

Presented by:



Mark Forest

Conсор
Engineers



Krey Price

Surface
Water
Solutions



Evan O'Brien

Genesis
Hydrology

AWS Free Webinar: 29 Oct 2025

HEC-RAS

Past, Present, and Future





The Past





The Present



 HEC-RAS Documentation

HEC Home Downloads Category ▾

Welcome to HEC-RAS

Hydraulics Documentation

 HEC-RAS User's Manual

 HEC-RAS 2D User's Manual

 HEC-RAS Mapper User's Manual

 HEC-RAS Hydraulic Reference Manual

 HEC-RAS 2025

Updates

 HEC-RAS Known Issues

 HEC-RAS Release Notes

Sediment Documentation

 HEC-RAS 1D Sediment Transport

 HEC-RAS 2D Sediment Transport

 Mud and Debris Flow

Additional Resources

 HEC-RAS Training

 HEC-RAS Guides and Tutorials

 HEC-RAS Applications Guide



The Future



The logo features a stylized blue mountain range with a winding river or path leading through it. Below this graphic, the text 'RAS 2025' is displayed in a large, bold, blue sans-serif font, with 'ALPHA' in a smaller, all-caps font underneath.

↓ Download

[Getting Started](#) | [Announcements](#) | [YouTube](#)

Riverine Hydraulics - History

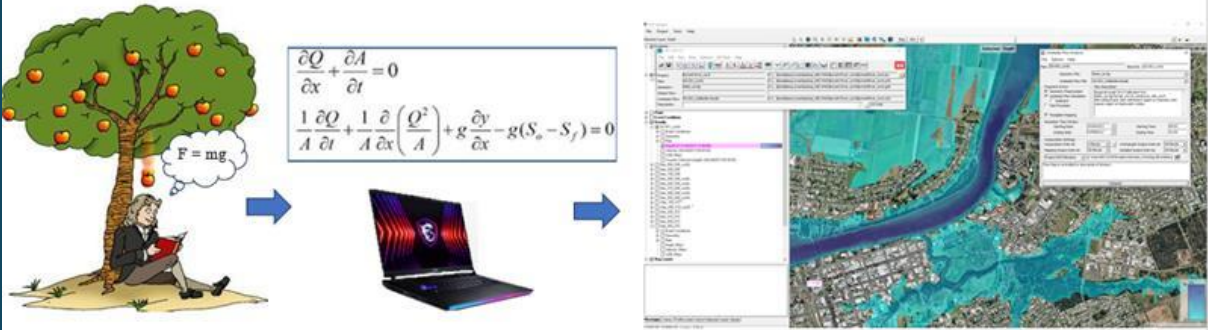
Mississippi Basin Physical Model

- Built at 1:2000 scale on 200 acre site
- Gigantic. 23 years to construct.
- Built by Italian POW's
- Accurate results, but time consuming and expensive.
- Led directly to development of HEC-2.
- HEC-2 was used to validate the Basin Model.
- HEC-2 is the ancestor to HEC-RAS.



Riverine Hydraulics - Today

- Massive computing power. Solve the fundamental equations millions of times per second on a laptop.
- The same understanding of physics that enables bridges, buildings, aircraft, boats etc. to be designed on computers.
- Founded in classical mechanics, principles understood for hundreds of years.
- As always, good outputs require good inputs. Calibration is important.



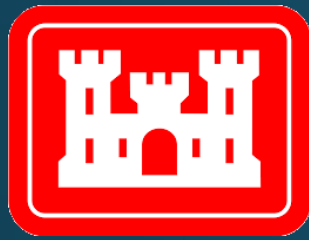
The Scale of Nature: Modeling the Mississippi River



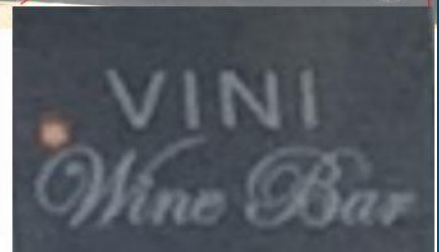
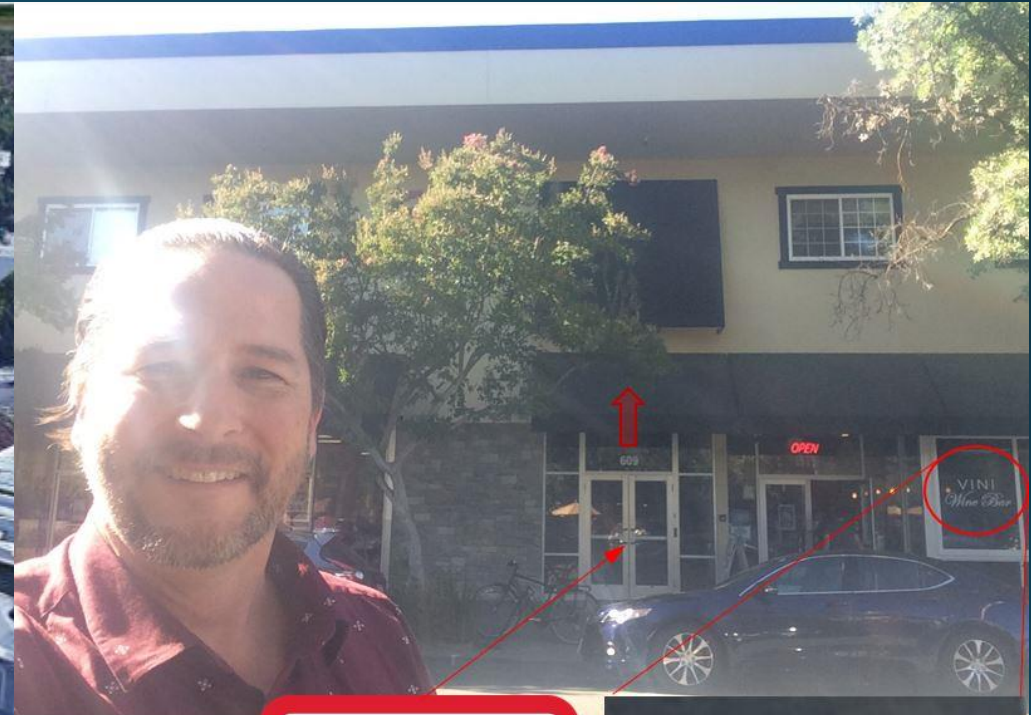
www.hydroschool.org/physical/

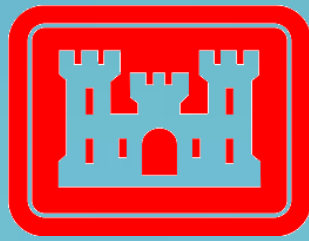


www.hydroschool.org/riprap/



U.S. Army Corps of Engineers Hydrologic Engineering Center





**U.S. Army Corps of Engineers
Hydrologic Engineering Center**

Flood Hydrograph Package	HFC-1	HEC-HMS
Water Surface Profiles Program	HEC-2	HEC-RAS
Reservoir Analysis or Conservation	HEC-3	
Stochastic Streamflow Generation Program	HEC-4	
Simulation of Flood Control and Conservation Systems	HEC-5	
Scour and Deposition in Rivers and Reservoirs	HEC-6	



U.S. Army Corps of Engineers (USACE)
BUILDING STRONG

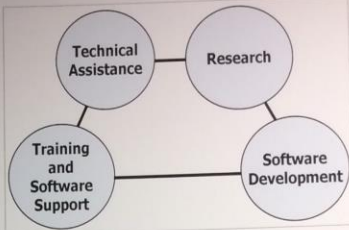
Hydrologic Engineering Center (CEIWR-HEC)

Background & Mission

- Founded in 1964, CEIWR-HEC is an element of USACE, Institute for Water Resources (CEIWR). CEIWR-HEC has served as a USACE Technical Center of Expertise (CX) in several technical areas for USACE for almost fifty years.
- Through programs in research, software development, training, and technical assistance, CEIWR-HEC provides technical expertise to USACE offices throughout the nation.
- CEIWR-HEC products are state-of-the-art software systems and analysis procedures, which have become standards of the profession in the United States and the international community.
- CEIWR-HEC's primary goal is to support the Nation in its water resources management responsibilities by increasing USACE technical capability in hydrologic engineering and water resources planning and management. Essentially, CEIWR-HEC's quest is to move the state-of-the-art into the state-of-the-practice. CEIWR-HEC provides services primarily to HQ USACE, USACE District and Division offices and laboratories. However, subject to appropriate agreements, services are also available to other Federal and local agencies, and the U.S. private sector in support of international work and international institutions.

Who We Are

- 35 full-time professionals; hydraulic engineers, a few computer specialists, mostly MS degrees, a few PhDs.
- Five to ten university students: University of California, Davis; California State University, Sacramento
- Primarily support USACE; some other Federal agencies; growing international assistance; increasing number of MoUs; visiting scholars – U.S. and international (over 25 activities supporting COCOM's in FY 2012/2013).



- Technical Specialty Areas**
- hydrologic statistics & risk analysis
 - planning analysis
 - real-time water control management
 - reservoir system analysis
 - river hydraulics & sediment transport
 - surface & groundwater hydrology

- Technical Expertise**
- data management
 - flood & drought statistics
 - flood risk management
 - reservoir sizing & operation
 - river hydraulics
 - water resources planning
 - watershed hydrology

Activities

- The CEIWR-HEC program includes developing engineering methods and software, performing research, and providing training, planning analysis and technical assistance to USACE MSC and district offices.
- CEIWR-HEC's mission focuses on serving the USACE engineering practitioners at the field level and to enable the districts to successfully accomplish civil works studies, projects and operations.
- CEIWR-HEC aims to build technical capacity throughout USACE, facilitating technology transfer of HEC products, and helping to elevate the overall capability of the USACE engineering profession by bridging the gap between the academic community, practicing hydrologic engineers and planning professionals.

HEC PROSPECT Training Classes

#178 Hydrologic Modeling with HEC-HMS	2-6 Dec 2013
#155 CWMS Modeling for Real-Time Water Management	27-31 Jan 2014
#188 Unsteady Flow Analysis with HEC-RAS	3-7 Feb 2014
#98 Reservoir Systems Analysis with HEC-ResSim	24 - 28 Feb 2014
#200 Risk Analysis for Flood Damage Reduction Projects	3-7 Mar 2014
#320 H&H for Dam Safety Studies	24-28 Mar 2014
#161 Hydrologic Analysis for Ecosystem Restoration	7-11 Apr 2014
#114 Steady Flow Analysis with HEC-RAS	14-18 Apr 2013
#219 Hydrologic Engineering Applications for GIS	28 Apr-2 May 2014
#60 Consequence Estimation with HEC-FIA	5-9 May 2014
#152 Water Data Management with HEC-DSSVue	7-11 Jul 2014
#123 Flood Frequency Analysis	14-18 Jul 2014
#352 Advanced 1D/2D Modeling with HEC-RAS	18-22 Aug 2014



Achievements

- Continued development of the CEIWR-HEC suite of software (HEC-RAS, HEC-HMS, HEC-FDA, HEC-WAT, HEC-ResSim, etc.)
- Providing leadership in establishing risk analysis as the foundation technology for flood risk management planning and analysis
- Development and deployment of CWMS, the real-time forecasting and decision-support system that is used 24/7 in execution of the USACE CW water resource, water management mission.



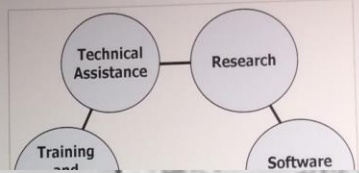
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1966	- International Hydrological Decade (IHD) involvement began - Staff size at 13
1968	HEC-1, HEC-2, HEC-3, HEC-4 released
1969	- HEC moves 12 miles West to Davis near the University of Davis campus - Five Branches; staff of 25
1972	- Leo R. Beard retires - Bill S. Eichert is appointed Director - Planning Analysis Branch is established - As part of IHD, a one-month training course was given to representatives from 21 nations - Hurricane Agnes; HEC is asked to prepare mathematical models for the four hardest hit basins
1974	HEC is 10 years old with a staff of 26 & an annual budget of \$1 million
1975	As part of IHD, a one-month training course was given to representatives from 18 nations
1977	IHD work is completed; 12 volumes of Hydrologic Engineering Methods for Water Resource Development are published
1979	HEC designated as a separate field operating activity (FOA) in January Water Resources Support Center (WRSC) is formed in June; HEC is an FOA within the WRSC structure
1984	- HEC is 20 years old with a staff of 31 & an annual budget of \$2.8 million - Robert MacArthur is selected as USACE Engineer of the Year
1985	First PC versions of HEC-1 & HEC-2 released
1988	- HEC has 17 technical specialties 3,800 copies of HEC PC software is distributed from a library of 52 PC & 129 mainframe program
1989	- HEC is 25 years old with a staff of 32 & an annual budget of \$3 million - Bill S. Eichert retires - Darryl W. Davis is appointed Director
1990	Missouri River main stem reservoir system operation optimization model (HEC-PRM)
1991	- Next generation (NexGen) of HEC software development began - Building of a USACE-wide database containing information on authorized & current operations of reservoirs by project purpose
1993	- First release (Beta) of HEC-RAS (River Analysis System) software - Interior flooding study on the Napa River
1994	HEC is 30 years old with a staff of 35 & an annual budget of \$4.1 million
1995	- Version 1.0 of HEC-RAS released - Development of a main stem Mississippi River real-time stage forecasting model - Groundwater model for Chena River, Alaska District - Des Plaines River, formulating & evaluating flood damage reduction measures
1996	- First release (Beta) of HEC-HMS (Hydrologic Modeling System) - First release (Beta) of HEC-FDA (Flood Damage Reduction Analysis) - Modernization of current Water Control Data System (WCDS) began
1997	Version 2.0 of HEC-RAS released
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1999	- WCDS modernization renamed to Corps Water Management System (CWMS) - First release of HEC-GeoRAS
2000	- Version 2.0 of HEC-HMS released (continuous simulation added) - Version 3.0 of HEC-RAS released (unsteady flow) - First release of HEC-GeoHMS - HEC became a Center within Institute for Water Resources (IWR); re-organized into 3 Divisions - Final report from National Academy of Sciences, National Research Council on USACE's use of risk-based analysis (HEC-FDA)

2001	- Iraq work - Desert Storm - HEC provides H&H modeling support to the Defense Intelligence Agency - First release of HEC-ResSim (Reservoir System Simulation) Version 1.1
2002	First version of Corps Water Management System (CWMS) software was released to USACE offices with water management responsibilities
2003	Version 2.0 of HEC-ResSim released
2004	HEC is 40 years old
2005	- Hurricane Katrina hits New Orleans. HEC is asked to develop hydrology models, hydraulic models, inundation maps, and compute consequences. HEC models are used to answer many "what if" questions, and evaluate future conditions. - Version 3.0 of HEC-HMS released (snowmelt & interior drainage features) - System-Wide Water Resources Research Program (SWWRP) starts
2006	- Darryl W. Davis retires - Christopher N. Dunn is appointed Director - First release (Beta) of HEC-WAT (Watershed Analysis Tool) software - HEC is asked to assist in performing Dam Safety studies for all of the dams in Hawaii - Flood and Coastal Storms Damage Reduction Research (FCSDR) program starts - Iraq - Strategy for Water & Land Resources project; renovation of stream gage network in conjunction with USGS - Afghanistan - operations manual & water budget analysis on Kajakai Reservoir
2007	- Version 3.0 of HEC-ResSim released - Training in water resources engineering in Nairobi, Kenya, & Addis Ababa, Ethiopia - part of Combined Joint Task Force - Horn of Africa - A critical levee evaluation & engineering performance analysis on a levee along the Anseung River, Camp Humphreys, South Korea
2008	- First release of HEC-SSP (Statistical Software Package) Version 1.0 - Version 4.0 of HEC-RAS released; includes sediment transport and water quality modeling - First release of HEC-EFM (Ecosystem Functions Model) - SRFCP (Sacramento River Flood Control Project) study for CESP led to formal guidance in the use of probabilistic methods to support USC 408 permit requested. Demonstrated that existing USACE risk analysis tools could be used in a systems context.
2009	- American Recovery & Reinvestment Act (ARRA) CWMS Implementation - Certification of Version 1.2.4 of HEC-FDA - HEC Assists CELRD & National Weather Service (NWS) in developing an unsteady HEC-RAS model of the entire Ohio River System - Version 2.0 of HEC-EFM released
2010	- HEC became a member of the Project Delivery Team (PDT) for the Columbia River Treaty (CRT) 2014/2024 Review - Development of the Flood Risk Analysis (FRA) compute option to the HEC-WAT software began - Version 2.0 of HEC-SSP released (coincident frequency analysis & duration analysis)
2011	- HEC assist CELRD, CEMVD, and the National Weather Service (NWS) with real-time forecasting of the May 2011 flood & the operation of the New Madrid Floodway. - System-Wide Water Resources Research Program (SWWRP) finished
2012	- Significant international activities - Cambodia, Thailand, Netherlands, Morocco, Spain, Taiwan, Japan, Russia, South Korea, Iraq - HEC-RAS workshop for Mekong River Commission - Certification of HEC-EFM software - CWMS National Implementation Plan initiated - Integrated Water Resources Science & Services (IWRSS) established - First release of HEC-FIA (Flood Impact Analysis) Version 2.2
2013	- Version 3.0 of HEC-EFM released - Version 4.0 of HEC-HMS released (sediment and water quality added)
2014	- HEC is 50 years old with a staff of 42 & an annual budget of \$9 million - Version 5.0 (Beta) of HEC-RAS release; two-dimensional modeling

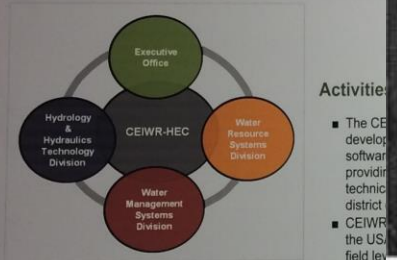
www.hydroschool.org/hec/

Background & Mission

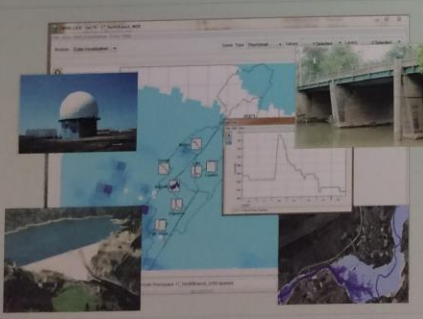
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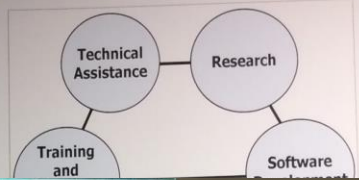
Al Gochran (OCE), Dan Deneff, Ed Hawkins, A.J. Fredrich, Al Onodera, Bill Eichert, Vilma Dudensing, Chuck Abraham, Denver Mills, Ed Jones, Harold, Kubik, Helen Nadolski and Leo R. Beard

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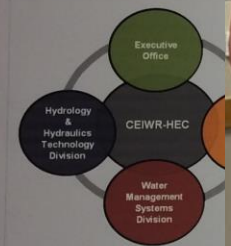


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graph TD
    TA((Technical Assistance)) --- R((Research))
    TA --- T((Training and))
    R --- S((Software))
    T --- S
    
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Achievements

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- Development and deployment of CV time forecasting and decision-support tools used 24/7 in execution of the USA water resource, water management





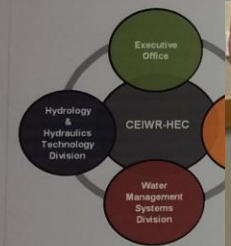



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The Past

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The Past



MS
CS

Finished - Steady Flow Analysis

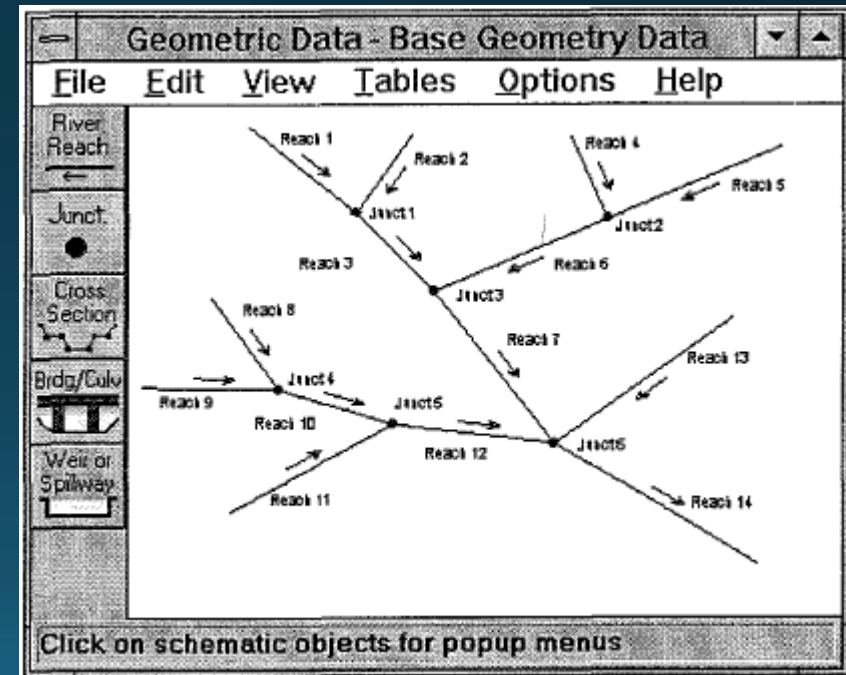
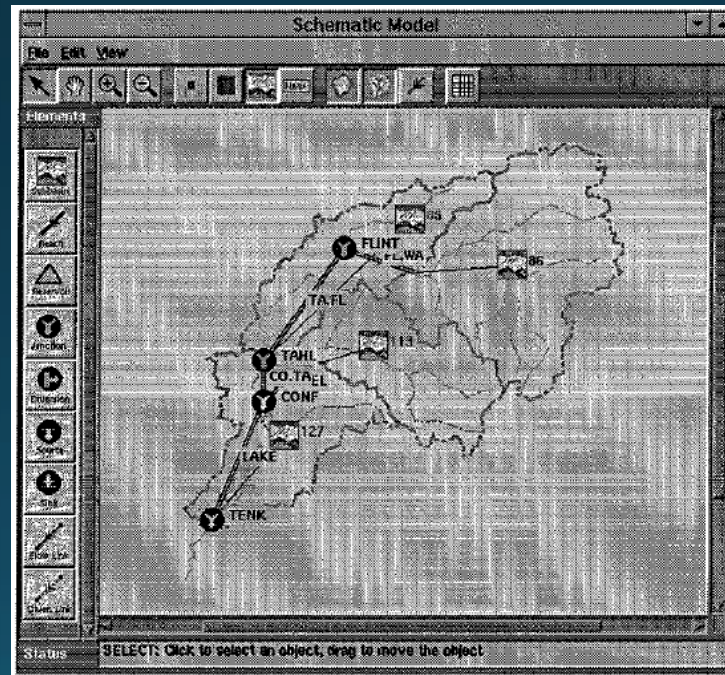
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	XSEC	31107	=	673.07	672.23	672.23
CULVERT						
	XSEC	31166	=	673.22	670.94	670.32
	XSEC	31249	=	674.54	672.03	672.03
	XSEC	31485	=	676.85	675.09	674.25
	XSEC	31576	=	677.32	677.01	
	XSEC	31806	=	678.42	677.45	
	XSEC	31961	=	679.72	679.22	
	XSEC	32093	=	682.09	681.09	681.09

PROGRAM TERMINATED NORMALLY

The Past





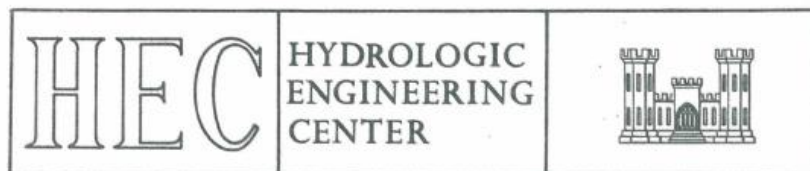
GENERALIZED COMPUTER PROGRAM

723-02A

HEC-2 WATER SURFACE PROFILES

USERS MANUAL
WITH SUPPLEMENT

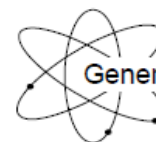
NOVEMBER 1976



U S ARMY CORPS OF ENGINEERS



US Army Corps
of Engineers
Hydrologic Engineering Center



Generalized Computer Program

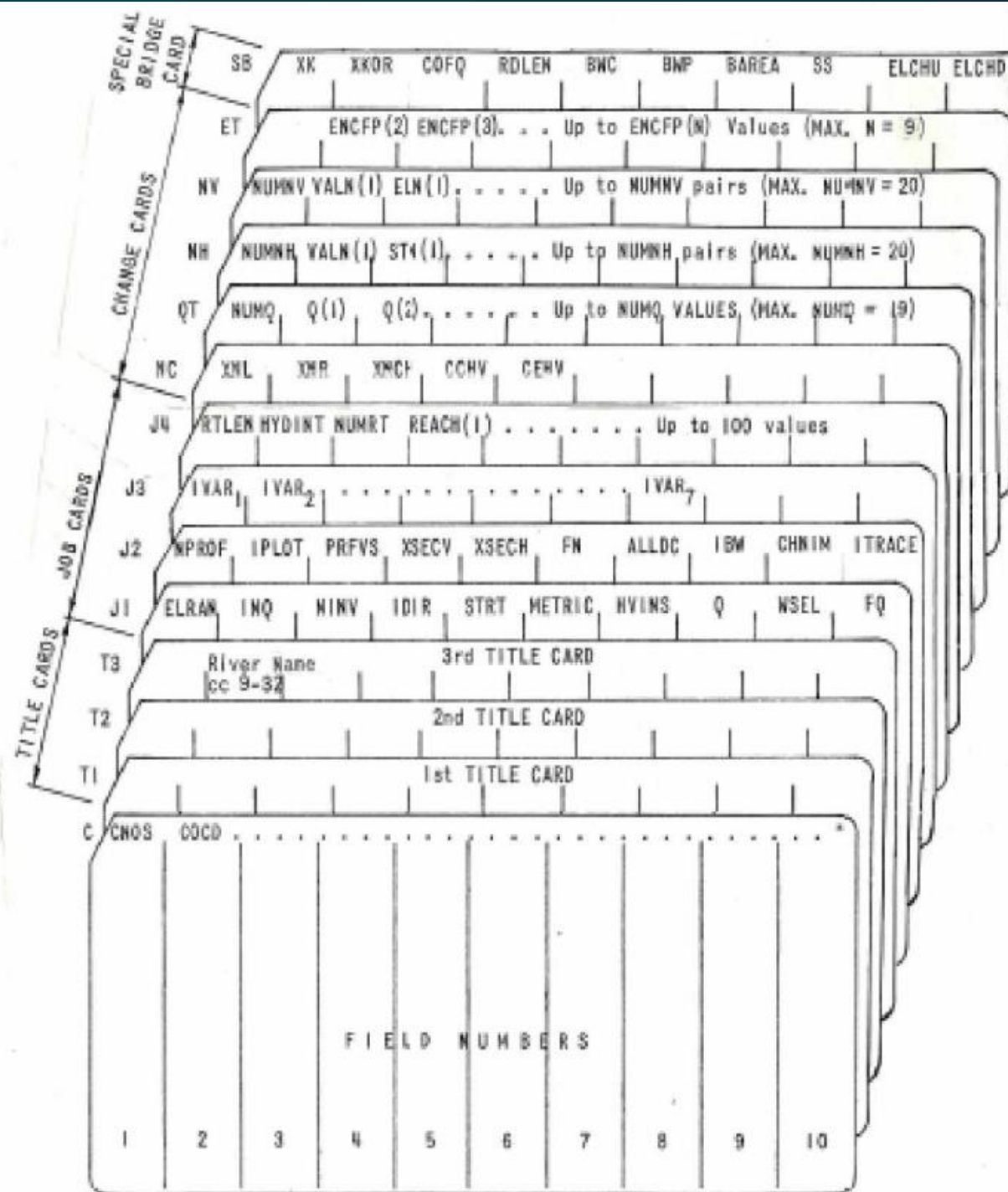
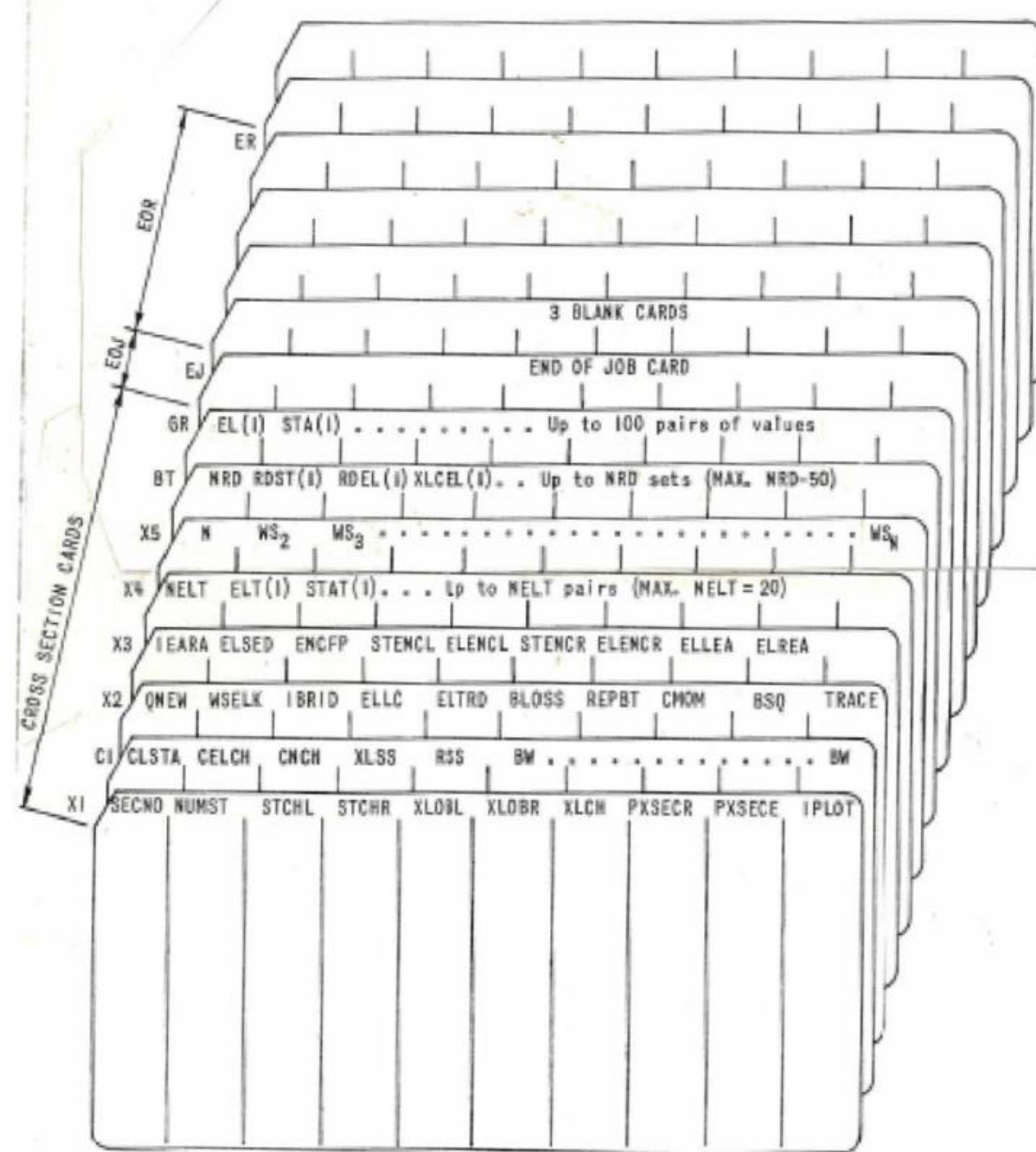
HEC-2 Water Surface Profiles

User's Manual

September 1990
Revised: September 1991

Approved for Public Release. Distribution Unlimited.

CPD-2A



8 Cross Section Records

8.1 X1 Record - General Items for Each Cross Section (required)

This record is required for each cross section (800 cross sections can be used for each profile) and is used to specify the cross section geometry and program options applicable to that cross section.

FIELD	VARIABLE	VALUE	DESCRIPTION
0	IA	X1	Record identification characters.
1	SECNO	+	Cross section identification number. NOTE: When using the Split Flow Option, cross section ID numbers must increase downstream to upstream.
		-	Start new tributary backwater at this cross section.
2	NUMST	0	Previous cross section is repeated for current section. GR records are not entered for this cross section.
		+	Total number of stations on the following GR records.
3	STCHL	0	NUMST(X1.2) is 0.
		+	The station of the left bank of the channel. Must be equal to one of the STA(N) on next GR records.
4	STCHR	0	NUMST(X1.2) is 0.
		+	The station of the right bank of the channel. Must be equal to one of the STA(N) on GR records and equal to or greater than STCHL.
5	XLOBL	+	Length of left overbank reach between current cross section and next downstream cross section. Zero for first cross section if IDIR = 0, (J1.4).
6	XLOBR	+	Length of right overbank reach between current cross section and next downstream cross section. Zero for first cross section if IDIR = 0.
7	XLCH	+	Length of channel reach between current cross section and next downstream cross section. Zero for first cross section if IDIR = 0.

8.8 GR Record - Ground Profiles Elevations and Stations

This record specifies the elevation and station of each point in a cross section used to describe the ground profile, and is required for each X1 record unless NUMST (X1.2) is zero. The points outside of the channel determine the subdivision of the cross section which influences calculation of a discharge-weighted velocity head for the cross section.

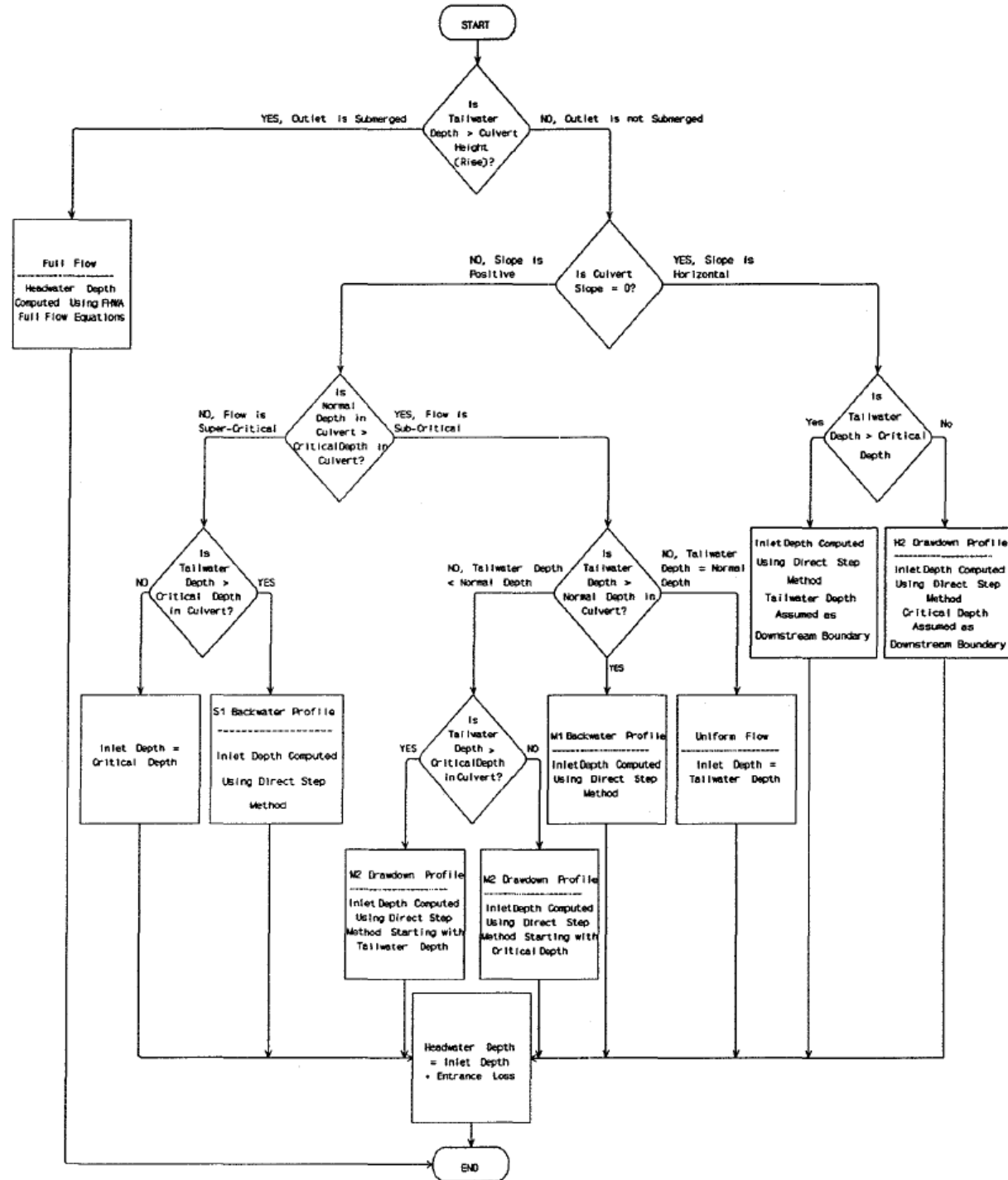
FIELD	VARIABLE	VALUE	DESCRIPTION
0	IA	GR	Record identification characters.
1	EL(1)	+ or -	Elevation of cross section point one at station STA(1). May be positive or negative.
2	STA(1)	+	Station of cross section point one.
3	EL(2)	+ or -	Elevation of cross section point two at STA(2).
4	STA(2)	+	Station of cross section point two.

5-10 etc.

Continue with additional GR records using up to 100 points to describe the cross section. Stations must be in increasing order progressing from left to right across the cross section.

METHOD	ET CARD VALUE	DESCRIPTION
6	X.6 or X.61	Uses an optimization scheme to obtain a desired difference in energy grade line elevations as closely as possible to the specified target.
	-X.6 or -X.61	Same as X.6 except the reduction of conveyance in each overbank will be in proportion to the conveyance in the overbanks under natural conditions.

The Past





US Army Corps
of Engineers
Hydrologic Engineering Center

HEC-1 and HEC-2 Applications on the Microcomputer

August 1987

Approved for Public Release. Distribution Unlimited.

TP-117

TRAINING DOCUMENT NUMBER 26

COMPUTING WATER SURFACE PROFILES WITH HEC-2 ON A PERSONAL COMPUTER

Description and User Guidance

SEPTEMBER 1988

Vernon R. Bonner

Accession For	
NTIS CR&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
PC 15.95 } By ME 6.95 } NTIS Distribution	
Availability Codes	
Dist	Avail and/or Special
A-1	21

THE HYDROLOGIC ENGINEERING CENTER
WATER RESOURCES SUPPORT CENTER
U.S. ARMY CORPS OF ENGINEERS
609 SECOND STREET
DAVIS, CA 95616-4687

(916) 551-1748

Status of HEC Next Generation Software Development Project

June 1996

US Army Corps of Engineers
Institute for Water Resources
Hydrologic Engineering Center
609 Second Street
Davis, CA 95616

(530) 756-1104
(530) 756-8250 FAX
www.hec.usace.army.mil

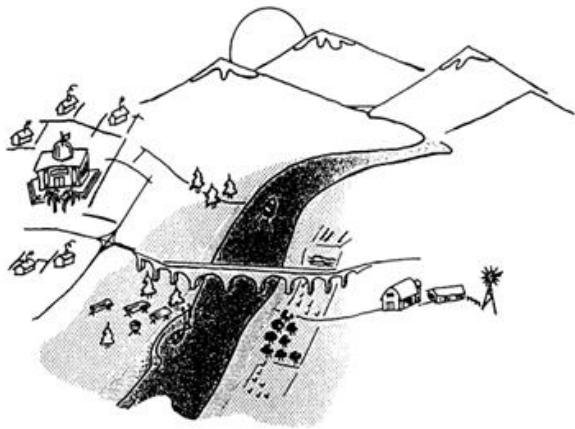
TP-156



US Army Corps
of Engineers
Hydrologic Engineering Center

HEC-RAS

River Analysis System



User's Manual

Version 4.1
January 2010

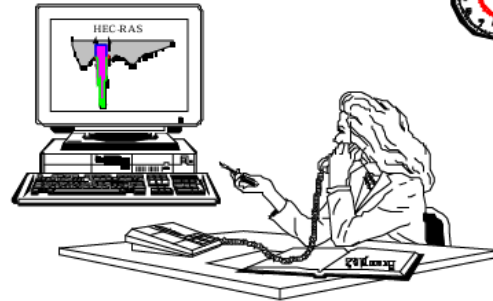
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CPD-68



US Army Corps
of Engineers
Hydrologic Engineering Center

HEC-RAS



River Analysis System
Applications Guide

Version 5.0
February 2016

Approved for Public Release. Distribution Unlimited

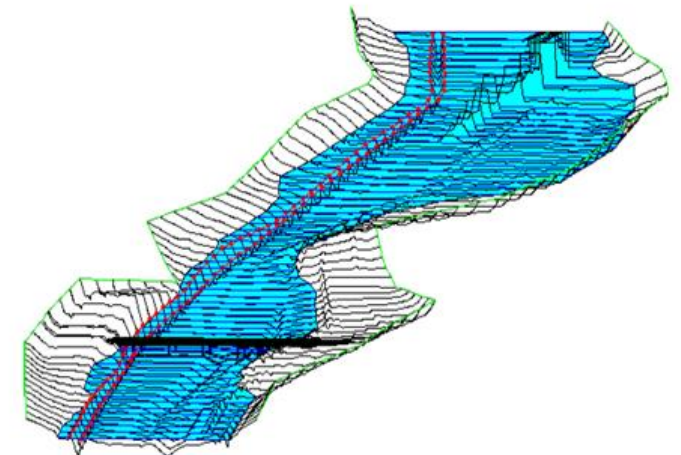
CPD-70



US Army Corps
of Engineers
Hydrologic Engineering Center

HEC-RAS

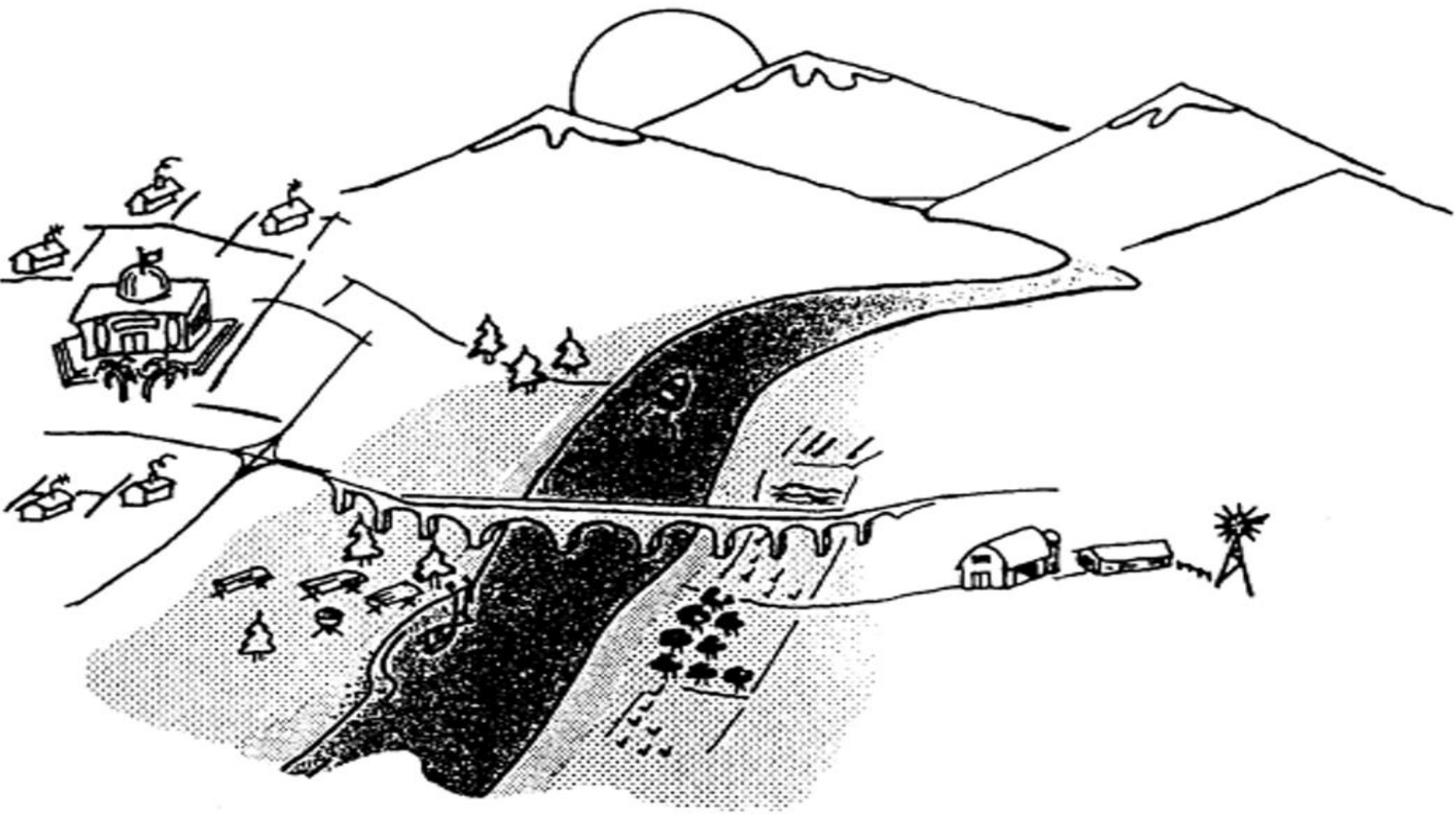
River Analysis System

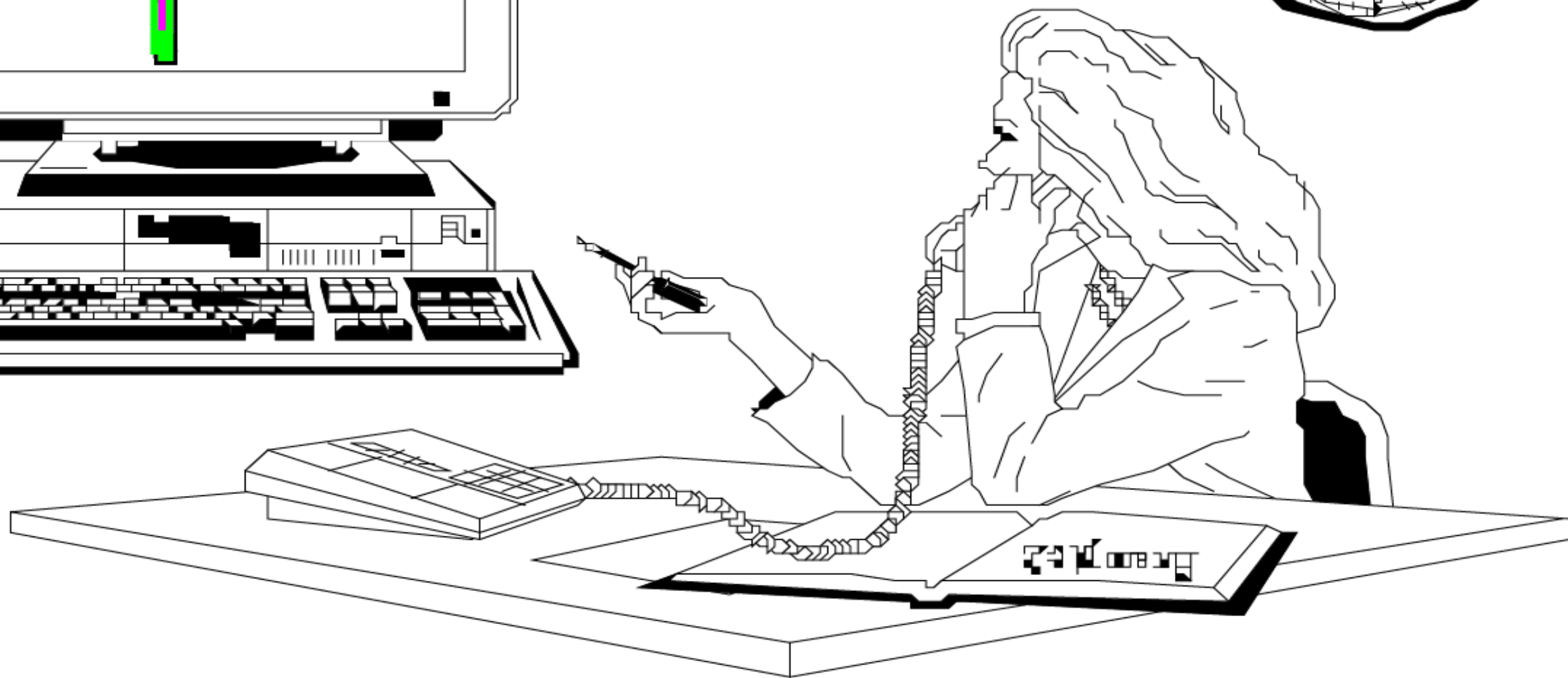
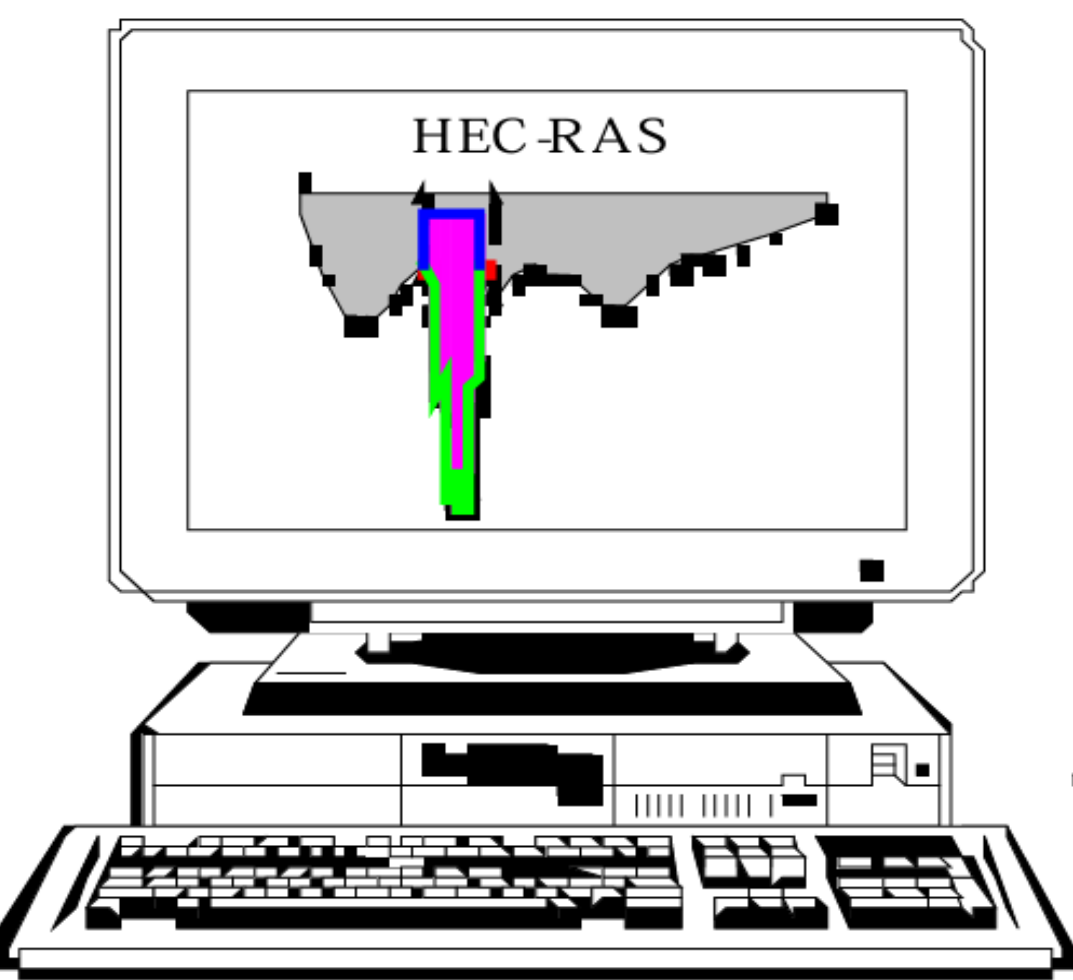


HEC-RAS Hydraulic Reference Manual

Version 6.6
Exported - September 2024

Approved for Public Release. Distribution Unlimited.





The Past

civilgeo.com/the-road-to-hec-ras/

CivilGEO
READY TO ENGINEER

<https://www.civilgeo.com/the-road-to-hec-ras/>

The Road to HEC-RAS



From ancient civilizations to modern settlements, people have relentlessly struggled to manage and predict river flow and stage. Early peoples had no recourse other than to try to anticipate a river's irregular patterns, an exercise often fraught with risk, and patch together solutions that might not prove effective.

Today, civil engineers have an array of engineering software available to predict river flow and stage, the predominant software being HEC-RAS (Hydrologic Engineering Center-River Analysis System), developed by the USACE (United States Army Corps of Engineers).

This article provides a brief history of water planning, particularly as it relates to the origins, evolution, and future directions of HEC-RAS.

HEC2 RELEASE DATED NOV 76 UPDATED FEB 1977
ERROR CORR - 01
MODIFICATION - 30,51,52

T1	WASHOE COUNTY									
T2	FLOOD INSURANCE STUDY									
T3	TRUCKEE R. EXTENSION - TRKEAT									
J1	ICHECK	INQ	NINW	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-0.	2.	-0.	-0.	.001600	-0.00	-0.0	-0.	4040.000	-0.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLOC	IBW	CHNIN	ITRACE
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J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
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GR	4030.900	777.000	4034.500	809.000	4040.700	821.000	4042.800	988.000	4048.300	1056.000
GR	4049.300	1120.200	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
X1	26.280	15.000	603.000	820.000	375.000	825.000	623.000	-0.000	-0.000	-0.000
GR	4041.200	0.000	4037.700	317.000	4038.900	603.000	4034.300	832.000	4031.900	695.000
GR	4031.900	742.300	4035.700	754.000	4038.700	774.000	4050.400	820.000	4052.100	925.000
GR	4053.700	1050.300	4053.900	1289.000	4054.200	1528.000	4051.400	1637.000	4052.400	1809.000
X1	26.360	23.000	574.000	937.000	405.000	376.000	417.000	-0.000	-0.000	-0.000
GR	4042.800	0.000	4040.700	51.000	4041.700	67.000	4038.900	242.000	4041.000	397.000
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GR	4036.400	769.000	4035.100	804.000	4033.300	812.000	4033.300	852.000	4037.100	875.000
GR	4043.900	840.300	4047.000	937.000	4052.100	1235.000	4052.900	1339.000	4054.700	1375.000
GR	4054.300	1878.000	4054.700	2173.000	4057.800	2318.300	-0.000	-0.000	-0.000	-0.000
ET	-0.000	-0.000	4.600	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
X1	26.370	35.000	1145.000	1308.000	1400.000	635.300	1127.000	-0.000	-0.000	-0.000
GR	10.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
X4	2.000	4033.300	1122.000	4033.300	1249.000	-0.000	-0.000	-0.000	-0.000	-0.000
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GR	4089.800	302.300	4052.700	518.000	4078.000	506.300	4069.800	846.000	4065.200	860.000
GR	4062.000	964.000	4051.100	949.000	4047.500	977.300	4060.500	1044.000	4070.400	1013.000
GR	4070.600	1046.200	4059.500	1063.000	4049.400	1081.000	4049.600	1094.000	4043.900	1102.000
GR	4040.300	1111.000	4040.300	1118.000	4043.000	1128.000	4043.900	1145.000	4037.400	1172.000
GR	4034.500	1193.300	4034.500	1252.000	4037.200	1259.000	4038.900	1308.000	4038.900	1359.000
GR	4042.300	1376.000	4042.300	1438.000	4046.100	1448.300	4047.300	2003.000	4051.200	2058.000

TRUCKEE RIVER
lower reach
HEC2 → Floodway
Section
K-

* WATER SURFACE PROFILES *
* VERSION OF NOVEMBER 1976 *
* UPDATED MAY 1984 *
* IBM-PC-KT VERSION AUGUST 1985 *
* RUN DATE 07-24-80 TIME 12:48:06 *

* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616 *
* (916) 440-2105 (FIS) 448-2105 *

```

X  X  XXXXXXX  XXXXX
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07-24-80 12:48:06

PAGE 1

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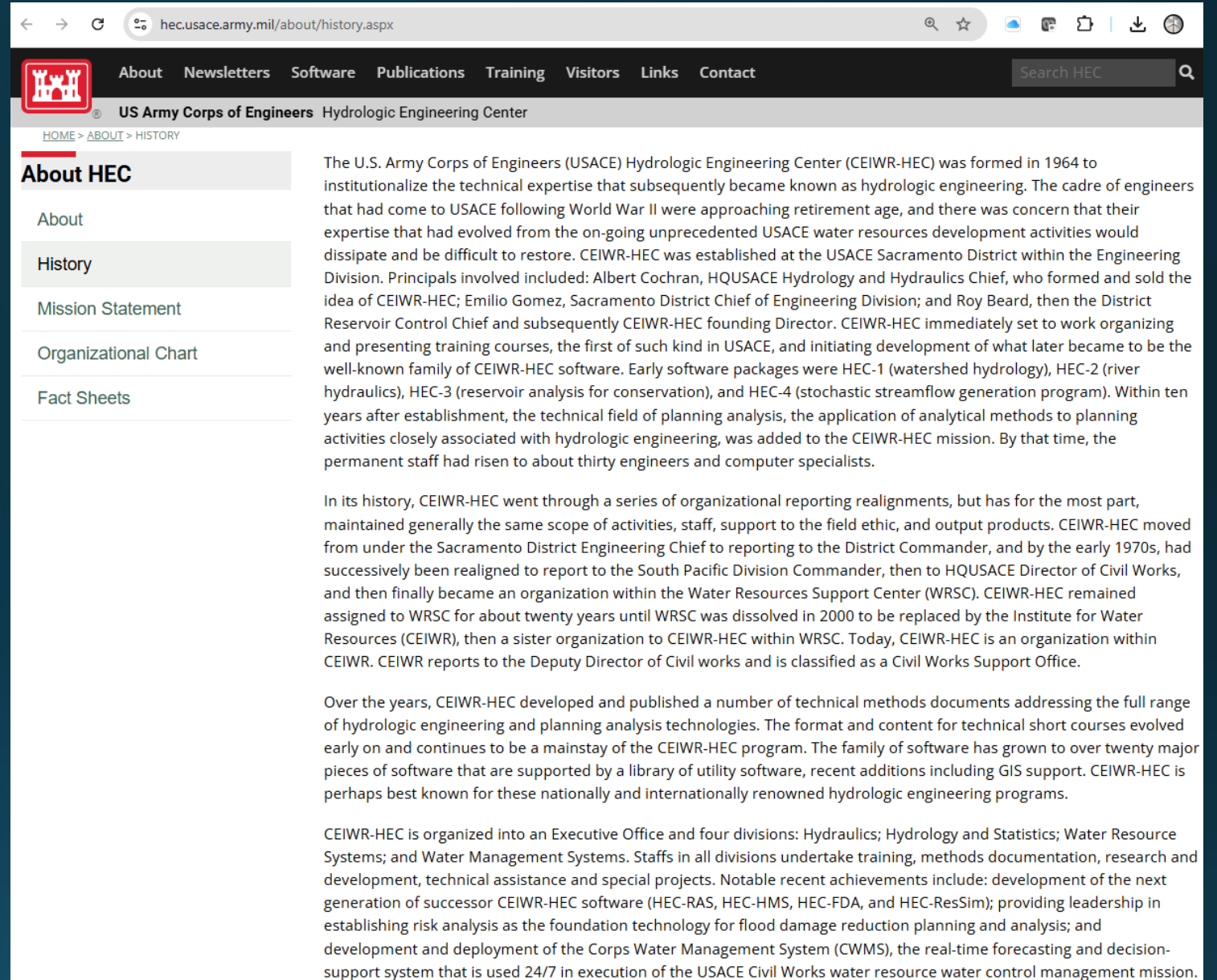
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ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-KT VERSION AUGUST 1985

T1 CARSON CITY DA
T2 Nimbus Q of 696 cfs
T3 GONI--SECTIONS 402-408

J1	ICHECK	INQ	NINW	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
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J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLOC	IBW	CHNIN	ITRACE
	1.000	.000	-1.000	.000	.000	.000	.000	.000	.000	15.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									



The Past



The screenshot shows a web browser window with the URL [hec.usace.army.mil/about/history.aspx](https://www.hec.usace.army.mil/about/history.aspx). The page features a dark navigation bar with the USACE logo and links to About, Newsletters, Software, Publications, Training, Visitors, Links, and Contact. Below the navigation bar, the page title is "US Army Corps of Engineers Hydrologic Engineering Center". A breadcrumb trail reads "HOME > ABOUT > HISTORY". The left sidebar contains a list of links: About, History (highlighted), Mission Statement, Organizational Chart, and Fact Sheets. The main content area is titled "About HEC" and contains three paragraphs of text. The first paragraph describes the formation of CEIWR-HEC in 1964 and its early work. The second paragraph details the organization's history, including its reporting structure and the transition to CEIWR. The third paragraph discusses the development of technical methods and software over the years.

he.usace.army.mil/about/history.aspx

About Newsletters Software Publications Training Visitors Links Contact

Search HEC

US Army Corps of Engineers Hydrologic Engineering Center

HOME > ABOUT > HISTORY

About HEC

- About
- History
- Mission Statement
- Organizational Chart
- Fact Sheets

The U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center (CEIWR-HEC) was formed in 1964 to institutionalize the technical expertise that subsequently became known as hydrologic engineering. The cadre of engineers that had come to USACE following World War II were approaching retirement age, and there was concern that their expertise that had evolved from the on-going unprecedented USACE water resources development activities would dissipate and be difficult to restore. CEIWR-HEC was established at the USACE Sacramento District within the Engineering Division. Principals involved included: Albert Cochran, HQUSACE Hydrology and Hydraulics Chief, who formed and sold the idea of CEIWR-HEC; Emilio Gomez, Sacramento District Chief of Engineering Division; and Roy Beard, then the District Reservoir Control Chief and subsequently CEIWR-HEC founding Director. CEIWR-HEC immediately set to work organizing and presenting training courses, the first of such kind in USACE, and initiating development of what later became to be the well-known family of CEIWR-HEC software. Early software packages were HEC-1 (watershed hydrology), HEC-2 (river hydraulics), HEC-3 (reservoir analysis for conservation), and HEC-4 (stochastic streamflow generation program). Within ten years after establishment, the technical field of planning analysis, the application of analytical methods to planning activities closely associated with hydrologic engineering, was added to the CEIWR-HEC mission. By that time, the permanent staff had risen to about thirty engineers and computer specialists.

In its history, CEIWR-HEC went through a series of organizational reporting realignments, but has for the most part, maintained generally the same scope of activities, staff, support to the field ethic, and output products. CEIWR-HEC moved from under the Sacramento District Engineering Chief to reporting to the District Commander, and by the early 1970s, had successively been realigned to report to the South Pacific Division Commander, then to HQUSACE Director of Civil Works, and then finally became an organization within the Water Resources Support Center (WRSC). CEIWR-HEC remained assigned to WRSC for about twenty years until WRSC was dissolved in 2000 to be replaced by the Institute for Water Resources (CEIWR), then a sister organization to CEIWR-HEC within WRSC. Today, CEIWR-HEC is an organization within CEIWR. CEIWR reports to the Deputy Director of Civil works and is classified as a Civil Works Support Office.

Over the years, CEIWR-HEC developed and published a number of technical methods documents addressing the full range of hydrologic engineering and planning analysis technologies. The format and content for technical short courses evolved early on and continues to be a mainstay of the CEIWR-HEC program. The family of software has grown to over twenty major pieces of software that are supported by a library of utility software, recent additions including GIS support. CEIWR-HEC is perhaps best known for these nationally and internationally renowned hydrologic engineering programs.

CEIWR-HEC is organized into an Executive Office and four divisions: Hydraulics; Hydrology and Statistics; Water Resource Systems; and Water Management Systems. Staffs in all divisions undertake training, methods documentation, research and development, technical assistance and special projects. Notable recent achievements include: development of the next generation of successor CEIWR-HEC software (HEC-RAS, HEC-HMS, HEC-FDA, and HEC-ResSim); providing leadership in establishing risk analysis as the foundation technology for flood damage reduction planning and analysis; and development and deployment of the Corps Water Management System (CWMS), the real-time forecasting and decision-support system that is used 24/7 in execution of the USACE Civil Works water resource water control management mission.

<https://www.hec.usace.army.mil/about/history.aspx>



US Army Corps
of Engineers
Hydrologic Engineering Center

HEC-RAS Verification and Validation Tests

April 2018

Approved for Public Release. Distribution Unlimited.

RD-52



US Army Corps
of Engineers
Hydrologic Engineering Center

Benchmarking of the HEC-RAS Two-Dimensional Hydraulic Modeling Capabilities

April 2018

Approved for Public Release. Distribution Unlimited.

RD-51

The Present



hec.usace.army.mil/software/hecras/...

 **US Army Corps of Engineers**
Hydrologic Engineering Center

HEC-RAS has been developed for the U.S. Army Corps of Engineers (USACE). However, software developed at the Hydrologic Engineering Center is made available to the public whenever appropriate. Use is not restricted and individuals outside of USACE may use the program without charge. HEC will not provide user assistance or support for this software to non-USACE users. Downloading this software indicates full acceptance of your responsibility in the use of this program. Please see the [distribution policy](#) for more details.

HEC-RAS 6.7 Beta 4a Windows:

The setup package includes HEC-RAS 6.7 Beta 4a.

Note – 6.7 Beta 4 was replaced with 6.7 Beta 4a to patch an issue with saving LW Position information when editing geometry data from the RASMapper window. Refer to the known issues for 6.7 Beta 4 for more information.

Primary Download Site:
[Download](#) HEC-RAS 6.7 Beta 4a Setup Package (195 MB) [\[Release Notes\]](#)

Alternate Download Site:
[Download](#) HEC-RAS 6.7 Beta 4a Setup Package (195 MB) [\[Release Notes\]](#)

Supported Operating Systems:
Windows 10/11 64-bit

hec.usace.army.mil/software/hecras/...

 **US Army Corps of Engineers**
Hydrologic Engineering Center



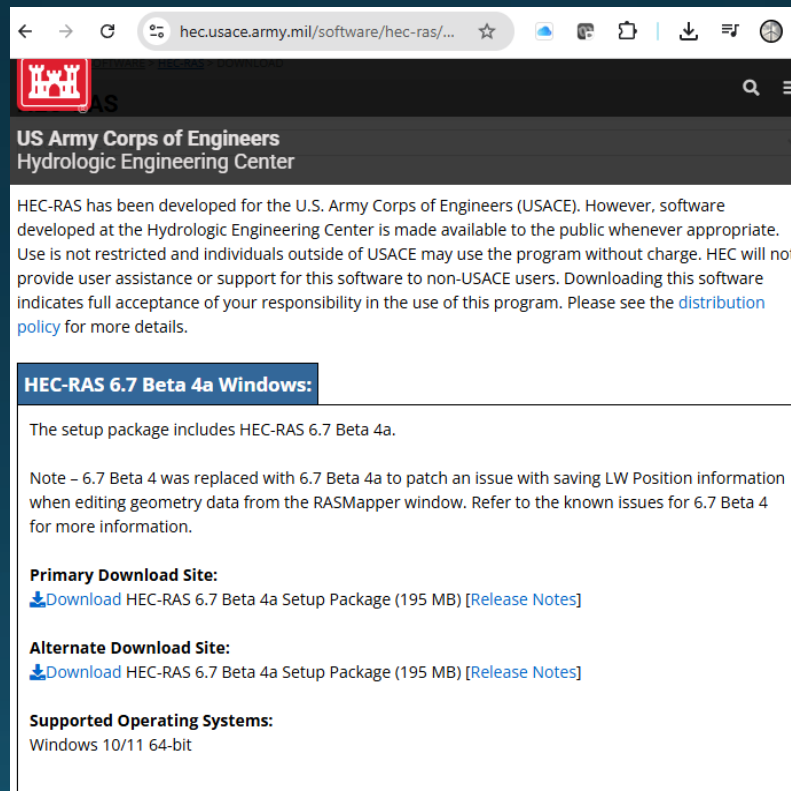
[←](#)

[Download](#)

[Getting Started](#) [Announcements](#) [YouTube](#)

The Present

Legacy vs RAS 2025



A screenshot of a web browser showing the HEC-RAS Legacy download page. The browser's address bar shows the URL `hec.usace.army.mil/software/hecras/...`. The page header includes the US Army Corps of Engineers Hydrologic Engineering Center logo and name. The main content area contains a paragraph about the software's availability to the public. Below this, a section titled "HEC-RAS 6.7 Beta 4a Windows:" provides details about the setup package, a note about a replacement, and download links for the 195 MB setup package, along with release notes and supported operating systems (Windows 10/11 64-bit).

hec.usace.army.mil/software/hecras/...

US Army Corps of Engineers
Hydrologic Engineering Center

HEC-RAS has been developed for the U.S. Army Corps of Engineers (USACE). However, software developed at the Hydrologic Engineering Center is made available to the public whenever appropriate. Use is not restricted and individuals outside of USACE may use the program without charge. HEC will not provide user assistance or support for this software to non-USACE users. Downloading this software indicates full acceptance of your responsibility in the use of this program. Please see the [distribution policy](#) for more details.

HEC-RAS 6.7 Beta 4a Windows:

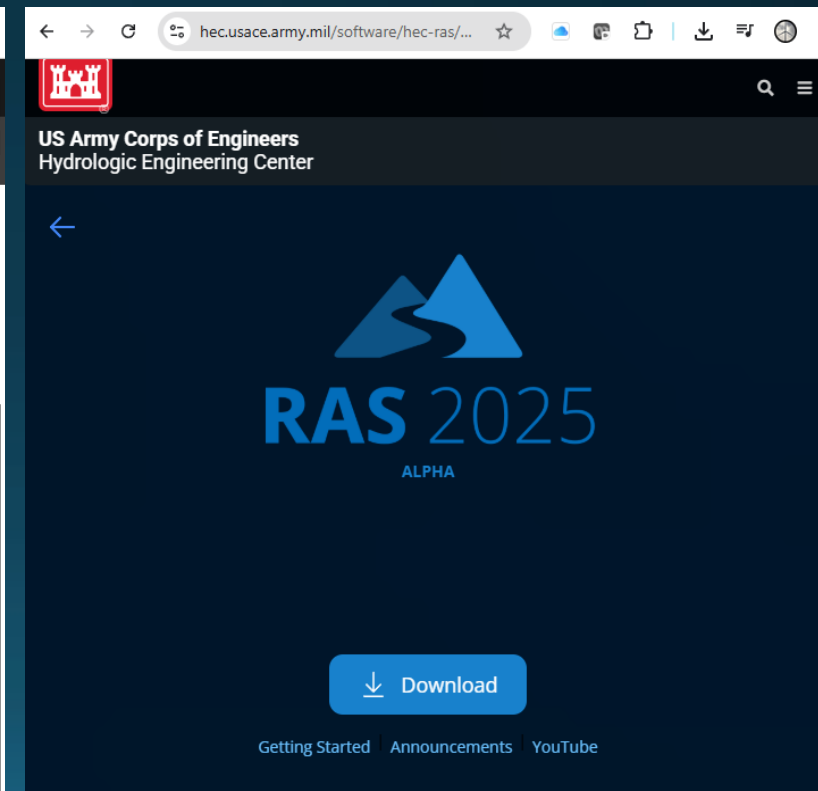
The setup package includes HEC-RAS 6.7 Beta 4a.

Note – 6.7 Beta 4 was replaced with 6.7 Beta 4a to patch an issue with saving LW Position information when editing geometry data from the RASMapper window. Refer to the known issues for 6.7 Beta 4 for more information.

Primary Download Site:
[Download](#) HEC-RAS 6.7 Beta 4a Setup Package (195 MB) [\[Release Notes\]](#)

Alternate Download Site:
[Download](#) HEC-RAS 6.7 Beta 4a Setup Package (195 MB) [\[Release Notes\]](#)

Supported Operating Systems:
Windows 10/11 64-bit



A screenshot of a web browser showing the RAS 2025 ALPHA download page. The browser's address bar shows the URL `hec.usace.army.mil/software/hecras/...`. The page header includes the US Army Corps of Engineers Hydrologic Engineering Center logo and name. The main content area features a large blue graphic with the text "RAS 2025 ALPHA". Below this, there is a prominent blue "Download" button. At the bottom, there are links for "Getting Started", "Announcements", and "YouTube".

hec.usace.army.mil/software/hecras/...

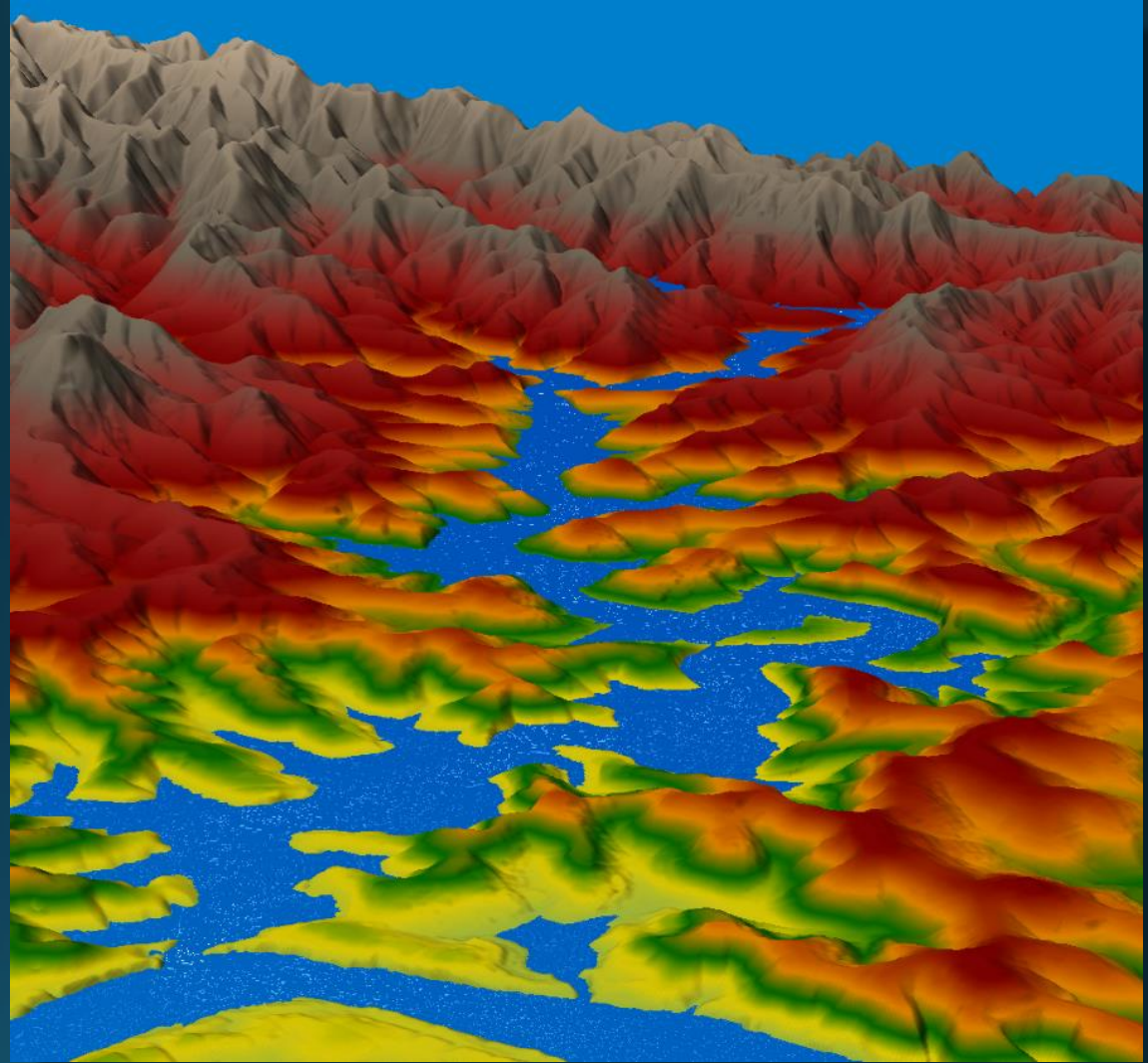
US Army Corps of Engineers
Hydrologic Engineering Center

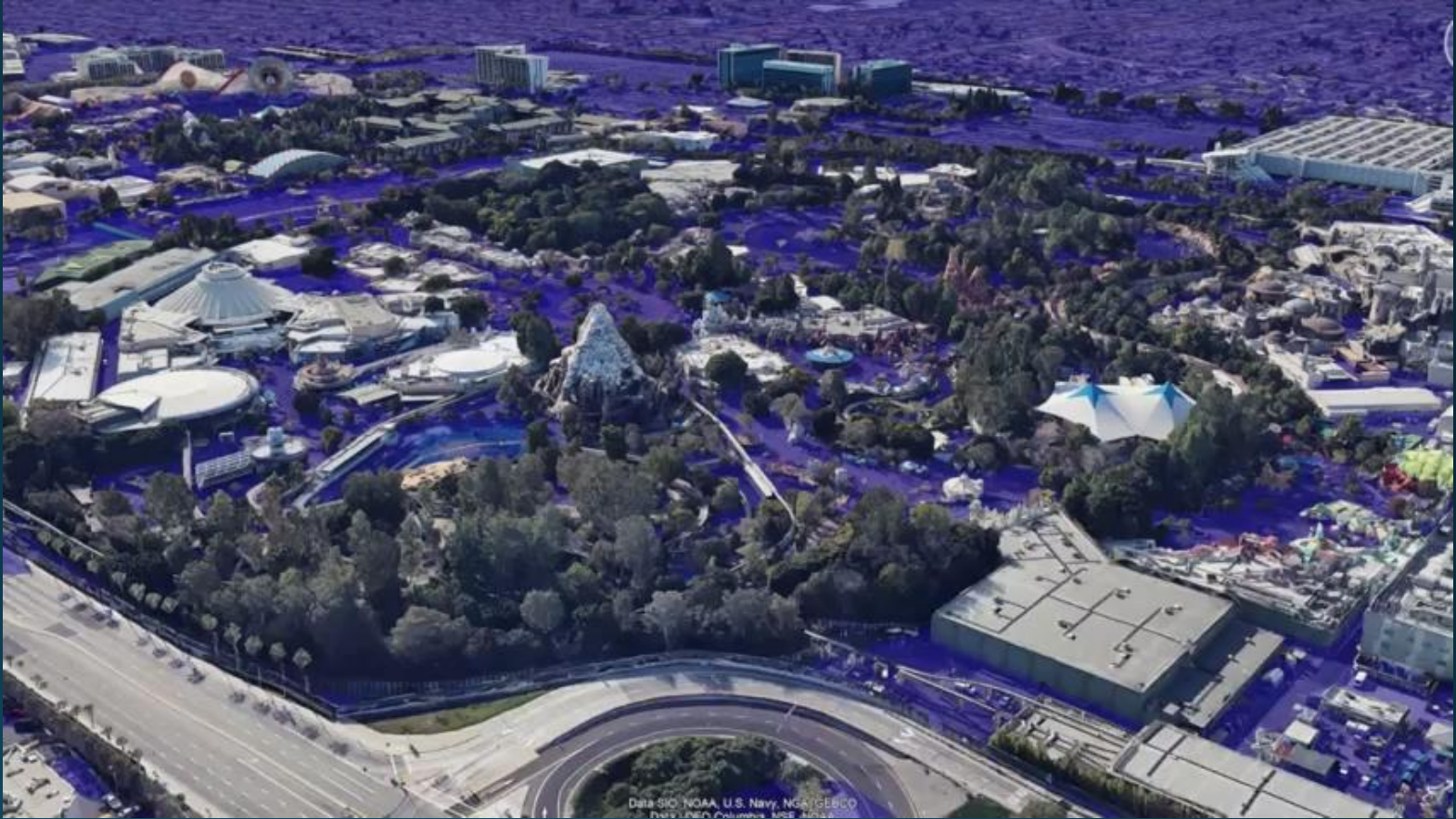
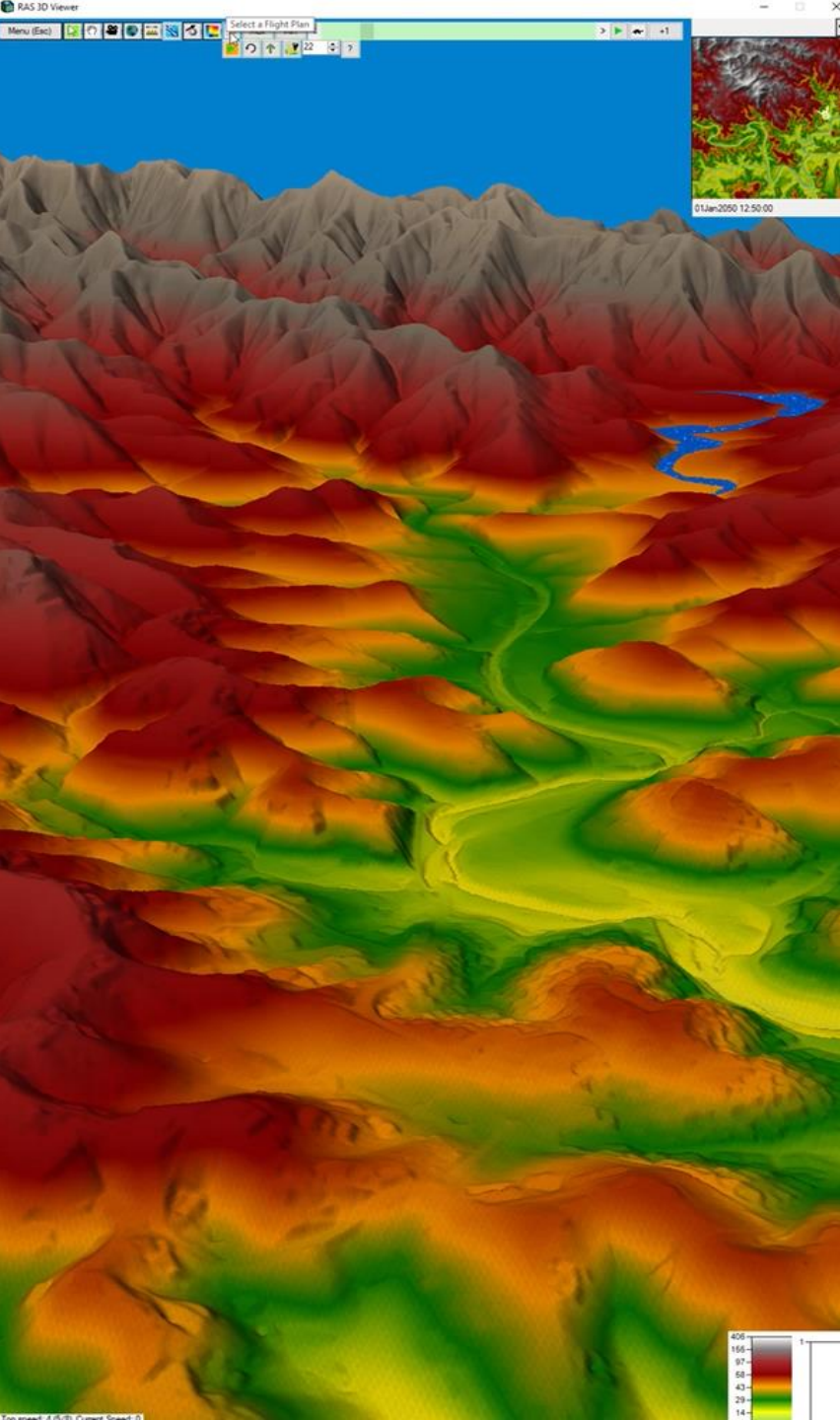
RAS 2025
ALPHA

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[Getting Started](#) [Announcements](#) [YouTube](#)

The Present





The Present

hec.usace.army.mil/software/hec-ras/2025/

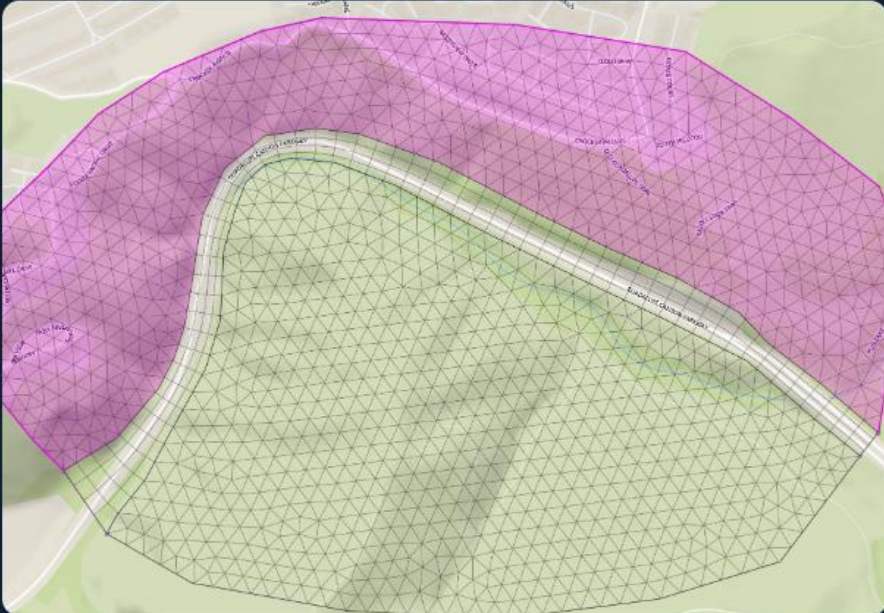
About Newsletters Software Publications Training Visitors Links Contact Search HEC

US Army Corps of Engineers Hydrologic Engineering Center

Mesh Generation

The HEC-RAS 2025 mesh generation system has been completely redesigned. Gone are the days wasting hundreds of hours painstakingly moving cells, only to be met with fatigue and frustration. Breaklines enforce faces, period.

From the inception of 2D modeling in HEC-RAS 5.0, meshes were cell-centric. Engineers would move cell center points, trying to convince the mesh generation system to put faces in the correct location. The new RAS mesh generation is now **face** centric.



Mesh Development Tools

Users digitize arcs in a 'conceptual' mesh, conveying intents like cell-size, shape, growth rates, and orthogonality. This mesh blueprint allows us to quickly build higher-quality computational meshes from simple inputs. This flexibility allows for quick and easy mesh manipulation at any point during model development.



Model Extents

Model

Project Explorer

Components Layer

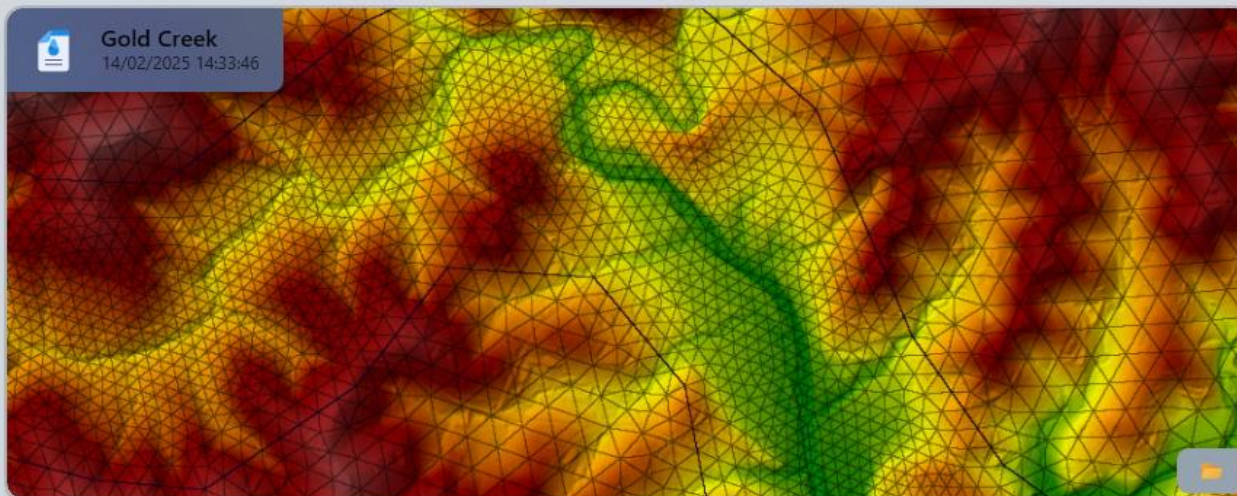
Components

 **New Project**
Create a new RAS project. **Open Project**
Open an existing RAS project. **Example Datasets**
Browse all examples and synthetic datasets. **GIS Mode**
Use our GIS features without storing a model.**Update Available**

A new update is available. During the RAS 2025 Alpha, we are constantly fixing bugs and adding new features. Updating helps improve your experience, as well as guarantees we have the most up-to-date feedback and bug reports.

Update**Gold Creek**

14/02/2025 14:33:46



Older

Disneyland 202514/02/2025 14:27:07
D:\HEC-RAS\Disneyland\Disneyland 2025 **Releases****RAS 2025 Alpha** 0.1.0.2089-dev
(October 11, 2025)

- Many major crashes fixed
- New charting, geoprocessing tools
- USGS importer issues fixed
- Much improved vector tooling

RAS 2025 Alpha 0.1.0.1822-dev
(July 3, 2025)

- New boundary condition workflow! DSS/RAS Results supported.
- New precipitation importer, DSS rasters supported.
- Mesh generation improvements and bug fixes.
- Inundation boundary exporter
- Terrain contour visualization
- Fixed GPU/CPU solver bugs, improved warnings and timestep calculations.
- Fixed numerous UI crashes.

RAS 2025 Alpha 0.1.0.1678-dev
(April 26, 2025)

- New data tables and spreadsheet tool
- Velocity particle tracing and static arrows
- More charts and tables available
- Mesh generation bug fixes and perf. enhancements
- Tree layout and serialization fixes
- Many minor crashes and bugs

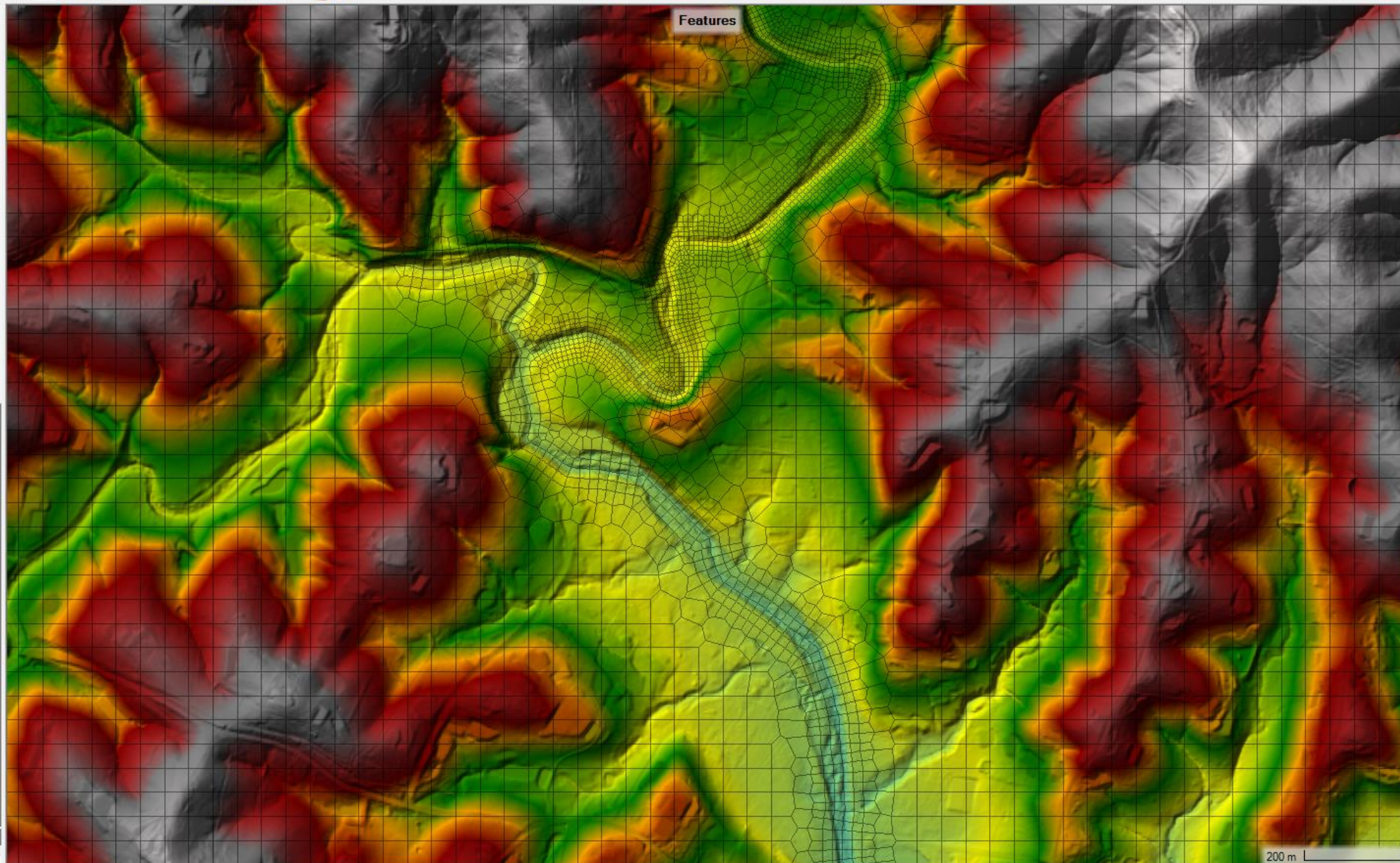
Update Available**RAS 2025 Alpha** 0.1.0.1576-dev **Settings** **Bug Report**



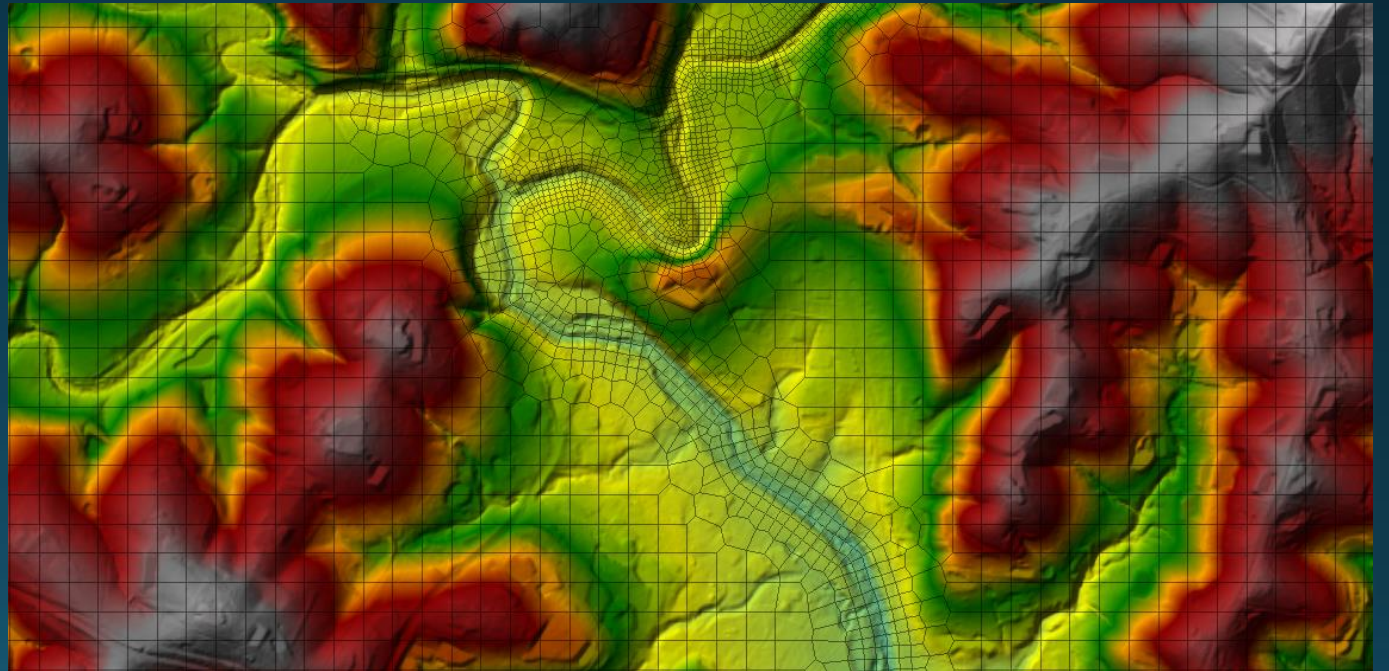
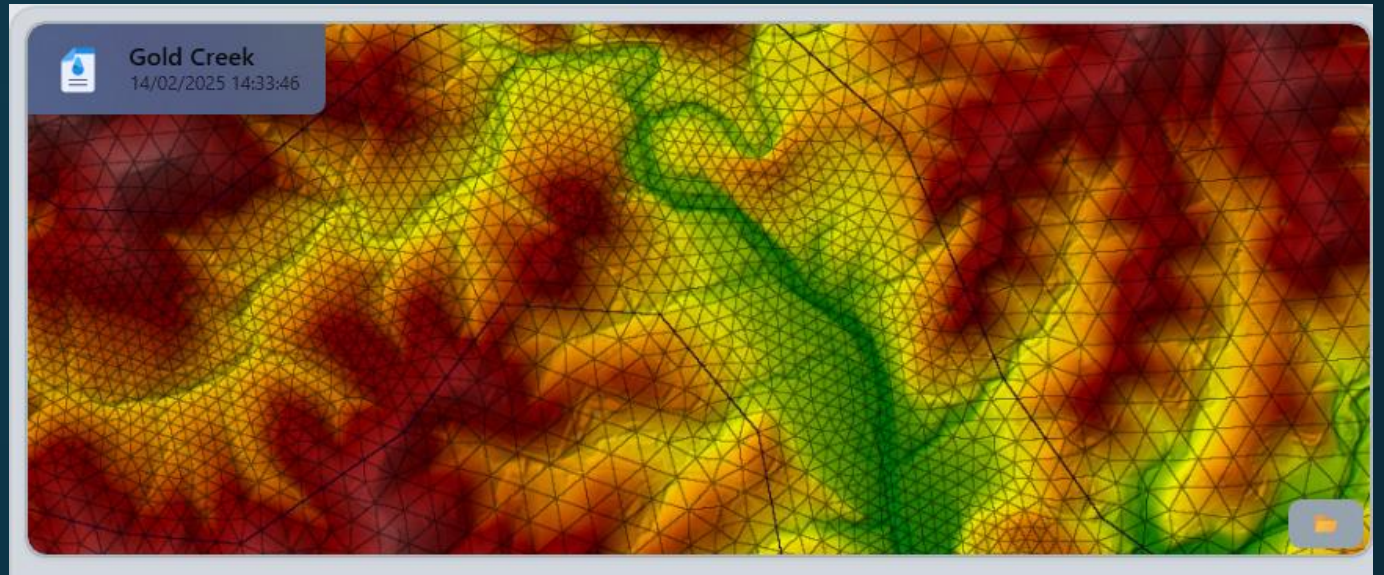
Max Min



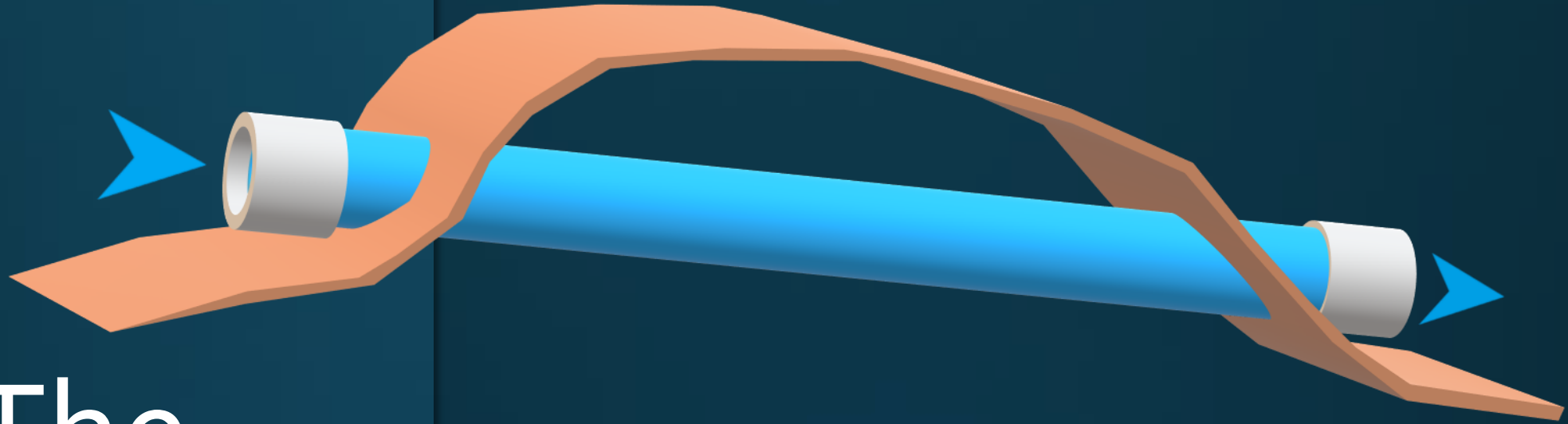
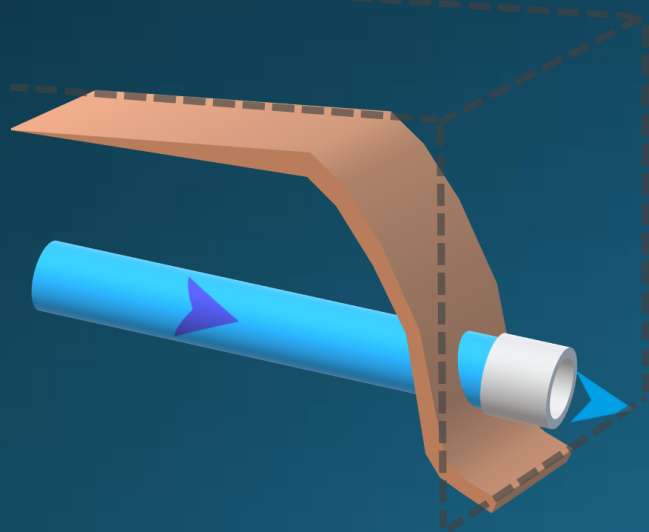
- ☐ 2D Unsteady Existing Gold Creek 10s
- ☐ 1D Unsteady Existing Brisbane River
- ☐ 2D Unsteady Existing Gold Creek 1min
- ☐ 2D Unsteady Existing Gold Crk 1D Compan
- ☐ 2D Unsteady Existing Gold Creek 1min AT
- ☐ 2D Unsteady Existing Gold Creek 10s FM
- ☐ 1D Unsteady Existing Brisbane River Hi n
- ☐ 1D Unsteady Existing Brisbane River Lo n
- ☐ 2D Unsteady Exist Gold Creek FM AT Hi n
- ☐ 2D Unsteady Exist Gold Creek FM AT Lo n
- ☐ 1D Unsteady Exist Brisbane River Fine XS
- ☒ 2D Unsteady Exist Gold Crk FM AT Fn Grc
- ☐ Event Conditions
- ☒ Geometry
- ☐ Plan
- ☐ Depth (Max)
- ☐ Velocity (Max)
- ☒ WSE (Max)
- ☐ 2D Unsteady Exist Gold Crk FMAT Crs Grn
- ☐ 2D Unsteady Exist Gold Crk FM AT Mid Sl
- ☐ 2D Unsteady Exist Gold Crk FM AT Stp Sl
- ☐ 2D Unsteady Exist Gold Creek FM AT C1
- ☐ 2D Unsteady Exist Gold Creek FM AT C5
- ☐ 2D Unsteady Existing Gold Creek EM AT



The Present

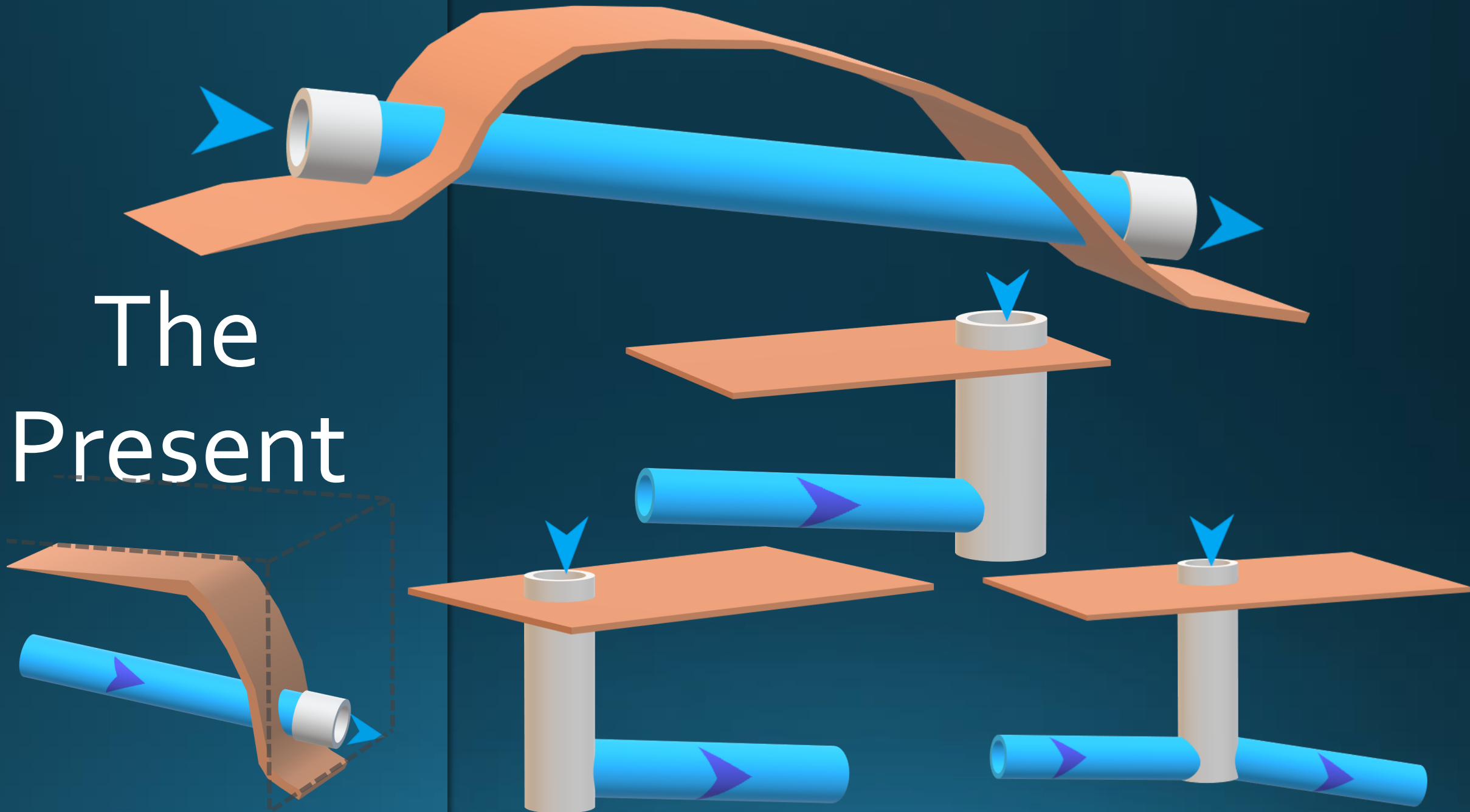


The Present

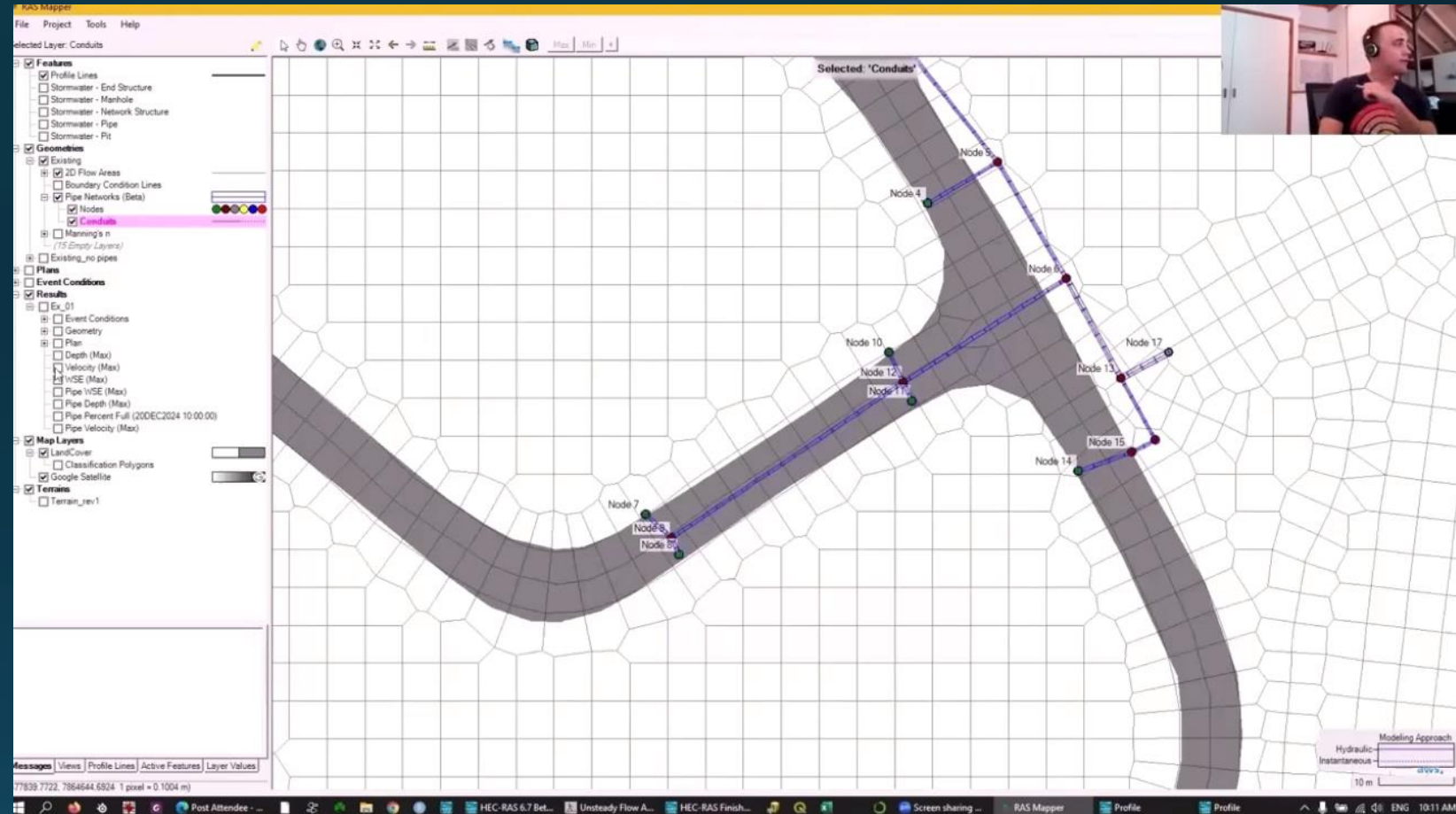


WHAT'S NEW IN HEC-RAS	
 RAS 2025 HEC-RAS 6.7	MODELLING PIPE NETWORKS IN HEC-RAS 6.7 6:55
Modelling Pipe Networks in HEC-RAS 6.7	
⋮	
 RAS 2025 ALPHA RELEASE	6.6 AND RAS 2025 DUAL RELEASE 10:35
What's new in HEC-RAS	
⋮	
Australian Water School	

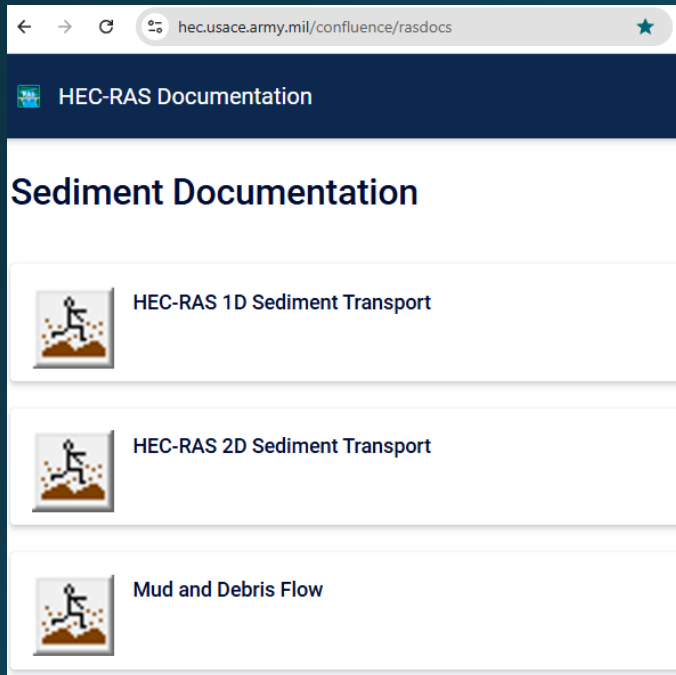
The Present



The Present

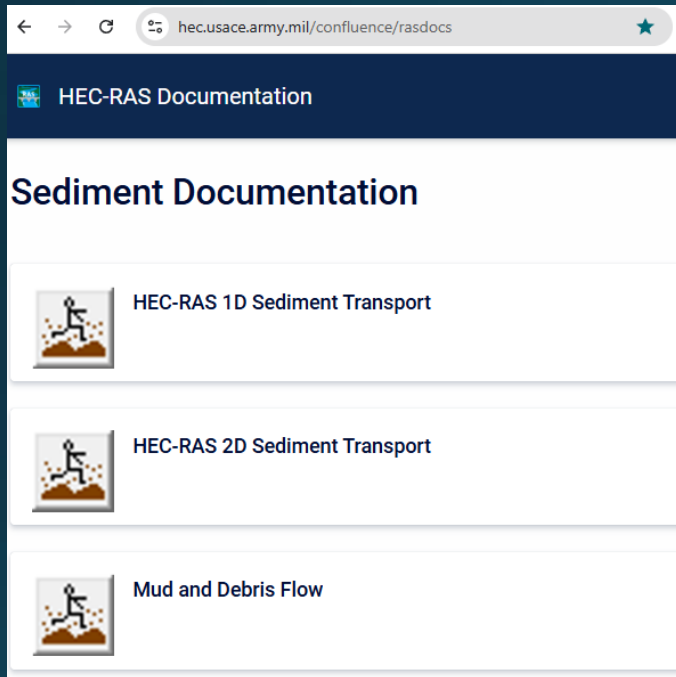


New Sediment Transport Features



- Rating curve calculator connected to USGS data
 - HEC-RAS can now read the new USGS water quality data format
- Automatic hydraulic updates for morphological acceleration
 - Can explore 2D sediment transport at a fraction of the full hydraulic run time
- BSTEM (bank failure)
 - Methodology updated and improved
- Variable concentration mud and debris modeling
 - Allows mixing (e.g., dam failure into clear water)

New Sediment Transport Features



- Grain class filter for floodplain deposition
 - Only user-defined grain classes are deposited on floodplains
- Bed roughness predictors
 - Sediment transport simulations can compute bed roughness dynamically based on the bed material and predicted bedform geometry
- Sediment rating curve calculator
 - Updates and improvements
- Sediment and debris tutorials
 - HEC has posted new tutorials

The Future



The Future

2025

Mesh generation
advancements

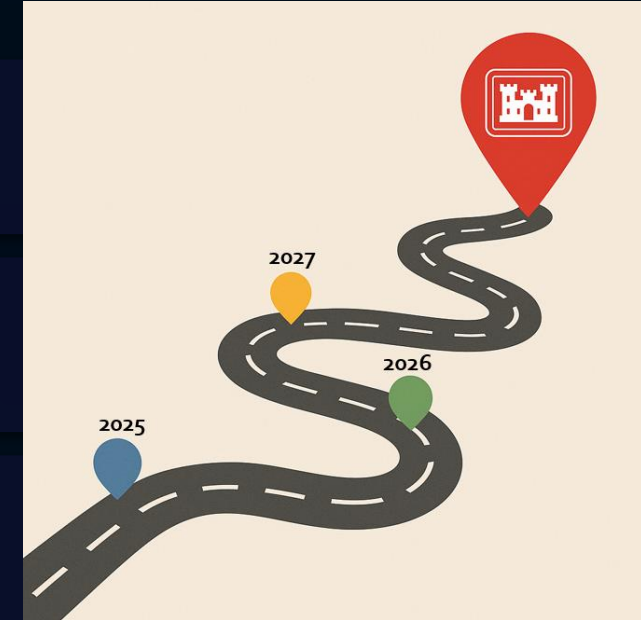
Precipitation

Basic Structures

Basic Terrain
Modification

Improved v6
Model Importer

1D/2D Hybrid and
Initial GPU Solvers



Alpha releases every 2-4 weeks with new features, bug fixes, and performance improvements

1.0 release in late Fall 2025. Multiple feature/bug-fix releases throughout the year.

2026

Advanced Terrain
Modification

Advanced Structures
(Bridges/Gates/Pumps)

Advanced Mesh Post-
Processor Tooling

Advanced 1D Solver and
Mesh enhancements

Extreme scale multi-
resolution Mesh
improvements

Improved Boundary
Conditions (Rating Curve,
Multi-Variate)

Initial Conditions

Breaching

2027

2.0 release (tentative). Multiple feature/bug-fix releases throughout the year.

Geometry & Boundary
Condition clipping,
import and export

Sensitivity analysis
framework

Project management
features (model delta
charts, summary report)

Improved inundation mapping
with precipitation and shallow
flow

Implicit 2D solver

The Future

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RAS2025: New Capabilities, Coming Attractions, and a Demo (RUG Webin...
2.4K views · 4 months ago

The Terrain Editor and Merged USGS Terrains in RAS2025
652 views · 5 months ago

Using the USGS DEM Importer in HEC-RAS 2025
1.2K views · 8 months ago

Importing a RAS2025 Mesh into HEC-RAS 6.6
3:32

Building a River Junction (Trib) Mesh in HEC-RAS 2025
7:01

Reporting a Bug in HEC-RAS 2025
448 views · 1 year ago

The Future

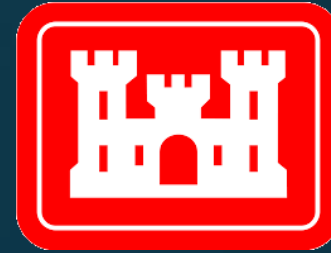
Demos

We are starting a new series of videos in RAS2025 to showcase the new workflows and improved features! Expect more to come.



Webinar Resources

www.hydroschool.org/hec/



Hydrologic Engineering Center

[CWMS](#)

[HEC-DSS](#)

[HEC-DSSVue](#)

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YouTube Playlists



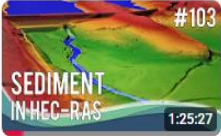
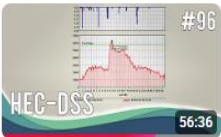
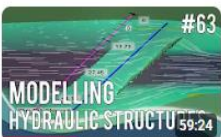
HEC-RAS

by Australian Water School

Playlist • 28 videos • 7,493 views

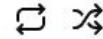
Need some training in HEC-RAS? Here's a great place to find upcoming free webinars and online short courses...more

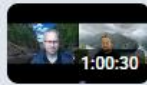


- 15  **#103** HEC-RAS 6.0, what you need to know: Part Two
Australian Water School • 11K views • 4 years ago
- 16  **#102** HEC-RAS 6.0, what you need to know: Part one
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- 17  **#96** HEC-DSS an introduction to the Data Storage System
Australian Water School • 9.2K views • 5 years ago
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Australian Water School • 9.8K views • 6 years ago
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Australian Water School • 2.6K views • 6 years ago
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Full Momentum Vodcast

The RAS Solution - 1 / 43

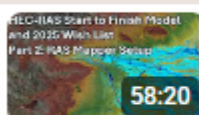
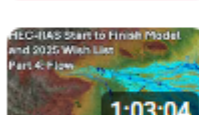
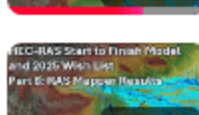


- ▶  **Full Momentum Episode 41: Turbulence**
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- 2  **Full Momentum Episode 40 (!!) - Rain on Grid Modeling with...**
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- 3  **Full Momentum Episode 39: Dam Breach Analysis - ...**
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- 4  **Full Momentum Episode 38 - Modeling Large Woody Debris...**
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- 5  **Full Momentum Episode 37 All Things Gates**
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- 6  **Spring 2025 HEC-RAS Class Announcement - 1 Month Left!**
The RAS Solution
- 7  **Full Momentum Episode 36: HEC-RAS 2025 Alpha Release**
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- 8  **Episode 35: Using HEC-RAS for Stream Restoration - an...**
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- 9  **Full Momentum Episode 34: New Graduates Experiences**
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HEC-RAS Start to Finish Model and ...

The RAS Solution - 1 / 6



- ▶  **HEC RAS Start to Finish Model and 2025 Wish List - Part 1:...**
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- 2  **HEC RAS Start to Finish Model and 2025 Wish List - Part 2: RA...**
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- 3  **HEC RAS Start to Finish Model and 2025 Wish List - Part 3:...**
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- 4  **HEC RAS Start to Finish Model and 2025 Wish List - Part 4: Flow**
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- 5  **HEC RAS Start to Finish Model and 2025 Wish List - Part 5: Plan**
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- 6  **HEC RAS Start to Finish Model and 2025 Wish List - Part 6: RA...**
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Retro Flashback

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ICE WaRM
International Centre of Excellence
in Water Resources Management

BEGINNING SOON: 2pm Sydney Time

WEBINAR:

Water Modelling using HEC-RAS: 1D and 2D

Presented by Krey Price, Mark Forest, Robert Keller



Australian Government



Australian
Water School

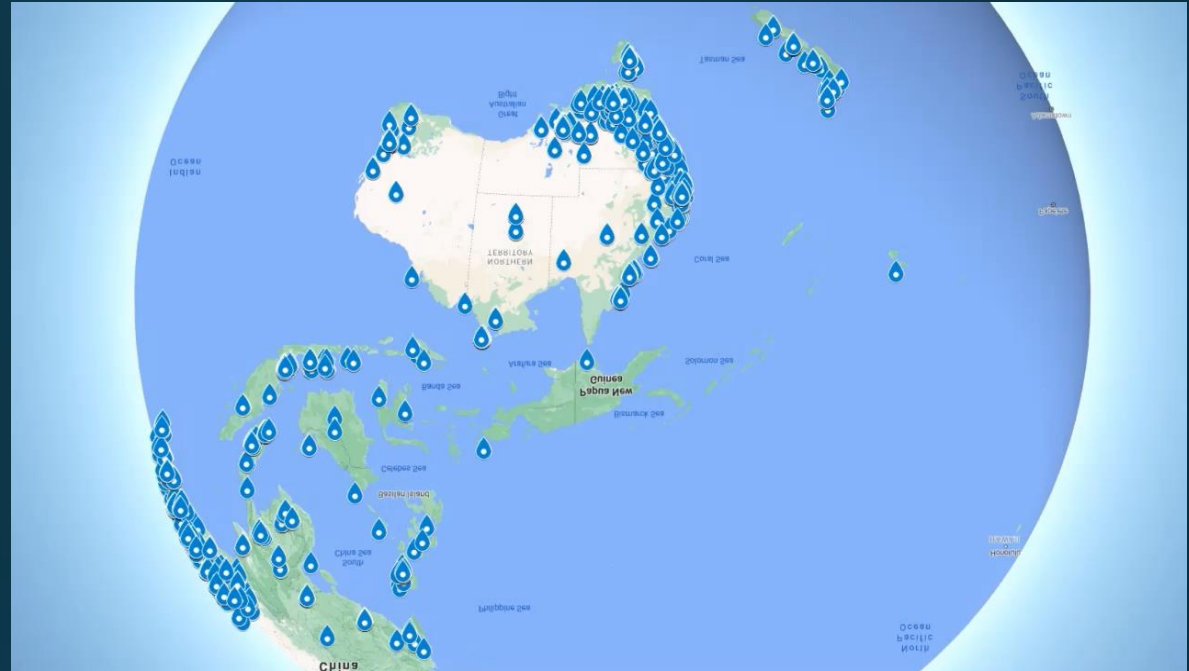


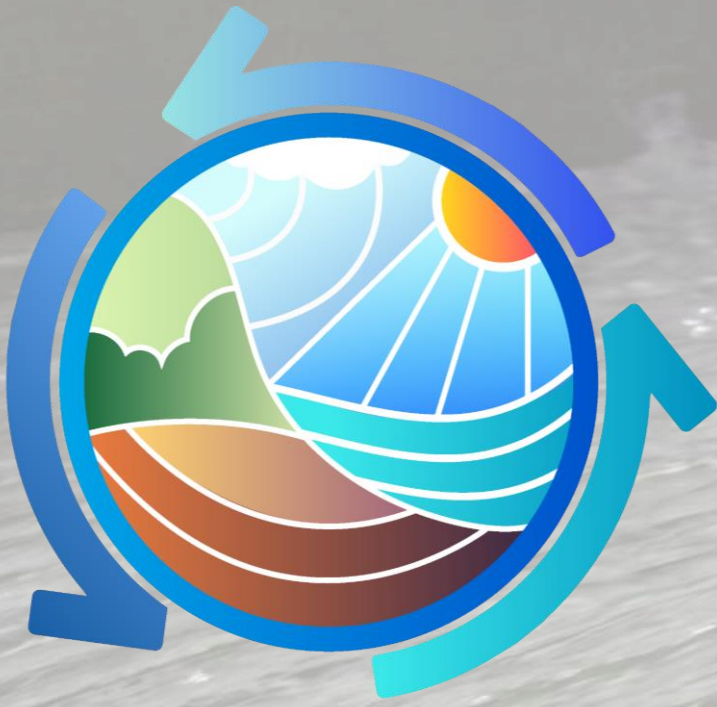
MONASH University



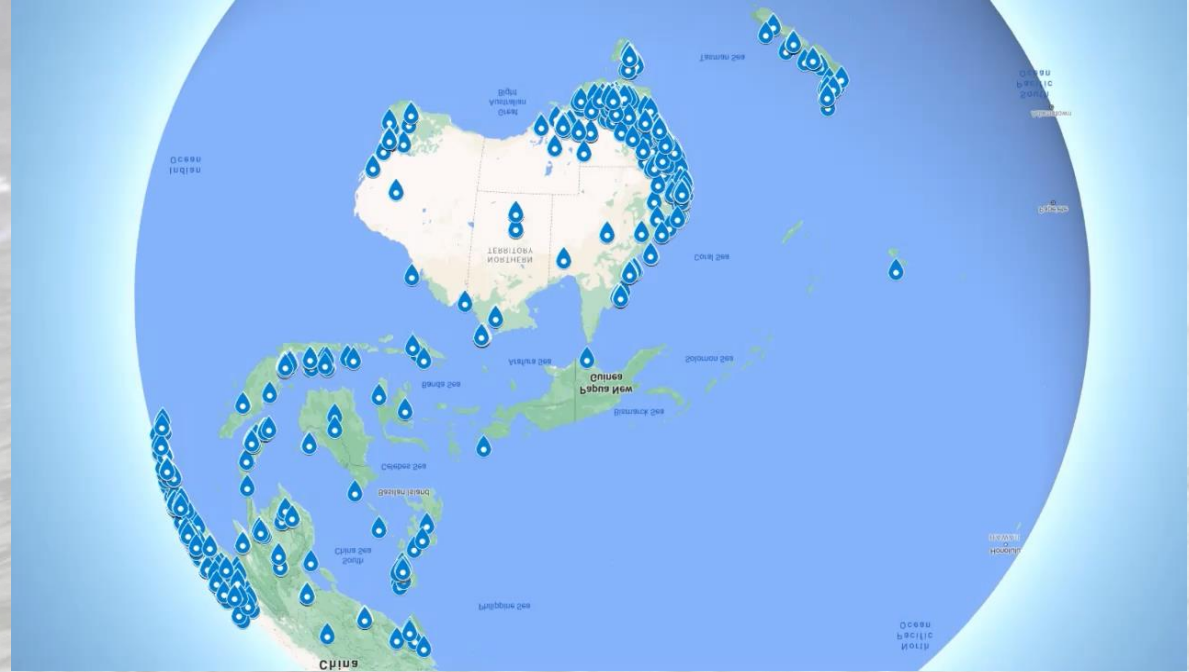
Retro Flashback

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Live Courses

- **Canada:** November 2025 Registrations open!
- **New Zealand:** March 2026 Save the date
- **Australia:** April 2026 Register interest



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Toronto Training

Register at cwra.org/events/
or e-mail on@cwra.org



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**ONTARIO BRANCH
HEC-RAS (1D-2D) TRAINING**

Speaker: Krey Price

November 11-13th, 2025
Conference Center in Sheridan College, Trafalgar Campus, Oakville, ON

Register at: bit.ly/47bE2CZ

NOV 11-13, 2025: ON BRANCH: HEC-RAS (1D-2D) TRAINING 2025

By [CWRA Webmaster](#) Posted In [Upcoming Event](#), [Upcoming ON](#), [Upcoming Workshops](#)



When: November 11-13, 2025

Where: Conference Center in Sheridan College, Trafalgar Campus, Oakville, ON

Description:

The CWRA Ontario branch will be hosting a 3-day in-person HEC-RAS training course, on 11th to 13th November, 2025 in the Conference Center in Sheridan College, Trafalgar Campus, Oakville, ON. The training will be delivered by the International Water Training Institute.



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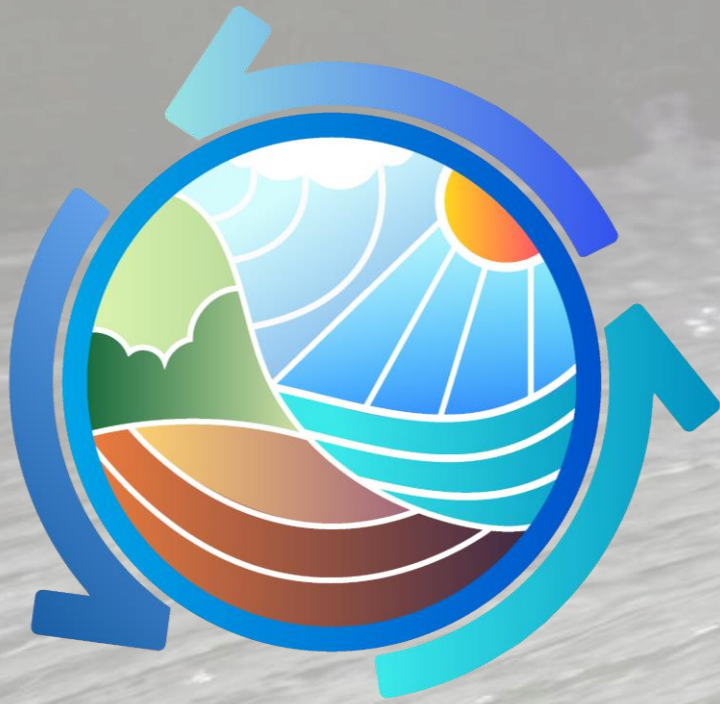


HEC-HMS and HEC-RAS Training Auckland NZ 31 Mar - 3 Apr 2025

In partnership with New Zealand-based [Golovin](#), our annual HEC-HMS and HEC-RAS course in Auckland continues in 2025 with a 4-day series of in-person courses. This intensive, interactive set of workshops uses free hydrologic and hydraulic modelling software:

- * Day 1: Learn essential skills to set up and run a HEC-HMS model with a focus on stormwater mitigation
- * Day 2: Apply GIS tools, gridded data sets, and other advanced features to generate rainfall-runoff relationships using HEC-HMS
- * Day 3: Set up and run basic 1D and 2D hydraulic models in HEC-RAS
- * Day 4: Apply terrain modification, culverts & bridges, 3D viewing, and other advanced features using HEC-RAS

E-mail info@hydroschool.org



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Register interest at
floodplainconference.com

Gold Coast Australia HEC-RAS and HEC-LifeSim Training 20-21 April 2026

floodplainconference.com

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21 – 24 April 2026, GCCEC, Gold Coast, QLD, Australia

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Presented by:



Mark Forest

Conсор
Engineers



Krey Price

Surface
Water
Solutions



Evan O'Brien

Genesis
Hydrology

AWS Free Webinar: 29 Oct 2025

HEC-RAS

Past, Present, and Future



Presented by:



Mark Forest
Conсор
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Krey Price
Source
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Genesis
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AWS Free Webinar: 29 Oct 2025

HEC-RAS

Past, Present, and Future

QUESTIONS?

