



U.S. Department
of Transportation

**Federal Highway
Administration**

2D Hydraulic Modeling User's Forum

SMS/SRH-2D Hydraulic Modeling Resources

Updated 4/2023

Overview of FHWA 2D Hydraulic Modeling Resources

- **Software download and licensing**
- **NHI Training Courses**
- **2D Hydraulic Modeling Reference Document**
- **SMS Wiki Page**
- **2D Modeling Tutorials**
- **YouTube 2D Hydraulic Modeling Videos**
- **YouTube 2D Sediment Transport Videos**
- **2D Hydraulic Modeling User's Forum**
- **FHWA Bridge Scour Workshop**

Software Download and Licensing

- Review [website](#) for current release and notes
- Community license (free to all)
 - No license code needed
- Pro-version
 - Request/Renew from SMS Menu: *Help* → *Register* → *Request License*
 - Includes technical support
 - DOT/FHWA staff contact scott.hogan@dot.gov or laura.Girard@dot.gov
 - All others contact support@Aquaveo.com
- Reviewers License – Pro-Version
 - Complete [form](#) and Contact Aquaveo

SMS Downloads

SMS Current Release

Software Title	Build Date	File Size
SMS 13.2.14 (64-bit) Release Notes	06Jan23	814MB
SMS Tutorials	11Aug22	3.8GB

Request Software License

In order to acquire a license to one of our software titles, please choose from one of the following options. If you need further assistance, please contact us.

Sales and Licensing Support
Phone: +1 (801) 691-5528
Email: licensing@aquaveo.com

[Purchase](#) - Purchase a commercial license

[Evaluate](#) - Evaluate a complete version of our software

[Govt. License
\(FHWA or USACE\)](#) - Request a sponsored license (for specific government agencies)

[Request
Community](#) Beginning with SMS 13.0, the software runs in Community mode by default and does not require a license code. Simply download and install SMS 13.0 or higher to utilize the Community Edition.

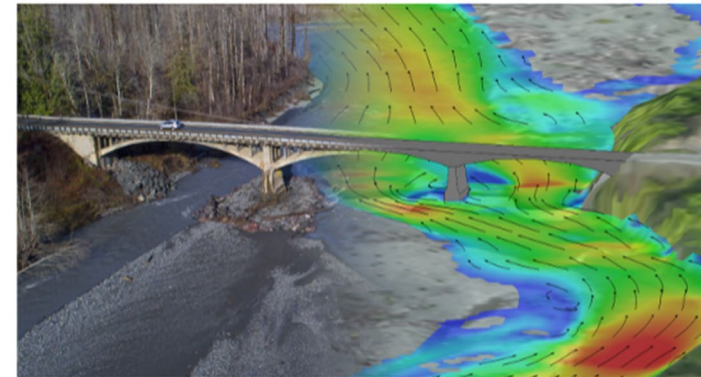
2D Hydraulic Modeling Reference Document

- [2D Hydraulic Modeling for Highways in the River Environment](#)
- Modeling fundamentals
- Data requirements
- Model development
- Model review and calibration
- SMS/SRH-2D User Interface
- Sample report outline
- Survey request form

Publication No. FHWA-HIF-19-061
October 2019

Two-Dimensional Hydraulic Modeling for Highways in the River Environment

Reference Document



U.S. Department of Transportation
Federal Highway Administration

NHI Training Courses

- In-person training (NHI [Course 135095](#))
- Virtual training available (NHI [Course 135095V](#))
- Virtual Training (NHI [Course 135095A](#))
SRH-2D Model Data files, Diagnostics & Verifying 2D Model Results
- Virtual Training (NHI [Course 135095B](#))
Model Terrain Development with Various Data Sources

The screenshot displays the NHI Training Courses website. The top navigation bar includes links for Login, My Training, My Profile, Checkout, Home, Contact, and Help. A sidebar on the left contains links for Enroll in Training, Host a Training, Find NHI Materials, and Pay an Invoice. The main content area is titled 'Course Search' and features a search bar with a 'Search for a Course' button. Below the search bar, there are sections for 'Email Updates' (with a sign-up form) and 'Connect with us' (with social media icons). The 'Find Training' section shows a map of the United States. The main content area displays the 'Course Description' for 'Two-Dimensional Hydraulic Modeling of Rivers at Highway Encroachments'. The course is listed as 'PROGRAM AREA: Hydraulics', 'COURSE NUMBER: FHWA-NHI-135095', and 'Instructor-led Training (ILT)'. A table shows the course details for 2023: 3 Days, 2.1 Units, and \$850 Per Participant. The 'TRAINING LEVEL' is Intermediate, and the 'CLASS SIZE' is Minimum: 20 Maximum: 30. The 'COURSE DESCRIPTION' includes a note about a virtual alternative and a detailed description of the course content. Buttons for 'View Sessions' and 'Host this Course' are visible.

Course Search

Search for courses based on delivery type, program area, or topic below, or find upcoming trainings in your state or territory. For more information on trainings from the National Highway Institute, [contact us](#).

SEARCH FOR COURSES **10 SEARCH FOR SCHEDULED SESSIONS** **QUICK SEARCH** **DOWNLOAD CATALOG**

[Return To Search Results](#) [Show Search Criteria](#)

JUMP TO: [Course Information](#) | [Outcomes](#) | [Target Audience](#) | [Session Information](#)

Course Description

Two-Dimensional Hydraulic Modeling of Rivers at Highway Encroachments

PROGRAM AREA: Hydraulics
COURSE NUMBER: FHWA-NHI-135095
Instructor-led Training (ILT)

Calendar Year **Length** **CEU** **Host Price**

2023	3 Days	2.1 Units	\$850 Per Participant
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[View Sessions](#)
[Host this Course](#)

TRAINING LEVEL: Intermediate
CLASS SIZE: Minimum: 20 Maximum: 30
COURSE DESCRIPTION:

Please Note: NHI offers a virtual alternative to the ILT Course 135095. To register for the virtual option, search the Course Number "135095V".

Two-Dimensional Hydraulic Modeling of Rivers at Highway Encroachments (135095) provides participants with instruction to understand and appropriately apply 2D hydraulic models of rivers in highway encroachment situations.

The course focuses on the use and application of the SRH-2D model, developed by the US Bureau of Reclamation (USBR) and sponsored by the USBR and FHWA. Modeling principles and techniques will be presented using the latest version of the Surface Water Modeling System (SMS), a graphical pre-and post-processor for several 2D modeling engines, including SRH-2D. Specific lesson topics include model terrain

Online SMS Wiki Page and Other Resources

- [SMS Workflows Overview](#)
- [Table of SRH-2D Errors and Solutions](#)
- [SMS Blog](#)

General Workflows	SRH-2D Workflows
3D Bridge	SRH-2D Project
Annotations	SRH-2D BD Data
Animation	SRH-2D Boundary Conditions
Breaklines	SRH-2D Culvert
Bridge Scour	SRH-2D Gate
CAD Data	SRH-2D Monitor Points
Cartesian Grid Creation	SRH-2D Obstructions
Compute Volumes	SRH-2D Pressure Flow Bridge
Cross Sections	SRH-2D Pressure Flow with 3D Bridges
Data Visualization	SRH-2D Post-Processing
Digitize	SRH-2D Sediment Transport
Display Options	SRH-2D Simulation
Display Themes	SRH-2D Summary Reports
Element Patch Workflow	Summary Table
Export Data	SRH-2D Weir
Extract Features	SRH-2D Advanced Simulation Tools
Fast Floodplain	
Feature Stamping	
Floodway Delineation	
GIS Data	
Images	
Import Data	
Import Online Data	
Import Spectra	
Lidar	
Mesh Creation	
Mesh Editing	
Multiple Elevation Sources	
Observations	

2D Modeling Tutorials

- [Tutorial Link](#)
- Over 75 SMS/SRH-2D Tutorials, including:
 - Data importing, processing, and conversions
 - Raster data features and tools
 - Display and Visualizations
 - Mesh development tools
 - Culverts and other 1D hydraulic structures
 - Bridge and culvert pressure flow
 - Floodway tools
 - Sediment transport
 - Calibration and advanced simulations

General SMS Tutorials	
Title	SMS 13.2
Overview	PDF Data
2D Summary Table	PDF Data
3D Bridge	PDF Data
Annotated Cross Sections	PDF Data
Bridge Meshing	PDF Data
Bridge Scour	PDF Data
Bridge Scour Scenarios	PDF Data
Cell-Centered Grid	PDF Data
Cross Section	PDF Data
Cross Section to Surface	PDF Data
Data Visualization	PDF Data
Dataset Toolbox	PDF Data
Datasets to Rasters	PDF Data
Display Themes	PDF Data
Display Themes – Additional	PDF Data
Display Themes – Vector	PDF Data
Extract Features	PDF Data
Extract Features for Mesh Generation	PDF Data
Fast Floodplain	PDF Data
Feature Stamping	PDF Data
Floodway Methods	PDF Data
Floodway Delineation – Equal Conveyance	PDF Data
Floodway Delineation – Unit Q	PDF Data
GIS	PDF Data
Google Earth	PDF Data
Grid Generation	PDF Data
Import From Web	PDF Data
Importing Spectral Data	PDF Data

SRH-2D	SRH-2D	PDF Data
	SRH-2D Boundary Conditions	PDF Data
	SRH-2D Bridge Pressure Flow	PDF Data
	SRH-2D Culvert Structures	
	SRH-2D Culvert Structures with HY-8	* PDF Data
	SRH-2D Gates	PDF Data
	SRH-2D Obstructions	PDF Data
	SRH-2D Post-Processing	* PDF Data
	SRH-2D Pressure Flow with 3D Bridges	PDF Data
	SRH-2D Reports	PDF Data
	SRH-2D Simulations	PDF Data
	SRH-2D Adv. Simulations – Calibration	PDF Data
	SRH-2D Adv. Simulations – Calibration Mannings	PDF Data
	SRH-2D Adv. Simulations – Scenarios	PDF Data
	SRH-2D Weir Flow	* PDF Data
	SRH-2D Sediment Transport	* PDF Data
	SRH-2D Cohesive Sediment Transport	* PDF Data

Short YouTube Training Videos – 2D Hydraulic Modeling

- 2017 [Videos](#) (11)
- 2020 [Videos](#) (6)
- Other [SMS Learning Videos](#)

Two-Dimensional (2D) Hydraulic Modeling Videos

Federal Highway Administration USDOTFHWA
6 videos 1,159 views Last updated on Nov 23, 2020

Play all Shuffle

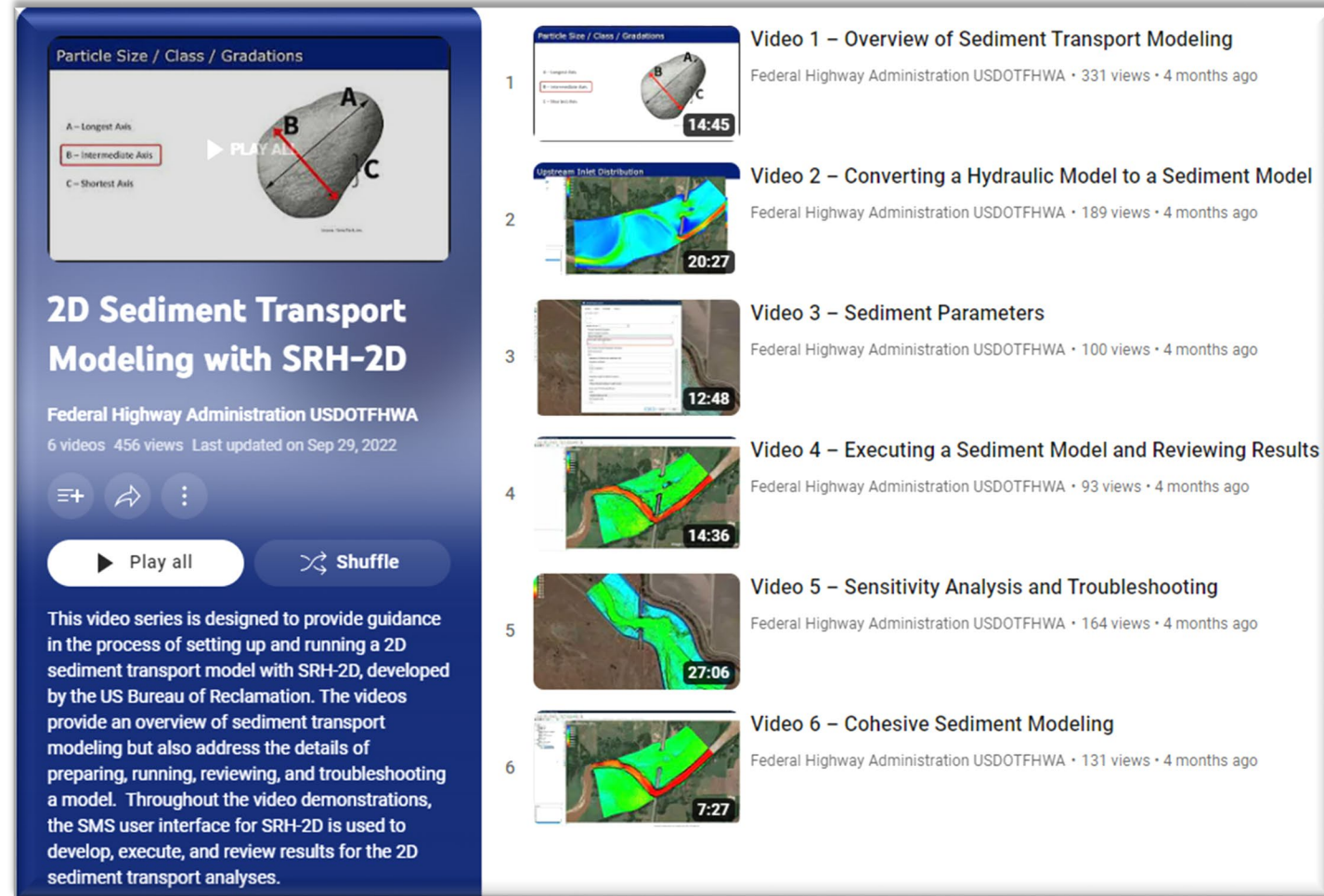
This series of videos is intended to provide training opportunities for those who are new to 2D hydraulic modeling and to promote best practices for the development of accurate and efficient models. Some of the examples demonstrate the use of the US Bureau of Reclamation SRH-2D model, but the concepts and methods are generally applicable to all models. The specific topics covered in these videos primarily focus on concepts that are important in transportation related hydraulic analyses.

<https://www.fhwa.dot.gov/engineering/hydraulics/>

- 1 **Approximate Channel Data**
Federal Highway Administration USDOTFHWA • 730 views • 2 years ago
4:52
- 2 **Bridge Features**
Federal Highway Administration USDOTFHWA • 1.1K views • 2 years ago
5:53
- 3 **Domain Limits**
Federal Highway Administration USDOTFHWA • 258 views • 2 years ago
5:54
- 4 **Hydraulic Controls**
Federal Highway Administration USDOTFHWA • 769 views • 2 years ago
4:57
- 5 **Material Roughness Values**
Federal Highway Administration USDOTFHWA • 335 views • 2 years ago
6:11
- 6 **Merging Terrain**
Federal Highway Administration USDOTFHWA • 541 views • 2 years ago
6:32

Short YouTube Training Videos – 2D Sediment Transport Modeling

- 2022 [2D Sediment Transport Videos](#) (6)



Particle Size / Class / Gradations

A – Longest Axis
B – Intermediate Axis
C – Shortest Axis

2D Sediment Transport Modeling with SRH-2D

Federal Highway Administration USDOTFHWA
6 videos • 456 views • Last updated on Sep 29, 2022

Play all Shuffle

This video series is designed to provide guidance in the process of setting up and running a 2D sediment transport model with SRH-2D, developed by the US Bureau of Reclamation. The videos provide an overview of sediment transport modeling but also address the details of preparing, running, reviewing, and troubleshooting a model. Throughout the video demonstrations, the SMS user interface for SRH-2D is used to develop, execute, and review results for the 2D sediment transport analyses.

Video 1 – Overview of Sediment Transport Modeling
Federal Highway Administration USDOTFHWA • 331 views • 4 months ago • 14:45

Video 2 – Converting a Hydraulic Model to a Sediment Model
Federal Highway Administration USDOTFHWA • 189 views • 4 months ago • 20:27

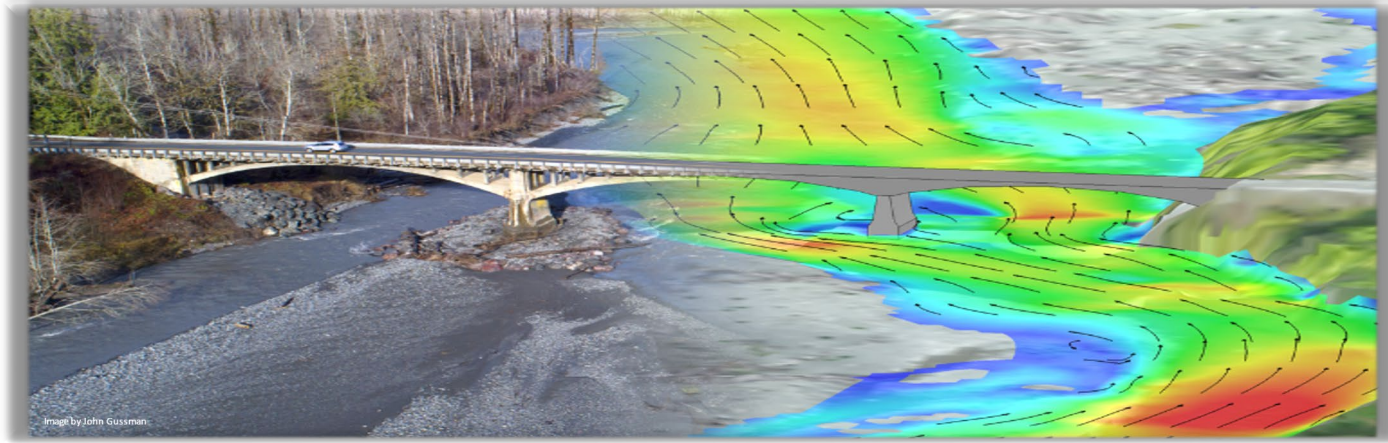
Video 3 – Sediment Parameters
Federal Highway Administration USDOTFHWA • 100 views • 4 months ago • 12:48

Video 4 – Executing a Sediment Model and Reviewing Results
Federal Highway Administration USDOTFHWA • 93 views • 4 months ago • 14:36

Video 5 – Sensitivity Analysis and Troubleshooting
Federal Highway Administration USDOTFHWA • 164 views • 4 months ago • 27:06

Video 6 – Cohesive Sediment Modeling
Federal Highway Administration USDOTFHWA • 131 views • 4 months ago • 7:27

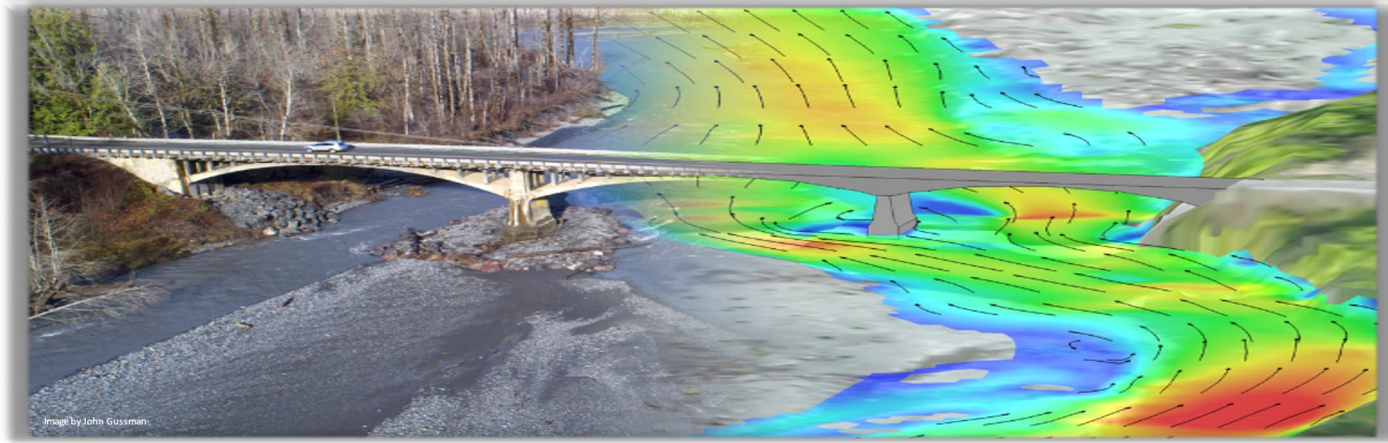
FHWA 2D Hydraulic Modeling User's Forum



- [Subscribe](#) to receive web meeting invites
- Web meetings held roughly every 2-3 months
- Updates on the latest SRH-2D and SMS developments
- 2D modeling best practices
- Tips and tricks in SMS
- Access to past eight years of web meeting recordings
- Contact Scott Hogan for more information

Scott Hogan
FHWA Resource Center
Scott.hogan@dot.gov
(720) 576-6026

FHWA 2D Hydraulic Modeling User's Forum



- Web Links to web meeting recording links after March 2022 (Zoom)
 - April 7, 2022 – Colorado DOT 2D Modeling Success Stories ([Recording](#) / [Handout](#))
 - November 16, 2022 - Automated Bridge and Culvert Meshing Tools ([Recording](#) / [Handout](#) / [Demo](#))
 - January 19, 2023 – How to Generate An Accurate and Efficient Mesh ([Recording](#) / [Handout](#))
 - February 23, 2020 - Troubleshooting SMS Projects ([Recording](#) / [Handout](#))

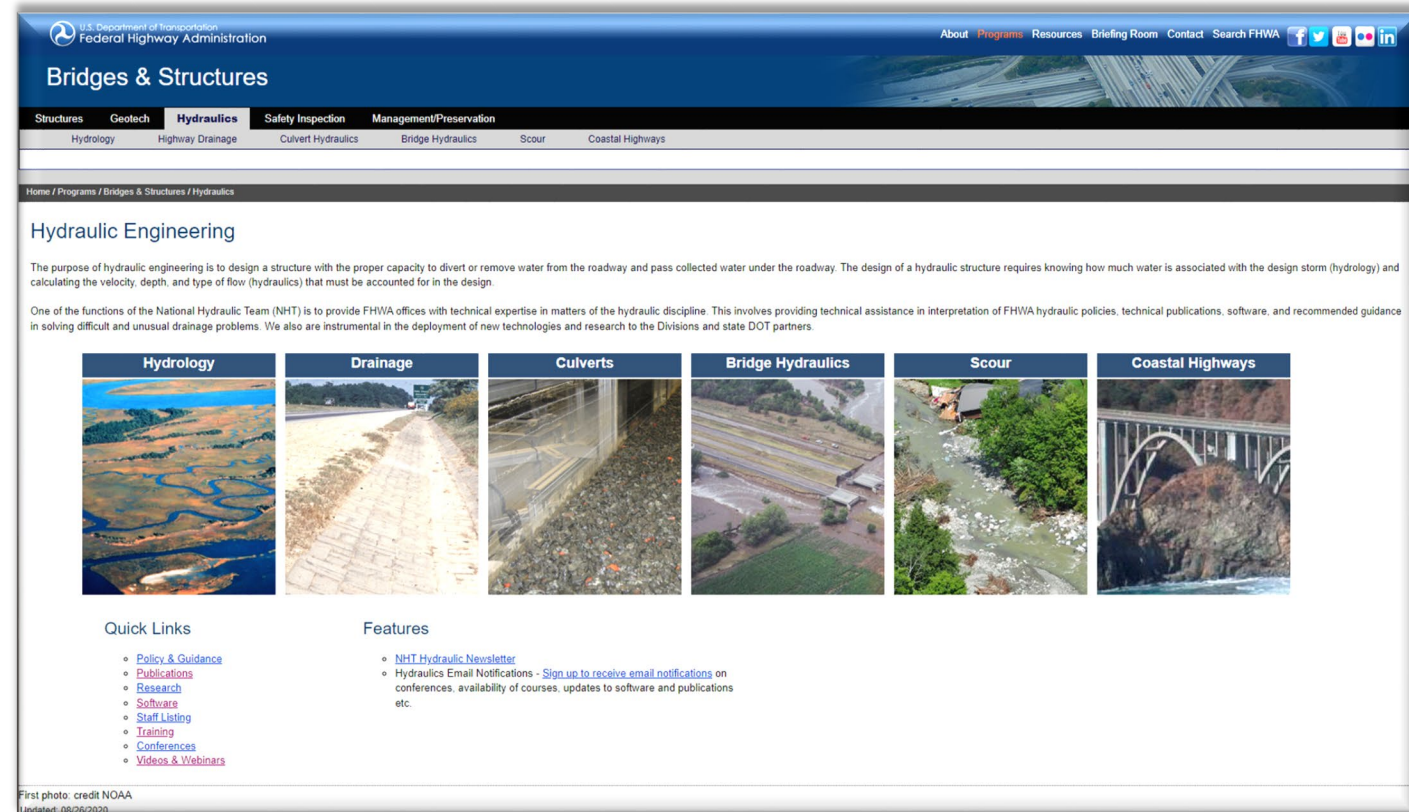
FHWA 2D Hydraulic Modeling User's Forum

Meeting recording links prior to March 2022 (Through Adobe Connect)

- July 15, 2015 - SRH-2D Model Development (*archived*)
- August 26, 2015 - Managing information in SMS and reviewing results for adequacy (*archived*)
- April 27, 2016 - Mesh Development and Review (*archived*)
- February 2, 2017 - Evaluating bridge scour with 2D model results (*archived*)
- April 19, 2017 - [SRH-2D Boundary Conditions](#)
- June 21, 2017 - [Developing Terrain Data](#)
- August 31, 2017 - [Back to the Basics for mesh development](#)
- October 18, 2017 - [Potential mesh stability issues and solutions](#)
- January 25, 2018 - [CDOTs 2D modeling experience](#)
- March 1, 2018 - [Nevada DOT terrain mapping with UAVs](#)
- May 31, 2018 - [Bridge and Culvert Best Modeling Practices](#)
- August 20, 2018 - [Minnesota Data Collection and Model Calibration](#)
- November 14, 2018 - [2D Hydraulic Model Review](#)
- January 17, 2019 - [New features in the SMS SRH2D interface](#)
- March 14, 2019 - [SRH-2D Model Development Overview](#)
- June 18, 2019 - [Importing and Compiling Terrain Data](#)
- August 8, 2019 - [Presenting and Exporting Results](#)
- November 14, 2019 - [2D Hydraulic Modeling Reference Document Overview](#)
- February 20, 2020 - [2D Hydraulic Model Review - Terrain Data](#)
- April 4, 2020 - [2D Hydraulic Model Review - 2D Mesh](#)
- May 13, 2020 - [2D Hydraulic Model Review - 2D Boundary Conditions and Materials](#)
- July 16, 2020 - [2D Hydraulic Model Review - Hydraulic Structures](#)
- December 1, 2020 - [What's new in SMS 13.1 and SRH-2D 3.3](#)
- March 2, 2021 - [2D Hydraulic Model Review - Model Controls and Results \(3D Bridges\)](#)
- June 17, 2021 - [Understanding the Importance of Hydraulic Controls/Mesh Resolution](#)
- January 13, 2022 - [FEMA Flood Mapping Using 2D Modeling](#)

Additional FHWA 2D Hydraulic Modeling Resources

- FHWA Bridge Hydraulics [Page](#)
 - 2D Hydraulic Modeling Sample Scope of Work
 - 2D Hydraulic Modeling Video Summary Pages
 - Benchmarking of SRH-2D Report
 - A Primer on Modeling in the Coastal Environment



FHWA Bridge Scour Workshop

- [Recordings and Handouts](#)
- Bridge Scour Overview
- Long Term Degradation
- Contraction Scour
- Pier Scour
- Abutment Scour
- 2D Bridge Scour Tools Demo

