Coastal Swamp-Cedar Regeneration 14-Years Post-Hurricane Katrina

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Presenter's Title: Graduate Research Assistant
Topic: Rare species management
Proposal Type: Individual Presentation

Abstract:
Coauthors: Dr. Joshua J. Granger, Dr. Sandra B. Correa, Dr. Courtney M. Siegert, Dr. Janice L. DuBien The number and severity of hurricanes in the Gulf Coast are increasing, resulting in intensified disturbance to coastal forest communities. Coastal swamp-cedar (Chamaecyparis thyoides (L.) B.S.P.) grows no further than one hundred miles from the coast, making the species and associated plant communities particularly vulnerable to large-scale disturbances such as hurricanes. Occurring primarily along the Atlantic Coast from Maine to Florida, this species does form isolated communities along the Gulf Coast regions of Florida, Alabama, and Mississippi. Coastal swamp-cedar is imperiled and at risk of extirpation by extreme weather events, altered disturbance regimes, changes in hydrology, and management. The primary objective of this study was to evaluate the recovery of coastal swamp-cedar 14-years post-Hurricane Katrina. Pre and post- Hurricane Katrina data were compared with recent data to determine how Southern Mississippi's coastal swamp-cedar has recovered post-Hurricane Katrina. All coastal swamp-cedar â‰¥ 2.5 cm at breast height (1.37 m) were inventoried within a ~4.85 ha study area located within Grand Bay National Wildlife Refuge, Jackson County, Mississippi. This inventory was compared with data obtained after Hurricane Katrina in 2005 to evaluate the long-term impacts of hurricanes on the stand density for this species. Following the 2005 hurricane, coastal swamp-cedar has increased in density across the study site. This increase was spatially correlated with wind damaged and toppled trees previously recorded within this population just after the hurricane. The structural changes caused by the hurricane disturbance supported the regeneration of this imperiled species. Understanding the long-term recovery of coastal swamp-cedar allows land managers and conservationists to more effectively manage for the species on the landscape.

Modeling Habitat Suitability for Mountain Stewartia and the Implications for Plant Conservation on Public Lands

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Topic: Rare species management
Proposal Type: Poster Presentation

Abstract:
Coauthors: Dr. Joshua J. Granger, Dr. Qin Ma, Dr. Jia Yang Modeling species habitat suitability has become a critical first step in conserving rare or threatened plant species. These models allow conservationists to locate previously undocumented populations and prioritize populations and habitats for conservation. Mountain Stewartia is a rare shrub or small tree endemic to the piedmont and mountains of Georgia, Tennessee, and Alabama with isolated populations occurring in Kentucky, North Carolina, South Carolina, Virginia, and Mississippi. The species often goes misidentified or overlooked by land managers and conservationists. As a result, Stewartia habitat niche descriptions and distribution data are insufficient for restoration and conservation use. Presented is the habitat suitability of the species across its natural range. Herbarium records (25), research-grade INaturalist observations (25), and other author identified locations (15) were used with 10 environmental layers to develop a maximum entropy model (Maxent). A cross-validation Maxent model was run 65 times and was determined to be statistically significant with an AUC of 0.916 and a standard deviation of 0.155. The resulting probability map was classified into bins of 10% of habitat suitability for spatial analysis. A total of 264,210 ha were designated within the top 10% tier of which 30% is nonindustrial protected lands. The presented model will allow plant conservationists to potentially locate new populations of mountain stewartia and identify suitable areas for the establishment of new populations. This approach provides a framework for using citizen science and natural history records for the modeling of other rare plant species with limited occurrence data.

Demographic evaluation of the federally endangered Florida goldenaster (Chrysopsis floridana) in Florida scrub

Presenter's Name: Eric Menges
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Topic: Rare species management
Proposal Type: Individual Presentation

Abstract:
Co-authors: Scott G. Ward (Archbold Biological Station), Katherine T. Charton (University of Wisconsin), Phillip A. Gonsiska (Bok Tower Gardens), Cheryl L. Peterson (Bok Tower Gardens) The composite genus Chrysopsis includes 14 Florida taxa; one species, Florida goldenaster (Chrysopsis floridana), is federally endangered and endemic to west-central Florida. C. floridana is a perennial herb occurring in xeric upland Florida scrub habitat; it was federally listed in 1986. Subsequent discoveries and translocations increased the number of known populations to 40, with numerous introduced populations now occurring on conservation lands. In the fall of 2017-2019, we followed populations of 18 wild and introduced populations of C. floridana across five counties, using both stage-class and level-3 demographic monitoring. Annual survival rates were higher in introduced compared to wild populations, with approximately 11% and 12% higher survival through 2018 and 2019, respectively. Recruitment and fecundity rates were also higher, with introduced populations producing approximately 18-19% more seedlings annually than wild populations and significantly more flowering heads per reproductive plant. Overall, populations were stable at introduction sites, but decreasing at wild populations, perhaps owing to management or site differences. While occasional burning may have helped to maintain beneficial open conditions for some populations, aggressive mechanical treatments caused others to decline within the short duration of this study. However, it is still unclear how management impacts C. floridana populations over longer durations.

Reintroduction of American Burying Beetle (Nicrophorus americanus) in Missouri

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Abstract:
The American Burying Beetle (Coleoptera: Silphidae) was federally-listed in 1989 and was historically known from a wide range of habitat across Missouri. Extensive surveys failed to find any extant populations, and captive rearing was begun by the St Louis Zoo in 2004. Mated pairs have been released with food source on Wah-Kon-T'ah Prairie in St Clair County since 2012. 3 years of mark-recapture study were undertaken to assess reintroduction success. Populations while reintroduction occurred peaked at 144+/- 11 individuals. After moving reintroduction sites, the population in the core area dropped to 45 +/- 7 individuals, though it is unclear the driving factor of this decline. Occupancy of the landscape was concentrated on high ridges throughout the prairie in low years, although the population occupied a much larger portion of the landscape in good year. Dispersal was documented to nearby protected sites over the course of the project, with the farthest site being 7 miles form the reintroduction site. Management for the species may require sustained reintroductions in Missouri, and carrion resources on the landscape may be an impeding factor to long-term establishment.

Quantifying the relationship between soil seed bank and plant community assemblage in Ivesia webberi A. Gray populations

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Presenter's Title: PhD candidate
Topic: Rare species management
Proposal Type: Individual Presentation

Abstract:
The soil seed bank is an important ecosystem component that can be pivotal for long-term persistence of many plant species. However, many Great Basin Desert perennials invest in clonal regeneration at the expense of seed production, which could limit the importance of their soil seed banks for species persistence. Furthermore, large areas of the Great Basin are currently invaded by alien weeds. Therefore, this study evaluates the relationship between the aboveground flora and the soil seed bank in 10 sites containing populations of the federally-threatened perennial forb Ivesia webberi. We used redundancy analysis, multiple regression on distance matrices, and variation partitioning to quantify the relationship between the aboveground flora and the soil seed bank, accounting for the effects of spatial processes and environmental variables describing the climatic and site conditions in the 10 studied sites. Findings reveal high dissimilarity in species assemblage and abundance between the aboveground plant communities and the soil seed bank. This is largely driven by the abundance of invasive alien weeds that are prevalent in the seed bank. The majority of the dominating native plants sampled in the standing vegetation were absent in the soil seed bank, suggesting high seedling mortality, possibly exacerbated by the competitive effects of invasive weeds. Overall, the plant community structure in the sampled sites is influenced by climatic factors, while floristic dissimilarity between the standing vegetation and the soil seed bank may be due to the abundance of invasive weeds. This indicates low resilience and high risk of native species loss following perturbation. Post-disturbance succession in these plant communities will be largely dominated by invasive annual species, and therefore native plant seeding may be necessary to sustain the ecological legacies of the desert ecosystem.

Oligarchy and Rareness in Large-scale Forest Inventories; Identifying and Managing for Vulnerable Species

Presenter's Name: James F Rosson Jr
Presenter's Company/Employer: USDA Forest Service
Presenter's Title: Research Forester
Topic: Rare species management
Proposal Type: Individual Presentation

Abstract:
Oligarchy is a common trait of forest stands in the eastern USA. It is evident in forest inventory stand tables of large-scale forest inventories, areas the size of individual states or larger. The degree of forest stand oligarchy is variable and is the result of a complex set of factors arising from competition, disturbance, and species characteristics. In contrast to oligarchy, these types of large-scale forest inventories are also useful in identifying rare tree species. Rare may be defined either spatially or in regard to a proportion of the total population of tree species. A general premise of rareness is that these particular species populations are vulnerable to environmental and/or anthropogenic fluctuations because of their small numbers, thus lessening the probability of survival and prompting the need for possible protective measures. I used data from the USDA Forest Service, Forest Inventory and Analysis (FIA) program to study oligarchy and rareness patterns of tree species in Arkansas. In the 2015 forest inventory 114,872 trees were tallied on 5600 plots representing 109 species. One species, Pinus taeda L., (an oligarch) accounted for 25 percent of all trees tallied. In contrast, 22 species (rare) only occurred 5 times or less in the tally. Because of the low frequency of rare species in a probabilistic sample, statistical parameters are weaker. However, baseline information can be established allowing for stronger follow-up stratified sampling. Establishing and defining specific levels of rareness may be difficult but conservationists might find large-scale forest inventories useful in monitoring changes in rareness. Changes in degrees of rareness in repeated samples over time could be used as alerts in modifying forest management practices in respective states to protect vulnerable tree species.