PRESENTERS

Morning Session

Short biographies of the morning presenters from the CESU Partner agencies and organizations are listed below in alphabetical order by last name.

- **Ray Albright**, National Park Service. Dr. Ray Albright is a Senior Scientist with the National Park Service. He oversees and facilitates National Park Service interests and actions in two CESUs: the Southern Appalachian Mountains CESU and the Piedmont South-Atlantic Coast CESU.

- **Laura Brandt**, Senior Wildlife Biologist, U.S. Fish and Wildlife Service. The presentation will focus on current applications and potential opportunities for CESUs to advance Gulf restoration efforts associated with NRDA, RESTORE, NFWF, and other funding sources emanating from the Deepwater Horizon oil spill.

- **Alfred Cofrancesco**, Technical Director, Civil Engineering Programs U.S. Army Engineer Research and Development Center

- **Melanie Damour**, Melanie Damour is a Marine Archaeologist and the Environmental Studies Coordinator for the Bureau of Ocean Energy Management's Gulf of Mexico Region office in New Orleans, Louisiana. *Melanie will be discussing the Bureau of Ocean Energy Management's anticipated information needs related to oil and gas, renewable energy, and marine minerals in Gulf of Mexico and south Atlantic Federal waters. BOEM's Environmental Studies Program funds applied science for decision-making among a variety of disciplines including: air quality, biology and ecology, cultural resources, fates and effects, marine mammals, protected species, physical sciences and oceanography, and social and economic sciences.*

- **Carol Daniels**, National Park Service coordinator for the South Florida Caribbean CESU

- **Thomas Doyle**, Deputy Director – Ecologist (Research), USGS Wetland and Aquatic Research Center

- **Thomas Fish**, National Coordinator of the Cooperative Ecosystem Studies Units Network. *Keynote presentation title: Priorities of science and technology research, application, and education supporting partnerships through the CESUs*

- **Sean MacDougall**, Biological Sciences Program Lead, BLM Eastern States

- **Giselle Mora-Bourgeois**, National Park Service coordinator for the Gulf Coast CESU.

- **Rachael Novak**, BIA Climate Science Coordinator, Bureau of Land Management

- **Sunny Snider**, Chief of Staff, NOAA Fisheries Southeast Fisheries Science Center. *The presentation will focus on fostering opportunities for research partnerships between NOAA Fisheries and CESU members in the Southeast Region.*

- **John Tirpak**, Gulf of Mexico Science Coordinator, U.S. FWS. Dr. John Tirpak currently serves as Science Coordinator for Gulf Restoration within

  the U.S. Fish and Wildlife Service. John also represents the Department of the

  Interior on the Louisiana Trustee Implementation Group and on the Executive

  Oversight Board for the NOAA RESTORE Act Science Program.

- **Doris Washington**, Director, National Water Management Center, USDA Natural Resources Conservation Service. *The presentation will focus on current federal projects and general agency update for CESU's.*

- **Sherry Whitaker**, CESU Grants Officer Technical Representative

Afternoon Session (Abstracts being added daily!)

The afternoon session of the presenters are listed below in last name order. The title of their presentation, authors and their affiliations are provided after each presenter name. The body of the abstract follows this information. Please note that in some cases there are multiple presentations by the same person. Please use your browser's search feature to find presentations using your own keyword search.

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Webinar Presenter: Allen, Joshua
Presentation Title: Evaluating the Effectiveness of the L31N Canal Seepage Barrier in the Florida Everglades.
Author(s): Allen, Joshua, Florida International University, Miami, Florida; Price, René (United States)
Abstract: Hydrologic conditions in Northeast Shark River Slough (NESRS), in Everglades National Park (ENP), has been subject to many alterations over the last century that resulted in a reduction of freshwater inflows. Through the Comprehensive Everglades Restoration Plan, two projects were undertaken in order to provide additional water to the region and to reduce its seepage out of ENP. These projects included: 1) a one-mile long bridge constructed along the northern boundary of ENP to deliver additional fresh water from the Tamiami Canal into NESRS; and 2) a two-mile long groundwater seepage barrier constructed along the northeastern boundary adjacent to the L31N canal and extending to five miles long in 2016. The goal of this study was to determine the effectiveness of the seepage barrier in preventing groundwater from NESRS discharging to the adjacent L31N canal. The project goal was assessed by using the stable isotopes of oxygen as a tracer of water to detect groundwater discharge to the canal. In addition, groundwater discharge to the canal was estimated from a water balance. Groundwater and surface water were sampled in October 2015 and again in October 2017. Water samples were analyzed for the stable isotopes of oxygen and hydrogen using a Los Gatos Liquid Water Analyzer. For the water balance, hydrologic data were obtained from the South Florida Water Management District Data Base DBHYDRO. The data included canal inflows and outflows along sections of the L31N canal, water levels and climate data (rainfall and evapotranspiration) from a weather tower located about X km south. The isotopic values of d18O of surface water and groundwater corroborated the water balance calculations that groundwater seepage to the canal was greatly reduced in the region of the seepage barrier. An investigation of water levels in the NESRS indicated higher water levels in 2017 compared to 2015, suggesting that the restoration attempts were effective in retaining water in this region of ENP.
Thematic Area: Basic Research

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Webinar Presenter: Briceno, Henry
Presentation Title: TOTAL PHOSPHOROUS LEVELS IN SURFACE WATER DISCHARGES TO SHARK RIVER SLOUGH, EVERGLADES NATIONAL PARK.
Author(s): Briceno, Henry, Florida International University, Miami, Florida;
Abstract: Water levels in Everglades marshes and canals are closely tied to management and climate variability. Furthermore, as stages in the Water Conservation Area 3A (WCA-3A) start decreasing, the L67A canal rather than

the marsh conveys the majority of the flow into the Everglades National Park (ENP). Canal water is typically of poorer quality than marsh water as it does not undergo much natural marsh filtering to remove nutrients. Current studies have identified a strong correlation between Total Phosphorous (TP) at S333 (inflow structure to ENP) and canal stage and WCA-3A stage. Low stages in marsh and canals are associated with high TP levels at S333, and the conditions and mechanisms that cause elevated TP are unknown. The purpose of this study is to identify the sources of the elevated TP at S333 and, if possible, characterize them as to be from either local effects and conditions at S333 or upstream of S333 within the L67A Canal, L29 Canal or the marsh. Results to date suggest that stirring of bottom sediments at low stage and high flow velocity, especially from the bottom of L29 canal (Tamiami Canal), have the potential of re-suspending and remobilizing nutrient-rich sediments that accumulate at the bottom of that canal. These phosphorus- and organic-rich sediments can be rapidly transported downstream while contributing part of their P load to canal waters to finally reach the park. Besides stage, preliminary results suggest that, pH, time of the day (insolation?) and turbidity are closely related to water TP concentrations, suggesting a biogenic mediate process as an additional mechanism of TP control. Furthermore, precisely defined stage level and time of the day thresholds seem to modulate these physical-chemical and compositional parameters.Next step in this research is to combine high frequency flow velocity measurements of bottom currents, physical-chemical monitoring and sediment sampling with high resolution GPU-based 2D hydrologic models with flexible-mesh (0.5 m to 1 m) to capture the complex water velocity fields, and pollutant concentration patterns.
Thematic Area: Basic Research

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Webinar Presenter: Carroll, John
Presentation Title: Interactions between an oyster pest and an oyster parasite.
Author(s): Carroll, John, Georgia Southern University, Statesboro, Georgia;
Abstract: The eastern oyster, *Crassostrea virginica*, provides a number of ecosystem services and is an important commercial fishery species along US East and Gulf Coasts. Unfortunately, their populations have declined dramatically, due to overharvest, habitat loss, and disease. As both oyster restoration efforts and aquaculture of oysters continues to increase throughout their range, it is important to consider the impacts of a number of potential oyster pests, including the boring sponge *Cliona* spp. and the pea crab *Zaops (Pinnotheres) ostreum* on oyster populations. Both of these pests have been demonstrated to reduce oyster growth, condition, and in some instances, reproductive output. Boring sponges in particular are a major concern for both oyster growers and managers, and our monitoring efforts have suggested that pea crabs might be more prevalent in sponge-infested oysters. We conducted an observational study to determine if there was any relationship between pea crab prevalence and sponge presence, and to examine whether the presence of both pests had synergistic effects on oyster condition. Across two very different systems (NC and NJ), sponge infested oysters were more likely to have a pea crab than the background population, both reduced oyster condition in isolation, and the effects were additive.
Thematic Area: Basic Research

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Webinar Presenter: Clendenin, Michelle
Presentation Title: Utilizing Ecological Site Descriptions in Conservation Planning: Managing for Wildlife
Author(s): Clendenin, Michelle, USDA-Soil Science Division, Raleigh, North Carolina;
Abstract: Recent initiatives by the USDA have accelerated ecological inventories throughout the US in order to classify soils and vegetation, delineating land units that respond similarly to management and disturbance. An increased emphasis on landscape scale conservation activities has required a comprehensive set of Ecological Site Descriptions (ESDs) to be available for larger spatial scales (landscapes, watersheds, regions); ecological sites are determined by natural processes, the environment and soils that occur in an area.   The heart of the ecological site concept is depicted in State and Transition models which illustrate relic, successional vegetation trends, and provide information with interpretation on ways to manage and restore ecological communities. ESDs provide a repository of relevant information to identify conservation challenges, implement solutions and evaluate progress in an increasingly complex and rapidly changing environment. These efforts have facilitated interactions with resource planners and landowners, in particular with regards to conservation programs supported by the 2014 Farm Bill.

Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Foley, Kara
Presentation Title: Aquatic plant management in the United States Army Corps of Engineers Wilmington District Lakes.
Author(s): Richardson, Rob and Foley, Kara. North Carolina State University, Raleigh, NC
Abstract: Aquatic invasive species monitoring and management practices are important for the maintenance of high-functioning and sustainable aquatic ecosystems. This project aims to identify and manage aquatic invasive plant populations as well as promote the establishment of native aquatic plant communities in four of the United States Army Corps of Engineers Wilmington District Lakes which include: Philpott Lake (Bassett, VA), Falls Lake (Wake Forest, NC), B. Everett Jordan Lake (Raleigh, NC), and W. Kerr Scott Lake (Wilkesboro, NC). The results of preliminary point-intercept and bio-volume surveys, aquatic invasive species control methods, and the establishment of native plant populations at these geologically young water bodies will be discussed. At Philpott Lake, the northernmost reservoir in this group of study sites, dioecious Hydrilla (*Hydrilla verticillata* (L.f.) Royle) was positively identified at 38% of the surveyed points. The tuber bank dynamics and management strategies of this uncharacteristic population of dioecious Hydrilla will also be addressed.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Franklin, Jennifer
Presentation Title: Vegetation Management on the C & O Canal.
Author(s): Franklin, Jennifer, University of Tennessee, Knoxville, Tennessee;
Abstract: A survey of vegetation in campsites and visitors centers on the Chesapeake and Ohio Canal National Historic Park was completed in the summer of 2017, to provide baseline data on forest health. The forest is primarily a mature to over-mature riparian hardwood overstory, with good regeneration of native tree species and a healthy and diverse understory. The assessment suggersted that the ecosystem services provided by the park may be enhanced by promoting the growth of native perennial plants. Units were identified within the large land area that is currently maintained in non-native grasses for conversion to native vegetation, and restoration plans were completed for these. A restoration plan was also created for riparian areas in which heavy foot traffic has resulted in a degradation of understory vegetation. GIS shapefiles delineating vegetation management zones were created for each site. These provide baseline measurements of land area under different management regimes, and along with vegetation and soil data provide a foundation on which to base long term studies of restoration success. The project provided training on restoration planning for a graduate student, and provided a case study for use in an undergraduate course in Applied Ecosystem Restoration.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Garcia, Reinaldo
Presentation Title: Hyper-resolution Water Pollution Assessments in Canals of the Everglades Water Conservation Area 3A using High Performance Modeling.
Author(s): Reinaldo Garcia, PhD, Hydronia, LLC. Florida, USA. E-mail: regarcia@hydronia.com, Phone: (954) 682 8736, And Henry Briceño, PhD Professor, Southeast Environmental Research Center & Department of Earth and Environment, Florida International University, 11200 SW 8th St, OE-148, Miami, FL 33199, ph 305 348 1269 bricenoh@fiu.edu
Abstract: Flood and water pollution assessments using two-dimensional (2D) models were until recently forced to use relatively coarse resolution due to limitations in bathymetric data, and exceedingly low performance of sequential computer codes. However, often there is a need to use high resolution models in areas where many small canals, and terrain features drive and control water circulation with a significant impact on the spatial and temporal distribution of pollutants. The increased availability of high resolution bathymetric surveys, and novel water velocity and pollutant concentration instrumentation, has brought the opportunity to use flexible-mesh models with cells small enough to ensure capturing the complex environment. Still, many numerical modeling tools sometimes require days if not weeks to run typical simulations. GPU-based 2D hydrologic and hydraulic models have proven able to accelerate simulations more than 100 times with respect to conventional models, opening new opportunities

for sub-meter evaluations. This presentation will discuss hyper-resolution pollutant distribution simulations in coastal areas with high performance computing models using Graphic Processing Unit parallelization. The models use unstructured meshes that can handle millions of computational cells ranging from less than 0.5 m to several meters. These meshes can resolve flow and determine solute distribution at canals, culverts, bridges, and over highly irregular bathymetry.We present preliminary results of applications to canals in the Everglades Water Conservation Area 3A (WCA-3A). Water levels in Everglades marshes and canals are closely tied to management and climate variability. Furthermore, as stages in the WCA-3A start decreasing, the L67A canal rather than the marsh conveys the majority of the flow into the Everglades National Park (ENP). Canal water is typically of poorer quality than marsh water because canal water has not benefitted from the marsh filtering removal quality of nutrients. Current studies have identified a strong correlation between Total Phosphorous (TP) and canal stage at structure S333 (inflow structure to ENP) of WCA-3A stage, suggesting that a set of hydraulic conditions may be responsible for the TP spikes observed in the water column. Initial applications of the high-resolution model demonstrate that it can simulate extremely detailed water velocity fields, and pollutant concentration patterns, and highlight the importance of mesh resolution to accurately assess pollutant mitigation solutions.
Thematic Area: Basic Research

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Webinar Presenter: Gleason, Daniel
Presentation Title: Drifting for knowledge: A test of the "Outwelling Hypothesis" resulted in interesting science and unique educational opportunities in coastal Georgia.
Author(s): Gleason, Daniel, Georgia Southern University, Statesboro, Georgia; Cohen, Risa (United States)
Abstract: The idea that estuarine waters deliver subsidies in the form of dissolved and particulate materials to offshore habitats is known as the "outwelling hypothesis." This hypothesis was proposed nearly 50 years ago and was quickly accepted despite the fact that there was little empirical evidence to support it from the outset, and that it was difficult to test. We aimed to improve understanding of the potential for dissolved and particulate materials to be exported from one of the largest river outflows on the Atlantic seaboard, the Altamaha River Estuary, to critical offshore habitats of the South Atlantic Bight. In carrying out this project, we partnered with the Coastal Resources Division of the Georgia Department of Natural Resources and Gray's Reef National Marine Sanctuary. Transport of dissolved substances out of the estuary was assessed by releasing a non-toxic water tracing dye, rhodamine WT, into the Altamaha River outflow during times of low (Fall) and high (Spring) freshwater discharge in two consecutive years. The direction of dye dispersion was determined using fluorometers moored at natural and artificial reef sites offshore. The movement of larger components, such as fragmented marsh grass, was simulated with satellite-enabled drifters constructed from basic and mostly biodegradable materials. Workshops were conducted to train secondary school teachers in the construction and deployment of these drifters. The teachers then participated in the offshore activities and released these drifters coincident with the dye deployments. A GPS locator secured atop each drifter documented its position at regular intervals and the accumulated data were available to the participating teachers for use in math and science classes in real time. These drifters provided not only educational opportunities, but also data on particle movements that were compared to dispersal of the dissolved rhodamine WT dye. Results demonstrated that both the dye and drifters escaped the southerly flow of the longshore current during the spring deployments and were transported west and north. For example, in May of 2014, the dye was transported to a reef site 48 km north of the drop site in 4 days and the drifters ended up in Atlantic waters well-east of Massachusetts in 92 days. In contrast, neither the dye nor drifters made it to offshore reefs in September and were either trapped within the estuary or hugged the coastline as they were pushed south. These findings suggested that the conduits exist for the highly heterotrophic reefs off the Georgia coast to receive estuarine subsidies, but that anthropogenic or natural processes that reduce river discharge rates could disrupt these connections. Methods and findings from this study were incorporated into several products, including drifter building training manuals and instructional videos, that were made available to the education and outreach arms of our government partners. Furthermore, this study was incorporated into an interactive multimedia display at the Georgia Southern University Museum where it is available to over 16,000 visitors per year.
Thematic Area: Basic Research

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Webinar Presenter: Jones, Athena
Presentation Title: Degradation of naled in natural waters collected from areas impacted by aerial spray activities.
Author(s): Athena Jones, Francisco Alberdi, Amanda Sanabria, Nakiya Clausell, Matthew Roca, Helena Solo-Gabriele, Elsayed Zahran, University of Miami, Coral Gables, FL
Abstract: Naled is an organophosphate pesticide that is applied aerially to control mosquito-borne disease transmission as well as areas with high bite rates by nuisance mosquitoes. During the summer of 2016 the use of naled in urban areas received considerable attention due to its use to control the first documented Zika virus outbreak in the continental U.S. Concerns were raised about the persistence of the pesticide in the environment and how this information can be used to develop protection strategies for humans and non-target organisms. Non-target organisms include pollinators, such as honeybees (Apis mellifera), butterflies, birds, beetles, and midges. The objective of this study was to evaluate the persistence of naled in natural waters in areas impacted by aerial spray activities. Two representative water samples (a freshwater and a marine water) were utilized for experimentation. Laboratory experiments were designed to evaluate the influence of hydrolysis, naturally occurring nucleophiles, and ultraviolet light on degradation rates. Water samples were also measured in the field to document levels observed immediately after the spray activities. Results show that the naturally occurring nucleophiles were necessary to promote degradation as experiments with deionized water resulted in the prolonged persistence of naled (half-life of more than 1 week). The half-life in natural waters which excluded all ultraviolet (UV) light sources was determined to be on the order of 6 hours. Naled was found to degrade into dichlorvos in all the laboratory experiments. With UV exposure, this reaction was accelerated and yielded more dichlorvos. Levels measured in the field after aerial sprays (13 ug/L in freshwater and 19 ug/L in marine water) suggest that levels are detectable in natural waters immediately after aerial sprays. Research is needed to utilize these results to assess human health and ecosystem impacts.
Thematic Area: Basic Research

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Webinar Presenter: Jungen, Michael
Presentation Title: Long-distance Translocation of Eastern Diamondback Rattlesnakes (*Crotalus adamanteus*).
Author(s): Jungen, Michael, Marshall University, Huntington, West Virginia; Welch, Shane; Holloway, John; Wiggers, Ernie; Waldron, Jayme (United States)
Abstract: The eastern diamondback rattlesnake (*Crotalus adamanteus*; EDB) is a long-lived, large-bodied pit viper endemic to southeastern pine savannas and woodlands. The EDB is declining, and conservation efforts, including long-distance translocation, are being undertaken to aid in the species' recovery. Long-distance translocation to re-establish or supplement populations of viperids has yielded mixed results, with survival averaging less than 50%. We translocated EDBs (N = 21) from a sea island population to a pine savanna restoration area located on private property in South Carolina, 2016-2017, and estimated post-translocation survival probability. This study will further our understanding of the efficacy of translocation as a conservation tool for EDB restoration.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Larson, Lincoln
Presentation Title: Citizen Science and Conservation Outcomes: The Multi-project Effect.
Author(s): Larson, Lincoln, North Carolina State University, Raleigh, North Carolina;
Abstract: Citizen science projects have the capacity to influence conservation in two ways. First, they help to generate new knowledge (often through crowd-sourced data collection) to inform scientific management and decision making. Second, they may create a more informed and empowered citizenry eager to engage in environmental stewardship and to help address the complex conservation challenges of the future. Few studies have systematically explored this second pathway. To investigate factors that impact citizen science's broader impacts on conservation outcomes, we surveyed participants in Audubon's 116th Christmas Bird Count (CBC) and asked them about their participation in a variety of conservation behaviors (e.g., donating money, educating others, participating in environmental groups, restoring habitats).Based on over 3,000 responses, our multinomial regression models showed that, when controlling for socio-demographic variables, the best predictors of conservation behavior were participant's environmental efficacy (i.e., perceptions about one's ability to improve the environment) and their experience participating in different types of citizen science projects. Individuals who

participated in projects spanning different disciplines (multi-topic, n=962) reported significantly greater odds of engaging in both high (OR = 3.05, p<0.001) and moderate (OR = 1.79, p<0.001) levels of conservation behavior when compared to individuals who only participated in bird-related projects (bird-only, n=1571). In fact, multi-topic participants reported significantly higher levels of participation in all nine conservation behaviors. These insights highlight strong associations between citizen science participation – particularly transdisciplinary project participation – and environmental stewardship. Ultimately, these data show that citizen science can be a valuable resource for advancing both scientific knowledge and conservation outcomes.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Lookingbill, Todd
Presentation Title: Community-engaged science and art: Richmond National Battlefield Bioblitz.
Author(s): Lookingbill, Todd, University of Richmond, Richmond, Virginia
Abstract: As one of the Centennial Initiatives, National Parks all over the country hosted BioBlitz events to discover and document as many species as possible within a 24-hour period. As part of the first of its kind Bioblitz at the Totopotomoy Creek unit of Richmond National Battlefield Park, over 100 citizen-scientists surveyed the park's flora and fauna. Participants in the community event included three classes and 10 faculty experts from three local universities. The event was also open to the public and was attended by volunteers ranging from grade school children to Master Naturalists. Using the mobile crowd-sourcing technology app iNaturalist to leverage the global community of scientists online, we were able to verify the presence of nearly 400 species of plants, birds, reptiles, amphibians, mammals, fish, arachnids, fungi, and insects. To further the project goals of education about biodiversity, conservation, and responsible stewardship, the data from the event were visualized in an 8-foot-tall pie chart comprised of thousands of broken toy pieces. The museum installation entitled "TMT: Too Many Toys" additionally invoked the complex ecology of plastic toy reclamation. Like the data collection itself, the material for the art installation was crowd-sourced; broken or unwanted small plastic toys were collected from parents in the artist's local community of Chicago and repurposed for the display. Toys were color-sorted and arranged in taxonomic groups to reflect the Bioblitz findings logged in iNaturalist. Interestingly, many of the toys had a military theme (e.g., army men, fighter jets, etc.), which ties in with the battlefield location of the Bioblitz. The project, thus, engaged local communities in Richmond and Chicago via the global iNaturalist app to collect and display baseline inventory data for a recently acquired unit of the National Park Service.
Thematic Area: Education

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Webinar Presenter: McCreary, Allie
Presentation Title: Exploring the potential of expert elicitation to inform climate adaptation of cultural resources.
Author(s): McCreary, Allie and Seekamp, Erin (NC State University, Raleigh, NC, United States); Fatoric, Sandra (United States)
Abstract: Cultural resource management involves conservation of historic structures and landscapes that hold multiple meanings for various populations (past residents, visitors, etc.). Climate change exacerbates the challenges of cultural resource management by exposing aged resources to increased natural threats (e.g., storm-related flooding, storms, and sea level rise). This is especially true in coastal areas, such as Cape Lookout National Seashore (CALO), situated along the barriers islands of North Carolina, USA. The cultural resources (CR) at CALO are maintained by the National Park Service (NPS), a federal agency that is charged with preserving natural and cultural resources for the enjoyment, education, and inspiration of present and future generations. As such, the NPS (and other agencies involved in CR management) have a vested interest in understanding the best practices regarding cultural resource adaptation and how to efficiently select the suitable adaptation strategies for the diverse structures they manage. A spectrum of adaptation strategies are available to CR managers from 'leaving things as they are' or documenting and releasing buildings to actively managing the change by improving structures' resilience or relocating key resources. While the NPS, specifically CALO administrators and planners, are proactively considering various adaptation options and scenarios, additional input from cultural resource experts will enhance how site-specific personnel consider historic structures' significance, vulnerability, and the best fit adaptation strategy. To explore the feasibility of remotely gauging experts' opinions on adaptation of cultural resources, an online questionnaire was administered to experts actively working in the field of cultural resource

management within the southeastern USA. The questionnaire explored how CR managers are evaluating vulnerability and site significance and, consequently, selecting adaptation strategies for various buildings within CALO. A total of 38 usable responses were analyzed to explore the influence of building type, manager characteristics, building significance and building vulnerability on the selection of various adaptation strategies. The small sample size allows for exploratory understanding of the influential predictors of adaptation strategies. For example with buildings that are perceived as moderately vulnerable, managers most likely seek to actively manage change and improve resilience, while low and a high vulnerability result in a tendency for more passive management (leaving things as they are or documenting and releasing, respectively). This and other findings will be presented to shed light on the key antecedents of selecting cultural resource adaptation strategies for coastal resources. Additionally, a discussion of the research design, using storytelling and geovisualizations to contextualize cultural resources and climate change to remote experts, will illustrate how to best leverage the expertise of off-site CR managers. This study can be used to inform future cultural resource management and research design.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: McRae, Susan
Presentation Title: Royal flush: behavior, ecology and management of the king rail.
Author(s): McRae, Susan, East Carolina University, Greenville, NC.
Abstract: Secretive marsh birds in the rail family have largely eluded detailed study. Yet, studies that go beyond reporting occupancy are crucial for helping to identify and mitigate threats to rail populations. Migrant and resident populations of the king rail *Rallus elegans* breed in freshwater and brackish marshes. Loss of wetland inland habitat has led to remnant breeding populations being limited mostly to larger tracts of coastal marshes where this globally Near Threatened (Birdlife International 2017) species faces further environmental assaults. We have studied the behavior and ecology of a resident population of king rails breeding in a managed coastal wetland for the last eight years. We find and monitor nests to characterize nest site preferences within the management framework, and to determine annual variation in reproductive effort and success. Our CESU-funded work helped uncover the king rail's seasonal variation in habitat use and home range dynamics. Radio-telemetry of adults during the breeding and non-breeding periods revealed home range size and movements, as well as previously unrecognized sex differences in habitat use. Intensive study of nesting pairs has revealed plasticity in incubation behavior including shading during periods of high ambient temperatures. Parents increase their nest building activity in relation to water level rise, but are limited in their ability to avoid nest flooding when levels rise too quickly. We are currently using this well-studied population to validate the use of autonomous recording units for passive surveys to estimate the density of breeders. Long-term monitoring of this population enables us to contribute to the development of more accurate and less invasive methodology for estimating breeder density of rail populations throughout their range.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Meyer, Kenneth D.
Presentation Title: SNAIL KITE MOVEMENTS AND PREY DYNAMICS: HABITAT ASSOCIATIONS, MULTIPLE RESIDENCE AREAS, AND SUSTAINABLE MANAGEMENT OF A RANGE-WIDE HABITAT NETWORK.
Author(s): Meyer, Kenneth D., Avian Research and Conservation Institute, Gainesville, Florida
Abstract: The U.S. population of Snail Kites, limited to peninsular Florida, declined substantially and became federally listed as Endangered in 1967 following massive hydrologic and agricultural changes to the Greater Everglades. The distribution of Snail Kites within Florida is a network of discrete areas of which only a portion are occupied at any given time. The relative quality of potential Snail Kite foraging sites in Florida, reflected in the density and availability of native and exotic apple snails (*Pomacea* species), shifts unpredictably over time due to varying human demands for water, management of aquatic vegetation, and the spatially variable effects of rainfall and droughts. Since 2007, we have collected over 100,000 satellite-telemetry locations for 22 adult Snail Kites, documenting frequent movements of individuals over large portions of the species' Florida range. Such tracking results, combined with the rapid establishment of large, productive breeding efforts in 2015 and 2016 on Lake Okeechobee and high nesting effort and success in a newly created impoundment in central Florida, make the case that Snail Kites are well-adapted to quickly detect and exploit ephemeral, high-quality feeding conditions anywhere in their range when necessitated by local changes in food availability. This large time-stratified telemetry dataset,

unique for its long duration, high detection probability, and low observer bias, provides a valuable basis for management planning. Year-round, only 36% of the satellite locations have been within the managed and monitored natural wetlands representing the Snail Kite's historic range. During the nesting season, only 17% fell within these wetlands. The rest of the time, occupied areas consisted of water-management canals, agricultural drainage ditches and impoundments, borrow pits, retention ponds, storm-water treatment areas (STAs), and remnants of natural wetlands embedded within landscapes dominated by agricultural and residential development. None of these areas are managed with consideration for Snail Kites, nor has their use been considered when assessing landscape-scale availability of prey. Furthermore, financial and logistic limitations preclude inclusion of these foraging habitats in the challenging and expensive monitoring effort devoted to this species. Sustaining the U. S. Snail Kite population will require large-scale habitat management that maintains a network in which site-specific snail densities and availability may vary substantially over time without jeopardizing kite population growth. This will require monitoring changes in Apple Snail populations and the aquatic communities on which they depend during Everglades restoration. Our ongoing remote-tracking research on Snail Kites is now linked to a study of how restoration and water-management actions influence Apple Snails. The purpose of this five-year project, which we assumed in 2017, is to help identify hydrologic targets in the Everglades Restoration Transition Plan (ERTP) that will increase Apple Snail production and, in turn, that of the Endangered Snail Kite.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Montas, Larissa
Presentation Title: Beach Exposure And Child HEalth Study (BEACHES).
Author(s): Helena Solo-Gabriele1, Larissa Montas1, Alesia Ferguson2, Kristina D. Mena3, Maribeth Gidley1, Rosalia Guerrero3,Naresh Kumar1, Patrick Tarwater31 University of Miami, Coral Gables, FL,2 University of Arkansas for Medical Sciences, Little Rock, AR,3 University of Texas Health Science Center at Houston, School of Public Health, Houston, TX
Abstract: During the weeks following the 2010, Deepwater Horizon (DWH) explosion, there was considerable uncertainty regarding the health risks associated with the oil spill due to the lack of knowledge about precise exposures, especially for children who are more vulnerable. Uncertainty also existed for the spread of oil spill chemicals (OSCs) in beach, sand, water and air. The goal of BEACHEs is to improve estimates of uncertainty in children exposures and risks to OSCs by quantifying children's dermal, ingestion and inhalation related beach play and time spent activities while accounting for beach physical factors. These contributions will be used to create an exposure modeling and estimation platform that can guide beach closures in light of health risks to promote safe beach usage for the most susceptible population.
The guiding hypotheses of this project are that health risks are driven by activity patterns and OSC concentrations. Both are influenced by beach physical factors, time since the spill, time of year, and age of the children. This proposal will test these hypotheses through three projects. Project 1 addresses Human Activities and Exposure Factors. Four beach sites will be used to quantify beach-related activities that expose children to OSCs and evaluate how a beach's physical traits influence a child's play activities. OSC Distributions are addressed in Project 2. Historical data from the DWH emergency and scientific response along with data from other oil spills will be utilized to create, test, and validate algorithms that describe time-space specific concentrations of OSCs in air, water, and beach sands, particularly in zones where children play. The objectives of Project 3 are to integrated results from the two other studies and conduct risk assessments that consider cumulative and aggregate risks. Statistical methods based upon Monte Carlo approaches will be used to provide confidence bounds on the estimated risk.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Olsen, Steele
Presentation Title: Geospatial and Unmanned Aerial System (UAS) Applications to Environmental Research.
Author(s): Halls, Joanne, Olsen, Steele (University of North Carolina Wilmington, Wilmington, NC, United States); Pricope, Narcisa (United States)
Abstract: Government agencies are increasingly seeking services to provide drone imagery and geospatial analysis data products. Urban development and land use planning, environmental hazards (such as floods, fires, or other

catastrophic events) coupled with population and infrastructure vulnerability, and conservation mapping and management, are just a few examples. The University of North Carolina Wilmington has recently established a geospatial and drone analysis service group to provide very high resolution visual and multispectral imagery and geospatial data analytics. Our mission is to provide value-added imagery and geospatial products that solve a problem or address a need. We have researched and designed workflows for capturing and photogrammetrically processing several types of unmanned aerial systems (UAS) datasets resulting in high resolution imagery that outperforms satellite imagery and can be flown on demand. Secondly, we have used publicly available data to develop spatial analytics and statistical models for quantifying trends, patterns, and predicting distributions. Some examples include: 1) spatial statistics that computes the relationship between independent variables and the death rate due to Parkinson's disease in the United States where each location has a unique prediction equation; 2) a model of population vulnerability to flooding for the coastal United States; 3) a statistical model of population vulnerability at the building scale using LiDAR data; 4) vegetation change through time to identify the rate of transition from one type (e.g. freshwater wetland) to another (e.g. salt marsh). These workflows are tailored to provide specific products that can assist in monitoring and decision-making within a variety of sectors that manage and conserve natural and cultural resources. This presentation will describe the purpose for the UNCW Geospatial and Drone Analysis Service Group and give specific examples of the work that has been accomplished. We train undergraduate and graduate students in geospatial technologies and imagery processing using applied research and our goal is to build our program by developing new collaborations. Applied research is a focal point at UNCW and any opportunities we develop will be used to further the mission of the university by funding students and garnering research resources.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Sah, Jay
Presentation Title: Vegetation dynamics along hydrologic gradients in marl- and peat-dominated wetlands in Everglades, FL.
Author(s): Sah, Jay, Florida International University, Miami, Florida; Ross, Michael (United States).
Abstract: In the Everglades, where plant communities are primarily arranged along hydrologic gradients, the direction and magnitude of temporal change are determined by the extent of climatic variability and management-induced hydrologic alterations. While prolonged and extreme wet events result in loss of upland woody vegetation, persistent drying conditions initiate an opposite trend, toward an expansion of sawgrass within the sloughs, and the dominance of trees over herbaceous plants on ridges and in marl prairies We studied the interaction between hydrology and vegetation over a 17-year period, between 1999/2000 and 2017 along the marl prairie-slough gradient and within seasonally flooded portions of tree islands in Shark Slough, Everglades National Park. Using a suite of multivariate techniques, including trajectory analysis, we examined the extent and direction of vegetation change over time by quantifying the displacement of sites in relation to the hydrologic gradient in ordination space. Along the marl prairie-slough gradient, where vegetation composition correlates with changes in the relative abundance of C3 and C4 species, regional differences in management strategies influenced hydrologic regimes, resulting in spatially differentiated shifts in vegetation composition within both landscapes. In the Marl Prairie landscape, the habitat of the Cape Sable seaside sparrow, a federally listed endangered species, our study over 12 years showed that sites located west of Shark Slough showed a shift in species composition indicative of drying condition, whereas sites east of the slough exhibited the opposite trend. In the peat-dominated ridge and slough portion of the gradient, relatively dry conditions in the past decade caused an apparent increase in spikerush and sawgrass cover at the expense of open water sloughs in comparison to late 1990s. Moreover, within the complex tree island landforms, we noted an expansion of woody plants across the full suite of communities, i.e., within the Bayhead Forest, Bayhead Swamp, and Sawgrass Tail portions of the islands. This study has implications for how the marl prairie and ridge and slough landscapes are managed in the Everglades.
Thematic Area: Basic Research

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Webinar Presenter: Shedd, Justin
Presentation Title: Integrating Science into National Park Service Resource Management via WebGIS.
Author(s): Shedd, Justin, North Carolina State University, Raleigh, North Carolina; Vukomanovic, Jelena;Makiko

Shukunobe, Research Assistant, Center for Geospatial Analytics, North Carolina State University

Abstract: A strong partnership between scientists and decision makers is essential in order to achieve a shared vision of the National Park Service mission and successfully integrate science into park management. In an effort to improve communication between park resource managers and the scientists that collect data in parks, the NPS Northeast Region's Inventory and Monitoring (I&M) Program is, leading efforts to create map products that will facilitate communication between park managers and scientists. Scientists and managers need a place to visualize, disseminate, share and reliably access the geospatial data they collected or are charged with managing. For example, data originating from local park resource staff, I&M staff, Fire Effects crews, and the Exotic Plant Management Team (EPMT) needs to be accessible to each group in order to apply the best science towards park management. NPS Units of the Mid-Atlantic Network (MIDN) located in Virginia and Pennsylvania were the focus of this agreement.North Carolina State University's Center for Geospatial Analytics (NCSU-CGA) surveyed staff at MIDN NPS Units and Wildland Fire and Aviation Management and EPMT Program leads to understand data collection and structure and to learn about group workflows. NCSU-CGA worked with program leads to ensure development of deliverables that would meet management needs. Final deliverables were developed in the ArcGIS Online (AGOL) platform and utilized hosted feature/map services to facilitate the dissemination of MIDN and EPMT data. These AGOL-hosted webmaps further leveraged ongoing efforts by the NPS Wildland Fire and Aviation Management Program to paint a complete picture of management activity. A web map was developed for each MIDN Park Unit, for a total of eight maps. Each map is accessible on both a desktop (laptop) environments and on mobile devices. The ability to visualize past fire management, exotic plant management, and species data in the field on a mobile device was a key requirement for NPS partners. NCSU-CGA developed training materials and held a webinar to demonstrate the functionality of the developed web maps and assist with creating accounts associated with the NPS AGOL Organization. To ensure web application sustainability and efficient data transfer, best practices were developed and shared with MIDN staff. The collaboratively developed web applications meet resource managers and program needs to spatially locate past management action in order to confidently and quickly address current management needs.

Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Shew, Roger
Presentation Title: Venus Flytrap (*Dionaea muscipula*): Populations, Importance of Controlled Burns, and Impacts of Poaching on Plant Distribution and Viability.
Author(s): Shew, Roger, Dept. of Earth and Ocean Sciences, Wilmington, North Carolina; Shew, Dale; Carl, Angie; Ryan, Dan (United States).

Abstract: *Dionaea muscipula*, a federal and state species of concern, occurs naturally only in southeastern North Carolina and in northeastern South Carolina within 140 km of Wilmington, NC. The plants occupy habitats that are wet, acidic, and nutrient-poor, with the most common location in the ecotone between the wet pine savannas and pocosins. A five-year study in the Green Swamp of Brunswick County, NC has helped reveal the impacts of seasonal controlled burns and poaching on health, flowering, and numbers of plants. Fourteen plots and four transects from four different savannas were used in the study. Dormant season (winter) burns lead to reduced numbers of flowering plants immediately following the burn, but increased flowering the following year. Growing season (summer) burns mostly show increased numbers of flowering plants the following year as well as increased plant numbers over several years following burns. In the absence of fire, thick grass and thatch lead to a reduction in size and eventual numbers of plants. Habitat management with fire is most important for maintaining large plant numbers. Poaching has varied over the 5-year period with over 50% of the plants removed in some plots and leaving mostly small plants, thus reducing population vitality. Raising the penalty for poaching to a felony (2014) may be a deterrent, but poaching occurred in all three years since that time. Poaching is particularly critical for smaller populations. Well-managed large preserves, such as the Green Swamp, are critical to the plant's viability.

Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Slocumb, William
Presentation Title: Resource Management Using Spatial Information Science Applications: Center for Geospatial Analytics at NC State University

Author(s): Slocumb, William, NC State University, Center for Geospatial Analytics, Raleigh, NC. Contributing Authors: William S. Slocumb, Jason A. Matney, Dr. Charlynne T. Smith, Dr. J. Aaron Hipp, Dr. Ross K. Meentemeyer.

Abstract: Our collaborative research program focuses on development of Geographical Information System (GIS) methods and protocols for decision-making, motivated by resource management needs of parks and programs of the Northeast Region and Conservation and Outdoor Recreation Branch of the National Park Service (NPS). Our research on emerging technologies are evaluated for application to broader NPS initiatives. Project objectives address two major collaborative areas of work: 1) evaluation of strategic and tactical planning for GIS implementation, including developing unified frameworks NPS programs and consistent approaches to the collection, organization, display, and communication of program implementation plans, and 2) operational testing and development of enterprise GIS initiatives and designs, including spatial database design with linkages to external multi-media document sets and deployment of web mapping systems focused on specific resource issues.

Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Solo-Gabriele, Helena

Presentation Title: Towards the Assessment of Possible Environmental Factors Associated with the Expression of Fibropapilloma Tumors in Chelonia mydas.

Author(s): Nicole Johnson1,2, Helena M. Solo-Gabriele2, Karena Nguyen3, Anna E. Savage4,Valerie J. Harwood3, Brittany F. Sears51Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Key Biscayne, FL2, Department of Civil, Architectural, and Environmental Engineering, University of Miami, Coral Gables, FL3Department of Integrative Biology, University of South Florida, Tampa, FL4Department of Biology, University of Central Florida, Orlando, FL, USA 328165, Florida Consortium of Metropolitan Research Universities, Orlando, FL

Abstract: An emerging concern for the endangered green sea turtle, *Chelonia mydas*, is the tumor-forming disease fibropapillomatosis (FP). Recent studies have attributed FP emergence to environmental contaminants, but definitive conclusions have not been reached on the role of environmental factors in the susceptibility to the disease. Recognizing these limitations, this study aimed to evaluate potential relationships between environmental factors and turtle strandings expressing fibropapilloma tumors. Specifically this study evaluated correlations between turtle strandings and water quality (nitrogen, phosphate, chlorophyll a) and geographic (human population, spatial trends) indicators of eutrophication. Results show an increase in FP positive strandings from 2011 to 2014 in the Florida Keys, which correlate with increases of phosphorous in coastal waters during the same time period. Within each study site, FP positive strandings occurred in clusters near areas of high human populations or areas characterized by distinct geomorphologic features. In conclusion, eutrophic areas and regions of coastal embayments, such as those observed in the Florida Keys and Hawaiian Islands, should be evaluated further to identify possible disease agents, including ChHV5 through qPCR screening detected in the field.

Thematic Area: Conservation Science and Management Research

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Webinar Presenter: White, Rickie

Presentation Title: Developing rapid assessment metrics for ecosystems to aid in conservation and restoration: a case study in longleaf pine.

Author(s): White, Rickie, NatureServe, Durham, NC.

Abstract: By some estimates, longleaf and other "open pine" ecosystems only cover less than 3% of their original extent in the Southeast. Of that existing longleaf pine, much of it is of very low quality due to this ecosystem's very specific disturbance needs. There is a major need to better understand the condition of existing stands and ways to monitor change in condition over time to see whether we are making adequate progress at all spatial scales to restore this important ecosystem. Florida State University and NatureServe continue to collaborate on a suite of practical tools to assess the ecological condition of individual sites and stands so that we can better understand how to manage these important systems. In our talk, we will discuss the tools we are developing, including easy to use protocols and a web-based calculator of ecological condition.

Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Witcher, Todd
Presentation Title: All Taxa Biodiversity Inventory (ATBI) in the Smokies and Beyond.
Author(s): Witcher, Todd, Discover Life in America, Gatlinburg, Tennessee;
Abstract: With almost 1,000 species new to science and nearly 10,000 new species records for Great Smoky Mountains National Park Discover Life in America (DLIA) kicks off a 20 Year Anniversary Celebration in 2018 with even higher aspirations for the future. DLIA's main work is an All Taxa Biodiversity Inventory or ATBI, which seeks to document all forms of life in each space. In 1998 not many imagined that a small, not-for-profit established by community leaders, scientists and the Park, with funding from Friends of the Smokies and Great Smoky Mountains Association, would still be going strong 20 years later. And that same organization would move forward in a Global partnership with the EO Wilson Biodiversity Foundation having just penned a new agreement with Xishuangbanna Tropical Botanical Garden in China this January.
Thematic Area: Conservation Science and Management Research

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Webinar Presenter: Zink, Ian
Presentation Title: Integrated Biscayne Bay Ecological Assessment and Monitoring (IBBEAM): 6 Yr of Everglades Restoration Impacts on the Nearshore Ecosystem.
Author(s): Zink, Ian, SFC CESU, University of Miami, Miami, Florida; Lirman, Diego; Bellmund, Sarah; Stabenau, Erik; Serafy, Joe; Browder, Joan; Jobert, Herve (United States)
Abstract: The Integrated Biscayne Bay Ecological Assessment and Monitoring (IBBEAM) program was initiated in 2012 to monitor the impacts of the Comprehensive Everglades Restoration Plan (CERP) implementation on Biscayne Bay nearshore ecosystems. The IBBEAM program consolidated four previously independent components: 1) monitoring of nearshore salinity conditions, 2) observation of coastal mangrove habitat utilization by fishes, 3) assessment of submerged aquatic vegetation (SAV), and 4) survey of nearshore epifaunal communities. The IBBEAM program involves field sampling, laboratory analyses, database management, and statistical modelling to provide a suite of ecological performance measures for assessment and use in adaptive management. A key ecological goal of CERP is to reestablish oligo- and mesohaline salinity habitats along the southwestern Biscayne Bay shoreline to restore historical SAV, fish, and invertebrate community diversity and abundance. IBBEAM evaluates progress towards this goal by: 1) collection of time-series data needed to characterize, and determine change over time in, salinity regimes, SAV communities, SAV-associated fish and invertebrate communities, and mangrove-associated fishes; 2) exploring key relationships between salinity and diversity, distribution, and abundance of SAV, epifaunal fishes and invertebrates, and shoreline fishes; and 3) formulating performance measures and targets to demonstrate the effectiveness of CERP implementation effectiveness. This presentation will describe the IBBEAM program, including field methods, data collection, scientific findings, habitat suitability models, and the development of performance measures.
Thematic Area: Conservation Science and Management Research