

Leveraging the *What* of Geographic Data

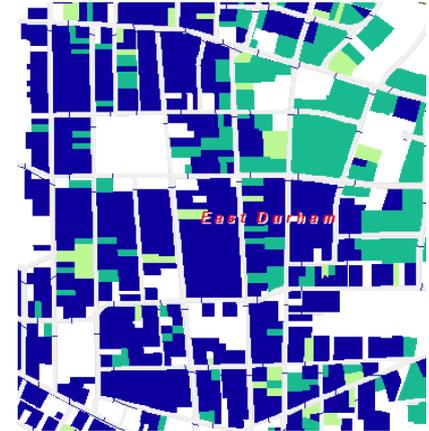
GIS I: Organizing Principles



- **Starting Simple: Map Tools**
- **Working with Tables**
- **Introduction to Table Joins**
- **Introduction to Table Queries**

Components

- Spatial (where?)
 - *Geometry or shape of an object*
 - *Where it is located*
- Attributes (what?)
 - *Tabular data*
 - *Describes an object*



OWNER_ST	LANDUSE_DE	PHYS_ADD	CONSTTYP	YEARBUILT	R
MD	VAC AG/ 0 ACRES OR >	0 OLD OXFORD RD		0	
NC	VAC AG/ 10 ACRES OR >	0 RED MOUNTAIN RD		0	
NC	PRESENT-USE/AGRICULTUR	0 COUNTY LINE RD		0	
NC	VAC AG/ TMBR 20 ACRES & >	0 COUNTY LINE RD		0	
NC	RES/ RURAL RES W/ ACREAG	811 COUNTY LINE RD	R/SD/CL-D/SH-2/AV	1985	
NC	RES/ RURAL RES W/ ACREAG	721 COUNTY LINE RD	R/SD/CL-D B/SH-2/AV	1985	

○ **Select**

○ **Identify**

○ **Find**



• Table Joins: Connecting your data

FID	Shape	AREA	PERIMETER	CO-49_D00	CO-49_D00_I	STATE	COUNTY	I.NAME
0	Polygon	0.304026	2.949866	2	1 49	033	Rich	
1	Polygon	1.880076	6.137284	3	2 49	003	Box Elder	
2	Polygon	0.328766	2.917776	4	3 49	005	Cache	
3	Polygon	0.183493	2.877793	5	4 49	057	Weber	
4	Polygon	0.169503	2.702826	6	5 49	029	Morgan	
5	Polygon	0.52069	4.943465	7	6 49	043	Summit	
6	Polygon	0.175633	2.170843	8	7 49	011	Davis	
7	Polygon	2.003301	6.018415	9	8 49	045	Tooele	
8	Polygon	0.200116	2.895183	10	9 49	009	Daggett	
9	Polygon	0.222852	2.318426	11	10 49	035	Salt Lake	
10	Polygon	1.231224	5.354266	12	11 49	047	Uintah	
11	Polygon	0.89321	3.940761	13	12 49	013	Duchesne	
12	Polygon	0.331825	3.224409	14	13 49	051	Wasatch	
13	Polygon	0.58928	4.858433	15	14 49	049	Utah	

OID	POP_TOT	POP_35_0	County	num_md	num_emp	rate_1000
0	6005	2741	Beaver	1	20	3.33056
1	42745	17936	Box Elder	2	95	2.22248
2	91391	29046	Cache	5	145	1.58659
3	20422	9913	Carbon	1	30	1.469
4	238994	92491	Davis	14	454	1.89963
5	14371	6149	Duchesne	1	30	2.08754
6	8485	4464	Grand	1	23	2.71067
7	33779	12059	Iron	2	51	1.50981
8	6046	3316	Kane	2	40	6.61594
9	12405	5626	Millard	1	40	3.22451
10	898387	364524	Salt Lake	40	1337	1.48822
11	22763	9101	Sanpete	1	41	1.80117
12	18942	8574	Sevier	1	30	1.59219
13	29736	14080	Summit	1	60	2.01776
14	40735	15419	Tooele	1	65	1.53568
15	25224	11012	Uintah	1	53	2.10117
16	368536	109524	Utah	16	451	1.22376
17	15215	6412	Wasatch	1	45	2.95761
18	90354	41475	Washington	4	131	1.44985
19	196533	83527	Weber	10	390	1.9844

Join Data

Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.

What do you want to join to this layer?

Join attributes from a table

- Choose the field in this layer that the join will be based on:
NAME
- Choose the field to join to this layer, or load the table from disk:
count_md_by_co
 Show the attribute tables of layers in this list
- Choose the field in the table to base the join on:
NAME

Join Options

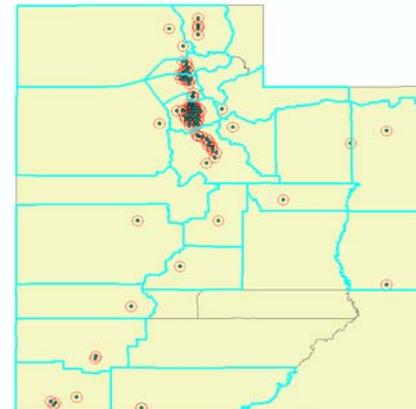
Keep all records
All records in the target table are shown in the resulting table. Unmatched records will contain null values for all fields being appended into the target table from the join table.

Keep only matching records
If a record in the target table doesn't have a match in the join table, that record is removed from the resulting target table.

About Joining Data OK Cancel

• Table Queries: Asking questions of your data

AREA	PERIMETER	CO-49_D00	CO-49_D00_I	STATE	COUNTY	I.NAME	LSAD	LSAD_TRANS	GEO_ID2	OID	POP_TOT	POP_35_0	County_1	num_
0.304026	2.949866	2	1 49	033	Rich	06	County	48033	0	0	0	0		
1.880076	6.137284	3	2 49	003	Box Elder	06	County	49003	1	42745	17936	Box Elder		
0.328766	2.916776	4	3 49	005	Cache	06	County	49005	2	91391	29046	Cache		
0.183493	2.877793	5	4 49	057	Weber	06	County	49057	19	196533	83527	Weber		
0.169503	2.702826	6	5 49	029	Morgan	06	County	49029	0	0	0			
0.52069	4.943465	7	6 49	043	Summit	06	County	49043	13	29736	14080	Summit		
0.175633	2.170843	8	7 49	011	Davis	06	County	49011	4	238994	92491	Davis		
2.003301	6.018415	9	8 49	045	Tooele	06	County	48045	14	40735	15419	Tooele		
0.200116	2.895183	10	9 49	009	Daggett	06	County	49009	0	0	0			
0.222852	2.318426	11	10 49	035	Salt Lake	06	County	49035	10	898387	364524	Salt Lake		
1.231224	5.354266	12	11 49	047	Uintah	06	County	49047	15	25224	11012	Uintah		
0.89321	3.940761	13	12 49	013	Duchesne	06	County	49013	5	14371	6149	Duchesne		
0.331825	3.224409	14	13 49	051	Wasatch	06	County	49051	17	15215	6412	Wasatch		
0.58928	4.858433	15	14 49	049	Utah	06	County	49049	16	368536	109524	Utah		
0.905441	6.753776	16	15 49	023	Juab	06	County	49023	0	0	0			
0.403491	3.638766	17	16 49	007	Carbon	06	County	49007	3	20422	9913	Carbon		
0.433921	3.223753	18	17 49	039	Sanpete	06	County	49039	11	22763	9101	Sanpete		
1.201488	5.953197	19	18 49	015	Emery	06	County	49015	0	0	0			



Select by Attributes

Enter a WHERE clause to select records in the table window.

Method: Create a new selection

"POP_TOT" > 10000
"POP_35_0" > 1000
"County_1" = "Rich"
"num_md" > 0
"num_emp" > 0
"rate_1000" > 0

Is Get Unique Values Go To:

SELECT * FROM UT_MD_Join WHERE:
"num_md" > 0

Clear Verify Help Load... Save...

Apply Close

Table Components

Fields (columns)



Records (rows)



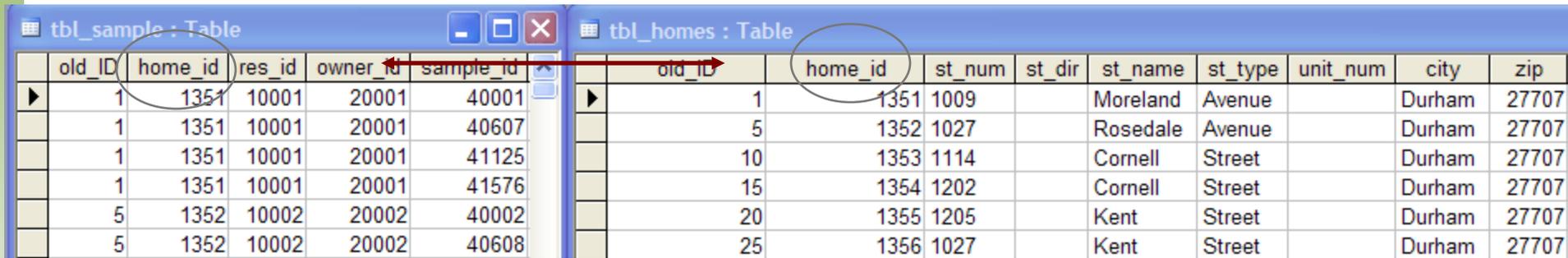
STFID	STATE	COUNTY	TRACT_1	BLKGRP	POP2000
37063000101	37	063	000101	1	1246
37063000101	37	063	000101	2	1905
37063000102	37	063	000102	1	4462
37063000200	37	063	000200	1	835
37063000200	37	063	000200	2	1323
37063000200	37	063	000200	3	958
37063000301	37	063	000301	1	1088
37063000301	37	063	000301	2	741
37063000301	37	063	000301	3	603
37063000302	37	063	000302	1	732



- **Columns**
 - **Must have unique names**
 - **Can contain different data type (text, numeric, date)**
 - **Column names limited to 10 characters**

STFID	STFID_1	HSEHLD_1_M	HSEHLD_1_F	KGP_PUBA	STATE	COUNTY
370630001011	370630001011	63	135	0	37	063
370630001012	370630001012	51	103	5.462	37	063
370630001021	370630001021	268	462	1.707	37	063
370630002001	370630002001	73	118	1.86	37	063
370630002002	370630002002	68	57	7.947	37	063
370630002003	370630002003	65	96	2.613	37	063
370630003011	370630003011	100	114	7.375	37	063
370630003012	370630003012	42	57	6.438	37	063
370630003013	370630003013	80	70	1.511	37	063
370630003021	370630003021	37	79	0	37	063

Connecting Tables?



tbl_sample : Table						tbl_homes : Table								
old_ID	home_id	res_id	owner_id	sample_id		old_ID	home_id	st_num	st_dir	st_name	st_type	unit_num	city	zip
1	1351	10001	20001	40001		1	1351	1009		Moreland	Avenue		Durham	27707
1	1351	10001	20001	40607		5	1352	1027		Rosedale	Avenue		Durham	27707
1	1351	10001	20001	41125		10	1353	1114		Cornell	Street		Durham	27707
1	1351	10001	20001	41576		15	1354	1202		Cornell	Street		Durham	27707
5	1352	10002	20002	40002		20	1355	1205		Kent	Street		Durham	27707
5	1352	10002	20002	40608		25	1356	1027		Kent	Street		Durham	27707

Table Join

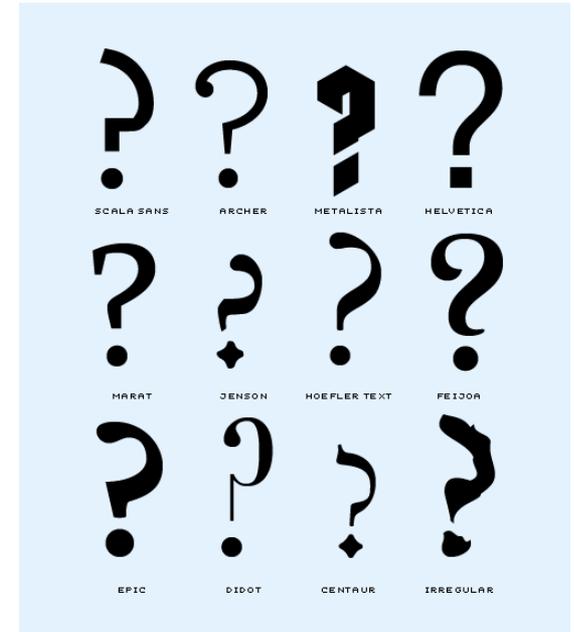
- Dynamic Connection between tables in your project
- Based on a common ID in each table
 - Must be the same data type
 - Do not have to have the same name

Attributes of Utah_co_prj

FID	Shape	AREA	PERIMETER	CO_49_D00_	CO_49_D00_I	STATE	COUITY	NAME	LSAD	LSAD_TRAHS	GEO_ID2	OID	POP_TOT	POP_35_0	County '	num_md	num_emp	rate_1000
0	Polygon	0.304026	2.949866	2	1	49	033	Rich	06	County	49033	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
1	Polygon	1.880076	6.137284	3	2	49	003	Fox Elder	06	County	49003	1	42745	17936	Fox Elder	2	95	2.22248
2	Polygon	0.328766	2.916776	4	3	49	005	Cache	06	County	49005	2	91391	29046	Cache	5	145	1.58659
3	Polygon	0.183493	2.877793	5	4	49	057	Weber	06	County	49057	19	196533	83527	Weber	10	390	1.9844
4	Polygon	0.169503	2.702826	6	5	49	029	Morgan	06	County	49029	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
5	Polygon	0.52069	4.943465	7	6	49	043	Summit	06	County	49043	13	29736	14080	Summit	1	60	2.01776
6	Polygon	0.175633	2.170843	8	7	49	011	Davis	06	County	49011	4	238994	92491	Davis	14	454	1.89963
7	Polygon	2.003301	6.018415	9	8	49	045	Tooele	06	County	49045	14	40735	15419	Tooele	1	65	1.59568
8	Polygon	0.200116	2.895183	10	9	49	009	Daggett	06	County	49009	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
9	Polygon	0.222852	2.318426	11	10	49	035	Salt Lake	06	County	49035	10	898387	364524	Salt Lake	40	1337	1.48822
10	Polygon	1.231224	5.354266	12	11	49	047	Uintah	06	County	49047	15	25224	11012	Uintah	1	53	2.10117
11	Polygon	0.89321	3.940761	13	12	49	013	Duchesne	06	County	49013	5	14371	6149	Duchesne	1	30	2.08754
12	Polygon	0.331825	3.224409	14	13	49	051	Wasatch	06	County	49051	17	15215	6412	Wasatch	1	45	2.95761
13	Polygon	0.585928	4.858433	15	14	49	049	Utah	06	County	49049	16	368536	109524	Utah	16	451	1.22376
14	Polygon	0.926541	6.753776	16	15	49	023	Juab	06	County	49023	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
15	Polygon	0.403491	3.638766	17	16	49	007	Carbon	06	County	49007	3	20422	9913	Carbon	1	30	1.469
16	Polygon	0.433921	3.223753	18	17	49	039	Sanpete	06	County	49039	11	22763	9101	Sanpete	1	41	1.80117
17	Polygon	1.201488	5.953197	19	18	49	015	Emery	06	County	49015	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
18	Polygon	1.840696	6.160707	20	19	49	027	Millard	06	County	49027	9	12405	5626	Millard	1	40	3.22451
19	Polygon	0.994581	4.917174	21	20	49	019	Grand	06	County	49019	6	8485	4464	Grand	1	23	2.71067
20	Polygon	0.514801	3.569653	22	21	49	041	Sevier	06	County	49041	12	18842	8574	Sevier	1	30	1.59219
21	Polygon	0.691985	4.248777	23	22	49	001	Beaver	06	County	49001	0	6005	2741	Beaver	1	20	3.33056
22	Polygon	0.204366	2.367568	24	23	49	031	Plute	06	County	49031	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
23	Polygon	0.658139	4.894553	25	24	49	055	Wayne	06	County	49055	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
24	Polygon	2.097212	8.683291	26	25	49	037	San Juan	06	County	49037	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
25	Polygon	1.380898	6.798509	27	26	49	017	Garfield	06	County	49017	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
26	Polygon	0.875574	4.571133	28	27	49	021	Iron	06	County	49021	7	33779	12059	Iron	2	51	1.50981
27	Polygon	0.639304	3.587616	29	28	49	053	Washington	06	County	49053	18	90354	41475	Washington	4	131	1.44985
28	Polygon	1.081238	5.988827	30	29	49	025	Kane	06	County	49025	8	6046	3316	Kane	2	40	6.61594

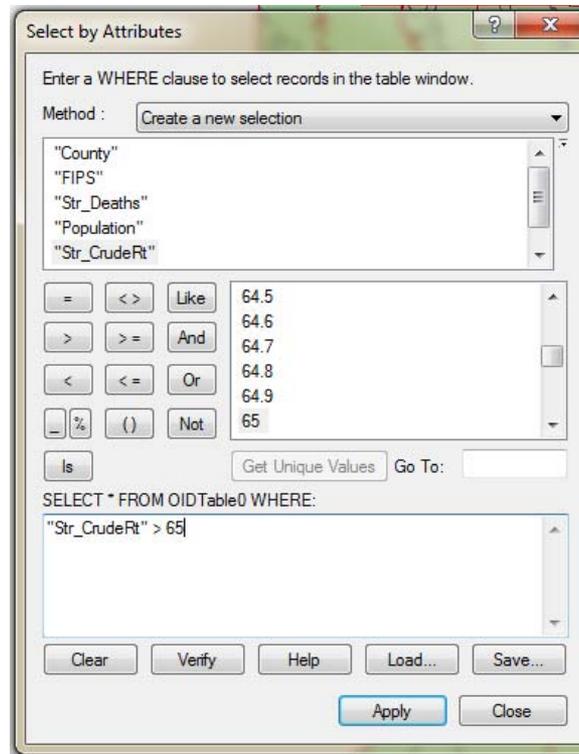
Record: 1 | Show: All Selected | Records (0 out of 29 Selected) | Options

- Does your table have a primary key?
- What type of join are you doing?
- Are the data types the same?

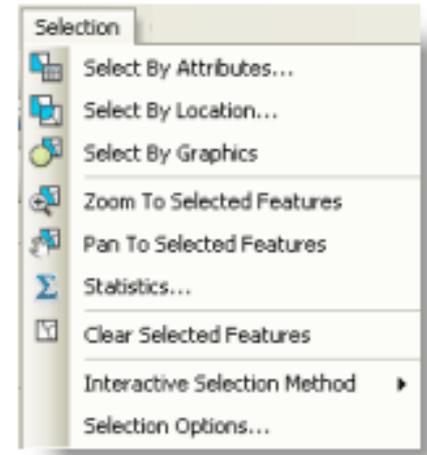


Attribute Selections

- Find features that meet a criteria
- Create a new layer based on a query
- Calculate statistics on a sample of features

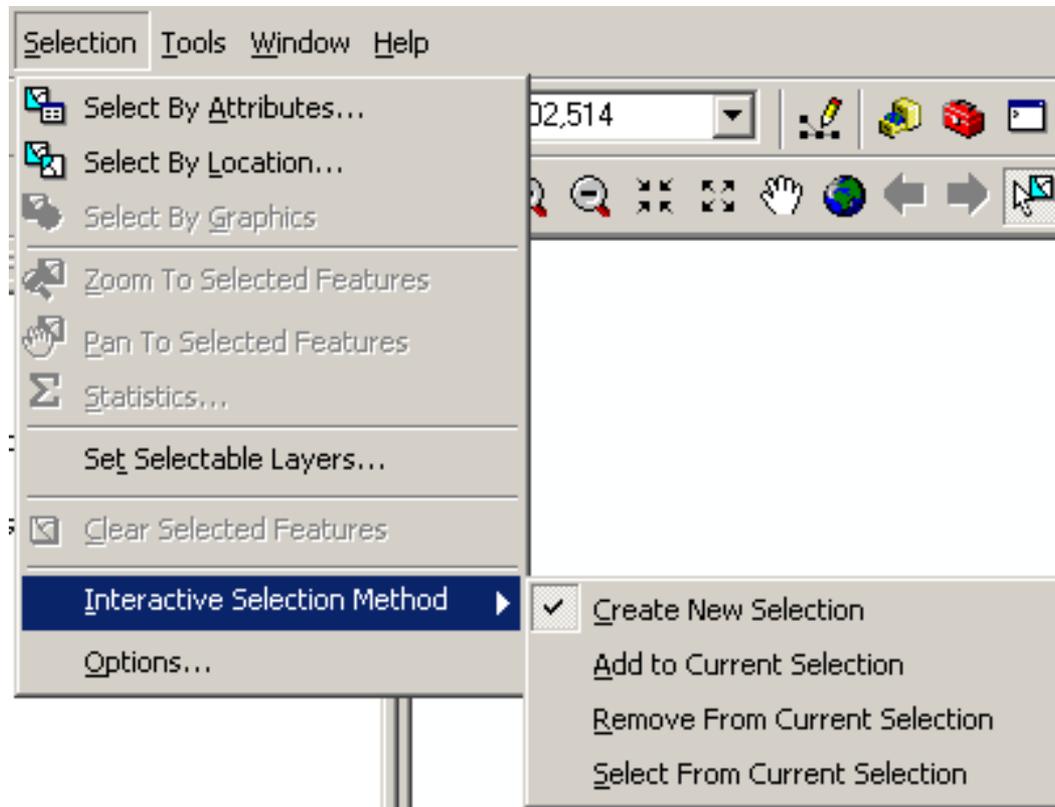


- Accessible through the 'selection' menu
- Tools allow different types of selections
- Zoom to, pan to, and statistics

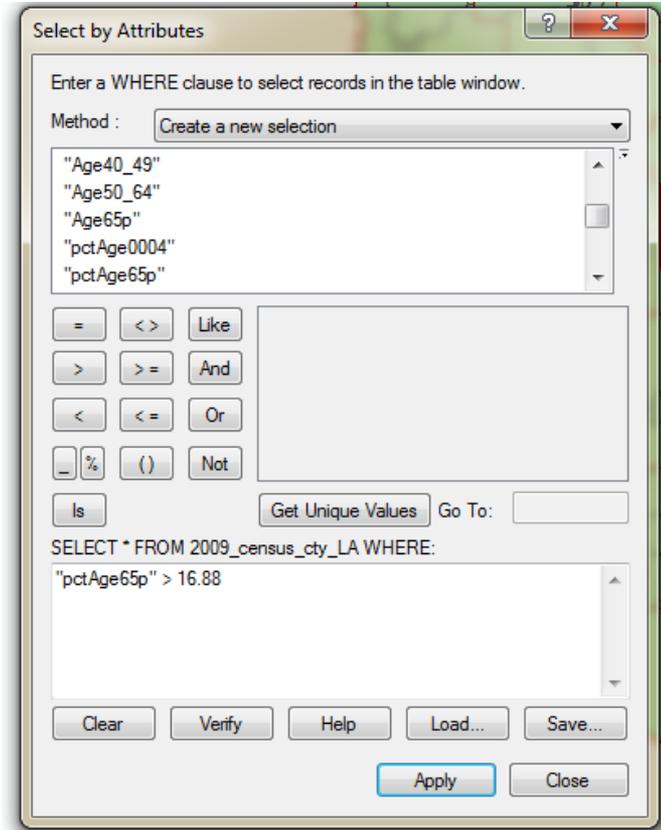
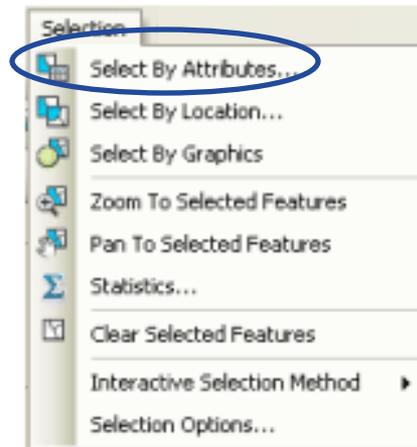


- Determine which layers can be selected
- Good if you have many layers in one project
- Displays number of selected features and display expression

- **Create new**
- **Add to current**
- **Remove from current**
- **Select from current**



- Simple data query
- Uses query statements
- Ex: Show me all the features with more than 10 percent of total population ≥ 65 years



- Selection
- Select By Attributes...
- Select By Location...
- Select By Graphics
- Zoom To Selected Features
- Pan To Selected Features
- Statistics...
- Clear Selected Features
- Interactive Selection Method ▶
- Selection Options...

10.0 North America Geoc <Type an address...>

Table - 2009_census_cty_LA

Stroke_Deaths_all_ages\$

County	FIPS	Str_Deaths	Population	Str_CrudeRt	Str_AdjRt
Autauga County, AL	1001	126	239458	52.6	68.2
Baldwin County, AL	1003	472	809829	58.3	46.6
Barbour County, AL	1005	101	147095	68.7	63.2
Bibb County, AL	1007	142	106412	133.4	135.4
Blount County, AL	1009	142	275166	51.6	49.8
Bullock County, AL	1011	42	54884	76.5	69.5
Butler County, AL	1013	86	101723	84.5	62.2
Calhoun County, AL	1015	351	560218	62.7	55.9
Chambers County, AL	1017	220	175563	125.3	92.6
Cherokee County, AL	1019	92	121654	75.6	59.9
Chilton County, AL	1021	128	207159	61.8	64.6
Choctaw County, AL	1023	76	72981	104.1	81
Clarke County, AL	1025	112	133911	83.6	71.7
Clay County, AL	1027	59	69382	85	59.3
Cleburne County, AL	1029	52	72076	72.1	66.1
Coffee County, AL	1031	131	226345	57.9	50.7
Colbert County, AL	1033	170	272043	62.5	49.1
Conecuh County, AL	1035	58	66310	87.5	67.3
Coosa County, AL	1037	46	55331	83.1	67.3
Covington County, AL	1039	172	183117	93.9	63.7
Crenshaw County, AL	1041	62	68176	90.9	67
Cullman County, AL	1043	262	396065	66.2	56.9
Dale County, AL	1045	95	242017	39.3	39.5
Dallas County, AL	1047	178	218042	81.6	74

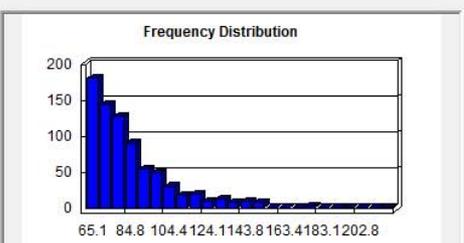
Selection Statistics of Stroke_Deaths_all_ages\$

Field: Str_CrudeRt

Statistics:

- Count: 763
- Minimum: 65.1
- Maximum: 216.2
- Sum: 66312.2
- Mean: 86.90983
- Standard Deviation: 21.076244

Frequency Distribution



65.1 84.8 104.4 124.1 143.8 163.4 183.1 202.8

(763 out of 2048 Selected)