

Reducing nutrient concentration in the Miami River to enhance water quality in Biscayne Bay using green ecological infrastructure, *Rhizophora mangle*

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Research Questions

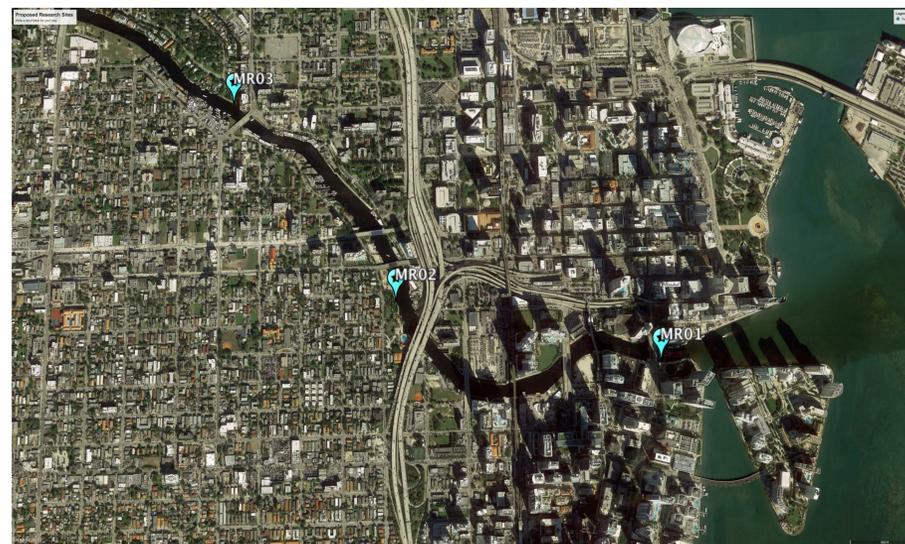
- Can mangroves be used as an urban ecological structure to improve water quality in inland aquatic systems?
- If mangroves are planted and show a positive feedback in water quality in the Miami River, can we expect eutrophication to be reduced in Biscayne Bay?
- Can managed fringe scrub mangroves provide enough protection against sea level rise to the Miami River shoreline?



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Introduction

In South Florida, mangrove forests serve as the main line of defense against coastal erosion, storm surges, and sea level rise. However, these are only a few of the ecosystem services mangroves provide for this area. In recent years, critical research aimed to understand the role of the mangrove in water quality enhancement has emerged, but only a few experimental in-situ studies have been conducted.



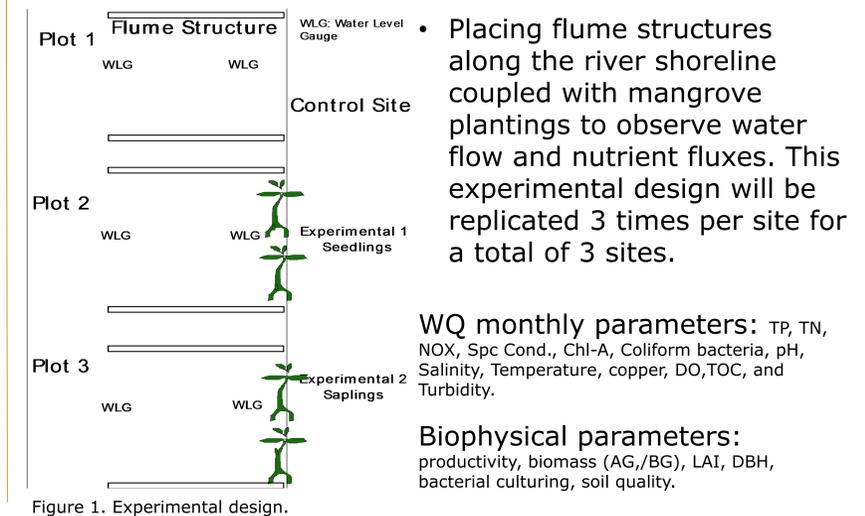
Proposed study area: Miami River

This system provides a unique opportunity to study a nutrient and water flow gradient that disembogues into Biscayne Bay, where increased eutrophication has been observed.

Objectives

- To interpret the role of Miami River's nutrient deposition into Biscayne Bay
- To test the range of mangrove inland propagation with increasing salt water intrusion
- To demonstrate the ability of red mangroves to improve water quality
- To estimate the red mangrove resilience against sea level rise in an inland urban aquatic system
- To understand the symbiotic relationship between mangrove plants and denitrifying bacteria for water quality enhancement purposes

Methods



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