



Trip Report for Vegetation Monitoring at Padre Island National Seashore 2019

Project Background and Methods

The Gulf Coast region features landscapes that are, or once were, at the interface of land and water, creating diverse and dynamic habitats for plants. The region's abundant plant life enhances our outdoor experiences, provides vital ecosystem services, and creates food, habitat, and shelter for wildlife. Yet even on protected lands, these unique botanical resources are threatened by human activities and environmental change. Monitoring plant communities is therefore essential to understanding park health and making informed management decisions, so that resources may be enjoyed, unimpaired, by future generations.

Throughout the NPS, plant communities and other key natural resources are tracked and assessed scientifically by 32 Inventory and Monitoring (I&M) networks, through their vital signs monitoring programs. For non-forested parks in the Gulf Coast I&M Network, the goals of vegetation monitoring include documenting the status and change in (1) richness of native and non-native species; and (2) percent cover and frequency of key species or growth forms like grasses, forbs, shrubs or cacti. The network follows a peer-reviewed protocol that is largely consistent with other I&M networks in the eastern US, with plot resampling at 3-year intervals.

At Padre Island National Seashore (NS), the network initiated monitoring in 2016 by randomly selecting 32 400-m² (20 m x 20 m) plots from four 200 hectare units that are roughly evenly spaced from north to south along the island. Field methods included finding and marking plots, creating species lists, and estimating percent cover within 1-m² and 10-m² nested frames placed at eight permanent locations along the perimeter of the 400-m² plot. For more details on plot design and field methods, see the protocol narrative, standard operating procedures (SOPs), and related resources in the Supplementary Materials section further below.

2019 Fieldwork Summary and Observations

The first round of vegetation monitoring at Padre Island NS was completed over two visits to the park: 23-28 September and 18-19 October, 2019. On the September visit, all plots were established and 24 plots were sampled by a crew of two network staff, one park biological technician, and three botanists from Texas Parks and Wildlife Department (TPWD). On the October visit, fieldwork was completed by the park technician and two TPWD botanists. Plots were established by 1-2 crew members installing stakes and marking the plot perimeter (led by Jeff Bracewell). Vegetation monitoring data were then typically collected by one two-person team per plot (botanist and recorder), although two teams occasionally worked on a plot together. The crews accessed plots using UTVs, with a maximum drive time of 3 hours one way to the southern-most plots. The average sampling time was 2 hours (max of 4 hours in plot 08-8). The lead botanist was Jason Singhurst (TPWD) but three others functioned as crew botanist at times: Amie Treuer-Kuehn (TPWD), Jane Carlson, protocol lead, and Charles Sassine from the park.



Recording plant species presence and cover in plot 28-8. White-topped sedge (*Rhynchospora colorata*, inset) was conspicuous there, as it was in 19 other plots.

Results from Vegetation Monitoring

The 32 plots at Padre Island NS were primarily in grassland interspersed with ephemeral, interdunal depression wetlands (Table 1). These nearly tree- and shrub-free communities are characteristic of other Texas barrier islands, but those on the park are notably large, remote and well-protected. Seacoast bluestem (*Schizachyrium littorale*) and gulfdune paspalum (*Paspalum monostachyum*) were the study's dominant grasses, found in 30 or 31 of plots, respectively. The patchy depressions featured *Schoenoplectus pungens*, *Spartina patens* and *Fimbristylis castanea*, or a special association of several umbrella and beak sedge species (e.g., *Fuirena scirpoidea* and *Rhynchospora microcarpa*; in sectors 8 and 18). Although grasses and sedges were dominant in percent ground area covered, they contributed less than half (42%) of species richness across all plots. Non-graminoid herbs, or forbs, contributed 50% of species richness, followed by vines (5%), then trees/shrubs (1%, or 0-2 per plot). Figure 1 has plot-level % richness by growth form, excluding the few cacti species (0-1 per plot).

Across all plots, 130 species were recorded, with an average of 26 species per plot (range 13-37). The 2 plots with the highest richness were in sector 28 and included both dry, sandy knolls and ephemeral wetland in depressions, although several less-rich plots had similar features and assemblages. The lowest richness plot (8-3) was unusual for its large patch of the invasive Bermudagrass (*Cynodon dactylon*) and no seacoast bluestem, a likely vestige of historic cattle grazing, which ended in 1971. The second lowest richness plot (38-6) also lacked seacoast bluestem, and it was unusual for its tidal flat plants and saline soil. Although the current report focuses on species lists, subsequent reports will use percent cover or relative frequency to better represent plot contents.

Data on rare or invasive species have particular value for management. Field crews found only 1 invasive grass species (in 8-3 and 8-7) and no rare, threatened or concern species from federal or Texas lists.

Results from Vegetation Monitoring, continued

Table 1. Plots sampled in 2019, including counts of native and non-native species. Types are based on National Vegetation Classification System (NVCS) with associations from Diamond et al. (2017). Superscripts are for ephemeral wet-lands dominated by ^a *Fuirena* & *Rhynchospora* spp.; ^b *Schenoplectus pungens*; or ^c *Spartina patens*. Where CEG002207 is written, 007222 was also present. 007234/836 abbreviates a mixed association of 007836 and 007234. Asterisks are for plots with higher salinity soils.

Site ID	Native spp.	Non-native sp.	Vegetation types	Plot community associations for NVCS (CEGL)
08-1	25	0	Seacoast bluestem grassland & ephemeral swale wetland ^a	002207, 004952
08-2	30	0	Seacoast bluestem grassland & ephemeral swale wetland ^a	002207, 004952
08-3	12	1	Ephemeral swale wetland ^b	007234
08-4	27	0	Ephemeral swale wetland ^{a,c}	007836, 004952
08-5	34	0	Seacoast bluestem grassland & ephemeral swale wetland ^a	002207, 004952
08-6	31	0	Seacoast bluestem grassland & ephemeral swale wetland ^{a,c}	002207, 007836, 004952
08-7	32	1	Seacoast bluestem grassland & ephemeral swale wetland ^a	002207, 004952
08-8	26	0	Seacoast bluestem grassland & ephemeral swale wetland ^a	002207, 004952
18-1	29	0	Seacoast bluestem grassland & ephemeral swale wetland ^{a,b}	002207, 004952, 007234
18-2	28	0	Seacoast bluestem grassland & ephemeral swale wetland ^b	002207, 007234
18-3	20	0	Seacoast bluestem grassland	002207
18-4	21	0	Seacoast bluestem grassland	002207
18-5	18	0	Seacoast bluestem grassland	002207
18-6	28	0	Seacoast bluestem grassland	002207
18-7	19	0	Ephemeral swale wetland ^b	007234
18-8	25	0	Seacoast bluestem grassland & ephemeral swale wetland ^b	002207, 007234
28-1	16	0	Seacoast bluestem grassland	002207
28-2	36	0	Seacoast bluestem grassland & ephemeral swale wetland ^{b,c}	002207, 007234/836
28-3	25	0	Seacoast bluestem grassland & seaots association	002207, 00221821
28-4	20	0	Seacoast bluestem grassland & ephemeral swale wetland ^{b,c}	002207, 007234/836
28-5	26	0	Seacoast bluestem grassland	002207
28-6	27	0	Seacoast bluestem grassland	002207
28-7	31	0	Seacoast bluestem grassland	002207
28-8	37	0	Seacoast bluestem grassland & ephemeral swale wetland ^{b,c}	002207, 007234/836
38-1	30	0	Seacoast bluestem grassland & ephemeral swale wetland ^b	002207, 007234
38-2	21	0	Seacoast bluestem grassland	002207
38-3*	23	0	Seacoast bluestem grassland & ephemeral swale wetland ^{b,c}	002207, 007234/836
38-4*	31	0	Seacoast bluestem grassland & ephemeral swale wetland ^{b,c}	002207, 007234/836
38-5	26	0	Seacoast bluestem grassland & ephemeral swale wetland ^{b,c}	002207, 007234/836
38-6*	15	0	Shoregrass association & borrichia tidal shrub flat	003991, 003924
38-7	28	0	Seacoast bluestem grassland & ephemeral swale wetland ^{b,c}	002207, 007234/836
38-8	31	0	Seacoast bluestem grassland & ephemeral swale wetland ^b	002207, 007234

List of Supplementary Materials

A supplementary materials document is prepared for each trip report, allowing additional space for data exports, preliminary summaries and informal exploratory analyses. The 2019 Supplementary Materials document includes (1) a table listing all plant species and unit presence; (2) a table of Texas species of conservation need for the park; (3) updates on invasive plant management and fire; (4) maps of relevant park characteristics and land use history; (5) references; and (6) select photos of fieldwork and species ID in 2019.

For more information on this monitoring project, visit:

1. Vegetation project repository, linking to all online documents <https://irma.nps.gov/DataStore/Reference/Profile/2247864>
2. Protocol narrative for Vegetation monitoring: <https://irma.nps.gov/DataStore/Reference/Profile/2256507>
3. Standard Operating Procedures for Vegetation monitoring: <https://irma.nps.gov/DataStore/Reference/Profile/2255905>
4. Gulf Coast Network webpage on the Vegetation project: <https://www.nps.gov/im/guln/terrestrial-vegetation.htm>
5. Webpages for Padre Island NS: <https://www.nps.gov/im/guln/pais.htm>; <https://www.nps.gov/pais/index.htm>

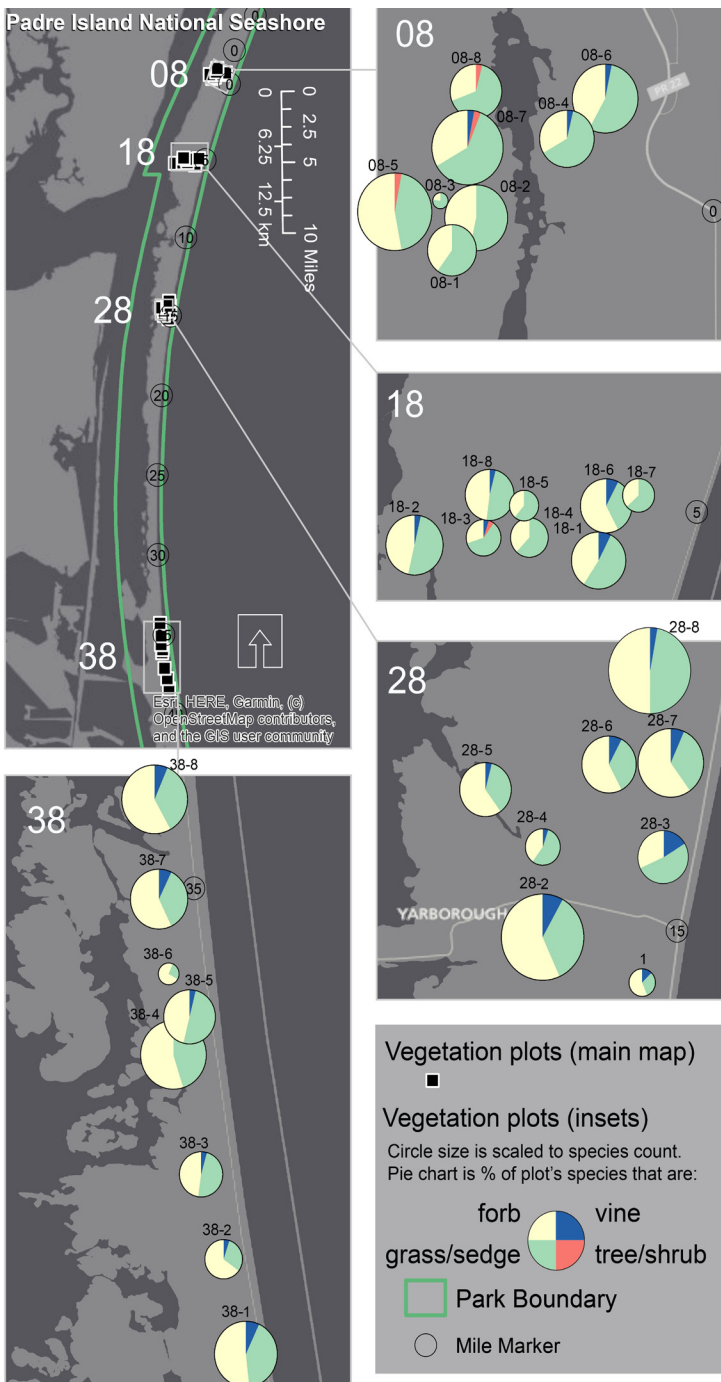


Figure 1. Plots sampled in 2019 (site ID # in black), scaled by species richness and showing % of richness associated with four different plant growth forms.