

# MWEA Lagoon Conference

February 18, 2014  
Holland, Michigan

“Duckweed”  
Jeff Grames  
NuSystems, Inc.

# Duckweed in Michigan

- The Species of Duckweed in Michigan is Lemna Minor
- How Duckweed Reproduces
- How Fast Does Duckweed Reproduce?

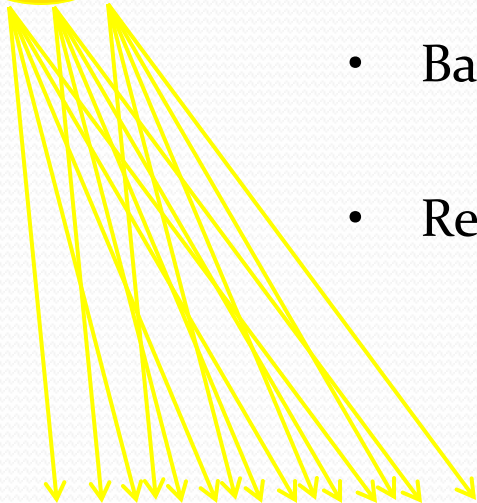
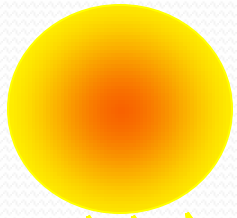


# The Plusses and Minuses of Duckweed

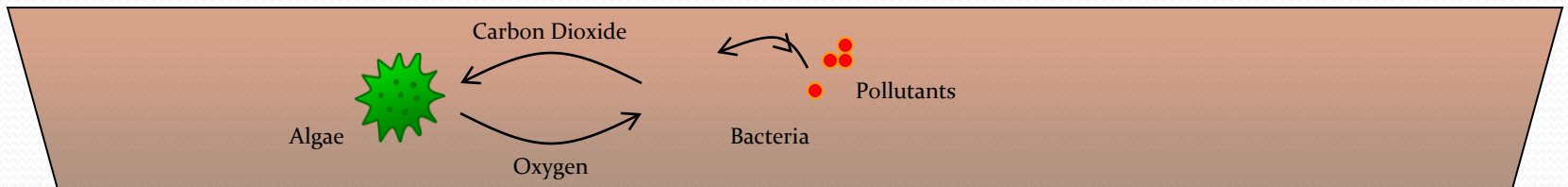
- Plusses: Nutrient Removal
- Minuses: Lower Oxygen Transfer

# Photosynthesis and Respiration

Algae + CO<sub>2</sub> + Sunlight  $\rightleftharpoons$  More Algae + Oxygen + Carbonate

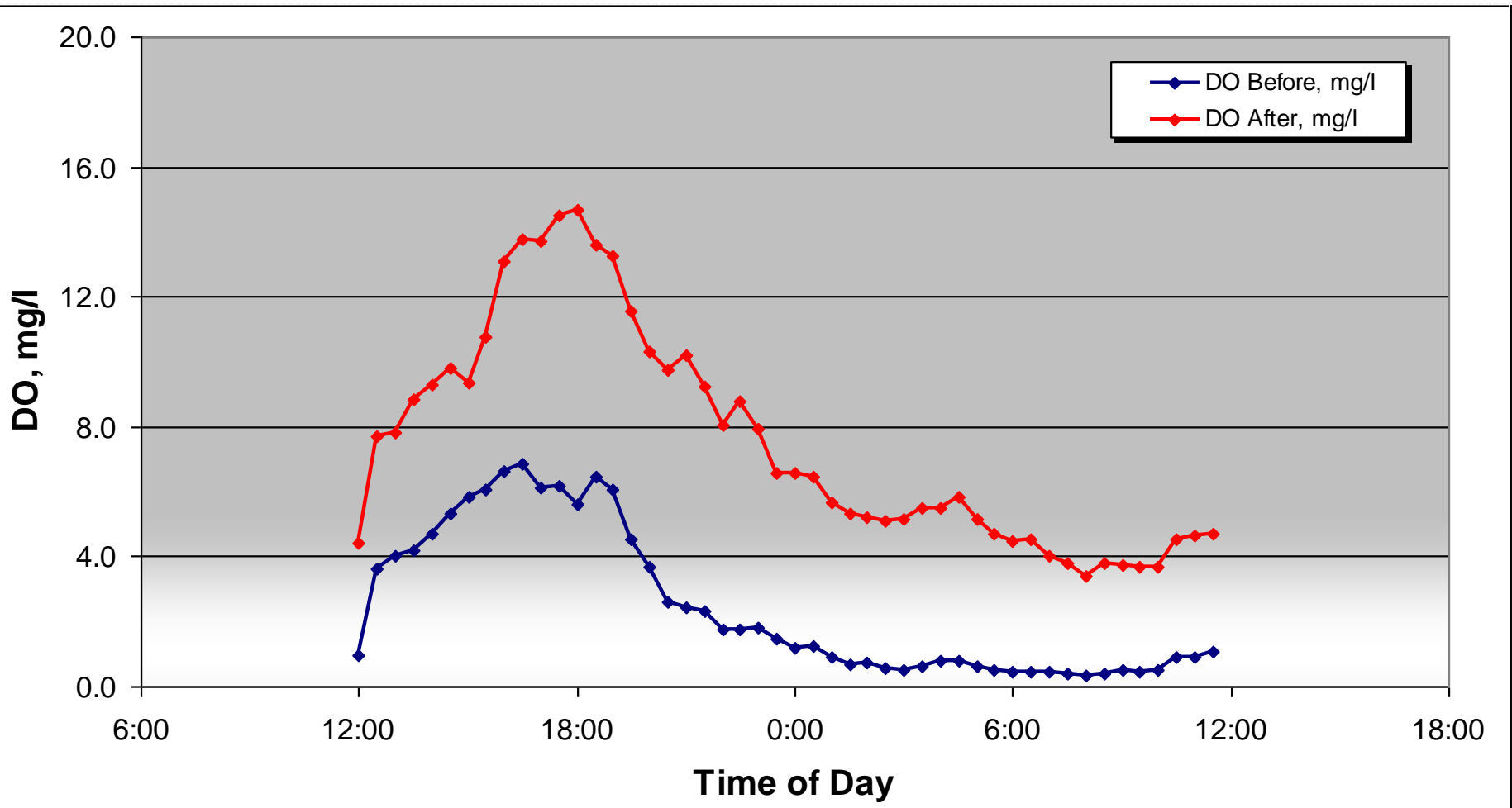


- Biomass increases nutrient uptake ( P, N ).
- Bacterial respiration decreases organic waste (C)
- ReNew allows algae to produce more oxygen.



# Lagoon Cell Two Influent

Influence of Time of Day on Dissolved Oxygen Levels



# Duckweed Control Methods

- Manual Removal
- Chemical Control

# Manual Removal



# Chemical Removal





# State and Federal Laws Regarding Pesticide Application

- Pesticide Use in the United States
- Pesticide Applied to the Waters of Michigan
- Certified Applicator