



Overview of Gulf Coast Network Vital Signs Monitoring Projects

Why Vital Signs Monitoring?

The National Park Service is tasked with managing park resources “unimpaired for the enjoyment of future generations.” Yet to achieve this, park managers must know the conditions of their park’s natural resources—past and present—over the long term. To meet this need, a long-term ecological monitoring program was initiated in 1999, known as “Vital Signs Monitoring,” with the goal of tracking key biological and physical processes within parks in a rigorous and repeatable way and thus providing a solid scientific basis for park management decisions.

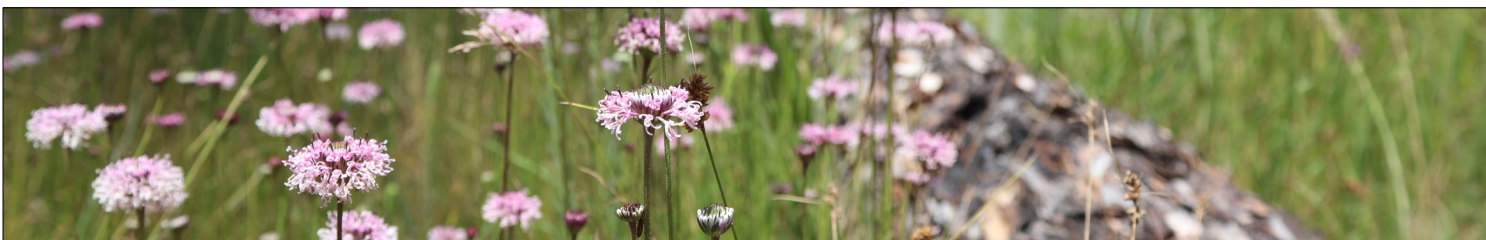
The Gulf Coast Network is one the 32 Inventory and Monitoring (I&M) networks conducting Vital Signs Monitoring in parks throughout the U.S. The eight parks within the Gulf Coast Network are Gulf Islands National Seashore (GUIS) in Mississippi and Florida; Natchez Trace Parkway (NATR) in Mississippi, Alabama, and Tennessee; Vicksburg National Military Park (VICK) in Mississippi; Jean Lafitte National Historical Park and Preserve (JELA) in Louisiana; Big Thicket National Preserve (BITH) in Texas; San Antonio Missions National Historical Park (SAAN) in Texas; Padre Island National Seashore (PAIS) in Texas; and Palo Alto Battlefield National Historical Park (PAAL) in Texas.

In collaboration with park staff, cooperators, and other participants, the network monitors seven different Vital Signs across the eight parks. Because each park has different needs and resources, the suite of Vital Signs varies among parks (see Table 1 for details). The main objectives of each Vital Signs Monitoring project are to determine the current status and change over time in the selected indicators of ecosystem health.



Above: Long-billed thrashers are one of 230+ species recorded during landbird monitoring. Photo by B. Finney/NPS.

Below: Grassleaf Barbara's Buttons (*Marshallia graminifolia*) occurs in long-term vegetation monitoring plots in wet pine flatwoods at BITH. Photo by J.Bracewell/NPS.



The Gulf Coast Network collects data on geomorphologic change on the barrier islands of two National Seashores, from island interior to dune crest to shoreline. Photo of Padre Island National Seashore by J. Bracewell/NPS.

Description of Vital Signs

Water Quality is monitored at several fixed locations in each park using five standard measurements: water temperature, specific conductance (SpC), pH, dissolved oxygen (DO), turbidity. Park-specific parameters are also collected, including nutrients, chlorophyll and *E. coli*. For parks where continuous autonomous sampling occurs, data are collected every 15 minutes.

Breeding Landbirds are sampled from fixed point locations using an established point-count method, which documents every individual seen or heard during a ten minute period. All monitoring points are sampled twice per year, during the summer breeding season. Bird survey points are often co-located with vegetation monitoring plots to improve data interpretation.

Terrestrial Vegetation is sampled within fixed 20 meter x 20 meter plots to determine the composition and condition of vascular plant communities. All plant species are identified, and the relative frequency and percent coverage of each species are recorded in nested subplots. Data are also collected on tree growth, recruitment and mortality.

Coastal Geomorphology is monitored in late spring in the network's two National Seashores. GPS equipment is used to measure shoreline position and elevations along permanent cross-shore transects.

Description of Vital Signs, continued

Amphibians are monitored using coverboards and PVC pipes as passive, artificial cover objects. Plywood coverboards are arranged in clusters of four along transects near waterbodies. PVC pipes are hung in pairs from trees near the coverboard clusters. During sampling events every other month, the team counts the amphibians by species in pipes or under boards, and they record environmental conditions for the site.

Texas Tortoises are monitored using a long-term mark-recapture approach on seven permanent sampling units that encompass 28 hectares of the tortoises' preferred habitat in coastal south Texas: thornscrub on low-rising ridges called lomas. During a single fall trip, each unit is searched twice, for a total effort of 112 person-hours. All encountered tortoises are weighed, measured for carapace dimensions and photographed. Their sex, overall condition and GPS location are also recorded. For newly-encountered individuals, holes are drilled in marginal scutes according to a unique numeric code, so recaptured individuals can be identified.

Seagrass Communities are monitored at permanent stations in shallow aquatic habitats of two park. At each station, four 0.5 x 0.5 m quadrats are visually assessed for percent cover and canopy height of all seagrass species present. Data are also recorded on environmental variables such as light availability, salinity, turbidity and depth. Fieldwork is completed through cooperative agreements.



Above: Bird voiced treefrogs at JELA are one of the species tracked in the amphibian monitoring project. Photo by J. Carlson/NPS.

Below: The Texas tortoise population at PAAL is surveyed each fall as one of the park's I&M Vital Signs. Photo by J. Carlson/NPS.



Table 1. Sampling effort and frequency for the network's seven Vital Signs.

Vital Sign	Park(s)	Sampling Frequency	Number of Sampling Locations
Water Quality	BITH, GUI, JELA, NATR, PAIS, SAAN, VICK	Sampling is conducted quarterly (NATR, VICK), every-other-month (BITH, JELA, SAAN), or continuously with every-other-month grab samples (GUI, PAIS).	56 locations total. Range per park is 2-6, excluding NATR, which has 33.
Breeding Landbirds	BITH, JELA, GUI, PAAL, SAAN, VICK	Annual sampling is completed over two visits to each point during May and June.	179 permanent point count locations total. Range per park is 21-33.
Terrestrial Vegetation	BITH, GUI, JELA, NATR, PAIS, PAAL, SAAN, VICK	Permanent plots are sampled once every four years in each park.	199 permanent plots total. Range per park is 10-60.
Coastal Geomorphology	GUI, PAIS	Shoreline position and dune topography surveys are conducted in the spring of every other year in each park.	205 km shoreline and 61 topography transects total: 105 km of shoreline and 23 at PAIS; 101 km of shoreline and 38 topography transects at GUI.
Amphibians	GUI, JELA, SAAN	Sampling is conducted every-other-month at each park.	252 pipes and 188 boards total: 128 pipes and 64 boards at JELA, 124 pipes and 64 boards at GUI, and 60 boards at SAAN.
Texas Tortoise	PAAL	Annual sampling is conducted over a single week each fall.	7 four-hectare units on the park's 7 major lomas.
Seagrass Communities	GUI, PAIS	The network supports seagrass sampling by cooperators as often as once every three years.	170 stations total: 64 at PAIS, 60 at GUI-FL, and 46 at GUI-MS.

Below: A water quality monitoring site at JELA. Photo by NPS.

