



Engineer Research and
Development Center

Overview of GenCade in SMS 11.1

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GenCade Webinar

16-18 October 2012



**US Army Corps
of Engineers®**



Overview of Presentation

- Introduction to GenCade in the SMS
 - Conceptual model
 - Set up shorelines, waves, and structures in real-world coordinates
 - GenCade model
 - All features are referenced to grid cell numbers
 - GenCade input files are created
 - Set up model control
 - Run GenCade
 - View results

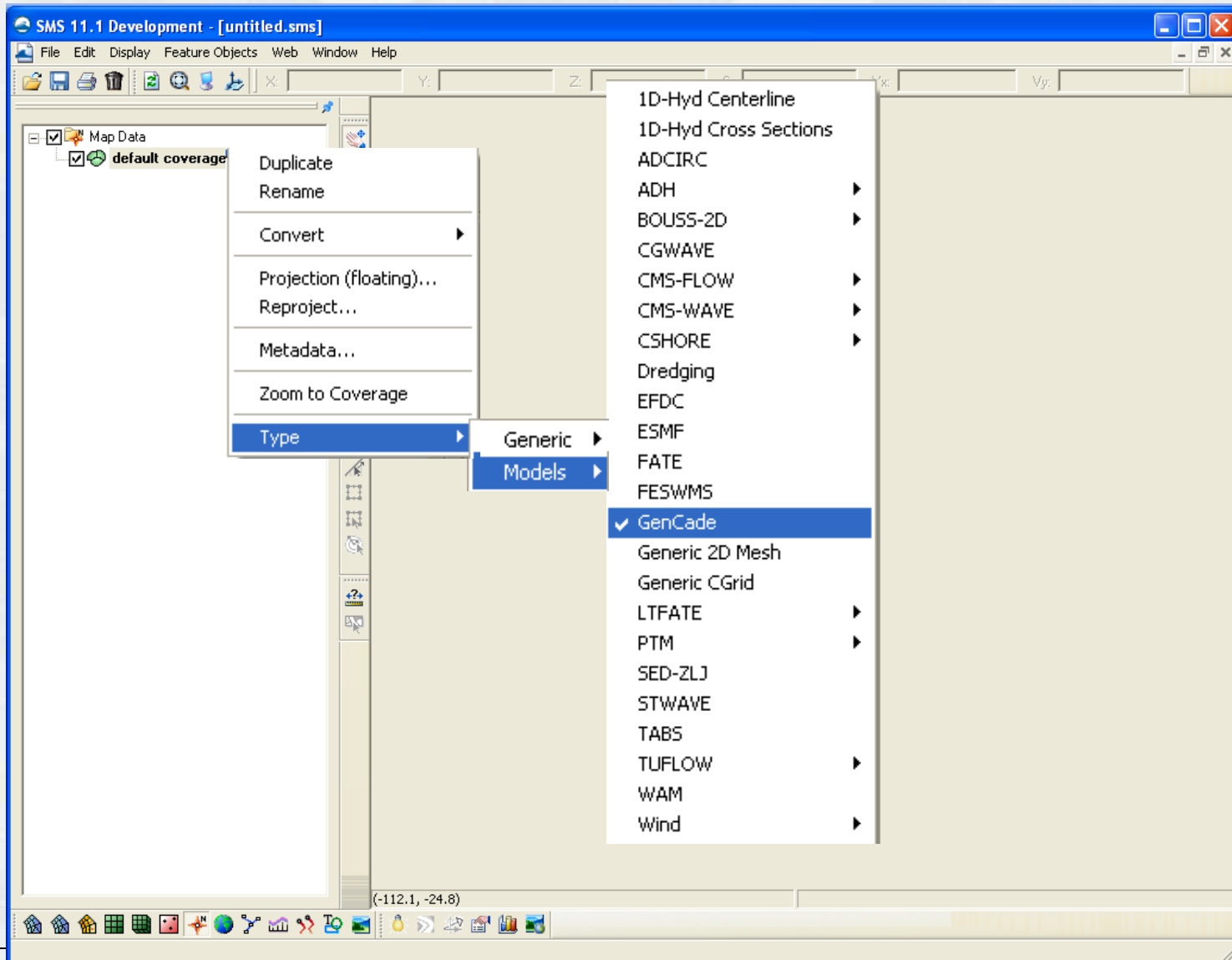


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Define as GenCade



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Location of Executable

The screenshot shows the 'SMS Preferences' dialog box with the 'File Locations' tab selected. The 'Model Executables' table is as follows:

Model	Executable
CGWAVE - Trans	BROWSE
CMS-FLOW 3D	BROWSE
CSHORE	BROWSE
Dredge Source	BROWSE
GenCode	C:\Program Files\SMS 10.1\models\GenCode_v1r1.exe
EFDC	C:\Program Files\SMS 10.1\models\GenCode_v1_07...
Make Placement	BROWSE
MPFATE	BROWSE
STFATE	c:\documents and settings\u4hncaf9\desktop\sms11...

The 'Other Files' table is as follows:

File	Location
LATLON conversion files	BROWSE
LeProvost tidal database	BROWSE
North Arrows Path	c:\documents and settings\u4hncaf9\desktop\sms 11...
TUFLOW Simulations Lo...	C:\Documents and Settings\All Users\Documents



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Define Projection

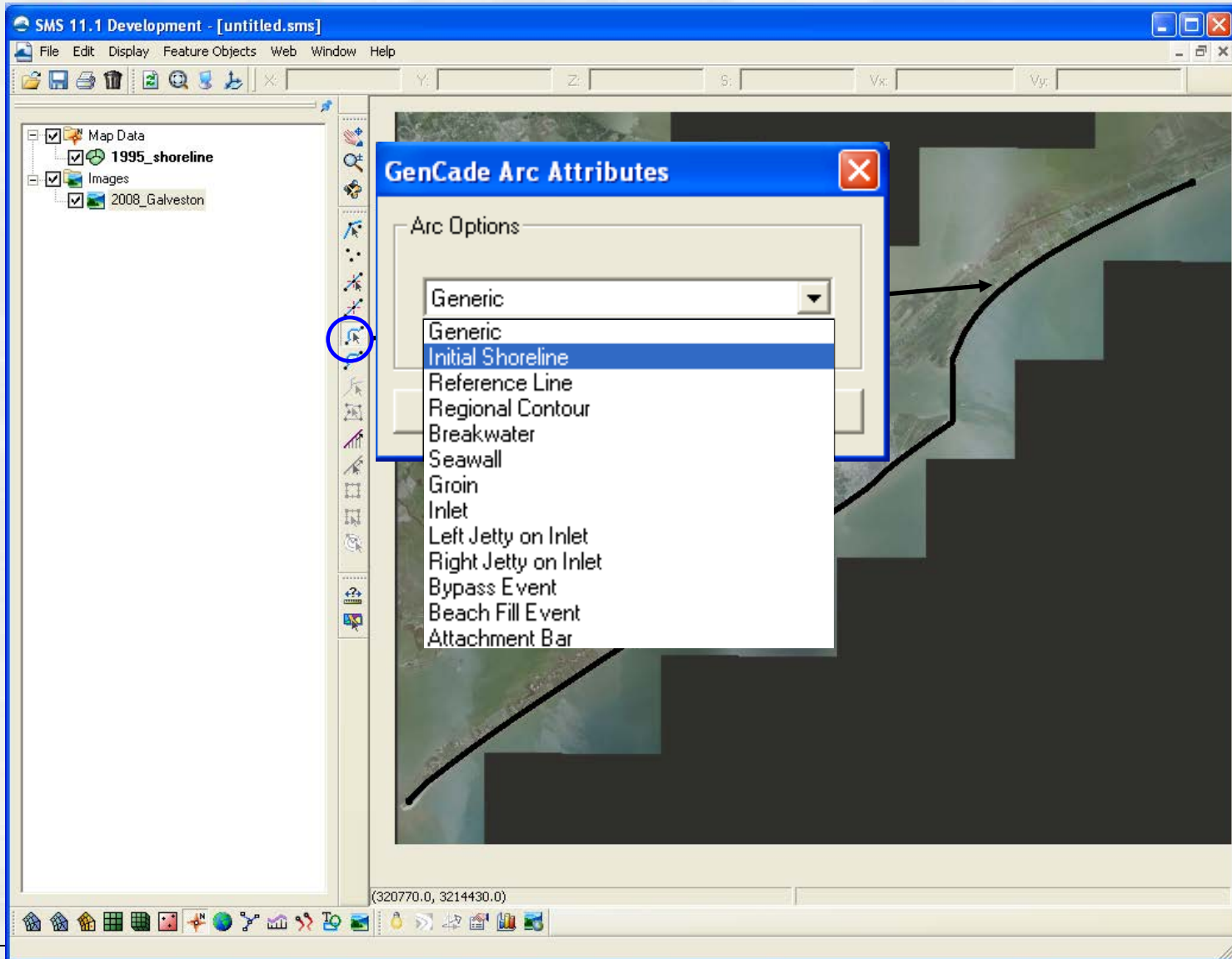
The screenshot displays the 'Current Projection' dialog box in the SMS 11.1 Development software. The 'Horizontal' section has 'Local projection' selected. The 'Units' are set to 'U.S. Survey Feet'. The 'Current projection' is 'Not Set'. The 'Vertical' section has 'Projection' set to 'Local' and 'Units' set to 'U.S. Survey Feet'. The 'Select Projection' dialog box is open, showing the following settings:

- Projection: UTM
- Zone: 15 (96°W - 90°W - Northern Hemisphere)
- Datum: NAD83
- Planar Units: METERS

Attribute	Value
CENTRAL MERIDIAN SCALE FACT...	0.999600000
CENTRAL MERIDIAN	-93.00000000
ORIGIN LATITUDE	0.00000000
FALSE EASTING (m)	500000
FALSE NORTHING (m)	0



Define Initial Shoreline

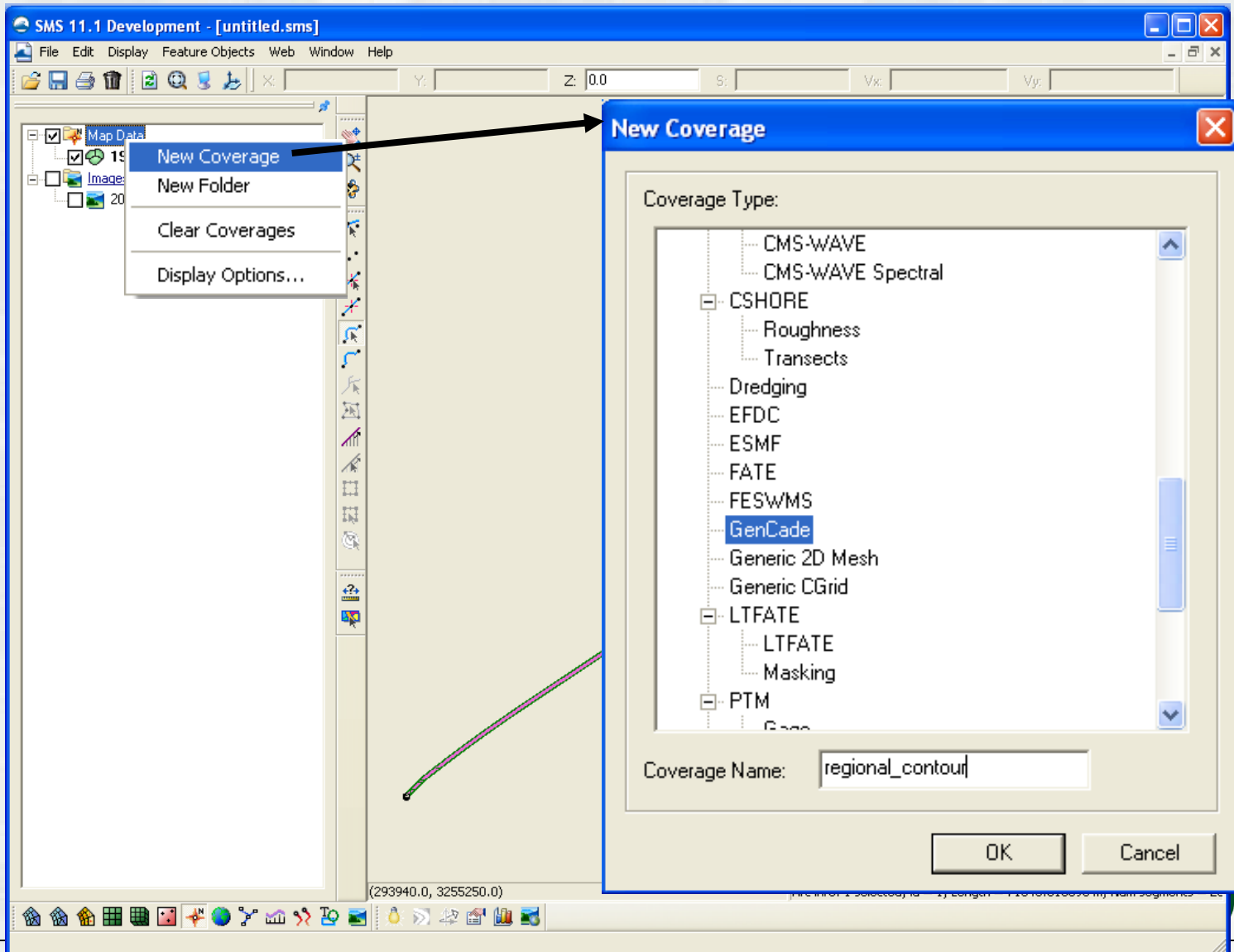


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Add New Coverage

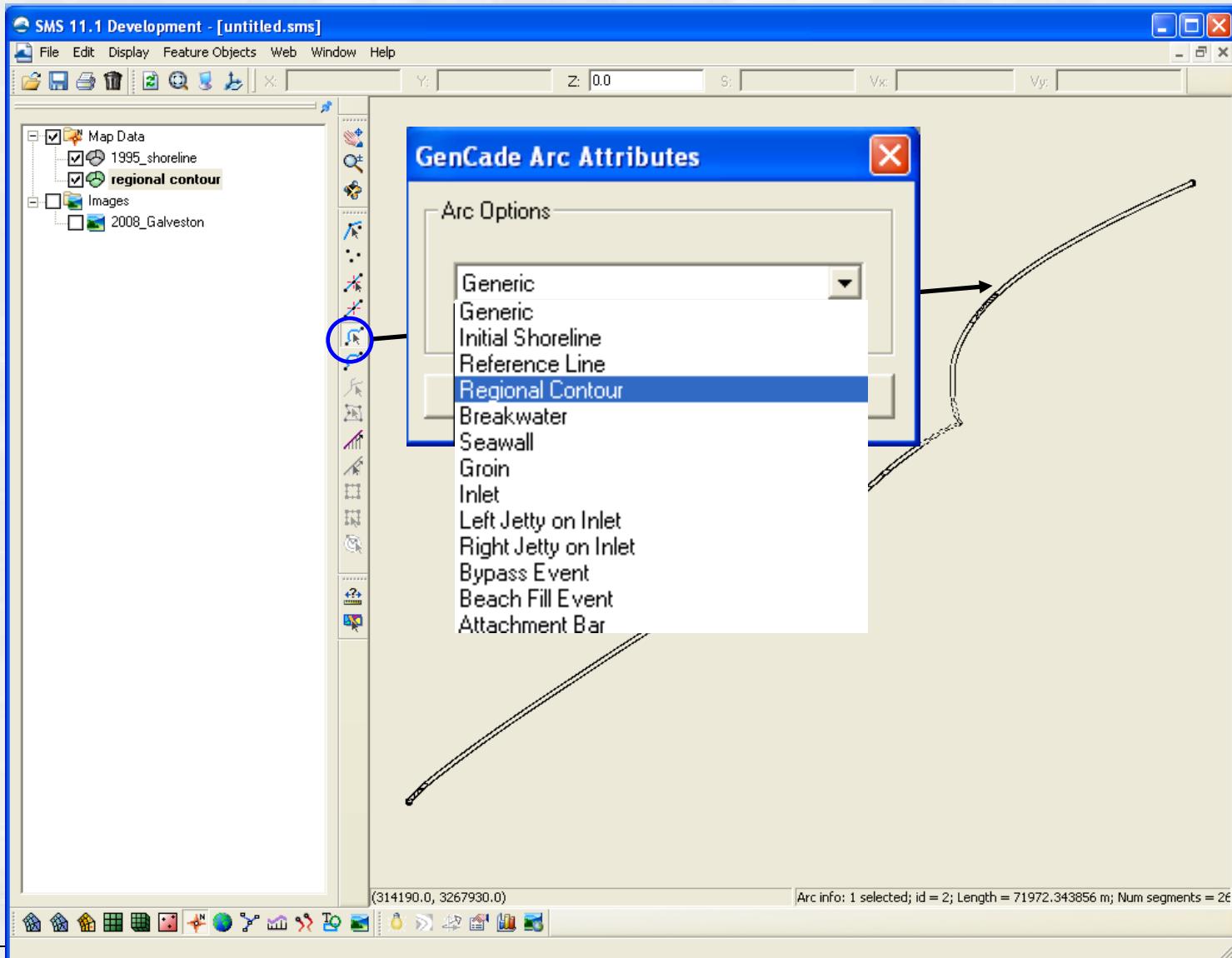


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Define Regional Contour

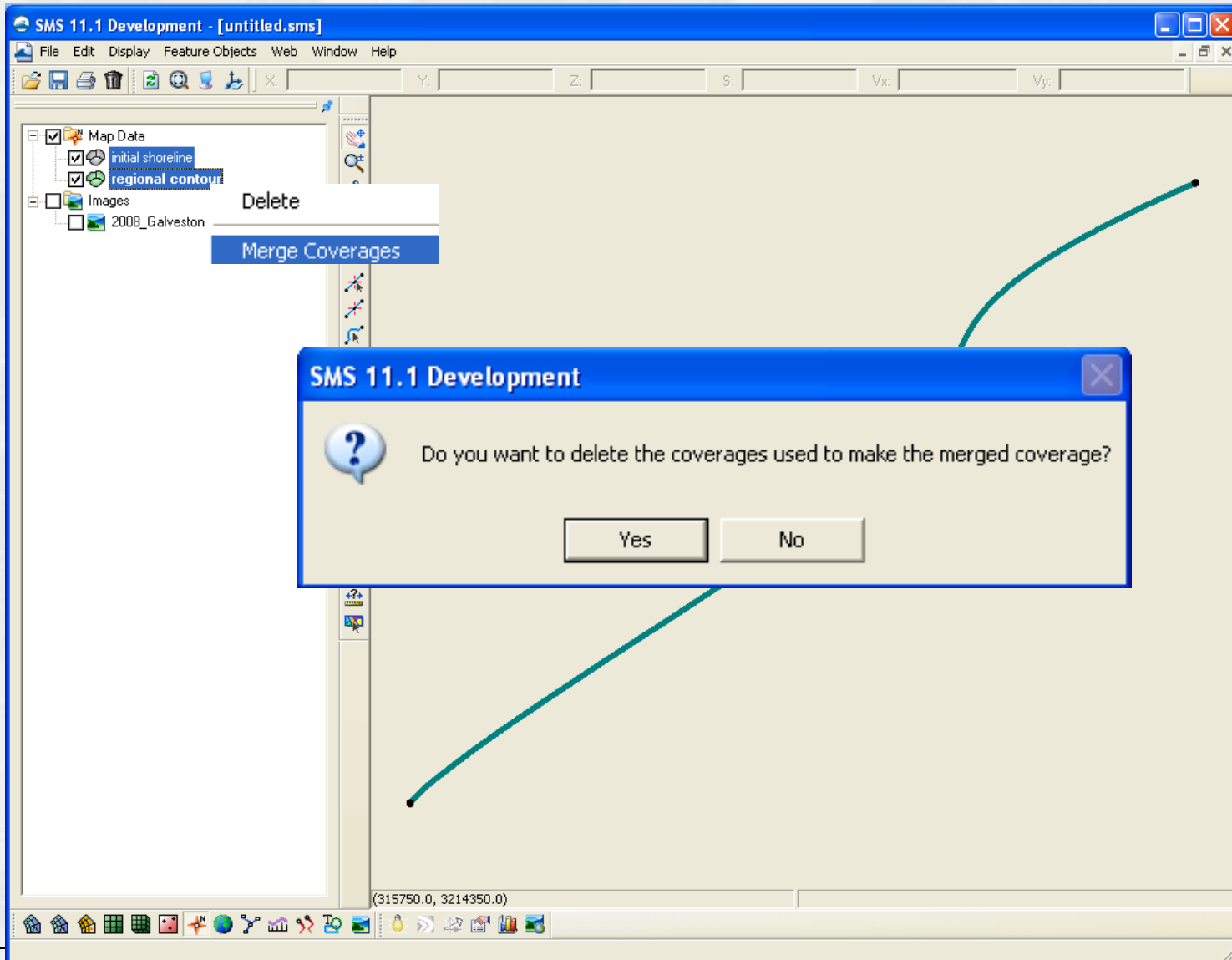


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Merge Coverages

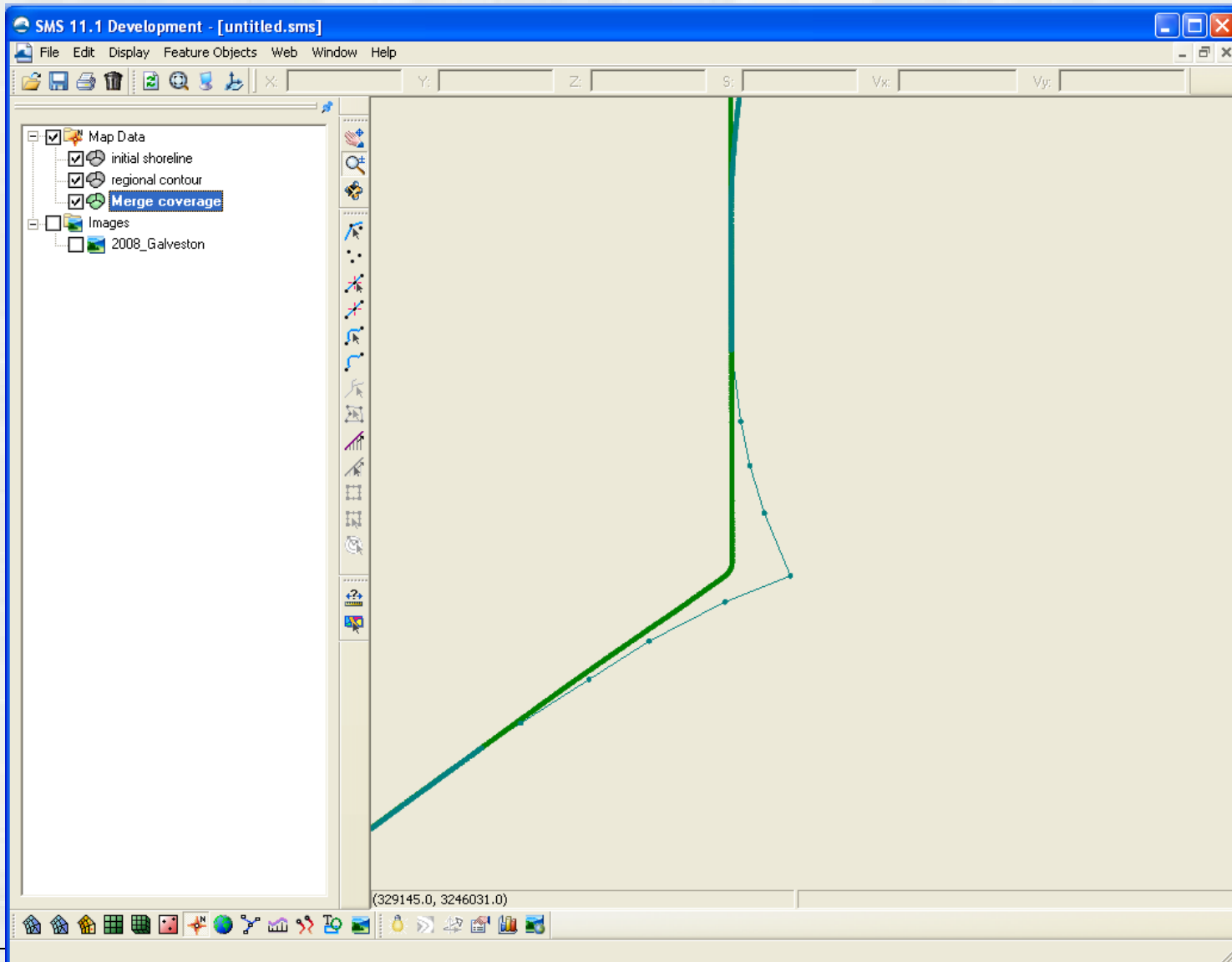


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Merged Coverages



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Convert to New Projection

The screenshot shows the 'Reproject Object' dialog box in the SMS 11.1 Development software. The dialog is used to convert a map object from its current projection to a new one. The current projection is UTM, NAD83, Meters, ZONE = 15.0. The new projection is State Plane Coordinate System (NAD83), NAD83. The dialog includes sections for Horizontal and Vertical projections and units, with 'Set Projection' buttons for each. A 'Help...' button is also present.

Reproject Object

Set

Horizontal

Local projection

Units: []

Global projection

[Set Projection]

Current projection: UTM, NAD83, Meters, ZONE = 15.0

Vertical

Projection: [Local]

Units: [Meters]

[Help...]

New projection

Local projection

Units: []

Global projection

[Set Projection]

Current projection: State Plane Coordinate System (NAD83), NAD83

Vertical

Projection: [Local]

Units: [U.S. Survey Feet]

[OK] [Cancel]



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Convert to New Projection

Current Projection

Horizontal

Local projection

Units: []

Global projection

Set Projection

Current projection: UTM, NAD83, Meters, ZONE = 15.0

Vertical

Projection: Local

Units: Meters

Help... OK Cancel

Select Projection

Projection: [State Plane Coordinate System] Load From File... Save To File... Init From EPSG...

Zone: Texas South Central (FIPS 4204)

Datum: NAD83 Add Datum...

Planar Units: FEET (U.S. SURVEY)

Parameters:

Attribute	Value
STATE PLANE SCALE FACTOR	1
EXTRA FALSE EASTING (m)	0
EXTRA FALSE NORTHING (m)	0
EXTRA SCALE CENTER EASTIN...	0
EXTRA SCALE CENTER NORTHI...	0
FIRST STANDARD PARALLEL	28.38333333
SECOND STANDARD PARALLEL	30.28333333

OK Cancel

(328122.0, 3247391.0)

Check or switch the current coordinates.



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Inlets

	Initial	Equilibrium
Ebb	5000000.0	5000000.0
Flood	1000000.0	1000000.0
Left Bypass	1000000.0	1000000.0
Left Attachment	500000.0	500000.0
Right Bypass	1000000.0	1000000.0
Right Attachment	500000.0	500000.0

	Name of Inlet	Cell	[yd ³]	Control	Manage	Left Bypass Coef	Right Bypass Coef
1	Galveston	Position...	Volume...	Jetties...	Dredging...	1.0	1.0

	Begin Date	End Date	Shoal to Be Mined	Volume (yd ³)
1	01-Jan-1996	01-Mar-1996	Ebb	1000000.0
2	25-Sep-2012	25-Sep-2012		



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Jetties

The screenshot shows the SMS 11.1 Development interface. The main map displays a coastal area with several blue lines representing jetties. Two dialog boxes are open:

- GenCode Arc Attributes**: A dialog box with a dropdown menu set to "Left Jetty on Inlet" and an "Attributes..." button.
- Groins**: A table with the following data:

	Cell Index	Length (ft)	Permeability	Diffracting	Seaward Depth (ft)
1	0	0.0	0.5	<input checked="" type="checkbox"/>	25.0

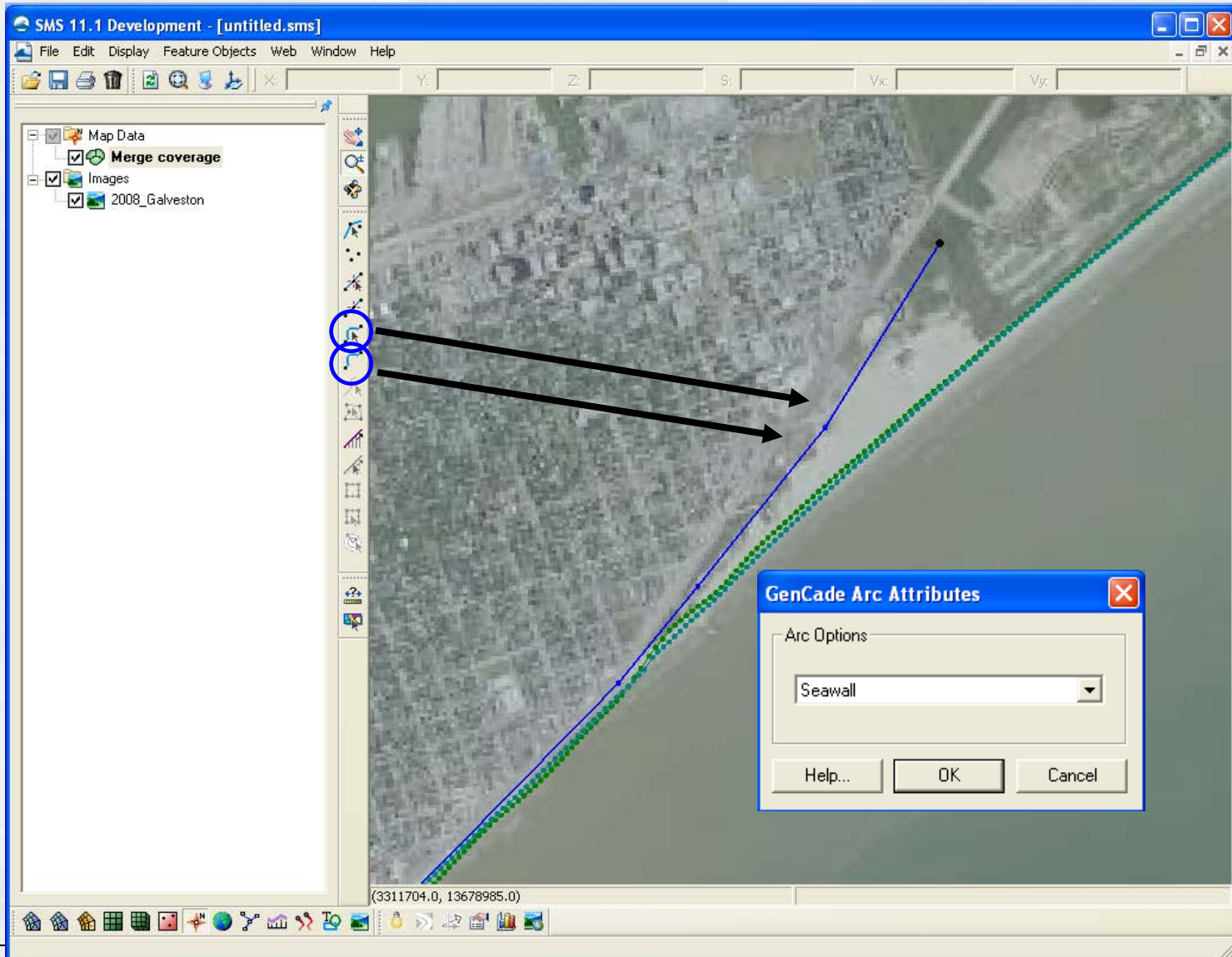


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Seawall



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Groins

The screenshot shows the SMS 11.1 Development software interface. The main window displays a map with a groin structure highlighted in blue. Two dialog boxes are open: 'GenCode Arc Attributes' and 'Groins'. The 'GenCode Arc Attributes' dialog has a dropdown menu set to 'Groin' and an 'Attributes...' button. The 'Groins' dialog is a table with the following data:

	Cell Index	Length (ft)	Permeability	Diffracting	Seaward Depth (ft)
1	0	0.0	0.1	<input checked="" type="checkbox"/>	8.0



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Beach Fill

The screenshot shows the SMS 11.1 Development software interface. The main map displays an aerial view of Galveston with a green line representing a beach fill. Two dialog boxes are overlaid on the map:

- Beach Fill**: A dialog box with a table containing the following data:

	Begin Date	End Date	Start Cell	End Cell	Added Berm Width (ft)
1	01-Jan-1995	01-Mar-1995	0	0	30.0
2	25-Sep-2012	25-Sep-2012	0	0	

- GenCode Arc Attributes**: A dialog box with the following options:

- Arc Options: Beach Fill Event
- Attributes...
- Help...
- OK
- Cancel

Arrows indicate the workflow: one arrow points from the 'Beach Fill' dialog to the 'Beach Fill' tool in the toolbar, another from the 'Beach Fill' dialog to the 'GenCode Arc Attributes' dialog, and a third from the 'GenCode Arc Attributes' dialog to the 'Beach Fill' tool.



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Detached Breakwater

The screenshot shows the SMS 11.1 Development software interface. The main window displays a map with a breakwater structure. Two dialog boxes are open:

- GenCade Arc Attributes:** This dialog box is titled "GenCade Arc Attributes" and contains an "Arc Options" section with a dropdown menu set to "Breakwater" and an "Attributes..." button. It also has "Help...", "OK", and "Cancel" buttons.
- Detached Breakwaters:** This dialog box is titled "Detached Breakwaters" and contains a table with the following data:

	Start Cell	Y1 (ft)	Depth 1 (ft)	End Cell	Y2 (ft)	Depth 2 (ft)	Transmission	Coeff/Perm/Atts
1	0	0.0	5.0	0	0.0	5.0	Ahren's	0.0

 A dropdown menu is open under the "Transmission" column, showing options: "Constant", "Ahren's", "Seabrook & Hall", and "d'Angremond".

Arrows indicate the flow of information: from the map to the "GenCade Arc Attributes" dialog, from the "GenCade Arc Attributes" dialog to the "Detached Breakwaters" dialog, and from the "Detached Breakwaters" dialog back to the map.

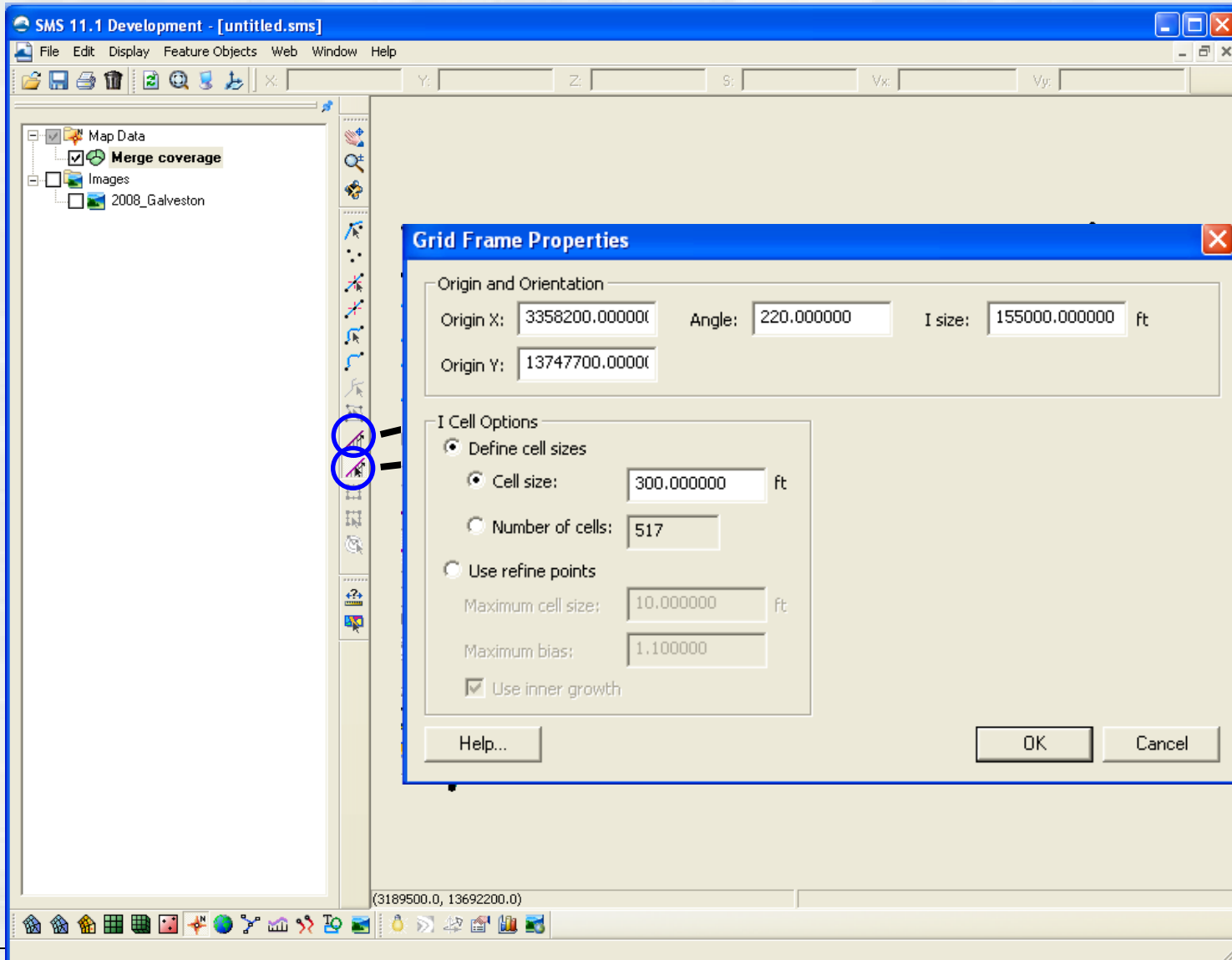


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Grid Setup



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Wave Gauges

The screenshot displays the SMS 11.1 Development software interface. The 'Refine Point' dialog box is open, showing the 'Wave gage' option checked. The 'Wave Gages' dialog box is also open, displaying a table with one row of data. The 'Wave Events' dialog box is open, showing a table of wave event data and a dropdown menu for 'Interpret Directions As'.

Refine Point Dialog:

- Attributes:
- Refine grid in I direction
- Base cell size: 1.0
- Wave gage
- Options...
- Help... OK Cancel

Wave Gages Dialog:

	Cell	Depth (ft)	Data..
1	258	50.0	

Wave Events Dialog:

	Date	H0 (m)	Period (sec)	Direction (deg)
1	01-Jan-1995 0:00	1.0	5.0	10.0
2	01-Jan-1995 1:00	1.0	5.0	10.0208
3	01-Jan-1995 2:00	1.0	5.0	10.0417
4	01-Jan-1995 3:00	1.0	5.0	10.0625
5	01-Jan-1995 4:00	1.0	5.0	10.0833
6	01-Jan-1995 5:00	1.0	5.0	10.1042
7	01-Jan-1995 6:00	1.0	5.0	10.125
8	01-Jan-1995 7:00	1.0	5.0	10.1458
9	01-Jan-1995 8:00	1.0	5.0	10.1667
10	01-Jan-1995 9:00	1.0	5.0	10.1875
11	01-Jan-1995 10:00	1.0	5.0	10.2083
12	01-Jan-1995 11:00	1.0	5.0	10.2292
13	01-Jan-1995 12:00	1.0	5.0	10.25
14	01-Jan-1995 13:00	1.0	5.0	10.2708
15	01-Jan-1995 14:00	1.0	5.0	10.2916
16	01-Jan-1995 15:00	1.0	5.0	10.3125
17	01-Jan-1995 16:00	1.0	5.0	10.3333
18	01-Jan-1995 17:00	1.0	5.0	10.3541
19	01-Jan-1995 18:00	1.0	5.0	10.375
20	01-Jan-1995 19:00	1.0	5.0	10.3958

Interpret Directions As:

Convention: Shore Normal

- Shore Normal
- Oceanographic
- Meteorologic
- Cartesian

Help... Import... OK Cancel

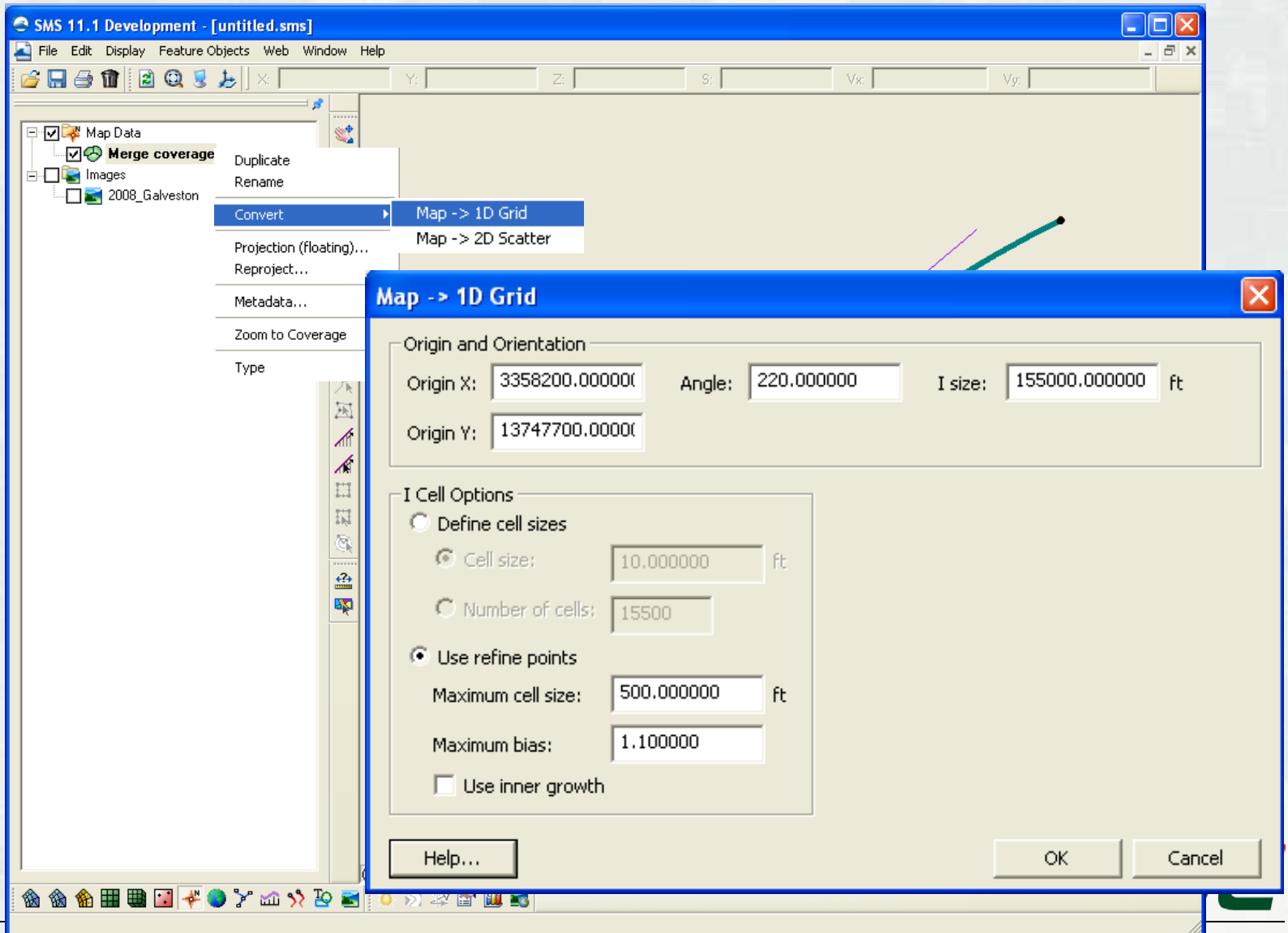


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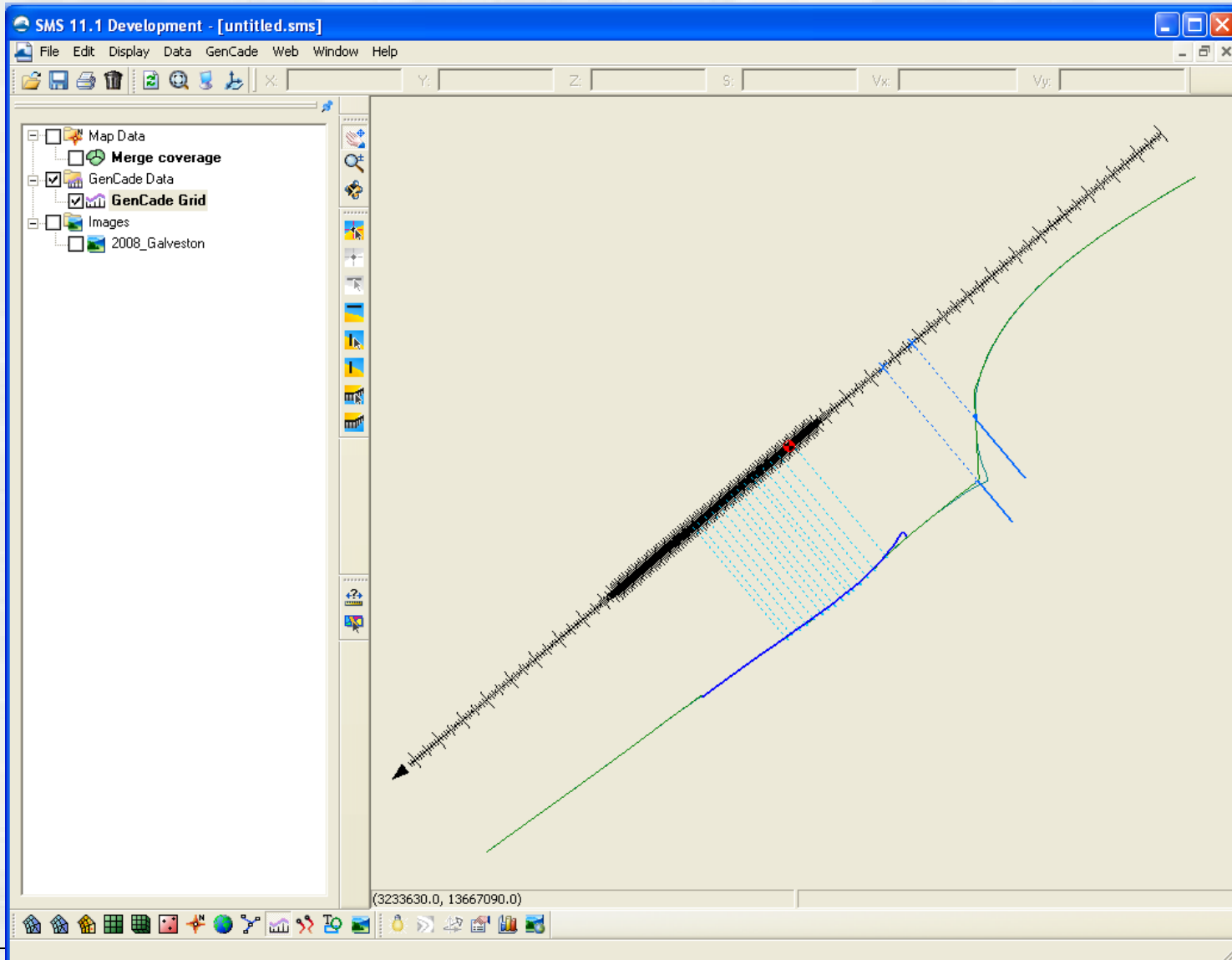


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Convert to 1D Grid



GenCade Model

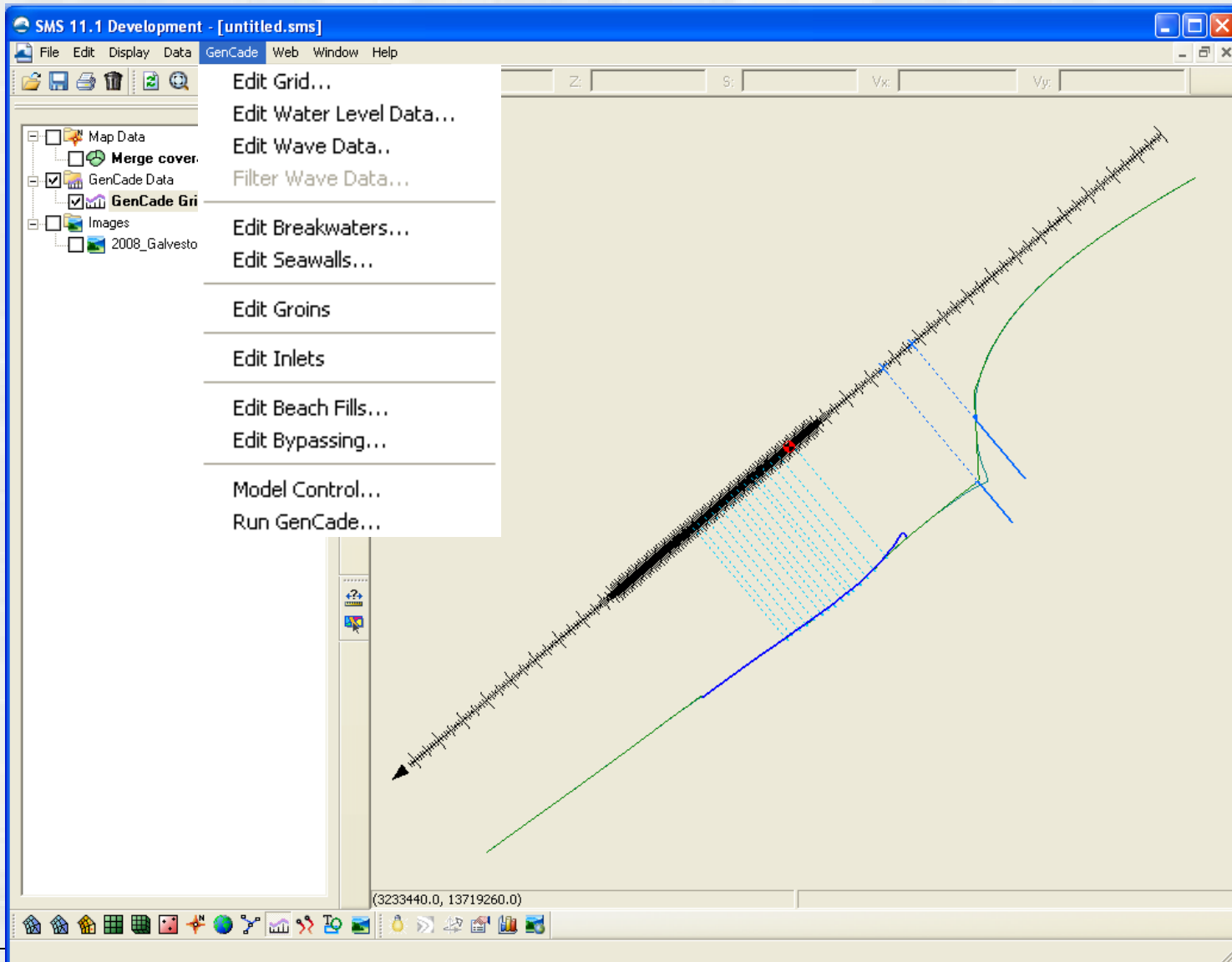


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GenCade Model



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GenCade Model Control

The screenshot displays the SMS 11.1 Development software interface. The main window shows a project tree on the left with folders like 'Map Data', 'Merge cover.', 'GenCade Data', 'GenCade Gri', 'Images', and '2008_Galvesto'. A menu is open over the 'GenCade Gri' folder, listing options such as 'Edit Grid...', 'Edit Water Level Data...', 'Edit Wave Data...', 'Filter Wave Data...', 'Edit Breakwaters...', 'Edit Seawalls...', 'Edit Groins', 'Edit Inlets', 'Edit Beach Fills...', 'Edit Bypassing...', 'Model Control...', and 'Run GenCade...'. The 'Model Control...' option is highlighted. A 'GenCade Model Control' dialog box is open in the foreground, featuring tabs for 'Model Setup', 'Beach Setup', 'Seaward BC', and 'Lateral BC'. The 'Simulation' section includes a 'Title' field with 'SMS Simulation' and a checked 'Full print output' checkbox. The 'Computation Time' section has 'Start Date' (01-Jan-1995 12:00 AM), 'End Date' (01-Jan-2000 12:00 AM), 'Time Step' (1.0 hr), and 'Recording Time Step' (720.0 hr). The 'Print Dates' section contains an empty list area with 'Add' and 'Remove' buttons. 'Help', 'OK', and 'Cancel' buttons are at the bottom of the dialog.



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GenCade Model Control

The screenshot displays the SMS 11.1 Development software interface. The main window is titled "SMS 11.1 Development - [untitled.sms]". The menu bar includes File, Edit, Display, Data, GenCade, Web, Window, and Help. The GenCade menu is open, showing options such as Edit Grid..., Edit Water Level Data..., Edit Wave Data..., Filter Wave Data..., Edit Breakwaters..., Edit Seawalls..., Edit Groins, Edit Inlets, Edit Beach Fills..., Edit Bypassing..., Model Control... (highlighted), and Run GenCade... The left sidebar shows a project tree with folders like Map Data, Merge cover, GenCade Data, GenCade Gri, Images, and 2008_Galvesto. The main workspace shows a map with a grid and a pencil icon. The GenCade Model Control dialog box is open, showing the following settings:

- Model Setup | Beach Setup | Seaward BC | Lateral BC
- Sand and Beach Data
 - Effective Grain Size: 0.17 (mm)
 - Average Berm Height: 3.0 (ft)
 - Closure Depth: 20.0 (ft)
- Longshore Sand Transport Calibration Coefficients
 - K1: 0.4
 - K2: 0.2

The dialog box has buttons for Help, OK, and Cancel. The status bar at the bottom shows coordinates (3233440.0, 13719260.0).

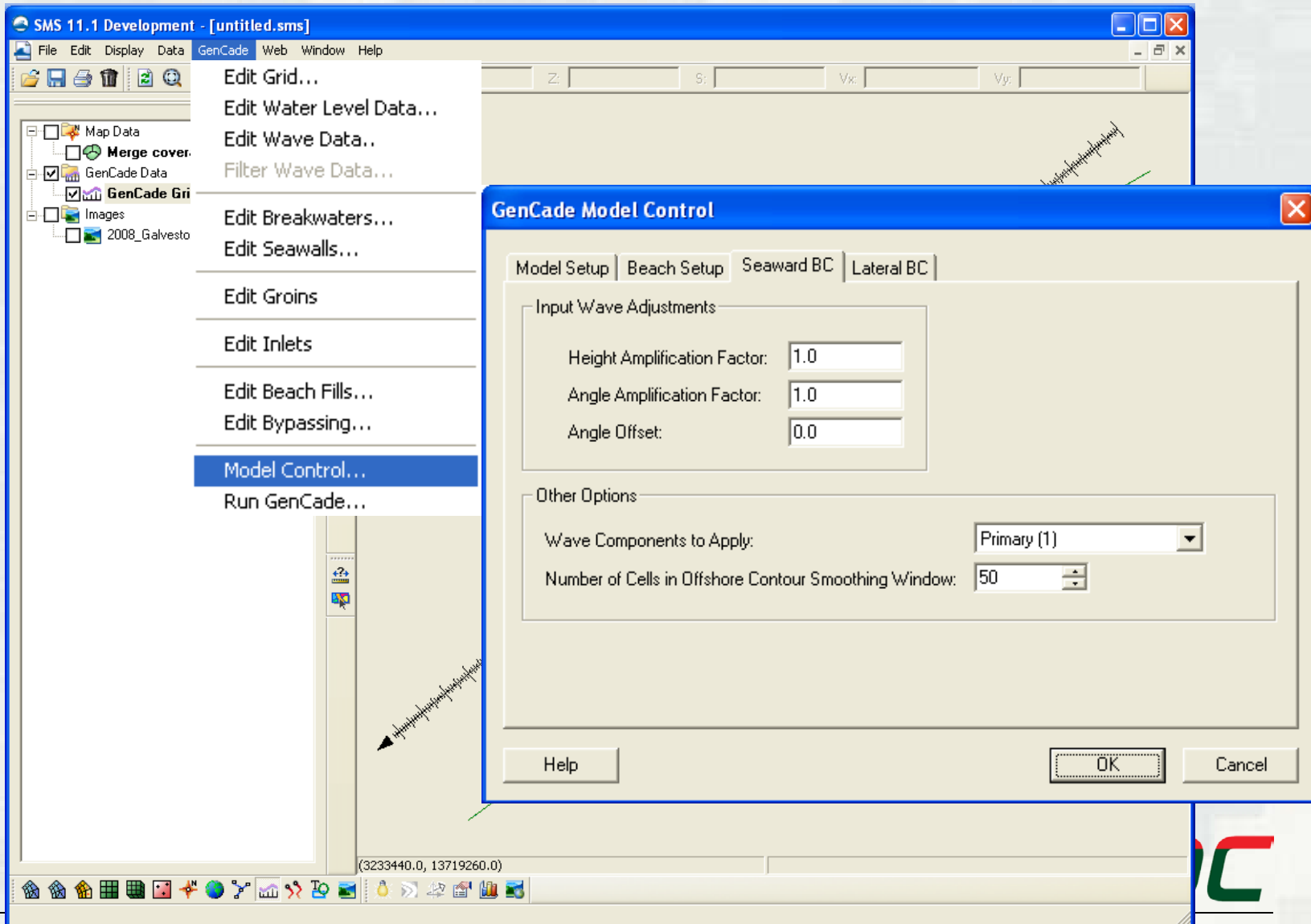


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GenCade Model Control



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GenCade Model Control

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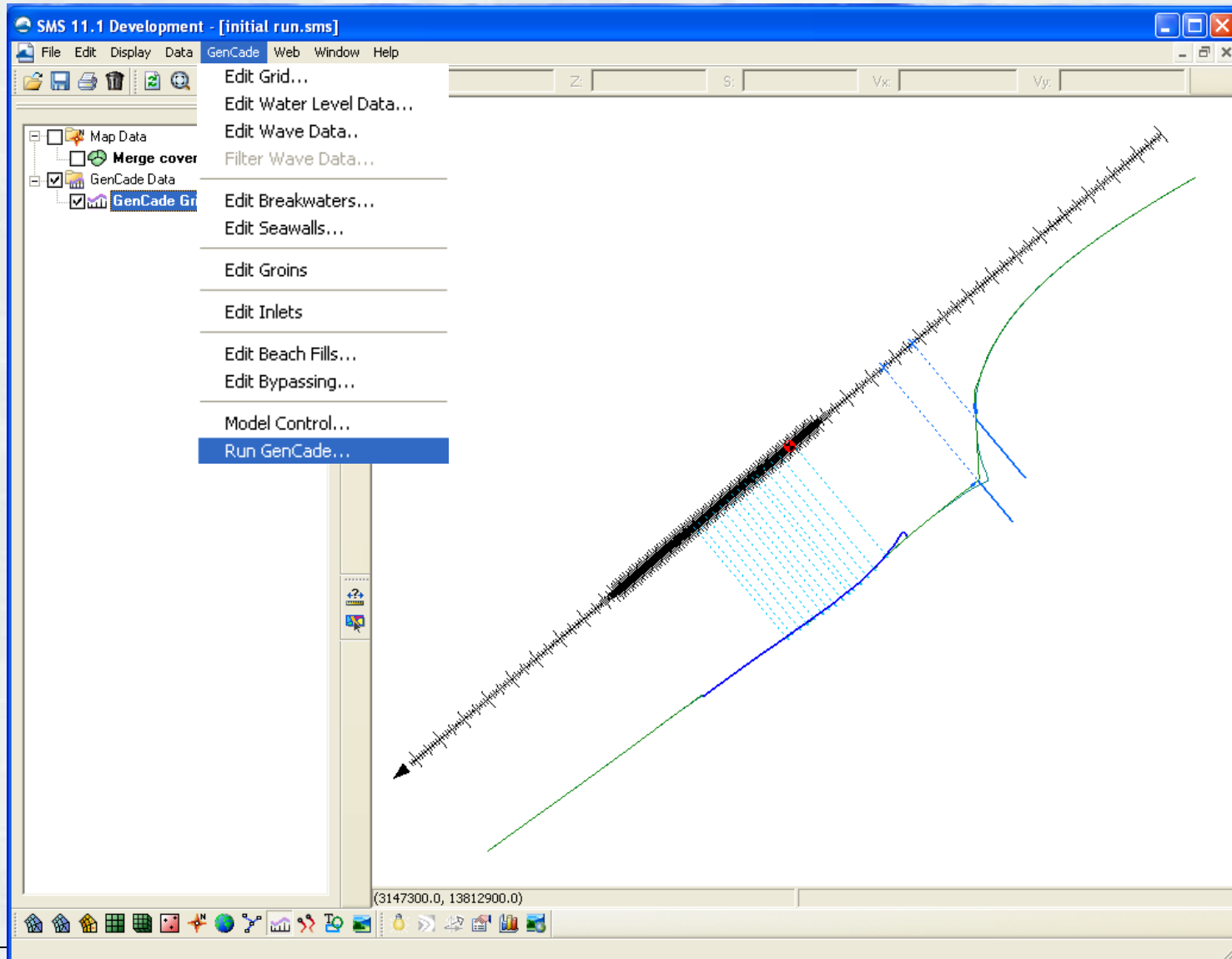


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Run GenCade

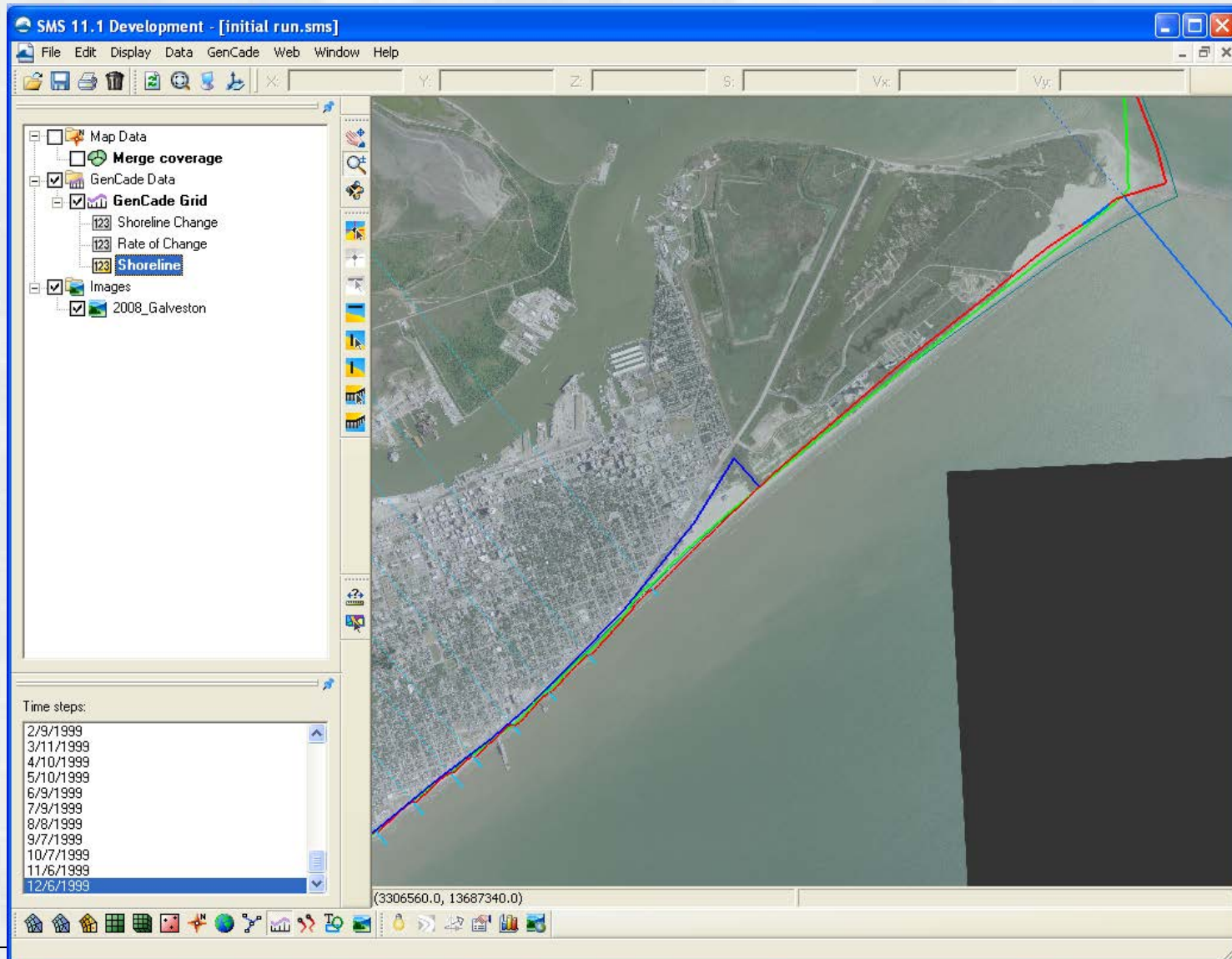


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GenCade Results



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GenCade Results

SMS 11.1 Development - [initial run.sms]

File Edit Display Data GenCade Web Window Help

Display Options... Ctrl+D
Shading Options...

Refresh Spacebar
Frame Image F

View

Plot Wizard...
Plot Data...
Plot Display Options...

2008_LaJalveston

Time steps:
2/9/1999
3/11/1999
4/10/1999
5/10/1999
6/9/1999
7/9/1999
8/8/1999
9/7/1999
10/7/1999
11/6/1999
12/6/1999

Plot Wizard - Step 2 of 2

Dataset

Active dataset
 Specified dataset(s)

GenCade Grid (active)
 123 Shoreline Change
 123 Rate of Change
 123 Shoreline

All On All Off

Time step

Active time step
 Specified time step(s)

	Show	Times
51	<input type="checkbox"/>	2/9/1999
52	<input type="checkbox"/>	3/11/1999
53	<input type="checkbox"/>	4/10/1999
54	<input type="checkbox"/>	5/10/1999
55	<input type="checkbox"/>	6/9/1999
56	<input type="checkbox"/>	7/9/1999
57	<input type="checkbox"/>	8/8/1999
58	<input type="checkbox"/>	9/7/1999
59	<input type="checkbox"/>	10/7/1999
60	<input type="checkbox"/>	11/6/1999
61	<input checked="" type="checkbox"/>	12/6/1999

All On All Off

Help < Back Finish Cancel

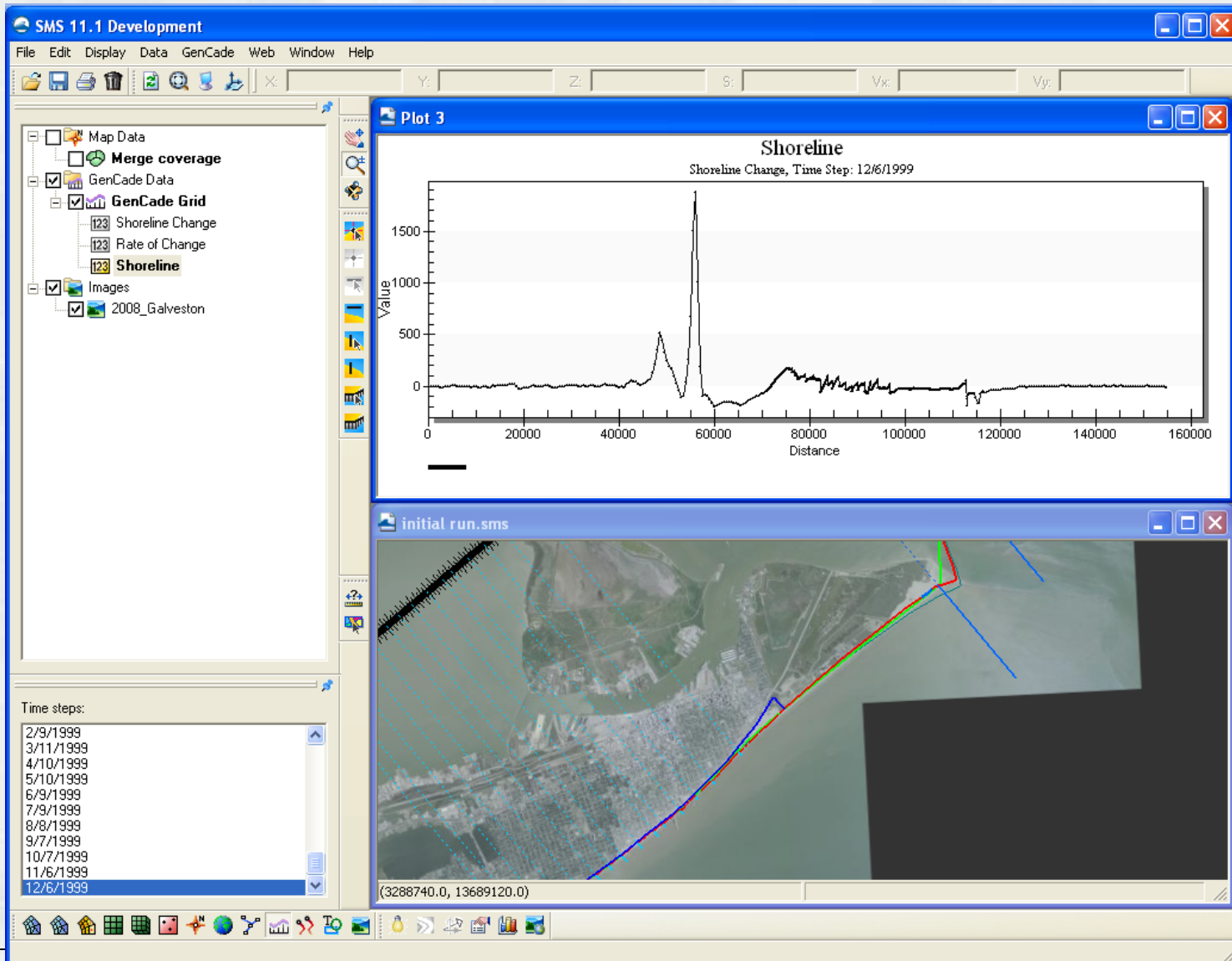


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GenCade Results

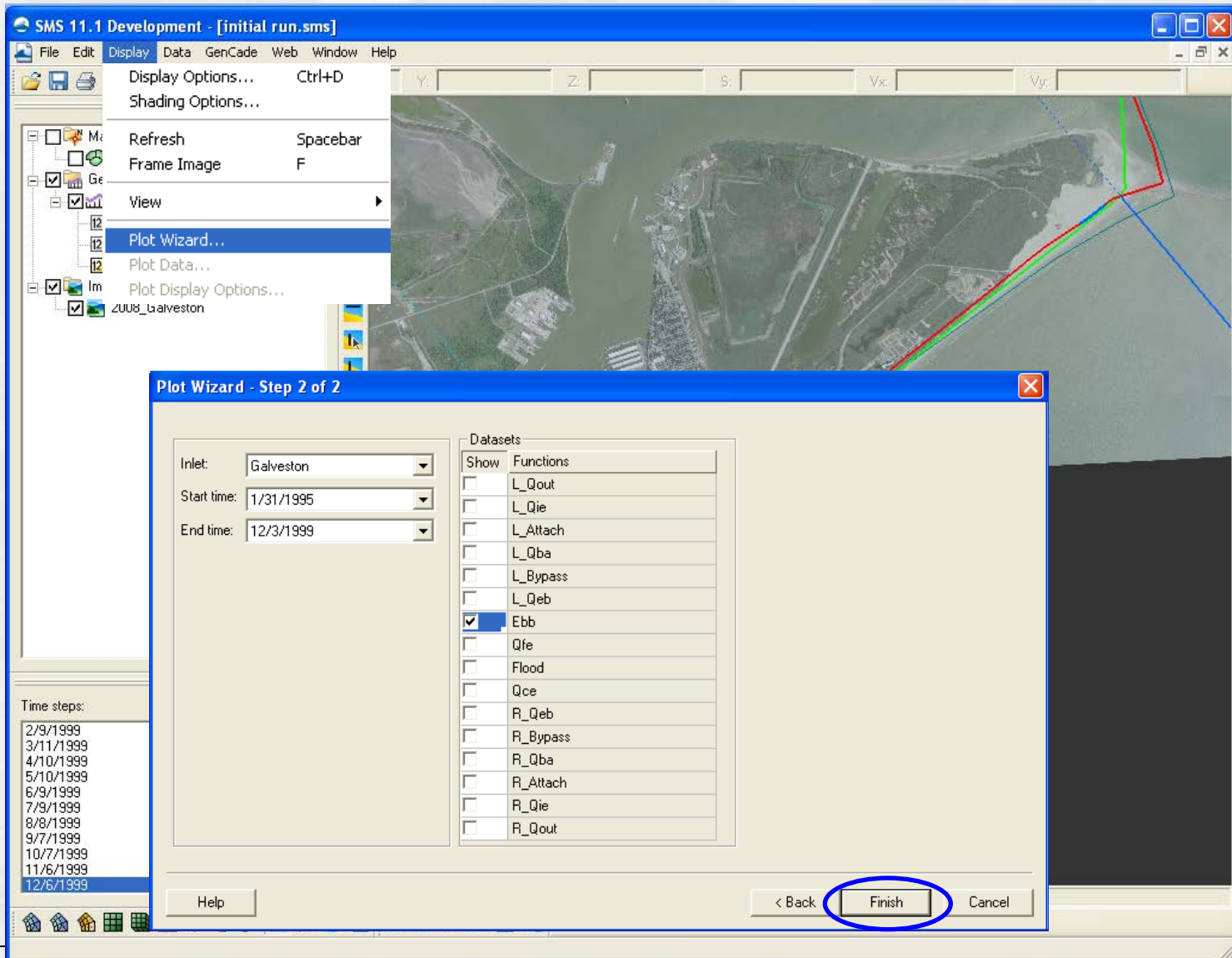


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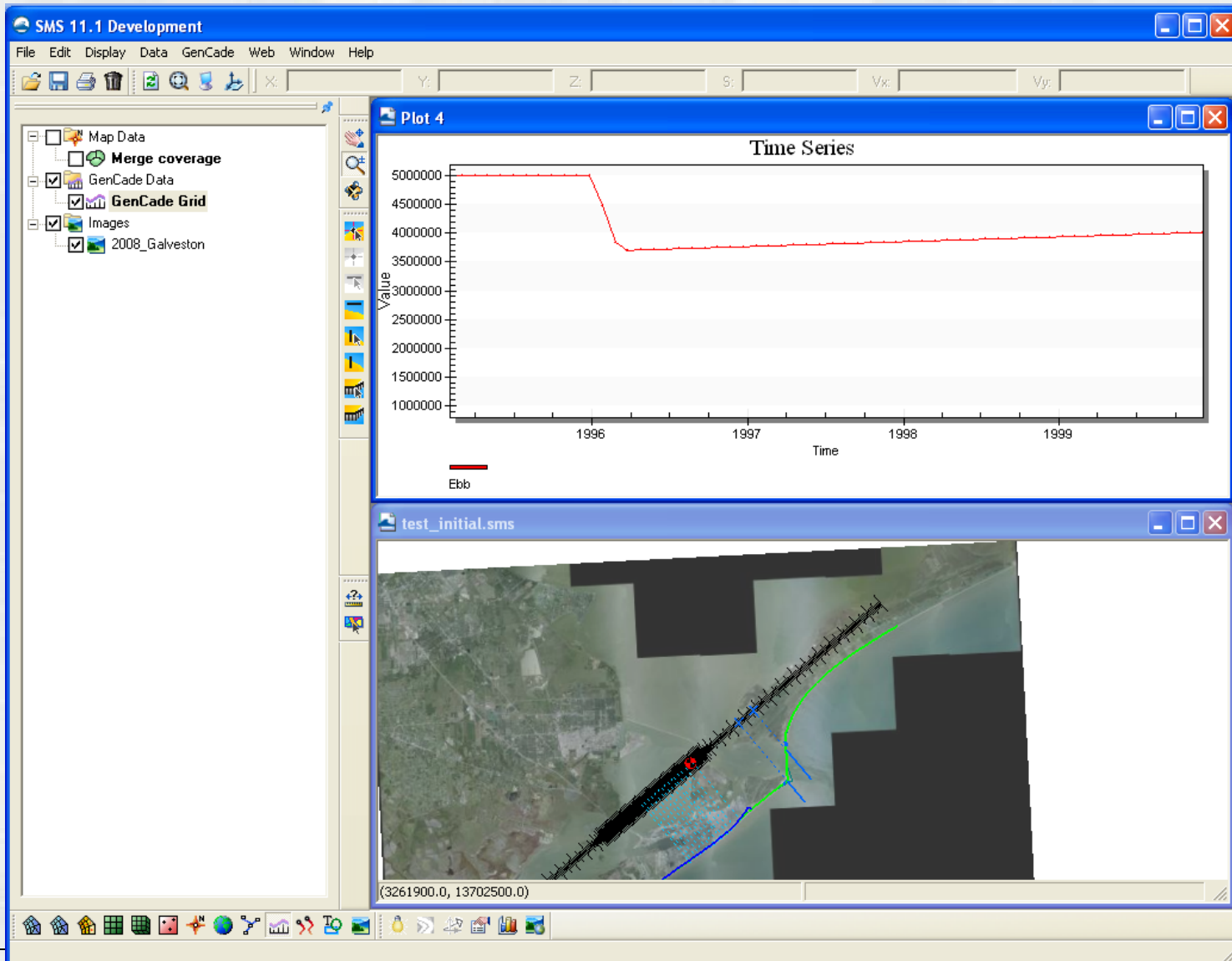


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GenCade Results



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