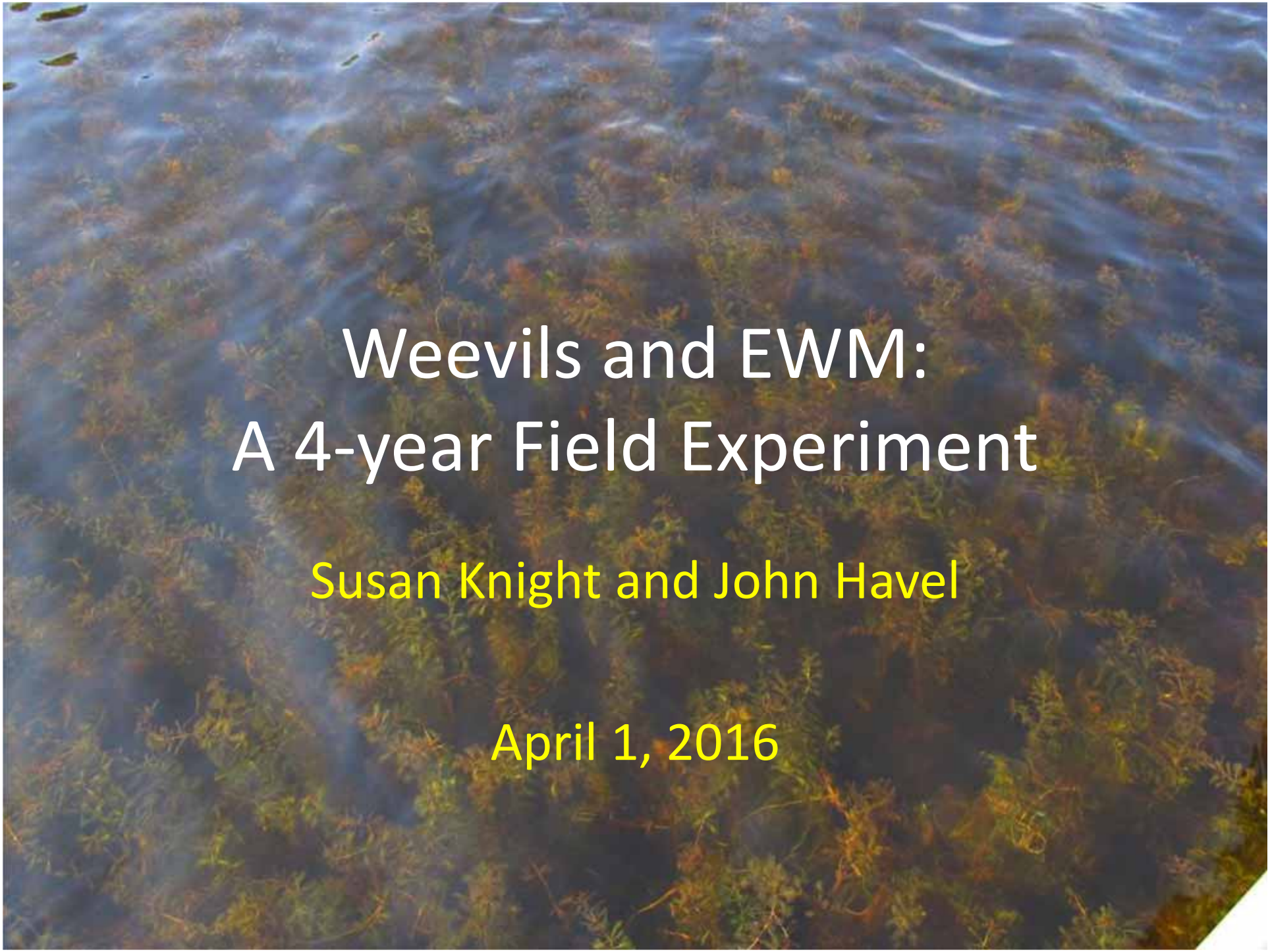


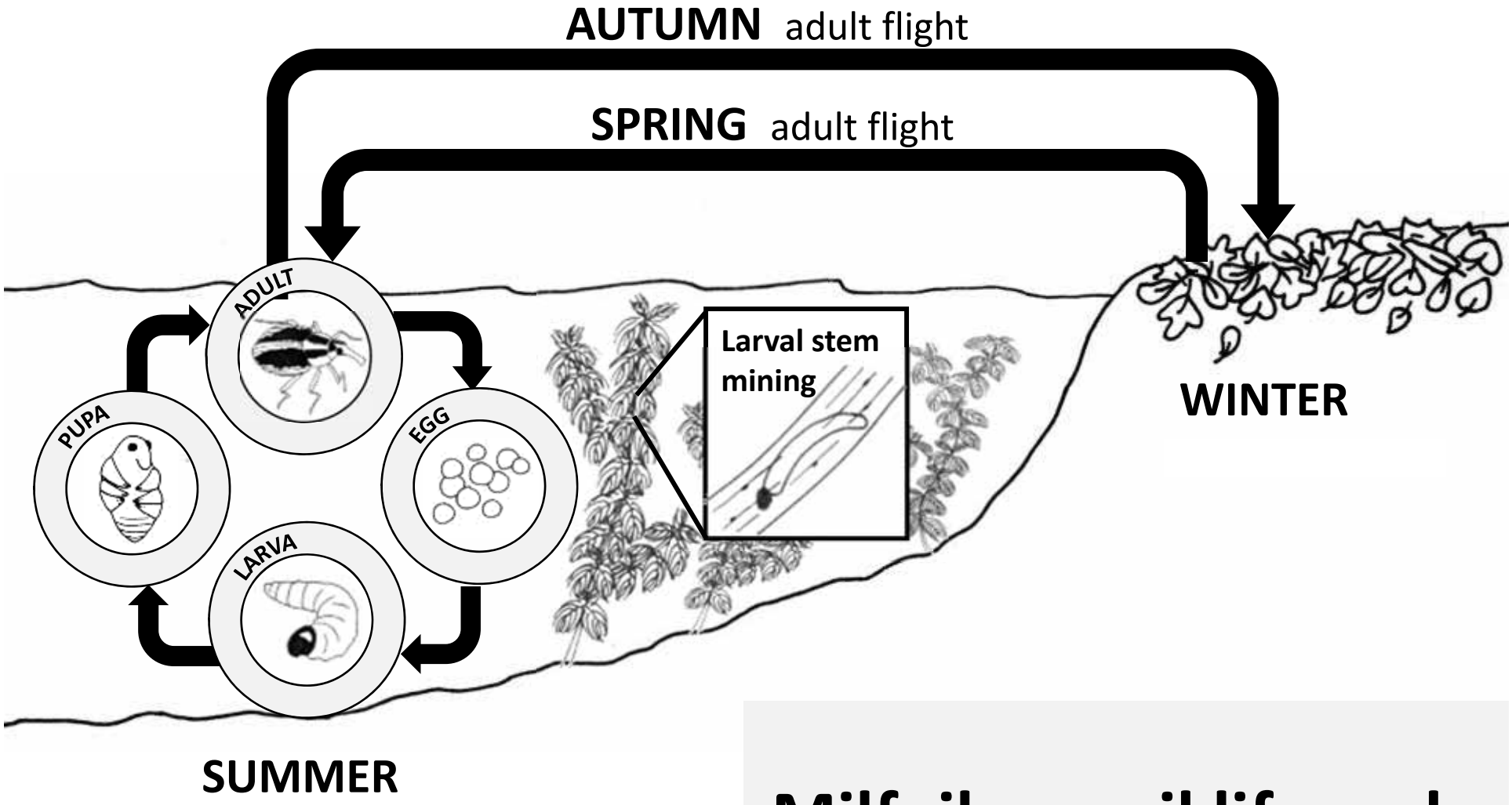
Weevils and EWM: A 4-year Field Experiment

Susan Knight and John Havel

April 1, 2016

Can Weevils Control EWM?

Little Bearskin Lake, Oneida County



Milfoil weevil life cycle

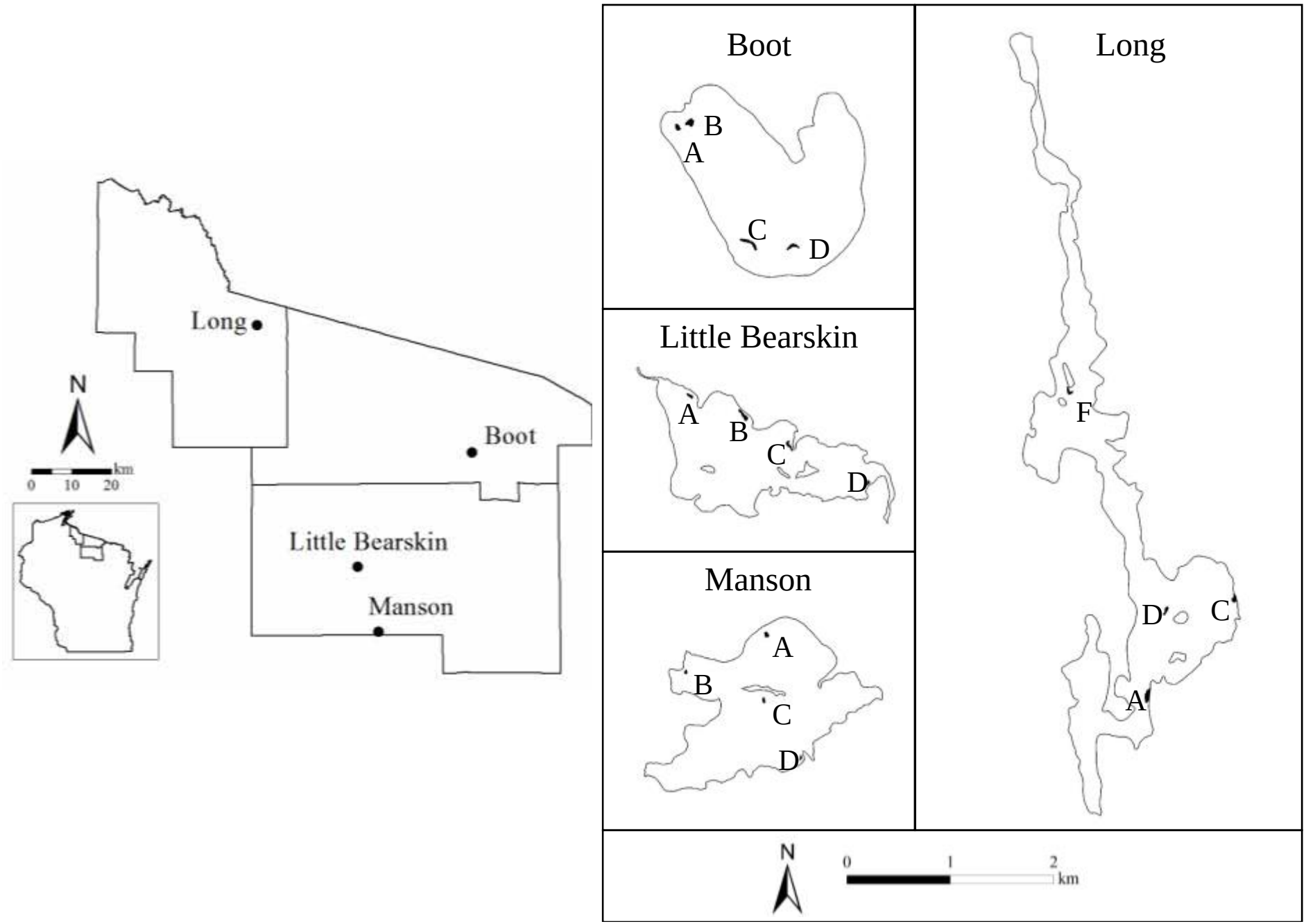
Can Weevils Control EWM?

Experimental design

- 4 Lakes
- 4 Beds/lake
- 2 beds/lake augmented with weevils (provided by EnviroScience)

Little Bearskin Lake, Oneida County

- 2012 baseline year
- 2013 augmentation with weevils
- 2014, 2015 planned augmentation years, but cancelled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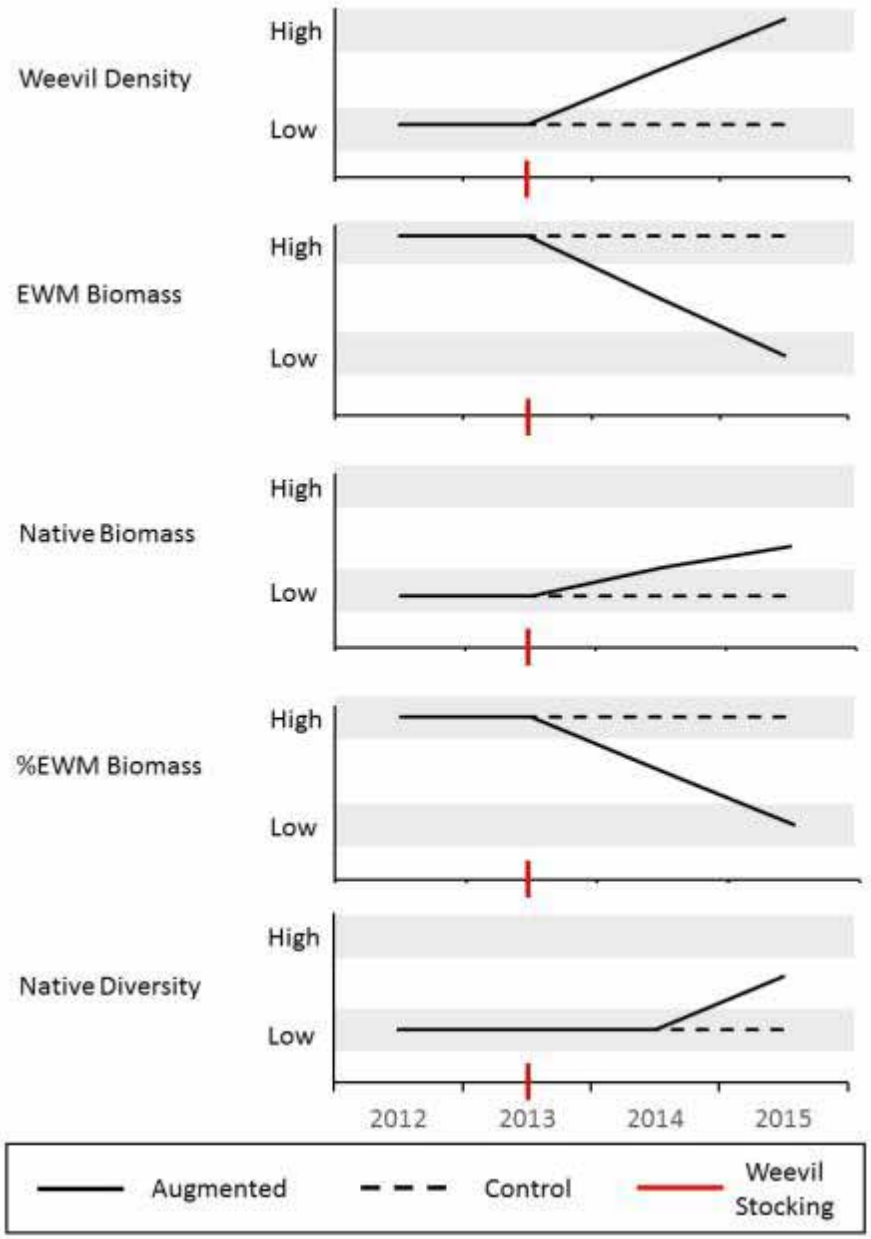
Hypotheses to Test



Weevil density will increase following augmentation

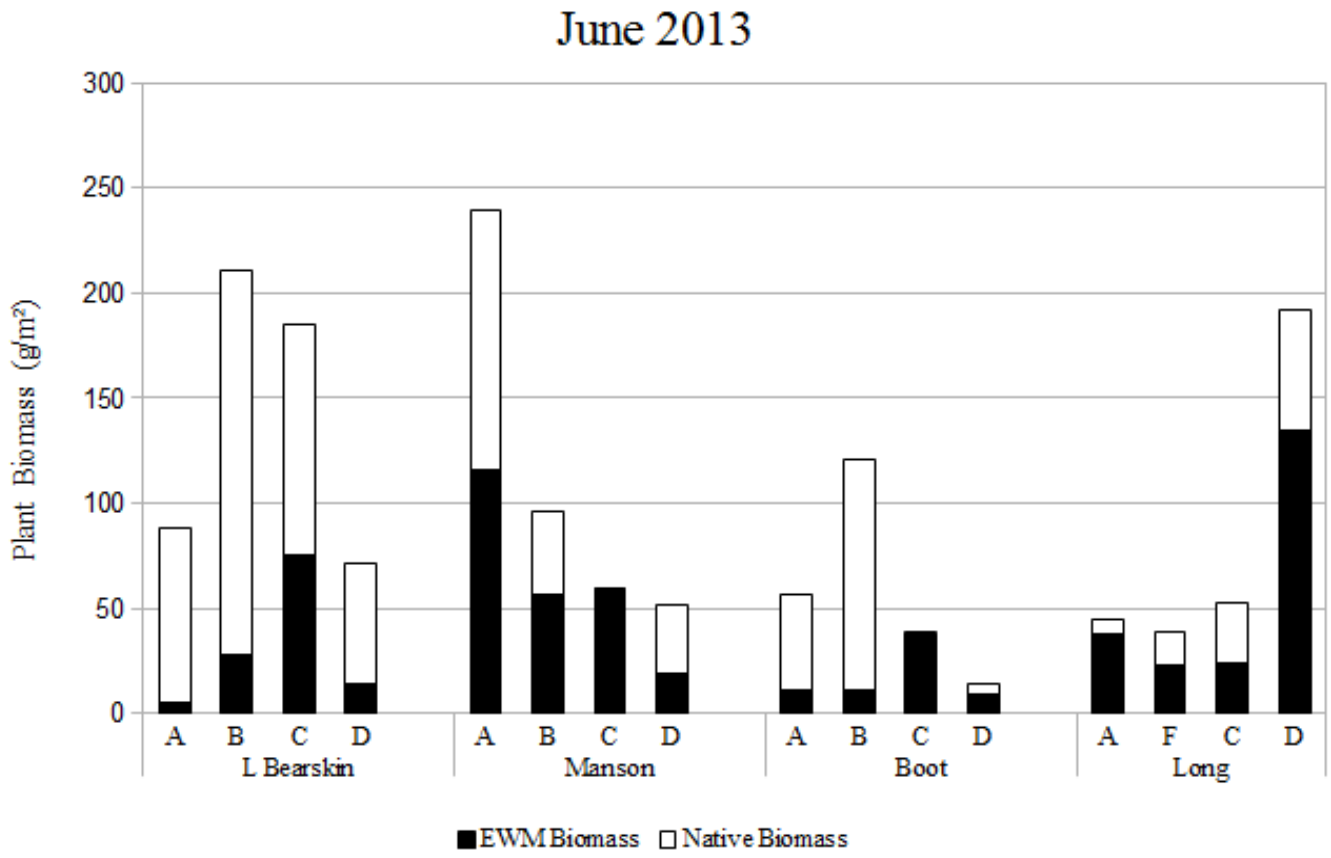
EWM biomass will decline

Native biomass will increase, but more slowly than EWM declines

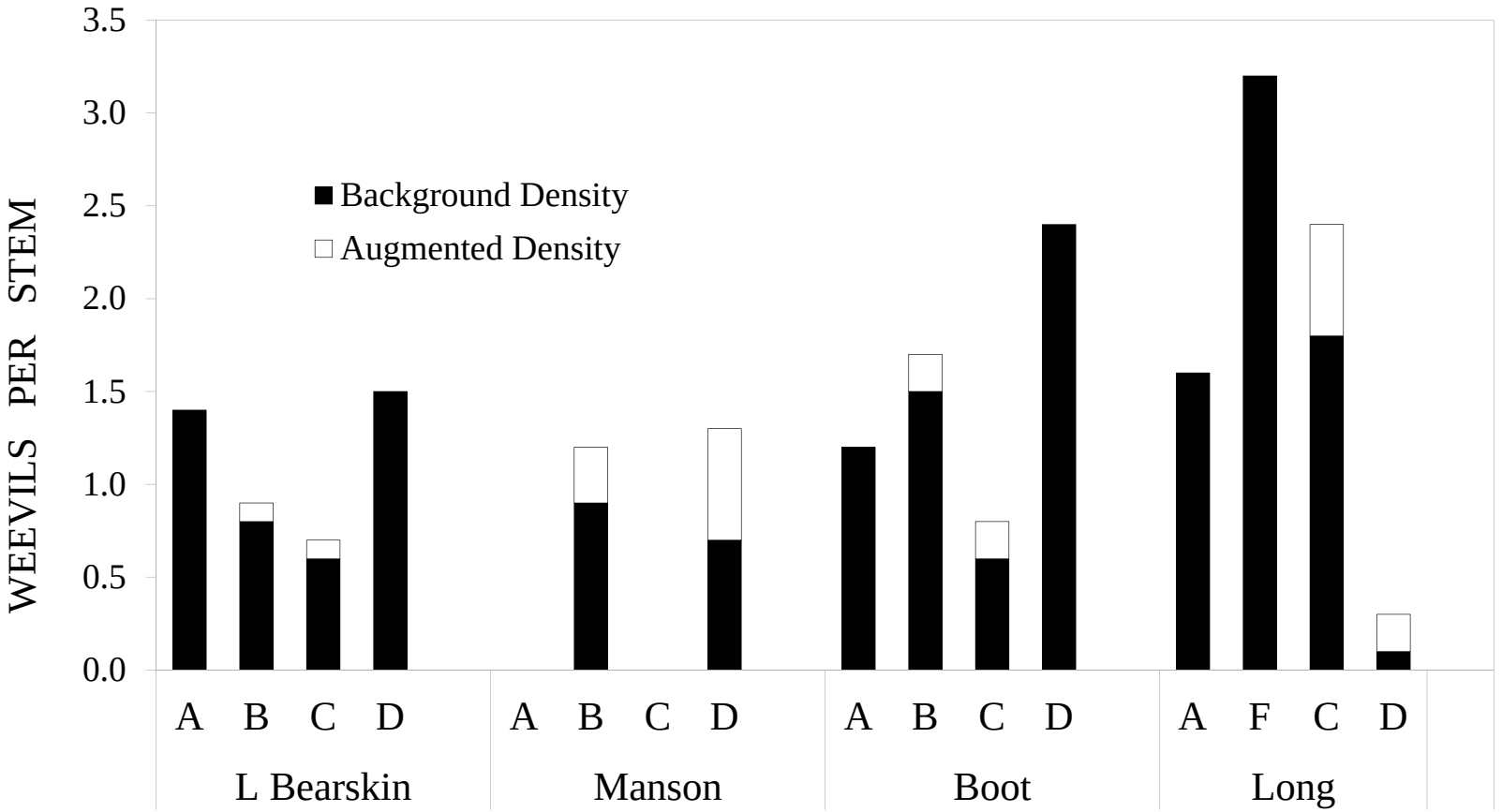
% EWM biomass will decline

Native diversity will eventually increase

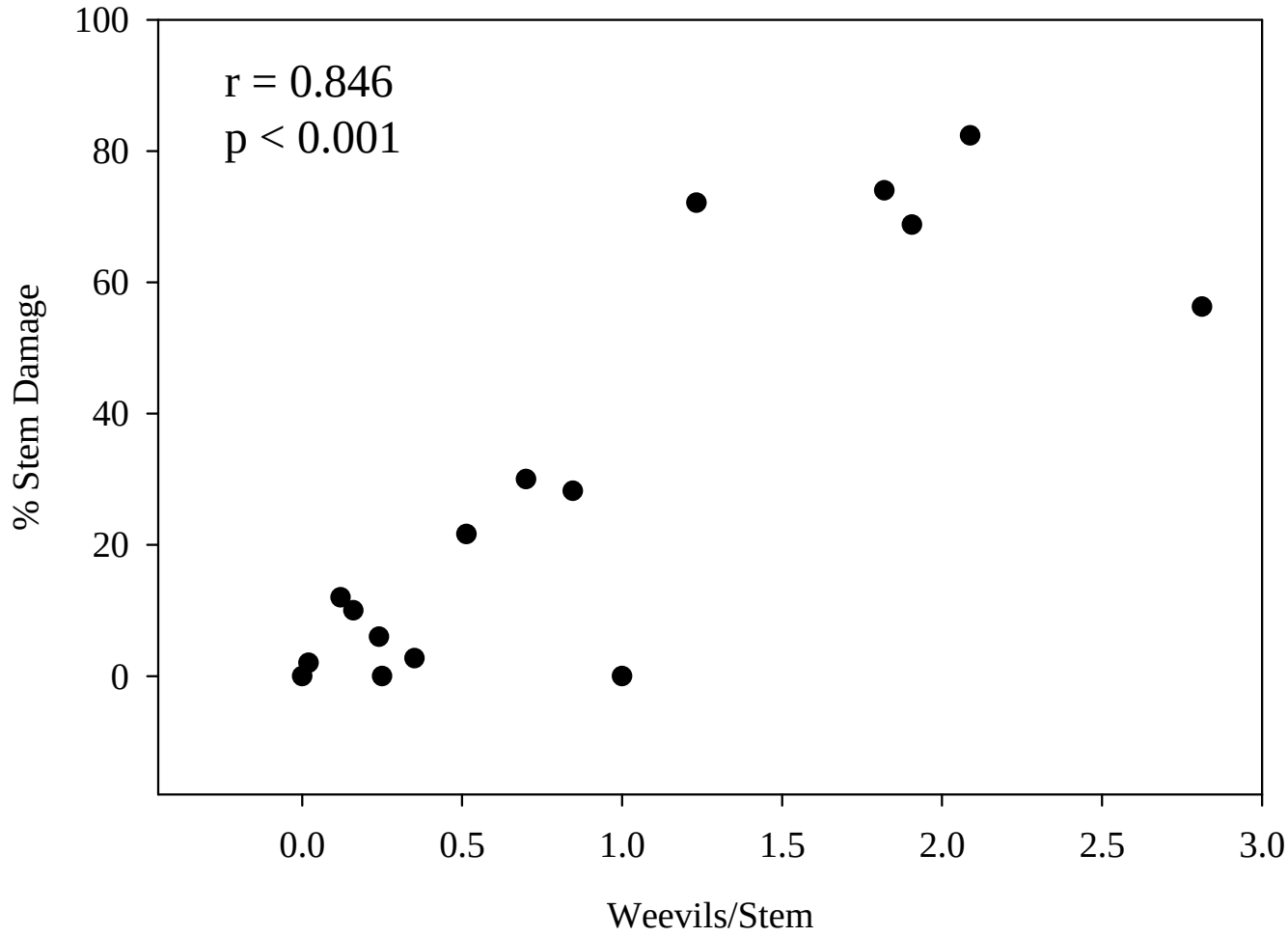
EWM biomass is highly variable, both among lakes and among beds. Trends are similar among years.



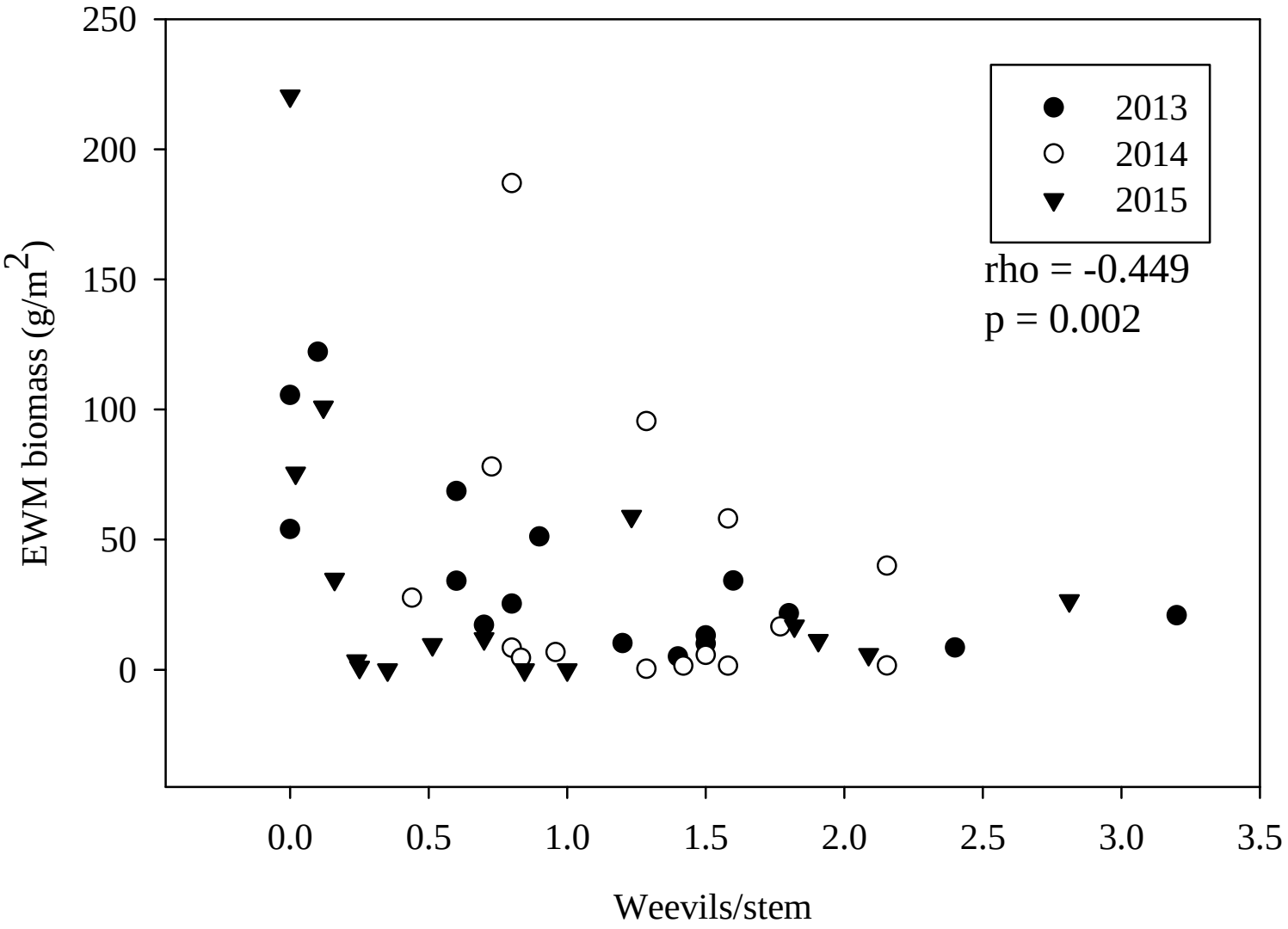
In some beds, extra weevils were a major addition to the existing weevil population but in many they were only a minor addition.



More EWM stems are damaged with higher weevils density



There is less EWM biomass with increased density of weevils



Results

- Weevils are common in EWM beds
- Weevils damage EWM
- There is less EWM biomass in beds with more weevils
- Experimentally, we could not detect a change in biomass consistent with weevil augmentation

Conclusions

- Biomass of native plants and EWM is highly variable among beds within a lake, among lakes and among years.
- Though weevils clearly harm EWM, weevils are not abundant enough to affect biomass of bed
- Our “treatment” was more of a nudge than a hammer. Lakes are messy and we needed a hammer.

Why didn't we see more of an effect?

- This was an experiment
  - It didn't not work, it was an experiment.
- Lake and bed selection
  - Lakes: not random (no herbicides)
  - Bed: not random (not too large)
  - Treatments to beds: random
- Background weevil population high in many beds
- Weevils may be working
  - EWM may be lower than it would be otherwise
  - These weevils cannot reproduce at a prolific rate

Should we spend money on weevils?

- No one offering weevils for sale in WI
- ES sold eggs, not adults
- $$$, but no harm
- Lake groups raise their own weevils?
- To be effective to combat EWM weevils need:
  - High EWM density
  - Absence of physical and chemical disturbance
  - Few weevil-eating fish
  - Proximity to good shore habitat
  - No chemical treatment

Lessons Learned

- Lakes are messy and complicated
- Field experiments are tough
- Find a very large hammer