

Spatial and Temporal patterns of periphyton in the Florida Everglades, down transects C-111 and Taylor Slough

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Abstract

Periphyton is a vital component of freshwater oligotrophic wetlands; it is been recognized as an important indicator of ecosystem health and important to nutrient dynamics in the Florida Everglades. This projects purpose is to identify biomass differences across transects in correlation to phosphorus values across sites and over time in the C-111 and Taylor Slough canals. We found interesting spatial and temporal differences in periphyton biomass and phosphorus content.

Introduction

Periphyton mat is an assemblage of algal, bacterial, and micro faunal communities. It serves an important role in the freshwater oligotrophic Everglades because it responds quickly to small changes in nutrient dynamics and has been established as an important indicator of ecosystem health. It is also a dominant ecosystem component regulating nutrient dynamics in the oligotrophic Everglades.

Objectives

1. Investigate spatial patterns in periphyton biomass and nutrient content in the Southern Everglades.
2. Investigate temporal patterns in periphyton biomass and nutrient content in the Southern Everglades.

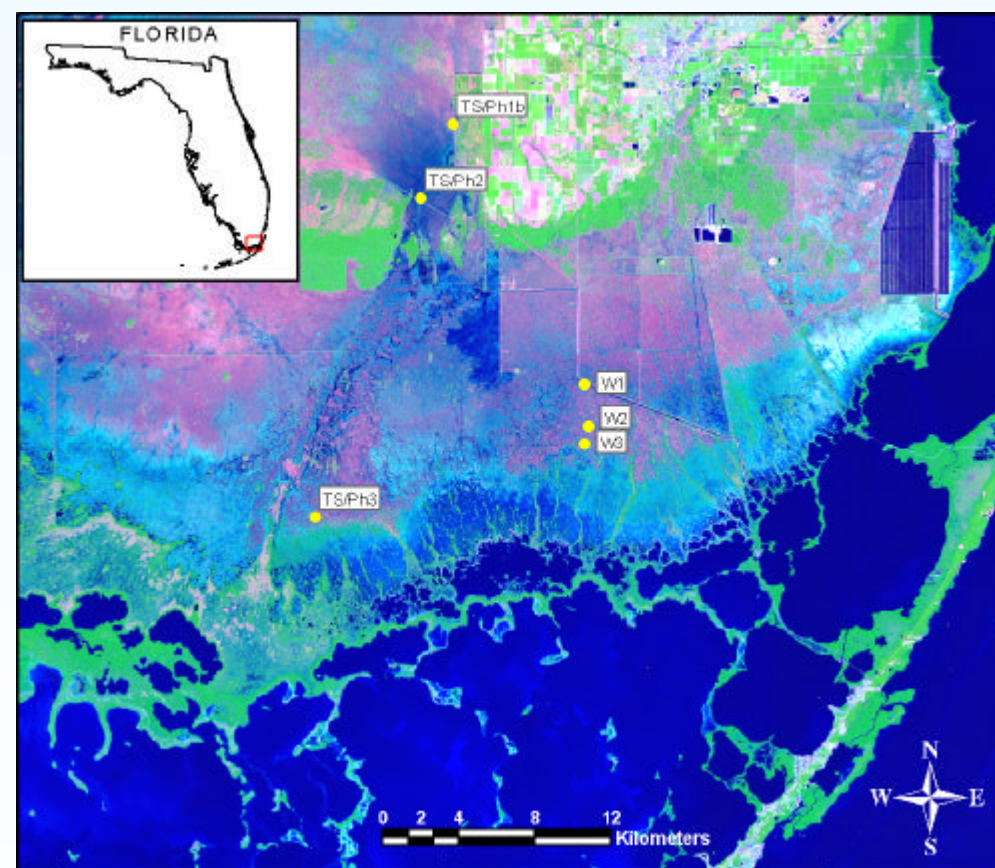
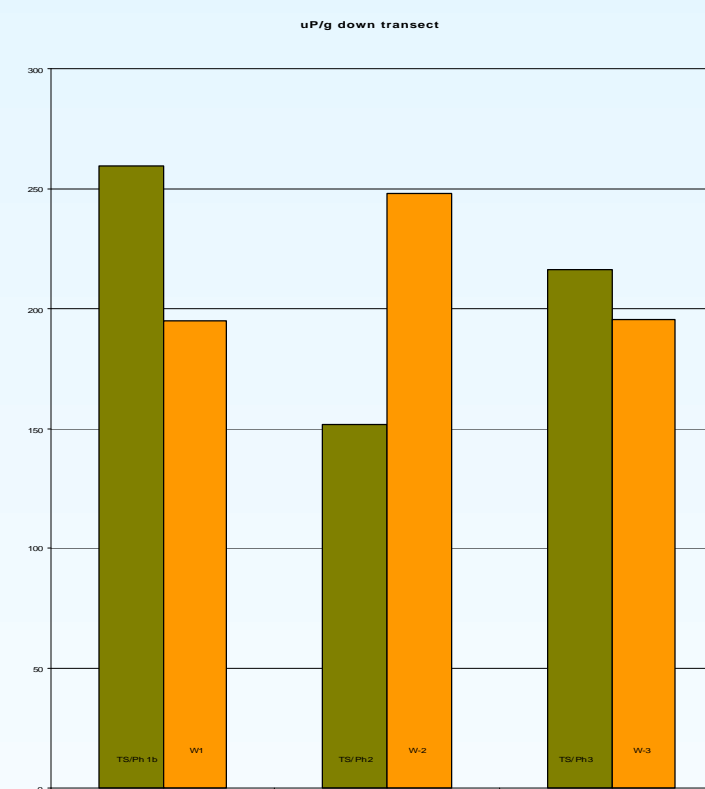


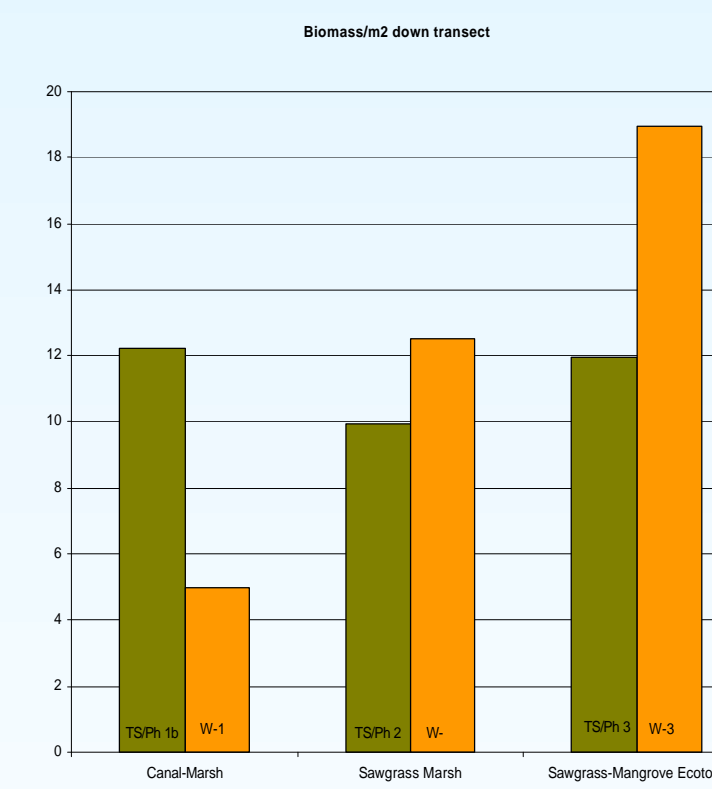
Figure 1: Landsat image of South Florida. Study sites in yellow

Methods

We sampled periphyton using a .25 meter squared plot. These collections occurred bimonthly during the wet season. The periphyton was collected in two different basins: Taylor Slough and C-111 Everglades National Park panhandle region. There were a total of six sites (Figure 3), three in Taylor Slough (TS/Ph-1-B, TS/Ph-2, TS/Ph-3) and three in the C-111 basin (W-1, W-2, W-3). The TS/Ph-2 site is within 2 km of the L31W canal. TS/Ph-3, and W-3 are located near the estuarine ecotone. The remaining sites are interior locations. This data is displayed in conjunction with temporal and spatial patterns in floc. Three samples were collected using the aforementioned .25 meter squared plot which was haphazardly tossed three times in order to receive triplicate random samples per site. After collection, the periphyton was sorted through removing all debris. Each sample was dried in a oven at a constant 70°C. After three days the sample was then removed and weighed. A sub sample was then removed for later analysis. The main sample was then weighed again and ashed for three hours at 500°C to obtain organic biomass. Next the sub samples were all analyzed for total N (TN), total C (TC) using a Carlo-Erba elemental analyzer, and total P (TP) using the Solorzano and Sharp (1980) method.



(Left) Figure 2: uP/g along the C-111 and Taylor Slough transects from 2002-2003



(Right) Figure 3: Biomass/m2 along the C-111 and Taylor Slough transects from 2002-2003

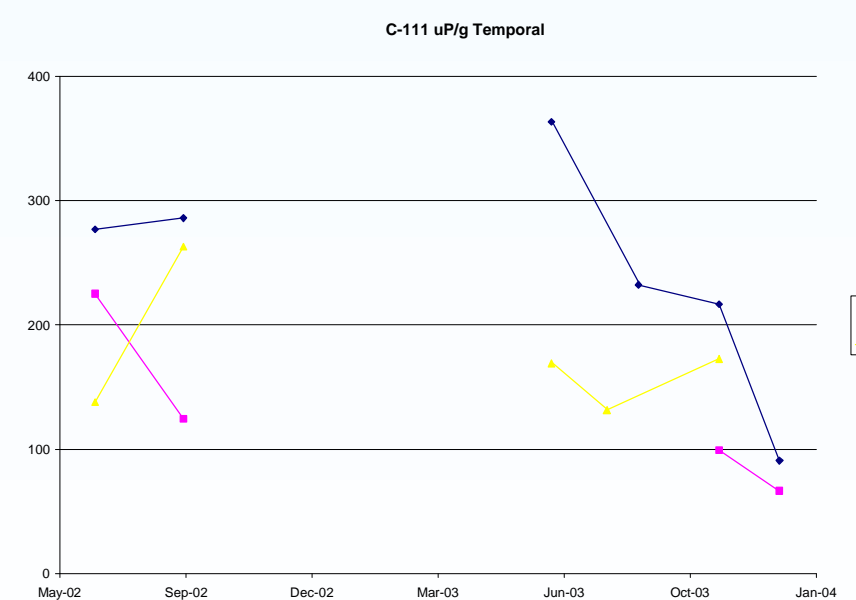


Figure 4: uP/g of periphyton along the C-111 transect from 2002-2003

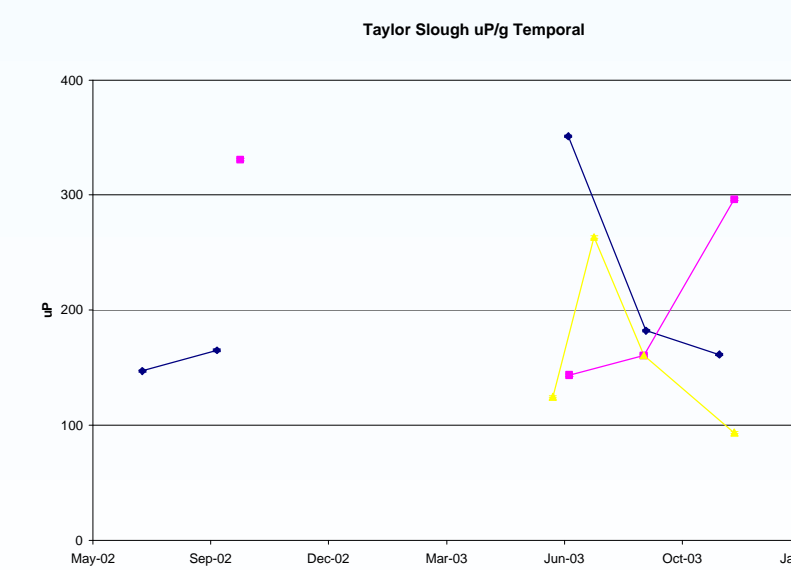


Figure 5: uP/g of periphyton along the Taylor Slough transect from 2002-2003

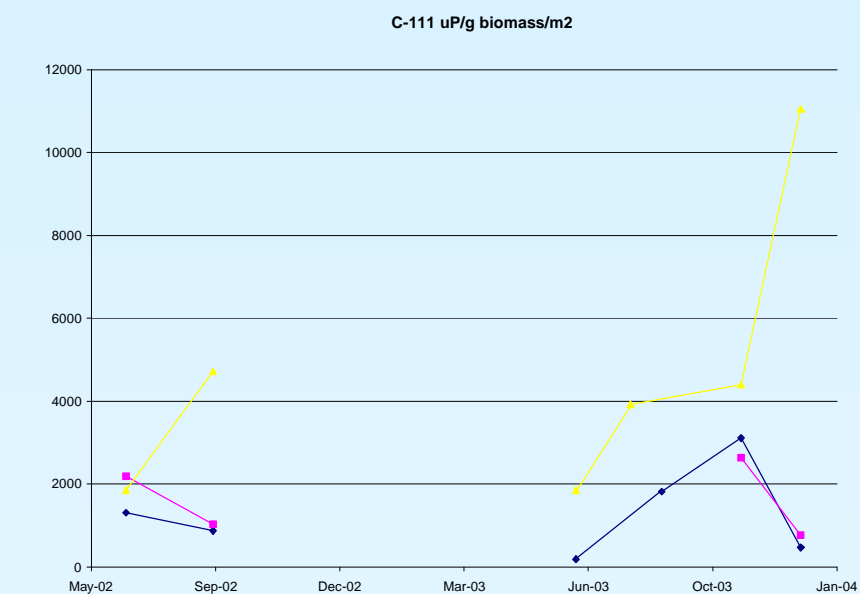


Figure 6: uP/g biomass/m2 at the C-111 transect from 2002-2003

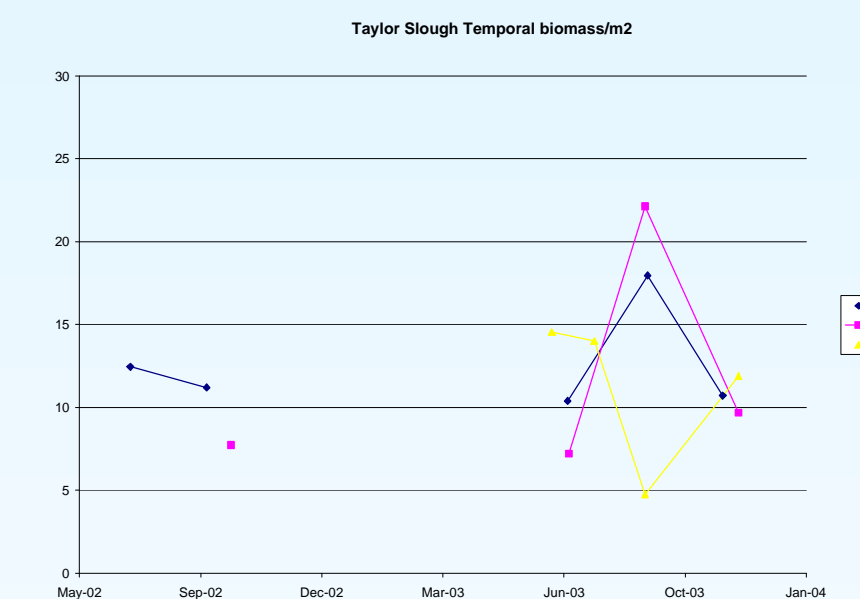


Figure 7: biomass/m2 at the Taylor Slough transect from 2002-2003

Results and Discussion

Highest levels of phosphorus in periphyton is seen at the canal-marsh site in C-111 and lowest at Taylor Sloughs canal-marsh site (figure 2). This would lead to the belief that biomass numbers would correlate accordingly in this phosphorus starved community but surprisingly they did not. But in fact, biomass trends were opposite of phosphorus trends. (figure 3). The sawgrass-mangrove ecotone site in C-111, W-3, accumulated the most biomass of all sites. Whereas in Taylor Slough the canal-marsh site and the sawgrass-mangrove ecotone site had about equal biomass results. This could possibly be attributed to accumulation of phosphorus from the mangrove leachate and other such factors in the sawgrass-mangrove ecotone sites. Temporal patterns may require a longer continuous dataset to reveal significant findings.

Acknowledgements

Very special Thanks to Damon Rondeau, Adam Wood and everyone in the South Florida Wetland Ecosystems Lab whom made this project possible. Support for this project was provided by the FCE LTER program.