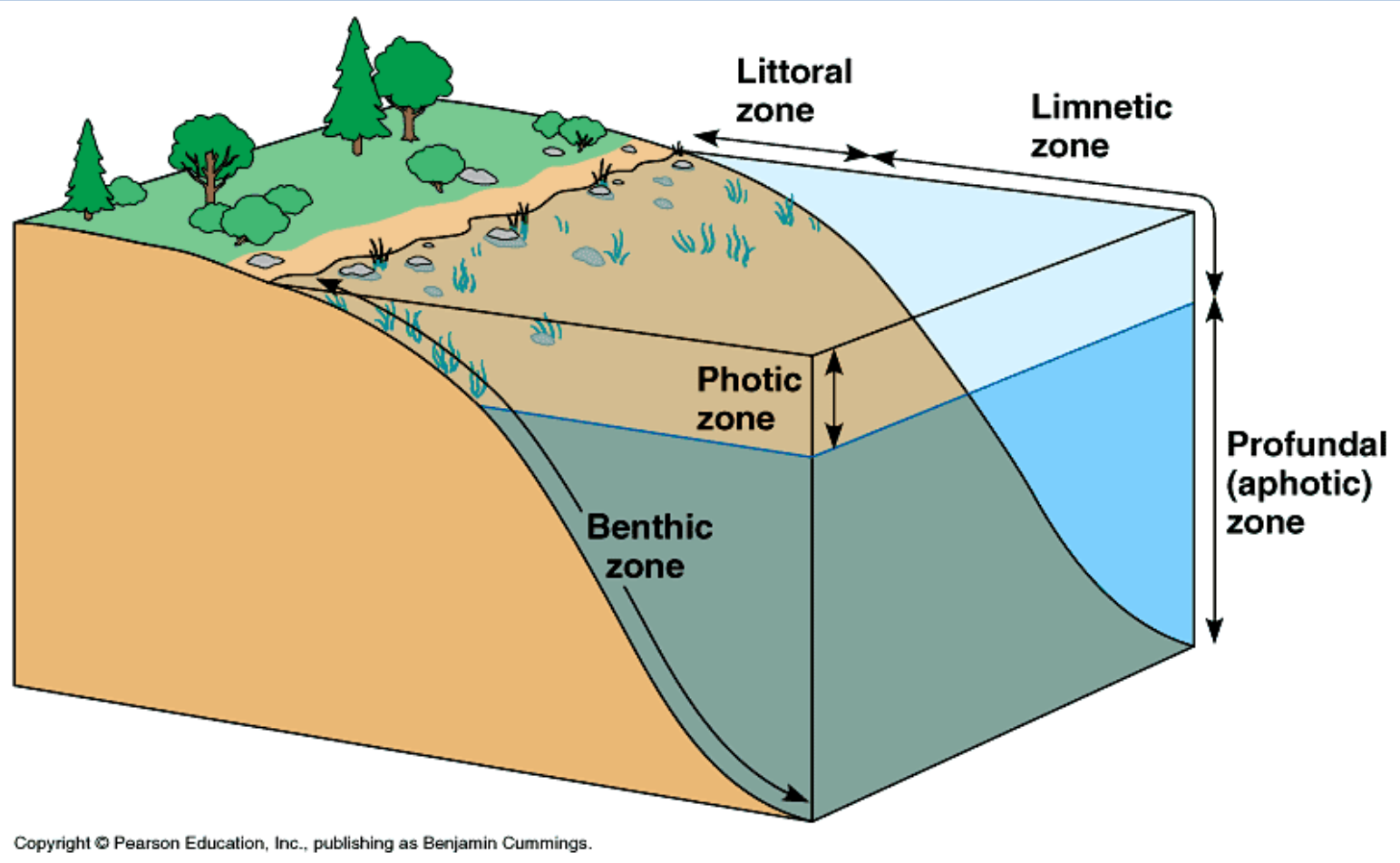
The Effect of Aquatic Macrophyte Structure on Fish Populations in a Vermont Lake

Nicholas Dragone

Aquatic Plant Growth



Eurasian Watermilfoil (EWM)

- *Myriophyllum spicatum*
- Introduced in the 1940's
- Currently in 42 Vermont lakes

http://enviroscienceinc.com/wp-content/uploads/2011/03/prop_with_EWM.png

http://www.northeastans.org/online-guide/files/axJHE7Wq/MilfoilUnderwaterPhoto.jpg

Effect of EWM on Native Plants Beds

- Decrease in species richness
- Increased density
- Change in growth form

What Could Have Caused This Response?

- Changes in:
  - Number of plant species
  - Plant density
  - Plant growth form

M. spicatum

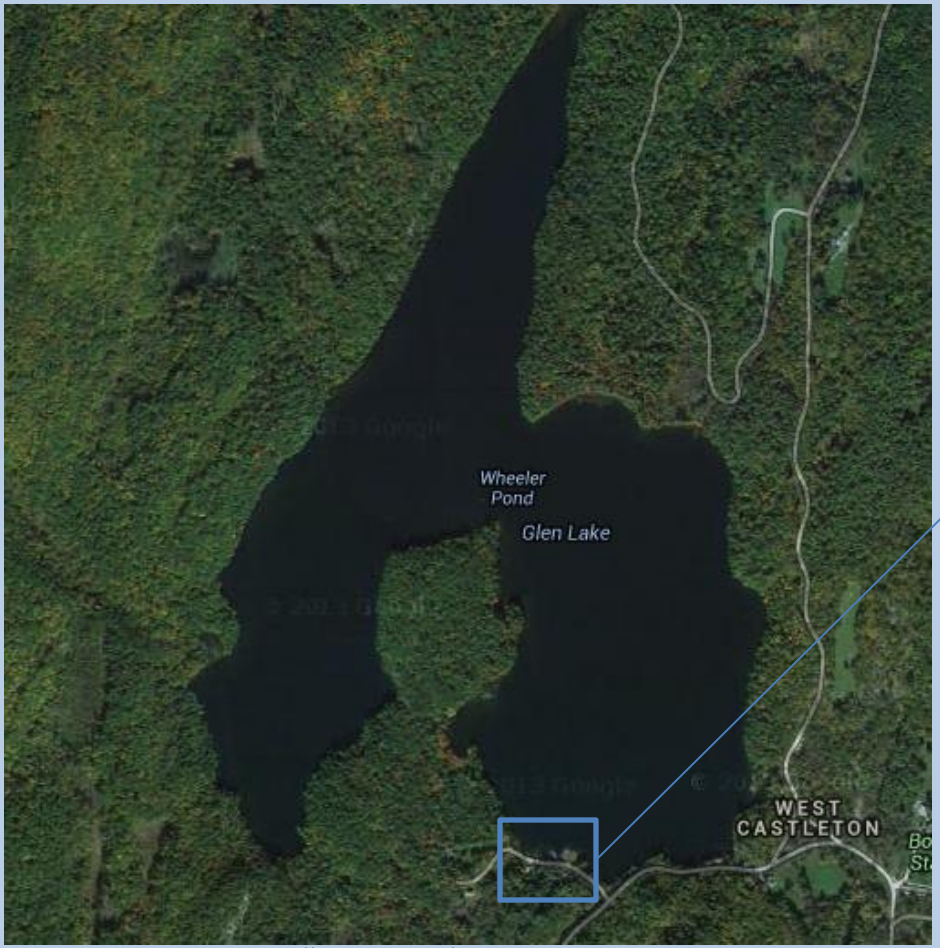
Potamogeton praelongus

Research Question

- What changes to aquatic plant beds, caused by the spread of EWM, have affected the visitation of fish to these habitats?

Methods

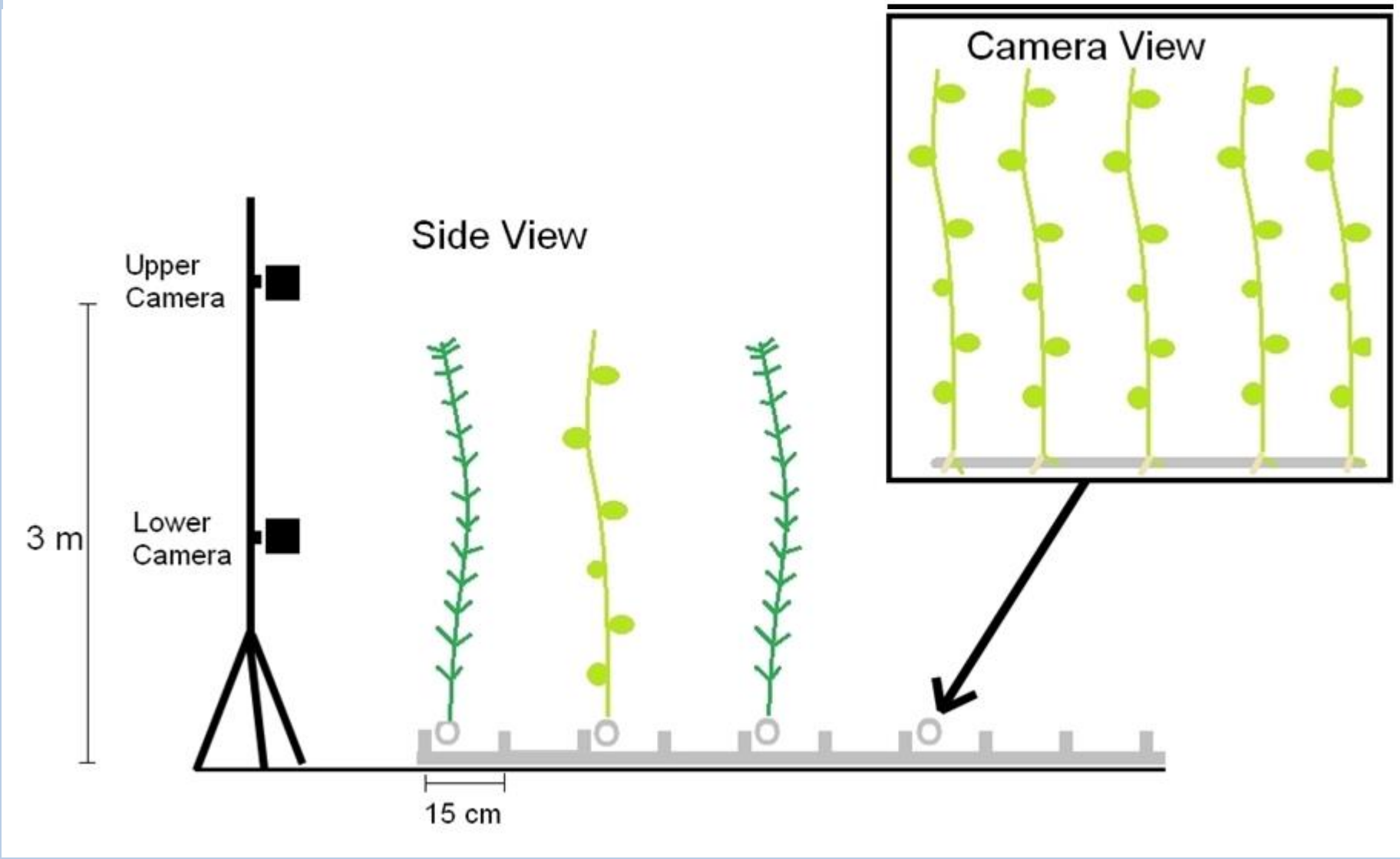
- Glen Lake, Castleton, Vermont



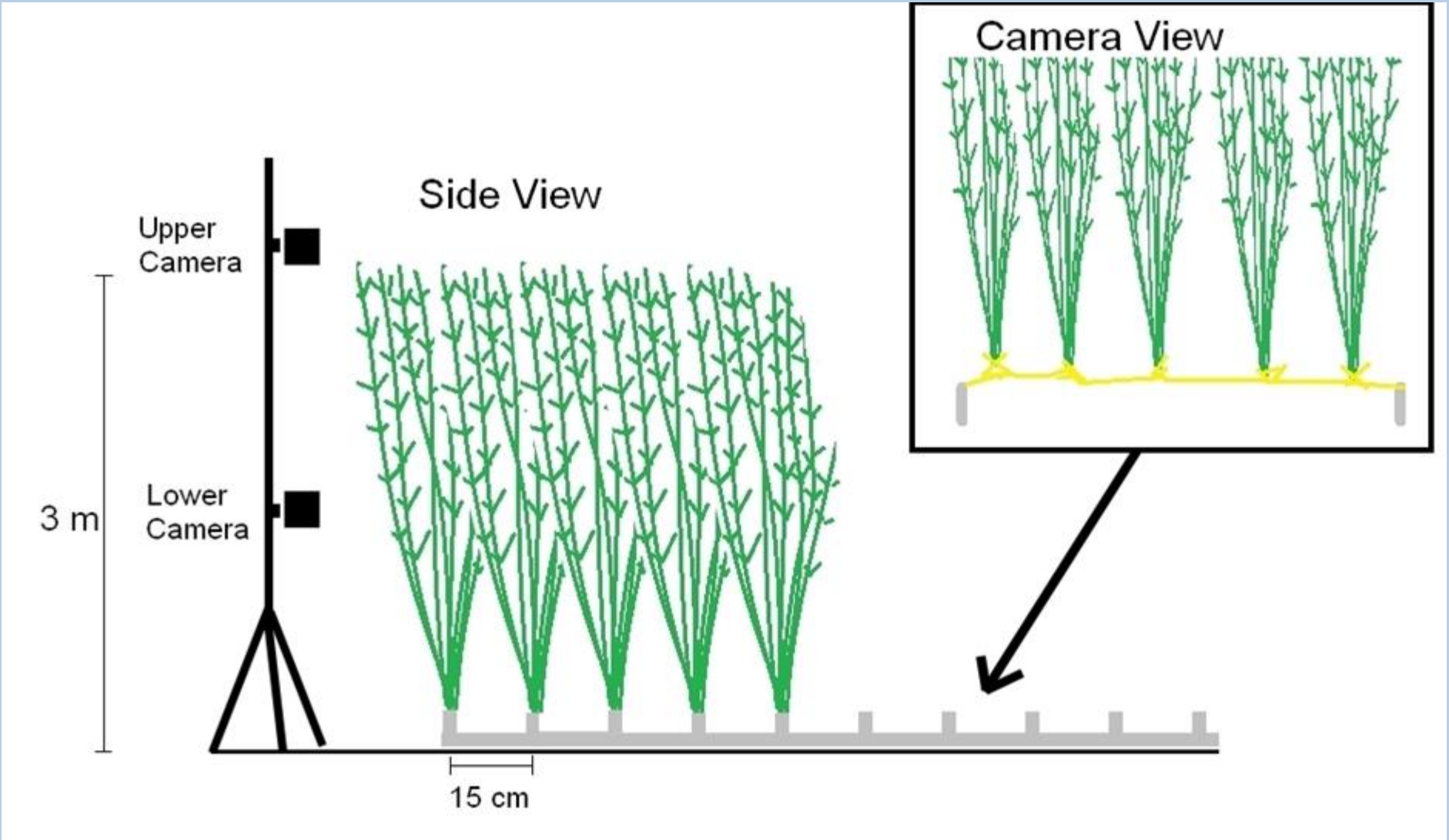
http://www.google.com/maps

Video Recording

Experimental Plant Gardens



Removal/Replacement

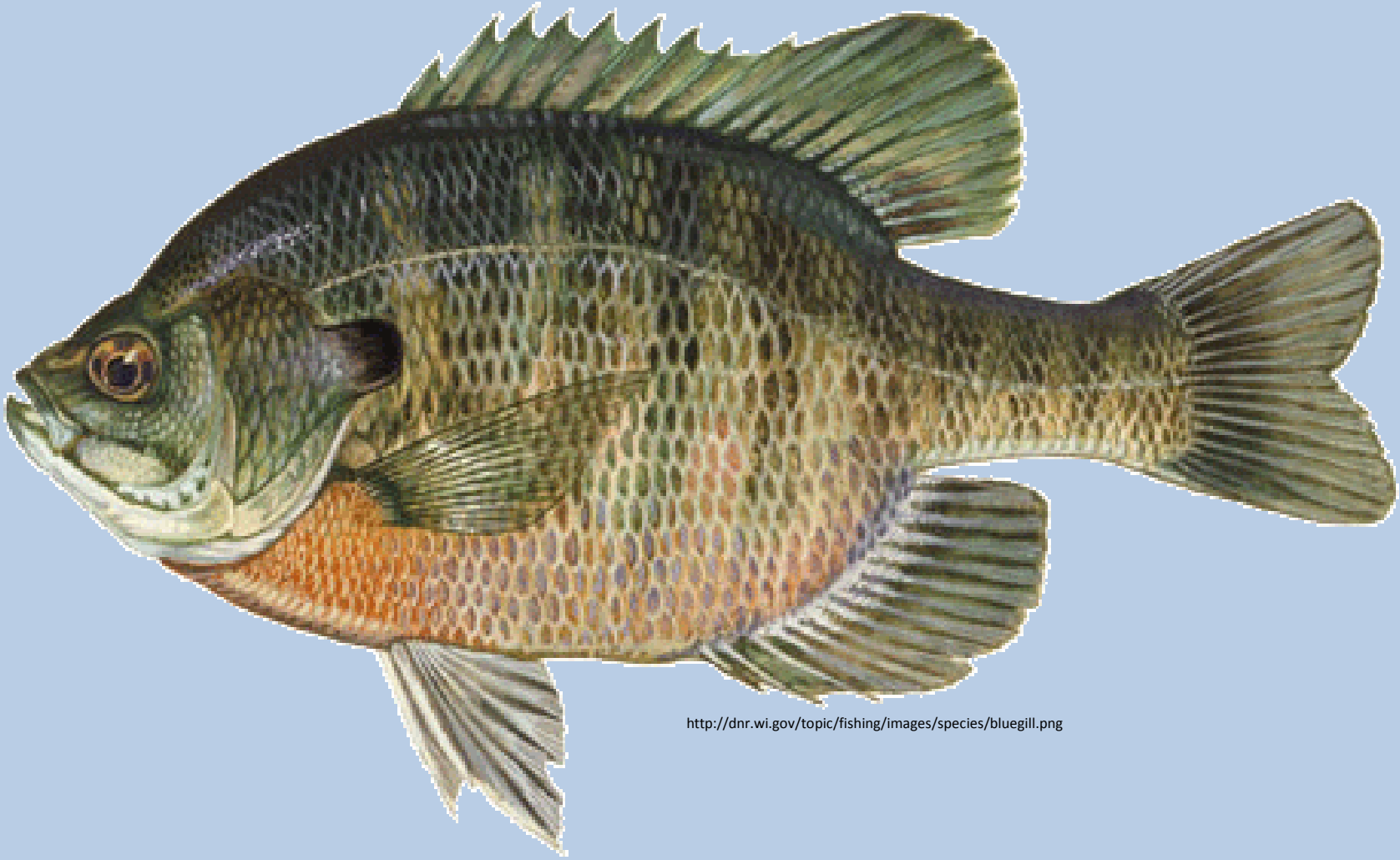


Analysis

- Length of fish visitations

http://www.amazon.com

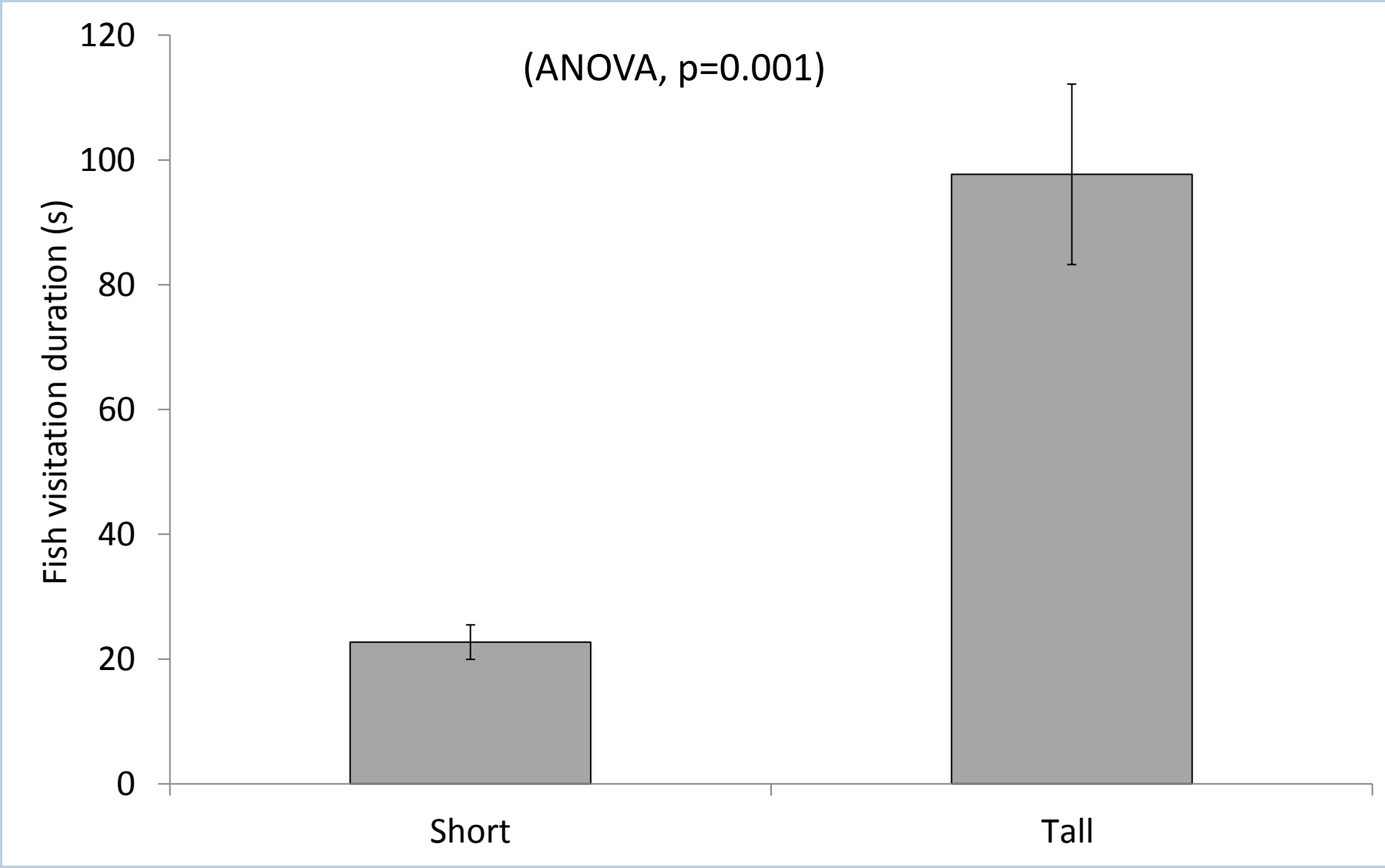
Fish Species



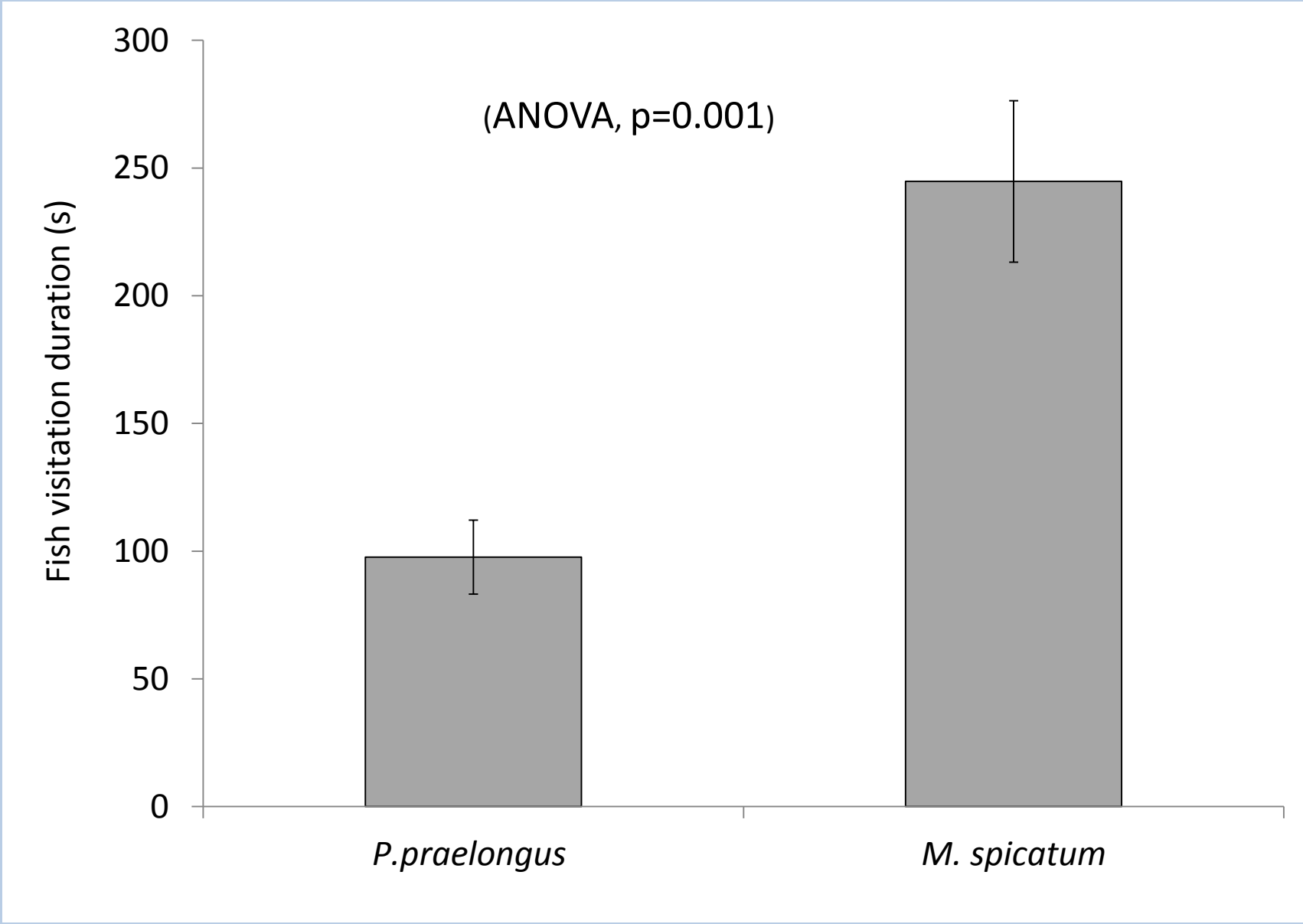
http://dnr.wi.gov/topic/fishing/images/species/bluegill.png

Bluegill (*Lepomis macrochirus*)

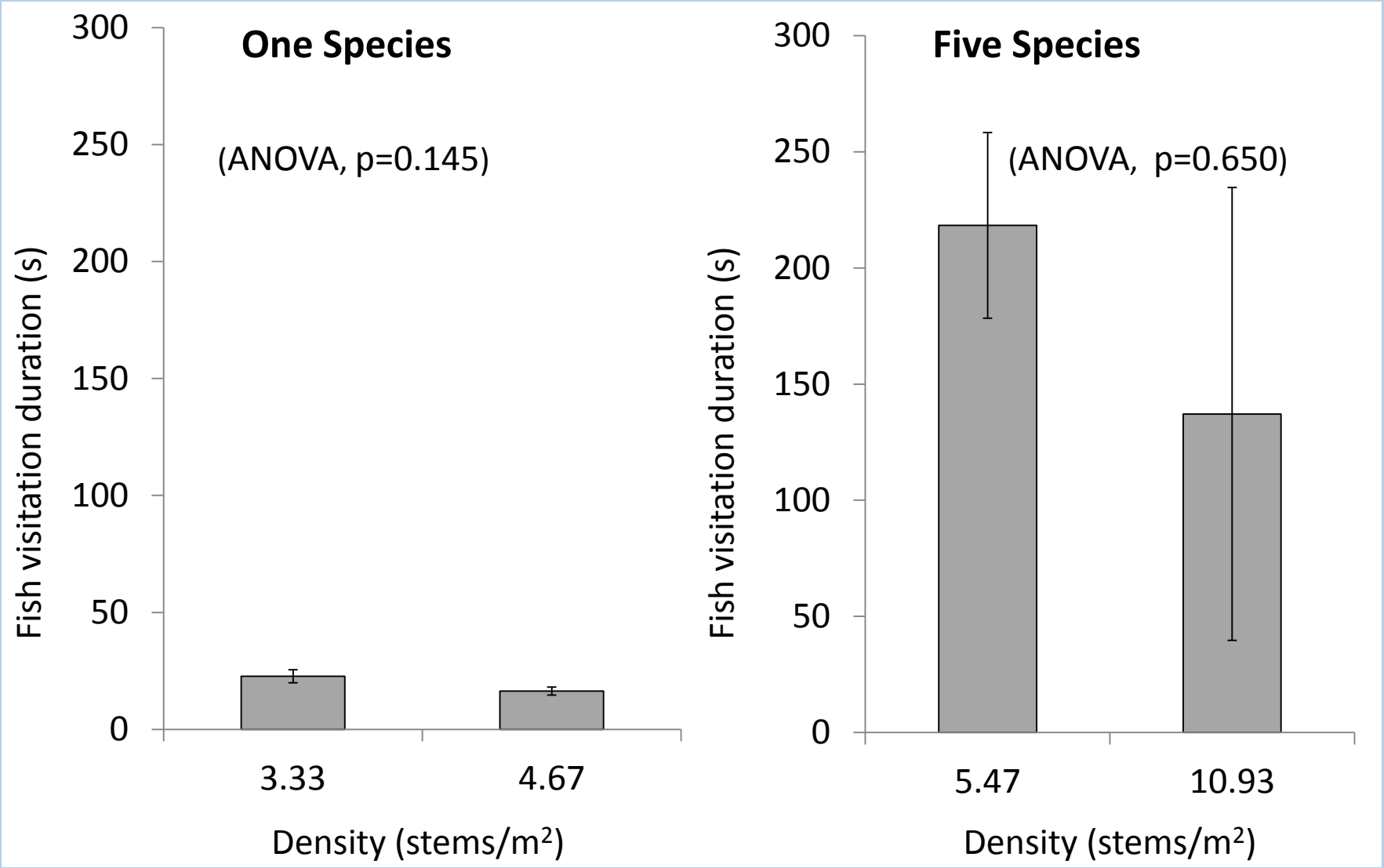
Plant Height



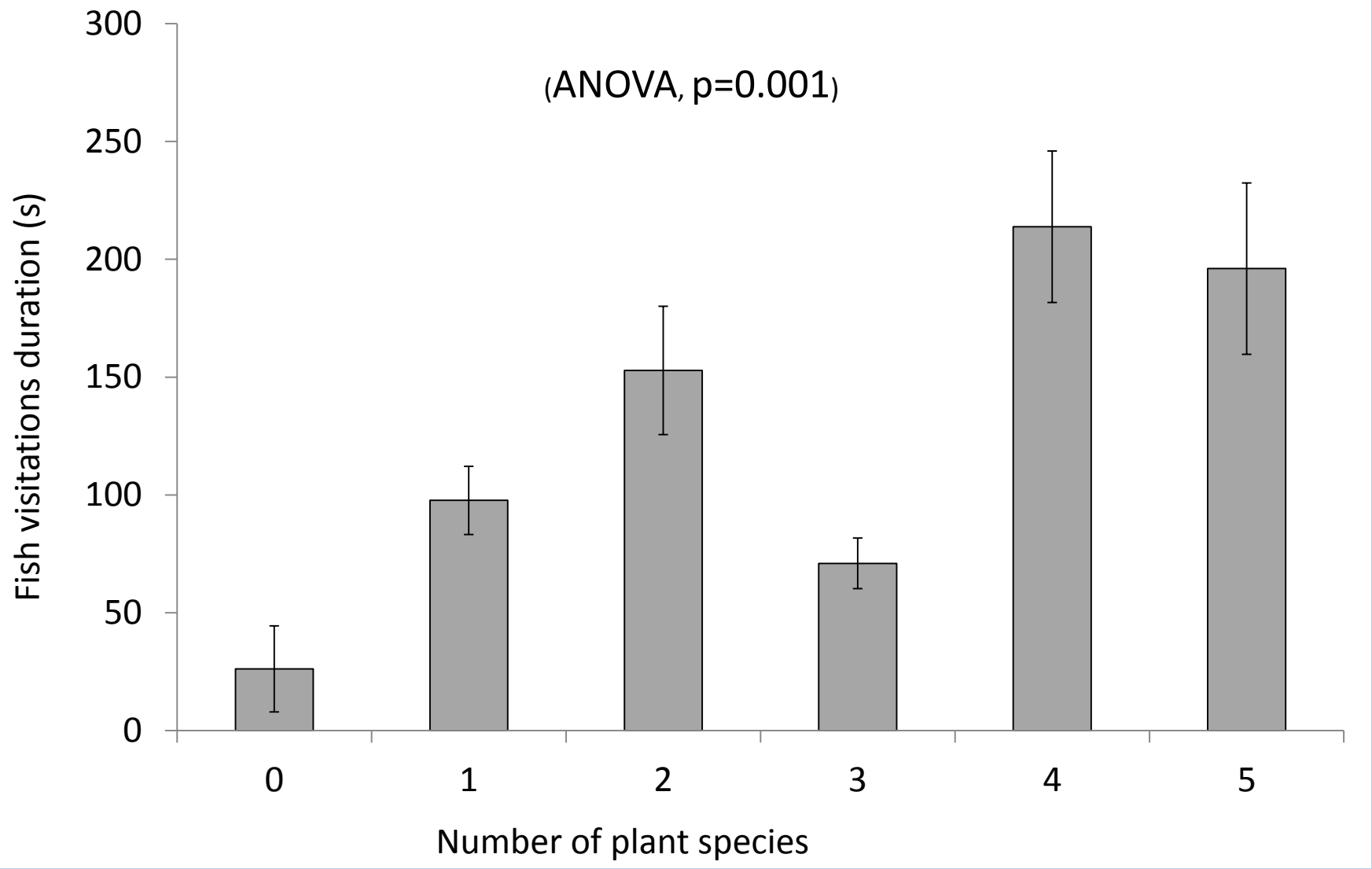
P. praelongus vs. *M. spicatum*



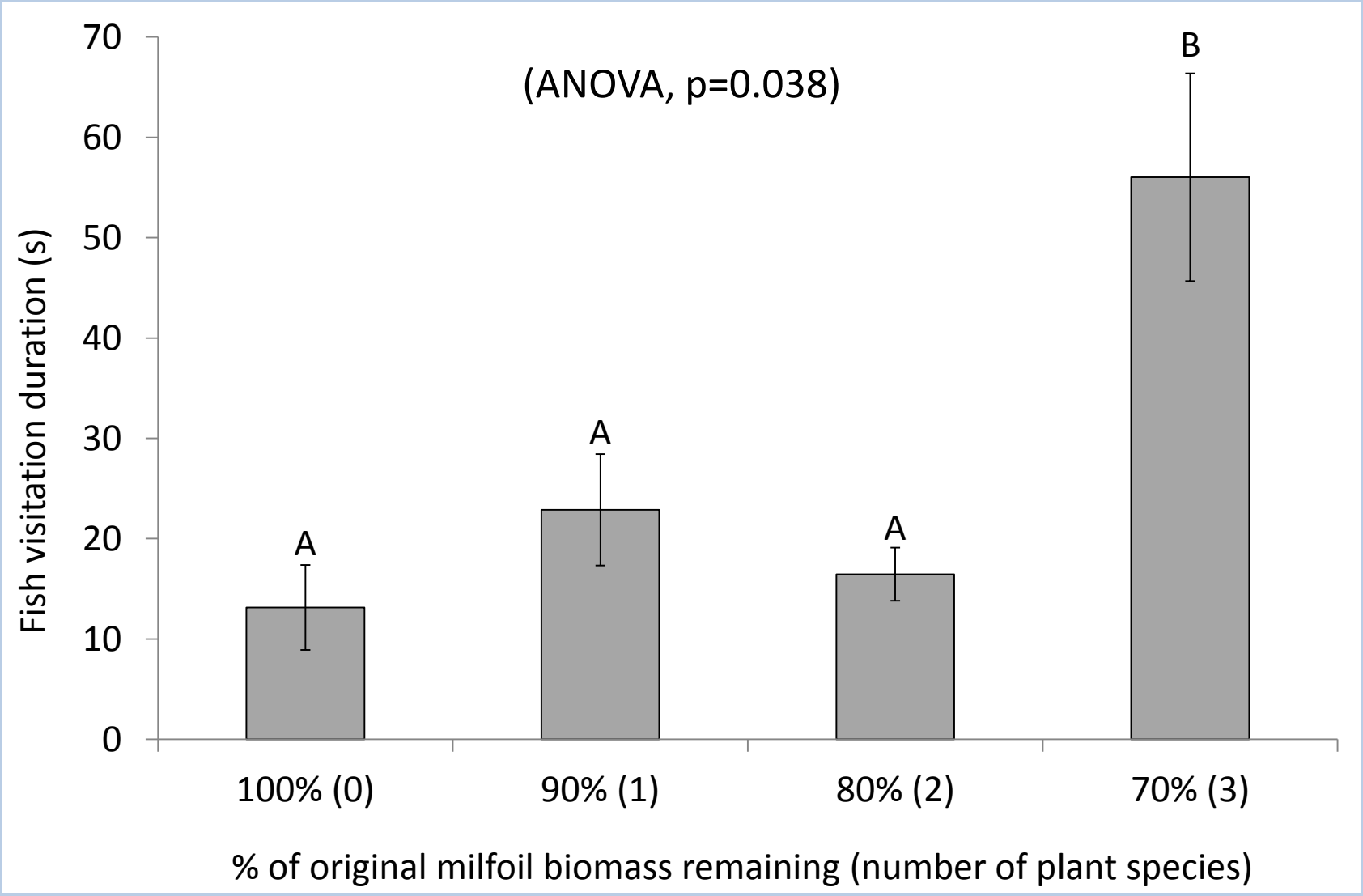
Density


One Species
(ANOVA, p=0.145)
Fish visitation duration (s)
300
250
200
150
100
50
0
3.33
4.67
Density (stems/m²)
Five Species
(ANOVA, p=0.650)
Fish visitation duration (s)
300
250
200
150
100
50
0
5.47
10.93
Density (stems/m²)

Species Richness



Removal/Replacement

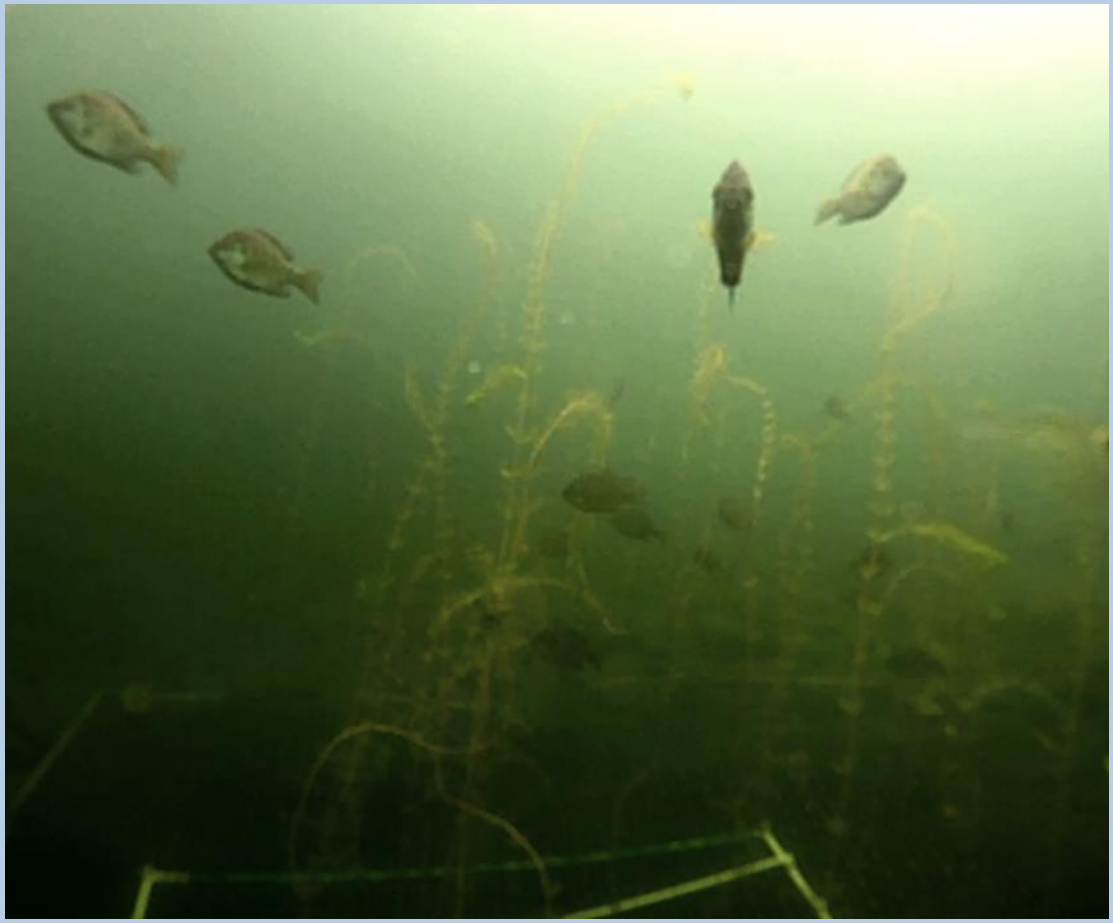


Discussion

- Height
- *M. spicatum* vs. *P. praelongus*
- Density
- Species richness
- Removal/replacement

M. spicatum vs. *P. praelongus*

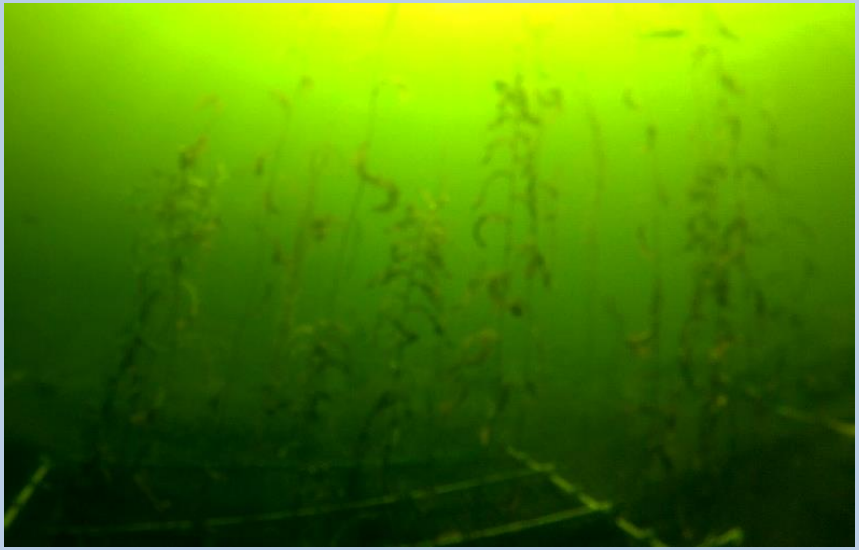
- EWM does not repel fish
  - Fish WILL visit low density EWM monocultures



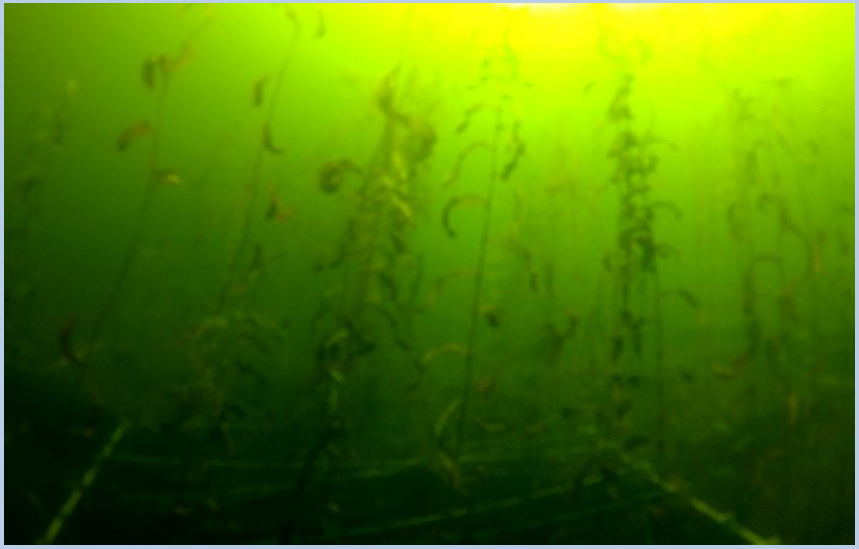
Plant Density

- Not enough of a change?

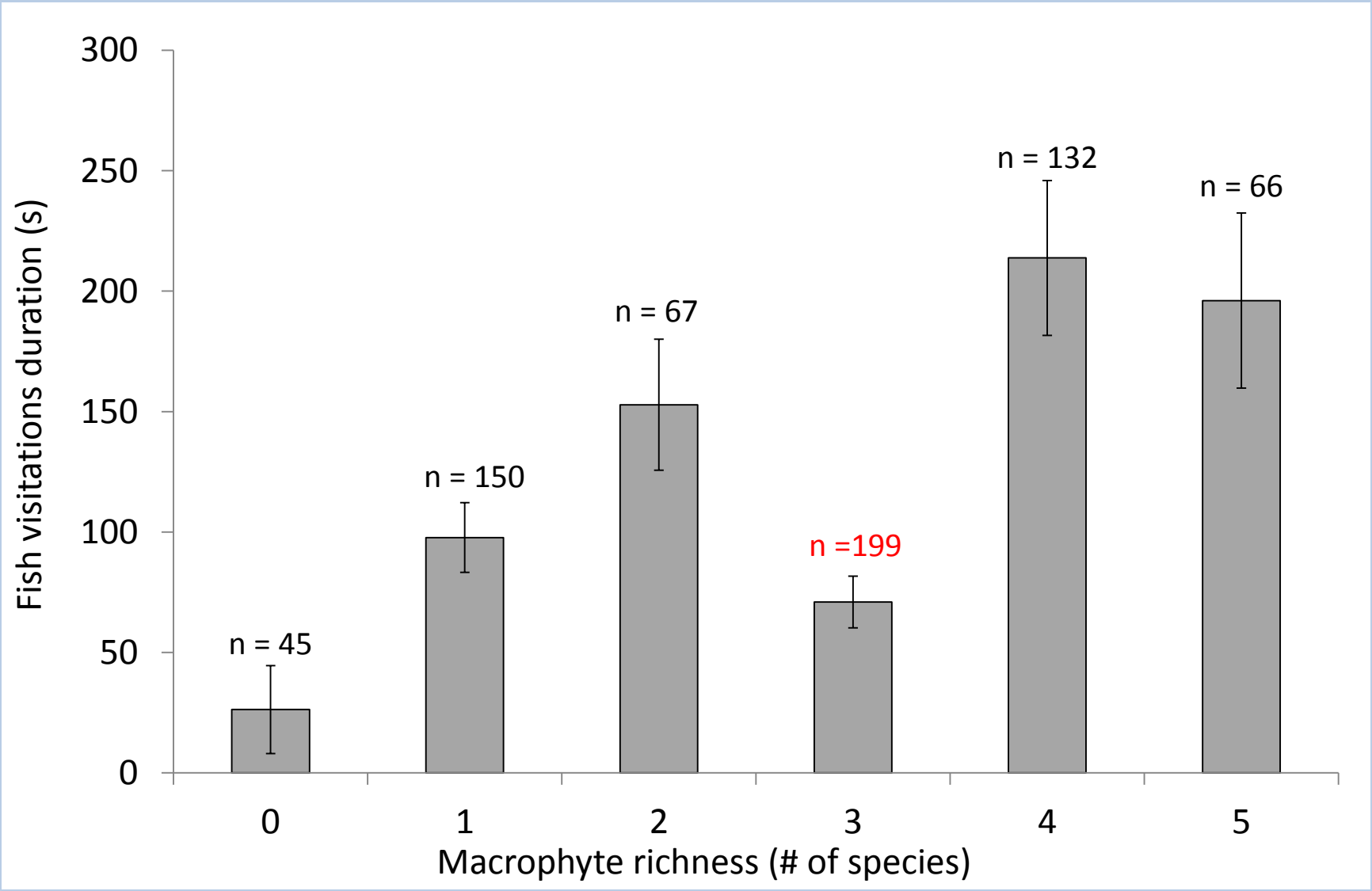
Low: 5.67 stems/m^2



High: 10.93 stems/m^2

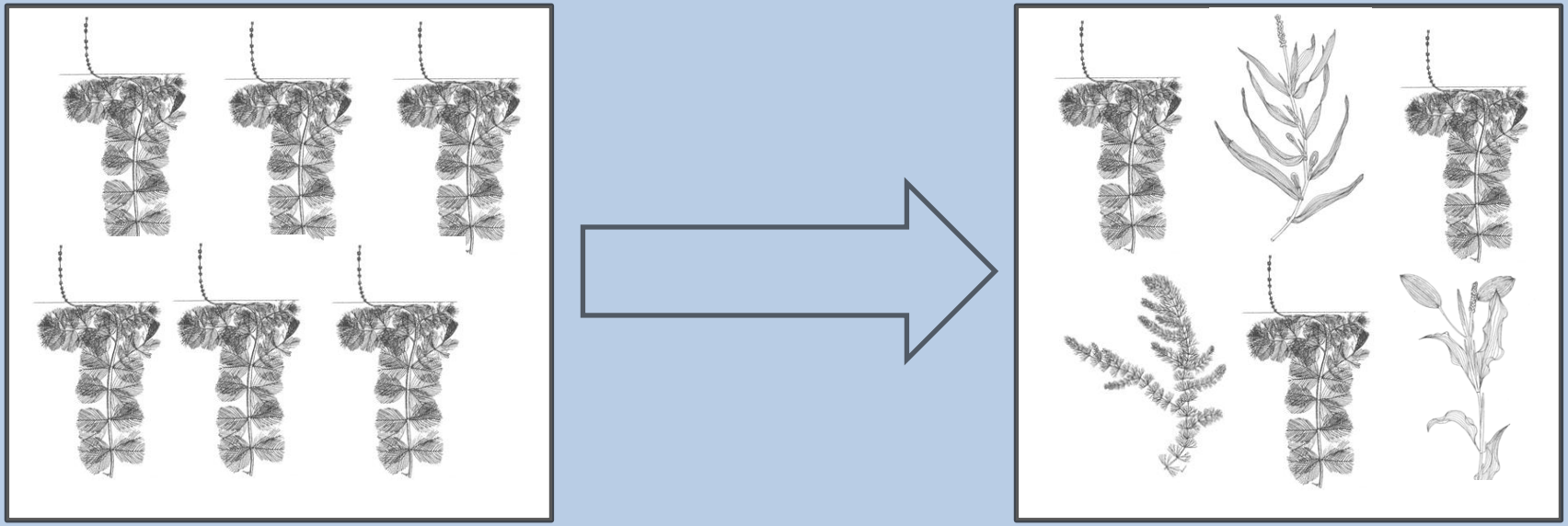


Gradual Increase



Removal/Replacement

- Fish begin to return after:
  - 30% reduction in milfoil biomass
  - Addition of three distinct native plants



Conclusion

- EWM decreases plant species richness and increases density
  - Fish like habitats of intermediate complexity

- EWM, in controlled populations, could increase plant diversity without affecting fish

Acknowledgements

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