



The following was presented at DMT'11
(May 22-25, 2011).

The contents are provisional and will be
superseded by a paper in the
DMT'11 Proceedings.

See also earlier Proceedings (1997-2010)
<http://ngmdb.usgs.gov/info/dmt/>

Raster Blending Techniques and Multi-Image Mashups for GIS

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Raster Blending Techniques

What Is Raster Blending?

Blending one raster into another so the properties of both are preserved.



Raster Blending Techniques

Why Raster Blending?

- To avoid using transparency on geologic map units, which weakens the colors!



Raster Blending Techniques

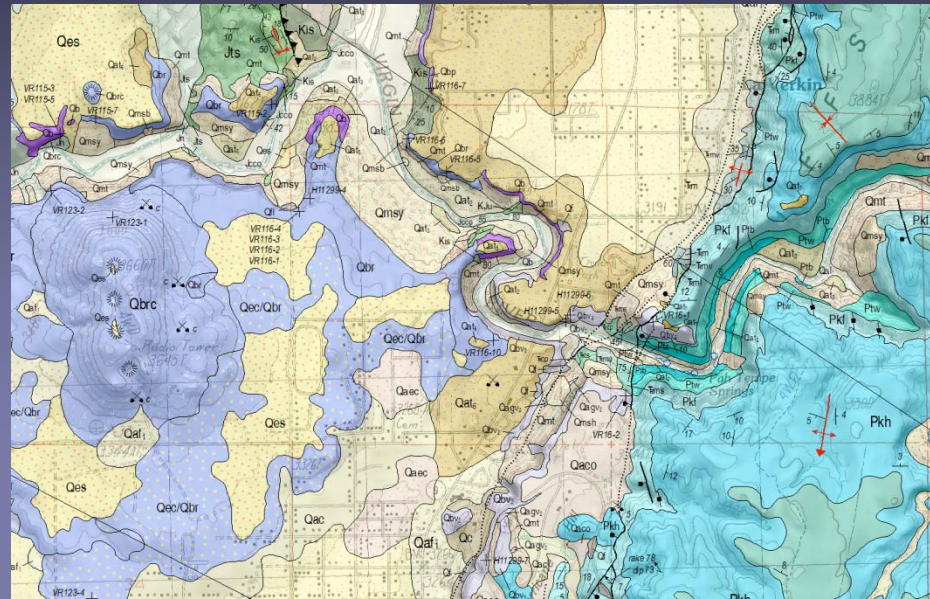
Why Raster Blending?

- To avoid using transparency on geologic map units, which weakens the colors!
- To balance the shading and topographic base map so they compliment, not dominate, the geologic mapping

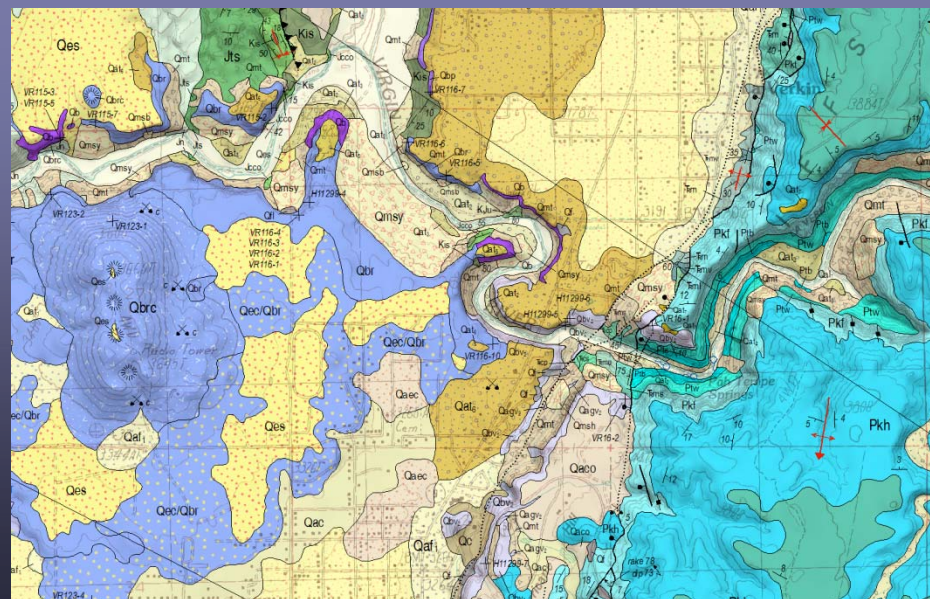


Raster Blending Techniques

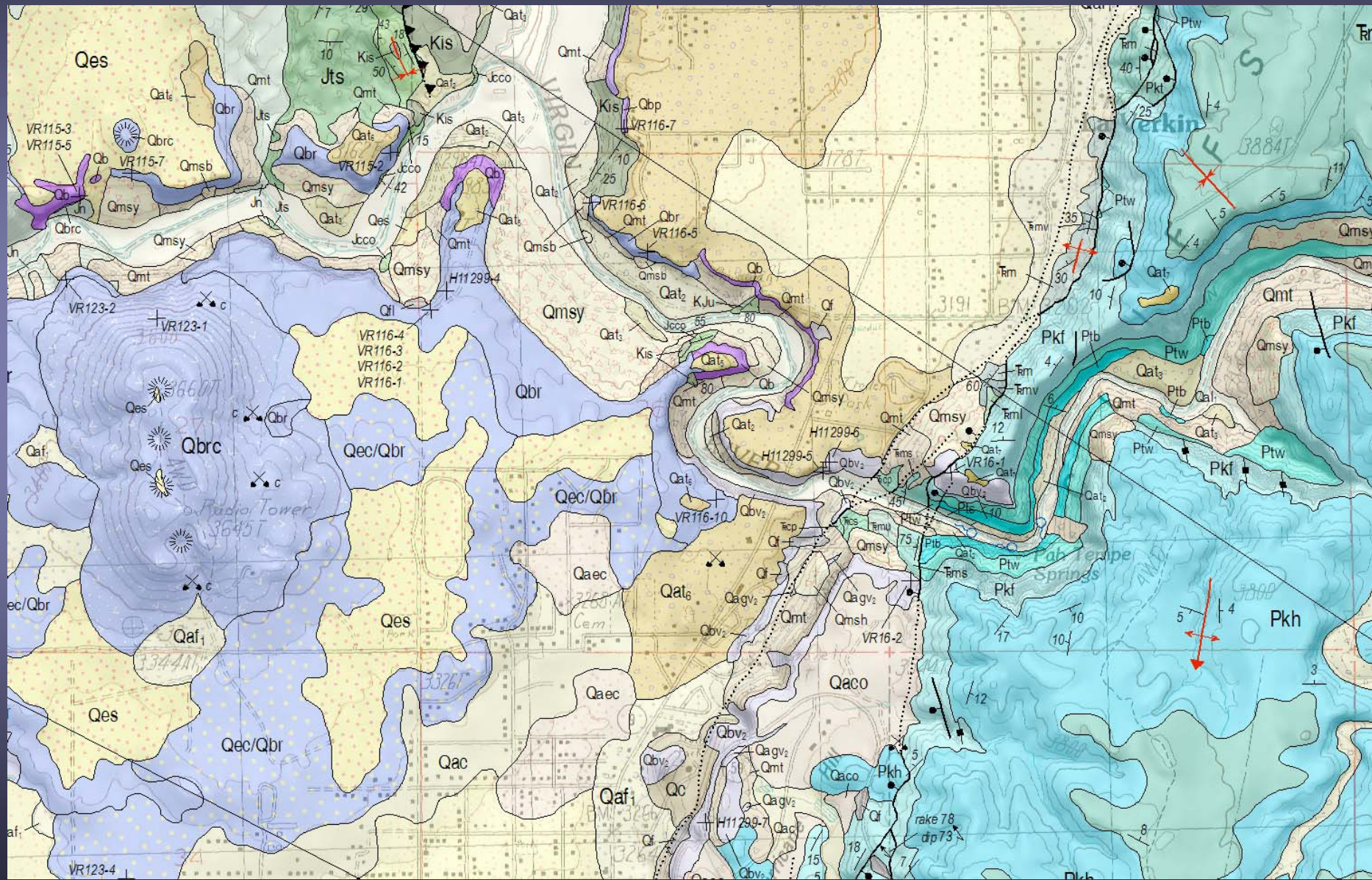
ArcMap
Transparency



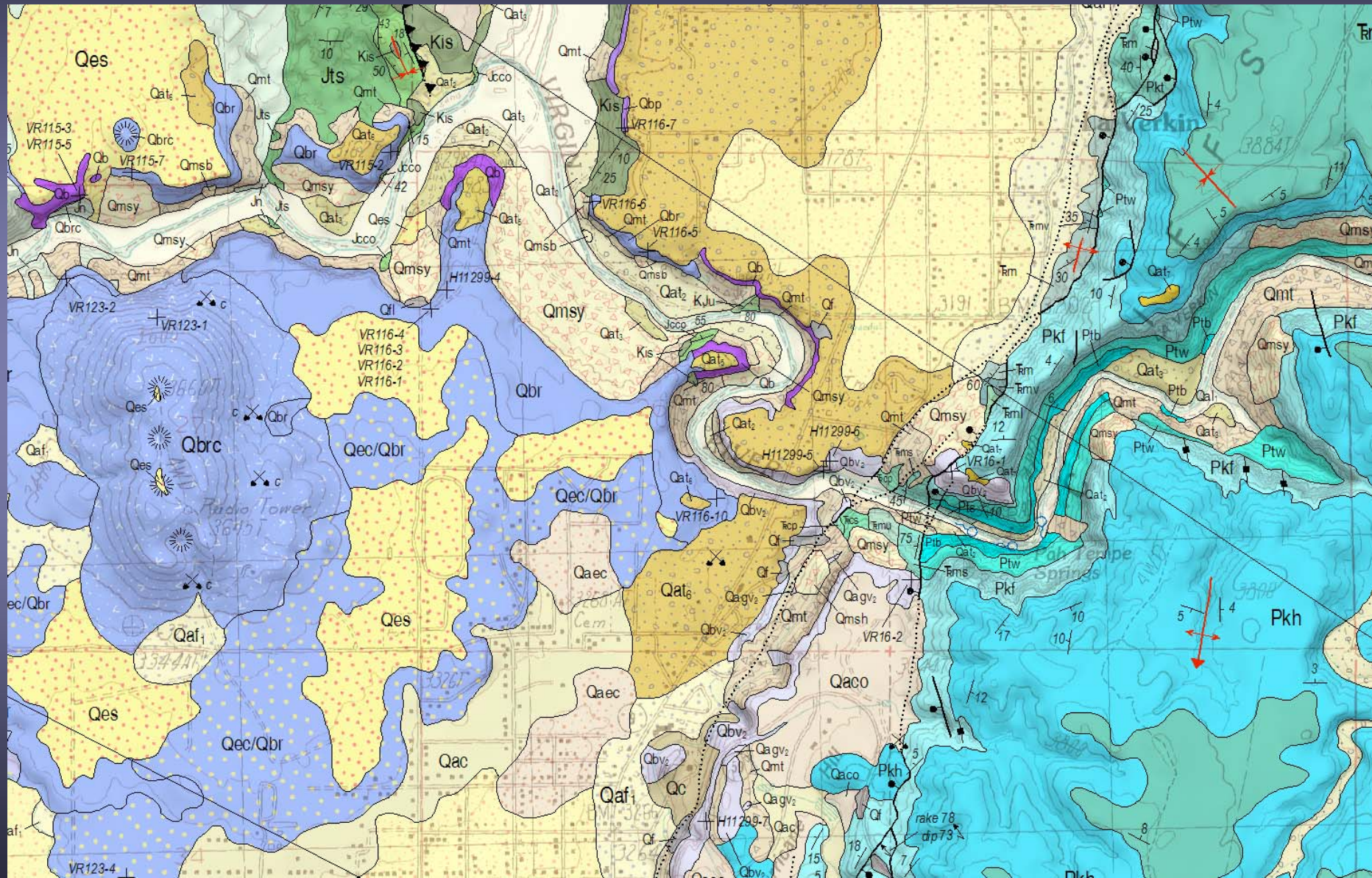
Global Mapper
Blending



Transparent Polygons



Raster Blending



Base On Top Of Polygons

“I don’t need no stinking blending”,
I’ll just put the base map on top of the
map unit polygons!

Base On Top Of Polygons

*“I don’t need no stinking blending”,
I’ll just put the base map on top of the
map unit polygons!*

I encourage you to not do that; base maps
belong at the “base” of all other layers

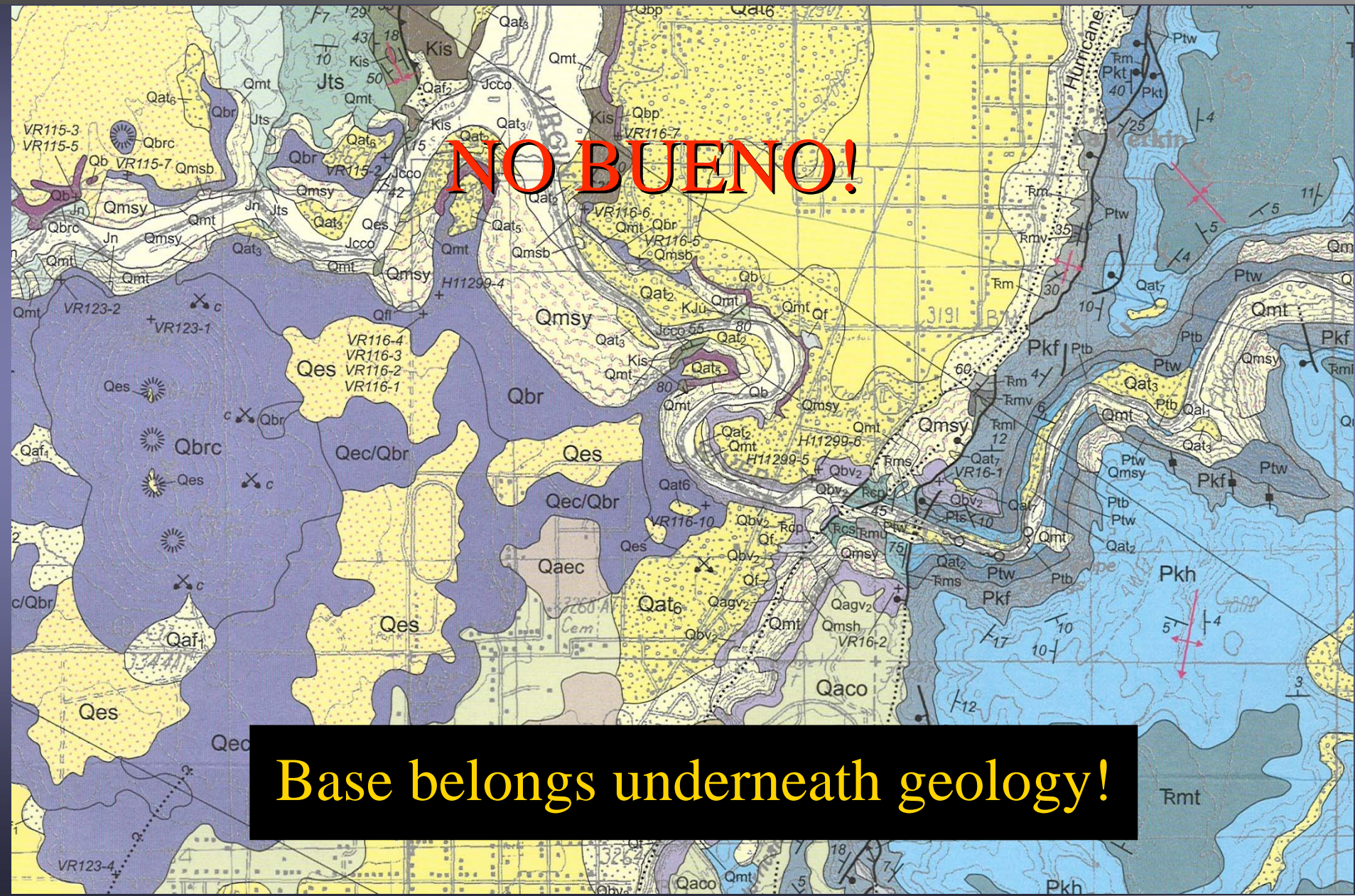
Base On Top Of Polygons Is Bogus



Base On Top Of Polygons Is Bogus

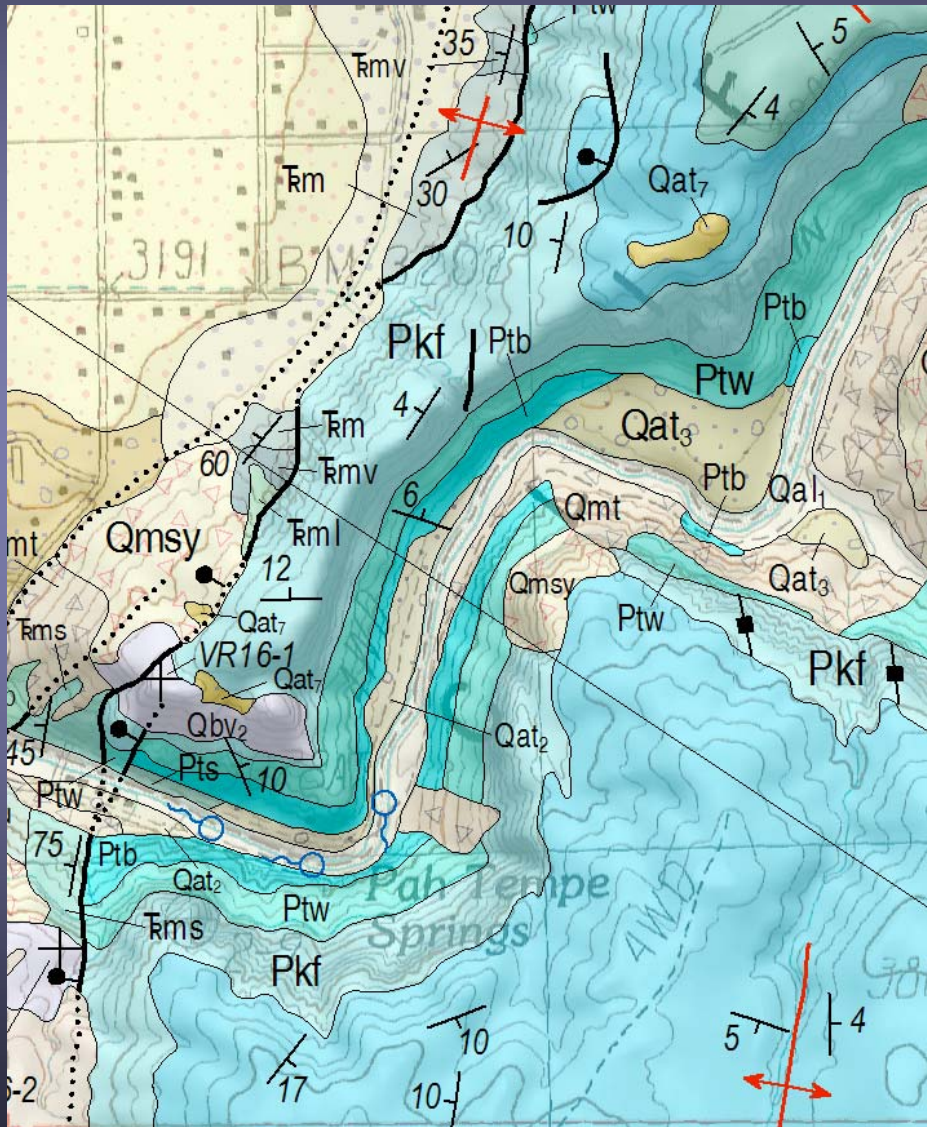
NO BUENO!

Base belongs underneath geology!

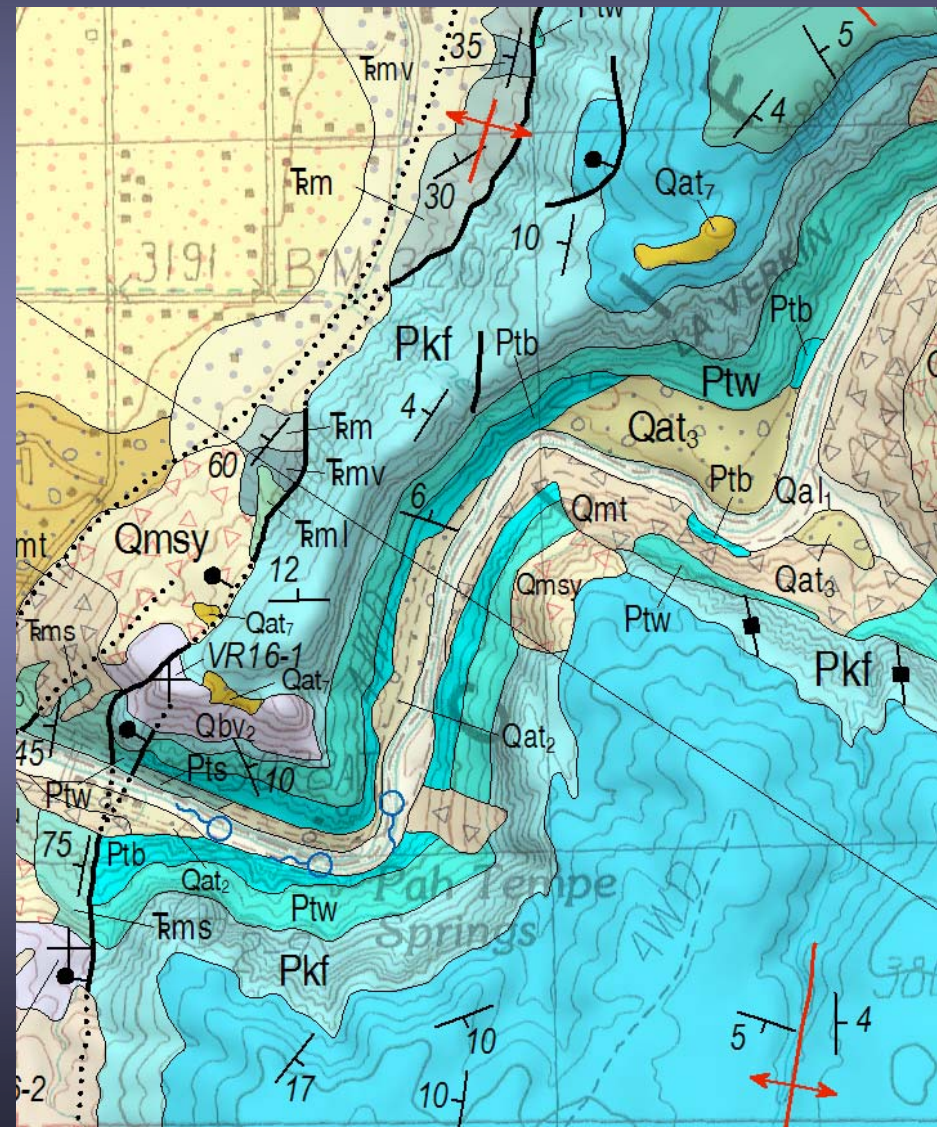


Raster Blending Techniques

Transparency



Blending



Raster Blending Techniques

Impressive, so how do you make these?

Start with a high-resolution raster made from
your map unit polygons and patterns...
let's go to an ArcMap project.



ArcMap Data View

First, symbolize your map unit polygons with colors and patterns.

Set the data frame reference scale to 1:24,000 (for 7.5' quads).

The screenshot displays the ArcMap interface with a geological map in Data View. The map shows various geological units labeled with codes like Qmt, Jts, Qat₂, Qbr, Qmsy, Qac, Qaf₁, Qc, Qbv₂, Qagv₂, Qaco, and Qf. A 'Data Frame Properties' dialog box is open, showing the 'Data Frame' tab. The 'Reference Scale' is set to 1:24,000. The 'Units' section shows 'Map' and 'Display' both set to 'Meters'. The 'Label Engine' is set to 'ESRI Maplex Label Engine'. The 'Simulate layer transparency in legends' checkbox is checked. The 'Table of Contents' on the left shows a list of layers under the 'Hurricane' folder, including 'Hurricane_samples_anno_1', 'Hurricane_dips_anno', 'HURRICANE_DIPANNO', 'Hurricane_geology_anno', 'unit_labels', 'Hurricane_geology_cross_s', 'Hurricane_geology_structur', 'Hurricane_geology_symbols', 'Hurricane_leaders', 'Hurricane_geology_lines', 'Hurricane_geology_lines_Re', 'Hurricane_geology_polys', 'Hurricane_geology_polys_R', 'Hurricane_ShadedReliefTop', 'Utah_thumbnail_indexmap', 'Hurricane_boundary', and 'StateBoundary_poly'. The 'Legend' shows a color key for RGB: Red: Band_1, Green: Band_2, Blue: Band_3.



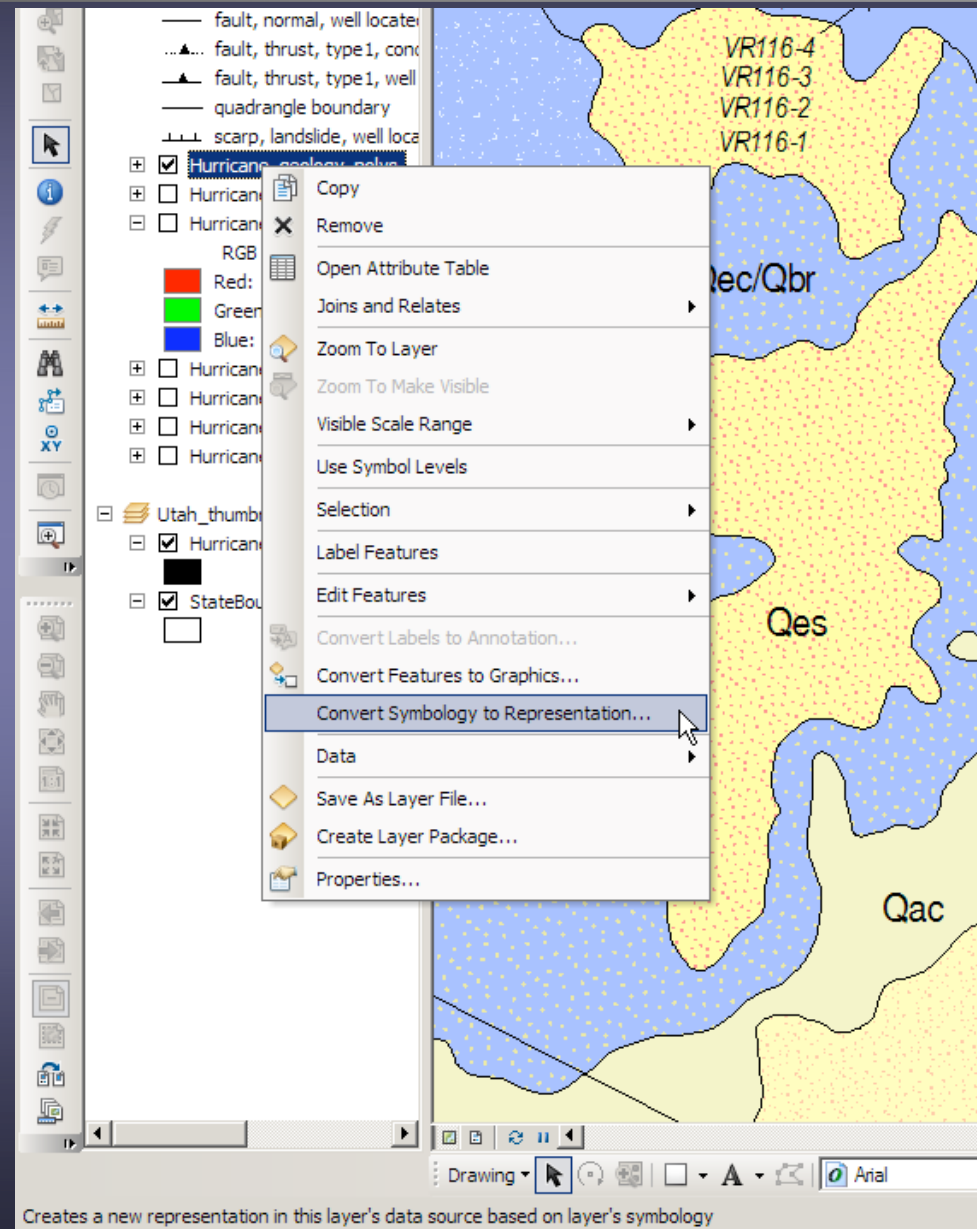
ArcMap - Polygon Symbology To Representation

Now right-click your polygon layer and choose *Convert Symbology to Representation*.

The representation layer will be added to the table of contents (TOC).

Feature class representations let you store symbology with your features in the geodatabase

With a representation, your map unit patterns will scale properly at all zoom levels in the data view.



ArcMap Data View

Standard Polygon Symbology

Symbology As Representation

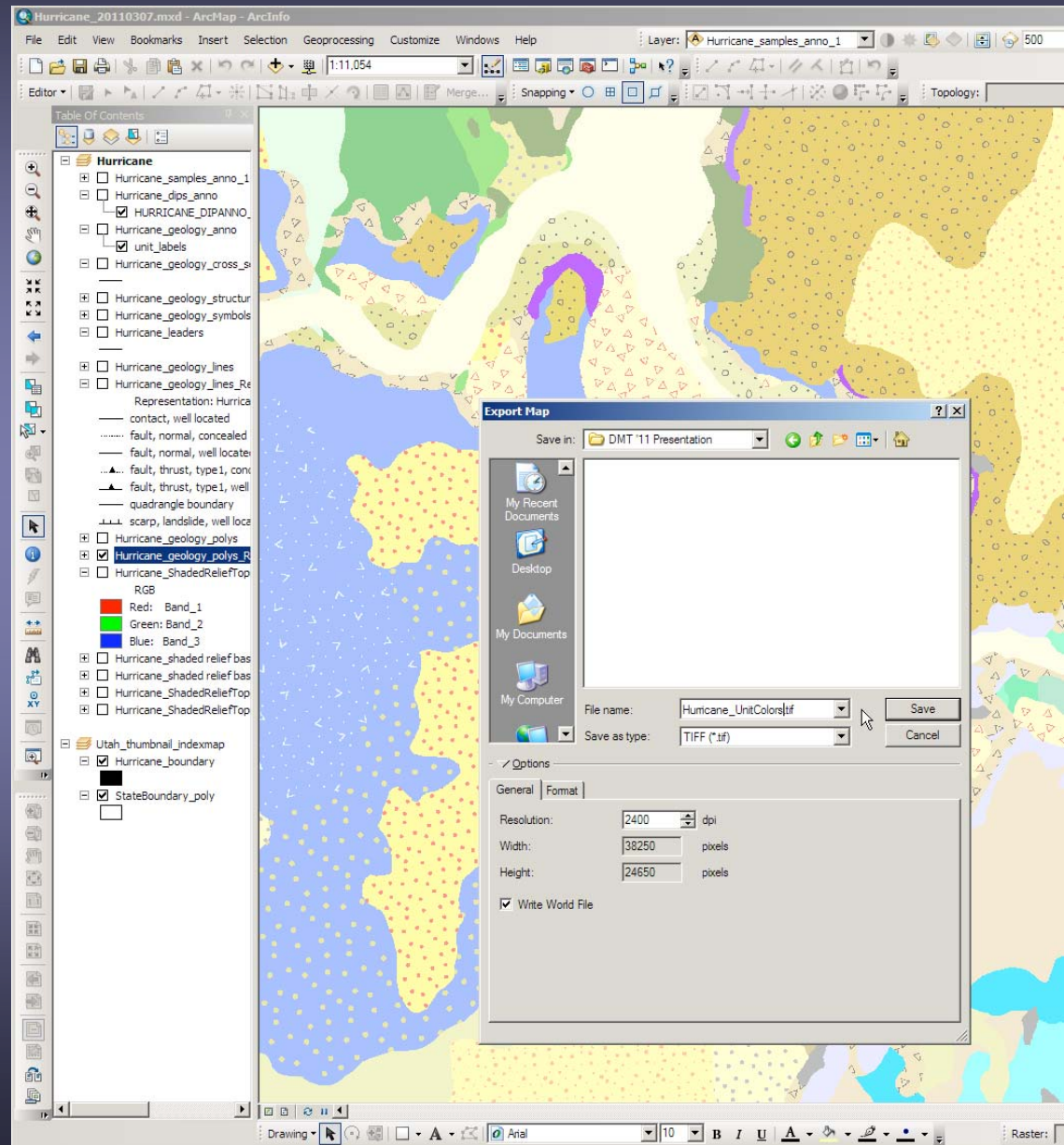


ArcMap - Export Representation To Raster

Turn off everything in your TOC except the polygon representation layer.

Then export your data view to a high-resolution GeoTiff, between 1800 and 2400dpi!

Yeah, that's right, you want a really high resolution raster for this.



Raster Blending Techniques

Now On To Global Mapper!



Raster Blending Techniques

Global Mapper Overlay Blending

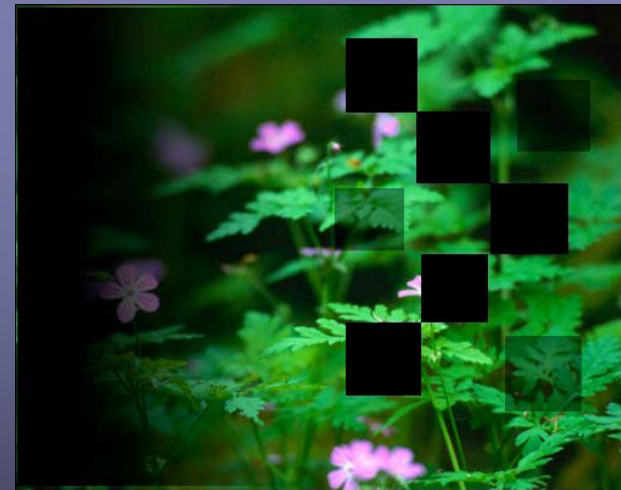
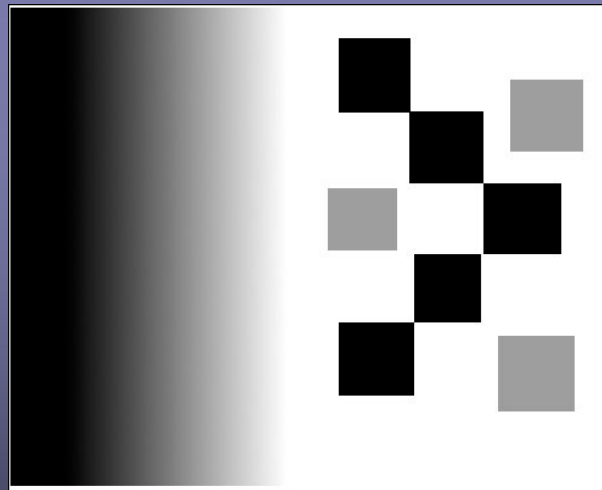
The *Blend Mode* settings control how an overlay is blended with underlying overlays, in addition to the *Translucency* setting. These settings allow Photoshop-style filters to be applied to overlays, giving stunning results.



Raster Blending Techniques

Global Mapper Overlay Blending

The *Multiple* blend mode is the most useful option for blending map images to make image mashups





Slope Shader

Overlay Control Center

Currently Opened Overlays (Right Click on Overlay Names for More Options)

- Hurricane_topo_scan_rectified_DRG.tif
- Hurricane_hillshade with slope_60_360.tif
- Hurricane_UnitColors_20110309_representations.png

Raster Options

Palette | Feathering | Color Grade | Projection

Display | Color/Contrast Adjustment | Cropping

Color Intensity (0)

Lighter ————— Darker

Default

Translucency (Can You See Through It?) (100.0%)

Transparent ————— Opaque

Transparency

Transparent Set Transparent Color...

Make Very Similar Colors Transparent as Well

Blend Mode: Multiple

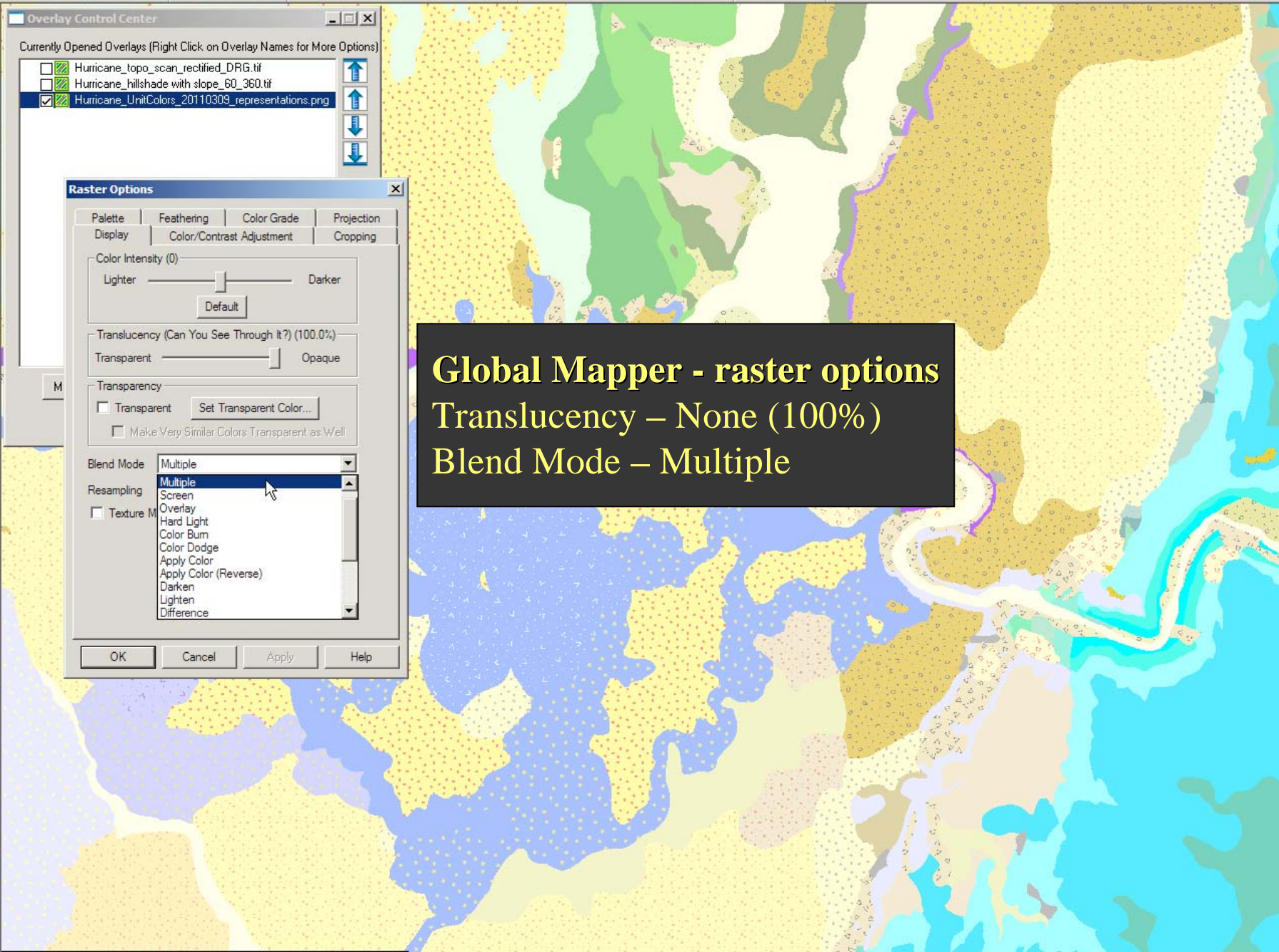
Resampling: Multiple

- Multiple
- Screen
- Overlay
- Hard Light
- Color Burn
- Color Dodge
- Apply Color
- Apply Color (Reverse)
- Darken
- Lighten
- Difference

Texture M

OK Cancel Apply Help

Global Mapper - raster options
Translucency – None (100%)
Blend Mode – Multiple





Overlay Control Center

Currently Opened Overlays (Right Click on Overlay Names for More Options)

- Hurricane_topo_scan_rectified_DRG.tif
- Hurricane_hillshade with slope_60_360.tif
- Hurricane_UnitColors_20110309_representations.png

Raster Options

Palette | Feathering | Color Grade | Projection

Display | Color/Contrast Adjustment | Cropping

Color Intensity (0)

Lighter ————— Darker

Default

Translucency (Can You See Through It?) (45.7%)

Transparent ————— Opaque

Transparency

Transparent Set Transparent Color...

Make Very Similar Colors Transparent as Well

Blend Mode: Multiple

Resampling: Multiple

- Screen
- Overlay
- Hard Light
- Color Burn
- Color Dodge
- Apply Color
- Apply Color (Reverse)
- Darken
- Lighten
- Difference

OK Cancel Apply Help

Global Mapper - raster options
Translucency – 45%
Blend Mode – Multiple



Overlay Control Center

Currently Opened Overlays (Right Click on Overlay Names for More Options)

- Hurricane_topo_scan_rectified_DRG.tif
- Hurricane_hillshade with slope_60_360.tif
- Hurricane_UnitColors_20110309_representations.png

Raster Options

Palette | Feathering | Color Grade | Projection
Display | Color/Contrast Adjustment | Cropping

Color Intensity (0) Lighter Darker
Default

Translucency (Can You See Through It?) (30.9%)
Transparent Opaque

Transparency
 Transparent Set Transparent Color...
 Make Very Similar Colors Transparent as Well

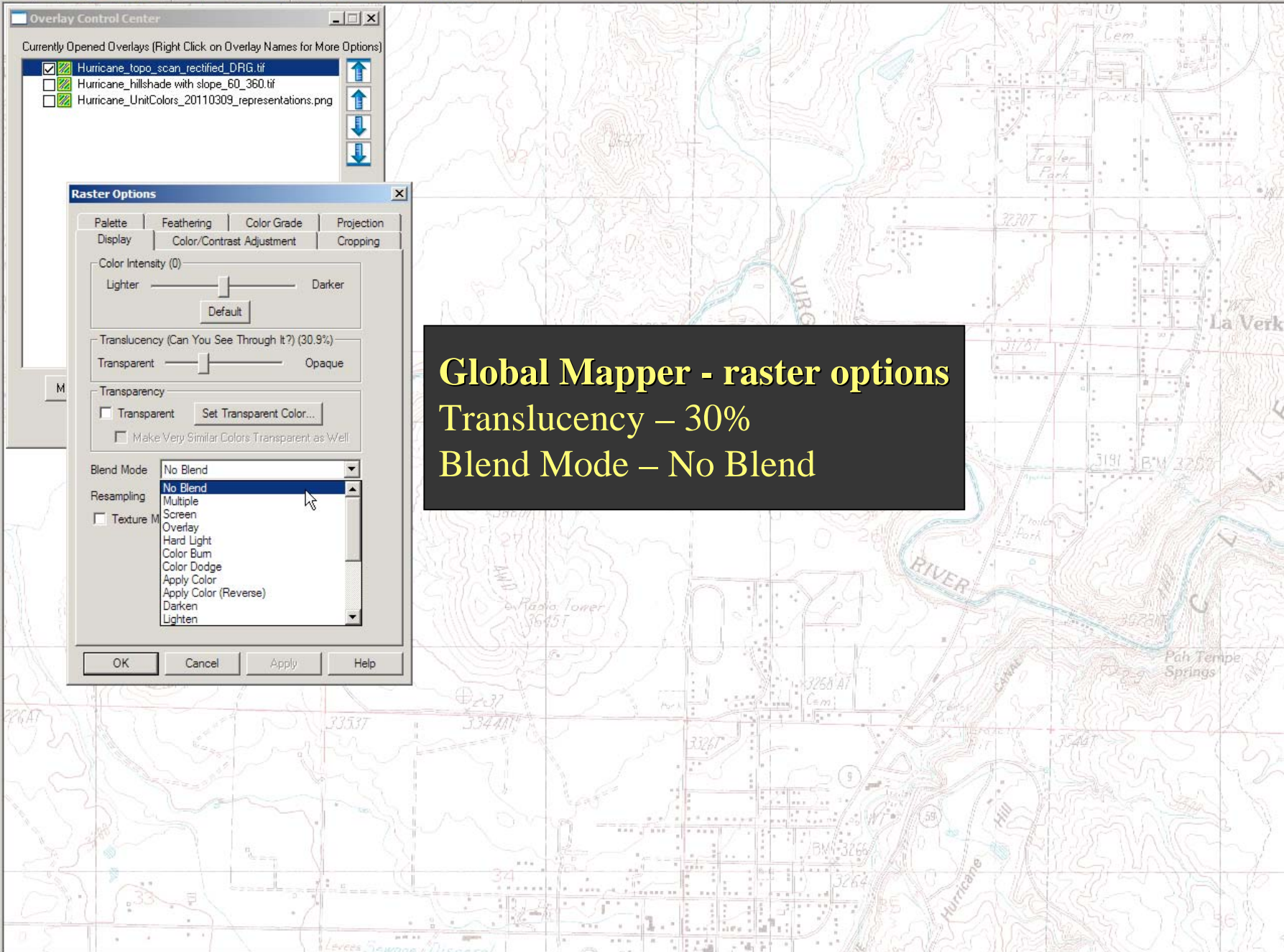
Blend Mode: No Blend

Resampling: No Blend

- Multiple
- Screen
- Overlay
- Hard Light
- Color Burn
- Color Dodge
- Apply Color
- Apply Color (Reverse)
- Darken
- Lighten

OK Cancel Apply Help

Global Mapper - raster options
Translucency – 30%
Blend Mode – No Blend





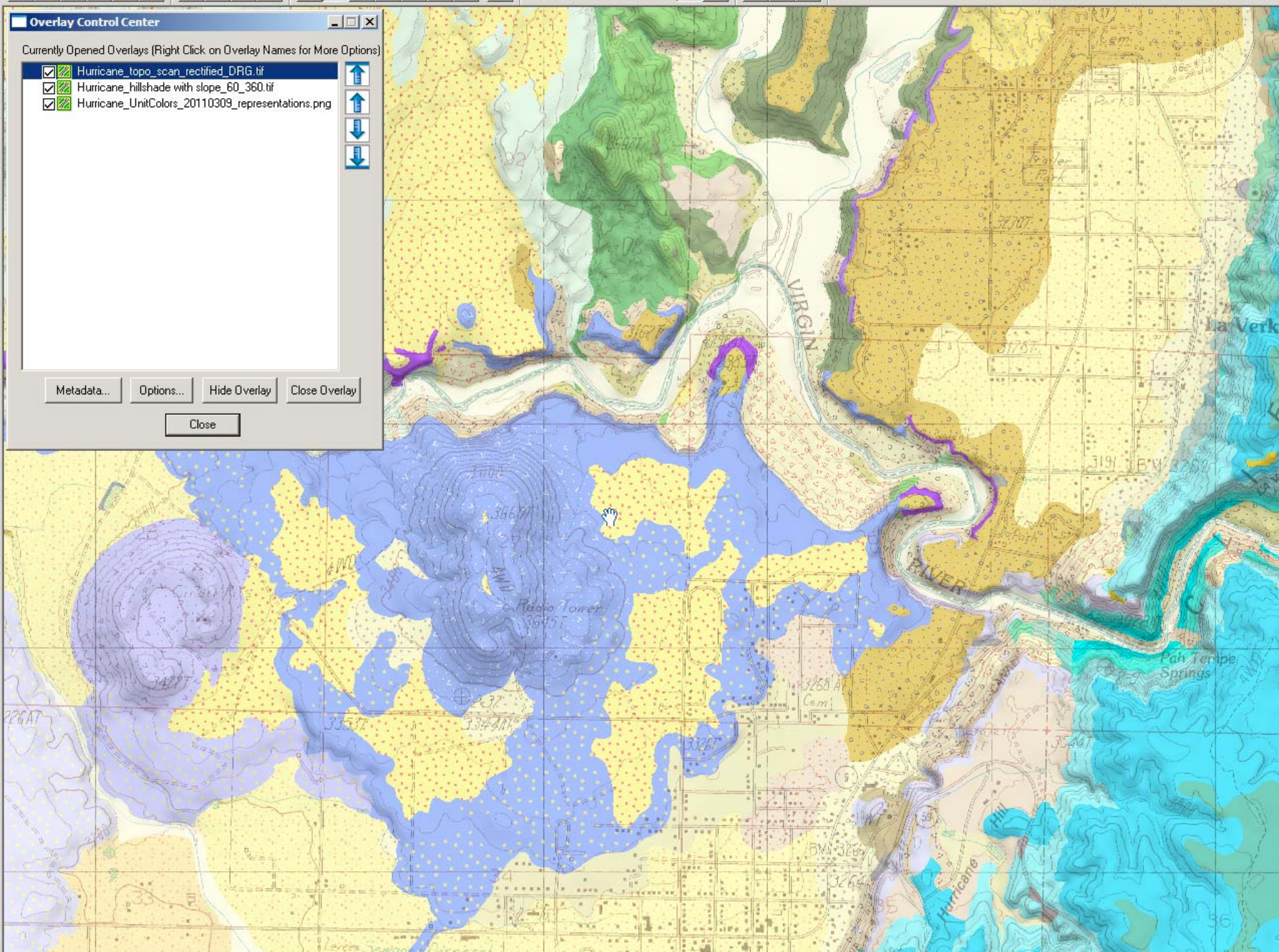
Overlay Control Center

Currently Opened Overlays (Right Click on Overlay Names for More Options)

- Hurricane_topo_scan_rectified_DRG.tif
- Hurricane_hillshade with slope_60_360.tif
- Hurricane_UnitColors_20110309_representations.png

Metadata... Options... Hide Overlay Close Overlay

Close



- Open Data File(s)... Ctrl+O
- Open Generic ASCII Text File(s)...
- Open All Files in a Directory Tree...
- Open ECW File from the Web...
- Open Data File at Fixed Screen Location...
- Unload All... Ctrl+U

- Create New Map Catalog...
- Find Data Online...
- Download Online Imagery/Topo/Terrain Maps...

- Load Workspace... Ctrl+W
- Save Workspace... Ctrl+S
- Save Workspace As...

Run Script...

- Capture Screen Contents to Image... Shift+C
- Export Global Mapper Package File...
- Export PDF File...
- Export Elevation Grid Format...

Export Raster/Image Format...

Export Vector Format...

Export Web Format...

Batch Convert/Reproject...

Create S-63 User Permit File...

Combine Terrain Layers...

Generate Contours...

Generate Watershed...

Rectify (Georeference) Imagery...

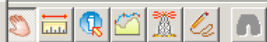
Print... Ctrl+P

Print Preview...

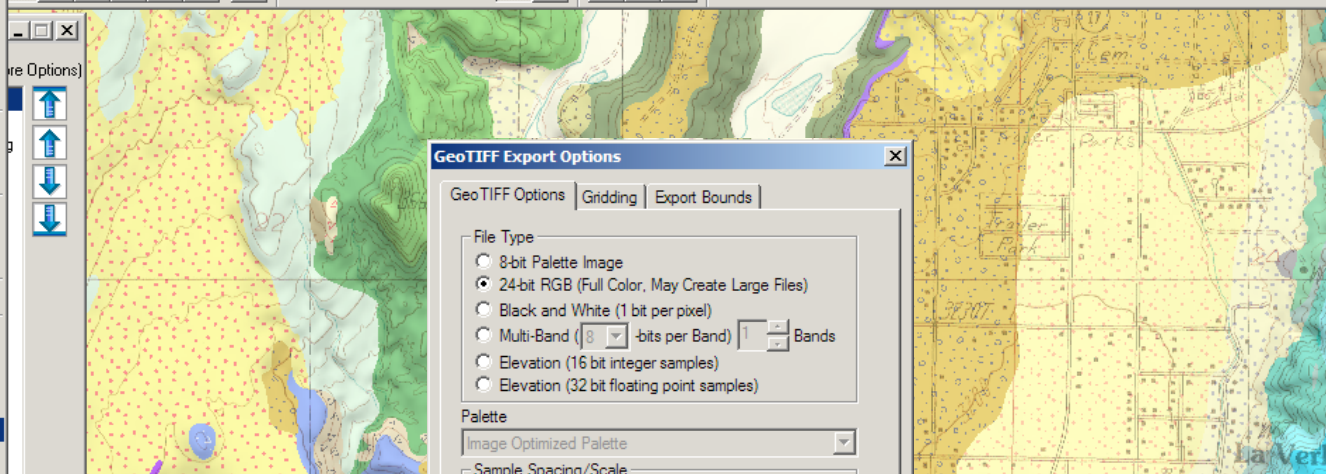
Print Setup...

- 1 Hurricane_US Topo.tif
- 2 GlobalMapper_Mashups test_20110303.gmw
- 3 StGeorgeForKent400.tif
- 4 StGeorge_GeologicUnits-Base_mashup_24bit.tif
- 5 tGeorge_BaseMap.gmw
- 6 StGeorgeColors5-5-2011.png
- 7 StGeorge_slope-enhanced shaded relief.tif
- 8 StGeorge_topo base.tif
- 9 StGeorgeColors5-5-2011.png

Exit Alt+X



Slope Shader



Select Export Format

Select the format to export your loaded data to. See <http://www.globalmapper.com/product/formats.htm> for information on the available formats.

GeoTIFF

OK Cancel

GeoTIFF Export Options

GeoTIFF Options | Gridding | Export Bounds

File Type

- 8-bit Palette Image
- 24-bit RGB (Full Color, May Create Large Files)
- Black and White (1 bit per pixel)
- Multi-Band (8 -bits per Band) 1 Bands
- Elevation (16 bit integer samples)
- Elevation (32 bit floating point samples)

Palette

Image Optimized Palette

Sample Spacing/Scale

X-axis: 0.686706429399818 meters

Y-axis: 0.704529814405126 meters

Always Generate Square Pixels

If you wish to change the ground units that the spacing is specified in, you need to change the current projection by going to Config->Projection.

[Click Here to Calculate Spacing in Other Units...](#)

Export at the Fixed Scale 1: 0

TIFF Format Options

DPI Value To Save in Image (0 for None): 0

Compression: Default (LZW Compression)

- Make Background (Void) Pixels Transparent
- ADVANCED: Use Tile Rather than Strip Orientation
- ADVANCED: JPEG-in-TIFF Quality 90
- Save Map Layout (Scale/Margins/Grid/Legend/etc.)
- Save Vector Data if Displayed
- Interpolate to Fill Small Gaps in Data
- Generate TFW (World) File
- Generate PRJ File

OK Cancel Apply Help

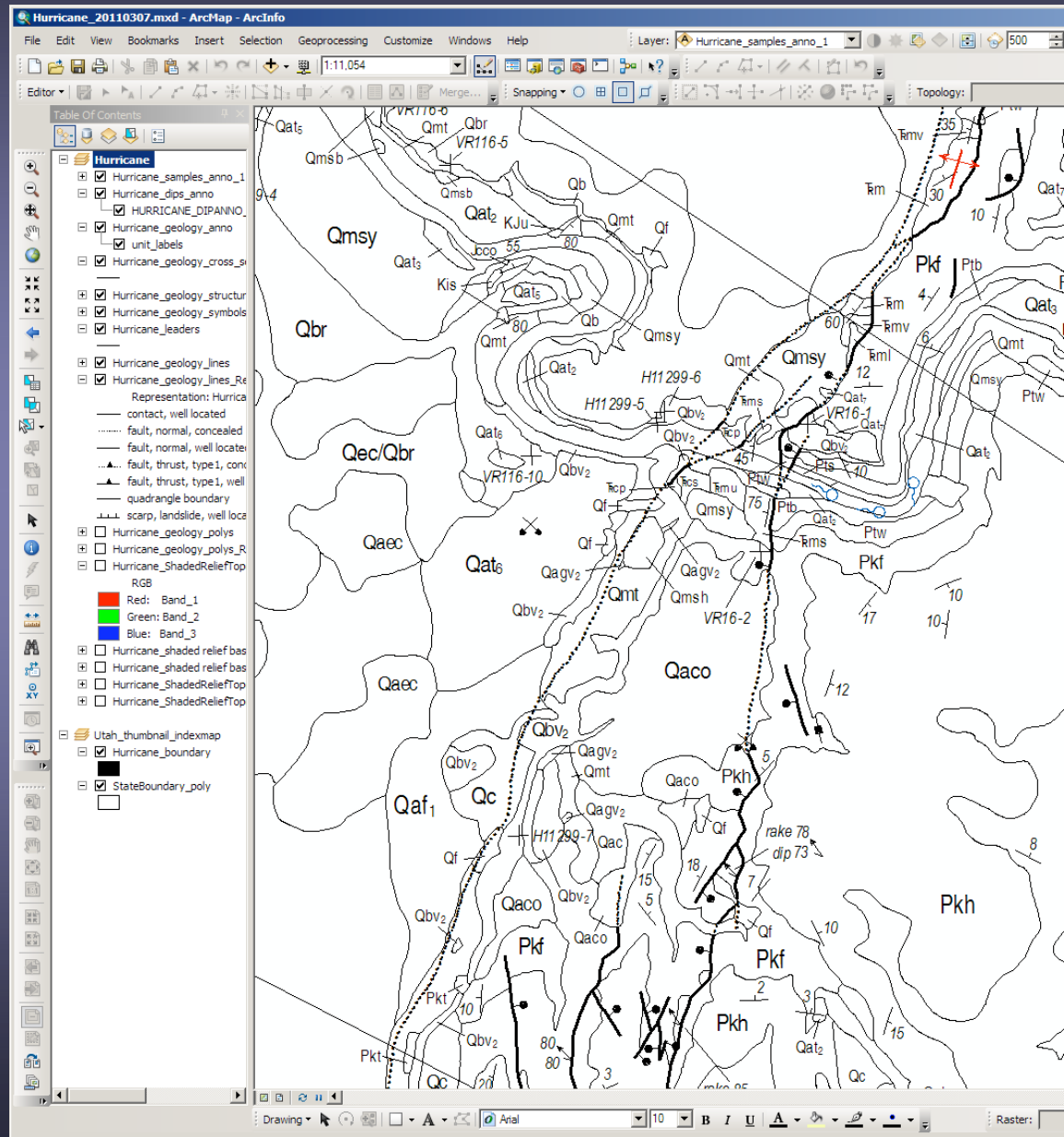
Multi-Image Mashups For Use In ArcGIS

Now On To ArcGIS!



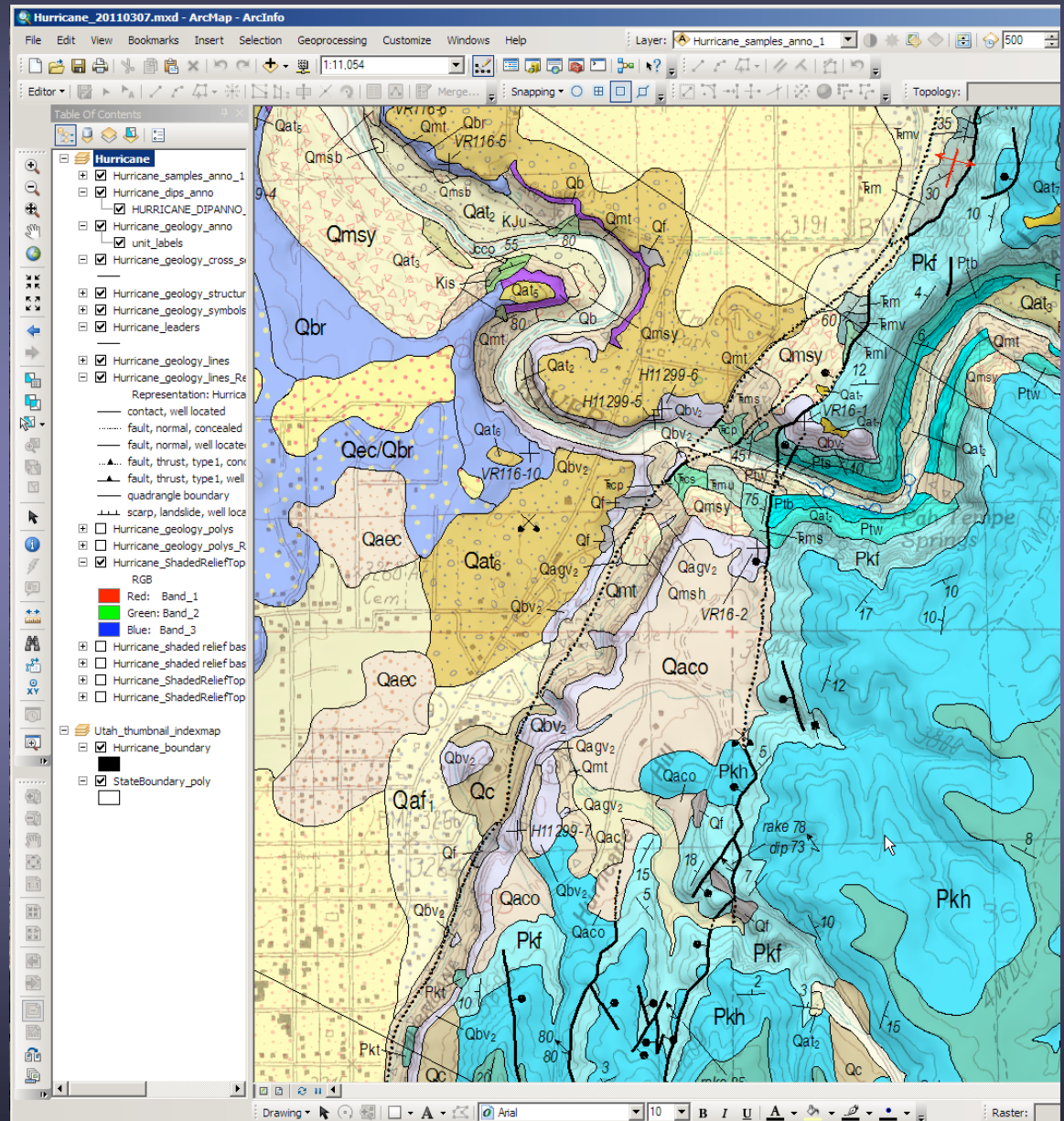
Multi-Image Mashups For Use In ArcGIS

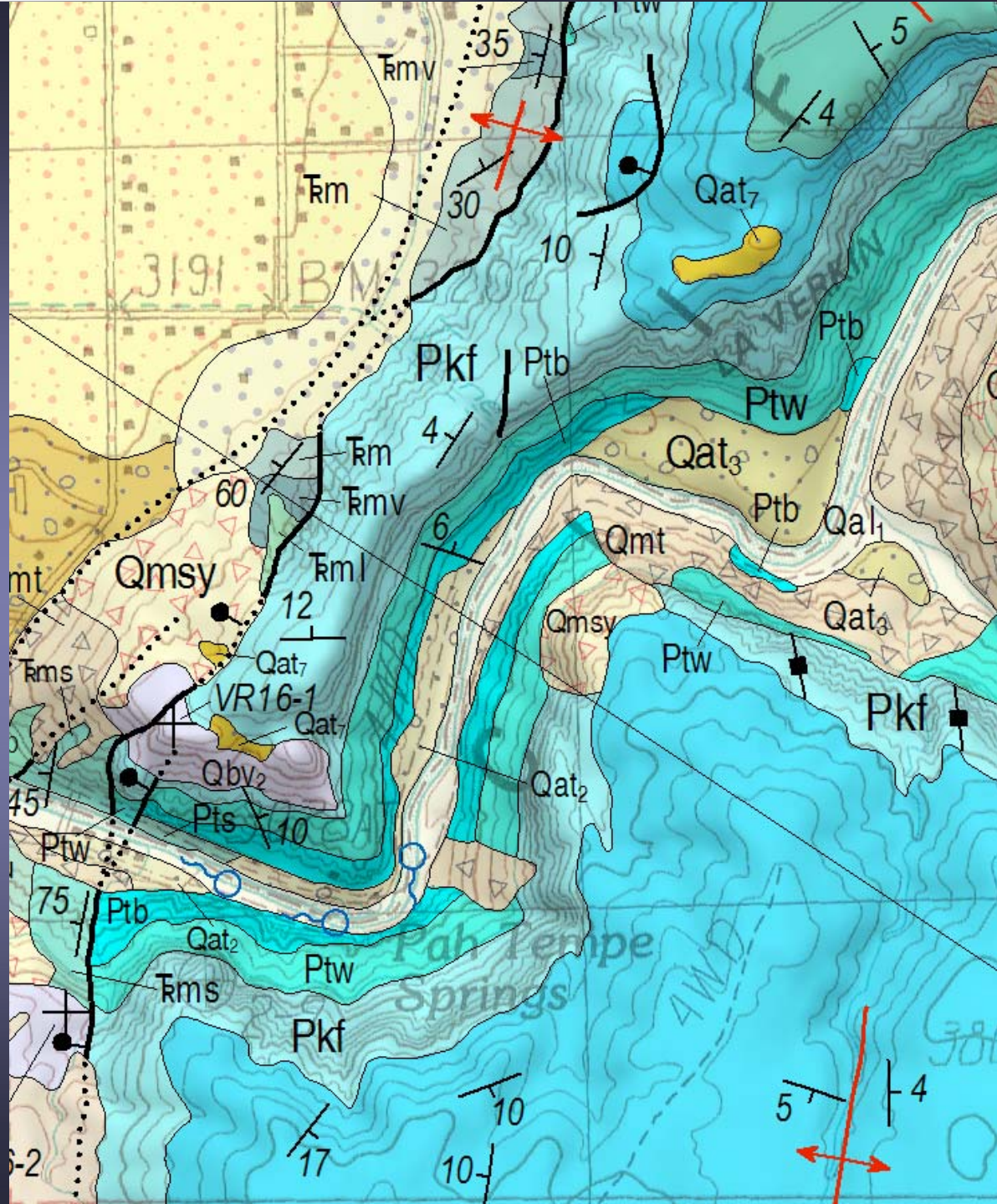
ArcMap -
Geologic lines,
symbols, and
annotations



Multi-Image Mashups For Use In ArcGIS

ArcMap -
Geologic lines,
symbols, and
annotations,
with multi-image
mashup of map unit
colors and patterns,
shaded relief, and
topographic base map





Multi-Image Mashups For Use In ArcGIS

Benefits of Multi-Image Mashups

- Full strength map unit colors



Multi-Image Mashups For Use In ArcGIS

Benefits of Multi-Image Mashups

- Full strength map unit colors
- Much better graphic presentation of geology, shaded relief, and topographic base map.



Multi-Image Mashups For Use In ArcGIS

Benefits of Multi-Image Mashups

- Full strength map unit colors
- Much better graphic presentation of geology, shaded relief, and topographic base map.
- Eliminates the need for most ArcMap layer transparency, significantly increasing graphic performance.



Digital Mapping Techniques '11



Association of
American State Geologists

United States
Geological Survey

Questions, comments?

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Global Mapper LLC - <http://www.globalmapper.com/>