Leveraging the *What* of Geographic Data

GIS I: Organizing Principles

Learning Objectives

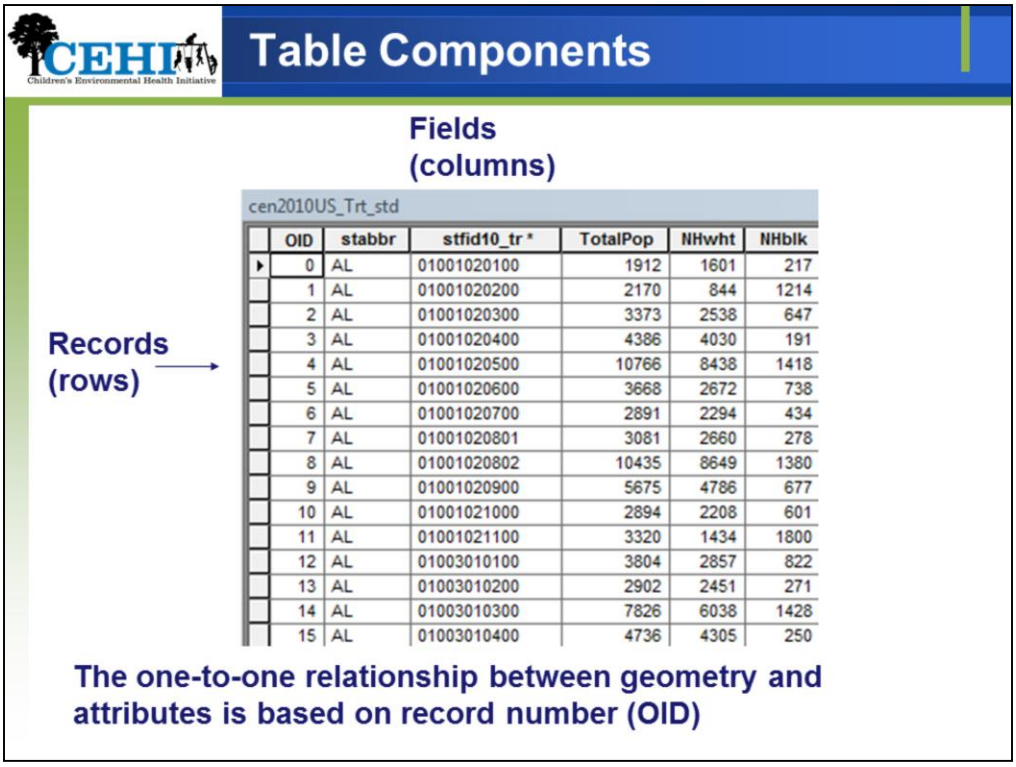
- Describe the tabular attribute structure for spatial data
- Discuss common table operations
- Perform table join and query operations

Review: Geographic Data?

Components

- Spatial
  - *Geometry or shape of an object*
  - *Where it is located*
- Attributes
  - *Tabular data*
  - *What it is*

OWNER_ST	LANDUSE_DE	PHYS_ADD	CONSTTYP	YEARBUILT
MD	VAC AG/ 10 ACRES OR >	0 OLD OXFORD RD		0
NC	VAC AG/ 10 ACRES OR >	0 RED MOUNTAIN RD		0
NC	PRESENT-USE/AG/RICULTUR	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 BV/SH-2/AV	1985



The dBASE table file contains feature attributes with one record per feature. The one-to-one relationship between geometry and attributes is based on record number.

Attribute records in the dBASE file must be in the same order as records in the main (.shp) file. The dBASE table (.dbf) file cannot exceed 2 GB, thus allowing approximately 70 million point features at most.

Table Components (cont.)

- Columns
  - Must have unique names
  - Can contain different data type (text, numeric, date)
  - Column names limited to 10 characters
  - Allowable column characters: all lower and uppercase alpha, all numeric digits, and the underscore '_' character

	FID	BATCHDATE	DEATHDATE	SEX	RACE	AGE
	39	072009	05072009	2	1	89
	40	082009	05312009	1	2	91
	41	092009	06222009	2	1	64
	42	112009	08052009	1	1	89
	43	112009	08202009	1	1	84
	44	112009	08312009	1	1	86
	45	112009	08222009	1	1	79
	46	122009	09272009	1	1	78

	A	B	C	D
1	Heart_Disease_Mort_FID	Heart_Disease_Mort_BATCHDATE	Heart_Disease_Mort_DEATHDATE	Heart_Disease_Mort_SEX
2	0	42009	2032009	2
3	1	52009	2282009	2
4	2	72009	5012009	1
5	3	72009	5052009	1
6	4	92009	6122009	2
7	5	92009	6252009	2
8	6	102009	7132009	2

	OID	Heart_Dise	Heart_Di_1	Heart_Di_2
▸	0	0	42009	2032009
	1	1	52009	2282009
	2	2	72009	5012009
	3	3	72009	5052009
	4	4	92009	6122009
	5	5	92009	6252009
	6	6	102009	7132009
	7	7	102009	7302009

Table Joins

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

tl_2010_37_tract10

FID	Shape	STATEFP10	COUNTYFP10	TRACTCE10	GEOID10
1158	Polygon	37	001	020100	37001020100
1156	Polygon	37	001	020200	37001020200
1155	Polygon	37	001	020300	37001020300
1152	Polygon	37	001	020400	37001020400
1173	Polygon	37	001	020501	37001020501
1171	Polygon	37	001	020502	37001020502
1175	Polygon	37	001	020601	37001020601
1172	Polygon	37	001	020602	37001020602
1174	Polygon	37	001	020701	37001020701
1196	Polygon	37	001	020702	37001020702
1168	Polygon	37	001	020801	37001020801
1166	Polygon	37	001	020802	37001020802

<Target Table>

cen2010US_Trt_std

OID	stabbr	stfid10_tr *	TotalPop
4811	NC	37001020100	3908
4811	NC	37001020200	4152
4811	NC	37001020300	8063
4811	NC	37001020400	6059
4811	NC	37001020501	3575
4811	NC	37001020502	3782
4812	NC	37001020601	3234
4812	NC	37001020602	2414
4812	NC	37001020701	4519
4812	NC	37001020702	4742
4812	NC	37001020801	1450
4812	NC	37001020802	5857

<Join Table>

Table Joins 2

- Result is the Join Table appended to the Target Table
- Joins are not preserved when ArcMap is closed
- To make a permanent file from joined data, Export Data

Table

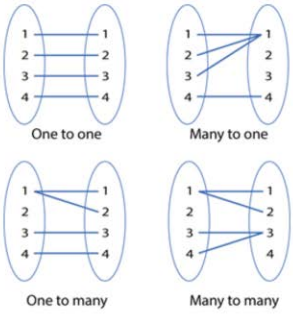
PA_counties

COUNTYFP10	COUNTYNS10	GEOID10	NAME10	NAMELSAD10	OID	stabbr	stfid10_cn *	TotalPop	NHwht	NHblk	NHasi	NHother	Hisp	p
021	01213662	42021	Cambria	Cambria County	10	PA	42021	143679	134073	5073	720	1807	2006	
003	01213657	42003	Allegheny	Allegheny County	1	PA	42003	1223348	986212	159998	33944	24124	19070	
001	01213656	42001	Adams	Adams County	0	PA	42001	101407	91830	1450	737	1275	6115	
061	01213672	42061	Huntingdon	Huntingdon County	30	PA	42061	45913	42197	2369	181	439	727	
039	01213666	42039	Crawford	Crawford County	19	PA	42039	88765	84930	1503	397	1112	823	
045	01209177	42045	Delaware	Delaware County	22	PA	42045	558979	397424	108231	26144	10643	16537	
035	01214721	42035	Clinton	Clinton County	17	PA	42035	39238	37618	612	199	372	437	
073	01213676	42073	Lawrence	Lawrence County	36	PA	42073	91108	84872	3448	365	1492	931	
093	01213681	42093	Montour	Montour County	46	PA	42093	18267	17206	237	323	177	324	
117	01209189	42117	Tioga	Tioga County	58	PA	42117	41981	40560	322	181	481	437	
009	01209171	42009	Bedford	Bedford County	4	PA	42009	49762	48535	236	101	440	450	
089	01209184	42089	Monroe	Monroe County	44	PA	42089	169842	119741	20461	3395	3957	22288	
131	01209192	42131	Wyoming	Wyoming County	65	PA	42131	28276	27270	185	94	290	437	
083	01210235	42083	McKean	McKean County	41	PA	42083	43450	41039	1008	191	455	757	
133	01209193	42133	York	York County	66	PA	42133	434972	374779	22493	5336	7967	24397	
049	01209178	42049	Erie	Erie County	24	PA	42049	280566	242787	19485	3036	5740	9518	
051	01209179	42051	Fayette	Fayette County	25	PA	42051	136606	126888	6270	397	2002	1049	
099	01213682	42099	Perry	Perry County	49	PA	42099	45969	44427	284	163	507	588	
085	01213678	42085	Mercer	Mercer County	42	PA	42085	116638	106176	6620	726	1868	1248	

<Resultant joined table>

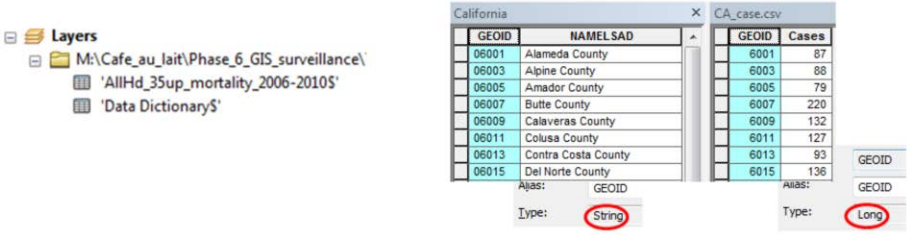
Key Table Join Considerations

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

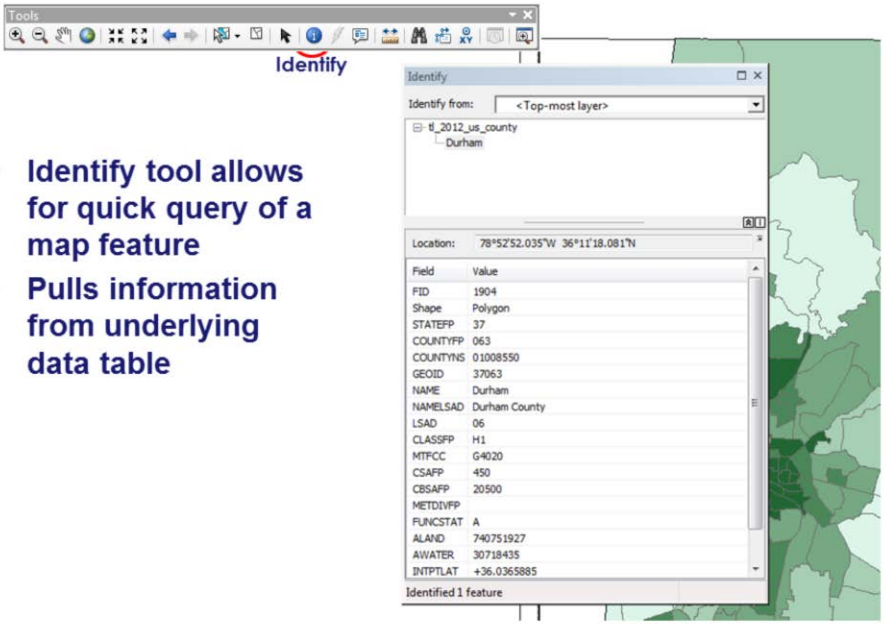


Joining to Excel

- Excel documents work in ArcGIS, but can be a challenge
- .xls work better than .xlsx, .csv work the best
- Remove all formatting from Excel document (colors, merged cells, etc)
- Make sure field names are valid and contain no strange characters or leading numbers
- Export Excel data to .dbf if possible



Identify

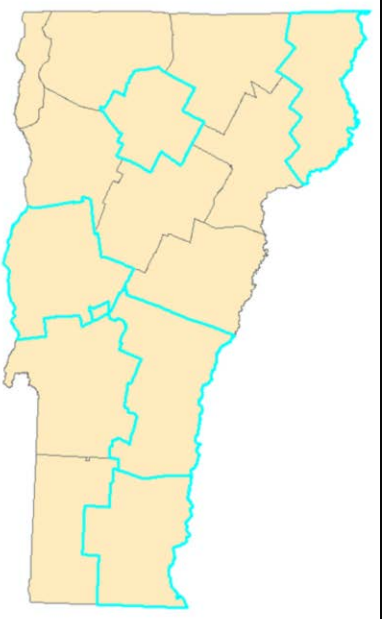


- Identify tool allows for quick query of a map feature
- Pulls information from underlying data table

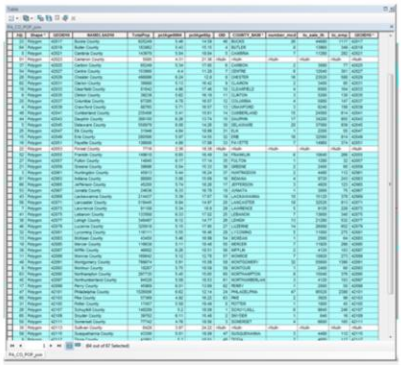
Why Selections?

Select

- Create subsets of data
- Perform actions on specific parts of a dataset
- Highlight features on a map
- Query both tabular and spatial data



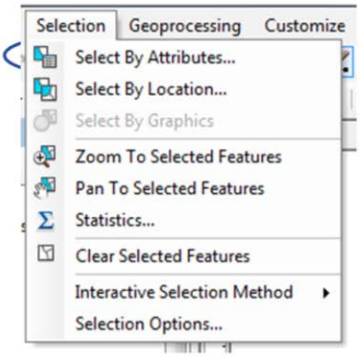
Understanding Selections



- Selections will appear both in the table and on the map
- Selections can be made in a variety of ways
  - Selecting from table
  - Selecting interactively with Select tool
  - Select by Attributes

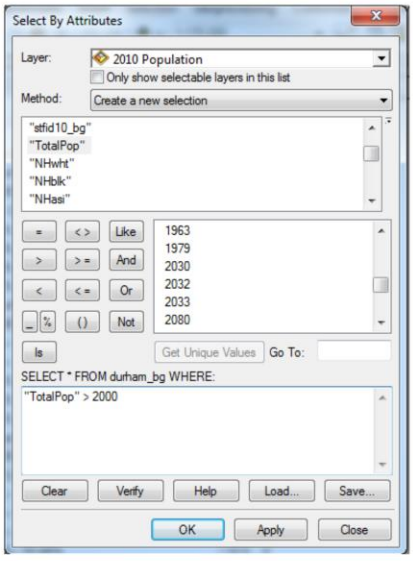
Selection Tools

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



Attribute Selections

- Select features that meet a criteria
- Create a new layer based on a query. Export Data used to create new shapefile from selection.
- Calculate statistics on a sample of features



Selection Statistics

Right click on a column name to open Statistics menu