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Creating Base Maps Using Global Mapper

OLD LINES



NEW DATUMS

48th ANNUAL

ALASKA SURVEYING & MAPPING CONFERENCE

MARCH 2014

Back to the Base-ics

Raster Blending Techniques
and Multi-Image Mashups

What is Raster Blending?

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

Back to the Base-ics

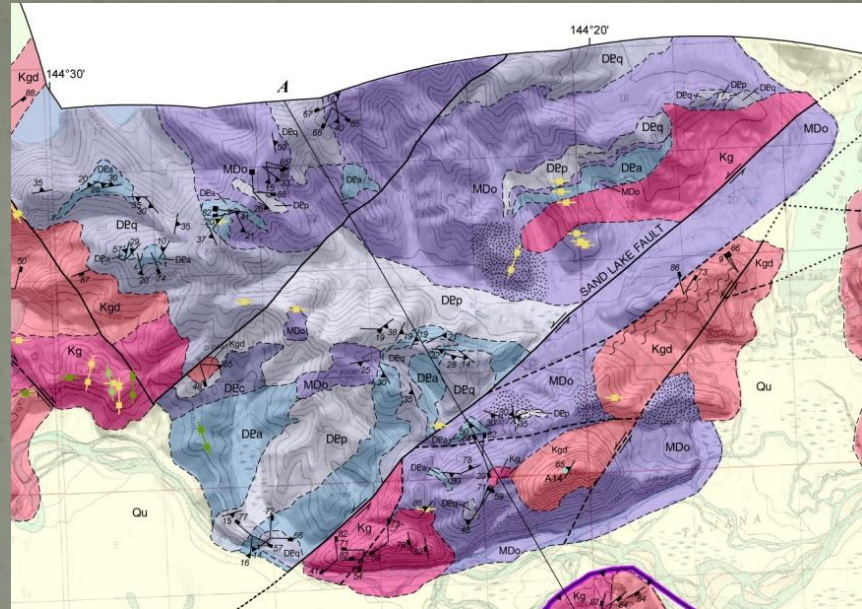
Raster Blending and Multi-Image Mashups

Why Raster Blending?

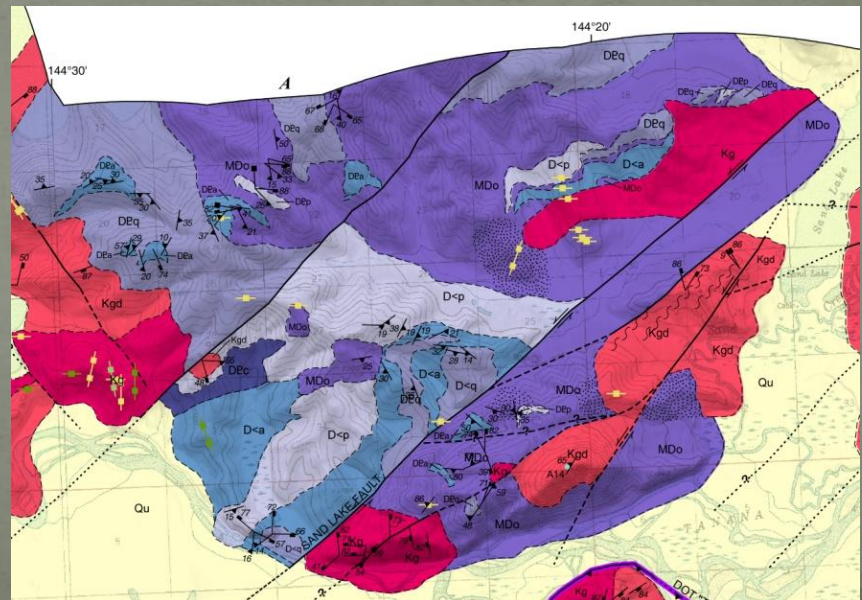
- 1) To avoid using transparency on geologic maps
- 2) To balance the shading and topographic base map so they complement the geologic map data

Raster Blending and Multi-Image Mashups

ArcMap
Transparency

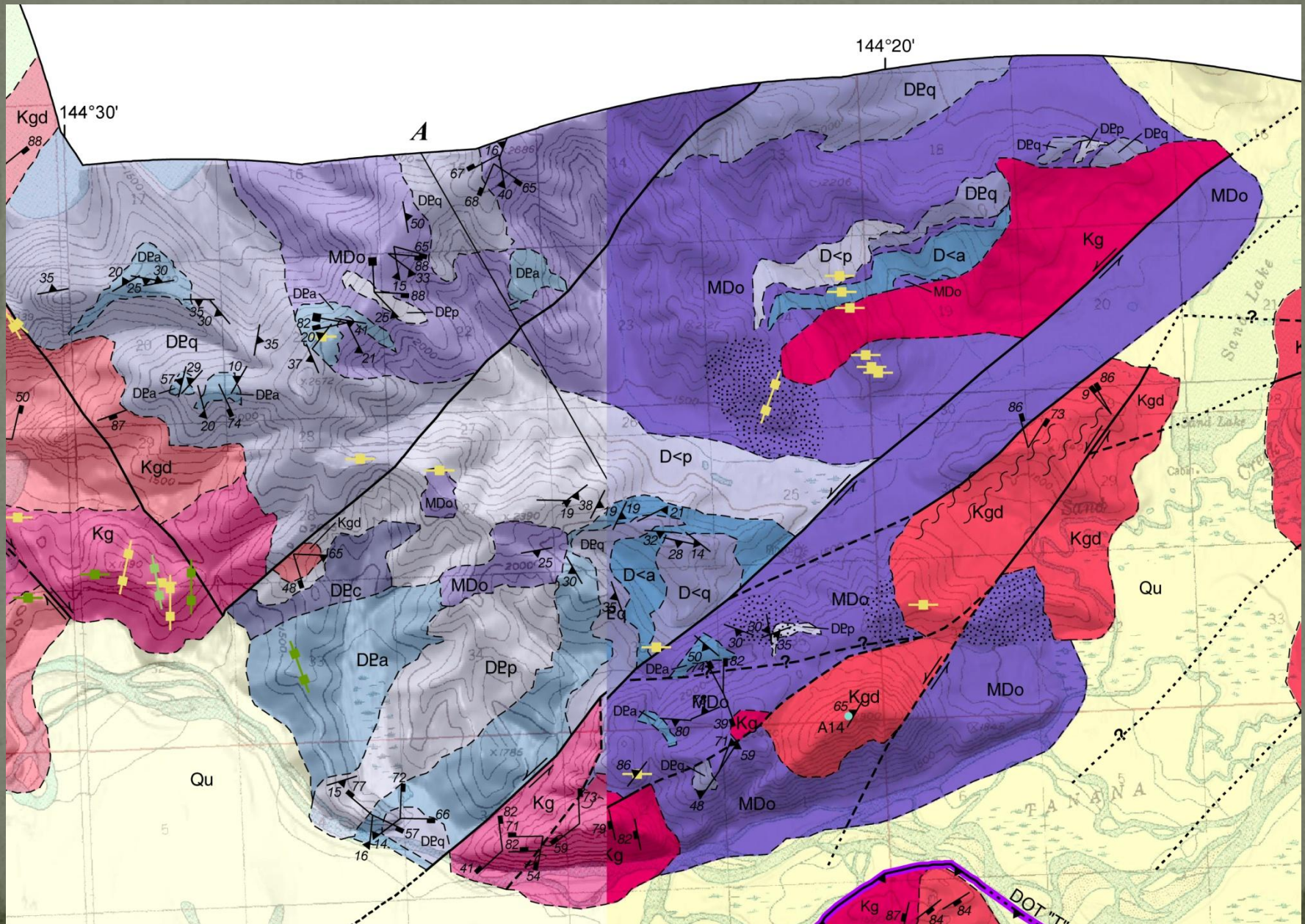


Global Mapper
Blending



Transparent Polygons

Raster Blending

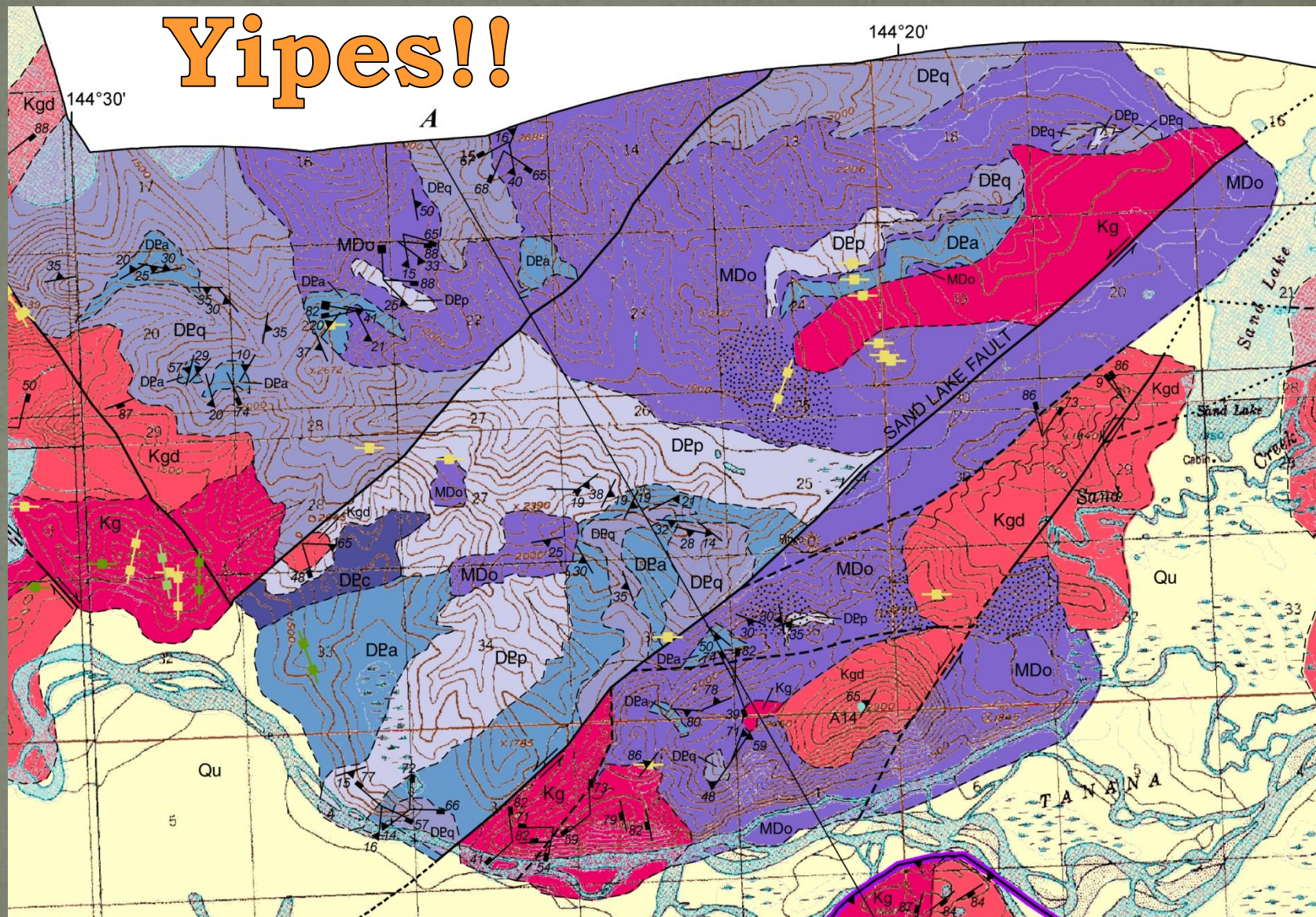


“Why can’t I just put the base map features on top of the map unit polygons?”

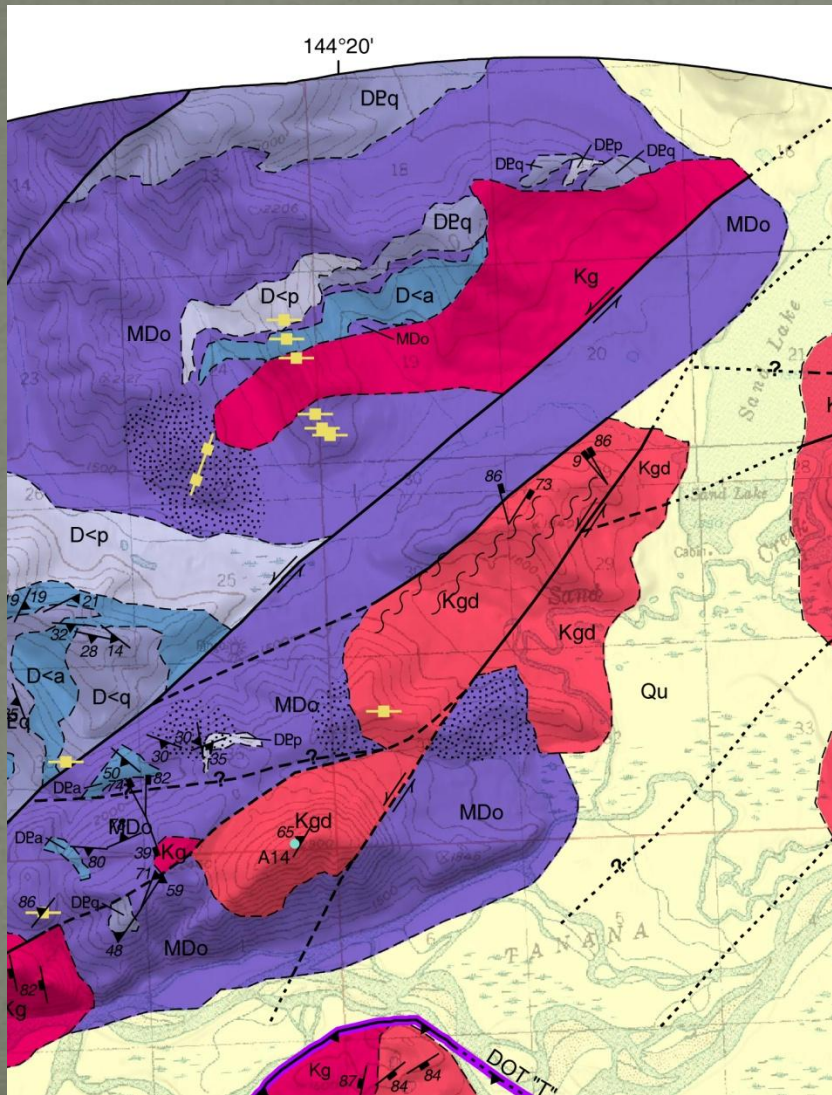
Because....

**Base maps belong at the
“base” of all other layers!**

Yipes!!



Very Impressive...



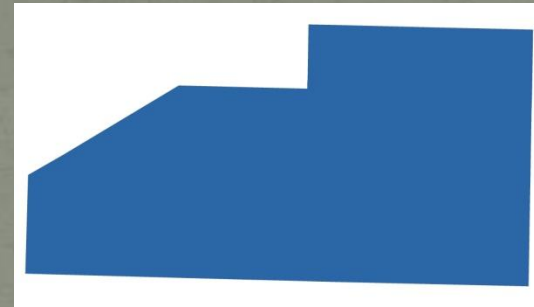
How do you make these!?

By using Global Mapper's raster shading and blending techniques.

Getting Started

What you need

1) Polygon boundary of your map area

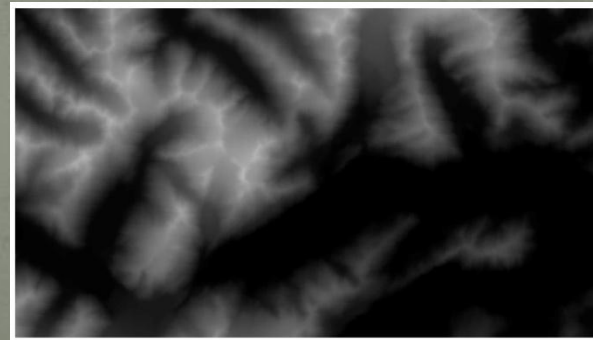


Whole area

Large water areas
clipped out



2) Elevation data for your project

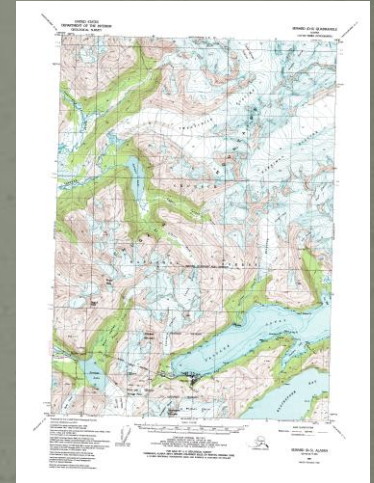


Best available – lowest common denominator

Getting Started

What you need

3) Digital Raster Graphics (DRGs)
that cover your map area



4) Global Mapper

Data processing application
that offers a wide variety of
built in functionality
~ \$450



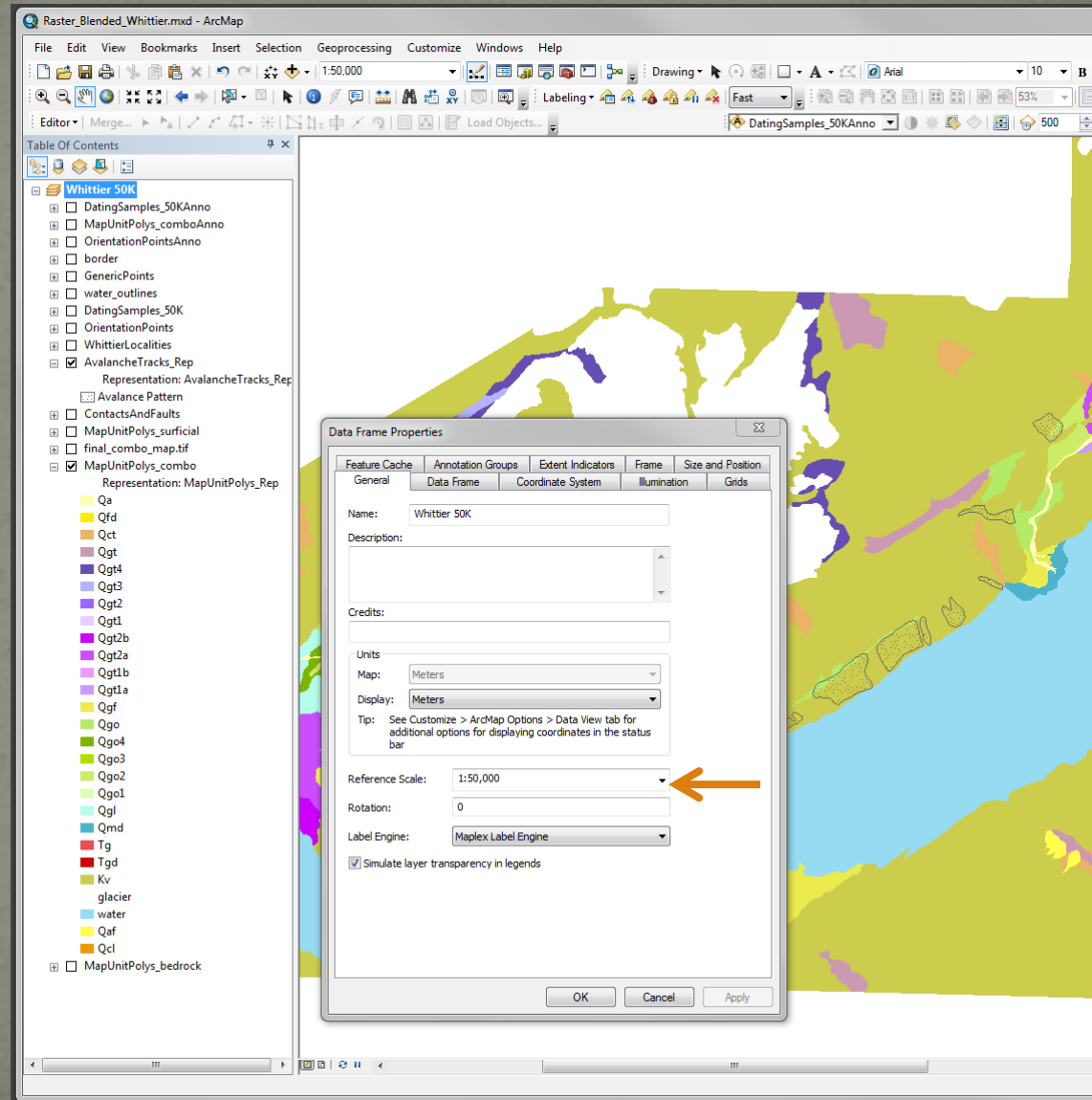
Step 1 – ArcMap Data View

A) Symbolize map unit polygons and convert to cartographic representations

- Patterns should also be stored as representations
- Patterns are optional for inclusion in raster blended image

B) Set the data frame reference scale

- Patterns will scale properly at all zoom levels



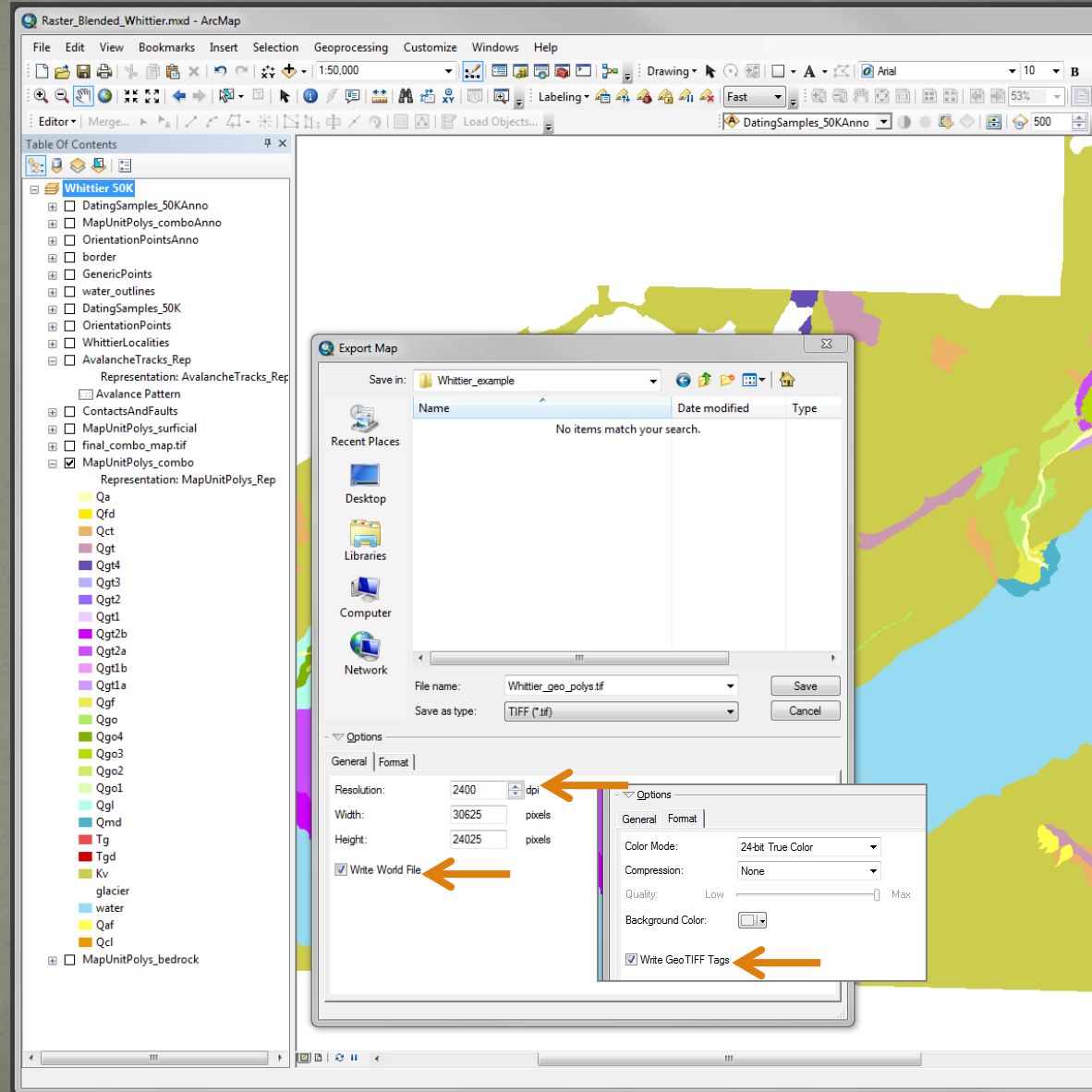
Step 1 – ArcMap Data View

A) Turn off all layers except for polygon representation layer

- Patterns are optional

B) Export data as a high resolution GeoTiff

- 2400dpi
- Check “write world file” box
- 24-bit true Color
- No compression
- Check “write GeoTIFF Tags” box



Step 2 – Get Elevation Data



<http://viewer.nationalmap.gov/viewer/>

Choose the best dataset that completely covers your map area

Step 3 – Most Recent Topo DRGs



<http://earthexplorer.usgs.gov/>

Use bulk downloader application for large downloads

Step 4 – Create Seamless DRG

The screenshot shows the Global Mapper v15.1 interface. The main window displays a topographic map with a green and brown color scheme. The 'Overlay Control Center' dialog is open, showing a list of four overlays under the 'drg' group. An orange arrow points from the 'Options...' button in this dialog to the 'Raster Options' dialog. The 'Raster Options' dialog is open to the 'Collar Cropping/Clipping' tab, where the 'Automatically Crop Collar (DRG/BSB/GeoPDF®/etc.)' option is selected. Below the map, there is a scale bar from 0 to 30 km and a status bar with coordinates and projection information.

A) Open DRGs in Global Mapper and group them together

B) Automatically crop the collars

Global Mapper v15.1 (b013014) [64-bit] - REGISTERED (seg1_bedrock.gmw*)

File Edit View Tools Analysis Search GPS Help

Slope Shader 3D

Set up Favorites List...

Overlay Control Center (4 Layers, 4 Selected)

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

- ☒ drg
 - ☒ <I63144E1.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes C-1. Product:607586
 - ☒ <I63144E5.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes C-2. Product:607585
 - ☒ <I63144G1.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes D-1. Product:607592
 - ☒ <I63144G5.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes D-2. Product:607591

Metadata Options... Hide Overlay Close Overlay

Raster Options

Palette Feathering Color Grade Layer Projection

Display Color/Contrast Adjustment Cropping

Collar Cropping/Clipping

- ☐ No Cropping/Clipping
- ☒ Automatically Crop Collar (DRG/BSB/GeoPDF®/etc.)
- ☐ Crop to Manually Specified Lat/Lon Boundary
 - Specify Lat/Lon Crop Boundary...
- ☐ Crop to Manually Specified Boundary in Native Layer Projection/Units
 - Specify Native Projection Crop Boundary...
- ☐ Crop a Specified Number of Pixels Around the Edges of the Layer
 - Left: 0 Top: 0 Right: 0
 - Bottom: 0
- ☐ Snap to Manually Specified Degree Boundary
 - Specify Degree Snap Boundary...
- ☐ Crop to Previously Specified Polygon(s)
- ☐ Crop to Currently Selected Polygon(s)

OK Cancel Apply Help

0 km 10 km 20 km 30 km

1:333200 UTM (NAD27) - (600528.048, 7072096.266) 63° 45' 49.5115" N, 144° 57' 42.2452" W

Step 4 continued...

Global Mapper v15.1 (b013014) [64-bit] - REGISTERED (seg1_bedrock.gmw*)

File Edit View Tools Analysis Search GPS Help

Slope Shader 30 Set up Favorites List...

Overlay Control Center (4 Layers, 4 Selected)

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

- ☒ drg
- ☒ <I63144E1.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes C-1. Product:607586
- ☒ <I63144E5.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes C-2. Product:607585
- ☒ <I63144G1.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes D-1. Product:607592
- ☒ <I63144G5.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes D-2. Product:607591

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

Raster Options

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

- Pal Idx 0 - RGB(0, 0, 0)
- Pal Idx 1 - RGB(255, 255, 255)
- Pal Idx 2 - RGB(0, 151, 164)
- Pal Idx 3 - RGB(203, 0, 23)
- Pal Idx 4 - RGB(131, 66, 37)
- Pal Idx 5 - RGB(208, 254, 188)**
- Pal Idx 6 - RGB(137, 51, 128)
- Pal Idx 7 - RGB(255, 234, 0)
- Pal Idx 8 - RGB(167, 226, 226)
- Pal Idx 9 - RGB(255, 184, 184)
- Pal Idx 10 - RGB(218, 179, 214)
- Pal Idx 11 - RGB(209, 209, 209)
- Pal Idx 12 - RGB(207, 164, 142)

Edit Selected Color... Edit Selected Label...
Load Palette File... Save Palette File...
Restore Original Palette Init from Layer Palette...

Color

Basic colors:

Custom colors:

Define Custom Colors >>

OK Cancel

Hue: 160 Red: 255
Sat: 0 Green: 255
Lum: 240 Blue: 255

ColorSolid Add to Custom Colors

0 km 10 km 20 km 30 km

Pal Idx 4 - RGB(131,66,37) (<I63144G5.TIF> USGS GeoTIFF DRG 1:63360 Quad of Mount Hayes D-2. Product:607591)

C) Turn green areas to white

D) Save your workspace!

Step 5 – Create Slope-Enhanced Shaded Relief Image

Slope-enhanced shaded relief is superior to standard “hillshades”

- Much better definition of “3-D” terrain
- Clears out the gray from low-angle slopes so map unit colors are not “muddied” by shading

Step 5 – Create Slope-Enhanced Shaded Relief Image

hillshade



Slope-enhanced



Create Slope-Enhanced Shaded Relief Image

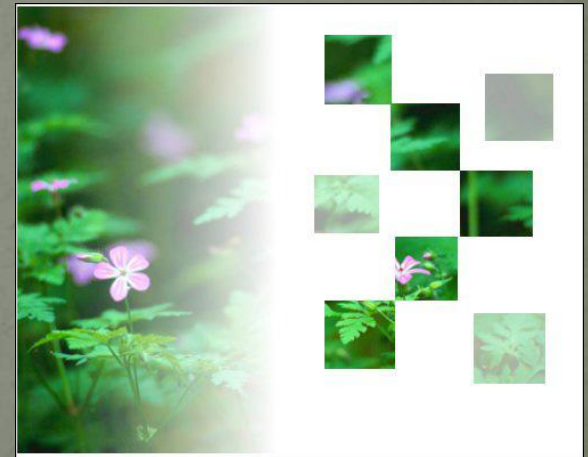
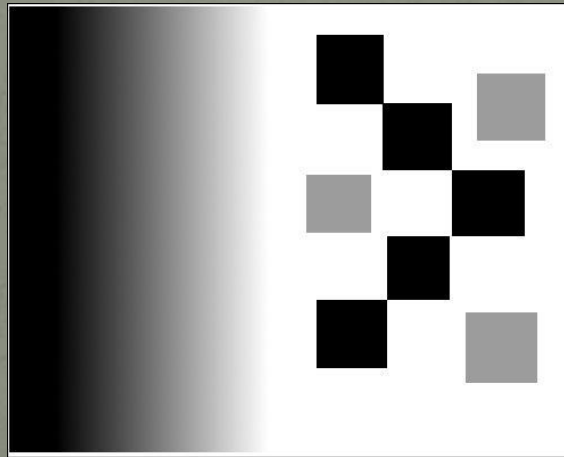
Three parts:

Step 5) Create a hillshade

Step 6) Create a slopeshade

Step 7) Combine (*Screen*) hillshade and slopeshade into a slope-enhanced shaded relief image

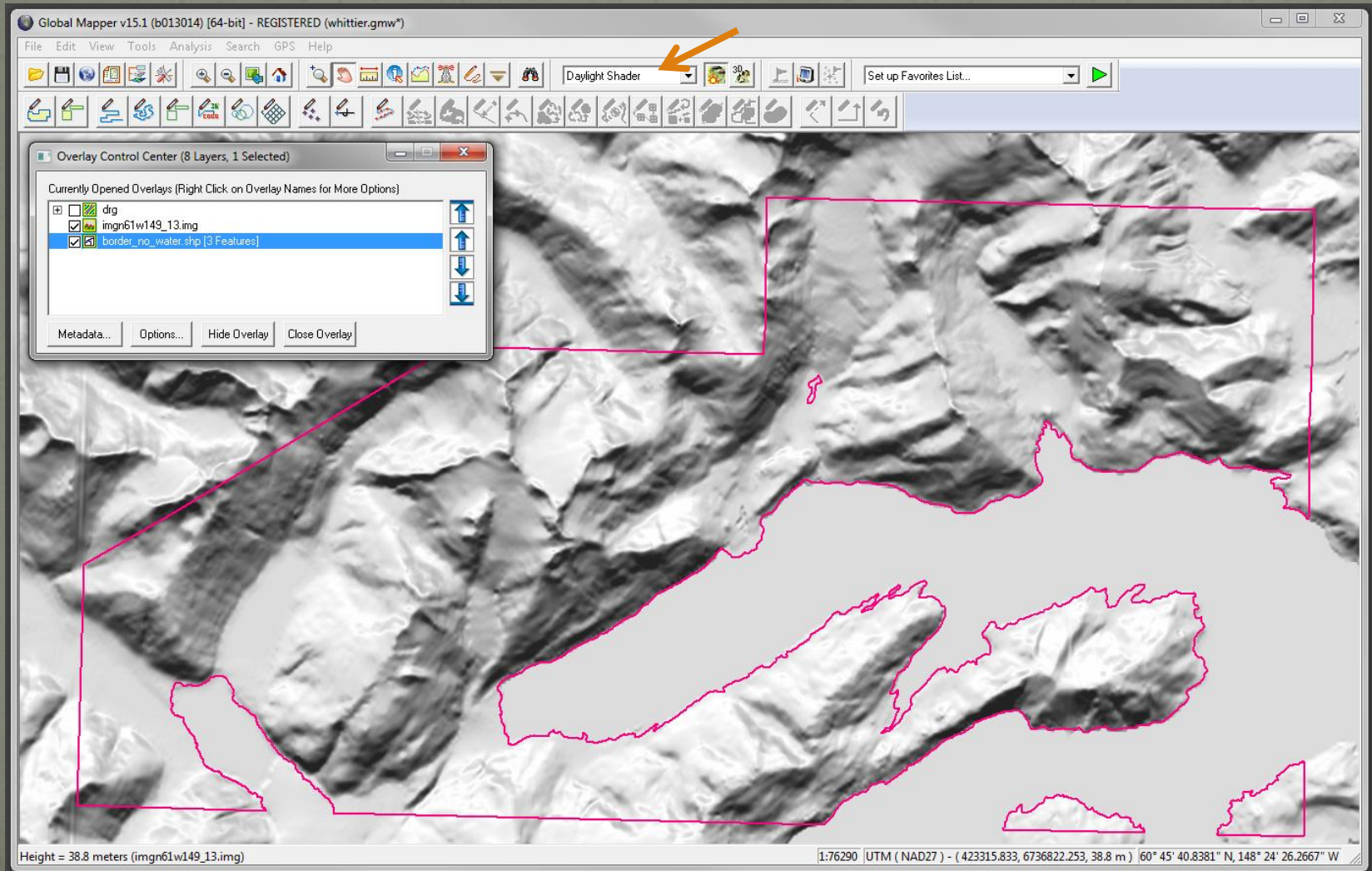
The *Screen* blend mode creates the slope-enhanced effect



Images from: Explaining Blending Modes in Photoshop and GIMP
(Multiply, Divide, Overlay, Screen) by [Margot Dinardi](#)

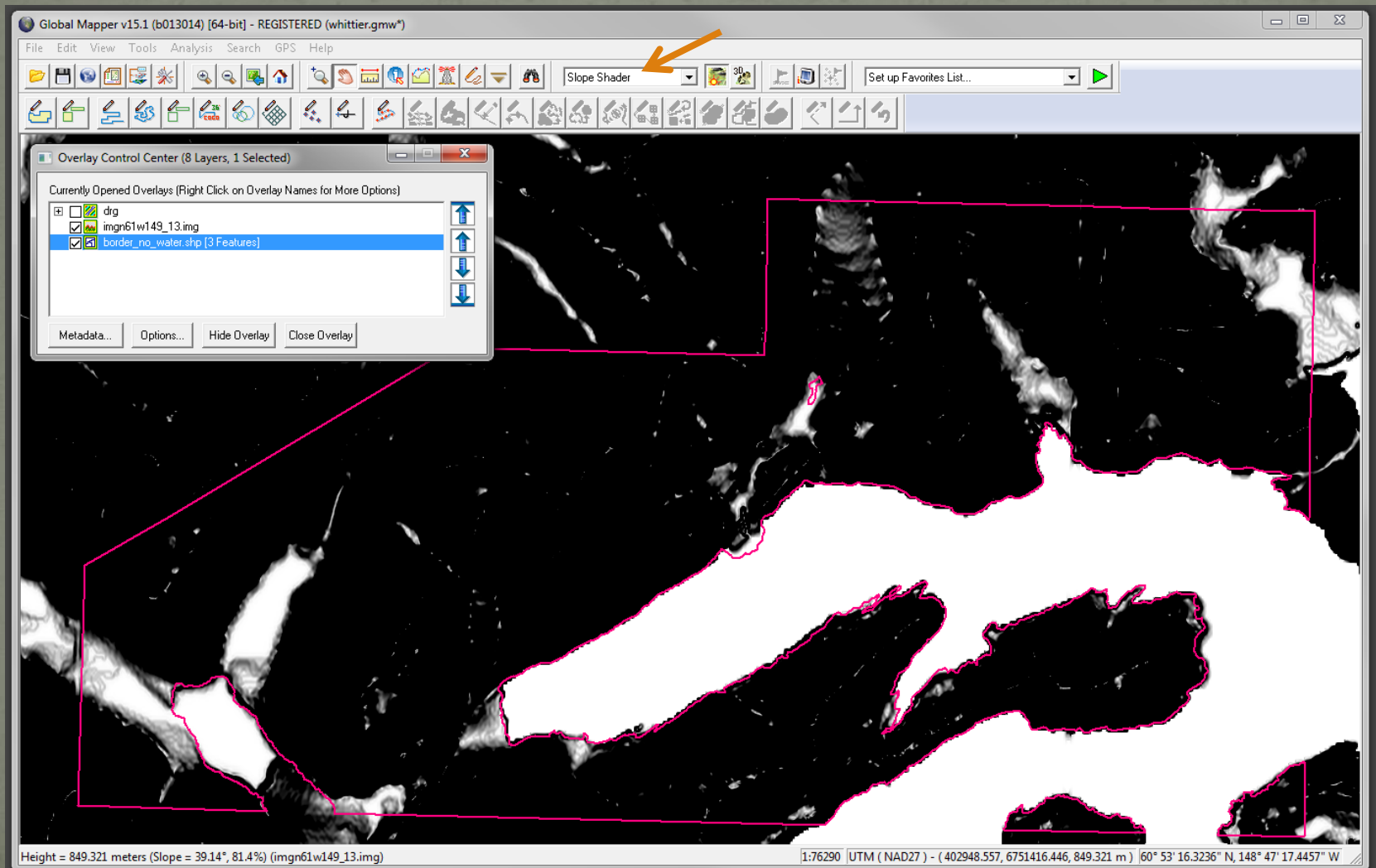
Create Slope-Enhanced Shaded Relief Image

Step 5) Create a hillshade



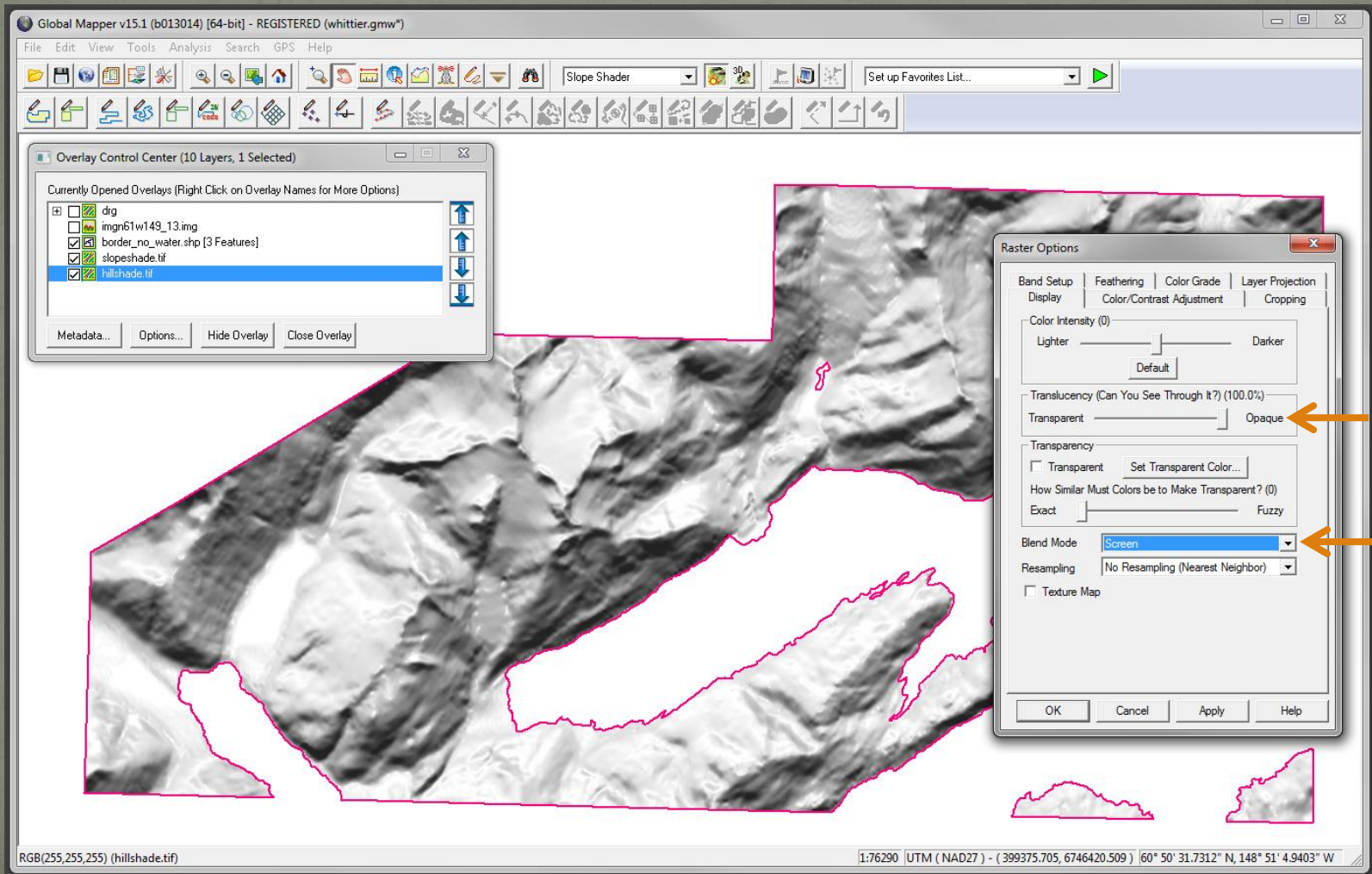
Create Slope-Enhanced Shaded Relief Image

Step 6) Create a slopeshade



Create Slope-Enhanced Shaded Relief Image

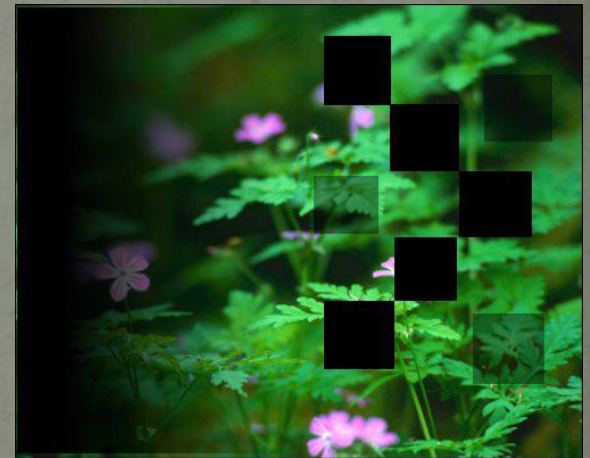
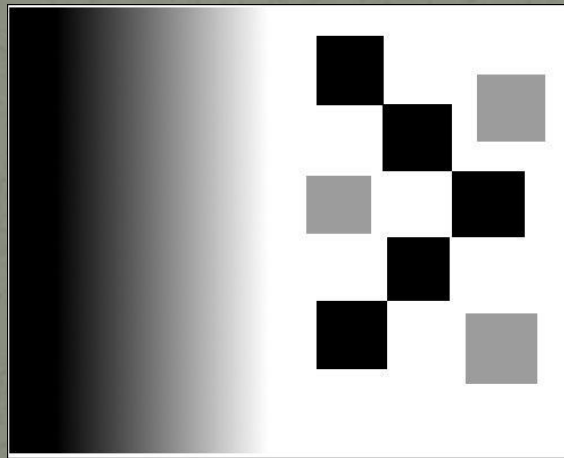
Step 7) Combine hillshade and slopeshade into a slope-enhanced shaded relief image



Step 8 – Create Final Raster Blended Geotiff

Global Mapper Overlay Blending

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



Images from: Explaining Blending Modes in Photoshop and GIMP
(Multiply, Divide, Overlay, Screen) by [Margot Dinardi](#)

Step 8 – Create Final Raster Blended Geotiff

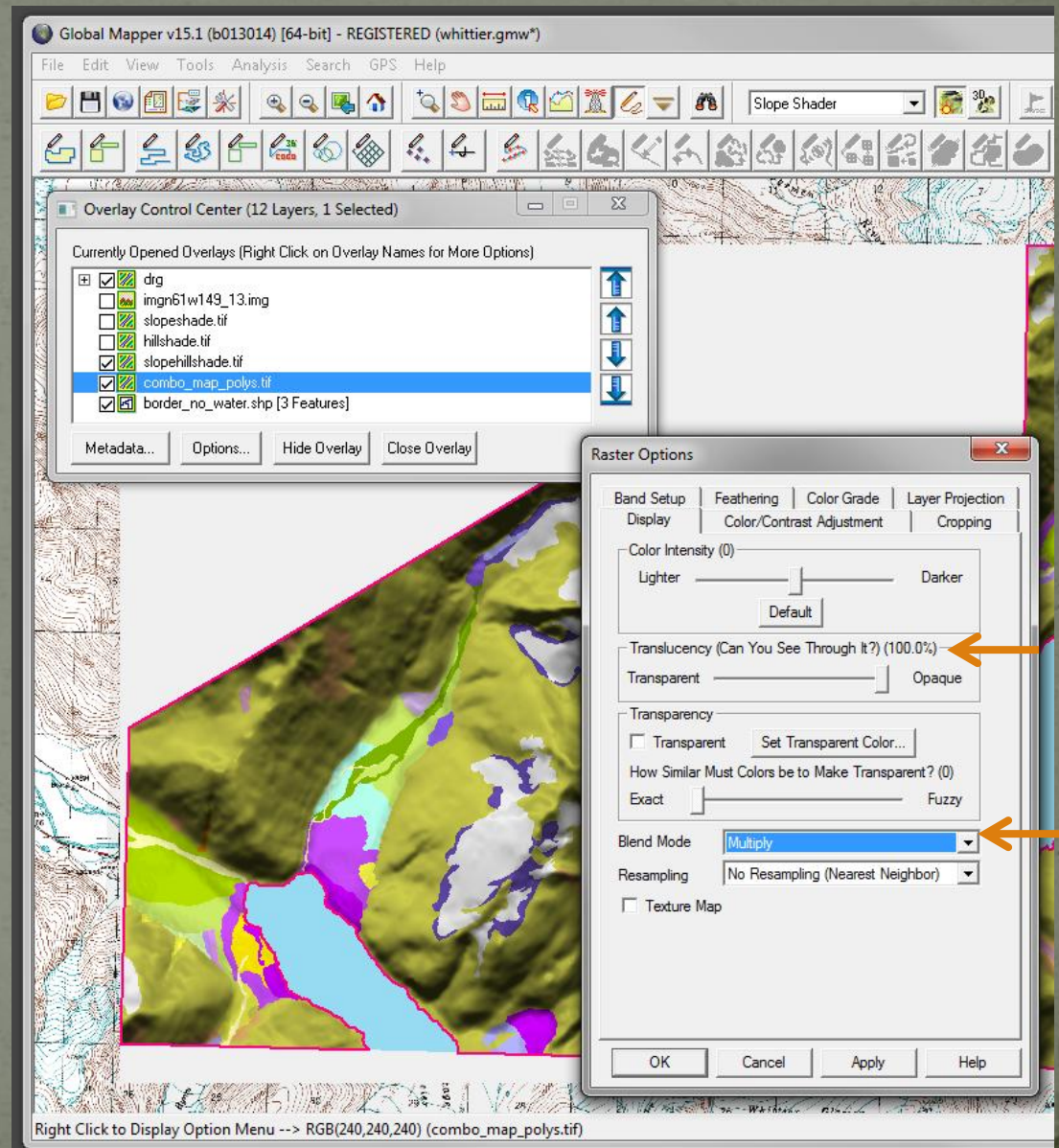
A) Add tiff of geologic units to Global Mapper

B) Arrange Overlay order

- DRGS from step 4
- Slopehillshade from step 5c
- Geologic units from step 1
- Border polygon shapefile

C) **Geologic units Overlay**
Raster Options

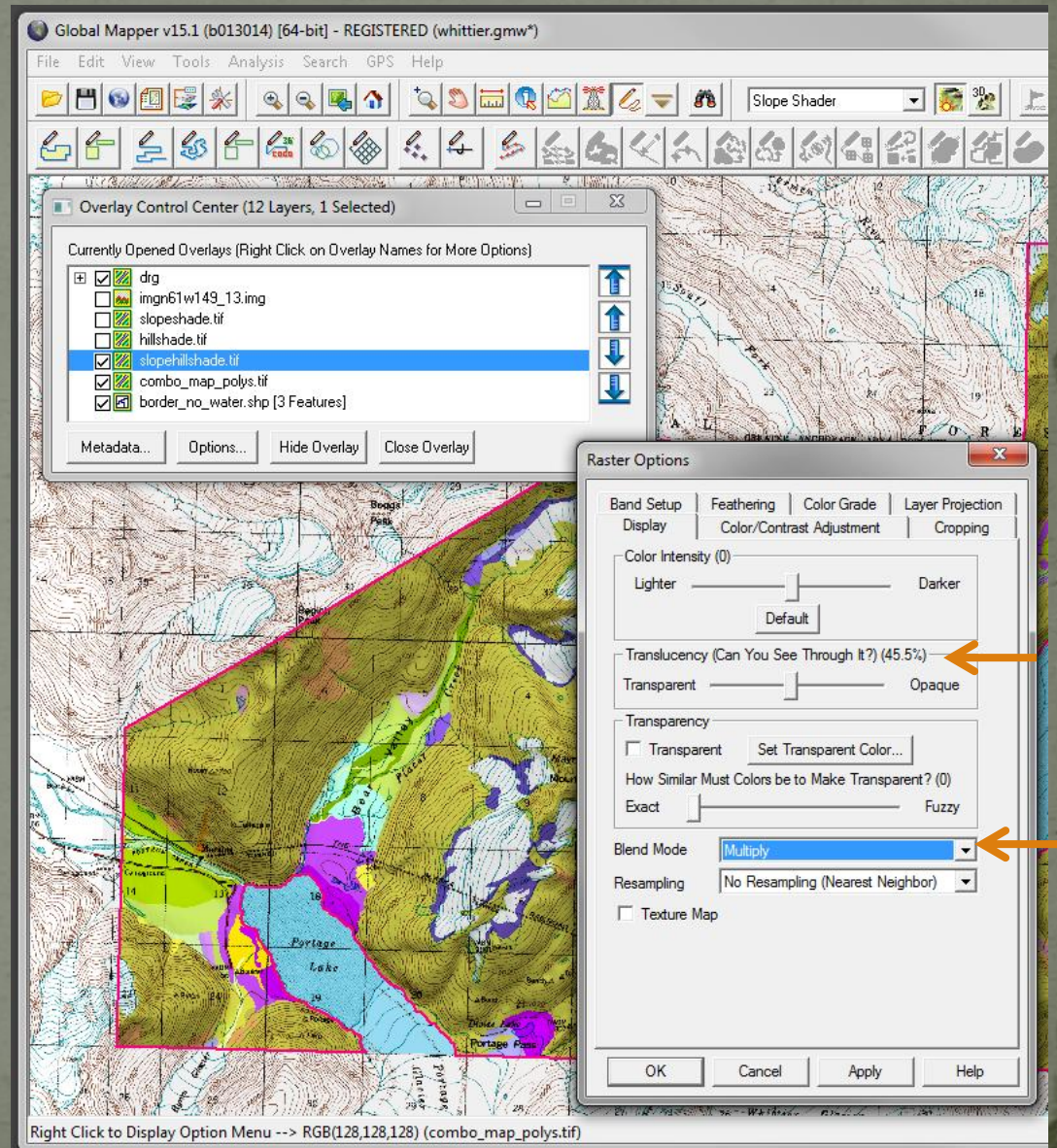
- **Translucency:**
100% (Opaque)
- **Blend Mode:**
Multiply



Step 8 – Create Final Raster Blended Geotiff

D) Slopehillshade Overlay Raster Options

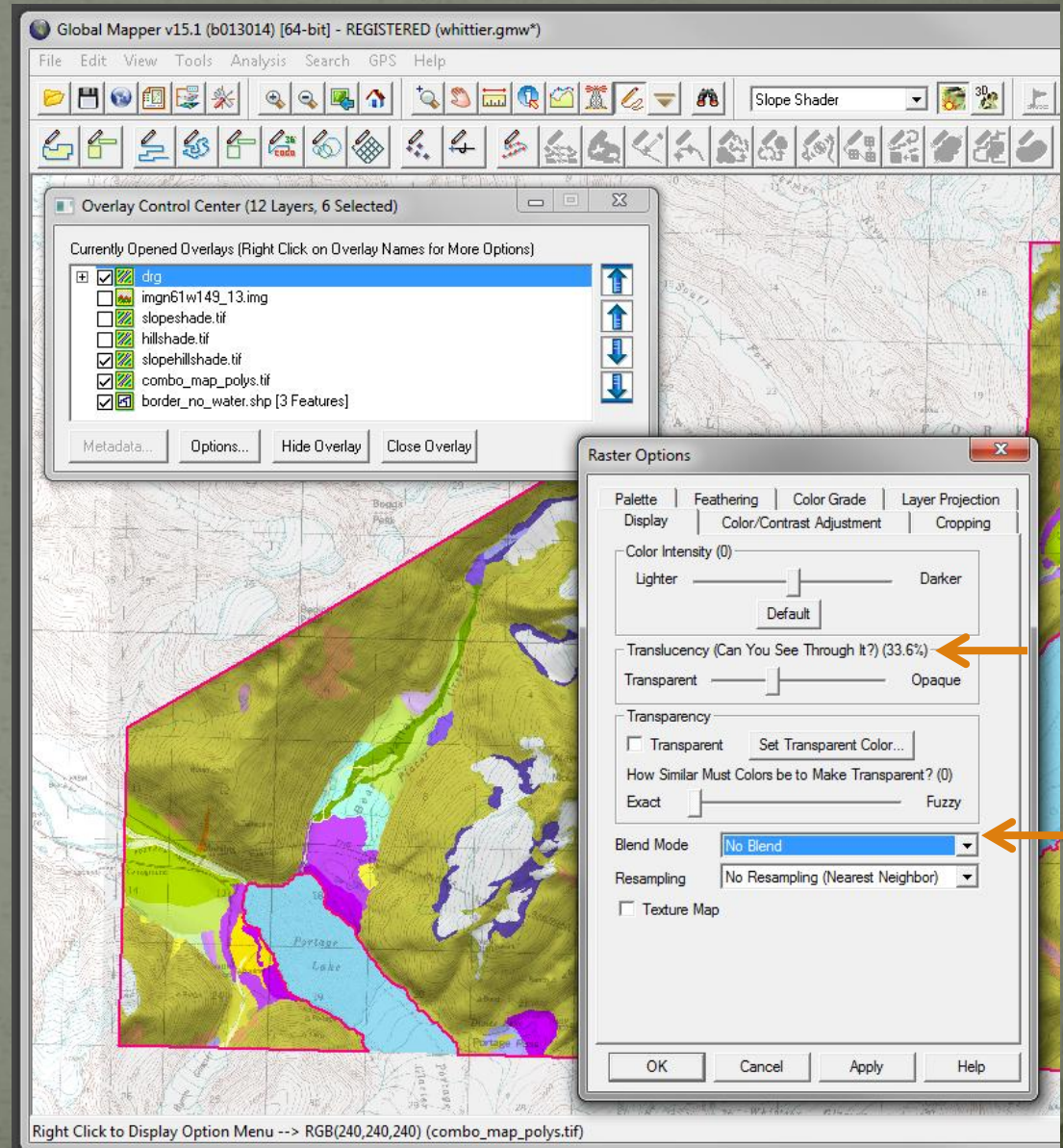
- **Translucency: 45%**
- **Blend Mode: Multiply**



Step 8 – Create Final Raster Blended Geotiff

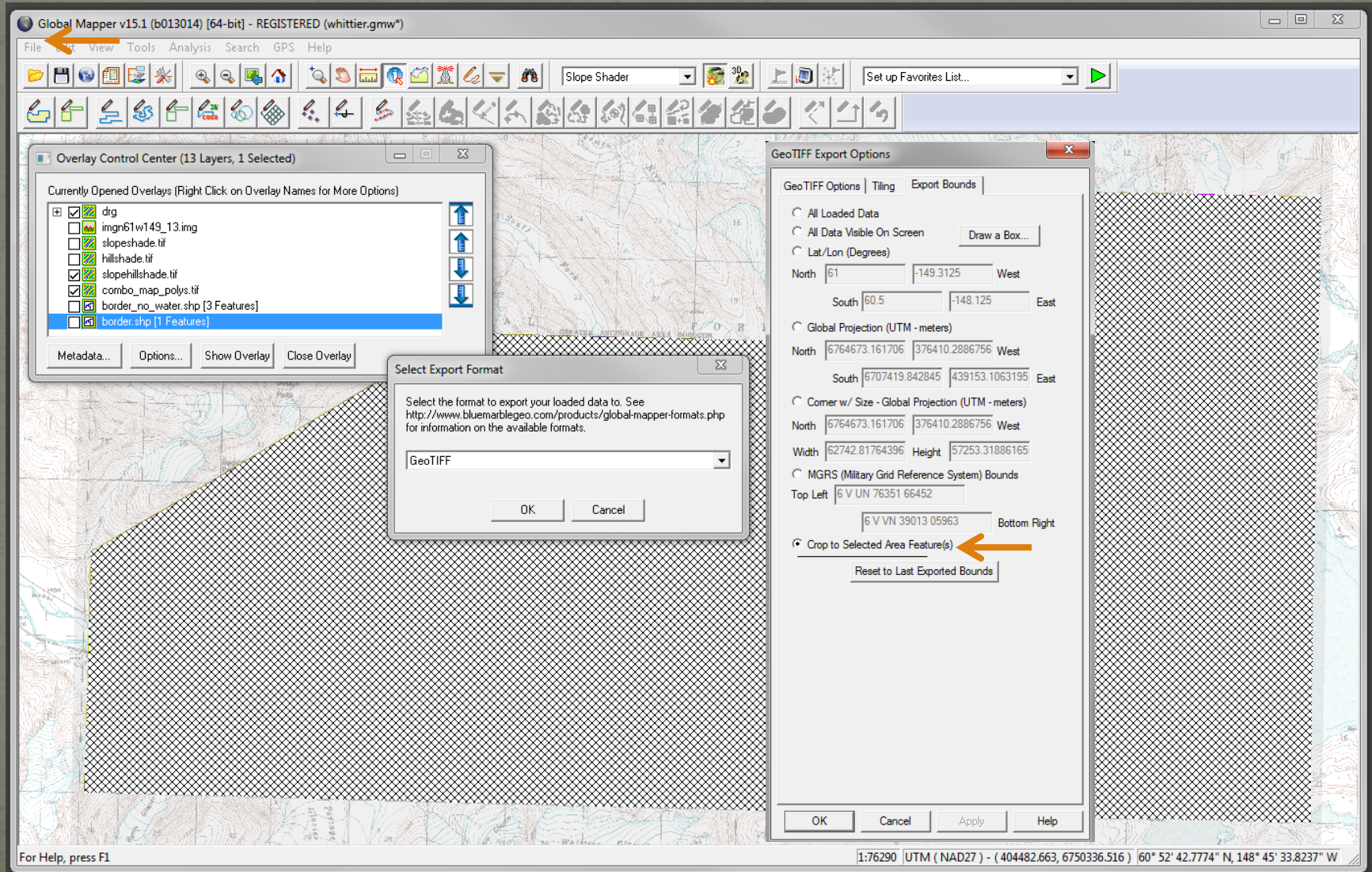
E) DRG Overlay Raster Options

- **Translucency: 33%**
- **Blend Mode: No Blend**

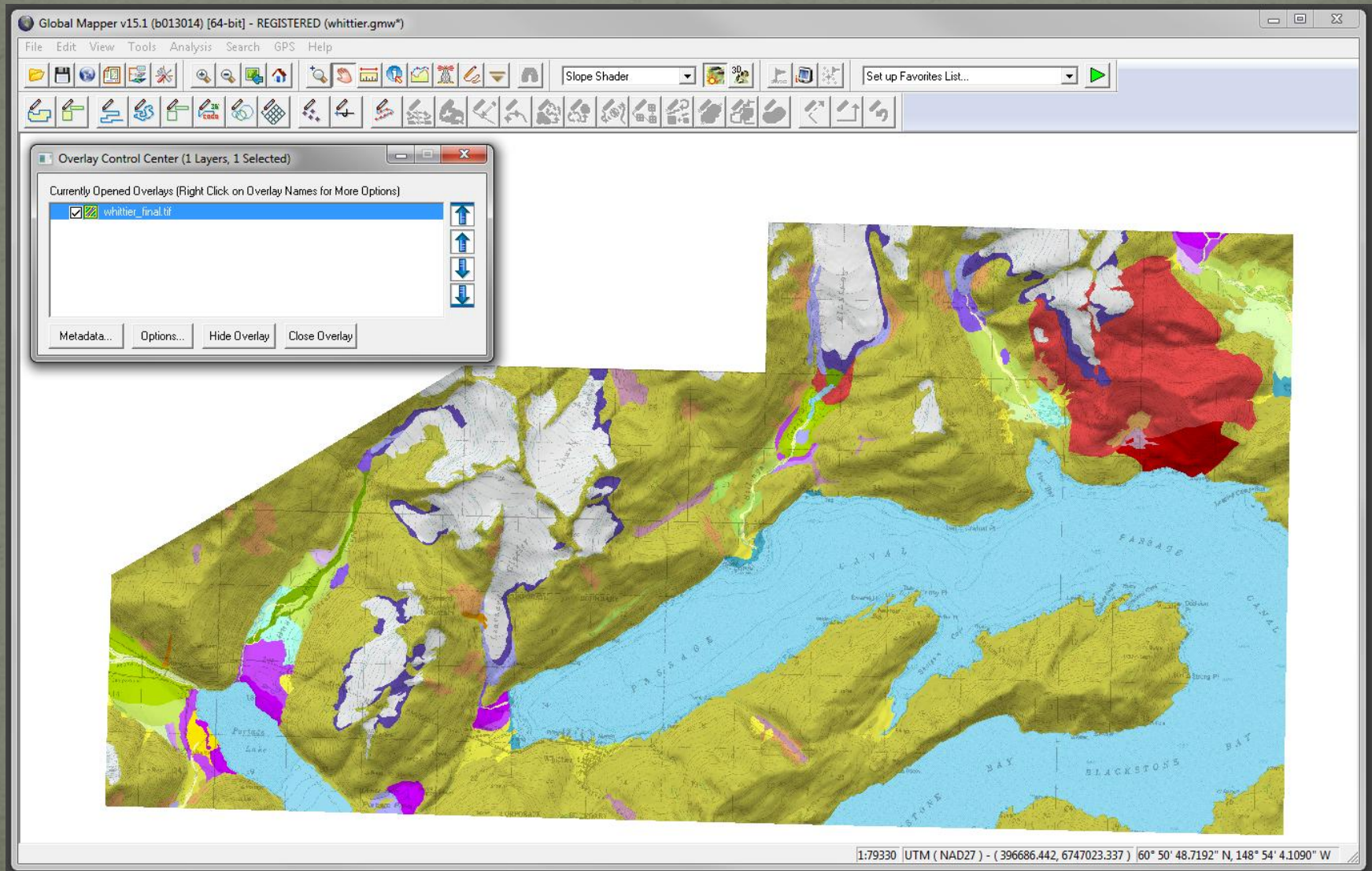


Step 8 – Create Final Raster Blended Geotiff

E) Export and crop to map area boundary

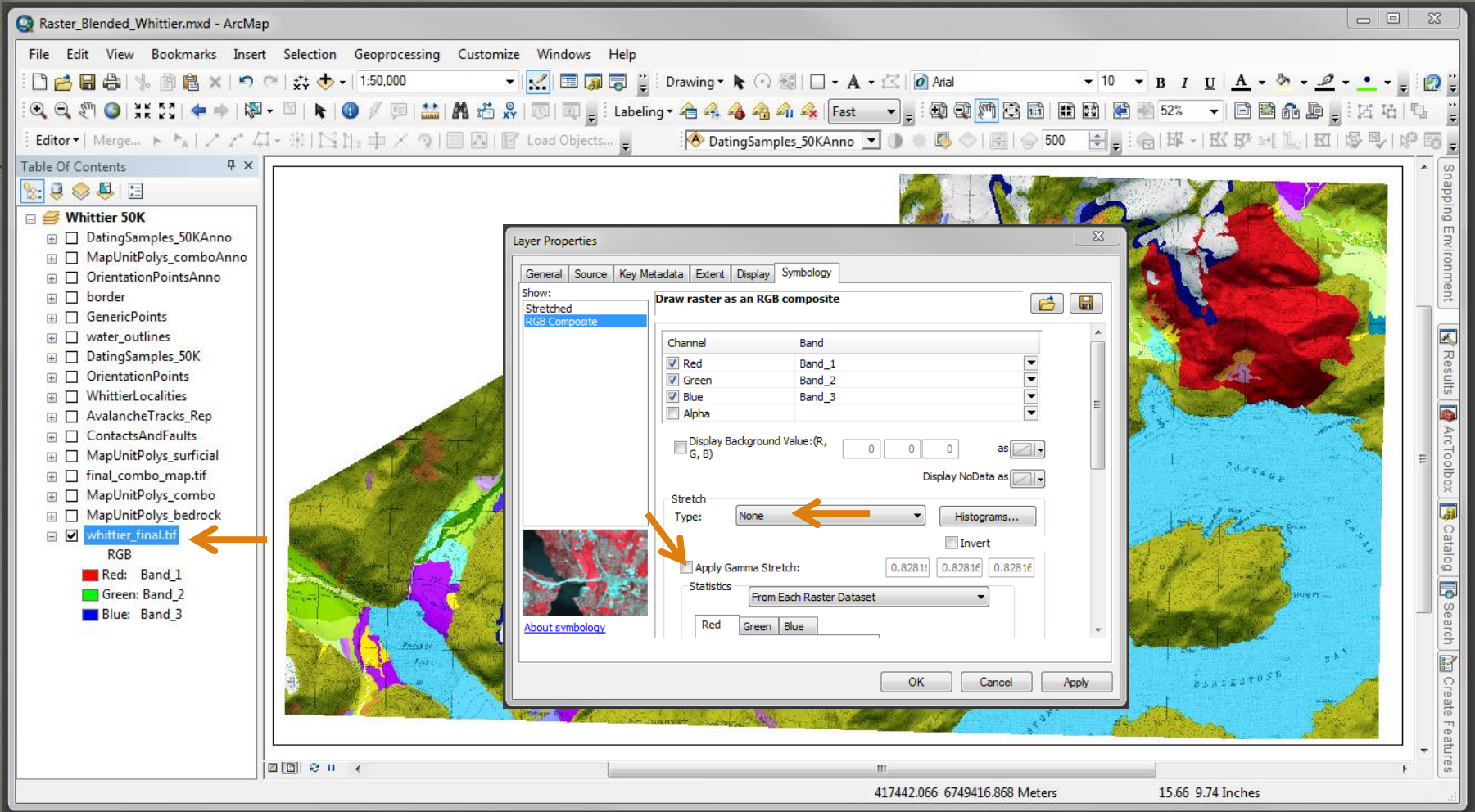


The final Geotiff in Global Mapper



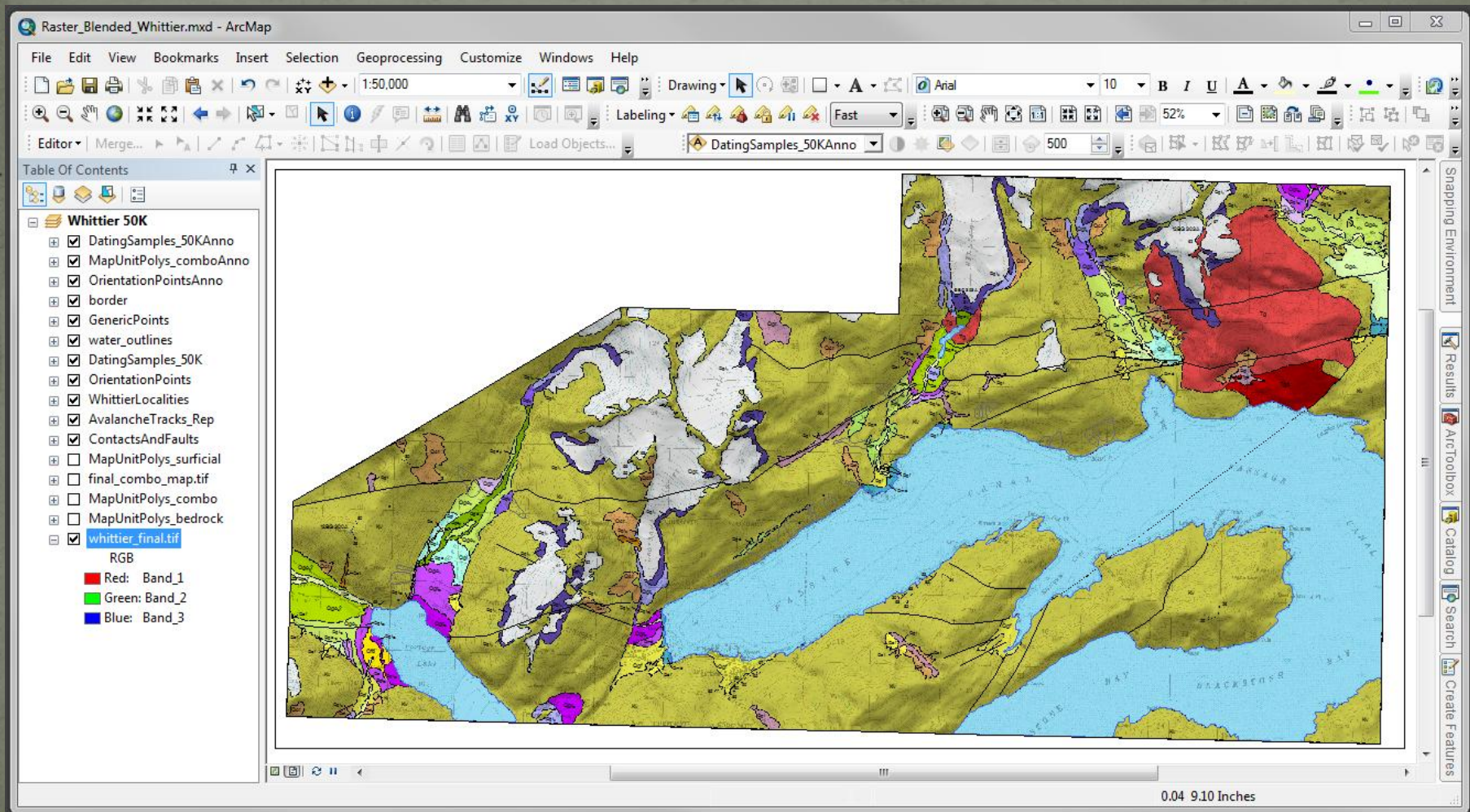
Step 9 – Put it all together in ArcMap

Bring final Geotiff into ArcMap – OMG CRAZY COLORS!!!

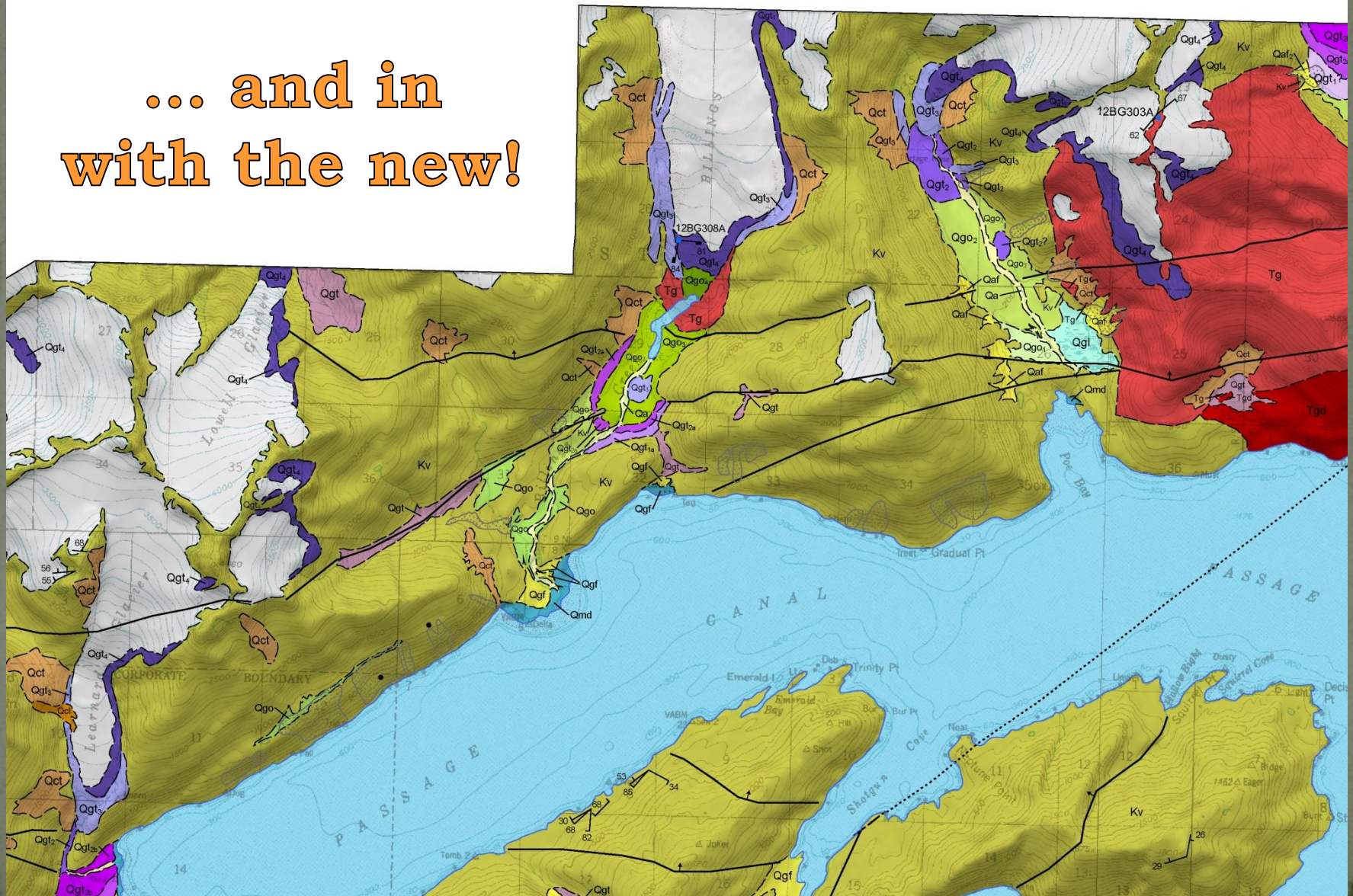


Step 9 – Put it all together in ArcMap

Arrange and turn on layers for final layout



... and in
with the new!



Resources

Global Mapper

<http://www.bluemarblegeo.com/products/global-mapper.php>

USGS National Map Viewer

<http://viewer.nationalmap.gov/viewer/>

USGS Earth Explorer

<http://earthexplorer.usgs.gov/>

Explaining Blending Modes in Photoshop and GIMP

(Multiply, Divide, Overlay, Screen) by Margot Dinardi

<http://emptyeasel.com/2008/10/31/explaining-blending-modes-in-photoshop-and-gimp-multiply-divide-overlay-screen/>



Questions?

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<http://www.dggs.alaska.gov/>



Special thanks to

Kent Brown

Utah Geological Survey

DGGS Online Map applications

www.dggs.alaska.gov

The screenshot shows a Mozilla Firefox browser window displaying the website www.dggs.alaska.gov. The browser's address bar and menu bar are visible at the top. The website itself has a yellow header with the "State of Alaska" logo and navigation links: myAlaska, My Government, Resident, Business in Alaska, Visiting Alaska, and State Employees. Below this is a dark blue banner for the "Alaska Department of Natural Resources Division of Geological & Geophysical Surveys", featuring a search bar and radio buttons for "DGGS" and "State of Alaska". A horizontal menu contains links to Home, About Us, Publications, Sections, STATEMAP, Geophysics, Geologic Materials Center, Contact Us, and Links. A dropdown menu is open under "Publications", showing links to Search, New Releases, Interactive Maps, Statewide Maps, Sales, and Databases. The main content area features a large photograph of a person in a field and a welcome message: "Welcome to the Alaska Division of Geological & Geophysical Surveys". Below this, the mission statement is provided: "Our mission: Determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources, the locations and supplies of groundwater and construction material, and the potential geologic hazards to buildings, roads, bridges, and other installations and structures (AS 41.08.020)." Social media icons for Twitter, Facebook, and YouTube are located in the bottom right corner of the main content area.

Alaska Division of Geological & Geophysical Surveys - Mozilla Firefox

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Alaska Division of Geological & Geophys... +

www.dggs.alaska.gov

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Natural Resources > Geological & Geophysical Surveys

Welcome to the Alaska Division of Geological & Geophysical Surveys

Our mission: Determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources, the locations and supplies of groundwater and construction material, and the potential geologic hazards to buildings, roads, bridges, and other installations and structures (AS 41.08.020).

<http://maps.dggs.alaska.gov/>

Interactive!

Geo Maps!

LiDAR!

Volcanoes!

Faults!

Geophysics!

Seriously this time!
April 9th at AMA

Interactive Maps | Alaska Division of Geological & Geophysical Surveys - Mozilla Firefox

File Edit View History Bookmarks Tools Help

maps.dggs.alaska.gov

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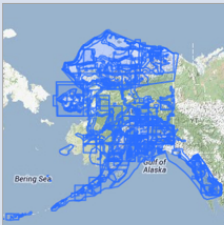
Natural Resources > Geological & Geophysical Surveys > Interactive Maps

Interactive Maps

Geologic Map Index of Alaska

Map Index provides outlines of DGGS and USGS geology-related maps of Alaska.

[See citation details for Geologic Map Index of Alaska](#)



LiDAR Datasets of Alaska

This interactive map displays known public-domain LiDAR datasets of Alaska.

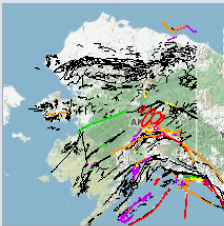
[See citation details for LiDAR Datasets of Alaska](#)



Quaternary Faults and Folds (QFF)

This interactive map displays locations and relative activity of Alaska's faults and folds.

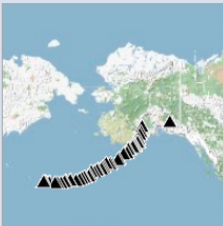
[See citation details for Quaternary Faults and Folds \(QFF\)](#)



Historically Active Volcanoes of Alaska

This interactive map displays the location of historically active volcanoes of Alaska.

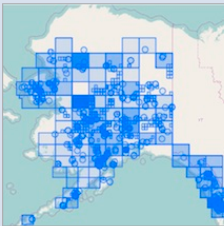
[See citation details for Historically Active Volcanoes of Alaska](#)



Alaska Geologic Data Index (AGDI)

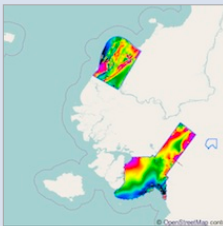
AGDI includes information about industry reports and maps, field notes, drill logs, and other unpublished geology-related data.

[See citation details for Alaska Geologic Data Index \(AGDI\)](#)



Airborne GeophysWeb

Coming Soon!



LiDAR Datasets in Alaska



This interactive map was designed to view known public-domain LiDAR datasets in Alaska. The map offers zoom and scroll options, and multiple base map layers. We provide an easy point and click interface to download the digital data.

Explanation of icons on this page:

-  Information Tool: Single click to get information about a survey area.
-  Area of Interest Tool: Use this tool to define an area and download compressed point cloud data.
-  Full screen mode: Toggles map using entire browser window.

For more download options, full citation information, WMS feed information, and metadata, go to: <http://www.dggs.alaska.gov/pubs/id/25239>

Please Note: The LAS files included in downloaded items have been compressed using [LASzip](#). [LASzip](#) is an open-source, lossless compression for LiDAR point-cloud data in the LAS format that provides significant file size reductions. To uncompress the .laz files in your download package, you can use the laszip tool linked below, or download the latest version directly from laszip.org

[laszip.exe 2.1.0](#) (for Windows)