
OVERALL COURSE GOALS

The overall goals for this course are to empower the participants to:

1. Use science-based vocabulary, terms and approaches for developing and implementing for water conservation and stewardship.
2. Encourage use of optimal water use efficiency tools in water stewardship planning.
3. Implement water conservation strategies that provide multiple benefits (environment, pest management, nutrient water quality, economics).

COURSE STRUCTURE

- There are six self-paced modules (each approx. 1 hour) that must be completed within two-week timeframe
 - Each module has an **overall topic with 3-4 specific goals** and then a short video(s) and some reading materials that provide the information for each goal (quiz questions will be based on these sections)
 - Each module also has a **Lessons from the Field** video that highlights a real world situation of the overall topic of the module (there are no quiz questions from these videos)
- A **short quiz** at end of each module must be completed to advance to next module
- At the end of each module, there may be **additional resources** listed (there are no quiz questions based on these resources); these resources are also listed below in the section Additional Course Resources
- Pre- and post evaluation assessment of course will be offered to assess learning needs/accomplishments of participants

Module 1: Basic terms and principals of water conservation in agriculture

Goal 1: Review basic terms

Goal 2: Learn about water movement and hydrology for Wisconsin

Bob Smal (Wisconsin Department of Natural Resources): three part video series (15 minutes) on hydrology, water movement and evapotranspiration

Goal 3: Develop basic options for plant water needs

Bob Smal: one video (6 minutes) on water withdrawals (both groundwater and surface water) and evapotranspiration from soil and plants

Mallika Nocco (University of California-Davis): one video (9 minutes) on evapotranspiration and basic water use efficiency technologies

Lessons from the Field:

Bob Smail: one video (5 minutes) on Wisconsin's landscape and restoration aspects as they relate to water quantity

Module 1 Quiz

Module 2: Water management in Wisconsin, overall water levels, natural landscapes and agricultural use, on-farm management of landscapes

Goal 1: Understand how landscapes and their restoration relate to water quantity and water quality

Tracy Hames (Wisconsin Wetlands Association): two part video series (11 minutes) on what wetlands are, the different types of wetlands and how wetlands help with both water quantity and water quality management and why they are important

Goal 2: Learn about the importance of wetlands for water retention and filtration

Tracy Hames: one video (7 minutes) on the loss of Wisconsin wetlands and why restoration is so important

Goal 3: Learn how to work with private landowners to implement restoration on their farms

Review pages 9 and 10 from **Promoting Natural Landscapes: A Guide to Ecological Restoration and Practices for Wisconsin Farms**

Lessons from the Field:

Nick Somers: one video (3 minutes) on the Plover River Farms' wetland restoration projects and how it has benefited his farm and surrounding landscapes

Module 2 Quiz

Module 3: New approaches to optimize water use

Goal 1: Understand the basics of sustainable irrigation management

Yi Wang (University of Wisconsin-Madison): one video (3 minutes) on sustainable water management and also introduces irrigation systems and irrigation scheduling.

Goal 2: Learn about variable rate irrigation (VRI) strategies

Yi Wang: one video (7 minutes) on irrigation systems maintenance and new approaches, including variable rate irrigation technologies.

Goal 3: Determine options to measure soil moisture levels

Yi Wang: one video (9 minutes)

Goal 4: Understand the decision support tools that aid in efficient water use

Mallika Nocco: two videos (7 minutes) on water productivity, allowable depletion and how decision support materials can be used to develop innovative irrigation schedules

Lessons from the Field:

Megan Wallendal: one video (8 minutes) on Wallendal Farms' use of variable rate irrigation has environmental and economic benefits

Steve Dierks: one video (6 minutes) on Colomas Farms' use of the benefits and challenges of new on-farm technologies

Module 3 Quiz

Module 4: Managing Irrigation to optimize water use

Goal 1: Understand the business aspects of irrigation management

Mallika Nocco: one video (6 minutes) on the intrinsic value and costs of water and irrigation with a detailed look at water productivity and its relationship to sustainability in regards to economics, environmental and crop production aspects

Goal 2: Learn the principles of irrigation scheduling

John Panuska (University of Wisconsin-Madison, Biological System Engineering Department): one video (3 minutes) on the basics of irrigation scheduling and data needed to start the process

John Panuska (optional section): one video (20 minutes) on the details about how to start and use the WISP program. Following the video, there is a downloadable excel version to explore

Goal 3: Review the business aspects of irrigation management

Scott Sanford (University of Wisconsin-Madison): five videos (17 minutes) on why is irrigation scheduling important and what is needed; the importance of soil surveys, soil moisture monitoring, crop water needs and permanent wilting points; full versus partial irrigation strategies are covered

Scott Sanford (optional section): one videos (8 minutes) on the details of a checkbook method of irrigation scheduling

Lessons from the Field:

Jeremie Pavelski: one video (4 minutes) on Heartland Farms, Inc. innovative in-field technologies and their farm's efforts to effectively manage irrigation, challenges to implementing certain approaches, and proactive approaches to tackling key farming concerns

Module 4 Quiz

Module 5: Modeling water use: approaches and practices

Goal 1: Understand water quality concerns in a global context

Yi Wang: one video (5 minutes) on the key ideas on global water issues and how it links to food security worldwide

Goals 2 and 3: Review solutions that other countries have developed and Learn about research and collaborative approaches used to address water quality concerns

Yi Wang: three videos (12 minutes) on three case studies that have addressed water quantity issues in Spain, China and Africa, and how collaborations and research have addressed the water quantity concerns

Lessons from the Field:

Dan Mahoney: one video (12 minutes) on the Little Plover River Restoration project and the on-going research efforts

Module 5 Quiz

Module 6: Implementing water conservation

Goal 1: Learn about the Wisconsin Water Stewards Program

Deana Knuteson: one video (4 minutes) on the the basics of the program and the standards used in its development

Goal 2: Explore opportunities to work with individuals on water quantity conservation

Deana Knuteson: one video (5 minutes) on how growers use the Wisconsin Water Stewards Program

Goal 3: Understand water conservation goals and place-based strategies

Bob Smail: four videos (20 minutes) on options for placed-based conservation planning, assessment and the development of targeted conservation tools.

Lessons from the Field:

Jed Colquhoun: one video (3 minutes) on how the Central Sands water quantity issues affect growers and markets.

Module 6 Quiz

ADDITIONAL COURSE RESOURCES

Presentation downloads for all modules listed in order of appearance by speaker:

Deana Knuteson: [WaterStewards_Knuteson_Overview.pdf](#)

Bob

Smali: [WaterStewards Smali WaterConservation1.pdf](#) [WaterStewards Smali WaterConservation2.pdf](#)

Mallika Nocco: [WaterStewards Nocco WaterProductivity.pdf](#)

Tracy Hames: [WaterStewards Hames Wetlands.pdf](#)

John Panuska: [WaterStewards Panuska ET WISP.pdf](#)

Scott Sanford: [WaterStewards Sanford IrrigationScheduling.pdf](#)

Yi Wang: [WaterStewards Wang AgWaterUse.pdf](#) [WaterStewards Wang SustainableIrrigation.pdf](#)

MODULE 2

Link to Ecosystems

Workbook: https://ipcm.wisc.edu/download/pubsBIOIPM/2016_EcosystemWorkbook_web.pdf

Videos and information from the Wisconsin Wetlands Association:

Home page for Wisconsin Wetlands Association: <https://wisconsinwetlands.org/>

Information For Landowners: <https://wisconsinwetlands.org/for-landowners/>

Video Informative Series: <https://wisconsinwetlands.org/videos/>

MODULE 3

Estimating Soil Moisture by Feel and

Appearance: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_051845.pdf

MODULE 4

Wisconsin Irrigation Scheduler Excel Spreadsheet: [WI Irrigation Scheduler WIS LAI V4.20.18.xls](#)

MODULE 5

"Economic Valuation of Water Resources in Agriculture" from the Food and Agriculture Organization of the United Nations: <http://www.fao.org/3/y5582e/y5582e04.htm> (Links to an external site.)

"Sustainable Water Management in Agriculture under Climate Change" from Science



Direct: <https://www.sciencedirect.com/science/article/pii/S2210784315000741> (Links to an external site.)


"Water Pollution from Global Agriculture" from the Food and Agriculture Organization of the United Nations: <http://www.fao.org/3/a-i7754e.pdf> (Links to an external site.)

"Wisconsin Groundwater Quality" from Wisconsin Agriculture, Trade and Consumer Protection: <https://datcp.wi.gov/Documents/GroundwaterReport2017.pdf>

MODULE 6

Water Stewards Program: [WaterStewards_Intro.pdf](#)  [WaterStewards_Background.pdf](#) 

Water Stewards Grower Assessment: [2018_WaterStewardshipAssessment_.pdf](#)  [LongTermConservationPriorities.pdf](#) 

Placed-based Conservation Options Table: [WaterStewardTableOptions.pdf](#) 

Jed Colquhoun's Badger Common' Tater Article (June 2016): [1606_BadgerBeat.pdf](#) 

OPTIONAL FIELD VISIT OPPORTUNITIES (Summer 2020)

Participants who are interest in seeing Water Stewards in action will have the opportunity in the summer of 2020! Below are some proposed options for site visits. These will be updated closer to the actual dates!

1: Restoration Sites

2: Grower Fields and Research Station Plots

3: Community projects