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Date: July 2011  
Software: ArcGIS 10

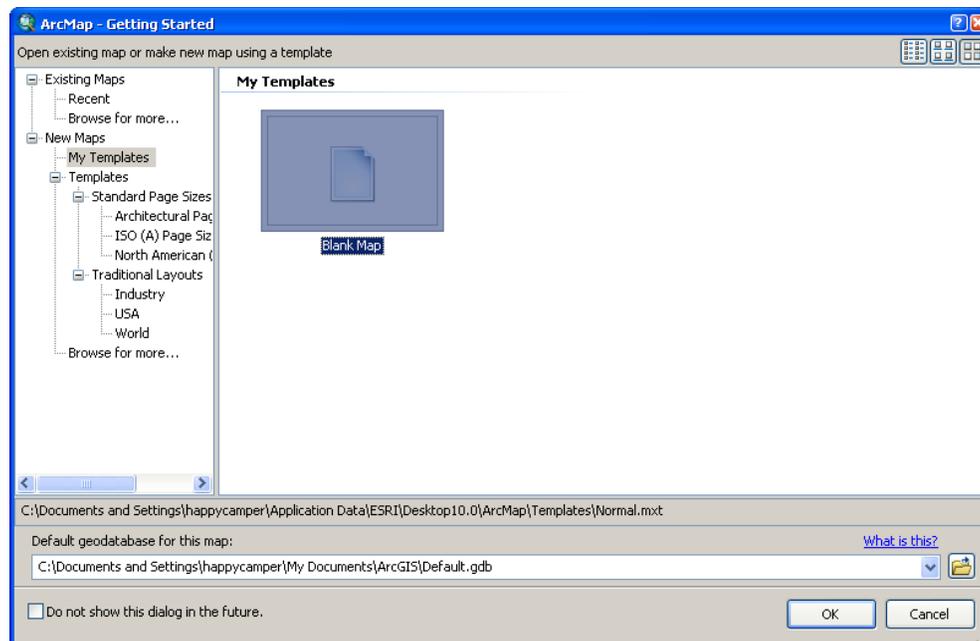
## Lesson 8 : How to Create a Distance from a Water Layer

### Background

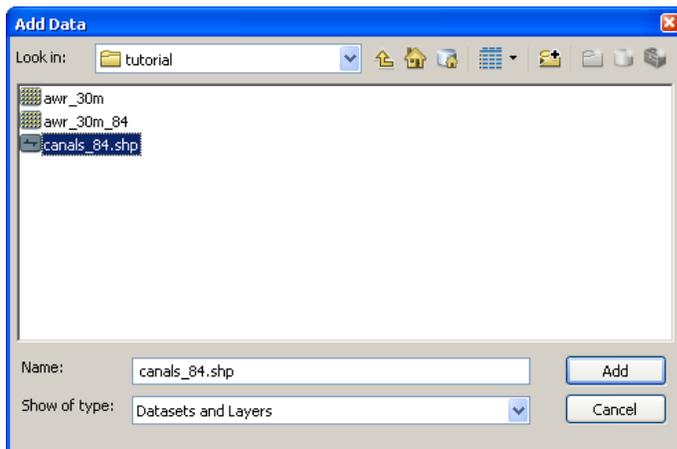
This tutorial will cover the basic processes involved with creating a distance from water raster from an existing stream or river polyline dataset. Steps will include bringing data into the new software, clipping, and creating a euclidean distance-based raster. All functions will be completed through the *ESRI ArcGIS* software using the toolbox and display functions within *ArcMap 10*. The Model Builder feature in *Arc* will also be introduced to show one way of function organization. Alligator River National Wildlife Refuge canals will be used to demonstrate the conversion techniques in this tutorial. This tutorial will also assume you already have a stream layer you would like to use and a boundary raster with a set extent and all in the same coordinate system.

### Bringing Data into ArcMap 10

1. Open ArcMap 10 by navigating to it within your Start menu.
2. When the window below appears, either select cancel or navigate to **My Templates**, select **Blank Map**, and click **OK**.



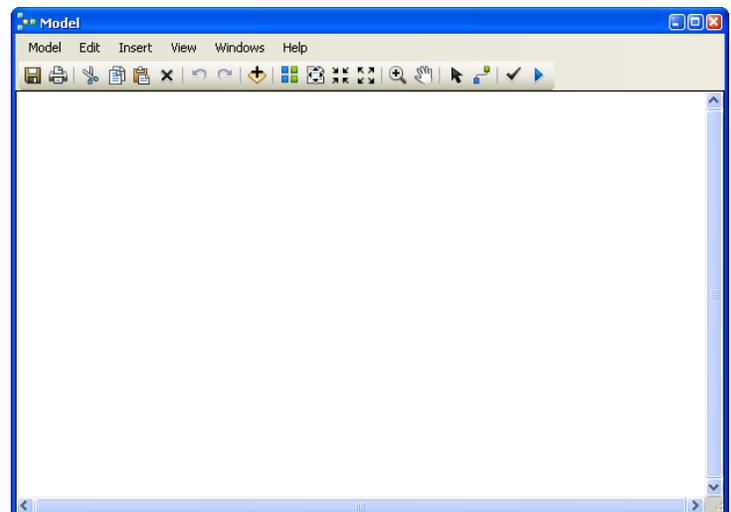
- This will bring up an empty map within *ArcMap 10*. To add data, click on the **Catalog** tab on the right side of the screen. This brings out a direct connection to files in an *ArcCatalog* display.
- Navigate to the directory where your stream layer is located using the **Folder Connection** button .
- Next, select your stream layer from the directory and drag it into the display portion of the *ArcMap* window. This will automatically add data to your current map.
- Or, you can also browse to the same file using the **Add Data** button  at the top of the *ArcMap* window. The **Add Data** browse window looks like the picture below.
- Repeat one of these processes with the raster boundary layer you would like to clip your final distance to water product to. In this example the stream layer is labeled **canals\_84.shp** and the boundary is **awr\_30m\_84**



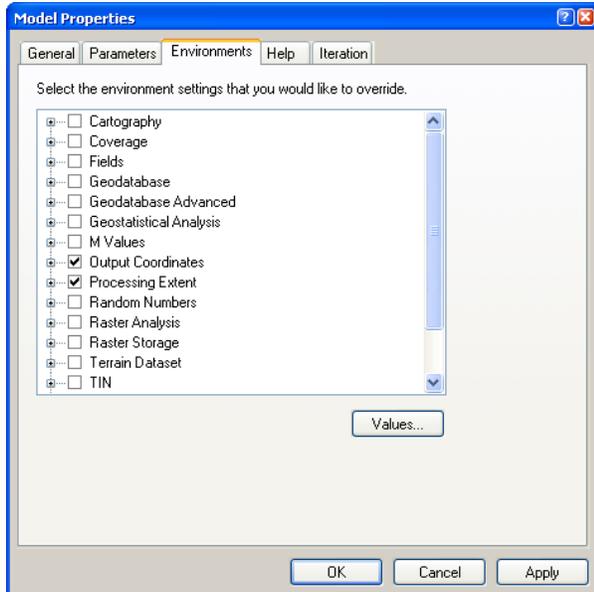
- You can change the symbology of each layer by clicking on it in the **Table of Contents (TOC)** on the left side of the screen.

### Using Model Builder to Organize Toolbox Functions

- Click on the Model Builder button  near the top of the page. This will open the Model Builder window, which serves as a visual aid in running processes with several ArcToolbox functions.
- First, click **Model** in the upper left hand corner. Select **Model Properties**.



3. At the top of the window that appears, select the **Environments** tab.



4. Check the environmental variables of **Output Coordinates** and **Processing Extent**. The window should look like the one to the left.

5. Next click **Values...** Extend both variables by clicking on their respective names.

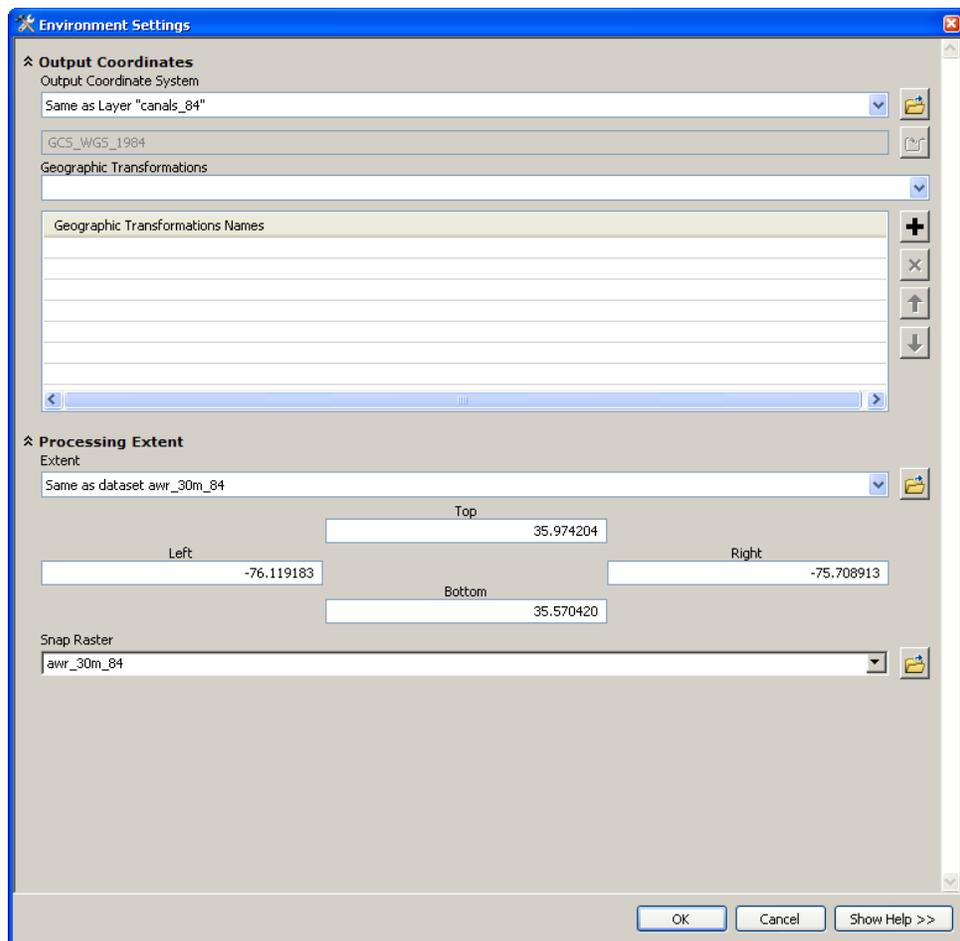
6. You are now setting a coordinate system and extent that will be applied to all rasters created within Model Builder.

7. Define your Output Coordinate System either by matching a layer already in your map or by selecting it through the projection browsing button . In this example the coordinate system will be WGS\_1984.

8. Select a **Geographic Transformation** algorithm if required.

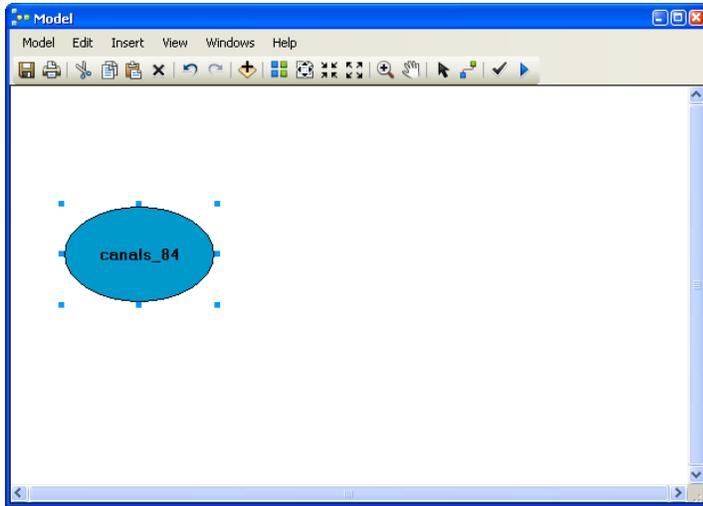
9. For the **Extent**, use the drop down menu and select the raster boundary that is already included in your map. In this example it is **awr\_30m\_84**.

10. Finally set the **Snap Raster** to the same as your raster boundary as well. The window should look something like the one to the right before you click **OK**.



11. In the **Model Properties** window, click **Apply** then **OK**. You can now start adding data and functions to the model.

12. To add data, click and drag your stream layer from the TOC on the left side of the screen and drop it into the model builder window. You can also browse to it using the **Add Data** button  within the Model Builder itself.



13. Once the stream layer is added it will look like the image to the left. Data is represented by blue oval-like shapes with the name of the dataset in the middle.

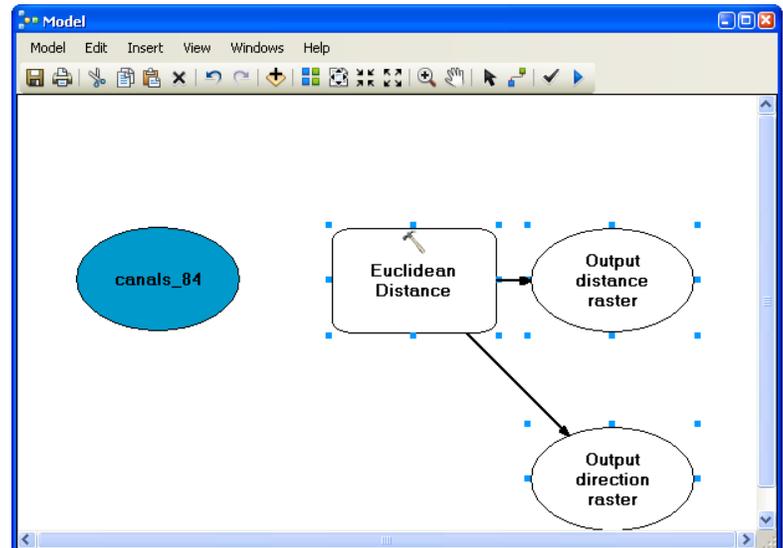
14. In order to add a toolbox function, click on the **Search** tab on the right side of the screen. Type “Distance” into the text window.

15. Arc displays a list of results of all functions that may relate to the word “Distance.” One of these results should be named **Euclidean Distance (Spatial Analyst)**.

16. Click the title and drag it into the Model Builder window. It will look like the image to the right.

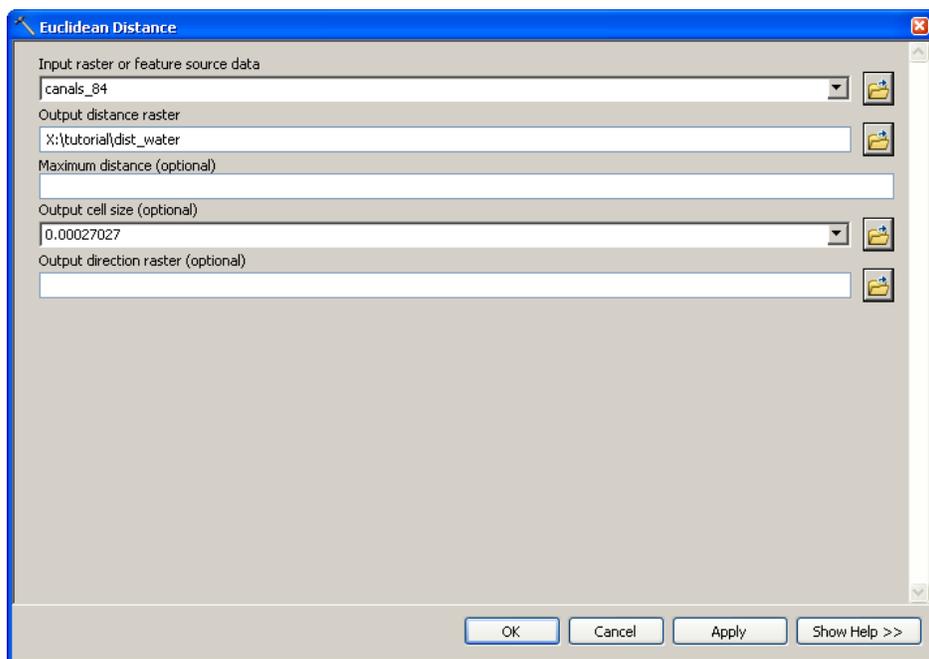
17. Double click the rectangle titled **Euclidean Distance**.

**Note:** If you receive a licensing warning, turn on your **Spatial Analyst** extension by clicking on **Customize** at the top of the screen then **Extensions...**



18. In the tool window select your **Input raster or feature source data** by clicking the drop-down arrow and selecting the name of your stream layer with this symbol  next to it.

19. Use the browse button  to select your **Output Distance raster**. Give it a meaningful name and store it in a directory you are familiar with.



20. Fill the other options in as necessary- the rest are optional. For this example I inserted a specific cell size. The tool window should look similar to the one on the left before you click **OK**.

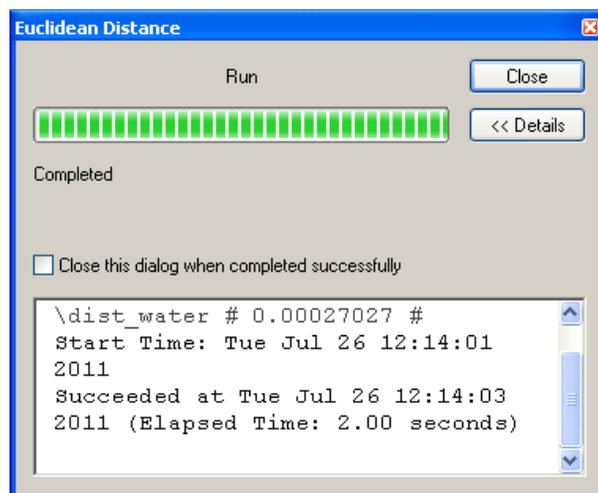
21. After you click **OK**, the tool will turn orange and the export raster will turn green within the Model Builder display window.

22. The **direction raster** is optional so it will not change to a different color unless you decided to create a direction raster.

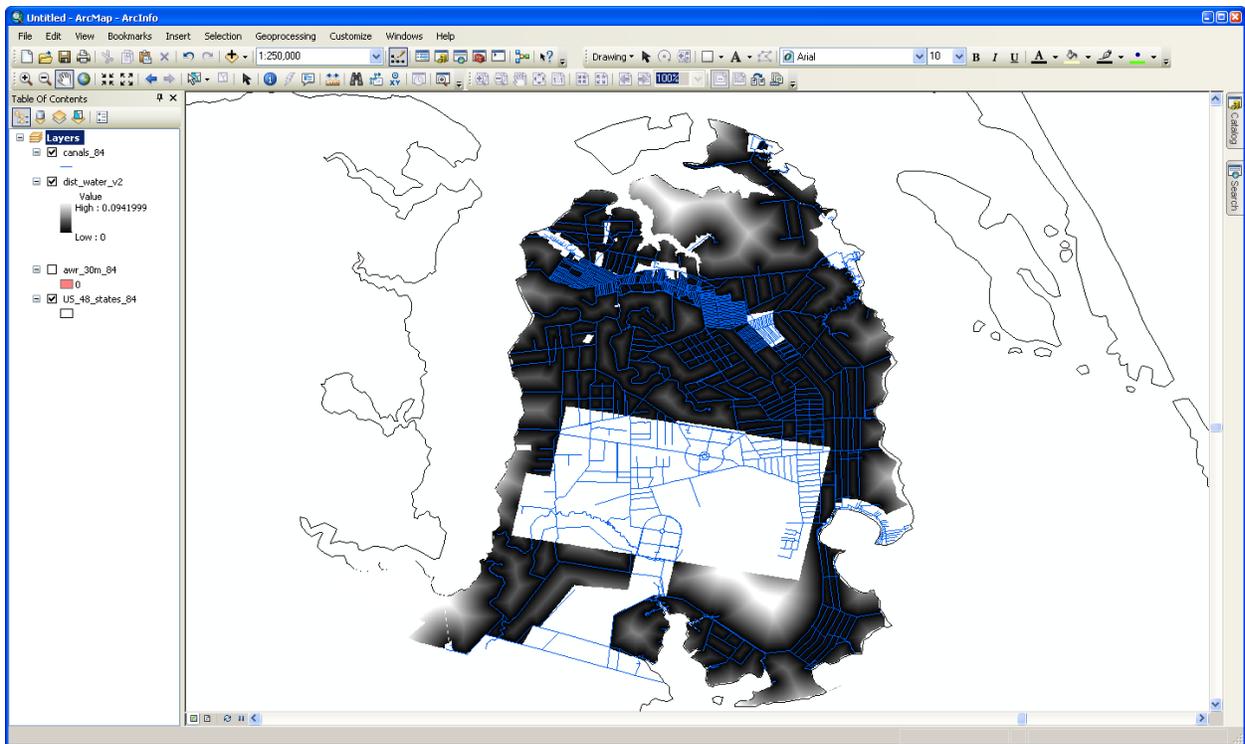
23. Click **Model** in the top left corner again and select **Validate Entire Model**. If no warnings are prompted, choose **Run** or **Run Entire Model**.

24. A progress window will appear like the one on the right. When it is completed, close the window.

25. Notice, there are drop shadows behind the modules that were completed successfully. In order to view the results, browse to the data by the processes described previously, or right click on the exported raster (green) and select **Add to Display**.



26. The resulting raster should look something like this and be clipped to the boundary raster you specified (the blue lines are the stream layer in this example):



**Well Done!** You have successfully made a distance to water raster from a streams layer.