

US Census Bureau TIGER/Line Shapefiles

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Good Morning, I'd like to thank MEGUG for inviting me today.

Goals

- Background of TIGER files
- Shapefiles
- How you can use shapefiles
- The limitations of shapefiles
- Types of shapefiles available and where can you find them
- Schedule
- How to connect census data to shapefiles
- How to compare 2000 and 2010 tracts



Today I'm going to discuss the following information, 1. TIGER, including a background or history, and an update on the realignment of the files. Next I'll talk about shapefiles, how to use them, their limitation, the types of census shapefiles available, where you can find them and a schedule of release. And then finally I'll discuss how to connect shapefiles to census data (like AFF data).

TIGER Background



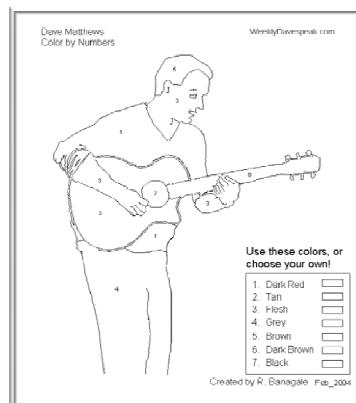
- Digital database
- Adapts the theory of topology
- National coverage



Before we begin lets take about the TIGER/Line shapefiles, I should provide you with a little background on the TIGER files. TIGER/Line files are not maps!!! The TIGER files are a digital database, an organized collection of data for the purpose, in the case to assist the census bureau with performing our job, counting everybody in the right place. The TIGER/Line shapefiles are extracts from the TIGER database. TIGER stands for Topologically Integrated Geographic Encoding and Referencing. The TIGER files adapts the theory of topology. Think of topology as the structure of the TIGER database that defines the locations and relationship of all the features in the database to each other as well as geographic entities that we tabulate data too. The TIGER file is a National database. There's lots of information on the TIGER/Line files on our TIGER web page off of the home page.

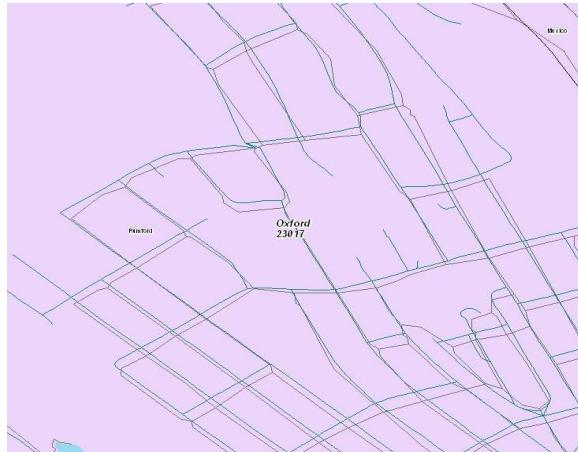
2010 Census TIGER/Line shapefiles

- Extracts from the TIGER/Line files
- Designed for use with GIS software



Census Bureau TIGER/Line Shape files are extracts of selected geographic and cartographic information from the Bureau's MAF/TIGER database. The TIGER/Line shape files are designed for use with GIS software. The GIS software provides you with the tools to make maps. Think of it like this. Everyone remembers the color by number paint sets. Well think of shapefiles as the outline between the areas and as the number that fills in an area. The numbers tell us the color and we can think of that like census data.

TIGER has been spatially enhanced



We just completed the Census. Prior to the Census beginning in 2003, we hired the Harris Corporation to spatially enhance the TIGER/Line files as part of our MTAIP. Once completed the TIGER/line features, such as roads, rail and rivers were spatially enhanced to an accuracy of 7.6 meters. The result, a spatially accurate line file that we can use to assist us with census operations, such as GPS map spot collection of housing units, as well as working with partners and provide them with this product which helps with better work performance and easier data sharing. A win/win for all involved. So keep this in mind because now if you attempt to compare a 2000 shapefile with a 2010 shapefile you may have spatial alignment issues. Also keep in mind the number of census blocks in your community most probably increased because the MTAIP added and corrected many road, rail and water features that previously did not exist in our database. In 2000 there were over 8 million blocks in 2010 there are over 11 million blocks in the database. This info is available on our website.

Use Census data w/ TIGER line Shapefiles

- Thematic maps



So now lets go back to our goals. #1. How you can use shapefiles. The possibilities are truly endless. The first thought that comes to mind is creating a thematic map to help you think about what is occurring along the landscape. Heres a thematic map of the number housing units by block in Rumsford, ME.

- Research and analysis
- Environmental
- Social
- Economic



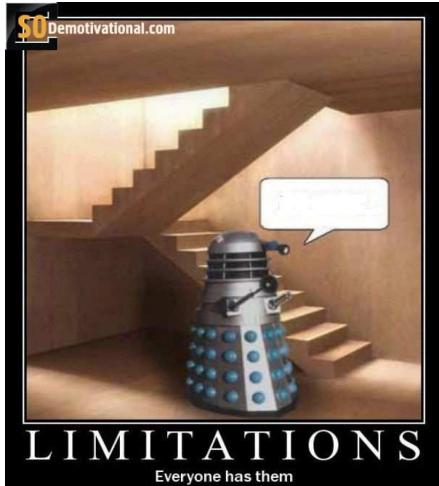
We don't often work on end product maps other than for census purposes and programs (delineations, assignment areas based on pop so we can determine the costs of the program), but over the years I have heard about people using our data for a variety of purposes.

The first thing that comes to mind is using census data and maps to research and analysis ideas. For example, an Environmental example I heard of: # of HU's in a block or block group to help understand how septic sewage effects water quality.

Social example: Race to make decisions on where to place a business. Information on age, senior citizens, may help a community determine where to place a nursing home.

Economic example: Block grant information is based on HU and population numbers by block. Demographic information to help cite a business. So just think of all the possibilities that a map with demographic information may help with any task that you are doing.

Shapefile Limitations



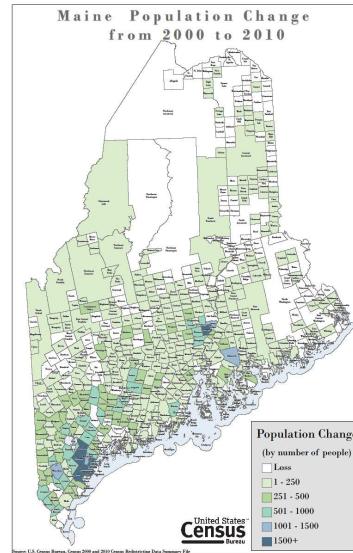
- Limited attribute information
- May have to manipulate your external data
- Only as good as the tools used to create them.



1. TIGER/Line files have limited attribute information.
2. Which means that you have to manipulate your external data and then attach that data to the shape files
3. Shape files are only as good as the tools used to create them. No warranty, expressed or implied, is made with regard to the accuracy of the data in the TIGER/Line Shapefiles.

SHAPEFILES USAGE

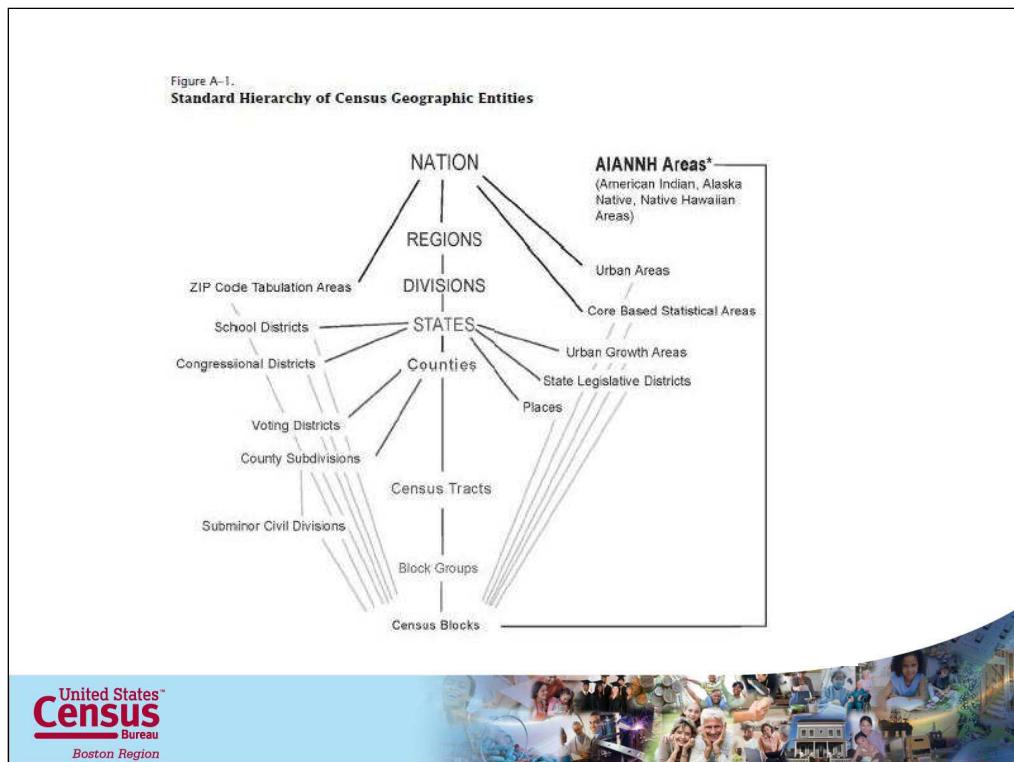
- Internal Census Operations
- External Census Projects



Internal: we used extracts of the TIGER/Line file (shapefiles) to help us with a variety of census projects and program. For example, we determine the best location of our LCO offices with the help of shapefiles, within the LCO we delineated, assignment areas based on pop so we can determine the costs of the program.

External: Many of the projects and programs that we worked with local communities involved in some form the use of shapefiles. For example, the LUCA, NC, Redistricting, PSAP. All projects we performed with local governments also used shapefiles.

The Census Bureau began releasing shapefiles in 2007 because the shapefile became a standard file for GIS applications. Whether were using our own shape files to make thematic maps or using some other source's shapefiles to correct our files, shapefiles have become the primary type of GIS file that we use.



The upside down census tree showing all of the available geographic layers available from the census bureau.

How are shapefiles organized



- Statistical
- Legal



So now lets talk about the type of shapefiles that are available and where you can find them. Census Bureau shapefiles on the internet are organized by legal entities and statistical entities. For example State Legislative districts are legal entities and maps showing tract boundaries are statistical entities.



Statistical Entities



- Blocks and Block Groups
- Census Designated Places
- Census Tracts
- Zip Code Tabulation Areas



United States™ Census Bureau
Boston Region

Statistical Areas
Blocks and Block Groups
Census Designated Places
Census Tracts
Zip Code Tabulation Areas

All of the file types are available for download on our website.



Legal Entities




- American Indian reservations (both federally and state-recognized)
- Congressional districts
- Counties and equivalent entities (except census areas in Alaska)
- Incorporated places
- Minor civil divisions (MCDs, legal county subdivisions)
- School districts (elementary, secondary, and unified)
- States and equivalent entities State legislative districts (upper and lower chambers) Subminor civil divisions (sub-MCDs, in Puerto Rico only)
- Urban growth areas (in Oregon and Washington)
- Voting districts





United States® Census Bureau
Boston Region



Legal Areas

American Indian off-reservation trust lands

American Indian reservations (both federally and state-recognized)

American Indian tribal subdivisions (within legal American Indian areas)

Congressional districts

Counties and equivalent entities (except census areas in Alaska)

Hawaiian home lands

Incorporated places

Minor civil divisions (MCDs, legal county subdivisions)

School districts (elementary, secondary, and unified)

States and equivalent entities State legislative districts (upper and lower chambers)

Subminor civil divisions (sub-MCDs, in Puerto Rico only)

Urban growth areas (in Oregon and Washington)

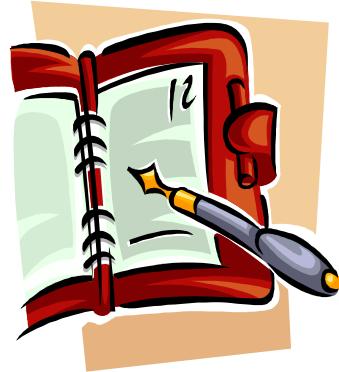
Voting districts

What shapefiles are available and where can they be found?

The screenshot shows the Census Bureau's main website. At the top, there's a navigation bar with links like 'File', 'Edit', 'View', 'Favorites', 'Tools', and 'Help'. Below the navigation is a banner with the text '2010 RESIDENT POPULATION' and the number '308,745,538'. To the right of the banner is a map of the United States. On the left side, there's a sidebar with various links such as 'New on the Site', 'Data Tools', 'American Factfinder', 'Jobs', 'Census Catalog', 'Publications', 'Are You in a Survey?', 'About the Bureau', 'Regional Offices', 'Doing Business with Us', and 'Related Sites'. The main content area has several sections: 'People & Households', 'Business & Industry', 'Geography', 'Newsroom', and 'Special Topics'. Under 'Geography', there's a link to 'Maps - TIGER'. The right side of the page features a 'Data Finders' section with population statistics ('U.S. 311,594,616', 'World 6,926,064,616') and a 'Population Finder' search bar. At the bottom, there's a footer with links to 'Accessibility', 'Information Quality', 'FOIA', 'Data Protection & Privacy Policy', 'U.S. Dept of Commerce', and 'Trusted sites'. The footer also includes a 'Boston Region' logo with a collage of diverse people.

The TIGER/Line Shapefiles are available free to download from our website. Just click on the TIGER link on the Census Bureau's home page. On this TIGER there's also lots of information regarding documentation, history, geography and maps in pdf format. As well as information on the MAF/TIGER Accuracy Improvement Project and how this work increased the # of blocks in our database. In addition there is a page regarding on how to download TIGER/Line Shapefiles, how to download 2010 census, ACS data and other Census data to use with TIGER/Line shapefiles. Including how to join census data to TIGER/Line shapefiles and creating a thematic map. I can show you these webpages on the internet.

Schedule for releasing shapefiles



- 2010 Census Redistricting Data Files
- National Summary File of Redistricting Data
- Summary file 1 by ZIP Code Tab Areas
- 2011 Island Areas Summary File
- 2012 Urban Area Update
- 2013 113th CD Summary File
- Future TBD – PUMS File



The current schedule also is located on the 2010 TIGER/Line Shapefiles Main Page.

Data Product Supported Dates	Geography Released	TIGER/Line Shapefiles Release
1. 2010 Census Redistricting Data (P. L. 94-171) State-based Files to Block for the U.S. and Puerto Rico Completed		
2. National Summary File of Redistricting Data/Summary File 1 National Files Completed		
3. Summary File 1 by 5-digit ZIP Code Tabulation Areas Completed		
4. Island Areas Summary File Island Areas released in 2011		
5. Urban Area Update, Urban Areas released in 2012.		
6. 113th Congressional District Summary File by 113th Congressional Districts released in 2013.		
7. Public Use Microdata Sample (PUMS) File by Public Use Microdata Areas To Be Determined		

How to compare 2000 Tracts/blocks with 2010 Tracts/blocks

http://www.census.gov/geo/www/2010census/tract_rel/tract_rel.html

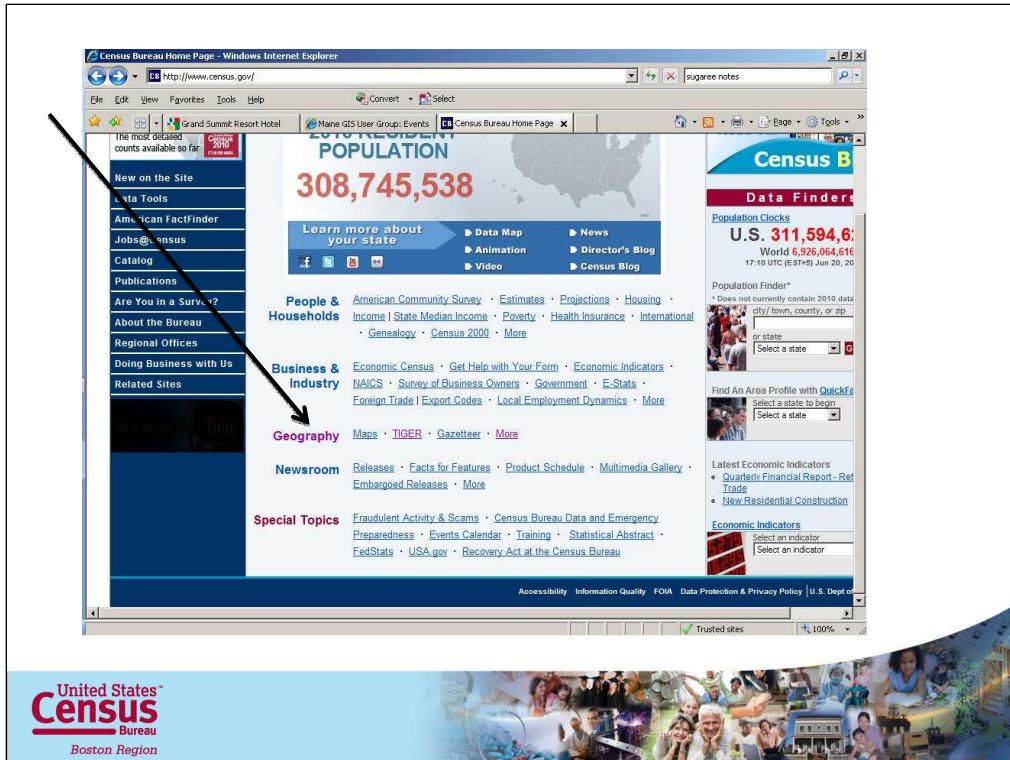


Go to this website

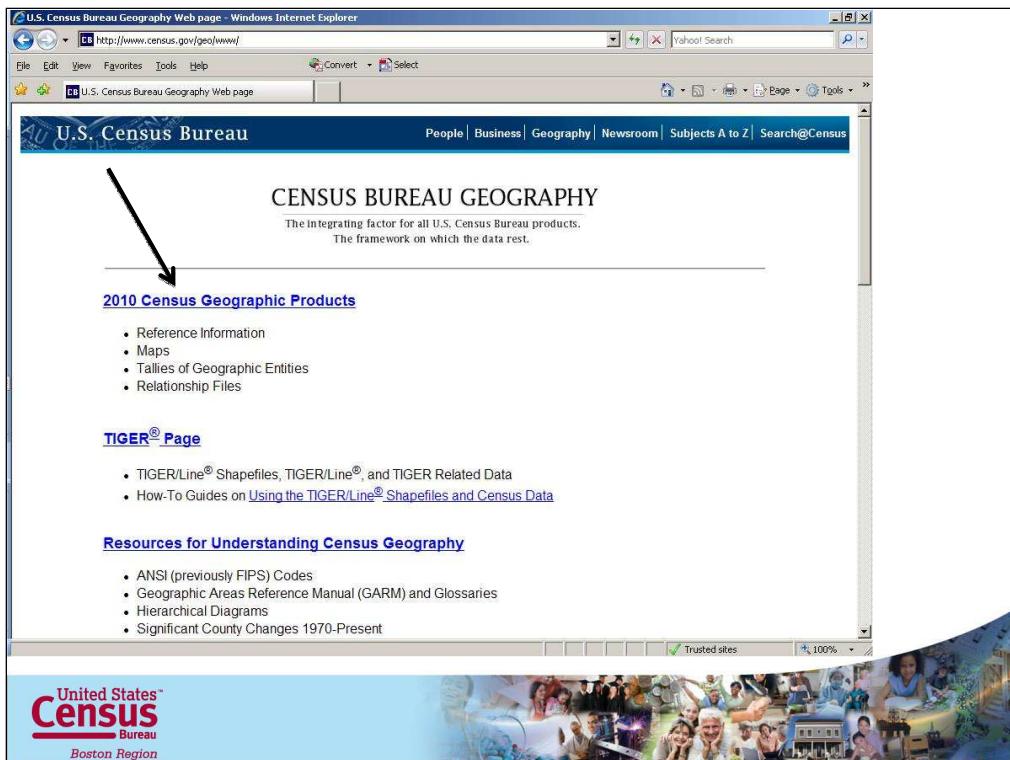
http://www.census.gov/geo/www/2010census/tract_rel/tract_rel.html

Find it by going to the home page, click on the geography link. Now I'll go through a step by step process of view this information on the web.

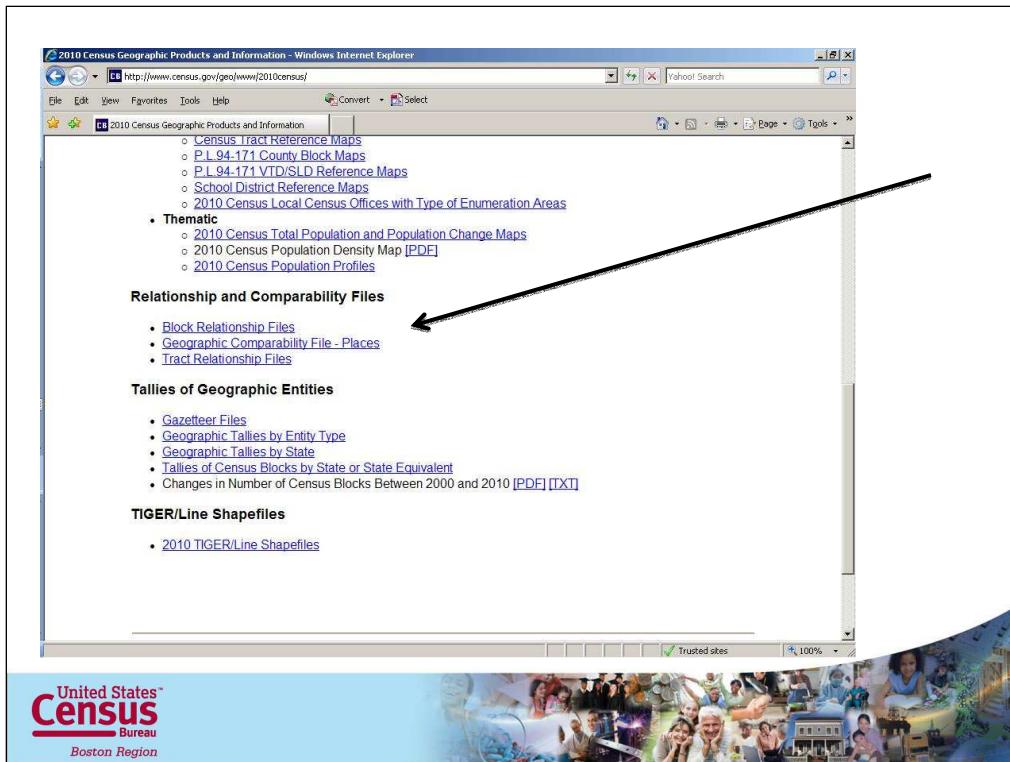
The field labelled "Part00" indicates if the tract is Whole (within) or Part (Part of).



Find it by going to the home page, click on the geography link



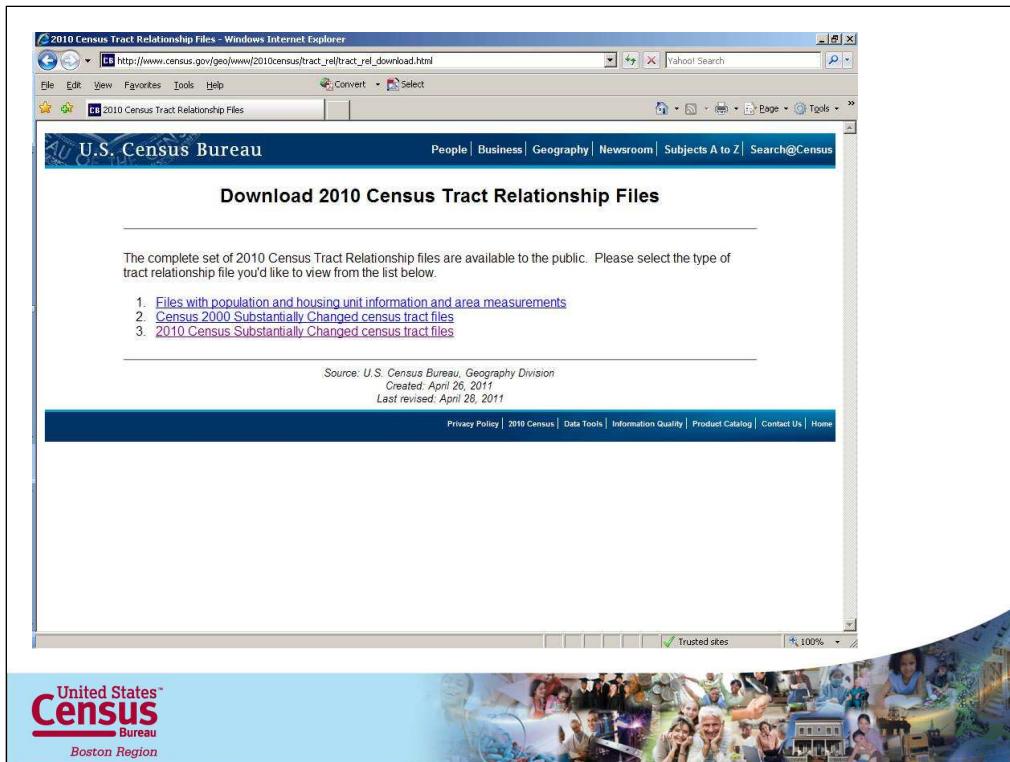
Click on the 2010 Census Geographic Products link



On this 2010 Geographic Products and Information page scroll down to almost the bottom of the page where it says “Relationship and Comparability Files.” Heres where you can choose between information on block or track relationship files.

The screenshot shows a Microsoft Internet Explorer window displaying the "2010 Census Block Relationship Files" page from the U.S. Census Bureau. The title bar reads "2010 Census Block Relationship Files - Windows Internet Explorer". The address bar shows the URL "http://www.census.gov/www/2010census/rel_blk.html". The page content includes a header with links to People, Business, Geography, Newsroom, Subjects A to Z, and Search@Census. Below the header is a section titled "2010 Census Block Relationship Files" with a brief description of the files' purpose. It lists several links: Overview of the 2010 Census Block Relationship Files, 2010 Census Block Relationship File Format, 2010 Census Block Relationship File Record Layout, Download the 2010 Census Block Relationship Files, and Contact Information. At the bottom of the page, there is a footer with copyright information: "Source: U.S. Census Bureau, Geography Division", "Created: January 21, 2011", and "Last revised: February 16, 2011". Below the footer is a navigation bar with links to Privacy Policy, 2010 Census, Data Tools, Information Quality, Product Catalog, Contact Us, and Home. The status bar at the bottom right shows "Trusted sites" and "100%".

Note on this page there is information regarding overview, file format, record layout and downloading the info. The data is available in in ASCII format. This same information is displayed on the 2010 Census Track relationship page. So lets go into the 2010 Census Tract Relationship Files page.



Now you have the choose between viewing the population and housing unit info and area measurements files, or either the 2000 or 2010 census tracts that have substantially changed. Choose one of these.

Download State-Based Substantially Changed 2010 Census Tract Files - Windows Internet Explorer
File Edit View Favorites Tools Help  Select 
http://www.census.gov/geo/www/2010census/tract_yel/sig10.html

U.S. Census Bureau People | Business | Geography | Newsroom | Subjects A to Z | Search@Census

Download State-Based Substantially Changed 2010 Census Tract Files

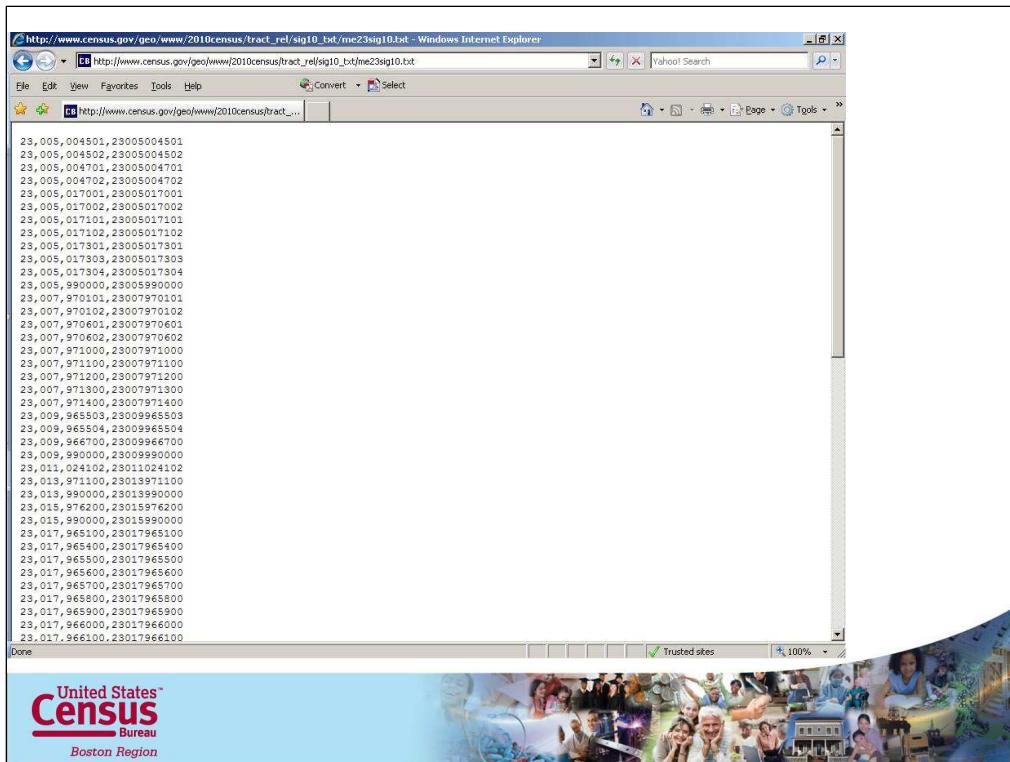
National Text File | Compressed National File

Alabama	Illinois	Montana	Puerto Rico
Alaska	Indiana	Nebraska	Rhode Island
Arizona	Iowa	Nevada	South Carolina
Arkansas	Kansas	New Hampshire	South Dakota
California	Kentucky	New Jersey	Tennessee
Colorado	Louisiana	New Mexico	Texas
Connecticut	Maine	New York	Utah
Delaware	Maryland	North Carolina	Vermont
District of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Hawaii	Mississippi	Oregon	Wisconsin
Idaho	Missouri	Pennsylvania	Wyoming

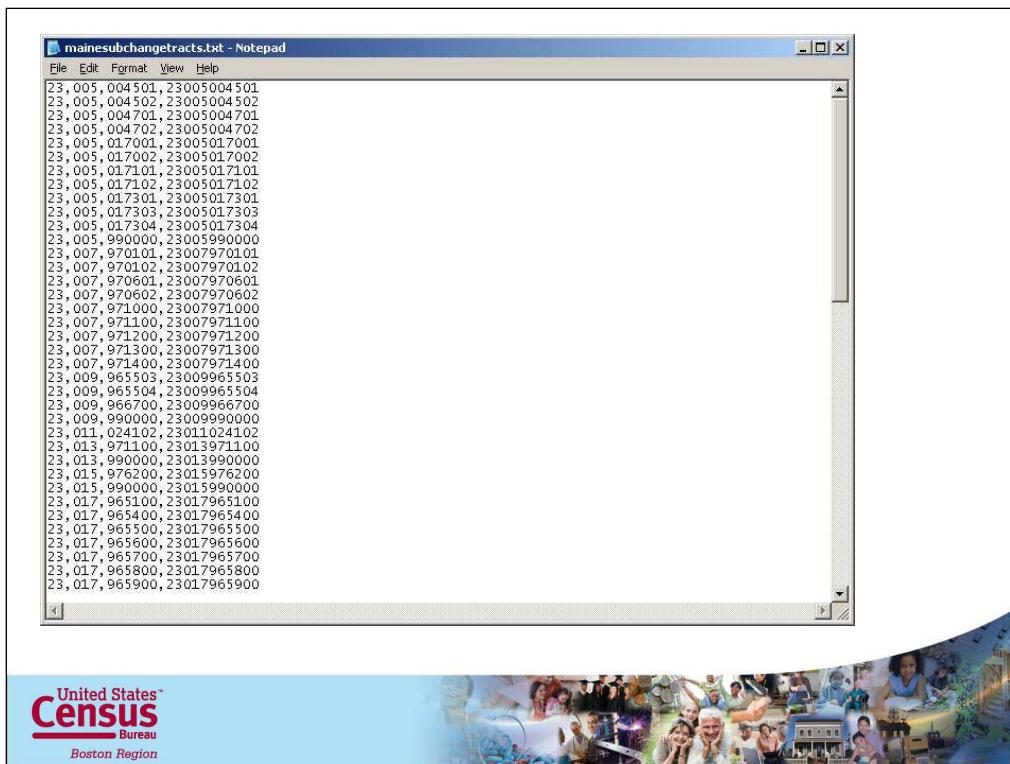
Done California U.S. Census Bureau Community Outreach Trusted sites 100%

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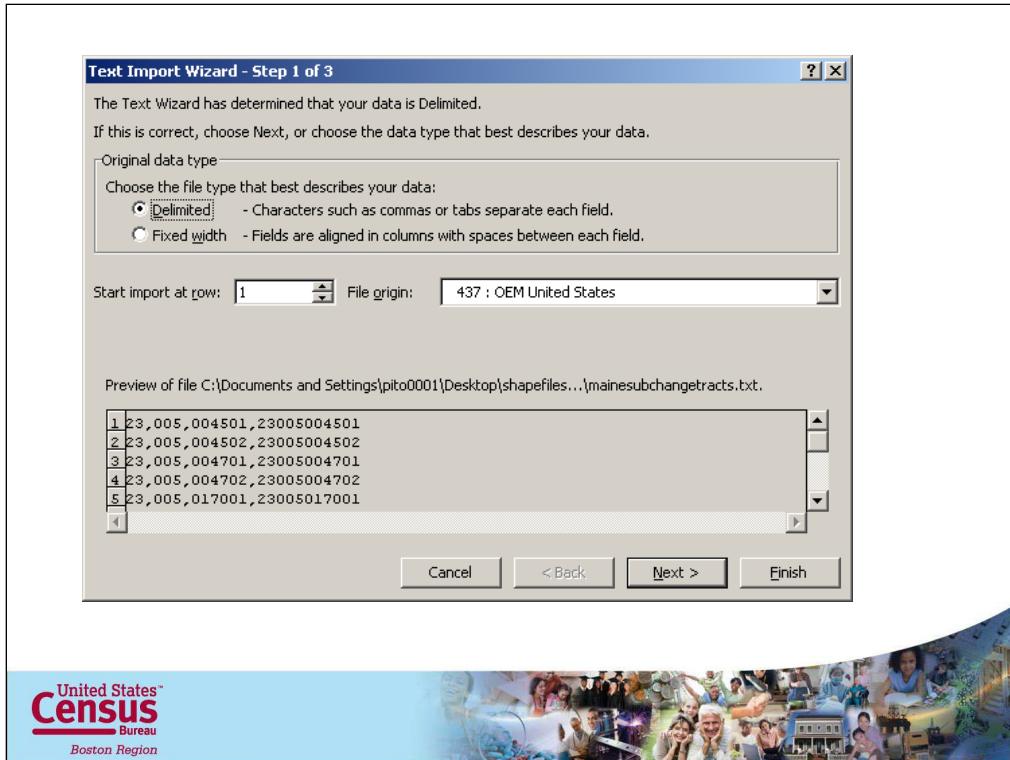
Choose your state: Maine



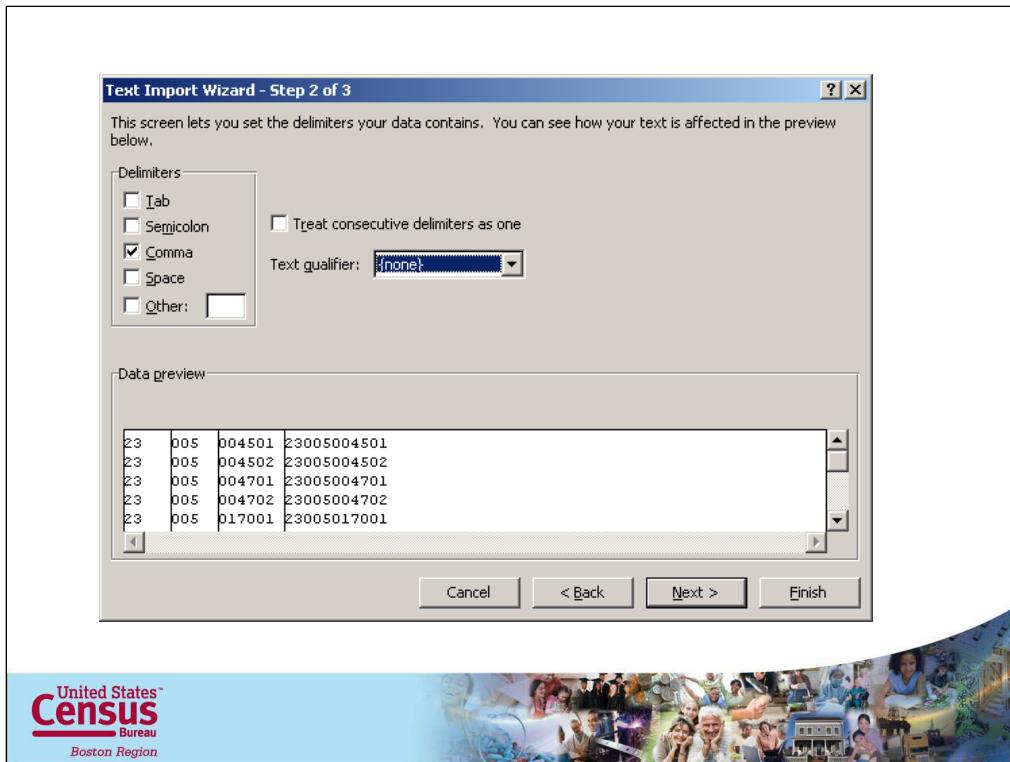
The file will come up as a text file. No worries. Either print this out the way it is or not down only the tracts your interested in, or tag it to your shape file to visually see where the changes have occurred. Keep in mind the fips information. Now lets copy and save it as a text file that we can use to join to our shapefile of tracts for maine. To do that copy and paste the information into a text editor.



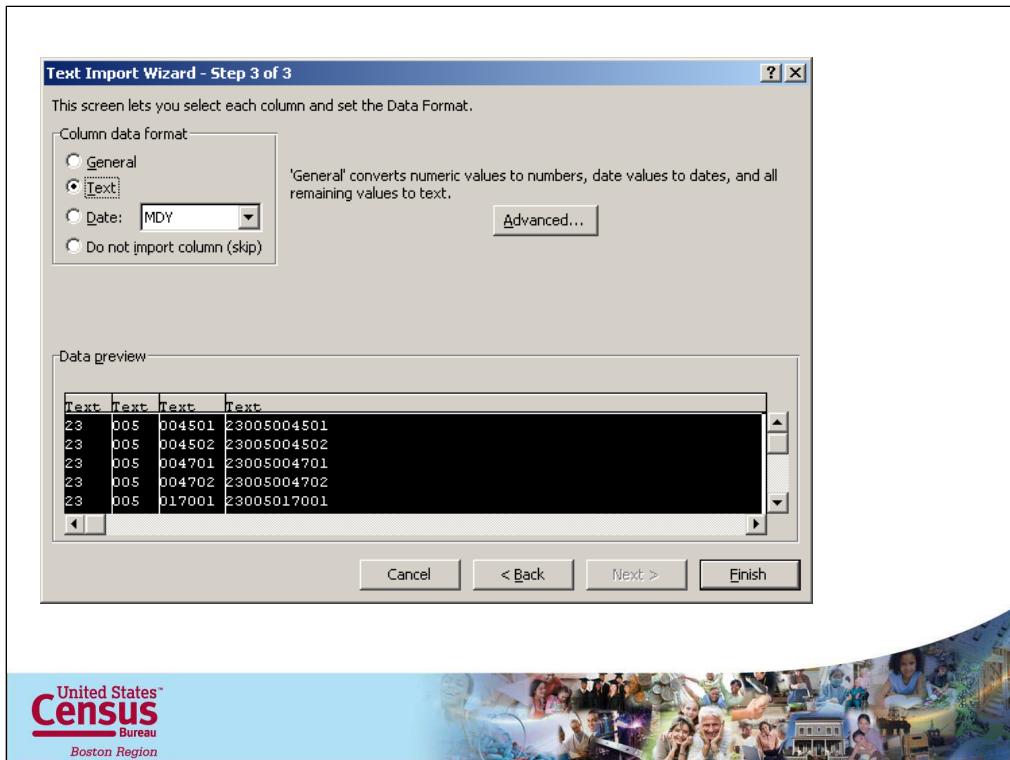
Save it to your hard drive.



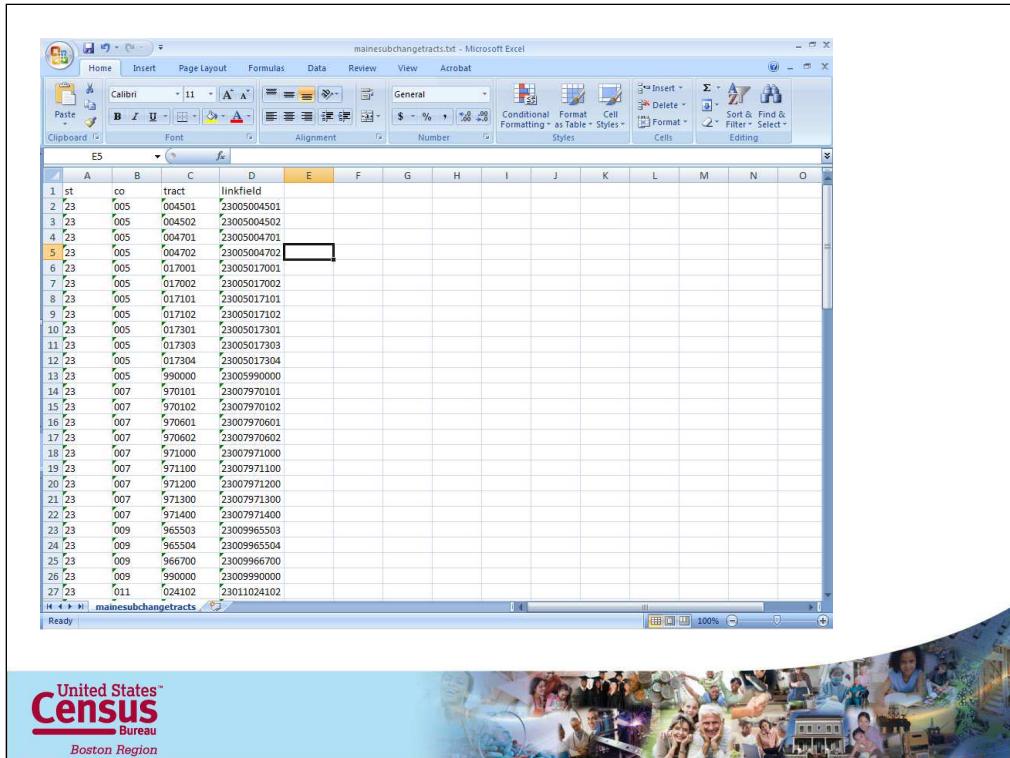
Open excel and open the new text file. This should automatically start the text import wizard. Click Next.



The delimiter should be comma and make sure your text qualifier is none. Click Next.



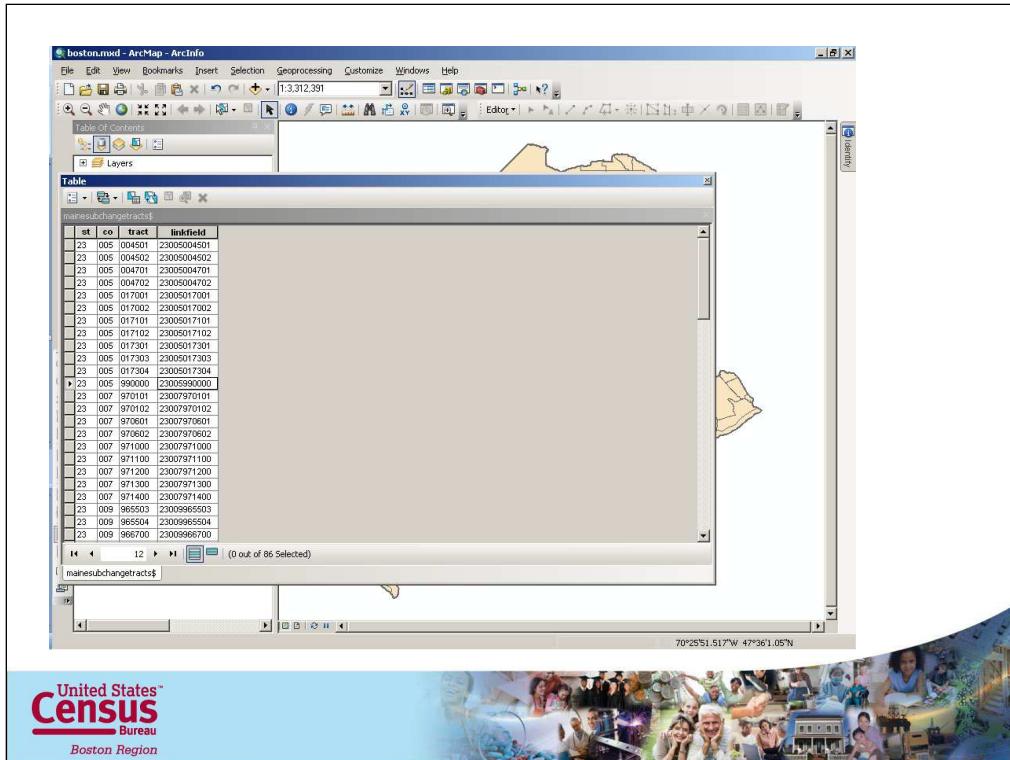
Make sure your fields are formated in text. Click finish.



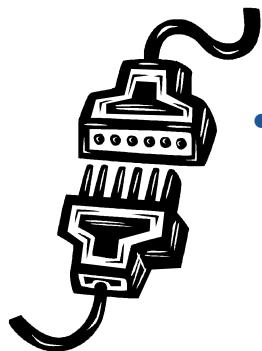
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	st	co	tract	linkfield											
2	'23	005	004501	23005004501											
3	'23	005	004502	23005004502											
4	'23	005	004701	23005004701											
5	'23	005	004702	23005004702											
6	'23	005	017000	23005017001											
7	'23	005	017002	23005017002											
8	'23	005	017101	23005017101											
9	'23	005	017102	23005017102											
10	'23	005	017301	23005017301											
11	'23	005	017303	23005017303											
12	'23	005	017304	23005017304											
13	'23	005	990000	23005990000											
14	'23	007	970101	23007970101											
15	'23	007	970102	23007970102											
16	'23	007	970601	23007970601											
17	'23	007	970602	23007970602											
18	'23	007	971000	23007971000											
19	'23	007	971100	23007971100											
20	'23	007	971200	23007971200											
21	'23	007	971300	23007971300											
22	'23	007	971400	23007971400											
23	'23	009	965503	23009965503											
24	'23	009	965504	23009965504											
25	'23	009	966700	23009966700											
26	'23	009	990000	23009990000											
27	'23	011	024102	23011024102											

United States Census Bureau Boston Region

Wala. Maine substantially changed tracts in text format ready to attach to your shapefile. Make sure you input a header row and type the header names in. If you don't know what to add, the header information is available back at the 2010 census tract relationship files under the link 2010 census tract relationship file record layout. Note our linkfield that's the field we will use to join to our shapefile.

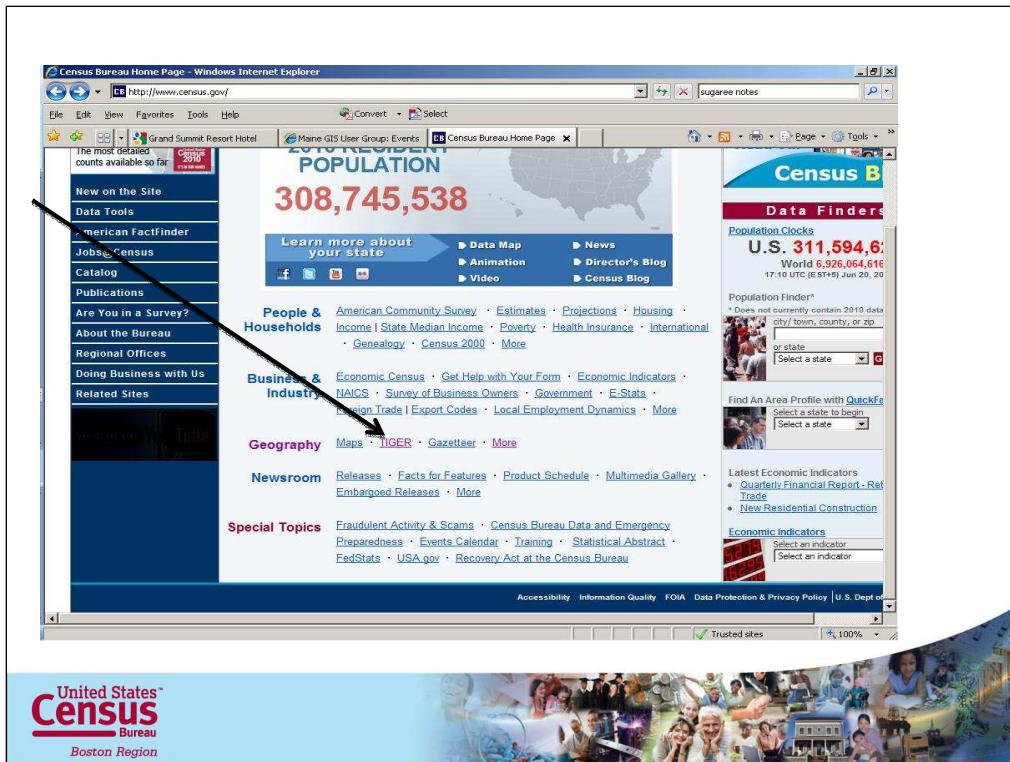


Important save the excel file as a excel 97-2003 workbook. This file type can be opened in ArcMap 10. Bring your tract shape files also. Look at the attribute table for both of the fields to confirm the link field. Heres the maine substantially changed tract text file with the linkfield column.

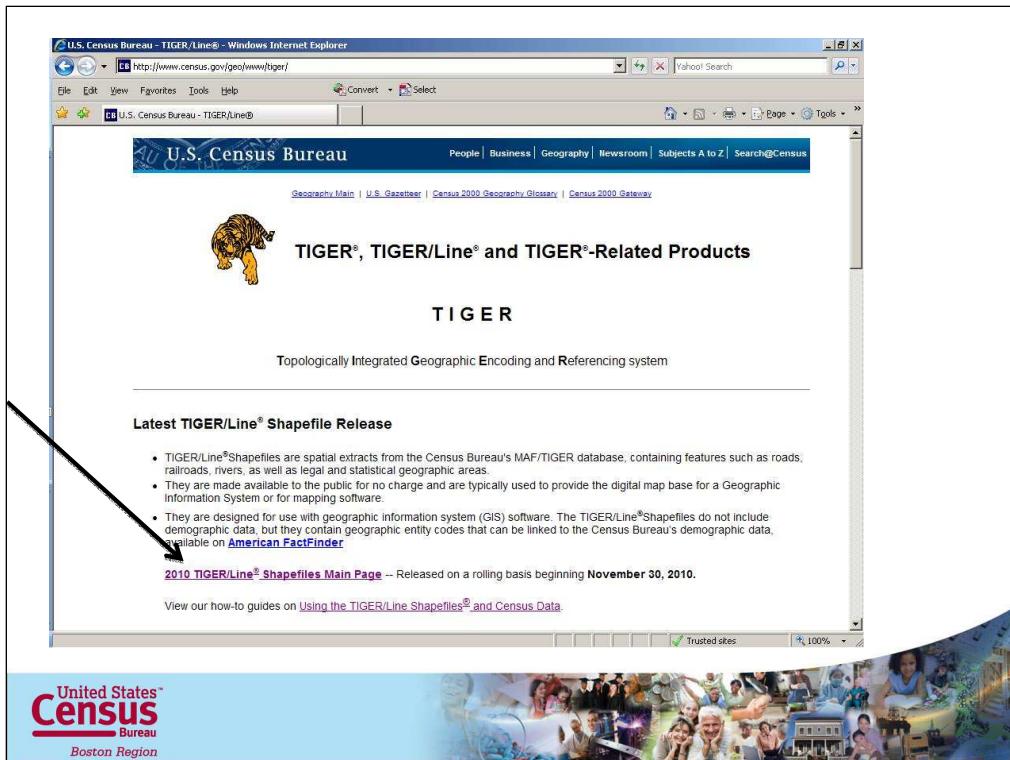


- Now download your shapefiles to link to the data.

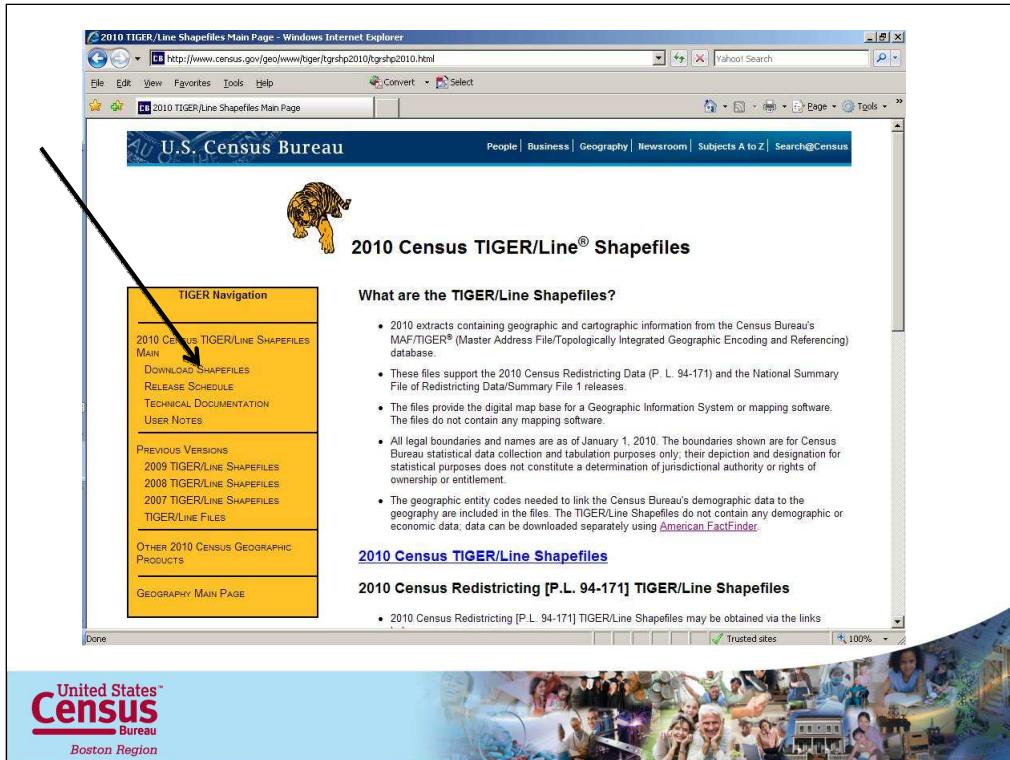




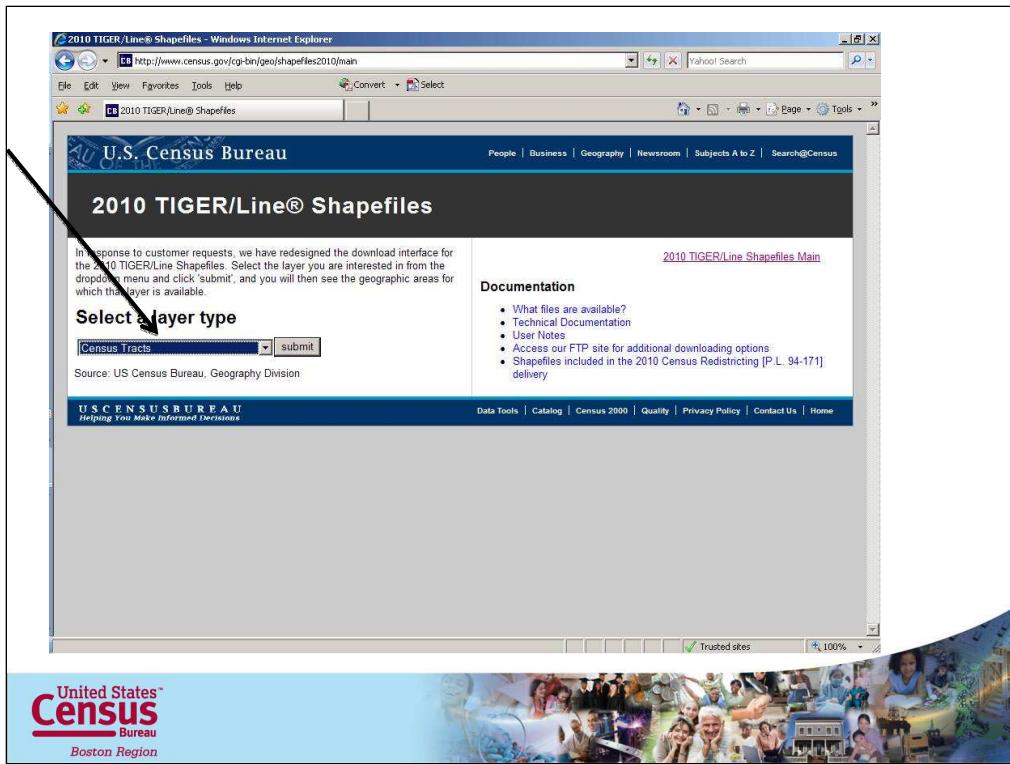
The TIGER/Line Shapefiles are available free to download from our website. Just click on the TIGER link on the Census Bureau's home page.



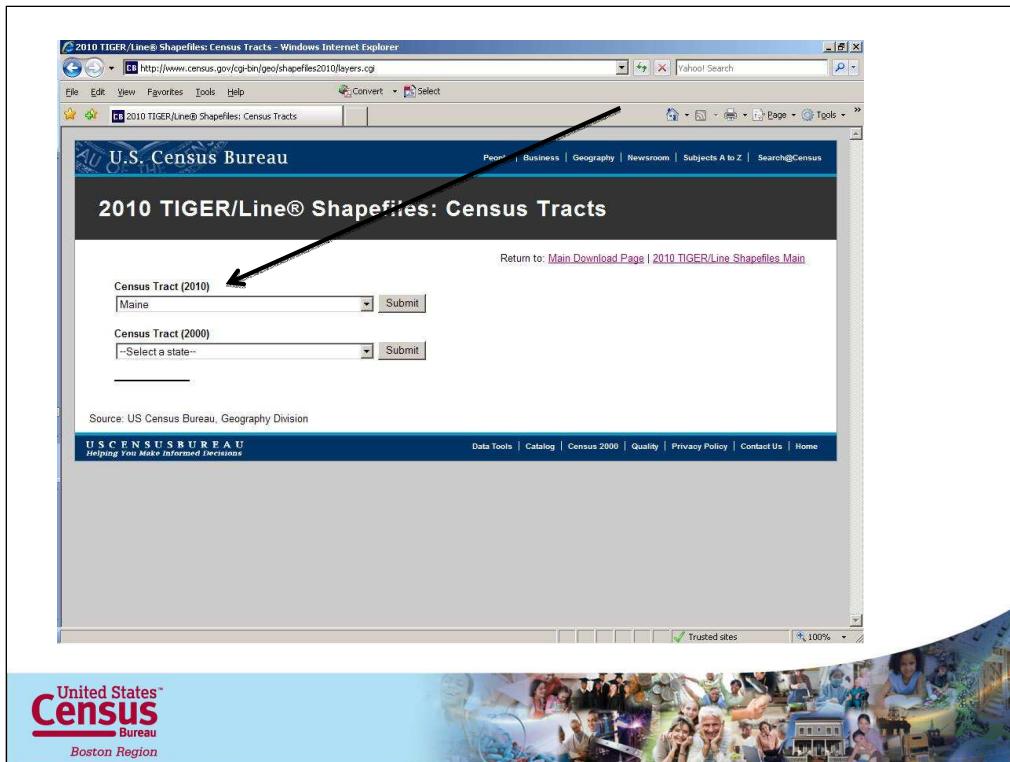
Click on the first link on this page



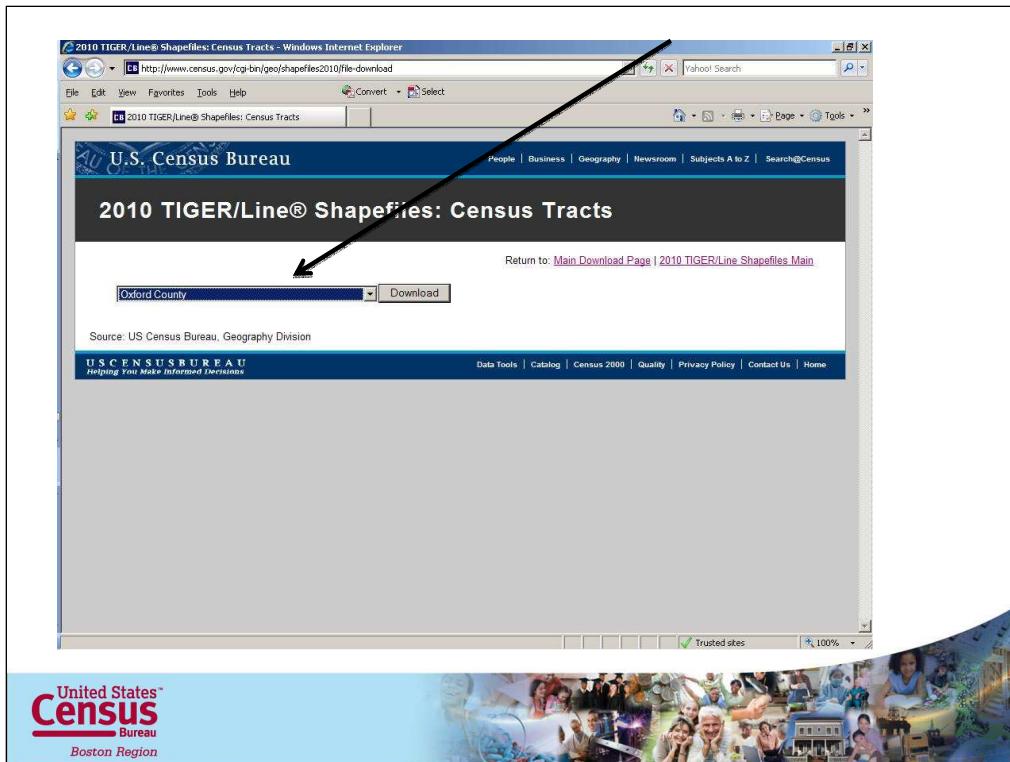
Click on the Download Shapefiles link on the left hand side of the page. Further down on this page you can choose the option of download entire state level shapefiles.



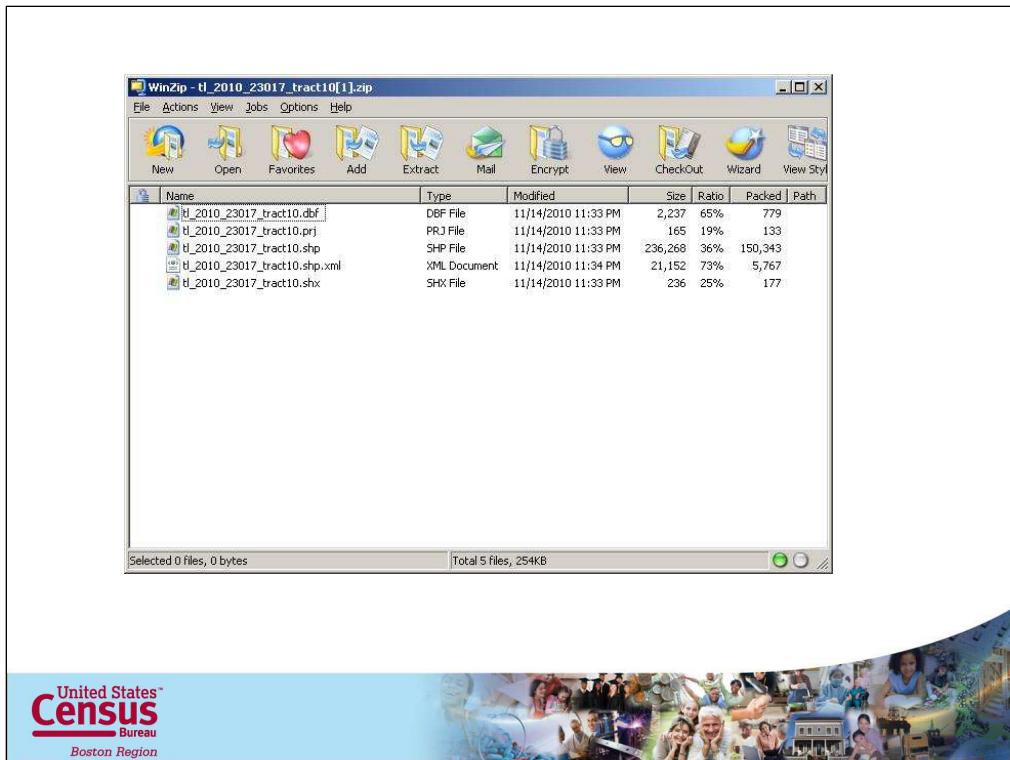
Choose the shapefile layer type that your interested in.



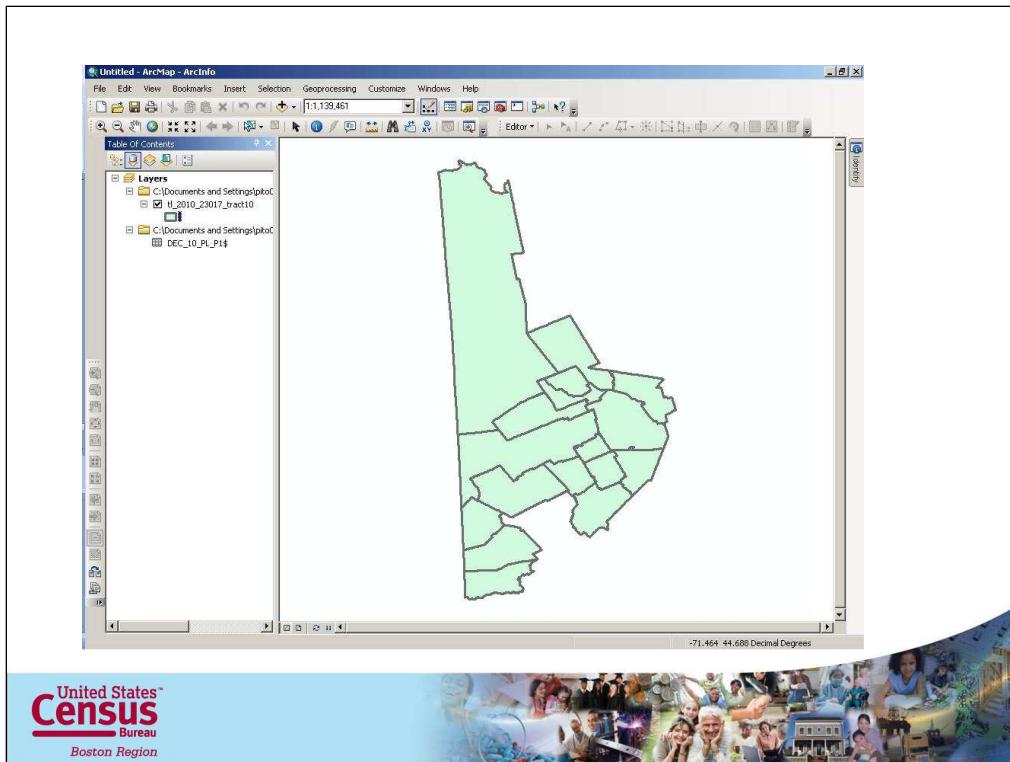
Be careful on this page because you have the options of downloading 2010 data or 2000 data.



Choose your county and hit download.



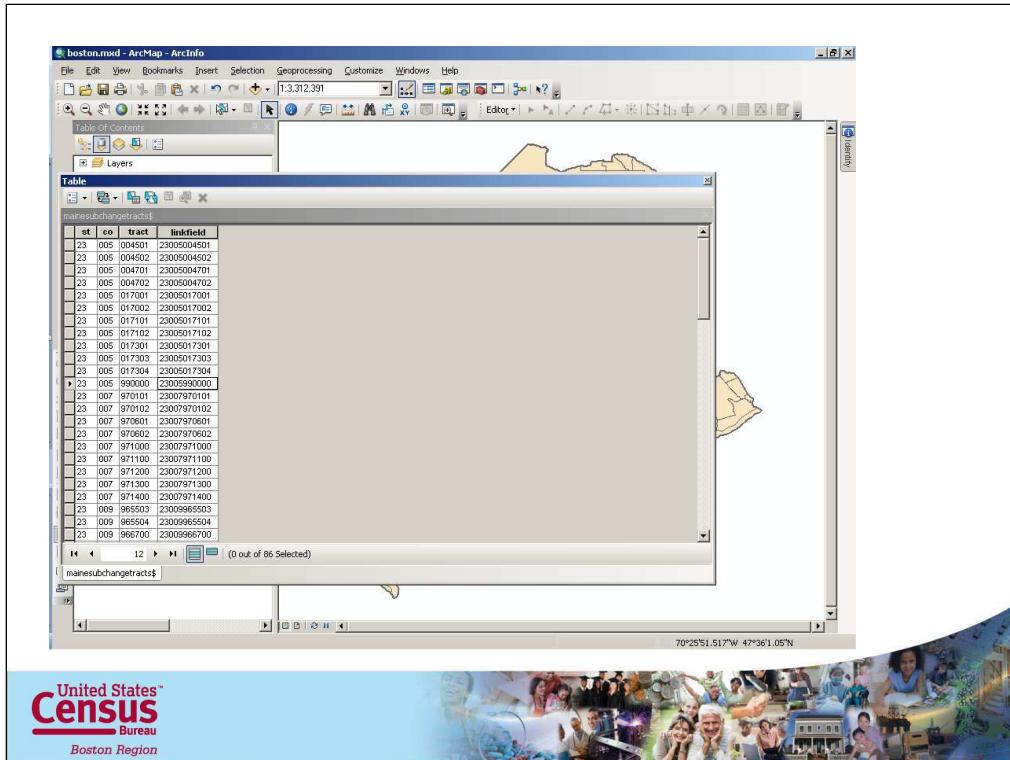
Here are the shapefiles. Save them to a folder on your computer.



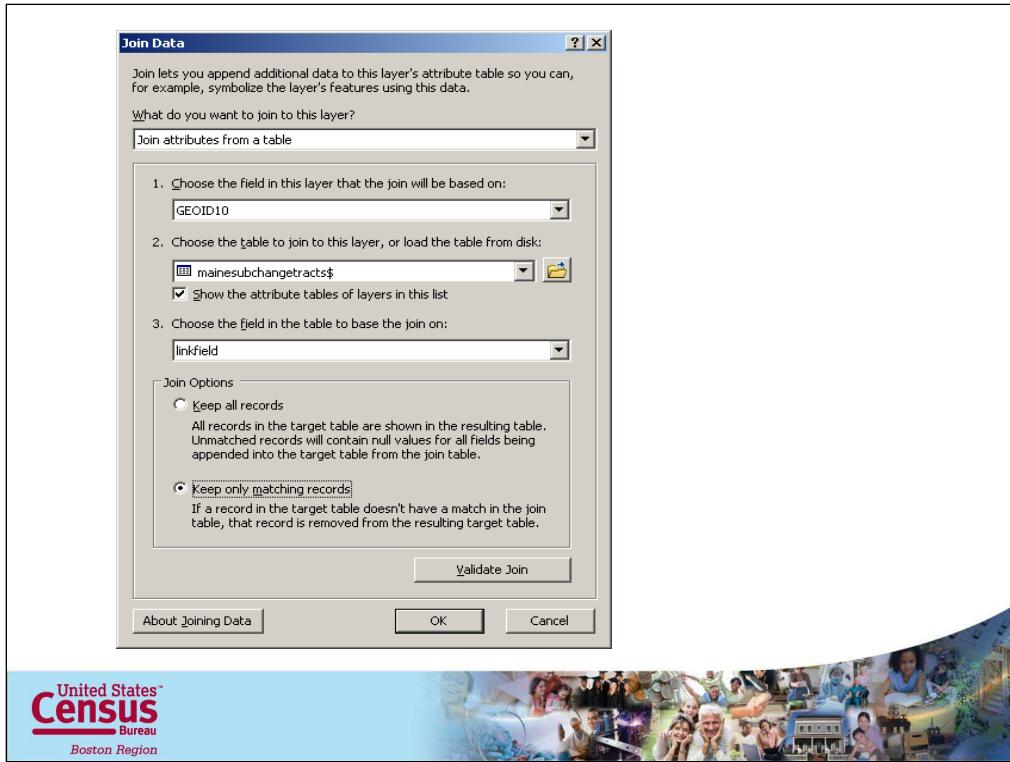
Open the shapefiles in Arc

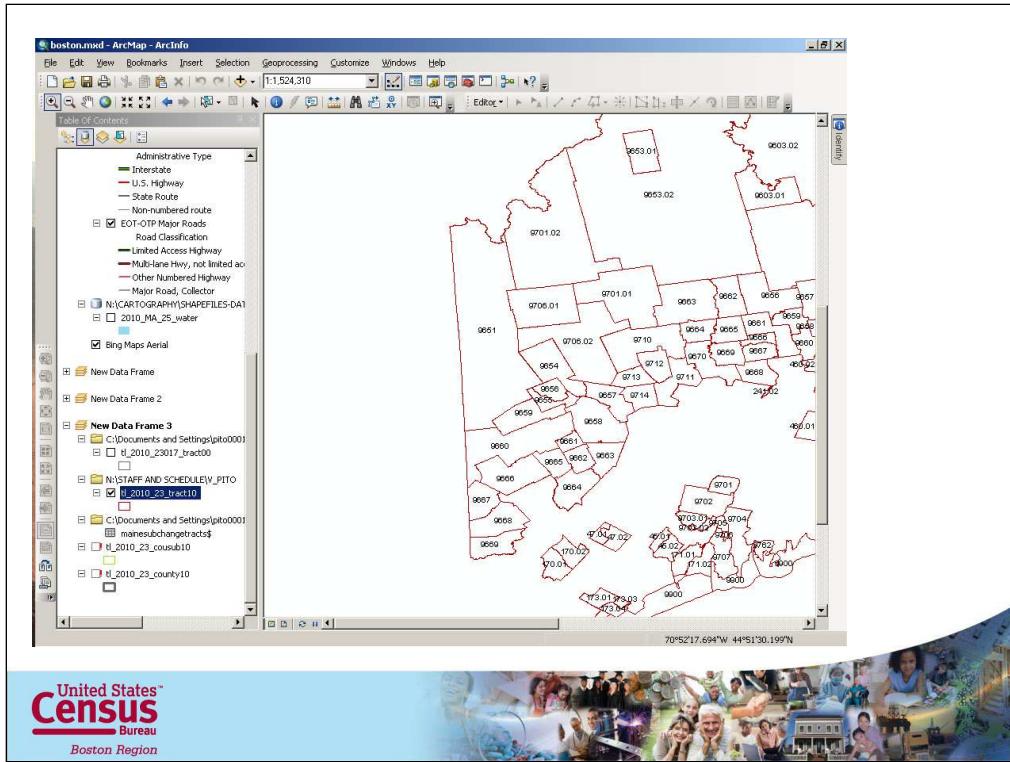
The screenshot shows a Microsoft Access 'Table' window titled 'H_2010_23017_tract10'. The table contains 17 records and 11 columns. The columns are: FID, Shape, STATEFP10, COUNTYFP10, TRACTCE10, GEOID10, NAME10, HAMELSAD10, MTFCC10, FUNCSTAT10, ALAIID10, and AI. The 'TRACTCE10' column is highlighted with a red arrow pointing to its header. The data in the 'TRACTCE10' column includes values such as 966100, 966900, 966200, 966300, 966500, 966500, 966400, 965800, 965900, 966600, 965500, 966800, 966000, 965700, 965100, 966700, and 965400. The 'GEOID10' column contains values like 23017966100, 23017966900, 23017966200, 23017966300, 23017966500, 23017966500, 23017966400, 23017965800, 23017965900, 23017966600, 23017965500, 23017966800, 23017966000, 23017965700, 23017965100, 23017966700, and 23017965400. The 'NAME10' column lists census tract names. The 'HAMELSAD10' column contains numerical values. The 'MTFCC10' column shows codes like G5020 and S. The 'FUNCSTAT10' column contains various numerical values. The 'ALAIID10' column contains more numerical values. The 'AI' column contains the value 1. The status bar at the bottom indicates '(0 out of 17 Selected)'. Below the table, there is a banner for the United States Census Bureau Boston Region.

Open the attribute layers for the shapefile and the AFF data you downloaded from the website to confirm that you have two fields that you can use to link the data. In this case the attribute table for the tract shapefiles has a field titled GEOID10 that we will use to link the data.

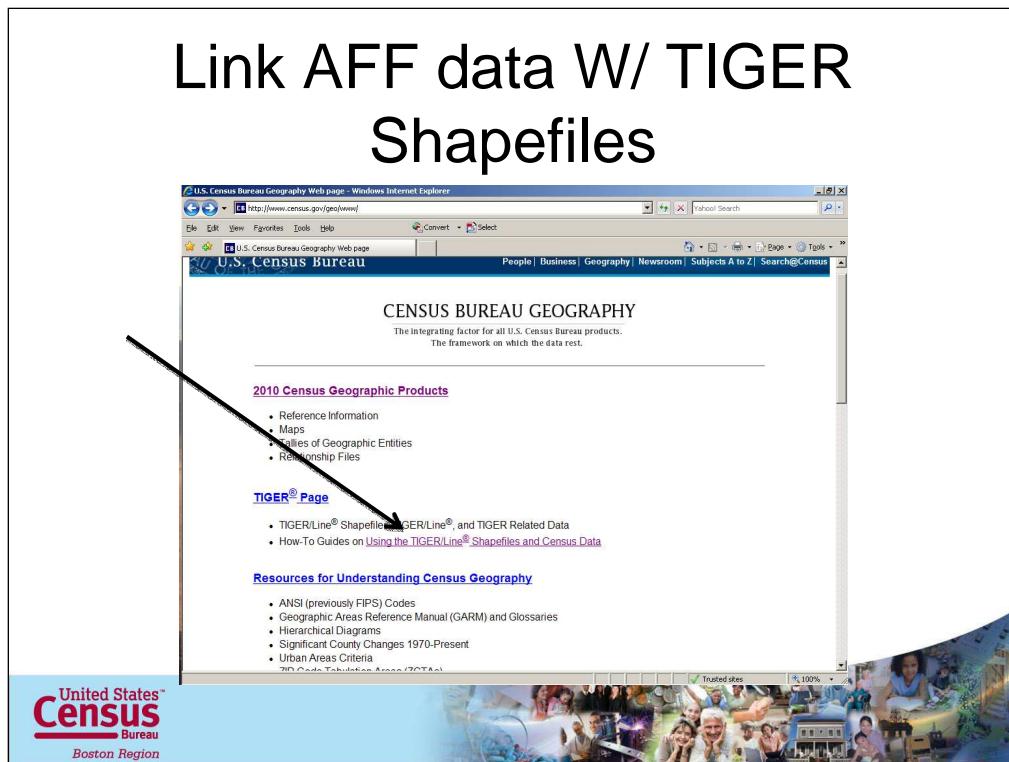


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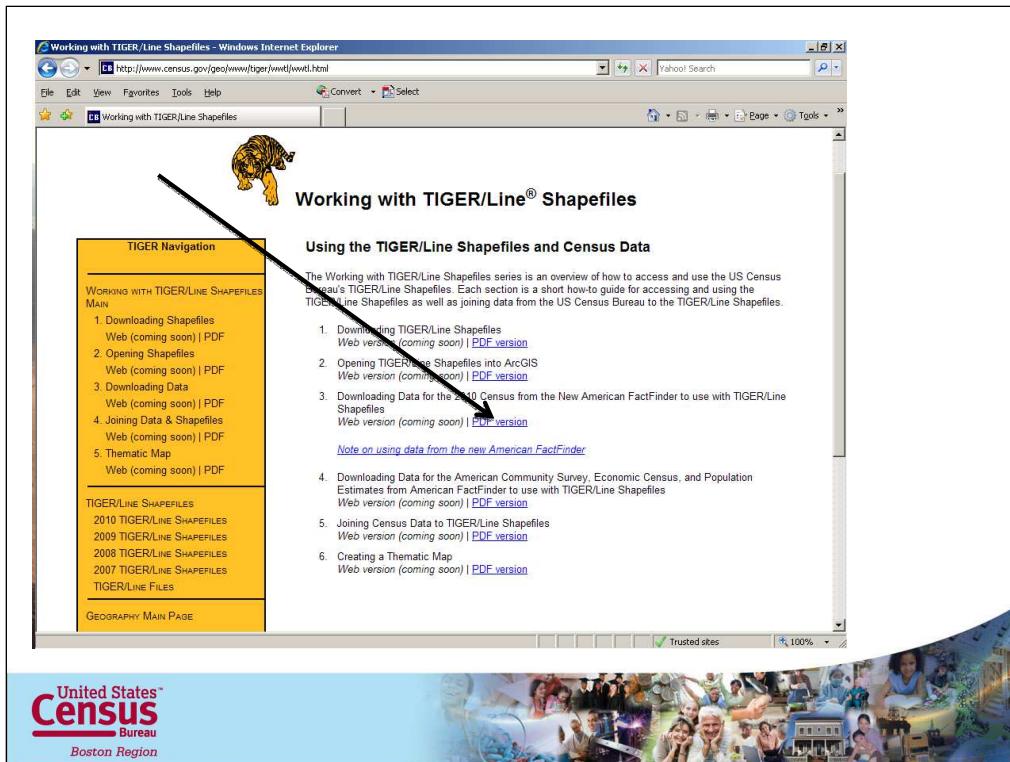




Link AFF data W/ TIGER Shapefiles



Go to the Census Bureau's Geography page and choose the How to guide link on this page.



Heres a list of how to guides. Choose the Downloading Data from the New American Fact Finder to use with TIGER/Line Shapefiles. Open Downloading PDF.

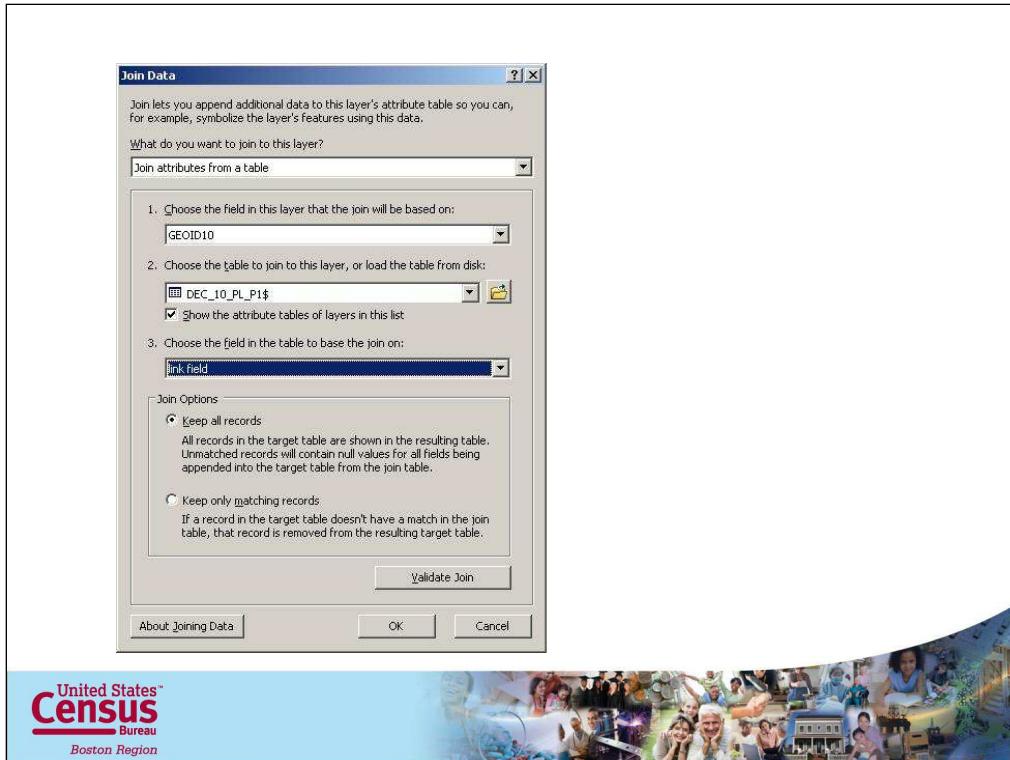
Table

DEC_10_PL_P1\$

GEOId	link field	total pop
1400000US23017965100	23017965100	1587
1400000US23017965400	23017965400	3195
1400000US23017965500	23017965500	2215
1400000US23017965600	23017965600	1626
1400000US23017965700	23017965700	3540
1400000US23017965800	23017965800	3665
1400000US23017965900	23017965900	2988
1400000US23017966000	23017966000	3307
1400000US23017966100	23017966100	1812
1400000US23017966200	23017966200	5183
1400000US23017966300	23017966300	3425
1400000US23017966400	23017966400	5880
1400000US23017966500	23017966500	5014
1400000US23017966600	23017966600	3084
1400000US23017966700	23017966700	3449
1400000US23017966800	23017966800	2745
1400000US23017966900	23017966900	3118



To make things simple I remove all of the extra fields to the right of the total population field and labelled our linking field “Link field.” The attribute data for the AFF comma delimited file has a field which we manipulated that also holds the geo id that we can use to link with the shapefile. We called it “Link Field.”



Now you've added your AFF data to ArcMap. Now in ArcMap right click on the tract10 shapefile layer and choose the command join. So because we're joining the AFF to the shapefile we first choose the field in the shapefile that we're basing the join on. In this case "GEOID10" field. The second command is to choose data file to join too. In this case our Microsoft 2007 excel file AFF data. And then choose the field in the excel file that will be linked too. In this case link field. Hit ok

Table

t_2010_23017_tract10

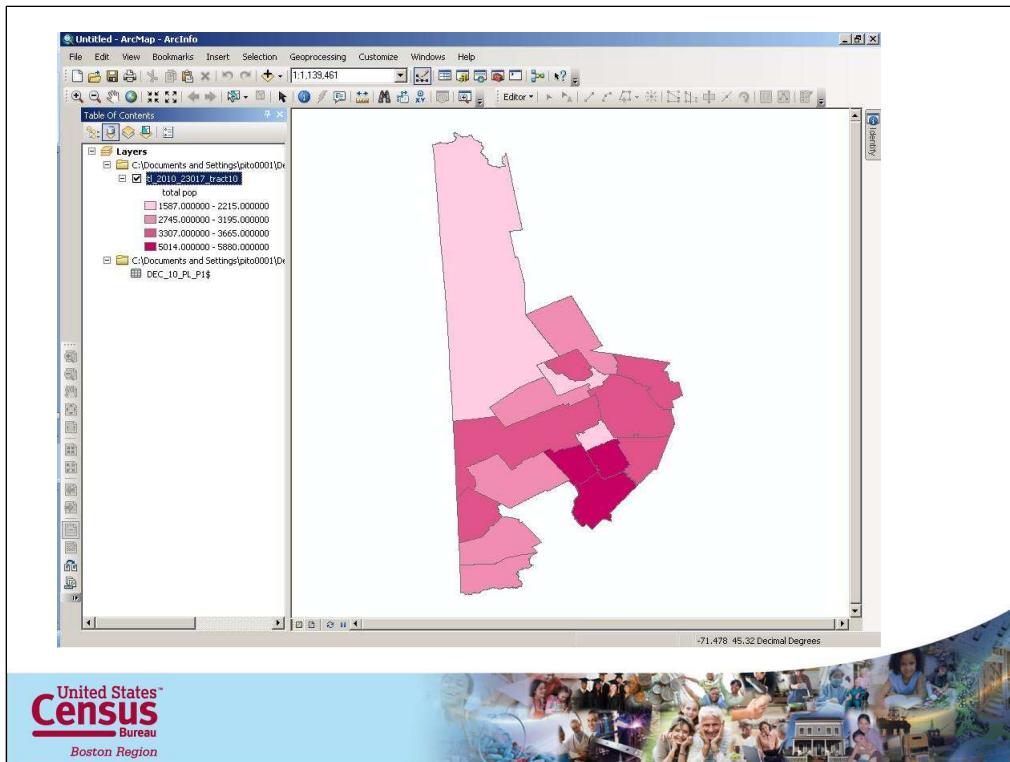
HIPPTLAT10	HIPPTLON10	GEOID	link field	total pop
+44.3192775	-070.5226467	1400000US23017966100	23017966100	1812
+43.8489131	-070.8315695	1400000US23017966900	23017966900	3118
+44.2460012	-070.4908157	1400000US23017966200	23017966200	5183
+44.2600454	-070.3903841	1400000US23017966300	23017966300	3425
+44.2258673	-070.6100222	1400000US23017966500	23017966500	5014
+44.5599538	-070.6253131	1400000US23017965600	23017965600	3626
+44.1173349	-070.5274779	1400000US23017966400	23017966400	5880
+44.4291620	-070.3822083	1400000US23017965800	23017965800	3665
+44.4327705	-070.7240688	1400000US23017965900	23017965900	2988
+44.1818346	-070.8076560	1400000US23017966600	23017966600	3084
+44.5079476	-070.6100356	1400000US23017955500	23017965500	2215
+43.9361738	-070.8704048	1400000US23017966800	23017966800	2745
+44.3077233	-070.7982926	1400000US23017966000	23017966000	3307
+44.5330635	-070.3459187	1400000US23017965700	23017965700	3540
+44.8335850	-070.9342310	1400000US23017965100	23017965100	1587
+44.0555107	-070.9445848	1400000US23017966700	23017966700	3449
+44.6542105	-070.6349396	1400000US23017965400	23017965400	3195

1 | (0 out of 17 Selected)

t_2010_23017_tract10 [DEC_10_PL_P1\$]




Confirm that the data was joined by returning to the shapefile attribute table and scrolling all the way to the right to confirm that the data has been joined.



Now that the data has been joined you can symbolize it in the layer properties field for the shapefile.

•Thank You

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So today we discussed

- How you can use shapefiles
- The limitations of shapefiles
- Types of shapefiles available and where can you find them
- Schedule
- How to connect census data to shapefiles
- How to compare 2000 and 2010 tracts
- How to compare ACS data w/ 2010 data