Supplementary Appendix S1

# **Detailed Course Outline: Aquatic Invasive Species Management 101**

## INTRODUCTION

* Welcome message
* Meet the instructors
* Tips for navigating the course and using the learning management system (Canvas)
* Acknowledgements
* Check-in assessment
* Discussion forum: introductions

## Module 1: aquatic plant management

* Learning objectives
* Terminology: Weeds vs. invasive species
* Overview of Minnesota’s Aquatic Plant Management and Invasive Aquatic Plant Management programs
* Overview and management options for submerged and emergent invasive plants
* Review quiz
* Discussion forum: Advantages and disadvantages of different types of management

## Module 2: other aquatic pests

* Learning objectives
* Terminology: Pests vs. invasive species
* Species profile and management options: Zebra mussels, swimmer’s itch, common carp, and rusty crayfish
* Review quiz
* Discussion forum: Thinking about differences between pathways and management of invasive aquatic

## Module 3: understanding pesticides

* Learning objectives
* Types of pesticides and how they work
* Factors influencing pesticide effectiveness
* What happens to pesticides in the environment
* Pesticide safety
* Pesticide resistance
* Limitations to chemical control
* Review quiz
* Discussion forum: Discuss new knowledge and murky concepts

## Module 4: pesticide regulations

* Learning objectives
* Agencies responsible for pesticide regulation
* How new pesticides get registered
* Permitting and applicator licensing requirements
* Understanding the label
* Minnesota rules and regulations
* Review quiz
* Discussion forum: How information can be used in the real-world

## module 5: Other types of control

* Learning objectives
* Physical removal: types, advantages, disadvantages
* Biological control: overview, advantages, disadvantages
* How to select management tools
* Discussion forum: Describe non-chemical control details helpful for decision-making

## module 6: evaluating management effectiveness

* Learning objectives
* Types of goals to evaluate
* Point-intercept vs. delineation surveys and challenges
* Survey methods for non-plant target organisms
* Required reporting vs. additional useful information for evaluation
* Review quiz
* Discussion forum: Discuss new knowledge and murky concepts

## module 7: taking a long view

* Learning objectives
* Thinking about management during different stages of invasion
* Benefits of control programs
* Importance of long-term planning and goal-setting
* Case study: How data and evaluation aid in improving management outcomes
* Review quiz
* Discussion forum: Identifying critical concepts

## Wrap-up

* Check-out assessment
* Course evaluation
* Additional resources

# Other course details

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  + Megan M. Weber, Extension Educator & Associate Extension Professor, University of Minnesota Extension and MAISRC
  + Patrick Mulcahy, Program Coordinator, University of Minnesota Extension and MAISRC
* Expert interview videos feature:
  + Managers of Invasive Aquatic Plant Management program and Aquatic Plant Management program managers at Minnesota Department of Natural Resources
  + Professional aquatic pesticide applicator
  + Aquatic Invasive Species Specialist at Minnesota Department of Natural Resources
  + Regulatory manager for pesticide development company
  + Graduate fellow at the Minnesota Aquatic Invasive Species Research Center, University of Minnesota
* Course overview at: https://maisrc.umn.edu/ais-management101