

Modeling the growth and sustainable control of invasive Eurasian Watermilfoil

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Eurasian watermilfoil (EWM - *Myriophyllum Spicatum*) is an invasive aquatic plant which was first introduced into North America in the 1940s (originating from Europe, Asia, and North Africa). Like other invasive plants, EWM has the ability to grow and spread quickly, forming dense monocultures, due to its ability to outcompete many native aquatic plants.

We begin by expanding on previous theoretical models [1],[2] to describe the growth of EWM in a dense single stand, using an ODE approach. This model is used to predict the total bio-mass of a single patch of EWM over a single growing season. Our new extension takes into account the winter months, and so can monitor EWM growth over multiple seasons. The novelty in this approach is that it takes into account the amount of carbohydrates that are stored in the plant roots at the end of the growing season. These carbohydrates help drive the initial EWM regrowth in the following growing season.

Several management strategies have been adopted to control this invasive species including mechanical harvesting, chemical use, and use of bottom covers. These methods alone are not sustainable since they are expensive and take a great deal of effort to implement. We further extend our model, and show how a sustainable management strategy, which includes the use of a biological control, the Milfoil Weevil (*Euhrychiopsis Lecontei* Dietz), can be utilized as an effective control strategy.

[1] Herb, W.R., and Stefan, H.G. 2006. Ecological Modeling 193: 560–574.

[2] Miller et al., 2011, Biocontrol 56: 935–945.

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References

- [1] L. Lamport, *TeX: A Document Preparation System*. Addison Wesley, Massachusetts, 2nd Edition, 1994.