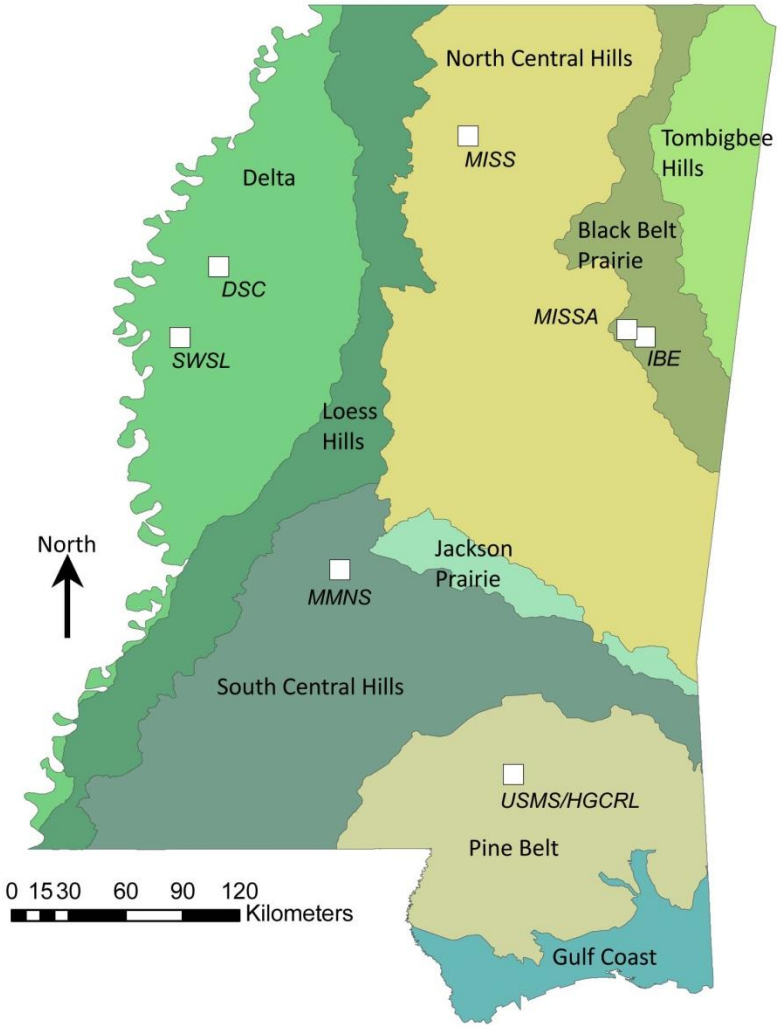
Magnolia grandiFLORA: digitally linking herbaria to support botanical research and education in Mississippi

- <u>Collaborators</u>
  Delta State University: Nina Baghai-Riding
- Mississippi Museum of Natural Science: Heather Sullivan, Angel Rohnke, Libby Hartfield
- Mississippi State University: Lisa Wallace, Gary Ervin
- University of Mississippi: Lucile McCook
- University of Southern Mississippi: Mac Alford
- Institute for Botanical Exploration: Sidney McDaniel, Robert Stewart
- Others: Charles Bryson, Lucas Majure

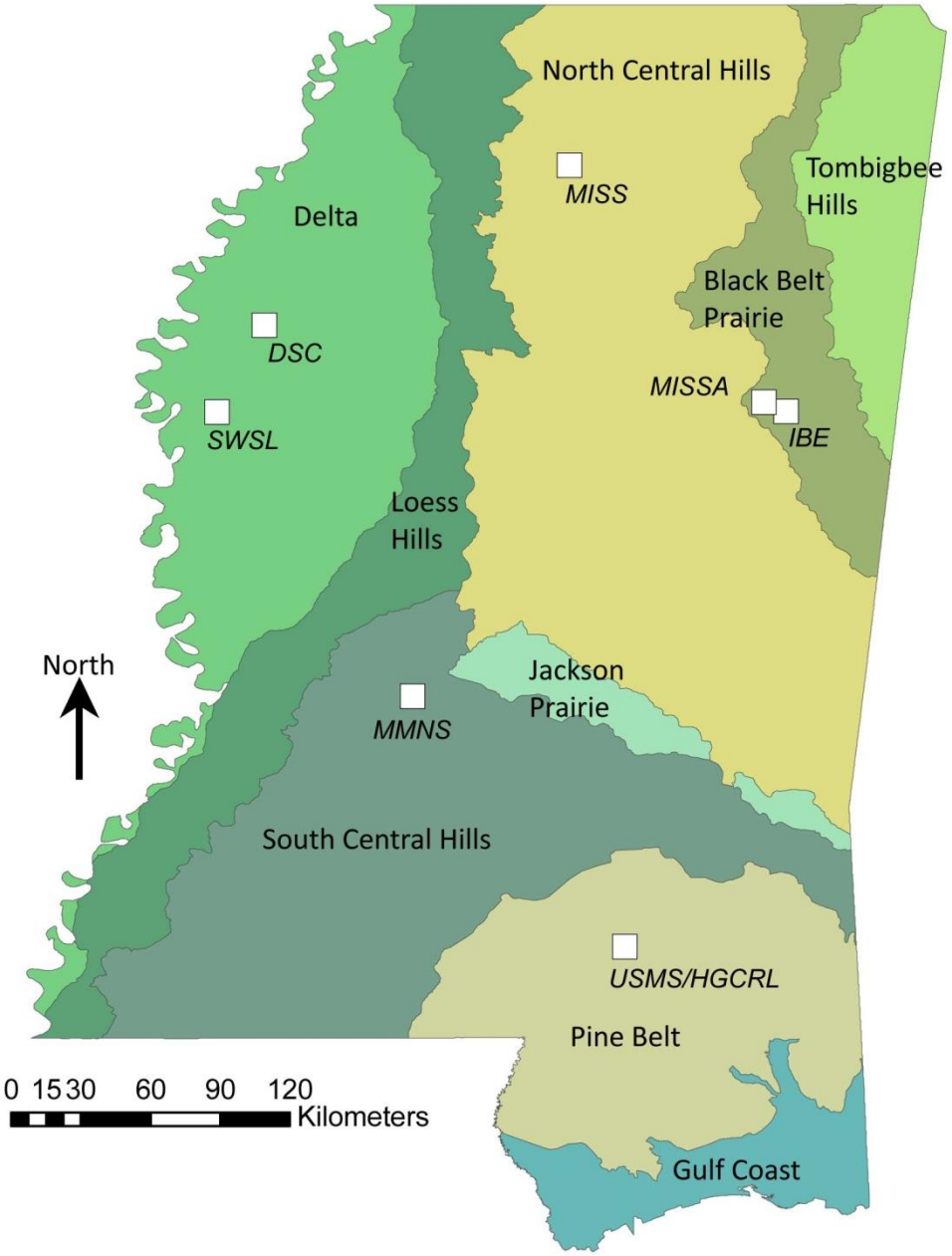
National Science Foundation
WHERE DISCOVERIES BEGIN

Mississippi's Flora

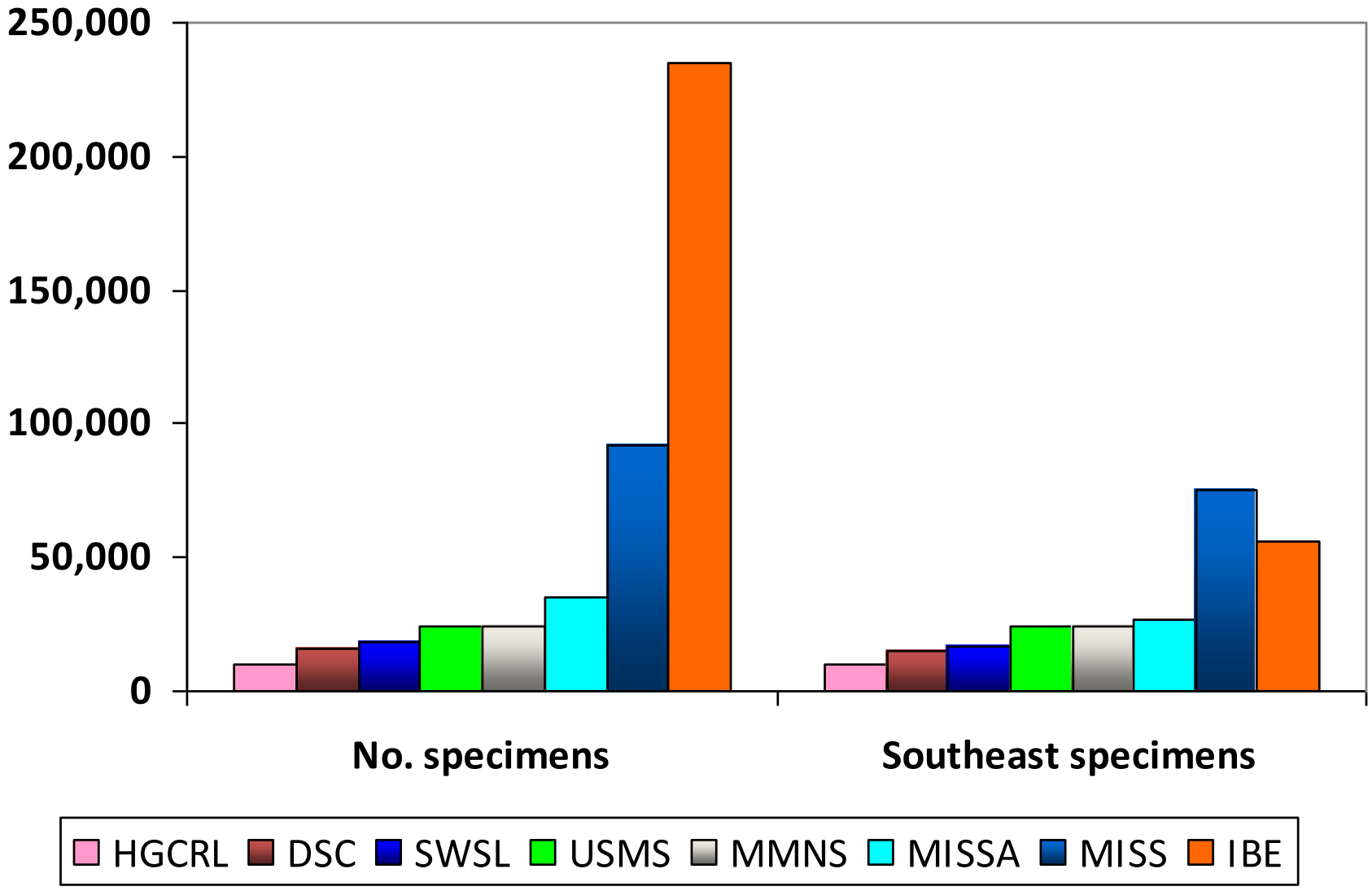
- 3,120 species, 3,925 taxa – vascular plants
- 4 ESA listed species
- MS ranks in the top 1/3 -1/2 of U.S. states in no. of plant species and genera and species per log area (Kartesz & Meacham 1999)
- 8th in numbers of plant families
- MS spans 9 physiographic areas



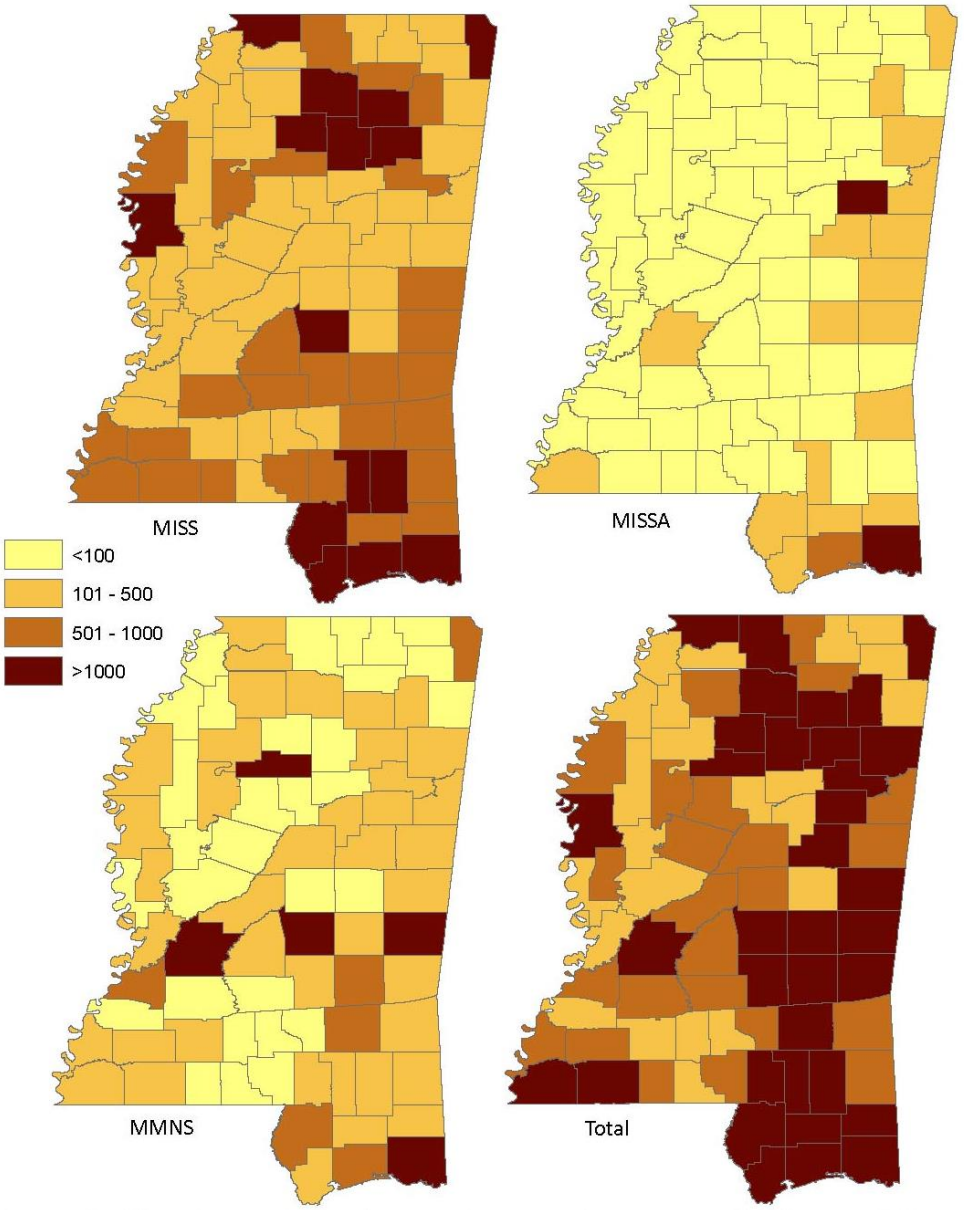
Active Herbaria in Mississippi



Herbarium Collection Sizes in MS



Specimens by County in 3 Collections



Goals for Project *Magnolia grandiFLORA*

- To image specimens and develop databases of label information for all active collections
- To georeference specimens where possible
- To integrate images with label and geospatial data in a virtual web-based framework
- To complete a checklist and atlas of the MS flora
- To develop educational uses of the collections as they relate to the flora of MS
- To train students in herbarium curation and develop research projects that use the collections

Our Approach to Digitization

- SilverBiology for imaging and development of the data portal
- SPECIFY for database management*
- GEOLocate for georeferencing
- Undergraduate and graduate students involved
- Data permanently housed at the MSU-
  High Performance Computing Collaboratory
- All PI's retain control of their data

Progress to Date- Nov 2013

- All institutions started barcoding/imaging specimens
- Two State-wide meetings
- Participation in Georeferencing (train-the-trainers), Specify & 2 iDigBio workshos/events
- SilverBiology software set up—state portal supposed to launch soon!

Progress to Date—Nov 2013

	Barcoded & Imaged	Georef'd	Barcoded
MISS	66,000		
MISSA	32,000		
USM	4,000	1,200	
IBE			20,000

Educational Initiatives of Project *Magnolia grandiFLORA*

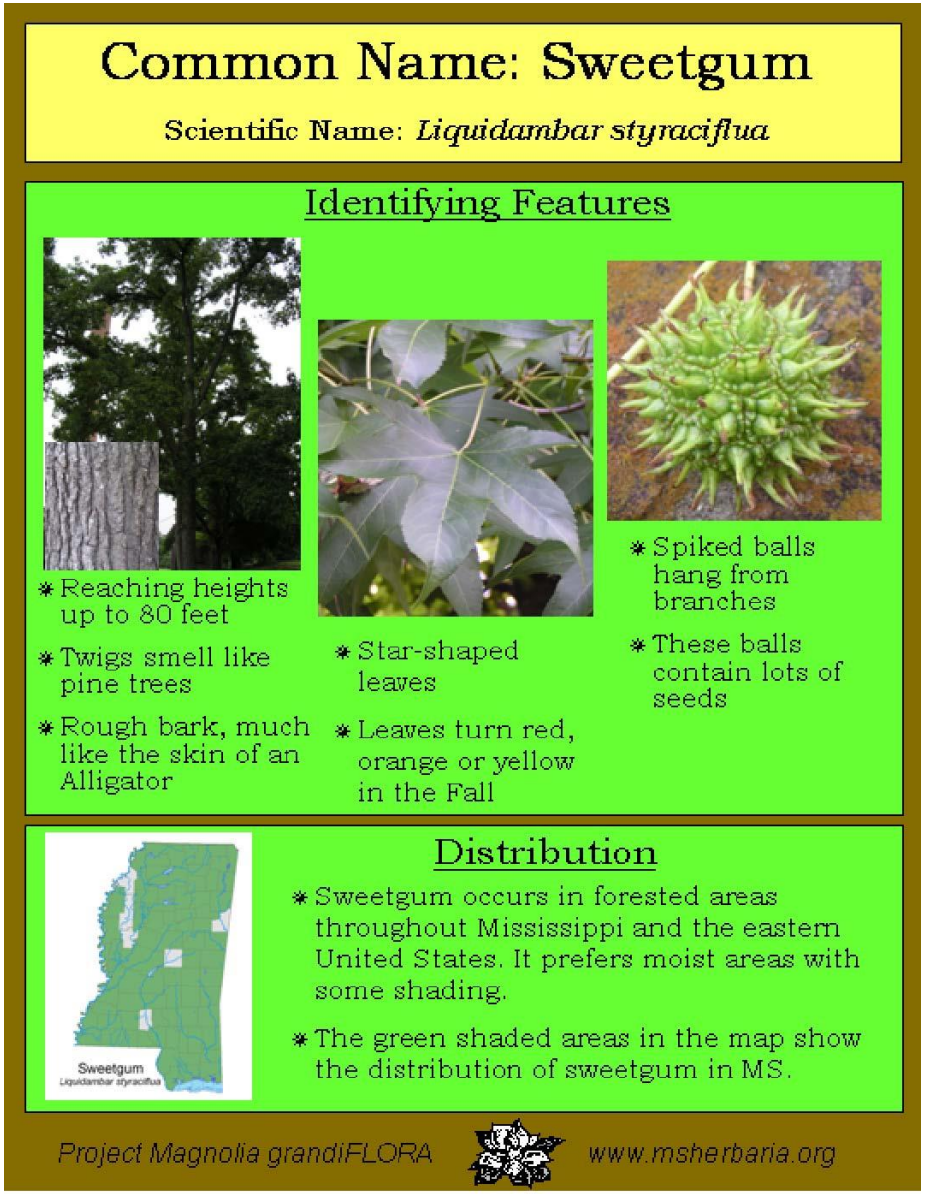
- ID Cards
- Expand Project WILD and Project WET
- Outreach Education
- Higher education
- General public

2010 Mississippi Science Framework

Grade levels	General topic area	Examples of specific learning targets
K – 2nd	Plant Anatomy	Understand characteristics, life cycles, environments of organisms.
1st – 3rd	Light, water, mineral nutrition	Identify basic needs of plants and animals.
3rd – 4th	Environmental adaptations	Compare characteristics of organisms in relation to their environments.
4th – 6th	Diversity, evolution, and natural selection	Compare and contrast the diversity across organisms in relation to adaptations to their environments.
6th – 8th	Food webs	Diagram the path of solar energy through food webs and explain how the organisms relate to each other.
9th – 12th	Taxonomy and plant structure and function	Differentiate the characteristics found in various plant divisions.

ID Cards

- Common trees of MS
- Regional diversity
- Carnivorous plants
- Invasive plants
- Backyard beauty



Project WILD and Project WET

- Training for K-12 teachers in science & environmental issues
- Tie plant diversity into existing training modules
- IPAMS
- Project Budburst
- Project GLOBE (*Global Learning and Observations to Benefit the Environment*)

Outreach Education

- MMNS reaches ~50,000 students annually
- Programs available in 82 MS counties
- “Green Power” – Identifying plants of MS, 2nd and 9th-12th grades
- “Put on Your Boots” – Aquatic biology, 3rd-12th grades
- “Here Today, Gone Tomorrow” – Endangered species, 2nd, 4th-12th grades

Higher Education

- Used in courses - Plant Taxonomy/Systematics, Conservation Biology, Environmental Biology, Aquatic Botany
- Graduate research assistantships - students actively using the collections in research projects
- Undergraduate research:
  - Quantifying species distributions
  - Interactive Keys
  - Choctaw and Chickasaw native plant garden – U. of MS Field Station

General Public

- “Public” website for the project
- Posters of notable MS plants based on ID card sets
- Talks, field trips for interested groups

Progress to Date- 2012

- Funding is now in place at all institutions
- Ordering equipment and getting SilverBiology software set up
- State-wide meeting planned for later this fall