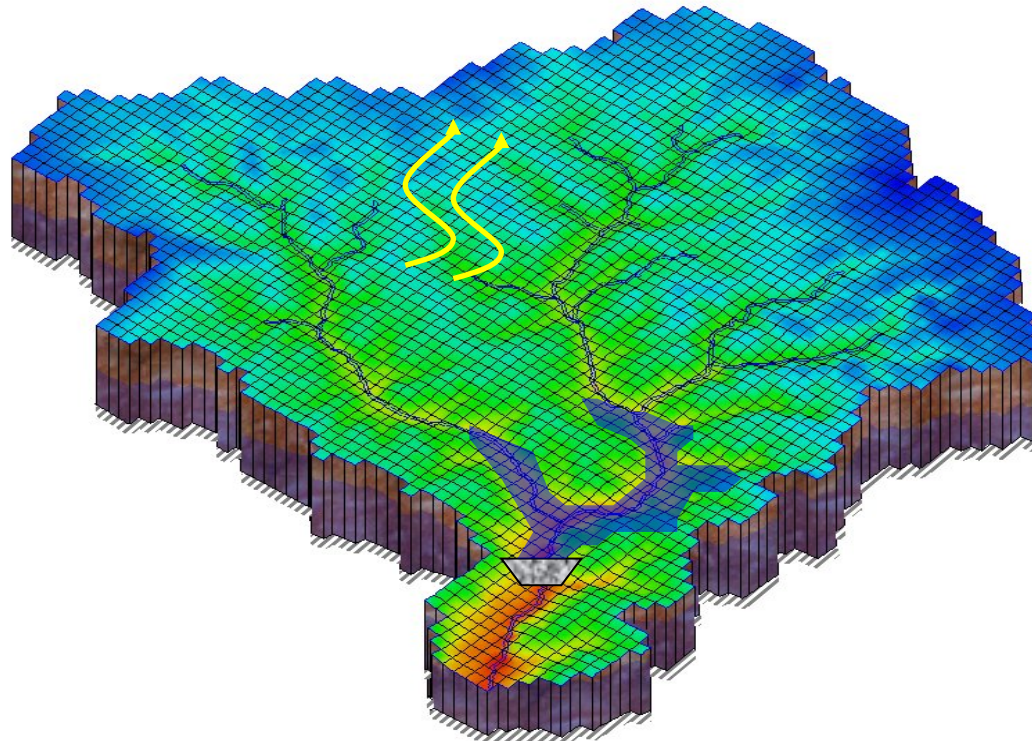




Introduction to USACE Physics Based, Distributed Hydrologic Modeling with GSSHA With Artic Hydrology





Goal

The goal of this course is to provide you with a basic understanding of advanced hydrologic modeling tools available through the DoD

- GSSHA
- WMS
- GSSHA/GIPL

You will have an understanding of how, when, and why to apply the tools to your specific studies and projects.





Course Objectives

1. Understand GSSHA features and formulation
2. Discover appropriate applications of GSSHA
3. Learn the basic spatial data required to parameterize GSSHA distributed models
4. Learn basics of WMS interface for developing GSSHA models
5. Set up and run basic GSSHA distributed runoff models
6. Use basic models to analyze changing conditions – land use, BMPs, streams, etc.
7. Use WMS/GSSHA to set up and simulate coastal flooding scenarios.
8. Learn about arctic hydrology and arctic hydrology capability in GSSHA.





Meet the Models

- GSSHA (Gridded Surface Subsurface Hydrologic Analysis) – is the USACE's physics based, fully distributed hydrologic model. GSSHA is intended to determine the hydrologic response of watersheds to meteorological inputs in a variety of modeling environments.
- WMS (Watershed Modeling System) is a Graphical User Interface (GUI) developed and distributed by Aquaveo Inc. that supports the development of inputs and analysis of results for a variety of hydrologic models, including GSSHA.
- GIPL – (Geophysical Institute Permafrost Laboratory) – simulates soil thermal regime including phase change and location of permafrost.





Meet Your Instructors

- Dr. Charles W. Downer, PE, PMP - Research Hydraulic Engineer, USACE-ERDC-CHL.
- Dr. Nawa Raj Pradhan - Research Hydraulic Engineer, USACE-ERDC-CHL.
- Mike Follum – Research Hydraulic Engineer, USACE-ERDC-CHL
- Gary Brown – Research Hydraulic Engineer, USACE-ERDC-CHL
- Cody Alberts – Civil Engineer, Aquaveo LLC.





Course Format

- Series on various topics
 - Lecture on the GSSHA formulation and fundamentals
 - Lecture and/or demo of how to prepare inputs for the given topic
 - Hands on workshop preparing input using WMS and other software





Course Outline

- **Day 1 – Fundamentals and Basic GSSHA modeling**
 - Introduction to hydrologic modeling
 - Introduction to GSSHA
 - Using WMS
 - GSSHA model setup using the WMS Hydrologic Wizard
 - Basic model setup
 - Overland flow routing
 - Stream routing
 - Index maps and mapping tables
 - Infiltration
- **Day 2 – GSSHA applications**
 - Rainfall
 - Hydraulic structures
 - Land use change and abatement measures
 - Continuous simulations
 - Coastal flooding





Course Outline

- **Day 3 – Advanced GSSHA Features**
 - Groundwater modeling in GSSHA
 - Sediment transport modeling in GSSHA
- **Day 4 – GSSHA applications**
 - Simulating snow in GSSHA
 - Simple frozen soil treatments in GSSHA
 - GSSHA/GIPL theory and application





Acknowledgements



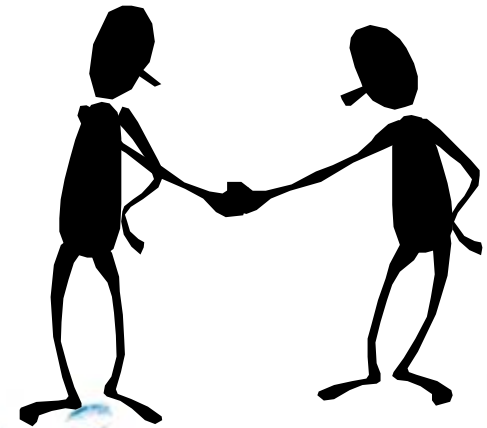
- ERDC – GSSHA development, teaching, applications, distribution
- UWY – GSSHA development, research
- BYU – WMS/GSSHA research, teaching
- Aquaveo – WMS development, teaching, distribution, consulting.





Participant Introductions

- Organization and position?
- Experience with hydrologic models?
- Motivation for course?





Important Resources

- <http://gsshawiki.com>
 - All there is to know about GSSHA
- <http://www.xmswiki.com/index.php?title=GSDA:GSDA>
 - Useful download sites for WMS-consumable digital data
- <http://www.xmswiki.com>
 - WMS Help-Wiki contained within

