GEON LiDAR Workflow (GLW) output and ArcMap Users Guide

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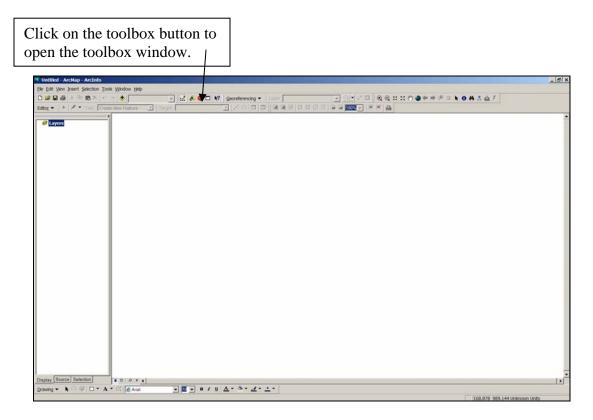
http://lidar.asu.edu

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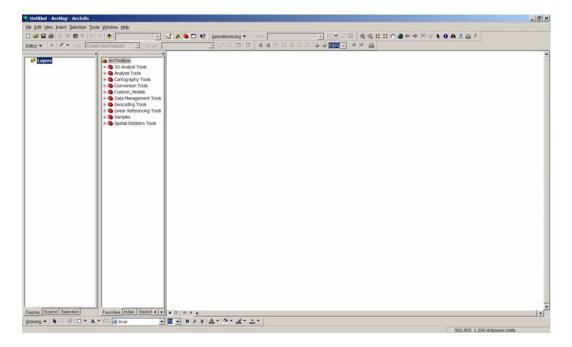
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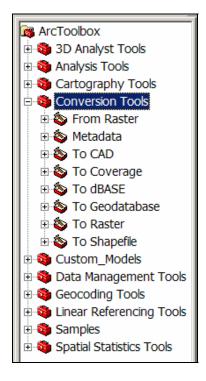
Importing GLW output into ArcMap

Open ArcMap and click on the toolbox button.



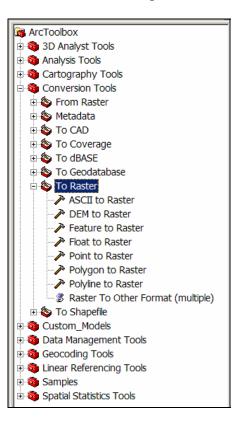
The toolbox window will open as a pane as shown below.



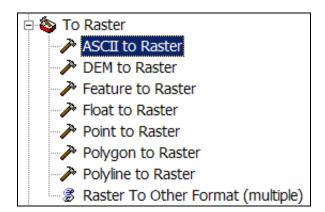


Click on the Conversion Tools option. This will expand the menu.

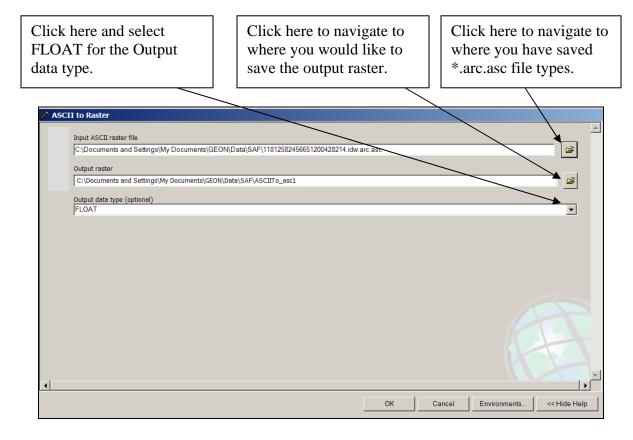
Click on the To Raster option. This menu will expand further.



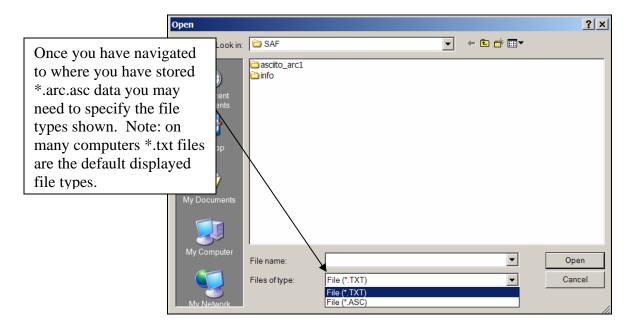
Select the ASCII to Raster option.



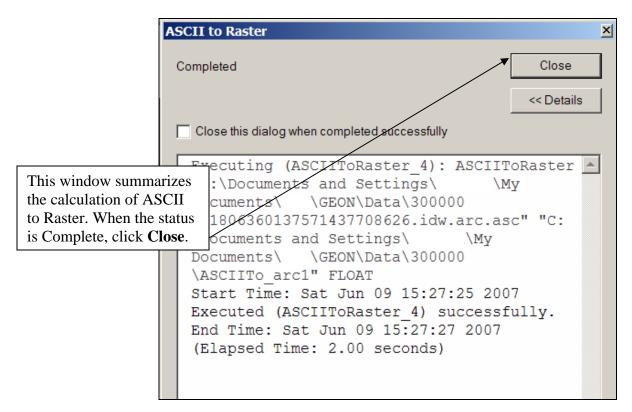
This opens a new window. Specify the file you would like to import, the name and location for the output and finally under **Output Data Type (optional)** select Float.



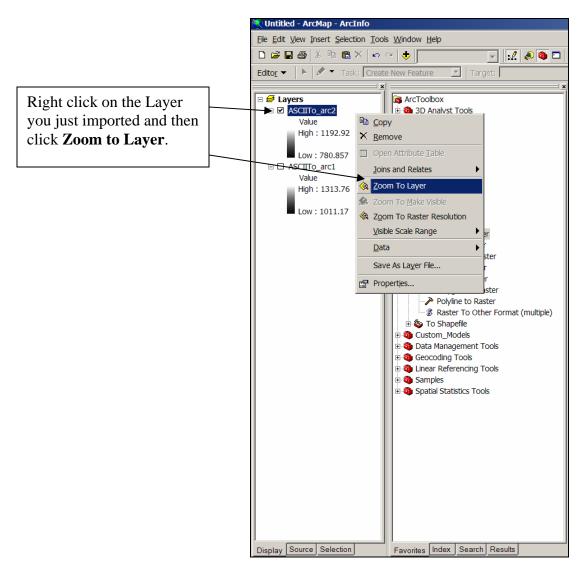
Note: based on your default settings, you may need to specify the file type listed.



Based on the size of your data set, it may take a moment for the calculation to complete. Once it has completed, the window will give you a notice that says the job has completed click **Close**.



Now on the left windowpane, under the layer you just added, right click on the layer and click **Zoom to layer**.



Defining the projection

You may not need to project the data (change the datum or projection). But, the DEM products delivered from the GLW are not internally defined in terms of their coordinate systems. You can work with them by themselves without this definition, but if you want to combine them with other data, you will need to define it.

If you have Arc Map open, you should close it so that there will not be a complaint from the other software, ArcCatalogue about the files being busy.

The example we give here is for the B4 LiDAR data which has these coordinate system attributes:

Grid Coordinate System Name: Universal Transverse Mercator UTM Zone Number: 11 N Transverse Mercator Projection Scale Factor at Central Meridian: 0.999600 Longitude of Central Meridian: -117.000000 Latitude of Projection Origin: 0.000000 False Easting: 500000.000000 False Northing: 0.000000 Planar Coordinate Information: Planar Distance Units: meters Geodetic Model Horizontal Datum Name: D_WGS_1984 Ellipsoid Name: WGS_1984

Launch ArcCatalogue: Start->Programs->ArcGIS->ArcCatalogue

Then Right click on the Raster file you made in the last step and select properties (see next page)

📣 ArcCatalog - ArcView - C:\Docum	ents and Settings\Rentech Solutions\Deskto
<u>File E</u> dit <u>V</u> iew <u>G</u> o <u>T</u> ools <u>W</u> indow <u>H</u> elp	
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Location: C:\Documents and Settings\I	Rentech Solutions\Desktop\Wallace Creek
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Documents and Settings	Inte Type 11644855686571868028251.idw Raster Dataset wc.mxd Map Document Image: Sdu Raster Dataset Copy Ctrl+C Load F2 Create Layer Export Build Pyramids Calculate Statistics Properties Properties
Displays the properties of the selected item	

R	aster Dataset Properties		?×
ſ	General		
	Property	Value	
	Pixel Type	floating point	
	Pixel Depth	32 Bit	
	NoData Value	-3.4028235e+038	
	Colormap	absent	
	Pyramids	present	
	Compression	Default	
	Extent		
	Тор	3907354.5	
	Left	242393.5	
	Right	243323.5	
	Bottom	3906415.5	
	Spatial Reference	<undefined></undefined>	
	Linear Unit		
	Angular Unit		
	Statistics	Options	• ·
	🗉 WC_IDW		
	Build Parameters	skipped columns:1, rows:1, ignored value:	
	Min	629.75	N
_		OK Cancel	spply

Scroll down to the Spatial reference which will be undefined and click on Edit:

Choose to **Define the coordinate system interactively**. Scroll to the bottom of the list of projections and choose UTM:

Define Projection Wizard	(co	verages, grids, TINs)	X
What is the projection of your dataset? Projections Polyconic The Universal Transverse			
Robinson RSO Simple Conic (1 std parallel) Simusoidal Space Oblique Hercator State Plane Stereographic (Equatorial View) Stereographic (Dollar view) Stereographic (Oblique view) Stereographic (Polar view) Times Transverse Mercator Two Point Equidistant UPS UTM		Mercator System divides the globe into sixity zones	
Help Cancel			

Units should be meters, zone is 11 (in this case), and X shift is the False Easting of 500,000:

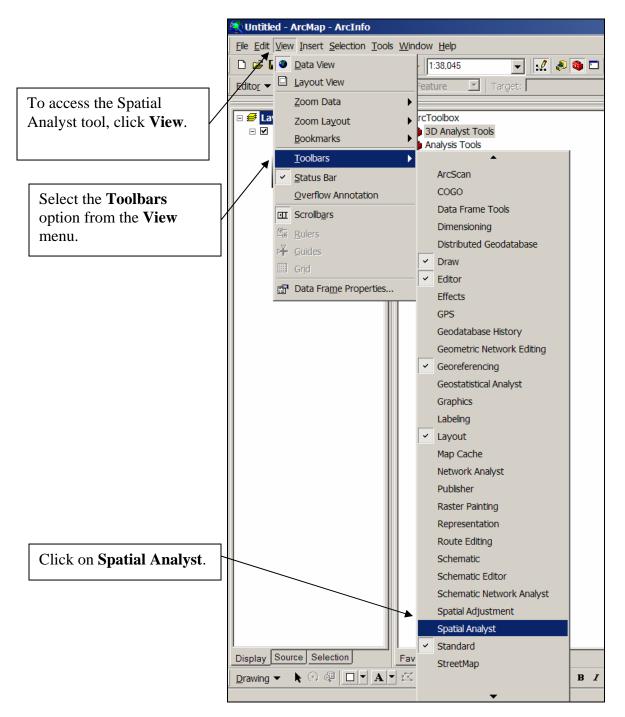
Projection V	Wizard (coverages, grids, TINs) 🛛 🛛 🔀
Assign a	value for each of the projection parameters below:
UTM parameters	
Units: Zone:	meters
X Shift (optional):	50000 maters
Y Shift (optional):	0 meters
	1 THOUGHS
Help	< Back Next > Cancel
neip	< Back Next > Cancel
Set the datum	n (in this case) as WGS84
	Wizard (coverages, grids, TINs) 🛛 🛛 🔀
Choose th	e datum or spheroid that applies to your dataset
Datum	
VOIROL 1960 WAKE ISLAND 19	152
WAKE-ENIWETO WG5 1972	
WG5 1984 YACARE - Urugua	
ZANDERIJ - Surin	
C Spheroid	
Spheroids	
Spheroid:	Clarke 1866
Semimajor axis	
Semiminor axis:	6356583.8 meters
Help	<back next=""> Cancel</back>

The final screen should look like this:

🎢 Define Projecti	on Wizard (coverages, grids, TINs) 🛛 🛛 🔀		
Summary of your input			
Input dataset:	C:\Documents and Settings\Rentech Solutions\Des 🔨		
Projection:	UTM Units: meters Zone: 11 X Shift (optional): 500000 Y Shift (optional): 0		
Datum:	WG5 1984		
Save to AML			
Help	< Back Finish Cancel		

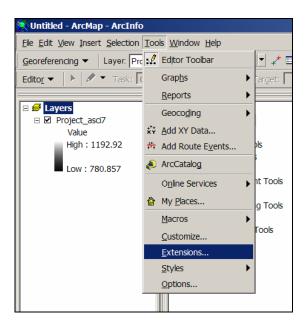
Producing a Hillshade Map

After you have loaded the data and projected it, click on the Spatial Analyst tool. If you do not have the Spatial Analyst tool in your toolbar, select **Toolbars** from the **View** menu. Then click **Spatial Analyst** from the pop up window.



Drag the Spatial Analyst toolbar to your toolbar.

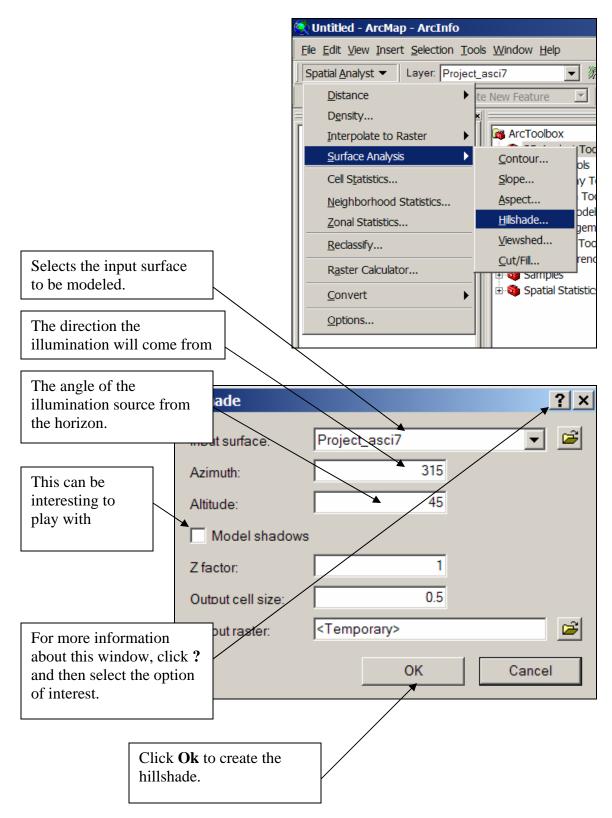
If this is the first time you have used the Spatial Analyst tool, you may need to turn on the extensions. To turn on the extensions, select the **Extensions** option from the **Tools** menu.



Check the 3D Analyst and the Spatial Analyst options, click **Close.**

Extensions	<u>?</u> ×
Select the extensions you want to use.	
 3D Analyst ArcScan Data Interoperability Geostatistical Analyst Maplex Network Analyst Publisher Schematics Spatial Analyst Survey Analyst Survey Editor Tracking Analyst 	
Description:	
3D Analyst 9.2 Copyright ©1999-2006 ESRI Inc. All Rights Reserved	
Provides tools for surface modeling and 3D visualization.	
About Extensions	Close

Now to make a hillshade map, select the **Surface Analysis** option under the **Spatial Analyst** pull down menu. Click on **Hillshade**.



Step 4 Combining the Hillshade and DEM, creating a color map

If you have the DEM and hillshade loaded make sure that the DEM is on top in the Layers pane. This can be done by simply clicking on the desired layer and dragging it above the hillshade. To color the DEM, right click on the DEM and select **Properties** then click on the **Symbology** tab.

Click on the Symbology tab.	Click on the color ramp pull down window to select the color scheme of your liking.	
Layer Properties		? ×
General Source Extent Display Symbology	Fields Joins & Relates	
Show: Classified Draw raster stretching	ng values along a color ramp Import	
Stretched Color Color Ramp:	Value Label 1192.922363 Figh: 1192.922363 780.857117 Low: 780.857117 wund Value: 0 as	
Use hillshade ef		
	OK Cancel Ap	ply

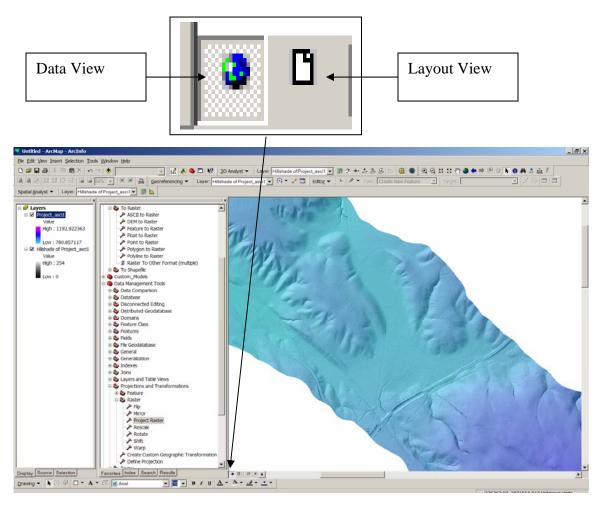
Once you have chosen a color scheme click on the **Display** tab. Change the Transparency setting to 50%. Then click **Ok**.

Click on the Display tab.		Change the Transparency setting to 50%.]
			_J
Layer Properties			<u>?</u> ×
General Source Extent Display Sy	mbology	Fields Joins & Relates	
Show Map Tips (uses primary display	/ field)		
Display raster resolution in table of co	ontents		
Allow interactive display for Effects to	olbar		
Resample during display using:	/		
Nearest Neighbor (for discrete data)		•	
Contrast: 0 % Brightness: 0 % Transparency: 50 %	6	Drthorectification using elevation Constant elevation: DEM Image: Project_ascil Elevation adjustment Z factor: 1 Z offset: 0 Geoid:	
		OK Cancel	Apply

The effects can be astonishing. Now you have a colored map.

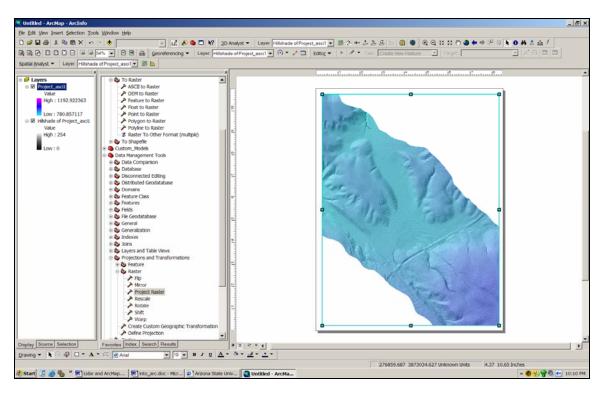
Printing the map

To print the map, first change from the **Data View** to the **Layout View**.

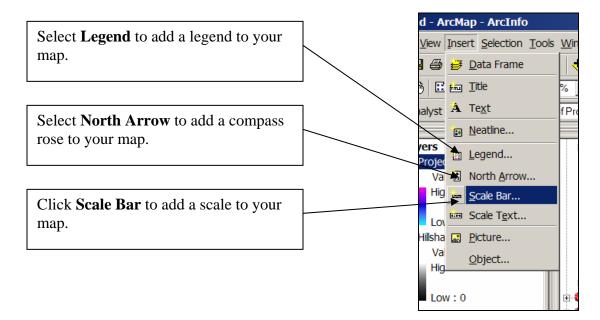


You will now see how the image will look on an 8.5 x 11 sheet of paper.

You can now see how the image will be centered and look on an 8.5 x 11 sheet of paper. You can now stretch the image or shrink the image by using the arrow button and clicking on the image. You can use the hand tool and adjust what part of the image is seen. You can also change the paper properties by choosing the **Page and Print Setup** option from the **File** menu.



To add a scale bar, legend, and compass rose click on the **Insert** menu at the top of your screen.



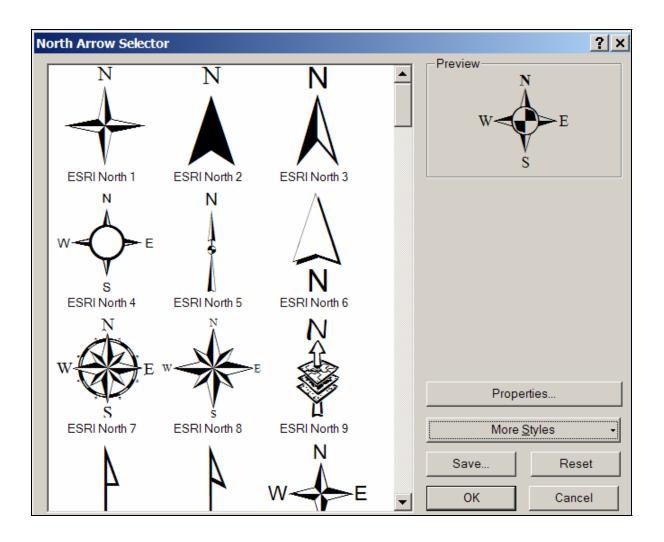
When you choose **Legend**, a new window will open like the one below. Remove the hillshade map and click **Next**.

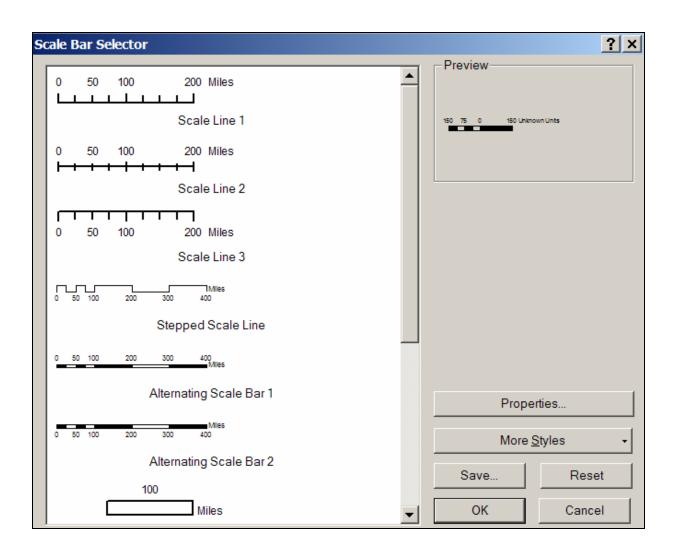
infishade map and check i text.	Once you have highlighted the	
	Hillshade item, click the remove	
Click on the	link to remove this item.	
Hillshade item	mik to remove tins item.	
	,	
Legend Wizard		×
Desired assift	end Legend Items	
<pre> Project_asci1 Hillshade of Project_asci1 </pre>	Hillshade of Project_asci1	
Set the number of columns in your legend:	×	
Preview		
	< Back Next > Cancel	

You can then click through the next four windows keeping the default settings or you can specify the options you would like for your legend. For more information about legend options, see the Arc help pages.

The end of this document goes through a tutorial on cleaning up the legend: <u>http://arrowsmith410-598.asu.edu/Lectures/Lecture9/DEM_data.html</u>.

When you select **North Arrow** a new window will open like the one below. Select the north arrow you would like and click **Ok**. You can further refine your choices with the **Properties** button or the **More Choices** button.





When you select **Scale Bar** a new window will open like the one below. Select the style of scale bar you would like and click **Ok**. You can further refine your choices and you can define the units with the **Properties** button or the **More Choices** button.

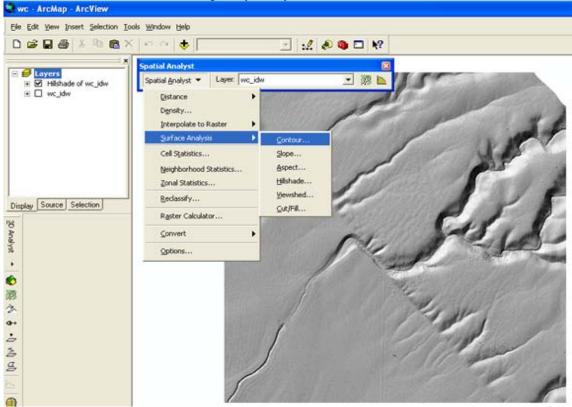
Print	<u>? ×</u>
Printer Name: KODAK 5100 AiO Status: Offline Type: KODAK 5100 AiO Where: USB001 Comments:	Setup
Printer Engine: Windows Printer Properties Output Image Quality (Resample Ratio) Fast Normal Best Ratio: 1: 3	Printer Paper(s) that will be printed Map Page (Page Layout) Sample Map Elements
 Tile Map to Printer Paper All 1 tile(s) Tiles from: 1 to: 1 to: Scale Map to fit Printer Paper Number of Copies: 1 to:	Ethionia Annalia Somalia Somalia Somalia Somalia Somalia
Print to File	OK Close

To print the map, select **Print** from the **File** menu. A window will open like the one below. Here you can specify the options you would like. When you are satisfied with your options, click **Ok**.

Other activities

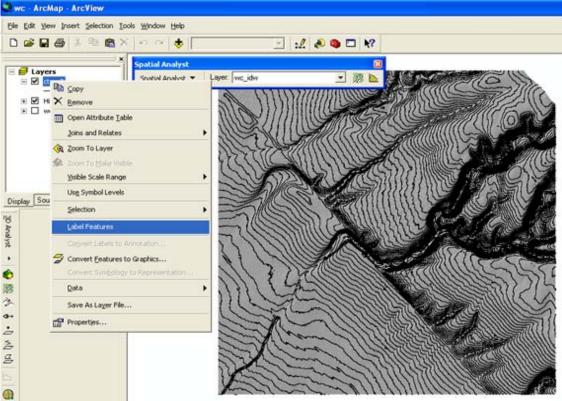
Making a contour map

Select the **Surface Analysis** option under the **Spatial Analyst** pull down menu. Click on **Contour**. Make sure that the target layer is your Raster DEM, not the Hillshade!



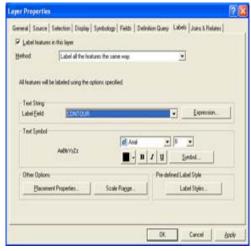
This screen will appear:

Contour	? 🗙	
Input surface:	wc_idw	Make sure this is the correct file (should be the DEM)
Input height range:	Z min: 629.75 Zmax: 704.517151	
Contour interval:		Define the contour interval
Base contour:	0	
Z factor:	1	
Output information based on input cor	tour definition	
Minimum contour:	630	
Maximum contour:	704	
Total number of contour values:	75	Save the contours if you
Output features:	C:\Documents and Settings\R	want
	OK Cancel	



To label the contours, right click on the contours layer and choose Label features:

The problem will be that the labels will probably be for the line ID and not the elevation! So, then right click on the layer again, but this time choose **Properties->Label Tab, and** make sure that the Label Field is CONTOUR:



Topographic profiles

To make a topographic profile along a path you define on the DEM, do the following: You will need the 3D analyst tool, so make sure that under extensions, its check box is checked (as you did above for the Spatial Analyst).

Then under View->Toolbars->3DAnalyst, select that and the toolbar will appear. Make sure that the target layer is the DEM you have made above, and then click on the little symbol that looks like a squiggle. It is the **Interpolate line** tool.

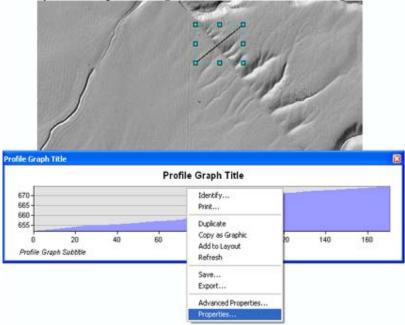
3D Analyst		×
<u>3</u> D Analyst 🔻	Layer: wc_idw	. 🧊 ॐ ↔ ≟ 🧕 🗠 🕕 🌒
		Interpolate Line

Use that tool to define your profile. Click once to start, and then click for each vertex along your profile (it does not have to be a single straight line profile). Double click at the end. When you double click, it may take quite a while (tens of seconds) at first for anything to happen. The program is going through the DEM and finding your pixels that are nearest to the line you chose.



To actually draw the profile, click on the symbol that looks like a profile (**Create Profile Graph** above).

If you right click on the resulting plot, you can set various parameters of the plot (labels, etc.) by choosing the **Properties** and **Advanced Properties**.



One choice under that menu (the one above that you get when right clicking on the plot), is **Export**. This is a new addition it seems in ArcGIS9.2. You can export the data from your profile to something like Microsoft Excel. Choose the **Data** tab and then the **Excel format**. This will export a two column XY or Distance-Elevation file that one can use for further analysis.

Export Dialog	
Picture Native Data	
Series: (all) C Text C XML C HTML Table C Excel	Implicate: Implication Implication
Copy Save	S <u>e</u> nd Close