

Cold Regions Hydrology Modeling Design Workshop With WMS and GSSHA

September 25, 2024

Virtual Training sponsored by the H&H Set Program

Web meeting information:

Join by video

URL: <https://usace1.webex.com/meet/ColdWatershedsHydrology>

WMS Software Download:

<https://www.aquaveo.com/downloads>

Download Version 11.2

Licenses for WMS will be given to attendees prior to the course.

Course Materials:

WMS tutorials are available here: <https://www.aquaveo.com/wms-learning-tutorials>

Additional materials will be posted on the GSSHA wiki home page:

<https://www.gsshawiki.com>

Additional materials may be provided directly to participants at the beginning of the course.

Students will learn the basics of:

- *Gridded Surface Subsurface Hydrologic Analysis (GSSHA)* model, developed at the U.S. Army Corps of Engineers, Engineering Research and Development Center and the University of Wyoming
- *Dept. of Defense Watershed Modeling System (WMS)*, developed by Aquaveo LLC
- How to utilize *GSSHA* and *WMS* to design cold regions hydrology management projects.

The *GSSHA* model with *WMS* support constitutes a complete watershed analysis system that can be used for a variety of hydrologic science and engineering computation and design evaluation, such as flood simulation, hydrologic impacts of land use change, best management practice design, and testing of flood mitigation measures.

Course Layout:

Through a combination of lectures and experiential applications, the course features the cold regions related spatially distributed modeling components of this system. The course begins with an overview of the capabilities of the *WMS* to ensure maximum benefit from the hands-on portions of the class. The course will build on and refer to the 2023 Watershed Engineering with Nature (EWN) Design Workshop With WMS and GSSHA training courses, referenced on the gssha wiki. Attendees will learn to use *WMS* to set up *GSSHA* models that include snow, frozen ground, and permafrost.

Outcome:

Having completed this course, attendees will gain a working knowledge of simulating cold regions hydrology using the U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC) *GSSHA* model that is supported by the Watershed Modeling System (*WMS*) graphical user interface software. Attendees will also understand how, when, and why to apply the tools to specific studies as well as understand input data requirements. This class builds on previous *GSSHA* and *WMS* training courses. This course will specifically focus on the development and use of *GSSHA* to model cold regions hydrology.

Who Should Attend?

The course is intended for anyone interested in watershed hydrology as it relates to cold regions where snow, frozen ground, and/or permafrost are concerns. Experience with hydrologic modeling and numerical methods are a plus, but not required. Some college-level background in hydrologic science and/or engineering is required. It will be helpful for participants to review previous tutorials and training materials found at <https://gsshawiki.com> and <https://www.aquaveo.com/software/wms-learning-tutorials>.

Instructors: This short course will be taught by the *GSSHA* developers Drs. Aaron R. Byrd, Charles W. Downer, and Nawa Pradhan USACE-ERDC, and Dr. Chris Smemoe from Aquaveo.

Requirements: Attendees will provide their own computer. Licenses for the Watershed Modeling System 11.2 software will be provided (see download information in the heading section of this document).

Tutorial Downloads:

Students shall download most of the tutorials from: <http://www.aquaveo.com/software/wms-learning-tutorials>

PDFs of the presentations can be downloaded from the main page of *GSSHA* wiki at: http://gsshawiki.com/Gridded_Surface_Subsurface_Hydrologic_Analysis

Fees, access, other: This course is sponsored by the USACE H&H Set. The course is offered free of charge to all USACE and DoD personnel. The course may be attended by others with permission of the lead course instructor. The course will be virtual.

PDHs are awarded based on contact hours. There are 4 possible contact hours.

Information: For additional information about the course and to sign up for the course contact Aaron Byrd at aaron.r.byrd2@usace.army.mil.

Schedule: The course is a half day.

A detailed itinerary follows.

DETAILED SCHEDULE

All Times CDT (UTC-5)

Wednesday, September 25, 2024

Cold Regions Hydrologic Modeling

Start	Finish	Duration	Activity	Topic
13:00	13:15	15	Greeting	Introduction / GSSHA & WMS Resources
13:15	13:30	15	Lecture	WMS Basics / Overview
13:30	13:45	15	Lecture	GSSHA Basics / Overview
13:45	14:15	30	Lecture	Effects of Temperature on Hydrology
14:15	14:45	30	Lecture	Snow Lecture
14:45	15:20	35	Tutorial	Snow Demo & Tutorial
15:20	15:30	10		<i>Break</i>
15:30	16:00	30	Lecture	Permafrost Lecture
16:00	17:00	60	Tutorial	Hydro-thermodynamics Demo & Tutorial
17:00	17:10	10	Closing	Wrap up