

Preface

Given the importance of microbiology to the structure and function of the Everglades ecosystem, the information available is limited and often scattered throughout varying sources. Microbiological information is buried in journals devoted to water quality, biology, and hydrology, as well as other sources. Our goal is to provide students, researchers and managers the first comprehensive source where the science of Everglades microbiology is organized into a more detailed and holistic form. The book characterizes the tight coupling between primary producers and bacterial communities and how their interactions help to shape the Everglades landscape. Although the examples provided are primarily from the Florida Everglades, the concepts and theory discussed are relevant to wetland systems globally.

The book is divided into three sections. The first section is devoted to abiotic factors that affect microbiological interactions including water nutrient concentration and trends, soil nutrient distribution, and mercury-sulfate interactions. A chapter concerning the implications of global climate change and sea level rise is also included. The second section contains information on periphyton structure and function in the Everglades landscape including the importance of species based assessments of water quality, the impact of hydrology, nutrient loading, and conductivity on periphyton communities, the role of periphyton mats in consumer community structure, patterns and regulators of nitrogenase activity, the structure and function of cyanobacterial mats in Belize, biological indicators of water quality and habitat, and distributions of epiphytic diatoms along phosphorus and salinity gradients in Florida Bay. Additionally, developing methods including pigment-based chemotaxonomy and the use of passive remote sensing to detect calcareous periphyton mats in the Everglades are also discussed. Although there is a lack of molecular information on bacterial and algal communities, the third section presents molecular based information on microbial communities in the Everglades ecosystem. This includes microbial ecology of mercury methylation and demethylation, methanogens in sawgrass communities of the Everglades and Biscayne Bay, syntrophic bacteria, methanogen and methanotroph associations, and biological control of invasive plants using native microorganisms, and degradation of microcystins by indigenous bacterial communities in the Everglades.

This book is intended to serve as a detailed Everglades and Florida Bay microbiology reference source. Given that environmental pressures such as nutrient enrichment, drying and salinization are wide spread phenomenon, the ideas presented in this book are also relevant to tropical and subtropical systems throughout the globe. The book provides recommendations regarding future research needs that will help

foster collaborative research and a greater understand. The editors would like to thank the authors who all contributed their expertise, time and energy to this book. We would also like to thank Robin Woodward-Entry for her work on the graphics in this book and Pat Littlechild for the painting used in the front cover.

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