Overlap and Adjacency Questions

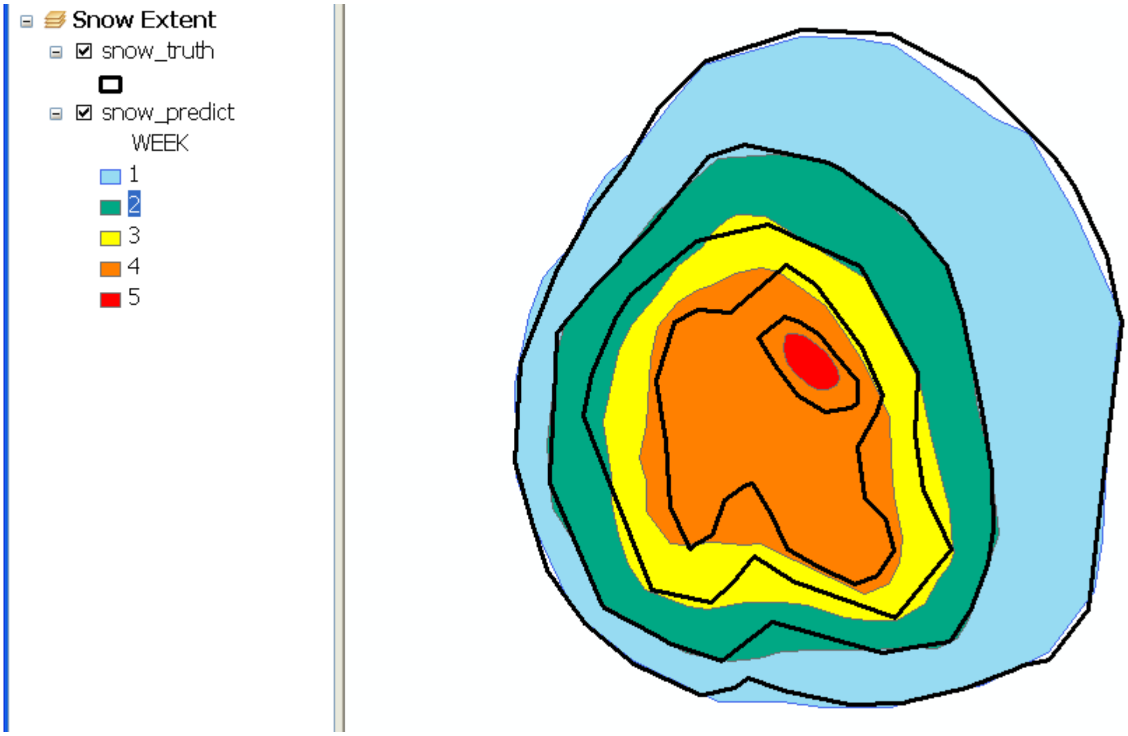
In this lab, you will answer three overlap or adjacency questions. First you will compare weekly snow areas predicted by a simulation model with actual snow areas or polygons. You will determine the percent overlap on a weekly basis and create a graph comparing modeled versus actual snow areas. The second question deals with adjacency of parcels on the Chena River versus parcels adjacent to those parcels. The third question is a adjacency question involving vegetation polygons: find the three longest boundaries between balsam poplar stands and white spruce stands.

Download and unzip ***Snow.zip*** from: **http://dverbyla.net/nrm435/data/**

Modeled versus Actual Weekly Snow Areas

A watershed scientist has developed a model to predict the melt of snowpack across the landscape. To validate the model, the scientist had orthophotography taken of the study area on a weekly basis.

The areal extent of snow as polygons are in a feature dataset named *snow* with a feature class named *snow_truth* corresponding to the actual snow area and in a feature class named *snow_predict* corresponding to the predicted or modeled snow area.



For every polygon, add and calculate the area in hectares…

snow_truth

Shape *	TRUTH_ID	WEEK	Truth_Hectares
Polygon	1	1	7,402.5
Polygon	2	2	4,058.3
Polygon	3	3	2,330.8
Polygon	4	4	1,117.2
Polygon	5	5	[illegible]

0 (0 out of 5 Selected)

snow_truth

snow_predict

Shape *	PREDICT_ID	WEEK	Predict_Hectares
Polygon	1	1	7,336.9
Polygon	2	2	4,116.2
Polygon	3	3	2,438.7
Polygon	4	4	1,413.2
Polygon	5	5	[illegible]

Symbolize your truth as white polygons and your predicted as non-white polygons.

☑ snow_truth

☑ snow_predict

Then create a bar chart showing these weekly areas:

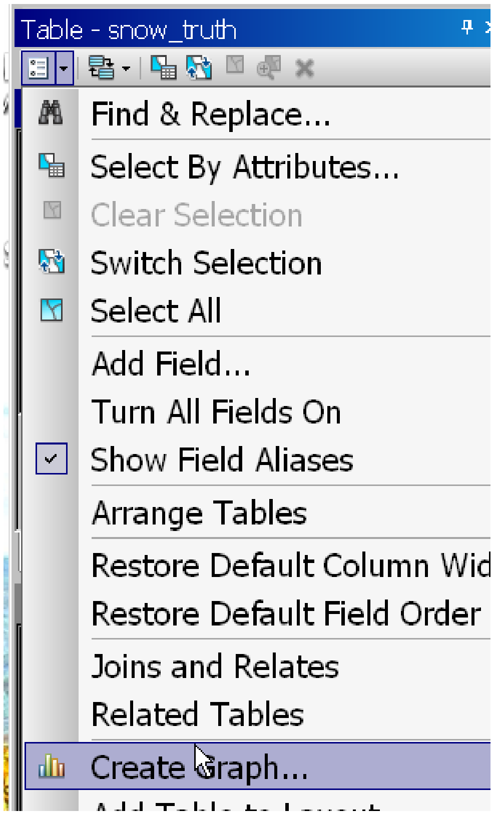
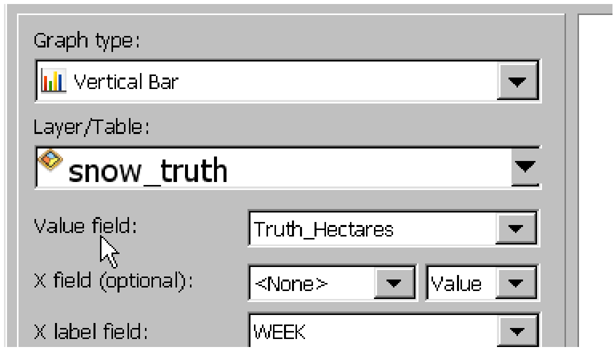
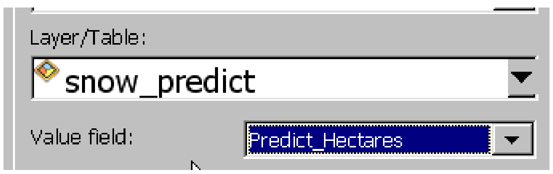


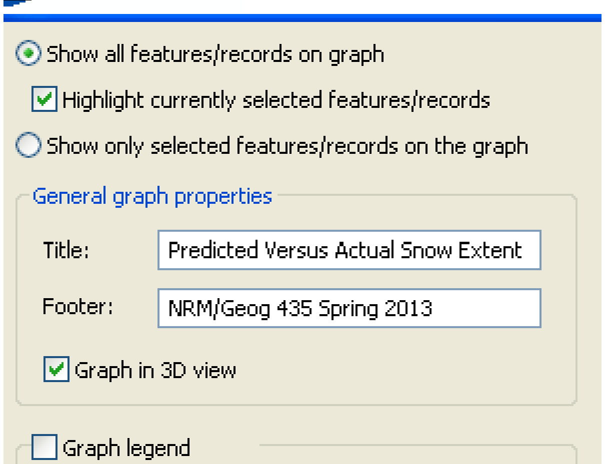
Table - snow_truth
Find & Replace...
Select By Attributes...
Clear Selection
Switch Selection
Select All
Add Field...
Turn All Fields On
Show Field Aliases
Arrange Tables
Restore Default Column Wid
Restore Default Field Order
Joins and Relates
Related Tables
Create Graph...

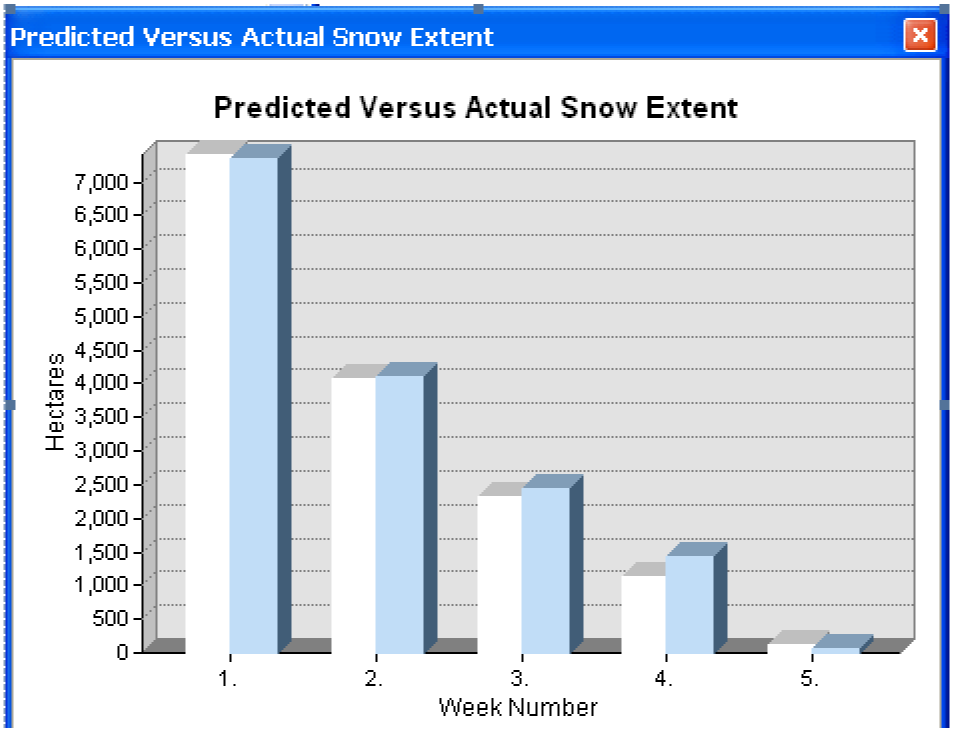

Graph type:
Vertical Bar
Layer/Table:
snow_truth
Value field:
Truth_Hectares
X field (optional):
<None>
Value
X label field:
WEEK


Vertical Bar
Add
New Series


Layer/Table:
snow_predict
Value field:
Predict_Hectares


Next >


Show all features/records on graph
Highlight currently selected features/records
Show only selected features/records on the graph
General graph properties
Title:
Predicted Versus Actual Snow Extent
Footer:
NRM/Geog 435 Spring 2013
Graph in 3D view
Graph legend



Next, determine the percent overlap of predicted snow over the actual snow for each week.
Select week 1 from Truth and Predict, and run the Intersect tool, the select the next week for Truth and Predict, and so on to week 5. Use the Results window to do this efficiently…

snow_predict

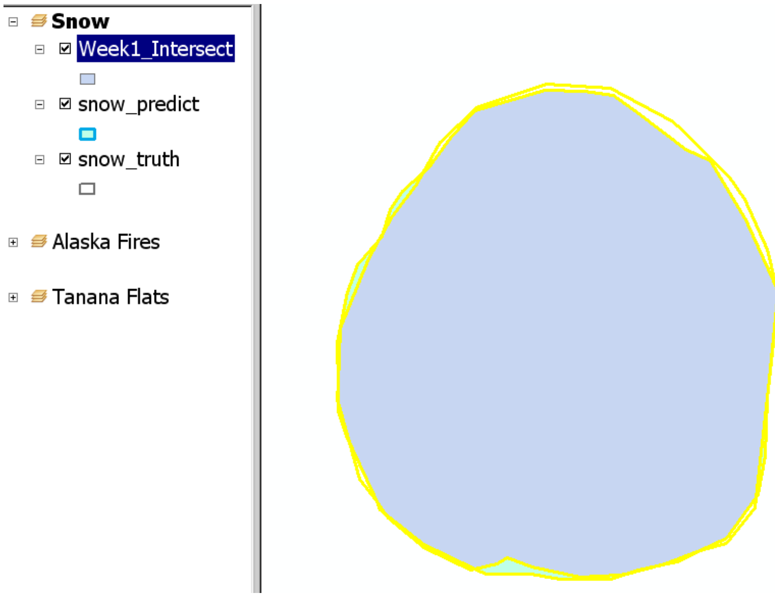
Shape *	WEEK	Predict_Hectares
Polygon	1	7,336.9
Polygon	2	4,116.2
Polygon	3	2,438.7
Polygon	4	1,413.2

0 (1 out of 5 Selected)

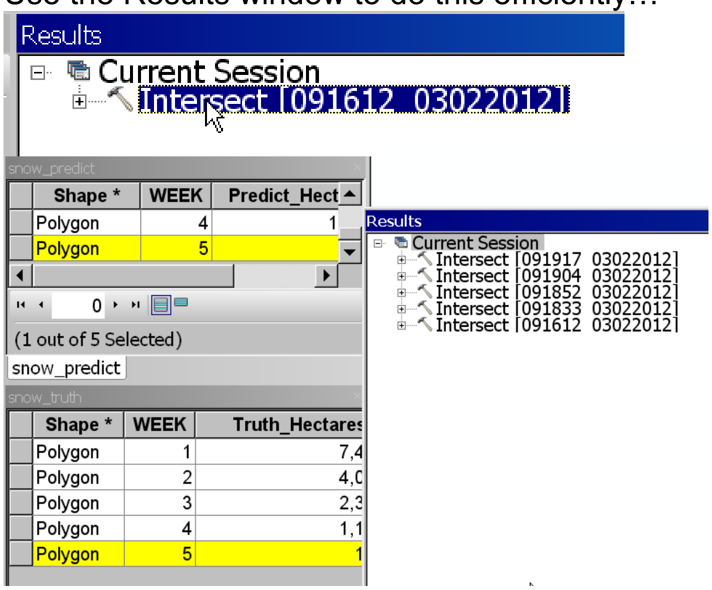
snow_predict

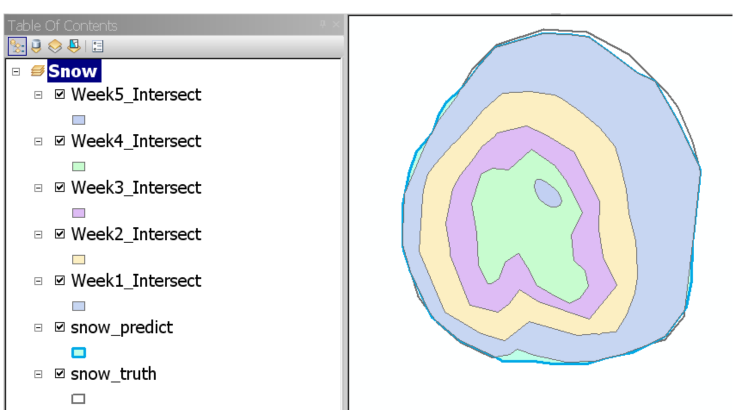
snow_truth

Shape *	WEEK	Truth_Hectares
Polygon	1	7,402.5
Polygon	2	4,058.3
Polygon	3	2,330.8
Polygon	4	1,117.2
Polygon	5	120.0



Use the Results window to do this efficiently…





Add a field named ***Overlap_Hectares***
You can do this using the Add Field tool in batch mode…

Add Field

	Input Table	Field Name	Field Type
1	Week1_Intersect	Overlap_Ha	DOUBLE
2	Week2_Intersect	Overlap_Ha	DOUBLE
3	Week3_Intersect	Overlap_Ha	DOUBLE
4	Week4_Intersect	Overlap_Ha	DOUBLE
5	Week5_Intersect	Overlap_Ha	DOUBLE

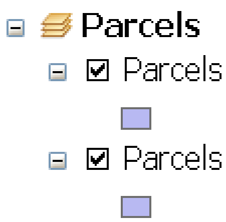
Use the ***Merge*** geoprocessing tool to create one final table.

Shape *	WEEK	Truth_Hecctares	Predict_Hectares	OVERLAP_HECTARE
Polygon	1	7,402.5	7,336.9	7,242.5
Polygon	2	4,058.3	4,116.2	4,025.0
Polygon	3	2,330.8	2,438.7	2,228.3
Polygon	4	1,117.2	1,413.2	1,093.4
Polygon	5	120.0	45.7	45.7

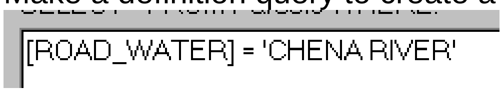
Parcel Adjacency

Download ***Parcels.zip*** from: **http://dverbyla.net/nrm435/data/**

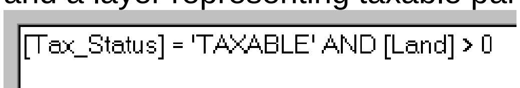
What is the mean land value of parcels on the bank of the Chena River compared to adjacent parcels not on the river?

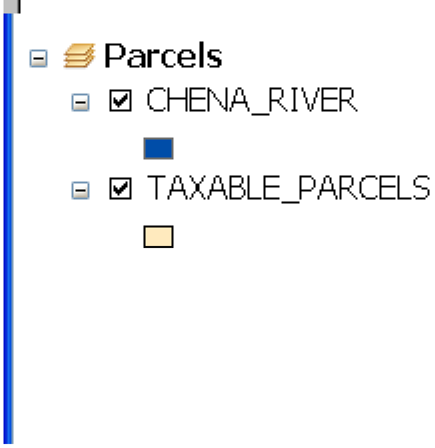


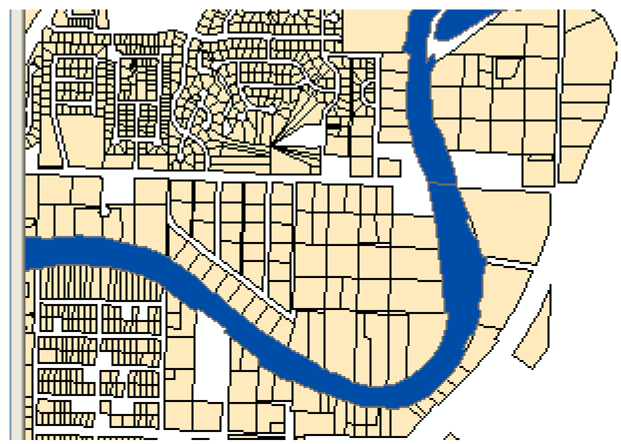
Make a definition query to create a layer representing the Chena River



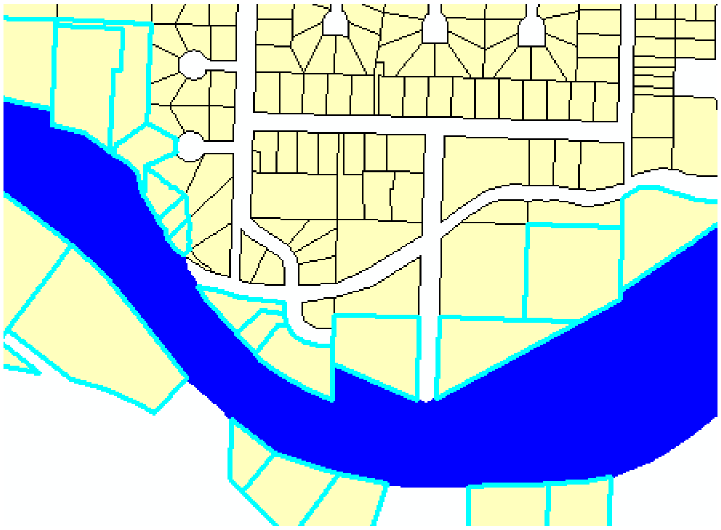
and a layer representing taxable parcels that have land appraised.



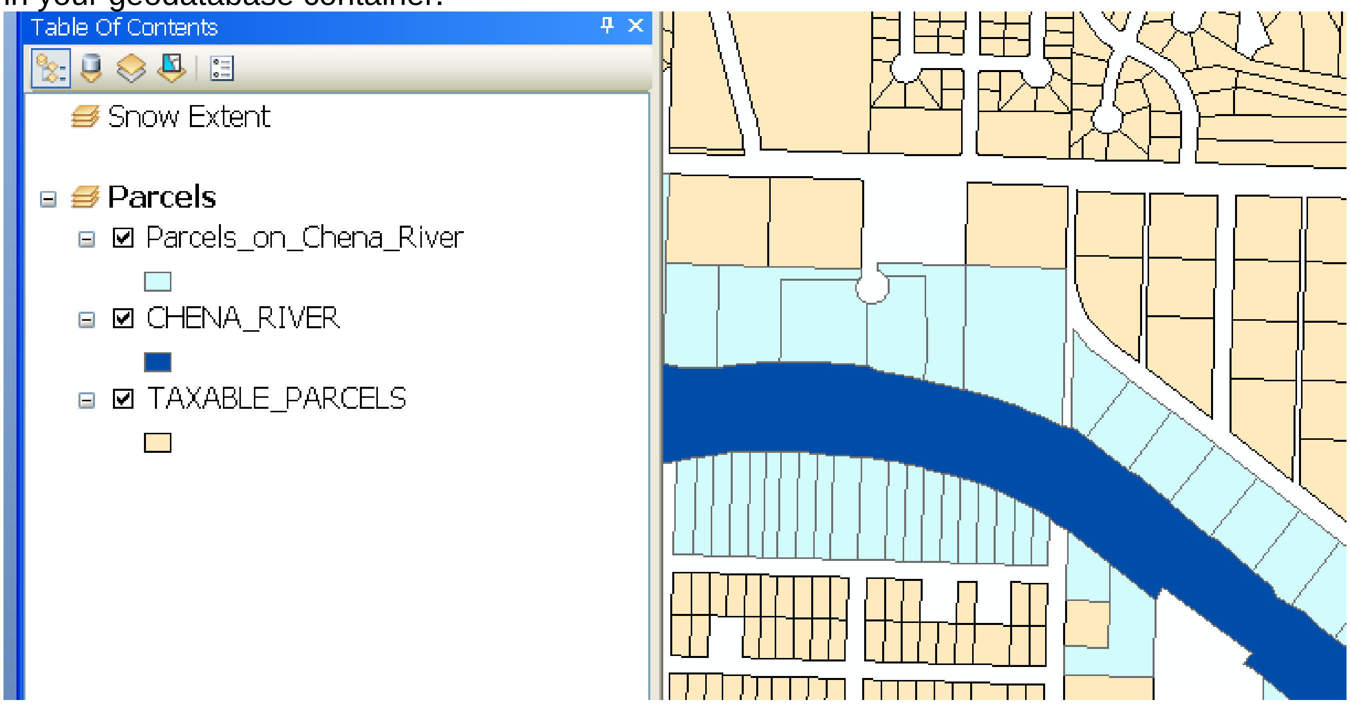




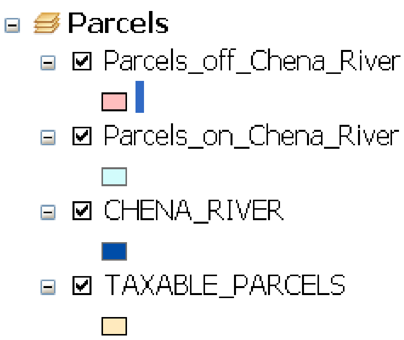
Use the ***Select Layer By Location*** geoprocessing tool to select all taxable parcels adjacent to the Chena River.

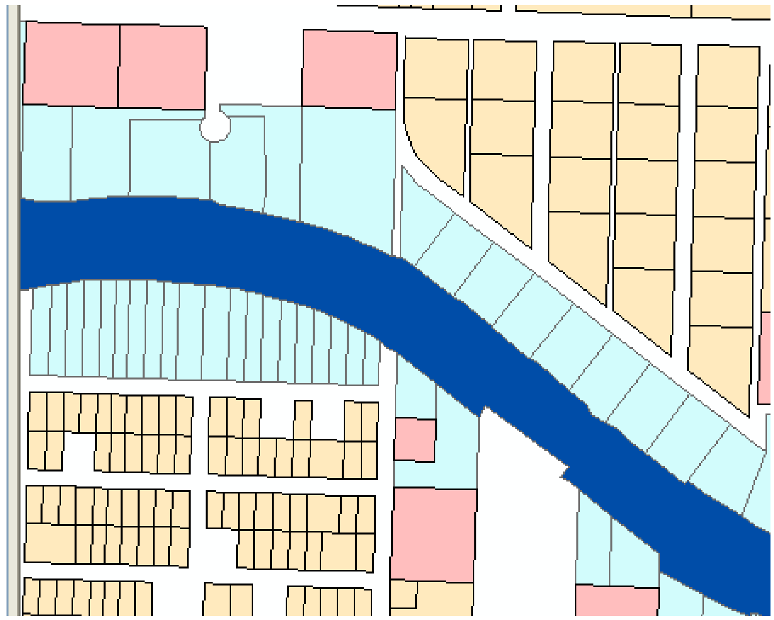


Use the ***Copy Features*** tool to stored these selected parcels as a new polygon feature class in your geodatabase container.



Next select by location all the parcels adjacent to the parcels on river, and use the ***Copy Features*** tool to stored these selected parcels as a new polygon feature class in your geodatabase container



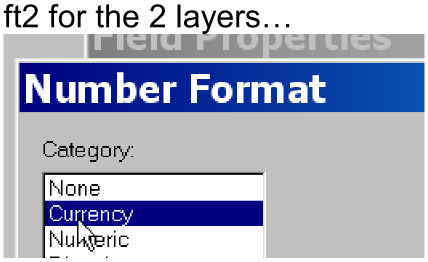


Determine the land value per square foot of land for each parcel polygon.

Parcels_on_Chena_River

	Land	SqFt	Land_Value_ft
	97330	68084.407436	1.429549
	143389	190827.13981	0.751408
	63050	40075.930319	1.573264
	145630	277490.445815	0.524811

Use the Summary Statistics tool to output the mean and standard deviation of Land value per ft2 for the 2 layers…



Parcels_On_River_Value_Table

FREQUENCY	MEAN_LandValue_SqFt	STD_LandValue_SqFt
405	$6.50	$18.50

(0 out of 1 Selected)

Parcels_Off_River_Value_Table

FREQUENCY	MEAN_LandValue_SqFt	STD_LandValue_SqFt
189	$3.02	$2.99

So on average the land value is $6.50 per ft2 adjacent to the Chena River compared to $3 one parcel away from the river.

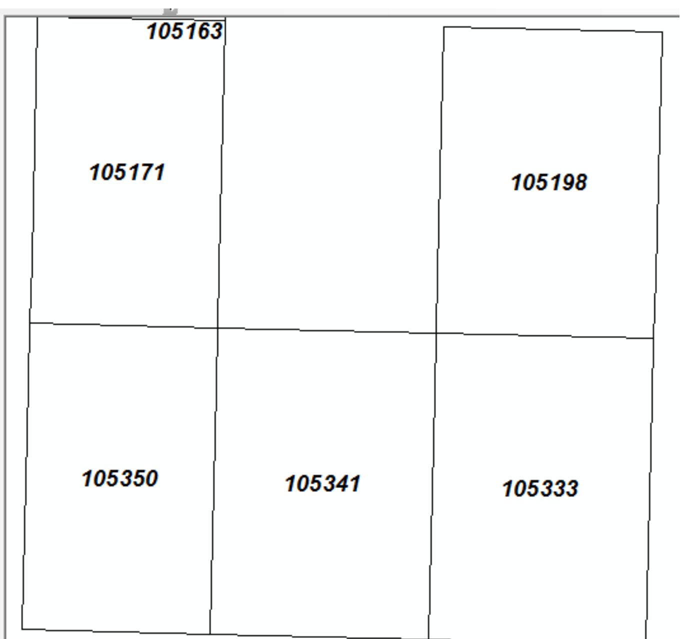
Polygon Neighbors Table

Create a layer of native parcels using the definition query: [Tax_Status] = 'NATIVE LANDS' For each native parcel polygon, we want to know what are the neighboring native parcel polygons. The PAN field is a parcel ID field, so use this with the ***Polygon Neighbors*** geoprocessing tool.

Parcels_PolygonNeighbors

src_PAN	nbr_PAN	LENGTH	NODE_COUNT
105163	105171	103.978033	0
105171	105163	103.978033	0
105171	105341	0	1
105171	105350	103.978068	0
105198	105333	120.977865	0
105198	105341	0	1
105333	105198	120.977865	0
105333	105341	169.949979	0
105341	105171	0	1
105341	105198	0	1
105341	105333	169.949979	0
105341	105350	169.949977	0
105350	105171	103.978068	0
105350	105341	169.949977	0

(4 out of 14 Selected)

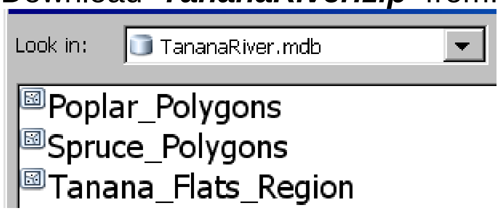


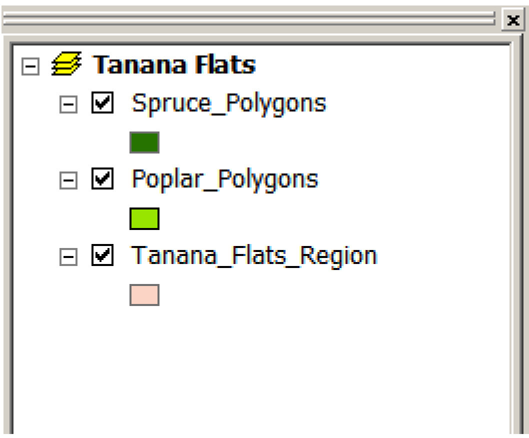
So for example, the parcel with PAN 105341 has four neighboring polygons, 2 polyons have a length of 170 feet border (PAN 105350,105333), and 2 polygons border only at a node (PAN 105171,105198).

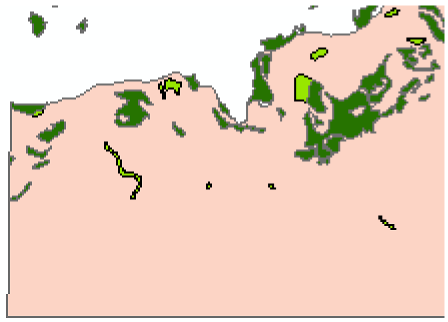
Adjacency Analysis Between Polygon Layers

A soil ecologist is interested in the effect of floodplain successional communities on soil nitrogen. She is specifically interested in balsam poplar versus white spruce effects on soil properties. She wants to locate the longest border between poplar and spruce polygons that is within the Tanana Flats area.

Download ***TananaRiver.zip*** from: **http://dverbyla.net/nrm435/data/**

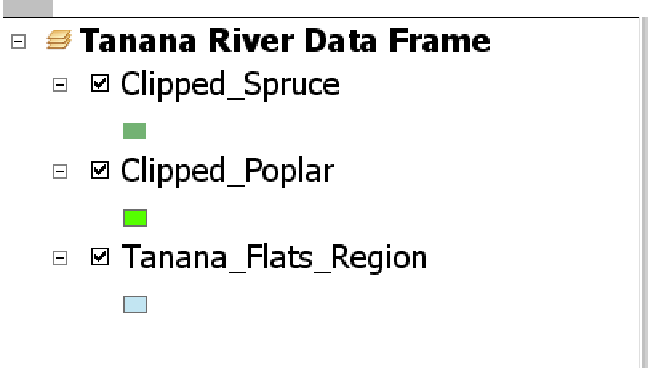


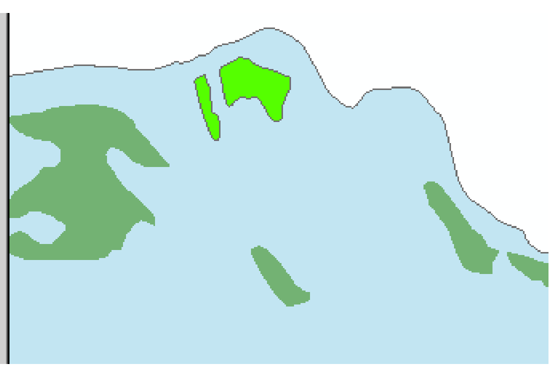




Use the ***Clip tool*** to batch clip the balsam poplar and white spruce polygons inside the Tanana Flats polygon. Output your clipped polygons to your geodatabases.

	Input Features	Clip Features	Output Feature Class
1	Poplar_Polygons	Tanana_Flats_Region	G:\nrm435\TananaRiver.mdb\Clipped_Poplar
2	Spruce_Polygons	Tanana_Flats_Region	G:\nrm435\TananaRiver.mdb\Clipped_Spruce





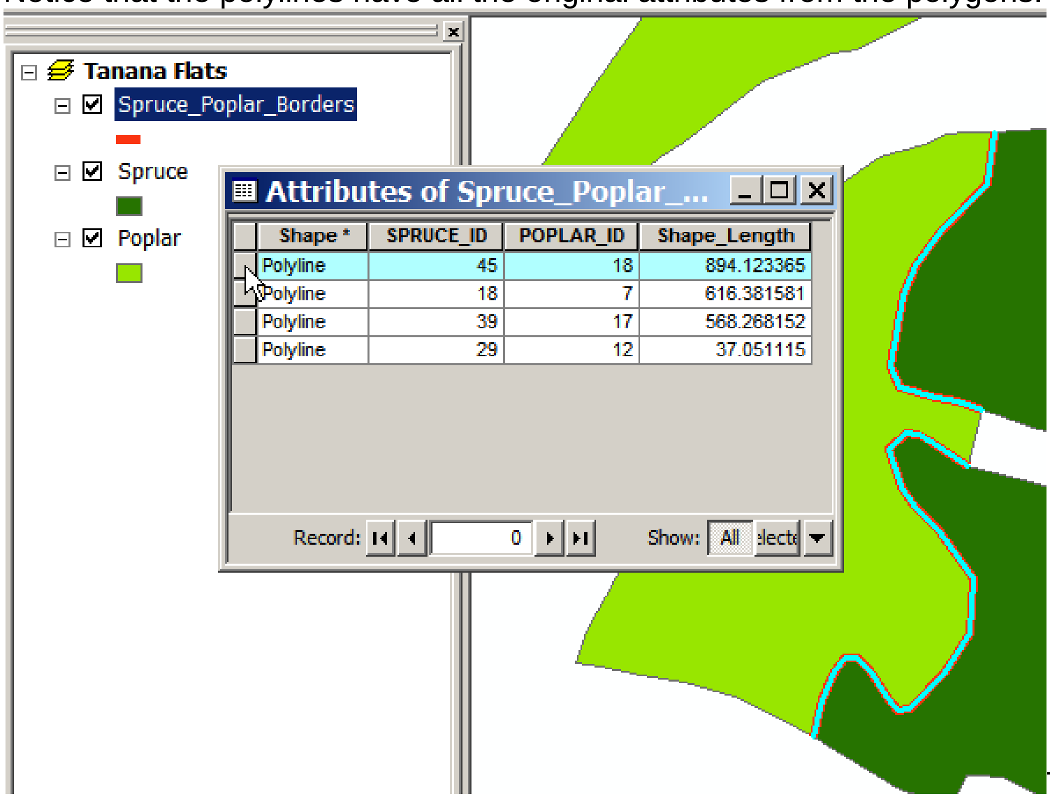
The original polygons were created as discontinuous multipart polygons. Use the ***Multipart to Single Part*** tool to batch convert these multipart polygons to single part polygons so that each individual polygon will have an area and perimeter.

Calculate the ID for each polygon as the Object ID, and add and calculate a field for Hectares.

POPLAR_ID	POPLAR_HA
1	2.571631
2	0.950119
3	0.875041
4	16.455831

SPRUCE_ID	SPRUCE_HA
1	5.932572
2	4.697503
3	1.846272
4	[illegible]

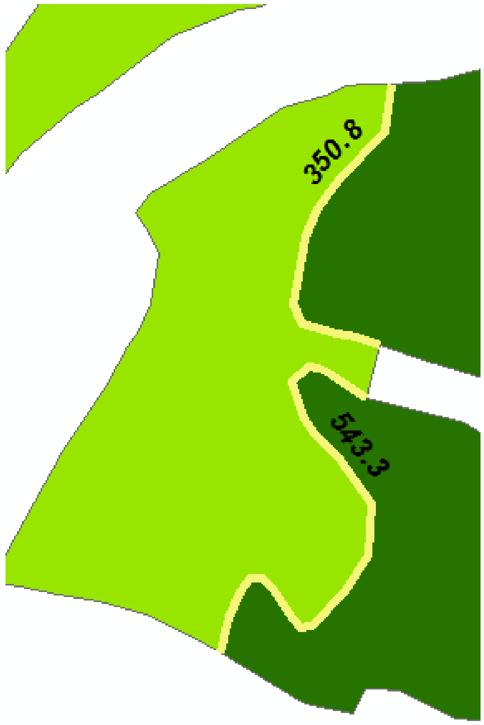
Use ***Intersect*** tool to create a line theme of spruce/poplar borders.
Notice that the polylines have all the original attributes from the polygons.



Shape *	SPRUCE_ID	POPLAR_ID	Shape_Length
Polyline	45	18	894.123365
Polyline	18	7	616.381581
Polyline	39	17	568.268152
Polyline	29	12	37.051115

The resulting border lines are multipart where one polygon bordered the other, but not continuously.

Fix this by using the ***Multipart to Singlepart*** tool. Label the length of each border line:


350.8
543.3