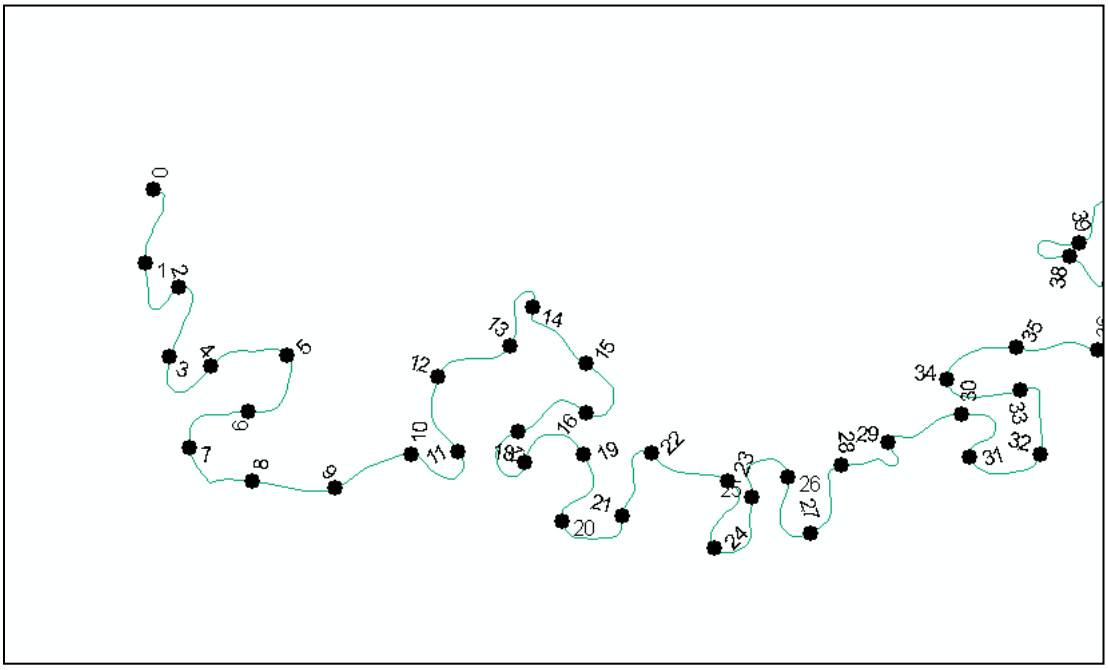
Exercise#1: Delineating 10-KM Stream Reaches

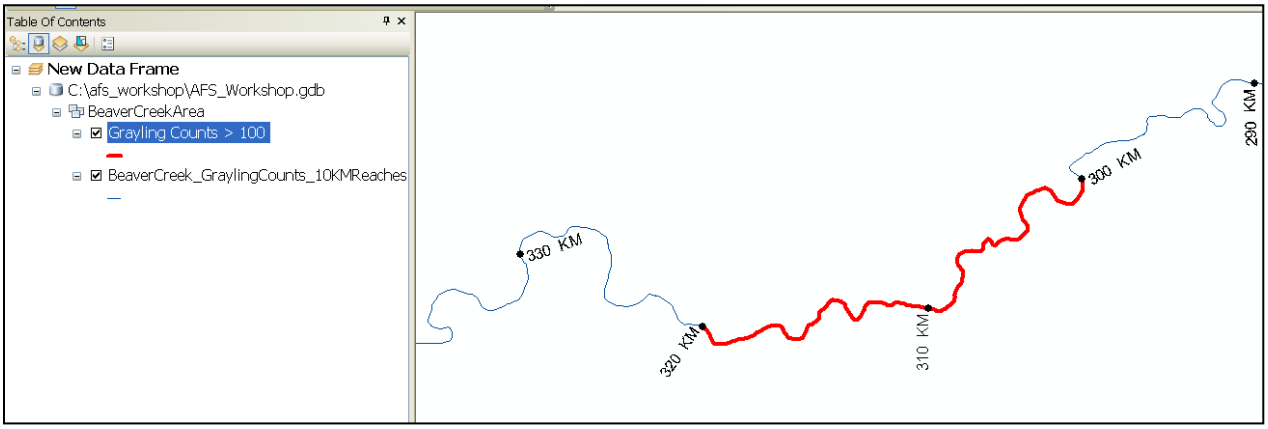
In this exercise, we will delineate Beaver Creek 10-km stream reaches starting at the Yukon River and going upstream. You can do this in the following steps:

1) Create one line representing entire stream (use ***Dissolve*** geoprocessing tool).
2) Make sure the stream line is going upstream…if it is not, use the ***Flip Line*** geoprocessing tool to correct the stream direction to be upstream.
3) Calculate the total length of the stream in kilometers.

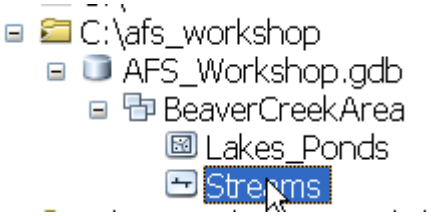
4) Use the ***Create Routes*** geoprocessing tool to create a measured line in kilometers, starting at the Yukon River and going upstream. Check your work by symbolizing hatches every 1km along the measured line.



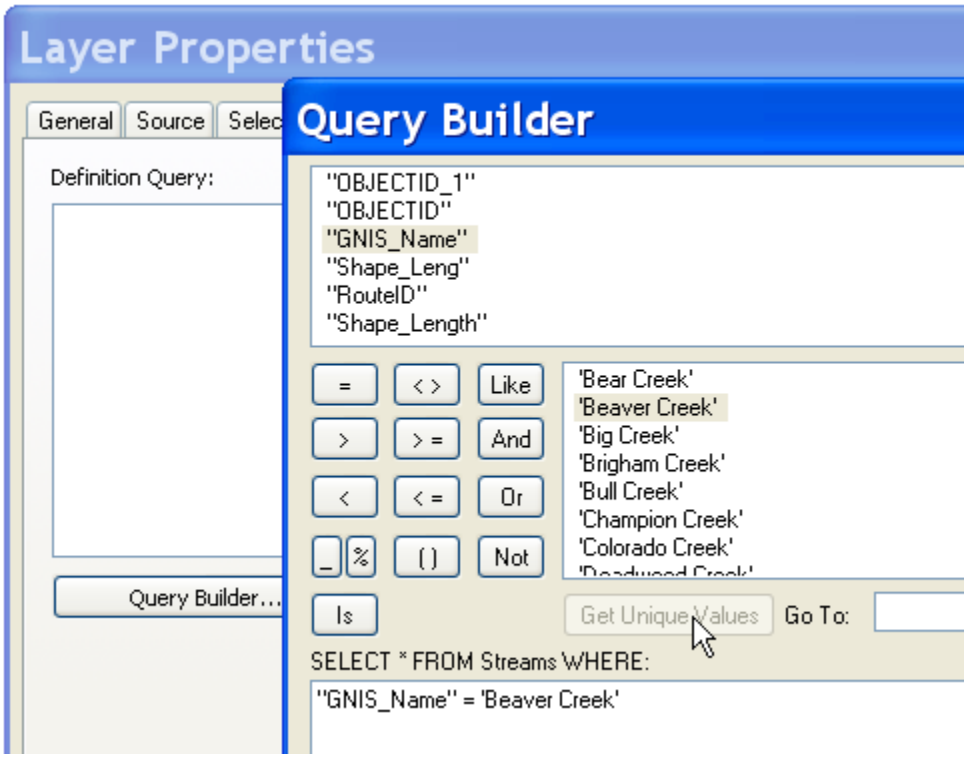
5) Use a table of grayling counts every 10-km to create "linear event" lines via the ***Make Route Event Layer*** geoprocessing tool.



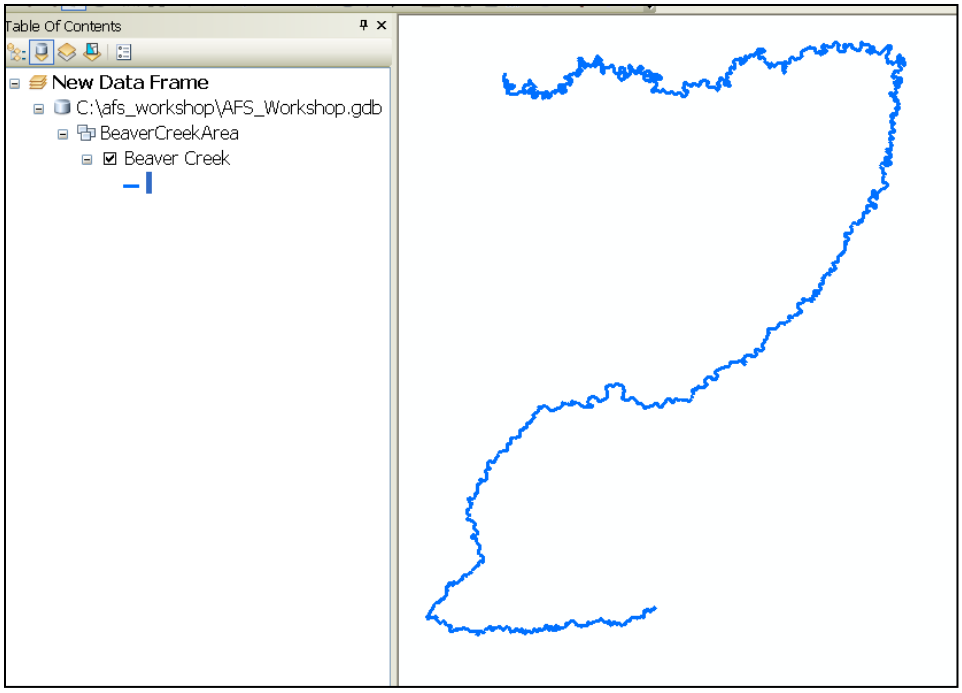
Start by adding the line feature class Streams to your Arcmap data frame…



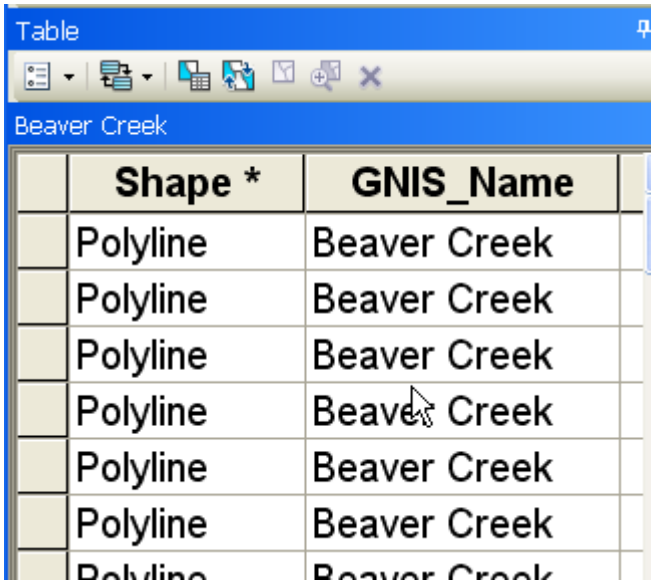
For now, we are interested exclusively with Beaver Creek, so do a Definition Query to create a Beaver Creek layer…



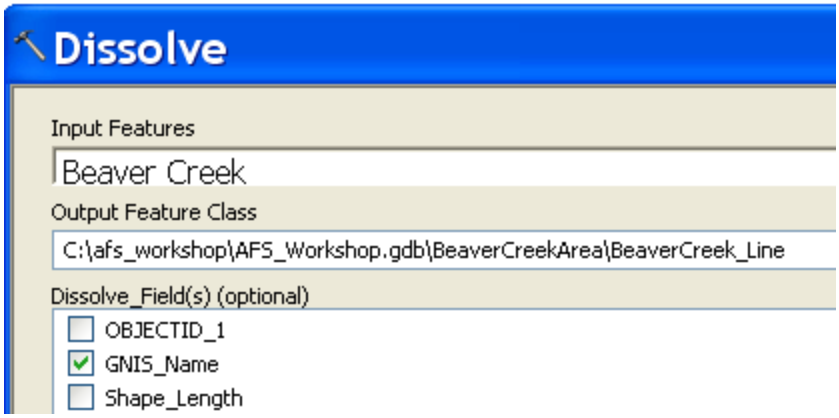
And name your layer BeaverCreek.



There are 407 lines representing Beaver Creek, we want one continuous line representing Beaver Creek,



so use the **Dissolve** geoprocessing tool to create this one line.


Dissolve
Input Features
Beaver Creek
Output Feature Class
C:\afs_workshop\AFS_Workshop.gdb\BeaverCreekArea\BeaverCreek_Line
Dissolve_Field(s) (optional)
OBJECTID_1
GNIS_Name
Shape_Length

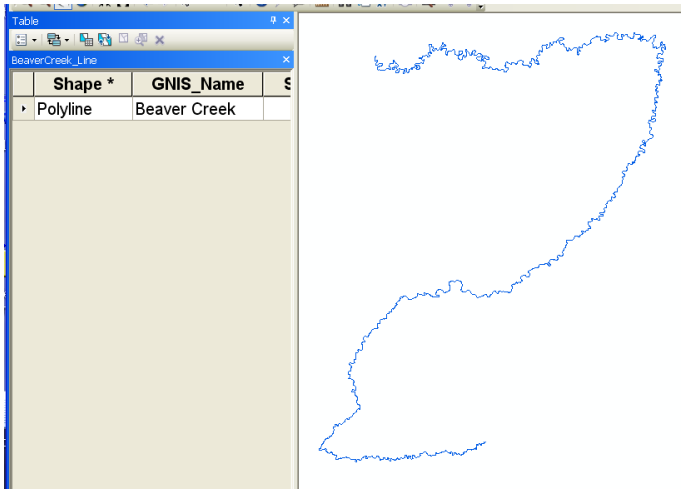
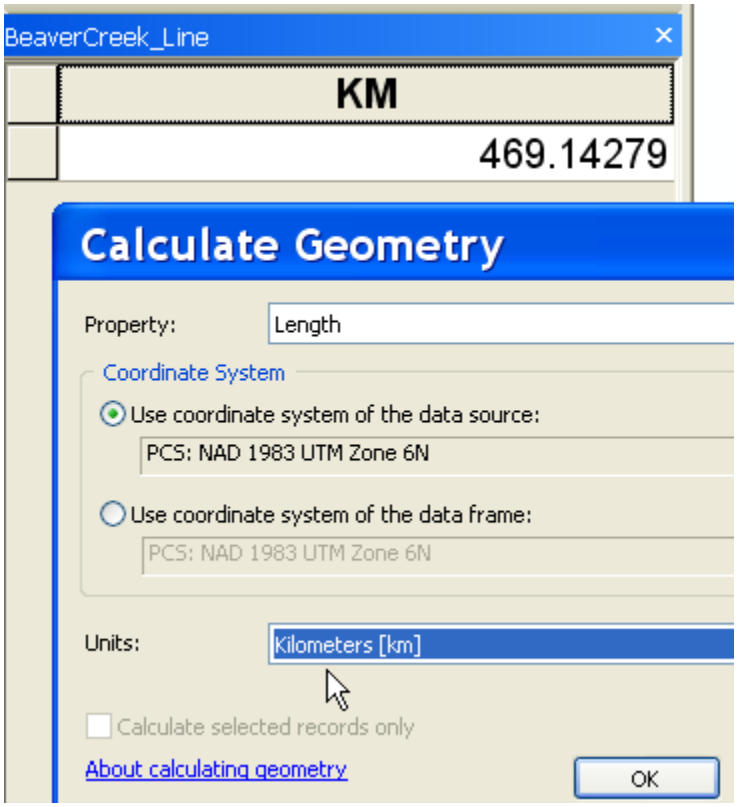
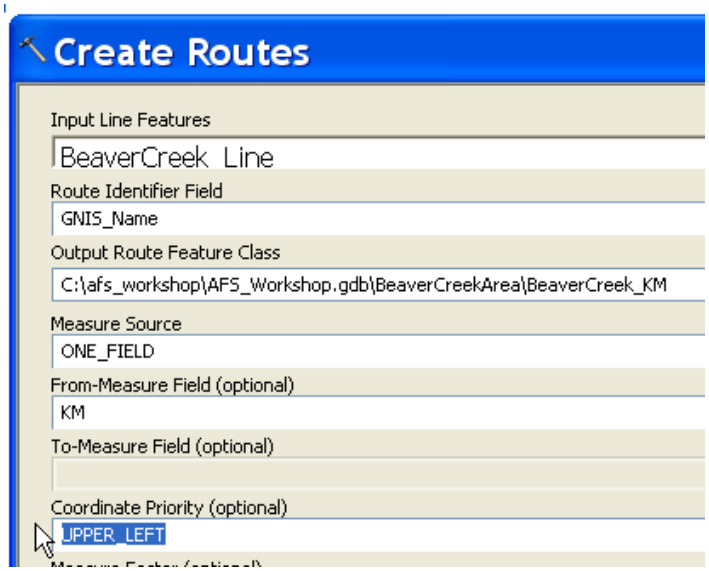


Table
BeaverCreek_Line
Shape *
GNIS_Name
Polyline
Beaver Creek

The X,Y coordinate system of the line is meters, yet we want our stream reaches in km, so add a double precision field named KM and compute the line length in kilometers.

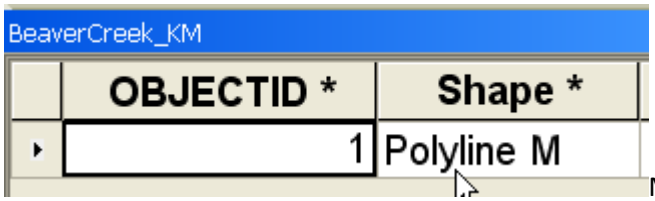


To create a measured line in kilometers, use the KM field and the ***Create Routes*** geoprocessing tool…



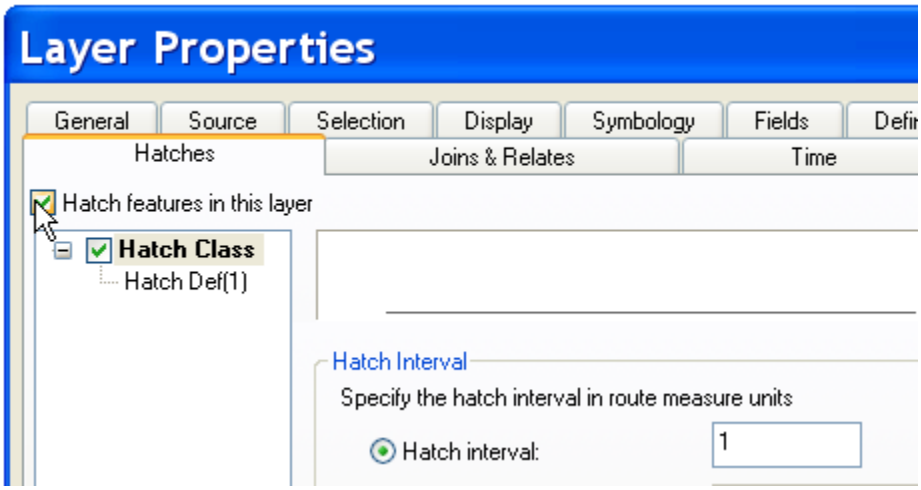
We want KM to accumulate from the Yukon River upstream on Beaver Creek, so select upper left to indicate that is where to start on Beaver Creek.

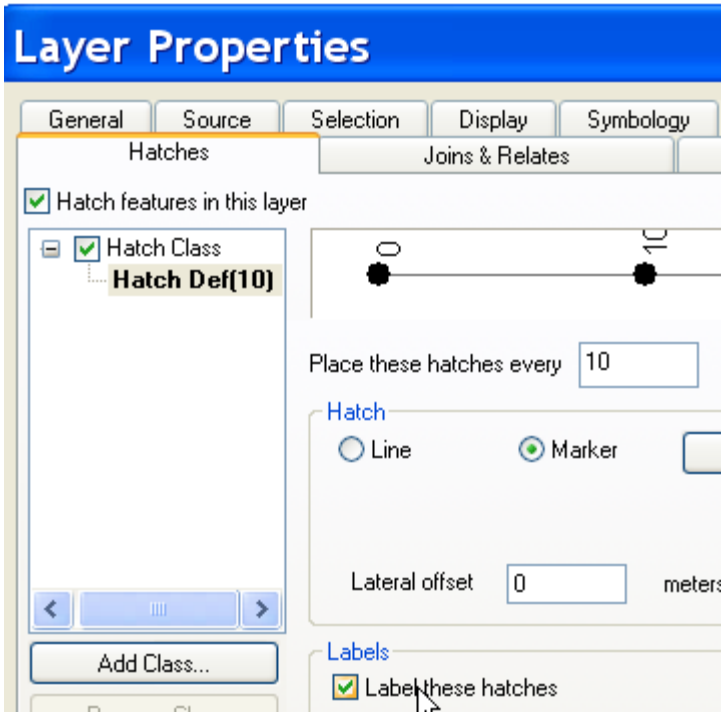
Notice that the shape of your output is PolylineM instead of Polyline…

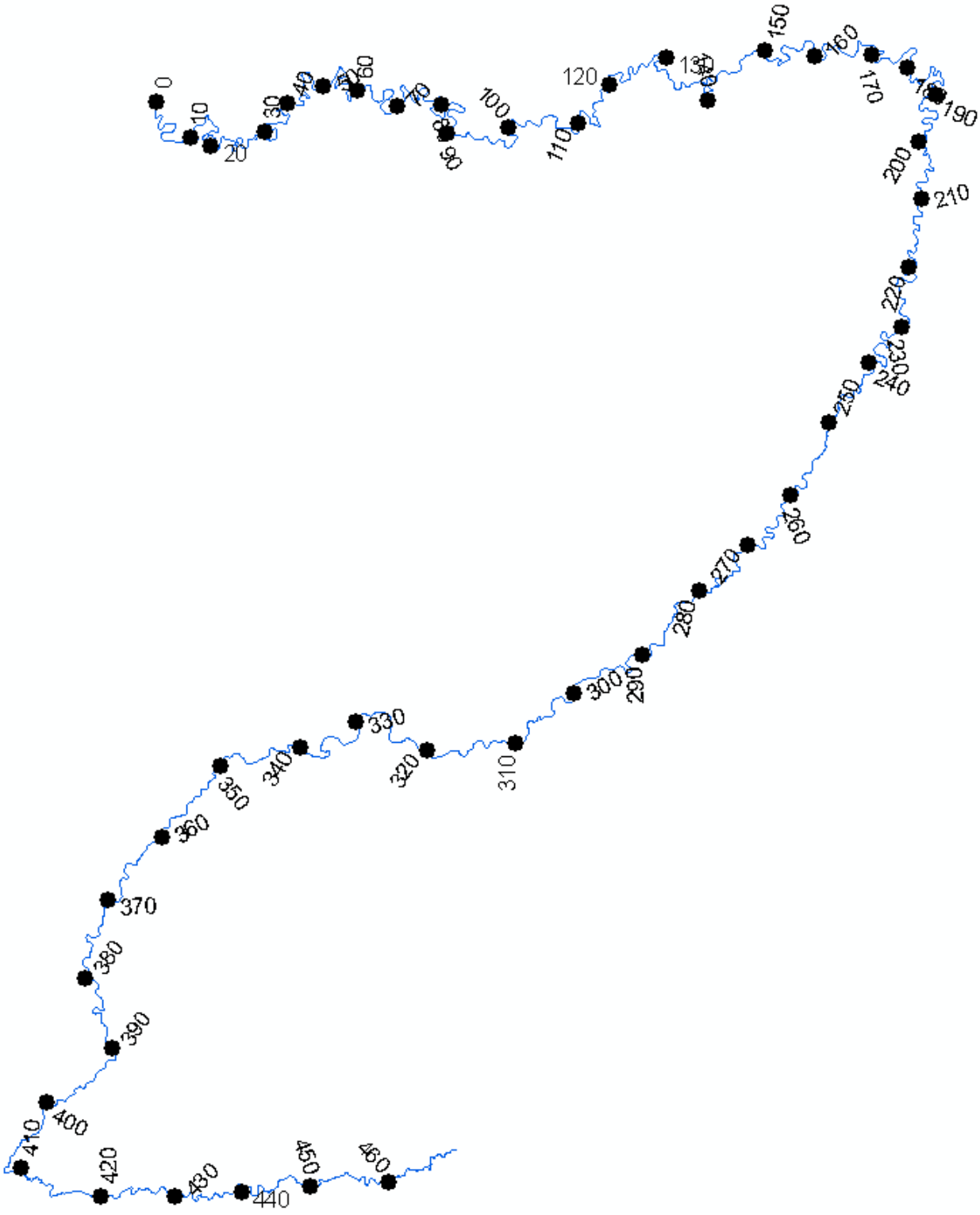


M stands for measured

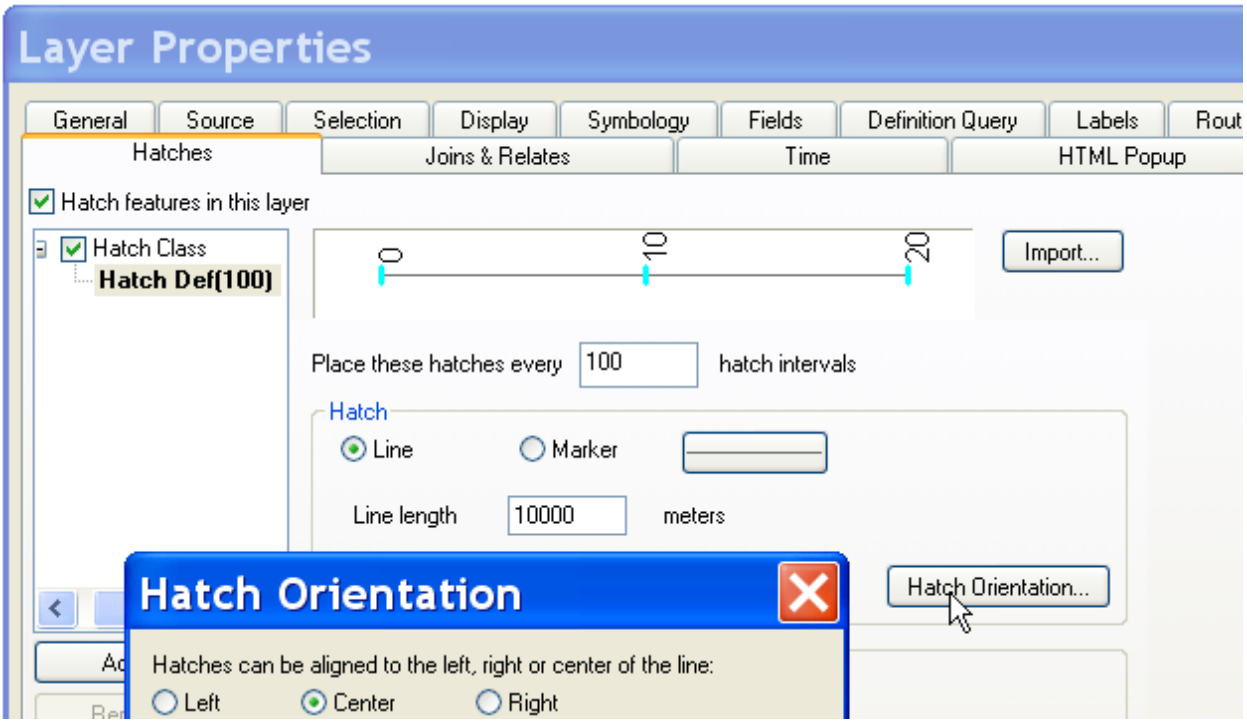
You can symbolize the measures using the Hatches tab under layer properties, for example, put a marker every 10km along the measured line…



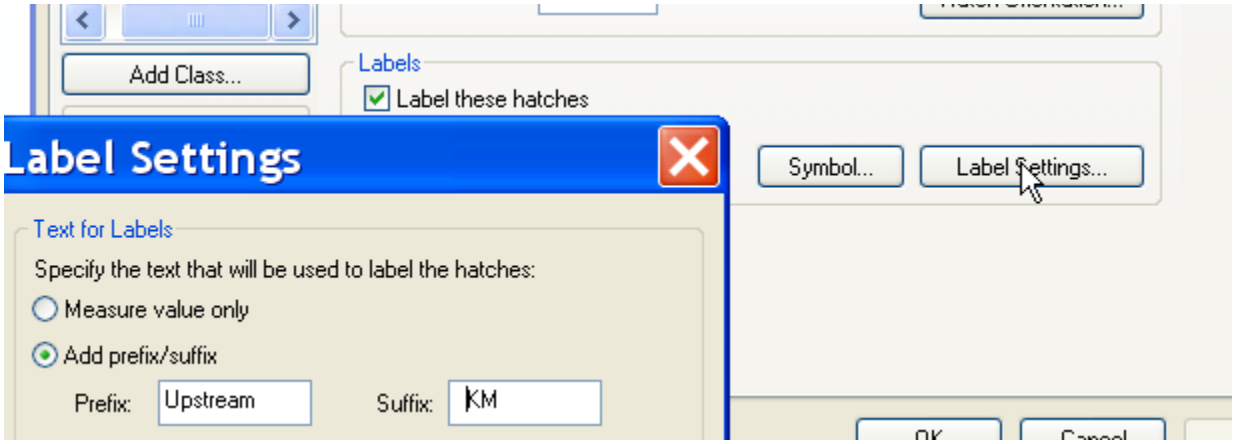




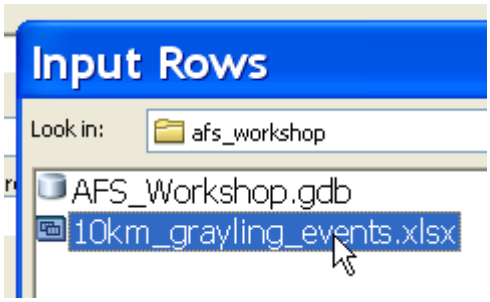
Change your hatches to put a line every 100km…

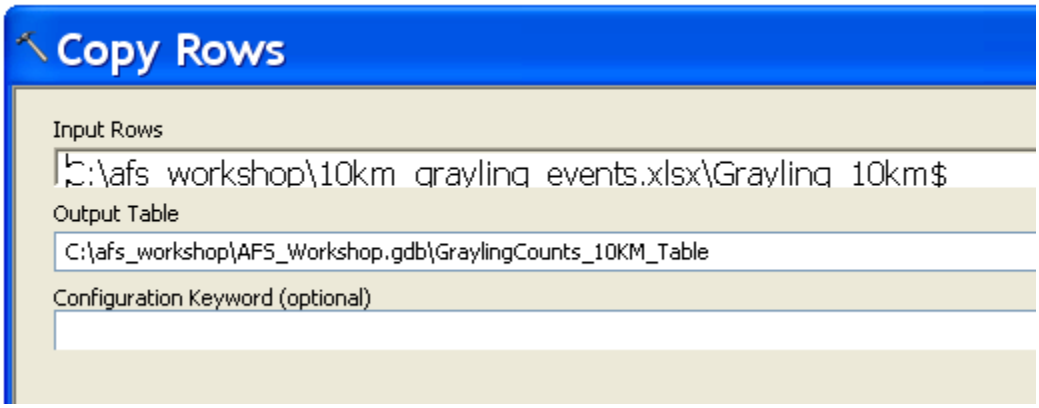


And add a prefix and suffix to your labels…



We have a spread sheet of grayling counts every 10 KM along beaver creek (I made the data up..it is not real counts). Use the ***Copy Rows*** geoprocessing tool to copy the spreadsheet into your geodatabase.


Input Rows
Look in:
afs_workshop
AFS_Workshop.gdb
10km_grayling_events.xlsx


Copy Rows
Input Rows
C:\afs_workshop\10km_grayling_events.xlsx\Grayling_10km$
Output Table
C:\afs_workshop\AFS_Workshop.gdb\GraylingCounts_10KM_Table
Configuration Keyword (optional)

GraylingCounts_10KM_Table

	OBJECTID *	ID	From_	To	Grayling
▸	1	1	0	10	5
	2	1	10	20	5
	3	1	20	30	2
	4	1	30	40	4
	5	1	40	50	1
	6	1	50	60	6
	7	1	60	70	6
	8	1	70	80	2
	9	1	80	90	4
	10	1	90	100	3
	11	1	100	110	2

1 (0 out of 47 Selected)

GraylingCounts_10KM_Table

BeaverCreek_KM

	Shape *	GNIS_Name *	Shape_Length
	Polyline M	Beaver Creek	469142.790253

There is not a common field among the Beaver Creek PolylineM table and the Grayling Counts table, so add a short integer StreamIID field to the PolylineM table and calculate it as a value of s

GraylingCounts_10KM_Table

OBJECTID *	ID	From_	To	Grayling
1	1	0	10	5
2	1	10	20	5
3	1	20	30	2
4	1	30	40	4
5	1	40	50	1
6	1	50	60	6
7	1	60	70	6
8	1	70	80	2
9	1	80	90	4
10	1	90	100	3
11	1	100	110	2

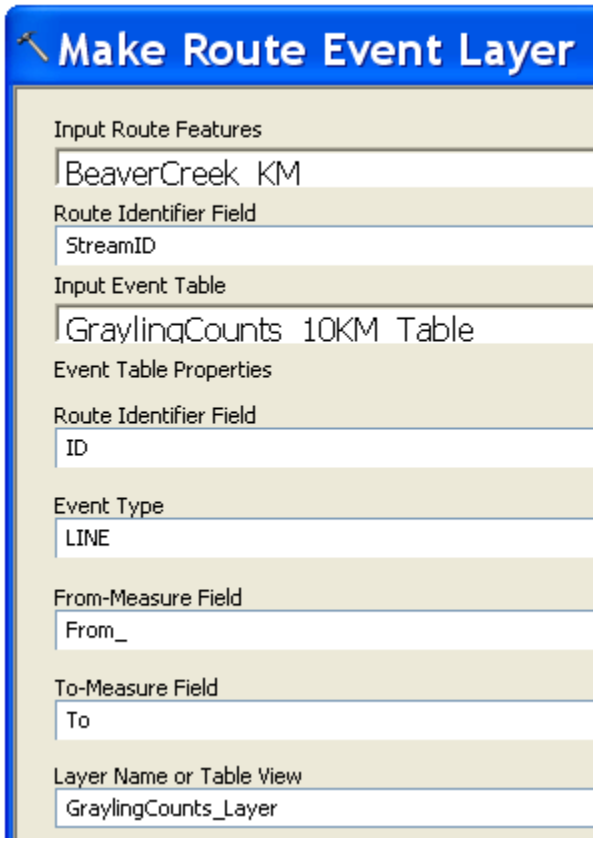
1 (0 out of 47 Selected)

GraylingCounts_10KM_Table

BeaverCreek_KM

GNIS_Name *	Shape_Length	StreamID
Beaver Creek	469142.790253	1

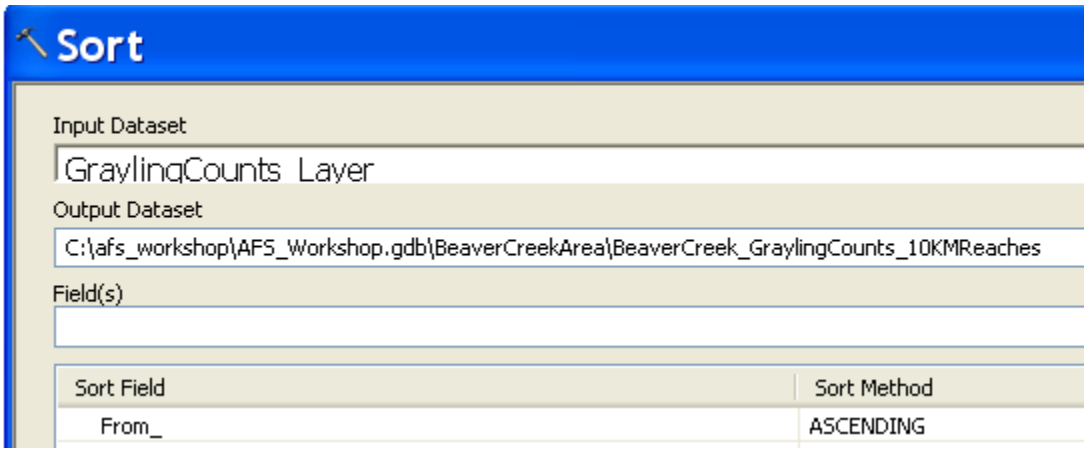
Next use the ***Make Route Event*** layer geoprocessing tool to add a “linear event layer” from your grayling count table..



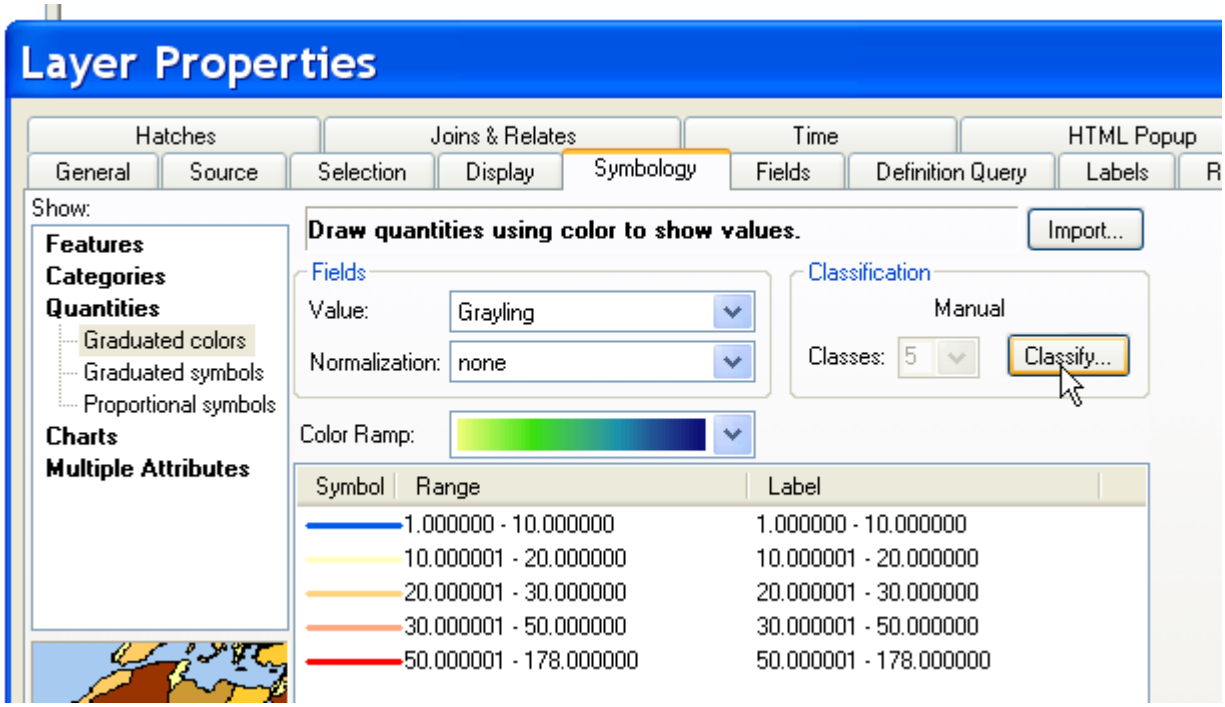
GraylingCounts_Layer

	ID	From_	To	Grayling	Shape *
	1	290	300	100	Polyline M
	1	0	10	5	Polyline M
	1	460	470	153	Polyline M
	1	180	190	6	Polyline M
	1	410	420	72	Polyline M
	1	130	140	3	Polyline M
	1	370	380	103	Polyline M
	1	80	90	4	Polyline M

Use the Sort geoprocessing tool to create sorted reaches based on the From_ value and output to your geodatabase.

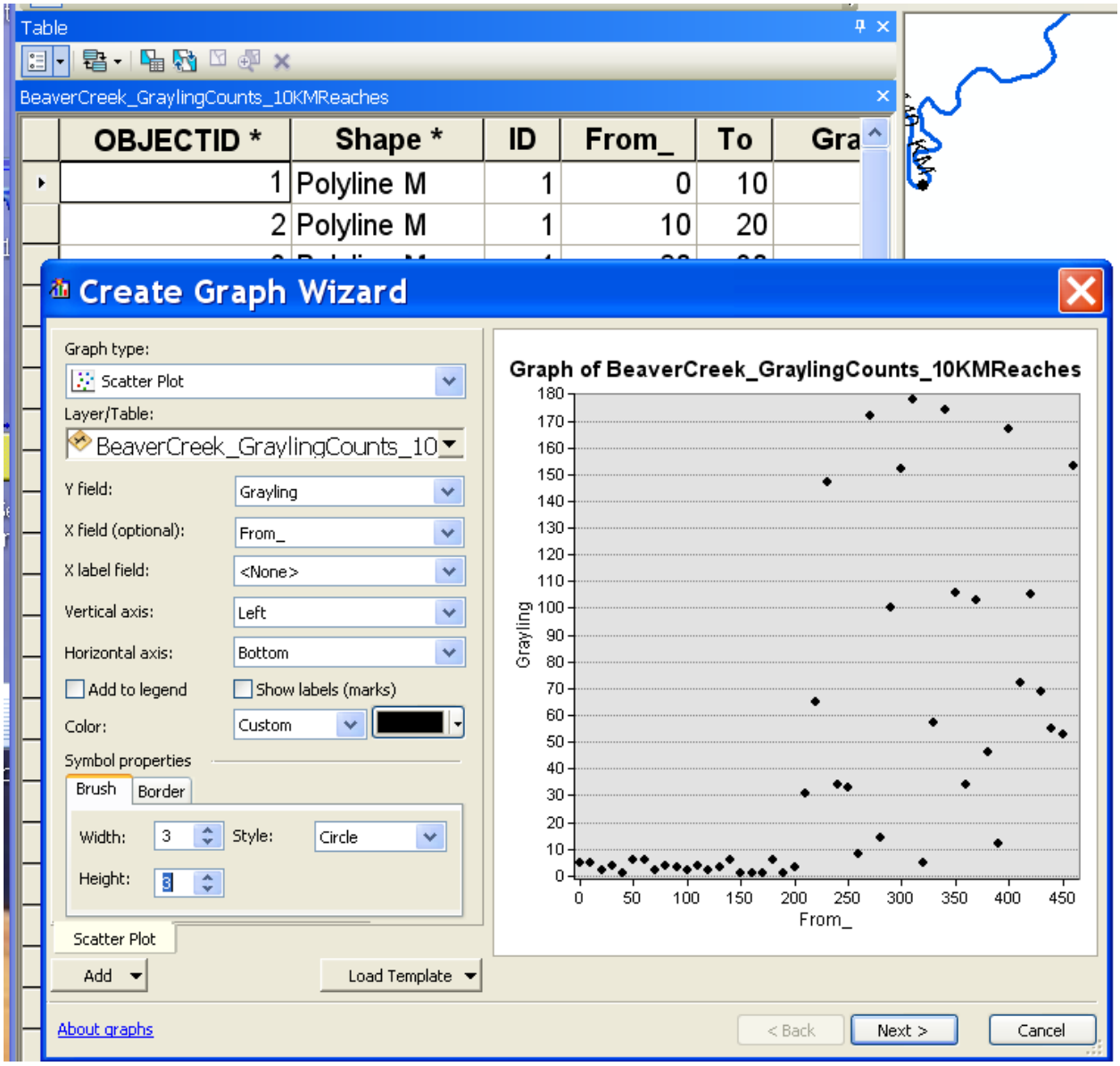


Manually classify your lines into the following 5 grayling count classes:



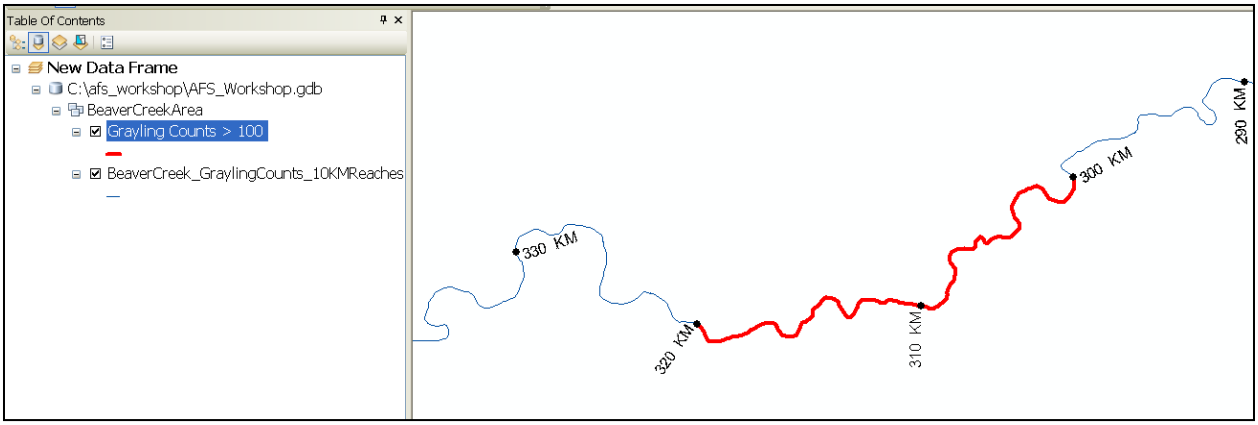
And symbolize hatches with labeled markers every 10km.

Create a plot of grayling count as a function of reach beginning KM..



In general, there was a low count of grayling from the Yukon River upstream to around 200km, then variable counts from 200km to 460 km.

Create a layer displaying all 10-km reaches with a grayling count above 10 grayling per km ..

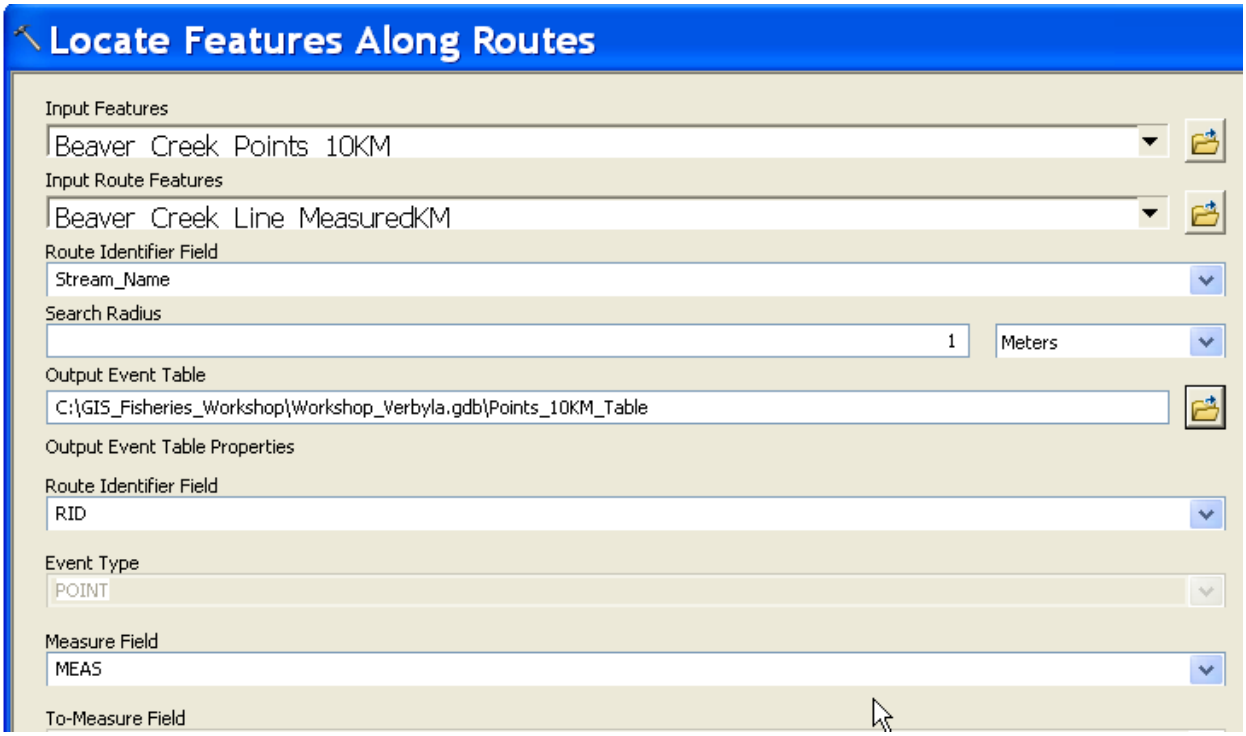


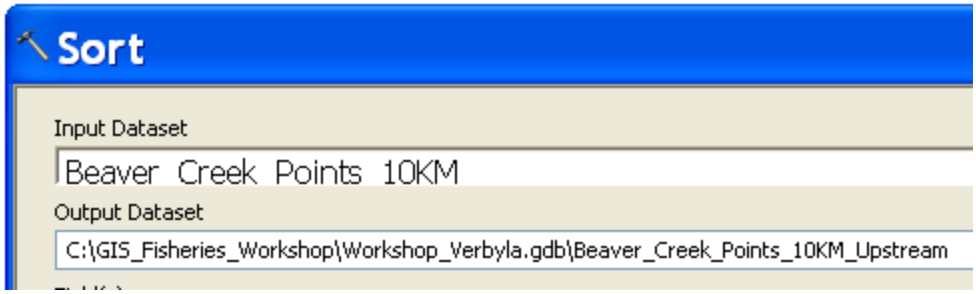
In the next exercise we will compute the sinuosity and stream gradient for each 10-km reach.

Stream gradient in 10km reaches:

Beaver_Creek_Points_10KM

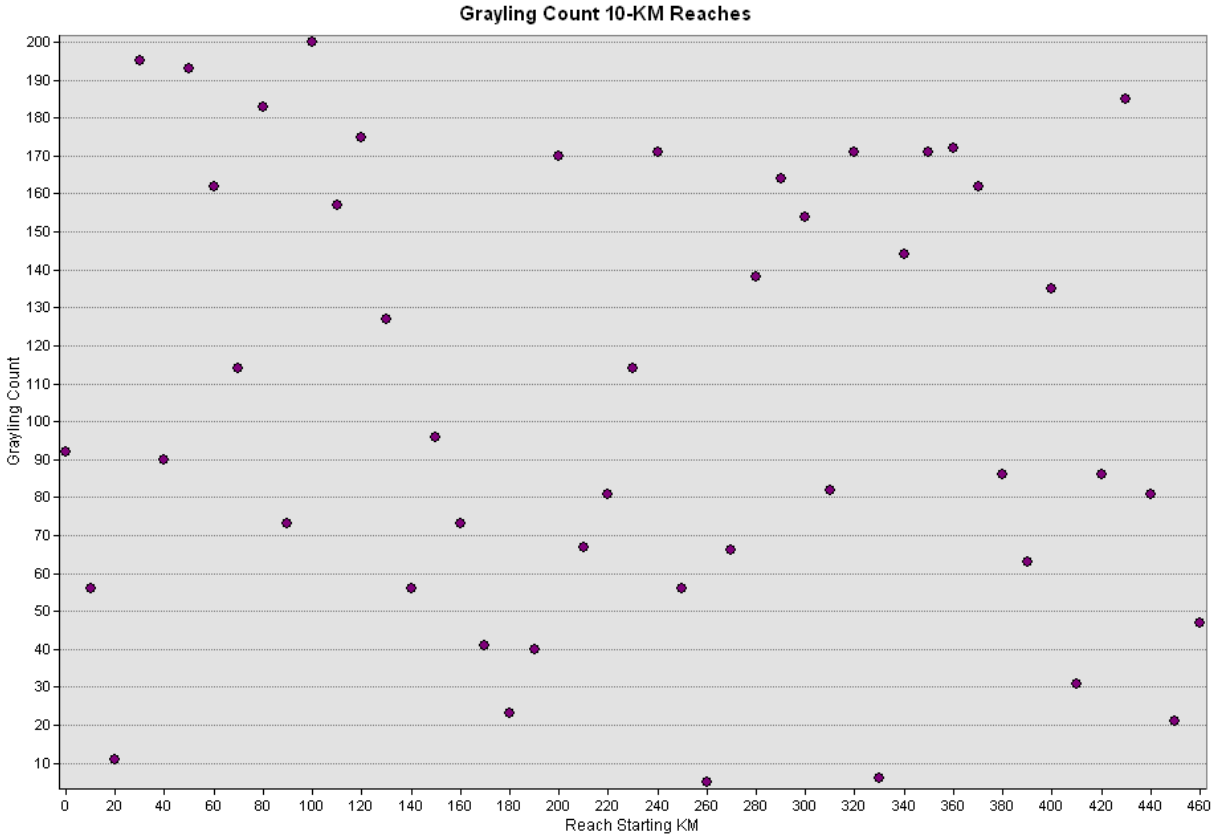
	OID *	Shape *	Name
▸	1	Point	
	2	Point	
	3	Point	
	4	Point	
	5	Point	
	6	Point	


Locate Features Along Routes
Input Features
Beaver Creek Points 10KM
Input Route Features
Beaver Creek Line MeasuredKM
Route Identifier Field
Stream_Name
Search Radius
1
Meters
Output Event Table
C:\GIS_Fisheries_Workshop\Workshop_Verbyla.gdb\Points_10KM_Table
Output Event Table Properties
Route Identifier Field
RID
Event Type
POINT
Measure Field
MEAS
To-Measure Field


Sort
Input Dataset
Beaver Creek Points 10KM
Output Dataset
C:\GIS_Fisheries_Workshop\Workshop_Verbyla.gdb\Beaver_Creek_Points_10KM_Upstream


Grayling Counts >= 100


30
40
50
60
70
80
90


Grayling Count 10-KM Reaches
Grayling Count
Reach Starting KM
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200