



## Terrestrial Vegetation Monitoring Program Summary

### Network Parks Where Monitoring Occurs

Big Thicket National Preserve (BITH), Jean Lafitte National Historical Park and Preserve (JELA), Gulf Islands National Seashore (GUIS), Natchez Trace Parkway (NATR), San Antonio Missions National Historical Park (SAAN), Padre Island National Seashore (PAIS), Palo Alto Battlefield National Historical Park (PAAL), and Vicksburg National Military Park (VICK).

### Importance

Plant communities are a defining component of terrestrial landscapes. They provide food, habitat, and shelter for wildlife, and they are essential to ecosystem function. The composition, cover and structure of a local flora reflect both the environment—in its current and historic form—and the impacts of stressors such as fires, extreme weather, disease, invasive species, and land-use change. Monitoring plant communities over time can therefore provide critical insights into ecosystem health, by revealing the key players in a relatively undisturbed system and documenting the consequences of anthropogenic change. The Gulf Coast Network collects long-term data on all major plant communities in its parks using a protocol that is largely based on the vegetation monitoring approach of the Northeast Temperate and Mid Atlantic Networks.



Tree measurement in a cypress-tupelo swamp at JELA, LA. Photo by J. Carlson/NPS.

### Monitoring Questions and Objectives

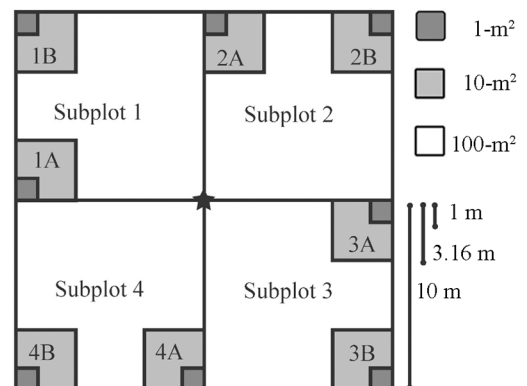
1. Does the number of native and invasive species change over time? This question is addressed by measuring vascular plant species richness in 400-meter<sup>2</sup> [m<sup>2</sup>] long-term plots.
2. Do some species or growth forms, –e.g., vines, shrubs, or herbs–, occupy more ground area a site, and does this change over time? This question is addressed by measuring the percent cover of plant species in 1-m<sup>2</sup> or 10-m<sup>2</sup> sampling frames within 400-m<sup>2</sup> plots.
3. Are some species or growth forms more numerous than others, and does this change over time? This question is addressed by measuring the relative frequency of vascular plant species using 1-m<sup>2</sup>, 10-m<sup>2</sup> and 100-m<sup>2</sup> sampling frames nested within the 400-m<sup>2</sup> plots.
4. For forested plots, are there changes over time in canopy closure, tree girth, tree condition and the dominance of different species? This question is address by measuring percent closure, stem density, girth, mortality and regeneration in the 10-m<sup>2</sup> frames and 400-m<sup>2</sup> plots.



Prairie blazing star (*Liatris pycnostachya*) in a pine savannah monitoring plot at Big Thicket National Preserve (BITH), TX. Photo by J. Carlson/NPS.

### Basic Approach

The Gulf Coast Network monitors vegetation in long-term plots located in any naturally vegetated area of a park, with plots selected as a random draw of points distributed across entire parks (VICK, JELA and PAAL) or targeted areas of the parks (GUIS, PAIS, SAAN, BITH, and NATR). Sample sizes within parks range from 10 to 60 plots. The 400-m<sup>2</sup> plots are permanently marked and sampled once every three years. The field crew locates the plot with GPS units, temporarily flags the edges and identifies all plant species present. At all plot corners and edge midpoints, the crew places 1-m<sup>2</sup> and 10-m<sup>2</sup> sampling frames, and there they record percent cover on a scale of 0-100% for groundcover in the 1-m<sup>2</sup> frame and for the shrub layer in the 10-m<sup>2</sup> frame. Seedlings and saplings are counted by species and size class in four 10-m<sup>2</sup> frames if the plot is forested. Frequency is recorded for all species in eight 1-m<sup>2</sup>, eight 10-m<sup>2</sup>, and four 100-m<sup>2</sup> frames. Finally, all trees with a diameter at breast height (DBH) greater than 10 cm are tagged and measured for DBH and condition. Site and stand level data are also recorded, and standardized photos are taken.



Layout and dimensions of a Gulf Coast Network Vegetation Monitoring Plot.

## Sample sizes in each park

| Park          | Total available area in which plots were distributed (hectares) | Major habitats represented                | Number of focal units | Total plots per park |
|---------------|-----------------------------------------------------------------|-------------------------------------------|-----------------------|----------------------|
| SAAN          | 55                                                              | forest, woodland, shrubland, grassland    | 2                     | 10                   |
| VICK          | 312                                                             | forest                                    | 1                     | 10                   |
| PAAL          | 450                                                             | grassland, shrubland                      | 1                     | 10                   |
| NATR          | 664                                                             | forest, swamp, grassland                  | 5                     | 32                   |
| GUIS          | 685                                                             | forest, woodland, swamp, marsh, shrubland | 5                     | 33                   |
| PAIS          | 788 of 7,862                                                    | grassland, marsh                          | 4                     | 32                   |
| JELA          | 704                                                             | forest, woodland, swamp                   | 1                     | 12                   |
| BITH          | 13,864                                                          | forest, woodland, swamp                   | 5                     | 60                   |
| <b>Totals</b> | <b>17,522</b>                                                   |                                           | <b>24</b>             | <b>199</b>           |



**Above:** Mountain azaleas (*Rhododendron canescens*) bloom in several Gulf Coast Network parks, including Big Thicket National Preserve and Natchez Trace Parkway. Photo by Chris Adams.

**Left:** Prickly pear cactus (*Opuntia engelmannii*) flowering in April at Palo Alto Battlefield National Historical Park. Photo by J. Carlson/NPS.

## About the Gulf Coast Network

In 1999, the National Park Service initiated a long-term ecological monitoring program, known as “Vital Signs Monitoring,” to provide the minimum infrastructure to allow more than 270 national park system units to identify and implement long-term monitoring of their highest-priority measurements of resource condition. The overarching purpose of natural resource monitoring in parks is to develop scientifically sound information on the current status and long-term trends in the composition, structure, and function of park ecosystems, and to determine how well current management practices are sustaining those ecosystems. The NPS Vital Signs Monitoring Program addresses five goals for all parks with significant natural resources:

1. Determine the status and trends in selected indicators of the condition of park ecosystems,
2. Provide early warning of abnormal conditions,
3. Provide data to better understand the dynamic nature and condition of park ecosystems,

4. Provide data to meet certain legal and congressional mandates, and
5. Provide a means of measuring progress towards performance goals.

Effective long-term management and stewardship of natural resources begins with baseline knowledge of these resources and a scientifically-rigorous understanding of how they change over time. In collaboration with park staff and other stakeholders, the Gulf Coast Network strives to meet this need for the eight parks in its region. The network’s geographic region encompasses portions of Florida, Alabama, and Tennessee, all of Mississippi and Louisiana, and the southeastern quarter of Texas.

### For more information

GULN Home Page:  
<https://www.nps.gov/im/guln/index.htm>

About the NPS Inventory & Monitoring Division:  
<https://www.nps.gov/im/index.htm>