



U.S. Department
of Transportation

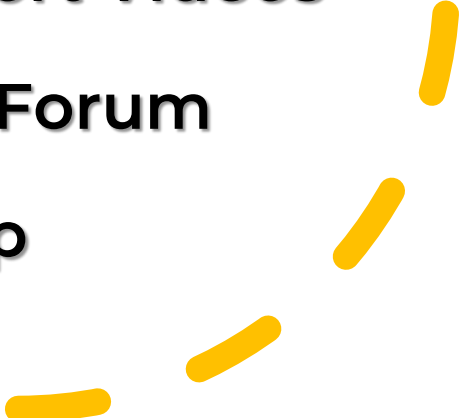
**Federal Highway
Administration**

2D Hydraulic Modeling User's Forum

SMS/SRH-2D Hydraulic Modeling Resources

Updated 2/2023

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.

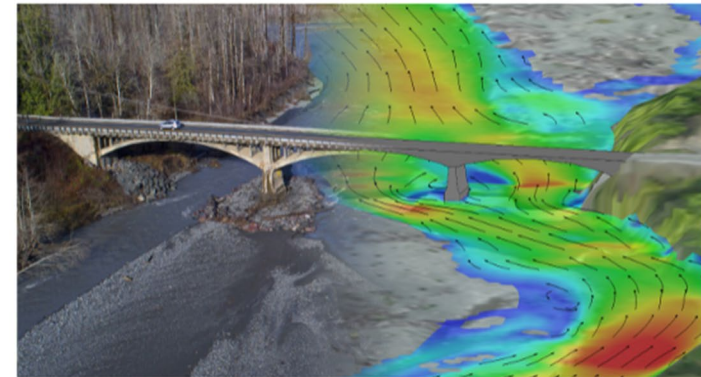
2D Hydraulic Modeling Reference Document

- [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 interface. The top navigation bar includes the NHI logo, '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 button) and 'Connect with us' (with social media icons). The 'Find Training' section shows a map of the United States. The main content area displays a search result for the course 'Two-Dimensional Hydraulic Modeling of Rivers at Highway Encroachments'. The course description includes the program area (Hydraulics), course number (FHWA-NHI-135095), and training level (Intermediate). A table shows the course details for the year 2023, including a length of 3 days, 2.1 CEU units, and a host price of \$850 per participant. The course description also includes a note about virtual alternatives and a detailed overview of the course content.

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 | **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 |

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

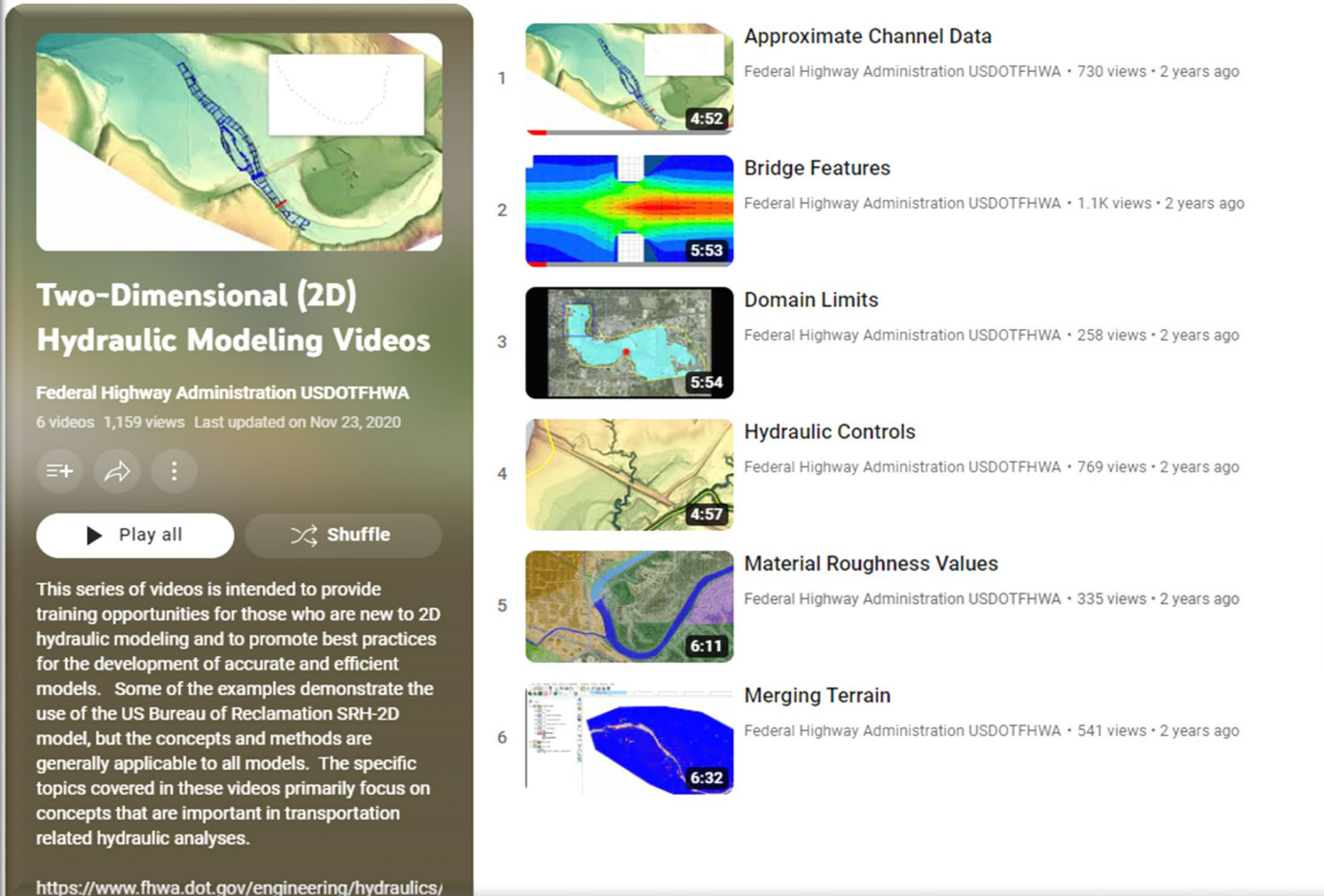
- [Tutorial Link](#)
- Over 75 SMS/SRH-2D Tutorials, including:
 - Data importing, processing, and conversions
 - Raster data features and tools
 - Display and Visualizations
 - Mesh development tools
 - Culverts and other 1D hydraulic structures
 - Bridge and culvert pressure flow
 - Floodway tools
 - 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 | PDF Data |
|--|--|--|
| | SRH-2D Boundary Conditions | PDF Data |
| SRH-2D Bridge Pressure Flow | PDF Data | PDF Data |
| SRH-2D Culvert Structures | | |
| SRH-2D Culvert Structures with HY-8 | * PDF Data | PDF Data |
| SRH-2D Gates | PDF Data | PDF Data |
| SRH-2D Obstructions | PDF Data | PDF Data |
| SRH-2D Post-Processing | * PDF Data | PDF Data |
| SRH-2D Pressure Flow with 3D Bridges | PDF Data | PDF Data |
| SRH-2D Reports | PDF Data | PDF Data |
| SRH-2D Simulations | PDF Data | PDF Data |
| SRH-2D Adv. Simulations – Calibration | PDF Data | PDF Data |
| SRH-2D Adv. Simulations – Calibration Mannings | PDF Data | PDF Data |
| SRH-2D Adv. Simulations – Scenarios | PDF Data | PDF Data |
| SRH-2D Weir Flow | * PDF Data | PDF Data |
| SRH-2D Sediment Transport | * PDF Data | PDF Data |
| SRH-2D Cohesive Sediment Transport | * PDF Data | 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)

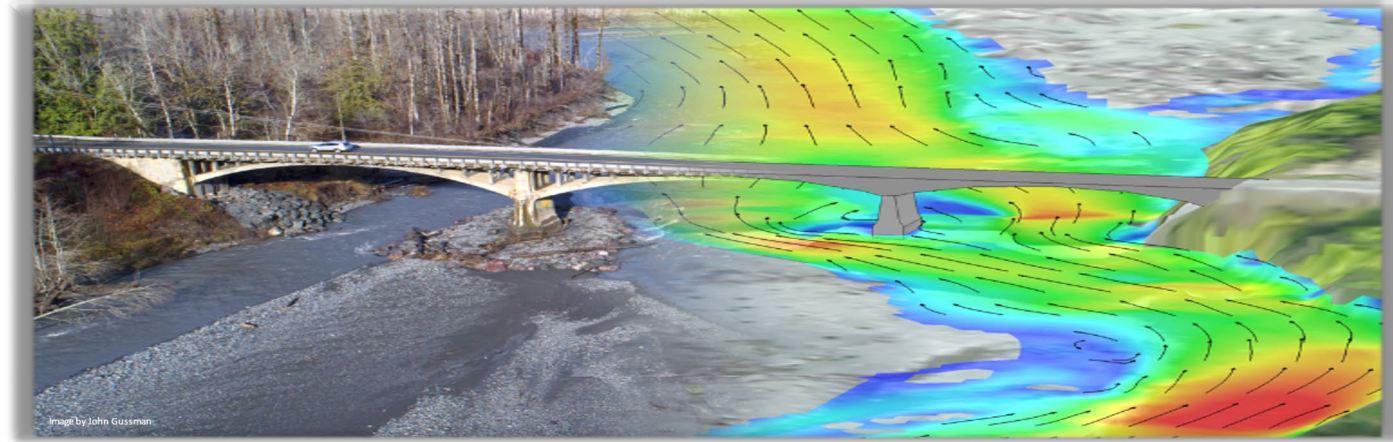
2D Sediment Transport Modeling with SRH-2D
Federal Highway Administration USDOTFHWA
6 videos · 456 views · Last updated on Sep 29, 2022

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.

- 1 **Video 1 – Overview of Sediment Transport Modeling**
Federal Highway Administration USDOTFHWA · 331 views · 4 months ago
- 2 **Video 2 – Converting a Hydraulic Model to a Sediment Model**
Federal Highway Administration USDOTFHWA · 189 views · 4 months ago
- 3 **Video 3 – Sediment Parameters**
Federal Highway Administration USDOTFHWA · 100 views · 4 months ago
- 4 **Video 4 – Executing a Sediment Model and Reviewing Results**
Federal Highway Administration USDOTFHWA · 93 views · 4 months ago
- 5 **Video 5 – Sensitivity Analysis and Troubleshooting**
Federal Highway Administration USDOTFHWA · 164 views · 4 months ago
- 6 **Video 6 – Cohesive Sediment Modeling**
Federal Highway Administration USDOTFHWA · 131 views · 4 months ago

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

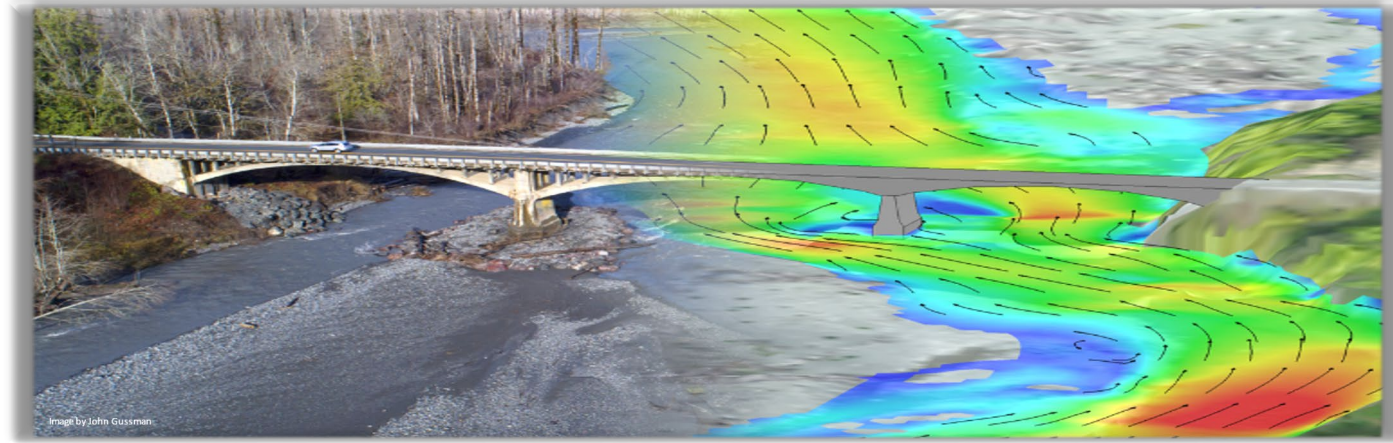
Scott Hogan

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](#))

FHWA 2D Hydraulic Modeling User's Forum

- [Link](#) to meeting recordings prior to March 2022 (Through Adobe Connect)
- July 15, 2015 - SRH-2D Model Development
- August 26, 2015 - Managing information in SMS and reviewing results for adequacy
- April 27, 2016 - Mesh Development and Review
- February 2, 2017 - Evaluating bridge scour with 2D model results
- 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

The screenshot shows the FHWA Bridges & Structures website. The header includes the U.S. Department of Transportation Federal Highway Administration logo and navigation links for About, Programs, Resources, Briefing Room, Contact, and Search FHWA. The main navigation bar lists Structures, Geotech, Hydraulics, Safety Inspection, and Management/Preservation. Below this, a sub-navigation bar includes Hydrology, Highway Drainage, Culvert Hydraulics, Bridge Hydraulics, Scour, and Coastal Highways. The page title is "Hydraulic Engineering". The main content area contains a paragraph explaining the purpose of hydraulic engineering and the role of the National Hydraulic Team (NHT). Below the text is a row of six image thumbnails: Hydrology, Drainage, Culverts, Bridge Hydraulics, Scour, and Coastal Highways. At the bottom, there are two sections: "Quick Links" with links to Policy & Guidance, Publications, Research, Software, Staff Listing, Training, Conferences, and Videos & Webinars; and "Features" with links to NHT Hydraulic Newsletter and Hydraulics Email Notifications. The footer includes the text "First photo: credit NOAA" and "Updated: 08/25/2020".

FHWA Bridge Scour Workshop

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

