Deep South Plant Specimen Imaging Project

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Longleaf Pine, or Gopherwood (Torreya taxifolia) is a plant species featured in the DSPSIP. Credit: Austin Mast, Florida State University Herbarium Director

Here in the East Gulf Coastal Plain, one of North America's premier and most imperiled regions for botanical biodiversity, Florida State University is leading an ambitious project that will create high-resolution digital images of 100,000 plant specimens, then make them available to scientists and students everywhere via the World Wide Web.

The Deep South Plant Specimen Imaging Project (DSPSIP) officially kicked off in April with a two-year, $200,000 grant from the National Science Foundation. FSU and its current project partners -- Troy

University, Auburn University, the University of South Alabama-Mobile and the University of Southern Mississippi -- will share the NSF funding in a collaborative mission to bring online a vast quantity of botanical information for 21st century-style researchers.

Ultimately, DSPSIP will produce a more complete, user-friendly picture of plant distribution and variation across the East Gulf Coastal Plain. Stretching from just west of Gainesville in the Florida Panhandle to New Orleans and about 175 miles inland, the region is home to no fewer than 2,864 native plant species -- 125 of which are found nowhere else on Earth.

The imaging project carries a special urgency for the imperiled ecoregion, considered one of the nation's top six hotspots both for biodiversity and species endangerment -- yet to-date, also one of the least documented.

"Many of the counties in this region fall within the top 95th percentile of all U.S. counties when ranked by the number of threatened and endangered species in each," said Austin Mast, the DSPSIP lead principal investigator and an assistant professor of biological science at FSU.

Mast also directs the Robert K. Godfrey Herbarium at FSU, which holds a museum-quality collection of North Florida plant specimens and plays a leading role in the Deep South project. In fact, 10 percent of the herbarium's 200,000 specimens already are digitally imaged, annotated and posted online in the same way that DSPSIP plans to produce and present 100,000 more: http://herbarium.bio.fsu.edu/search-specimens.php.

Among the most threatened ecosystems in the East Gulf Coastal Plain are the longleaf pine-dominated wetlands and uplands that now

encompass less than five percent of their original extent, according to Gil Nelson, a research associate at the FSU Herbarium and courtesy faculty member of biological science at FSU. A respected naturalist, botanical author and photographer of the region with expertise in computer programming and data management, Nelson will work with Mast as the project coordinator for DSPSIP.

His work will begin in earnest this spring. During phase one of the multi-institution collaboration -- conceived in 2005 at an FSU-hosted "Deep South eFlora" workshop that garnered national attention -- essential software will be built and installed on the FSU server, a special database will be created, an online "bulletin board" will go up to aid communication between technicians at DSPSIP institutions, and photographers will attend a digital imaging training workshop.

By next summer, the project will have produced 100,000 annotated digital recordings of plant specimens from across the ecoregion. Then, DSPSIP will ensure the broad distribution of those images by submitting them to Web sites such as the Global Biodiversity Information Facility portal (www.gbif.org).

But most notably, they will be deposited in "MorphBank" -- the Web's gigantic repository of flora and fauna images paired with searchable digital annotations by expert biologists (www.morphbank.net). A range of FSU researchers -- including Mast as a co-principal investigator -- have contributed to MorphBank's creation and refinement.

Depositing images into the vast MorphBank will enable researchers everywhere to search, view and manage multiple collections of Deep South images from many "Biological Research Collections" (BRCs) at the same time, Mast said. Currently, users might wait a month or more for physical plant specimens to arrive at their institution from just one BRC; to look at specimens from 10 such collections, they must make 10

separate requests and then wait. However, once the images land in MorphBank, researchers will be able to take out “virtual loans” of 10,000 or more East Gulf Coastal Plain specimens from five or more institutions concurrently -- all with a few mouse clicks.

“With our leadership of the Deep South Plant Specimen Imaging Project and contributions to other major Web initiatives such as MorphBank, FSU has become a recognized player in what I call ‘biodiversity informatics,’ a way of better producing, organizing, analyzing and presenting information to reveal patterns of diversity in organisms across time and space,” Mast said.

Along the way, students of all ages will play a key role. DSPSIP will engage as many as eight students in specimen-based research, and will develop and implement a lesson package to introduce those at the middle- and high-school levels to the distinctiveness of East Gulf Coastal Plain plant life and the process and value of scientific specimen collecting.

Source: Florida State University

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