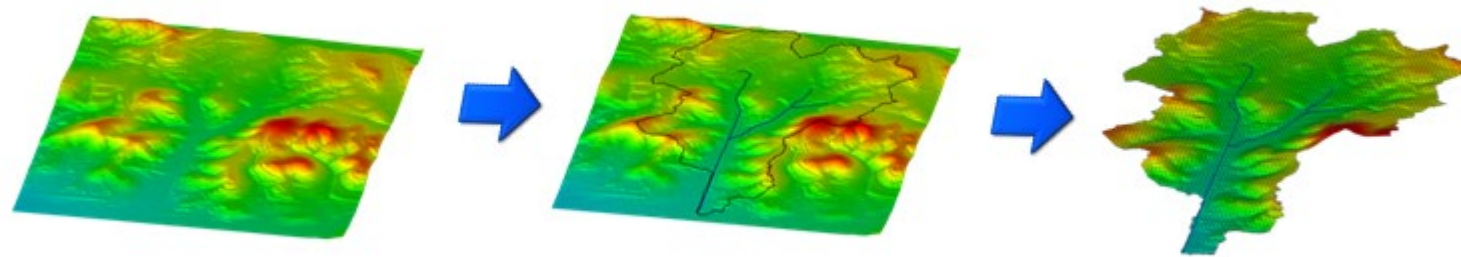


Watershed Modeling With DEMs

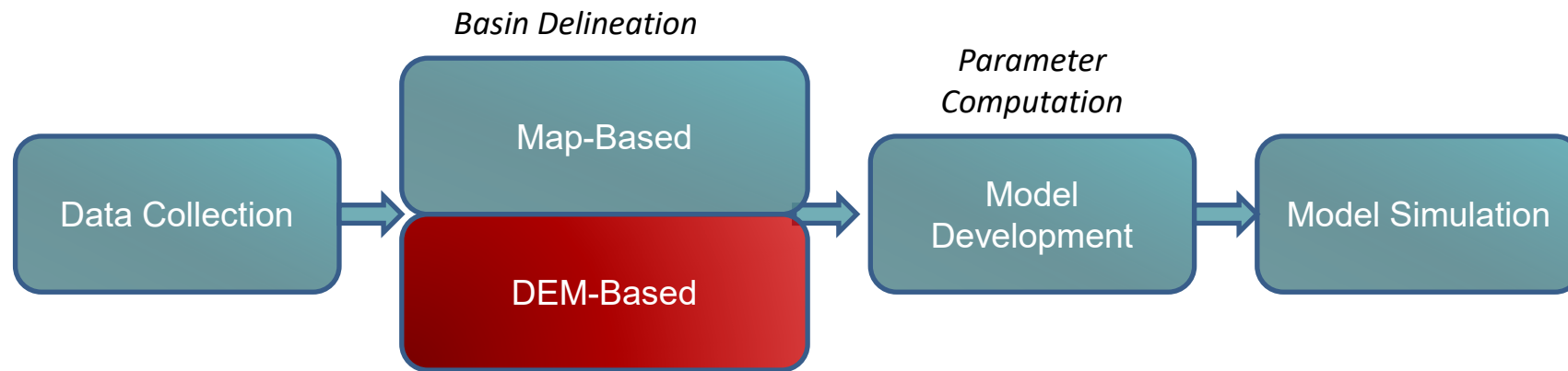


Lesson Learning Outcomes

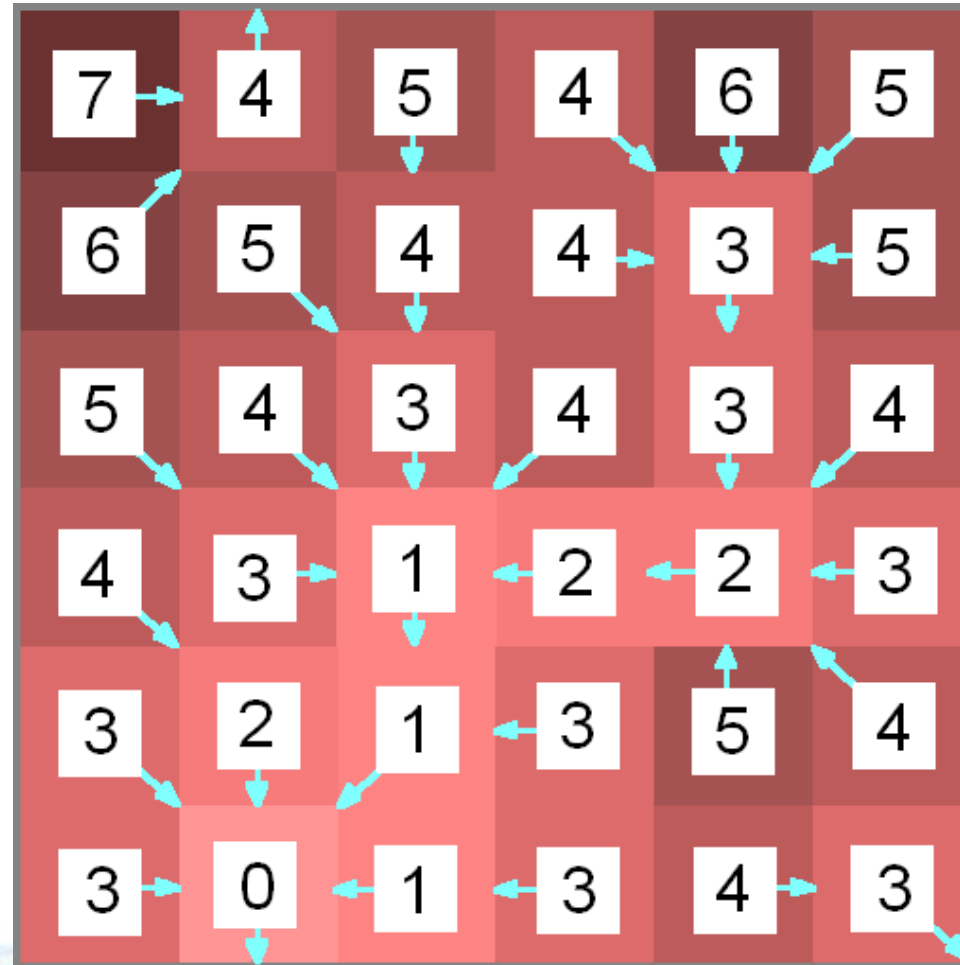
- Upon completion of this lesson, we will be able to:
 - Use DEMs for basin delineation.
 - Use WMS to compute geometric basin data from a delineated basin.



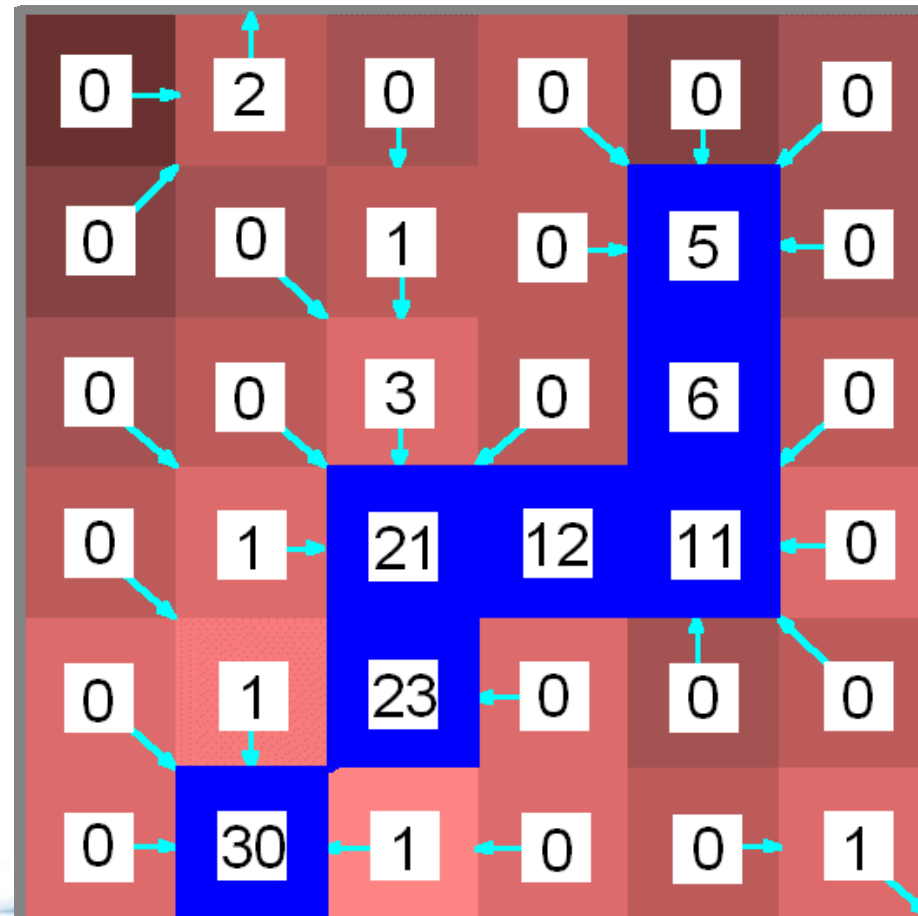
Hydrologic Modeling Workflow



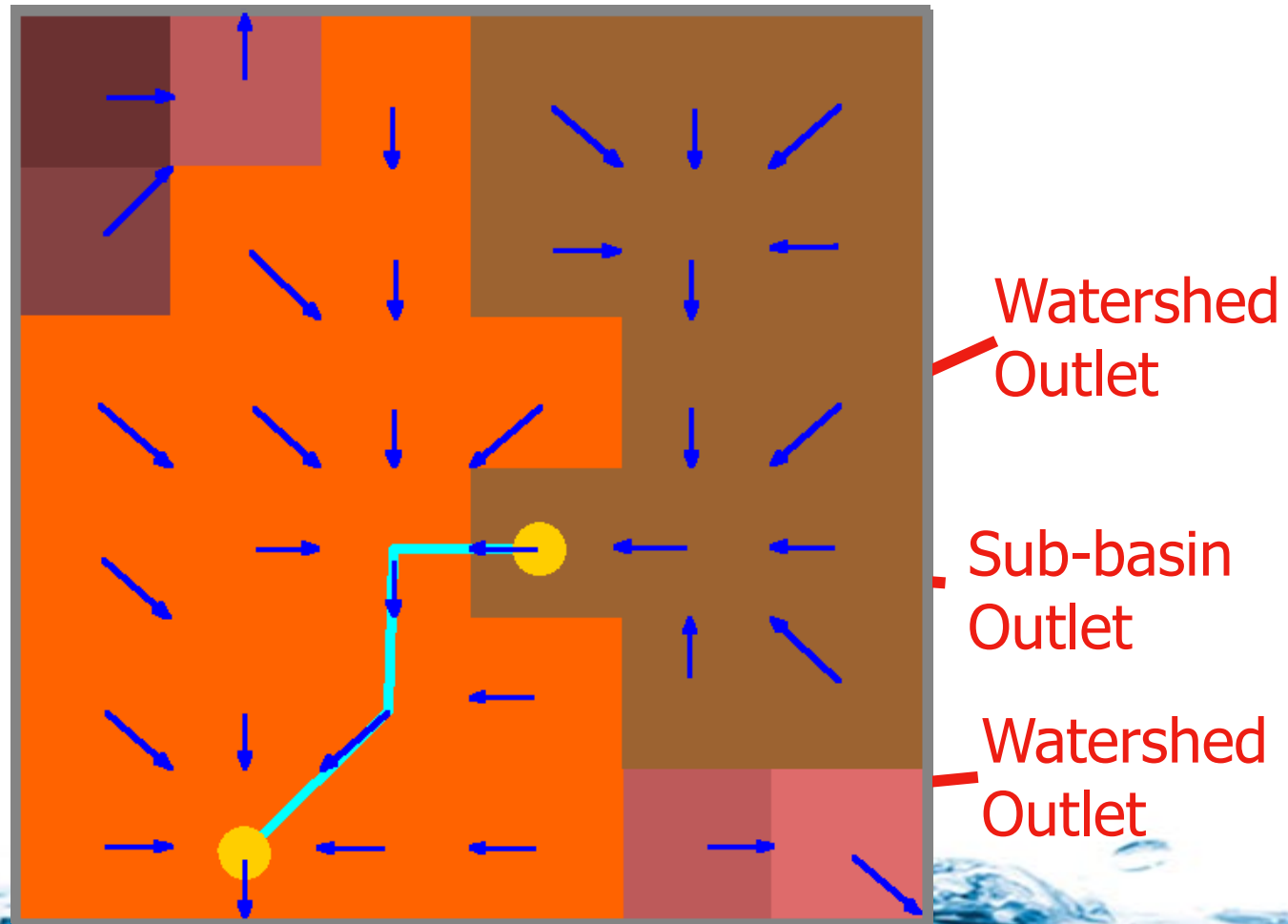
Flow Directions



Flow Accumulation



Basin Delineation

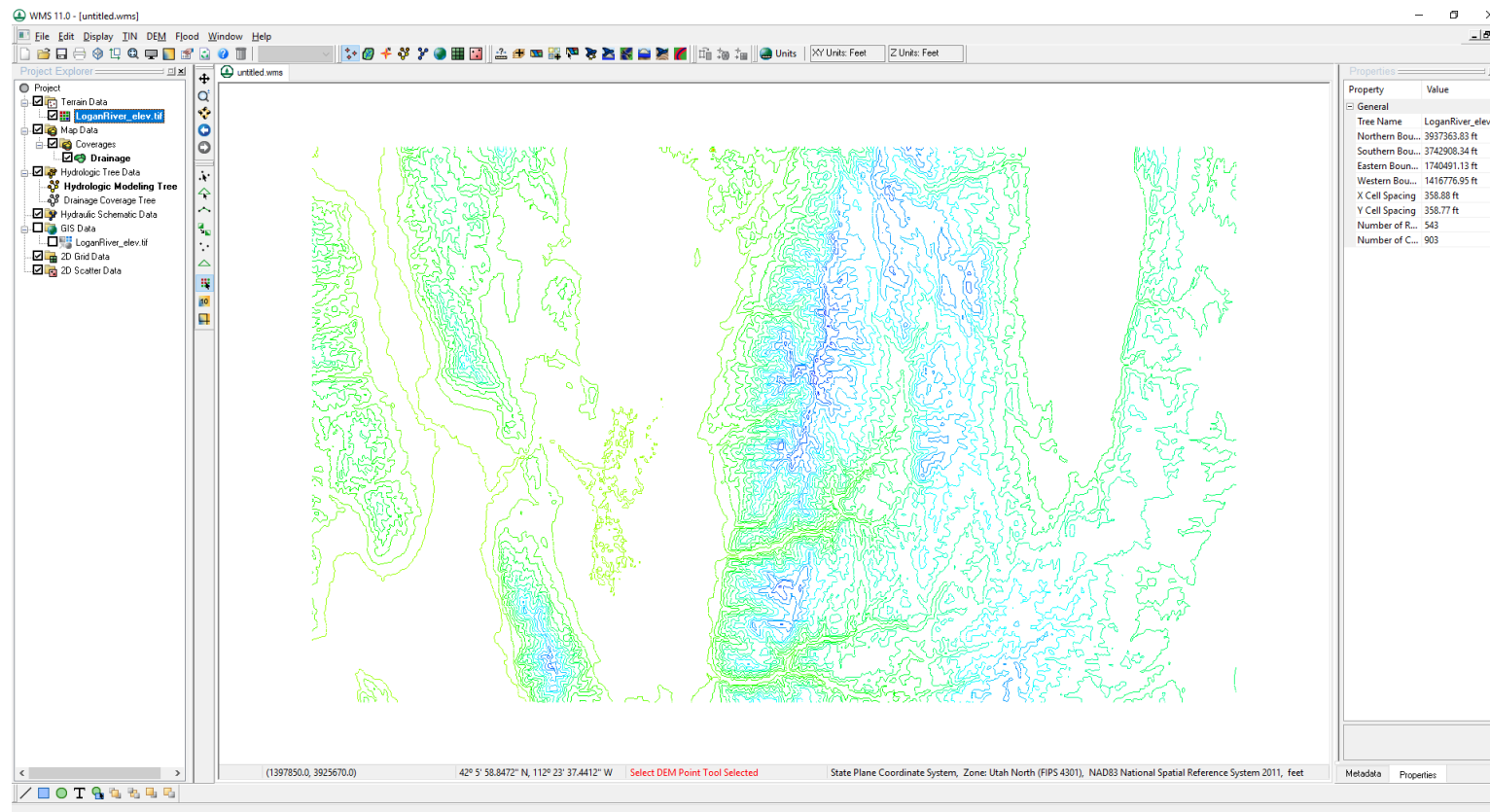


7 Steps in WMS for DEM Delineation

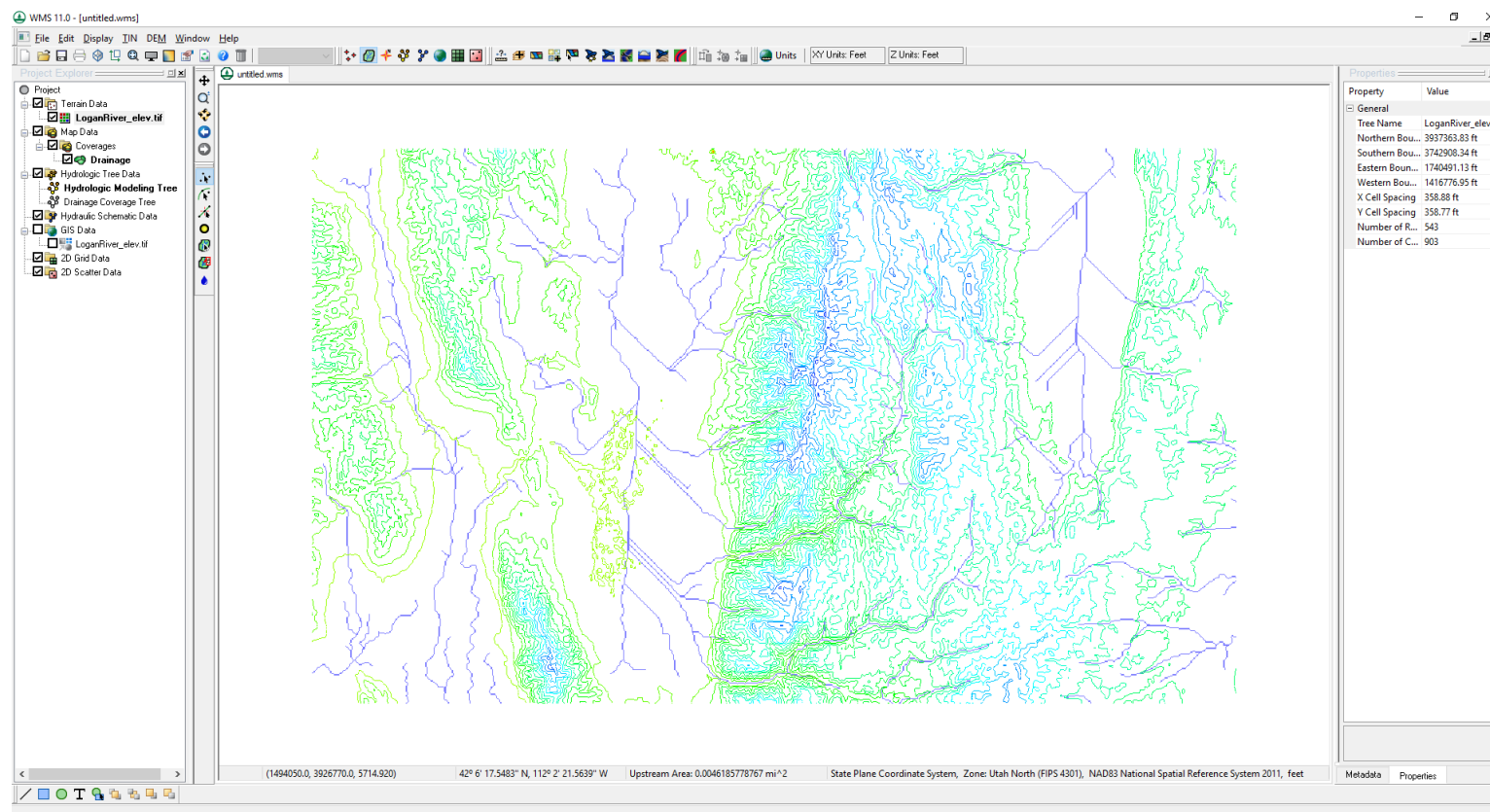
1. Read Elevations
2. Compute Flow Directions and Accumulations with TOPAZ
3. Define Basin Outlet(s)
4. Convert DEM Streams to Feature Objects
5. Define Basin(s)
6. Convert Boundaries to Polygons
7. Compute Basin Parameters



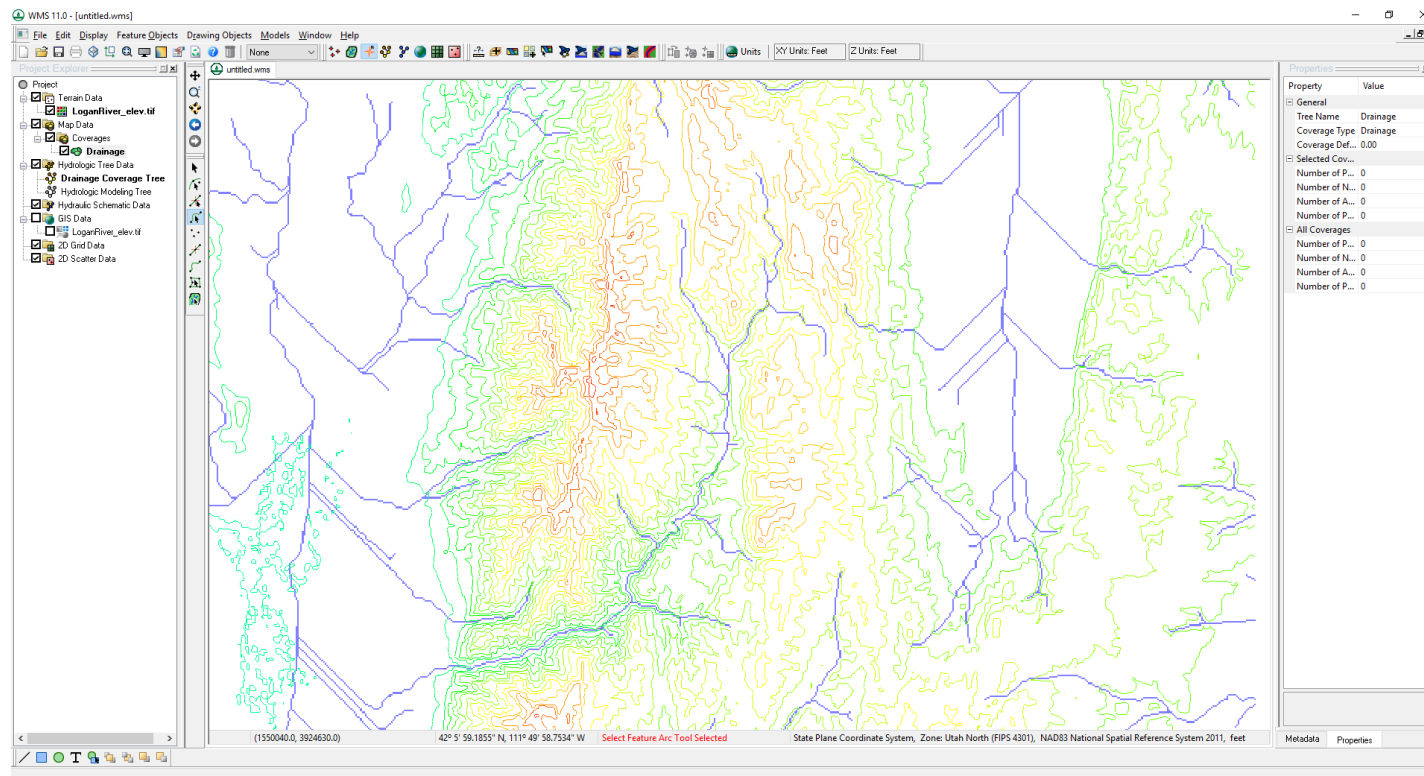
1. Read Elevations



2. Compute Flow Data – Flow Directions and Accumulations (TOPAZ or TauDEM)



2. Compute Flow Data – Accumulation Threshold

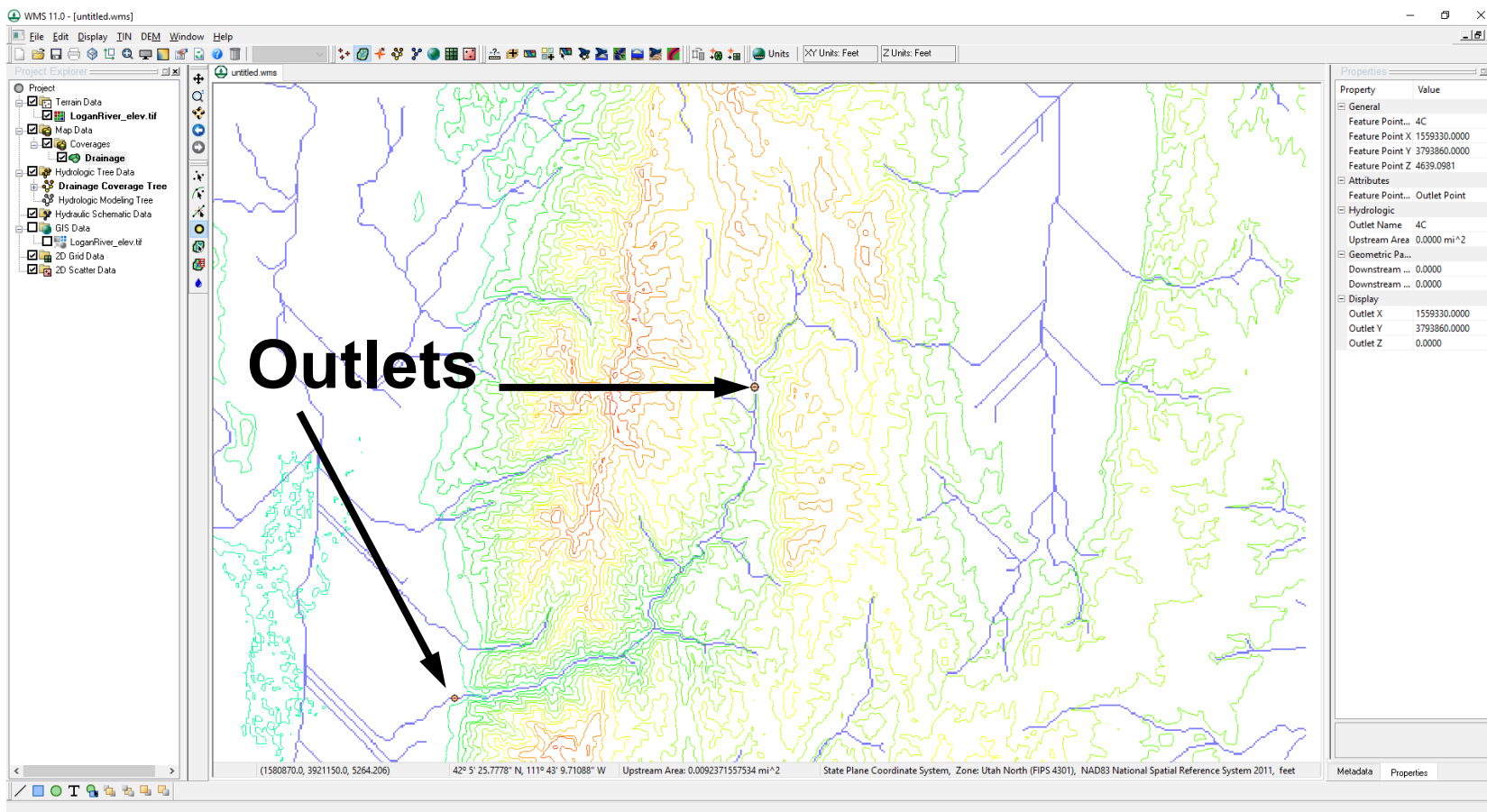


1.0

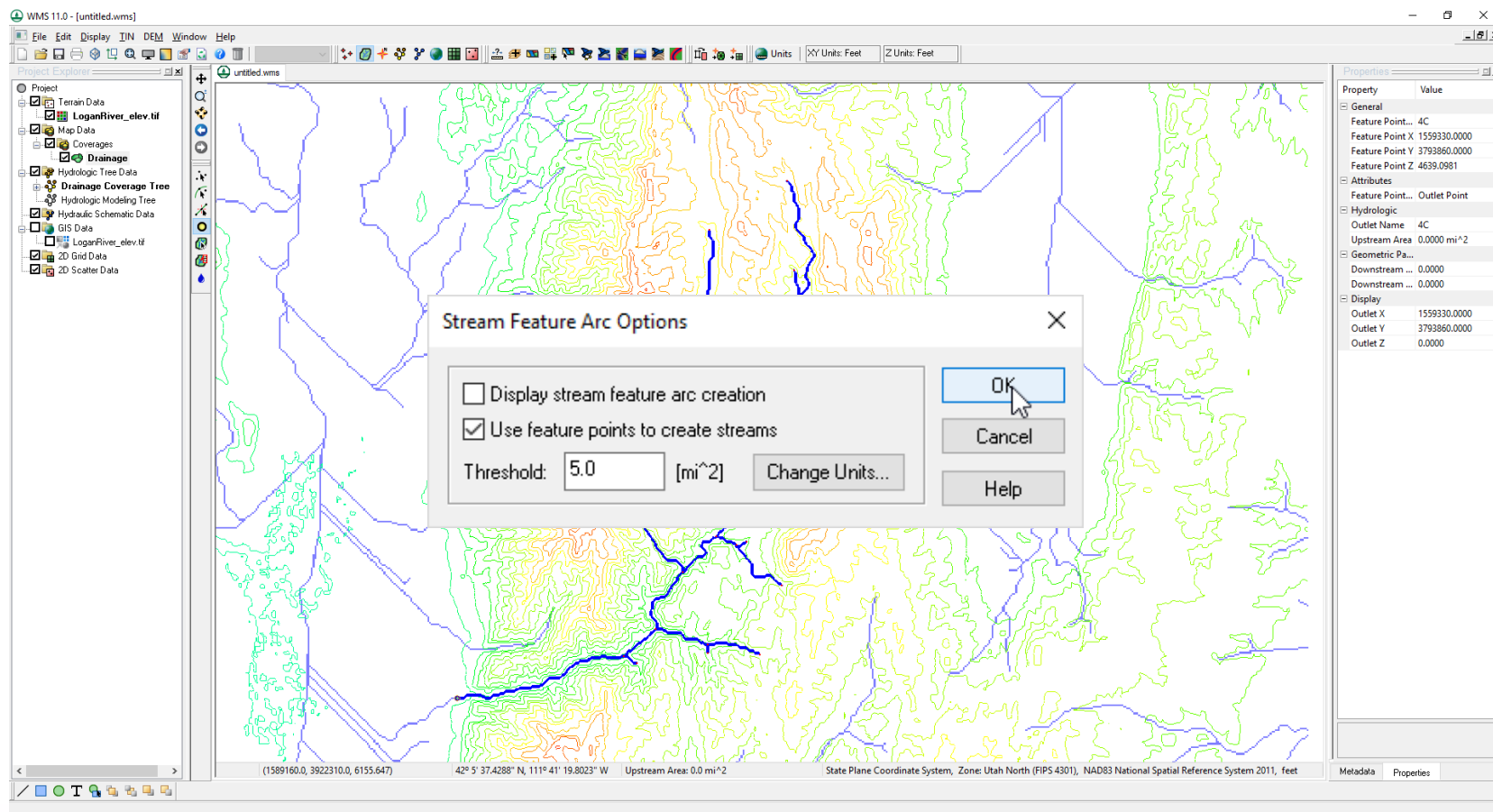
2.0

5.0

3. Define Basin Outlet(s)



4. Convert DEM Streams to Feature Objects



Which two delineation functions are performed by TOPAZ?

- A) Flow direction computation and basin delineation
- B) Basin delineation and computing geometric parameters
- C) Flow direction computation and computing geometric parameters
- D) Flow direction and flow accumulation computation



Which two delineation functions are performed by TOPAZ?

- The correct answer is:
 - A) Flow direction computation and basin delineation
 - B) Basin delineation and computing geometric parameters
 - C) Flow direction computation and computing geometric parameters
 - D) Flow direction and flow accumulation computation



If we have a larger value for the flow accumulation threshold, we would expect ...

- A) The streams created from the DEM accumulation cells to be relatively shorter
- B) The streams created from the DEM accumulation cells to be relatively longer
- C) The streams created from the DEM accumulation cells are not affected by the flow accumulation threshold

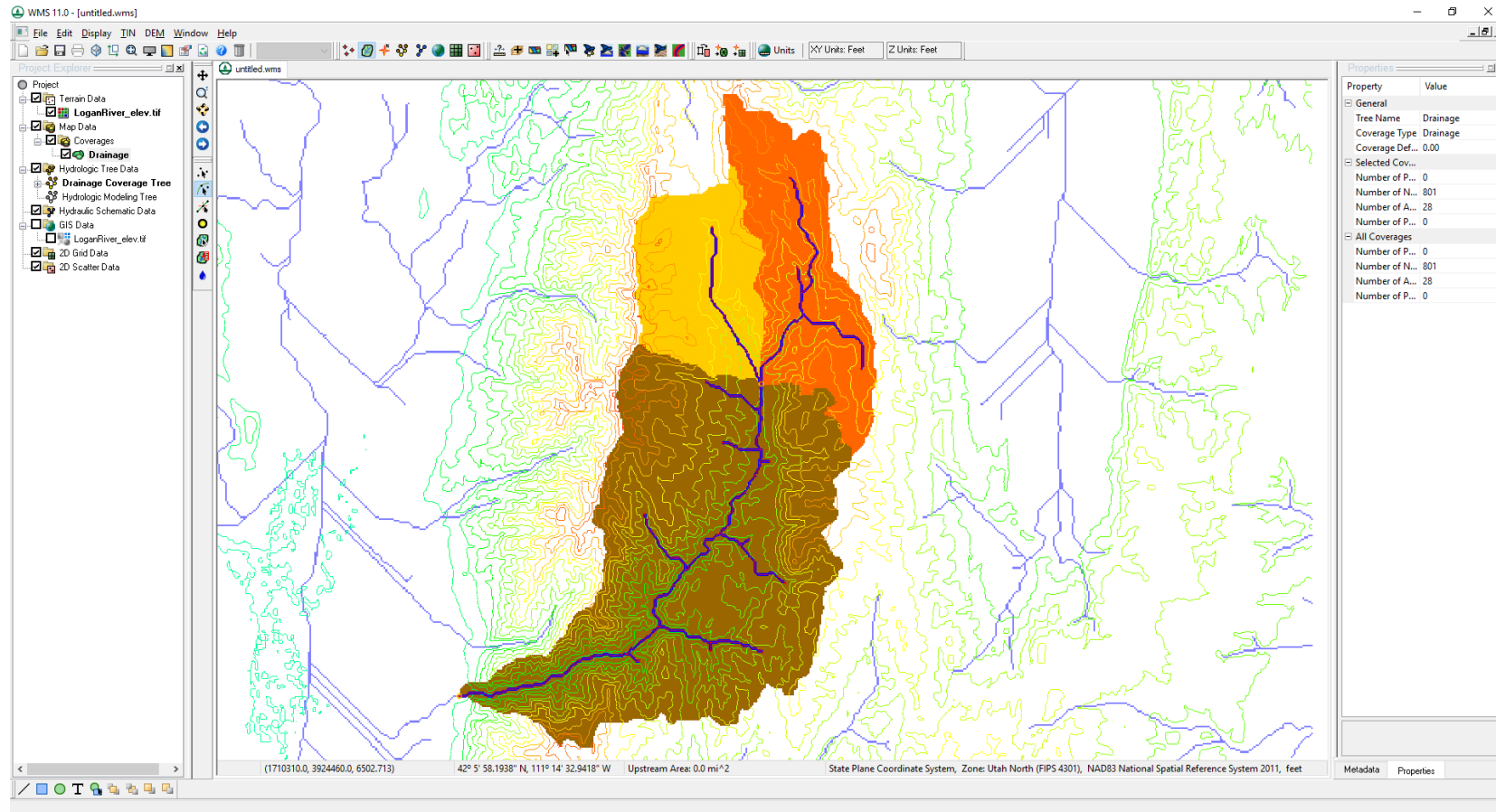


If we have a larger value for the flow accumulation threshold, we would expect ...

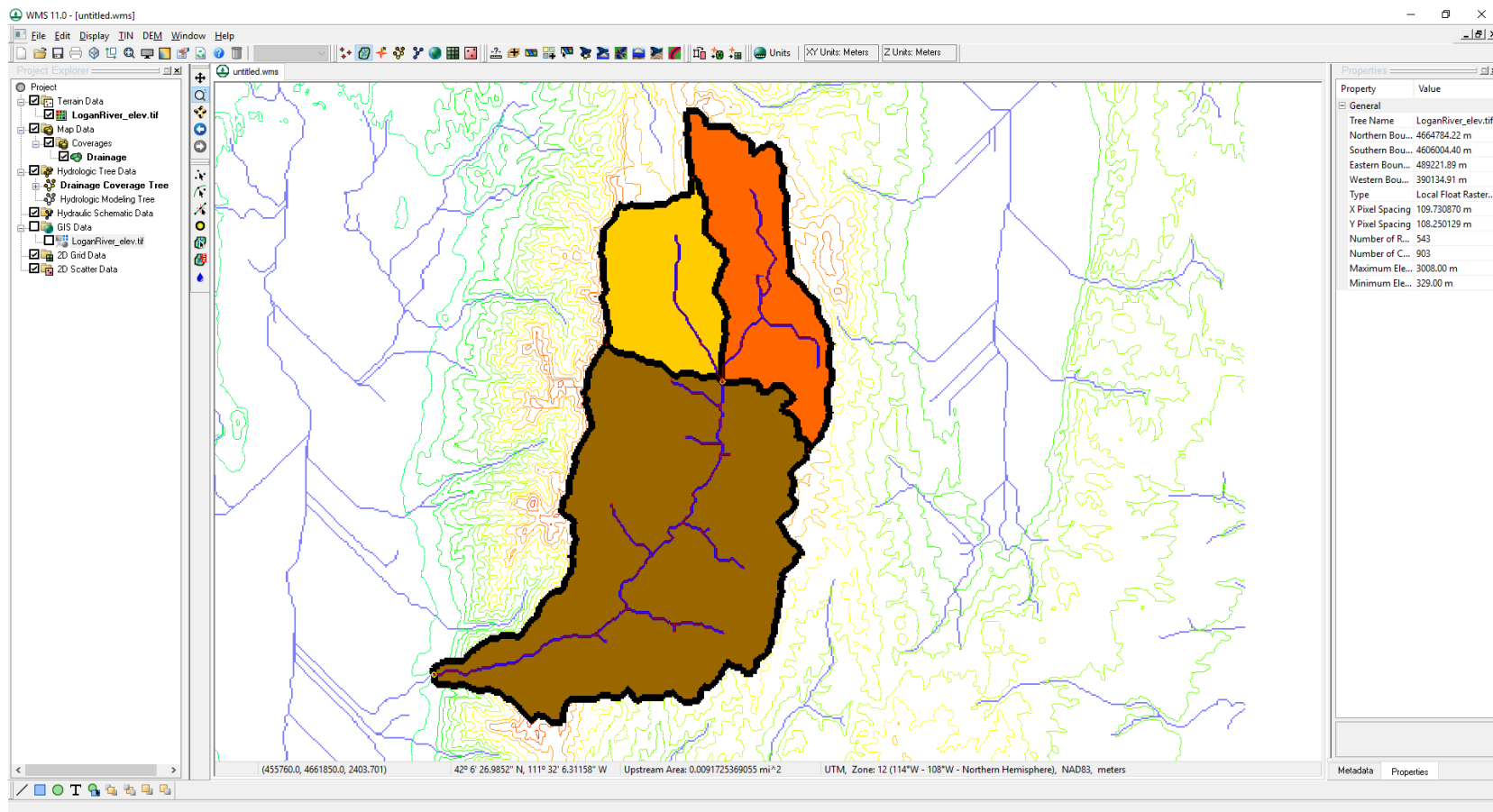
- The correct answer is:
 - A) The streams created from the DEM accumulation cells to be relatively shorter
 - B) The streams created from the DEM accumulation cells to be relatively longer
 - C) The streams created from the DEM accumulation cells are not affected by the flow accumulation threshold



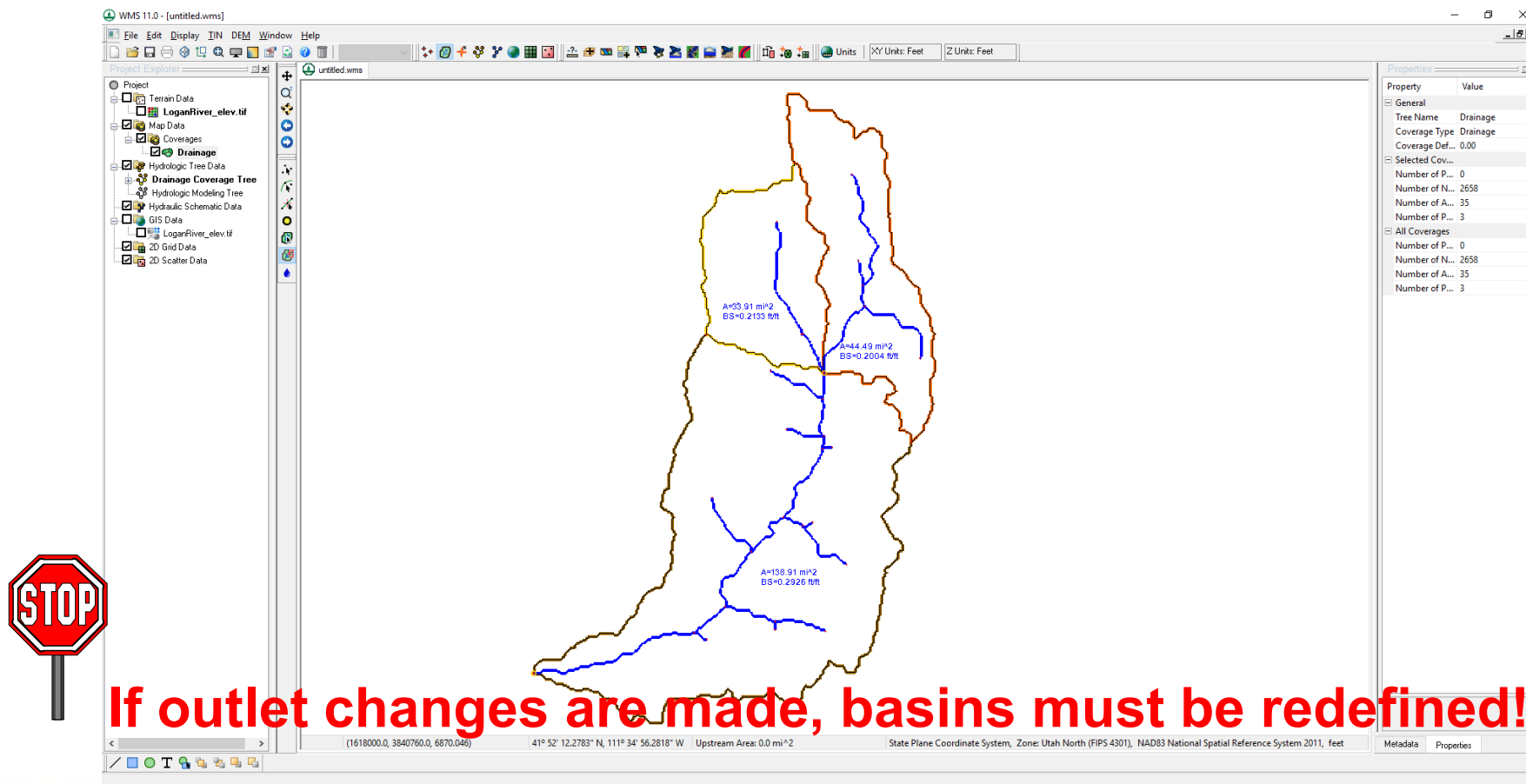
5. Define Basin(s)



6. Convert Boundaries to Polygons



7. Compute Basin Parameters



7. Geometric Computations

Display Options

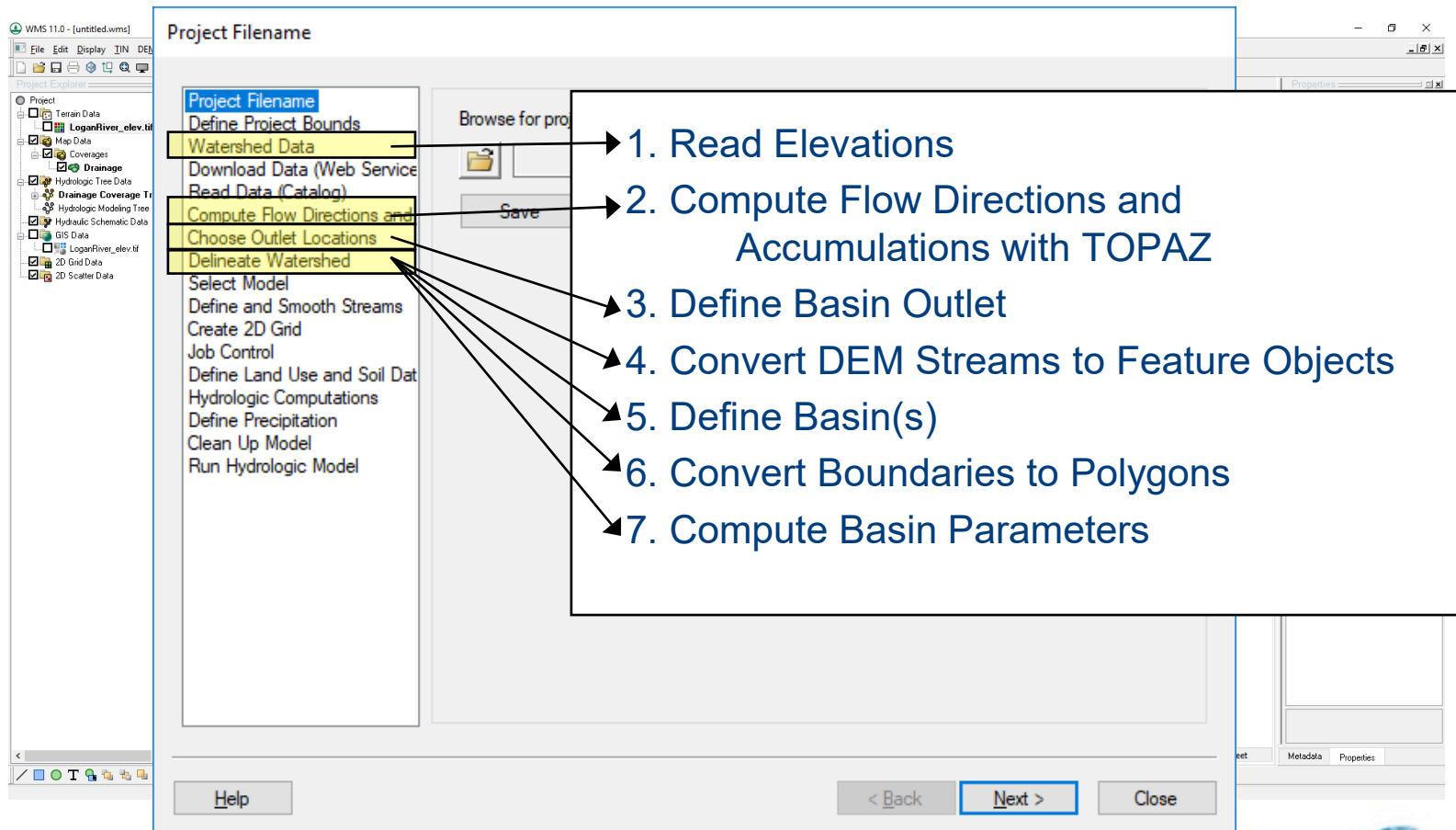
<input type="checkbox"/> Basin ID's	<input type="checkbox"/> Average Overland Flow	<input type="checkbox"/> Max Flow Slope
<input type="checkbox"/> Basin Names	<input type="checkbox"/> North/South Aspects	<input type="checkbox"/> Max Stream Length
<input type="checkbox"/> Basin CN's (curve numbers)	<input type="checkbox"/> Basin Lengths	<input type="checkbox"/> Max Stream Slope
<input type="checkbox"/> Basin Average Precipitation	<input type="checkbox"/> Perimeter	<input type="checkbox"/> Distance From Centroid To Stream
<input type="checkbox"/> Basin RC's (runoff coefficients)	<input type="checkbox"/> Shape Factor	<input type="checkbox"/> Centroid Stream Distance
<input checked="" type="checkbox"/> Show Units	<input type="checkbox"/> Sinuosity Factor	<input type="checkbox"/> Centroid Stream Slope
<input checked="" type="checkbox"/> Basin Areas	<input type="checkbox"/> Mean Basin Elevation	<input type="checkbox"/> Stream Segment Length
<input checked="" type="checkbox"/> Basin Slopes	<input type="checkbox"/> Max Flow Distance	<input type="checkbox"/> Stream Segment Slope

Coverage Color:

☒ Show option pages for existing data only

Help... OK Cancel

Hydrologic Modeling Wizard



Project Filename

Project Explorer

- Project
- Terrain Data
- LoganRiver_elev.tif
- Map Data
- Coverages
- Drainage
- Hydrologic Tree Data
- Drainage Coverage Tr
- Hydrologic Modeling Tree
- Hydraulic Schematic Data
- GIS Data
- LoganRiver_elev.tif
- 2D Grid Data
- 2D Scatter Data

Project Filename

Define Project Bounds

Watershed Data

Download Data (Web Service)

Read Data (Catalog)

Compute Flow Directions and

Choose Outlet Locations

Delineate Watershed

Select Model

Define and Smooth Streams

Create 2D Grid

Job Control

Define Land Use and Soil Data

Hydrologic Computations

Define Precipitation

Clean Up Model

Run Hydrologic Model

Browse for project file

Save

1. Read Elevations

2. Compute Flow Directions and Accumulations with TOPAZ

3. Define Basin Outlet

4. Convert DEM Streams to Feature Objects

5. Define Basin(s)

6. Convert Boundaries to Polygons

7. Compute Basin Parameters

Help

< Back

Next >

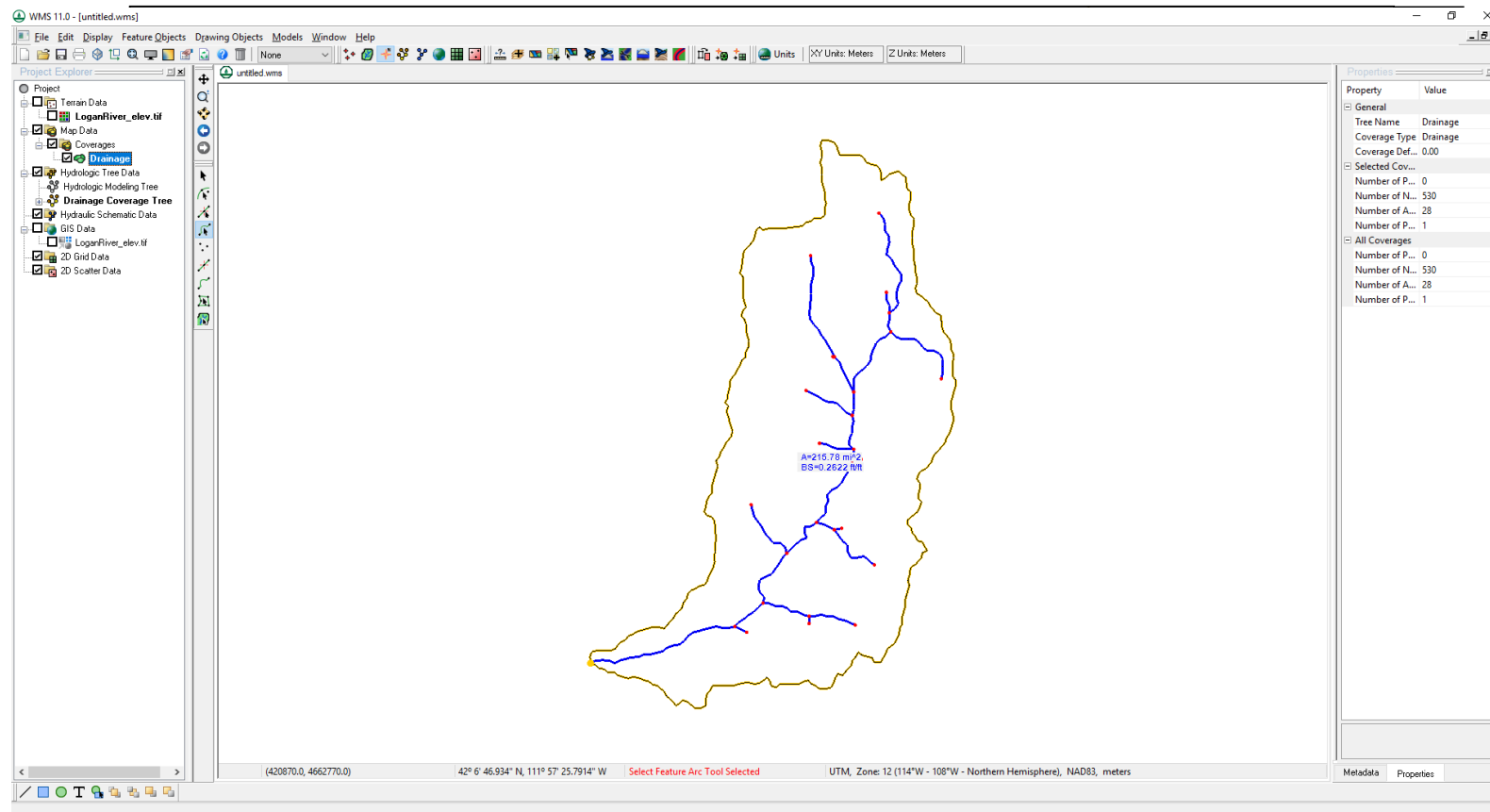
Close

Additional DEM Delineation Topics

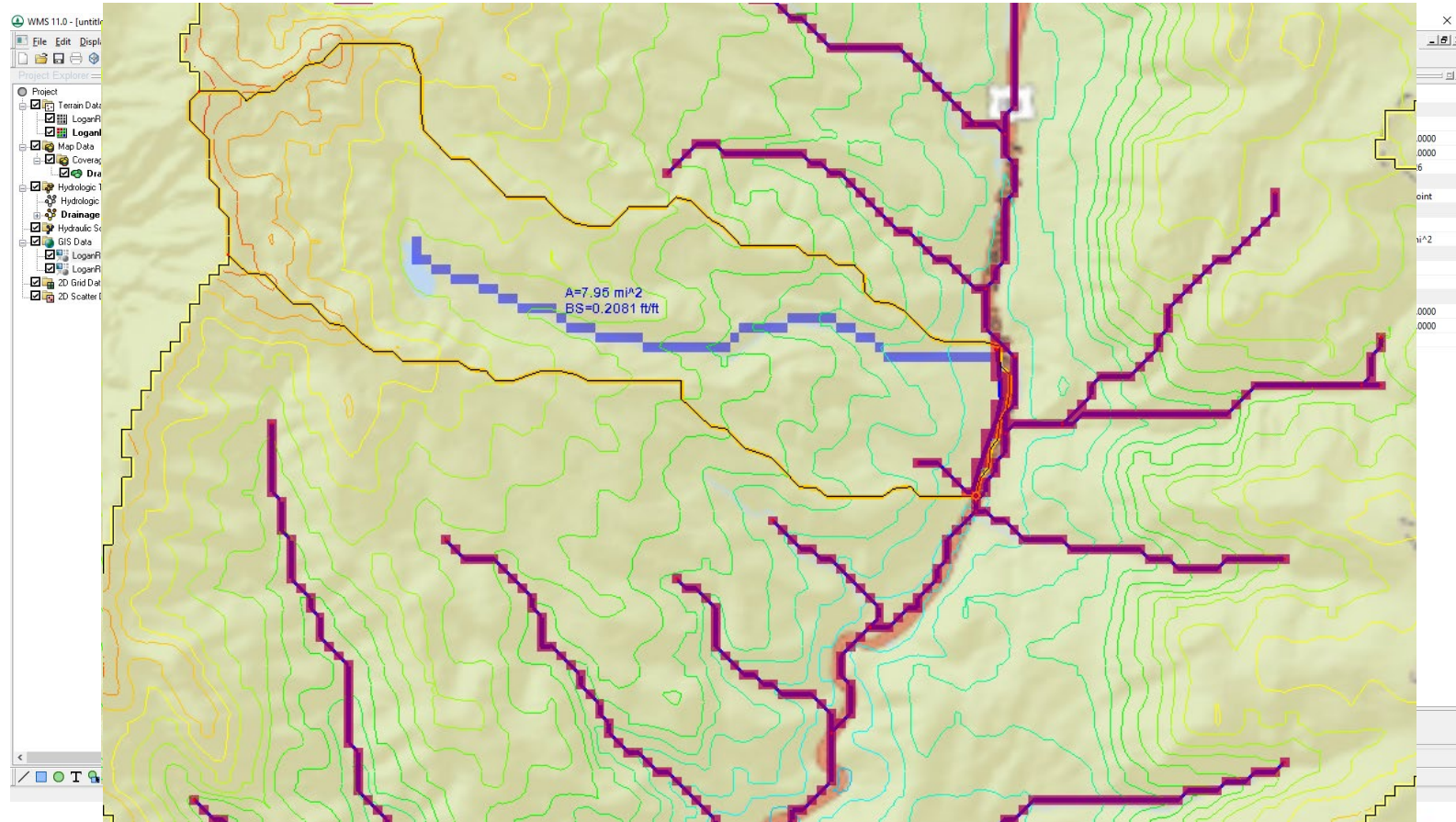
- Smoothing streams and boundaries
- Representing roads, railroads, canals, etc.



Smoothing Streams and Boundaries



Representing roads, railroads, canals, etc.



Features such as roads, canals, ditches, and embankments may be represented by:

- A) Selecting a node or vertex and converting it to a stream
- B) Digitizing a stream arc from upstream to downstream
- C) Digitizing a stream arc from downstream to upstream
- D) None of the above



Features such as roads, canals, ditches, and embankments may be represented by:

- The correct answer is:
 - A) Selecting a node or vertex and converting it to a stream
 - B) Digitizing a stream arc from upstream to downstream
 - C) Digitizing a stream arc from downstream to upstream
 - D) None of the above





Demonstration



- We are now able to:
 - Use DEMs for basin delineation.
 - Use WMS to compute geometric basin data from a delineated basin.



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

