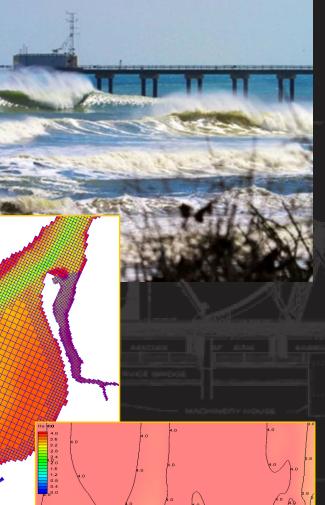
COVERAGES, SIMULATIONS, AND MODEL CONTROL

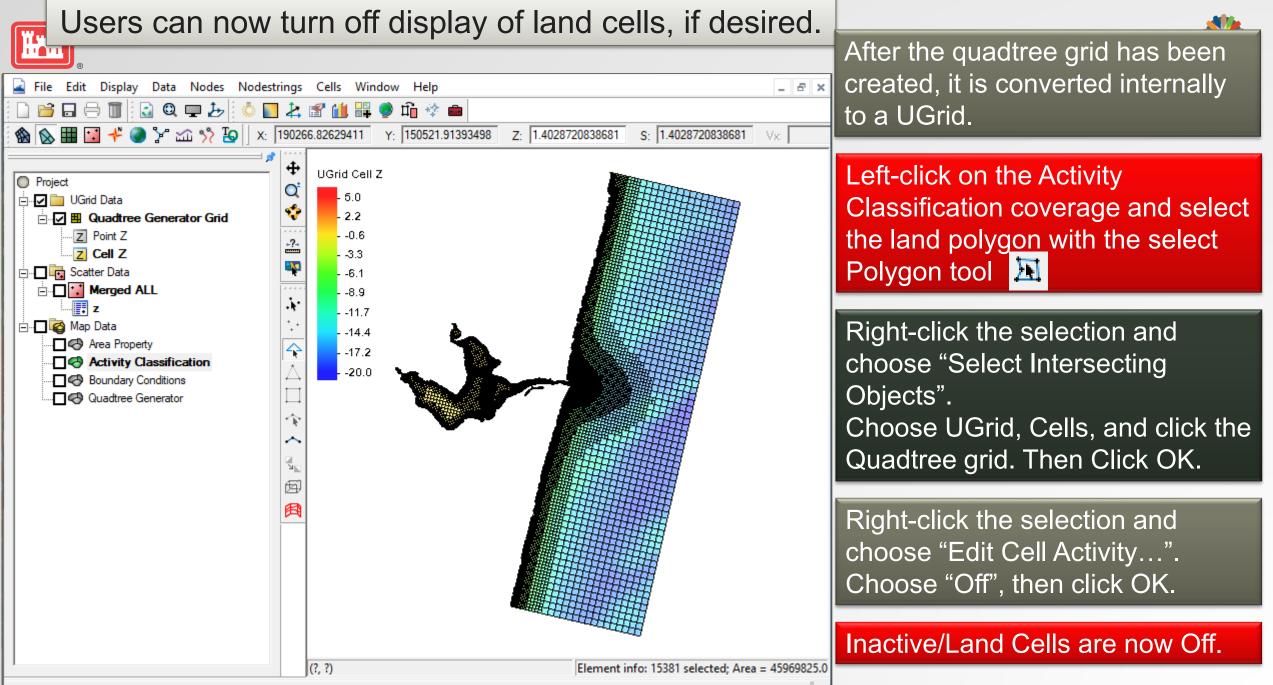
Mitchell Brown Liz Holzenthal Honghai Li

U.S. ARMY

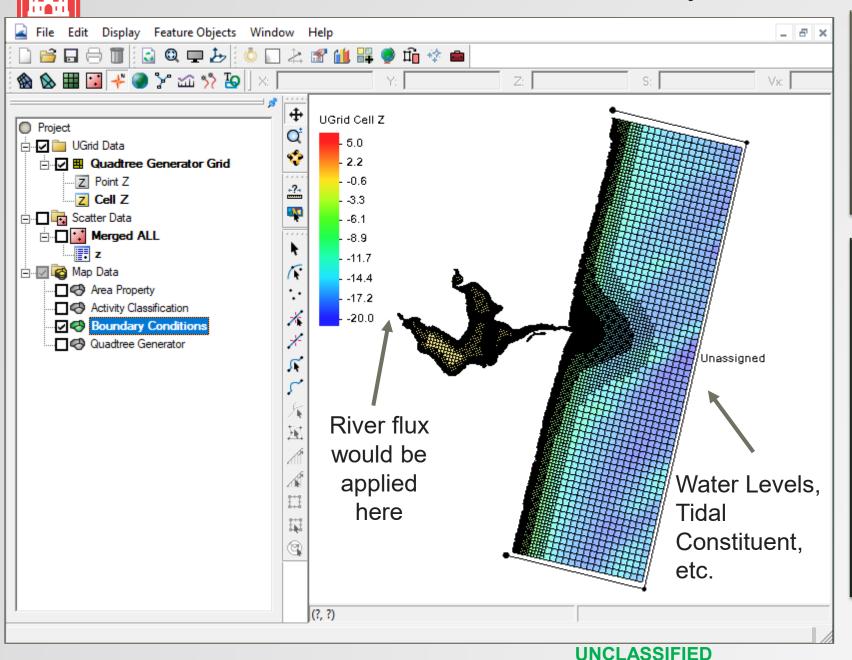
Coastal & Hydraulics Laboratory US Army Engineer Research and Development Center (ERDC)







Next, we define the boundary conditions (forcing).



Boundary forcing comes in from the edges by way of Feature Arcs of specific types.

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• Select the *Boundary Condition* coverage,

then the Create Feature Arc tool.



Click in the approximate location for the type of forcing and create an arc for the boundary condition.

Water Surface Elevation Boundary Condition



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	Name:	
	Options	
UGrid Data	Type: WSE-forcing \checkmark	
Z Point Z	WSE source: Curve ~	
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E 🔽 🙀 Map Data	WSE onset / Sea Level change Constant	
Area Property	Constant value for WSE offset (m): 0.0	
Activity Classification		
Boundary Conditio		
Quadtree Generator		
	Salinity	
	Define salinity curve Curve	
	Temperature	
	Define temperature curve Curve	
	OK Cancel Help	
		_
	(?, ?)	

Select the Select Feature Arc tool.
Click, right click on the arc created.

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Choose Assign Boundary Conditions and select the appropriate boundary type. Choose the type "WSE-forcing" and for the source, choose "Curve".

Water Surface Elevation Boundary Condition

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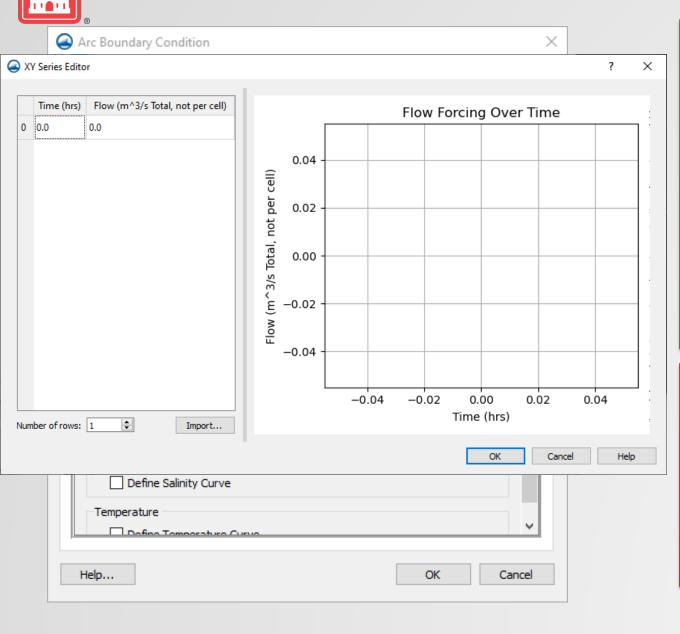


	8	_		- 1	•	Click the "Define curve" box.
	Arc Boundary Condition ×				_	
🕝 XY	Arc Boundary Condition	×	? >	<]	•	Enter values for time and
1 2 3 4 5	Name: Options Type: WSE-forcing ~ WSE source: Curve ~ Define curve: Curve					elevation. This can be by hand, cut/paste from spreadsheet, or importing a file. Let's import a file with the data.
6 7 8 9 10	WSE offset / Sea Level Change Constant V Constant value for WSE offset (m): 0.0					Click "Import" and find the file named "WLforcing.xys" which is in the CMS_Grid_Creation directory.
11 12	Temperature		0 700		•	Click "Open". Click "Ok" to finish.
Numb	Define temperature curve Curve OK Cancel Help	ie I	el Help			A Name is optional. The WSE offset is optional. Click OK.

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UNCLASSIFIED River Flux Boundary Condition (unused now, explanation only)





- For River flux, choose the type "Flow rate-forcing"
- Choose either a "Constant" or "Curve."
- Note: Flux values differ from previous versions of SMS/CMS. All flux values are <u>Total Flux per arc</u>, and not per cell in the arc.
- The curve is set up the same way as WSE elevation boundary condition.
- A Name is optional.
- Inflow direction should be approximate in degrees clockwise from North. (This will be optional in a future update.)
- The Conveyance coefficient can be modified from the default.



UNCLASSIFIED Tidal/Harmonic Boundary Condition



•	For Tidal Constituent or Harmonic
	forcing, select the type "WSE-forcing"
	and the source as needed. Add rows as
	needed to represent the constituents
	desired.

Harmonic has no temporal connection to the start date/time, Tidal does.

- A Name is optional. \bullet
- Inflow direction should be approximate • in degrees clockwise from North. (This will be removed in a future update.)
- The WSE Offset is optional.

Optio				_	
	me:				
_	pe:				
W	SE-forcing	•			
WS	E Source:				
Ti	dal Constituent	•			
Inf	low direction:				
0					
Co	nstituents:				
	Constituent	Amplitude (m)	Phase (deg)		
1	M2 🔻	0	0		
2	S2 🔻	0	0	1	
3	N2 🔻	0	0		
4	К1 🔻	0	0		
5	01 🔻	0	0]	
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Tidal Database Forcing (External Tidal)

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Arc Boundary Condition - Process ID: 16712			×
Name:			
Options			
Type: WSE-forcing ~			
WSE source: External tidal \checkmark			
Note: The tidal constituents will come from the tidal constituents compo	onent of the simu	lation.	
WSE offset / Sea Level Change Constant $ \lor $			
Constant value for WSE offset (m): 0.0			
		N	
		3	
Salinity			
Define salinity curve Curve			
Temperature			
Define temperature curve Curve			
	OK	Cancel	Help



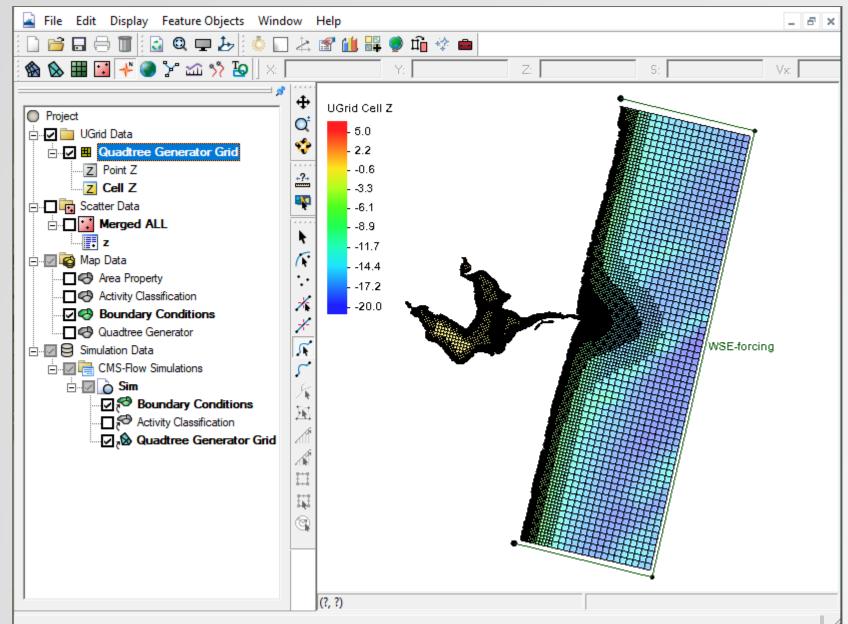
- When you have a larger domain, a simple tidal forcing along the offshore edge may not be adequate because of the phase difference along your boundary.
- In these cases, use forcing from a tidal database such as LeProvost or ADCIRC.
- Other steps must be followed in the Simulation section to enable this type of forcing.

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Steps for Running CMS-Flow Create a new simulation





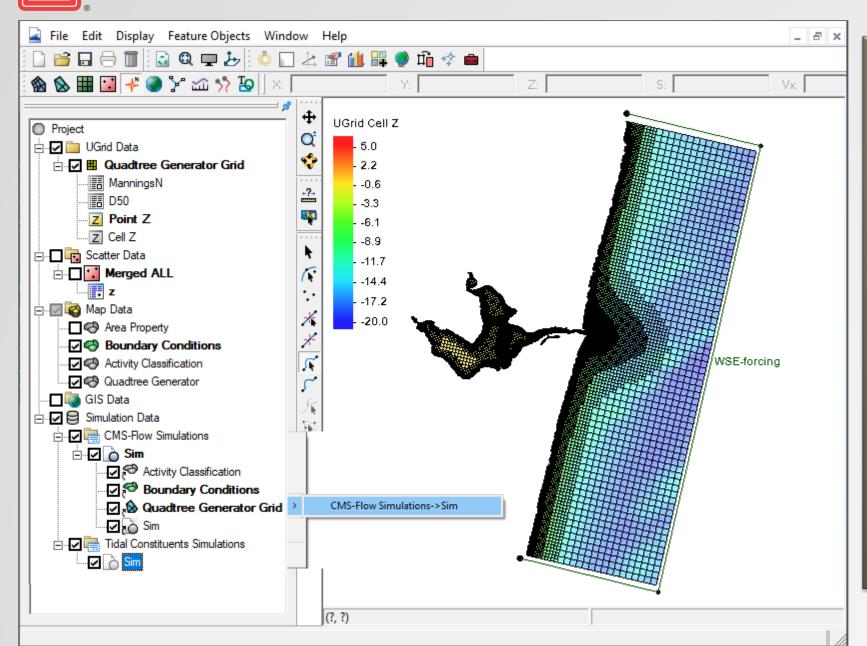
- Right click in open space at bottom of data tree to pull up a dialog.
- Choose 'New Simulation | CMS-Flow'

 \bullet

- Right click on each object to 'Apply To' the simulation
 - Activity Classification
 - Boundary
 Conditions
 - CMS-Grid (not coverage)

Adding a Tidal Constituent component to simulation.





If an "External Tidal" boundary condition was selected earlier, another type of simulation component must be added.

•

- Right click in open space at bottom of data tree and Choose 'New Simulation | Tidal Constituents'
 Right click on "Sim" and
 - "Apply to" the CMS Simulation



Choose which Database and Tidal Constituents



Tidal Constituents - Process ID: 26732	×
Source: ADCIRC2015 ~ Reference time: 1/1/2001 12:00 AM + Constituents	
2MK3 2N2 2Q1 2SM2 J1 K1 K2 L2 LAMBDA2 M1 M2 M3 M4 M6 M8 MF MK3 MM MN4 MS4 MSF MU2 N2 NU2 O1 O01 P1 Q1 R2 RHO1 S1 S2 S4 S6 SA SSA T2 Select Minor	
	lelp

- Right click on the Tidal Constituent "Sim" and choose "Edit Constituents..."
- From Source, choose which database to use.
- Different databases have different constituents to choose from.
- Select the ones that are most important in the are of this project.
- Choose a reference time that is the same as your simulation start time.

Click OK

This project does not use the Tidal Database, so later steps will not show these items in the simulation area.

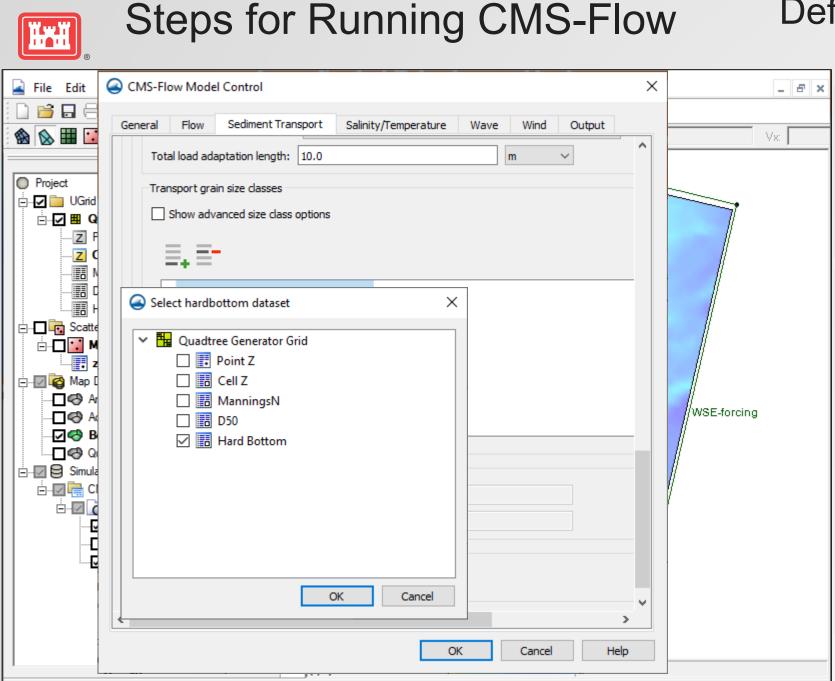
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Steps for Running CMS-Flow Creating new Datasets for Model Control



	<mark>Dataset Toolbox</mark>	ladastringe Calle Mindow Halp	×		Several datasets should be
		Data Calculator Data Sets Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Grid Quadtree Generator Git All to Expression Data Set Info			created to associate with CMS Processes.
	Update Available Tools Help	Output dataset name: new dataset	Compute		
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Defining Model Control parameters



- Rename 'Sim' something meaningful (Right click, rename)
- Right click on simulation and choose Model Control.
- Change values as needed on each tab.
- Select the 'ManningsN' dataset on Flow tab, then click OK.
- On Sediment Transport tab, scroll to Bed Composition, and assign 'D50' dataset to Bed Layer 1.
- Scroll down to bottom of tab to add a Transport grain size
- Add Hard Bottom dataset.

Steps for Running CMS-Flow

MS-Flow Model Co	ntrol					×
eral Flow Se	diment Transport	Salinity/Temperatu	re Wave	Wind	Output	
ulation label: SRI_te utput time lists List 1 List 2	estRun 1 List 3 List 4					^
1 0.0	hrs) Increment (hrs 1.0) End time (hrs) 744.0				
utput datasets Water surface e	levation (m)		List 1		~ ^	
 Current velocity 	,		List 1		~	
Current may Current velo	gnitude (m/s) ocity (m/s)					
 Morphology 			List 2		~	
Depth (m, tl Morphology	hrough time) / (m)					
✓ Transport			List 3)~	
Sediment to	tal-load capacity (kg	/m^3)				~
			OK	Cancel	Н	elp

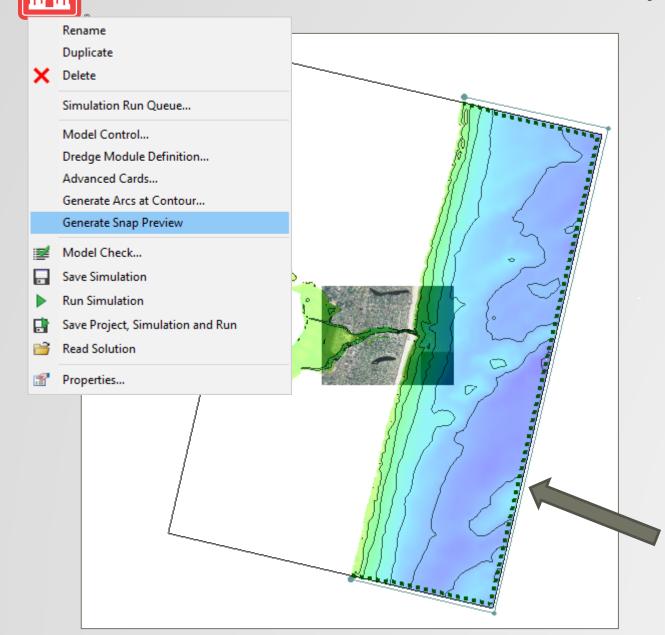
Defining Model Control parameters



- Change Simulation label, if desired.
- Change increment and end times for List 1, 2, and 3.
- Change List to use for Morphology and Transport
- Click OK to Exit Model Control

UNCLASSIFIED Check to see where Boundary Condition cells are located



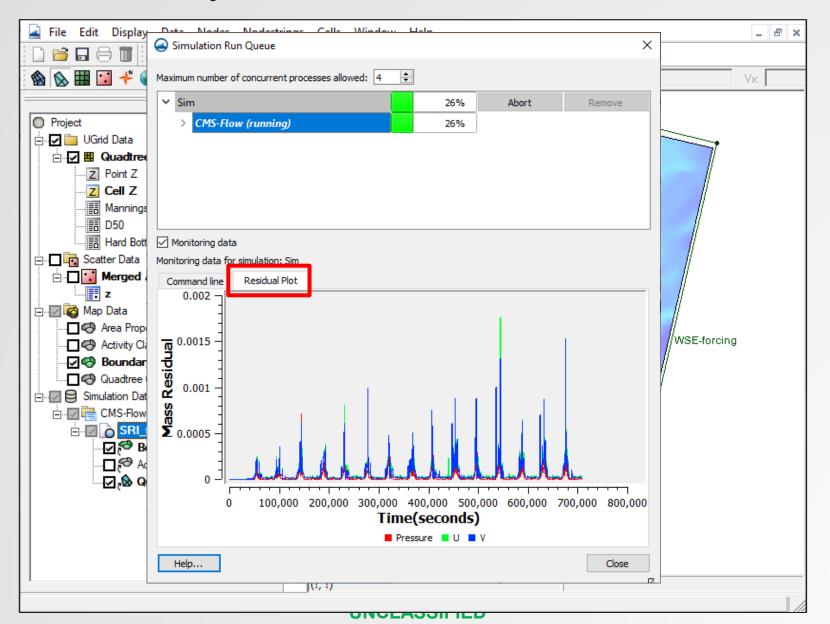


- Once Boundary Conditions are linked to the simulation, you can preview which cells will be used to apply the forcing.
- Right-Click on the Simulation in Data Tree and select "Generate Snap Preview".
- Once it is complete, there should be an indication of the cells for each boundary condition.



Steps for Running CMS-Flow Save Project, Save Simulation, Run Simulation





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QUESTIONS?

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50 THE BANE BULKHEADS CAN BE USED FOR LOOKS & DAM

> PRESTRESSED-CONCRETE TRUNNON GROEP

NOTE: EANVERIGATE NOT SHONE