



Increasing Access to High Quality, Affordable Wetland Training for On-the-Ground Wetland Professionals in the United States

**Final Grant Report
EPA Grant #83578201**

Submitted to the U.S. Environmental Protection Agency
Wetland Program Development Grants Program
by the Association of State Wetland Managers





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Report Introduction

This document represents the final report to EPA on the Association of State Wetland Managers' Wetland Program Development Grant project (EPA Grant #83578201) to improve access to high quality wetland training for states, tribes and other wetland professionals across the United States.

This project was designed to explore and articulate training priorities that will increase the capacity of on-the-ground state and tribal wetland professionals to carry out their day-to-day work implementing wetland programs. The project was designed to identify tools and techniques to improve decision making and ultimately enhance the protection and management of wetlands.

This report shares ASWM's wetland training project activities, findings, products, new tools and opportunities the project has created. The report concludes with a summary of findings about the needs for supporting future efforts to improve access to high quality, low cost wetland training. Additionally, ASWM has developed a training [project page](#) on the ASWM.org website, which provides direct links to all the products of the project.



Photo Credit: Brenda Zollitsch

Formation of a National Project Workgroup to Guide ASWM's Wetland Training Project

ASWM formed a National Wetland Training Project Workgroup to provide guidance to the grant project. The national project workgroup was formed to be representative of the range of different wetland programs, geographic distribution, and expertise with training programs.

The following is a list of the National Wetland Project Training Workgroup Members:

1. Collis Adams, Administrator, Wetlands Bureau, New Hampshire Department of Environmental Services
2. Ryan Anderson, Bureau Chief, Bureau of Coastal Regulation, New Jersey Department of Environmental Protection
3. Kristen Bennett, Member, American Water Resources Association (FL Chapter) and National Association of Environmental Professionals
4. Eliodora Chamberlain, National Wetland Monitoring & Assessment Lead, U.S. EPA Region 7
5. Jeanne Christie, Executive Director, Association of State Wetland Managers
6. Laura Giese, Visiting Faculty, College of Natural Resources and Environment, Virginia Tech
7. Joanna Lemley, Wetland Ecologist, Colorado Natural Heritage Program
8. Michael McDavit, Chief, Wetlands Strategies and State Programs Branch, Office of Water/USEPA
9. Maryann McGraw, Wetlands Program Coordinator, New Mexico Environment Department
10. Doug Norris, Minnesota Department of Natural Resources
11. Carol Petrow, Acting Team Leader, Wetland Science Team, U.S. EPA Region 3
12. Regina Poeske, Senior Ecologist, U.S. EPA Region 3/EPA Headquarters
13. Myra Price, Office of Wetlands, Oceans and Watersheds, U.S. EPA
14. Lisa Rhodes, Wetland Program, Massachusetts Department of Environmental Protection
15. Mike Rolband, President, Wetland Studies and Solutions, Inc., Virginia
16. Matt Schweisberg, Principal, Wetland Strategies and Solutions/Society of Wetland Scientists Representative
17. Yvonne Vallette, Aquatic Ecologist, U.S. EPA Region 10, Oregon Ops Office
18. Amy Yahnke, SEA- Wetlands, Washington Department of Ecology
19. Brenda Zollitsch, Policy Analyst, Association of State Wetland Managers

National Project Workgroup Calls

ASWM's National Wetland Training Project Workgroup met monthly through the majority of the grant project period. Up to two hours calls were held on the third Tuesday of the month at 3 pm Eastern. ASWM hosted a series of calls to discuss key project topics and guidance for the various elements of the project.

The following is a list of the calls held and the topics covered during the calls:

- *February 11, 2016 Inaugural Workgroup Call*
Covered: Welcome and introductions; overview of project and reason for forming project workgroup; update on ASWM work to date; review initial training needs list developed from ASWM research and evaluations; how this project will connect with other ASWM training initiatives; group sharing session about workgroup members perceptions about wetland training needs; expectations for participation in the workgroup; and next steps.
- *March 16, 2016 Workgroup Call*
Covered: Project progress report; review of training types; presentation of wetland training matrix; ASWM's plans for comparative analysis of different ASWM trainings; group work session on identifying the characteristics of high quality training; work session on development of pilot online training; plans for developing a wetland training academic white paper.
- *April 19, 2016 Workgroup Call*
Covered: Group discussion about connecting wetland professionals with existing training resources (review of the list of current training entities, workgroup sharing of other providers not on the list); identification of other potential training types that should be included in the matrix; feedback on elements of search tools for use by ASWM when developing online searchable database of national training opportunities; sharing of research-based evaluation tool developed for the project to assess quality of different types of ASWM trainings for the project; update on forthcoming planning call on soils training online pilot; group input on potential faculty members to invite to join the project's academic white paper project committee.
- *May 17, 2016 Workgroup Call*
Covered: Continued review of training matrix content; group review of compiled documentation of characteristics of high quality wetland training; sharing of evaluation tools; sharing of decisions and four-training outline from soils training planning subgroup and discussion/recommendations.
- *June 21, 2016 Workgroup Call*
Covered: Review of plans for soil training webinar series; evaluation efforts; planning for academic white paper; online training modules planning decisions.
- *July 19, 2016 Workgroup Call*
Covered: Review of Hydric Soils Webinar #1, quiz, and upcoming training webinars; group planning on online module development; decisions about marketing online trainings, and timing for rollout; Revision of training list; blog on characteristics of high quality wetland training; and academic white paper discussion.

- *August 16, 2016 Workgroup Call*
Covered: Review of Hydric Soils Webinar #2; plans for promoting/marketing online modules; progress report on on-the-ground hydric soils training guidance document; potential pilot at upcoming joint NEBAWWG/MAWWG meeting in New Jersey; supporting accommodations for the hearing impaired; review of assessment stats from Winter Meeting; identifying desirable skills for wetland professional hiring processes.
- *September 20, 2016 Workgroup Call*
Covered: Review of Hydric Soils Webinar #3; changes to quiz mechanism and questions; review of web-based structure for online training modules; review of mapping of front-end user experience for online modules; discussion of charges for certificates for non-ASWM Members; update on academic white paper; connecting with firms to gather insights on professional hiring processes and desirable training/skills; review of grant and reporting requirements.
- *October 18, 2016 Workgroup Call*
Covered: Review of four-part Hydric Soils Webinar Training Series results; discussion of on-the-ground Hydric Soils Training Guidance document; discussion on next steps in training series; discussion of online training modules development; input on white paper contents.
- *November 15, 2016 Workgroup Call*
Covered: Development of online modules and beta testing of modules; review of online module structuring and payment decisions; On-the-Ground Hydric Soils Training Guidance document and pilot; evaluation of inter-regional training session and RAE national conference using ASWM training evaluation tool; populating the academic white paper; working towards project closure (final products, reporting, etc.); and next steps for ASWM training activities.
- *Workgroup members participated in ongoing beta testing and review of project materials until the end of the project period.*

Training Needs of On-the-Ground Wetland Professionals Identified

For this project, ASWM conducted a significant needs assessment connecting the dots between findings from a range of major ASWM studies and discussions with wetland program managers and partners on training needs. The need for improved training on a range of topics was derived from ASWM’s State Wetland Program Status and Trends Report, Wetland Restoration Project, study on stream identification, delineation and jurisdiction, and through ASWM’s ongoing workshop and training activities. Partners have shared similar findings as well. According to the Society of Wetland Scientists Professional Certification Program Board of Directors, the absence of affordable training opportunities is a source of concern for many wetland professionals.

A list of training needs (Table 1) was developed, circulated and revised to become a guide for ASWM’s priority setting. This list is not all-inclusive, but provides a roadmap of needs that have emerged from investigation and discussion with our key stakeholders over the last several years. Information on ASWM’s [wetland training needs](#) is also on the ASWM.org-based project page.

Table 1. Summary of Priority Training Needs for Wetland Professionals

A. Regulatory Training
1. Training on strategies to strengthen §401 Water Quality Certification Programs
2. Orientation to the Clean Water Act and the Section §404 Program
3. Wetland basics – hydrology, soils, plants, biology, hydro-bio connections, etc.
4. Training on wetland-specific regulatory topics (especially for new staff), such as what is a wetland regulatory program, how to review a permit, how to integrate requirements into permits; how to develop, implement and evaluate mitigation requirements; and how to evaluate outcomes.
Additional regulatory training priorities include: How to review a restoration permit application; Training on in lieu fee programs and mitigation bank development/financial and legal planning; Training on energy project wetland impacts and permitting considerations; and How to use functional uplift measures in mitigation assessment
B. Monitoring and Assessment Training
1. Training on targeted monitoring and assessment tools
2. Guidance on how to adapt targeted monitoring and assessment tools to individual states (RAMs, IBIs)
3. How to effectively use monitoring and assessment tools to measure success (performance)
Additional monitoring and assessment training priorities include: Mapping and other technology; QA/QC for wetland mapping; Training on how and when to use hydrogeomorphic assessments (HGM); Measuring functional uplift; How to target data collection to support program goals; and Field-based training to see and test on real-world examples
C. Wetland Water Quality Standards Training
1. Training for states that rely on 401 certifications on how wetland water quality standards can strengthen their protection of wetlands
2. What makes water quality standards for wetlands unique from other standards
3. Sharing of models, templates and lessons learned
D. Wetland Restoration Training for Voluntary and/or Regulatory (Mitigation) Restoration
1. Training on components of restoration success and how to measure success (performance)
2. How to incorporate wetland restoration into larger watershed planning
3. How to connect wetland restoration with floodplain and hazard management
Additional monitoring and assessment training priorities include: How to develop performance standards for restoration projects; Training on restoration techniques; How to prioritize restoration site selection; How to access and use comprehensive GIS data layers for restoration planning and design; and Training on how to incorporate applicable recommendations to other (non-state) voluntary wetland restoration planning and implementation efforts
E. Other Training Topics
1. Training on how to successfully use and develop tools to assist with communications
2. Training on specific technical tools and topics (e.g. scenario based planning, adaptation planning processes; ecosystem services valuation)
3. Training on EPA’s four core elements and how to strengthen them (planning and implementation)
4. Trainings that further explore the impacts to wetlands from climate change and/or the value of wetlands to ameliorate some of the impacts of climate change
5. Training on leadership, strategic planning, supervision, facilitation and project management

Matrix of Existing Wetland Training Providers Developed and Posted on ASWM’s Website

While ASWM is interested in helping create or facilitate the creation of high quality training to fill in the gaps, it would be inefficient to recreate the wheel where there are existing high quality trainings that are accessible and affordable to state wetland professionals. One of the first tasks undertaken by ASWM was to identify existing training offerings and to compile a matrix of these offerings. ASWM has identified over 350 wetland training offerings and more than 100 entities that regularly deliver wetland training in various locations across the United States. To organize this information, ASWM developed a matrix to provide consistent information between providers in a user-friendly format (Figure 1). The online [wetland training providers matrix](#) is also on the ASWM.org-based project page.

ASWM’s new matrix provides available information on training offerings listed by:

- Name of training entity
- Type of training
- Delivery mechanism (classroom, online, fieldwork, etc.)
- Level of education (undergraduate, graduate, professional/continuing)
- Additional information, if available, is included on the cost of the training and whether or not it contributes towards certification requirements.

This matrix has been posted on the ASWM website. The focus of the matrix is on connecting those seeking trainings with information about who is offering what. Training opportunities are also currently being posted on ASWM’s website calendar.

Figure 1. Partial Screenshot of ASWM Wetland Training Provider Matrix

Training Institution	Type of Trainings Offered	Delivery Types	Entity Type	Weblink	Examples of Training Offerings
American Water Resources Association (AWRA) Annual Conferences	Professional Training	webinars, conferences, podcasts, etc.	Association	http://www.awra.org/	Climate change and water resources, Water quality and/or monitoring, Infrastructure, WTRB, Social Media, Citizen Science
Antioch University - New England (Graduate Courses)	Graduate Course	classroom, online courses and fieldwork	Academic	http://www.antiochne.edu/academics/	Sustainability, Resource Management and Conservation, Environmental Studies, etc.
Army Corps of Engineers Learning Center	Professional Training	Workshops	Government	http://alc.usace.army.mil/	Range
Association of Massachusetts Wetland Scientists	Professional Training	Workshops	Nonprofit	http://www.amwts.org/upcoming_workshops.html	A range of workshops on wetland science and regulatory updates
Association of State Wetland Managers (ASWM)	Professional Training	webinars and conferences	Nonprofit	http://www.aswm.org/aswm/aswm-webinarscalls	Range
B.F. Environmental Consultants	Professional Training	Workshops, Online training	Private	https://www.bfenvironmental.com/	Wetland delineation, Primer for Design Professionals, Field Evaluation and Permitting Considerations, Constructed wetlands, Inland wetland restoration, stream restoration, green infrastructure
Buzzard's Bay National Estuarine Research Reserve	Professional Training	Workshops, courses, online courses	Government	http://buzzardsbay.org/	Wetland delineation
Center for Watershed Protection	Professional Training	Webcasts, on-site training seminars, conferences, publications and fieldwork	Nonprofit	http://www.cwp.org/training/	analyzing and assessing watersheds, protecting watersheds, restoring watersheds, designing better development sites, managing stormwater runoff, improving watershed forestry, building better local NPDES programs, detecting and eliminating illicit discharges, etc.
Coastal Carolina University - Master of Science in Coastal Marine and Wetland Studies	Graduate Course	Graduate Courses, Highschool and Undergraduate Internships, Public Programs, Technical Training Programs and Workshops	Academic	https://www.coastal.edu/coastalstudies/	Coastal Marine and Wetland Studies
College of William and Mary - Virginia Institute of Marine Sciences	Various Educational Programs	Graduate Courses, Highschool and Undergraduate Internships, Public Programs, Technical Training Programs and Workshops	Academic	http://www.vims.edu/education/index.php <small>See these F13 & 141 the same</small>	Marine Science

Characteristics of High Quality Wetland Training Identified

Part of ASWM’s effort to connect wetland professionals with training opportunities was to determine the characteristics of “high quality” training. To explore this and identify the characteristics, ASWM staff (in collaboration with the national project workgroup) conducted a review of peer-reviewed and training industry literature on training quality. Working with states and the national workgroup, ASWM gathered additional information. The project has produced a list of key characteristics to guide practitioners developing training activities as well as wetland professionals seeking to participate in high quality learning opportunities (Table 2). Key characteristics address elements, ranging from quality of teaching staff and a foundation based on sound science to training approaches and evaluation. ASWM encourages wetland professionals to evaluate training alternatives, including those offered in the future by ASWM, based on these characteristics, by examining whether specific elements are in place and encouraging those who develop training to adopt them. A factsheet on the [Characteristics of High Quality Wetland Training](#) is also posted on the ASWM.org-based project page.

Table 2. Characteristics of High Quality Wetland Training

Is based on thorough assessment of target audience’s training needs	Limits participant numbers to allow for interaction appropriate to the training type	Provides opportunities for participants to ask questions
Is taught by high quality trainer(s)	Includes a diversity of participants and embraces different learning styles	Provides opportunities for participants to express personal perspectives
Identifies minimum skill-level required	Emphasizes how content could impact the work of participants	Provides opportunities for participants to interact with each other
Is based on sound science	Provides examples of the content/practices in use	Allows participants opportunities throughout to provide feedback to the trainer
Provides learning objectives	Includes experiential component, as appropriate for the training type	Provides opportunities to reflect on what was learned
Circulates a description of the training, speakers and agenda prior to the training activity	Provides opportunities for participants to share their own experiences	Includes evaluation and is accompanied by support resources
Is focused and well-paced; Has clear direction	Employs humor/fun in teaching	Has before-during-after strategies to ensure training is transferable directly to job
Is scheduled at convenient times and locations; regular schedule is provided for multi-session trainings	Utilizes engaging visuals	Provides a supportive post-training environment

Different Types of Wetland Training Delivery Approaches Examined

ASWM also explored which *types* of training are preferred by wetland professionals? To conduct this analysis, ASWM and the national workgroup developed a set of research evaluation measures and conducted training evaluations in a variety of training venues. By the end of the project, ASWM assessed a dedicated conference, a workshop at a conference, participation in a training webinar, online training delivery, and a symposium (as part of an existing wetland professional conference) to examine measures of quality, similarities, differences, priorities and preferences.



While initial findings indicate that the majority of wetland professionals prefer participating in onsite training workshops, their ability to participate in this kind of training is very limited. Training participants have indicated that while they PREFER face-to-face onsite training, they are far more LIKELY to participate in online training opportunities. Primary factors identified to date appear to be lack of training opportunities, timing (trainings are not offered when they need it), and lack of funding. Measures of quality also vary depending on the capacity of different types of trainings to provide characteristics of high quality training.

Academic White Paper Developed to Help Institutions of Higher Education Prepare Students to Enter Wetland Professions

ASWM worked with wetland academics to review and refine a white paper for higher education institutions. The white paper was designed to assist academic institutions and their funders explore ways to strengthen the preparation of wetland professionals through academic training and resources.

The white paper starts with a summary, project background and discussion of educational needs. Next, the paper outlines the standard necessary education and skills needed for wetland professionals, recommended course offerings to strengthen wetland offerings, and the hallmarks of quality wetland training, to assist institutions in the formulation of offerings. The paper goes on to discuss additional supporting resources that can draw students to wetland programs, a range of research opportunities institutions can capitalize on to address areas of inquiry by state and federal agencies, and ways that academia can engage with organizations that hire wetland professionals to obtain a better understanding of regional needs. The paper concludes with a series of key recommendations for academic institutions seeking to strengthen offerings for students seeking to enter careers in the wetland field.

The [Academic White Paper](#) on *Helping Institutions of Higher Education Prepare Students to Enter Wetland Professions* is also posted on the ASWM.org-based project page. An additional outreach document is being developed by ASWM's Communications Committee, capturing the key takeaways from the white paper in an attractive one-page factsheet that can be used to invite discussion and sharing of the white paper.



**Preparing Students for Wetland Professions:
A White Paper to Assist Planning by
Institutions of Higher Education**

Association of State Wetland Managers
April 2017

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Background Coursework
Students should be provided background courses in chemistry, geology, physical sciences, statistics, and environmental/natural resource policy and law. A program seeking to attract a range of students interested in wetland work should also consider offering or co-listing a course on urban and environmental planning and management, with the ability to focus class projects on wetland planning and management decision making.

Core Coursework
Core coursework should be designed to include hydrology, botany, soils, and ecology courses. Hydrology courses should address the complex and variable hydrological conditions present in the range of wetland types and zoning conditions. Botany should include elements of wetland plant identification, focus on hydro soils. Wetlands are complex ecosystems, requiring professionals not only to be able to recognize elements of wetlands, but also how these elements work together. To prepare students to work with wetlands, ecology courses need to cover a range of ecological issues, including ecosystems/community ecology, wetland conservation ecology, conservation ecology, plant ecology, soil ecology and animal/wildlife ecology.

Specialty Coursework
Specialty courses are recommended both in science and non-science topics. Science specialty courses useful to wetland professionals include limnology, ornithology and oceanography. Recommended non-science specialty courses focus on skill building for work with others on wetland issues, such as project management, supervision, leadership development, inclusion, and conflict management.

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Basic Knowledge and Skills Required for Wetland Positions Identified

The national workgroup also explored what coursework, skills, additional training and certifications are preferred by those hiring new wetland staff. It is important to note that there are a range of wetland professions, with this variation requiring different skills for application in different work environments. Training should be designed to fill a need (i.e. answer the question “to what end?”). The ASWM workgroup identified key knowledge and skills, reviewing prior studies, connecting with consulting firms, and groundtruthing with wetland program managers. Table 3 documents the knowledge and skills recommended for wetland professionals by topic area, including skills in the areas of wetland science, wetland regulation, wetland restoration, wetland water quality, and other preferred skills. This listing is provided on the ASWM project webpage in the [Academic White Paper](#) Document.

Table 3. Recommended Basic Knowledge and Skills for Wetland Professionals
<i>Wetland Science</i>
Background and core coursework; specialty coursework as appropriate
Understanding of wetland hydrology and the hydrology-soil-plant connection
Hydric soils training and field experience
Understanding of measures of wetland condition, function & value/how to assess these measures
Understanding of the complex and critical connections between wetlands and streams
How to connect science with policy and decision-making
<i>Wetland Regulation</i>
Knowledge of key elements of federal and state wetland regulatory programs
Wetland delineation experience
Understanding of how to review, condition and integrate requirements into a permit
How to develop, implement and evaluate mitigation requirements, how to evaluate mitigation outcomes
Understanding of how laws become rules and are applied
<i>Wetland Restoration</i>
Training on components of restoration performance and how to measure performance
How to review a restoration permit application
Training on in lieu fee programs and mitigation bank development/financial and legal planning; \
Training on restoration techniques
How to prioritize restoration site selection
<i>Wetland Water Quality</i>
Understanding of what makes water quality standards for wetlands unique from other standards
How to effectively use monitoring and assessment tools to measure performance
How to access and use comprehensive GIS data layers for restoration planning and design
Training on how to incorporate applicable recommendations to other (non-state) voluntary wetland restoration planning and implementation effort
<i>Other Professional Skills</i>
Strong technical writing; project and time-management; facilitation/moderating skills
Ability to identify differences in information quality
Able to provide Wetland Professional Certifications

Filling in Training Gaps: ASWM's Hydric Soils Training Webinar Series Developed and Recorded

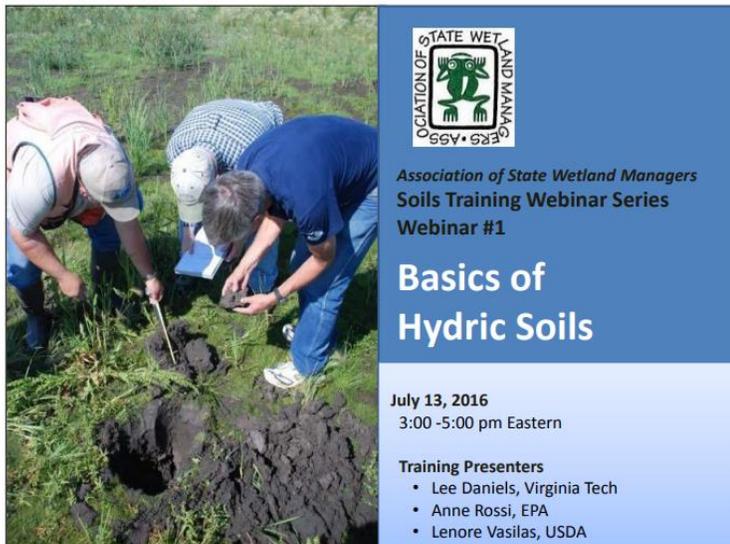
To meet the high demand for training on hydric soils, ASWM developed and delivered a webinar training series on the topic. ASWM was fortunate to be able to recruit five nationally-respected hydric soils trainers who were willing to contribute their time, knowledge and skills to develop and deliver four webinars on hydric soils. The webinars were designed for wetland professionals and more specifically state and tribal wetland field staff (plus state/tribal wetland managers, local municipal officials, conservation commissions, boards of health and others).

The four-part webinar training series focused on training for wetland field practitioners who needed expertise in hydric soils and who sought to understand how hydric soils are formed and how to recognize and interpret the information they provide when observed in the field. They were also used as refresher courses for those practitioners that had not had soils training in recent years.

ASWM Hydric Soils Training Webinar #1: Basics of Hydric Soils

Webinar Presentations/Content Development Reported Under this Grant

- *Five factors of Soil Formation and Horizonation vs. Simple Processes* – W. Lee Daniels, PhD. Virginia Tech
- *Soil Texture and Structure* – Ann Rossi, US EPA
- *Describing Soil Color for Hydric Soils Determination* - Lenore Vasilas, USDA Natural Resources Conservation Service



Webinar #1: Basics of Hydric Soils

Delivery Information reported in EPA Training Grant 783592601

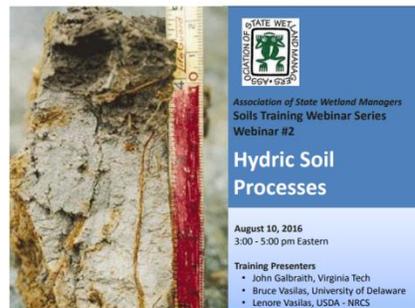
Webinar Delivery: July 13, 2016 from 3-5 pm Eastern
Registrants: 1154
Live Participants: 697 (plus at least 100 more in group viewing environments)
Quiz Completion: 419
Certificates of Attendance: 348

ASWM Hydric Soils Training Webinar #2: Hydric Soil Processes

Webinar Presentations/Content Development Reported

Under this Grant

- *Redox Reactions and Redoximorphic Features* – John Galbraith, PhD, Virginia Tech
- *Hydric Soils Functions* – Bruce Vasilas, PhD, University of Delaware
- *The Hydric Soil Technical Standard* - Lenore Vasilas, USDA Natural Resources Conservation Service



Webinar #2: Hydric Soil Processes

Delivery Information reported in EPA Training Grant #783592601

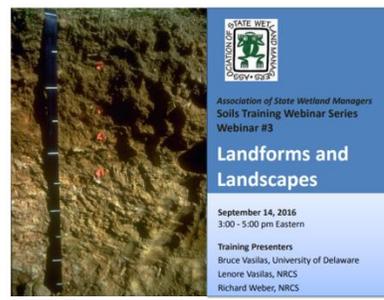
Webinar Delivery:	August 10, 2016 from 3-5 pm Eastern
# Registrants:	1191
# Participants:	815 (+at least 100 more in group viewing environments)
# Quiz Completion:	404
#Certificates of Attendance:	361

ASWM Hydric Soils Training Webinar Webinar #3: Landforms and Landscapes

Webinar Presentations/Content Development

Reported Under this Grant

- *Landscapes and Hydric Soils* - Bruce Vasilas, PhD, University of Delaware
- *Problematic Landscapes and Parent Materials* - Lenore Vasilas, USDA Natural Resources Conservation Service
- *HGM and Hydric Soils* - Richard Weber, P.E, NRCS



Webinar #3: Landforms and Landscapes

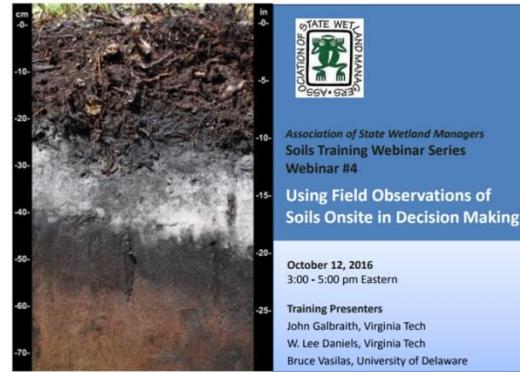
Delivery Information reported in EPA Training Grant #783592601

Webinar Delivery:	September 14, 2016 from 3-5 pm Eastern
# Registrants:	1077
# Participants:	602 (+at least 100 more in group viewing environments)
# Quiz Completion:	286
# Certificates of Attendance:	262

ASWM Hydric Soils Training Webinar #4: Using Field Observations of Soils Onsite in Decision Making

Webinar Presentations/Content Development Reported Under this Grant

- *Field Indicators of Hydric Soils in the United States* – John Galbraith, Associate Professor, Crop and Soil Environmental Sciences, Virginia Tech
- *Using Soils for Mitigation, Voluntary Restoration and Creation* – W. Lee Daniels, Professor of Environmental Soil Science, Virginia
- *Using Field Indicators to Assess Long-term Hydrology* - Bruce Vasilas, Professor of Agronomy and Soil Management in the Plant and Soil Sciences Department at the University of Delaware



Webinar #4: Using Field Observations of Soils Onsite in Decision Making **Delivery Information reported in EPA Training Grant 783592601**

Webinar Delivery:	October 12, 2016 from 3-5 pm Eastern
# Registrants:	1162
# Live Participants:	674 (+ at least 100 more in group viewing environments)
# Quiz Completion:	337

Webinar Quiz to Assess Knowledge Developed and Implemented

Each webinar was accompanied by a short quiz at the end to assess whether participants understand the key take-away points of the training. While taking the quiz is voluntary, to receive CEUs for this course (for this soils training webinar series only), participants had to complete the assessment quiz. Regardless of whether they sought CEU documentation, all participants were encouraged to complete the quiz at the end of each webinar to help ASWM assess the effectiveness of the presentations and the training session.

The hydric soils webinar training series was an unexpected huge success!

- Each webinar garnered around a thousand registrations because according to participants, there were no other quality training opportunities on this topic.
- A total of 1,512 individuals participated in one or more of the webinars, with many participating in all four webinars.
- ASWM issued a total of 1,308 certificates of participation for webinar participants for use in applying for continuing education units (CEUs) from accrediting entities.

This represented *unprecedented interest and participation* in webinars for ASWM. While participation had been growing with ASWM's wetland restoration series, the hydric soils project lifted participation to new levels.

Post-Processing of Hydric Soils Training Webinars Conducted through another Grant

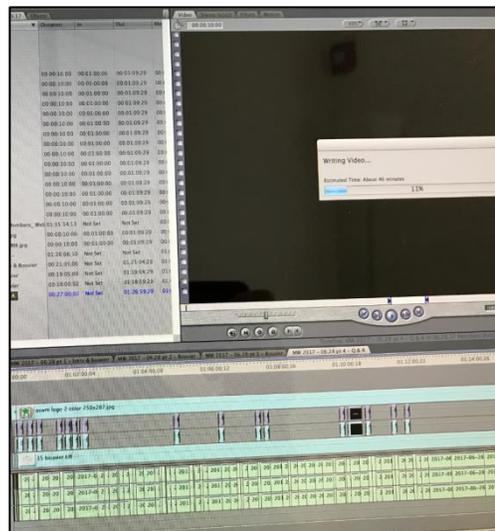
IMPORTANT NOTE:

ASWM's Hydric Soils Webinars were Post-Processed under EPA Training Grant #783592601

While development of the webinars was funded by this EPA grant # 83578201 (High Quality Wetland Training for State and Tribal Wetland Staff), post-processing was funded by EPA training Grant #783592601. *The two processes were tracked separately to ensure there was no double-billing for the same effort.*

ASWM's post processing of the hydric soils webinars developed by this project included:

- Recording each live webinar presentation through GoToWebinar
- Downloading the recording into video format (generally .wmv)
- Editing and adjusting audio levels
- Adjusting video or replacing with still images
- Separating the recording into segments of approximately 18 minutes (following TED Talks length guidelines)
- Uploading video segments to ASWM's Vimeo host site (private hosting for viewing control and lighter load on website).



****Above and Beyond Grant Deliverables****

Closed-Captioning Applied to Online Module Recordings through another Grant



During the project period, ASWM received a request for the webinars to be closed-captioned. ASWM explored several Closed-captioning alternatives, including using YouTube's CC tools. While the tool provided reliable captioning for common words, it did not caption many of the technical, scientific words properly. Funded by ASWM's EPA Training Grant #783592601, ASWM staff worked to review and correct the lines of captioning for 9 of the 12 modules. Working with the individual requesting the CC accommodation, ASWM is currently evaluating the learning effectiveness of the two different options – straight YouTube-direct captioning v. edited captioning. ASWM will be using the feedback from the hearing impaired user to determine the most effective way to deliver these services in the future.

ASWM’s Pilot Online Training Modules Developed: Meeting the Need for Anytime/Anywhere Access

One of the primary deliverables of this project was to develop and pilot online training for wetland professionals. ASWM utilized the training webinar recordings to develop twelve online anytime/anywhere access online training modules. This was a multi-step process, conducted by ASWM and guided by ASWM’s National Wetland Training Workgroup, which included 1) additional post-processing video into module-ready segments, 2) developing delivery mechanisms for module Certificates of Completion, 3) compilation of the various elements required to complete a module package, and 4) developing a beta testing process to evaluate module content, delivery and user-friendliness.

1) Post-Processing Webinar Recordings into Video Modules

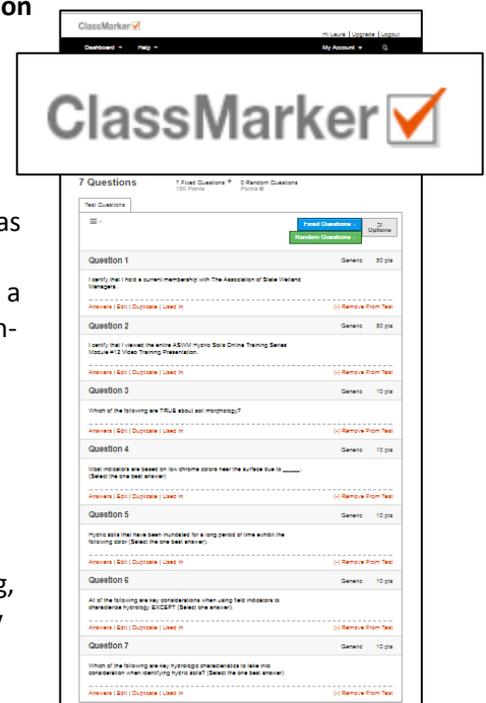
Under EPA Training Grant #783592601, each of ASWM’s hydric soils recorded training webinar videos were further post-processed for use in online training modules.

- Each webinar had three presentations, which were post-processed into three individual modules.
- Bookend information was added before and after each presentation to complete each module “package.”
- ASWM kept each trainer’s presentation as one intact learning module, bracketed by an introduction and recap of learning opportunities.
- ASWM dropped/missing audio that had potential to impede learning was rerecorded and woven back into original recording.

2) Development of Process to Provide Asynchronous Module Completion Certificates

Prior to this project, ASWM only provided Certificates of Participation for participants in the live webinar only. ASWM tracks participation during webinars using the GoToWebinar software. However, ASWM has not been able to track use of archived webinars by individuals and thus has not awarded certificates for after-the-event viewing. The project beta tested knowledge acquisition testing as a way to evaluate whether or not a participant qualifies for a certificate of completion for participation in non-live training.

- The team worked to develop and test a series of questions.
- Pre-testing the quiz questions provided insights into question structure and the capacity of participants to utilize information learned in the online setting.
- After testing a variety of tools (including SurveyMonkey, Quiz Egg, and others), ClassMarker was selected as the online quiz delivery mechanism of choice.



- The new ClassMarker system developed by the project now allows ASWM the option to be able to provide documentation of completion to individual participants in an entirely remote training environment.

Upon completion of a quiz, participants receive a certificate of completion that can be used to apply to various accrediting institutions for continuing education credits. As part of this work, ASWM identified delivery tools and systems, determined how to support and coordinate online offerings and tested ways to evaluate knowledge acquisition in an entirely remote interaction.

Additionally, ASWM piloted different automated certificate generating options in order to improve the efficiency with which these services can be delivered to participants. A final selection was made to use the online ClassMarker quiz tool to host the knowledge quizzes and process certificates automatically once the participant passes the quiz.

3) Compilation of Online Training Modules

The resulting post-processed video and quizzes were then incorporated into an online module. The compilation of the online modules included the following steps:

1. Development of a “landing page” for each individual module (see an example of a landing page [here](#)). Each landing page now includes the following information about associated module training: *Module title, module description, target audience, module learning objectives, trainer bio, link to the Vimeo-based module training video, link to the online quiz, directions on how to download Certificates of Completion, and contact information for questions and feedback.*
2. Posting of the module video link on the module landing page. (see an example of a training module video [here](#)).
3. Addition of a link to the ClassMarker Quiz (see an example of a module quiz link [here](#)).
4. Modules were beta-tested using a formal beta testing protocol before going live.

4) Online Module Beta Testing Process

In order to facilitate methodical beta testing of the new ASWM online training modules, staff developed a formal beta testing process, involving the following steps:

1. Beta testing of each module was assigned to two wetland professionals.
2. The tester reviewed the landing page information.
3. The tester reviewed the module video presentation.
4. The tester accessed and completed module knowledge quiz.
5. The tester reviewed the module quiz results.
6. The tester downloaded their Certificate of Completion.
7. The tester completed a survey monkey beta testing questionnaire about their experience undertaking each of these steps.

ASWM Hydric Soils Online Modules Beta Testing Steps
Last Revised: 3-24-17

If you have any questions, please contact Brenda Bellbach, ASWM Policy Analyst
via email at bbell@aswm.org or by calling our office at (207) 892-3399.

Beta Testing Process Step (Please complete steps in order)	Your Task	Average Time Needed (Total ~ Approximately 1 hour)
1. On the spreadsheet attached to this email, select the link to go to the module you have been assigned (Mod1, Mod2, etc.)	Read the full text on this page (Note: At ASWM this is called the "landing page" for the module)	5 minutes
2. Click on the link to the module video presentation	View the video presentation recording in its entirety.	10-15 minutes
3. When the video is done, go back to your Module landing page	Navigate from the end of the video back to the module landing page	10 seconds
4. Access the quiz —On the module landing page, click on the ASWM Member Quiz link to access the quiz	Read the introduction to the quiz in its entirety	5 minutes
5. Take the associated module quiz	Answer all 7 quiz questions	10 minutes
6. After completing the quiz, find the copy link on the ClassMarker results page and download your certificate.	Download and review your certificate (during this phase, we are using a template document that will soon have the specific module name added on it).	5 minutes
7. Go to the ASWM Online Training Module Scale Testing Tool on Survey Monkey: https://www.surveymonkey.com/r/7P831ME	Answer all beta testing questions. Please provide any and all constructive input so that we can improve our offerings.	15 minutes (up to 30 minutes, depending on the amount of feedback you want to provide or issues you had).

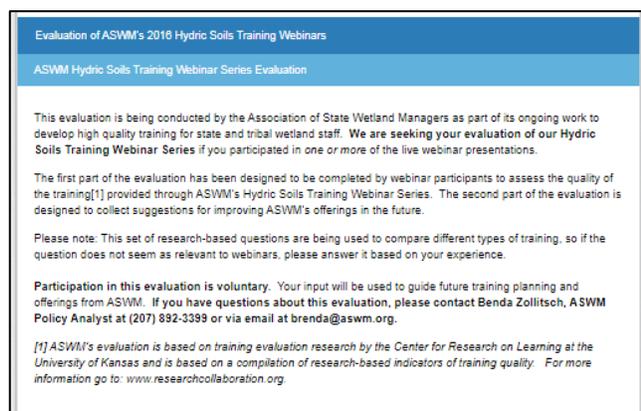
You are done! Thank you very much for your time, effort and input.
Your testing information will assist ASWM improve our online module offerings.

Beta Testing Questions to Evaluate ASWM's Online Hydric Soils Modules

To ensure that the information collected from the beta testers provided analysis of the range of considerations critical to assessing the quality of both the training and the user experience, ASWM developed a SurveyMonkey tool for all beta testers to use. Using SurveyMonkey allowed ASWM to collect and compare information across the modules. ASWM took the feedback from this beta testing process to refine and improve the delivery of the online modules.

All testers were asked to provide the same following information:

- Beta tester Information
- Clarity of information on the module landing page about module goals, learning objectives, length of presentation, length of quiz
- Effectiveness of the online module as a stand-alone training
- Presentation content delivered at the appropriate pace, described technical terms before using them, spoke clearly, had visuals that were useful as learning tools, and met the learning objectives.
- Quiz included information about the voluntary nature of completing the quiz, that to receive a certificate, the quiz needed to be completed, that a score of 50% or higher needed to be achieved to receive a certificate, that a link to the quiz is available on the module landing page, and that the quiz is hosted on a non-ASWM platform (ClassMarker).
- Information was clear on how to receive a Certificate of Completion for the module.
- Opportunities to provide open-ended feedback on each of the following: module presentation, module user-friendliness, web-organization and certification process.



Modules Available to the Public on ASWM.org Website

All [twelve hydric soils online training modules](#) were posted on the ASWM.org website. ASWM is currently tracking use through web analytics and completion of module certificates issued through ClassMarker. At the end of the project period, ASWM was completing a soft rollout of the modules, to ensure that quality controls were accurate and that the modules were functioning as planned. As of June 30, ASWM had a total of 70 individual viewers watch the module training presentation videos and awarded 25 certificates for individual module completion.

Promotion of Wetland Training Project Products

ASWM's Communications Committee has undertaken the organization's standard publicity process to promote the products from this grant. This process consists of pre-publication and post-publication publicity. Promotion has been garnering interest and inquiries about the module training series and has resulted in a spike in module use. ASWM's promotion process has included:

- ✓ Promotion on ASWM's homepage
- ✓ Publication in Insider's Edition (ASWM's Weekly News Bulletin)
- ✓ Information posts in Wetland Breaking News (ASWM's monthly newsletter)
- ✓ Publication of feature article in ASWM's major Wetland News publication (ASWM Members'-only bi-monthly newsletter)
- ✓ ASWM's social media outlets
- ✓ Sharing at ASWM's State-Tribal-Federal Coordination Workshop (April 2017)
- ✓ Presentation through ASWM webinars (scheduled for Hot Topics Webinar on July 11, 2017)
- ✓ ASWM's publicity distribution list (electronic)

Wetland Training Project Publications & Presentations

All project products are available on the ASWM.org-based Wetland Training Project Webpage
<https://www.aswm.org/wetland-programs/increasing-access-to-wetland-training-project>

In addition to the development of the project products, ASWM also produced a number of articles, blogs, and presentations sharing the findings and challenges identified in this project.

ASWM Hot Topics Webinar (Delivered - July 11, 2017)

How to Connect with the Public to Protect Wetlands: Findings from ASWM's Wetland Communications Case Study Project

<https://www.aswm.org/aswm-webinarscalls/8386-aswm-hot-topics-webinar-series#webinar071117>

Society of Wetland Scientists 2017 Annual Conference (June 9, 2017)

San Juan, Puerto Rico

Increasing Access to High Quality Wetland Training in the United States

http://swsannualmeeting.org/images/pdfs/Final_Schedule_For_Web.pdf

Association of State Wetland Managers State-Tribal-Federal Workshop (March 2016 and April 2017)

Shepherdstown, West Virginia

Sharing of project progress and products

Wetland News Feature Article (September/October 2016)

Increasing Access to High Quality, Affordable Training for On-the-Ground Wetland Professionals in the United States: Putting Together the Puzzle and Hitting an Accidental Home Run

https://www.aswm.org/wetland_news/102716.pdf

ASWM Wetland Wanderer Blog (February 23, 2017)

Q&A on ASWM's Forthcoming Series of Online Hydric Soils Training Modules and their Associated Certificates of Completion for Remote Learning

<https://www.aswm.org/wordpress/the-wetland-wanderer-qa-on-aswms-forthcoming-series-of-online-hydric-soils-training-modules-and-their-associated-certificates-of-completion-for-remote-learning/>

ASWM Wetland Wanderer Blog (December 15, 2016)

Digging into Learning: The Value of On-the-Ground Hydric Soils Training

<https://www.aswm.org/wordpress/the-wetland-wanderer-digging-into-learning-the-value-of-on-the-ground-hydric-soils-training/>

ASWM Wetland Wanderer Blog (November 16, 2016)

Bring them together and Let them Loose

<http://www.aswm.org/wordpress/the-wetland-wanderer-bring-them-together-and-let-them-loose/>

On-the-Ground Training Supplement Document Developed to Accompany Hydric Soils Online Training

****Above and Beyond Project Grant Deliverables****

While the online options developed by this project have been applauded for providing high quality basic training in a highly accessible format at no cost to participants, ASWM acknowledges that webinars and online modules cannot replace some key elements provided through on-the-ground training.

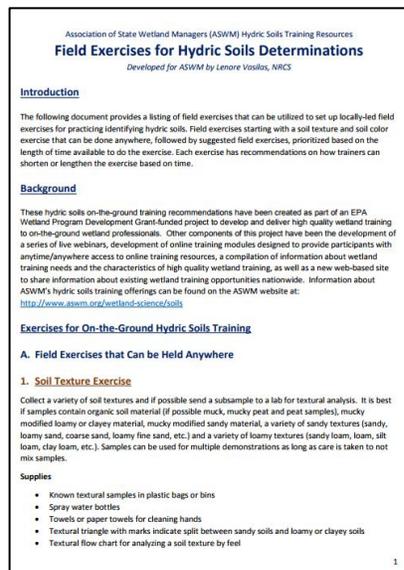
To address this need, ASWM worked with the hydric soils training development team and the national Wetland Training Workgroup to develop supplemental guidance for individuals seeking additional field training on how to apply the concepts presented in the webinars in the real world.

The guidance document provides a set of field exercises that can be utilized to set up locally-led field exercises for practicing identifying hydric soils. Field exercises starting with a soil texture and soil color exercise that can be done anywhere, followed by suggested field exercises, prioritized based on the length of time available to do the exercise. Each exercise has recommendations on how trainers can shorten or lengthen the exercise based on time. Exercises include how to prepare reference information about a wetland site before going into the field, how to assess soil plots in various soil types and circumstances, and how to apply this information to management decisions.

This guidance document is now available to agencies, organizations and businesses seeking to expand employee skills in hydric soils, with proposed options for recruiting trainers to run half-day, whole day and multi-day training options. ASWM's [Field Exercises for Hydric Soils Determinations](#) guidance document is also available on the ASWM.org project webpage.

On-the-Ground Training Exercises Piloted

A half day field exercise piloted and evaluated on-the-ground exercises on November 2, 2016 as part of a state monitoring workshop in New Jersey. Findings from this training effort verified the value of these supplemental trainings, as many of the participants in the on-the-ground training had also participated in the online webinar training series. It is expected that this guidance information will be refined over time as additional lessons are learned about how to improve training for wetland professionals working on hydric soils.



Summary of Results & Environmental Improvements

Project Results (Output):

ASWM successfully delivered or exceeded all promised outputs listed in the grant proposal. This project delivered: 1) A report on current national training priorities for state and tribal wetland field staff (National Wetland Training Needs Document); 2) a listings of existing training opportunities posted on the ASWM website (Training Provider Matrix); 3) training materials organized on the ASWM website; 4) a white paper for academia describing desirable wetland education curriculum and follow-up communications with targeted post-secondary education programs; 5) the planning and development of the pilot online wetland training program, including decisions platform, delivery, content, frequency, and evaluation; 6) two online wetland training pilots (webinar series and online modules) for wetland program field staff and other wetland professionals; and, 7) a final written report of the full project.

Anticipated Environmental Improvement for Project (Outcome):

1. Support the translation of current technical concepts into practice by frontline wetland managers.

Evaluation results show that the hydric soils training opportunities provided welcomed information/formal training on processes and mechanisms of formation, morphology, and uses. A majority of evaluation respondents indicated that they learned new concepts, with many indicating that most of what was included was new to them or allowed them to better apply this information to their field work. Information was specifically valuable to participants on the timing of soils development and when indicators begin to show up in soils.

2. Investment in applied research and technology will lead directly to improved decision making regarding wetland restoration, protection, and management.

More than 50% of respondents plan to use what they learned in the course directly in their on-the-ground work in the coming year. A primary theme was that what they learned will help improve on-the-ground work delineating wetland sites. Respondents plan to use their work in numerous ways to improve wetland planning and management work. These include, but are not limited to, helping evaluate potential restoration sites, making decisions in regulatory situations, determining how water moves through the landscape, understanding what could be wrong on dysfunctional mitigation sites (discharge v. recharge), better understanding and interpreting site decisions, looking up rainfall/climate data for the region, identifying appropriate means and methods of demonstrating hydric soils on disturbed sites within urbanized areas, assessing the potential for green infrastructure, determining the extend of wetlands adjacent to onsite septic systems, assessing soils on wetland mitigation sites, making decisions about subsoils for wetland creation, and in reviewing mitigation plans and mitigation banking documents.

3. Increased knowledge will be spread to other managers through peer to peer training.

Evaluation results show that many participants plan to use the information from the trainings to conduct hydric soils field review for internal staff. They plan to use the materials as references for their program staff. One state indicated that they are using the training as part of training for staff responsible for groundtruthing remote sensing data.

4. Greater wetland field expertise and to more efficient and effective use of staff resources, thus reducing the overall cost of wetland management.

While the first post-training field season starts just as this project is ending, evaluation indicates that the training provided by this grant is already being applied. Participants shared that the webinars have helped them learn about soils and be able to more efficiently identify indicators and what they mean. They also shared that the training is helping improve their wetland delineation techniques and reduce time spent in the field for wetland delineation. Better understanding of hydric soils is aiding in improving wetland and restoration decision-making and determining opportunities on problem landscapes.

5. Increased staff technical skills will also increase the quality of staff decisions which support improvement in wetland quality and quantity in a minimum of 10 states. Additionally, training will support wetland protection and restoration needed to improve water quality and quantity when those resources are increasingly scarce due to climate change.

Evaluation of the pilot indicates that participants are applying concepts from the training to better understand the landscape, assess soil hydrology and guide restoration decisions associated with improving wetland quality and quantity. Participants indicate improvements in their ability to make decisions around wetland opportunities in problem landscapes and the placement of wetland creation projects. Participants from more than 20 states indicated changes would be made in their decision making as a result of knowledge learned in the trainings. Training also addressed climate change, which participants found useful for their planning and management activities. Many participants were from arid western states, where drought, complex hydric soils, and natural hazards (e.g. forest fires) are key issues for on-the-ground wetland staff. Participants specifically interested in these issues were from ID, MT, NE, ND, NM, SD, UT, and WY.

6. Articulating training needs will stimulate the development of additional wetland training opportunities in a minimum of four universities, five nonprofits and three private institutions

One of the last project elements completed during the project period was identifying key findings from the project to share with training entities, such as universities, nonprofits and private institutions. This project resulted in the development of a new on the ground soils training in New Jersey by the USDA. ASWM's new online training model is being used in Washington State by the Washington Department of Ecology and the Washington Department of Natural Resources' Natural Heritage Program to deliver additional online wetland training offerings. Several institutions have been communicating with ASWM about developing training possibilities. ASWM will continue to monitor additional connections between the content of this project and the development of new training offerings.

Report Conclusion

As ASWM has explored each element of this project, internal practices have changed to ensure lessons learned are incorporated --- about needs, preferences, characteristics of high quality training, and technical options for delivering and evaluating wetland training. ASWM is now better situated to select training topics that are needed, format training to incorporate best practices and use tools that work for a wide range of people with varying skill levels.

The need remains for major investments in training resources. However, ASWM's project has made a contribution to this effort by exploring the fundamental underpinnings this work should build upon and by testing new tools and guidance that can serve as a springboard to launch future efforts. ASWM has already learned that states are using ASWM's online wetland training series model to inform asynchronous online training efforts in Washington State.

Plans are in the works to develop additional online training series in 2017 and beyond. ASWM's commitment to creating and strengthening training opportunities for wetland professionals will continue as part of the organization's mission. ASWM welcomes the opportunity to share the results and findings of this report, as well as the models and products created by the project.

To learn more about the products from this project or ASWM's wetland training initiatives, please contact:

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