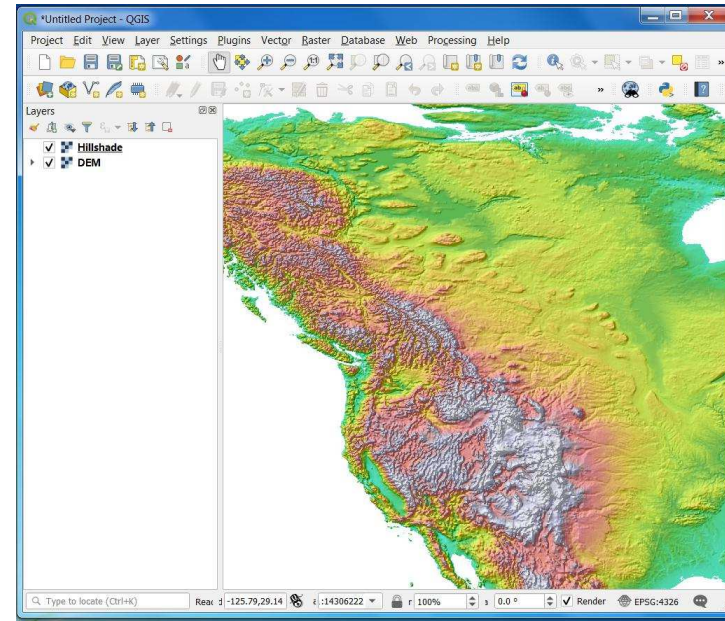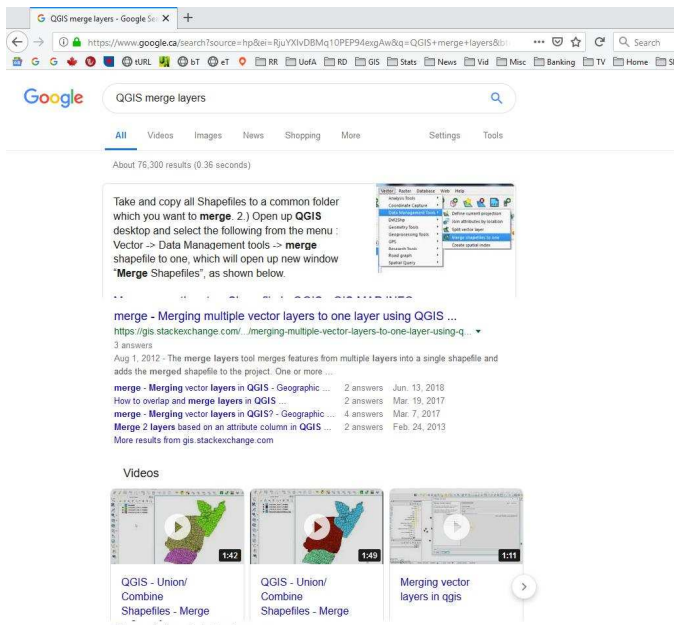# Introduction to QGIS

RenR690

Winter 2019
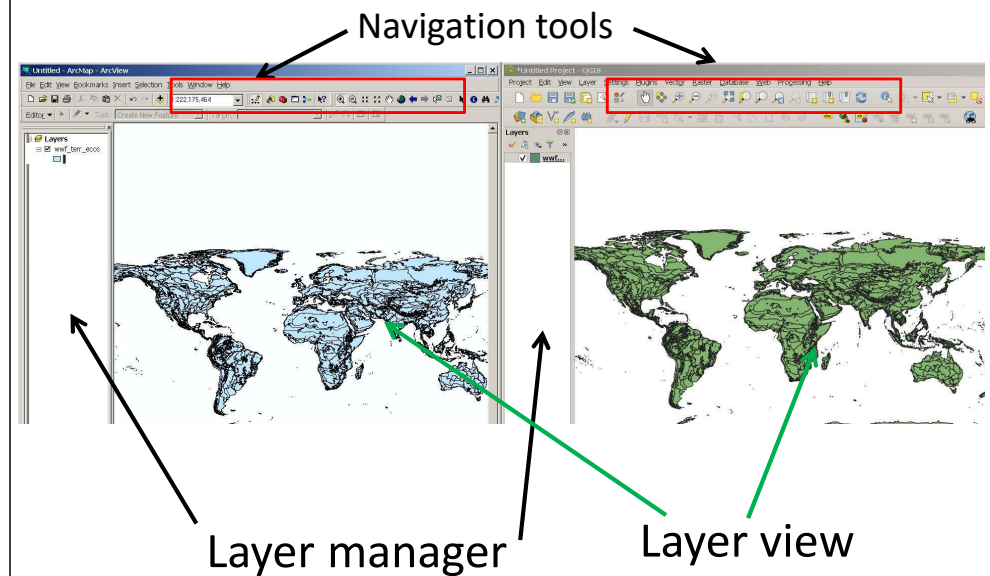
- Intro to QGIS for beginners and ArcMap users

- Intro to QGIS for beginners and ArcMap users

- Intro to QGIS for beginners and ArcMap users

Navigation tools

Layer manager

Layer view

# Common GIS files: vectors and rasters

- Polygons
- Lines
- Points
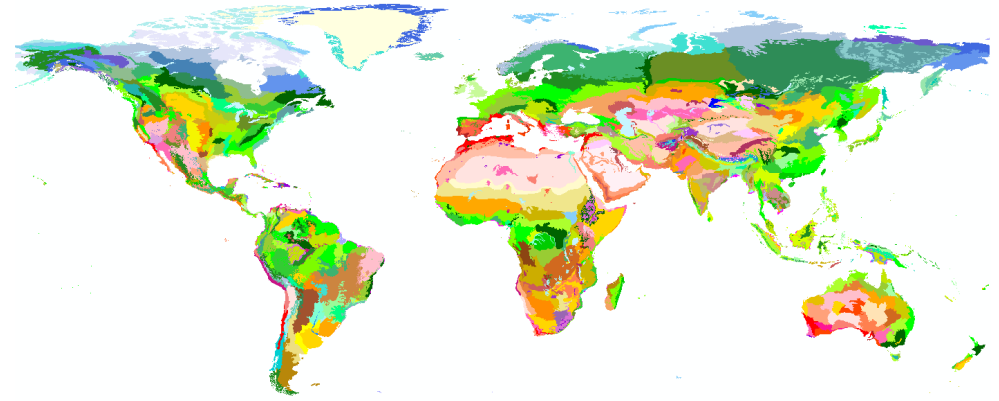
- Vectors

- Raster



# Common GIS files: shapefiles



Ecosystems of the world

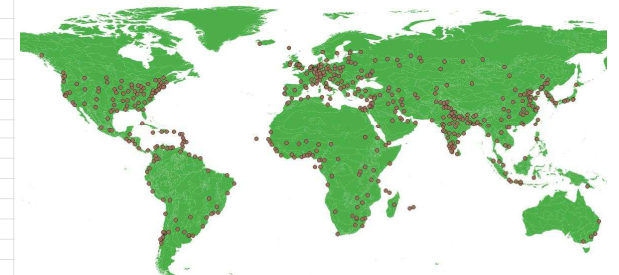# Common GIS files: shapefiles

- shp file, shx file, dbf file, prj file.



ecos.dbf    ecos.prj    ecos.shp    ecos.shx

| | A | B | C | D | H |
|---|---|---|---|---|---|
| 1 | OBJECT | AREA | PERIMETER | ECO_NAME | ECO_ID |
| 2 | 1 | 29.80 | 0.22 | Northern Mesoamerican Pacif | 61404 |
| 3 | 2 | 11.98 | 0.19 | Northern Mesoamerican Pacif | 61404 |
| 4 | 3 | 77301.37 | 111.95 | Sinaloan dry forests | 60228 |
| 5 | 4 | 215.49 | 1.27 | Northern Mesoamerican Pacif | 61404 |
| 6 | 5 | 19.64 | 0.36 | Northern Mesoamerican Pacif | 61404 |
| 7 | 6 | 19867.17 | 14.32 | Everglades | 60904 |
| 8 | 7 | 51.10 | 0.46 | Northern Mesoamerican Pacif | 61404 |

wwf_terr_ecos.prj - Notepad

File  Edit  Format  View  Help

```
GEOGCS["GCS_WGS_1984",DATUM
["D_WGS_1984",SPHEROID
["WGS_1984",6378137.0,298.257223563]],P
RIMEM["Greenwich",0.0],UNIT
["Degree",0.0174532925199433]]
```

# Common GIS files: point data

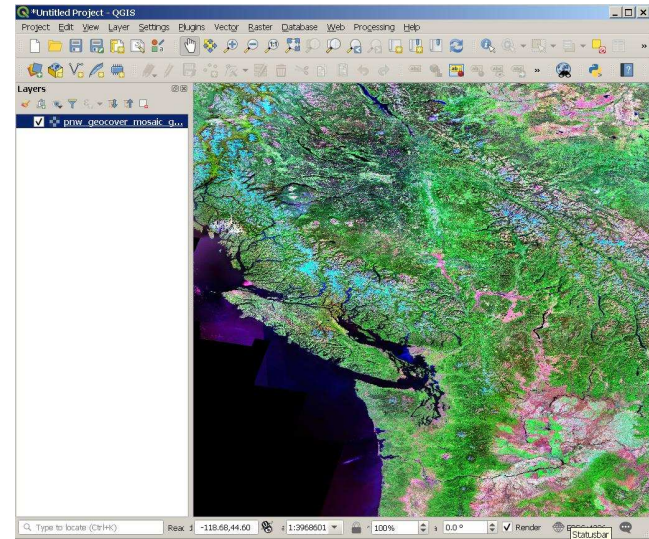| LAT | LONG | CITY |
|---|---|---|
| +035.6961000 | +139.7795997 | TOKYO |
| +039.0459000 | -095.6753997 | TOPEKA |
| +045.0615997 | +007.6882000 | TORINO |
| +043.6582997 | -079.3872997 | TORONTO |
| +062.0009000 | -006.7874997 | TORSHAVN |
| +040.2225997 | -074.7646000 | TRENTON |
| +032.8843997 | +013.1828000 | TRIPOLI |
| -008.5058000 | +076.9574000 | TRIVANDRUM |
| -008.1111000 | -079.0387997 | TRUJILLO |
| +036.8241997 | +010.1722000 | TUNIS |
| +043.8051000 | +087.5823000 | UERUEMQI |
| -005.1455997 | +119.3992997 | UJUNG PANDANG |
| +047.9138000 | +106.9219997 | ULAANBAATAR |
| +019.1944000 | +073.0070000 | ULHASNAGAR |
| +022.2926000 | +073.1979997 | VADODARA |
| +047.1420000 | +009.5180000 | VADUZ |
| +010.1798000 | -067.9923000 | VALENCIA |

# Common GIS files: rasters
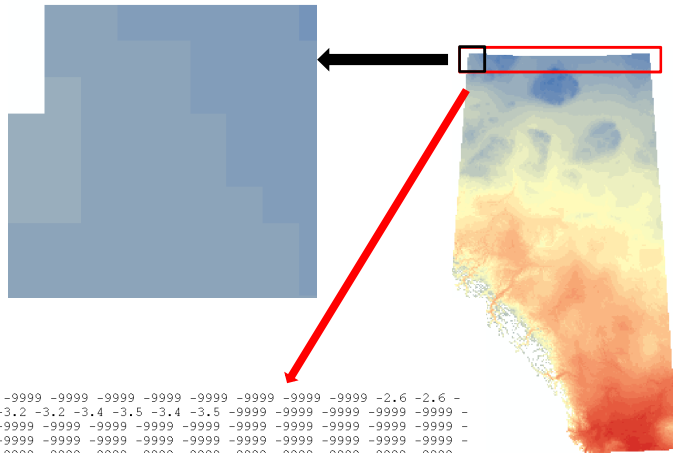
```
ncols        174
nrows        308
xllcorner    170500
yllcorner    5425500
cellsize     4000
NODATA_value -9999
-9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -2.6 -2.6 -
2.7 -2.7 -2.8 -2.9 -2.9 -3.1 -3.2 -3.2 -3.4 -3.5 -3.4 -3.5 -9999 -9999 -9999 -9999 -9999
-9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -
9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -
9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -
9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -
9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -
9999 -3.3 -3.4 -3.4 -3.4 -3.4 -3.4 -3.4 -3.4 -3.4 -3.5 -3.5 -3.6 -3.7 -9999 -9999 -
9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -
9999 -9999 -9999 -9999 -9999
```

# Common GIS files: rasters
# Remote sensed data
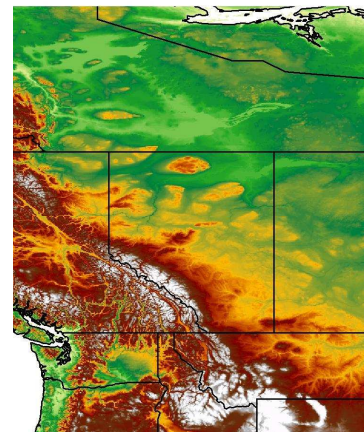
# UofA Library Guide to spatial data

# Projections

WGS 84

NAD 83 UTM 11N

## Cartographic output

Mean Coldest Month Temperature (MCMT)

Annual Heat Moisture Index (AHM)

Northwest plateau

Sierra Madre
Oriental

Sierra Madre
Occidental

Trans-Volcanic
Belt

AHM (°C/mm*1000)

3 - 20
20 - 30
30 - 45
45 - 65
65 - 95
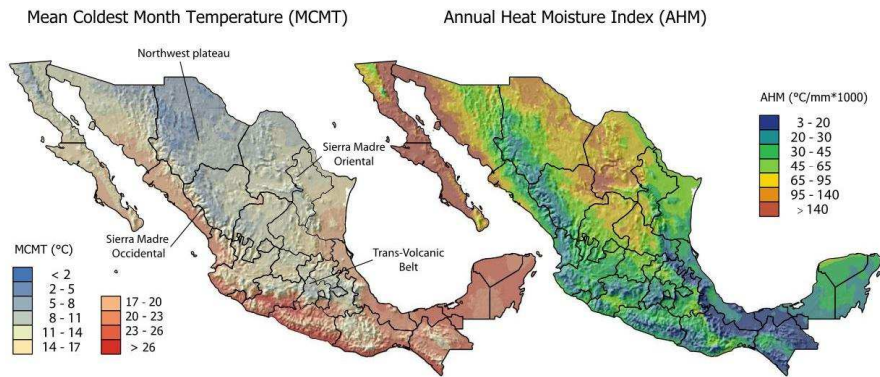95 - 140
> 140

MCMT (°C)
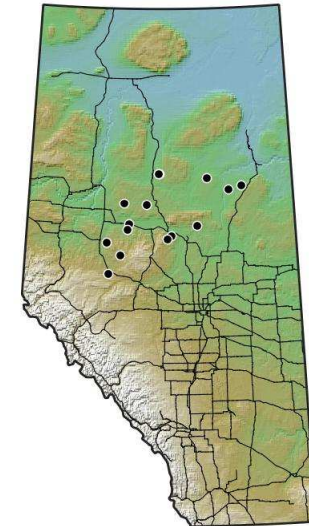
< 2
2 - 5
5 - 8
8 - 11
11 - 14
14 - 17

17 - 20
20 - 23
23 - 26
> 26

Not possible to do in ArcMap

## Goal for today:

- Nice map of a study area
- Extract spatial data for your study locations
- Adapt the techniques for your own data

## What you'll learn

- 1. Working with shapefiles
- 2. Dealing with projections
- 3. Colors and symbols from attributes
- 4. Extract data from shapefiles
- 5. General operations, navigation
- 6. Working with gridded data
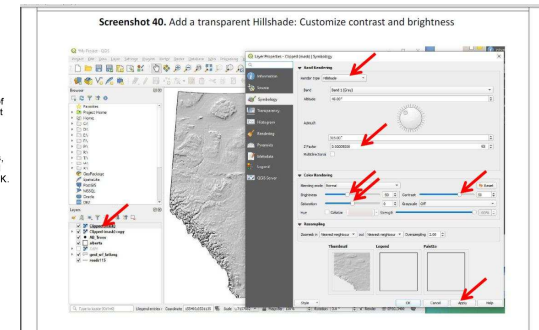- 7. Extract data from grids
- 8. Layout of single and multi-panel maps6.

## How the lab works

**6.4. Adding a hillshade for better visualization of terrain**

- While elevation can be represented just fine with a colorized scale, another method of representing terrain, and that can be used with a colorized scale of elevation or other variable, is a hillshade. A hillshade is a grayscale representation that uses elevation and the sun's position, to generate a 3D effect useful to represent the form of valleys and hills.
  In this example, we are going to combine the use of colorized elevation with a hillshade effect. Start by duplicating the clipped DEM for Alberta by right-clicking on it and selecting **Duplicate layer** (*Screenshot 39*). In the duplicated layer in the **Symbology tab**, instead of the singleband pseudocolor render option, select the **hillshade** option.

- In this rendering mode, you can play with the position of the sun with the **Azimuth control**. A value of 0° would locate the sun to the North and lighten up the North facing slopes. A value of 180° would put the sun to the South and lighten up the South facing slopes. The default of 315° usually gives good results, so we are going to leave that value (*Screenshot 40*).

- For Alberta, a z-value of around 0.000015 is the correct one, but you can use slightly larger values, around 0.00005, to accentuate the look of ridges and hills. Play with the brightness, saturation and contrast controls until you find values you like, or use the ones on the screenshot. Click apply or OK.

- Finally, switch from the **Symbology** tab to the **Transparecy** one, and set the **Global opacity** parameter to around 50% (*Screenshot 41*). Click Ok, and reorder the layers to obtain the visualization in the slides (*Screenshot 42*).

Handout, or online:
https://tinyurl.com/QGIS-getting-started

**Screenshot 40.** Add a transparent Hillshade: Customize contrast and brightness

Online only: https://tinyurl.com/QGIS-screenshots