Using 2001 Census Data In ArcMap 9.0 and Census Data in Beyond 20/20 Tables

These procedures outline:

1. Downloading and opening the Cartographic Boundary Files (CBF)
2. Downloading and joining the attribute (data) files with the CBF

A. Importing an Arc Export File

Digital Cartographic Files are available for download from the **University of Toronto Data Library Services: Census 2001 Spatial Data Files**, located at the University of Toronto URL below:

http://0-www.chass.utoronto.ca.innopac.lib.ryerson.ca/datalib/cc01/geospat01.htm

This site provides the option to download either **Digital Boundary Files** (DBF) or **Digital Cartographic Files** (DCF) in Arc/Info or MapInfo formats. In this example, the Arc/Info digital cartographic file at the census tract level is used. Often Arc/Info Cartographic files(.e00 extension) are found in Arc Export File formats (.exe extension). In order to view a desired Arc Export file in ArcMap 9.0, follow the steps below.

***Note** – To access the files from a computer located off the Ryerson campus, you must be a Ryerson University student (full-time or continuing education), staff or faculty member and have a matrix (e-mail) account.

Example:

1. Scroll down to **Hamilton** (**537**) and *Download* the ***.exe file (gct_537b02a_e.exe)** for **Arc/Info** to your hard drive (the file size of **gct_537b02a_e.exe** should be 208KB).

2. Once this file has been downloaded, browse to it in your directory and use **WinZip** to extract the file.

3a.) In order to translate the Arc/Info export file for use in ArcMap 9.0, you need to open the **ArcGIS 8x** Tools toolbar located in **ArcCatolog**.

3b.) *Double-Click* on the **ArcMap 9.0** icon or *Select* **Start > Programs > ArcGIS > ArcMap**. If the **Add Data** window appears, *click* **Cancel**.

4a.) Open **ArcCatolog** by *clicking* the **ArcCatolog** button  .

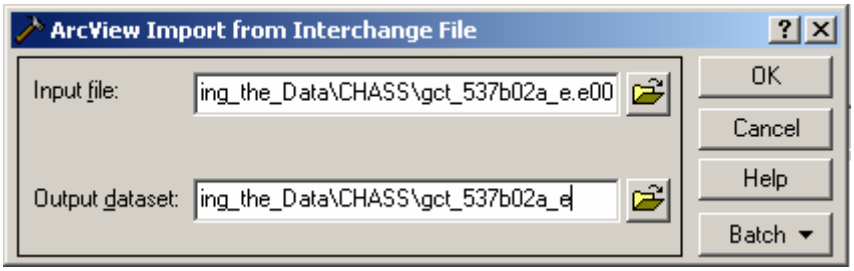
4b.) In the **ArcCatolog** from the main menu *click* **View** > **Toolbars** > **Customize .**

4c.) In the **Customize** window check *off the* box next to **ArcGIS8x** then *click* **close.**

4d.) With **ArcCatolog** still open, *click* the **Conversion Tools** 

button near the top of your screen. Then *click* **Import from Interchange File**.

4e.) (Figure 1) In the **Import from Interchange File** window, *browse* to the name of the recently downloaded **.e00** file in the **Input File** text box. In the **Output Dataset** text box, *browse* to the location where you would like to store the new coverage and choose an appropriate name. (in this example we have chosen the name **gct_537b02a_e**) *Click* **OK**. Close **ArcCAtalog**.



(Figure 1)

B. Opening the ArcInfo Coverage in ArcMap 9.0

Note: If ArcMap is already open, skip to step 2 below.

1. *Double-Click* on the **ArcMap 9.0** icon or *Select* **Start > Programs > ArcGIS > ArcMap**.
2. ArcMap should automatically prompt the option to **Add Data**. Otherwise, *Click* the **Add Data** button  . In the **Add data** window, browse to **gct_537b02a_e**. *Click* **Add**. The Hamilton CMA should appear, divided into Census Tract boundaries.

C. Converting From a Coverage to a Shape-file

1. Open **ArcToolbox** by *Clicking* the small red tool box button in the main menu 

2. In ArcToolbox, *Click* **Conversion Tools > To Shapefile > Feature Class to Shapefile (Figure 2)**.

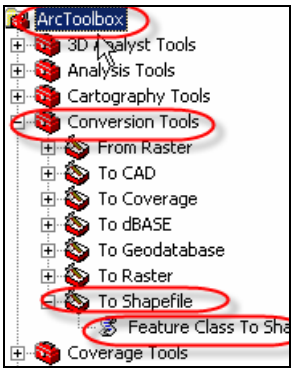


Figure 2

3. In the **Feature Class to Shapefile (multiple)** window, Select **gct_537b02a_e** from the **Input Features** drop down menu **(Figure 3)**. In the **Output Folder** dropdown menu, browse to the location where the file is to be saved. *Click* **OK**.

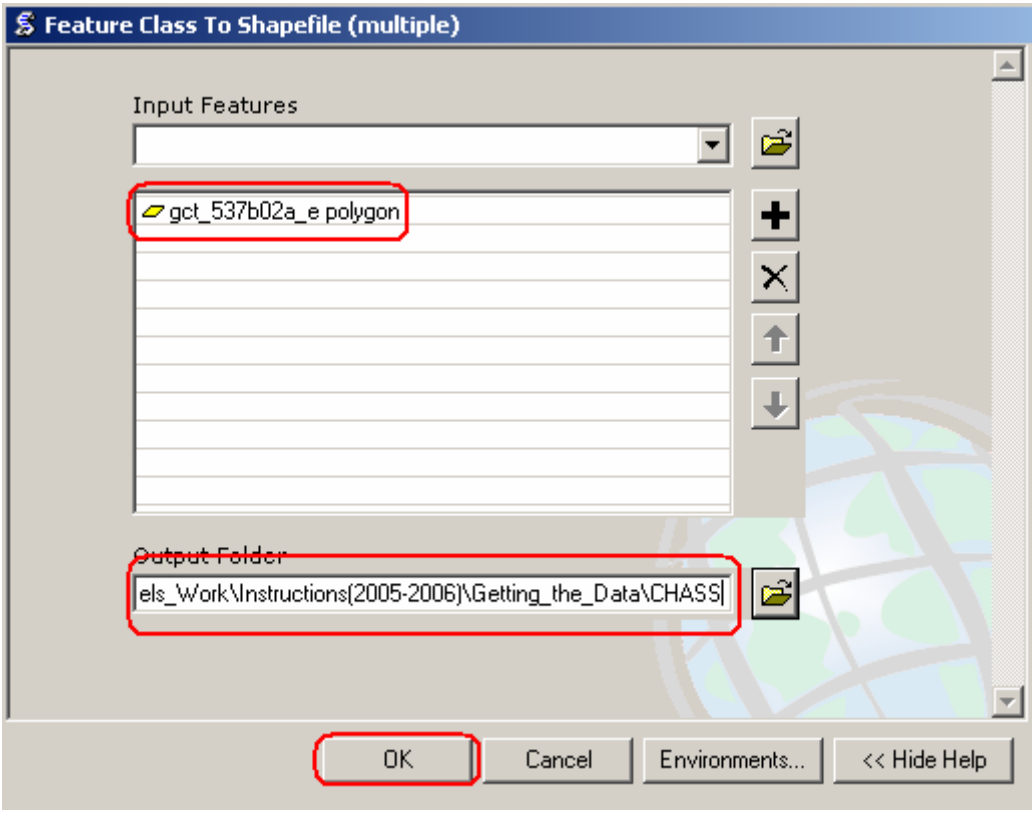


Figure 3

4. Once the execution stage is complete, *Click* **Close**. If a message does not appear prompting the addition of the new file to the view, use the **Add Data** button to browse to the selected folder in the previous step and add **gct_537b02a_e polygon**.

D. Getting Attribute Census 2001 Data

1. You may download the data from **Census of Canada, 2001: Profile Series** located at the site listed below:

http://0-www.chass.utoronto.ca.innopac.lib.ryerson.ca/datalib/cc01/profil01.htm

There are 9 subject profiles:

1. Profile of language characteristics
2. Profile of aboriginal communities
3. Age and sex
4. Marital status, families & household living arrangements, and housing
5. Language, mobility, and migration
6. Citizenship, immigration, birthplace, generation status, ethnic origin, visible minorities and aboriginal peoples
7. Labour force activity, class of worker, occupation, industry, place of work, mode of transportation, language of work and unpaid work
8. School attendance, education, field of study, highest level of schooling and earnings
9. Profile of income of individuals, families and households, social and economic characteristics of individuals, families and households, housing costs, and religion

At the Census tract level there is also an "All Canada file" and a "CMA Toronto Subset" As you can see on the website, these files are available at many geographic levels that include:

A. Census Subdivision (CSD)
B. Dissemination Area (DA)
C. Forward Sortation Area (FSA)
D. Census Metropolitan Area (CMA) / Census Agglomeration (CA)
E. Census Tract (CT)
F. Federal Electoral District (FED)

***Note:** In order to continue this exercise, you must have a version of Beyond 20/20 that is version 6.2 or later. If you do not have this program, you can go to the website below and download it:

http://0-www.chass.utoronto.ca.innopac.lib.ryerson.ca/datalib/caq/b2020.htm

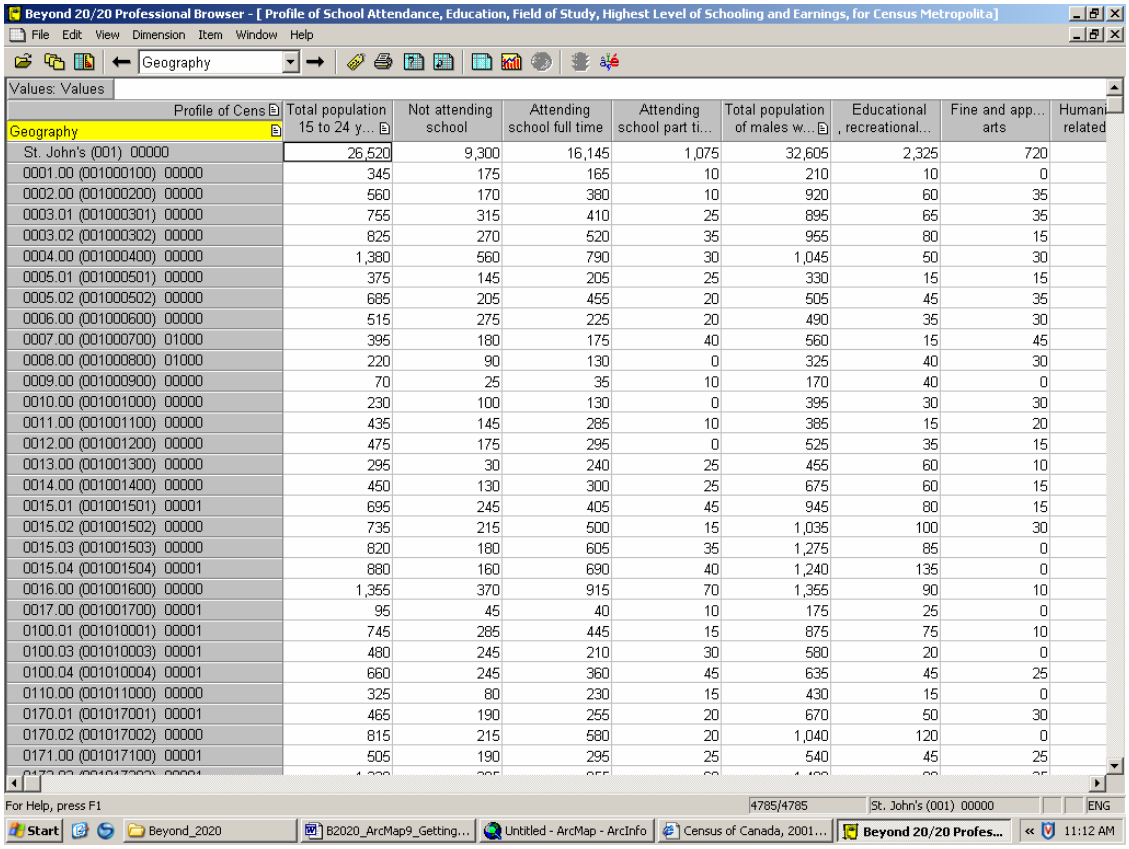
-Then select the link beyond-6-2.exe. when prompted to save, select a desired location and then save. The file will be compressed (zipped), thus you have to uncompress it in order to use it.

1(a). For this exercise we will use: **School attendance, education, field of study, highest level of schooling and earnings** at the **C. Census Tract (CT) Level**, therefore, *select* **95f0491xcb01005.**

1(b). Then *select* **Open**.

A **Beyond 20/20 Professional Browser version 6.2**, should *open*.

The first task is to *switch* the position of the **Columns** and the **Rows**. The **Census Metropolitan Areas** with their **census tract numbers** should be at the side, while the variables should be along the top.



(Figure 2)

2. *Select* the **Geography** heading, now *hold* the **button** *down* and *drag* it over to the heading that says **Profile of Cens**. Then *release* the **button**, now the **Census Metropolitan Areas** with their **census tract numbers** are in the left column (your screen should look like **Figure 2**).

2(a). Make sure the **Geography** heading is *highlighted* in yellow. From the **Main Menu Bar** *select* **Dimension > Search**.

Field = English Desc
Text to Find = 537
Type of Selection = Reduce

OK

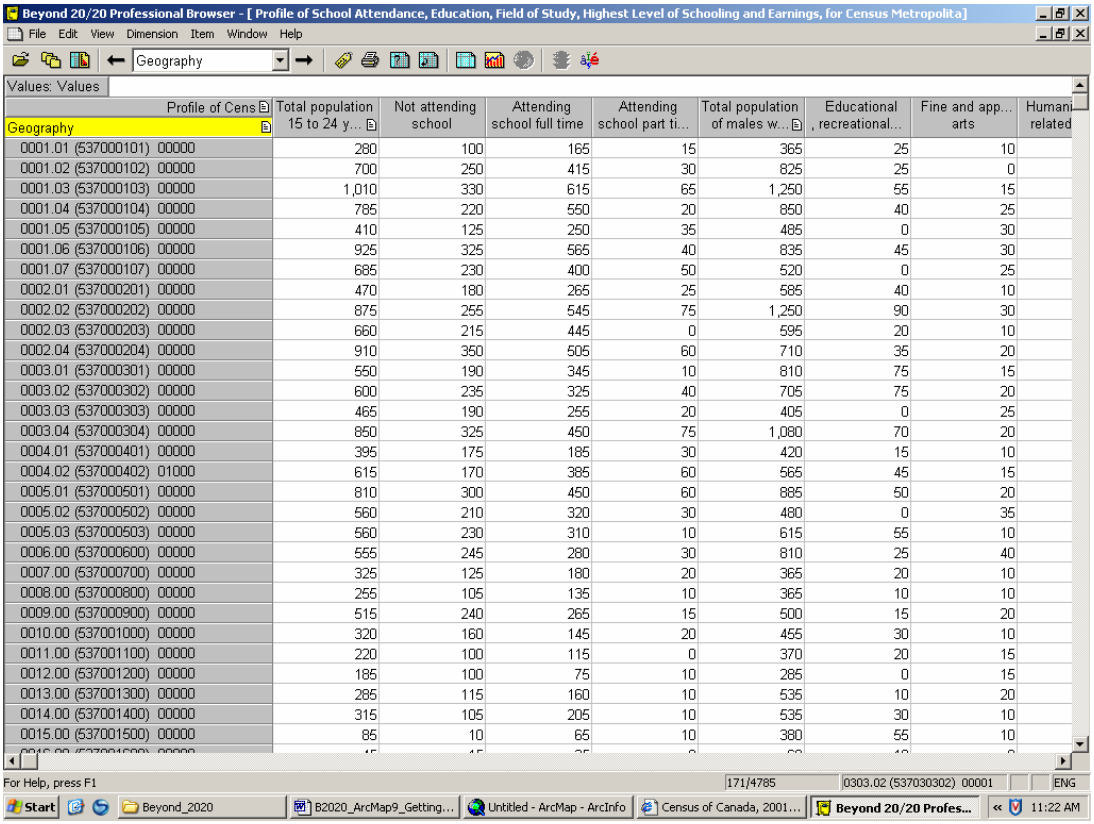
2(b). We only want **Census Tracts** which are within the **Hamilton Census Metropolitan Area**, so we will *hide* the extras.

Highlight **Hamilton (537) 00000**

From the **Main Menu Bar** *select* **Item > Hide**

Now *scroll down* to the **bottom** of the **data** and *highlight* the **last 3 census tracts (0537.01, 0537.02, 0537.03)**

From the **Main Menu Bar** *select* **Item > Hide**



Geography	Total population 15 to 24 y...	Not attending school	Attending school full time	Attending school part ti...	Total population of males w...	Educational , recreational...	Fine and app... arts	Humani... related
0001.01 (537000101) 00000	280	100	165	15	365	25	10	
0001.02 (537000102) 00000	700	250	415	30	825	25	0	
0001.03 (537000103) 00000	1,010	330	615	65	1,250	55	15	
0001.04 (537000104) 00000	785	220	550	20	850	40	25	
0001.05 (537000105) 00000	410	125	250	35	485	0	30	
0001.06 (537000106) 00000	925	325	565	40	835	45	30	
0001.07 (537000107) 00000	685	230	400	50	520	0	25	
0002.01 (537000201) 00000	470	180	265	25	585	40	10	
0002.02 (537000202) 00000	875	255	545	75	1,250	90	30	
0002.03 (537000203) 00000	660	215	445	0	595	20	10	
0002.04 (537000204) 00000	910	350	505	60	710	35	20	
0003.01 (537000301) 00000	550	190	345	10	810	75	15	
0003.02 (537000302) 00000	600	235	325	40	705	75	20	
0003.03 (537000303) 00000	465	190	255	20	405	0	25	
0003.04 (537000304) 00000	850	325	450	75	1,080	70	20	
0004.01 (537000401) 00000	395	175	185	30	420	15	10	
0004.02 (537000402) 01000	615	170	385	60	565	45	15	
0005.01 (537000501) 00000	810	300	450	60	885	50	20	
0005.02 (537000502) 00000	560	210	320	30	480	0	35	
0005.03 (537000503) 00000	560	230	310	10	615	55	10	
0006.00 (537000600) 00000	555	245	280	30	810	25	40	
0007.00 (537000700) 00000	325	125	180	20	365	20	10	
0008.00 (537000800) 00000	255	105	135	10	365	10	10	
0009.00 (537000900) 00000	515	240	265	15	500	15	20	
0010.00 (537001000) 00000	320	160	145	20	455	30	10	
0011.00 (537001100) 00000	220	100	115	0	370	20	15	
0012.00 (537001200) 00000	185	100	75	10	285	0	15	
0013.00 (537001300) 00000	285	115	160	10	535	10	20	
0014.00 (537001400) 00000	315	105	205	10	535	30	10	
0015.00 (537001500) 00000	85	10	65	10	380	55	10	

The ones we have hidden don't start with **537** with the number in brackets, ie **0537.01 (602053701) 00000**. So now if you *scroll* the table from top to bottom there should only be **census tracts** that in the brackets start with **537**.

2(c). From the **Main Menu Bar** *select* **File > Save As > Ham01.dbf** (Make sure you *change* **List Files of Type to dBase File (*.dbf)**

2(d). *Select* **OK** and again **OK** when it says "**Duplicate code(s) detected, unique codes will be generated.**" (You can now close the Beyond 20/20 program as it is not needed anymore).

3. *Open* **Microsoft Excel**

3(a). **File > Open >** (browse to the location of the saved **Ham01.dbf**) **> Open** (Make sure you *change* **Files of Type to dBase Files (*.dbf**)

3(b). *Select* **Column A** (Make sure the entire column is *highlighted*)

From the **Main Menu Bar** *select* **Data > Text to Columns**
The **Convert Text to Columns Wizard - Step 1 of 3** should *open*.
For **Original Data Type** = **Fixed Width**
Click **Next**

The **Convert Text to Columns Wizard Step 2 of 3** should *open*
Simply *Click* **Next**

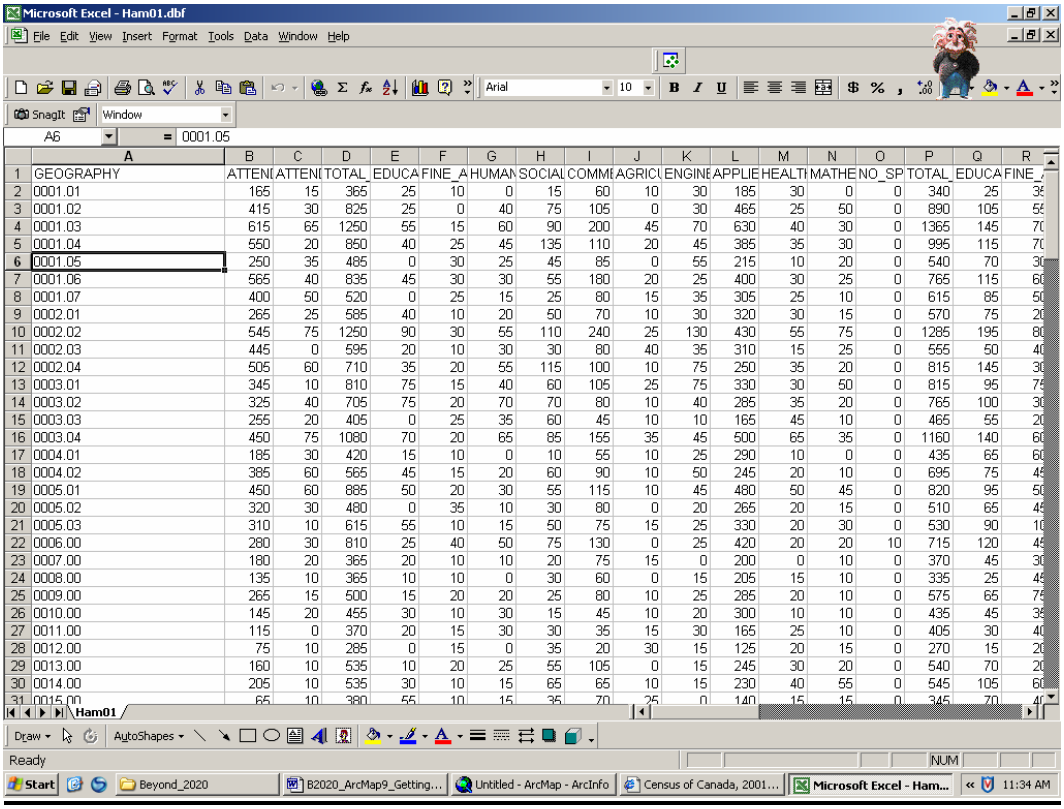
The **Convert Text to Columns Wizard Step 3 of 3** should *open,*
Select the first column (the one with the two decimal places) then
under the **Column Data Format** heading *Select* **Text**
Click **Finish**
Select **OK** for the **Do you want to replace the contents of the destination cells?**

3(c). *Highlight* **Columns B & C**. Then **Edit > Delete > Columns B & C**
(You will also notice that the column title for column A has been altered, simply click on the title and change it back to Geography)

3(e). *Highlight* the entire **worksheet** by *selecting* the **grey cell** above the **Row 1**, and left of **Column A**.

From the **Main Menu Bar** *select* **Data > Sort**
Sort By = GEOGRAPHY
Select Ascending
Click **OK**

4. Save the file. You may choose to give the file a new name or retain the old one. Make sure that you choose **DB4** in the **Save as type column**. A warning will pop up indicating that your dbf file may contain features that are not compatible with DB4 (dbase IV) and will ask you if you would like to keep the workbook in the current format. *Click* **Yes.** Then close Microsoft Excel. If the save prompt pops up, simply follow the procedures above. Close Microsoft Excel.



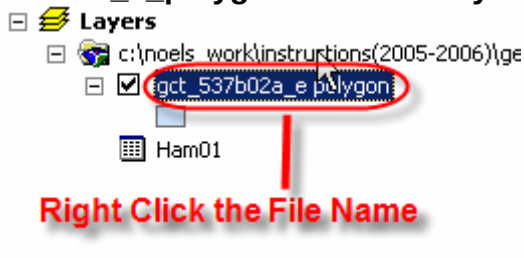
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	GEOGRAPHY	ATTEN	ATTEN	TOTAL	EDUCA	FINE_A	HUMAN	SOCIAL	COMM	AGRIC	ENGINE	APPLIE	HEALTH	MATHE	NO_SP	TOTAL	EDUCA	FINE_
2	0001.01	165	15	365	25	10	0	15	60	10	30	185	30	0	0	340	25	3
3	0001.02	415	30	825	25	0	40	75	105	0	30	465	25	50	0	890	105	5
4	0001.03	615	65	1250	55	15	60	90	200	45	70	630	40	30	0	1365	145	7
5	0001.04	550	20	850	40	25	45	135	110	20	45	385	35	30	0	995	115	7
6	0001.05	250	35	485	0	30	25	45	85	0	55	215	10	20	0	540	70	3
7	0001.06	565	40	835	45	30	30	55	180	20	25	400	30	25	0	765	115	6
8	0001.07	400	50	520	0	25	15	25	80	15	35	305	25	10	0	615	85	5
9	0002.01	265	25	585	40	10	20	50	70	10	30	320	30	15	0	570	75	2
10	0002.02	545	75	1250	90	30	55	110	240	25	130	430	55	75	0	1285	195	8
11	0002.03	445	0	595	20	10	30	30	80	40	35	310	15	25	0	555	50	4
12	0002.04	505	60	710	35	20	55	115	100	10	75	250	35	20	0	815	145	3
13	0003.01	345	10	810	75	15	40	60	105	25	75	330	30	50	0	815	95	7
14	0003.02	325	40	705	75	20	70	70	80	10	40	285	35	20	0	765	100	3
15	0003.03	255	20	405	0	25	35	60	45	10	10	165	45	10	0	465	55	2
16	0003.04	450	75	1080	70	20	65	85	155	35	45	500	65	35	0	1160	140	6
17	0004.01	185	30	420	15	10	0	10	55	10	25	290	10	0	0	435	65	6
18	0004.02	385	60	565	45	15	20	60	90	10	50	245	20	10	0	695	75	4
19	0005.01	450	60	885	50	20	30	55	115	10	45	480	50	45	0	820	95	5
20	0005.02	320	30	480	0	35	10	30	80	0	20	265	20	15	0	510	65	4
21	0005.03	310	10	615	55	10	15	50	75	15	25	330	20	30	0	530	90	1
22	0006.00	280	30	810	25	40	50	75	130	0	25	420	20	20	10	715	120	4
23	0007.00	180	20	365	20	10	10	20	75	15	0	200	0	10	0	370	45	3
24	0008.00	135	10	365	10	10	0	30	60	0	15	205	15	10	0	335	25	4
25	0009.00	265	15	500	15	20	20	25	80	10	25	285	20	10	0	575	65	7
26	0010.00	145	20	455	30	10	30	15	45	10	20	300	10	10	0	435	45	3
27	0011.00	115	0	370	20	15	30	30	35	15	30	165	25	10	0	405	30	4
28	0012.00	75	10	285	0	15	0	35	20	30	15	125	20	15	0	270	15	2
29	0013.00	160	10	535	10	20	25	55	105	0	15	245	30	20	0	540	70	2
30	0014.00	205	10	535	30	10	15	65	65	10	15	230	40	55	0	545	105	6
31	0015.00	65	10	380	55	10	15	35	70	25	0	140	15	15	0	345	70	4

E. Opening the Data File in ArcMap 9.0

1. To open the **.dbf** file in ArcMap, *Click* the **Add Data** button. Browse to **Ham01.dbf.** *Click* **ADD**.

F. Joining the Files

1. *Right-click* the **gct_537b02a_e_polygon** file in the **Layers** window.



2. In the drop down menu *click* **Joins and Relates > Join**. This will open the **Join Data** window.

3. In the Join Data window
   a. What do you want to join to this layer = **Join attributes from a table**
   b. Choose the field in this layer that the join will be based on = **CTNAME**

c. Choose the table to join to this layer, or load the table from disk: = **Ham01**
d. Choose the field in the table to base the join on: = **GEOGRAPHY**
e. *Click* **OK.**

At this point the data from **Ham01.dbf** should be joined to the **gct_537b02a_e_polygon** table. To verify this, in the **Layers** window *right click* **gct_537b02a_e_polygon** and *click* **Open Attribute Table**. *Scroll* over to the right. The new variables should be at the right end of the data table. If the join procedure worked correctly, you have now completed the process of getting census data. In front of you should be a map of the Hamilton CMA with 2001 population joined to it.

Currently there are some glitches with the attribute table functions that ESRI has not resolved. These problems result in the attribute table showing error messages or coming up completely blank. If this is the case with the attribute tables after a join has been attempted, try one of the following solutions: exporting the data, re-opening the data, and/or adding new fields. In most cases, exporting the data will solve the problem.

Exporting the Data

When the join procedure is first completed, the joined table exists as a temporary file. One solution to this problem is to create a permanent file by **Exporting the data**.

1. *Right-Click* **gct_537b02a_e_polygon** in the **Layers** window**,** scroll down and *click* **Data,** then *Click* **Export Data.**

2. In the **Export Data** window, change the name and the location of the file. *Click* **OK**.

3. Use the **Add Data** button  to add the newly created file. *Right click* the newly created file and open its **Attribute Table**. Scroll to the right end of the attribute table to view the new variables. If this procedure worked correctly, you have now completed the process of getting census data. In front of you should be a map of the Hamilton CMA with 2001 population joined to it.

Re-Opening the Data

If the entire table is blank, attempt to remove and add **gct_537b02a_e_polygon** again**.**

1. *Right-click* **gct_537b02a_e**_polygon. *Click* **Remove**.

2. Use the **Add Data** button  to add **gct_537b02a_e_polygon**.

Check the attribute table again. If this procedure worked correctly, you have now completed the process of getting census data. In front of you should be a map of the Hamilton CMA with 2001 population joined to it.

Adding New Fields

A problem exists with the data table fields if the attribute table is blank or if an error message exists. New fields must be created in **Ham01.dbf** and **gct_537b02a_e_polygon** to correct this problem.

1. Close ArcMap by clicking the '**x**' in the upper right corner of the screen (do not save changes).

2. Open ArcMap **Start > Programs > ArcGIS > ArcMap**.

3. Use the **Add Data** button  and browse to **Ham01.dbf** and **gct_537b02a_e_polygon.** Add both files.

4. Perform this step for each file: **Ham01.dbf** and **gct_537b02a_e_polygon.**

   a. *Right-click* the file name in the **Layers** window (**Ham01.dbf** or **gct_537b02a_e_polygon).**
   b. *Click* **Open Attribute table** (or *click* **Open** for **Ham01.dbf**).
   c. *Click* the 

button located at the bottom of the **Attribute** window.
   d. *Click* **Add Field** (**Figure 5)**.
      - **Ham01.dbf**
        1) ***Set*** Name = COL2_num
        2) ***Set*** Type = Long Integer
        3) Leave everything else alone.

      - **gct_537b02a_e_polygon**
        1) ***Set*** Name = COL2_num
        2) ***Set*** Type = Long Integer
        3) Leave everything else alone.

   e. *Click* **OK**. A field has been created designed to hold values in **Long Integer** format. Previously, **COL2** and **CTNAME** were strings.

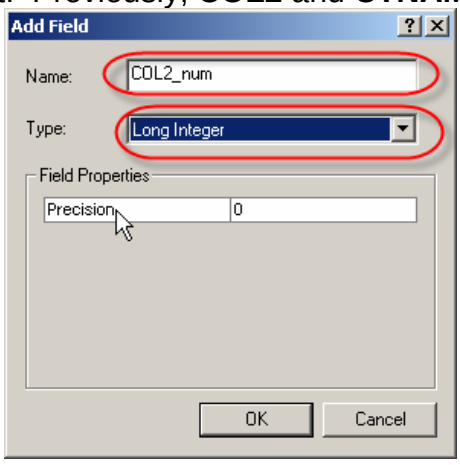


Figure 5

5. Assign data to the two new columns (**COL2_num** and **ctname_num**). Open **ArcToolbox** by *Clicking* the small red toolbox  near the top of the screen. In **ArcToolbox**, *Click* **Data Management Tools > Fields > Calculate Field** to open the **Calculate Field** window **(Figure 6)**.

6. As in Step 4, this procedure must be carried out for both **Ham01.dbf** and **gct_537b02a_e_polygon.**

- **Ham01.dbf**
  a) ***Set*** Input Table = **Ham01.dbf**
  b) ***Set*** Field Name = **COL2_num**
  c) ***Set*** Expression = **[COL2]**
  d) *Click* **OK**.
- **gct_537b02a_e_polygon**
  a) ***Set*** Input Table = **gct_537b02a_e_polygon**
  b) ***Set*** Field Name = **ctname_num**
  c) ***Set*** Expression = [**CTNAME**]
  d) *Click* **OK**.

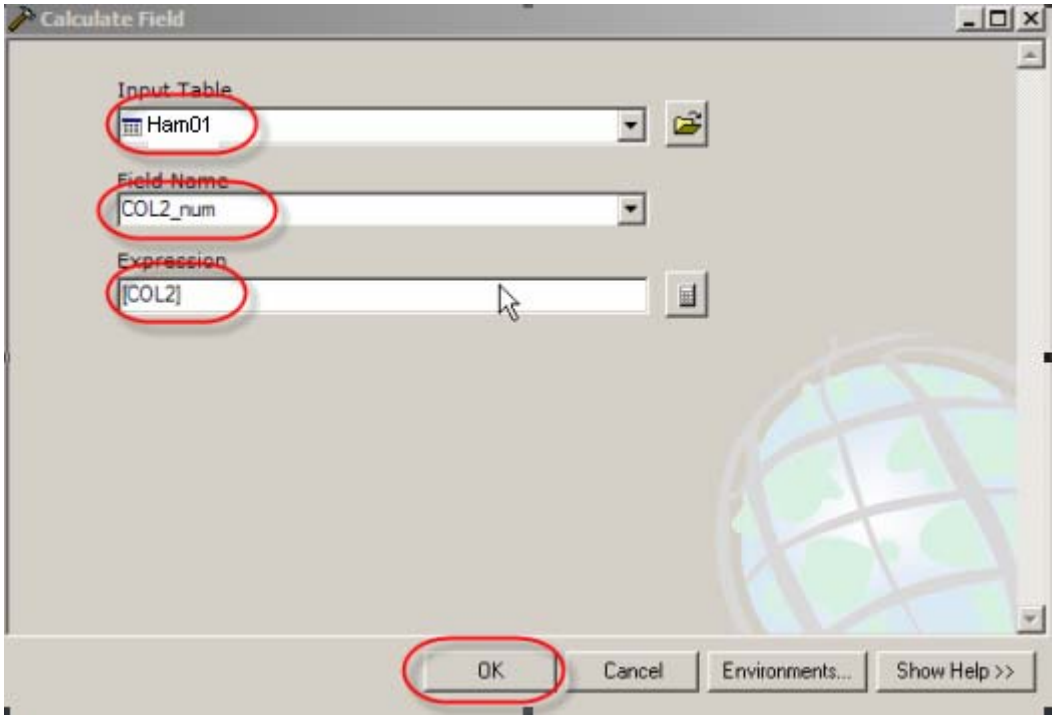


Figure 6

7. Click **OK**. The new fields are calculated. To join the newly created files, *Click* **Joins and Relates > Join** in the drop down menu. The **Join Data** window will open.

8. In the Join Data window

a) ***Set*** What do you want to join to this layer **= Join attributes from a table**
b) ***Set*** Choose the field in this layer that the join will be based on **= ctname_num**
c) ***Set*** Choose the table to join to this layer, or load the table from disk **= Ham01**
d) ***Set*** Choose the field in the table to base the join on **= COL2_num**
e) Click **OK.**

The data from **Ham01** should be joined to the **gct_537b02a_e_polygon** table. To verify the join, *Right Click* **gct_537b02a_e_polygon** in the **Layers** window. *Click* **Open Attribute Table**. *Scroll* to the right end of the attribute table to view the new variables. If this procedure worked correctly, you have now completed the process of getting census data. In front of you should be a map of the Hamilton CMA with 2001 population joined to it.