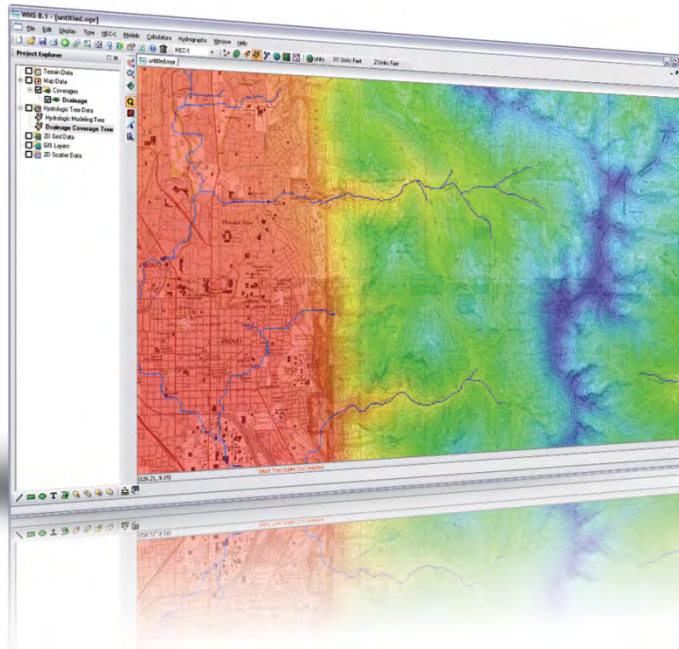




Introduction and Overview



1. Use digital terrain data to automate drainage basin delineation.
2. Compute drainage basin parameters commonly used in hydrologic models.
3. Use Land Use and Soils geographic data to compute runoff coefficients and curve numbers.
4. Set up input data files for industry standard models used to develop peak flow estimates and hydrographs.
5. Identify and use sources of electronic data such as web sites and proprietary data.
6. Set up input data for hydraulic models to run a floodplain delineation and determine hydraulic properties.
7. Basic overview of the GSSHA 2D hydrologic model



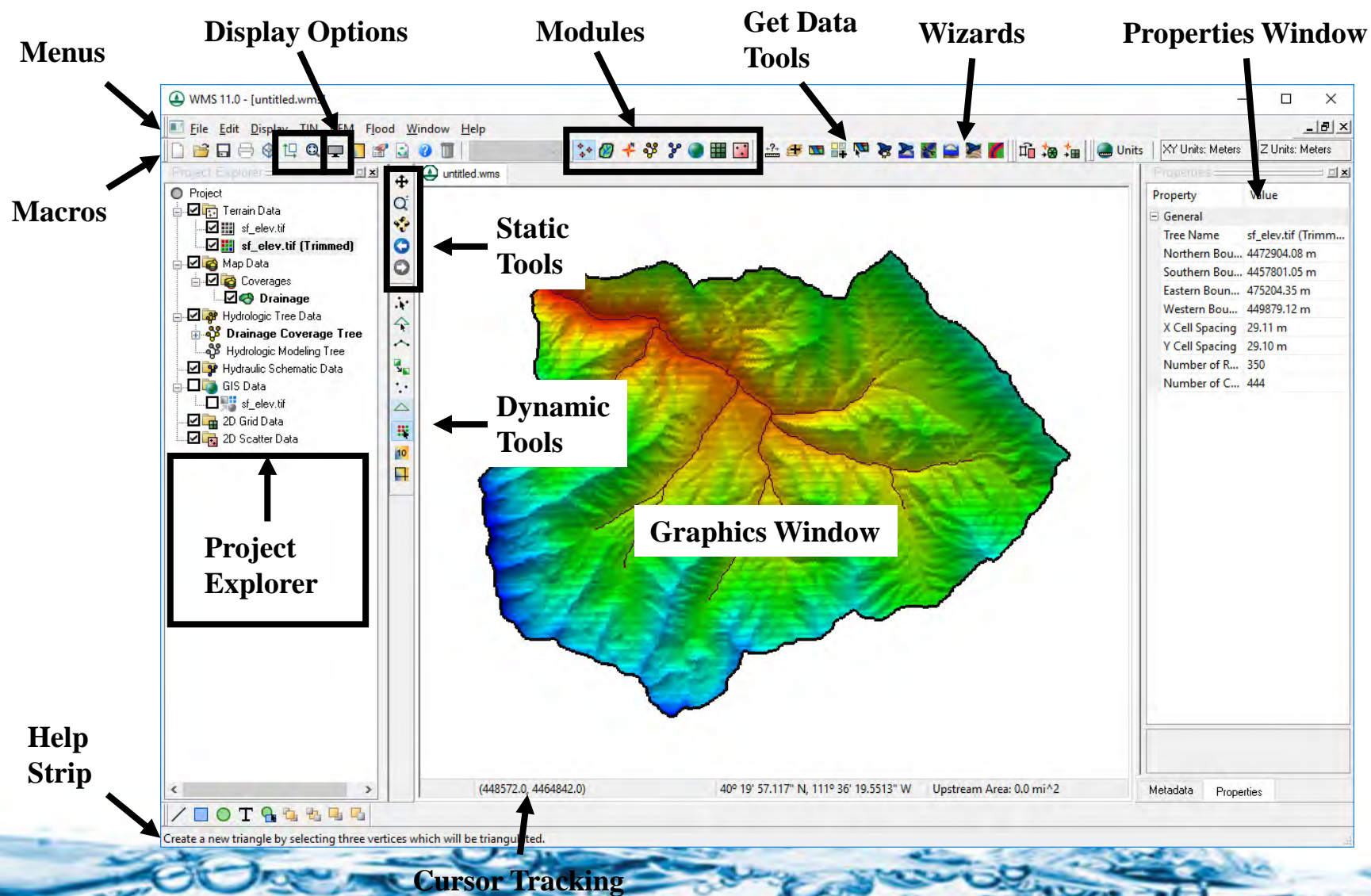
- Lecture
- Demonstration
- Workshop
- Review



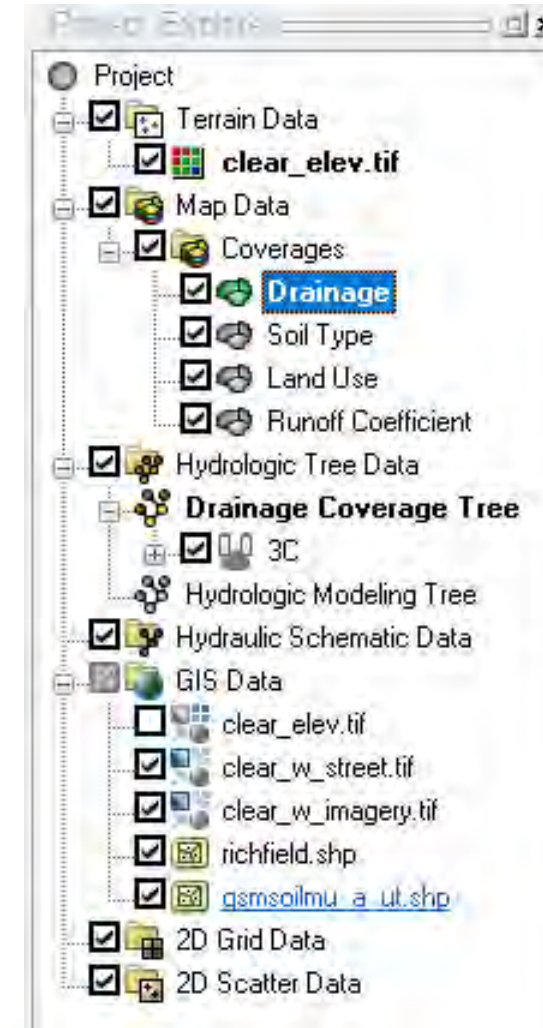
Lesson Learning Outcomes









- Upon completion of this lesson, we will be able to:
 - Describe the process for building a hydrologic model in WMS
 - List the primary functions and features of the WMS interface





- Entries for Geometric Objects
 - DEM data
 - Map coverages
 - Hydrologic and hydraulic simulation data
 - Images, GIS and CAD data
- Turn on/off data objects
- Right-click to operate on items in Project Explorer



-  • Terrain Data – Edit elevation data.
-  • Drainage – Automate basin delineation.
-  • Map – Create points, arcs, and polygons.
-  • Hydrologic Modeling – Define and run hydrologic simulations.
-  • Hydraulic Modeling – Define and run hydraulic simulations.
-  • GIS – Import geospatial data
-  • 2D Grid – Distributed modeling and gridded data.
-  • Scatter – x, y, z data

Editing DEM data is done in which of the following modules?

- A) The GIS module
- B) The Terrain module
- C) The 2D Grid module
- D) The Scatter module

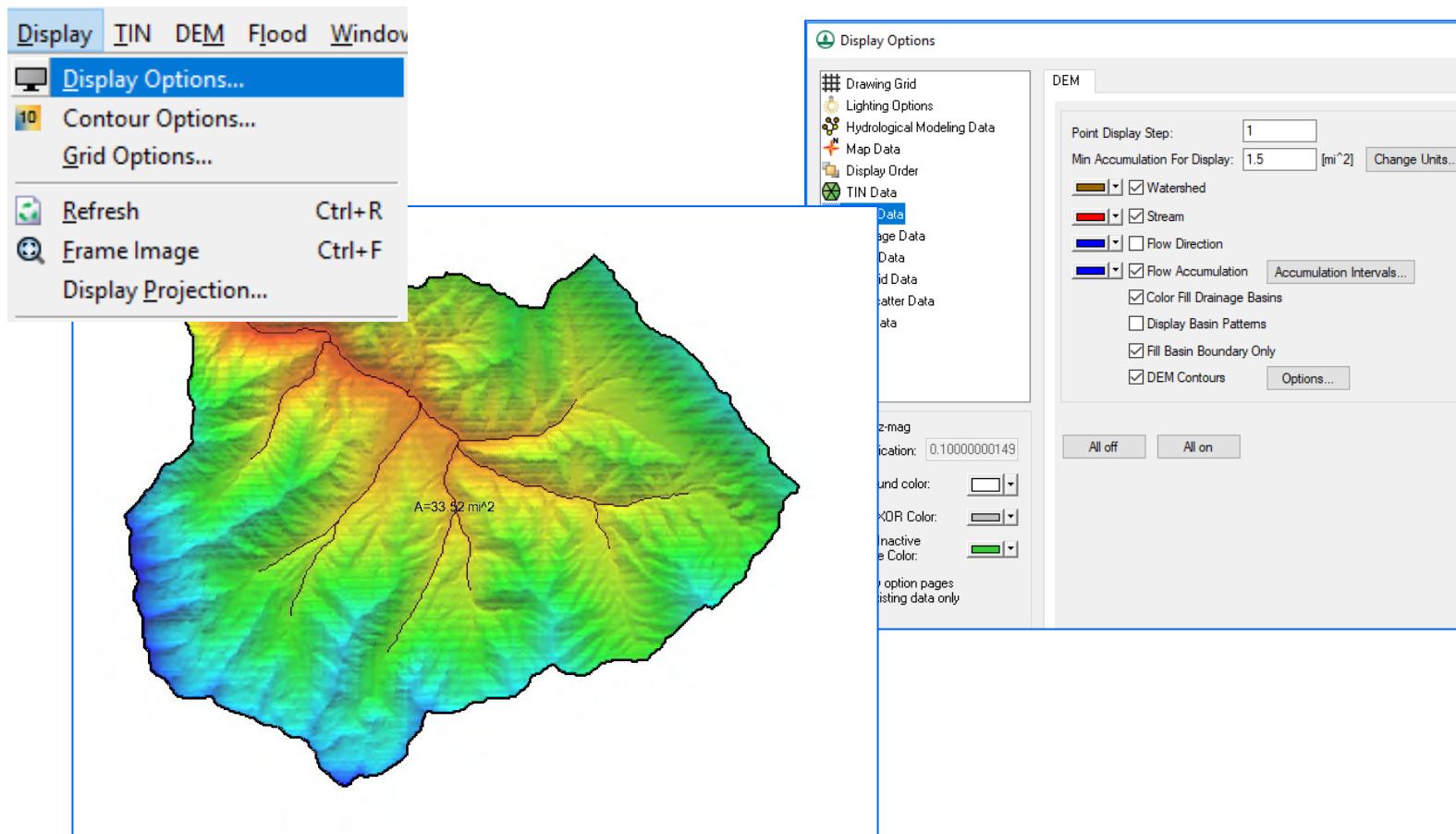


Editing DEM data is done in which of the following modules?

- The correct answer is:
 - A) The GIS module
 - B) The Terrain module
 - C) The 2D Grid module
 - D) The Scatter module



Display Options



The screenshot displays the software interface for Watershed Management And Modeling. The main window shows a topographic map of a watershed area, colored by elevation (green for lower elevations, yellow/orange for higher elevations). A text label on the map indicates an area of $A=33.32 \text{ mi}^2$.




The **Display** menu is open, showing the following options:

- Display Options...
- Contour Options...
- Grid Options...
- Refresh (Ctrl+R)
- Frame Image (Ctrl+F)
- Display Projection...

The **Display Options** dialog box is open, showing the **DEM** tab. The dialog includes the following settings:

- Point Display Step:** 1
- Min Accumulation For Display:** 1.5 [mi²] (Change Units...)
- Watershed:** ☒ (Color: brown)
- Stream:** ☒ (Color: red)
- Flow Direction:** ☐ (Color: blue)
- Flow Accumulation:** ☒ (Color: blue) (Accumulation Intervals...)
- Color Fill Drainage Basins:** ☒
- Display Basin Patterns:** ☐
- Fill Basin Boundary Only:** ☒
- DEM Contours:** ☒ (Options...)
- All off** / **All on** buttons

The dialog also includes a list of data layers on the left, including Drawing Grid, Lighting Options, Hydrological Modeling Data, Map Data, Display Order, and TIN Data. The **TIN Data** layer is currently selected.

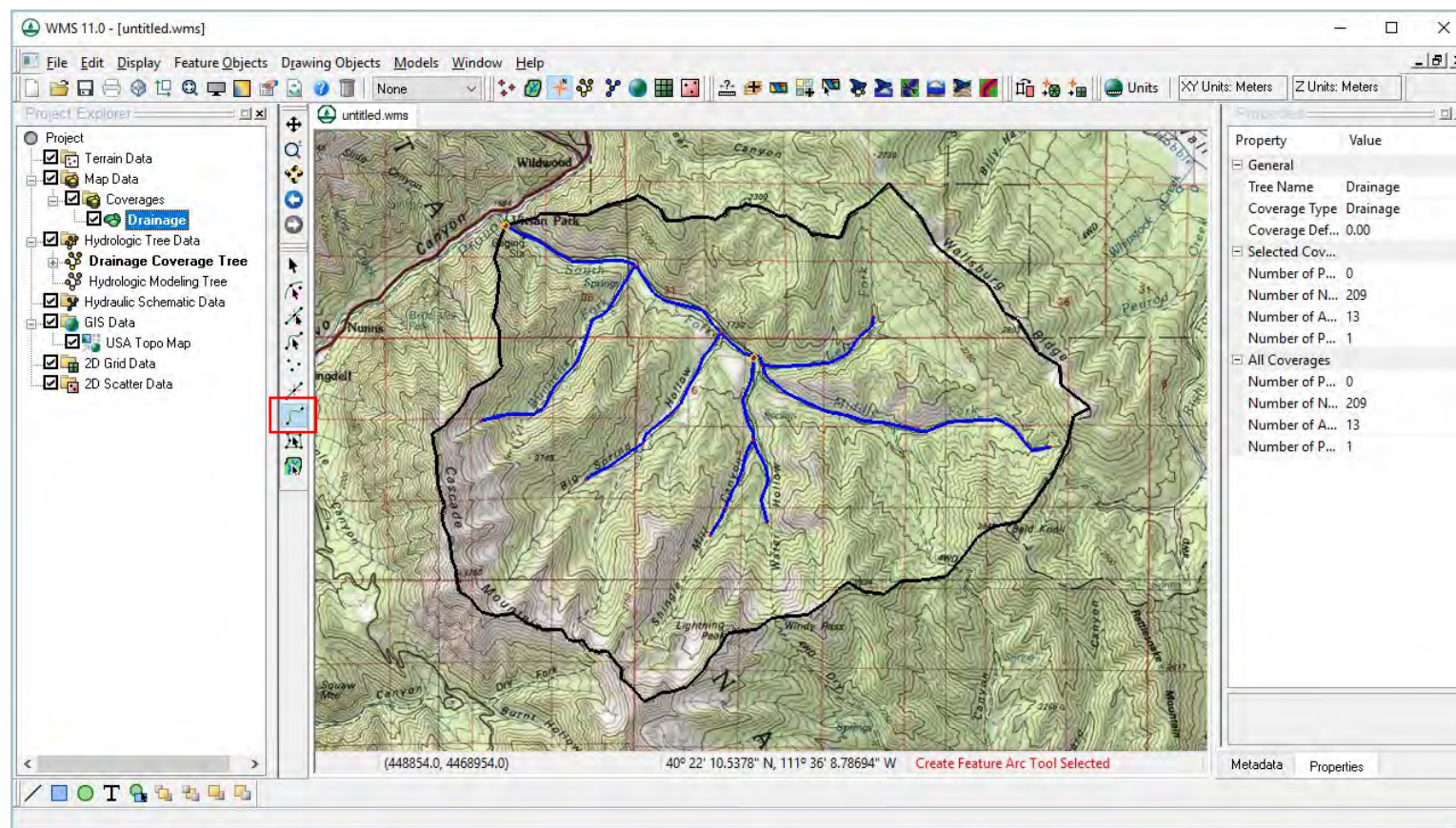
- Zoom Option 
 - Draw a box
 - Click to zoom in
 - Shift-click to zoom out
 - Mouse wheel
- Pan 
 - Hold down mouse wheel
- Rotate 
 - 3D view
 - Click rotate around center
- Plan view and frame



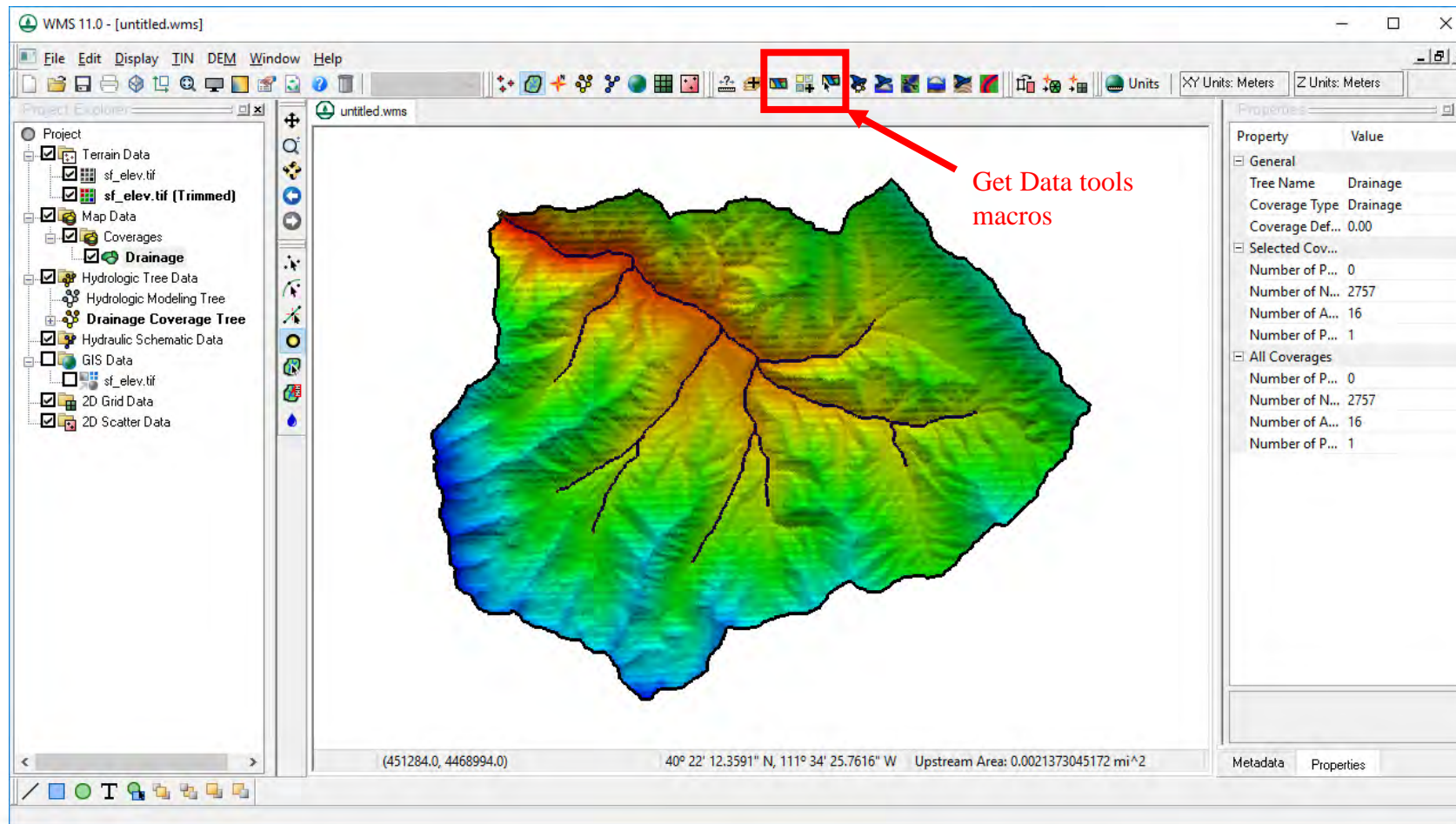
- Base Map Data
 - Images
 - Geographic Information Systems (GIS) data
 - Computer-Aided Design (CAD) data
- Elevation Data
 - Digital Elevation Models (DEMs)
 - Triangulated Irregular Networks (TINs)
 - Light Detection and Ranging (LiDAR)



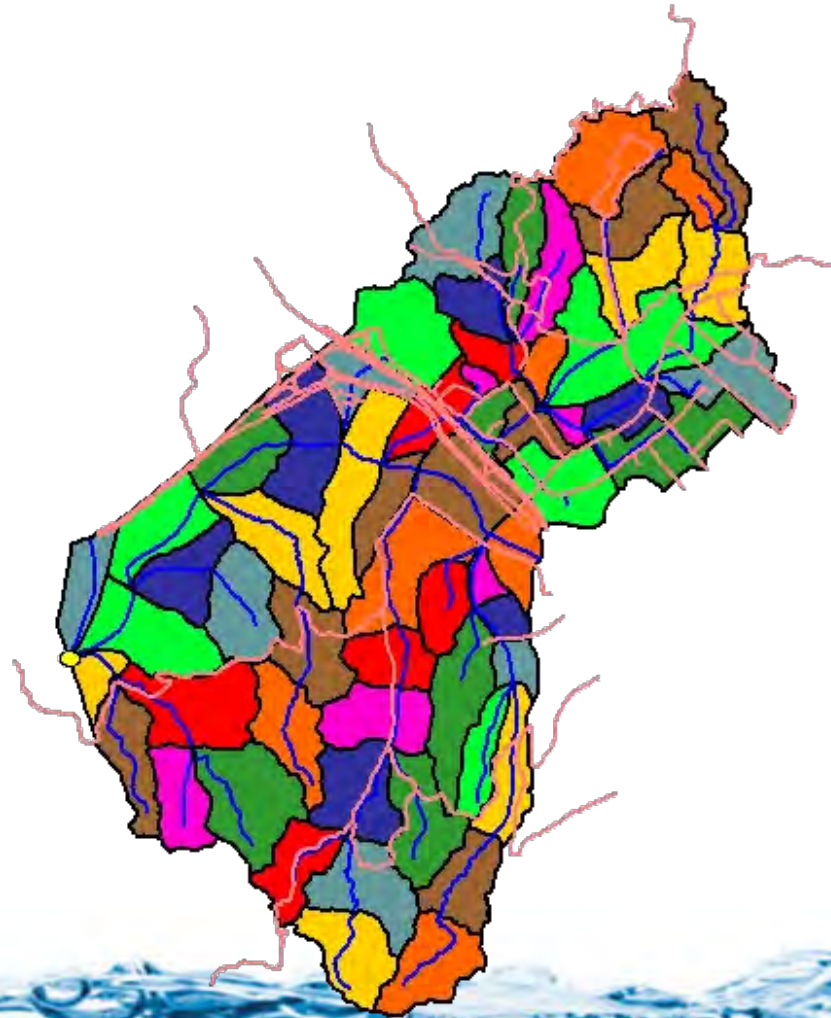
Basins From Digital Maps



Basins From Elevation Maps



Basins From CAD and GIS



How are basins delineated in WMS?

- A) Importing GIS or CAD files
- B) Manually digitizing boundaries and streams using scanned base maps
- C) Using digital elevation data to automate the procedure
- D) All of the above



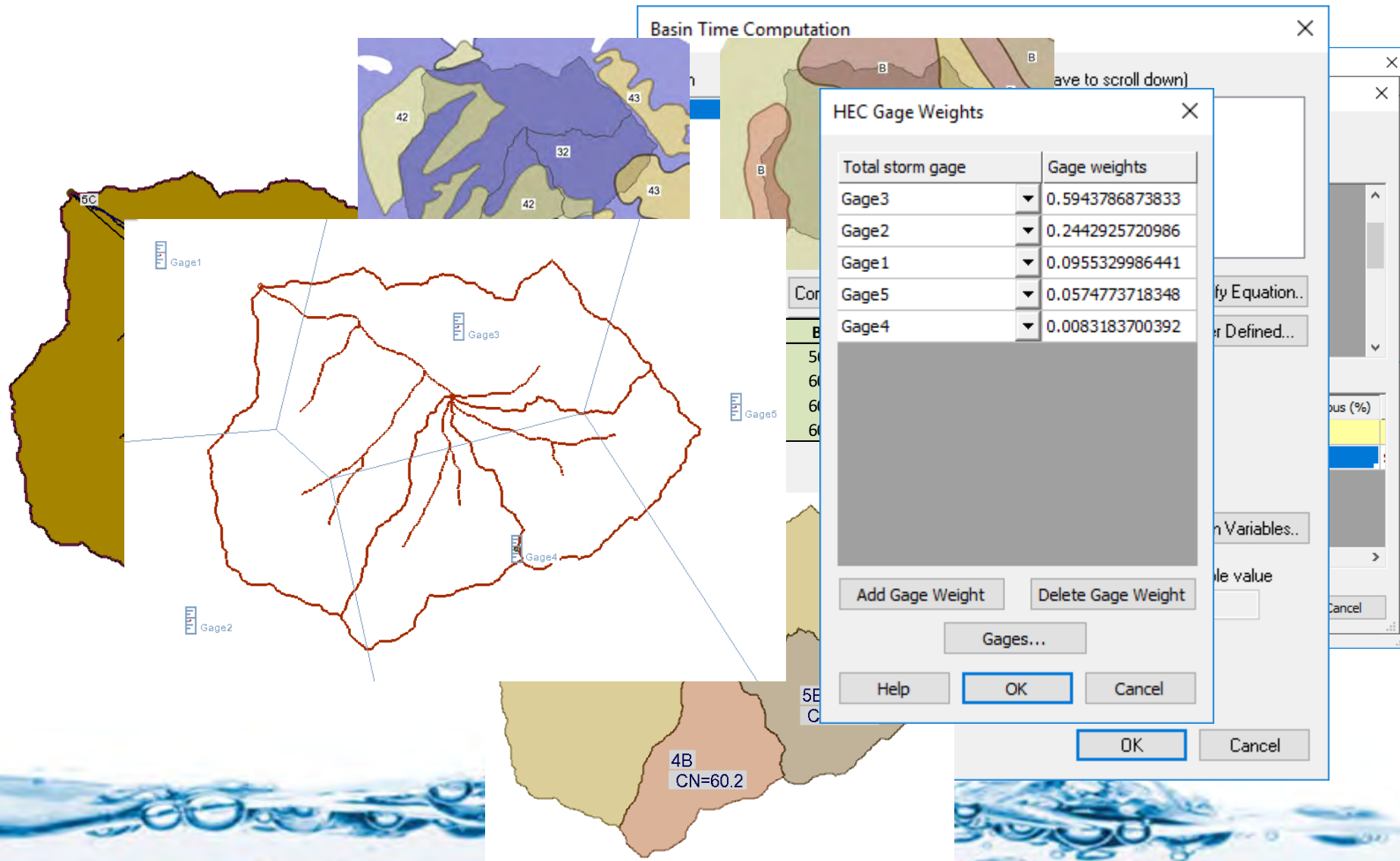
How are basins delineated in WMS?

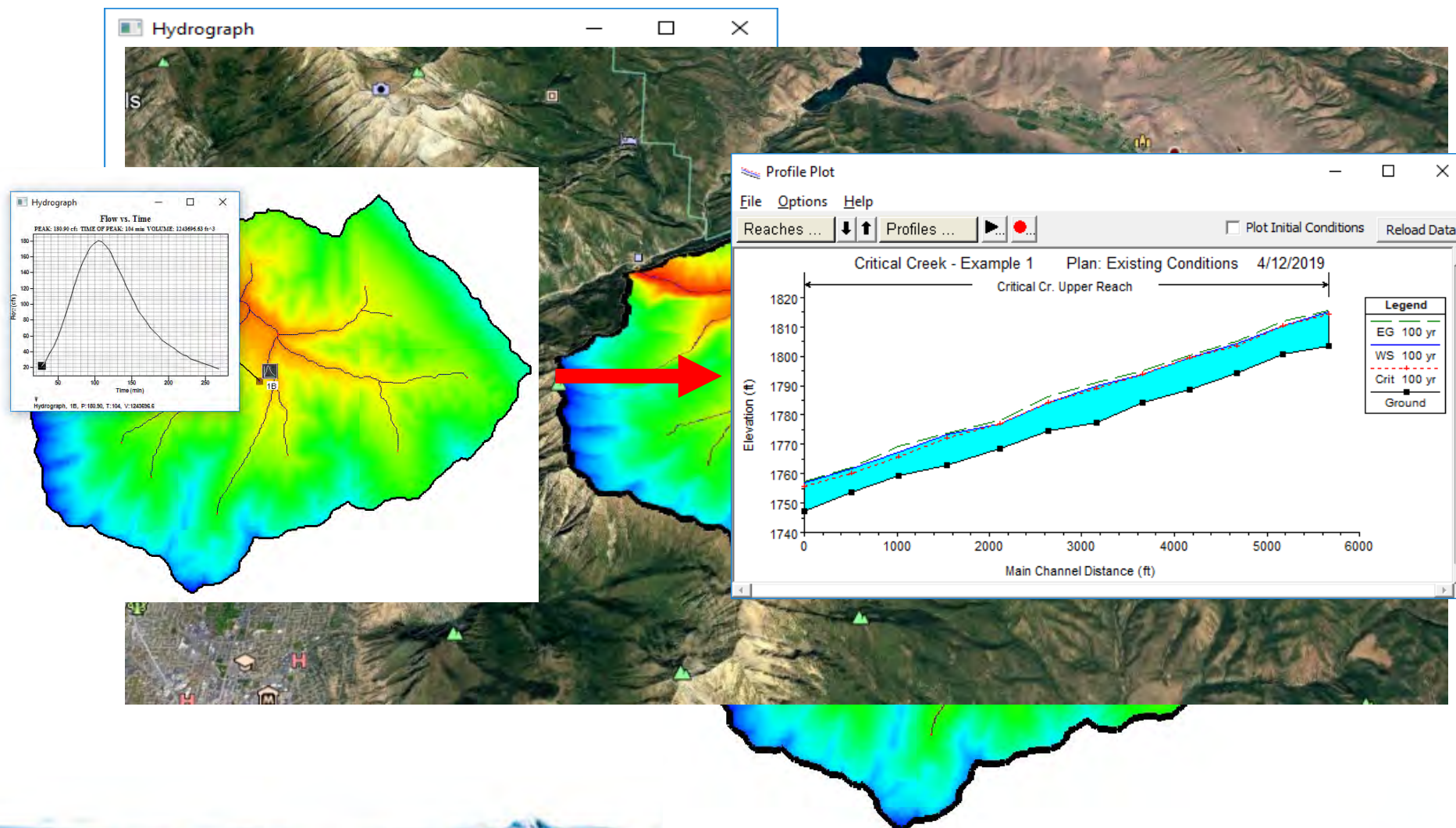
The correct answer is:

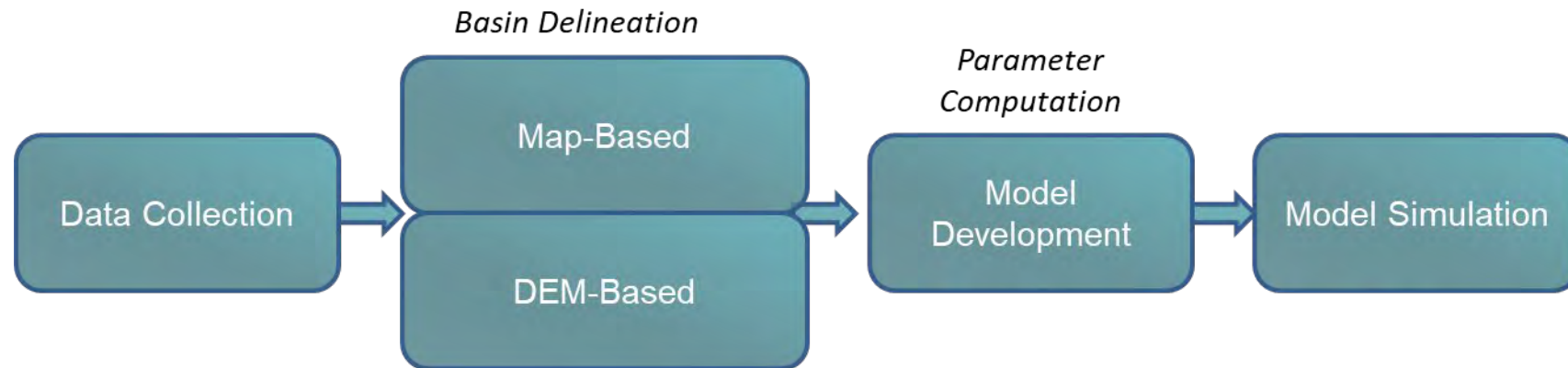
- A) Importing GIS or CAD files.
- B) Manually digitizing boundaries and streams using scanned base maps.
- C) Using digital elevation data to automate the procedure.
- D) All of the above.



Compute Parameters









Demonstration



- We are now able to:
 - Describe the process for building a hydrologic model in WMS
 - List the primary functions and features of the WMS interface



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

