FLORIDA COASTAL EVERGLADES LTER

FCE IV YEAR ONE ANNUAL REPORT

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Accomplishments

Major goals of the project

The goal of the Florida Coastal Everglades Long Term Ecological Research (FCE LTER) program is to conduct long-term studies to understand how climate change and resource management decisions interact with biophysical processes to modify coastal landscapes. Changes to drivers at either the freshwater or marine endmember of karstic coastal ecosystems, with strong biotic feedbacks of geomorphology, hydrology, and ecosystem processes, shift the dominance of landscape patterns that determine carbon sequestration and food webs dynamics. We have observed rapid intrusion of saltwater and associated limiting nutrients (phosphorus) into brackish and freshwater ecosystems driven by increased rates of sea-level rise. Experimental studies are revealing the mechanisms by which saltwater intrusion into freshwater and brackish wetlands drives rapid loss of stored carbon. However, we now have evidence of changes in ecological process attributed to restoration projects implemented over the last few years. Observed increases in pulsed delivery of fresh and marine water to this sensitive ecosystem via water management and climate change provides a landscape-scale template for testing theories of how pulse dynamics may maintain ecosystems in a developing state, reducing vulnerability to the accelerating press driven by climate change (sea-level rise).

During 2019, we focused on continuing core long-term data collection and thematic research of FCE while also reorganizing our program based on feedback from the panel that reviewed our 2018 renewal proposal that resulted in our program being placed on probation. We continued to address the central question of how changes in the balance of fresh and marine water supplies influence ecosystem structure and function in coastal karstic ecosystems, including **biogeochemistry and organic matter dynamics, primary producers,** and **trophic dynamics** along our freshwater to marine gradients of two major drainages, Shark River Slough (SRS) and the Taylor Slough/Panhandle (TS/Ph). We put a particular focus our trophic dynamics research to further integrate consumer movement and food web patterns along freshwater-marine-estuarine gradients. Integrative goals are being met through our cross-cutting thematic research on **climate and hydrology**, where we focused on defining hydrologic presses and pulses, **carbon stocks and fluxes**, where we completed the implementation of a full representative flux tower network to measure the net ecosystem carbon balance, **water governance**, where we continue studies of how water conflicts impact the timing, design, delivery, implementation and adaptive management of Everglades restoration, and integrative modeling to produce landscape-scale predictions of all key ecosystem elements of future climate and restoration scenarios. We created a new conceptual framework to achieve further integration by addressing theoretically-motivated questions that connect each of these cross-cutting themes.

The overarching goals of this reporting year included: (1) addressing the key goals (summarized below) of each of the core areas in bold, above; (2) collecting core long-term data and integrating results from mechanistic experiments and spatial scaling studies; (3) modeling and synthesis efforts linking climate and disturbance legacies to future projections, (4) publishing our FCE synthesis book and three broad synthesis manuscripts, (5) updating FCE data to the Network Information System (PASTA), (6) integrating core findings across through LTER network-wide collaborations, (7) advancing education (FCE Schoolyard) and outreach activities through expanded partnerships and creation of a diversity plan.

Major Activities

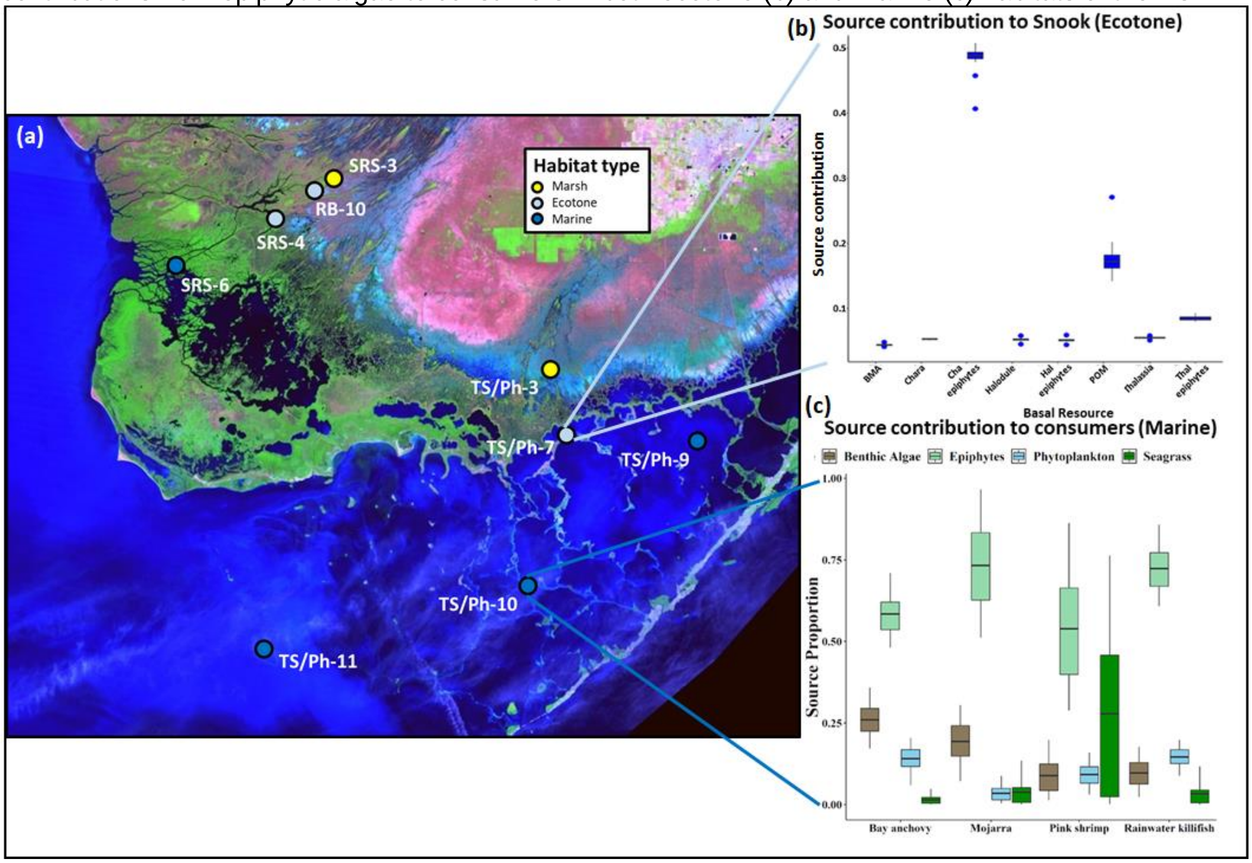
Climate and Hydrology: To address how the climatological presses and pulses are changing, we conducted a workshop to review the status of climate downscaling efforts and methodologies. We completed the analysis of drivers of long-term trends in precipitation, freshwater inflows, sea-level rise, and water levels. To determine how changes in climate presses and pulses influence water and nutrient transport along vertical and horizontal hydrologic gradients, we employed the saturated-unsaturated transport model with variable-density ground-water flow (SUTRA-MS; Voss and Provost, 2010) to simulate the groundwater flow pattern along the TS/Ph transect. Bench-scale experiments were conducted to refine the understanding of P desorption from calcite as sea water intrudes into a coastal aquifer.

Biogeochemistry and Organic Matter Dynamics: To quantify how dissolved and particulate organic matter and associated microbial communities change along gradients of salinity and phosphorus of freshwater, brackish, and estuarine wetlands, we collected monthly water samples from SRS and TS/Ph sites (n = 14) for quantifying dissolved organic carbon (DOC) concentrations, dissolved organic matter (DOM) fluorescence characteristics, and DOM structural and isotopic composition, and breakdown rates of particulate organic carbon (POC). We also finalized results from experimental salinity and phosphorus additions in freshwater peat marshes to test for drivers of peat collapse and legacies of saltwater intrusion.

Primary Production: To determine the role of foundation species in freshwater wetlands worldwide we reviewed ~150 studies in subtropical, boreal, and temperate freshwater wetlands. Integration of long-term hydrological, biogeochemical, and primary production data are ongoing to determine trajectories of ecosystem structure and function in response to the balance of fresh and marine water supplies that regulates environmental resource and stressors gradients. We completed 4 years of experimental work in field and outdoor mesocosms to test the effects of salinity and inundation and the subsidy-stress effect of salinity and phosphorus on freshwater and brackish marshes. We completed assessments of landscape-scale coastal ecotone vegetation to determine how plant composition and primary production vary with variation in marine water supplies. We evaluated the effects of Hurricanes Wilma and Irma on mangrove net primary productivity (NPP) rates and the resilience capacity of these forested wetlands to hurricane disturbance, and used remote sensing data to detect the extent of mangrove damage induced by Hurricane Irma.

Trophic Dynamics: Based on panel feedback on the lack of a fully integrated treatment of trophic dynamics, we created a trophodynamics research platform to collect and analyze food web data along the SRS and TS/Ph (Fig. 1a). The goal of this platform is to develop a predictive understanding of the influence that marine press and freshwater pulse dynamics have on system-wide pathways of trophic flux and to facilitate the integration of food web research across the marsh, ecotone, and marine systems among FCE researchers and outside collaborators. Trophic sampling across both FCE transects aims to: 1) characterize the trophic structure along the two transects spanning the marsh-riverine-estuarine-marine, 2) identify changes is resource contributions to consumers over seasonal and spatial gradients in salinity and primary productivity, and 3) describe how spatiotemporal variations in food web structure influence the feeding behavior and movement of consumers. Stable isotopes are being used to track food web dynamics with sampling along both transects expanding 4 freshwater to marine sites in SRS and 5 sites in TS/Ph (Fig. 1). In the SRS transect, we continued our long-term sampling prey and consumer sampling and acoustic movement tracking (Eggenberger et al 2019). We performed juvenile bull shark fishing to obtain a minimum of 12 longline sets per yearly quarter and we continue seasonal electrofishing to quantify the magnitude and timing of marsh prey pulses into estuarine mangroves. We acoustically tagged and measured juvenile bull sharks, largemouth bass, common snook and American alligators as well as sampled multiple tissues for stable isotope analysis in the last year to determine the ecological roles of consumers, their carbon sources, and the interplay of these roles with changing environmental conditions. We also used long-term fishing data to assess changes in marine catfish abundance and distribution seasonally, yearly, and before and after the cold snap of 2010. We continue our long-term passive acoustic monitoring paired with stable isotope analysis of biopsy samples and stomach content analysis of bottlenose dolphins using standard passive acoustic monitoring in SRS to determine fine scale habitat use of a large consumer. In freshwater marshes, we collected samples for analysis of nutritional landscape and analyzed these for fatty acid profiles and stoichiometry of key freshwater consumers and basal resources. We also wrote review paper on impacts of invasive species on ecosystem function in aquatic ecosystems, and conducted two field experiments on transfer of basal food resources to primary and secondary consumers. In Florida Bay, we are mapping seascape transformation and effects of this transformation on trophic dynamics via remote sensing and stable isotope sampling in areas affected by the 2015 seagrass die off.

Figure 1. (a) Map of our trophodynamics sampling sites across the SRS and TS/Ph transects. Initial food web analysis based on trivariate (C, N, S) stable isotope mixing models demonstrate substantial dietary contributions from epiphytic algae to consumers in both ecotone (b) and marine (c) habitats of the FCE.



Carbon Stocks & Fluxes: To determine the role that net calcification plays in the flux of CO_2 between Everglades ecosystem and the atmosphere, we established an eddy covariance tower to measure H_2O and CO_2 fluxes between the Florida Bay seagrass beds and the atmosphere. We began a critical assessment of the role of net calcification in ecosystem fluxes by systematically assessing pH, pCO2, DIC and alkalinity.

Water Governance: Our water governance working group focused on how water conflicts impact the timing, design, delivery, implementation and adaptive management of Everglades restoration. We have carried out work in two main areas. First, we have sought to understand the tensions that exist between conservation/restoration efforts and local populations with a particular focus on Homestead residents and farmers. We have conducted 35 interviews and conducted participant observation at 20 public meetings, including stakeholder interest group meetings and government meetings, and gathered and digitized archival records on saltwater intrusion dating back to the early 1900s. Second, we have been conducting exploratory fieldwork on adaptive and environmental management initiatives within the park, reviewing government policies on regional planning and water management and invasive species management.

Integrated Modeling: In addition to parameterizing our process-based models described in working group sections, we progressed with a range of refinements to update the fully-integrated Everglades Landscape Model (ELM) from v2.9 (used in recent publications, e.g., Flower et al. 2019) to v3.1. This included a new module of diatom community dynamics for assessment of rapid ecological responses to phosphorus and salinity. With updated observed data on water control structure flows, rainfall, and potential-ET, we now simulate historical conditions from 1981-2015 (vs. 1981-2000). Refined tidal boundary condition data and river-creek topology led to improved performance in the most-southern/western regions. These, and related vegetation, periphyton, floc, fish, other, model refinements are ongoing and will involve comprehensive statistical performance assessments to the extent possible, with the major ELM v3.1 update anticipated to be largely completed in 2020.

Specific Objectives

Climate and Hydrology: Specific objectives of this past year were to examine drivers of shifting presses and pulses using long-term analytical and climate downscaling approaches, determine the horizontal pattern of vertical ground-surface water fluxes in TS/Ph, and to generate a coefficient for non-linear saltwater-driven phosphorus desorption using benchtop experiments.

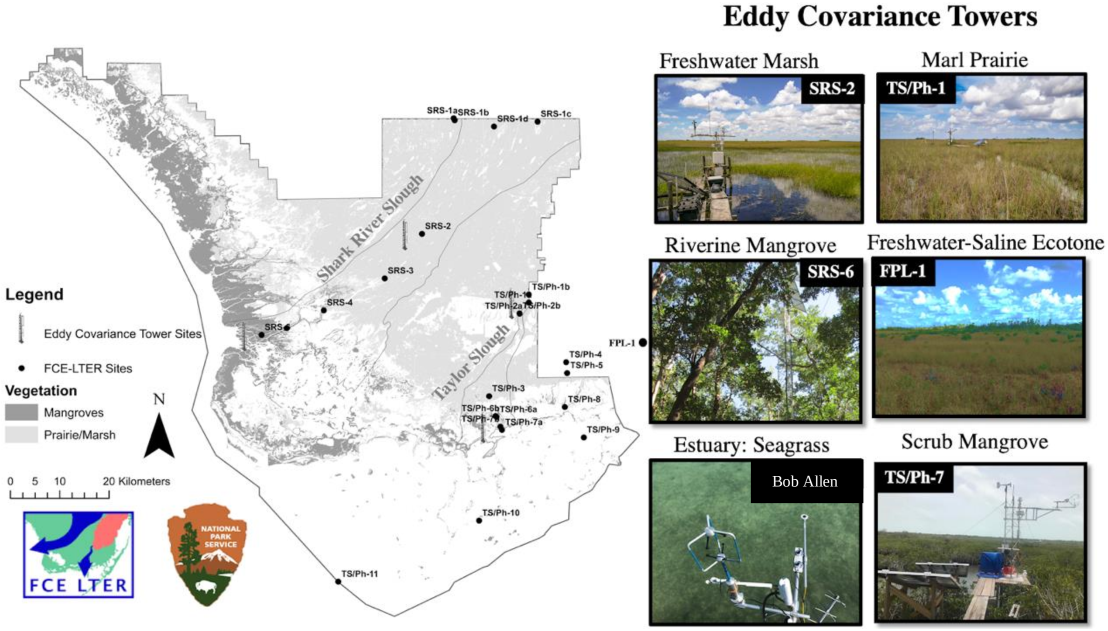
Biogeochemistry and Organic Matter Dynamics: Specific objectives were to assess patterns of dissolved and particulate organic matter and microbial decomposers along salinity and phosphorus gradients of SRS and TS/Ph by (i) analyzing long-term trends in dissolved organic carbon, nitrogen, and phosphorus concentrations and bacterioplankton productivity along fresh-to-marine estuary gradients relative to hydrologic presses and pulses; (ii) synthesizing of long-term DOC concentrations, dissolved organic matter (DOM) fluorescence characteristics, and DOM structural and isotopic composition, (iii) quantifying breakdown rates of labile and recalcitrant particulate organic matter standard substrates, (iv) characterizing assemblages of water-column and benthic microbial communities, (v) identifying mechanisms of peat collapse through experimental manipulations of salinity and phosphorus, as well as experimental freshwater restoration of salt-exposed wetlands to test for legacies of saltwater intrusion.

Primary Production: Our specific objectives were to complete analysis of long-term trends in foundation species abundance in periphyton mats, complete analysis of the effects of phosphorus and salinity manipulations on periphyton, and to incorporate periphyton and diatom prediction functions into the Everglades Landscape Model. We identified salinity threshold responses in long-term primary production along our transects using our intensive, synoptic sampling approach. We continued focus on integrated experiments and a completed first-generation coastal ecotone vegetation map. We explicitly focused synoptic sampling to align with developing datasets that link variability in hydrology and salinity with vegetation structure and aboveground biomass**.** We also evaluated the effect of Hurricane Irma on mangrove NPP and assessed resilience of mangrove wetlands to Hurricane Wilma and impacts on carbon cycling.

Trophic Dynamics: The goals of trophodynamics research is to identify changes in primary resource contributions to consumer feeding behavior and movement over spatiotemporal gradients in salinity and primary productivity through stable isotope analysis of carbon, nitrogen, and sulfur. This information will then be used to forecast the influence of future amplified pulse dynamics associated with hydrological restoration and sea-level rise on energy flux and consumer movement across the FCE. With their movements, consumers (American alligators, bull sharks, common snook common bottlenose dolphins) create trophic linkages among freshwater, estuarine and marine food webs, and partition resources over both space and time. These trophic linkages can be severed by extreme events that alter both the magnitude and the quality of the marsh prey subsidy and directly affect their movements and distribution in the estuary. With our continued long-term data collection efforts, our goal is to track spatiotemporal variation in prey and consumer distribution and abundance and relate these to hydroclimatic conditions. We added a third year to nutritional landscape long-term data collection in SRS and TS to characterize the relative role of autotrophic and heterotrophic production in sustaining the food web. To document fatty acids displaying direct routing and de novo synthesis in key Everglades consumers we are manipulating basal resource quality as indicated by stoichiometry and fatty acid profile. We examined how seascape transformation (seagrass loss and fragmentation) affects the movement and trophic ecology of recreational sportfish to identify resource contributions to focal recreational sportfish along environmental gradients between seasons. This information will be related to the movement data from tagged recreational sportfish to describe how spatiotemporal variations in resources influence habitat use of recreational fisheries/mesoconsumers.

Carbon Stocks & Fluxes: Our specific goals were to establish new seagrass bed eddy covariance tower in Florida Bay seagrass beds to complement the extant marsh and mangrove towers (Fig. 2). The new tower was built at TS/Ph 10 on the TS/Ph transect. Data collection began in March 2019. We also began assessing the importance of net calcification to net CO_2 flux by measuring in-water parameters of the inorganic carbon system and alkalinity at all flux sites, and the role of net calcification in net CO_2 flux at the seagrass-dominated sites along the TS/Ph transect.

Figure 2. The FCE flux towers capture carbon and water dynamics across major wetland ecosystems. The coastal towers (TS/Ph-10, SRS-6 and TS/Ph-7) are uniquely positioned to study the abrupt shifts in ecosystem structure and function that are facilitated by disturbance, changes in freshwater supply, and sea level rise.



Water Governance: Our objectives for the past year have focused on conducting preliminary fieldwork and beginning to transfer from preliminary fieldwork to more in-depth research activities. Given our use of qualitative methods, our preliminary fieldwork involves a combination of different activities: the identification of archival resources and relevant policy documents; textual analysis of archival and policy materials, and review of secondary literature, to establish a baseline understanding of the social, political, economic, and cultural context, and scoping interviews with stakeholders. We have been conducting these activities on adaptive management and environmental management initiatives along the boundary between the Everglades and residentially-developed regions in Greater Miami. We have also begun to conduct in-depth and targeted interviews on water conflicts and agriculture in Homestead. In addition to this work, an important component of our work has been specifying the theoretical framework we will use to analyze water management, governance and conflicts in the region. This involves a wider literature review on themes of ecological design, resilience, and the Anthropocene.

Integrative Modeling: Our specific goals were to update the Everglades Landscape Model with new hydrologic input conditions, including water control structure flows, rainfall, and potential-ET, we now simulate historical conditions from 1981-2015 (vs. 1981-2000). In conjunction with output from a water-use management model, we used three scenarios: a Baseline scenario of 2010 climate, and two scenarios that both included 1.5 °C warming and 7% increase in evapotranspiration, and differed only by rainfall: either increase or decrease by 10%, to drive the Everglades Landscape Model to simulate changes in a suite of parameters that include both hydrologic drivers and changes to soil pattern and process.

Significant Results

Climate and Hydrology: Increasing rainfall, sea-level rise, and restoration projects along the FCE boundaries are increasing wet season surface water levels throughout FCE (Fig. 3, 4; Dessu et al. 2018). Climate downscaling using CMIP3 and 5 produced soil moisture, runoff, and potential evapotranspiration inputs to FCE ecological models. SUTRA modeling results suggest that in the absence of significant hydraulic head difference, sea level rise drives the inland extent of saltwater intrusion, particularly at a depth below 10m in the aquifer (Fig. 5, 6). The results of the modeling effort indicate that seawater intrusion extends further inland by at least 1000m at a depth of 20m in the aquifer compared to near the ground surface. Seawater has continued to intrude into the aquifer at 20 m at a constant linear pattern from 2000 to 2016. The results of our bench-scale experiments indicated that as seawater content reached 3%, the amount of P desorbed from calcite increased as a power function of the amount of seawater in each mixture (R^2 = 0.99; Fig. 7).

Figure 3. Analysis of monthly rainfall (1906-2016) showing increasing trends in wet season rainfall (Abiy et al. 2019).

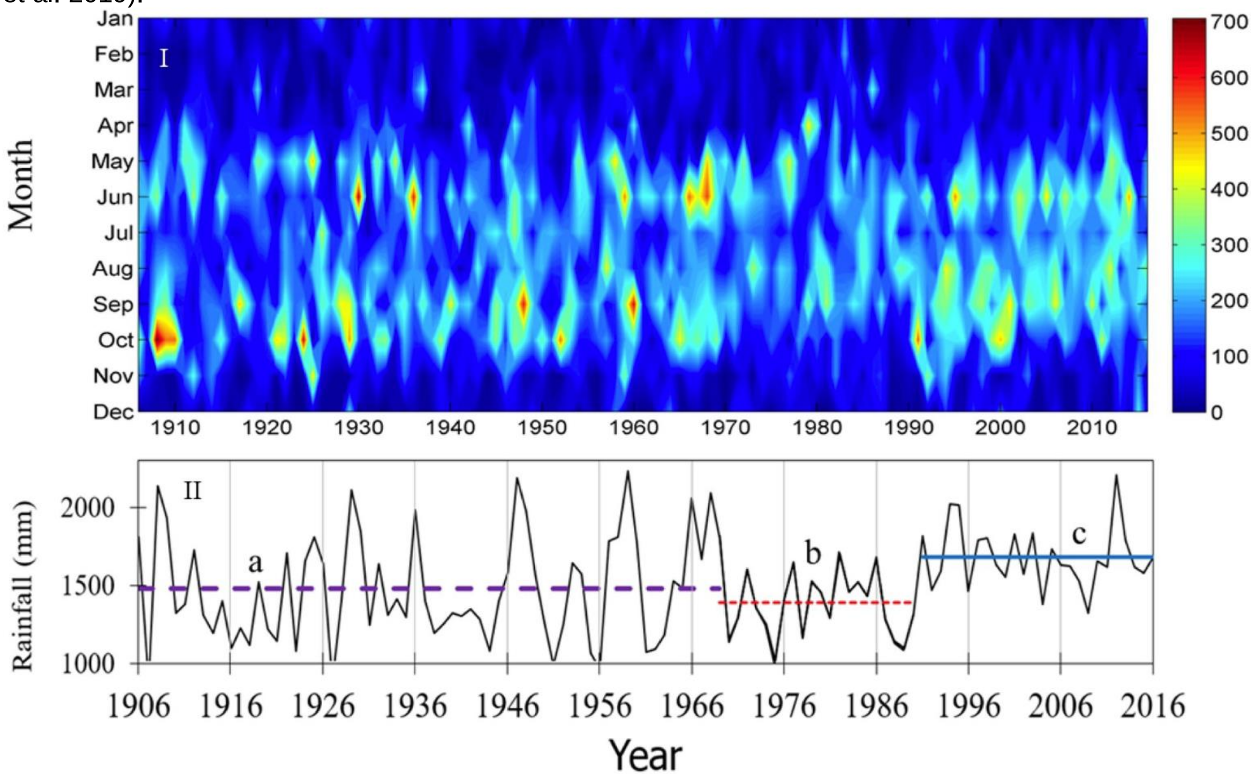


Figure 4. Box and whisker plots of median (black line), upper and lower quartiles of annual surface water levels among freshwater marshes (grey) and mangrove forests (dark grey) of the SRS and TS/Ph from 2000 to 2017.

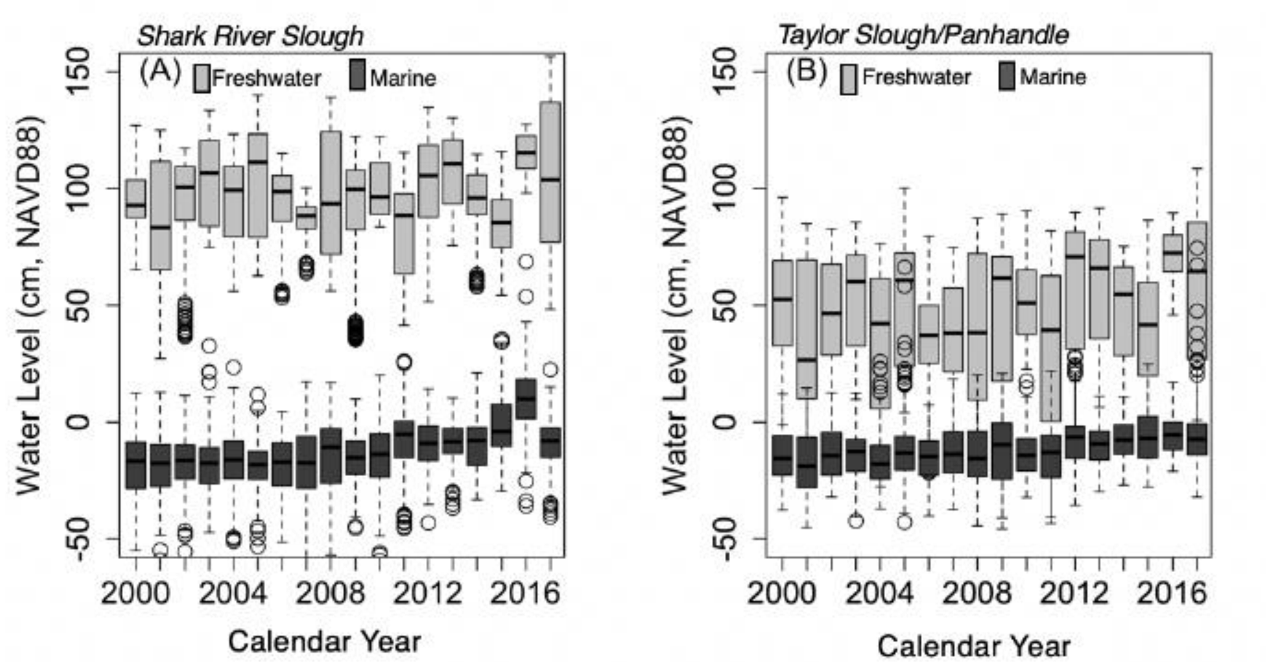


Figure 5. Set-up of the SUTRA modeling domain for the TS/Ph transect.

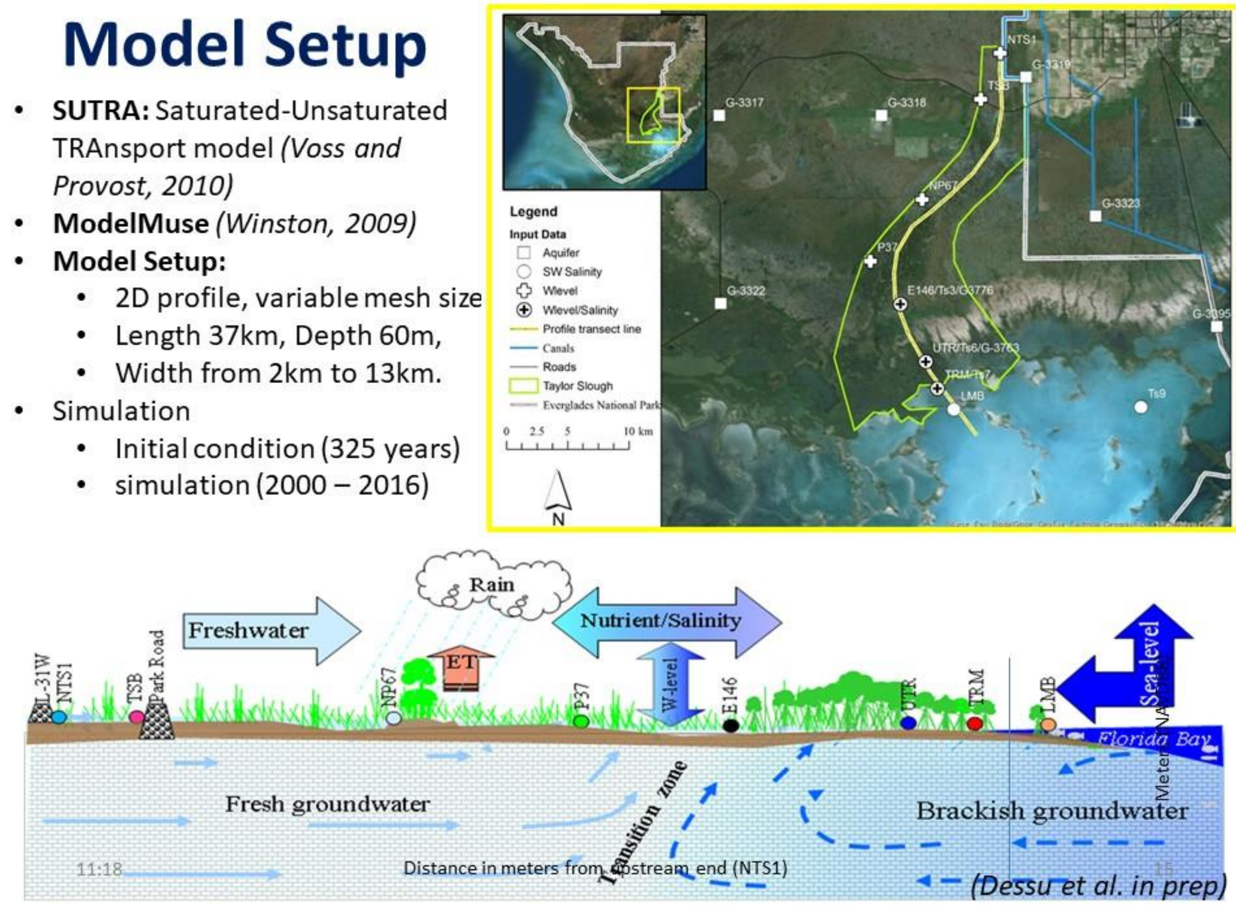


Figure 6. SUTRA modeling results with distance downstream in TS/Ph. The top figure illustrates that the salinity in the upper 30 cm of the aquifer varies with freshwater delivery at the upstream end, but also by sea level rise from the downstream end. The lower figure is salinity at about 20 m depth in the aquifer and indicates that saltwater intrusion extends further inland than in the upper part of the aquifer and has been moving inland at that depth at a consistent linear pattern since the year 2000.

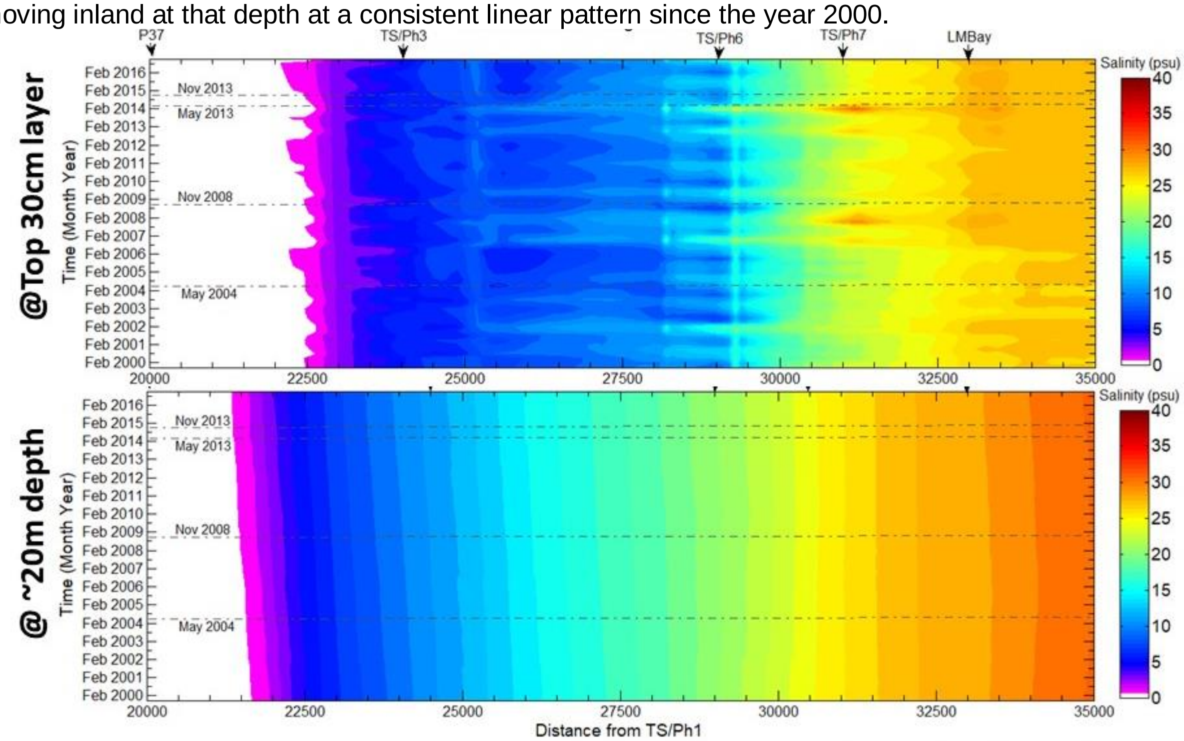
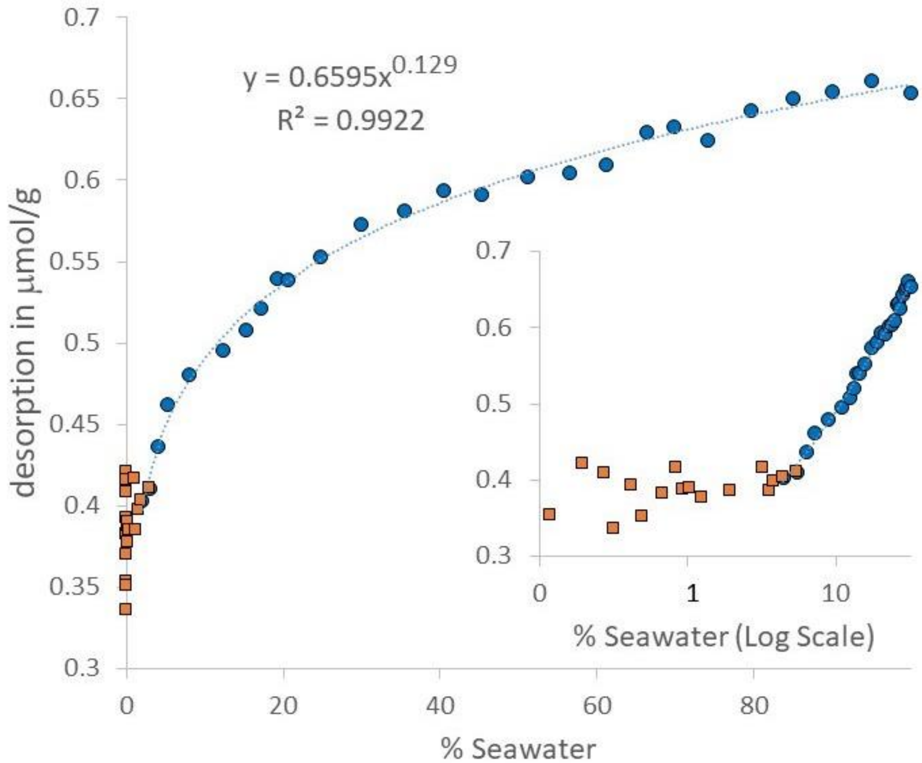


Figure 7. The fraction of phosphorus desorbed from calcite as a function of the percentage of seawater mixed with freshwater. Orange squares: the mixtures at the freshwater end of the mixing continuum that exhibited no trend. Blue circles: the mixtures that departed from the freshwater pattern.



Biogeochemistry and Organic Matter Dynamics: Water column total phosphorus variability was strongly driven by proximity to storm surges delivered by hurricanes Wilma (2005) and Irma (2017), while total nitrogen increased in freshwater wetlands exposed following droughts and fires (Figs. 8, 9). Bacterioplankton productivity was stimulated by low-temperature events and hurricanes. Nutrient and bacterioplankton productivity are spatiotemporal synchronized (Fig. 10). Long-term increases in water levels in freshwater, brackish, and estuarine wetlands (Dessu et al. 2018) have impacted DOC concentrations and DOM characteristics (Fig. 11). Mass loss rates of both labile and recalcitrant particulate organic matter are higher in freshwater marshes than in brackish and estuarine marshes (Fig. 12). Experimental studies of salinity and P additions reveal the sensitivity of freshwater peat soils to saltwater intrusion, whereby soils can lose up to 2.6 cm of elevation within 6 months of continuous exposure to brackish water (~10 ppt) (Charles et al. 2019). The mechanism of such peat collapse is a loss of fine root biomass upon continued exposure to saltwater. Microbial assemblages are similar among freshwater marshes but different among brackish marshes, suggesting community responses to salinity may interact with organic matter type (marl versus peat) and relative P-limitation (Fig. 13).

Figure 8. Box and whisker plots of median (black line), upper and lower quartiles of annual surface water dissolved organic carbon (DOC), total nitrogen, and total phosphorus concentrations, and bacterioplankton productivity among freshwater marshes (grey) and mangrove forests (dark grey) of SRS and TS/Ph from 2001 to 2017. Disturbances are indicated by black (droughts, flood), red (fire), blue (hurricanes), and grey lines (freeze events).

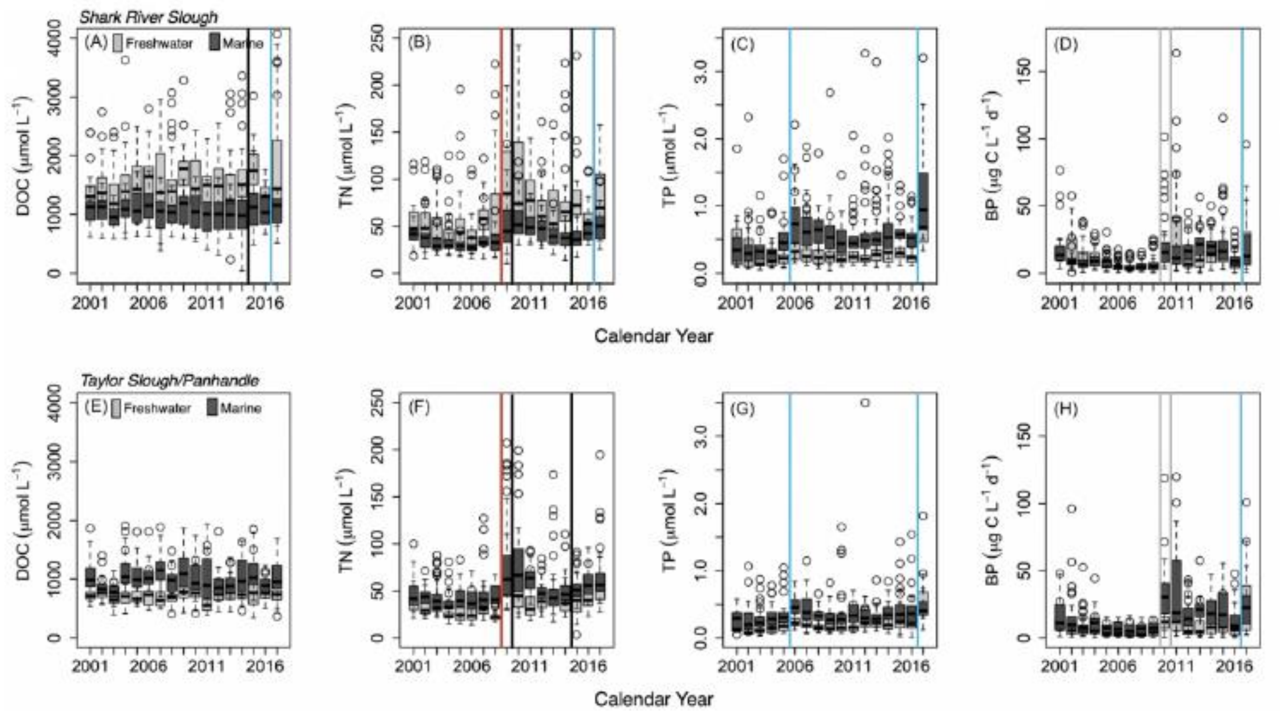


Figure 9. Box and whisker plots of median (black line), upper and lower quartiles of annual surface water dissolved organic carbon (DOC), total nitrogen, and total phosphorus molar ratios (DOC:TN, DOC:TP, TN:TP) among freshwater marshes (grey) and mangrove forests (dark grey) of SRS and TS/Ph from 2001 to 2017.. Disturbances are indicated by black (droughts, flood), red (fire), blue (hurricanes), and grey lines (freeze events)

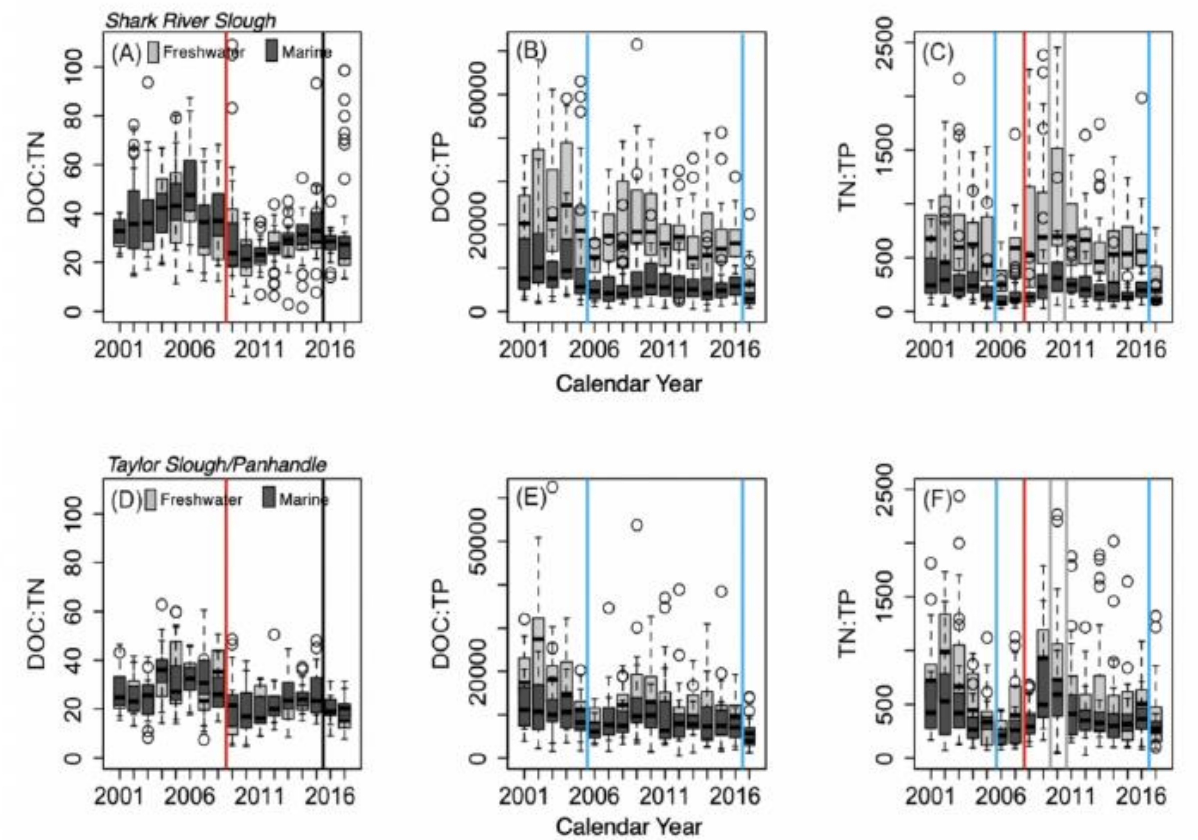


Figure 10. Spatial and temporal synchrony of long-term mean dissolved organic carbon, total nitrogen, and total phosphorus concentrations, and bacterioplankton productivity along the estuarine-freshwater gradient of SRS and TS/Ph from 2001-2017. Positive and negative correlations with lag distance indicate relative synchrony or asynchrony, respectively. Horizontal dashes are mean values across spatial gradients of both SRS and TS/Ph transects. Filled circles denote significant (P <0.05) departures from means.

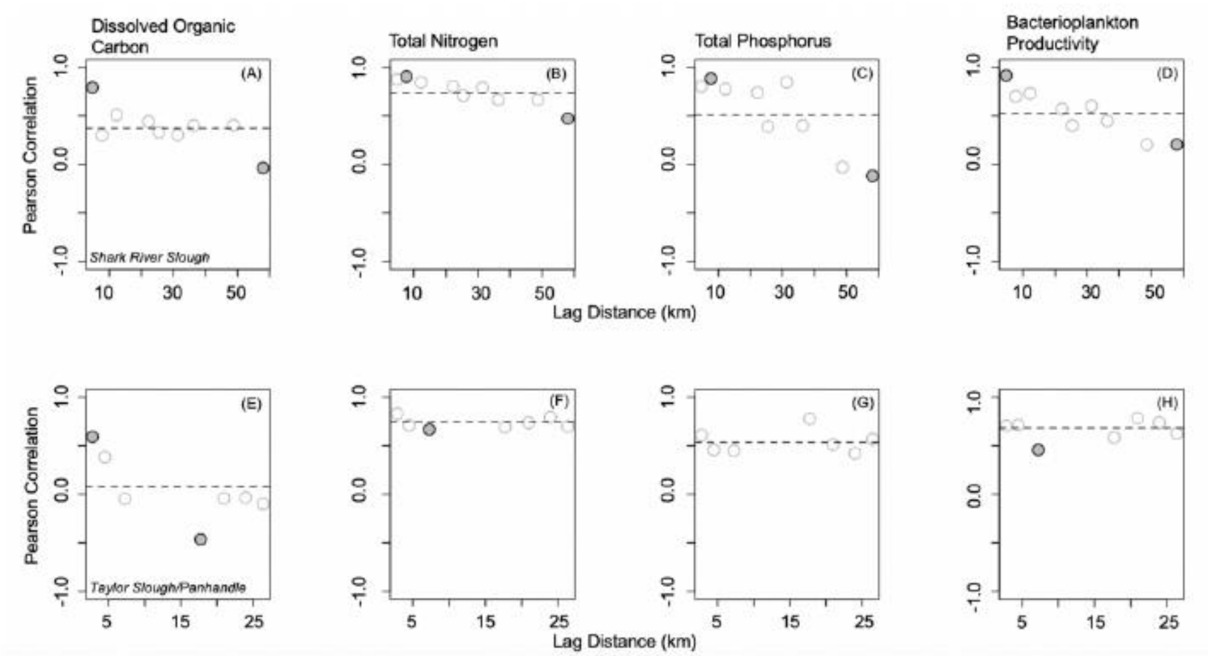


Figure 11. Linear regressions of DOC concentration, fluorescence index (FI), specific absorbance at 254 nm ($SUVA_{254}$) and percentages of the four PARAFAC groupings against water level for A) SRS sites and B) TS sites. Upstream sites are presented in blue (SRS2 and TS2), mid-transect sites in red (SRS4 and TS3), and estuarine sites in green (SRS6 and TS7). Regression lines are only presented for significant ($p < 0.05$) regressions, with 95% confidence intervals shaded. Regier et al., in revision.

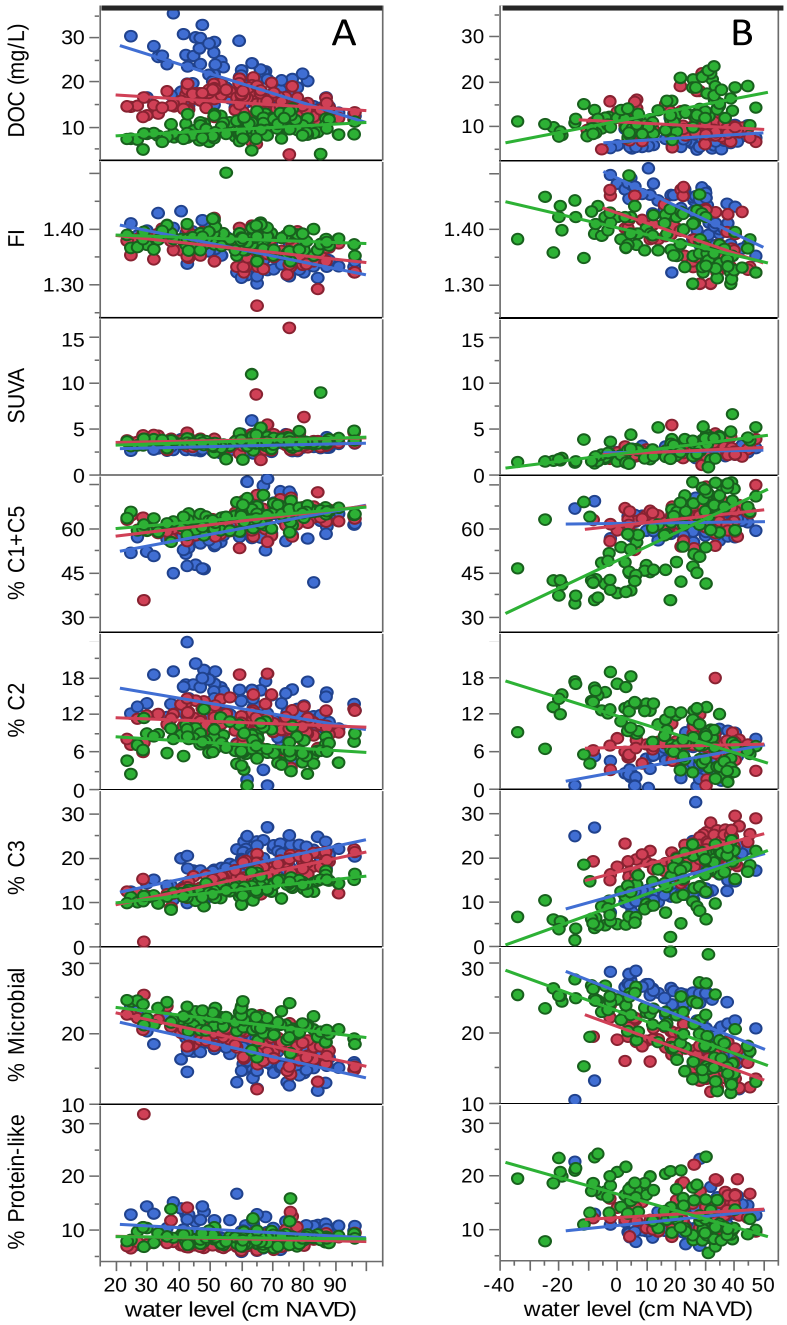


Figure 12. Breakdown rates of labile (green tea) and recalcitrant (red tea) litter along covarying gradients of salinity and phosphorus along SRS and TS/Ph. Trends illustrate gradual (along SRS) and abrupt (along TS/Ph) declines in breakdown rates of both litter types with increasing exposure to salinity, despite increasing exposure to P. Kominoski & Oehm, in prep.

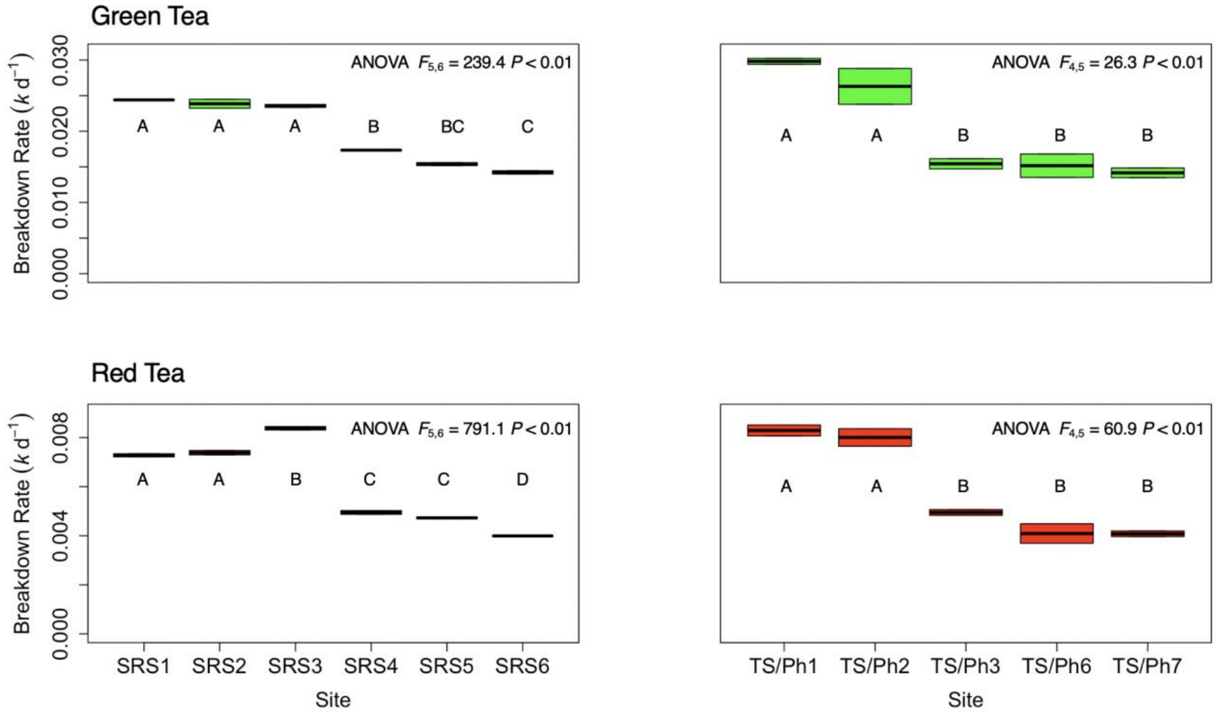
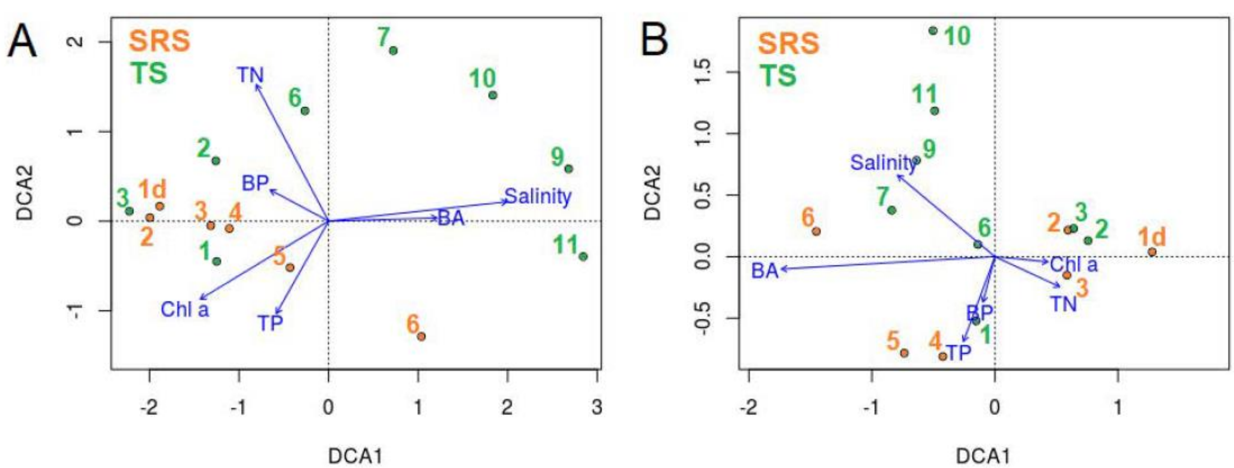


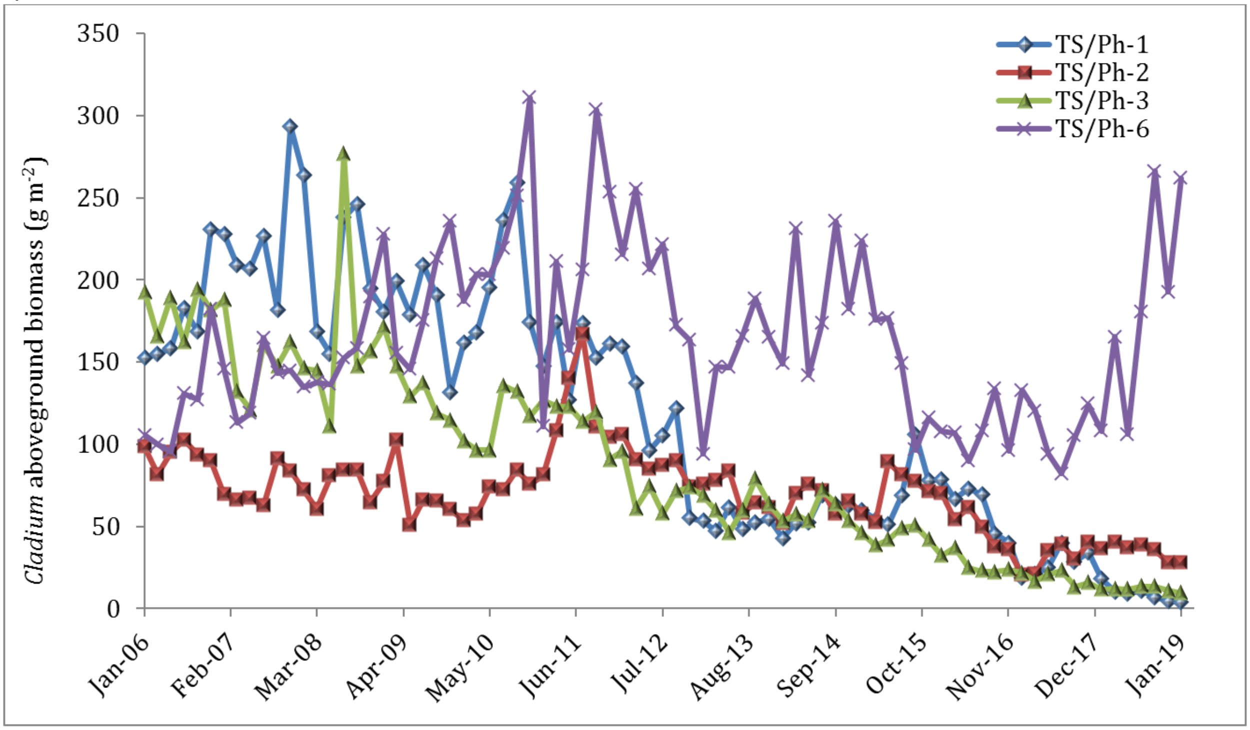
Figure 13. Detrended Correspondence Analyses of the prokaryotic (A) and eukaryotic (B) communities fitted with environmental vectors: bacterial abundance (BA), bacterial production (BP), total nitrogen (TN), total phosphorous (TP) and chlorophyll *a* (Chl a). Laas et al., in prep.



Primary Production: Foundation species in freshwater wetlands suggested an important conservation role of microbial species (Marazzi et al. 2019). Sawgrass biomass and production is declining at freshwater marsh sites (TS/Ph-1 & 3), and more recently at the lower ecotone site (TS/Ph-6; Figs. 14a, b) related to increased wet season water depths and salinity, respectively. The sawgrass plant – peat soil mechanistic model (Fig. 15 a) provided annual aboveground productivity needed to maintain a constant peat elevation for different levels of salinity (Fig. 15b). Simulated marsh peat elevations provide examples of accumulating, stable, and collapsing peats in response to aboveground productivity, salinity, and hydrology (Fig. 16). Long-term mangrove litterfall rates reveal canopy defoliation after Hurricane Irma (September 10, 2017) (Fig. 17). Mangrove foliar residence time could be used as a proxy for mangrove resilience (Fig. 18; Rivera-Monroy et al. 2019). Models generated landscape-scale predictions of groundwater salinity (Fig. 19) and annual hydroperiod. We used our FCE-LTER mangrove litterfall data to generate a continental-scale analysis of litterfall production trends for neotropical mangroves across different geomorphological settings (Ribeiro et al. 2019). Litterfall rates were higher in river-dominated deltaic coastlines than carbonate settings (Fig. 20). The total annual carbon fixed in mangrove litterfall in the neotropics is estimated at 11.5 TgC (Ribeiro et al. 2019).

Figure 14. Long-term variation in *Cladium* aboveground biomass (a) and Net Primary Productivity (ANPP; b) in TS/Ph.

a)



b)

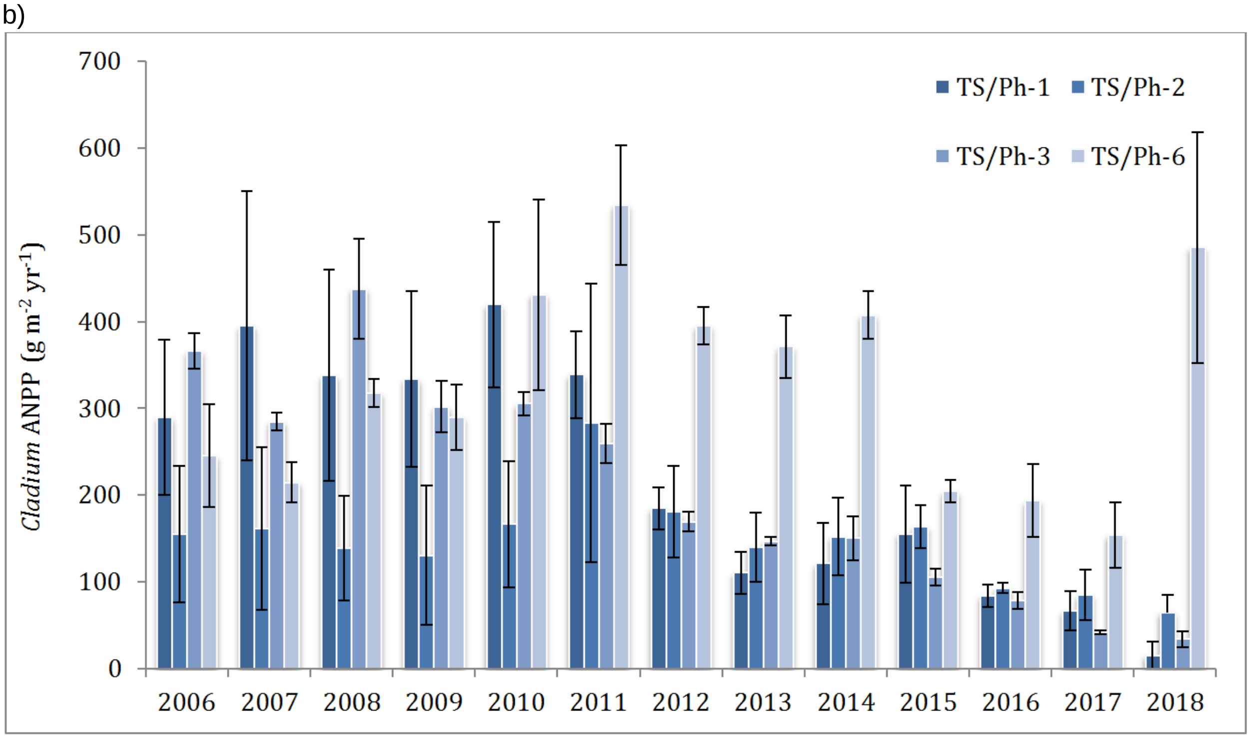
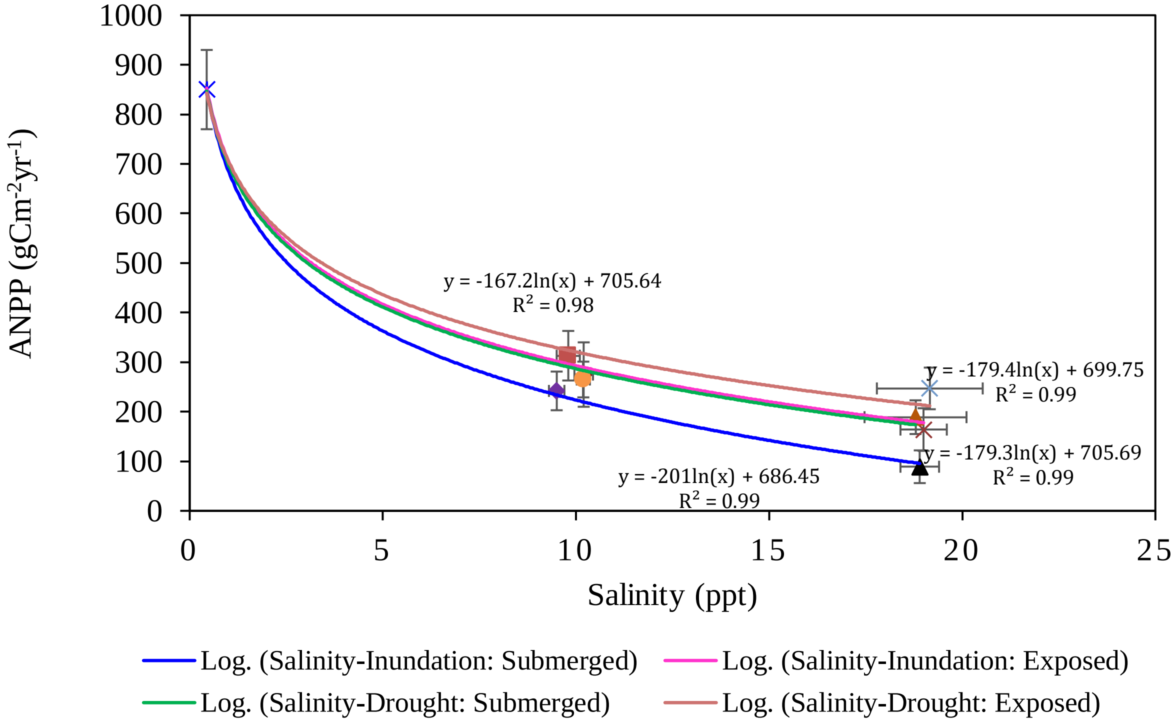


Fig. 15. Experimental data illustrating strong, non-linear relationship between salinity and sawgrass ANPP (a) and modeled estimated threshold ANPP needed to maintain equilibrium in peat soil elevation in response to increasing salinity (b). ANPP to BNPP ratio of 2.8, aboveground turnover rate of 2.5 year^{-1}, belowground turnover rate of 0.25 year $^{-1}$, and soil bulk density of 0.09 gcm^{-3} were used as constant inputs to simulate the model.

a)



b)

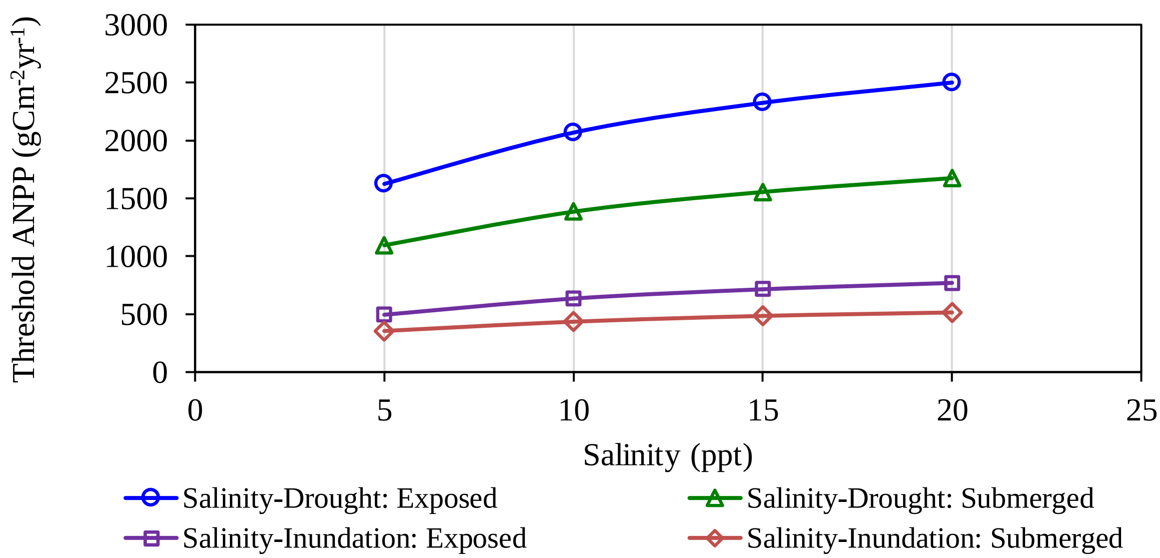


Figure 16. Simulated marsh peat elevations showing examples of accumulating, stable, and collapsing peats in response to aboveground productivity, salinity, and hydrology.

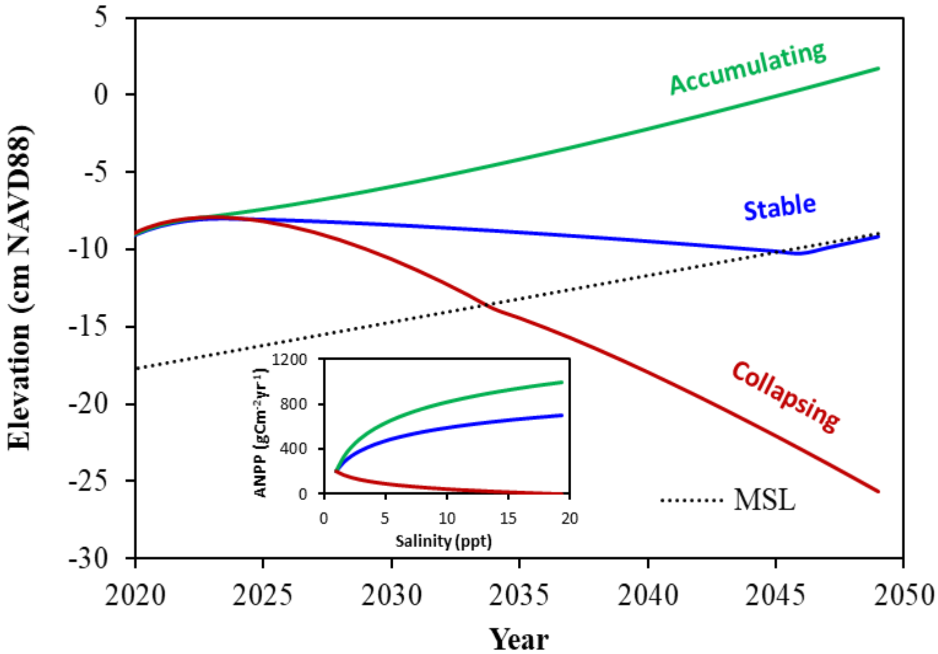


Figure 17. Long-term variation in total annual litterfall production in mangrove forests along SRS estuary before and after the passage of Hurricanes Wilma (October 2005) and Irma (September 2017) across the FCE.

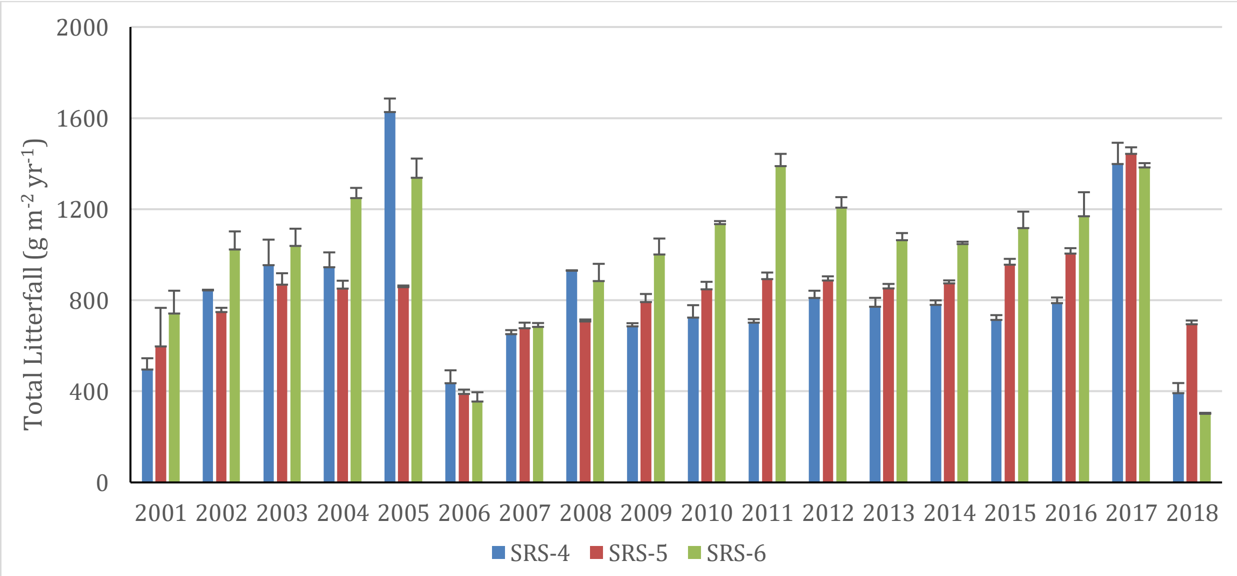


Figure 18. (a) Mean (± SE) foliar residence time (yr) in Shark River mangrove sites from 2001 to 2013. Hurricane symbol denotes Hurricane Wilma impact in October 2005. (b) Linear regression of foliar residence time and leaf aboveground biomass (AGB) anomaly (% change from 2000 to 2001 leaf AGB mean) across all sites.

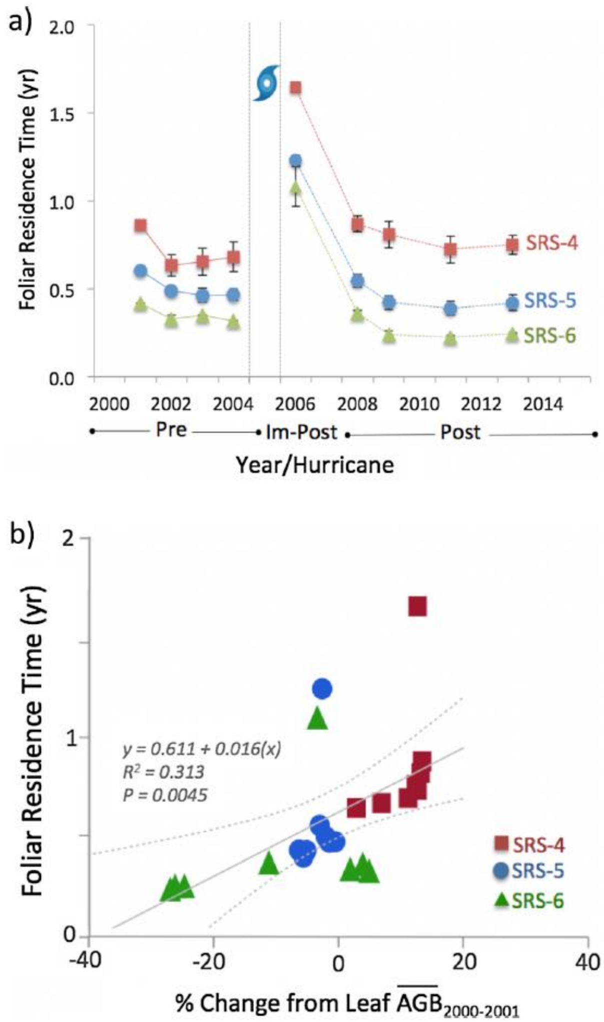


Figure 19. Modeled median groundwater salinity at 0-2m for 2016 using BISECT (Swain et al. 2019).

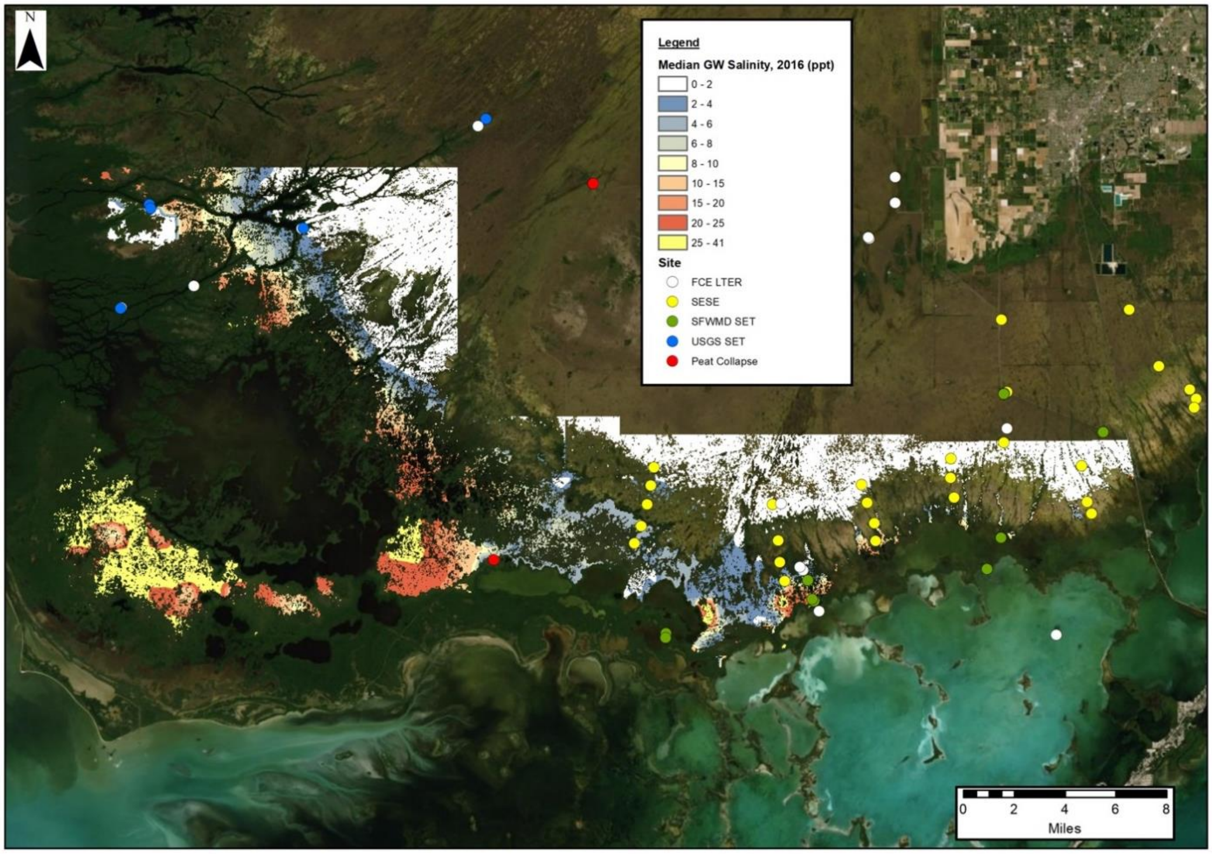
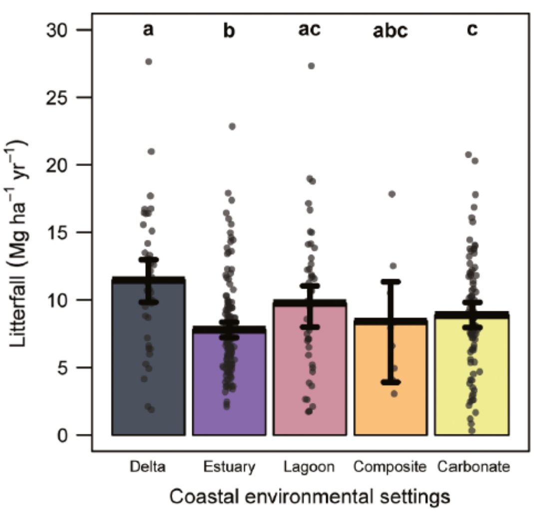


Figure 20. Variability of mangrove litterfall values in the neotropics (N = 329) across different environmental settings. Bars show group means (± 95% confidence interval) and lower-case letters difference among groups (*P* < 0.05).



Trophic Dynamics: Food web analysis revealed substantial contributions of epiphytic algae to the diets of ecotonal predators (Eggenberger et al. 2019; Fig 1b) and important consumers in marine habitats (Fig. 1c). Hurricane Irma forced evacuation of juvenile bull sharks from the estuary (Fig. 21; Strickland et al. 2019). Common Snook (*Centropomus undecimalis*) evacuated upstream areas driven by increases in flow/water level driven by rainfall, and fluctuations in barometric pressure (Massie et al. 2019). Alligators were largely unaffected by the hurricane while dolphin detections increased four-fold in upstream SRS. By 2017, the juvenile bull shark population appears to have recovered (Fig. 22). We obtained evidence of phosphorus limitation in abundant consumer Eastern Mosquitofish in SRS by stoichiometric analysis (Fig. 23). We documented evidence that the invasion of saltwater habitats was facilitated by the evolution of herbivory in diets of fish of the genus *Poecilia*.

Figure 21. Hourly proportion of juvenile bull sharks (*Carcharhinus leucas*) within our tagged sample that small-bodied detected within an acoustic telemetry array in the Shark River Estuary, Florida, USA. Red dotted line denotes the estimated time Hurricane Irma was reported to be at its closest (ca. 60 km) to the Shark River mainstem at 15:00 UTC 10 September 2017. The plot does not include three sharks that suffered potential storm-related mortality. Strickland et al. (2019).

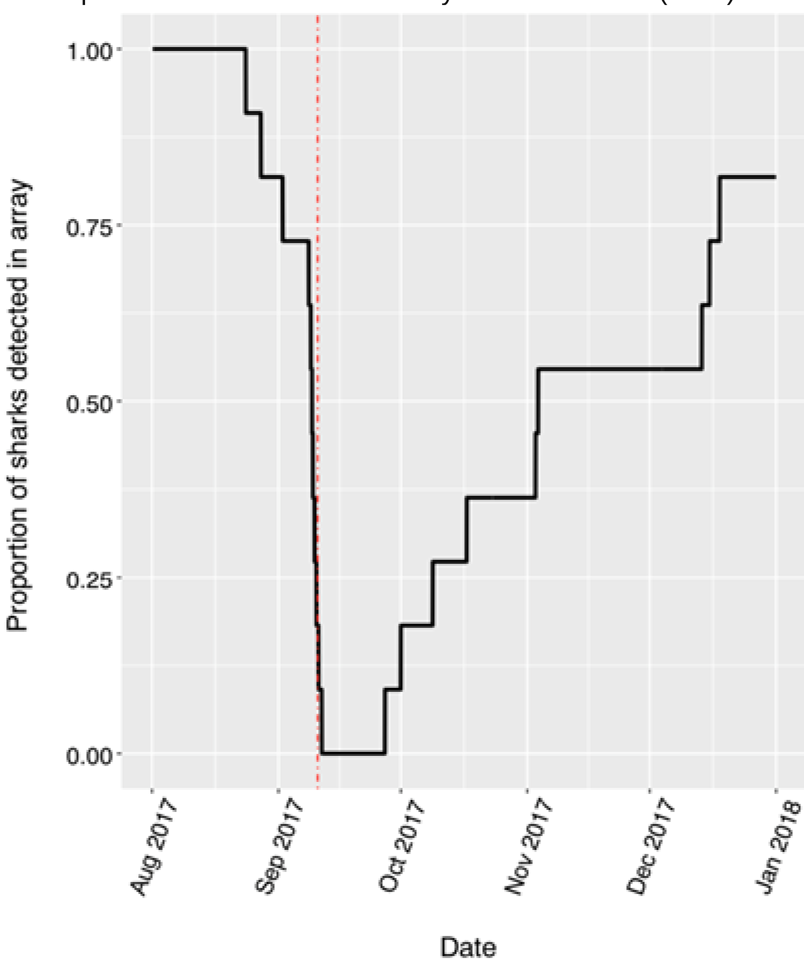


Figure 22. Annual variability in the proportion of sharks in each age-class, with sample sizes. Data collected before the 2010 cold snap were not significantly different ($\chi^2 = 15.50$, $p = 0.08$), and were pooled. Letters within bars indicate significant interannual differences at $p < 0.05$ based on post hoc chi-squared test. Matich et al. in review.

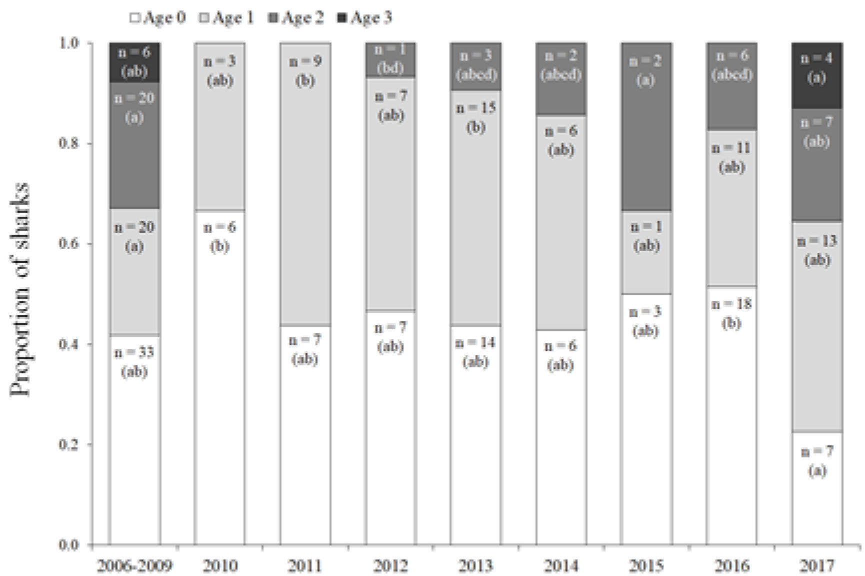
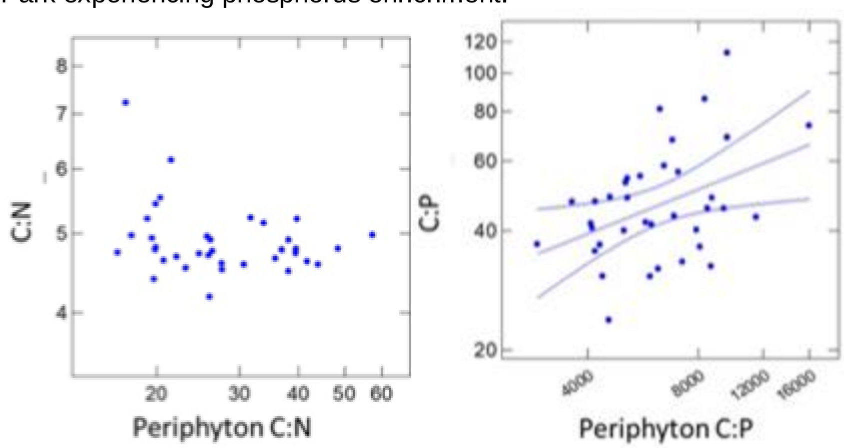


Figure 23. Relationship of stoichiometric ratios C:N (left panel) and C:P (right panel) between Eastern Mosquitofish (*Gambusia holbrooki*) whole body and periphyton in Everglades freshwater marshes. Linear regression indicated a significant positive relationship for C:P (P=0.012) but not C:N. Each point is the site mean of at least five fish. Sites include the FCE sites and sites in areas north of the Everglades National Park experiencing phosphorus enrichment.



Carbon Stocks & Fluxes: Net ecosystem exchange ranges from -0.4 to 0.4 g C m^{-2} 30 min^{-1} across FCE tower sites. Fluxes are greatest in the riverine mangrove forest at SRS 6, followed by the scrub mangroves along the coast of TS/Ph 7, and are lowest in Florida Bay (TS/Ph 10; Fig. 24-26). In the coastal and terrestrial sites net methane emissions are an order of magnitude smaller than net ecosystem exchange. Freshwater marshes and marl prairies that historically developed large below ground carbon pools are carbon neutral annually. Near-coast riverine mangrove forests are a strong sink for carbon dioxide, which has been attributed to year-round productivity and low ecosystem respiration. We found that oligotrophic seagrass ecosystems if the TS/Ph transect could be net heterotrophic despite large positive seagrass net aboveground primary productivity. We suggest that a combination of carbonate dissolution and respiration in sediments exceeded seagrass primary production and calcification. Fig. 24).

Figure 24. Time-series plot of FCO_2 from the new TS/Ph 10 seagrass bed eddy covariance tower (points colored by Latent Heat Flux, LE) and z/L. The unstable but very close to neutral zone (UVCN) is shown between the dotted lines, where -0.1< z/L < 0. The unitless stability parameter, z/L, is an indicator of the relative importance of shear and buoyant forcing at the measurement height (z; m) (Smedman et al., 2007). Values of z/L greater than 0 indicate a stable boundary layer where vertical transfer is driven by wind-shear, whereas negative values indicate convective and unstable conditions.

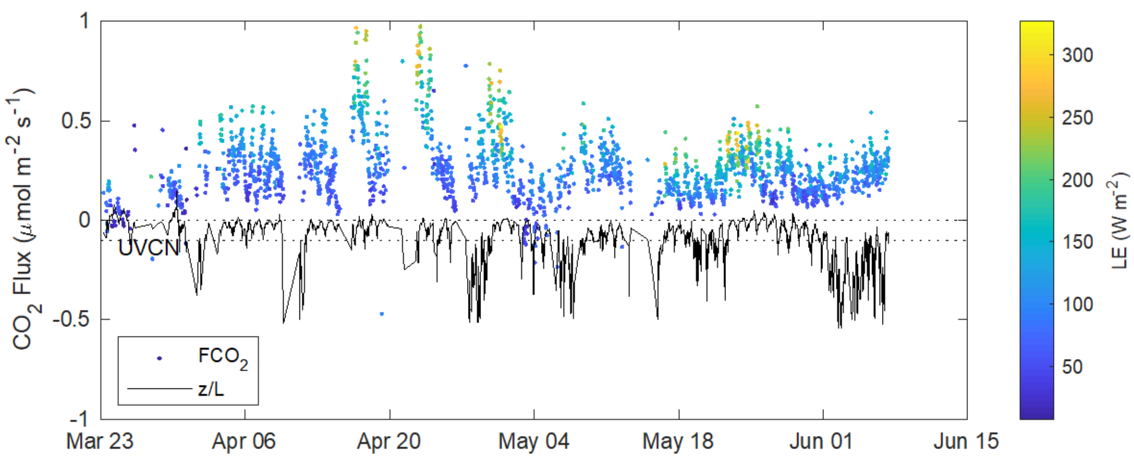


Figure 25. CO_2 dynamics in the scrub mangrove tower site at TS/Ph 7. (a) Strong diurnal patterns, (b) seasonal oscillations, and dynamic fluxes of net ecosystem exchange (NEE), Ecosystem Respiration (R_{eco}) and gross ecosystem exchange (GEE).

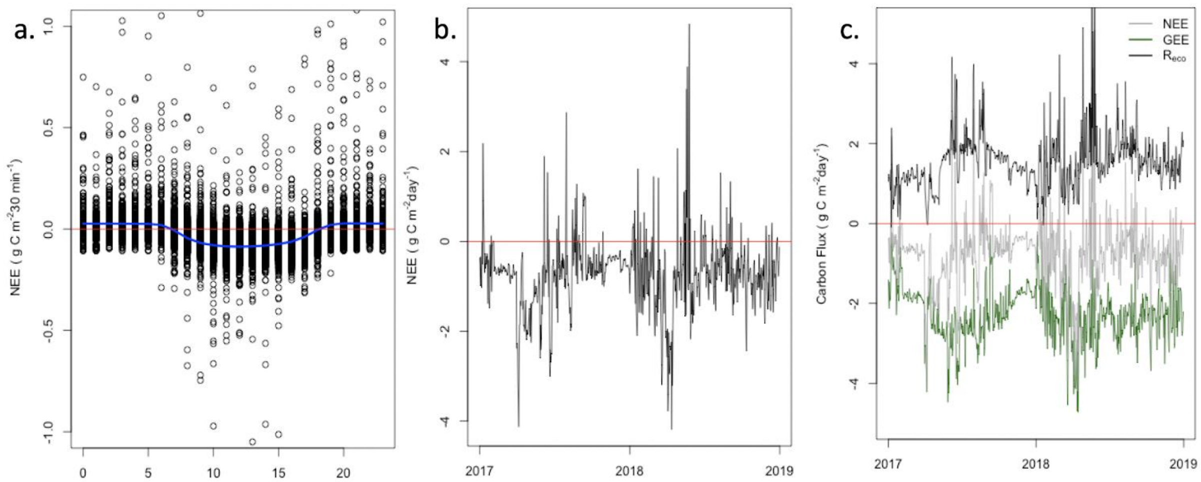
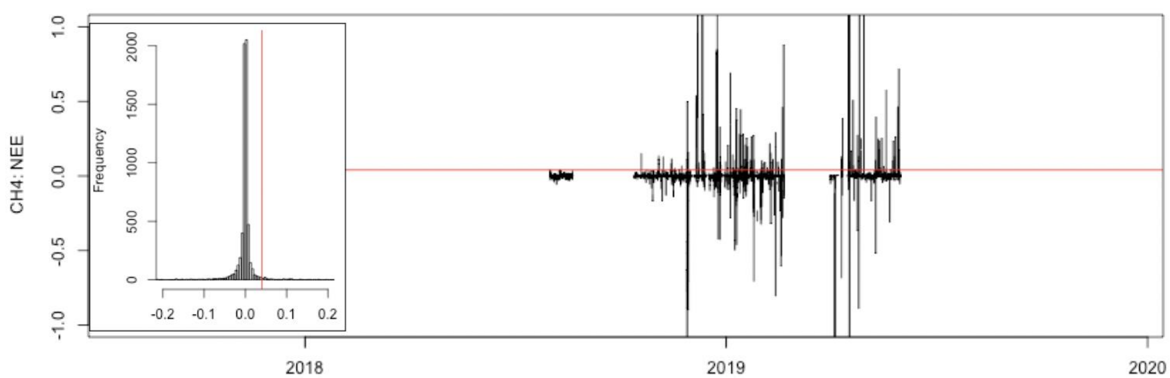


Figure 26. The greenhouse carbon balance for riverine mangrove forests at SRS 6. The redline indicates the compensation point above which net CO_2 is not offsetting net CH_4 emissions. While this threshold is crossed sporadically, the site is a greater sink for CO_2.



Water Governance: Participants in research activities in Homestead have provided qualitative data (in the form of transcribed texts from interviews and participant observation field notes). These data assist in understanding the role that water management plays in their everyday activities and how this has simultaneously assisted and complicated their resilience to environmental changes. This will inform our understanding of actually existing resilience and provide the foundation for manuscripts that will be submitted to peer-reviewed journals, focusing on agricultural resilience and environmental management. Our preliminary theoretical framework development activities have enabled us to conceptualize the relation between resilience and the Anthropocene, which we have developed in an edited collection with senior colleagues who work on resilience in other locations (Chandler et al. 2019).

Integrative Modeling: The decreased rainfall scenario produced marked changes across the system in comparison to the Baseline scenario. Most notably, muck fire risk was elevated for 49% of the period of simulation in one of the three indicator regions. Surface water flow velocity slowed drastically across most of the system (Fig. 27), which may impair soil processes related to maintaining landscape patterning. Due to lower flow volumes, this scenario produced decreases in parameters related to flow-loading, such as phosphorus accumulation in the soil, and methylmercury production risk. The increased rainfall scenario was hydrologically similar to the Baseline scenario due to existing water management rules. A key change was phosphorus accumulation in the soil, an effect of flow-loading due to higher inflow from water control structures in this scenario (Fig. 28).

Figure 27. Daily mean velocity of surface water flow for the period of simulation; simulation maps for the Baseline scenario (top left), +RF scenario (top center), and −RF scenario (top right). Difference maps compare the +RF scenario (bottom left) and −RF scenario (lower right) to the Baseline scenario. Flower et al. 2019.

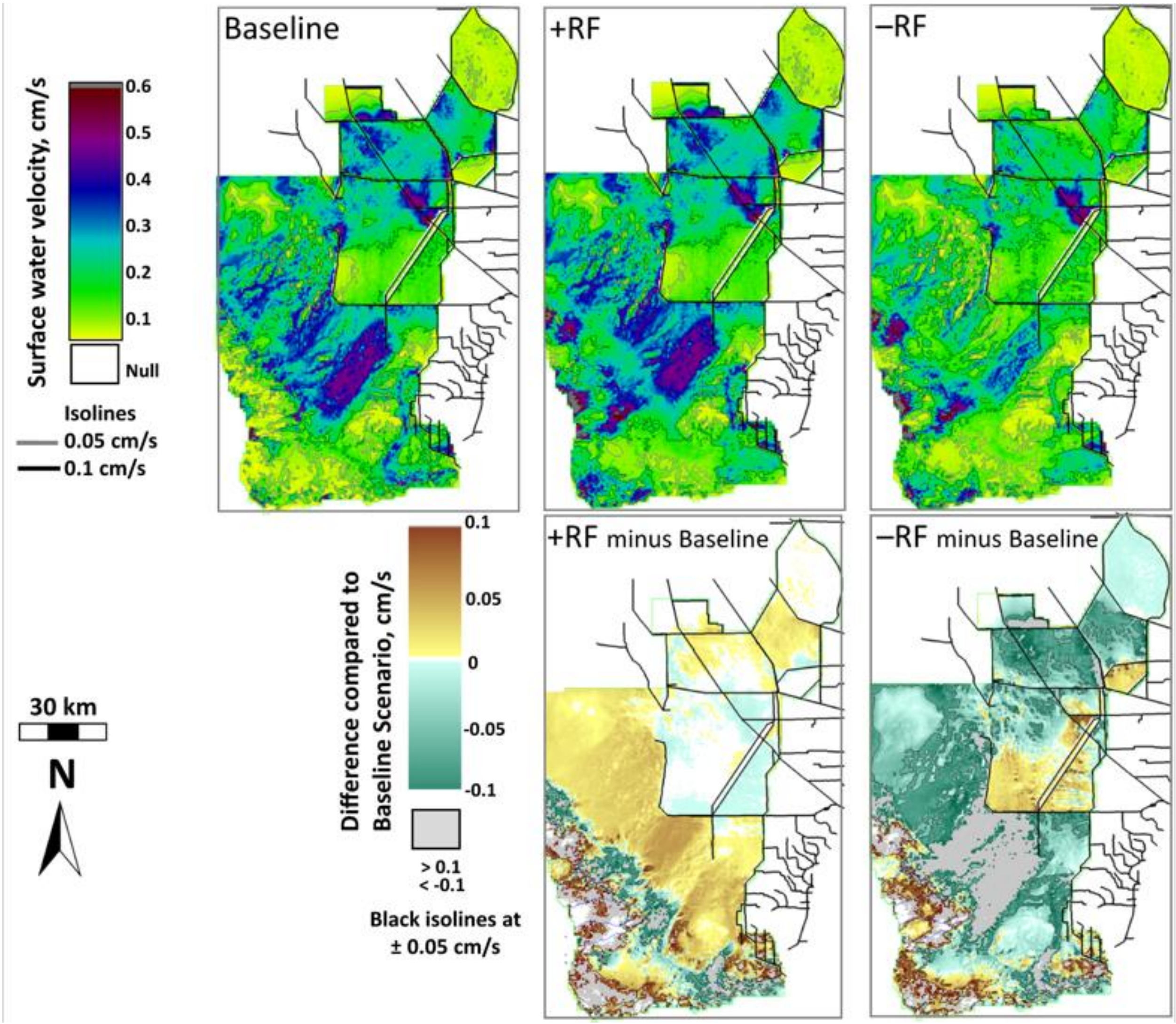
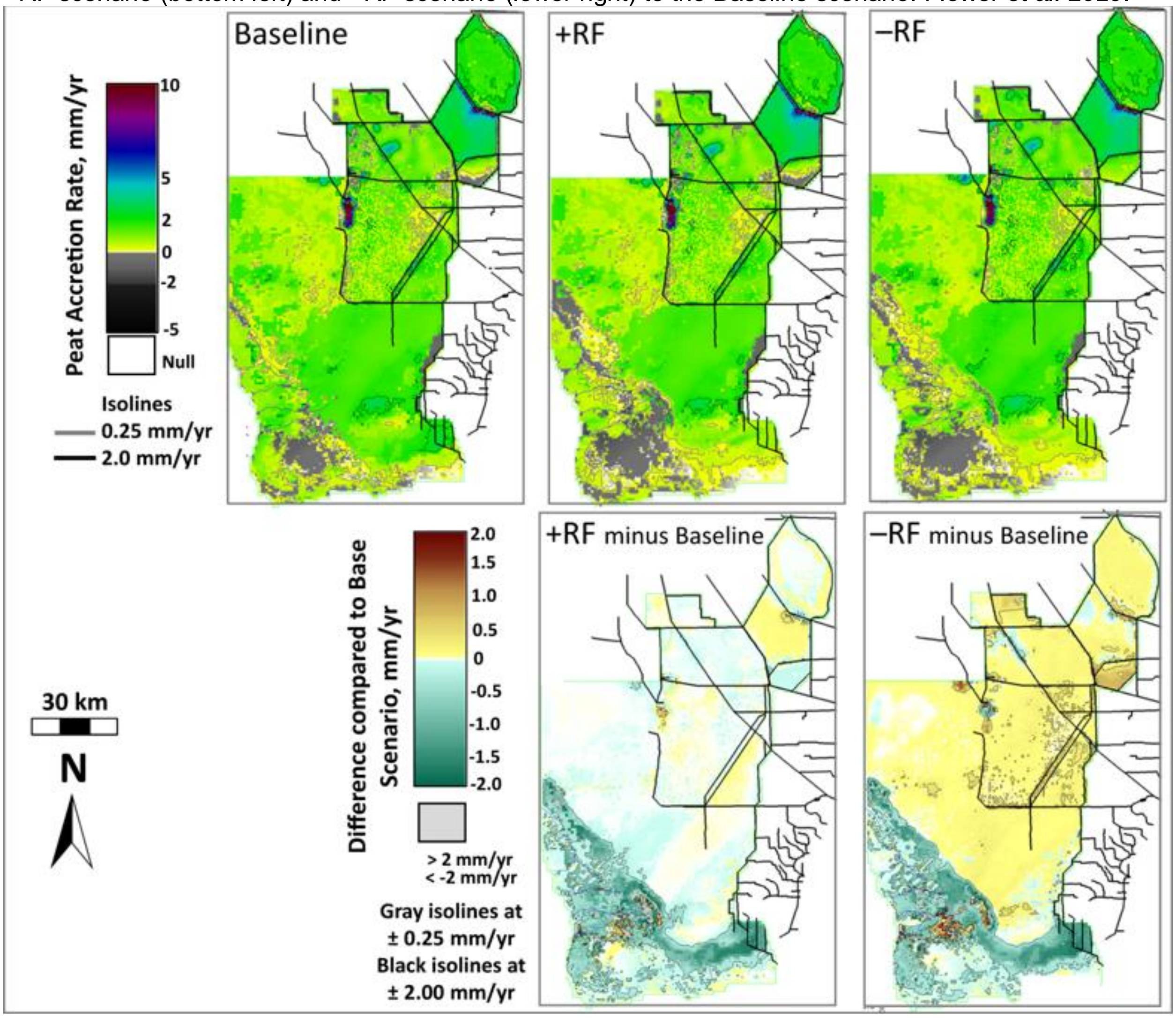


Figure 28. Average peat accretion rate simulation maps for the period of simulation for the Baseline scenario (top left), +RF scenario (top center), and −RF scenario (top right). Difference maps compare the +RF scenario (bottom left) and −RF scenario (lower right) to the Baseline scenario. Flower et al. 2019.



Key outcomes or Other achievements

Here we provide a bulleted list of major outcomes and achievements organized across our cross-cutting themes:

Climate and Hydrology:

- Analysis of long-term rainfall trends show that wet season rainfall increased as a step-function after 1992. Implementation of hydrologic restoration projects along the boundaries of TS/Ph and SRS are creating detectable increases in wet season water depths. Similar wet-season depth increases are being observed in

brackish-water and marine sites, associated with sea-level rise. These features are amplifying seasonal hydrologic pulses throughout the FCE.
- Saltwater intrusion has been increasing into the aquifer beneath ENP consistently at depths greater than 10 m between 2000 and 2016. In the shallow portion of the aquifer (< 10 m), seawater intrusion is more variable and can be pushed back towards the coastline by the presence of freshwater delivery into TS/Ph.
- Phosphorus desorption from calcite begins with just 3% seawater mixtures and increases as a power function as the amount of seawater in the mixture increases towards 100%.

Biogeochemistry and Organic Matter Dynamics:

- Dissolved organic matter concentrations and characteristics fluctuate with water levels, with a strong negative relationship between water level and dissolved organic carbon in freshwater sloughs. Decreased mass loss of labile and recalcitrant particulate organic matter is observed along the fresh-marine gradient.
- Microbial assemblages are similar between the freshwater marshes but differ among brackish marshes of SRS and TS/Ph.
- Salt inhibition of fine root biomass leads to soil elevation loss in freshwater marshes. A legacy of saltwater intrusion is a persistent loss of dissolved organic carbon from freshwater peat wetlands.

Primary Production:

- Sawgrass biomass and annual net primary production have experienced an abrupt decline at the upstream freshwater marsh sites (TS/Ph-1 & 3), and more recently at the lower ecotone site (TS/Ph-6).
- Experimental manipulations suggest a significant reduction in sawgrass root production with salt exposure that shifts the peat marshes from a carbon sink to a source, resulting in a loss of soil elevation and carbon stocks. However, carbon losses can be offset by phosphorus additions that enhance carbon uptake rates of peat marshes.
- Using a sawgrass plant – peat soil mechanistic model, we identified the annual aboveground productivity needed to maintain a constant peat elevation for different levels of salinity. Model simulated peat elevations also show examples of accumulating, stable, and collapsing peats in response to aboveground productivity, salinity, and hydrology.
- Mangrove foliar residence time could be used as an indicator to evaluate trajectories of canopy recovery and resilience to hurricane disturbances in latitudinal comparative studies across mangrove ecotypes and coastal settings, particularly in areas of high disturbance frequency such as the Gulf of Mexico and the Caribbean regions.

Trophic Dynamics:

- The trophodynamics stable isotope sampling began with the first dry season sampling in May 2019 and first the wet season sampling planned for October 2019. A characterization of the FCE food web is being developed based on the synthesis of available community structure and food web information across marsh-mangrove and marine ecosystems.

Carbon Stocks & Fluxes:

- Some seagrass beds in oligotrophic Florida Bay are seasonally net sources of CO2 to the atmosphere, despite being sites of calcite dissolution.
- The seagrass beds of TS/Ph 10 were net sources of carbon dioxide to the atmosphere through spring-early summer 2019.
- Air/sea temperature difference, convective forcing and wind shear are more important determinants of evaporation and latent heat flux than solar radiation in Florida Bay.
- The green house carbon balance suggests that the riverine mangrove forests are a strong sink for carbon dioxide and net ecosystem exchange offsets methane emissions.
- Everglades freshwater marshes and marl prairies are currently carbon dioxide neutral annually.

Integrative Modeling:

- A major advancement was made to extend predictions into the FCE period of record, to predict consequences of hydrodynamic and nutrient shifts on the base of the food web, and to improve boundary conditions through collaborations with the climate and hydrology working group.

Water Governance:

- Analytical attention on destituent politics of water management is necessary to understand consequences of ecological design in relation to restoration and resilience-building efforts.
- There is significant divergence between everyday, actually-existing resilience as practiced by Homestead farmers and formalized resilience initiatives by government, extension agencies.

Opportunities for training and professional development

Education Programs

The FCE Education Program combines our research with participatory science opportunities, training and mentoring across the K-20 spectrum. We continue to offer opportunities to our citizens, pre- and professional service teachers, K-12 students, undergraduates, and graduate students in order to expose them to our research, and to provide them with the training and mentoring that is critical for impacting human resource development in science, engineering, and technology.

Participatory Science: The FCE Participatory Science program continues to provide ongoing support for opportunities to engage with our scientists. *Predator Tracker* allows participants to track and study big predators in the Shark River Estuary in Everglades National Park and explore their tracking data. *CAST: Project Bay Bones* and *CAST: Mark-Recapture* participants learn how changes in the Everglades impact coastal fisheries in order to conserve and maintain fishing quality in the future. More recently launched in the fall of 2018, the *FCE LTeaER* decomposition project is modeled after the *Tea Bag Index* (TBI; http://www.teatime4science.org) study and engages participants in a long-term decomposition study to test hypotheses about the drivers of organic matter transformation while contributing to a global research project (Keuskamp et al. 2013). Teabags are deployed at each of our research sites in Taylor and Shark River Sloughs and are being monitored by an REU and an RET. Last year's RET worked with their students to compare the decomposition rates in their schoolyard with those four at FCE sites. The students presented their results in two posters entitled *Environmental Realitea* and *The Analysis of Decomposition Between Rooibos Tea and Green Tea Bags to Understand the Global Carbon Cycle* at the South Florida Regional Science and Engineering Fair. Their teacher and RET presented a poster entitled *The effects of saltwater on leaf litter breakdown in the Florida Coastal Everglades* at the 2019 FCE All Scientists Meeting. This year, our RET deployed the *LTeaER* project within the Cutler Slough at the Deering Estate. Samples are due for collection during the late fall and the RET will work with their students to analyze and present their data at the *2020 South Florida Regional Science and Engineering Fair* and the RET will present a poster at the 2020 FCE All Scientists Meeting. These results will also be developed and submitted as a new *Data Nuggets* (http://datanuggets.org) for classroom use and contributed to the Tea Bag Index (http://www.teatime4science.org).
Our Education & Outreach Coordinator has also been working in his role as Co-Chair of the LTER's Education & Outreach Citizen Science Subcommittee to expand *LTeaER* to other sites. In June 2019, our two most recent RETs met via. Zoom with an RET at VCR to share their *LTeaER* experience and lessons learned. Other sites that have expressed interest in participating will allow us compare across the FCE-VCR-PIE coastal sites and with KNZ, CAP, HBR, and SEV. A follow up Zoom call for FCE and VCR RETs is planned for sharing updates and will include other interested sites.

K-12 Schoolyard Activities: The FCE Schoolyard Program has maintained its K-12 programs and continues to identify opportunities to improve human resource development in STEM disciplines by engaging local students and teachers in our research. Working in collaboration with our FIUteach, National Tropical Botanical Garden, Everglades Foundation (EF) and Deering Estate partners, we continue to offer near peer mentoring to K-12 students and teachers through research experiences and professional development. This year, 17 professional- service and 5 pre-service teachers enrolled in the *2019 Kampong Science Teachers Enrichment Program (K-STEP) 2019: Resilience of Caribbean Urban Ecosystems* at the National Tropical

Botanical Garden (NTBG) in Miami. During the two-day professional development, FIU scientists introduced participants to the Kampong's botanical collection and discussed cutting-edge research related to two participatory science projects related to climate change: the *FCE LTeaER* decomposition project and the *Grove ReLeaf* project. The purpose of these sessions was to train teachers how to identify local flora to monitor Miami's urban tree canopy for *ReLeaf* and to prepare, deploy, retrieve *LTeaER* bags to study decomposition rates. Afterwards, each teacher received an *LTeaER* and *ReLeaf* starter kit that can be used to design and conduct their own *LTeaER* decomposition experiments. Teachers that successfully implement an *LTeaER* experiment will have the opportunity to adopt an and visit an *FCE LTeaER* site with one of our scientists and/or adopt a Cutler Slough site where their students can conduct their own *LTeaER* experiment. In addition to their starter kits, each participant received continuing education credits, tuition waiver, meals, complimentary admission, and a private Director's Tour.

Training of Undergraduates and Early Career Scientists: FCE broadly mentors early career scientists at all levels and strives to include them throughout our research program. Our membership currently includes 50 Ph.D., 18 Masters students and 12 post-doctoral researchers and provide formal support to 5 students through FCE IV funding and an additional 3 through leveraged funding sources such as Everglades Foundations' ForEverglades Fellows. We continuously engage our students through our student group, the annual FCE All Scientists Meeting, enrollment in FCE-related graduate courses and distributed seminars, and by including them in cross-site opportunities to collaborate with other members of the LTER Network. In addition to our graduate students, several undergraduates work in our labs and assist in the field as research assistants. Two undergraduates receive REU support each year through FCE core funding. This year, our REUs were included as members of the CREST CAChE REU Site where they participated in networking opportunities, social events, and weekly field trips. At the end of their REU experience, each participant presented their results at the CREST CAChE Student Research Symposium and will also present their results at the 2020 FCE All Scientists Meeting.

Communicating results to communities of interest

Outreach

The FCE Outreach program works closely with the FIU Division of External Relations, Strategic Communications & Marketing, LTER Network Communications Office, Everglades Foundation, and NSF Communications Office to increase public awareness and generate an interest in learning about the Florida Coastal Everglades. Through these collaborations we receive guidance for communicating with external audiences through social media, press releases, newsletters, and an annual impact report. These communications allow us to maintain a consistent presence in the news media and increases our ability to engage with the members of our community that are not typically aware of our research.

Dissemination: FCE scientists are actively engaged throughout the community and receive regular coverage in both traditional news and social media. Over the last year, they have participated in 47 events including: panels; presentations; tabling events and art exhibitions and 41 researchers have been discussed in 73 media events, on 68 calendar days since our last report. This news media has been distributed across 25 local, national, and international media outlets including: *NPR*; *PBS; BBC;, NBC*; *The New York Times; The New Yorker; Miami Herald; Palm Beach Post; and Earther/Gizomdo Magazine.* We also maintain our social media presence regular contributions to Facebook (FB), Twitter, and our *Wading Through Research* blog. Over the last year, our graduate students have made 37 new posts to the FCE FB page which have been displayed 8,043 times to 5,345 unique users. Through FB, our page has generated 50 new "Likes" (443 total) and the FCE Twitter following has increased by 23% from 434 to 534 total followers. We have also continued to share important news through our monthly *News from the Sloughs* and our graduate student blog *Wading Through Research*.

Arts & The Humanities: Engaging with the arts and humanities remains an important priority for FCE Education & Outreach and our collaboration with the Tropical Botanic Artists (TBA) has long served as the cornerstone to FCE STEAM initiatives. Since our last report, the *The Trail: In the Beginning. . .Tamiami Trail 100th Anniversary* was on display April-May 2019 at Bailey Contemporary Arts, Pompano, FL. This is the fifth public display of the *The Trail* and marks our 16^{th} exhibition with the TBA. *The Trail* features 31 portraits of native plants found in the various vegetation zones, across the breadth of South Florida, from Miami-Dade to Collier County, at the time the Tamiami Trail documentation was signed on May 15th 1915. The group has artistically depicted a variety of plants, many of which are still there today, but now bordering on the rare or endangered, or their predominant locations have shifted due to a change in water flow and man's intervention.

Plans to accomplish goals during the next reporting period

We will continue as planned to address programmatic goals. We hope to transition to our new integrative conceptual framework and structure for FCE IV, focusing on how the return of freshwater pulses via restoration interact with marine pulses (storm surges, tidal extension) to reduce the vulnerability of carbon stocks to collapse from saltwater intrusion (long term press).

Climate and Hydrology: We will implement our EXO fDOM sensors in wells to quantify variability in ground-surface water flux of dissolved organic matter. We will begin our climate downscaling research to study interactions with regional changes in surface water distribution and to provide inputs to the Everglades Landscape Model.

Biogeochemistry and Organic Matter Dynamics: We will continue long-term collection of total and dissolved water constituents, and advance characterization of food webs through molecular characterization of microbial assemblages in water, periphyton and soils.

Primary Production: We will continue long-term collection of plant and benthic algal productivity and composition, and begin the implementation of our landscape vulnerability experiment.

Trophic Dynamics: We will complete our trophodynamics characterization and use it to implement our long-term spatially-explicit food web tracking platform.

Carbon Stocks and Fluxes: Now that our flux tower network is complete, we will proceed with additional characterization of the inorganic carbon fluxes at all sites. We will install our new sediment elevation sites and begin comparisons of our net ecosystem carbon balance and net ecosystem exchange datasets.

Water Governance: We will continue our archival and interview research, focusing particularly on anthropogenic legacies along the urban-wildland boundary.

Integrated Modeling: We will complete our refinements to the Everglades Landscape Model and work on integrating the downscaled climate projections. We will continue workshops toward the integration of marsh elevation model approaches.

Products

Publications

Books (2)

Childers, D.L., E.E. Gaiser and L.A. Ogden. 2019. The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Chandler, D., K. Grove and S. Wakefield (Submitted). Resilience in the Anthropocene: Governance and Politics at the End of the World. Routledge : Abingdon, UK.

Book Chapters (13)

Childers, D.L., E.E. Gaiser and L.A. Ogden. 2019. Preface, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Childers, D.L., E.E. Gaiser and L.A. Ogden. 2019. Chapter 1, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Davis, S.E., E. Castañeda-Moya, R. Boucek, R.M. Chambers, L. Collado-Vides, H.C. Fitz, J.D. Fuentes, E.E. Gaiser, M.R. Heithaus, J.S. Rehage, V.H. Rivera-Monroy, J.P. Sah, F.H. Sklar and T. Troxler. 2019. Chapter 7: Exogenous Drivers - What has Disturbance Taught Us?, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Gaiser, E.E., L.A. Ogden, D.L. Childers and C. Hopkinson. 2019. Chapter 9: Re-Imagining Ecology through an Everglades Lens, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Kominoski, J., J.S. Rehage, W.T. Anderson, R. Boucek, H.O. Briceno, M.R. Bush, T.W. Dreschel, M.R. Heithaus, R. Jaffe, L. Larsen, P. Matich, C. McVoy, A.E. Rosenblatt and T. Troxler. 2019. Chapter 4: Ecosystem Fragmentation and Connectivity - Legacies and Future Implications of a Restored Everglades, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Ogden, L.A., J.C. Trexler, D.L. Childers, E.E. Gaiser and K.Z.S. Schwartz. 2019. Chapter 2: The Everglades as Icon, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Price, R.M., K.Z.S. Schwartz, W.T. Anderson, R. Boucek, H.O. Briceno, M.I. Cook, H.C. Fitz, M.R. Heithaus, J. Onsted, J.S. Rehage, V.H. Rivera-Monroy, R. Roy Chowdhury and A.K. Saha. 2019. Chapter 3: Water, Sustainability, and Survival, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Rivera-Monroy, V.H., J. Cattelino, J. Wozniak, K.Z.S. Schwartz, G.B. Noe, E. Castañeda-Moya, G. Koch, J.N. Boyer and S.E. Davis. 2019. Chapter 5: The Life of P: A Biogeochemical and Sociopolitical Challenge in the Everglades, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Sklar, F.H., J.F. Meeder, T. Troxler, T.W. Dreschel, S.E. Davis and P.L. Ruiz. 2019. Chapter 16 - The Everglades: At the Forefront of Transition, pp. 277-292 in Wolanski, E., J.W. Day, M. Elliott and R. Ramachandran (eds.) Coasts and Estuaries: The Future. Elsevier.

Sklar, F.H., J.M. Beerens, L.A. Brandt, C. Coronado-Molina, S.E. Davis, T.A. Frankovich, C.J. Madden, A. Mclean, J.C. Trexler and W. Wilcox. 2019. Chapter 8: Back to the Future - Rebuilding the Everglades, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Troxler, T., G. Starr, J.N. Boyer, J.D. Fuentes, R. Jaffe, S.L. Malone, J.G. Barr, S.E. Davis, L. Collado-Vides, J.L. Breithaupt, A.K. Saha, R.M. Chambers, C.J. Madden, J.M. Smoak, J.W. Fourqurean, G. Koch, J. Kominoski, L.J. Scinto, S. Oberbauer, V.H. Rivera-Monroy, E. Castañeda-Moya, N.O. Schulte, S.P. Charles, J.H. Richards, D.T. Rudnick and K.R.T. Whelan. 2019. Chapter 6: Carbon Cycles in the Florida Coastal Everglades Social-Ecological System across Scales, in Childers, D.L., E.E. Gaiser and L.A. Ogden (eds.) The Coastal Everglades: The Dynamics of Social-Ecological Transformation in the South Florida Landscape. Oxford University Press : New York, New York.

Twilley, R.R., V.H. Rivera-Monroy, A. Rovai, E. Castañeda-Moya and S.E. Davis. 2019. Chapter 21 - Mangrove Biogeochemistry at Local to Global Scales using Ecogeomorphic Approaches, pp. 717-785 in Perillo, G.M.E., E. Wolanski, D.R. Cahoon and M.M. Brinson (eds.) Coastal Wetlands: An Integrated Ecosystem Approach. Elsevier.

Uchida, E., V.H. Rivera-Monroy, S.A. Ates, E. Castañeda-Moya, A. Gold, T. Guilfoos, M.F. Hernandez, R. Lokina, M.M. Mangora, S.R. Midway, C. McNally, M.J. Polito, M. Robertson, R.V. Rohli, H. Uchida, L. West and X. Zhao. 2019. Collaborative Research Across Boundaries: Mangrove Ecosystem Services and Poverty Traps as a Coupled Natural-Human System, pp. 115-152 in Perz, S.G. (eds.) Collaboration Across Boundaries for Social-Ecological Systems Science. Palgrave Macmillan : Cham.

Journal Articles (43)

Abbas, M.M., A. Melesse, L.J. Scinto and J.S. Rehage. 2019. Satellite estimation of chlorophyll-a using Moderate Resolution Imaging Spectroradiometer (MODIS) sensor in shallow coastal water bodies: Validation and improvement. Water 11: 1621

Abiy, A., A. Melesse and W. Abtew. 2019. Teleconnection of regional drought to ENSO, PDO, and AMO: Southern Florida and the Everglades. Atmosphere 10: 295

Boucek, R. and D. Morley. 2019. Demonstrating the value of cross-ecosystem syntheses and comparisons in animal movement and acoustic telemetry research. Fisheries Research 216: 74-78

Boucek, R., A.A. Trotter, D.A. Blewett, J.L. Ritch, R.O. Santos, P.W. Stevens, J. Massie and J.S. Rehage. 2019. Contrasting river migrations of Common Snook between two Florida rivers using acoustic telemetry. Fisheries Research 213: 219-225

Breithaupt, J.L., J.M. Smoak, C.J. Sanders and T. Troxler. 2019. Spatial variability of organic carbon, CaCO3 and nutrient burial rates spanning a mangrove productivity gradient in the coastal Everglades. Ecosystems 22: 844-858

Breithaupt, J.L., N. Hurst, H.E. Steinmuller, E. Duga, J.M. Smoak, J. Kominoski and L.G. Chambers. 2019. Comparing the biogeochemistry of storm surge sediments and pre-storm soils in coastal wetlands: Hurricane Irma and the Florida Everglades. Estuaries and Coasts DOI: 10.1007/s12237-019-00607-0

Brown, C.E., M.G. Bhat, and J.S. Rehage. (Accepted). Valuing ecosystem services under climate risk: a case of recreation in the Florida Everglades. Journal of Water Resources Planning & Management.

Charles, S.P., J. Kominoski, T. Troxler, E.E. Gaiser, S. Servais, B.J. Wilson, S.E. Davis, F.H. Sklar, C. Coronado-Molina, C.J. Madden, S.P. Kelly and D.T. Rudnick. 2019. Experimental saltwater intrusion drives rapid soil elevation and carbon loss in freshwater and brackish Everglades marshes. Estuaries and Coasts DOI: 10.1007/s12237-019-00620-3

Cooper, H.M., C. Zhang, S.E. Davis and T. Troxler. 2019. Object-based correction of LiDAR DEMs using RTK-GPS data and machine learning modeling in the coastal Everglades. Environmental Modelling & Software 112: 179-191

Dessu, S.B., R.M. Price, J. Kominoski, S.E. Davis, A. Wymore, W.H. McDowell and E.E. Gaiser. 2019. Percentile-Range Indexed Mapping and Evaluation (PRIME): A new tool for long-term data discovery and application. Environmental Modelling & Software DOI: 10.1016/j.envsoft.2019.104580

Eggenberger, C., R.O. Santos, T.A. Frankovich, W.R. James, C.J. Madden, J. Nelson and J.S. Rehage. 2019. Coupling telemetry and stable isotope techniques to unravel movement: Snook habitat use across variable nutrient environments. Fisheries Research 218: 35-47

Flower, H., M. Rains, H.C. Fitz, W.H. Orem, S. Newman, T.Z. Osborne, K.R. Reddy and J. Obeysekera. 2019. Shifting ground: Landscape-scale modeling of biogeochemical processes under climate change in the Florida Everglades. Environmental Management DOI: 10.1007/s00267-019-01200-8

Gatto, J. and J.C. Trexler. 2019. Seasonality of fish recruitment in a pulsed floodplain ecosystem: Estimation and hydrological controls. Environmental Biology of Fishes 102: 595-613

Hatt, D. and L. Collado-Vides. 2019. A comparative analysis of the organic and inorganic carbon content of Halimeda and Penicillus (Chlorophyta, Bryopsidales) in a coastal subtropical lagoon. Botanica Marina 62: 323-326

Jaramillo, F. et al. 2019. Priorities and Interactions of Sustainable Development Goals (SDGs) with Focus on Wetlands. Water 11: 619

Kominoski, J.S., E.E. Gaiser, E. Castañeda-Moya, S.E. Davis, S. Dessu, P. Julian II, D.Y. Lee, L. Marazzi, V.H. Rivera-Monroy, A. Sola, U. Stingl, S. Stumpf, D. Surratt, R. Travieso, and T.G. Troxler. (Accepted). Disturbances increase and synchronize long-term nutrient concentrations and bacterial productivity in coastal ecosystems. Ecology.

Kroloff, E., J. Heinen, K.N. Braddock, J.S. Rehage and R.O. Santos. 2019. Understanding the decline of catch-and-release fishery with angler knowledge: a key informant approach applied to South Florida bonefish. Environmental Biology of Fishes 102: 319-328

Lee, D.Y., J.S. Kominoski, H. Briceño, S. Thomas, J.N. Boyer, and C.J. Madden. (Accepted). Testing long-term and episodic hydrologic drivers of benthic and planktonic biogeochemistry in shallow oligotrophic estuarine ecosystems, Florida, USA. Estuaries and Coasts.

Macreadie, P.I. et al. 2019. The future of Blue Carbon science. Nature Communications 10: 3998

Malone, S.L., J. Zhao, P. Olivas, G. Starr, C.L. Staudhammer, J.S. Kominoski, J.A. Cummings, and S.F. Oberbauer. (Accepted). Quantifying the effects of aquatic metabolism on ecosystem carbon dynamics in subtropical wetlands. Limnology and Oceanography.

Marazzi, L., E.E. Gaiser, M.B. Eppinga, J.P. Sah, L. Zhai, E. Castañeda-Moya and C. Angelini. 2019. Why Do We Need to Document and Conserve Foundation Species in Freshwater Wetlands? Water 11: 265

Massie, J., B.A. Strickland, R.O. Santos, J. Hernandez, N. Viadero, R. Boucek, H.E. Willoughby, M.R. Heithaus and J.S. Rehage. 2019. Going downriver: Patterns and cues in hurricane-driven movements of common snook in a subtropical coastal river. Estuaries and Coasts DOI: 10.1007/s12237-019-00617-y

Mazzei, V., B. Wilson, S. Servais, S. Charles, J.S. Kominoski, and E.E. Gaiser. (Awaiting publication). Periphyton as an indicator of saltwater intrusion in freshwater wetlands: insights from experimental manipulations. Ecological Applications.

Padulles Cubino, J., J.M. Cavender-Bares, S.E. Hobbie, D.E. Pataki, M. Avolio, L. Darling, K. Larson, S.J. Hall, P.M. Groffman, T.L.E. Trammell, M.K. Steele, J.M. Grove and C. Neill. 2019. Drivers of plant species richness and phylogenetic composition in urban yards at the continental scale. Landscape Ecology 34: 63-77

Parkos, J.J.III, J. Kline and J.C. Trexler. 2019. Signal from the noise: model-based interpretation of variable correspondence between active and passive samplers. Ecosphere 10: e02858

Rastetter, E.B., M.D. Ohman, K.J. Elliott, J.S. Rehage, V.H. Rivera-Monroy, R.E. Boucek, E. Castañeda-Moya, T.M. Danielson, L. Gough, P. Groffman, C.R. Jackson, C.F. Miniat, and G.R. Shaver. (Awaiting publication). Future trajectories for ecosystems in the U.S. Long-term Term Ecological Research Network: The importance of time lags. Ecosphere.

Regier, P., H.O. Briceno and J.N. Boyer. 2019. Analyzing and comparing complex environmental time series using a cumulative sums approach. MethodsX 6: 779-787

Rehage, J.S., R.O. Santos, E. Kroloff, J. Heinen, Q. Lai, B.D. Black, R. Boucek and A.J. Adams. 2019. How has the quality of bonefishing changed over the past 40 years? Using local ecological knowledge to quantitatively inform population declines in the South Florida flats fishery. Environmental Biology of Fishes 102: 285-298

Ribeiro, R.D.A., A. Rovai, R.R. Twilley and E. Castañeda-Moya. 2019. Spatial variability of mangrove primary productivity in the neotropics. Ecosphere 10: e02841

Rivera-Monroy, V.H., T. Danielson, E. Castañeda-Moya, B.D. Marx, R. Travieso, X. Zhao, E.E. Gaiser and L. Farfan. 2019. Long-term demography and stem productivity of Everglades mangrove forests (Florida, USA): Resistance to hurricane disturbance. Forest Ecology and Management 440: 79-91

Saderne, V., N.R. Geraldi, P.I. Macreadie, D.T. Maher, J.J. Middelburg, O. Serrano, H. Almahasheer, A. Arias-Ortiz, M. Cusack, B.D. Eyre, J.W. Fourqurean, H. Kennedy, D. Krause-Jensen, T. Kuwae, P.S. Lavery, C.E. Lovelock, N. Marba, P. Masque, M.A. Mateo, I. Mazarrasa, K.J. McGlathery, M.P.J. Oreska, C.J. Sanders, I.R. Santos, J.M. Smoak, T. Tanaya, K. Watanabe and C.M. Duarte. 2019. Role of carbonate burial in Blue Carbon budgets. Nature Communications 10: 1106

Sanchez, J.L., H.D. Bracken-Grissom and J.C. Trexler. 2019. Freshwater-to-marine transitions may explain the evolution of herbivory in the subgenus Mollienesia (genus Poecilia, mollies and guppies). Biological Journal of the Linnean Society DOI: 10.1093/biolinnean/blz045

Santos, R.O., J.S. Rehage, E. Kroloff, J. Heinen and A.J. Adams. 2019. Combining data sources to elucidate spatial patterns in recreational catch and effort: fisheries-dependent data and local ecological knowledge applied to the South Florida bonefish fishery. Environmental Biology of Fishes 102: 299-317

Santos, R.O., R. Schinbeckler, N. Viadero, M.F. Larkin, J.J. Rennert, J.M. Shenker and J.S. Rehage. 2019. Linking bonefish (Albula vulpes) populations to nearshore estuarine habitats using an otolith microchemistry approach. Environmental Biology of Fishes 102: 267-283

Servais, S., J. Kominoski, S.P. Charles, E.E. Gaiser, V. Mazzei, T. Troxler and B.J. Wilson. 2019. Saltwater intrusion and soil carbon loss: Testing effects of salinity and phosphorus loading on microbial functions in experimental freshwater wetlands. Geoderma 337: 1291-1300

Simard, M., L. Fatoyinbo, C. Smetanka, V.H. Rivera-Monroy, E. Castañeda-Moya, N. Thomas and T. Van der Stocken. 2019. Mangrove canopy height globally related to precipitation, temperature and cyclone frequency. Nature Geoscience 12: 40-45

Strickland, B.A., J. Massie, N. Viadero, R.O. Santos, K.R. Gastrich, V.A. Paz, P. O'Donnell, A.M. Kroetz, D. Ho, J.S. Rehage and M.R. Heithaus. 2019. Movements of juvenile bull sharks in response to a major hurricane within a tropical estuarine nursery area. Estuaries and Coasts DOI: 10.1007/s12237-019-00600-7

Tiling-Range, G., T.J. Smith, A.M. Foster, J.M. Smoak and J.L. Breithaupt. 2019. Utilizing fossilized charcoal to augment the Everglades National Park Fire History Geodatabase. Journal of Environmental Management 249: 109360

Tully, K., K. Gedan, R. Epanchin-Niell, A. Strong, E.S. Bernhardt, T. BenDor, M. Mitchell, J. Kominoski, T.E. Jordan, S.C. Neubauer and N. Weston. 2019. The invisible flood: the chemistry, ecology, and social implications of coastal saltwater intrusion. BioScience 69: 368-378

Wilson, B.J., S. Servais, S.P. Charles, V. Mazzei, E.E. Gaiser, J. Kominoski, J.H. Richards and T. Troxler. 2019. Phosphorus alleviation of salinity stress: effects of saltwater intrusion on an Everglades freshwater peat marsh. Ecology 100: e02672

Wilson, S., B. Furman, M.O. Hall and J.W. Fourqurean. 2019. Assessment of Hurricane Irma impacts on south Florida seagrass communities using long-term monitoring programs. Estuaries and Coasts DOI: 10.1007/s12237-019-00623-0

Yoder, L.. 2019. Compelling collective action: Does a shared pollution cap incentivize farmer cooperation to restore water quality? International Journal of the Commons 13: 378-399

Zhao, J., S.L. Malone, S. Oberbauer, P.C. Olivas, J. Schedlbauer, C.L. Staudhammer and G. Starr. 2019. Intensified inundation shifts a freshwater wetland from a CO2 sink to a source. Global Change Biology DOI: 10.1111/gcb.14718

Conference Papers and Presentations (99)

Boucek, R. 2019. Rethinking recreational fisheries management for 2020 and beyond. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Breithaupt, J.L. 2019. Comparing rates of vertical change in mangrove and marsh soils of the Coastal Everglades using measurements from surface elevation tables, marker horizons, CS-137, PB-210, and C-14. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Brown, C.E. and M. Bhat 2019. Valuing freshwater ecosystem services: A missing piece in the restoration and climate change debate on the Florida Everglades. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Castillo, N. 2019. Examining the threat of contaminants to south Florida bonefish: A spatial approach. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Charles, S.P., J. Kominoski, J.F. Meeder, L.J. Scinto, J.M. Smoak and J.P. Sah 2018. Will mangrove encroachment mitigate carbon loss with saltwater intrusion in subtropical coastal wetlands? American Geophysical Union Fall Meeting. Washington, D.C.

Chavez, S., D. Lagomasino, L. Fatoyinbo, B. Cook, E. Castañeda-Moya, R.P. Moyer, K. Radabaugh, J.M. Smoak and S. Wdowinski 2019. Determining coarse woody debris in mangrove forest of the Florida Everglades after Hurricane Irma using airborne lidar imagery. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Cook, M.I. 2019. Restoring Beauty Requires a Beast or Two. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Coronado-Molina, C. 2019. Elevation-dependent soil accretion and carbon accumulation: Implications for tree islands persistence in the Water Conservation Area 3. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Davis, S.E. 2019. Communicating science to Policy-Makers. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Dessu, S.B. 2019. Coupling sea-level rise and freshwater management on the Coastal Everglades through determination of the Fresh-To-Marine Head Difference. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Dessu, S.B., R.M. Price, A. Wymore, J. Kominoski, S.E. Davis, W.H. McDowell and E.E. Gaiser 2018. Development and Application of Percentile-Range Indexed Mapping and Evaluation (PRIME) Tool for Long Term Ecological Assessment. American Geophysical Union Fall Meeting. Washington, D.C.

Eggenberger, C., R.O. Santos, T.A. Frankovich, C.J. Madden, J. Nelson and J.S. Rehage 2019. Habitat preference and resource use of Common Snook (*Centropomus undecimalis*) and sub-adult Atlantic Tarpon (*Megalops atlanticus*) in altered coastal Everglades lakes. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Eggenberger, C., R.O. Santos, T.A. Frankovich, J. Nelson, C.J. Madden and J.S. Rehage 2019. Coupling telemetry and stable isotope techniques to unravel movement: Common Snook habitat use across variable nutrient environments. American Fisheries Society (AFS) Florida Chapter Meeting. Haines City, Florida.

Evans, N.T., J.C. Trexler, S. Newman and M.I. Cook 2019. Nutrient cycling by fishes and macroinvertebrates in the Everglades stormwater treatment areas. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Fitz, H.C. 2019. Tortoise or hare? Landscape hydro-ecological interactions from presses (sea level rise) and pulses (freshwater flows) in the Coastal Everglades. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Flood, P.J. 2019. Community composition of the Upper Taylor Slough Region: Monitoring responses to an altered flow regime. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Flood, P.J. and J.C. Trexler 2019. Are mixing models robust to trophic enrichment factors? Evaluation with simulation modeling. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Flood, P.J. and J.C. Trexler 2019. Community composition of the upper Taylor Slough region: monitoring responses to an altered flow regime. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Flower, H. 2019. Changing tides: Phosphate desorption from calcite in freshwater-seawater mixing zones. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Flower, H. 2019. Shifting ground: Landscape modeling of soil biogeochemistry under climate change in the Florida Everglades. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Frankovich, T.A. 2019. A decade of submerged aquatic vegetation dynamics in mangrove lakes affected by altered freshwater deliveries. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Gaiser, E.E. 2019. Climate change fortunes from plants in glass houses. Phycological Society of America 2019 Annual Meeting. Fort Lauderdale, Florida.

Gaiser, E.E. 2019. The Wonderful Wizard of Wind. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Gaiser, E.E., E. Castañeda-Moya, J. Kominoski, J.S. Rehage, T. Troxler and K. Zhang 2019. Hurricanes interact with disturbance legacies to effect ecosystem resilience. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Gaiser, E.E., V. Mazzei, L. Marazzi and E. Massa 2019. Comparing three methods for determining phosphorus thresholds for Everglades diatoms. 25th North American Diatom Symposium. Eatonton, Georgia.

Gatto, J. 2019. Evaluating otolith microchemistry for tracking phosphorus experienced by Everglades fish. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Gatto, J. and J.C. Trexler 2019. Predicting sustainable population growth by linking age-specific mortality and growth rate (M"/G") to biomass in a fluctuating environment. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Gatto, J., J.C. Trexler, S. Newman, C.J. Saunders and M.I. Cook 2019. Evaluating otolith microchemistry for tracking phosphorus experienced by Everglades fish. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Gervasi, C.L. 2019. Fish communities in the Crocodile Sanctuary: Effects of the closure & opening of Joe Bay. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Gervasi, C.L. 2019. Multiple data sources to assess the status of an undervalued recreational fishery: Crevalle Jack in South Florida. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Grove, K. 2019. Designing urban futures: technopolitical landscapes of resilience in Miami-Dade County. Society for the Social Studies of Science (4S) annual conference. New Orleans, Louisiana.

Harvey, J., C.J. Saunders, S. Newman, J. Choi, B. Rosen, J.C. Trexler, L. Larsen, D. Ho, C. Zweig, E. Tate-Boldt, C. Coronado-Molina, F. Santamaria, E. Cline, R. Jaffe, P. Regier and N. Schmadel 2019. Forecasting the restoration of a free-flowing Everglades based on the DPM large-scale high-flow experiments. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Hatt, D. and L. Collado-Vides 2019. Comparing long-term standing stock and Tissue C:N:P Ratios between *Halimeda* and *Penicillus* (Chlorophyta) across a Trophic Gradient within Florida Bay, USA. Phycological Society of America 2019 Annual Meeting. Fort Lauderdale, Florida.

James, W.R. 2019. Consumer-specific energetic landscapes in Florida Bay: Linking seagrass die off to economically-valuable fisheries. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Julian, P. 2019. Hydrologic restoration of a shallow oligotrophic marl wetland: What is the soil telling us? Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Kamener, G., F. Tobias, N.O. Schulte, S.S. Lee and E.E. Gaiser 2019. A comprehensive environmental and diatom database for assessing Everglades restoration. 25th North American Diatom Symposium. Eatonton, Georgia.

Kelly, S.P. 2019. Examining the effects of sea level rise on Everglades coastal marshes using coupled mesocosm and insitu field manipulations: Design and implementation. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Kiflai, M. 2019. The effect of Hurricane Irma storm surge on the freshwater lens in Big Pine Key, Florida using electrical resistivity tomography. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Kominoski, J. 2019. How does freshwater restoration change marsh ecosystem biogeochemistry? A Northeast Shark River Slough case study. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Kominoski, J., A. Kuhn, S.P. Charles, S.C. Pennings, C.A. Weaver, T. Maddox and A.R. Armitage 2019. Plant composition affects ecosystem connectivity during a catastrophic hurricane. ASLO 2019 Aquatic Sciences Meeting. San Juan, Puerto Rico.

Kominoski, J., E.E. Gaiser, M. Ardon, E.S. Bernhardt, L.G. Chambers, S.P. Charles, J.A. Cherry, C. Craft, S.E. Davis, K. Gedan, A.M. Helton, M.L. Kirwan, K.W. Krauss, P. Megonigal, S.C. Neubauer, M.J. Osland, S.C. Pennings, S. Servais, T. Troxler, K. Tully and B.J. Wilson 2019. Comparing effects of saltwater intrusion on carbon loss among coastal wetland ecosystems: From monitoring to mechanisms. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Lagomasino, D. 2019. Winners and losers after Hurricane Irma in the Everglades mangrove forests: A NASA perspective. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Lagomasino, D., T.E. Fatoyinbo, D.C. Morton, B. Cook, P. Montesano, E. Castañeda-Moya, C.S.R. Neigh, R.P. Moyer, K. Radabaugh, J.M. Smoak and T. Troxler 2018. Heterogeneous patterns of mangrove disturbance and recovery from Hurricane Irma. American Geophysical Union Fall Meeting. Washington, D.C.

Lamb-Wotton, L. 2019. An emerging tool to assess peat loss and wetland vulnerability in the Florida Everglades. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Lee, D.Y. 2019. Lasting salt and phosphorus effects limit the capacity of restored freshwater wetlands to recover carbon losses. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Liao, H. and S. Wdowinski 2018. Exploration of Sentinel-1 InSAR observations for Monitoring Water Level Changes in Everglades Florida. American Geophysical Union Fall Meeting. Washington, D.C.

Liao, H. and S. Wdowinski 2019. Space-Based monitoring of water level changes in Everglades with Sentinel-1 InSAR observation. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Liao, Y. 2019. Current and future water table and carbon dynamics of Everglades Wetlands in an Earth System Model. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Marazzi, L., M.B. Eppinga, C. Angelini, E. Castañeda-Moya, E.E. Gaiser, J.P. Sah and L. Zhai 2019. Why do we need to document and conserve foundation species in oligotrophic wetlands? ASLO 2019 Aquatic Sciences Meeting. San Juan, Puerto Rico.

Massa, E. 2019. Effects of phosphorus on diatom assemblage networks. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Massa, E. and E.E. Gaiser 2019. Effects of phosphorus on benthic diatom assemblage network structure. 25th North American Diatom Symposium. Eatonton, Georgia.

Massa, E. and E.E. Gaiser 2019. Effects of phosphorus on diatom assemblage networks. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Massie, J. 2019. Hurricane-Driven movements of Common Snook in the Shark River: An examination of fish redistribution and environmental drivers. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Massie, J., J.S. Rehage, R.O. Santos, N. Viadero, C. Eggenberger, J. Rodemann, T.A. Frankovich, M.R. Heithaus, B.A. Strickland, V.A. Paz, K.R. Gastrich, C.J. Madden, P. Matich and A.J. Adams 2018. Florida Coastal Everglades acoustic telemetry updates. Florida Atlantic Coastal Telemetry (FACT) Fall Meeting. Florida.

Mazzei, V. 2019. Community-level modeling of periphytic diatoms in response to changing salinity and phosphorus gradients using the Everglades Landscape Model. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Mazzei, V., C. Fitz, T. Troxler, C.J. Madden and E.E. Gaiser 2019. Community-level modeling of periphytic diatoms in response to sea level rise using the Everglades Landscape Model. 25th North American Diatom Symposium. Eatonton, Georgia.

McCarthy, E., E.E. Gaiser and J.C. Trexler 2019. Assessing fish movement through time in Everglades National Park using drift fences. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Mesa, X. 2019. Mapping tree island vegetation in the Water Conservation Area 3B using WorldView2 and LIDAR data. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Newman, S. 2019. Resuscitate Resilience by Curbing Cattail. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Ontkos, A. and J.C. Trexler 2019. Changes in habitat connectivity affect habitat use of fish in the Decomp Physical Model (DPM). Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Paduani, M. 2019. Plastic sinks or sources: Characterizing cycling of marine debris on mangrove shorelines in Biscayne Bay. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Price, R.M. 2019. Hydrodynamics of constructed Everglades tree islands. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Rehage, J.S. 2019. Decadal dynamics of fish and fisheries in the Shark River: What have we learned about responses to hydroclimate variation? Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Richards, J.H. 2019. Patterns of vegetation change in Northeast Shark River Slough, 2010-2016. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Rodemann, J., R.O. Santos, J.S. Rehage, D. Gann, Z.F. Fratto, D. Lagomasino, M.O. Hall and B. Furman 2019. Mapping large-scale seagrass change from your desk: Application of Google Earth Engine and remote sensing. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Rosen, B., S. Newman, C.J. Saunders, J.C. Trexler, J. Harvey and E. Tate-Boldt 2019. Algal indicators of ecosystem response in the Decomp Physical Model high-flow experiment. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Ross, M.S. 2019. Tenacious tree islands of Florida's southern coastal swamp. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Rovai, A., R.R. Twilley, E. Castañeda-Moya, P. Pagliosa, A.L. Fonseca and P. Riul 2019. Adjusting the contribution of mangroves to global carbon stocks. ASLO 2019 Aquatic Sciences Meeting. San Juan, Puerto Rico.

Rudnick, D.T. 2019. Salt, Fire, Water and the Fate of an Ecosystem. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Sah, J.P. 2019. Overstory-understory interactions along flooding gradients in everglades tree islands. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Santos, R.O. 2019. Comprehensive assessment of coastal fisheries responses to extreme climate events: Lessons from 40 years of catch-data in the Coastal Everglades. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Scinto, L.J. 2019. Developing a mechanistic understanding of tree islands: Lessons learned from nearly a decade of studying an Everglades Physical Model. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Sklar, F.H. 2019. The Everglades: At the forefront of transition. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Smith, M.D., J. Kominoski, E.E. Gaiser, T. Troxler, O. Barbosa and N.B. Grimm 2019. A comparison of nutrient uptake dynamics in urban wetlands across different regional climates. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Smoak, J.M. 2019. Fate of coastal wetlands under rising sea level and punctuated by major hurricanes. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Smoak, J.M., J.L. Breithaupt, T.S. Bianchi, D. Vaughn, J. Ruiz-Plancarte and L.G. Chambers 2018. Increasing accumulation of soil organic matter in mangrove forests could indicate greater-than-expected resilience to sea-level rise and enhance the ongoing carbon sink capacity. American Geophysical Union Fall Meeting. Washington, D.C.

Smott, S. and J.C. Trexler 2019. Landscape-scale aquatic fauna monitoring for CERP 2005-2017. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Stingl, U. 2019. Re-modelling of foliar lipids in *Thalassia testudinum* (Turtlegrass) allows for growth in phosphorous deplete conditions. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Strazisar, T. 2019. Environmental trends and ecological responses to water management, restoration, and extreme events in Florida Bay. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Strickland, B.A. 2019. Responses of estuarine predators to hurricanes. NSF Synthesis Workshop: Ecosystem Responses to Hurricanes. Corpus Christi, Texas.

Strickland, B.A. and M.R. Heithaus 2019. Movements of juvenile bull sharks in response to a major hurricane within a tropical estuarine nursery area. Biology Symposium, Florida International University. Miami, Florida.

Strickland, B.A., J. Massie, D. Ho, J.S. Rehage and M.R. Heithaus 2019. Responses of juvenile bull sharks to a major hurricane within a tropical estuarine nursery area. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Strickland, N.D. and J.C. Trexler 2019. Estimation of fish biomass in the Everglades from the meter scale to the landscape scale. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Thomas, S.E. 2019. Settling and entrainment properties of stormwater treatment area particulates. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Trexler, J.C. 2019. Intra-community diversity of invasive species impacts in space and time: Scaling up to ecosystem function. ASLO 2019 Aquatic Sciences Meeting. San Juan, Puerto Rico.

Trexler, J.C. 2019. Invasive species impacts in space and time: Scaling up to ecosystem function. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Troxler, T. 2019. Responses of marsh ecosystems to coastal change in the southeastern Florida Everglades. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Viadero, N. 2019. Bass in the coast: Patterns of seasonal habitat use by Florida Largemouth Bass in the Upper Shark River, Everglades National Park. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Viadero, N., C. Eggenberger, J. Massie, R.O. Santos and J.S. Rehage 2019. Bass in the coast: Patterns of seasonal habitat use by Florida Largemouth Bass in the Upper Shark River, Everglades National Park. American Fisheries Society (AFS) Florida Chapter Meeting. Haines City, Florida.

Vidales, R. 2019. Quantifying intraspecific variation of red mangrove leaf traits in the Southeast Saline Everglades. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Vorseth, C., A. Stainback and M. Bhat 2019. Deliberative multi-criteria analysis of restoration alternatives for the Greater Everglades Ecosystem. Ecological Society of America Annual Meeting 2019. Louisville, Kentucky.

Wachnicka, A. 2019. Spatiotemporal shifts in phytoplankton biomass in two contrasting estuarine systems of Southeast Florida. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Wachnicka, A., J.A. Browder, T.A. Frankovich, L. Wingard and W.J. Louda 2019. Resilience of south Florida estuarine systems to climatic and anthropogenic disturbances. ASLO 2019 Aquatic Sciences Meeting. San Juan, Puerto Rico.

Wdowinski, S. 2019. Regional sea level rise projections. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Wdowinski, S., H. Liao and B. Zhang 2019. Space-based hydrological monitoring of the entire Everglades using Sentinel-1 observations. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Wilson, B.J., S. Servais, S.P. Charles, V. Mazzei, S.E. Davis, E.E. Gaiser, J. Kominoski, D.T. Rudnick, F.H. Sklar and T. Troxler 2018. Drivers and Mechanisms of Peat Collapse in Coastal Wetlands. American Geophysical Union Fall Meeting. Washington, D.C.

Wilson, S., B. Furman, M.O. Hall and J.W. Fourqurean 2019. Assessment of Hurricane Irma impacts on south Florida seagrass communities using long-term monitoring programs. ASLO 2019 Aquatic Sciences Meeting. San Juan, Puerto Rico.

Zhang, B. and S. Wdowinski 2019. Space-based monitoring of temporal water level variations in the south Florida Everglades ecosystem using Sentinel-1 SAR observations. Greater Everglades Ecosystem Restoration Meeting. Coral Springs, Florida.

Zhao, J., S.L. Malone, S. Oberbauer, C.L. Staudhammer and G. Starr 2018. A comprehensive understanding of how inundation changes ecosystem CO2 exchange in a coastal freshwater wetland. American Geophysical Union Fall Meeting. Washington, D.C.

Dissertations and Theses

Master's Theses (4)

Eggenberger, Cody. 2019. Coupling telemetry and stable isotope techniques to unravel movement: Snook habitat use across variable nutrient environments. Master's thesis, Florida International University

Massa, Eric. 2019. Effects of phosphorous on benthic diatom assemblage network structure. Master's thesis, Florida International University

Ontkos, Alex. 2018. Habitat use of three abundant predatory fish species in the freshwater marshes of the Florida Everglades. Master's thesis, Florida International University

Tasci, Yasemin. 2019. Modeled affinity constants for phosphorus adsorption and desorption due to saltwater intrusion. Master's thesis, University of South Florida

Websites

Florida Coastal Everglades LTER Program Website

https://fcelter.fiu.edu/

The Florida Coastal Everglades LTER Program Website provides information about FCE research, data, publications, personnel, education & outreach activities, and the FCE Student Organization.

Coastal Angler Science Team (CAST) Website
http://cast.fiu.edu/
The Coastal Angler Science Team (CAST) Website, created by FCE graduate student Jessica Lee, provides information about how researchers and anglers are working together to collect data on important recreational fish species in Rookery Branch and Tarpon Bay in the Everglades and invites anglers to participate in this project.

Predator Tracker
http://tracking.fiu.edu/
The Predator Tracker website has information about the Predator Tracker application and a link to download the application. Predator Tracker is a stand alone application based on a kiosk at the Museum of Discovery and Science in Ft. Lauderdale. The application allows one to learn how researchers at Florida International University track and study big predators in the Shark River Estuary in Everglades National Park and explore their predator tracking data.

Wading Through Research
http://floridacoastaleverglades.blogspot.com/
A blog created by FCE graduate students which focuses on the experiences of graduate students conducting research in the Everglades.

Other products

Databases
The FCE Information Management System contains 174 datasets which are publicly available on FCE LTER's website (https://fce-lter.fiu.edu/data/core/) and in the EDI Data Repository (https://portal.edirepository.org). Datasets include climate, consumer, primary production, water quality, soils, and microbial data as well as other types of data. A table of FCE LTER datasets in the EDI Data Repository with dataset titles and DOI is included in the Appendix.

Participants & Other Collaborating Organizations

Group photo from the 2019 FCE LTER All Scientists Meeting

Participants

Name	Most Senior Project Role
Gaiser, Evelyn	PD/PI
Fourqurean, James	Co PD/PI
Grove, Kevin	Co PD/PI
Kominoski, John	Co PD/PI
Rehage, Jennifer	Co PD/PI
Burgman, Robert	Faculty
Castaneda, Edward	Faculty
Flower, Hilary	Faculty
Heithaus, Michael	Faculty
Kiszka, Jeremy	Faculty

Name	Most Senior Project Role
Malone, Sparkle	Faculty
Martens-Habbena, Willm	Faculty
Nelson, James	Faculty
Oehm, Nick	Faculty
Price, Rene	Faculty
Stingl, Ulrich	Faculty
Trexler, Joel	Faculty
Troxler, Tiffany	Faculty
Wdowinski, Shimon	Faculty
Dessu, Shimelis	Postdoctoral
Duran, Alain	Postdoctoral
Laas, Peeter	Postdoctoral
Liao, Heming	Postdoctoral
Mercado Molina, Alex	Postdoctoral
Rezek, Ryan	Postdoctoral
Santos, Rolando	Postdoctoral
Van Dam, Bryce	Postdoctoral

Name	**Most Senior Project Role**
Wakefield, Stephanie	Postdoctoral
Zeller, Mary	Postdoctoral
Castellanos, Emily	Other Professional
Rugge, Michael	Other Professional
Bond, Charles	Technician
Burgos, Sofia	Technician
Chakrabarti, Seemanti	Technician
Cordoba, Nicole	Technician
Gastrich, Kirk	Technician
Stumpf, Sandro	Technician
Tobias, Franco	Technician
Travieso, Rafael	Technician
Viadero, Natasha	Technician
Wilson, Sara	Technician
Fitz, Carl	Staff Scientist (doctoral level)
Vanderbilt, Kristin	Staff Scientist (doctoral level)
Bernardo, Melissa	Graduate Student

Name	Most Senior Project Role
Bonnema, Erica	Graduate Student
Briggs, Kristin	Graduate Student
Castillo, Nicholas	Graduate Student
Chavez, Selena	Graduate Student
Eggenberger, Cody	Graduate Student
Emery, Meredith	Graduate Student
Flood, Peter	Graduate Student
Garcia, Laura	Graduate Student
James, Ryan	Graduate Student
Lopes, Christian	Graduate Student
Massa, Eric	Graduate Student
Massie, Jordan	Graduate Student
Ontkos, Alex	Graduate Student
Paz, Valeria	Graduate Student
Rodemann, Jonathan	Graduate Student
Sanchez, Jessica	Graduate Student
Shannon, Thomas	Graduate Student

Name	Most Senior Project Role
Smith, Matt	Graduate Student
Stansbury, Kaitlin	Graduate Student
Strickland, Nicole	Graduate Student
Strickland, Bradley	Graduate Student
Sullivan, Kristy	Graduate Student
Ugarelli, Kelly	Graduate Student
Zhang, Boya	Graduate Student
Gonzalez, Jeffrey	Undergraduate Student
Horminga, Samantha	Undergraduate Student
Infante, Maria	Undergraduate Student
Jonas, Ariana	Undergraduate Student
Samara, Yamilla	Undergraduate Student
Schinbeckler, Rachel	Undergraduate Student
Sisco, Sarah	Undergraduate Student
Contreras, Andreina	Research Experience for Undergraduates (REU) Participant
Linenfelser, Joshua	Research Experience for Undergraduates (REU) Participant

Partner Organizations

Name	Location
Clark University	Worcester, Massachusetts
College of William & Mary	Williamsburg, Virginia
Dartmouth College	Hanover, New Hampshire
Eckerd College	St. Petersburg, Florida
EcoLandMod, Inc	Fort Pierce, Florida
Encounters in Excellence, Inc.	Miami, Florida
Everglades Foundation	Palmetto Bay, Florida
Everglades National Park	Homestead, Florida
Florida Gulf Coast University	Fort Meyers, Florida
Florida State University	Tallahassee, Florida
Indiana University	Bloomington, Indiana
Louisiana State University	Baton Rouge, Louisiana
Miami-Dade County Public Schools	Miami-Dade County, Florida
NASA Goddard Space Flight Center	Greenbelt, Maryland
National Audubon Society - Tavernier Science Center	Tavernier, Florida
National Park Service - South Florida/Caribbean Network Inventory	Palmetto Bay, Florida
Sam Houston State University	Huntsville, Texas
South Florida Water Management District	West Palm Beach, Florida

Name	Location
The Deering Estate	Miami, Florida
The Pennsylvania State University	University Park, Pennsylvania
Tulane University	New Orleans, Louisiana
U.S. Geological Survey	Reston, Virginia
University of Alabama	Tuscaloosa, Alabama
University of California, Los Angeles	Los Angeles, California
University of Central Florida	Orlando, Florida
University of Florida	Gainesville, Florida
University of Hawaii at Manoa	Honolulu, Hawaii
University of Louisiana at Lafayette	Lafayette, Louisiana
University of South Carolina	Columbia, South Carolina
University of South Florida	Tampa, Florida
University of South Florida St. Petersburg	St. Petersburg, Florida

Impacts

Impact on the development of the principal disciplines

FCE science is fundamental to the fields of coastal and ecosystem ecology. By conducting long-term ecological research in the FCE, we are advancing understanding of how coastal ecosystems adapt and otherwise change with changing water presses and pulses.

Advances to uses of remote sensing technology: FCE is advancing the application of remote sensing techniques, as SAR and InSAR, for wetland science.

Advances to microbial ecology: Correlations of monthly environmental data with community composition help explain structure and function of microbial communities. Not much work has been done on identifying important microbial players in food webs in tropic wetlands; identifying a cosmopolitan group of bacteria (Polynucleobacter) in the marsh waters will improve our understanding of its ecology and metabolism. While bacterial secondary productivity has been measured routinely by the FCE LTER, we can now put names to the (high) activities that have been reported. Our data also suggests a potential testable path for energy transfer from heterotrophic bacteria and DOC to higher trophic levels in the water column through Cryptomonads and Ciliates.

Advances to spatial ecology: FCE movement data provides key data on the movement of megafauna across the Gulf of Mexico by providing data on mobile species that are moving through our network (e.g., Griffin et al 2018 Fisheries Research)

Advances in the social sciences: Grove and Wakefield's co-edited volume on Resilience in the Anthropocene: Governance and Politics at the End of the World that will impact how geographers and scholars in cognate fields understand the relation between the Anthropocene and resilience.

Impact on other disciplines

By uniting scientists and water managers across multiple social- and ecological-science disciplines, FCE science is providing fundamental knowledge for advancing best practices of land and water management.

Application of Results to Management or Policy Decisions: The FCE has a long history of engaging scientists from agencies and NGOs as collaborators to co-develop research and models to inform ecosystem management (e.g., Davis et al. 2014; Long et al. 2015; Borkhataria et al. 2017). These collaborators serve an important role in connecting with policymakers and regulators by allowing us to report our results directly to governmental agencies such as the US EPA, USGS, South Florida Water Management District, and National Park Service. Two of our researchers have recently been appointed to new positions that will expand our ability to provide science-based restoration guidance to policymakers and staffers. In April 2019, PI Gaiser was named as a member of the State of Florida's Blue Green Algae Task Force where she will inform and advise the Governor of the upstream causes of harmful algal blooms. More recently, Collaborator Steve Davis began a new position as Communications Director for the Everglades Foundation where he will meet regularly with lawmakers, staffers, and key constituents to provide briefings and restoration guidance. In addition, Grove gave a paper based in part on exploratory research at the 4S conference in New Orleans, which is contributing to scholarly understandings of technopolitics and resilience in disciplines of science and technology studies and anthropology.

Impact on the development of human resources

FCE LTER embraces the notion that our community is enriched and enhanced by diversity and is committed to increasing the representation of those populations that have been historically excluded from participation. Working with FIU's Office to Advance Women, Equity & Diversity (OAWED), we continue to work with FIU-OAWED on human resource development by recruiting students and faculty from diverse backgrounds within the university, across the LTER Network, and from other minority serving institutions to provide opportunities for women and underrepresented minorities to engage in FCE research.

In August 2019, FCE established a Diversity Committee to draft a Diversity Plan and to develop a vision and strategy for broadening the participation of women and underrepresented minorities in our research. The Committee is open to all members of the FCE community and currently consists of Dr. Jose Fuentes, NSF's Chair of The Committee on Equal Opportunities in Science and Engineering (CEOSE), Co-PIs, Collaborators, Graduate Students, the Education and Outreach Coordinator and includes representation of women, LGBTQIA, Hispanic, Asian, and South Asian communities.

The Committee has begun its work drafting the Diversity Plan and is also collecting demographic data through a Diversity Survey. Once the draft of the Diversity Plan is complete, we will request feedback from our membership and FIU OAWED. The finalized Diversity Plan will use the survey results to address the goals outlined in the NSF Strategic Plan (2014-2018) for broadening participation by developing objectives, metrics of success and key milestones/goals for recruiting, education, training, and preparing a diverse STEM workforce.

Impact on physical resources that form infrastructure

FCE provides the physical platform for collaborative, multi-agency research in the Everglades.

Impact on institutional resources that form infrastructure

FCE scientists have helped advance legislative budget requests to expand human and capital resources for Florida International University's Institute of Water and Environment.

Impact on information resources that form infrastructure

FCE Databases
The FCE Information Management System contains 174 datasets which are available on the FCE LTER's website (https://fce-lter.fiu.edu/data/core/) and in the EDI Data Repository. Datasets include climate, consumer, primary production, water quality, soils, and microbial data as well as other types of data. All datasets are publicly accessible except when an embargo has been granted while a graduate student publishes on a dataset or where a dataset was not collected using FCE LTER funds. A table of titles and DOIs for FCE LTER datasets deposited in the EDI Data Repository is included as a supporting file in the Products section of this report.

Data Use
Use of FCE LTER data is steady. A manual search of Google Scholar for DOI's from the EDI Data Repository detected 6 papers published in 2018 and 2019 that contain 16 citations of FCE LTER datasets. Downloads of FCE datasets suggest that the data are being used more frequently than they are cited. The logs from the FCE website recorded 973 non-robot dataset downloads between 10/1/2018 and 9/25/2019, while the EDI Repository recorded 3,425 non-robot downloads of FCE datasets during the same period. Even though these numbers are probably somewhat inflated by automated download agents that aren't eliminated by filtering out known robots, they still indicate considerable interest in FCE data--although for uses unknown.

FCE Information Management Supports Science
The FCE information management team (Kristin Vanderbilt and Mike Rugge) support site and network level science by making high quality FCE data and metadata accessible through the FCE LTER website and the EDI Data Repository. Updates to long-term datasets are regularly published in both locations in compliance with the FCE Data Management Policy and LTER Data Access Policy. FCE updates to LTER Network databases ClimDB and HydroDB are being made automatically through a service provided by the GCE LTER information manager (IM). The FCE information management team lends its expertise to FCE researchers and graduate students by offering presentations about information management topics, assistance with metadata development, data submissions, individual project database design, collaborations on GIS work and research graphics.

IT Infrastructure
The FCE information management system's web server, Oracle 12c database and SFTP server are loaded on three virtual servers housed on FIU's Division of Information

Technology's equipment. Per the FCE Disaster Recovery Plan, the FCE LTER Oracle database and websites are backed up offsite at the Northwest Florida Regional Data Center (NWRDC) located on the campus of Florida State University in Tallahassee, Florida. Rugge and Vanderbilt worked with personnel in the FIU Network Operations Center this year to design a procedure for quickly switching to the databases and website at the NWRDC in the event the servers in Miami become unavailable.

FCE Website

The current FCE website, soon to be replaced, continues to provide outstanding support for site and network science. The site's homepage (https://fcelter.fiu.edu) is a gateway to a wealth of information ranging from the FCE LTER project overview to a searchable database of FCE publications. Scientists seeking data may select from FCE LTER Data Products, LTER Network Data, and Outside Agency Data, where links are available to multiple external databases. FCE Core Research Data are searchable through a sophisticated interface. The FCE Data Summary Table for each dataset displays a link to download the data, and the dataset citation, including the DOI as generated by the EDI Data Repository. This summary table also contains links to a web-based data visualization tool that allows researchers to rapidly visualize complex data streams.

Throughout the past year, the FCE information management team has continued to partner with the FIU College of Arts, Sciences, and Education (CASE) web team to develop the new FCE LTER website. The new website will have the look and feel of other CASE websites and will also be consistent with the *Guidelines for LTER Website Design and Content, Version 2.0* released in 2018. While most content from the current website has been retained, it has been reorganized for ease of discovery on the new website. The static content from the current FCE website has been updated and migrated into the Cascade content management system used by FIU. Dynamic content, which is stored in FCE's Oracle 12c database, will still be served from the FCE webserver through a template with the same design as the Cascade pages. The scripts used to query the Oracle database to deliver dynamic content have been completely rewritten in PHP by Mike Rugge. The scripts had previously been implemented in a now-deprecated version of Perl (Embperl). The mechanism for discovering FCE data has been updated to use the PASTA+ API and REST web services available through the EDI Data Repository. FCE dataset summary pages will display metadata accessed from the EDI Data Repository, rather than duplicate content stored in the local Oracle database as was done in the past. The new FCE website will be launched in November 2019.

Other contributions

The FCE IM has been active in national and international LTER network-level information management initiatives. She co-organized the sessions "Semantic Approaches to Improving LTER Data Discovery and Interoperability: A Panel Discussion" and "Data Preparation for Synthesis—Reuse Scripts, Collaborate, Learn" at the LTER All Scientists Meeting in September 2018. To support linking the US LTER Controlled Vocabulary to other semantic resources used in the International LTER (ILTER) Network, she co-organized two workshops on this topic at the 2019 ILTER

Network's Open Science Meeting in Leipzig, Germany. She will start a two-year term as the Associate Editor of Ecological Data Science for the journal Ecological Informatics in October 2019.

The FCE IM works quarter-time for the Environmental Data Initiative. In this role, she co-led information management training workshops and a hackathon in 2019 that included LTER IMs. The FCE IM also serves as the liaison between EDI and the LTER IM Executive Committee to ensure that the needs of EDI's largest client are met.

Impact on technology transfer

FCE science has been fundamental to advancing best data management and accessibility practices.

Impact on society beyond science and technology

FCE science provides society with a model for how stakeholders can work towards a common goal of maintaining ecosystem services in urban-wild interfaces threatened by climate change.

FCE data on prey and consumer movement dynamics is informing status and trends for one of the key ecosystem services provided by the Everglades, recreational fisheries. We are engaging the angling community in our research, which is a key stakeholder in Everglades water issues.

Appendix: Table of FCE LTER Data Sets in PASTA

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
Abiotic monitoring of physical characteristics in porewaters and surface waters of mangrove forests from the Shark River Slough and Taylor Slough, Everglades National Park (FCE), South Florida from December 2000 to Present; Castaneda, Edward; Rivera-Monroy, Victor	doi:10.6073/pasta/1f61bffd880b6c90d31d92f501bfe3be
Biogeochemical data collected from Northeast Shark River Slough (FCE LTER), Everglades National Park from September 2006 to November 2018; Sarker, Shishir; Gaiser, Evelyn; Kominoski, John; Scinto, Leonard	doi:10.6073/pasta/12b89a6c02ef6833415940a327efec99
Biogeochemical data collected from Northeast Shark Slough, Everglades National Park (FCE) from September 2006 to Present; Gaiser, Evelyn; Scinto, Leonard	doi:10.6073/pasta/ee08228027fd32182996ce39cfde7e22
Biomarker assessment of spatial and temporal changes in the composition of flocculent material (floc) in the subtropical wetland of the Florida Coastal Everglades (FCE) from May 2007 to December 2009; Jaffe, Rudolf; Pisani, Oliva	doi:10.6073/pasta/e84cc609ffbc63bb45bd484810e6746b
Biomass data from the Peat Collapse-Saltwater Intrusion Field Experiment within Everglades National Park (FCE), collected from October 2014 to September 2016; Wilson, Benjamin; Troxler, Tiffany	doi:10.6073/pasta/6a18d0ec3a960a82b6989c18f01205b2

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
Bulk Parameters for Soils/Sediments from the Shark River Slough and Taylor Slough, Everglades National Park (FCE), from October 2000 to January 2001; Mead, Ralph	doi:10.6073/pasta/435f4c70788b8199849b43c5445d3367
Bull shark catches, water temperatures, salinities, and dissolved oxygen levels in the Shark River Slough, Everglades National Park (FCE) , from May 2005 to May 2009; Heithaus, Michael; Matich, Philip	doi:10.6073/pasta/04a8792fed9ceed4237bd3273a97e8f8
Capture data for sharks caught in standardized drumline fishing in Shark Bay, Western Australia, with accompanying abiotic data, from February 2008 to July 2014; Heithaus, Michael; Thomson, Jordan	doi:10.6073/pasta/5541d081239577c69c87c0df5ff3a52e
Capture data for sharks caught in standardized drumline fishing in Shark Bay, Western Australia, with accompanying abiotic data, from January 2012 to April 2014; Heithaus, Michael; Thomson, Jordan	doi:10.6073/pasta/3f664bf54f492e77fe408543f9eeafa8
Characterization of dissloved organic nitrogen in an oligotrophic subtropical coastal ecosystem (Taylor Slough and Shark River Slough) for December 2001 in Everglades National Park (FCE), South Florida, USA; Jaffe, Rudolf	doi:10.6073/pasta/cc9f23891b8bb977eaf5d7eb6f76005f
Chemical characteristics of dissolved organic matter in an	doi:10.6073/pasta/76696c297746734756f827ec748eb20f

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
oligotrophic subtropical wetland/estuary ecosystem, Everglades National Park (FCE), South Florida from December 2001 to January 2002; Jaffe, Rudolf	
Cichlasoma urophthalmus cytochrome b sequences collected from the Florida Everglades (FCE) and Central America from January 2012 to May 2014; Harrison, Elizabeth; Trexler, Joel	doi:10.6073/pasta/406058160f1adb10a2ec578c56db5df8
Cichlasoma urophthalmus microsatellite fragment size collected from the Florida Everglades (FCE) and Central America from June 2010 to March 2013; Harrison, Elizabeth; Trexler, Joel	doi:10.6073/pasta/de1ec3c490268a9b3d784a9266fa2ebf
Common snook (Centropomus undecimalis) movements within the Shark River estuary (FCE), Everglades National Park, South Florida from February 2012 to Present; Rehage, Jennifer	doi:10.6073/pasta/58414574e57fd558d71cfab0952c0dc1
Consumer Stocks: Fish Biomass from Everglades National Park (FCE), South Florida from February 1996 to March 2000; Trexler, Joel	doi:10.6073/pasta/4c6f16f6825cc77204ef76f21e86b75a
Consumer Stocks: Fish Biomass from Everglades National Park (FCE), South Florida from February 2000 to April 2005; Trexler, Joel	doi:10.6073/pasta/b0e2ae3fb140447717b8dd9fdc3f4ac5
Consumer Stocks: Fish,	doi:10.6073/pasta/354b4b6ac638551cc947a9e83e17805d

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Vegetation, and other Non-physical Data from Everglades National Park (FCE), South Florida from February 2000 to April 2005; Trexler, Joel	
Consumer Stocks: Physical Data from Everglades National Park (FCE), South Florida from February 1996 to April 2008; Trexler, Joel	doi:10.6073/pasta/bc7e38fe4b8f5f976f1adb9e6395a8f8
Consumer Stocks: Wet weights from Everglades National Park (FCE), South Florida from March 2003 to April 2008; Trexler, Joel	doi:10.6073/pasta/7ff817fdf10aac0ad84a64acd6ca1c95
Count data of air-breathing fauna from visual transect surveys including water temperature, time, sea and weather conditions in Shark Bay Marine Park, Western Australia from February 2008 to July 2014; Heithaus, Michael; Nowicki, Robert	doi:10.6073/pasta/fac4bf481caf8149f86ea357455abb86
Cross Bank Benthic Aboveground biomass, Everglades National Park (FCE), South Florida from 1983 to 2014; Fourqurean, James; Howard, Jason	doi:10.6073/pasta/8e96bfec4be54df2a5e0d4a1741d4dab
Cross Bank sediment characteristics, Everglades National Park (FCE), South Florida from 2014; Fourqurean, James; Howard, Jason	doi:10.6073/pasta/8a665416247299616dfd90a9feca8dcd
Diatom Species Abundance Data	doi:10.6073/pasta/84241f5358c01c8dacd832b42d3fc736

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
from LTER Caribbean Karstic Region (CKR) study (FCE) in Yucatan, Belize and Jamaica during 2006, 2007, 2008; Gaiser, Evelyn	
DIC and DOC 13C tracer data from Shark River Slough and Harney River (FCE), Everglades, South Florida in November 2011; Anderson, William	doi:10.6073/pasta/dd9da92e48b2506cc0c2a352a5cbea8f
Environmental data from FCE LTER Caribbean Karstic Region (CKR) study in Yucatan, Belize and Jamaica during Years 2006, 2007 and 2008; Gaiser, Evelyn	doi:10.6073/pasta/5a01d59e5f7d73bd1f7baee2c71af765
Evaporation Estimates for Long Key C-MAN Weather Station, Florida Bay (FCE) from July 1998 to May 2004; Smith, Ned	doi:10.6073/pasta/c40d320f5d15fdd36a65ef7a2ef93f17
Examination of protein-like fluorophores in chromophoric dissolved organic matter (CDOM) in a wetland and coastal environment for the wet and dry seasons of the years 2002 and 2003 (FCE); Jaffe, Rudolf	doi:10.6073/pasta/6d2e26bc8c8cd2322981d22a095ab968
FCE Redlands 1994 Land Use, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/1d696e0668ed238469adeaed24dd7bc1
FCE Redlands 1994 Land Use, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/e7856aad78610c7c365cf620f47a5ef5

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
FCE Redlands 1998 Land Use, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/ab8e1dea7bc3301919512575093460fc
FCE Redlands 1998 Roads, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/f5831e56dffab52a99bbe8a1a2563b1d
FCE Redlands 2001 Land Use, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/b1c64a9c7c616829ace724de8d41785b
FCE Redlands 2001 Zoning, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/e6e6563f64ae6d6aa4cb07b294f1ec95
FCE Redlands 2006 Land Use, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/b7e35d8321a2db2138748b869993dacd
FCE Redlands 2006 Roads, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/c1e2b4bdf4d5a1ad441e69b7417cdfab
FCE Redlands 2008 Slope Mosaic, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/f0c0fcaaca44b472112745262c372628
FCE Redlands Flood Zones, Miami-Dade County, South Florida; Onsted, Jeff	doi:10.6073/pasta/54138174a44f11a0000279a7e480b632
Fish and consumer data collected from Northeast Shark Slough, Everglades National Park (FCE) from September 2006 to	doi:10.6073/pasta/4eda63d153f0859a70c4398c3762be9e

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
September 2008; Gaiser, Evelyn; Trexler, Joel	
Fish community data obtained from Antillean-Z fish trap deployment in the Eastern Gulf of Shark Bay, Australia from June 2013 to August 2013; Heithaus, Michael; Nowicki, Robert	doi:10.6073/pasta/3eed6e46081423861d71e6d6a6ee3194
Fish trap catch, set, and environmental data from Shark Bay Marine Park, Western Australia from May 2010 to July 2012; Heithaus, Michael; Bessey, Cindy	doi:10.6073/pasta/4a273aa566c090cd059f5f8780f566be
Florida Bay Braun Blanquet, Everglades National Park (FCE), South Florida from October 2000 to Present; Fourqurean, James	doi:10.6073/pasta/eebe8b8d18ec58b39bfea1f73ba48371
Florida Bay Nutrient Data, Everglades National Park (FCE), South Florida from August 2008 to Present; Fourqurean, James	doi:10.6073/pasta/536f61d4f0383101fc618ea51ae83d6b
Florida Bay Physical Data, Everglades National Park (FCE), South Florida from January 2001 to February 2002; Frankovich, Thomas	doi:10.6073/pasta/f0e13c236606c1ed6efe5618e3eee8c0
Florida Bay Physical Data, Everglades National Park (FCE), South Florida from September 2000 to Present; Fourqurean, James	doi:10.6073/pasta/4f444ecc52b7f7eb83431d01a6d3429c
Florida Bay Productivity Data, Everglades National Park (FCE),	doi:10.6073/pasta/7bac5b8ba8ec4683f2785a4a4e8cad64

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
South Florida from September 2000 to Present; Fourqurean, James	
Florida Bay Seagrass Canopy Temperature Data, Everglades National Park (FCE), South Florida from September 2000 to Present; Fourqurean, James	doi:10.6073/pasta/d9534ad732dc977032a7864042f331ab
Florida Bay Stable Isotope Data Everglades National Park (FCE), South Florida from January 2005 to Present; Fourqurean, James	doi:10.6073/pasta/2afb909efc72500d7cdb7b1beb880f34
Florida Bay, South Florida (FCE) Seagrass Epiphyte Light Transmission from December 2000 to February 2002; Fourqurean, James	doi:10.6073/pasta/393fd3bbbd5a520e5cf372483113f2ce
Flux data from the Peat Collapse-Saltwater Intrusion Field Experiment within Everglades National Park, collected from October 2014 to September 2016; Wilson, Benjamin; Troxler, Tiffany	doi:10.6073/pasta/a84048bfa2552499fad8d80f313db008
Flux measurements from the SRS-6 Tower, Shark River Slough, Everglades National Park (FCE), South Florida from October 2006 to Present; Barr, Jordan; Fuentes, Jose; Engel, Vic; Zieman, Joseph	doi:10.6073/pasta/da2dd08561a8df482d64180735e416dc
Flux measurements from the SRS-6 Tower, Shark River Slough, Everglades National Park, South Florida (FCE) from January 2004 to August 2005;	doi:10.6073/pasta/aec87311dc582fde9adf4a11a198e0aa

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
Barr, Jordan; Fuentes, Jose; Zieman, Joseph	
Fluxes of dissolved organic carbon from the Shark River Slough, Everglades National Park (FCE), South Florida from May 2001 to September 2014; Regier, Peter; Jaffe, Rudolf	doi:10.6073/pasta/02cf0405c4f560746a5e5275ef6e225b
Gastropod Biomass and Densities found at Rabbit Key Basin, Florida Bay (FCE) from March 2000 to April 2001; Frankovich, Thomas;	doi:10.6073/pasta/e9498a3ecfd1d497c6b4c266901c9d4b
Global Climate Change Impacts on the Vegetation and Fauna of Mangrove Forested Ecosystems in Florida (FCE): Nekton Mass from March 2000 to April 2004; McIvor, Carole	doi:10.6073/pasta/beb355c2f21efc3653f888709cf49637
Global Climate Change Impacts on the Vegetation and Fauna of Mangrove Forested Ecosystems in Florida (FCE): Nekton Portion from March 2000 to April 2004; McIvor, Carole	doi:10.6073/pasta/7b0e0c1a9a93965c79fd66bd4bbae46d
Greenhouse experiment (FCE) in April and August 2001: Responses of neotropical mangrove saplings to the combined effect of hydroperiod and salinity/Biomass; Cardona-Olarte, Pablo; Rivera-Monroy, Victor; Twilley, Robert	doi:10.6073/pasta/b4200968cd7c84d47fd59a3d271e11b8
Greenhouse mixed culture experiment from August 2002 to April 2003 (FCE): Evaluate the effect of salinity and hydroperiod on interspecific mangrove	doi:10.6073/pasta/c559309bdc4b90e325b1e8772e1de60a

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
seedlings growth rate (mixed culture) / Morphometric variables; Cardona-Olarte, Pablo; Rivera-Monroy, Victor; Twilley, Robert	
Groundwater and surface water phosphorus concentrations, Everglades National Park (FCE), South Florida for June, July, August and November 2003; Price, Rene	doi:10.6073/pasta/2b42a17496155b8a7ce2191ae90e193b
Institutional Dimensions of Restoring Everglades Water Quality - Social Capital Analysis (FCE), Florida Everglades Agricultural Area from September 2014 to July 2015; Yoder, Landon; Roy Chowdhury, Rinku	doi:10.6073/pasta/05944589bc8b526ead9b1df50797e00a
Institutional Dimensions of Restoring Everglades Water Quality -Interview Notes (FCE), September 2014-July 2015; Yoder, Landon; Roy Chowdhury, Rinku	doi:10.6073/pasta/94d1f65d4c822af1150bc9e7694e59d1
Isotopic Variation of Soil Macrofossils from Shark River Slough, Everglades National Park (FCE) in December 2004; Saunders, Colin	doi:10.6073/pasta/2bcdb06ad4018aac1783c25701fa086b
Large consumer isotope values, Shark River Slough, Everglades National Park (FCE LTER), May 2005 to Present; Heithaus, Michael; Matich, Philip; Rosenblatt, Adam	doi:10.6073/pasta/0fb149ced55edb32c282deb234caab56
Large shark catches (Drumline), water temperatures, salinities, and dissolved oxygen levels, and	doi:10.6073/pasta/0f02b8eb2fa3c0751be63d67cccb2000

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
stable isotope values in the Shark River Slough, Everglades National Park (FCE) from May 2009 to May 2011; Heithaus, Michael; Matich, Philip	
Leaf nutrient and root biomass data from the Peat Collapse-Saltwater Intrusion Field Experiment within Everglades National Park (FCE), collected from October 2014 to September 2016; Wilson, Benjamin; Troxler, Tiffany	doi:10.6073/pasta/0412d0e992558af65cf22110ef8f0e1b
Light limited carboxylation rates of Red mangrove leaves at Key Largo, Watson River Chickee, Taylor Slough, and Little Rabbit Key, South Florida (FCE) from July 2001 to August 2001; Barr, Jordan; Fuentes, Jose; Zieman, Joseph	doi:10.6073/pasta/d6bea805dbfa2dca53bfd60735de1af8
Macroalgae Production in Florida Bay (FCE), South Florida from May 2007 to Present; Collado-Vides, Ligia	doi:10.6073/pasta/e49e256a8b8d4842b68894721107ab16
Macrofossil Characteristics of Soil from Shark River Slough, Everglades National Park (FCE) from July 2003 to February 2006; Saunders, Colin	doi:10.6073/pasta/e8f697869b4be3ac9c0cecff377d94d8
Macrophyte count data collected from Northeast Shark Slough, Everglades National Park (FCE) from September 2006 to Present; Gaiser, Evelyn	doi:10.6073/pasta/effd9e98134913af21b670febebd6233
Mangrove Forest Growth from the Shark River Slough, Everglades National Park (FCE),	doi:10.6073/pasta/0c8f485c7095dfed160e66b9b959f470

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
South Florida from January 1995 to Present; Twilley, Robert; Rivera-Monroy, Victor; Castaneda, Edward	
Mangrove leaf physiological response to local climate at Key Largo, Watson River Chickee, Taylor Slough, and Little Rabbit Key, South Florida (FCE) from July 2001 to August 2001; Barr, Jordan; Fuentes, Jose; Zieman, Joseph	doi:10.6073/pasta/7390d5ffed6b06f0b881a8942a53e880
Mangrove Litterfall from the Shark River Slough and Taylor Slough, Everglades National Park (FCE), South Florida from January 2001 to Present; Rivera-Monroy, Victor; Castaneda, Edward; Twilley, Robert	doi:10.6073/pasta/3652feeb67338a8b9c9f5080d77dbfe0
Mangrove Soil Chemistry Shark River Slough and Taylor Slough, Everglades National Park (FCE), from December 2000 to May 23, 2002; Castaneda, Edward; Rivera-Monroy, Victor Twilley, Robert	doi:10.6073/pasta/542c044a50f7081beb454d1314fddff2
Mangrove soil phosphorus addition experiment from July 2013 to August 2013 at the mangrove peat soil mesocosms (FCE), Key Largo, Florida - Nutrients in Surface Water and Aboveground Biomass; Kominoski, John; Gaiser, Evelyn	doi:10.6073/pasta/96f4fc41e721f657219429c64b01f0e4
Mangrove soil phosphorus addition experiment from June 2013 to August 2013 at the mangrove peat soil mesocosms	doi:10.6073/pasta/e355a9f1d3c1e5ad4e5764a9c24b02c3

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
(FCE), Key Largo, Florida - Nutrients in Porewater, Soil and Roots; Kominoski, John; Gaiser, Evelyn	
Marine turtles captured during haphazard at-sea surveys in Shark Bay, Australia from February 2008 to December 2013	doi:10.6073/pasta/0ae2eafe1fd94702a8471a80741b8cb1
Mean Seagrass Epiphyte Accumulation for Florida Bay, South Florida (FCE) from December 2000 to September 2001; Frankovich, Thomas	doi:10.6073/pasta/0d88f0cd8f29d6f227e19050bde91896
Meteorological measurements at Key Largo Ranger Station, South Florida (FCE) for July 2001 to August 2001; Barr, Jordan; Fuentes, Jose; Zieman, Joseph	doi:10.6073/pasta/d0950d21f1ba78c9e91ae08d867174be
Microbial Sampling from Shark River Slough and Taylor Slough, Everglades National Park, South Florida (FCE) from January 2001 to Present; Briceno, Henry	doi:10.6073/pasta/4c8501ea776921f442de1593bb987584
Minnowtrap Data from Rookery Branch and the North, Watson, and Roberts Rivers National Park (FCE) from November 2004 to April 2008; Rehage, Jennifer	doi:10.6073/pasta/91d7c7dd18e2580c7b1523c562db8021
Modeled flux data from the Peat Collapse-Saltwater Intrusion Field Experiment within Everglades National Park (FCE), collected from October 2014 to September	doi:10.6073/pasta/54104d869d122b20b4bcfa3cf8acad1c

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
2016; Wilson, Benjamin; Troxler, Tiffany	
Monitoring of nutrient and sulfide concentrations in porewaters of mangrove forests from the Shark River Slough and Taylor Slough, Everglades National Park (FCE), South Florida from December 2000 to Present; Rivera-Monroy, Victor; Castaneda, Edward; Twilley, Robert	doi:10.6073/pasta/035fa41859dfc4541c04e20cadee1b84
Monthly monitoring fluorescence data for Florida Bay, Ten Thousand Islands, and Whitewater Bay, in southwest coast of Everglades National Park (FCE) for February 2001 to December 2002; Jaffe, Rudolf	doi:10.6073/pasta/1bb7981116c89e6f414964b0a113b294
Monthly monitoring fluorescence data for Shark River Slough and Taylor Slough, Everglades National Park (FCE) for October 2004 to February 2014; Jaffe, Rudolf	doi:10.6073/pasta/3938d3bb664d57584afc749c6a768f31
Monthly monitoring of Fluorescence, UV, Humic and non-Humic Carbon, Carbohydrates, and DOC for Shark River Slough, Taylor Slough, and Florida Bay, Everglades National Park (FCE) for January 2002 to Present; Jaffe, Rudolf	doi:10.6073/pasta/09d51db8543d43cb6f8f4e21f9630611
Monthly water balance data for southern Taylor Slough Watershed (FCE) from January 2001 to December 2011;	doi:10.6073/pasta/1fb384a7c943af6f367dbdc46493f566

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
Price, Rene	
NOAA Daily Surface Meteorologic Data at NCDC Everglades Station (ID-082850)(FCE), South Florida from February 1924 to Present	doi:10.6073/pasta/a27e3e1a20d6aa9f1dc827a5c25069c7
NOAA Daily Surface Meteorologic Data at NCDC Flamingo Ranger Station (ID-083020) (FCE), South Florida from January 1951 to Present	doi:10.6073/pasta/7bae64d38e108bd316c0e4b0058df94e
NOAA Daily Surface Meteorologic Data at NCDC Miami International Airport Station (ID-085663)(FCE), South Florida from January 1948 to Present	doi:10.6073/pasta/a5ba3ca4e949c16a95825fc1620c93d0
NOAA Daily Surface Meteorologic Data at NCDC Royal Palm Ranger Station (ID-087760)(FCE), South Florida from May 1949 to Present	doi:10.6073/pasta/4fd84503fa9cb81fe9f7f30b0c8e41cd
NOAA Daily Surface Meteorologic Data at NCDC Tavernier Station (ID-088841)(FCE), South Florida from June 1936 to May 2009	doi:10.6073/pasta/dd507279ead6dab518823bdcafec8071
NOAA Monthly Mean Sea Level Summary Data for the Key West, Florida, Water Level Station (FCE) (NOAA/NOS Co-OPS ID 8724580) from 01-Jan-1913 to Present	doi:10.6073/pasta/566f715b925fdf8d9d96c17d7f7c992f
Non-continous meteorological data from Butternut Key Weather Tower, Florida Bay, Everglades National Park (FCE), April 2001	doi:10.6073/pasta/93ac051825af8798aaee03fcc37acb57

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
thru Present; Price, Rene	
Non-continuous TS/Ph7b Weather Tower Data, Everglades National Park (FCE), South Florida from May 2008 to Present; Price, Rene	doi:10.6073/pasta/6d96be1549a77e16c0bb9178ca7de695
Nutrient data from the Peat Collapse-Saltwater Intrusion Field Experiment from brackish and freshwater sites within Everglades National Park, Florida (FCE LTER), collected from October 2014 to September 2016; Wilson, Benjamin; Troxler, Tiffany	doi:10.6073/pasta/adc510f0d772128a19c545cc6c8a7df1
Overnight Shark River Surveys from Shark River Slough, Everglades National Park (FCE), South Florida from October 2001 to March 2002	doi:10.6073/pasta/8b6e429fb37dbeaeaa22f962af725a42
Percent cover, species richness, and canopy height data of seagrass communities in Shark Bay, Western Australia, with accompanying abiotic data, from October 2012 to July 2013; Boyer, Joseph; Dailey, Susan	doi:10.6073/pasta/272c332a1c3d83dd522c5ed6324e0df9
Percentage of Carbon and Nitrogen of Soil Sediments from the Shark River Slough, Taylor Slough and Florida Bay within Everglades National Park (FCE) from August 2008 to Present; Chambers, Randy; Russell, Timothy; Hatch, Rosemary; Katsaros, Dean; Gorsky, Adrianna	doi:10.6073/pasta/7d38b9b5d9c235c3b81468fae06dd654

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Periphyton Accumulation Rates from Shark River Slough, Taylor Slough and Florida Bay, Everglades National Park (FCE) from January 2001 to Present; Gaiser, Evelyn	doi:10.6073/pasta/245e729301981be6892ba6ee764b2e7e
Periphyton and Associated Environmental Data From the Comprehensive Everglades Restoration Plan (CERP) Study from February 2005 to November 2014 (FCE); Gaiser, Evelyn	doi:10.6073/pasta/7ed04d64d07a7dd7a4694615df8211a6
Periphyton Biomass Accumulation from the Shark River and Taylor Sloughs, Everglades National Park (FCE), from January 2003 to Present; Gaiser, Evelyn	doi:10.6073/pasta/d9cac9a1796bf98284f9df5a2806cd29
Periphyton data collected from Northeast Shark Slough, Everglades National Park (FCE) from September 2006 to Present; Gaiser, Evelyn	doi:10.6073/pasta/03e9d26feab9b1eb156477057aa587b7
Periphyton data from LTER Caribbean Karstic Region (CKR) study in Yucatan, Belize and Jamaica (FCE) during 2006, 2007, 2008; Gaiser, Evelyn	doi:10.6073/pasta/f3a6a99aa7dacb1d338cf2d6d1698482
Periphyton Net Primary Productivity and Respiration Rates from the Taylor Slough, just outside Everglades National Park (FCE), South Florida from December 1998 to December 2004; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/6cd7783c4871eaf3527ab177deacd035

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Periphyton Net Primary Productivity and Respiration Rates from the Taylor Slough, just outside Everglades National Park, South Florida (FCE) from December 1998 to August 2002; Troxler, Tiffany	doi:10.6073/pasta/6b1a16e33753fdd17053c94d3e69c044
Periphyton Nutritonal Data across the freshwater Everglades (FCE): June 2016-Feb 2017; Trexler, Joel; Sanchez, Jessica	doi:10.6073/pasta/70cdfca241ed9dffefdb7b3608d20ef1
Periphyton Productivity from the Shark River Slough and Taylor Slough, Everglades National Park (FCE), from October 2001 to Present; Gaiser, Evelyn	doi:10.6073/pasta/7c77d9b858b2f3cf41edbddeb66b9948
Periphyton, hydrological and environmental data in a coastal freshwater wetland (FCE), Florida Everglades National Park, USA (2014-2015); Mazzei, Viviana; Gaiser, Evelyn	doi:10.6073/pasta/4e6dc2b1aab5c02c224a27c2eaff2e82
Physical and Chemical Characteristics of Soil Sediments from the Shark River Slough and Taylor Slough, Everglades National Park (FCE LTER) from August 2004 to Present; Chambers, Randy; Russell, Timothy; Gorsky, Adrianna	doi:10.6073/pasta/48bbbc5e009be9663bd9cfdac0cbcb53
Physical and microbial processing of dissolved organic nitrogen (DON) (Photodegradation Experiment) along an oligotrophic marsh/mangrove/estuary ecotone (Taylor Slough and Florida Bay) for August 2003 in Everglades	doi:10.6073/pasta/da883a9edecd3c2a2be661531b16a780

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
National Park (FCE), South Florida, USA; Jaffe, Rudolf	
Physical and microbial processing of dissolved organic nitrogen (DON) (Salinity Experiment) along an oligotrophic marsh/mangrove/estuary ecotone (Taylor Slough and Florida Bay) for August 2003 in Everglades National Park (FCE), South Florida, USA; Jaffe, Rudolf	doi:10.6073/pasta/07272b339cff887abca38b8676789a56
Physical Characteristics and Stratigraphy of Deep Soil Sediments from Shark River Slough, Everglades National Park (FCE) from 2005 and 2006; Saunders, Colin	doi:10.6073/pasta/43f9e2156680db7372e8ad4db497eb0d
Physical Hydrologic Data for the National Audubon Society's 16 Research Sites in coastal mangrove transition zone of southern Florida (FCE) from November 2000 to Present; Saunders, Colin	doi:10.6073/pasta/995902ba06bad81c9696381907db5e54
Pond Cypress C-111 Basin, Everglades (FCE), South Florida ; Dendroisotope Data from 1970 to 2000; Anderson, William	doi:10.6073/pasta/9e929b1d4c7ab02e3afd12652391f3a3
Precipitation from the Shark River Slough, Everglades National Park (FCE), South Florida from November 2000 to Present; Price, Rene; Childers, Daniel	doi:10.6073/pasta/bce2f88a472a486704f26da265308da0
Precipitation from the Taylor	doi:10.6073/pasta/b9e6beb8b06b7f6fe857090536d5745d

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Slough, Everglades National Park (FCE), South Florida from July 2000 to Present; Troxler, Tiffany; Childers, Daniel	
Precipitation from the Taylor Slough, just outside Everglades National Park (FCE), South Florida from August 2000 to December 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/6581a4898452afd4bc1f6665b44aeb4f
Quantitative and qualitative aspects of dissolved organic carbon leached from plant biomass in Taylor Slough, Shark River and Florida Bay (FCE) for samples collected in July 2004; Jaffe, Rudolf	doi:10.6073/pasta/22916d1d52d8a756020b8c7537b1bd87
Radiation measurements at Key Largo Ranger Station, South Florida (FCE) for July 2001; Barr, Jordan; Fuentes, Jose; Zieman, Joseph	doi:10.6073/pasta/7682f3f1180f6048716b39531328a0b4
Radiometric Characteristics of Soil Sediments from Shark River Slough, Everglades National Park (FCE) from 2005 and 2006; Saunders, Colin	doi:10.6073/pasta/c0cb8ff0f150e429674ecf0db15bedc5
Rainfall Stable Isotopes collected at Florida International University-MMC (FCE LTER), Miami Florida, from October 2007 to Present; Price, Rene	doi:10.6073/pasta/adbd8a51eeb4b76bdbbf40a5db30d210
Relative Abundance Diatom Data from Periphyton Samples Collected for the Comprehensive Everglades Restoration Plan (CERP) Study (FCE) from	doi:10.6073/pasta/cb0f7e88d28075a6ff1f59d008bb732c

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
February 2005 to November 2014; Gaiser, Evelyn	
Relative Abundance of Soft Algae From theComprehensive Everglades Restoration Plan (CERP) Study (FCE) from February 2005 to November 2014; Gaiser, Evelyn	doi:10.6073/pasta/6e16b97781030e670fd94221ac812f5d
Rubisco limited photosynthesis rates of Red mangrove leaves at Key Largo, Watson River Chickee, Taylor Slough, and Little Rabbit Key, South Florida (FCE) from July 2001 to August 2001; Barr, Jordan; Fuentes, Jose; Zieman, Joseph	doi:10.6073/pasta/6a3a958ec35ea159a935be9ceb214fe8
Sawgrass Above and Below Ground Total Nitrogen and Total Carbon from the Shark River Slough, Everglades National Park (FCE), from September 2002 to Present; Gaiser, Evelyn; Childers, Daniel	doi:10.6073/pasta/43d2b844559a40dbb95d809236559ecd
Sawgrass Above and Below Ground Total Nitrogen and Total Carbon from the Taylor Slough, Everglades National Park (FCE), South Florida for March 2002 to Present; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/9392a1fbc0b9c34ed57af52683f5e0f5
Sawgrass Above and Below Ground Total Phosphorus from the Shark River Slough, Everglades National Park (FCE), from September 2002 to Present; Gaiser, Evelyn; Childers, Daniel	doi:10.6073/pasta/b5d302ff05dde47e1741afadd5c800db

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Sawgrass Above and Below Ground Total Phosphorus from the Taylor Slough, Everglades National Park (FCE), South Florida for March 2002 to Present; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/0df09f4b7e70b88177427456cda626aa
Sawgrass above ground biomass from the Shark River Slough, Everglades National Park (FCE), South Florida from November 2000 to Present; Gaiser, Evelyn; Childers, Daniel	doi:10.6073/pasta/2d4ef632fe268a3dda19cbb59214f0f1
Sawgrass above ground biomass from the Taylor Slough, Everglades National Park (FCE), South Florida from August 1999 to Present; Gaiser, Evelyn; Childers, Daniel	doi:10.6073/pasta/91c2364a43f3f046c38a70bb71f68ef0
Sawgrass above ground biomass from the Taylor Slough, just outside Everglades National Park (FCE), South Florida from October 1997 to December 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/e6640b978d38e54d88f2231ebc7db92d
Seagrass Epiphyte Accumulation for Florida Bay, South Florida (FCE) from December 2000 to September 2001; Frankovich, Thomas	doi:10.6073/pasta/2bf2a1f1d9c7904b12b137ba58956203
Seagrass Epiphyte Accumulation: Epiphyte Loads on Thalassia testudinum in Rabbit Key Basin, Florida Bay (FCE) from March 2000 to April 2001; Frankovich, Thomas	doi:10.6073/pasta/5aadc198730a74b48ae27b6c1e11f3a8
Seasonal Electrofishing Data from Rookery Branch and Tarpon	doi:10.6073/pasta/ed3febe89ff59f68ae2aedf6c87b7eff

FCE Datasets Published in the EDI Data Repository (Title; Creators)	DOI
Bay, Everglades National Park (FCE) from November 2004 to Present; Rehage, Jennifer	
Sediment Elevation Change (Feldspar Marker Horizon Method) from Northeastern Florida Bay (FCE) from 1996 to Present; Coronado, Carlos A; Sklar, Fred	doi:10.6073/pasta/1755e84862607d90e33bcefe6ce997e2
Sediment Elevation Change (SET Method) from Northeastern Florida Bay (FCE) from 1996 to Present; Coronado, Carlos A; Sklar, Fred	doi:10.6073/pasta/0edc80f91191e66eea6b4b0ebd407a0d
Shark catches (longline), water temperatures, salinities, and dissolved oxygen levels, and stable isotope values in the Shark River Slough, Everglades National Park (FCE) from May 2005 to Present; Heithaus, Michael; Matich, Philip	doi:10.6073/pasta/c4cb7d543f468f982a5c146f4c3950e6
Soil Characteristic and Nutrient Data from the Taylor Slough, within Everglades National Park (FCE), from March 2002 to April 2004; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/6040a745baed01378e215c8070d0126d
Soil Characteristics and Nutrient Data from the Shark River Slough, within Everglades National Park (FCE), from March 2003 to March 2004; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/b159b26b251d40494258f3d4430f4dfc
Soil Physical Data from the Shark River Slough, Everglades National Park (FCE), from	doi:10.6073/pasta/903576c777c0b7dc6bf87cd86f9fbc05

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
November 2000 to January 2007; Troxler, Tiffany; Childers, Daniel	
Soil Physical Data from the Taylor Slough, just outside Everglades National Park (FCE), from October 1998 to October 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/81e0fc75f420c948340b17715a4d78a5
Soil Physical Data from the Taylor Slough, within Everglades National Park (FCE), from September 1999 to November 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/ac54452865f50d6ca972a4c196522e4f
Standard Lengths and Mean Weights for Prey-base Fishes from Taylor River and Joe Bay Sites, Everglades National Park (FCE), South Florida from January 2000 to April 2004; Lorenz, Jerry	doi:10.6073/pasta/73c32ad91eddd1843338e4081754d41e
Stationary camera observations, set, and environmental data from Shark Bay Marine Park, Western Australia from July 2011 to June 2012; Heithaus, Michael; Bessey, Cindy	doi:10.6073/pasta/351008458935802ef0436d43bfb487ba
Subsurface Water Temperatures taken in Shark River Slough and Taylor Slough, Everglades National Park, South Florida (FCE) from May 2010 to Present; Rains, Mark	doi:10.6073/pasta/56a7c2c88e4e20dc8c2b0100c3de9a1d
Surface Water Quality Monitoring Data collected in South Florida Coastal Waters (FCE) from June 1989 to Present; Briceno, Henry	doi:10.6073/pasta/15a68e643d4c359a8c62efe1099b508f

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Temperatures,salinities, and dissolved oxygen levels in the Shark River Slough, Everglades National Park (FCE LTER) from May 2005 to Present; Heithaus, Michael; Matich; Rosenblatt	doi:10.6073/pasta/b6a32d593cf8810a59a4ff519358ef8e
Thalassia leaf morphology and productivity measurements from arbitrary plots located in a Thalassia seagrass meadow in Rabbit Key Basin, Florida Bay (FCE) from March 2000 to April 2001; Frankovich, Thomas	doi:10.6073/pasta/bf798892c1105cb3a157f7132165c732
The Salinity and phosphorus mesocosm experiment in freshwater sawgrass wetlands: Determining the trajectory and capacity of freshwater wetland ecosystems to recover carbon losses from saltwater intrusion (FCE LTER), Florida, USA from 2015 to 2018; Lee, Dong Yoon; Wilson, Ben J.; Servais, Shelby; Kominoski, John	doi:10.6073/pasta/2d77638c7d15761bcbe5840c93978912
Trophic transfer of Everglades marsh consumer biomass to Everglades Estuaries (FCE), Everglades National Park, South Florida from December 2010 to Present; Rehage, Jennifer	doi:10.6073/pasta/bb567fd4066fa2866419a1a200a89c92
Water flow velocity data, Shark River Slough (SRS) near Black Hammock island, Everglades National Park (FCE), South Florida from October 2003 to Present; Price, Rene	doi:10.6073/pasta/d14efe4f113f59a36e4af3c63041ec3b

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Water flow velocity data, Shark River Slough (SRS) near Chekika tree island, Everglades National Park (FCE LTER) from January 2006 to Present; Price, Rene	doi:10.6073/pasta/a26144d352063ef4969868177d62a79f
Water flow velocity data, Shark River Slough (SRS) near Frog City, south of US 41, Everglades National Park (FCE) from October 2006 to Present	doi:10.6073/pasta/eb350d627455e94f0566adea2a7c65e8
Water flow velocity data, Shark River Slough (SRS) near Gumbo Limbo Island, Everglades National Park (FCE) from October 2003 to Present	doi:10.6073/pasta/bdc327b2f493cfd4f51e3820fcbe4a0c
Water flow velocity data, Shark River Slough (SRS) near Satinleaf Island, Everglades National Park (FCE) from July 2003 to Present; Price, Rene	doi:10.6073/pasta/c63a5d588755fa961bcd0dfc041e6d19
Water Levels from the Shark River Slough and Taylor Slough, Everglades National Park (FCE), South Florida from May 2001 to Present; Rivera-Monroy, Victor; Castaneda, Edward	doi:10.6073/pasta/d241ada3c2dafac1a6b10e5d947c3f35
Water Levels from the Shark River Slough, Everglades National Park (FCE), South Florida from October 2000 to Present; Childers, Daniel; Price, Rene	doi:10.6073/pasta/8fdf7ed68053f30b92cc0ba91f2c7f4c
Water Levels from the Taylor Slough, Everglades National Park (FCE), South Florida from	doi:10.6073/pasta/49710a787476c49ae0522c1c946907dd

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
August 1999 to Present; Troxler, Tiffany; Childers, Daniel	
Water Levels from the Taylor Slough, Everglades National Park (FCE), South Florida from April 1996 to Present; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/c6f897f83cf418015657eab9bcc4a6b4
Water Levels from the Taylor Slough, just outside the Everglades National Park (FCE), South Florida from October 1997 to December 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/2bb421d19f71704ed7476ca128bacb72
Water Quality Data (Extensive) from the Shark River Slough, Everglades National Park (FCE), from October 2000 to Present; Gaiser, Evelyn; Childers, Daniel	doi:10.6073/pasta/3edb21eb7cd4f3681a17292e17700378
Water Quality Data (Extensive) from the Taylor Slough, Everglades National Park (FCE), from April 1996 to Present; Troxler, Tiffany	doi:10.6073/pasta/548ecbd27063785b0c8bc788dd7dd73c
Water Quality Data (Extensive) from the Taylor Slough, Everglades National Park (FCE), South Florida from July 1999 to Present; Troxler, Tiffany	doi:10.6073/pasta/d6179852ba17eca66089bda36f043312
Water Quality Data (Extensive) from the Taylor Slough, just outside Everglades National Park (FCE), from August 1998 to December 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/986977091d9ff18aac52ea1c4886e64b
Water Quality Data (Grab Samples) from the Shark River	doi:10.6073/pasta/8e8dc6a2b1a47c48ed4a951d2c4838fa

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Slough, Everglades National Park (FCE), from May 2001 to Present; Gaiser, Evelyn; Childers, Daniel	
Water Quality Data (Grab Samples) from the Taylor Slough, Everglades National Park (FCE), from May 2001 to Present; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/18c7168b940c5a7f91099edda43a6dcf
Water Quality Data (Grab Samples) from the Taylor Slough, Everglades National Park (FCE), South Florida from September 1999 to Present; Troxler, Tiffany	doi:10.6073/pasta/0294ae8a173c7ee31bc50e389a225812
Water Quality Data (Grab Samples) from the Taylor Slough, just outside Everglades National Park (FCE), for August 1998 to November 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/cd96927a753e84af3d9d2a07b02fa322
Water Quality Data (Porewater) from the Shark River Slough, Everglades National Park (FCE), from January 2001 to Present; Gaiser, Evelyn; Childers, Daniel	doi:10.6073/pasta/8000a852fabf49599a2da8055fd044f8
Water Quality Data (Porewater) from the Taylor Slough, Everglades National Park (FCE), South Florida from September 1999 to December 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/d4e923e473d693cce2a896d82348e112
Water Quality Data (Porewater) from the Taylor Slough, just outside Everglades National Park (FCE), from August 1998 to October 2006; Troxler, Tiffany; Childers, Daniel	doi:10.6073/pasta/1c4f9019e3dc4306b17a067f455430ad

FCE Datasets Published in the EDI Data Repository (Title; Creators)	**DOI**
Water Temperature measured at Shark River, Everglades National Park (FCE) from July 2007 to June 2011; Rosenblatt, Adam	doi:10.6073/pasta/a50dd41d188c25bc122deee65c2c73a9
Water Temperature measured at Shark River, Everglades National Park (FCE) from October 2007 to August 2008; Rosenblatt, Adam	doi:10.6073/pasta/274fb25dec72d09d8226f147cdfbecb1
Water Temperature, Salinity and other physical measurements taken at Shark River, Everglades National Park (FCE) from February 2010 to Present; Rosenblatt, Adam	doi:10.6073/pasta/65bf262c4bfd8ab956effc63f920c4d3
Water, Soil, Floc, Plant Total Phosphorus, Total Carbon, and Bulk Density data (FCE) from Everglades Protection Area (EPA) from 2004 to 2016; Sarker, Shishir	doi:10.6073/pasta/f66a58d857b76740e03c3c48da16cc73