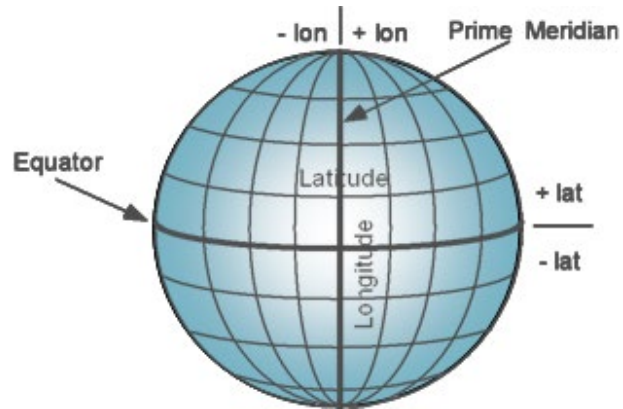


# Background Data and DEMs

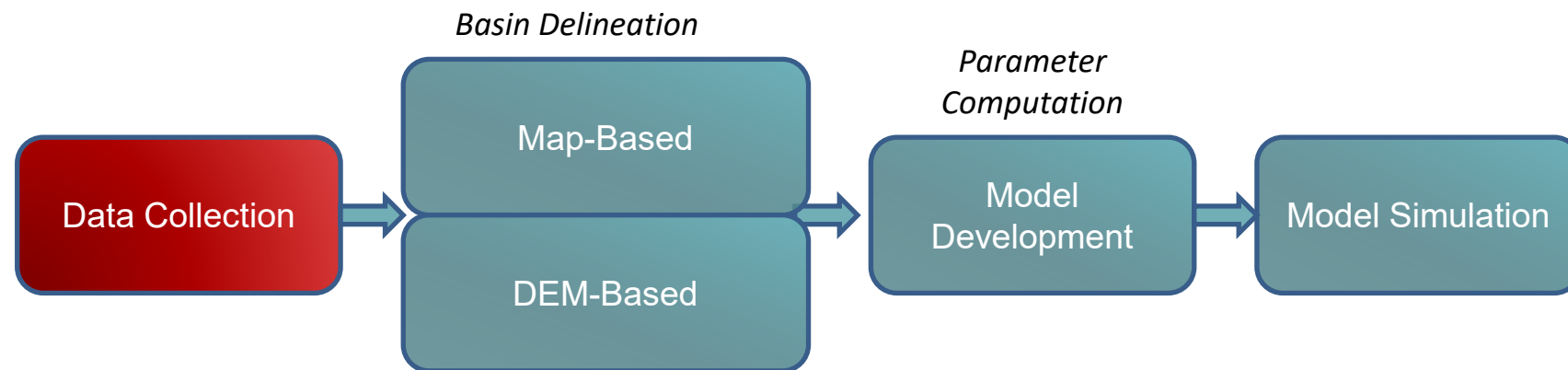


# Lesson Learning Outcomes

Upon completion of this lesson, we will be able to:

- Define data projections
- Assess how to set projections in WMS and how to reproject data from one system to another
- Define digital elevation models (DEMs) in the context of WMS.
- Demonstrate the usage of DEMs in WMS

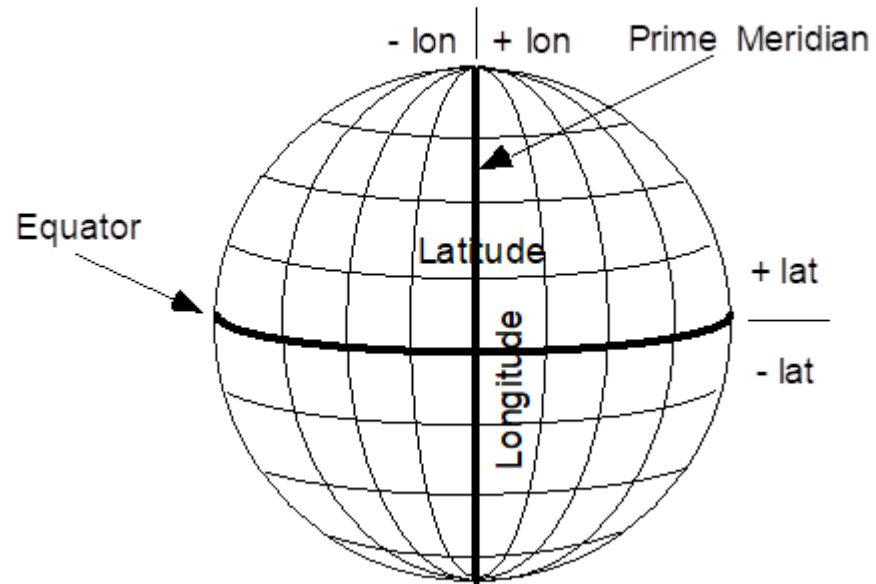




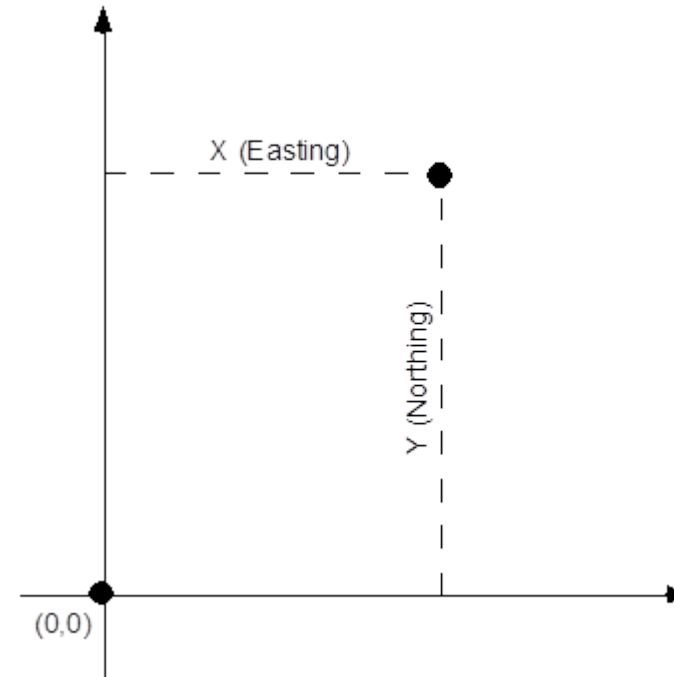
- Data must have a projection
- All data must be in a consistent projection
- Data sources are in different projections
- WMS can convert from one projection to another



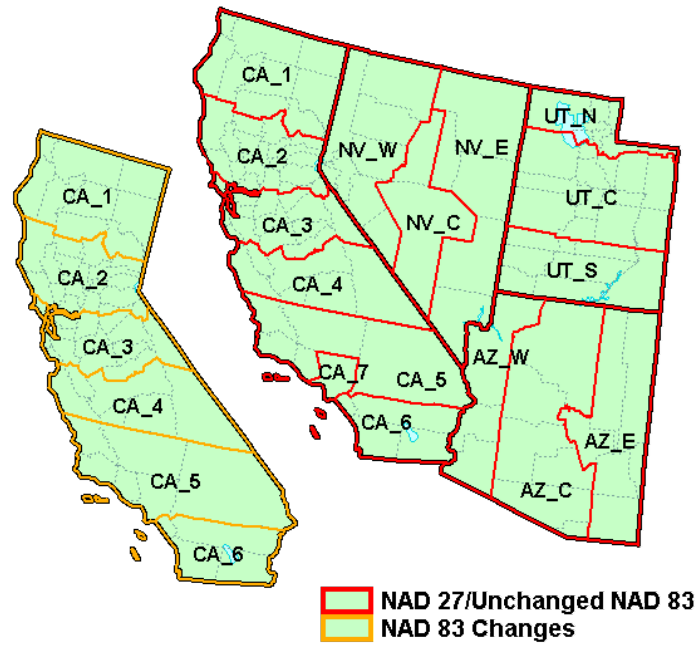
# Projections



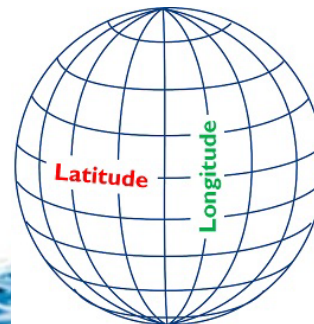
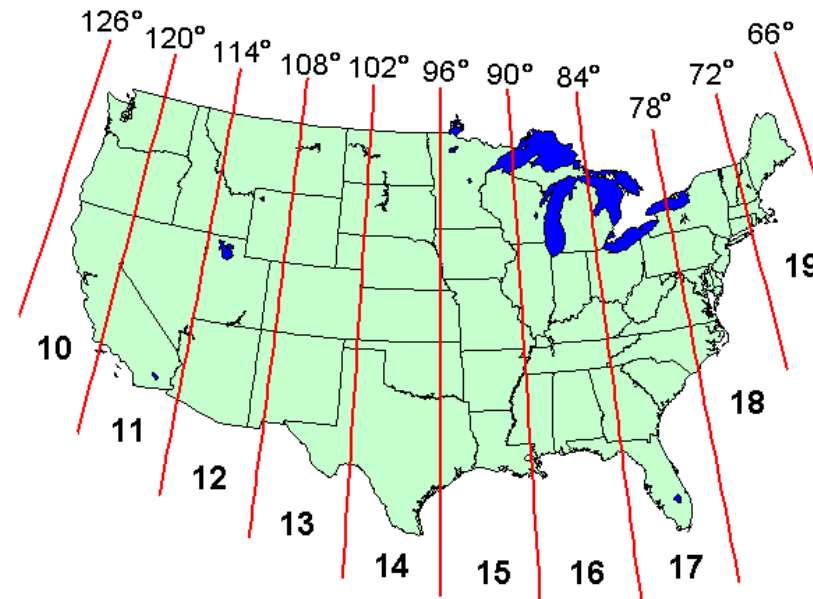
Geographic



Planimetric

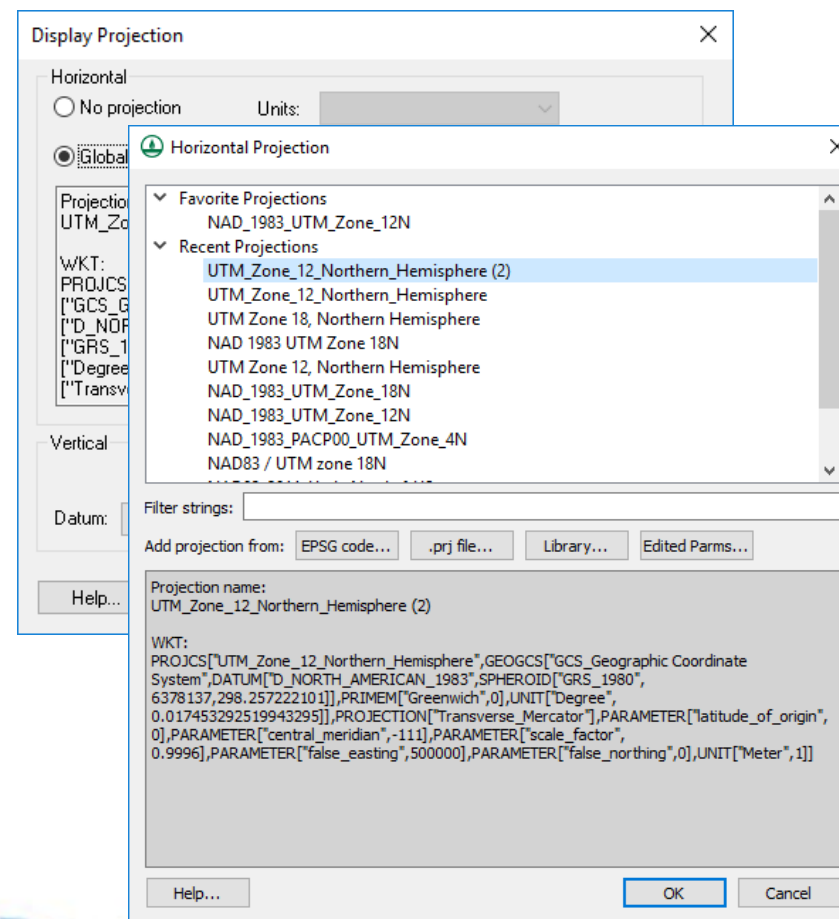


U.S. UTM Zones





- Working projection
- Set when starting a project
- Can be set by first dataset loaded
- Does not need to be same as any data



# Projection “On the Fly”

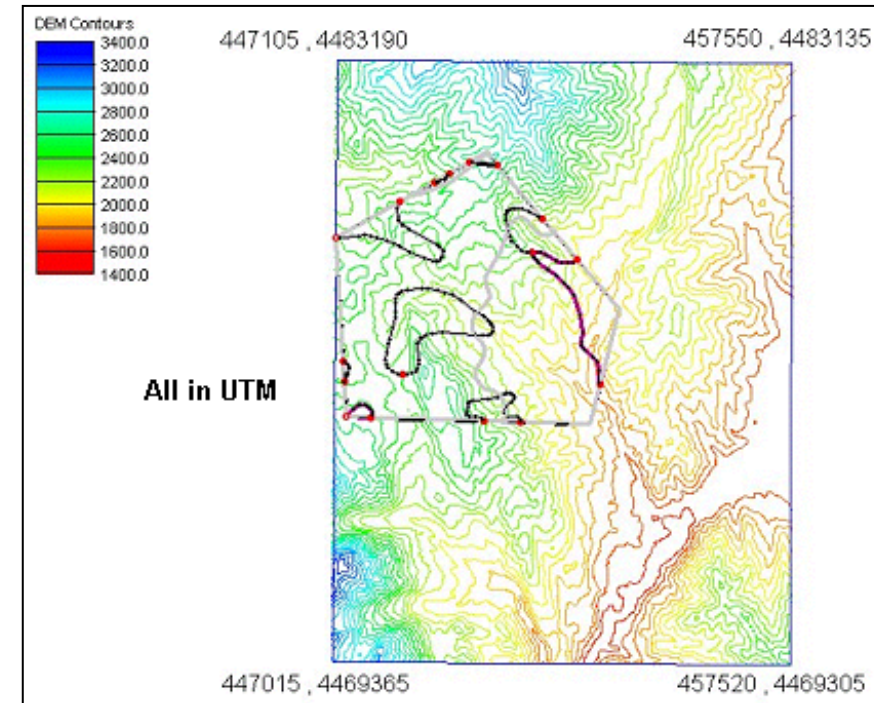
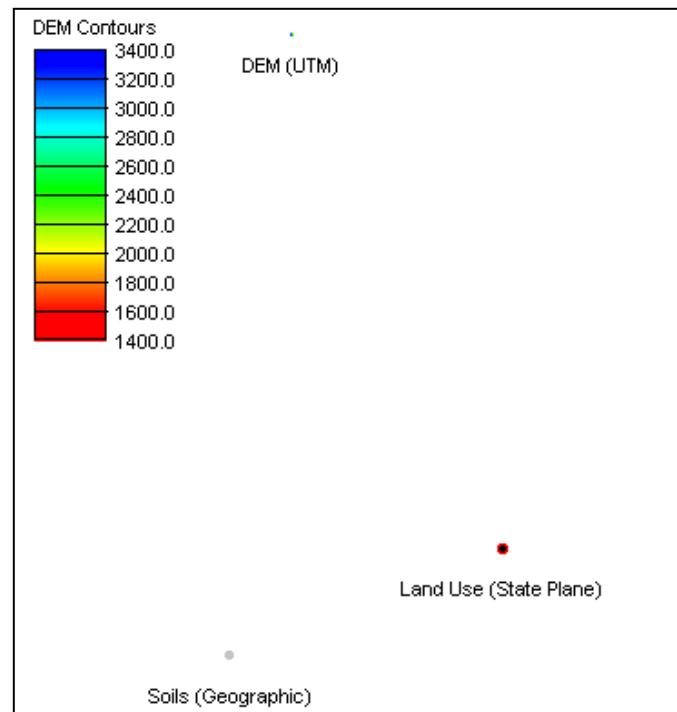
- Each object has a projection
  - .prj file attached or embedded
- WMS reprojects “on the fly” to display projection
- Unprojected objects
  - When no projection is available for data
  - Can/should assign projection when determined
  - Displayed as if in “Display Projection”
- Local Projection (with units)
  - Useful for lab or flume studies



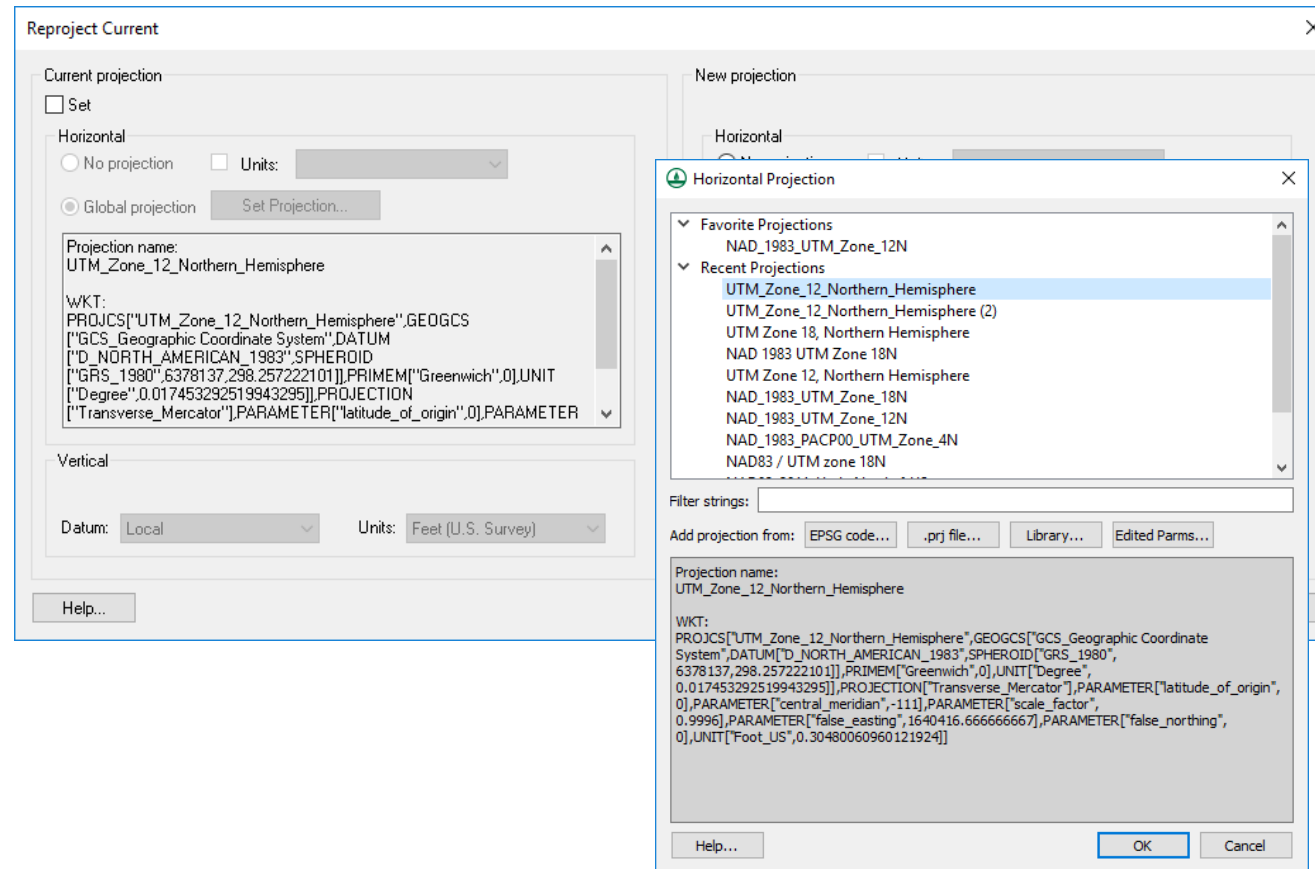


# Inconsistent Projections

DEM in one projection, Soils and Land Use in another



# Reprojection



# Why must we know the coordinate system of our data?

- A) So that we can make correct calculations of area, distance, slope, etc.
- B) So that we can convert to another coordinate system if necessary
- C) So that we can accurately overlay one layer of data with another
- D) All of the above



# Why must we know the coordinate system of our data?

■ The correct answer is:

- A) To make correct calculations of area, distance, slope, etc.
- B) To be able to convert to another coordinate system if necessary.
- C) So that we can accurately overlay one layer of data with another.
- D) All of the above



# Which coordinate system/projection would not be effective as a display projection?

- A) State Plane
- B) Universal Transverse Mercator (UTM)
- C) Geographic
- D) All of the above could be used as a display projection





# Which coordinate system/projection would not be effective as a display projection?

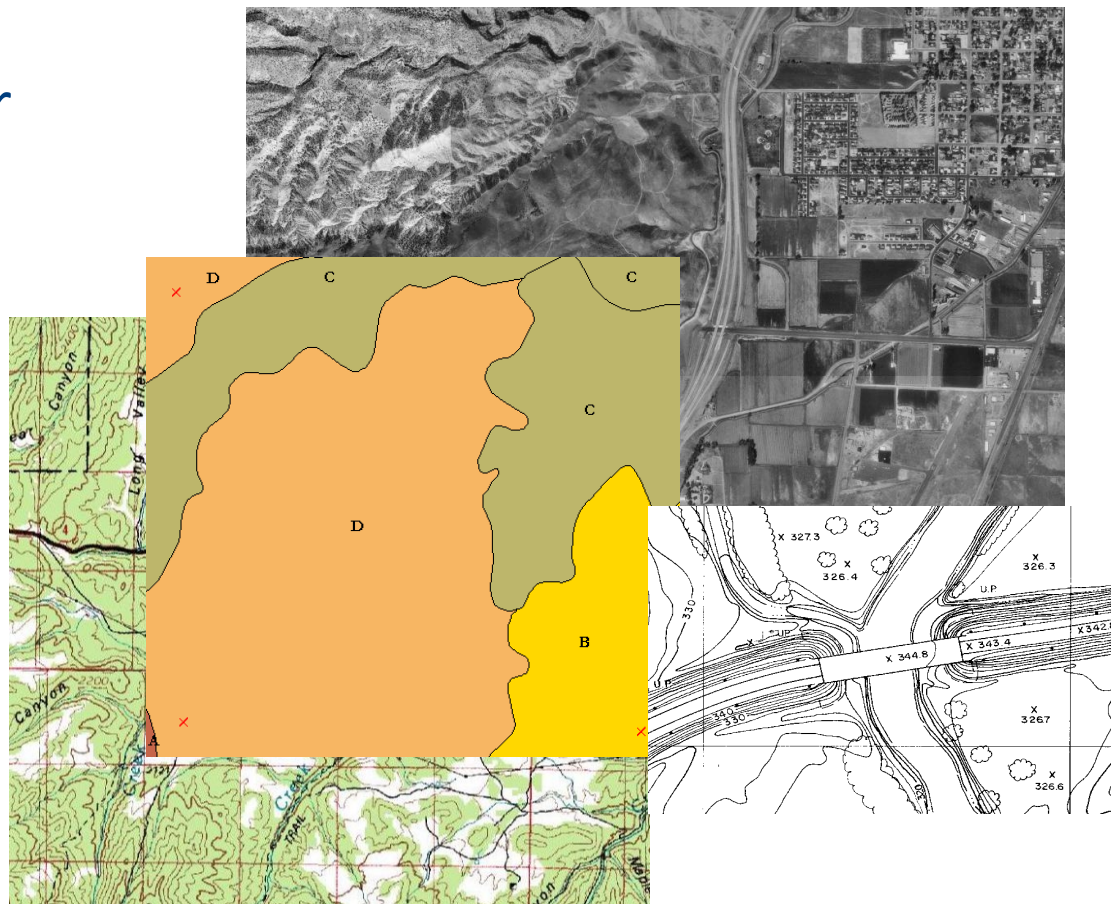
■ The correct answer is:

- A) State Plane
- B) Universal Transverse Mercator (UTM)
- C) Geographic
- D) All of the above could be used as a display projection

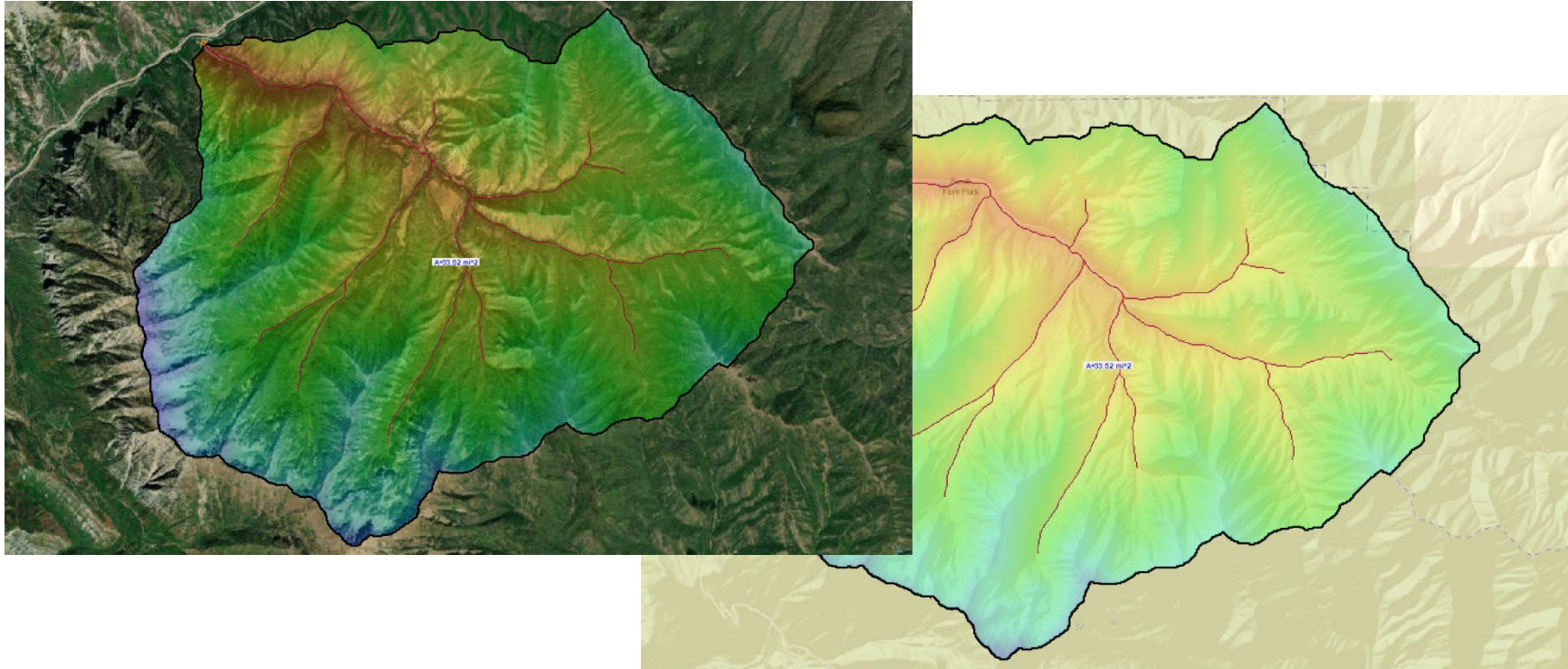




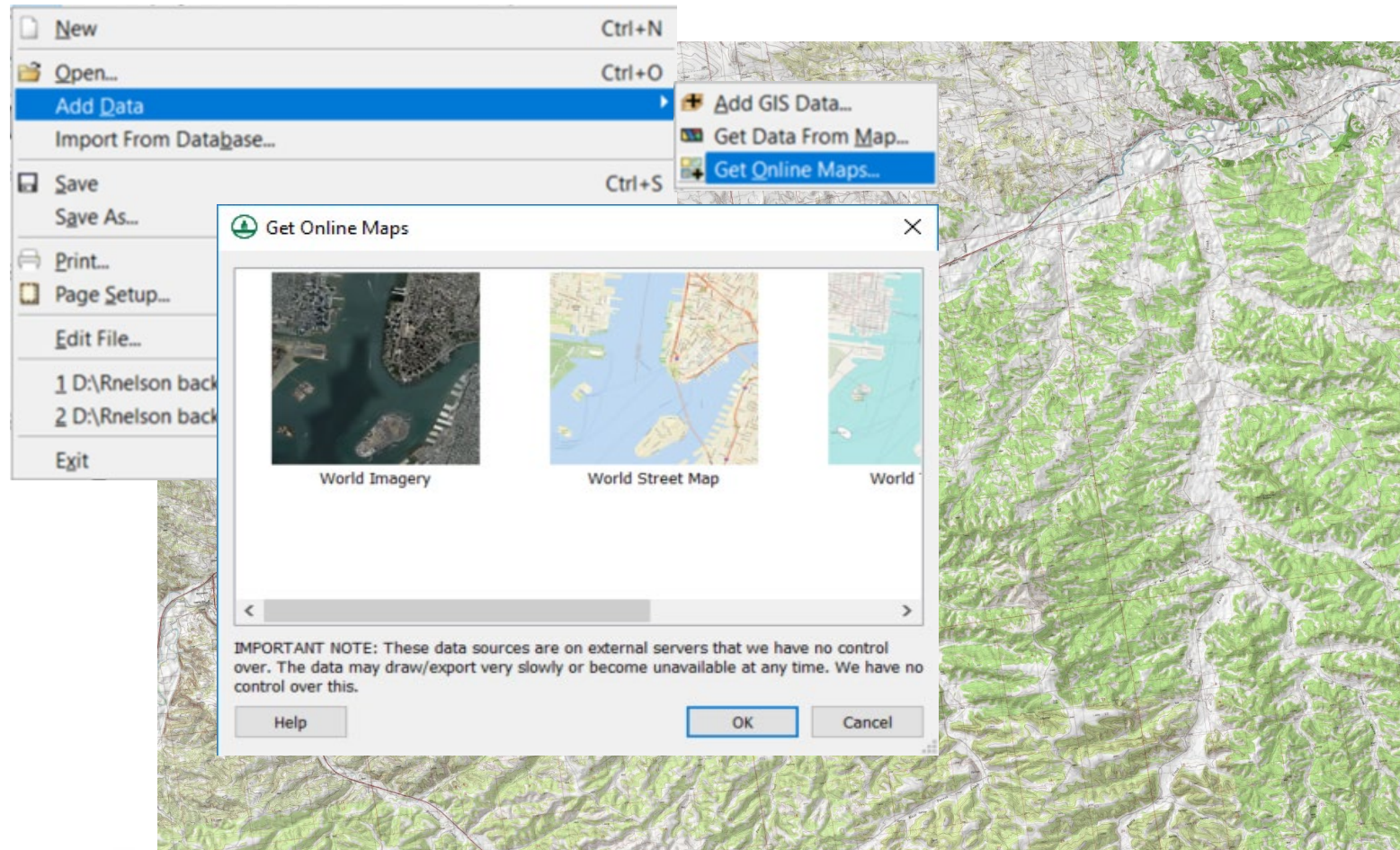
- Reference data for the site:
  - Aerial photos
  - Topo charts/maps
  - CAD
  - GIS

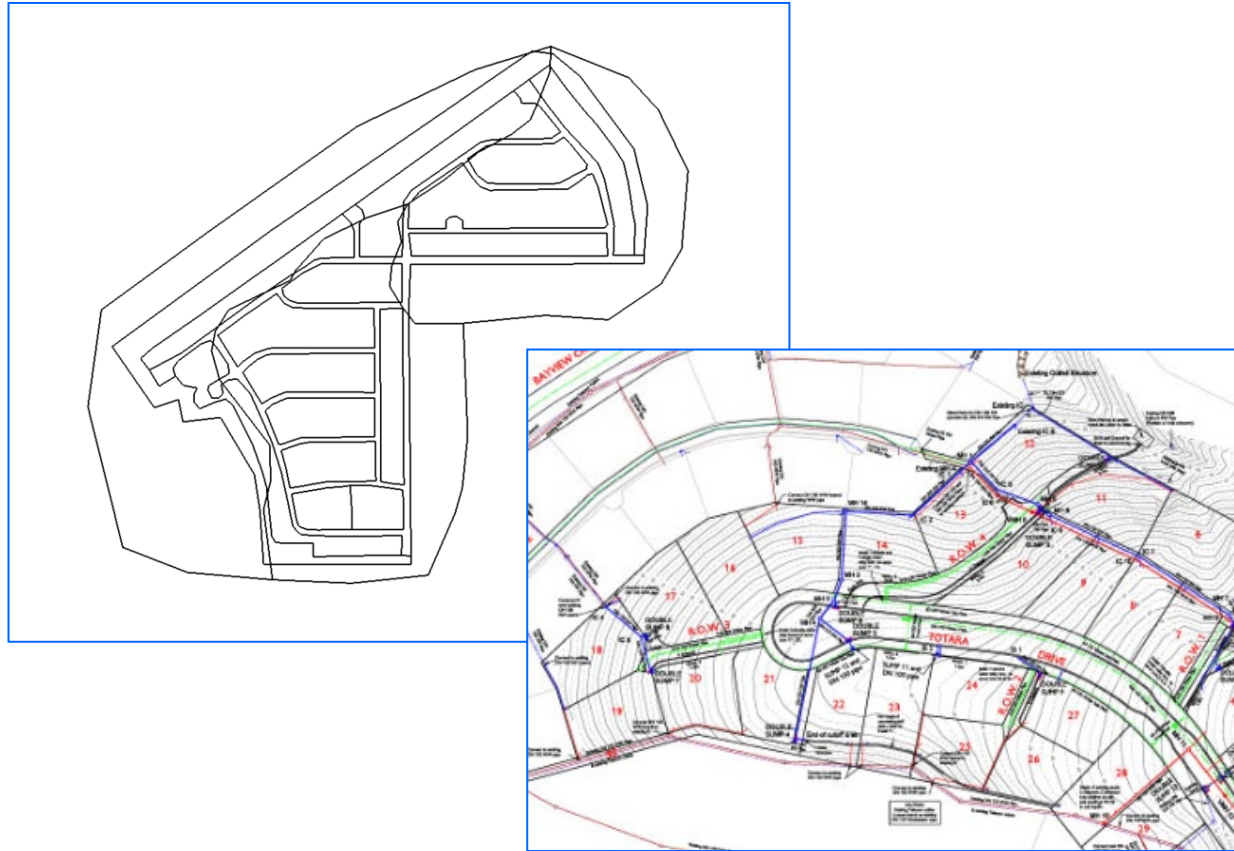


## Overlay data on images





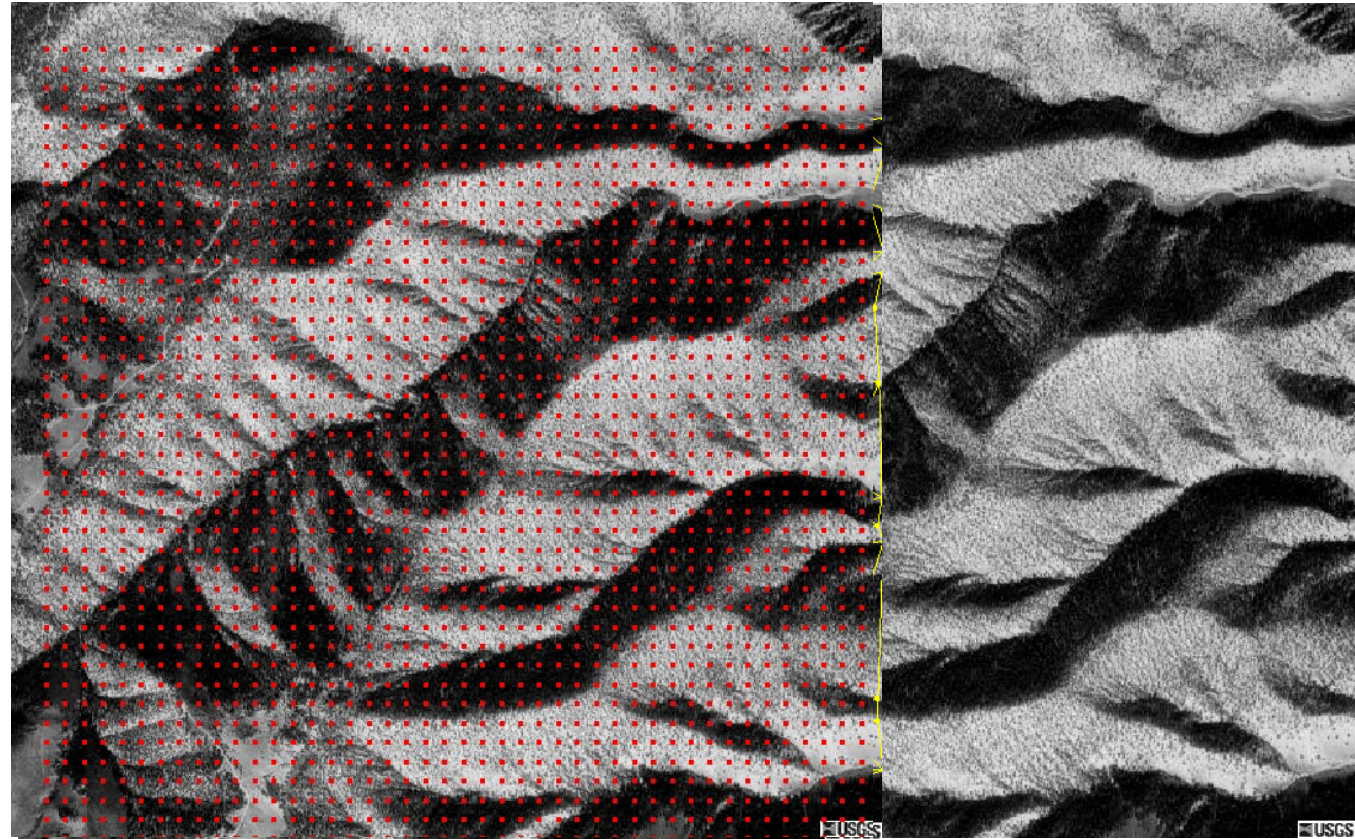






## Digital Terrain Model

- Digital Representation
  - TINs
  - DEMs
- DEMs used in WMS



- DEM Data
  - Gridded elevation data
  - Less memory
- Formats
  - USGS DEM
  - ArcINFO GRID (.asc)
  - GeoTIFF
  - Numerous others

ORIGIN x lower left y lower left

DELTA X x resolution

DELTA Y y resolution

NCOLS

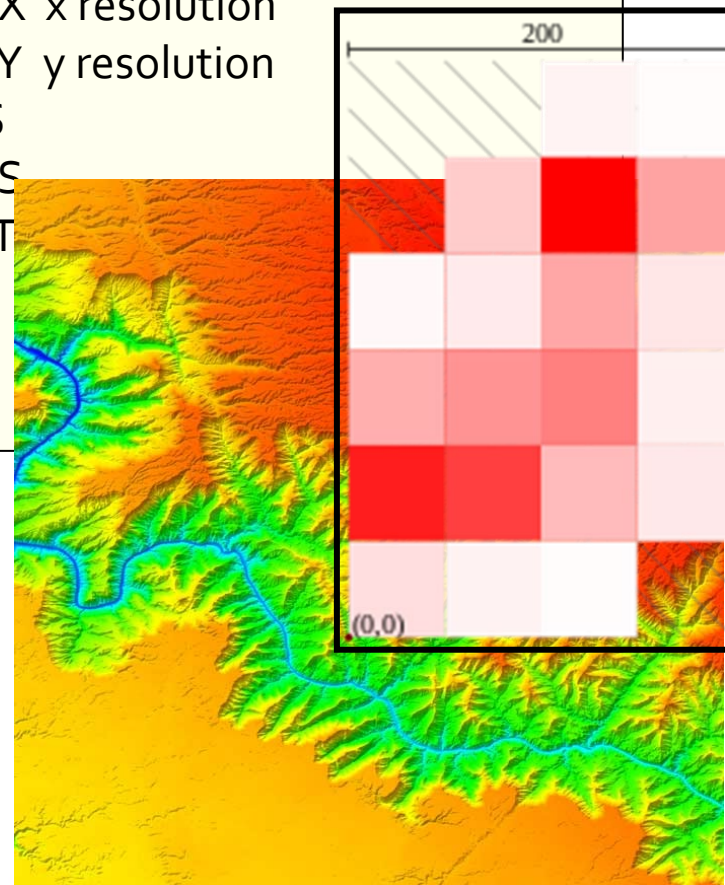
NROWS

ELEVAT

Z<sub>11</sub>

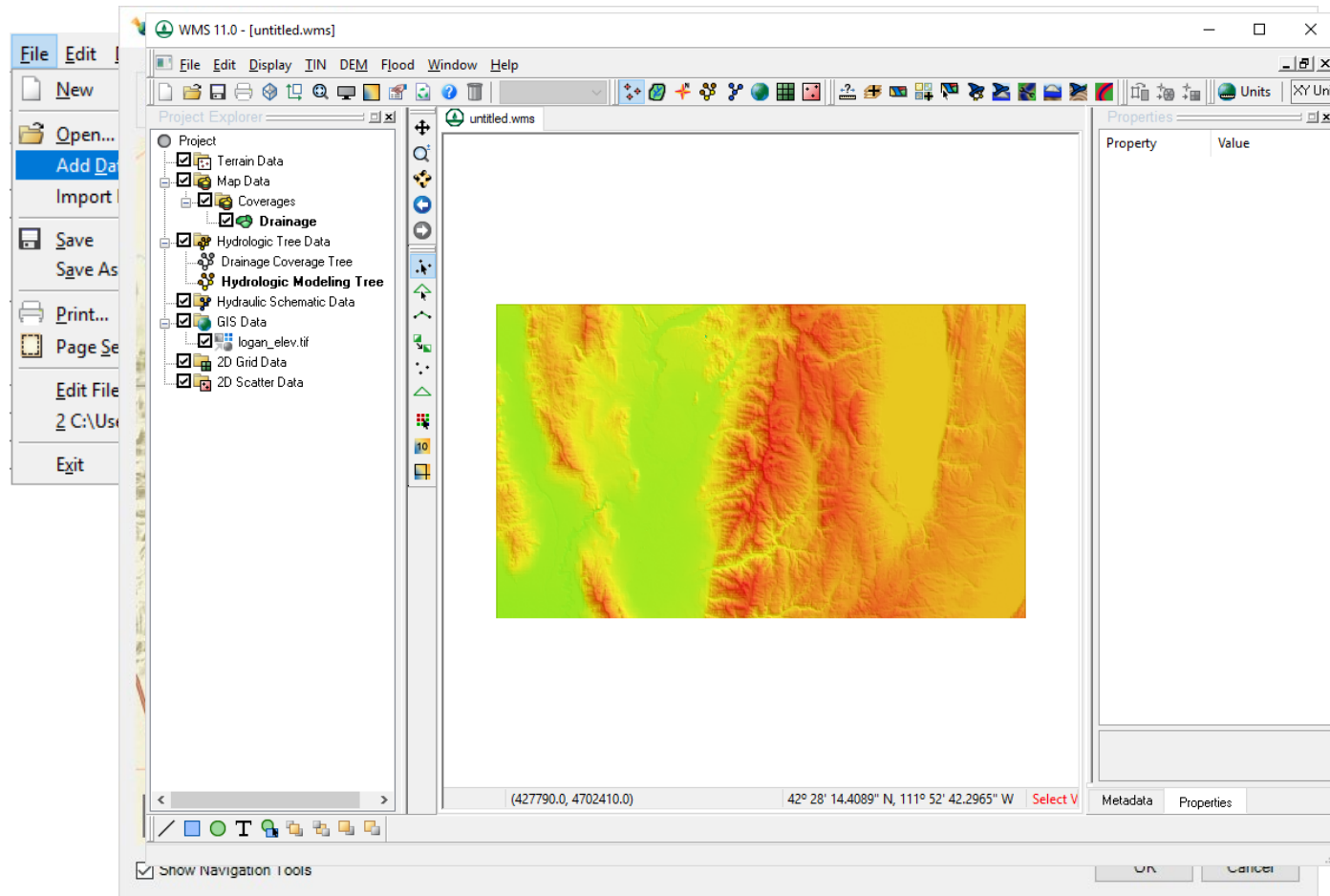
Z<sub>21</sub>

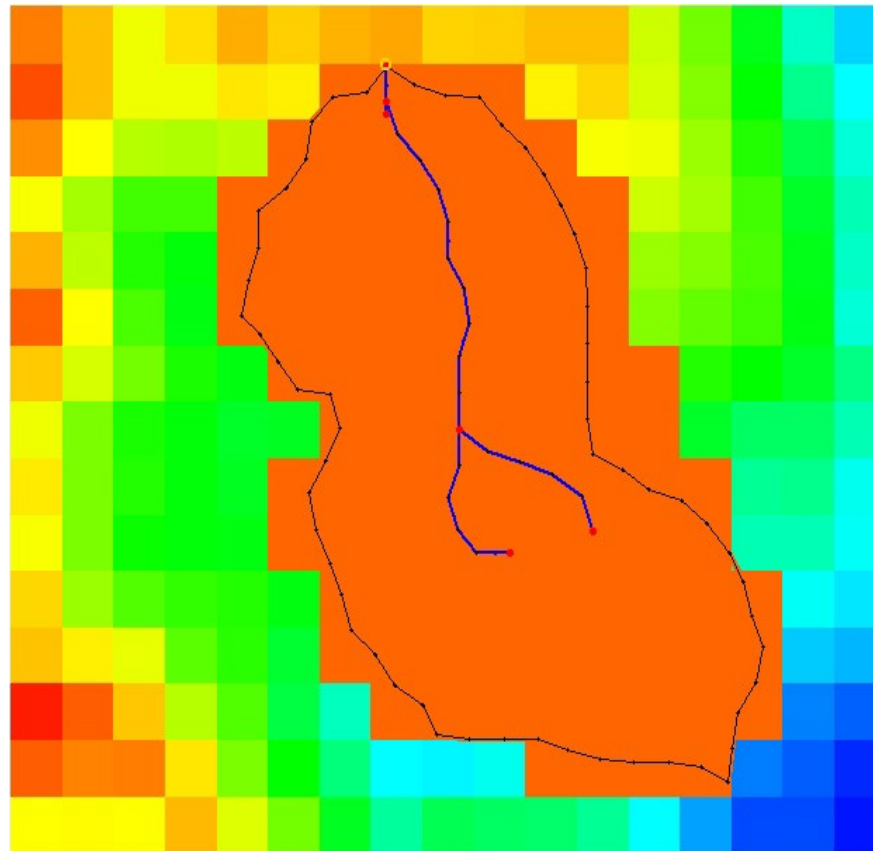
Z<sub>31</sub>



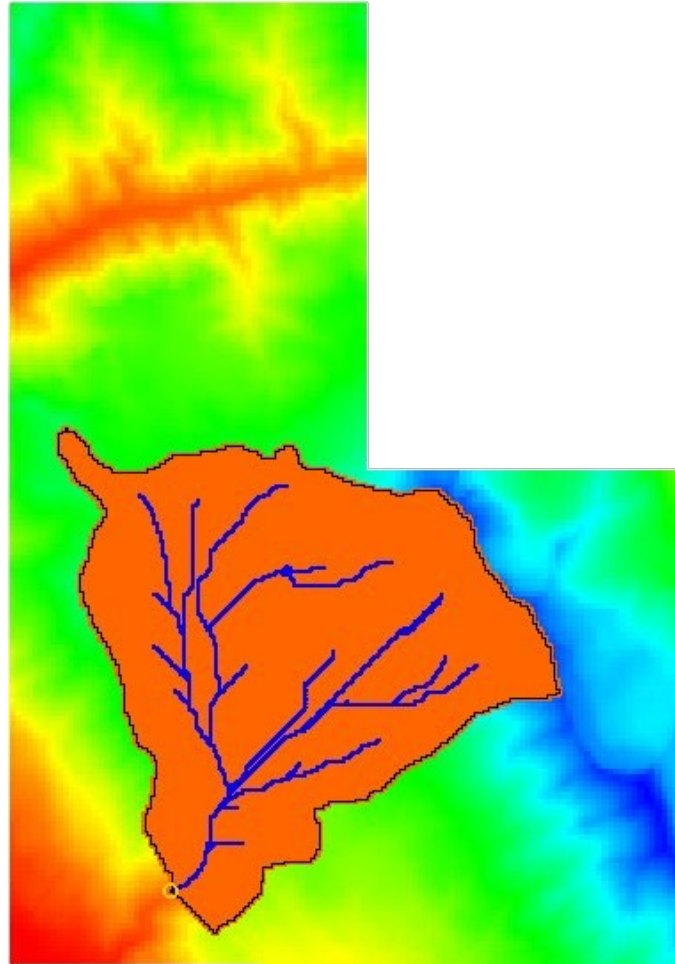


# DEMs from Get Online Data



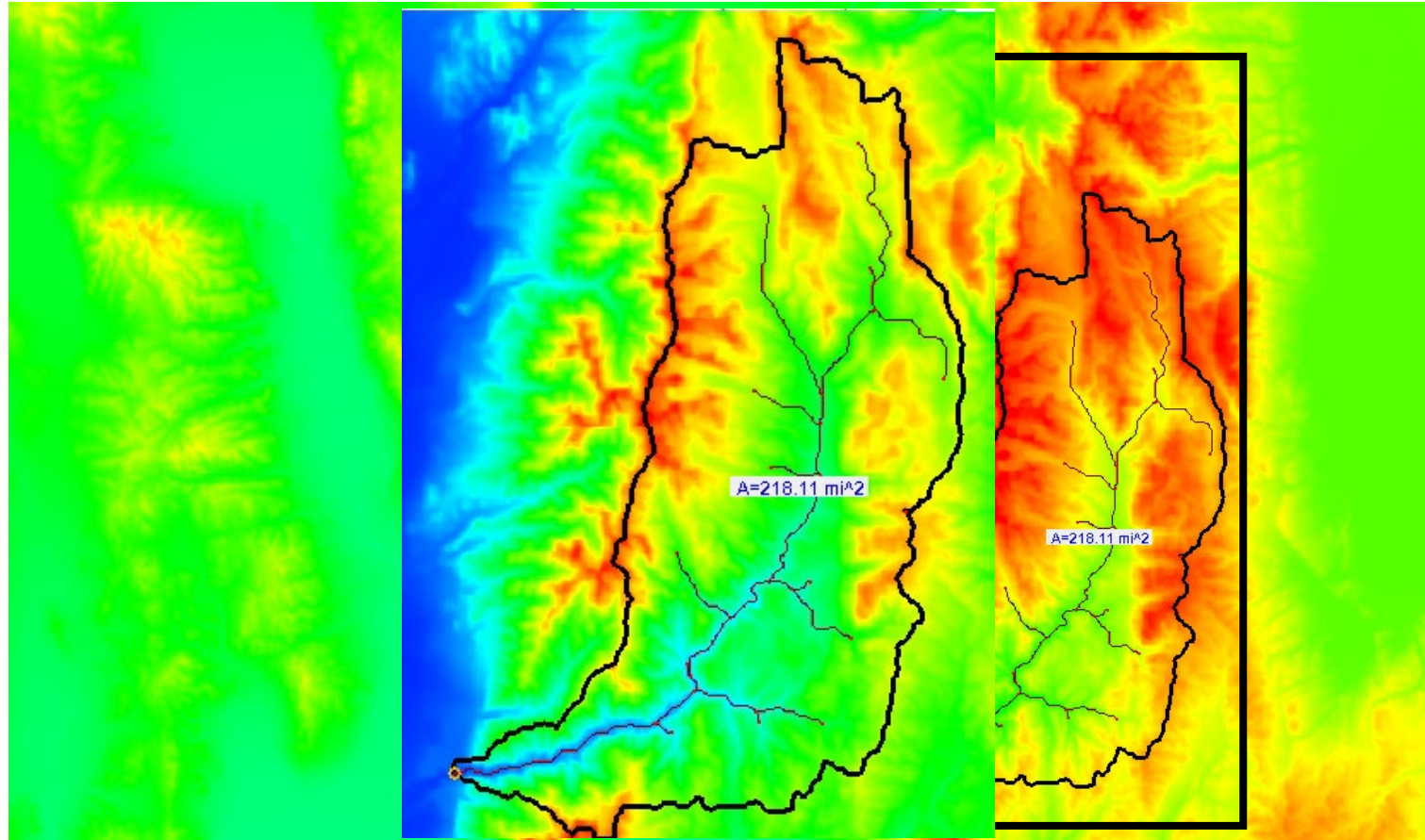


- Tiling of DEMS



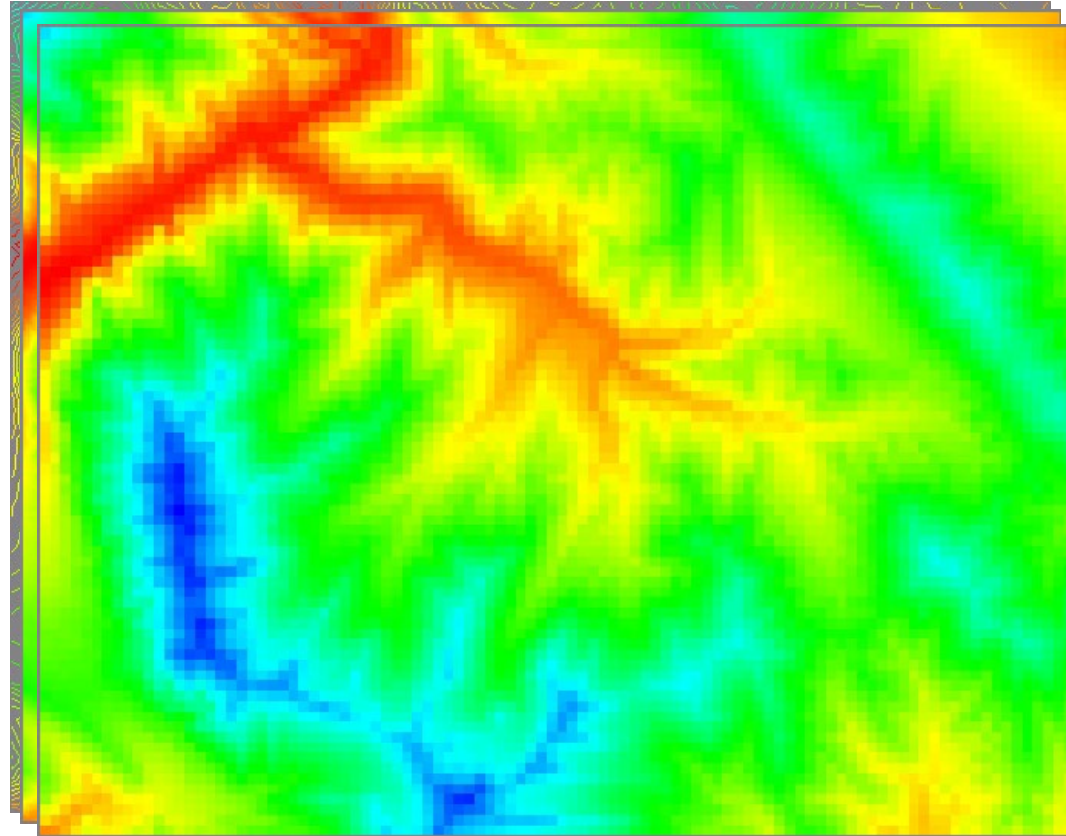


# Trimming DEMs



# Elevation Display Options

- Contour Options
  - Linear Contours
  - Color Fill Contours
    - Display Step



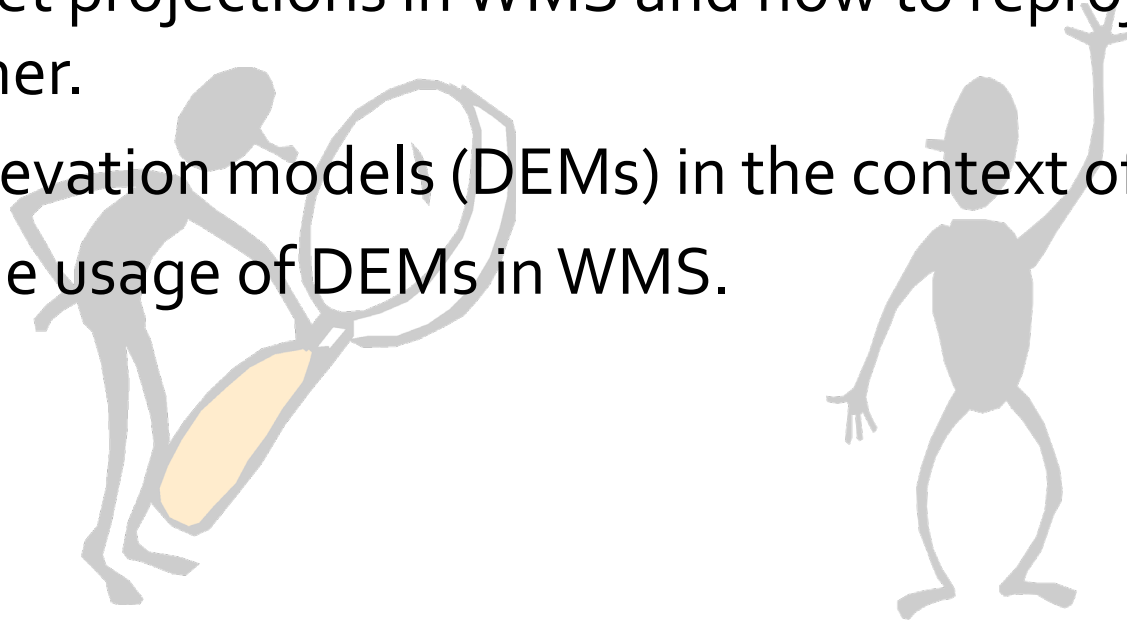


# Demonstration





- We are now able to:
  - Define data projections.
  - Assess how to set projections in WMS and how to reproject data from one system to another.
  - Define digital elevation models (DEMs) in the context of WMS.
  - Demonstrate the usage of DEMs in WMS.



- Let's practice ...
- **Exercises** folder for instructions
- **Background** folder contains the data files required for the exercise.

