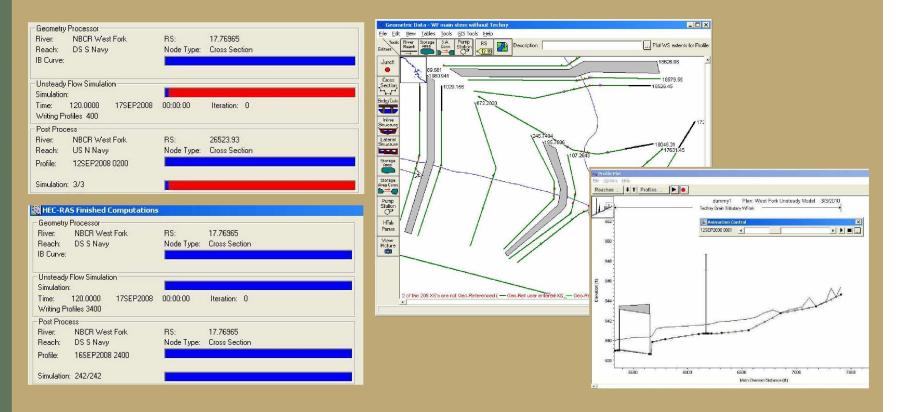


De-Bugging a HEC-RAS Unsteady Flow Model

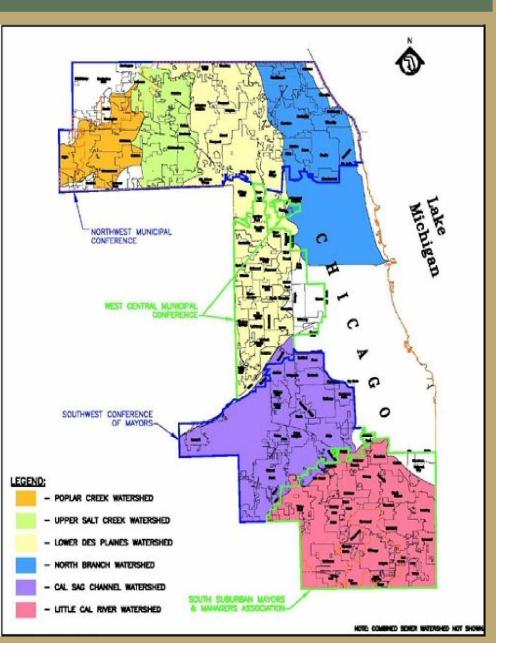


Presented by: Jennifer Maercklein, P.E., CFM V3 Companies



Presentation Agenda

- Goals
- Model Errors Before Simulation Begins
- De-bugging Initial Conditions
- De-bugging Runtime Errors
- Resources for Help
- Questions





Presentation Goals

- Tips to get started with de-bugging
 - Useful HEC-RAS tools for debugging
 - Tips to find sources of error
- De-bugging ideas presented here do not represent an exhaustive list of de-bugging techniques
- Presentation Assumptions
 - Familiarity with HEC-RAS
 - Familiarity with Unsteady Flow Modeling



Model Errors Before Simulation Begins

- Model Errors Before Simulation Begins
 - Cross
 Section
 Location
 Errors

reach. In an unsteady analysis, internal boundar	
Copy the top or bottom cross section of the react internal boundary.	n to put another cross section between the end of the reach and the
Clipboard Print File	Close

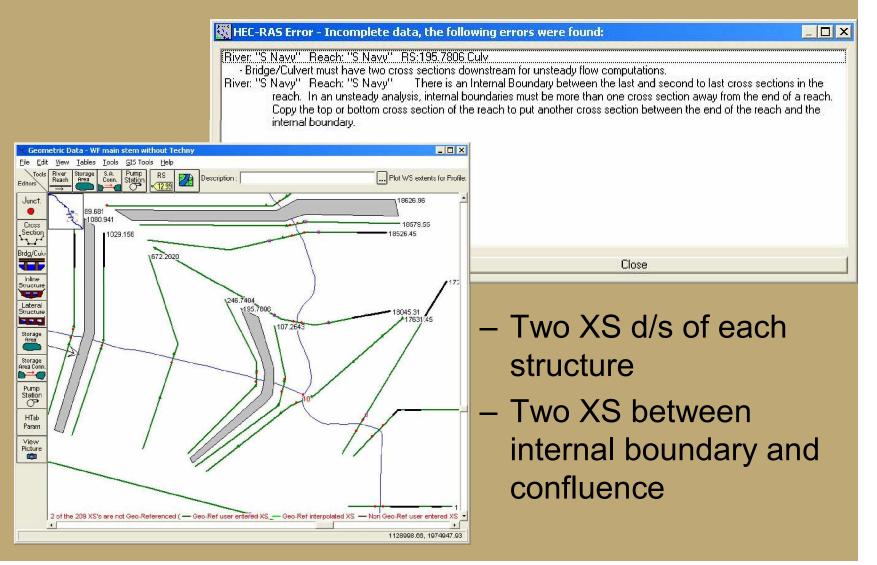
UnsteadyFlowInflowErrors

K HEC-RAS Error - Incomplete unsteady	flow data, the following errors were found:
plan file: C:\jen\08034.01\ West Fork\071509 geom file: C:\jen\08034.01_West Fork\07150 flow file: C:\jen\08034.01_West Fork\071509 Boundary at River: S Navy Reach: S Navy RS Downstream RS is at the bottom of a reach.	9 Burke Transmittal\dummy-error.g08 Burke Transmittal\dummy-error.u01
Clipboard Print File	Close



Model Errors Before Simulation Begins

Cross Section Locations

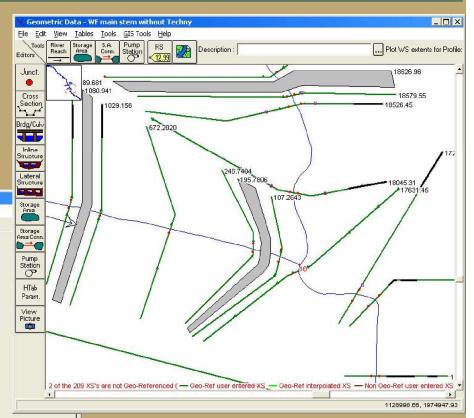




Model Errors Before Simulation Begins

Unsteady Flow
 Inflow Errors

oundary Conditions				Apply D.a
C	Select	Location for	Boundary Condition	
iver: SNavy	_			
each: S Navy	▼ Bi	ver Sta.: 2	228.927 👻 Add a Bo	oundary Condition Locatio
		and the second second	ndition Types	
Stage Hydrograph	Flow Hydr		Stage/Flow Hydr.	Rating Curve
stage Hydrograph		ograph	Stage/Flow Hydr.	Hating Lurve
Normal Depth	Lateral Infl	ow Hydr.	Uniform Lateral Inflow	Groundwater Interflow
T.S. Gate Openings	Elev Control	led Gates	Navigation Dams	IB Stage/Flow
Rules	1			6
		100	1	
River 1 N Navy Ditch	Reach	RS 2242.068	Boundary Condition Type	2
2 N Navy Ditch	Upper Reach Upper Reach	1808,803	Flow Hydrograph Uniform Lateral Inflow	
3 N Navy Diversion	N Navy Diversion	1056.009	Flow Hydrograph	
4 NBCR West Fork	US Techny	50056.06	Flow Hydrograph	
5 NBCR West Fork	US Techny	49138.40	Lateral Inflow Hvdr.	
6 NBCR West Fork	US Techny	47101.55	Uniform Lateral Inflow	
7 NBCR West Fork	US Techny	44505.76	Lateral Inflow Hvdr.	
8 NBCR West Fork	US Techny	44145.32	Uniform Lateral Inflow	
9 NBCR West Fork	US Techny	43027.12	Lateral Inflow Hydr.	
0 NBCR West Fork	US Techny	42781.46	Uniform Lateral Inflow	
1 NBCR West Fork	US Techny	41969.86	Uniform Lateral Inflow	
2 NBCR West Fork	US Techny	38343.83	Uniform Lateral Inflow	
3 NBCR West Fork	US Techny	36886.14	Uniform Lateral Inflow	
4 NBCR West Fork	US Techny	34925.93	Uniform Lateral Inflow	
5 NBCR West Fork	US Techny	30891.70	Lateral Inflow Hydr.	
6 NBCR West Fork	US Techny	30430.81	Uniform Lateral Inflow	
7 NBCR West Fork	US Techny	26777.59	Uniform Lateral Inflow	
8 NBCR West Fork	DS S Navy	15654.78	Lateral Inflow Hydr.	
9 NBCR West Fork	DS S Navy	15287.88	Uniform Lateral Inflow	
20 NBCR West Fork	DS S Navy	10761.58	Lateral Inflow Hydr.	
1 NRCR West Fork	DS S Navu	9895 283	Lateral Inflow Hudr	-



- Uniform Lateral Inflow
 Can't Span Structures
- Uniform Lateral Inflow Can't End at D/S End of Reach



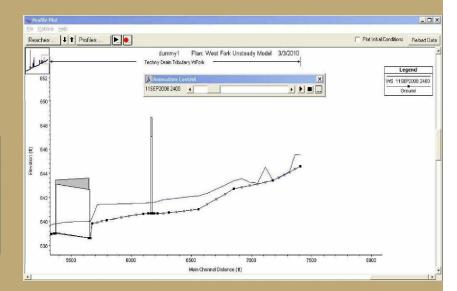
- Model crashes at beginning of simulation
- Problem with Initial Conditions
 - Flow too low, reaches go "dry"
 - Flow u/s of
 confluence ≠
 flow d/s
 - Supercritical
- Computational Time Step

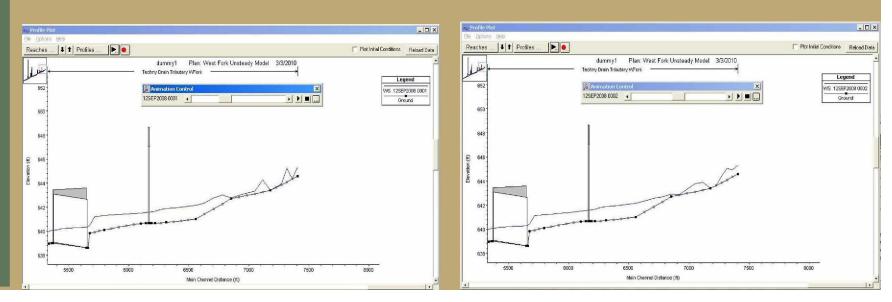
River: NBCR West Fork	RS:	17.76965		
Reach: DSSNavy		Cross Section		
B Curve:	linear type.			
	A.			
Unsteady Flow Simulation				
Simulation:				
Time: 120.0000 17SEP2008	00:00:00	Iteration: 0		
Writing Profiles 6400				
Post Process				
River: NBCR West Fork	RS:	17.76965		
Reach: DS S Navy	Node Type:	Cross Section		
Profile: 11SEP2008 2400				
Simulation: 2/2				
Computation Messages				
12SEP2008 00:03:15 Techny North	Tributary Techny	486.2416	647.00	0.333
Solution solver went unstable, iteration	1 Year of the Constant and Constant South			
	Tributary Techny		649.84	2.262
Solution solver went unstable, iteration				
JUIUUUTI SULVELIVELIL UHSLODIE, ILETOLUUTI	1 0012011 2000	00.03.43		
Techny South	Tributary Techny		651.43	0.343
	Tributary Techny	912.5332	651.43 651.19	0.343 0.161
Techny South	Tributary Techny Tributary Techny	912.5332 682.35*		
Techny South 12SEP2008 00:04:00 Techny South	Tributary Techny Tributary Techny Tributary Techny	912.5332 682.35* 50	651.19	0.161
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South	Tributary Techny Tributary Techny Tributary Techny Tributary Techny	912.5332 682.35* 50 437.7529	651.19 645.38	0.161 0.253
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny	912.5332 682.35* 50 437.7529 912.5332	651.19 645.38 648.82	0.161 0.253 0.085
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South 12SEP2008 00:04:45 Techny South	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny	912.5332 682.35* 50 437.7529 912.5332 50	651.19 645.38 648.82 650.51	0.161 0.253 0.085 3.673
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South 12SEP2008 00:04:45 Techny South 12SEP2008 00:05:00 Techny South Solution solver went unstable, iteration	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny	912.5332 682.35* 50 437.7529 912.5332 50	651.19 645.38 648.82 650.51	0.161 0.253 0.085 3.673
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South 12SEP2008 00:04:45 Techny South 12SEP2008 00:05:00 Techny South Solution solver went unstable, iteration Techny Drain	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny 8 at 12SEP2008	912.5332 682.35* 50 437.7529 912.5332 50 00:05:15	651.19 645.38 648.82 650.51 645.38	0.161 0.253 0.085 3.673 1.263
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South 12SEP2008 00:04:45 Techny South 12SEP2008 00:05:00 Techny South Solution solver went unstable, iteration	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny 8 at 12SEP2008	912.5332 682.35* 50 437.7529 912.5332 50 00:05:15	651.19 645.38 648.82 650.51 645.38	0.161 0.253 0.085 3.673 1.263
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South 12SEP2008 00:04:45 Techny South 12SEP2008 00:05:00 Techny South Solution solver went unstable, iteration Techny Drain	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny 8 at 12SEP2008 Tributary WFork	912.5332 682.35* 50 437.7529 912.5332 50 00:05:15 6693.42*	651.19 645.38 648.82 650.51 645.38	0.161 0.253 0.085 3.673 1.263
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South 12SEP2008 00:04:45 Techny South 12SEP2008 00:05:00 Techny South Solution solver went unstable, iteration Techny Drain	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny 8 at 12SEP2008 Tributary WFork	912.5332 682.35* 50 437.7529 912.5332 50 00:05:15 6693.42*	651.19 645.38 648.82 650.51 645.38	0.161 0.253 0.085 3.673 1.263
Techny South 12SEP2008 00:04:00 Techny South 12SEP2008 00:04:15 Techny South 12SEP2008 00:04:30 Techny South 12SEP2008 00:04:45 Techny South 12SEP2008 00:05:00 Techny South Solution solver went unstable, iteration Techny Drain	Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny Tributary Techny 8 at 12SEP2008 Tributary WFork	912.5332 682.35* 50 437.7529 912.5332 50 00:05:15 6693.42*	651.19 645.38 648.82 650.51 645.38	0.161 0.253 0.085 3.673 1.263



- Initial flow too low, reaches go "dry"
- Animate Profile

File Edit F	Run View Options Help	
1		¥ĭ≝∀₽₽८¥⊾@∎∎ि∞ i ii
Project	dummy-error3	C.\\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.prj 🕒
Plan:	Plan 01	C:\jen\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.p01
Geometry:	Dummy Geom	C:\jen\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.g01
Steady Flow:	1	j.
Unsteady Flo	w: WF HMS Hydrology 062309	C.\jen\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.u01
Description :		US Customary Units





- Keep Reaches "Wet"
 - Check Initial Flows
 - Check Minimum Flows
 - Add Dummy Flow to Emergency/Diversion

Channels

Jns	teady Flow Data	- WF HMS Hydro	logy 06230	09	
⊆	ptions <u>H</u> elp				
our	dary Conditions	itial Conditions			Apply Data
	al Flow Distribution N				
10.000			-		
	Use a Restart File	Filename:			Ē
•	Enter Initial flow dist	ribution			
		Loca	tions of Flow	Data Changes	
Rive	er: Techny Drain	-			Add Multiple
-	in the second se		o. 17	400.071	Add & Flow Change Landing
Hea	ich: Tributary WFo	rk 🔄 Biy	verSta.: 7	468.671	Add A Flow Change Location
	River	Reach	RS	Initial Flow	
1	N Navy Ditch	Upper Reach	2242.068	2	- A12
2	N Navy Diversion	N Navy Diversion	1056.009	0.1	
3	NBCR West Fork	US Underwriters	50056.06	5	
4	NBCR West Fork	US Techny	44505.76	5	
5	NBCR West Fork	DS Techny	30891.70	20	
6	NBCR West Fork	US N Navy Div	23552.81	20	
7	NBCR West Fork	US S Navy	21471.09	20	
8	NBCR West Fork	DS S Navy	17631.45	20	
9	S Navy	S Navy	2228.927	2	
10	Techny Drain	Tributary WFork	7468.671	20	
	Techny North	Tributary Techny	3808.565	20	
11		The second s	0000 544	00	
11	Techny South	Tributary Techny	2899.544	20	

niform	Lateral Inflow Hyd	rograph	
-	River: N Navy Ditcl	n Reach: Upper Reach	RS: 1808.803
Inflow w	vill be evenly distribute	d from RS: "1808.803"	to RS: 338.1133 🔹
		[ct DSS file and Path
	from DSS before sim		······································
File:	C:\jen\08034.01_\	Vest Fork\071509 Burk	e Transmittal\WestFork_P
Path:	//W-WF-NND-1/FL	.0W/01SEP2008/15MI	N/RUN:STORM1_AVGC
Enter	Table	Data time inter	rval: 1 Hour 🗾
1.1.200.005		arting Time Reference	
(F U	lse Simulation Time:	Date: 12Sep2	008 Time: 0000
C F	ixed Start Time:	Date:	Time:
N.		an a	Del Row I Ins Row
INO.	Ordinates Interpo	blate Missing Values	
		Hydrograph Data	
		and the second	1
	Date	Simulation Time	Lateral Inflow
		(hours)	Lateral Inflow 🔺 (cfs)
	11Sep2008 2400	(hours) 00:00	
2	11Sep2008 2400 12Sep2008 0100	(hours) 00:00 01:00	
2	11Sep2008 2400 12Sep2008 0100 12Sep2008 0200	(hours) 00:00 01:00 02:00	
234	11Sep2008 2400 12Sep2008 0100 12Sep2008 0200 12Sep2008 0200 12Sep2008 0300	(hours) 00:00 01:00 02:00 03:00	
2	11Sep2008 2400 12Sep2008 0100 12Sep2008 0200	(hours) 00:00 01:00 02:00	
2 3 4 5 6	11Sep2008 2400 12Sep2008 0100 12Sep2008 0200 12Sep2008 0300 12Sep2008 0300 12Sep2008 0400 12Sep2008 0500 Step Adjustment Opti	(hours) 00:00 01:00 02:00 03:00 04:00 05:00 ons ("Critical" boundary	(cfs)
2 3 4 5 6	11Sep2008 2400 12Sep2008 0100 12Sep2008 0200 12Sep2008 0300 12Sep2008 0300 12Sep2008 0400 12Sep2008 0500 Step Adjustment Opti	(hours) 00:00 01:00 02:00 03:00 04:00 05:00	(cfs)
2 3 4 5 6 Time	11Sep2008 2400 12Sep2008 0100 12Sep2008 0200 12Sep2008 0300 12Sep2008 0400 12Sep2008 0400 12Sep2008 0500 Step Adjustment Optin fonitor this hydrograph	(hours) 00:00 01:00 02:00 03:00 04:00 05:00 ons ("Critical" boundary	(cfs)
2 3 4 5 6 Time	11Sep2008 2400 12Sep2008 0100 12Sep2008 0200 12Sep2008 0300 12Sep2008 0400 12Sep2008 0500 Step Adjustment Optionitor this hydrograph Max Change in Flow (*	(hours) 00:00 01:00 02:00 03:00 04:00 05:00 ons ("Critical" boundary for adjustments to com	(cfs)



• Flow upstream of confluence not equal to flow downstream of confluence

5. Unsteady Flow Data - WF HM	15 Hydrold	ogy 06230)9			
File Options Help						
Boundary Conditions Initial Cond	itions]				Apply Data	
						The second se
Initial Flow Distribution Method						
💭 Use a Restart File	Filename:				E C	
Enter Initial flow distribution						
	Locatio	ons of Flow	Data Char	naes		
River: Techny Drain					Add Multiple	
		-			Add Malaple	
Reach: Tributary WFork	🔄 🗾 Bive	er Sta.: 7	468.671	-	Add A Flow Change Location	
River Reach		RS	Initial Flow	1		
1 N Navy Ditch Upper R	each	2242.068	2			
2 N Navy Diversion N Navy	Diversion	1056.009	0.1			
3 NBCR West Fork US Und	erwriters	50056.06	5			
4 NBCR West Fork US Tecl	nny	44505.76	5			
5 NBCR West Fork DS Tecl	nny	30891.70	20			
6 NBCR West Fork US N N	avy Div	23552.81	20			
7 NBCR West Fork US S Na	ауу	21471.09	COLOR CHILD			
8 NBCR West Fork DS S Na	ауу	17631.45	20			
9 S Navy S Navy		2228.927	2			
10 Techny Drain Tributary	WFork	7468.671	20			
11 Techny North Tributary	Techny	3808.565	20			
	Techny	2899.544	20			
13 Underwriters Trib We	st Fork	1274.258	10			



- Supercritical Flow, Model Unable To Converge To Solution
- Review Summary Output Tables

4.0	
un <u>V</u> iew <u>O</u> ptions <u>H</u> elp	
(<u>5-700</u> 🖤 🖬 L L L L	▝▓▝ፇ▋ዸዿዾዸ፝۩▦፼፼ ≀፟፟፟፟፟፟፟፟
dummy-error3	🔲 [C:\\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.prj 🚞
Plan 01	C:\jen\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.p01
Dummy Geom	C:\jen\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.g01
	ſ
WF HMS Hydrology 062309	C:\jen\08034.01_West Fork\071509 Burke Transmittal\dummy-error3.u01
[US Customary Units
	Krister Karlen (Krister Karlen Karle

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Profile Output Table - Standard Table 1

File Options Std. Tables User Tables Locations Help

	HEC-RAS	Plan: WestForkUnsteady	River: Tec	hny Drain	Reach: Trit	outary WFo	ik Profile:	12SEP2008	0005			Reioad Data
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		1	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tributary WFc	rk 7468.671	12SEP2008 0005	-8.45	644.590	644.76	645	645	0	-4	2	18	2.37
Tributary WFc	rk 7423.21*	12SEP2008 0005	28.06	644.350	645.60		646	0	1	29	35	0.19
Tributary WFc	rk 7377.75*	12SEP2008 0005	26.67	644.110	645.11		645	0	2	16	27	0.37
Tributary WFc	rk 7332.28*	12SEP2008 0005	-2.91	643.870	643.91	644	966	4430	-144		1	180.65
Tributary WFc	rk 7286.82*	12SEP2008 0005	-2.08	643.630	643.65	644	3866	97357	-456	0	0	765.95
Tributary WFc	rk 7241.367	12SEP2008 0005	-0.81	643.390	643.41	644	1846	36848	-278	0	0	467.87
Tributary WFc	rk 7176.16*	12SEP2008 0005	-1.68	643.250	643.48	644	644	1	-5	0	3	2.74
Tributary WFc	rk 7110.95*	12SEP2008 0005	-2.64	643.120	643.14	644	10859	364456	-811	0	0	1361.85
Tributary WFc	rk 7045.75*	12SEP2008 0005	0.57	642.980	643.00	643	1059	15973	164	0	0	274.82
Tributary WFo	rk 6980.54*	12SEP2008 0005	3.95	642.850	643.47		644	0	2	2	8	0.53
Tributary WFo	rk 6915.343	12SEP2008 0005	4.46	642.710	643.57		644	0	1	5	10	0.26
Tributary WFo	rk 6841.37*	12SEP2008 0005	5.63	642.280	643.51		644	0	1	6	10	0.22
Tributary WFo	rk 6767.39*	12SEP2008 0005	4.50	641.850	642.68		643	0	2	2	5	0.56
Tributary WFo	rk 6693.42*	12SEP2008 0005	-5.23	641.430	642.48		643	0	-2	3	6	0.40
Tributary WFo	rk 6619.455	12SEP2008 0005	-8.29	641.000	641.68	642	642	0	-6	1	4	1.94
Tributary WFo	rk 6557.86*	12SEP2008 0005	-0.35	640.930	640.95	641	1421	32297	-224	0	0	376.36
Tributary WFo	rk 6496.26*	12SEP2008 0005	3.22	640.860	642.04		642	0	1	4	7	0.20
Tributary WFo	rk 6434.67*	12SEP2008 0005	2.39	640.800	641.94		642	0	1	4	8	0.16
Tributary WFo	rk 6373.082	12SEP2008 0005	2.36	640.730	641.89		642	0	1	4	10	0.15
Tributary WFo	rk 6326.95*	12SEP2008 0005	2.43	640.690	641.84		642	0	1	4	9	0.18
Tributary WFo	rk 6280.837	12SEP2008 0005	2.52	640.660			642		1	3	10	0.32
Para secora						÷ • •	((<u> </u>		- ·



Computational Parameters

- May need shorter computational time step to allow HEC-RAS to converge
- May need shorter output time step to enable user to see results at time of failure

jile Options Help Plan : Plan 01	Short ID Plan 01	
Geometry File : Unsteady Flow File Programs to Run	Dummy Geom WF HMS Hydrology 062309 Plan Description : Dummy Model	- -
	ep2008 Starting Time: 0000 EP2008 Ending Time: 0000	
Computation Settings	ecor 💌 Hydrograph Output Interval: 30 Mir	
a series and the series of the	en\08034.01_West Fork\071509 Burke Transm nenu: "Options/Mixed Flow Options")	it 🚅
	Compute	



De-bugging Runtime Errors

- De-bugging Runtime Errors
- Identify Source of Model Crashes
 - Note time and location of model crash
 - Find problematic XS and consider HEC-RAS suggestions
- Heed Model
 Extrapolation Warnings

River: NBCR West Fork	RS:	17.769		
Reach: DSSNavy	Node Type:	Cross :	Section	
IB Curve:				
Unsteady Flow Simulation ——— Simulation:				
Time: 120.0000 17SEP20	00:00:00	I kasa bi	on: O	
Writing Profiles 400	00.00.00	nerau	Jri. U	
Post Process				
River: NBCR West Fork	BS	26523	93	
Reach: US N Navy	Node Type:			
Profile: 12SEP2008 0200	Hode Type.	C1033 .	JCC001	
Frome: 125EF2006 0200				
Simulation: 3/3				
Computation Messages				
	N D.C. 105	7000		
	Navy R.S. 195 Reach DSSNavy		15392.18	
	Reach DSSNavy Reach DSSNavy		12756.26	
	Reach DSSNavy Reach DSSNavy		11870.73	
	Reach DSSNavy Reach DSSNavy		11359.11	
	Reach DSSNavy			
	Reach DSSNavy		4060.731	
At River NBCR West Fork				
	07 0.511 - 25 A.4.511 - 4.54	e (1997) - 199	N/TC3, 2007 - N/DS4	
Finished Unsteady Flow Simulation	1			
Writing Results to DSS				
Finished Writing Results to DSS				
Reading Data for Post Process				
Simulation went unstable at: 129 Resetting post process profiles t	A CONTRACTOR OF A DECK REPORT OF	00 0000		
Researing post process promes a	U enu al. 125EF20	00 0200		
Running Post Processor Version 4	10.0 March 2008			
Finished Post Processing				
Task	Time			
Preprocessing Geometry	0.44 sec			
Unsteady Flow Computations	9.02 sec			
Writing to DSS	1.45 sec			
Post-Processing	2.31 sec			
Complete Process	13.27 sec	selle se success		
Computation messages written to:	C:\jen\08034.01\du	ummyforl.	AFSM.p18.comp_msgs.txt	



De-bugging Runtime Errors

Identify Source of Model Crashes
 – Note time and location of model crash

•				•
NBCR West Fork	US N Navy	23529.47		
Minimum error exc	eeds allowable tolerance at	125EP2008	0214	
**** Matrix	Solution Failed ****			

- Review detailed output tables
- Find problematic cross section and consider HEC-RAS suggestions
- Often, just need more cross sections

	e Options					
liver: N	BCR West F	ork 🚬	Profile: 12SEP2008 0200			
leach U	IS N Navy	*	RS: 23529.47 💌	Plan:	ust4 trunc h	ialf _
Pla	n: ust4 trunc	half NBCR W	est Fork US N Navy RS: .	23529.47 Profil	e: 12SEP2008	8 0200
E.G. Elev	/ (ft)	620.58	Element	Left OB	Channel	Right OB
Vel Head	l (ft)	0.03	Wt. n-Val.		0.035	
W.S. Ele	v (ft)	620.55	Reach Len. (ft)	0.50	80.00	82.70
Crit W.S.	(ft)		Flow Area (sq ft)		3.38	
E.G. Slop	be (ft/ft)	0.011402	Area (sq ft)		3.38	
Q Total (cfs]	-4.69	Flow (cfs)		-4.69	
Top Width (ft)		19.91	Top Width (ft)	-	19.91	
Vel Total (ft/s)		-1.39	Avg. Vel. (ft/s)		-1.39	
Max Chl Dpth (ft) Conv. Total (cfs)		0.23	Hydr. Depth (ft)		0.17	
		44.0	Conv. (cfs)		44.0	
Length W	/td. (ft)	80.00	Wetted Per. (ft)		19.92	
Min Ch E	l (ft)	620.32	Shear (lb/sq.ft)	a	0.12	
Alpha		1.00	Stream Power (lb/ft s)	A	-0.17	
Freth Loss (ft) 3.51 C & E Loss (ft)		3.51	Cum Volume (acre-ft)	0.00	0.33	
			Cum SA (acres)	0.00	1.37	
			Errors, Warnings and Not	ies		
Warning:	The velocit	v head has cha	nged by more than 0.5 ft (0.1	15 m). This may i	ndicate the ne	ed for
	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.					
Warning:						
	0.7 or greater than 1.4. This may indicate the need for additional cross sections.					
Warning:						
	section Th	nis may indicate	the need for additional cross	sections		2



De-bugging Runtime Errors

- Heed Model Extrapolation Warnings
 - Adjust
 Hydraulic
 Table (HTab)
 Parameters
 - Adjust Storage
 Ratings

River:	NBCR West	Fork	RS:	17.769	65	
Reach:	: DS S Navy		Node Type:	Cross 9	ection	
IB Curve:						
Unsteady F	Flow Simulatio	n				
Simulation:						
Time: Writing Pro	120.0000 ofiles 400	17SEP2008	00:00:00	Iteratio	n: O	
Post Proce	:\$8					
River:	NBCR West	Fork	RS:	26523.	93	
Reach:	US N Navy		Node Type:	Cross S	ection	
Profile:	12SEP2008	0200				
Simulation:	2/2		-			_
sinuauori.	0/0					
Computatio	on Messages		-			
Computatio	on Messages					
Computatio WARNING	on Messages il	e/bevond Ratir	na Curve (Brida	e/Culvert	/etc.) *****	
Computatio WARNING ***** Extra	on Messages 31 polated above		ng Curve (Bridge sh. USN Navy			
Computatio WARNING ***** Extra At River	on Messages 31 polated above NBCR Wes	tFork Read	h USN Navy	R.S.	21960.49	
Computatio WARNING ***** Extra At River At River	on Messages 31 polated abov NBCR Wes NBCR Wes	tFork Read tFork Read	h USN Navy h USN Navy	R.S. R.S.	21960.49	
Computatic WARNING ***** Extra At River At River At River At River	polated above NBCR Wes NBCR Wes S Navy	tFork Read tFork Read Reach SNav	h USNNavy h USNNavy y R.S. 108	R.S. R.S. 0.941	21960.49	
Computatic WARNING ***** Extra At River At River At River At River	polated above NBCR Wes NBCR Wes S Navy	tFork Read tFork Read Reach SNav Reach SNav	h USN Navy h USN Navy	R.S. R.S. 0.941 7806	21960.49 18626.96	
Computation WARNING ***** Extra At River At River At River At River At River	polated above NBCR Wes NBCR Wes S Navy I S Navy I	tFork Read tFork Read Reach SNav Reach SNav tFork Read	xh USNNavy xh USNNavy y R.S. 108 y R.S. 195	R.S. R.S. 0.941 7806 R.S.	21960.49 18626.96 15392.18	
Computation WARNING At River At River At River At River At River At River At River	polated above NBCR Wes NBCR Wes NBCR Wes S Navy S Navy NBCR Wes	tFork Read tFork Read Reach SNav Reach SNav tFork Read tFork Read	h USNNavy h USNNavy y R.S. 108 y R.S. 195 h DSSNavy	R.S. R.S. 0.941 7806 R.S. R.S.	21960.49 18626.96 15392.18 12756.26	
Computation WARNING At River At River At River At River At River At River At River At River	on Messages al NBCR Wes NBCR Wes S Navy I S Navy I NBCR Wes NBCR Wes	tFork Read tFork Read Reach SNav Reach SNav tFork Read tFork Read tFork Read	sh USNNavy sh USNNavy y R.S. 108 y R.S. 195 sh DSSNavy sh DSSNavy	R.S. R.S. 0.941 7806 R.S. R.S. R.S.	21960.49 18626.96 15392.18 12756.26 11870.73	
Computation WARNING At River At River At River At River At River At River At River At River At River	on Messages al NBCR Wes NBCR Wes S Navy I S Navy I NBCR Wes NBCR Wes NBCR Wes	tFork Read tFork Read Reach SNav Reach SNav tFork Read tFork Read tFork Read	sh USNNavy sh USNNavy y R.S. 108 y R.S. 195 sh DSSNavy sh DSSNavy sh DSSNavy	R.S. R.S. 0.941 7806 R.S. R.S. R.S. R.S. R.S.	21960.49 18626.96 15392.18 12756.26 11870.73 11359.11	
Computation WARNING ***** Extra At River At River At River At River At River At River At River At River At River At River	on Messages polated above NBCR Wes NBCR Wes S Navy I S Navy I NBCR Wes NBCR Wes NBCR Wes NBCR Wes NBCR Wes NBCR Wes	tFork Read tFork Read Reach SNav Reach SNav tFork Read tFork Read tFork Read tFork Read	h USNNavy h USNNavy y R.S. 108 y R.S. 195 h DSSNavy h DSSNavy h DSSNavy h DSSNavy	R.S. R.S. 0.941 7806 R.S. R.S. R.S. R.S. R.S. R.S.	21960.49 18626.96 15392.18 12756.26 11870.73 11359.11 6664.061	

Finished Unsteady Flow Simulation

Close

Summary

- Start with Good XS Locations, Good Unsteady Flow Input Locations
- Use HEC-RAS Graphical & Tabular Tools
 - Review .txt file to find time & location of error
 - Animate Profile
 - Review Summary Output Tables
 - Review Detailed Output Tables
- Pay Attention to:
 - Initial Flows
 - Supercritical Flow
 - Cross Section Spacing
- Consider HEC-RAS Warnings



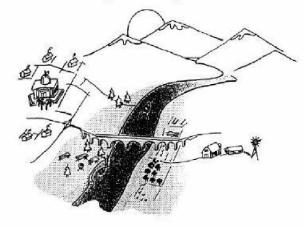
Resources for Help

- Resources for Help
 - HEC-RAS Help
 - ASCE HEC-RAS
 Unsteady Flow
 Class and/or
 Class Manual



US Army Corps of Engineers® Hydrologic Engineering Center

HEC-RAS River Analysis System



User's Manual

Version 4.0 March 2008

Approved for Public Release. Distribution Unlimited.

CPD-68



Model Runs! Success!

HEC-RAS Finished Computatio Geometry Processor			
River: NBCR West Fork	RS:	17.76965	
Reach: DSSNavy		Cross Section	
B Curve:	Nodo Typo.		
	3		
Unsteady Flow Simulation			
Simulation:			
Time: 120.0000 17SEP200	8 00:00:00	Iteration: 0	
Writing Profiles 1700			
Post Process			
River: NBCR West Fork	RS:	17.76965	
Reach: DS S Navy	Node Type:	Cross Section	
Profile: 16SEP2008 2400			
Simulation: 62/62			
Computation Messages			
Writing Results to DSS			1
Finished Writing Results to DSS			
Reading Data for Post Process			
Running Post Processor Version 4.0).0 March 2008		
Finished Post Processing			
Task	Time		
Preprocessing Geometry	0.75 sec		
Unsteady Flow Computations	1 min 11.56 se		
Writing to DSS	11.50 sec	5	
Post-Processing	1 min 34.41 se	5	
Complete Process	2 min 58.24 se	3	
	\ien\08034.01\ \	Vest Fork\072709 HDR Transmittal\NBCR_W	/F.p01.comp msgs.txt 🛛 🚽
Computation messages written to: C:			
Computation messages written to: C:			

Questions?