The effect of lily pad removal on water quality in an eutrophic lake

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Introduction

- Fragrant white water lily (*Nymphaea odorata*)
- Hardy plant with a huge native range and beautiful flowers
- Grows in shallow, slow moving water
- Grows rapidly, can take over the surface of a lake

Marcus, Joseph A.
http://www.wildflower.org/plants/result.php?id_plant=NYOD
Introduction (cont.)

- Fragrant white water lilies are present in Teatown Lake
  - Eutrophic (nutrient rich)
Why are lily pads important?

• A source of food for beavers and muskrats
• They provide habitats for other organisms
  • Sunfish, frogs, macroinvertebrates
• Keeps water cool
• Previous studies show that lily pads reduce evaporation rate
• May alter water chemistry
Research Question

• Do water lilies affect the water chemistry of Teatown Lake when they are removed?
Methods

- Field Study:
  - 3 sites with lily pads growing (control)
  - 3 sites with lily pads that were pulled out (experimental sites)
  - 2 x 2 meter plots
  - Test for:
    - Algae levels
    - Dissolved oxygen (DO)
    - pH
    - Conductivity
    - Temperature
    - Nitrate
    - Phosphate
Experimental Study

• Put lily pads into a container with lake water

• 3 experimental containers, 3 control containers

• Test for:
  • Algae levels
  • DO
  • pH
  • Conductivity
  • Temperature
  • Nitrate
  • Phosphate
Macroinvertebrates

- Good indicators of water quality
- Leaf packs used to catch macroinvertebrates
- Left at sites for a week

Field Study Results

Algae Levels

![Graph showing algae levels from 7/19/2016 to 7/25/2016 comparing control and experimental groups. The graph indicates a peak on 7/22/2016 for the control group and a general increase for the experimental group.]
Experimental Study Results

Dissolved Oxygen

Dissolved Oxygen (mg/L)

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Discussion

Field Study
• Algae levels were lower when lily pads were removed
• However, nitrate levels were higher at experimental sites
• Lily pads take in nutrients, so since they were pulled out, not as many nutrients were being taken up

Experimental Study
• Dissolved oxygen and pH were lower in the experimental containers
• The decomposition process consumes oxygen
• Pollution tolerant macroinvertebrates were found at both sites
Conclusion

- Lily pads do have an effect on water quality
- Decomposing lily pads take up a lot of oxygen, which is required by organisms to survive

Future research

- Have more sites
- Look at the effect lily pads have on other plants/animals at the sites
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