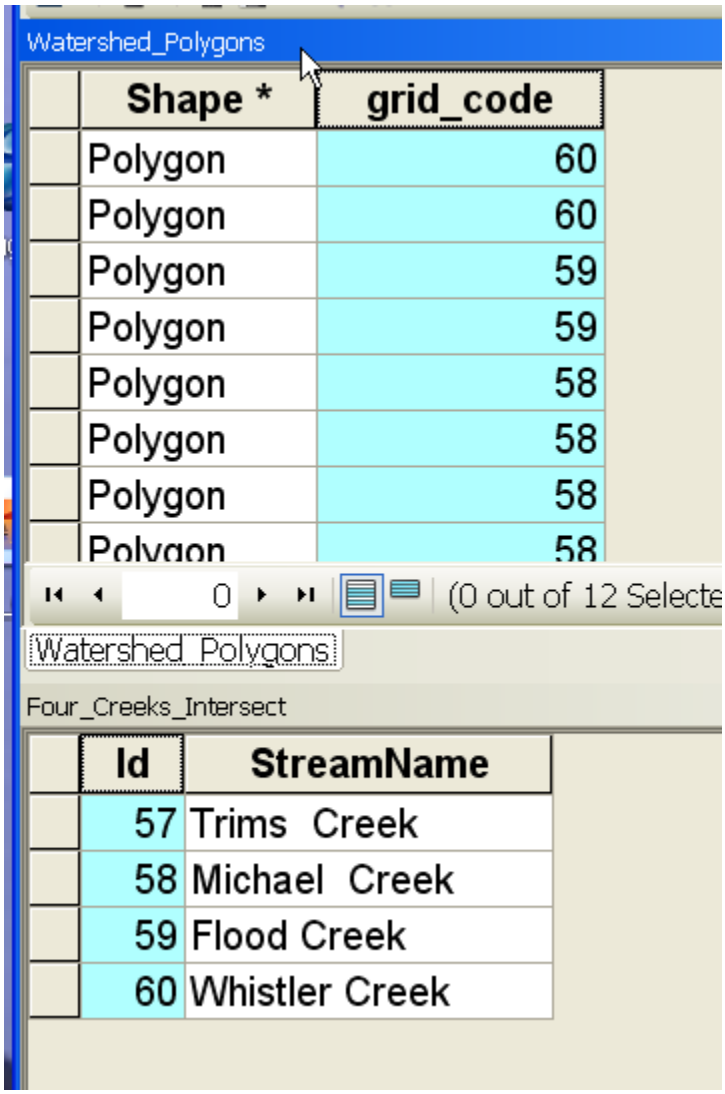
Exercise#6 Raster Analysis

In this exercise, we will determine some topographic characteristics of each watershed basin.

Use the ***Join Field*** geoprocessing tool to transfer the Stream Name to each watershed polygon.



Watershed_Polygons

Shape *	grid_code
Polygon	60
Polygon	60
Polygon	59
Polygon	59
Polygon	58
Polygon	58
Polygon	58
Polygon	58

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Watershed_Polygons

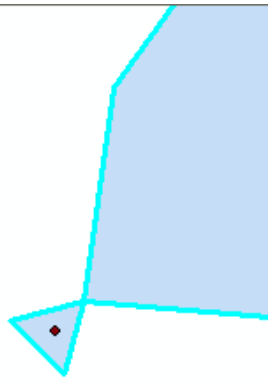
Four_Creeks_Intersect

Id	StreamName
57	Trims Creek
58	Michael Creek
59	Flood Creek
60	Whistler Creek

Table

Watershed_Polygons

Shape *	grid_code	StreamName
Polygon	60	Whistler Creek
Polygon	60	Whistler Creek
Polygon	59	Flood Creek
Polygon	59	Flood Creek
Polygon	58	Michael Creek



Then use the ***Dissolve*** geoprocessing tool to create one polygon representing each watershed basin.

Add a double precision field named KM2 and compute that area of each basin in KM2.

Shape *	StreamName	KM2
Polygon	Flood Creek	8.2
Polygon	Michael Creek	7.8
Polygon	Trims Creek	13.8
Polygon	Whistler Creek	7.9

So Trims Creek has a substantially larger watershed relative to the three other basins.

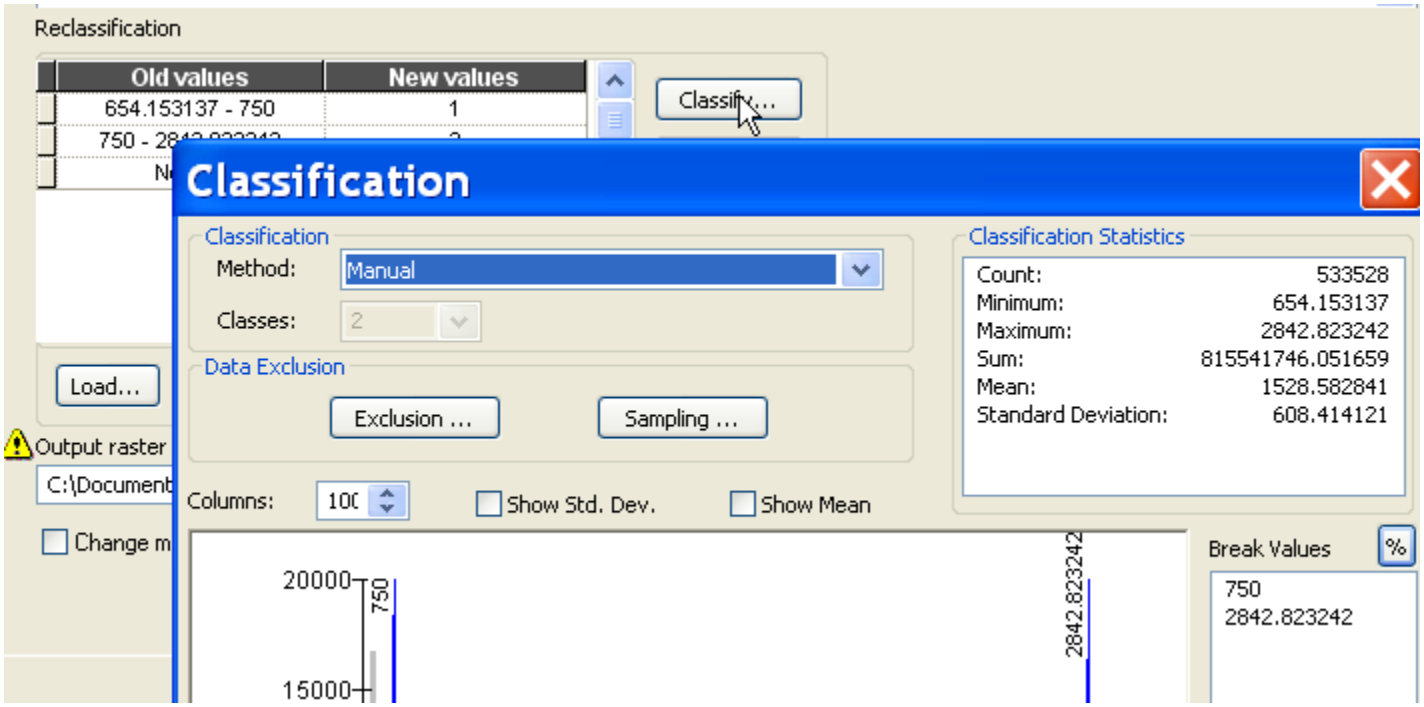
What is the min, max, and mean elevation within each basin? Use the ***Zonal Statistics as Table*** geoprocessing tool to create a table containing these values.

Basin_Elevation_Table

STREAMNAME	MIN	MAX	MEAN
Flood Creek	731.8	2,006.9	1,452.5
Michael Creek	733.3	2,036.5	1,438.3
Trims Creek	753.0	2,391.4	1,461.8
Whistler Creek	702.6	2,051.0	1,309.8

So Whistler Creek has a lower min,max, and mean elevation relative to the three other basins.

Use the ***Reclassify*** geoprocessing tool to create 2 elevation classes assuming shrub line is up to 1000 meters.

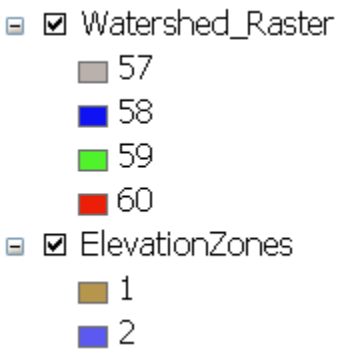


Add a text field for each elevation zone…

ElevationZones

Value	Count	ElevZone
1	91527	Vegetated--Trees & Shrubs
2	175237	Above Shrub Line

What percentage of each basin is in each elevation zone? Use the Watershed raster with your Elevation Zones Raster and the ***Combine*** geoprocessing tool.



Combine_Basins_ElevationZones

Count	Watershed_Raster	ElevationZones
20492	57	2
1599	57	1
11555	58	2
976	58	1
12140	59	2
941	59	1
9497	60	2
3132	60	1

Add a double precision field and compute the percent within each basin.

Combine_Basins_ElevationZones

Count	Watershed_Raster	ElevationZones	Percentage
20492	57	2	92.8%
1599	57	1	7.2%
11555	58	2	92.2%
976	58	1	7.8%
12140	59	2	92.8%
941	59	1	7.2%
9497	60	2	75.2%
3132	60	1	24.8%

And finally use the ***Join Field*** geoprocessing tool to join the stream name to your raster attribute table.

Combine_Basins_ElevationZones

ElevationZones	Percentage	StreamName
2	92.80636	Flood Creek
1	7.19364	Flood Creek
2	92.211316	Michael Creek
1	7.788684	Michael Creek
2	92.761758	Trims Creek
1	7.238242	Trims Creek
2	75.199937	Whistler Creek
1	24.800063	Whistler Creek

So Whistler Creek has a higher percentage of area in the lower elevation zone (likely trees and shrubs) relative to the three other basins…about 25% compared to 7 or 8 %.

What is the mean and standard devation of slope gradient within each basin? Use the ***Slope*** geoprocessing tool to create a raster representing percent slope of each pixel. The use the ***Zonal Statistics as Table*** geoprocessing tool to create a table containing mean and standard deviations of percent slope values inside each basin.

PercentSlope_Table

STREAMNAME	MEAN	STDEV
Flood Creek	47.4%	17.4
Michael Creek	47.2%	17.8
Trims Creek	47.2%	18.8
Whistler Creek	45.6%	19.9

Once again, Whistler Creek has a different mean slope gradient relative to the other three basins.