

# Investigation of Iron Stimulation of Filamentous Algal Growth in Rainbow River

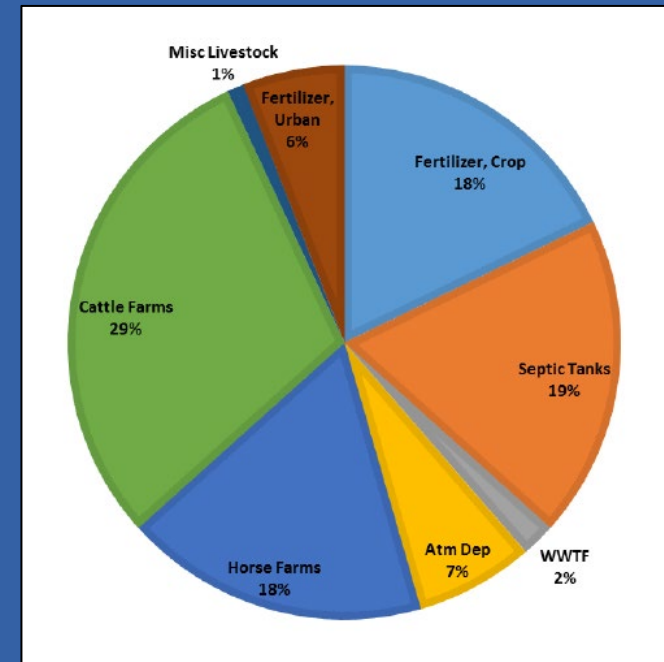
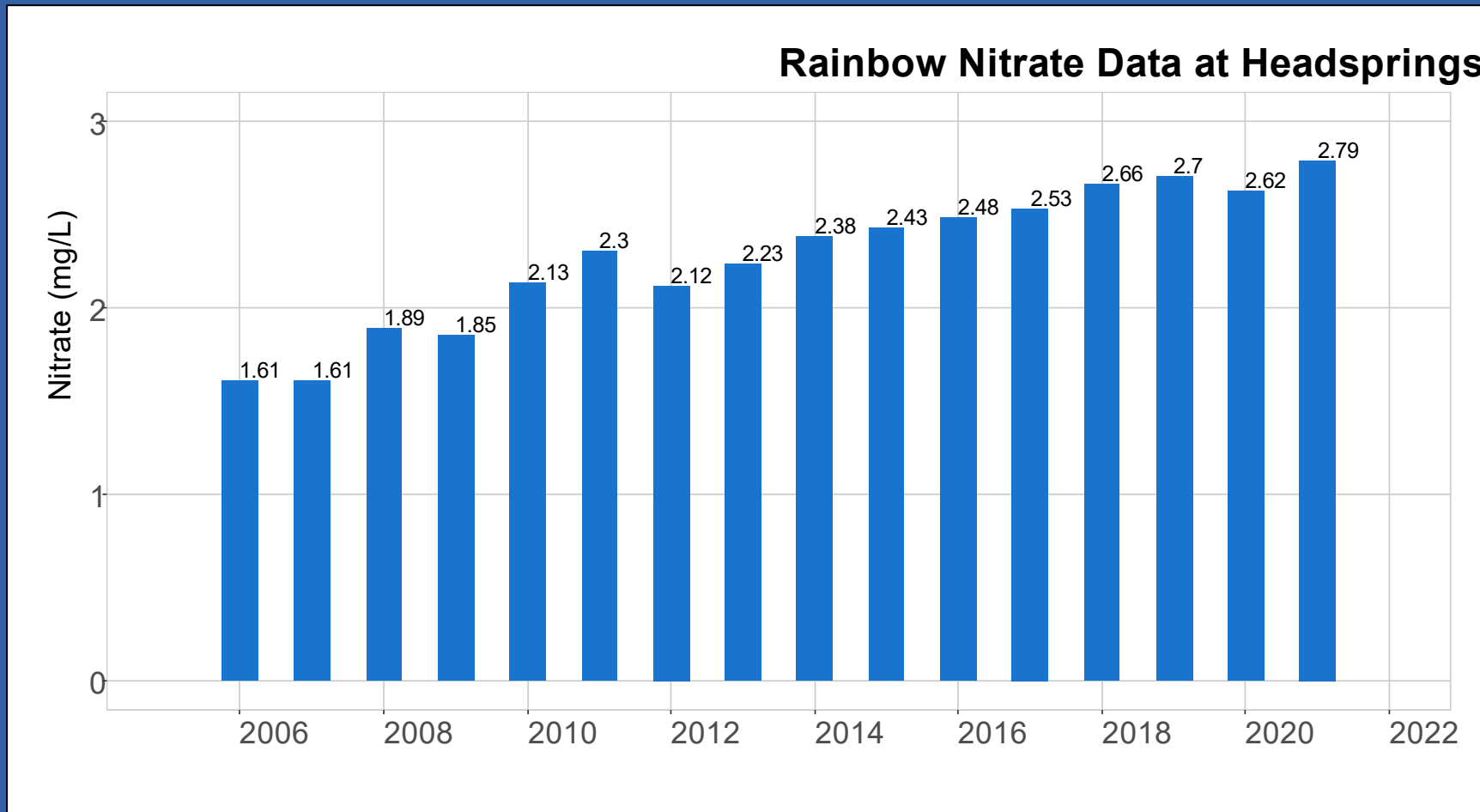


Madison Trowbridge, Ph.D.

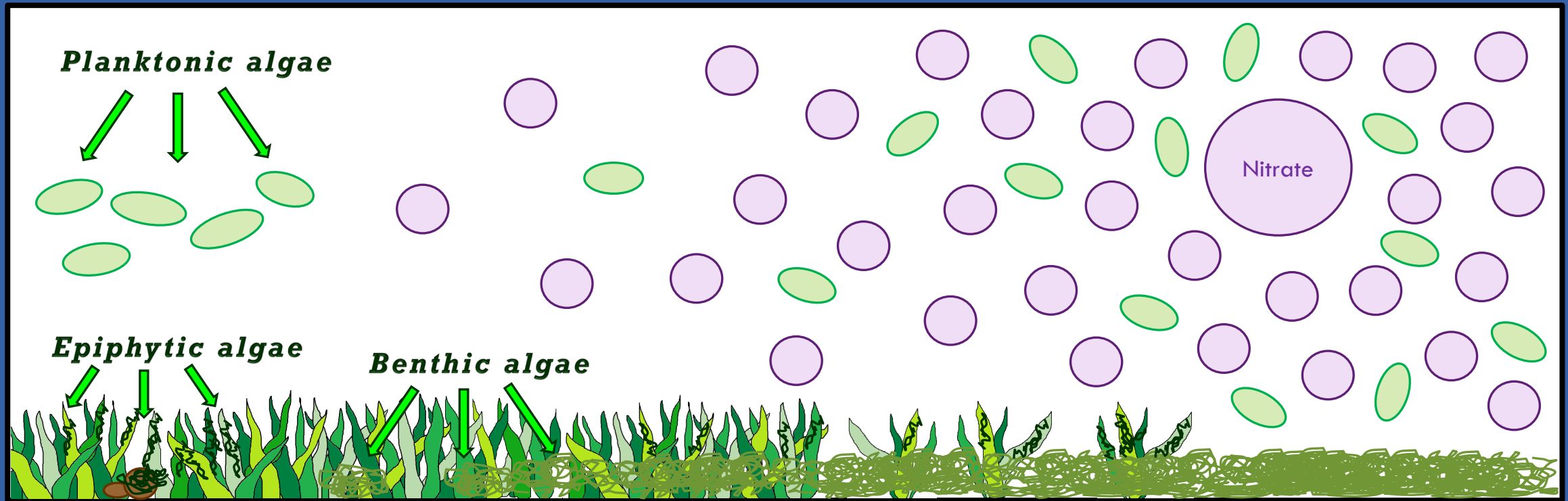
Springs Scientist

Surface Water Improvement & Management (SWIM) Section

# Primary issue: nitrate enrichment



# Excess nitrate thought to cause overgrowth of algae



# Algae abundance increases with downstream distance in Rainbow River





# Hensley et al. 2017: Rainbow River report

- District partnered with UF – Rainbow River Vegetation, Filamentous Algae, & Benthic Sediment Assessment
- Benthic chambers
  - Measured plant/algae metabolism
  - Tested different nutrients/combinations
    - N, P, Fe, N+P, N+Fe, P+Fe, N+P+Fe



# Hensley et al. 2017: Key findings

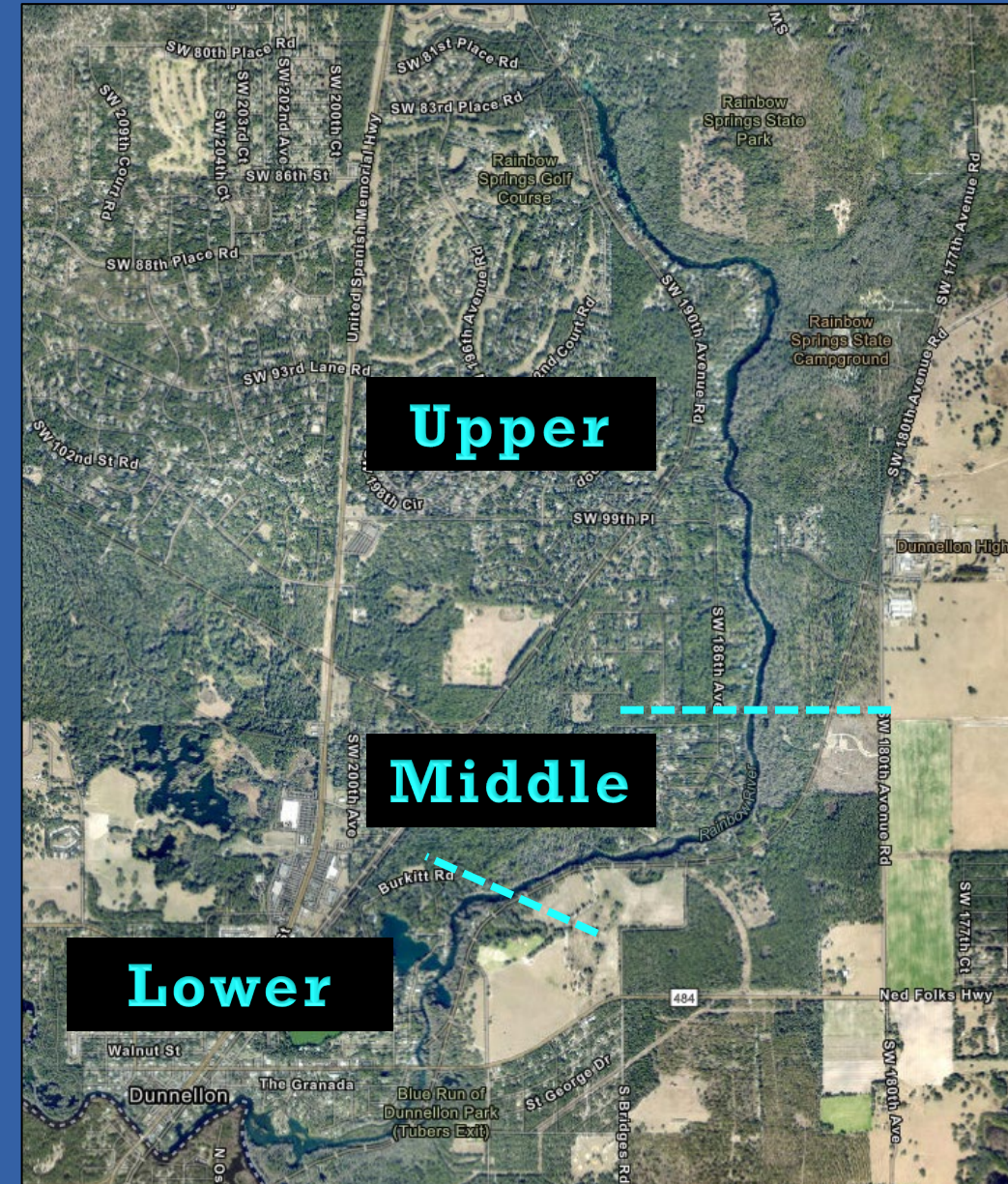
- Rainbow River gross primary production (GPP) not limited by nitrate
- Filamentous algae coverage not correlated to water velocity
- **GPP and epiphytic algae biomass stimulated by iron (Fe) additions**





# Iron & Filamentous Algae in Rainbow River

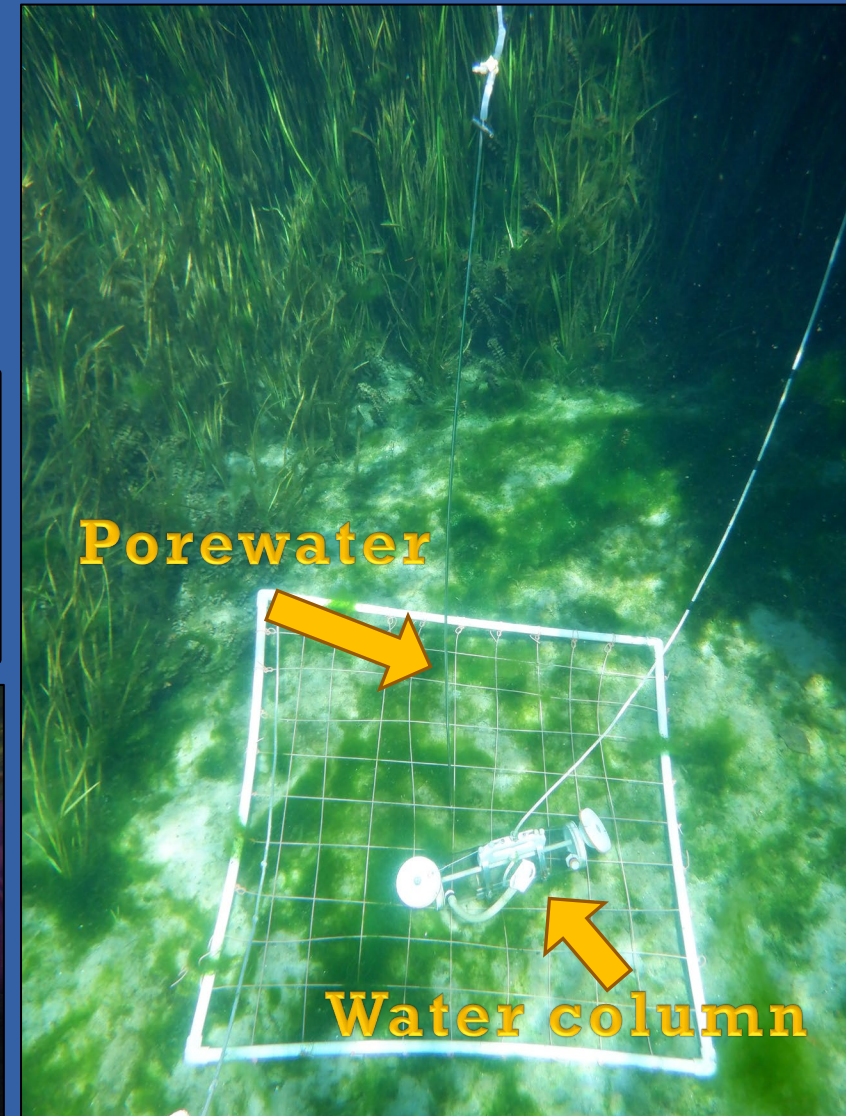
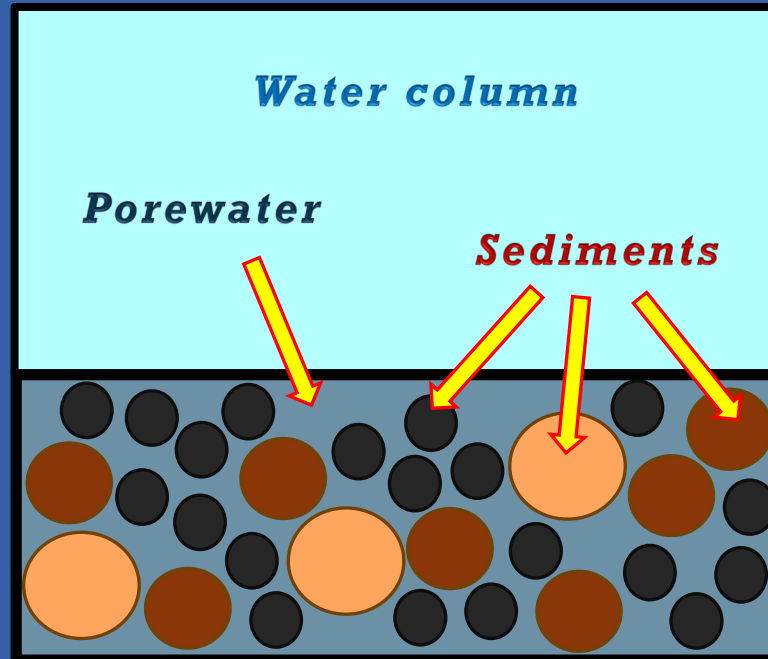
- Is iron correlated to algae?
- Upper/Middle/Lower
  - Known variation throughout system
- Sampling methodology
  - Total: 60+ samples
  - Control
  - Tested seasonality





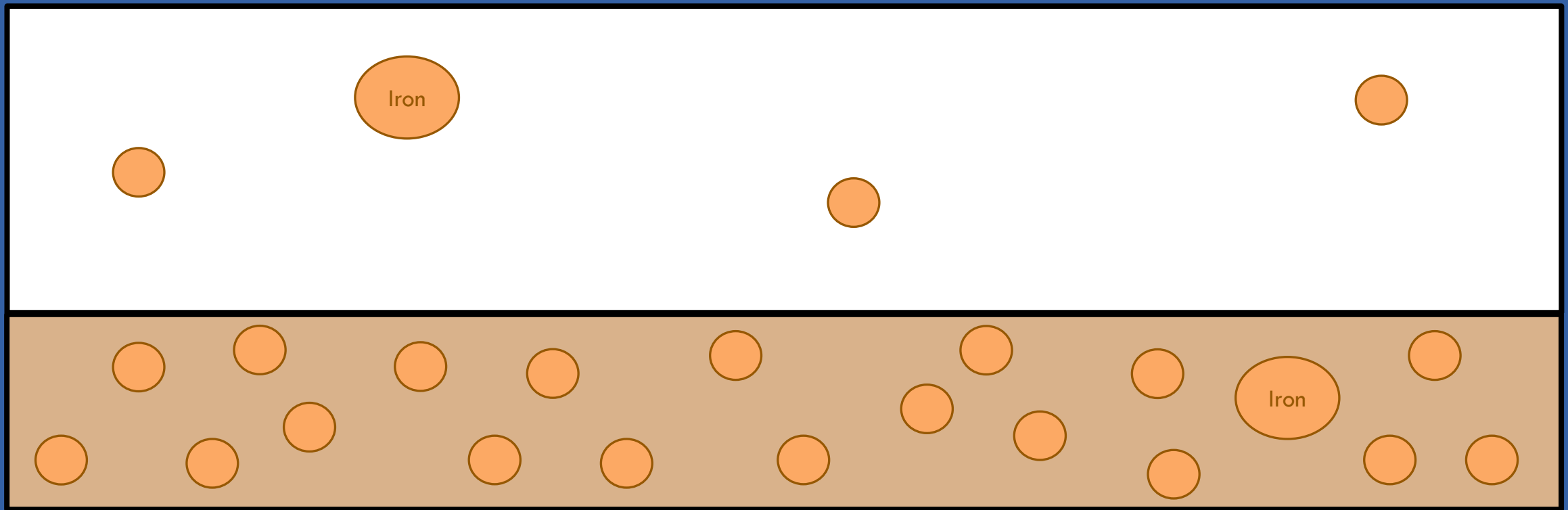
# Iron & Filamentous Algae in Rainbow River

- Benthic algae coverage & thickness
- Porewater & water column water chemistry

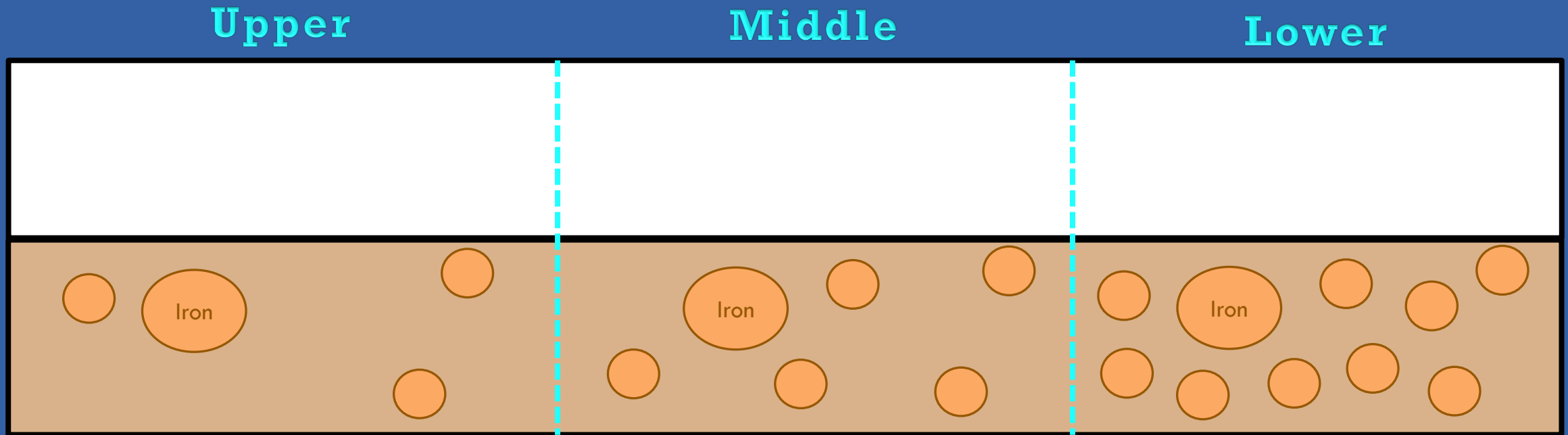




# Iron concentrations higher in porewater than water column



# Iron concentrations varied by location in porewater



Background

Methods

Results

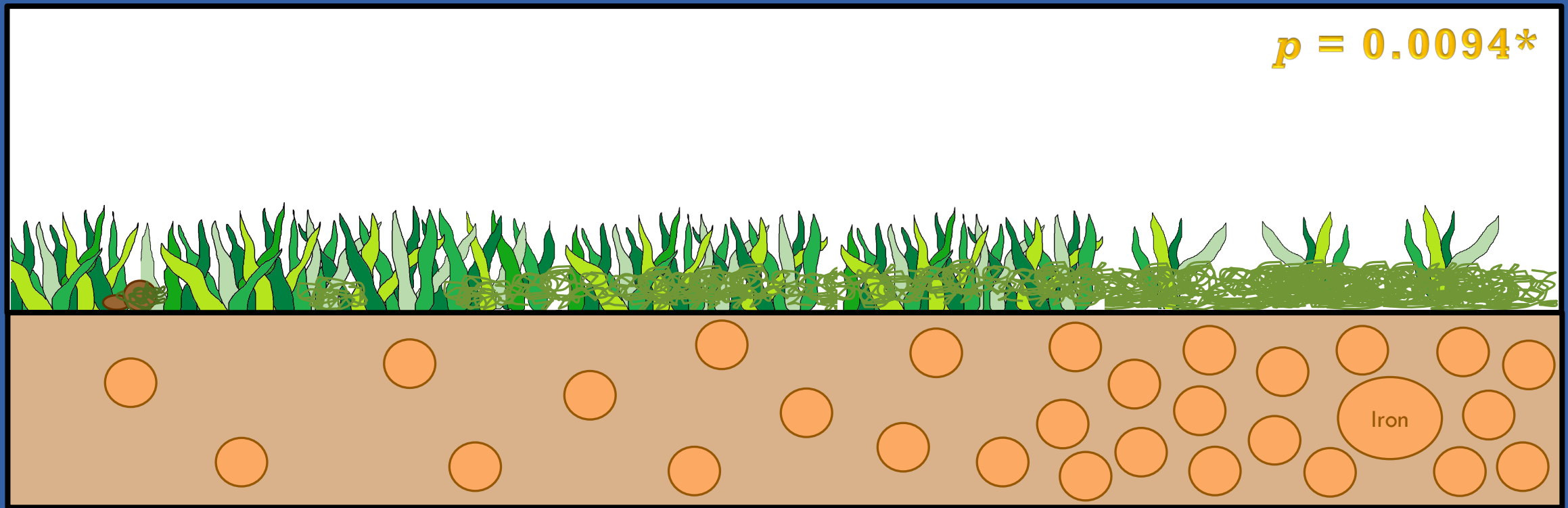


# SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT



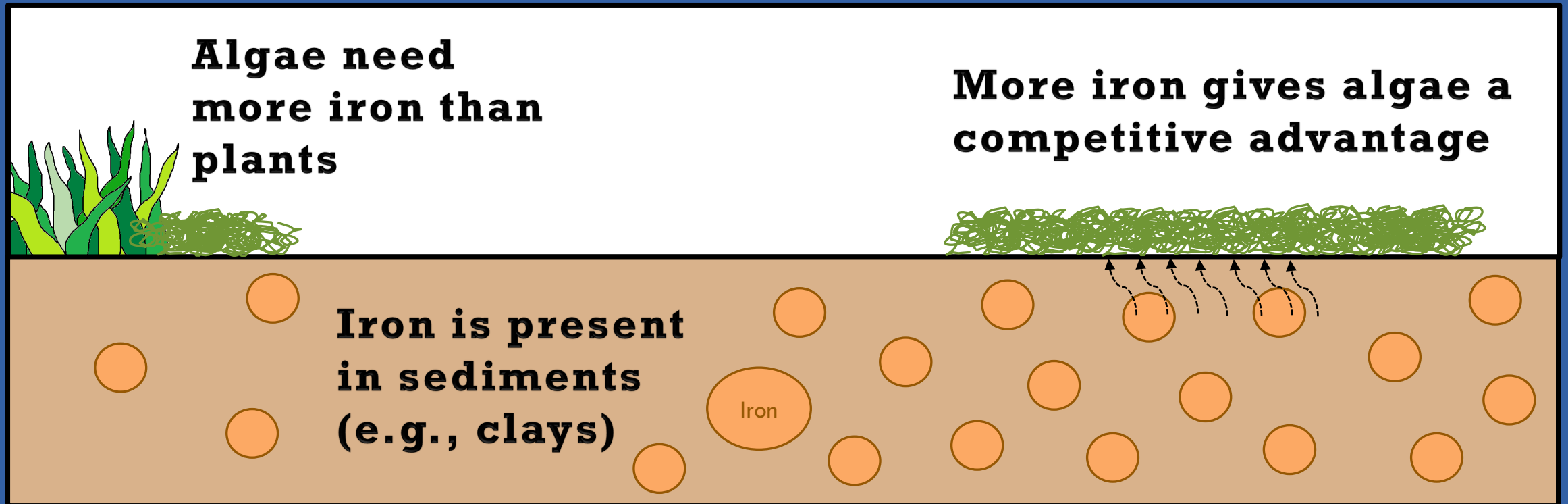


# Porewater iron concentration was correlated to algae coverage



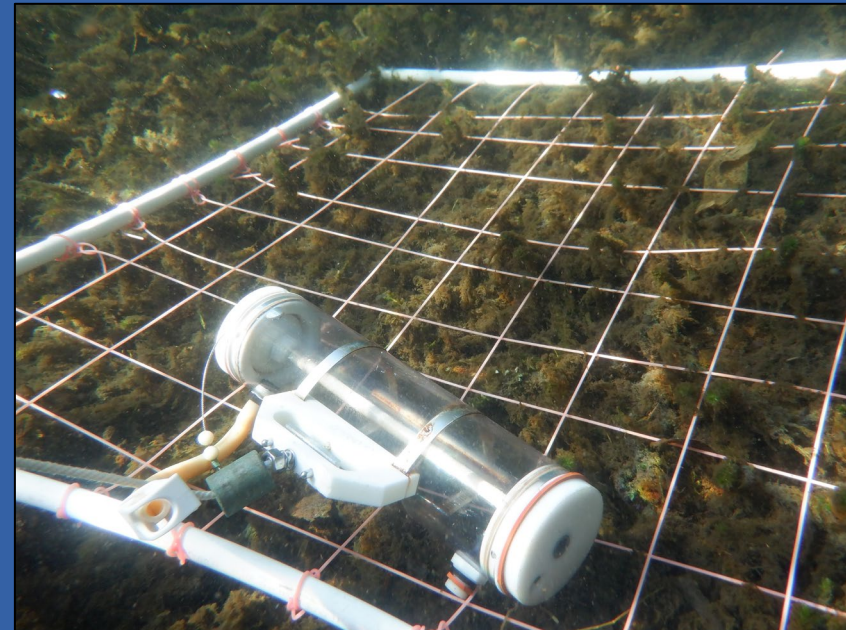
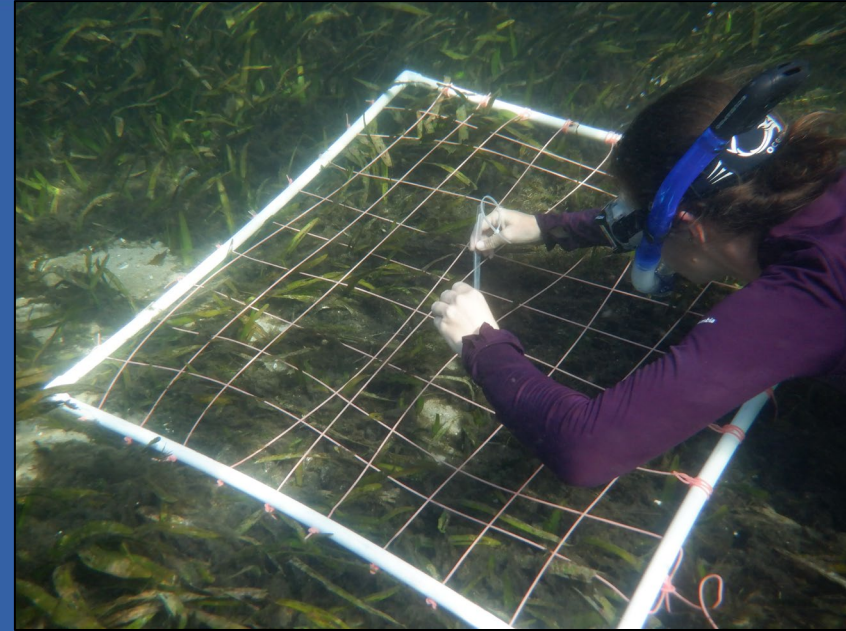


# Why iron?



# Key takeaways

- Algae is part of natural flora in springs
- Spatial distribution of algae identified by Odum (1957)
- Nitrate is important, but iron may be a limiting nutrient in Rainbow River



Background

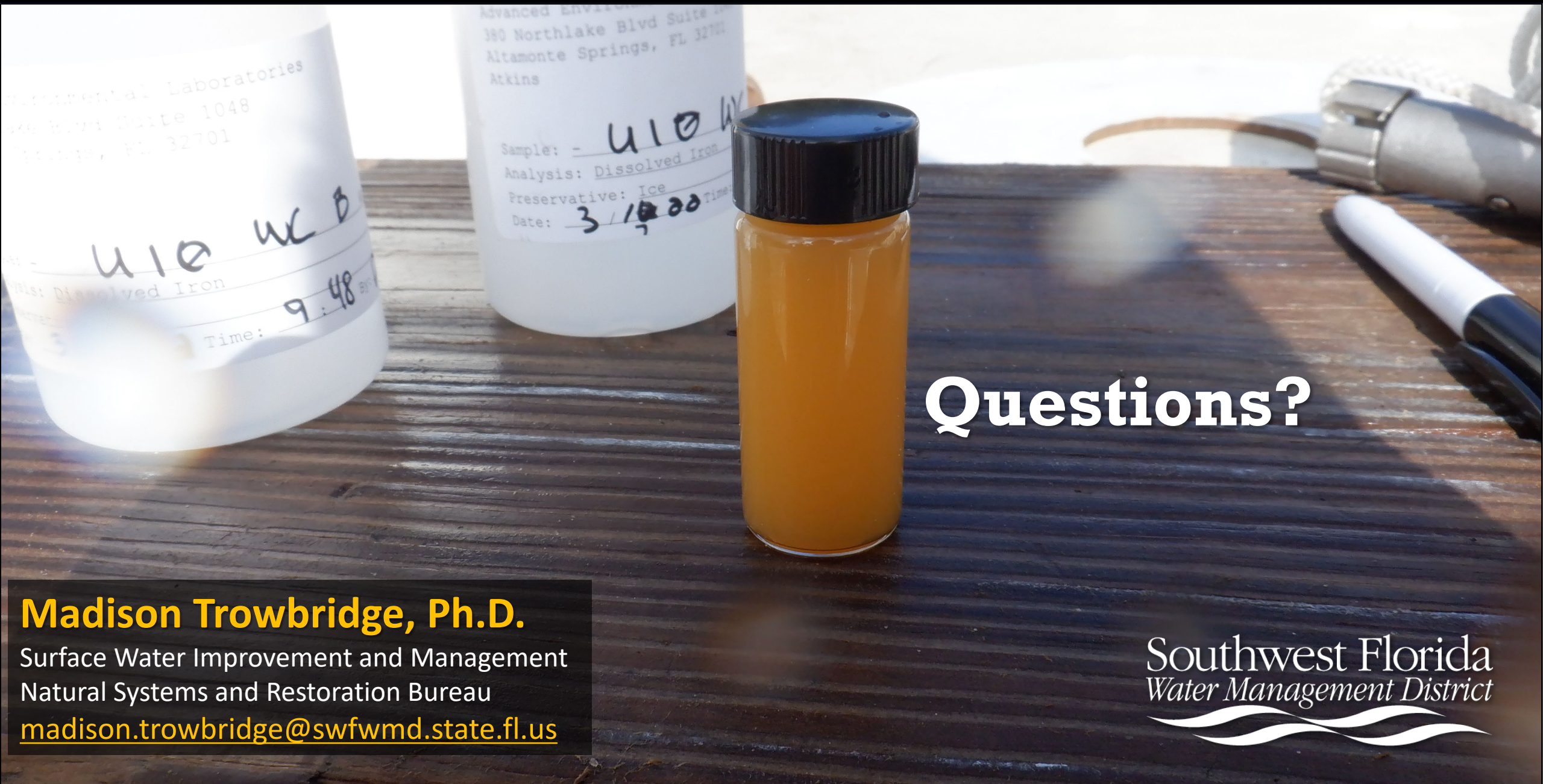
Methods

Results

Conclusions



## SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT



# Questions?

**Madison Trowbridge, Ph.D.**

Surface Water Improvement and Management  
Natural Systems and Restoration Bureau

[madison.trowbridge@swfwmd.state.fl.us](mailto:madison.trowbridge@swfwmd.state.fl.us)

Southwest Florida  
Water Management District