infauna

*Nancy Rabalais, Wendy Morrison, Gina Woods – LSU & LUMCON / LUMCON / LUMCON*

- 2019 Field Work Goals
  - Replicate sampling May 2019
  - Examine salinity trends
- 2019 Lab Work & Analyses
- Infauna
  - Extract & identify
  - Preparation for TOC and grain size analyses
  - Standard Operating Procedure finalized for laboratory
- Data Entry, QA/QC
- Conferences: Benthic Ecology Meeting 2019, 2019 CERF meeting [if possible]

[illegible]



# Looking Forward: Macroinvertebrates & Litterbags

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*Michael Polito, Brian Roberts, López-Duarte – LSU / LUMCON / UNCC*

- 2019 Lab Work & Analyses
  - J. Winston, Honors Project
    - Macro-inverts being extracted & sorted
    - *S. alterniflora* decomposition measured
    - Honors thesis: May 2019
    - Manuscript: Summer 2019?
    - Conferences: 2019 CERF meeting
- 2019 Field Work Goals
  - Replicate sampling May to July 2019
  - Examine salinity trends if siphon is open





# Questions and Feedback

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# Looking Forward (Part 2)

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Brief summary of major research activities to date, ongoing analyses and preliminary results (*~2 mins each*)

- Insects – Hooper-bui
- Suction & Trawl Sampling – Martin
- Minnow Traps – Lopez-Duarte & Olin
- Biomarkers – Polito, Olin, & Lopez-Duarte
- Food-web Modeling – Jensen



# Looking Forward: Terrestrial Insect Sampling

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*Linda Bui & Rachel Strecker – LSU*

- Hooper-Bùi or student may present at CERF 2019
- Continue sorting with new student workers
- Excited about May sampling



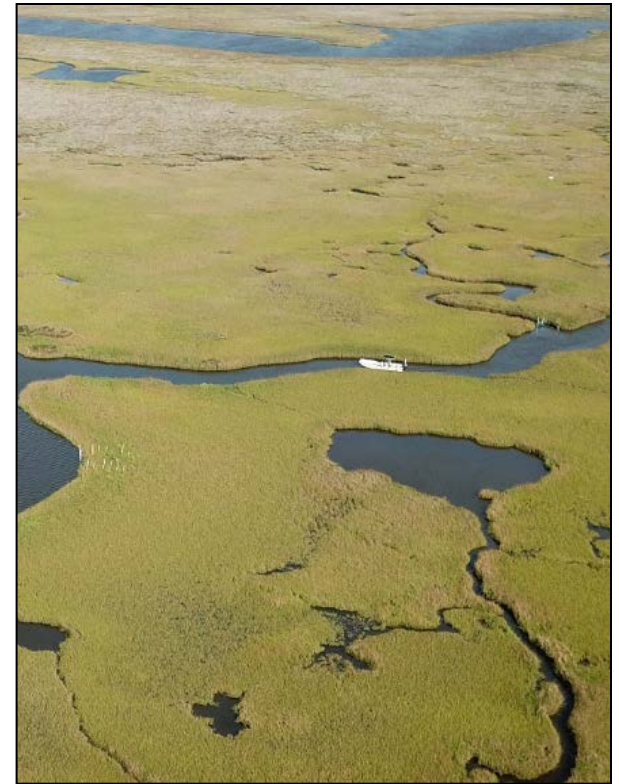


# Looking Forward: Nekton Sampling

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*Charles W. Martin – University of Florida*

- 2019 Field Work Goals
  - Replicate sampling May to July 2019
    - Trawls  $n=8/\text{site}$
    - Suction sampling  $n=10/\text{site}$  along salinity gradient
  - Examine ways to utilize fyke net catches in a quantitative fashion
- Analyses
  - Incorporate 2019 data into community analyses
  - Examine salinity trends if siphon is open
- Conferences:
  - 2019 Benthic Ecology Meeting, 2019 CERF meeting



# Looking Forward: On-marsh nekton community

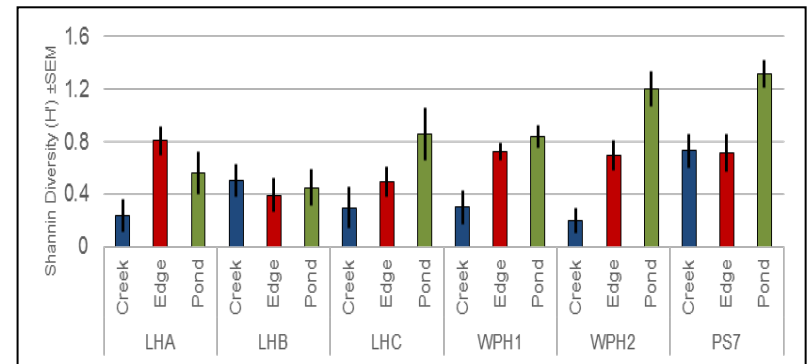
*López-Duarte, Olin – UNCC / MTU*

## 2019 Field Work:

- Replicate Y1 sampling effort
- Measure pond size, and characterize connectivity at each site

## Analyses:

- **Objective 1 (Olin, Winter 2019):** To examine nekton composition and abundance trends among sub-habitats during periods of low (siphon off: 2018) and high freshwater input (siphon on: 2019) if siphon is on.
- **Objective 2 (López-Duarte, Fall 2019):** To incorporate site-specific data (e.g., pond sizes, marsh height) to determine which drivers influence community structure in ponds, creeks, or edges, across sites.



Conferences: 2019 CERF meeting

# Looking Forward: Biomarker Analyses

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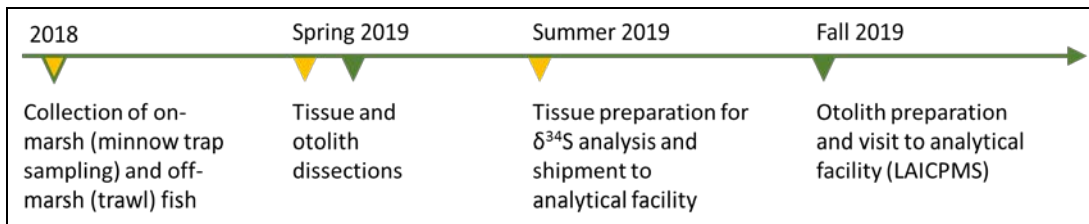
*Mike Polito, Jill Olin, & Paola Lopez-Duarte – LSU/MTU/UNCC*

*Bulk C&N Analysis (Lamb, Polito):* Analyze samples and assess foraging niche space, trophic level, and carbon source use of common taxa in created vs. natural marshes.

*CSIA-AA Analysis (Moyo, Polito):* Analyze 2016 samples to assess carbon source uses along salinity gradient.

*Sulfur Analysis (Olin):* Evaluate residency of the on- and off-marsh fish assemblages using bulk sulfur stable isotope values ( $\delta^{34}\text{S}$ ) of 2018 and 2019 samples from fish species in marsh sub-habitats and along the salinity gradient in restored and natural sites.

*Otolith Microchemistry Analysis (López-Duarte):* Reconstruct the salinity regime experienced by fish over their lifetime and understand fish residence and habitat use patterns using otolith microchemistry.



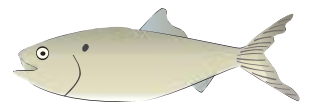
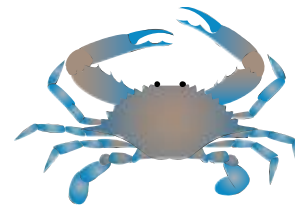
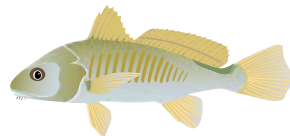
CERF 2019 Session:  
Isotopes, lipids, and DNA:  
Trophic biomarkers in  
coastal ecosystem ecology

# Looking Forward: Food Web Modeling

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*Olaf Jensen – Rutgers*

- February: Hire new postdoc to work on food web modeling
- April-June: Participate in fieldwork to ensure data collection matches model input needs
- June – December: development of forcing functions for salinity and restored marsh age. These will be based on data from CWC, RESTORE, and other studies and will link environmental change to vital rates of model functional groups/species.





# Questions and Feedback

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# Looking Forward (Part 3)

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Brief summary of major research activities to date, ongoing analyses and preliminary results *(5 mins)*

- Communication & End-User Engagements – Polito & Swenson



# Looking Forward: Communication

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## Planned Conferences:

- Benthic Ecology Meeting, St. John's, Newfoundland, CA, 3-6 April 2019
- Biennial CERF Conference, Mobile, Alabama, USA, 3–7 November 2019
- AGU Fall Meeting, San Francisco, California, USA, 9-13 December 2019
- GoMOSES 2020



# Looking Back: End User Engagements

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## *Management Advisory Panel*

### Management Advisory Panel & Site Visit Meetings :

- Fall 2019 - Online meeting Advisory Panel Meeting
- Spring 2020 - In person “Site Visit” & Advisory Panel meeting.

### West Point a la Hache Siphon Stake-Holders

- Maintain contact with Plaquemines Parish, USACE, and K-Belle Construction prior to and after levee construction is complete and siphon operations have resumed.

### CPRA & Other End-Users :

- Maintain contact with Danielle Richardi (CPRA) to coordinate 2019 sampling with post-construction monitoring
- Maintain contact with land owners.

### New End-Users :

- Engage with new end-users as opportunities arise.





# Questions and Feedback

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# Coffee Break (3:30-3:55pm)

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Coffee & snacks available and opportunity for small group Q/A and discussions





# Contingencies & Project Changes

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## *West Point a la Hache Siphon Construction*

### **Initial plan (3 year project):**

- Spring & Fall 2018 (Siphon High/Low flow)
- Spring & Fall 2018 (Siphon High/Low flow)

### **Current plan (4 year project):**

- \*Spring 2016 (Siphon on)
- Spring 2018 (Siphon off)
- Spring 2019 (Siphon recently on)
- Spring 2020 (Siphon on)

### **Contingencies:**

- Mid to Late May 2019 sampling event
- If siphon is on we will proceed as planned
- If not we will still sample to gain an additional year of created vs. natural marsh comparisons.



# Budgets & Subawards

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## Looking Back:

- Budget changed from 3 year to 4 year award.
- Y1 & Y2 main budget and sub-awards were received, approved, and dispersed by NOAA and LSU.
- Had some confusion due to budget changes and sub-award OSPs worried about year to year carry over.
- No equipment purchases

## Looking Forward:

- Will work with NOAA/LSU to receive, approve, and disperse main budget and sub-awards for Y3 this spring/summer.
- No equipment purchases planned





# Permits

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## Looking Back:

- We received all permits for 20198 Field work

## Looking Forward:

- Need to renew LDWF permits & Conoco Phillips land access

Permit Type	Permit Issued by	Expiration
IACUC	LSU	5/3/2020
IACUC	UF	6/6/2020
Landowner access - west point a La Hache	Mark A. Pivach	NA
Landowner access - Lake Hermitage	Ray Brandt	NA
Landowner access - Bradish Johnson property	Camille Strachan	NA

Permit Type	Permit Issued by	Expiration
Landowner access - Conoco Phillips property	Conoco Phillips	3/21/2019
LA Dept Fish and Wildlife - Polito Lab	LDWF	12/31/2018
LA Dept Fish and Wildlife - Other Project Pls	LDWF	12/31/2018
LA Dept Fish and Wildlife - LUMCON	LDWF	12/31/2018
LA Dept Fish and Wildlife - Insects	LDWF	12/31/2018

# Data Management

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*Rabalais, Morrison, Weick*

## Looking Back

- Finalization of sample design *[Spring 2018]*
- Initial conference call with NOAA data staff *[March 2018]*
- Draft Data Management Plan (DMP) shared with PI *[June 2018]*
- Input from PIs, revisions, revisions, revisions *[Summer 2018]*
- DMP to NOAA RESTORE science coordinators [Sep 2018; approval November 2018]
- Development of Data Information Form (DIF) and call for submission from PIs *[January 2019]* to GRIIDC, simplified
  - Format similar to GRIIDC, simplified

*Mostly On Schedule*

# Data Management

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## Looking Forward *Rabalais, Morrison, Weick*

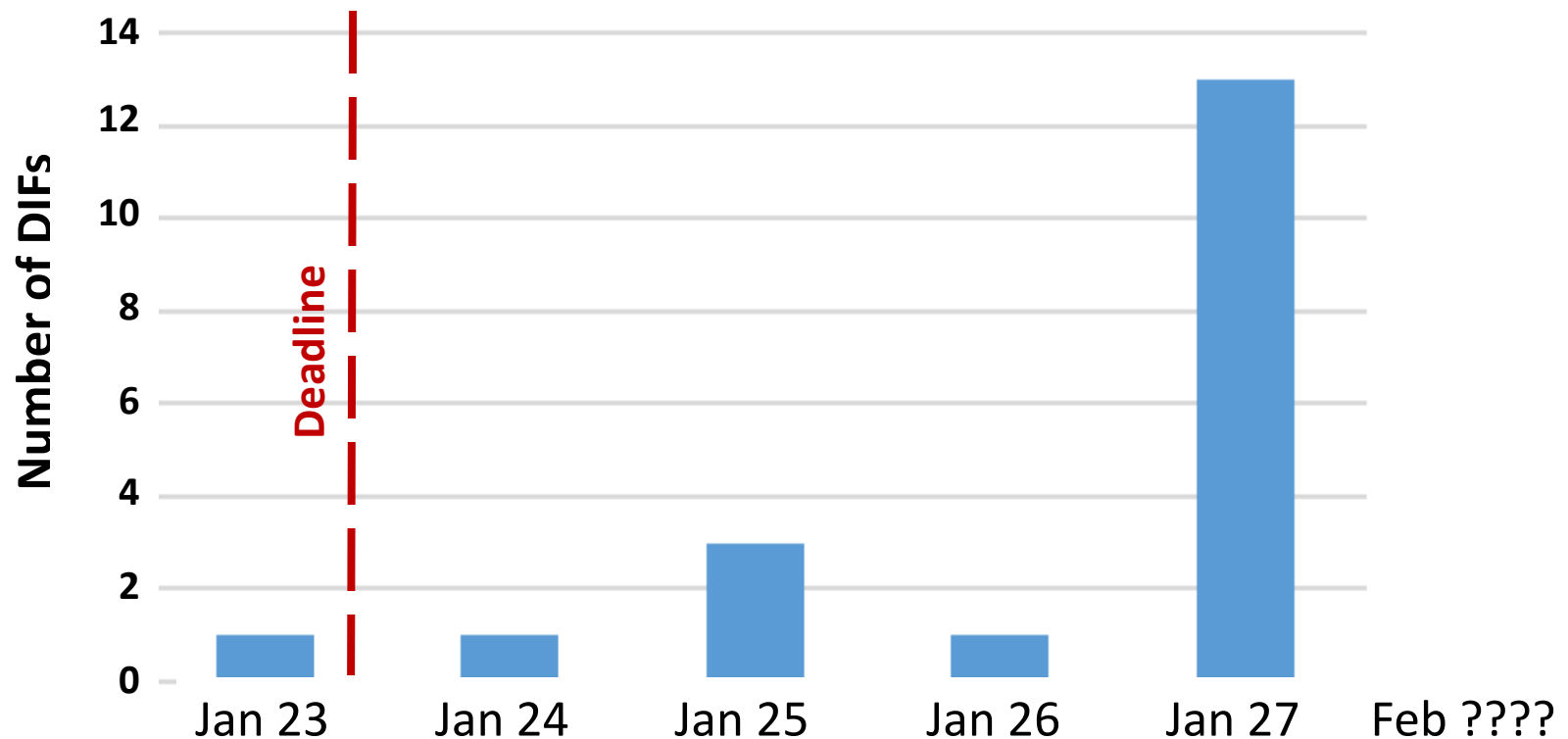
- Receipt of Data Information Form(s) from PIs [*Jan 2019; 19 DIFs as of January 30*]
- Development of Data Tracking procedures, forms [*Jan 2019*]
  - Data tracking log sheet developed [*Jan 2019*]
  - Internal tracking numbers (ITNs) given to PI datasets [*Feb 2019*]
- Routine calls for submission of data (6 mo intervals)
  - Anticipate first in March 2019 for April 2019
- Creation of internal data sharing platform [*TBD*]
  - Data will be placed on a data sharing platform (likely Google Drive at LUMCON, or elsewhere) exclusive to the PIs until formal submission
  - Creation of internal data sharing platform
- Resolution of sample archival issue [NEW]

*Behind Schedule*

# Data Management

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## Busy Professor Response Delay to Deadline



*For Fun*



# Project Website

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*Rabalais, Morrison, Smith, Weick*

## Looking Back

- Initial discussions among data managers and NOAA staff [August 2018]
- Initial ideas exchange *[October 2018]*

## Looking Forward

- Decision that a RESTORE Food Web research project site is best served via LUMCON, rather than try to access and add to NOAA's site. We will need to populate NOAA's site as well in their categories.
- Secure URL and home for web site
  - Subdomain or separate URL
- Design and implement web site [Smith and Rabalais, ongoing]

*Behind Schedule*

# Questions and Feedback

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# Input from Advisory Board members

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1. What are the specific management needs your agency is hoping to have addressed as part of this project? Have they changes from our last meeting?
2. Have we sufficiently incorporated your management needs into our research plans, and if not how can we do a better job moving forward?
3. Are there any new activities or projects at your agency that are complementary to this project?





# Input from NOAA Restore

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1. What are the specific management needs your agency is hoping to have addressed as part of this project? Have they changes from our last meeting?
2. Have we sufficiently incorporated your management needs into our research plans, and if not how can we do a better job moving forward?
3. Are there any new activities or projects at your agency that are complementary to this project?





# Wrap-Up & Next Steps

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## Analyses

- Finalize analyses and QAQC May 2018 field and lab data.
- QAQC and conduct preliminary analyses on May 2019 field data.
- Parameterize preliminary EcoSim models

## Data & Outreach

- Dataset identified and collection
- Implement website
- Present preliminary results at meetings.
- Online & in-person meetings
- Ad hoc end user meetings and other outreach

## Field work

- **Feb/March 2019** - Water level/salinity recorder maintenance
- **May 2019** – Primary field sampling trip (~10 days long)
- **July 2019** – Secondary field sampling trip (liter bags, elevation mapping)



# Thank you!

*Linking Community and Food-Web Approaches to Restoration: An Ecological Assessment of Created and Natural Marshes Influenced by a River Diversion*



Feb. 7th, 2019, 1:00 – 5:00pm CDT,  
Room “Imperial 5AB”, Hyatt Regency New Orleans

*Join from your computer, tablet or smartphone.*

<https://global.gotomeeting.com/join/580293133>

*You can also dial in using your phone.*

*United States: +1 (571) 317-3122*

*Access Code: 580-293-133*

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## ***NOAA Restore Program Officers:***

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