



Periphyton Monitoring in Big Cypress National Preserve

2020

Importance and Overview

Periphyton is a common and ecologically important component of South Florida non-forested wetlands, such as those found in the Big Cypress National Preserve (BICY). It is a critical basal component of the food web of these wetlands where it is responsible for a large proportion of primary production, creation of calcitic soil (marl), and control of nutrient upwelling. Periphyton communities (diatoms, etc.) change compositionally in direct response to changes in nutrients, salinity, and water management. Diatom composition reflects changes in these environmental variables as they occur over prolonged periods of time, and thus provides a better, holistic indicator of water quality than monthly water-column measurements (Figure 1).

Diatom community structure is an important index of water quality and overall wetland health. Diatoms are used by state and federal agencies as a system-wide indicator for Everglades Restoration. The long-term monitoring of diatoms provides resource managers with a more complete picture of a biological community responding to water quality and implications for future water-management decisions.

Objectives

The overall goal of the monitoring is to assess water quality within the marsh habitats in northwestern BICY using total phosphorus (TP) and diatom metrics. SFCN is currently targeting marshes in northwest BICY in seven basins, as this was deemed of highest priority. The sampling design is a restricted random sample of marshes within each basin to establish permanent sites (Figure 2).



Figure 1. Impacted site in East Hinson Marsh.

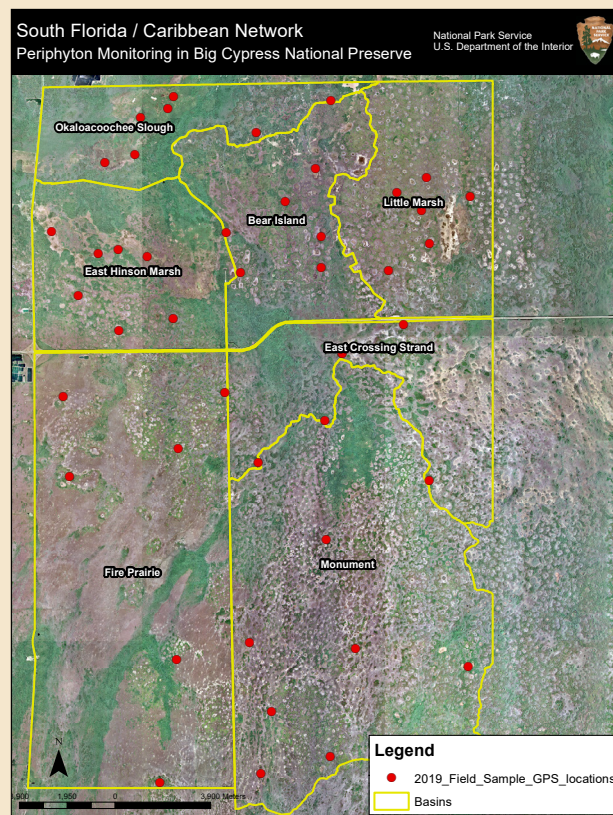


Figure 2. The location of the 44 periphyton sites that were sampled during the 2019 dry season. The Western BICY Vegetation Map was used to determine all samplable freshwater graminoid marsh habitat.



Figure 3. Unimpacted site in Little Marsh.



Objectives/ Approach continued

The specific objectives of periphyton monitoring are to:

- Identify any basins in the northwest section of Big Cypress National Preserve where periphyton community structure and periphyton TP content are different from an oligotrophic (low-nutrient) and unimpacted community signal.
- Document any temporal and/or spatial changes in the periphyton community structure and periphyton TP content showing progression towards an oligotrophic, unimpacted condition or a eutrophic (high-nutrient), impacted condition.



Figure 4. Helicopter in a marsh outside of the sampling area. In October 2019, 35 sites were visited via helicopter.



Figure 5. ATV in a marsh outside of sampling area. In November 2019, 5 sites were visited via ATV.

Protocol Status/Results

The Periphyton Protocol was published in 2019, making FY2020 the first official year of sampling conducted. Field work was conducted from October through November 2019. A total of 44 sites were visited via helicopter (Figure 3), ATV (Figure 4), and hiking, where 118 bottled samples of periphyton were collected; 59 TP samples and 59 diatom samples. In addition, a pilot study was also conducted to compare the CERP sample collection method with the SFCN composite grab sample method (Figure 5). Samples for the pilot study were collected at a total of 10 sites. All samples were prepared and sent to the labs for processing. These results are in the process of being compared.



Figure 6. Pilot work done during FY2020 field sampling comparing the CERP 1m² sample method with the SFCN composite grab sample method. Twenty additional samples at 10 sites were collected for the pilot study.

