SAND2016-9626 TR

SNL-Delft3D-CEC

3D/2D modeling suite for integral water solutions



Building an Advanced Model



Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.





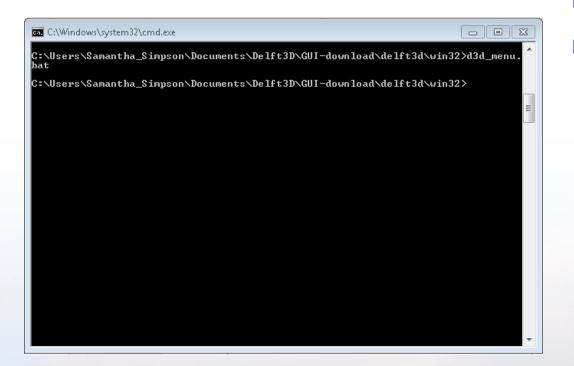
This tutorial will aim to:

- Edit grids with attribute files (polygons)
- Create depth files through interpolation and extrapolation
- Manually add boundaries to geographical grid
- Run a simulation





Delft 3D initialization



Start the Delft 3D program.

From the Windows command line, run d3d_menu.bat





Grid

🔯 Delft3D VERSION_NUMB	ER - [/GUI-download/delft3d/win32]	From the main	n menu, sele	ect Grid
Information	Information and version numbers			
Grid	Grid and bathymetry			
Flow	Hydrodynamics (including morphology)			
Wave	Waves (standalone)			
Water Quality	Far-field water quality			
Utilities	Delft3D Utilities			
Exit	Exit Delft3D menu Select working directory			
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🔯 Grid and bathymetry - [/E)elft3D/GUI-download/delft3d/win32]
RGFGRID	Boundary fitted grid generation
QUICKIN	Data interpolation to computational grid
DIDO	Grid aggregation program
Report RGFGRID	View report from grid generation
Report QUICKIN	View report from data interpolation to computational grid
Return	Return to Delft3D menu
	Select working directory

From the Grid and Bathymetry menu, select RGFGRID





In this tutorial, we will create our own 400x370 grid to be edited into the shape of SF Bay.

■ Go to Operations → Create Rectangular or Circular Grid

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Create rectangular or circular grid

👪 RGFGRID - [--unnamed--]

Domain

Copy Delete Convert Grid

📇 🍕

File Edit Operations View Co-ordinate System Settings

Change Centre of Projection

Change Splines into Grid Grow Grid from Splines Create Grid from Polygon

Refinement

Merge Nodes Merge Grids Paste two Grids

Rotate Grid Administration

Orthogonalise Grid Flip Edges Grid Properties

Create Rectangular or Circular Grid...

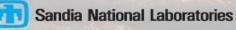
Actual and Maximum Data Dimensions.. Attach Grids at DD Boundaries Compile DD Boundaries Remove small links 

🖗 Create Rectangular or Circular Grid 🔋 💌					
Number of Gridcells in M-Direction	400				
Number of Grid cells in N-Direction	n 370				
Delta X [m]	255				
Delta Y [m]	255				
Origin X [m]	527510.526				
Origin Y [m]	4141700.246				
Rotation left [deg]	0				
Radius of M-Curvature [m]	0				
Uniform M-Fraction [-]	1				
Maximum Size / Delta X [-]	5				
Uniform N-Fraction [-]	1				
Maximum Size / Delta Y [-]	5				
OK Cancel					

Create your own Grid

Create grid to match these values.



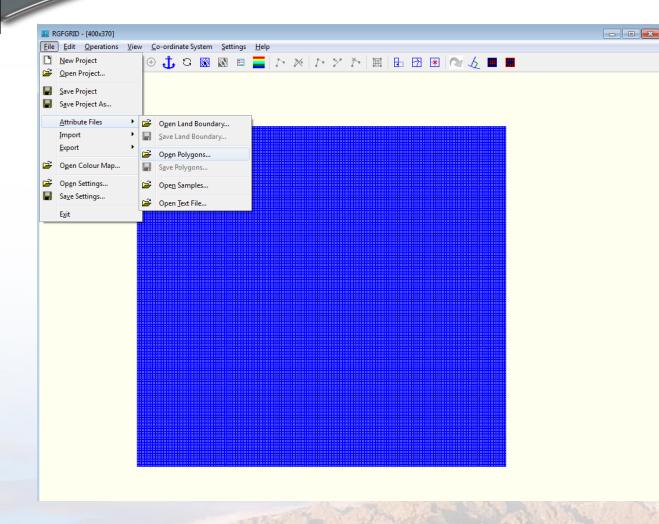


■ RGFGRD - [400:370] File Edit Operations View Co-ordinate System Settings Help ● ジ 米 @ ① ① ① ① ② 怒 図 目 ■ た ※ た ざ た 田 昆 図 图 ◎ ② 2 ■ ■	
	This is what you should see.

Choose menu option || X,Y: 587214.224, 4141334.595 |||







■ Select File → Attribute Files → Open Polygon



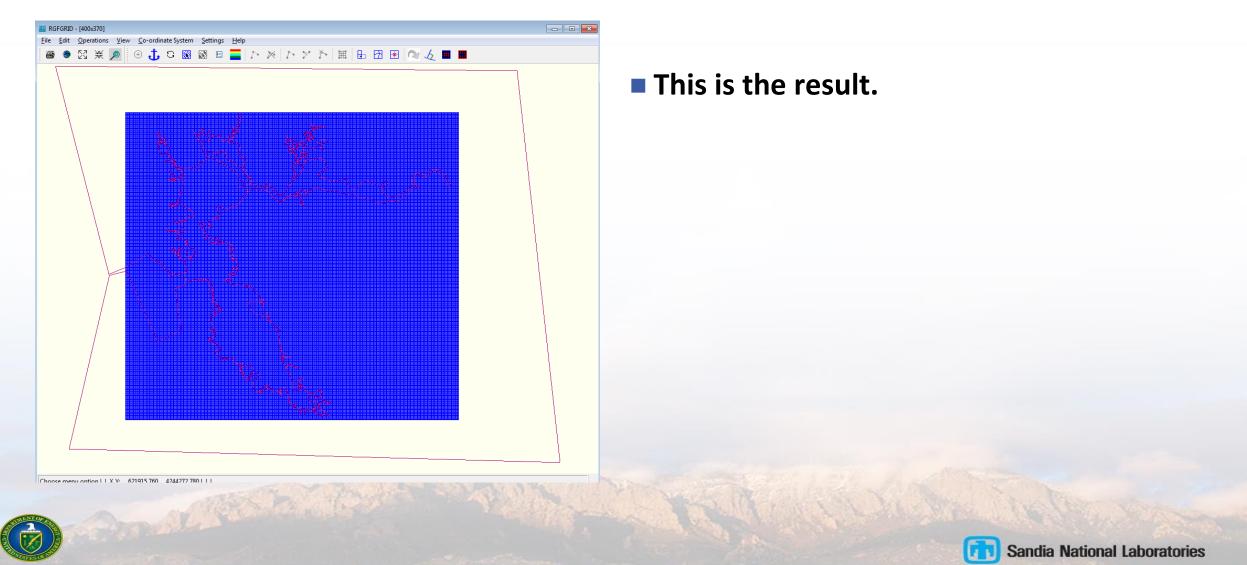


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7 Favorites	Documents library sfbay		Ar	rrange by: Folder 🔻
Libraries	Name	Date modified	Туре	Size
Computer	SFShoreLine_flip.pol	10/30/2015 8:31 AM	POL File	632 KB
p computer	SFShoreLine2.pol	10/30/2015 8:31 AM	POL File	694 KB
Network	SFShoreLine-grid.pol	10/30/2015 8:31 AM	POL File	150 KB
Filection	SFShoreLine.pol	10/30/2015 8:31 AM	POL File	694 KB

Select "SFShoreline2.pol"





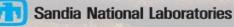


<u>File E</u> dit	_	0x370] :rations <u>V</u> iew <u>C</u> o-ordinate System <u>S</u> etting:	s <u>H</u> elp	
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	Ð	Change Centre of Projection Copy ►		
		D <u>e</u> lete	Land Boundary	
		Co <u>n</u> vert Grid	Splines	
\	Ħ	Change Splines into Grid Grow Grid from Splines Create Grid from Polygon Create Rectangular or Circular Grid	Grid Polygons Samples Elements	
		<u>R</u> efinement <u>O</u> rthogonalise Grid Elip Edges		
		Gr <u>i</u> d Properties <u>A</u> ctual and Maximum Data Dimensions		
		Attach Grids at DD Boundaries Compile DD Boundaries		
		Remove small links Merge Nodes Merge Grids Paste two Grids Rotate Grig Administration		
	/			
l				

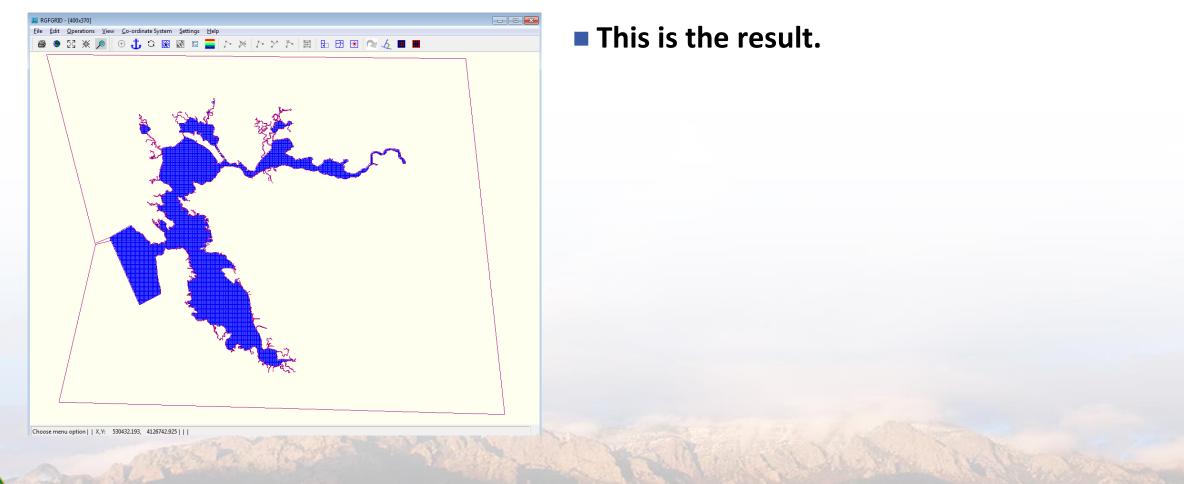
 Select Operations → Delete → Grid
 This will remove all points "inside" of the polygon.

х

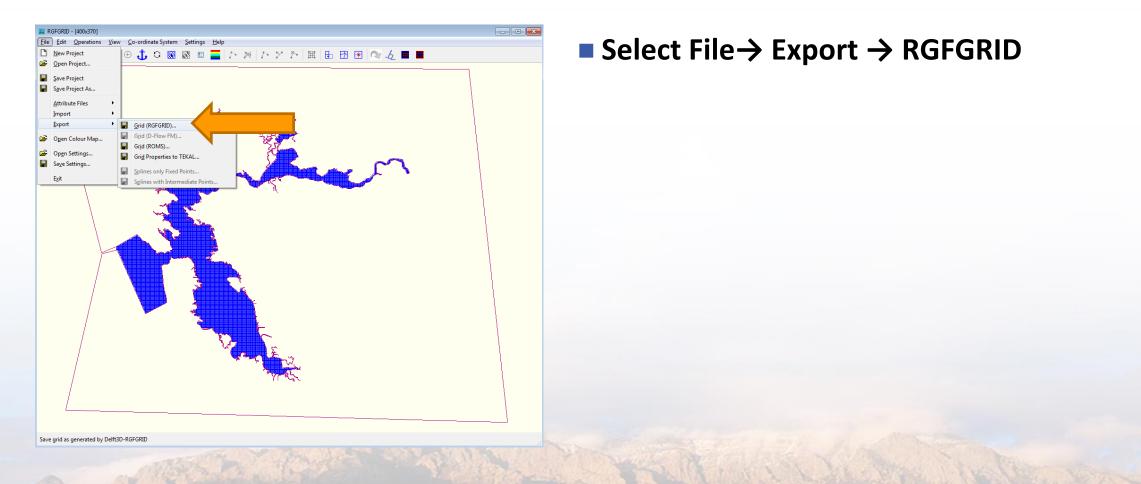




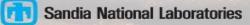
Sandia National Laboratories











📓 Save Grid (RGFGRIE))			×
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💻 Desktop 🚺 Downloads 注 Recent Places	E	No items match your se	earch.	
🥃 Libraries 📑 Documents				
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File <u>n</u> ame:				-
Save as <u>t</u> ype:	*_rgf.nc (*_rgf.nc)			
lide Folders			<u>S</u> avi	

Save the grid file as "400x370.grd".

Close RGFGRID and import it again.

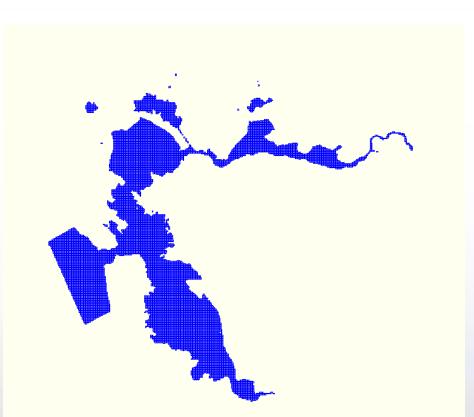




Editing the Grid

Import the newly created grid.

In order to make creating the boundary easier, grid cells will be deleted to allow for smooth boundary edges instead of jagged.

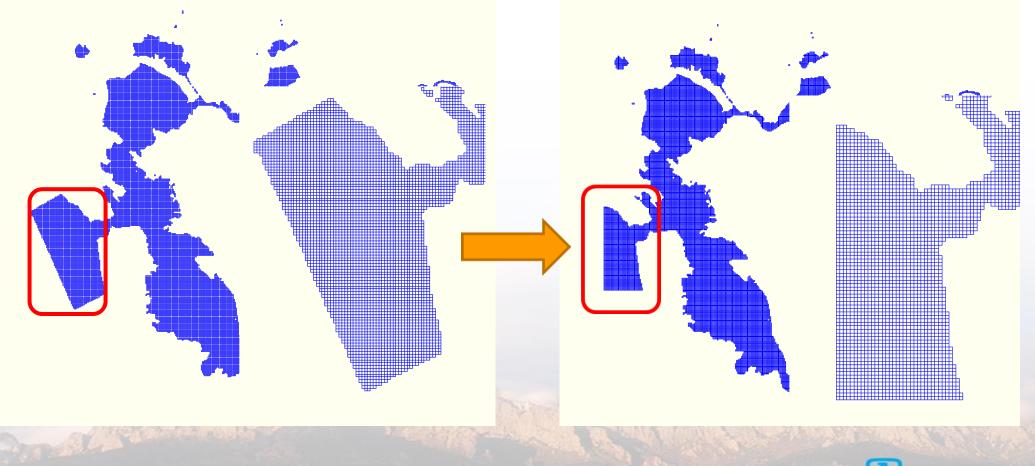






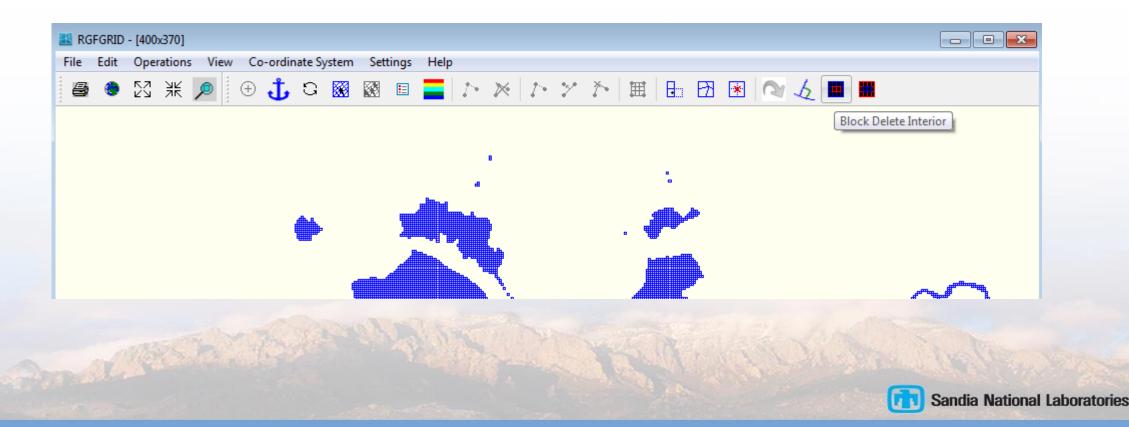
Editing the Grid

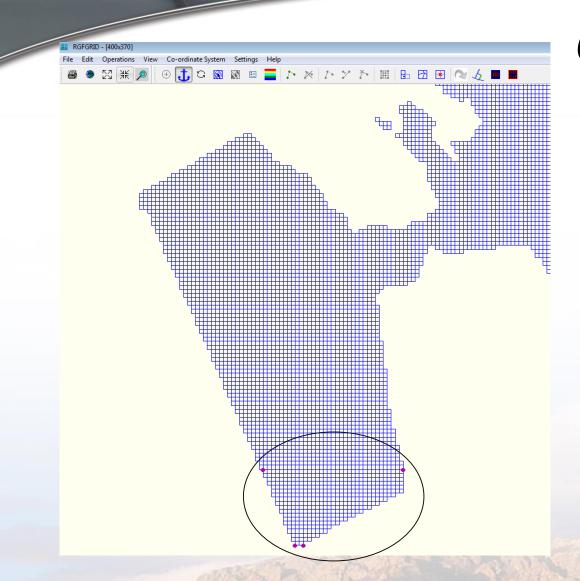
The end goal is to transform the boxed region on the left to the one on the right.



Creating a Linear Boundary

- Remove parts of the grid with the "Block Delete Interior" tool.
- Use the tool to delete grid cells from the bottom, left side, and top of the SF Bay boundary



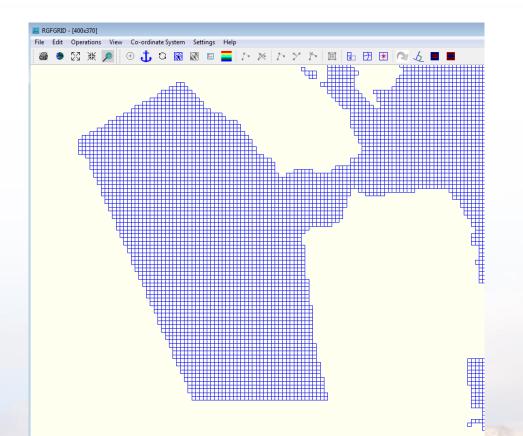


Creating a Linear Boundary

- Create a block by selecting four points on the grid.
- Have top points be on the same line, and have bottom along the bottom corner of the grid.
- Right click to delete the grid points within the selected grid points.



Creating a Linear Boundary

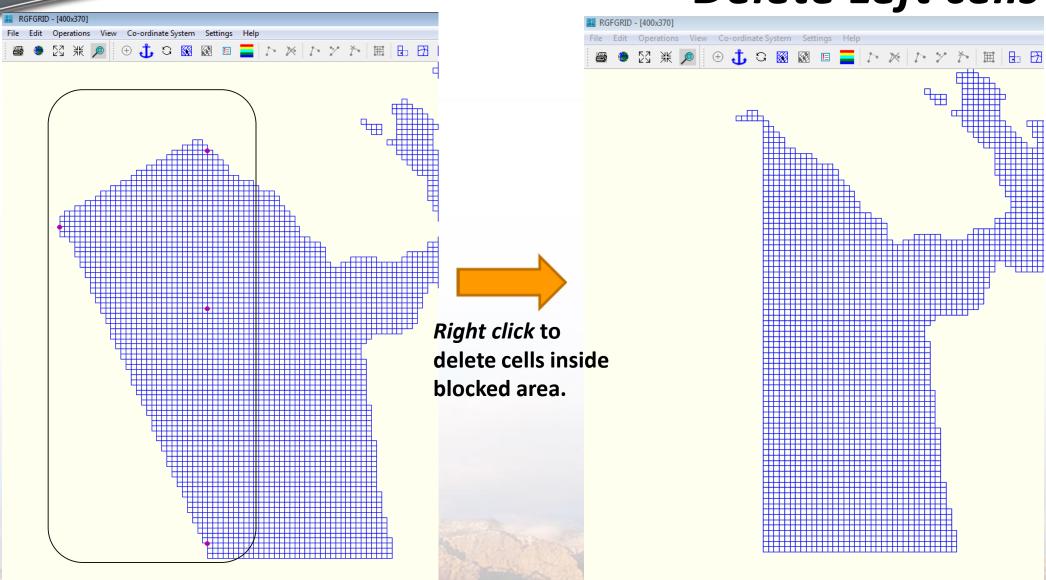


Drac West

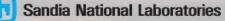
- The bottom should now be smooth.
- Repeat process for left side and top.



Delete Left cells

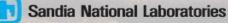




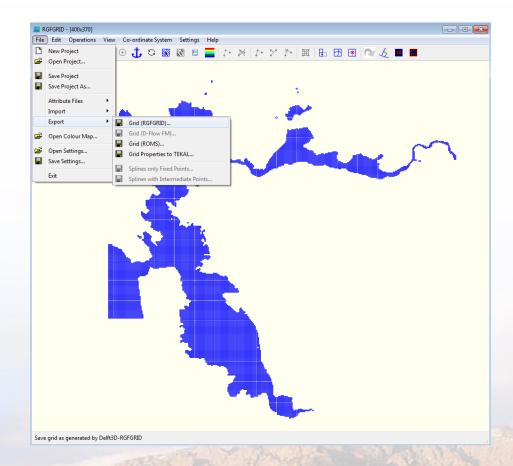


Delete Cells on top 👪 RGFGRID - [400x370] RGFGRID - [400x370] File Edit Operations View Co-ordinate System Settings Help File Edit Operations View Co-ordinate System Settings Help 🚇 🖲 💥 🗯 🗩 🕕 C 📓 📓 🗉 🧮 か 💥 か ジ か 🖽 🗄 🔂 | 🚇 🖲 🔀 米 🔎 🕀 🤳 🔾 🖼 🎯 🞯 🗉 🧮 / ト ※ | ト ン 가 | 田 | 🏪 🖪 THE . Right click to delete cells inside blocked area. mark





Saving Your Grid



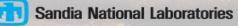
Export the completed grid as "400x370.grd"



🔯 Grid and bathymetry - [/D	elft3D/GUI-download/delft3d/win32] 📃 🖃 🗾
RGFGRID	Boundary fitted grid generation
QUICKIN	Data interpolation to computational grid
DIDO	Grid aggregation program
Report RGFGRID	View report from grid generation
Report QUICKIN	View report from data interpolation to computational grid
Return	Return to Delft3D menu
	Select working directory

 Exit RGFGRID and return to the Grid and Bathymetry menu.
 Select QUICKIN



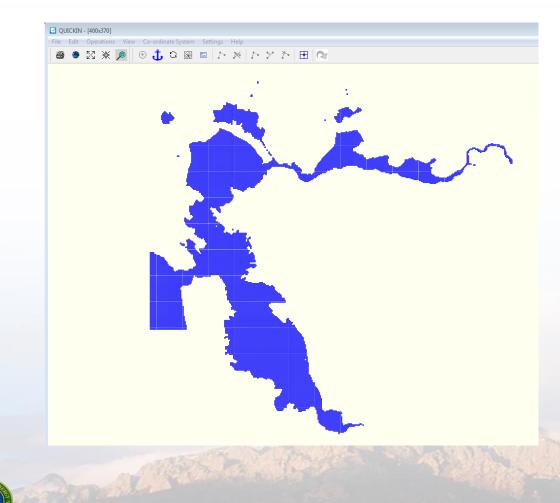


	QUICKIN - [unnamed]		- • •
File	Edit Operations View Co	o-ordinate System Settings Help	
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2	Open Project		
	Save Project		
	Save Project As		
	Attribute Files		
	Import +		
	Export •		
	Delft3D-FLOW Attributes		
i 🖉	Open Colour Map		
1	Open Settings		
	Save Settings		
	Exit		
Cho	ose menu option -160.65000	10, 1564.150000 Unknown	

- Select File → Import → RGFGRID and open the file that we just created.
- QUICKIN will be used to add attribute files and interpolate and extrapolate sample data.







This is what you will see.



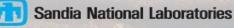
🛃 QUICKIN - [400x370] File Edit Operations View Co-ordinate System Settings Help 🗋 New Project 🚺 ロ 🕺 🗉 | ハ 🛪 | ハ ツ ブ | 🖽 | 🐼 ൙ Open Project... Save Project Save Project As... Attribute Files Open Land Boundary... Import Save Land Boundary... Export ൙ Open Polygons... Delft3D-FLOW Attributes Save Polygons... ൙ Open Colour Map... ൙ Open Samples... ൙ Open Settings... 🗳 Open Samples (TEKAL) ... Save Settings... Save Samples... Exit ൙ Open Text File...

QUICKIN

■ Select File → Attribute Files → Open Samples

Open samples





Adding a Sample File

🖪 Open Samples	oson, Samantha F 🕨 My Document	s ▶ Delft3D ▶ sfbay ▶ sfbay ▼	Search sfba	IV	× (
Organize 🔻 New	folder			= -	2	
🔆 Favorites	A Name	Date modified	Туре	Size		
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F	ile <u>n</u> ame: test.xyz		✓ Samples (*.× <u>O</u> pen	yz) Cancel	• 	

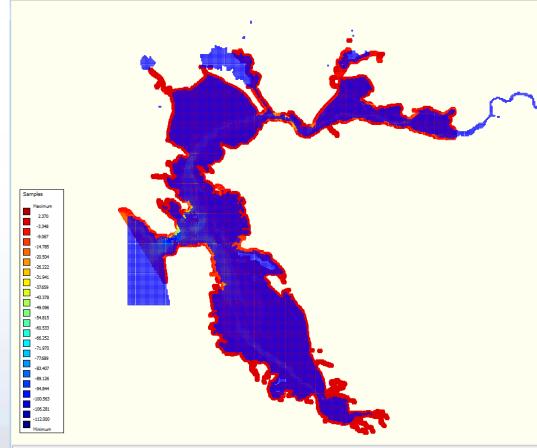
Select test.xyz

test.xyz contains data samples at each (x,y) coordinate on the grid.





🔣 QUICKIN - [400x370]

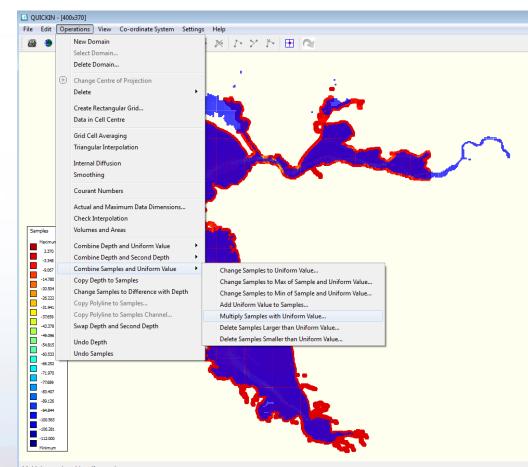


Choose menu option | | X,Y: 585311.606, 4140910.507 | Cartesian | |

Adding a Sample File

This is the result. Notice the samples (z-values) range from 2.37 to -112.



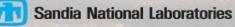


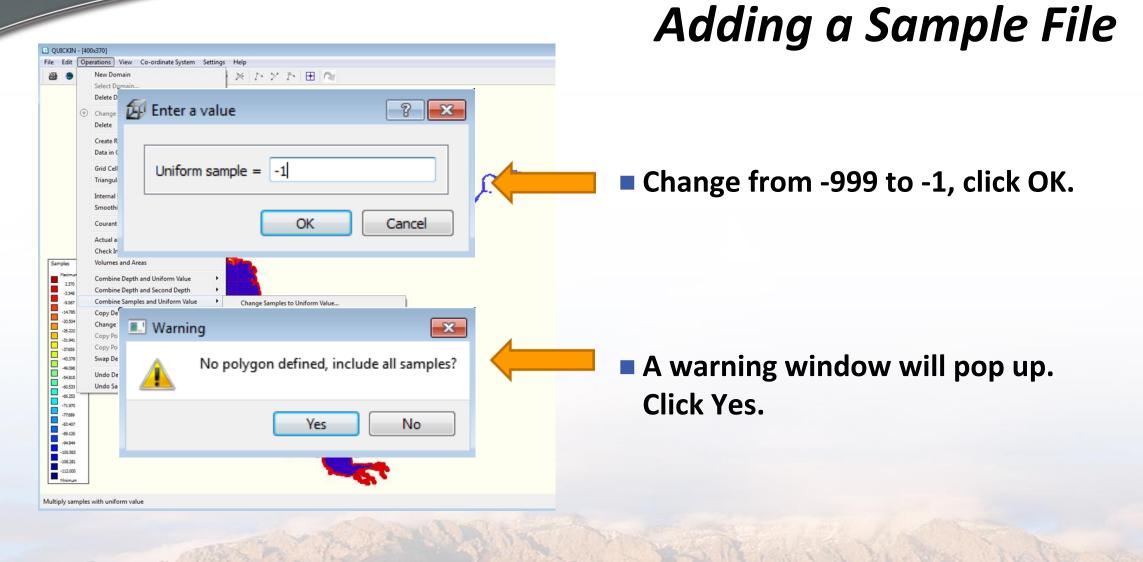
Adding a Sample File

- Flip the signs of the sample values
- Select Operations → Combine Samples and Uniform Value → Multiply Samples with Uniform Value...

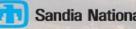
Multiply samples with uniform value

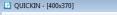




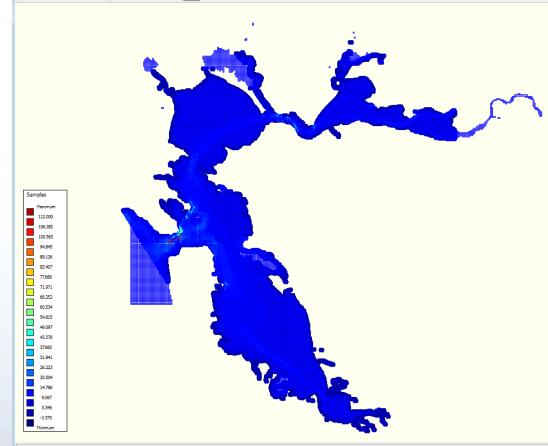








File Edit Operations View Co-ordinate System Settings Help 🗃 ● 🖸 💥 🖉 🕀 🕕 Co 🐼 🗐 🗗 🎢 🏠 🏠



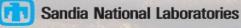
QUICKIN

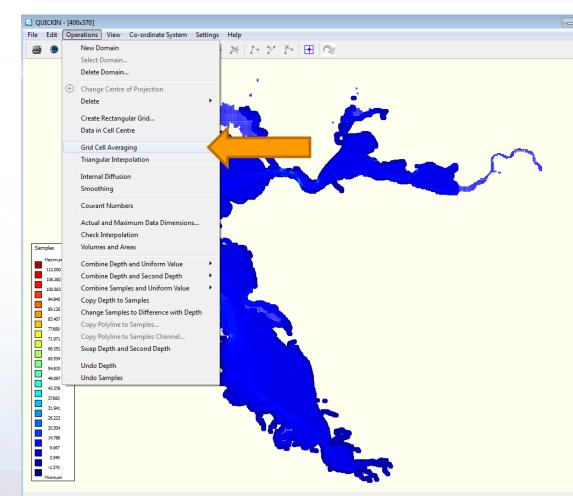
This is the result.

Notice the difference in the sample values from before.

Choose menu option | | X,Y: 557288.694, 4209841.868 | Cartesian | |







Grid Cell Averaging

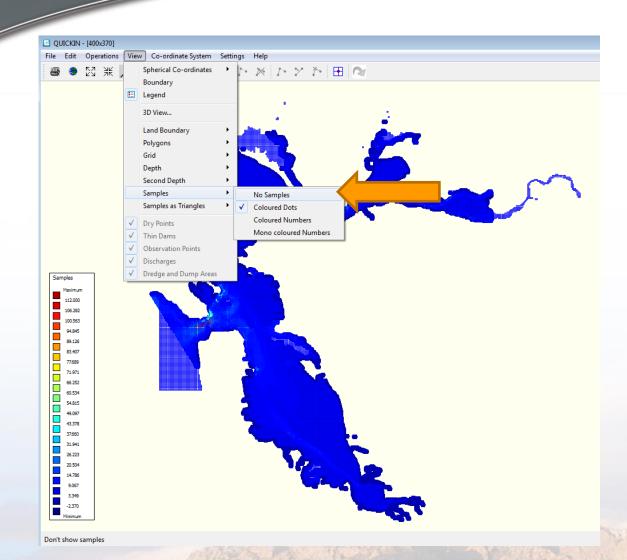
■ Select Operations → Grid Cell Averaging

This will interpolate the samples on to the grid.



Calculate depth using grid cell averaging





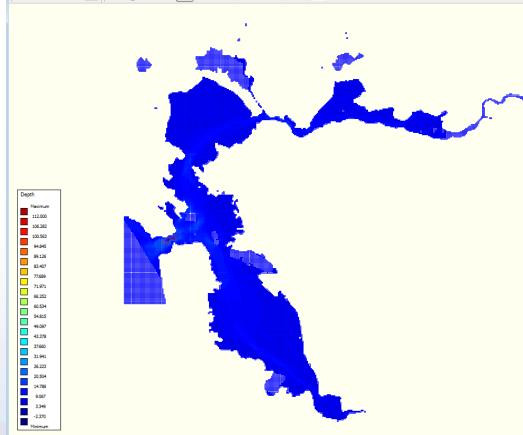
Sample Removal

Select View \rightarrow Samples \rightarrow No **Samples**



🛃 QUICKIN - [400x370]

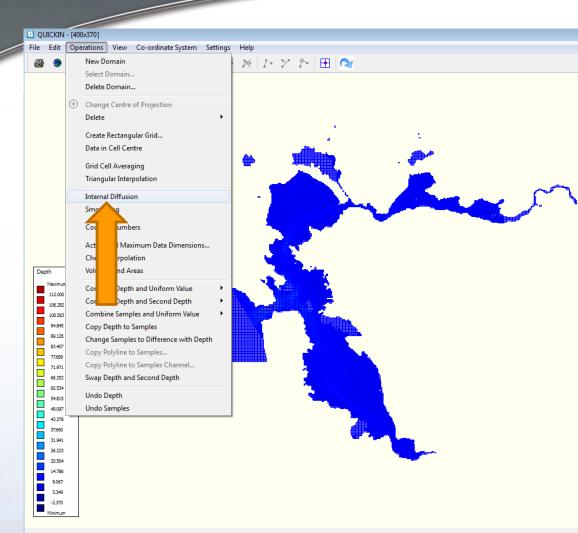
| X,Y: 554911.750, 4140910.507 | Cartesian | |



Sample Removal

The removal of the contour indicates that the interpolation was successful.

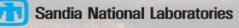
đ



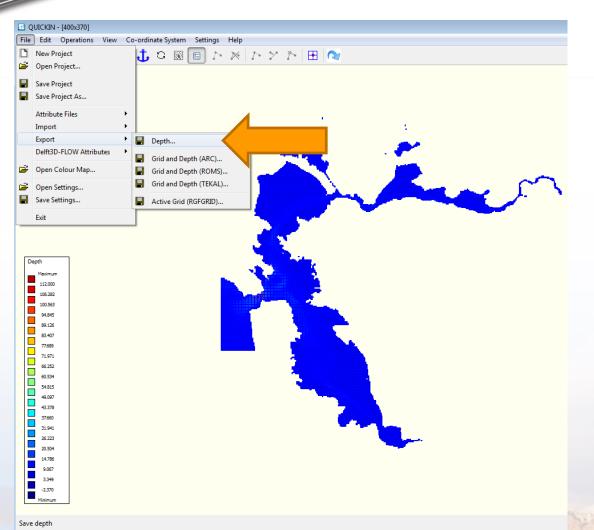
- Select Operations → Internal Diffusion
- This will extrapolate the depths to the remaining unpopulated cells.

Apply internal diffusion on depth





QUICKIN



■ Select File \rightarrow Export \rightarrow Depth

- Save as sfbay.dep
- This depth file will be used in the Flow setup.



Flow

🔯 Delft3D VERSION_NUMBER	- [/GUI-download/delft3d/win32]
Information	Information and version numbers
Grid	Grid and bathymetry
Flow	Hydrodynamics (includie
Wave	Waves (standalone)
Water Quality	Far-field water quality
Utilities	Delft3D Utilities
Exit	Exit Delft3D menu
	Select working directory

Bracksh

Return to the main Delft 3D menu.

Select Flow



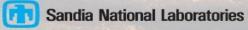


🔄 Hydrodynamics (including morphology) - [/delft3d/win32]		
Flow input	Create or edit FLOW input file (incl. morphology)	
Wave input	Create or edit WAVE input file	
Start	Start FLOW simulation (incl. waves/coupling; single domain)	
Start DD	Start FLOW simulation (incl. waves/coupling; multiple domains)	
RemoteOLV	Remote online visualisation	
QUICKPLOT	Postprocessing with QUICKPLOT	
Reports	View report files	
Batch	Prepare and start FLOW batch job	
Tools	Additional tools	
Return	Return to Delft3D menu	
	Select working directory	

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Select Working Directory





Flow

🔯 Select working directory						×
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🔆 Favorites	Name	Date modified	Туре	ize		
💻 Desktop 🚺 Downloads 🗐 Recent Places	퉬 sfbay	6/18/2015 2:03 PM	File folder			
 ➢ Libraries i Documents J Music ➢ Pictures i Subversion i Videos 						
惧 Computer 🚢 Local Disk (C:)						
🗣 Network						
Folde	r: sfbay					
				Select Folder	Cancel	

Choose the folder currently being worked in.







🔯 Hydrodynamics (including morphology) - [/delft3d/win32]		
Flow input	Create or edit FLOW input file (incl. morphology)	
Wave input	Create or edit WAVE input file	
Start	Start FLOW simulation (incl. waves/coupling; single domain)	
Start DD	Start FLOW simulation (incl. waves/coupling; multiple domains)	
RemoteOLV	Remote online visualisation	
QUICKPLOT	Postprocessing with QUICKPLOT	
Reports	View report files	
Batch	Prepare and start FLOW batch job	
Tools	Additional tools	
Return	Return to Delft3D menu	
	Select working directory	

Return to the main menu and select Flow Input





Description	Enter a number of descriptive text lines (Max. 10)	
Domain		
Time frame		
Processes		
Initial conditions		
Boundaries		
Physical parameters		
Numerical parameters		
Operations		
Monitoring		
Additional parameters		
Output		
		Descrip

■ Select File \rightarrow New





Delft3D-FLOW *	
le <u>T</u> able <u>V</u> iew <u>H</u> elp	
Description	Enter a number of descriptive text lines (Max. 10)
Domain	Delft Advanced Model
Time frame	
Processes	
Initial conditions	
Boundaries	
Physical parameters	
Numerical parameters	
Operations	
Monitoring	
Additional parameters	
Output	
	Descripti

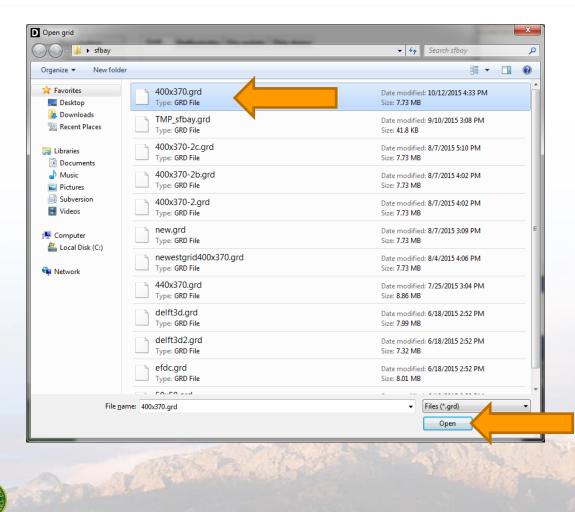
Under the Description tab, label your .mdf file.



le <u>T</u> able <u>V</u> iew <u>H</u> elp			
Description	Grid Bathymetry Dry	points Thin dams	
Domain			
Time frame	Open grid		
	Open grid enclosu	re Filename unknown	
Processes	Open gria enciosu	re month and a share a sha	
Initial conditions	Co-ordinate system:		
Boundaries	Grid points in M-direc		
Physical parameters	Grid points in N-direc		
Numerical parameters	Latitude:	0 [dec. deg]	
Operations	Orientation:	0 [dec. deg]	
	Number of layers:	1	
Monitoring			
Additional parameters			
Output			

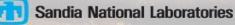
■ Under Domain → Grid, select Open Grid





Select 400x370.grd



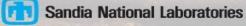


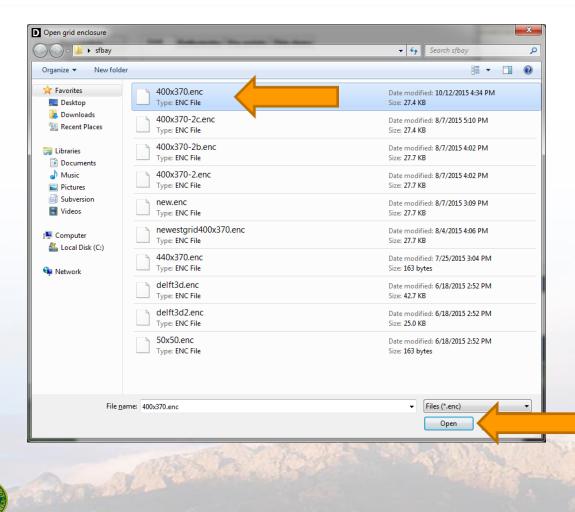


Delfi3D-FLOW* File Table View Help Description Domain Time frame Processes Initial conditions Boundaries Physical parameters Numerical parameters Operations	irid Bathymetry Dry point Open grid Open grid enclosure Co-ordinate system: Grid points in M-direction: Grid points in N-direction: Latitude: Orientation: Number of layers:	Thin dams File\Desktop\sfbay\400x370.grd Cartesian 400 359 0 [dec. deg] 0 [dec. deg] 1	X
Output			Domain

Select Open grid enclosure







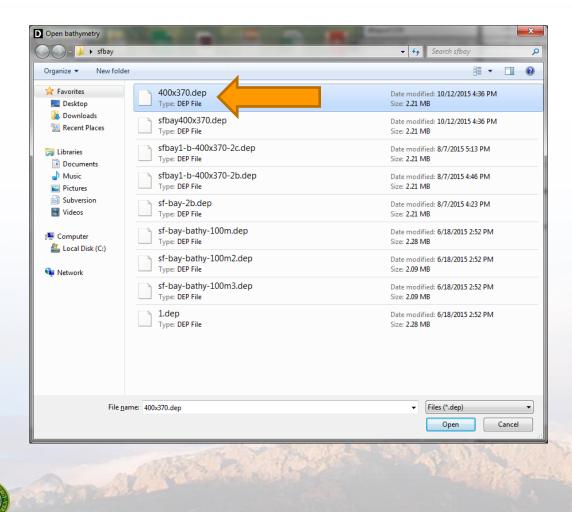
Select 400X370.enc



Description	Grid Bathymetry D
Domain	
Time frame	Uniform Depth: 10 [m] below reference level
Processes	
Initial conditions	File Open
Boundaries	Values specified at: O Grid cell centres
Physical parameters	Grid cell corners
Numerical parameters	Cell centre values computed using: Max
Operations	
Monitoring	
Additional parameters	
Output	
ουφαί	
L	
	Domain - Bathyme

Select Bathymetry and then Select Open





Select the 400x370.dep depth file





elft3D-FLOW *		
Table View Help		
Description	Time frame	
Domain	Reference date	17 12 2015 [dd mm yyyy]
Time frame	Simulation start time	17 12 2015 00 00 00 [dd mm yyyy hh mm ss]
Processes Initial conditions	Simulation stop time	19 12 2015 00 00 00 [dd mm yyyy hh mm ss]
Boundaries	Time step	1.0 [min]
hysical parameters	Local time zone (LTZ)	0 +GMT
umerical parameters Operations	GMT = Local time - LTZ	
Monitoring		
lditional parameters		
Output		
		Time frame

 Under Time frame, fill in the Reference date, Simulation start time, Simulation stop time, and Time step.

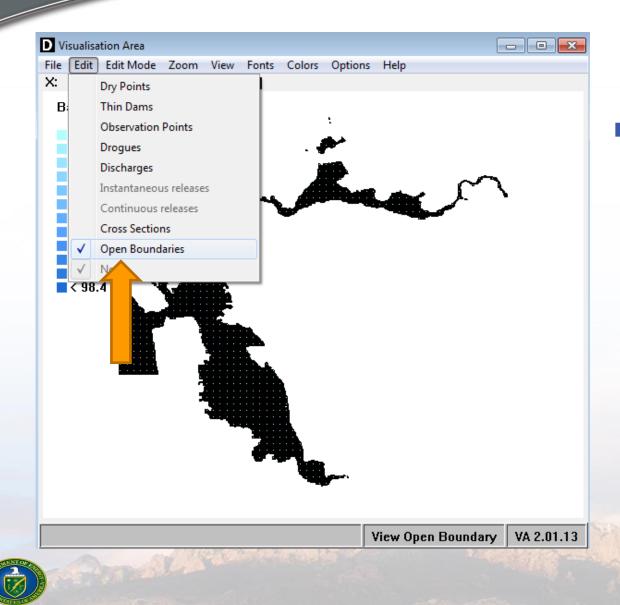


D Delft3D-FLOW *	
<u>File</u> Table <u>V</u> iew	
Description	Boundaries
Domain	Add Open
Time frame	Delete
Processes	Section name
Initial conditions	
Boundaries	- M1 N1
Physical parameters	M2 N2
Numerical parameters	Flow conditions
Operations	Type of open boundary (quantity) : Water level Reflection parameter alpha:
Monitoring	Forcing type:
Additional parameters	
Output	Edit flow conditions

 Select the Boundaries Tab
 Then, select View → Visualization Area

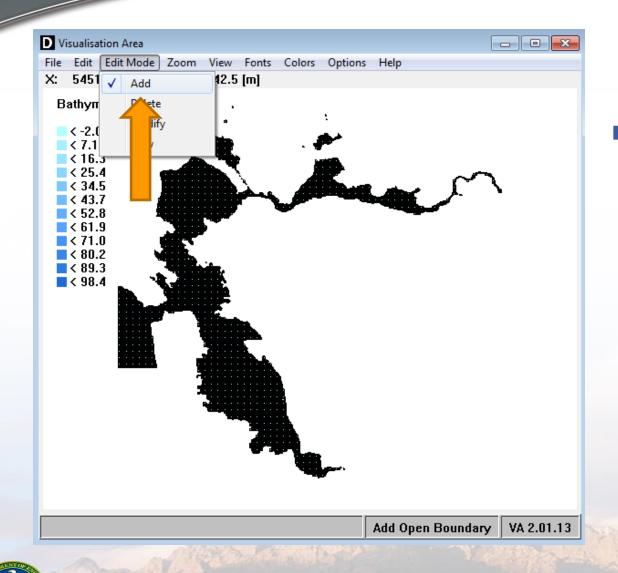






■ Select Edit → Open Boundaries

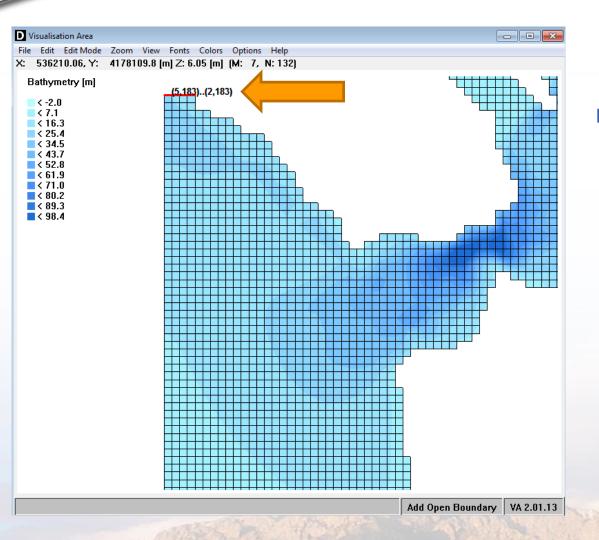




■ Select Edit Mode → Add

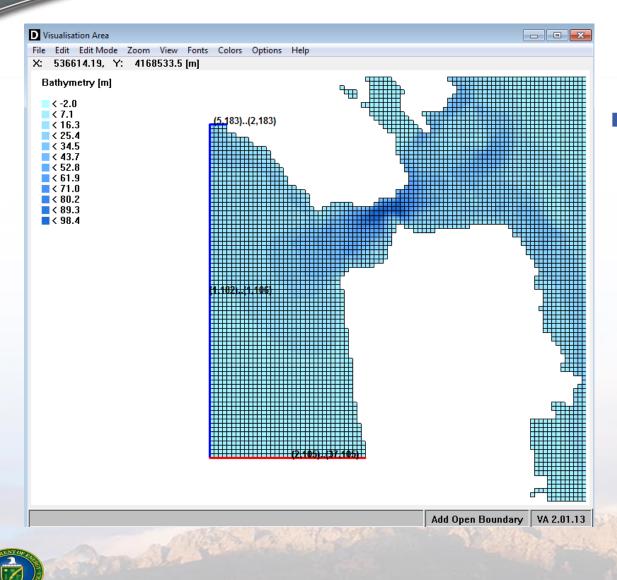


Using the mouse, drag and add boundaries along the edge of the grid.



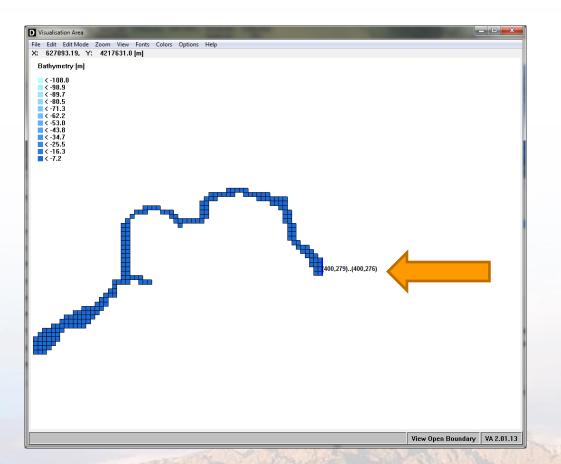






The left side should look like this.





- The boundary on the far right side of the bay (river inlet) could be added to allow for the input of river data.
- For the purposes of this tutorial, this will not be necessary.

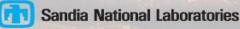


Labeling Boundaries

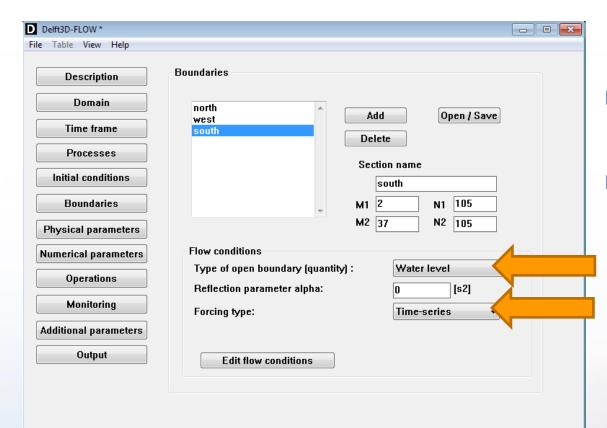
Rename the newly created boundaries to north, west, and south depending on the boundary's location on the grid.

D Delft3D-FLOW *	D Delft3D-FLOW*
File Table View Help	File Table View Help
Additional parameters Edit flow conditions	Monitoring Forcing type: Additional parameters Astronomic Output Edit flow conditions





Editing Boundaries



- Change the Forcing type for all boundaries
- Forcing Type → Time Series





D Delft3D-FLOW *		- • •
File Table View Help		
Description Domain Time frame Processes Initial conditions Boundaries	Boundaries Add Open / Save South Delete Section name north M1 5 N1 183 M2 2 N2 183	
Physical parameters Numerical parameters Operations Monitoring Additional parameters Output	Flow conditions Type of open boundary (quantity) : Water level • Reflection parameter alpha: 0 [s2] Forcing type: Time-series • Edit flow conditions	

Edit flow conditions for all boundaries (north, west, south).



Boundaries



D Boundaries : Flow C	onditions	
Table		
Boundary: Quantity: Forcing type:	north Water level Time-series	

Time dd mm yyyy hh mm ss	Begin [m]	End [m]	
17 12 2015 00 00 00	-0.5	-0.5	^
17 12 2015 08 00 00	-1.5	-1.5	
17 12 2015 16 00 00	1	1	
18 12 2015 08 00 00	-0.5	-0.5	=
18 12 2015 16 00 00	1	1	-
19 12 2015 00 00 00	0	0	
	-		
			Ŧ

Close

- For each boundary, edit flow conditions by entering water level data.
- For our purposes, have the flow conditions match this table (entry for "dd" will change depending on your model). Or choose to import water level data from external sites.
- Add rows to table by selecting: Table → Insert row above.
- Note: Data could be added manually through the GUI or entered in your .bct file.

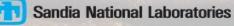


D Delft3D-FLOW *		- 0
File Table View Help		
Description Domain Time frame Processes Initial conditions Boundaries Physical parameters	Boundaries Add Open / Save South Delete Section name north M1 5 N1 183 M2 2 N2 183	
Numerical parameters Operations	Flow conditions Type of open boundary (quantity) : Water level - Reflection parameter alpha: 0 [s2]	
Monitoring	Forcing type:	
Additional parameters Output	Edit flow conditions	

Click on Open/Save to save the Boundary definitions and Timeseries flow conditions

Boundaries





en/Save Bounda	aries					
Boundary def	initions	3	L		_	
Open		Save				
Filename:	Filenar	ne unknown				
Astronomical	flow co	nditions				
Open		Save]			
Filename:	Filenar	ne unknown				
Astronomical	correct	ions				
Open		Save]			
Filename:	Filenar	ne unknown				
Harmonic flow	v condi	tions				
Open		Save]			
Filename:	Filenar	ne unknown				
QH-relation fl	ow con	ditions				
Open		Save]			
Filename:	Filenar	ne unknown				
lime-series f	low cor	ditions				
Open		Select file		Save		
Filename:	Filenar	ne unknown			_	
Fransport con	ditions	;				
Open		Select file		Save		
Filename:					_	

Close

- Save Boundary definition as bnds.bnd
- Save Time-series flow conditions as boundaries.bct

You have now created a .bnd and a .bct file.



Physical Parameters

ile <u>T</u> able <u>V</u> iew <u>H</u> elp		-1.mdf *	
Description	Constants Roughness	Viscosity	
Domain	Hydrodynamic consta		
Time frame	Gravity	9.81 [m/s2]	
Processes	Water density	1000 [kg/m3]	
Initial conditions			
Boundaries			
Physical parameters			
Numerical parameters			
Operations			
Monitoring			
Additional parameters			
Output			
	100		

■ Then under Physical parameters → Constants , add the gravity and water density





Physical Parameters

Description	Constants Roughness
Domain	Bottom roughness
Time frame	Roughness formula: Chezy
Processes	◎ Uniform U: 65 V: 65
Initial conditions	© File Select file
Boundaries	File: Filename unknown
Physical parameters	
Numerical parameters	Well surplus as
Operations	Wall roughness Slip condition: Free
Monitoring	
Additional parameters	Roughness length: 0 [m]
Output	
σαφαί	

Under the Roughness tab, use the Chezy Roughness Formula with Uniform U and V





Physical Parameters

Description	Constants Roughness Viscosity	
Domain	Background horizontal viscosity/diffusivity	
	 Uniform Horizontal eddy viscosity 1 	
Processes		
Initial conditions	© File Select file	
Boundaries	File: Filename unknown	
ysical parameters	Model for 2D turbulence	
merical parameters	Subgrid scale HLES Edit	
Operations		
Monitoring		
ditional parameters		
Output		

Under Viscosity, select Uniform Horizontal Eddy Viscosity





Numerical Parameters

Description	Numerical parameters	
Domain	Drying and flooding check at:	I Grid cell centres and faces
Time frame		Grid cell faces only
Processes	Depth at grid cell faces:	Mean 🔹
Initial conditions	Threshold depth:	0.1 [m]
Boundaries	Marginal depth:	-999 [m]
hysical parameters	Smoothing time:	60 [min]
umerical parameters	for momentum: Threshold depth for critical flow limiter	Cyclic
Monitoring	•	
lditional parameters		
Output		

Under Numerical Parameters, match these values.





Monitoring

	ntha_Simpson\Desktop\sfbay\sfbay-1.mdf *
<u>File T</u> able <u>V</u> iew <u>H</u> elp	
Description	Observations
Domain	
Time frame	(36,139) Add
Processes	(29,147) (28,156) Delete (44,126)
Initial conditions	(22,164) (55,112) Open
Boundaries	(18,168) (398,279) Save
Physical parameters	 File :\Desktop\sfbay\observationpts2.obs
Numerical parameters	
Operations	Name (36,139) M 36 N 139
Monitoring	
Additional parameters	
Output	
	·····
	U 🕹 📐 🗐 🔕 🖉

Using the visualization area, select observation points and save.

Or open file of pre-selected observation points.





Output

Description	Storage Print D	etails		
Domain				
Time frame	FLOW simulation	on times Start time: Stop time:		15 00 00 00 15 00 00 00
Processes		Time Step [mi	n]: 1.0	
Initial conditions	Store map resu	lts dd mm yyyy hh mm ss	Store	communication file : dd mm yyyy hh mm s
Boundaries	Start time	17 12 2015 00 00 00	Start time	17 12 2015 00 00 00
Physical parameters	Stop time	19 12 2015 00 00 00	Stop time	19 12 2015 00 00 00
Numerical parameters	Interval	10.0 [min]	Interval	0.0 [min]
Operations				
Monitoring	History interval	30 [min]	Restart int.	144.0 [min]
Additional parameters	🔲 Fourier analy	vsis	0 🗆	nline visualisation
Output			E	×port WAQ input
	File : Filename	: unknown		Edit WAQ input >>

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• Under the Output \rightarrow Storage tab:



D Delft3D-FLOW *

File Table View Help



Output

- - -

Output

Description	Storage Print	D		
Domain				
	FLOW sime	ulation times	Start time:	17 12 2015 00 00 00
Time frame			Stop time:	19 12 2015 00 00 00
Processes			Time step [min]:	1.0
Initial conditions	Print histor	y results:		Print map results:
Boundaries		dd mm yyyy h	nh mm ss	dd mm yyyy hh mm ss
	Start time	17 12 2015 0	D 00 00	*
Physical parameters	Stop time	19 12 2015 0	D 00 00	
Numerical parameters	Interval	1 [mi	n]	
Operations				
Monitoring				τ
Additional parameters				Add Delete
-				dd mm yyyy hh mm ss
Output				
				Ou





😧 Hydrodynamics (including morphology) - [/Desktop/sfbay]	
Flow input	Create or edit FLOW input file (incl. morphology)
Wave input	Create or edit WAVE input file
Start	(incl. waves/coupling; single domain)
Start DD	Start FLOW simulation (incl. waves/coupling; multiple domains)
RemoteOLV	Remote online visualisation
QUICKPLOT	Postprocessing with QUICKPLOT
Reports	View report files
Batch	Prepare and start FLOW batch job
Tools	Additional tools
Return	Return to Delft3D menu
	Select working directory

- After saving the .mdf file, return to the main FLOW menu.
- Select start. And choose your .mdf file.
- Expected run time: ~7 minutes



