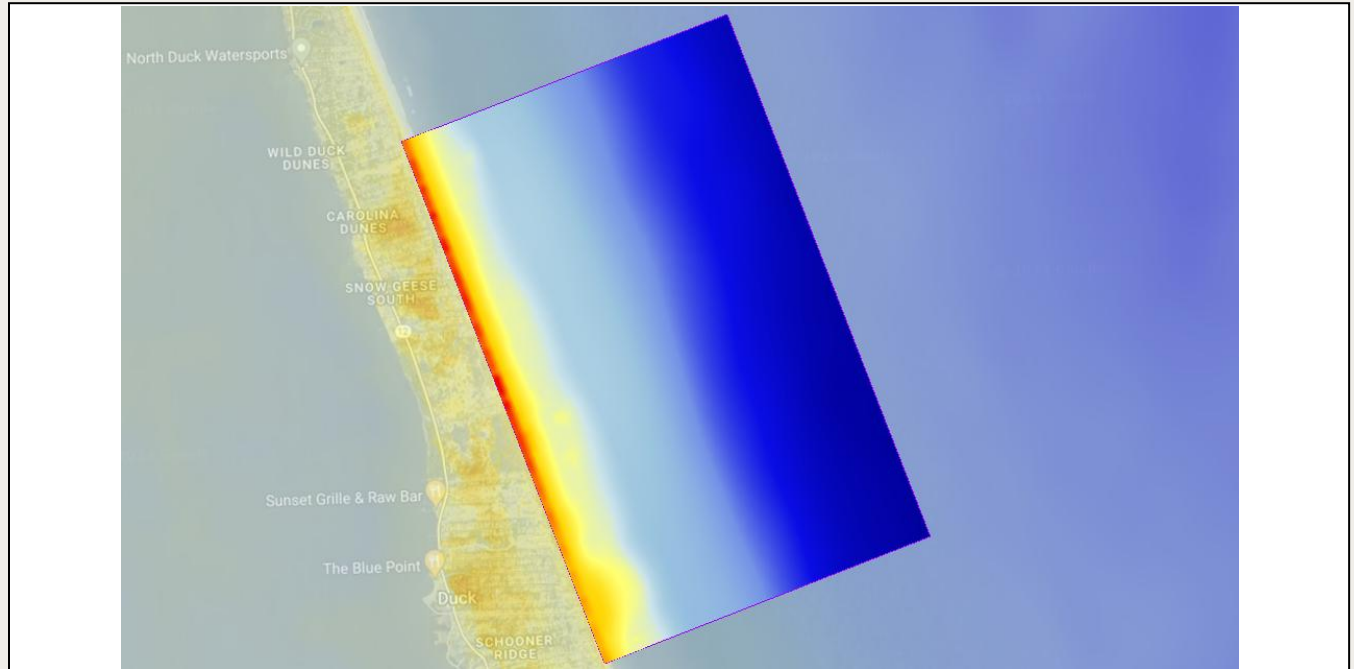




SMS 14.0 Tutorial

CMS-Wave Grid Generation

Creating a Cartesian Grid for use with CMS-Wave



Objectives

This tutorial demonstrates generating a Cartesian Grid for use with CMS-Wave.

Prerequisite Tutorials

- Overview
- Map Module

Required Components

- SMS Core

Time

- 5–10 minutes

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1 Introduction

This tutorial demonstrates how to create an oriented Cartesian grid for use with CMS-Wave. Cartesian grids can be used with CMS-Wave as well as other numeric models such as STWAVE and TUFLOW. This tutorial uses data from Currituck Sound, North Carolina, in the United States.

2 Getting Started

The initial project includes a digital elevation map (TIF file) as well as a hybrid map of the area around Currituck Sound, North Carolina.

To open the project, do the following:

1. Select **File | Open...** to bring up the *Open* dialog.
2. Browse to the *data files* folder for this tutorial and select “start.sms”.
3. Click **Open** to import the project and exit the *Open* dialog.

The project should appear similar to Figure 1.

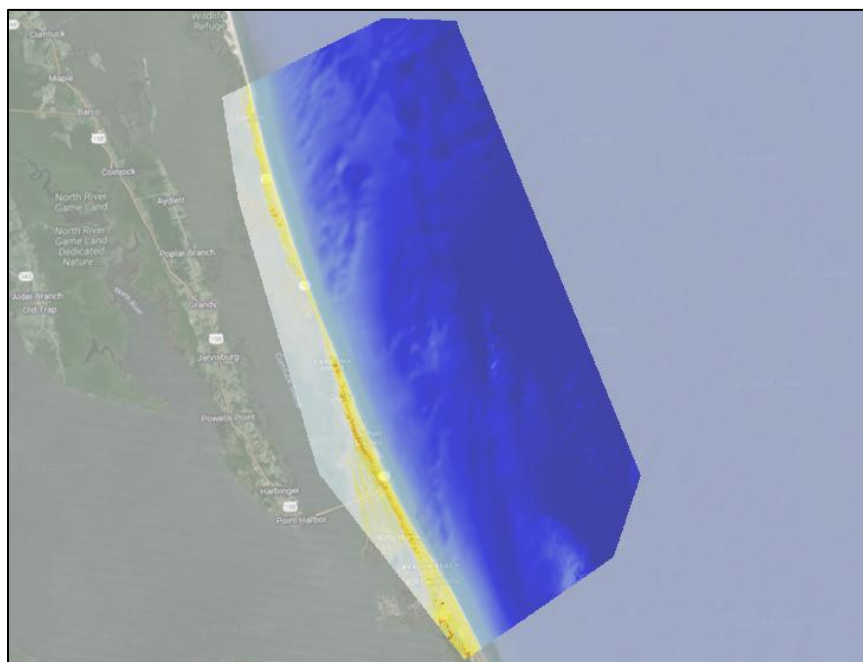


Figure 1 Initial project appearance

3 Creating the Cartesian Grid

The next step is to create a Cartesian grid. The grid frame is created in the **Map**  module, which contains tools for creating GIS objects such as points, arcs, and polygons. It is also used for creating a frame which will be filled in by a Cartesian grid.

3.1 Creating the Cartesian Grid Frame

To create the grid frame:

1. Right-click on “ Map Data” in the Project Explorer and select **New Coverage** to open the *New Coverage* dialog.
2. Under *Coverage Type*, expand the *Generic list*, and select **CGrid Generator**.
3. Enter “CMS-Wave 50m Domain” as the *Coverage Name* and click **OK** to close the dialog.
4. Select “ CMS-Wave 50m Domain” to make it active.
5. **Zoom**  in on the area shown in Figure 2.



Figure 2 Zoom to the area in red

6. Using the **Create 2-D Grid Frame**  tool, click out three corners of the grid in the order shown in Figure 3 to create the grid frame. This grid does not need to be exact, as the grid will be refined in a later step.

Points 1 and 2 define the i -direction, which is the direction of the incoming waves. Points 2 and 3 are placed on the land.

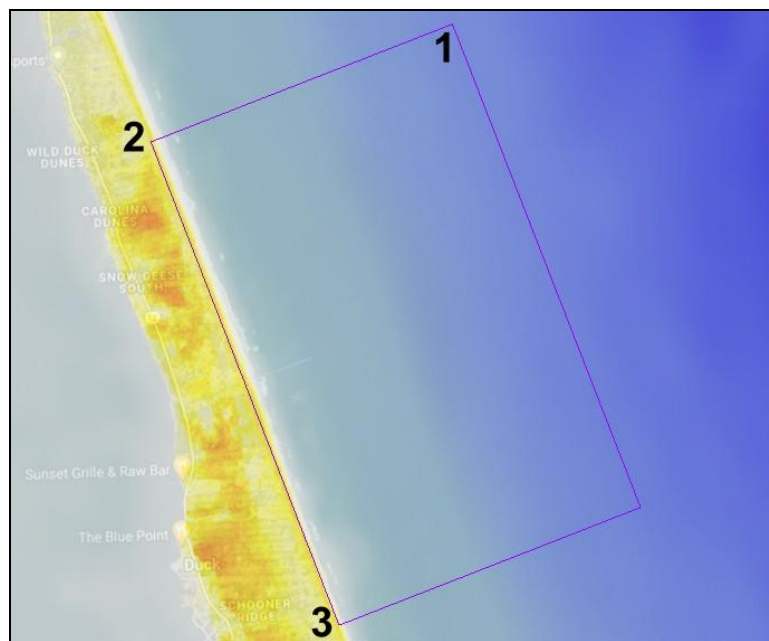


Figure 3 Creating the Cartesian grid frame

7. Using the **Select Grid Frame**  tool, double-click on the selection box in the middle of the grid frame to bring up the *Grid Frame Properties* dialog.

The origin and angle can be manually entered in this dialog. This allows for greater precision in placement of the grid.

8. In the *Origin, Orientation and Dimensions* section, for *Origin X*: Enter “903419.0”.
9. For *Origin Y*: Enter “277358.0”.
10. For the *Angle*: Enter “201.3”.
11. For the *I size*: Enter “2500.0”.
12. For the *J size*: Enter “4000.0”.

These values can also be edited when generating the 2D grid in section 3.2.

13. Click **OK** to close the *Grid Frame Properties* dialog.
14. Click outside the grid frame to unselect the grid.
15. In the Project Explorer, turn off “ GIS Data”
16. **Frame**  the project.

3.2 Mapping to the Grid

This section covers how to fill in the interior of the grid. While the grid is filling, the depth and current values will be interpolated from the scatter set and mapped to each cell.

To do this:

1. Right-click on “ CMS-Wave 50m Domain” and select **Convert | Map → 2D Grid** to bring up the *Map → 2D Grid* dialog.

2. Verify the values in the *Origin, Orientation and Dimensions* section match those given in steps 8–11 in section 3.1.
3. In both the *I Cell Options* and *J Cell Options* sections, select *Cell size* and enter “50.0” in the field to the right of each.
4. In the *Elevation Options* section, select “Raster” from the *Source* drop-down.
5. Click **Options...** to bring up the *Raster Sets* dialog.
6. Select “Trimmed_thirdarcsec_DEM.tif” from the tree list.
7. Click **OK** to exit the *Raster Sets* dialog.

The elevation values will now be interpolated to the final Cartesian grid. Other options can be selected as needed.

8. Continuing in the *Elevation Options* section of the *Map → 2D Grid* dialog, turn on the *Mark cells* option and enter “3.0” as the value for data above land.
9. Click **OK** to exit the *Map → 2D Grid* dialog and create the Cartesian grid.

The project should appear similar to Figure 4.

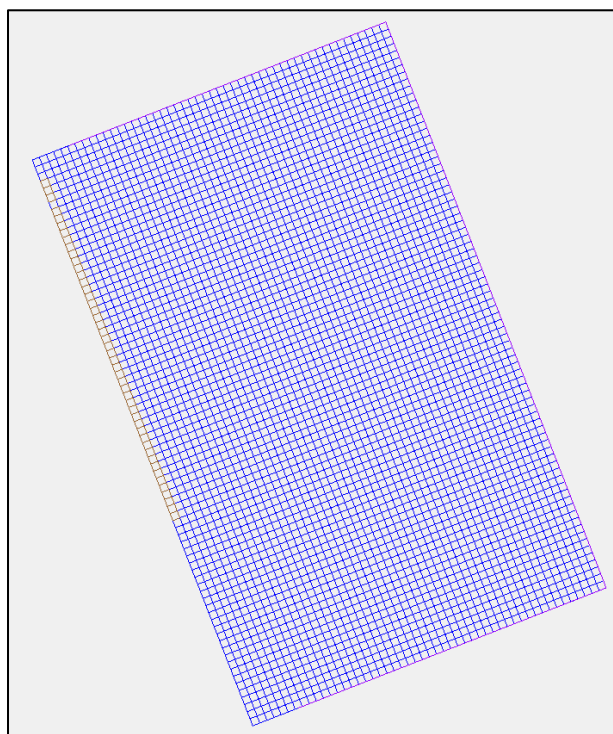


Figure 4 Cartesian grid

A Cartesian grid has been created from the grid frame.

4 Grid Display Options

To view only the grid:

1. Right-click on the “ Cartesian Grid Data” object in the Project Explorer and select **Display Options...** to bring up the *Display Options* dialog.
2. On the *Cartesian Grid* tab, click **All Off**.

3. Turn on *Contours*.
4. On the *Contours* tab, in the *Contour method* section, select “Color Fill” from the first drop-down.
5. Click **Color Ramp...** to open the *Choose color ramp* dialog.
6. Expand the *This project* folder to see the color ramps for this project.
7. Select the *Velocity2* color palette.
8. Click **OK** to exit the *Choose color ramp* dialog.
9. Click **OK** to close the *Display Options* dialog.

Examine the “ CMS-Wave 50m Domain Grid” which should be similar to Figure 5.

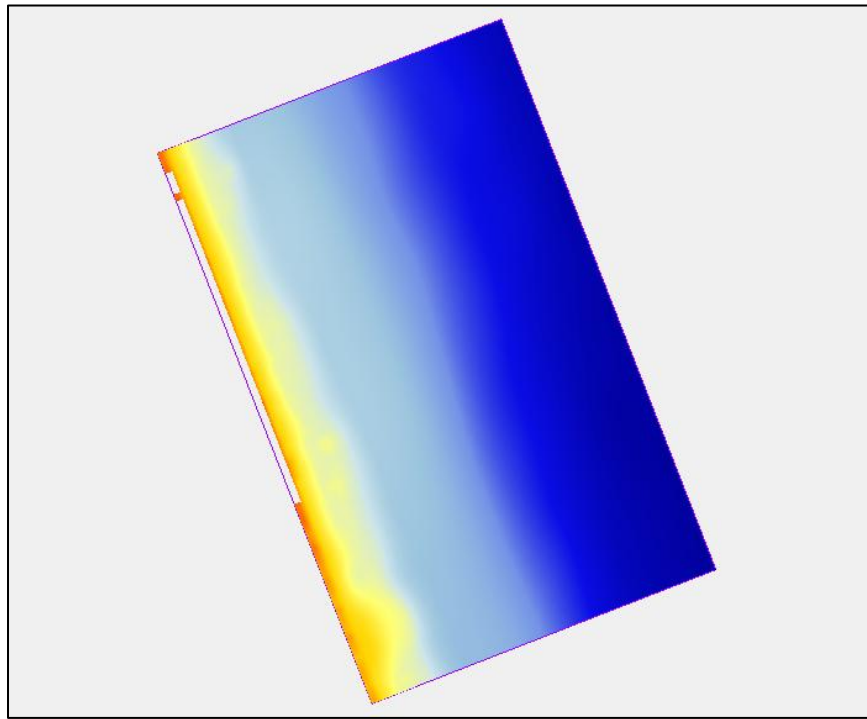


Figure 5 Final grid

5 Conclusion

This concludes the “CMS-Wave Grid Generation” tutorial, which showed how to create a Cartesian grid using the Cartesian grid generator coverage. The grid can be used with a numeric model such as CMS-Wave, STWAVE, or TUFLOW.