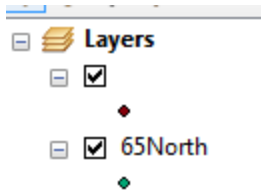


KEY Week#3 GIS Problems

Linear Distances

Download and unzip the file *week3_coordsys_problems.zip* from http://dverbyla.net/nrm338/blackboard_data/



Arrange the tables for the Equator and 65North points, so you can see both tables.

Table - 65North

Equator

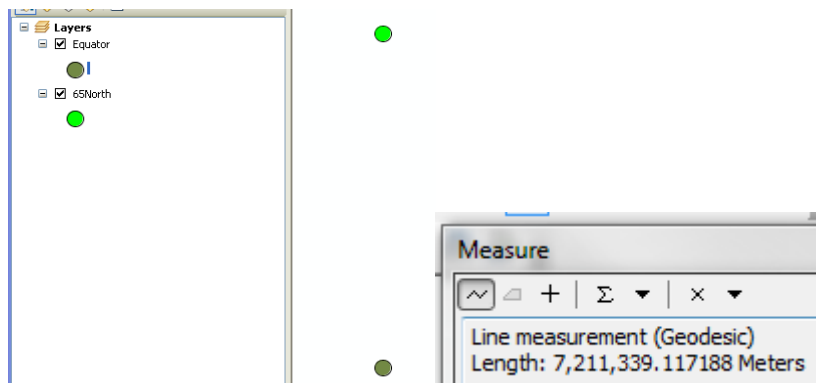
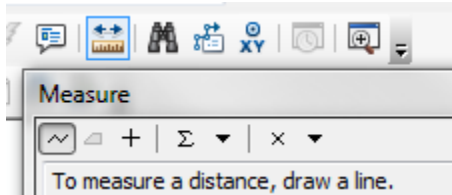
FID	Shape *	ID	X	Y	Location
0	Point	1	-150	0	Equator

Equator

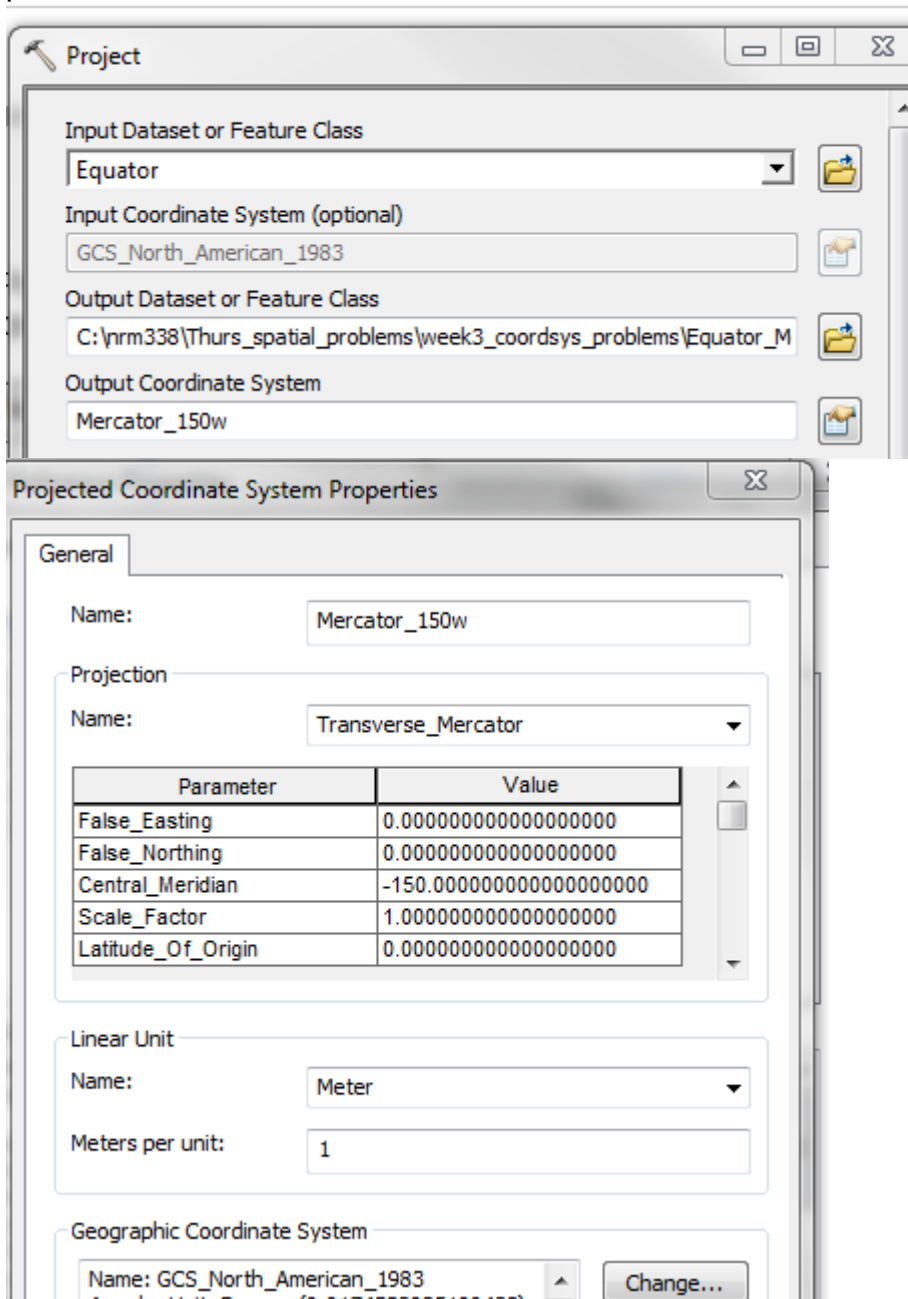
65North

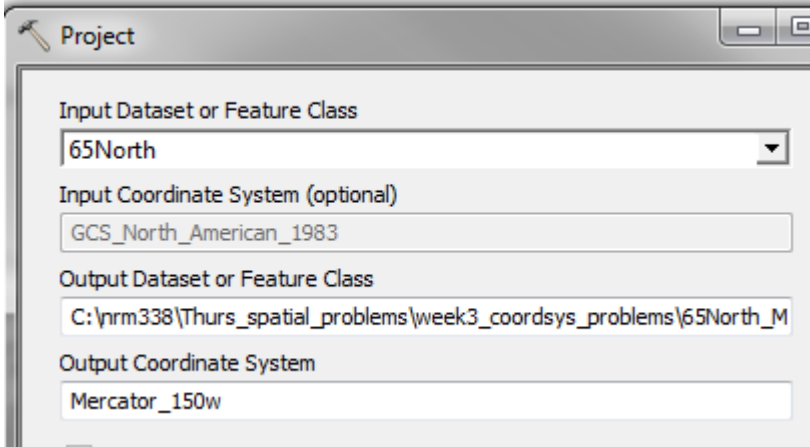
FID	Shape *	ID	X	Y	Location
0	Point	2	-150	65	North_65degrees

Assuming the NAD83 datum, use the Measure tool on the Tools Toolbar to interactively determine the distance in KM from the equator to 65 degrees north.



Project your locations to a projection in meters that has a scale factor of 1.0 between the 2 points.





Use the **Add XY** geoprocessing tool to determine the Y-coordinates of your 2 merged points. Based on the Y-coordinates, what is the planar distance between the 2 points?

Table - 65North_Meters

Equator_Meters

FID	Shape *	ID	X	Y	Location	POINT_X	POINT_Y
0	Point	1	-150	0	Equator	0	0

Equator_Meters

65North_Meters

FID	Shape *	ID	X	Y	Location	POINT_X	POINT_Y
0	Point	2	-150	65	North_65degrees	0	7,211,339.117

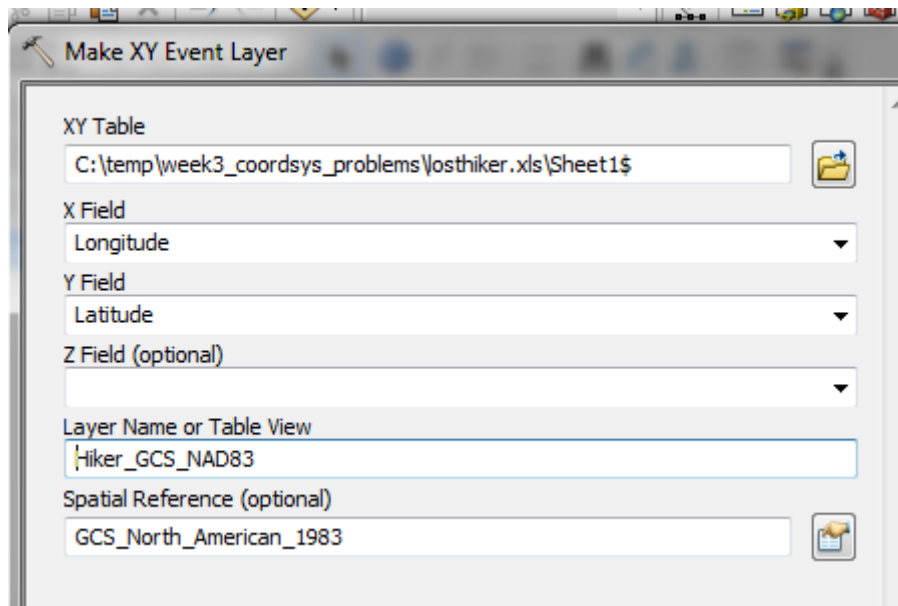
Lost Hiker

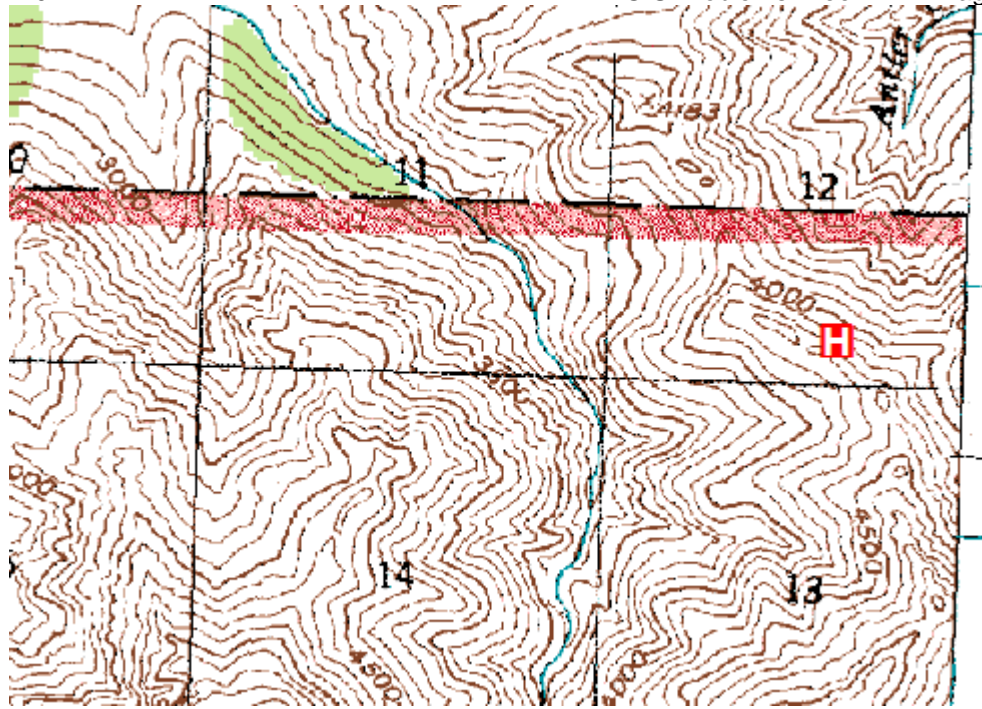
An injured hiker is lost in the fog in Denali National Park. She has a satellite phone and calls in her GPS position as

63 degrees 47 minutes 44 seconds, 149 degrees 0 minutes 37 seconds, GCS NAD83

Locate this hiker on the scanned USGS topomap, Healy D5 (Map is in UTM NAD83

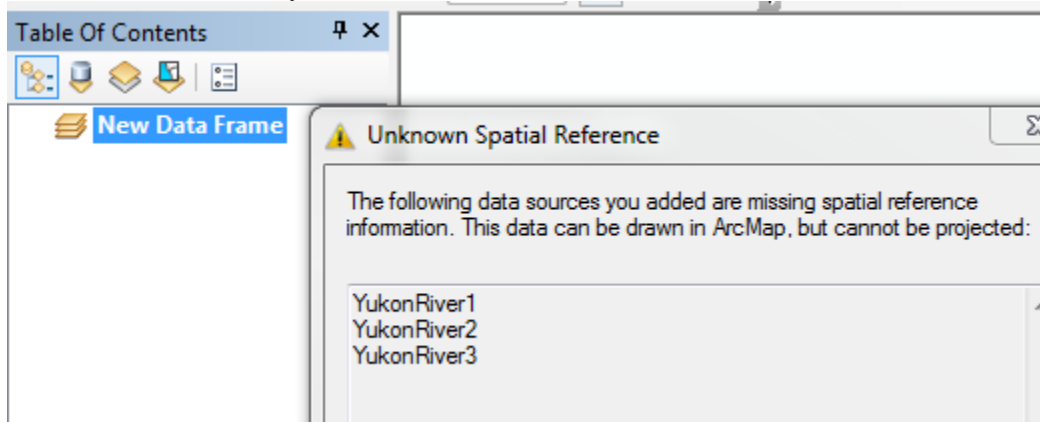
H2									: <input type="checkbox"/> <input checked="" type="checkbox"/> <i>fx</i>		=E2+F2/60 +G2/3600	
	A	B	C	D	E	F	G	H	I			
1	Deg	Min	Sec	Longitude	Deg	Min	Sec	Latitude				
2		149	0	37	-149.01028	63	47	44	63.79556			
3												
4												





Specifying Coordinate Systems

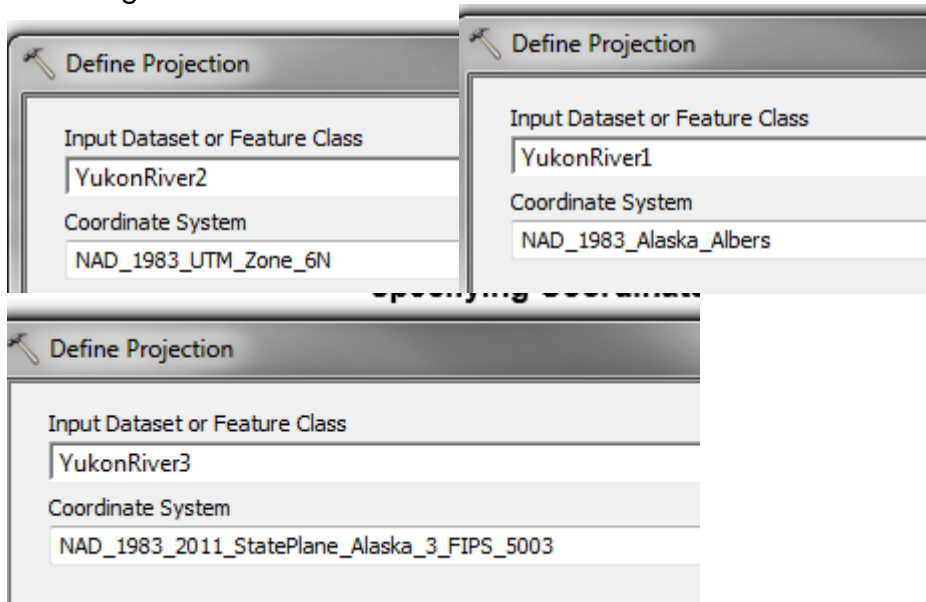
The Yukon River shapefiles are in Alaska Albers NAD83, UTM Zone 6 NAD83, Alaska State Plane NAD83 in meters. However each layer does not have a prj file which defines the correct coordinate system.





Use the **Define Projection** geoprocessing tool to correctly define the coordinate system of each layer. (latitude of origins are: UTM equator, Alaska Albers 50 degrees north, State Plane 54 degrees north)

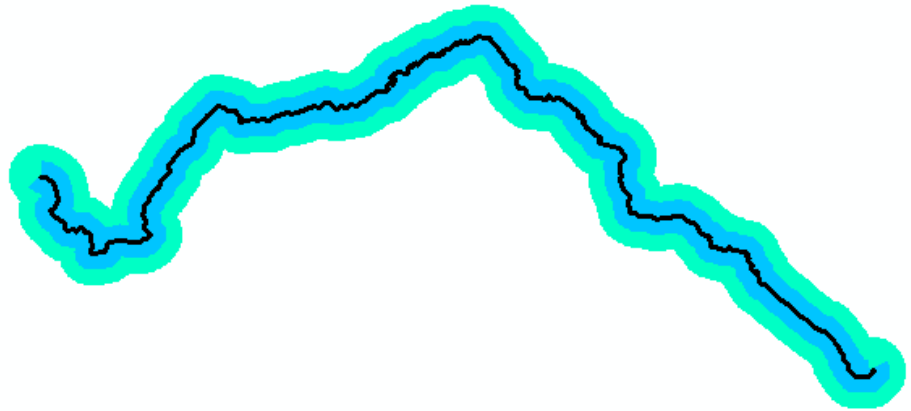
UTM origin is equator, so Y values at least 6 million meters north of equator

Alaska Albers origin 50 degrees north, State Plane 54 degrees north, so Alaska Albers would have larger Y-values.



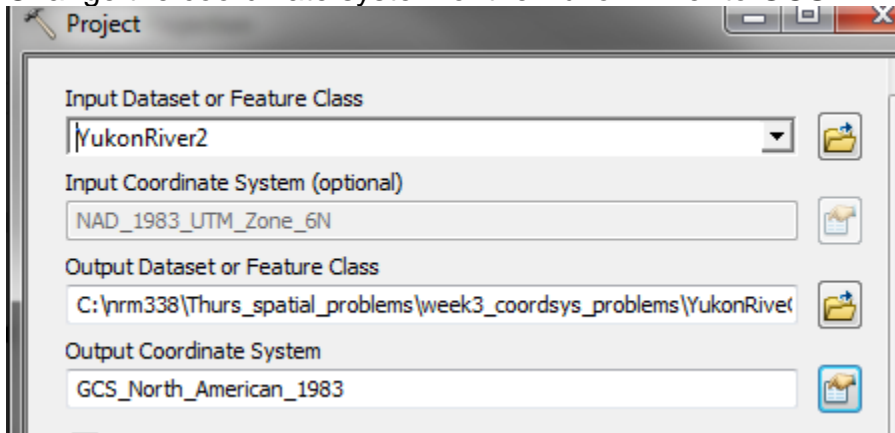
 **New Data Frame**

- YukonRiver1
- YukonRiver2
- YukonRiver3
- 

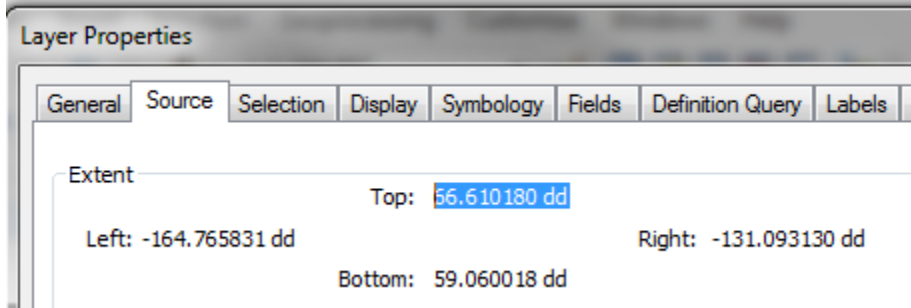


Changing Coordinate Systems

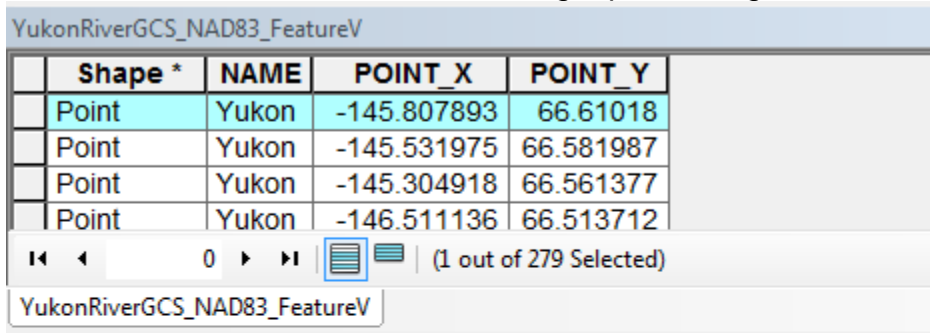
Change the coordinate system of the Yukon River to GCS NAD83



What is the highest latitude of the Yukon River? 66.61018 degrees

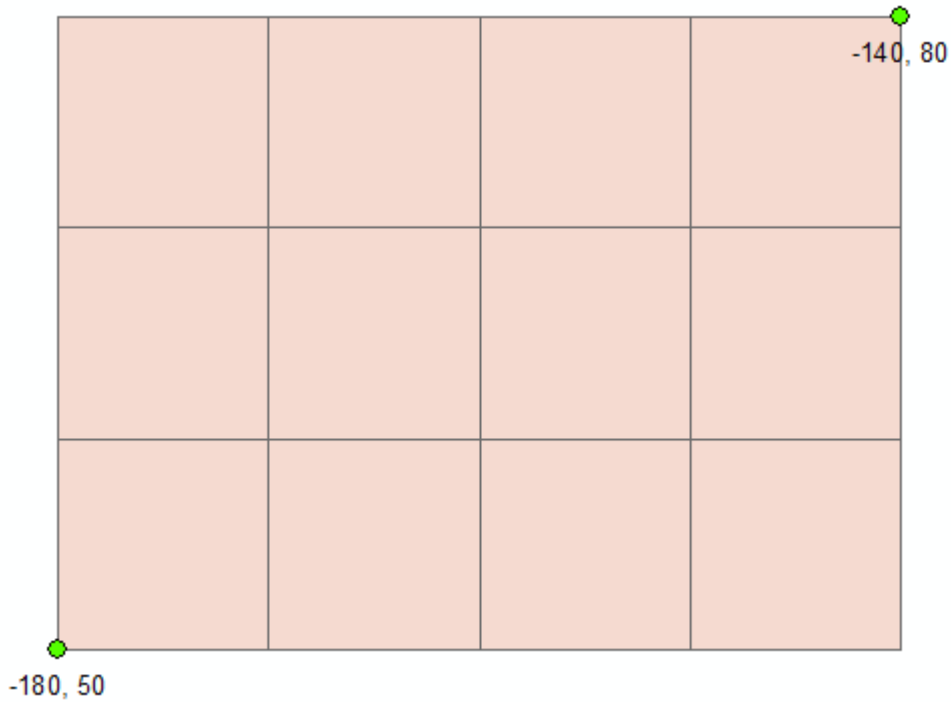


Or Feature Vertices to Points, Add XY geoprocessing tools:



UTM Zones

Create a new data frame and use the Create Fishnet geoprocessing tool to create ten degree rectangles from -180 to -140 longitude, 50 to 80 latitude in GCS NAD83..



Display the fishnet in UTM Zone 1, 5, and 10 by changing the coordinate system of your data frame.

