Census Tutorial: Downloading and Mapping American Factfinder Census Data for use in ArcMap



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Skills covered in this tutorial include:

- Obtaining excel data from the American Fact Finder on Census.Gov
- Obtaining Geography Data from census.gov
- Cleaning Excel Data for Joins
- Joining Excel Data in ArcMap

In this tutorial, we will be obtaining information about housing tenure at the **Census Tract** level from the **2010 Census** for a single county using American Factfinder. You can then use a similar process to download any other Census 2010, American Community Survey, or Census 2000 data for other geography levels and/or for whole states or multiple counties. You have many, many options in American Factfinder – this shows one possible path.

Obtaining Data from American FactFinder (AFF)

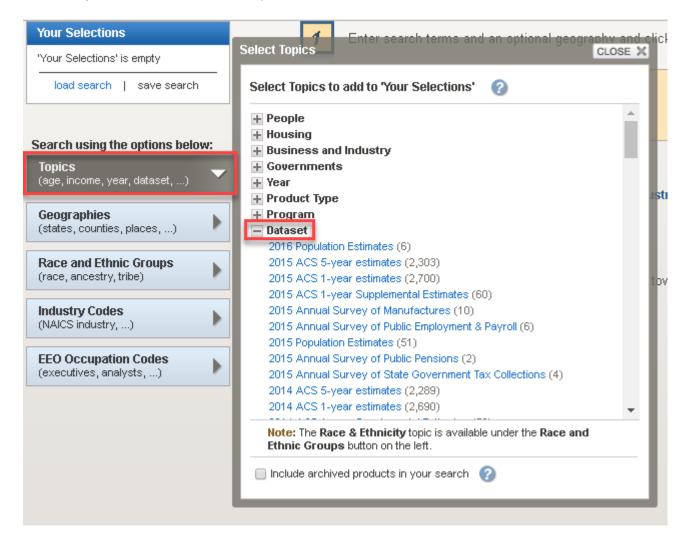
- 1. Data management is critical when dealing with the multiple tables of the Census. Before beginning this tutorial:
 - a. Create a Census 2010 folder in your personal workspace
 - b. Create two subfolders: AFF Data and Census Geography
- 2. Go to the US Census web site http://census.gov
- 3. Click on the *Data* tab → *Data Tools* & *Apps* → select **American FactFinder.** This is the web interface to access census excel/tabular data.

Topics Population, Economy	Geography Maps, Products	Library Infographics, Publications	Data Tools, Developers	Surveys/Programs Respond, Survey Data	Newsroom News, Blogs	About Us Our Research
Latest Informat	tion	Data Tools & Apps	·] _	Developers	N	lobile Apps
Find information us statistics from mul Latest Information		pplications to get	Census Small B	an FactFinder Business Builder: usiness Edition Explorer lats	Interactive Po My Congressi Population Ck State & Count	onal District ock

- 4. Click on Advanced Search and select Show Me All.
 - Community Facts



5. Click on Topics in the left column and expand Dataset.



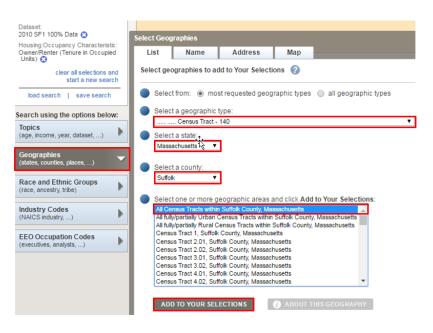
6. Scroll down to click on 2010 SF1 100% Data – this will send this criteria to your Selection box in the upper left of the site:



7. Scroll up in the **Topics** list and click on **Housing.** Then, under *Occupancy Characteristic*, click **on Owner/Renter (Tenure in Occupied Units**).



- 8. <u>Close the **Topics** box in the top right of the box</u>.
- 9. Click on **Geographies** on the left column this brings up *the Select Geographies overlay*.
- Fill out the box so that you are selecting Census Tracts for a <u>specific state</u> and a <u>county in that state</u>. You can follow the example below if you want to select all census tracts in Suffolk County, Massachusetts. Alternatively, you could pick a state and county of your choosing.



11. Be sure to click on ADD TO YOUR SELECTIONS.

12. Close the Select Geographies overlay.



13. Be sure that the **Your Selections** box in the upper left corner contains what you want – the data set, the general topic, and the census geography level for the specific location you want (all tracts, not just one tract). If it does not say this, clear your selections and start over from Step 5 above.

Your Selections
Search using Dataset:
2010 SF1 100% Data 🕄
Housing:Occupancy Characteristic: Owner/Renter (Tenure in Occupied Units) 😳
Census Tract All Census Tracts within Suffolk County, Massachusetts 😋
clear all selections and start a new search

14. You should now have a list of available datasets about housing characteristics. Checkmark one of interest

and see what variables it contains by clicking on the *Information* icon for that table. ⁴⁹ For this exercise, we <u>highly recommend</u> a table with just a few variables. In this exercise, we have used the H11 table for total population in occupied housing.

- 15. After checking a table, click on **Download** (Download) and follow the instructions. This creates a zip file. Save it in your *Census 2010* →*AFF Data* folder.
- 16. Navigate to your AFF folder. Right click on the zipped folder and select *extract here* or open with Power Archiver and extract to AFF folder.

Preparing American Factfinder Data for Use in ArcMap

1. Double-click on both downloaded CSV files to open them:



Note: If you are opening the file from within Excel, you will need to set the option to look for all file types:

2. The "DEC_10...with_ann" file should look something like this.

	A1	-	· (=	f_{x}	GEO.	id			
	А	В	С		D	E	F	G	Н
1	GEO.id	GEO.id2	GEO.displ	D00	L	D002	D003	D004	
2	Id	ld2	Geograph	Tota	I рорі	Owned wi	Owned fre	Renter oc	cupied
3	14000000	2.5E+10	Census Tra	4225	(r 338:	794	231	3200	
4	140000US	2.5E+10	Census Tra	3730	(r338:	828	262	2640	
5	140000US	2.5E+10	Census Tra		3861	857	349	2655	
6	14000000	2.5E+10	Census Tra		2628	799	270	1559	
7	140000US	2.5E+10	Census Tra		2916	941	413	1562	
8	14000000	2.5E+10	Census Tra		5672	851	281	4540	
9	140000US	2.5E+10	Census Tra		3511	868	297	2346	
10	14000000	2.5E+10	Census Tra		3110	447	154	2509	
11	14000000	2.5E+10	Census Tra		2211	444	81	1686	
12	140000US	2.5E+10	Census Tra		4915	682	187	4046	
13	14000000	2.5E+10	Census Tra		3371	818	248	2305	
14	14000000	2.5E+10	Census Tra		3974	264	107	3603	
15	14000000	2.5E+10	Census Tra		4397	474	150	3773	
16	14000000	2.5E+10	Census Tra		2619	90	25	2504	
17	14000000	2.5E+10	Census Tra		4794	447	154	4193	
18	14000000	2.5E+10	Census Tra		7869	907	316	6646	
19	14000000	2.5E+10	Census Tra		1601	11	6	1584	
20	14000000	2.5E+10	Census Tra		720	33	34	653	
21	14000000	2.5E+10	Census Tra		2914	498	168	2248	
22	14000000	2.5E+10	Census Tra		5407	289	60	5058	

3. Now look at the "DEC_10..._metadata" file. This file explains the column header codes in the data file - it should look something like what you see below. This is a very important file!!!

	А	В	С	D	E	
1	GEO.id	Id				
2	GEO.id2	ld2				
3	GEO.displ	Geograph	у			
4	D001	Total population in occupied housing units				
5	D002	Owned wi	ith a mortg	age or a lo	an	
6	D003	Owned fre	Owned free and clear			
7	D004	Renter oc	cupied			

Typically the first data column (D001 here) is the **Universe** of things counted in this table. This table is counting people in occupied housing units. If you wanted to show the % of the population that is in rented housing units, you would divide D004 by D001 and multiply by 100. This process is called "normalizing".

A few important steps left.

- 1. ArcGIS does not like ANY extra characters in the column names. Delete all periods (.) and extra characters (-) in all the **column names/heading**. The <u>only</u> acceptable character is underscores (_).
- 2. The Geo ID in the *Census Tracts polygon attribute table* to which you will be joining this data table is in a text format. **GEOID2** in this file must also be *text* for the join to work properly.
 - a) Click on the tab (B) above **GEOID2** to highlight the entire column.
 - b) Click on the Excel Tab for Data
 - c) Click on Text to Columns:

-	-									
но	DME IN	ISERT PAGE LAYOU	T FORMULAS DATA	A REV	/IEW VIEW					
From Web		m Other Durces v Connections	Refresh All - Connections Connections	2↓ <mark>Z</mark> Z↓ So	7 Filter	Clear Reapply Advanced	Text to Columns		re Data tes Validation - Data To	
	- []	X 🗸 fx 🛛 GE	Oid2		3		Text to Col	umns	-	
4			с		D	E	Split a singl multiple co	e column of lumns.	text into	I
d	GEOid2	GEOdisplaylabel			D001	D002	For example	e, you can se	narate a	
	ld2	Geography			Total popula	t Owned wit		ull names in		
0000	2.5E+10	Census Tract 1, Suffo	lk County, Massachusett	s	4225(r33818)	794	first and las	t name colur	nns.	
000U	2.5E+10	Census Tract 2.01, Su	ffolk County, Massachus	etts	3730(r33819)	828	Vou can ch	oose how to	colit it up	
000U	2.5E+10	Census Tract 2.02, Su	ffolk County, Massachus	etts	3861	. 857		or split at ea		
000U	2.5E+10	Census Tract 3.01, Su	ffolk County, Massachus	etts	2628	3 799	period, or o	ther characte	er.	
000U	2.5E+10	Census Tract 3.02, Su	ffolk County, Massachus	etts	2916	i 941	2 Tell me	more		
000U	2.5E+10	Census Tract 4.01, Su	ffolk County, Massachus	etts	5672	851		10.10		
0000	2.5E+10	Census Tract 4.02, Su	ffolk County, Massachus	etts	3511	. 868	3 297	2346		
0000	2.5E+10	Census Tract 5.02, Su	ffolk County, Massachus	etts	3110) 447	7 154	2509		
0000	2.5E+10	Census Tract 5.03, Su	ffolk County, Massachus	etts	2211	. 444	4 81	1686		
00011	2 5E±10	Consus Tract 5 04 Su	ffolk County, Massachus	otte	/015	. 601	107	1016		

- d) Click **Next** to leave the first setting at Delimited.
- e) Click **Next** to leave the second setting at Tab.

f) In Step 3, change the column data format to **TEXT**, and then hit **Finish**.

ſ	Convert Text to Columns Wizard	- Step 3 of 3	x
	This screen lets you select each co Column data format General Text Date: MDY Do not import column (skip)	lumn and set the Data Format. 'General' converts numeric values to numbers, date values to dates, and all remaining values to text. Advanced	
	Destination: \$8\$1 Data greview		•

3. Census.gov now includes the description of the column under the column heading in the excel sheet (e.g. Under D001 it says Total Population). However, ArcMap does not like this extra row and the text causes the software to read it as a "string" (e.g. text) instead of "double" (e.g. numbers). Therefore, it is necessary to delete this row so that ArcMap realizes that this is a number field and not a text field.

A2 • :	$\land \checkmark Jx$	ια						
Calibri - 11 - A	a`\$ * % * 🖻	С	D	E	F	G	н	I
B I = 🖄 - A -	• .00 .00 → .00		D001	D002	D003	D004		
2 Id Id2	Geography		Total populat	Owned with	Owned fr	Renter occ	upied	
🔏 Cu <u>t</u>	0 Census Tract 1, Su	ffolk County, Massachusetts	4225	794	231	3200		
Depy	0 Census Tract 2.01,	Suffolk County, Massachusetts	3730	828	262	2640		
Paste Options:	0 Census Tract 2.02,	Suffolk County, Massachusetts	3861	857	349	2655		
-	0 Census Tract 3.01,	Suffolk County, Massachusetts	2628	799	270	1559		
r	0 Census Tract 3.02,	Suffolk County, Massachusetts	2916	941	413	1562		
Paste Special	0 Census Tract 4.01,	Suffolk County, Massachusetts	5672	851	281	4540		
Insert	0 Census Tract 4.02,	Suffolk County, Massachusetts	3511	868	297	2346		
-	0. Census Tract 5.02,	Suffolk County, Massachusetts	3110	447	154	2509		
<u>D</u> elete	0 Census Tract 5.03,	Suffolk County, Massachusetts	2211	444	81	1686		
Clear Co <u>n</u> tents	0. Census Tract 5.04,	Suffolk County, Massachusetts	4915	682	187	4046		

Optional Tip – Although you need to delete the 2nd row of text, you can change the column headings to the descriptions if it makes it easier (e.g. Change D001 to Tot_Pop). However, there can be no spaces or periods and the heading needs to be under 9 characters. For excel sheets containing several fields, it's probably easier to refer to the codes later rather than changing all the column headings.

4. To make things easier later, rename the worksheet to something comprehensible, e.g.,

Housing Tenure - the worksheet name will be the identifier in ArcCatalog.

 44
 1400000US25025040100
 25025040100
 Cens

 45
 1400000US25025040200
 25025040200
 Cens

- Housing Tenure
- 5. Very important step **save your modified CSV file as an Excel Workbook (.xlsx)** give it a comprehensible name, e.g., 2010 Census H11_population by housing tenure.xlsx

Note: Your table may have columns, like D001/Tot_Pop, where the data has text values in it (ex: 4225(r33818)). Since ArcMap uses the first eight rows to determine what the data type is for each column (ex: string, float, double, integer, etc.), it is necessary to delete the information in parentheses for it to be mappable as a number.

	A	В	C	D	E	F	G
1	GEOID	GEOID2	Geo_display	Tot_Pop	Own_Loan	Own_Free	Renter
2	1400000US25025000100	25025000100	Census Tract 1, Suffolk County, Massachusetts	4225(r33818)	794	231	3200
3	1400000US25025000201	25025000201	Census Tract 2.01, Suffolk County, Massachusetts	3730(r33819)	828	262	2640
4	1400000US25025000202	25025000202	Census Tract 2.02, Suffolk County, Massachusetts	3861	857	349	2655
5	1400000US25025000301	25025000301	Census Tract 3.01, Suffolk County, Massachusetts	2628	799	270	1559
6	1400000US25025000302	25025000302	Census Tract 3.02, Suffolk County, Massachusetts	2916	941	413	1562

6. Extra step for Alaska, Alabama, Arkansas, Arizona, California, Colorado, and Connecticut. (*Ignore this section if you are not working in these states*)

Some states have FIPS codes that start with a zero, and because Excel removes that leading zero, the table won't join properly unless we put it back on. If you're working in Alaska, Alabama, Arkansas, Arizona, California, Colorado, or Connecticut, you'll have to add that zero back on manually. To add the zero back on, at the beginning of the table, under Column A, at Row2 type in: **=concatenate("0",B2)**.

A2	2 - : 🗙	$\checkmark f_x$	=CONCATENATE("0", B2)
	Α	В	С
1	GEOID	GEOID2	Geo_display
2	CATENATE("0", B2)	25025000100	Census Tract 1, Suffolk County, Massachusetts
3	1400000US25025000201	25025000201	Census Tract 2.01, Suffolk County, Massachusetts
4	140000000000000000000000000000000000000	25025000202	Consult Tract 2.02. Suffally County, Massachusette

4 1400000US25025000202 25025000202 Census Tract 2.02, Suffolk County, Massachusetts

Hit **Enter**. If the result of that formula looks right (i.e. it has a leading zero), copy that cell's formula to the rest of the column.

You're almost done! To keep this compatible with the rest of the directions, copy all of the cells in this new column, and right click on the GEOid2 column. Click the options below "**Paste Special**", choose **Values**, and your leading zeroes should be all set. Ensure your column is still named GeoID2.

Delete the column you added but be sure you still have the fixed GeoID2 column. Save the file!

Final STEP: Save your file and EXIT out of Excel – you CANNOT have Excel open still when you work with this data in ArcGIS!

Obtaining GIS files from Census Geography

Now you need to download the geospatial data, in this scenario you will download "Census Tract polygons".

1. Go to the Census web site (<u>http://census.gov</u>) and click on **Geography** tab and then **Maps & Data.**

Consul	es"				U.S. Department of C	Commerce Blogs
CCIISU	Topics Population, Economy	Geography Maps, Products	Library Infographics, Publications	Data Tools, Developers	Surveys/Programs Respond, Survey Data	Newsroom News, Blogs
	Latest Information		About	Educa	ation	GSS Initia
	Interactive Maps	м	aps & Data	Metropolitan &	Micropolitan	Partnersh
	Reference		Research			

2. Under Geographic Data, select TIGER Products. Then click on Tiger/Line Shapefiles in the TABLE as shown: Geography

Maps & Data	TIGER P	roducto									
Maps & Data Main Page	HGER P	roducts									
laps	TIGER = Topologically Integrated Geographic Encoding and Referencing										
iupo	TIGER products are spatial extracts from the Census Bureau's MAF/TIGER database, containing features such as										
Census Data Mapper	rivers, as well as legal and statistical geographic areas. The Census Bureau offers several file types and an online application. Our products are:										
 Reference 		pplication. Our products are: TIGER/Line Shapefiles - New 2015 Shapefiles									
Thematic			ies								
 Maps Available for Purchase 		<u>ne Geodatabases</u>									
	 <u>TIGER/Li</u> 	ne with Selected Demographic an	<u>d Economic Data</u>								
ata	 <u>Cartograp</u> 	hic Boundary Shapefiles									
 TIGER Products 	 <u>KML - Ca</u> 	rtographic Boundary Files									
Census Geocoder	<u>TIGERwe</u>	<u>b</u>									
 Partnership Shapefiles 	25 Years and	Counting									
 Relationship Files 		tory Map (Part 1)									
 Gazetteer Files 	 Happy 25 	th Anniversary, TIGER									
 Block Assignment Files 											
Name Lookup Tables	IIGER Data	and Product FAQs									
 Tallies 	Which produ	ict should I use?									
■ LandView	Product	Best For	File Format	Type of Data	Level of Detail	Descr Attrib					
	<u>TIGER/Line</u> <u>Shapefiles</u>	Most mapping projectsthis is ou most comprehensive dataset. Designed for use with GIS (geographic information systems)	(.shp) and database files	Boundaries, roads, address information, water features, and more	Full detail (not generalized)	Extens					

3. Click on **2016** and expand **Download** tab. Then click on **Web Interface**.



4. Under Select a Layer Type choose Census Tracts then Submit.

Select a layer type

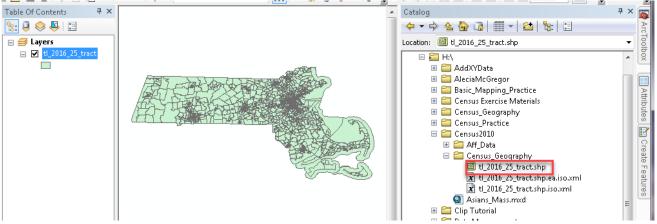
	Census Tracts	•	submit
	Geographic Areas	*	
S	American Indian Area Geography		Division
	Blocks		
	Block Groups		
	Census Tracts		
	Congressional Districts Consolidated Cities		

- 5. Select your State of interest and download the data set it is compressed in a .zip file.
- 6. Save the zip file into the **Census Geography** folder. Navigate to the folder and right click on the zipped file. Select *extract here* or *Extract files* and select the geography folder.

Now you're ready for mapping!

Joining the AFF table to your Census Tract polygons in ArcMap

- 1. Start a session of ArcMap with a blank map.
- 2. Add your Census Tracts geography data set to the map (e.g., tl_2016_25_tract.shp) from your H Drive.

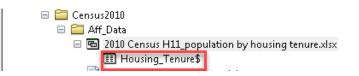


- 3. In the *Table of Contents,* rename *tl_2016_25_tract* to *Census Tracts.* The census naming system for this particular files works as such: tl =tiger, 2016 is the year the data represents, 25 is the state number –aka Mass, and Tract is the unit of the administrative boundary.
- 4. Open the *Census Tracts* polygon attribute table and take a look at it. Which column matches the excel document EXACTLY? The GeoID in the attribute table matches the GeoID2 from the excel table exactly! Therefore, the *GeoID* column is what we will be using for joining our AFF data.

Right-click on GEOID field name and choose Properties. You'll see it is a string type attribute field – that's important to know. Strings are the same as "text", which is why we bothered to change GeoID2 to "text" in excel! Close the table.

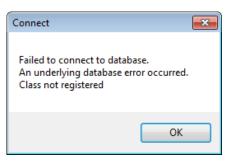
en	sus T	racts							Name:	GEOID
Γ	FID	Shape	STATEFP10	COUNTYFP10	TRACTCE10	GEOI	040	NAMERO NAMEL CADRO	Alias:	GEOID
Г	0	Polygon	25	025	010405	250250	Δ.	Sort Ascending	Type:	String
Г	1	Polygon	25	025	010404	250250	₹.	Sort Descending		oung
1	2	Polygon	25	025	010801	250250		Advanced Sorting	Display	
Г	3	Polygon	25	025	010702	250250		Advanced Sorting	 Turn fiel	d off
Г	4	Polygon	25	025	010204	250250		Summarize	 Make fie	ld read only
1	5	Polygon	25	025	010802	250250	7	Statistics	📃 Highlight	field
Γ	6	Polygon	25	025	010104	250250	4	Statistics	 Number For	mat:
Γ	7	Polygon	25	025	000703	250250		Field Calculator	 Data	
Г	8	Polygon	25	025	000504	250250		Calculate Geometry	Data	
Γ	9	Polygon	25	025	000704	250250		calculate oconterty	Length	11
Γ	10	Polygon	25	025	010103	250250		Turn Field Off		
Г	11	Polygon	25	025	000803	250250		Freeze/Unfreeze Column		
Г	12	Polygon	25	025	980300	250259		Freeze/ Onireeze Column		
Γ	13	Polygon	25	025	120201	250251	×	Delete Field		
	14	Polygon	25	025	120104	250251	-	D		
1							5	Properties		ОК

6. In Catalog, add your American Factfinder table to the map by dragging it in- you need to drill down to the **sheet** level:



7. If you get the following error, it means that your version of ArcGIS and Excel are having connectivity issues. A solution may be to save your Housing Tenure excel sheet as an Excel 97-2003 Workbook (*.xls) or CSV.

Apply



8. In the Table of Contents, open *Housing_Tenure* <u>Table</u> by right-clicking on it and choosing *Open*- very similarly to how you would open an attribute table.

٦	Table						
Γ	🔚 • 🖶 • 🖳 🎦 📲 🗙						
	Housing_tenure\$						
		GeoID	GeoID2	Geography			
Ш		1400000US25025000201	25025000201	Census Tract 2.01, Suffolk County, Massachuse			
Ш		1400000US25025000202	25025000202	Census Tract 2.02, Suffolk County, Massachuse			
Ш		1400000US25025000301	25025000301	Census Tract 3.01, Suffolk County, Massachuse			
Ш		1400000US25025000302	25025000302	Census Tract 3.02, Suffolk County, Massachuse			
ill		1400000US25025000401	25025000401	Census Tract 4.01, Suffolk County, Massachuse			
Ш		1400000US25025000402	25025000402	Census Tract 4.02, Suffolk County, Massachuse			
		1400000US25025000502	25025000502	Census Tract 5.02, Suffolk County, Massachuse			

9. **GEOID2** will be used to join this AFF data to the 2016 Census. Right click on GeoID2 to check its properties. Ensure that it is also a **STRING** type and then close table when done.

If it says **double**, **long or short**, that means you <u>did not convert the data to text in excel</u>. You must reopen the excel file and redo step 2 from the previous section.

10. Right click on your Census Tracts and choose Join & Relates, then select Join...

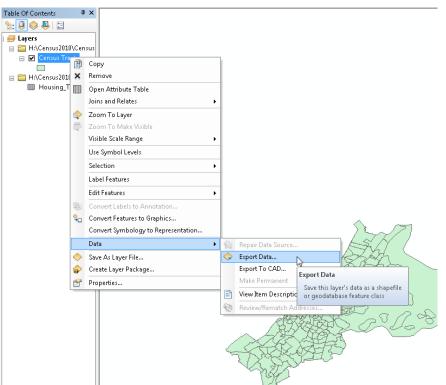
11. Fill in the dialog box as follows – you are joining attributes from a table, using *GEOID* in your Census Tracts layer and *GEOid2* in your AFF table – click OK when done:

Join Data	23				
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: GEOID 2. Choose the table to join to this layer, or load the table from disk: 					
 Image: Housing Tenure\$' ✓ Show the attribute tables of layers in this list 					
3. Choose the field in the table to base the join on:					
GEOID2					
 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.					
Validate Join					
About joining data OK Cancel					

Note: By clicking "Keep only matching records", only Suffolk County will remain visible in the shapefile because we only downloaded census tabular data for this one county in MA. If we select "Keep all records", MA would remain whole, however, the attribute table would only have housing information for the census tracts within Suffolk County. The rest of the census tracts would read "Null" in those joined fields.

- 12. Open *Census Tracts* attribute table to ensure that the join was made correctly. If so, you should see your housing tenure AFF data when you scroll to the right in the table. Close table.
- 13. It is important to know that when you make a join it is not permanent until you EXPORT THE DATA. Until you export, the join is only temporary. If you run any tools on this layer without exporting the data, it will drop the joined data. Exporting the data saves this shapefile as a NEW shapefile, where the join is now permanently part of the attribute table.

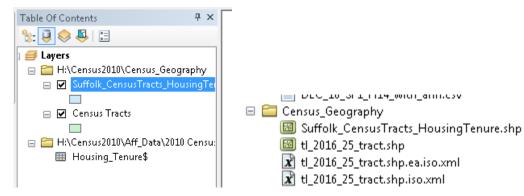
Export the data by right clicking on the census tracts, selecting Data and then Export Data.



14. Save the shapefile with an appropriate name inside the Geography folder (include Census tracts so you know the boundaries and include the location). It can be good to acknowledge exactly what has been joined, especially if you will end up having multiple joined layers. Also make sure to save as a shapefile, otherwise you will encounter an error.

Export Data	
Export: All features	Savino Data
Use the same coordinate system as: this layer's source data	Look in: Census_Geography
(a) the data frame	I 1_2016_25_tract.shp
 the feature dataset you export the data into (only applies if you export to a feature dataset in a geodatabase) 	
Output feature class:	
H:\Census2010\Census_Geography\Suffolk_CensusTracts_Housing	
	Name: Suffolk_CensusTracts_HousingTenure.shp Save
	Save as type: Shapefile Cancel
OK Cancel	File and Personal Geodatabase feature classes Shapefile Database feature classes

- 15. Exporting data is always good practice to ensure something is permanent. It also sometimes resolves minor ArcGIS glitches, such as layers not drawing on the map.
- 16. Now before hitting OK you will need to decide if you want to save this new shapefile to the coordinate system it came with (2016 Census Data uses GCS_North_American_1983), or if you have already put the data frame into a certain projection you could select data frame (this map ultimately uses NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001). By setting your data frame projection first, this then saves you the step of projecting your data later!
- 17. Press ok and then click yes when asked if you want to add the exported the data to the map as a layer. Now, you should see a new layer in the Table of Contents with your given name. It has also been added to the Catalog!



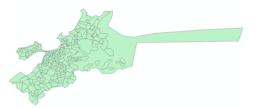
 Since you have saved this join as new shapefile, you can remove the join from the original Census Tracts Shapefile. Right click on Census Tracts, and click Joins and Relates and then Remove Join(s) → Housing_Tensure\$.

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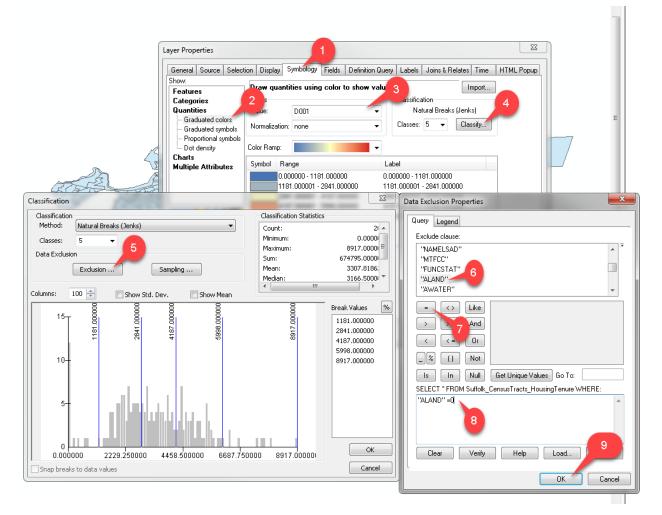
- 19. When you do this, it removes the excel data and the shapefile reverts back to all of Massachusetts. The reason why you would want to remove the join is so you can join a new or different tabular dataset to this shapefile without having to download it again from the census!
- 20. After you remove the join from the original Census Tracts layer, turn the layer off. You are done working with this one.

Removing Water Only Census Tracts

One tip – if your area of interest is near water or has water features in it (like Boston), your tract data will extend into the water. Why? Because people live on islands and on boats, and census tracts includes those areas! However, we don't always want to map them, so let's remove them.



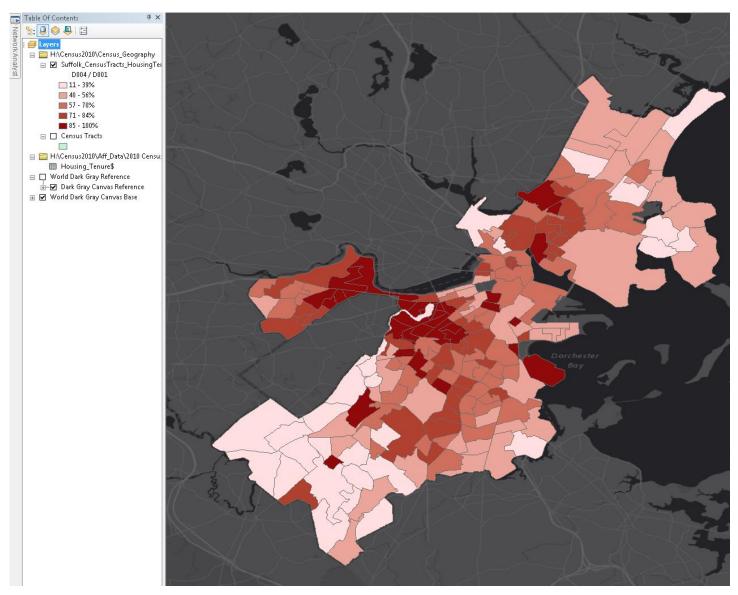
- 1. To get rid of the water tracts from your new shapefile, **Suffolk_CensusTracts_HousingTenure**, go the layer's **Symbology** tab in properties.
- 2. Click on *Quantities* and choose the variable **D001** (or Tot_Pop if you renamed it in excel first).
- 3. Then click on *Classify*.
- 4. In the *Classify* dialog box, click on **Exclusion**. You can exclude all census tracts where the **land area is equal to0** (no land aka only water), and hit OK. These steps are outlined below:



- Now you can make a map of your data in symbology which will no longer include census tracts that are only water. If you are unfamiliar with mapping numeric values using symbology, see the <u>ArcGIS 10.2 online help</u> – <u>About Symbolizing Layers to Represent Quantity</u>.
- 6. Now is a good time to save, with all your data ready to be mapped.

Here is an example of a map showing the percent of people in rental housing units for each tract in Suffolk County (population renting normalized by total population in housing units). The map is using the "Dark Gray Canvas"

option from ESRI's basemap choices (Click on File \rightarrow Add Data \rightarrow Add Basemap to get this option). If you add the basemap, turn off the Reference Layer (aka labels) because they don't look great.



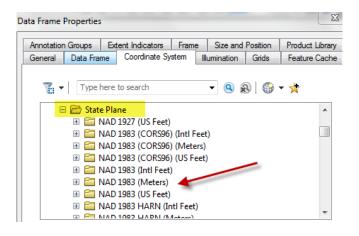
Note: Do not just accept the default colors. Play around with the different color schemes!

Setting a Projected Coordinate System for your Map

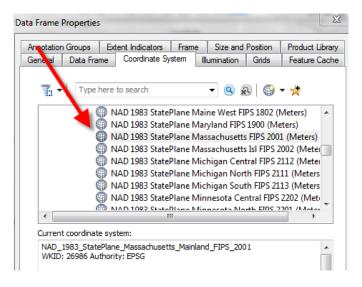
It is good cartographic practice to put your map into a projected coordinate system. The TIGER data is in a geographic coordinate system (GCS) and can appear stretched in an odd way on your map. You can fix this problem by setting a projected coordinate system appropriate for your region.

You will need to know the best coordinate system to use for your area. In the case of Massachusetts, we will use the Massachusetts State Plane (NAD83) – meters coordinate system. If you don't know what coordinate system to use, use <u>this resource</u>. It is a quick read that gives you an understanding of what needs to go into selecting a projection, and at the end provides a table.

- 1. Click on View → Data Frame Properties.
- 2. Click on the Coordinate System tab.
- 3. Scroll down till you find the **Projected Coordinate Systems** folder. Make sure you are not still in the *"Geographic Coordinate System"* folder.
- 4. Scroll down to the State Plane folder open that folder and select NAD 1983 (Meters) from the list:



5. Find NAD_1983_StatePlane_Massachuestts Mainland (not Isl which means Islands) and click on it:



6. Click **OK** and click **Yes** when warned that the coordinate system is different from the data in your maps.

You're done! You have successfully downloaded American Fact Finder data (AFF) and joined it to Census Geography data in ArcMap. This routine of data search and prep might sometimes take longer than creating the map, but doing it correctly is important to assure that conclusions drawn from its map(s) are sound.