

Museum Highlight

Research by museum scientists contributes to our knowledge of the natural world and human cultures.

Florida — Our Global Biodiversity Hotspot

Florida's longleaf pine habitats are home to plants and animals found nowhere else in the world, making them a top global biodiversity hotspot.

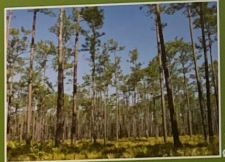
Epicenter of Biodiversity

Florida is part of the North American Coastal Plain (NACP), a global biodiversity hotspot of conservation concern. This region supports an abundance of unique plants in danger of extinction, largely due to the destruction of longleaf pine habitats — once widespread but only 5% remain. Scientists have identified over 1,000 rare plant species endemic (found in only one single ecosystem or region) to the NACP and over 250 of them are only found in Florida.

Biodiversity is the total variety of life in a particular ecosystem. A biodiversity hotspot is a region with high diversity and many endemic species in threat of extinction. One common conservation strategy is to measure and document vulnerable species in biodiversity hotspot habitats to protect those most in need.



There are 36 global biodiversity hotspots of critical conservation concern, including the North American Coastal Plain (NACP). Florida contains the greatest number of rare endemic species found within this hotspot.



A typical pine flatwoods habitat with an open canopy of longleaf pine, saw palmetto, shrubs, and herbaceous plants.

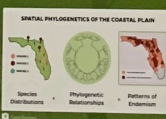


Rare and unique species like pumpkins, yucca and various grasses thrive in the dry Florida pine sandhill habitat.

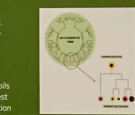
Searching for Patterns

One way scientists study biodiversity patterns is to look at the family history of a region's plant species and how they are related using a phylogenetic tree. The research method is called spatial phylogenetics, and it allows scientists to identify areas that have a high diversity of rare, endemic plants with unique family histories and to then see what makes these areas so special.

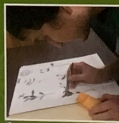
By using this method, researchers at the Florida Museum have found that rare plant species in the NACP are concentrated in areas with sandy, acidic soils and heavy summer rains. The longleaf pine habitats of Florida hold the highest concentration of these rare, endemic species. With this information, conservation groups and government agencies can develop more strategic plans to preserve and protect these unique ecosystems.



To find patterns of endemism, researchers combine species distribution (where the species are in each area) with phylogenetic relationships (their family trees).



A phylogenetic tree shows the common ancestor shared between present-day species, much like how we make a family tree to learn about our relatives.



Taisien Kiser, a research scientist at the Florida Museum, carefully collects leaf tissue from museum specimens at the UF Herbarium. This tissue contains the plant's DNA, or genetic code, which can be used to build a phylogenetic tree of evolutionary relationships.



Florida Landscape Soil Profile

Florida may seem flat, but under the surface, slight changes in elevation and soil result in entirely different habitats. Longleaf pines live well above the water table on sands that quickly drain the water from Florida's frequent rainstorms. The main longleaf pine habitats in Florida are flatwoods and sandhills.

Pine flatwoods are found throughout Florida, while **sandhills** are at the state's highest elevations with the deepest, sandiest soils. **Sandhills** (and the similar Florida **scrub** habitat) are incredibly dry, and home to some of the world's rarest plant species, which have adapted hair and scales to help them retain water and protect them from Florida's harsh sun.

Spatial phylogenetics reveals that many of the rare sandhill plants are relatively young, likely from recent ice ages when Florida was drier. These findings can help us understand where Florida's rare species came from and how they may respond to a changing climate. The goal is to better preserve the habitats for future generations.



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