Linking the Efficacy and Side Effects of Long-Term Best Management Practices for Eurasian Watermilfoil Control in Wisconsin Lakes

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Eurasian watermilfoil (*Myriophyllum spicatum*)

- Widespread
- Ecological/economic effects
- Management strategies and herbicide treatment
  - Treatment appears to decrease EWM, but most research is limited to one lake for one year.
  - What about the long-term?

Monitored 28 Wisconsin lakes for 11 years:

- Long-term herbicide efficacy
- Early response
- Non-target effects

Managed and unmanaged lakes from each of WI's 3 lake-rich ecoregions

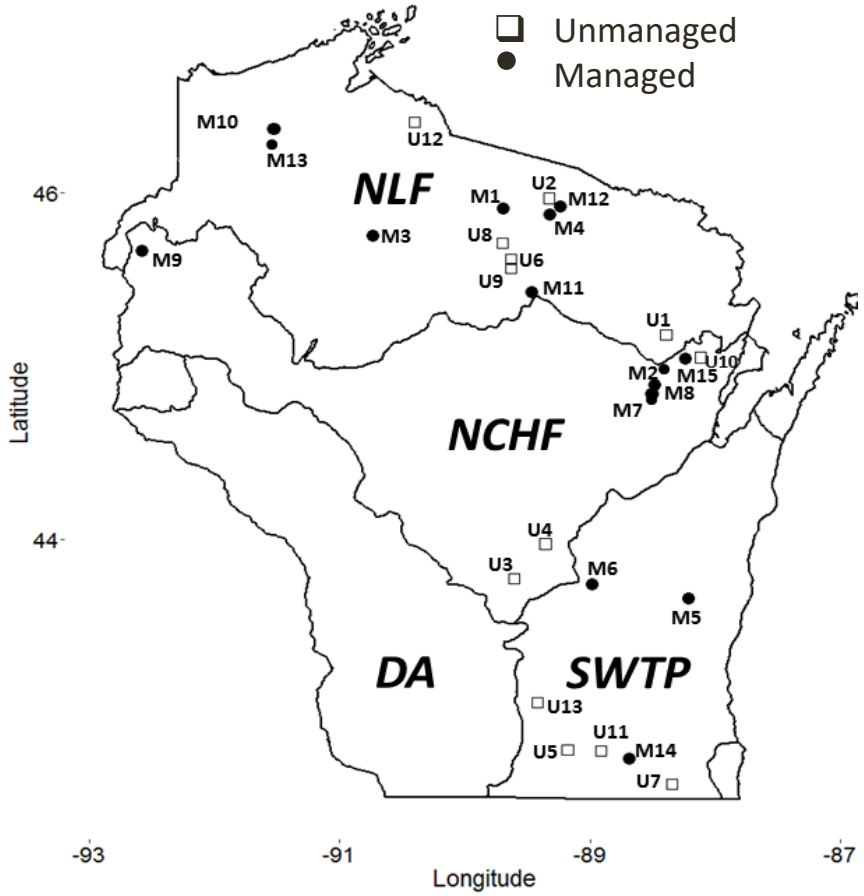
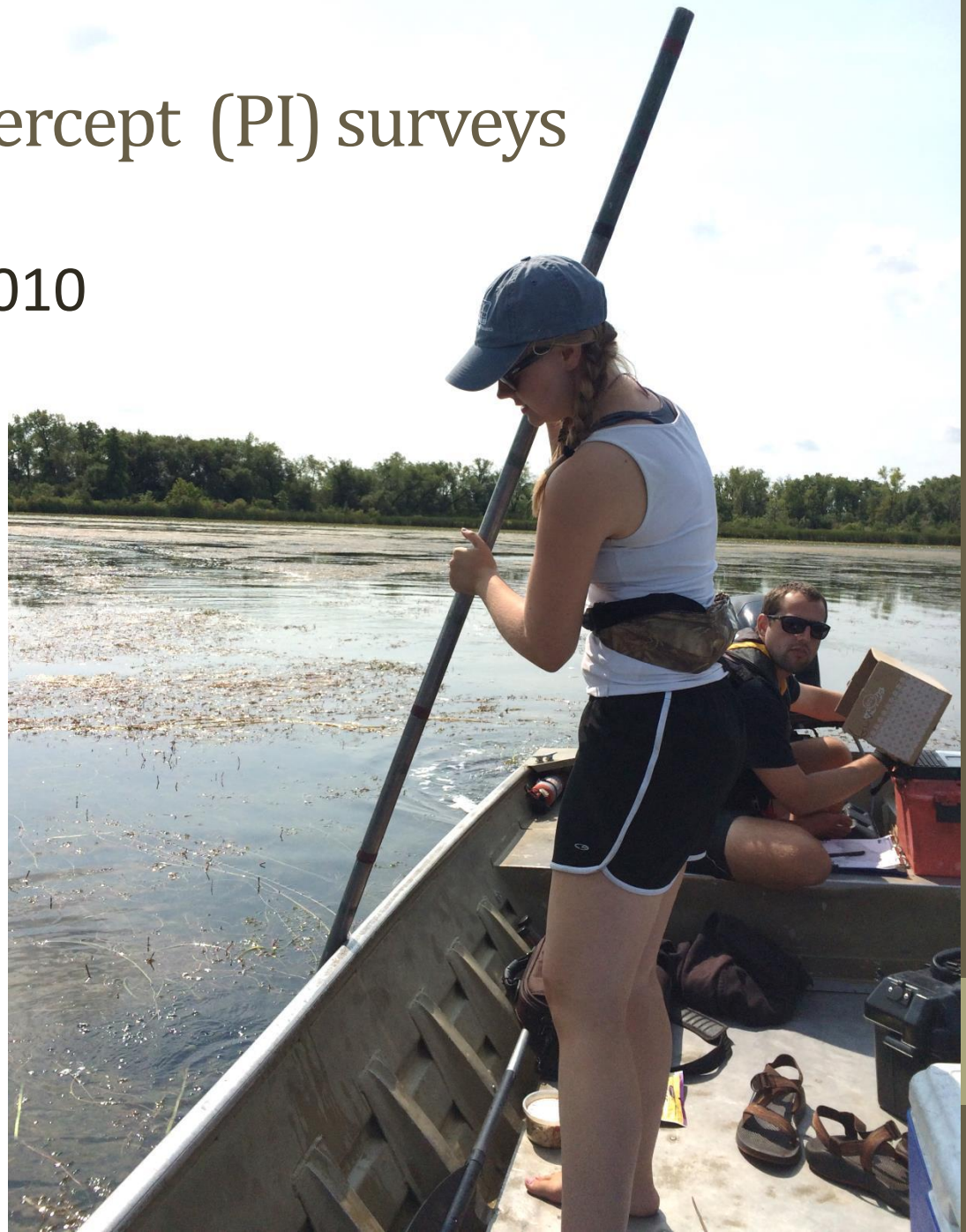


Fig. 1: Site map of long term study lakes

Annual point-intercept (PI) surveys

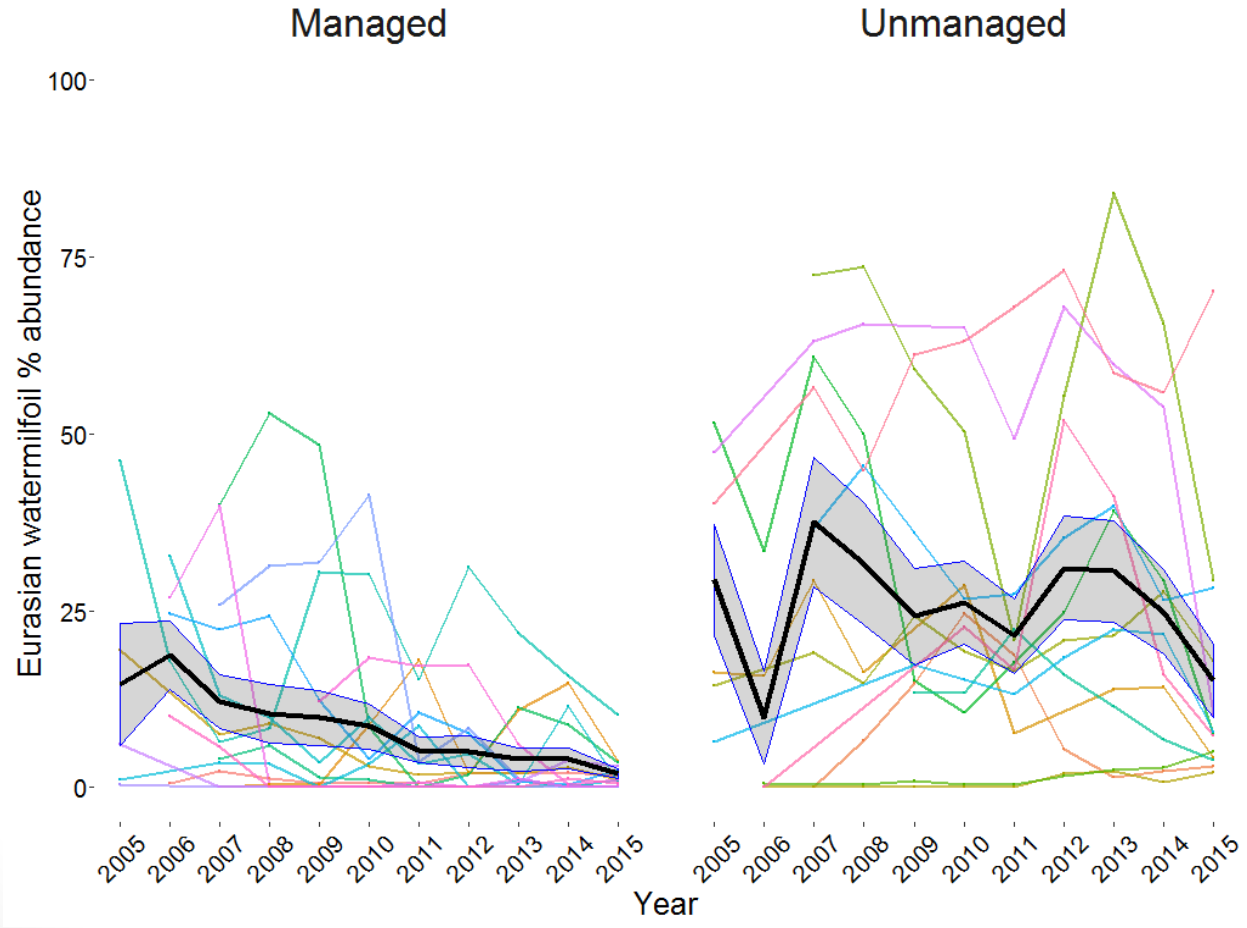
- Hauxwell et al. 2010



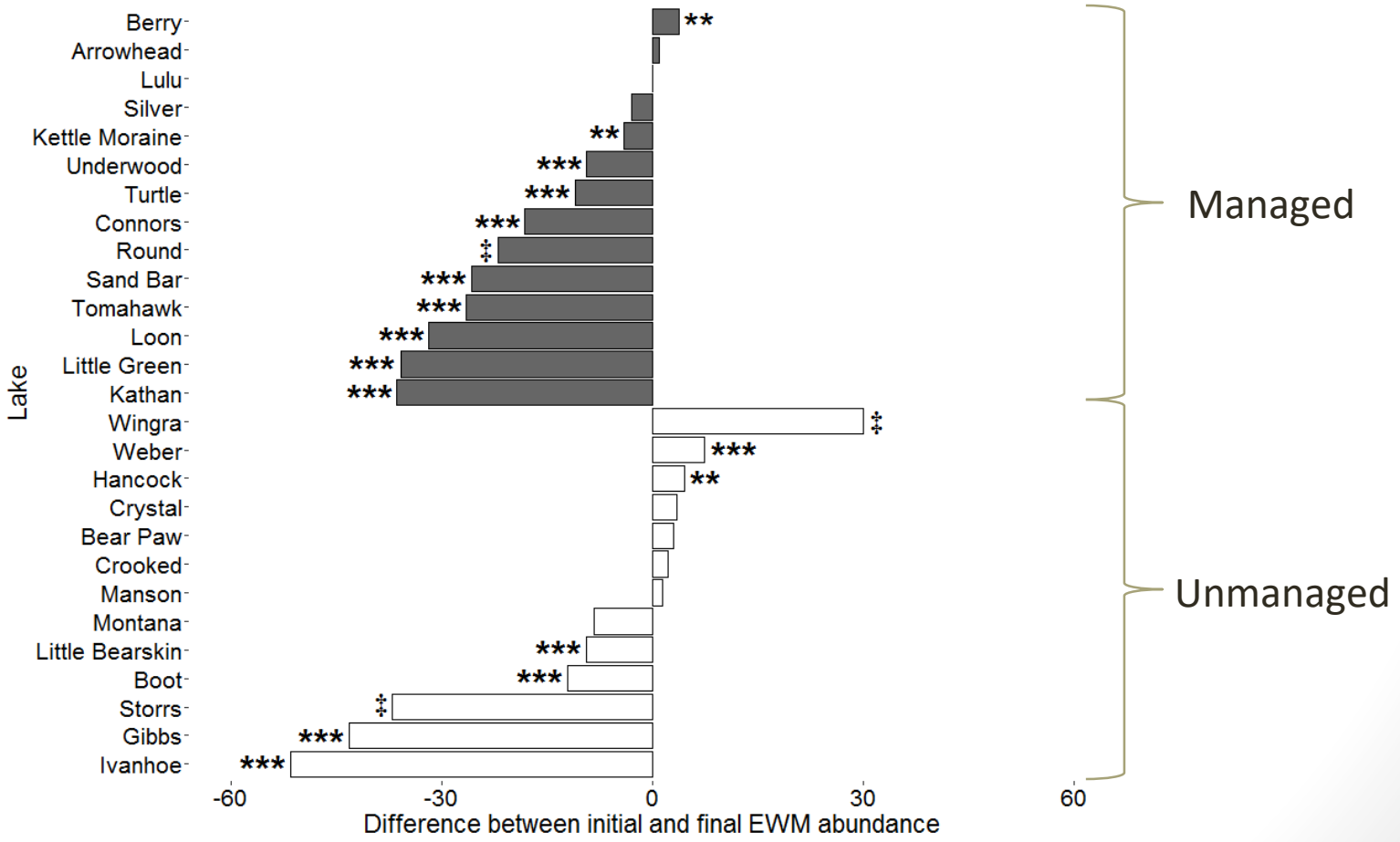
Statistical analyses

- Generalized estimating equations (GEE)
- McNemar's tests
- Kolmogorov-Smirnov tests

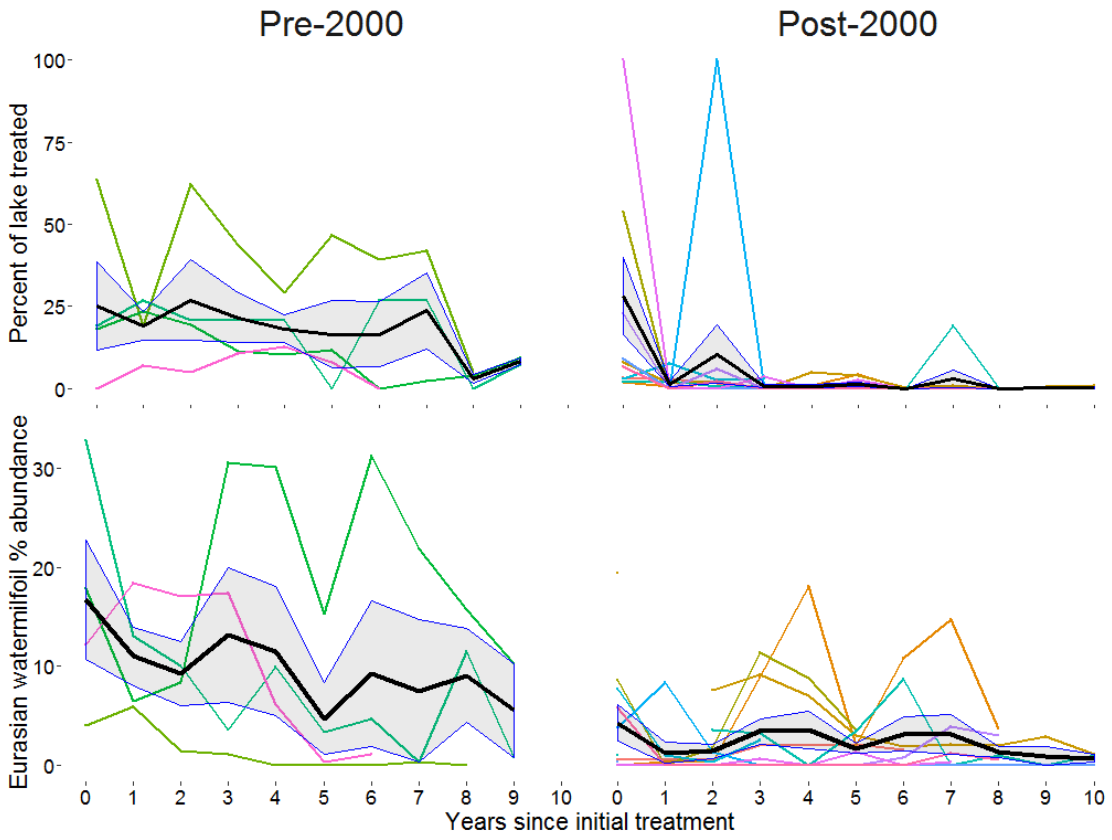
Lakes that treated as part of an adaptive management strategy had lower EWM abundance



Managed lakes had more significant decreases in EWM abundance over the course of the study



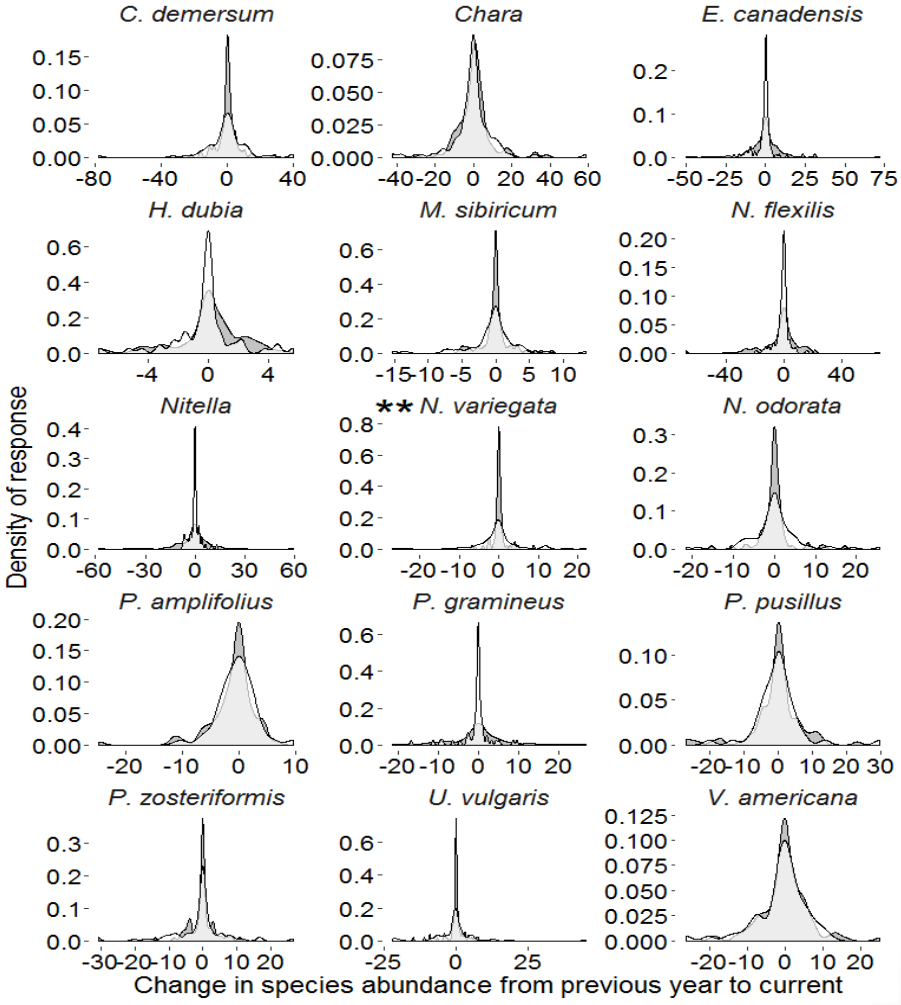
Early response to EWM invasion appears to increase treatment efficacy.



Sample size low

Native macrophyte responses to management are variable and can be significant.

- Decreased coontail and yellow-pond lily
- Increased Canadian waterweed and *Nitella* spp.



Results Recap

- Lakes that treated as part of an adaptive management strategies had lower EWM abundance.
- Managed lakes had more significant decreases in EWM abundance over the course of the study.
- Early detection of, and response to EWM invasion increases treatment efficacy (but low sample size!)
- Native macrophyte responses to management are variable and can, in a few cases, be significant.

Conclusions and further research directions

- Herbicide treatment appears to be an effective management tool, particularly for recently invaded lakes, though responses by native species should be considered carefully.
- To our knowledge, this is the largest and longest study of EWM, and provides new information to researchers, managers, and other lake stakeholders.
- Further research areas include:
  - Which factors optimize treatment efficacy
  - Whether early detection & response increase management success on a broader scale
  - Viability long-term management is, from an economic and social perspective


Questions?