

02B007I  
SCB-ABC2-48

WORCESTER COUNTY RETURN VALUATIONS  
An Interactive Qualifying Project Report

submitted to the Faculty

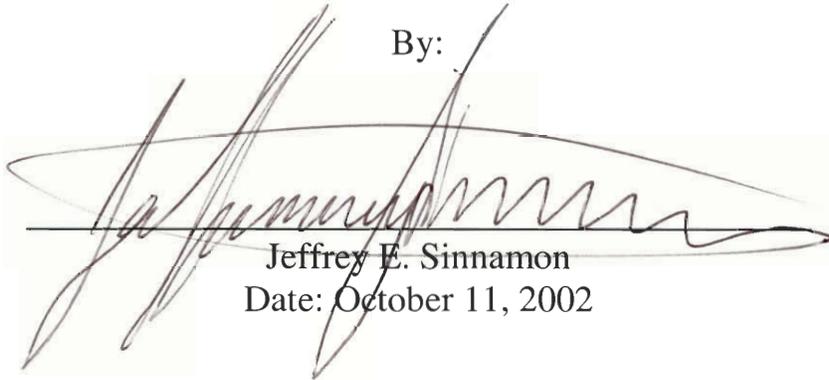
of the

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

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Date: October 11, 2002

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## **Abstract**

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Historical data is frequently found in numbers, numbers that take a great deal of work to produce an accurate picture of what has been recorded. Old Sturbridge Village Research Library has the return valuations of the Commonwealth of Massachusetts stored numerically. This project developed a format in which historical data, such as these return valuations may be displayed using MapInfo, a geographic mapping program. A historical analysis of this data was not intended, simply to make such analysis easier, and to provide a starting point for applying the data at Old Sturbridge Village.

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## 1. Introduction

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In the course of this project, I sought to format historical censuses from Old Sturbridge Village so that they can be understood at a glance by a layperson, while also providing a valuable new tool for historians. The final goal is to be able to overlay historical data on geographical information, creating historical maps. Specifically, I will be working with data from historical censuses taken in the Commonwealth of Massachusetts from 1791 through 1860. These censuses, or return valuations, contain a variety of information, ranging from population, to the number of mills, to the number of acres used to grow wheat. They were originally used by the Commonwealth to determine the tax rates for towns, but now they provide insight into life and how it changed during the early nineteenth century. These maps could be used in an interactive display for the public, or in a classroom setting. They could also prove useful in giving a historian a new look at data, allowing new trends and relationships to be discovered.

This project was initiated by Old Sturbridge Village, a “living museum” located in Sturbridge, Massachusetts. The Village was originally created as a way to display

antiques from the early nineteenth century, but has since grown to include a walk-through town. Here visitors can converse with and witness actors portraying everyday life in the early nineteenth century. Old Sturbridge Village strives to provide something more than a static display of historical artifacts, giving the public a view of a town in early nineteenth century New England and the changes that were occurring during that period of time. Therefore, organizing these censuses would provide the Village with a graphical representation of information pertaining to these changes, which could then be used in a variety of ways. The obvious use would be to use it within the Old Sturbridge Village Research Library. There it could be used to insure that the historical town itself reflects the changes that were actually occurring during that period. Instead of examining numbers, the research historians would be able to do direct graphic comparisons of the available data. Changes that could be examined would be what crops were being farmed in what years, what livestock was being raised, and what level of manufacturing was being performed. All of this information could be applied directly to the Village's live display.

Old Sturbridge Village was founded by the Wells family, owners of the American Optical Company in nearby Southbridge, Massachusetts. Channing, Albert, and J. Cheney Wells shared the business that their father had founded but also shared a passion for collecting. Albert collected things that had been handmade in New England. He collected such items as wooden bowls, scythes, hayrakes and butter churns. J. Cheney Wells began to collect early American clocks and other timepieces. During the 1920's, many of his pieces could be found in the American Optical Company's offices. His brother, Channing also collected, amassing a collection of fine furniture.

During the 1920's and 1930's, Albert continued to collect items of historical significance. At first, the growth of his collection necessitated the addition of rooms to his already generous Southbridge home. By the 1930's, the collection required forty-five rooms, and the family moved to a new home near Walker's Pond in Sturbridge.

In 1935, Albert, his brothers, and several other family members, along with a few trusted associates founded the Wells Historical Museum. The Museum took title to the collections and became responsible for their care and display. In July of 1936 the trustees, mostly Wells family members, met to discuss the future of the Museum. Albert proposed moving a large number of historical buildings to a family owned site in Southbridge and using them to display the collection. His son, George, had a different idea. He proposed having "...a live village, one with different shops operating..." Thus the basic premise of the Village was born. Within a week of reaching agreement with George's concept, the corporation purchased the Sturbridge farm of David Wight. Consisting of one hundred and fifty three acres and a millpond, it remains the location of the Village today.

With this new purpose, the Wells Historical Museum became the Quinabaug Village Corporation. Its mission was to "... operate a model village wherein shall be exhibited and carried on for the educational benefit of the public, specimens and reproductions of New England architecture and antiquities, the arts, crafts, trades, and callings commonly practiced in and about New England villages prior to the period of industrial expansion....". This description still applies to the Village today.

Work on the museum continued through the hurricane of 1938, halting briefly during the Second World War. In 1946, Ruth Wells, Albert's daughter-in-law, became the Acting Director. With the approval of the town selectmen, the Corporation was renamed Old Sturbridge Village. It opened to the public for the first time on June 8, 1946. Visitors were able to drive their cars through the Village witnessing craftsmen at work, see the gristmill in operation, and of course see the collection of the Wells brothers.

Since Old Sturbridge Village opened, it has grown in both reputation and in size. Nevertheless, the basic mission remains unchanged, to provide the public with an in-depth look at early nineteenth century New England. The description of what an in-depth view is has changed over the years, growing to include the walk-through village, more extensive exhibits, and programs tailored to visitors of all ages.

Behind the scenes at the Village is the Old Sturbridge Village Research Library. The library contains a wealth of historical information. Of interest to this project is the information the library has on the state valuation returns taken during the period from 1791 to 1860. These valuation returns are censuses taken every ten years by order of the Commonwealth of Massachusetts, in order to assess property taxes. The Commonwealth collected detailed information from each town regarding total agricultural, commercial and manufacturing output. These returns contain such information as acres of land for various crops, bushels of crops produced, numbers and types of buildings, and population. All of these data are useful to the Village in their quest to provide an accurate picture of the changes taking place during the early

nineteenth century in New England. However, they are not always organized in the most useful manner.

## 1.2 Software Packages

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During this IQP, I accomplished several things. The first was importing the valuation return data for Worcester County from Old Sturbridge Village Research Library's SPSS program to MapInfo. Once the information was imported, I manipulated the data to provide a comparison between the various censuses. Finally, I overlaid the data on each town, allowing trends to be tracked from year to year and from town to town. This provided a visual representation of the returns that may reveal previously undiscovered trends. It also provides a basis for constructing an interactive display for this information.

SPSS is a statistical software tool developed by the SPSS Business Intelligence division of SPSS Incorporated. It is used to perform statistical analysis of data, including historical data. The SPSS Base program provides the ability to do complex operations including linear regression, factor analysis, two-step cluster analysis, and hierarchical cluster analysis. By adding additional software packages to the base program it can perform even more complex operations. It is a very powerful tool for statistical analysis used by mathematicians at UCLA, University of Texas, and University of Colorado. It is also used by the Old Sturbridge Village Research Library to track historical trends and information. However, despite its wide application, it is primarily targeted to serve a business audience, not academia.

SPSS has the ability to create graphs from the information it has stored, but until recently was unable to generate a map from statistical information. A recent release of a package known as SSPS Maps allows SPSS version 11.5 to perform demographic

analysis. So, while SPSS can provide powerful statistical analysis it has not historically been useful in doing analysis, in conjunction with maps.

MapInfo is the flagship product of MapInfo Corporation. It is designed to function primarily as a mapping program and as such has a distinct advantage over SPSS. It provides users with the ability to create maps to analyze data imported from various sources for tracking trends, geographic assets and perform data analysis. It is compatible with Microsoft Office products to provide ease of use. MapInfo also ships with a large amount of data to enable the user to get started immediately. Like SPSS, MapInfo is geared towards a business audience. This does not mean it is not useful in non-commercial applications. MapInfo has the ability to import files from sources including Microsoft Access and Excel, Lotus 1-2-3, and dBASE. MapInfo can also import raster graphics. Raster graphics are digital images created or captured (for example, by scanning in a photo) as a set of samples of a given space. A raster is a grid of x and y coordinates on a display space. A raster image file identifies which of these coordinates to illuminate in monochrome or color values. The raster file is sometimes referred to as a bitmap because it contains information that is directly mapped to the display grid. Several common graphics types are raster images including bitmaps, GIF, and JPEG images. This ability allows the possibility of future projects importing digitally scanned historical maps, providing historically accurate geographic information on which to overlay the data. All of these features allow MapInfo to display information in a variety of modes including prism, thematic, three-dimensional and the traditional two-dimensional maps.

MapInfo does not provide an advanced method of manipulating data once it is imported. You can edit each field in a column but editing on a larger scale is simpler and more efficiently done in an external spreadsheet program such as Microsoft Excel. It also does not provide a method for permanently merging various datasheets. The only solution available is merging the two tables column by column temporarily. While this is useful in examining various subsets of data, it makes data manipulation difficult. A newer version of MapInfo, not available at WPI, appears to resolve some of these difficulties by using a software tie to the database engine in Microsoft Access.

## 2. Data

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The information obtained from the Old Sturbridge Village Research Library was the basic valuation data. No geographic information was available to overlay the data on. I was able to obtain the geographic information I needed from the Massachusetts Geographic Information System, maintained by the Executive Office of Environmental Affairs. The Massachusetts GIS maintains a large number of data files regarding various environmental issues ranging from forestland to town boundaries to transmission lines. I was able to download the information regarding town boundaries from the Massachusetts GIS web site located at <http://www.state.ma.us/mgis/ftpstate.htm>. This data is not available in the format used by MapInfo, only in that used by a different mapping program, ArcLink. A brief search for a way to convert the data revealed that MapInfo is able to install itself with an appropriate converter. I uninstalled MapInfo, and reinstalled it with the appropriate converter. With the appropriate converter installed MapInfo quickly converted the ArcLink file into the format used by MapInfo. The converter split the single ArcLink file into multiple table and data files; all of which are required to display the information originally stored in the single ArcLink file.

With the geographic information in place, the next step was to convert the information provided by the Research Library. The valuation returns were originally stored in SPSS, which is not readable by MapInfo. Fortunately, Jack Larkin, the Director of Research, Collections and Library at Old Sturbridge Village, was able to convert the information from within SPSS to a Microsoft Access format. The information in Microsoft Access, while in a format which is readable by MapInfo, proved to be difficult to import correctly. MapInfo would not read the column headings as headings, instead treating them as valid data. To remedy this situation I split the information in Microsoft Access into individual sheets within an Excel workbook. This was accomplished by using Access's 'Save As/Export' function, and saving the data as a large Excel spreadsheet. It was then a simple matter to cut and paste each year into a specific sheet.

Within the Excel sheets, it was a simple matter to copy and paste two sheets together. Then by simply subtracting the later census from the earlier a change could be calculated and displayed in a new set of fields. These new fields reflect the changes between the two census years, providing a useful numerical contrast over a period of ten years. Figure 1 shows an example of two years being subtracted to form a new set of data. The only difficulty arises when there are values that are not recorded from year to year. The same information was not always collected by the Commonwealth, occasionally making direct comparison difficult. The data was eventually split into each of the years for which there was census data, along with a sheet for the differences

between each census year. While there are no contrasts between non-sequential censuses, a similar procedure could be followed to provide comparisons over a wider period.

TownID	ID	YEAR	TOWNNAME	TOWNAREA	TOWNPOP	POLLS	POLLSUPP	DWELLING
126	11	1850-1860	Ashburnh	0	233	96	0	5
127	15	1850-1860	Athol	0	570	184	-1	11
128	17	1850-1860	Auburn	0	35	-61	3	1
129	21	1850-1860	Barre	0	-3	19	-2	2
130	28	1850-1860	Berlin	0	240	83	2	5
131	32	1850-1860	Blacksto	3526	1062	126	0	10
132	34	1850-1860	Bolton	0	85	30	3	2
133	39	1850-1860	Boylston	0	11	-34	4	-
134	45	1850-1860	Brookfie	0	602	188	3	10
135	54	1850-1860	Charlton	0	32	21	-2	3
136	64	1850-1860	Clinton	0	746	283	2	17
137		1850-1860	Dana	0	34	7	-2	1
138	77	1850-1860	Douglas	0	564	64	-7	10
139	80	1850-1860	Dudley	0	293	36	-3	2
140	97	1850-1860	Fitchbur	0	2685	624	-3	41
141	103	1850-1860	Gardner	0	1113	307	1	19
142	110	1850-1860	Grafton	0	413	125	-6	10
143	124	1850-1860	Hardwick	0	-110	-29	4	-
144	125	1850-1860	Harvard	0	-123	-37	1	2
145	134	1850-1860	Holden	0	12	29	0	1

Figure 1 Excel Table and Formulas

Importing the sheets into MapInfo so that they could be overlaid on the geographic information was more difficult. The Excel sheets can be opened through the 'Open Tab File' function in MapInfo. However, the titles of the columns in Excel are treated as valid data by MapInfo, which disables the mapping function, as you cannot plot non-numeric characters. Examine Figure 2 and note the top line of the sheet.

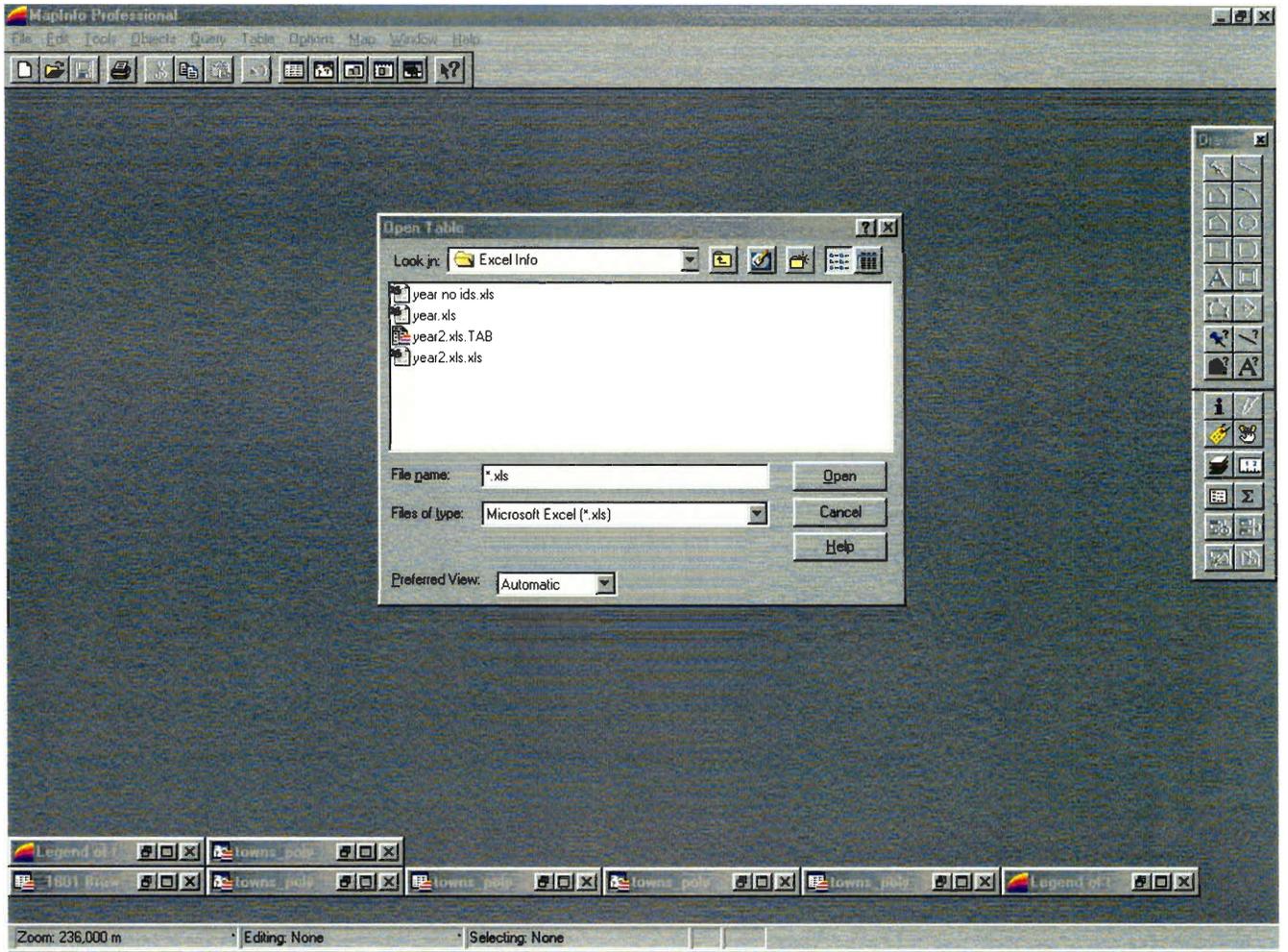
MapInfo has incorrectly imported the column headings as data. This situation is exacerbated when importing the sheets with the data used to calculate the comparisons between years. The entire sheet is imported directly, valid data, column titles, and whitespaces. To resolve this issue you must import only the data cells.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
<input type="checkbox"/>	ID	YEAR	TOWNNAME	TOWNAREA	TOWNPOP	POLLS	POLLSUPP	DWELLING	SHOPNEAR	MISCSHOP	DISTILL	TANNERY	WARESTOR	GRIST	CA
<input type="checkbox"/>	1	1781	Ashburnh	24992	n/a	158	n/a	97	10	6	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	2	1781	Athol	20001	n/a	236	n/a	125	17	7	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	3	1781	Auburn	8340	n/a	111	n/a	64	10	5	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	4	1781	Barre	27730	n/a	323	n/a	180	20	9	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	5	1781	Berlin	7986	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	6	1781	Blacksto		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	7	1781	Bolton	13821	n/a	297	n/a	166	20	5	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	8	1781	Boylston		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	9	1781	Brookfie		n/a	615	n/a	364	95	14	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	10	1781	Charlton	27462	n/a	340	n/a	188	15	11	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	11	1781	Clinton		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	12	1781	Dana	12466	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	13	1781	Douglas	22912	n/a	212	n/a	123	16	10	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	14	1781	Dudley	22326	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	15	1781	Fitchbur		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	16	1781	Gardner		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	17	1781	Grafton	14796	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	18	1781	Hardwick	26641	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	19	1781	Harvard	16341	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	20	1781	Holden	19840	n/a	167	n/a	170	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	21	1781	Hubbards	22540	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	22	1781	Lancaste		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	23	1781	Leiceste	15694	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	24	1781	Leominst		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	25	1781	Lunenbur		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	26	1781	Mendon		n/a	296	n/a	165	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	27	1781	Milford		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	28	1781	Milbury		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	29	1781	New Brai	13494	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	30	1781	North Br		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	31	1781	Northbor		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	32	1781	Northbri		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	33	1781	Outbur		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a

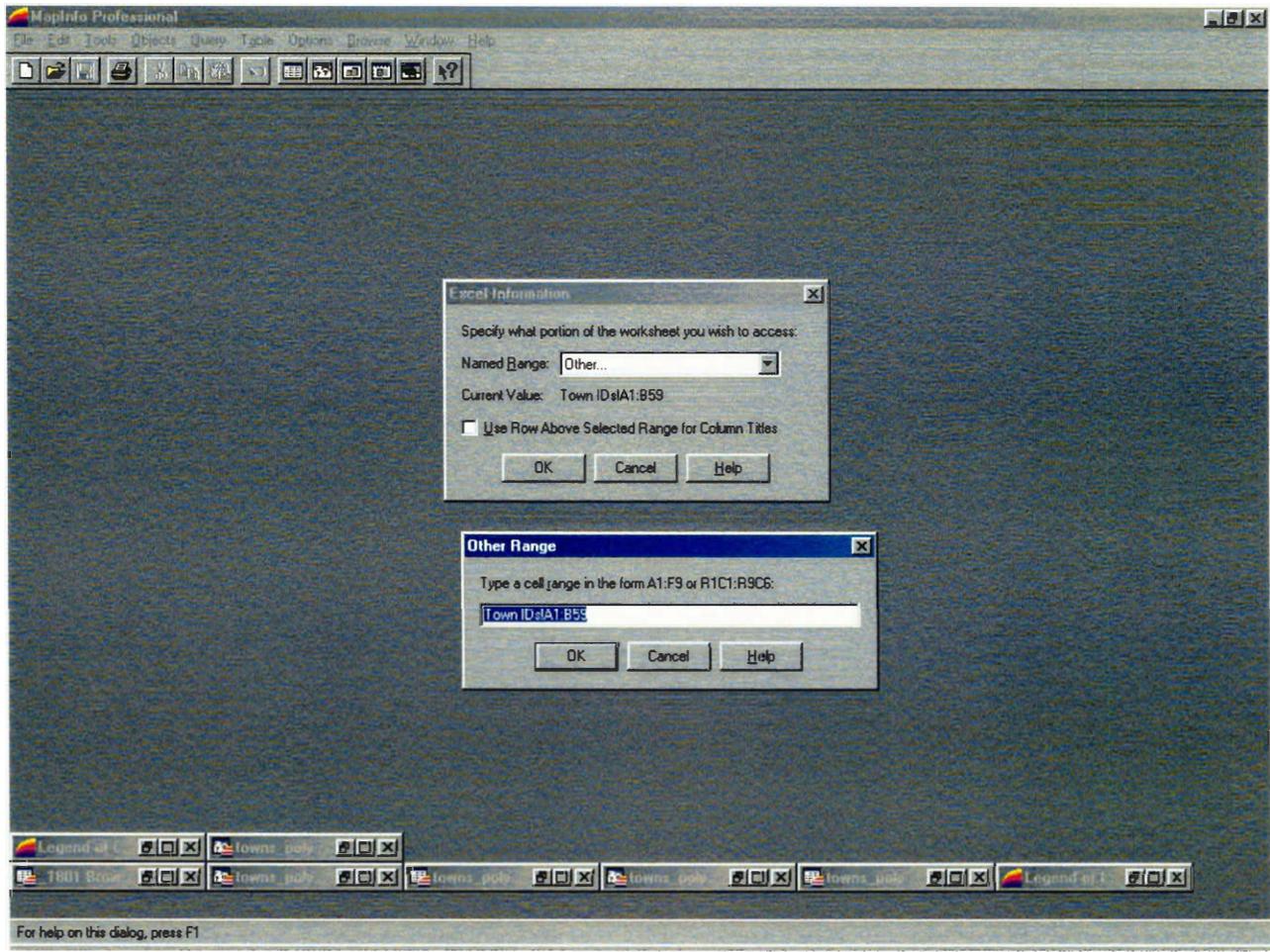
*Figure 2 Incorrectly Imported MapInfo Table*

In order to correctly import an Excel spreadsheet you use the 'Open Tab File' function in MapInfo's 'File' menu. See Figure 3 for an example of the dialogue box that MapInfo will present. Select the Excel workbook that contains the sheet that you wish to

import. MapInfo will prompt you with a dialogue box containing all of the worksheets in that workbook. At the very bottom is the option 'Other'. By selecting other you can specify the sheet, and more importantly the cells you wish to import. The format is NAME!X1:Y1, where 'NAME' is the name of the worksheet, 'X1' is the upper left side field of data and 'Y1' is the lower right side field of data. Be sure that you do not select the column headings in this range. MapInfo allows you to check an indicator in the same dialogue box to show that the row above your selection contains column headings. See Figure 4 for a screen shot of a correctly completed dialogue box. Select 'OK', to finish converting an Excel sheet into a MapInfo table file.



*Figure 3 Open Table Dialogue*



*Figure 4 Importing A Specific Range of Fields from Excel*

Once the data for a sheet is correctly imported into MapInfo, it can be saved as a table file. If you are importing multiple sheets from a single Excel workbook, you should save each sheet individually as a MapInfo table as soon as you import it, and then close all tables before attempting to import another sheet. When a sheet is imported, MapInfo creates a table file with the name of the Excel workbook containing the data from the single sheet you selected, not the data from the entire workbook. In order to open a different Excel sheet you have to close all of the tables that are currently open. This is

accomplished by using the 'Close All' function in the MapInfo 'File' menu. Once the open tables are closed, a new worksheet can be opened as described above. MapInfo will warn that the table already exists and will be overwritten. If the previously imported sheet has been saved under a new name, it is safe to overwrite this table. MapInfo will import the new sheet. Save the sheet under a new name, close all of the open tables and repeat until the process until all of the worksheets have been imported. An example of a correctly imported Excel sheet that has been saved as a MapInfo table file is found in Figure 5.

*Figure 5 Correctly Imported MapInfo Table*

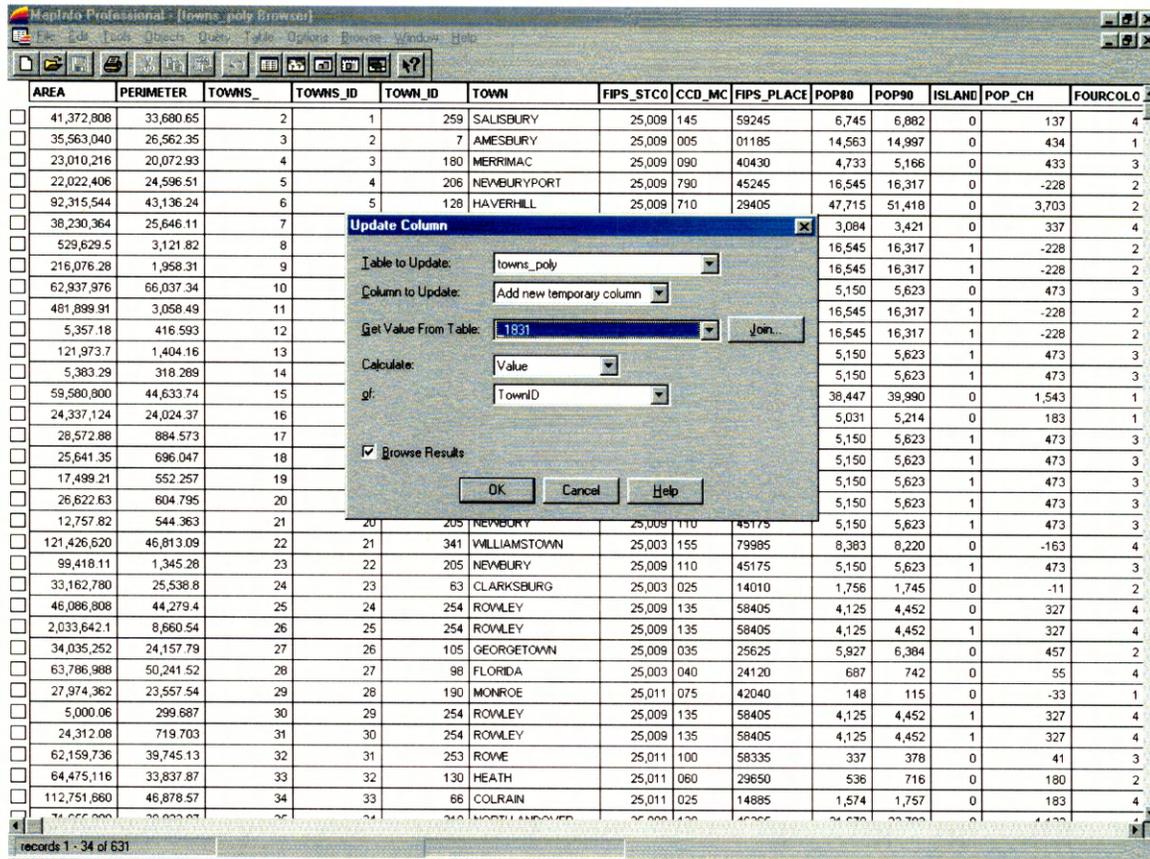
TownID	ID	YEAR	TOWNNAME	TOWNAREA	TOWNPOP	POLLS	POLLSUPP	DWELLING	SHOPNEAR	MISCSHOP	DISTILL	TANNERY
11	117	1,801	Ashburnh	24,992	994	214	1	140	0	9	0	
15	118	1,801	Athol	20,001	993	210	0	134	1	13	0	
17	119	1,801	Auburn	8,340	532	119	1	79	1	0	0	
21	120	1,801	Barre	27,730	1,937	368	1	210	1	2	0	
28	121	1,801	Berlin	7,986	590	120	1	80	1	10	0	
32	122	1,801	Blacksto	0	0	0	0	0	0	0	0	
34	123	1,801	Bolton	13,821	945	218	1	133	1	20	0	
39	124	1,801	Boylston	0	1,058	228	7	134	2	0	0	
45	125	1,801	Brookfie	43,506	3,284	676	1	421	7	50	0	
54	126	1,801	Charlton	27,462	2,120	456	3	289	2	27	1	
64	127	1,801	Clinton	0	0	0	0	0	0	0	0	
0	128	1,801	Dana	12,466	0	118	0	46	1	2	0	
77	129	1,801	Douglas	22,912	1,083	221	5	154	0	3	0	
80	130	1,801	Dudley	22,326	1,140	212	2	131	1	6	0	
97	131	1,801	Fitchbur	0	1,390	272	2	188	1	24	0	
103	132	1,801	Gardner	14,124	667	149	0	87	0	8	0	
110	133	1,801	Gratton	14,796	985	214	0	122	0	12	0	
124	134	1,801	Hardwick	26,641	1,727	246	2	213	0	2	0	
125	135	1,801	Harvard	16,341	1,319	327	0	178	8	41	0	
134	136	1,801	Holden	19,840	1,142	236	0	135	5	3	0	
140	137	1,801	Hubbards	22,540	1,113	242	0	127	0	1	0	
147	138	1,801	Lancaste	0	1,584	321	7	196	0	6	0	
151	139	1,801	Leiceste	15,694	1,103	229	1	133	1	1	0	
153	140	1,801	Leominst	18,603	1,486	298	3	187	0	4	0	
162	141	1,801	Lunenbur	17,494	1,243	261	1	170	3	19	0	
179	142	1,801	Mendon	0	1,628	299	8	195	4	17	0	
185	143	1,801	Milford	12,170	907	175	0	114	3	14	0	
186	144	1,801	Millbury	0	0	0	0	0	0	0	0	
202	145	1,801	New Brai	13,494	875	185	0	102	7	7	0	
212	146	1,801	North Br	0	0	0	0	0	0	0	0	
215	147	1,801	Northbor	11,630	698	147	2	86	2	6	0	
216	148	1,801	Northori	10,590	544	116	0	75	0	3	0	
222	149	1,801	Oakham	0	801	188	1	98	2	10	0	

### 3. MapInfo

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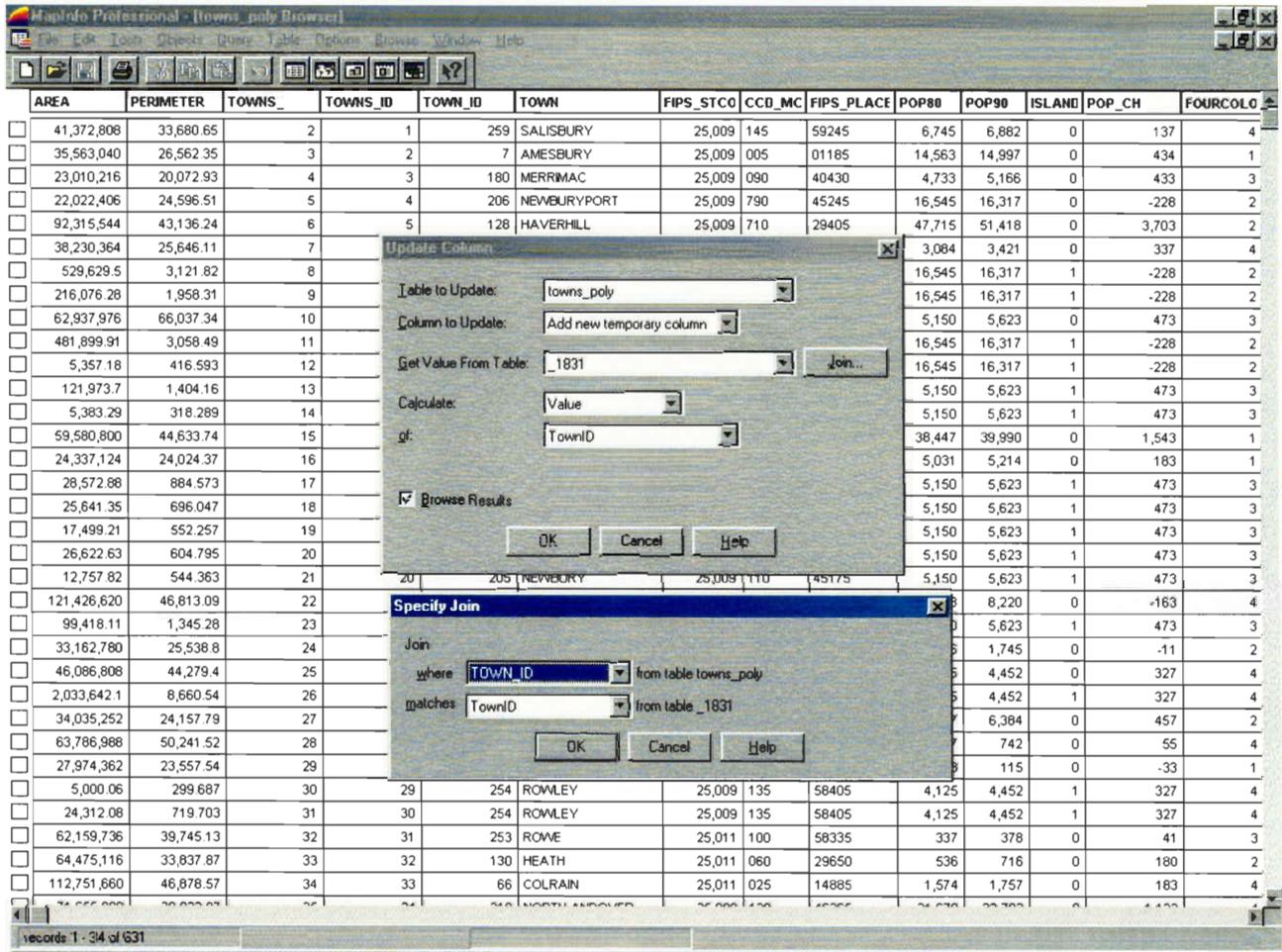
With the data imported, it is time to examine the basic framework within which MapInfo operates. The basic file type is the table, which has a similar appearance to a sheet in Microsoft Excel. It is the basis for everything that MapInfo does. All maps and graphs are generated from this basic format. The information that was imported from SPSS could not be graphed because it contains no geographic references. The information needs to be linked to a table that contains the geographic information. In order to link tables together you must add a temporary column.

Temporary columns are how MapInfo links two tables together. Using the 'Update Column' function in the 'Table' menu, it is possible to join two tables together temporarily. First, open the two tables that you wish to join. Then select the 'Update Column' function. MapInfo will present a menu asking what open tables you would like to join. The dialogue box is shown in Figure 6. If you are performing an overlay on geographic information, insure that you are adding the temporary column to the table containing the geographic information or you will be unable to create a new map. Then you must select the conditions under which you want the join to occur. Each town in the Massachusetts geographic information was assigned a specific identifier labeled 'Town\_ID' by Massachusetts GIS. Each town in the valuation returns also had an identifier assigned to it by SPSS. I stripped the information added by SPSS and replaced it with the field 'TownID'. 'TownID' is coded so that it correlates with the Town\_ID value used in the geographic information. Each individual town then has a unique identifier that is common to both tables



*Figure 6 Adding a Temporary Column*

. The join should be computed where 'Town\_ID' is equal to 'TownID'. Then select the column that you wish to join to the geographic information. An example of a temporary column join being performed correctly is found in Figure 7.



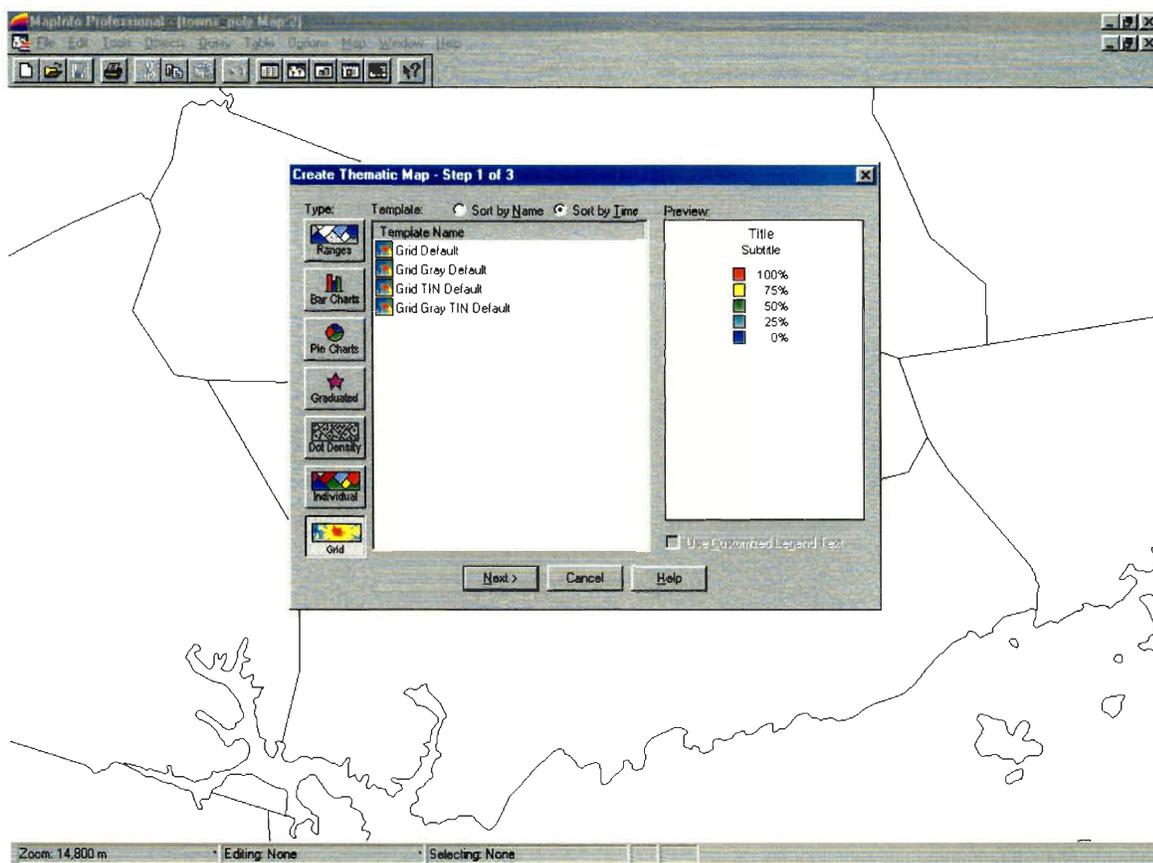
*Figure 7 Specifying When to Join Tables*

For example, if you were attempting to do an overlay of a population change you would select the join where 'Town\_ID' is equal to 'TownID'. Then you would select the column 'Pop' to add to the geographic information. You can join any number of temporary columns together or join columns from multiple sheets. Now that you have the table assembled, you need to create a map.

## 3.2 Maps

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To create a basic map you select the table 'from which you wish to create a map and select 'New Map Window' from the 'Window' menu. MapInfo will then generate a basic map. No information will appear to have changed from the original geographic map to this map. It will merely appear to be a map of the Commonwealth of Massachusetts, including the boundaries of the individual towns. MapInfo has not been instructed to include the new column that we have added. The basic map is required to create all other maps. To overlay the data, a thematic map is required. Under the Map menu, select the function 'Create Thematic Map'



*Figure 8 Creating a Thematic Map*

Many different options are immediately presented in a dialogue box as shown in Figure 8. Pie charts, bar charts, grid maps and range maps are all available. Any of these displays can be created from the basic map window and our modified table. The most practical display for our purposes is available under range maps. Select range maps and then select the style and colors in which you wish the map to be displayed. Then select the option 'Next'. MapInfo prompts you for the table you wish to display and the column you wish to take your data from. An example is shown in Figure 9.

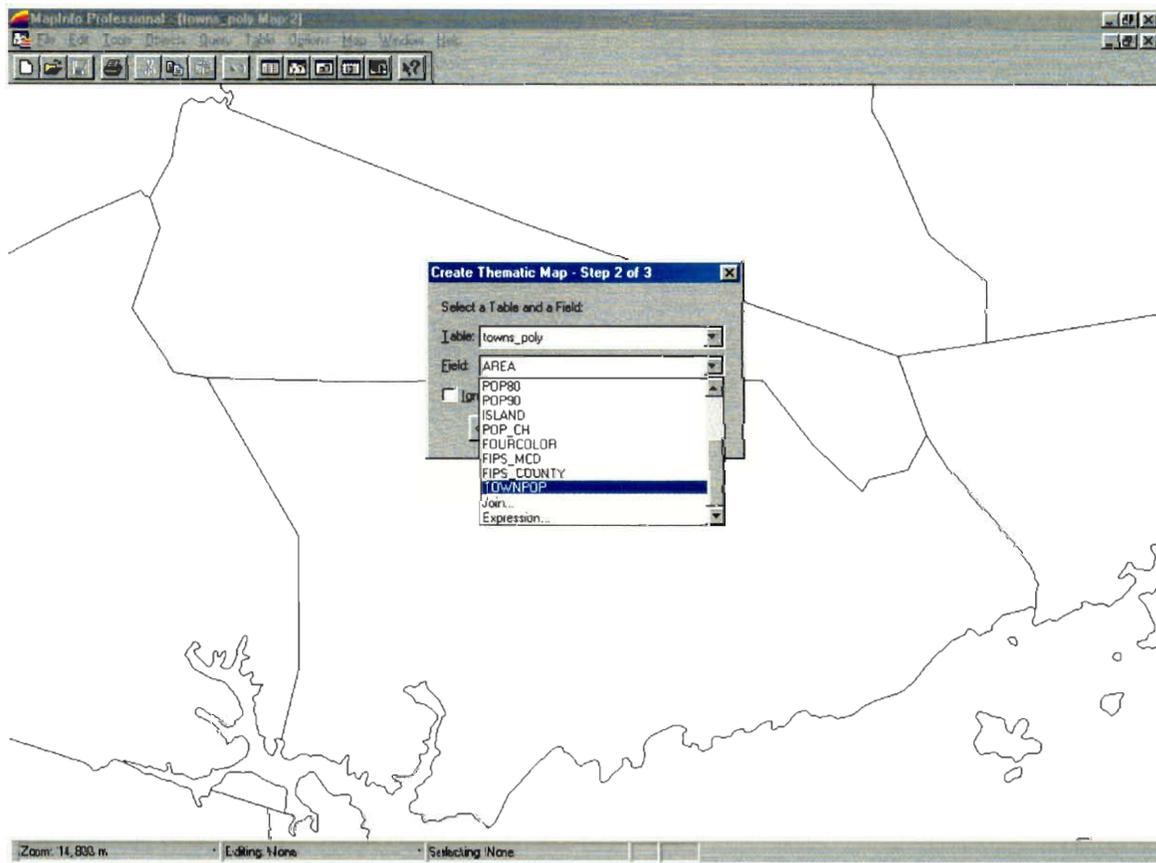
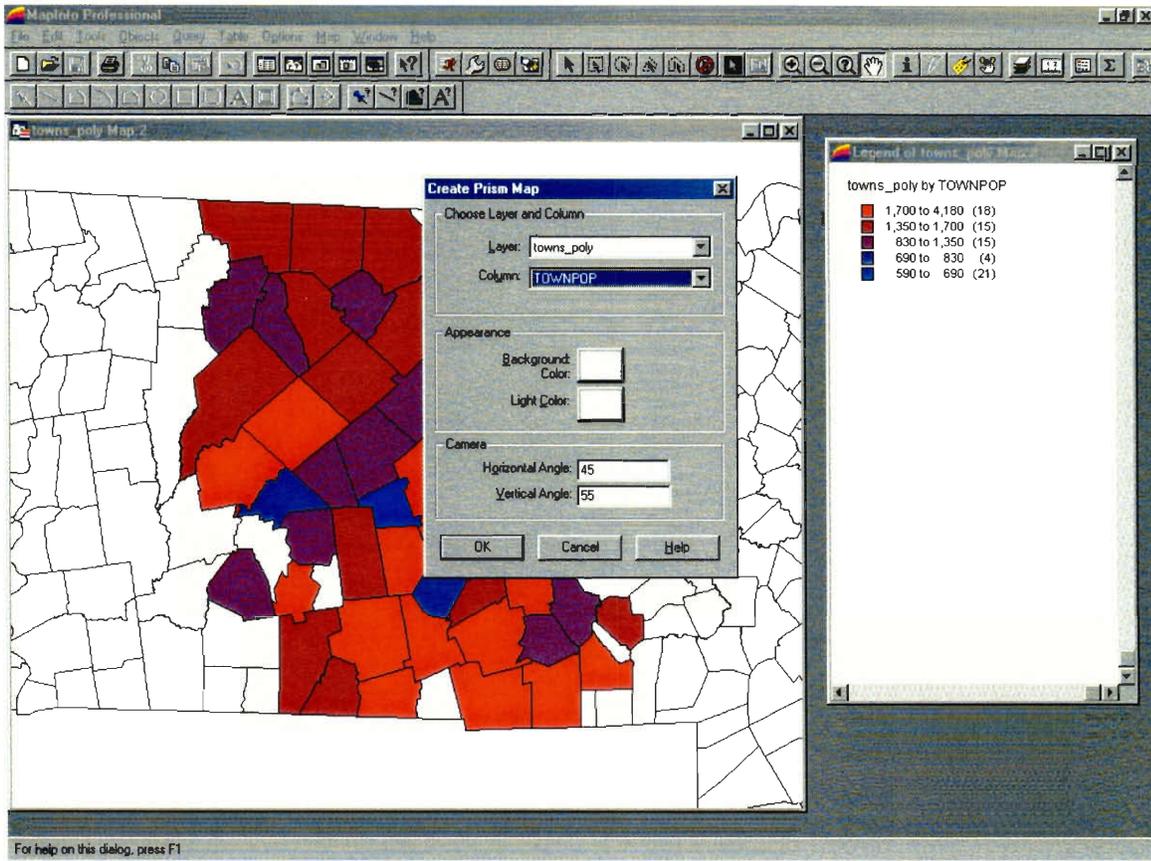


Figure 9 Selecting Field to Display for Thematic Map

Select your newly joined column from the geographic table. There is an option to ignore zeros and blanks available at this point. Be sure and select this, since the table only contains data for Worcester County, so many towns have no values in your new column. If you do not select this, you will find your range map to be inaccurate, as MapInfo will attempt to include the numerous blank values when selecting the ranges to display. Select the 'Next' option again. MapInfo will give you its default ranges. You can change these if you wish to by selecting the 'Ranges' option. Here you can change how many divisions you wish to have, and by what method you wish to select them. You can also edit the style of the map by selecting 'Style'. Alternatively, if you wish to create a number of maps with a similar look, you can save your options as a Template. Once you have your options set, select 'OK' to generate your map.

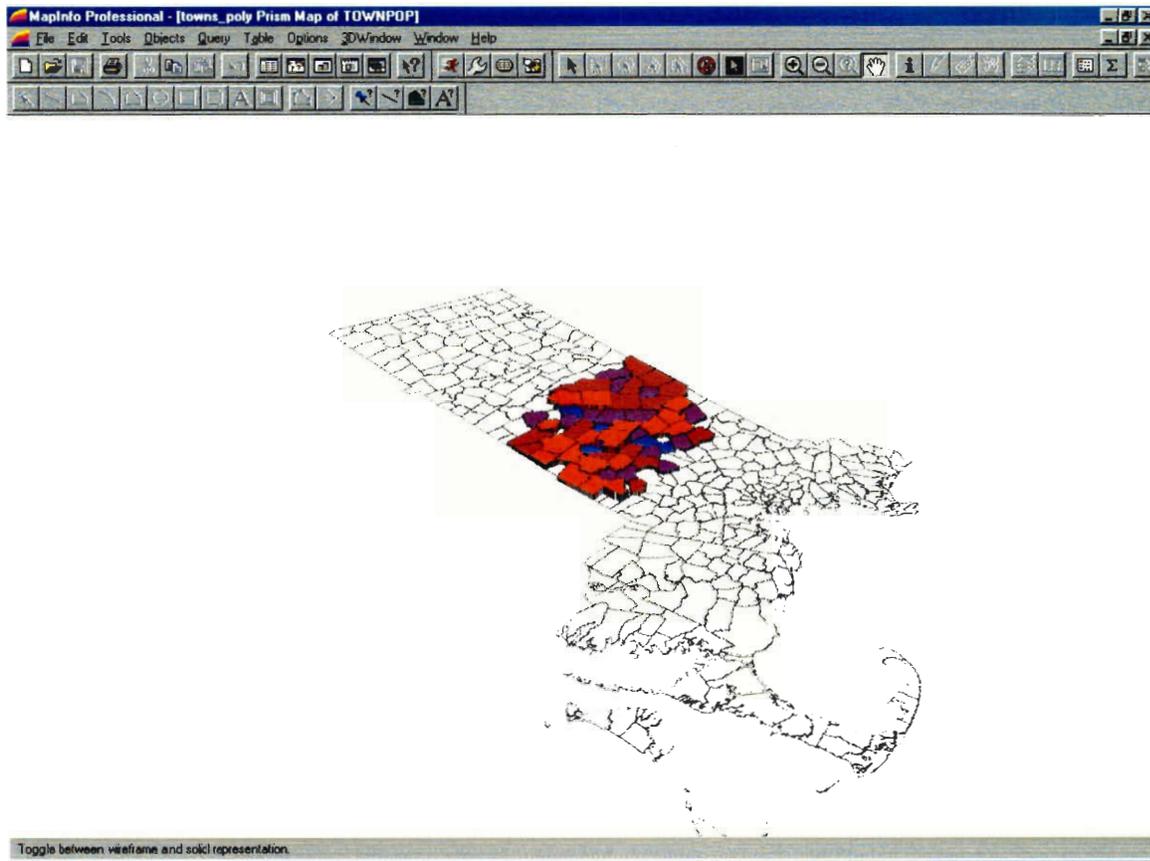
Pie charts, bar graphs and grid maps can be created in a similar fashion to the method described above. Prism maps add a third dimension to basic maps and can be combined with thematic maps to generate a different perspective. They are created in a slightly different fashion. First, create a thematic map as described above. Once that map is generated, select it, and then select 'Create Prism Map' from the 'Map' menu. A dialogue box similar to that shown in Figure 10 will appear.



*Figure 10 Creating a Prism Map*

You will be prompted for your layer, which is your geographic information with your new column and your column, which is your temporary column. You may also change your camera angle, which will be the angle at which the map is presented to you. When selecting the camera angle, keep in mind that this is a three dimensional map. When you are finished, select 'OK' and MapInfo will generate a prism map. This map will not only show the colors from the thematic map, it will display the data in elevation. The median values will appear to be at 'ground' level, while high values will be elevated and low values will be depressed. This type of map is useful for getting a more concrete display of disparities. It is most useful if you have a large number of ranges selected

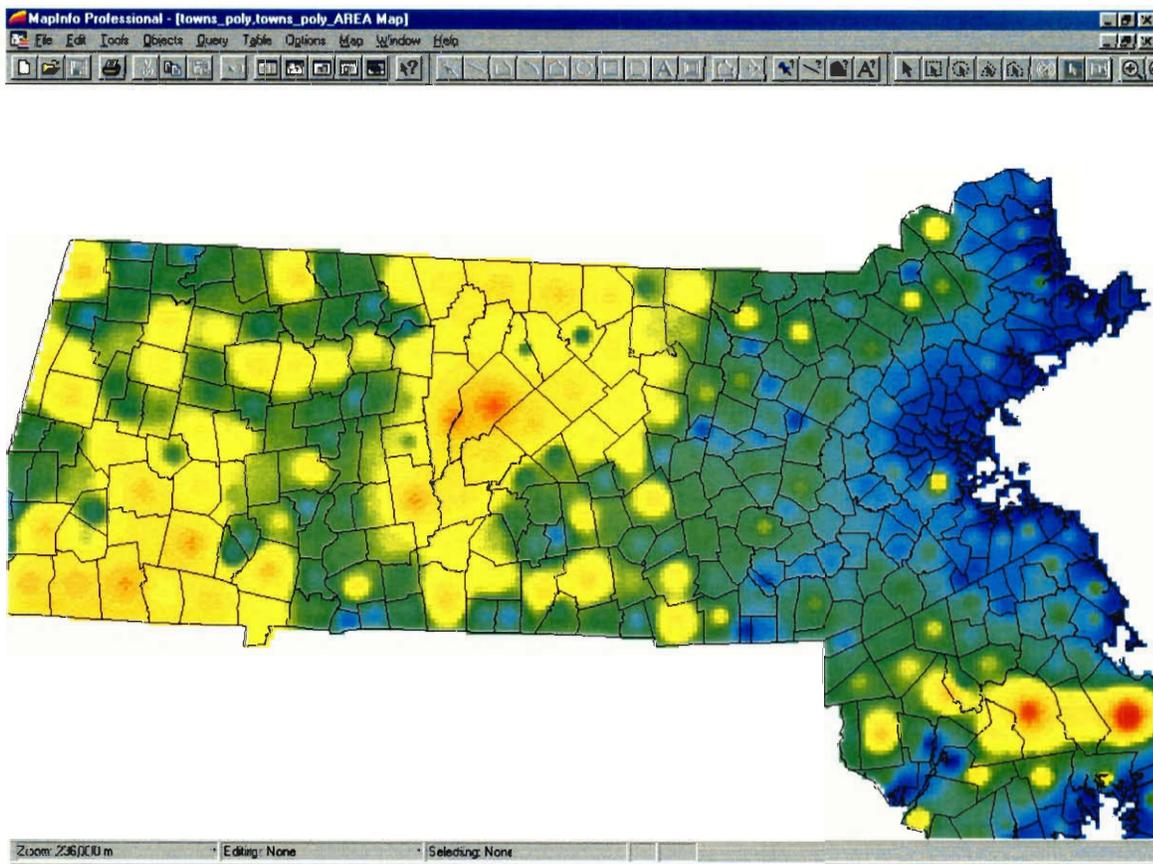
when generating your thematic map. A prism map of the population change in Worcester County is shown in Figure 11.



*Figure 11 Prism Map Displaying Change of Population in Worcester County*

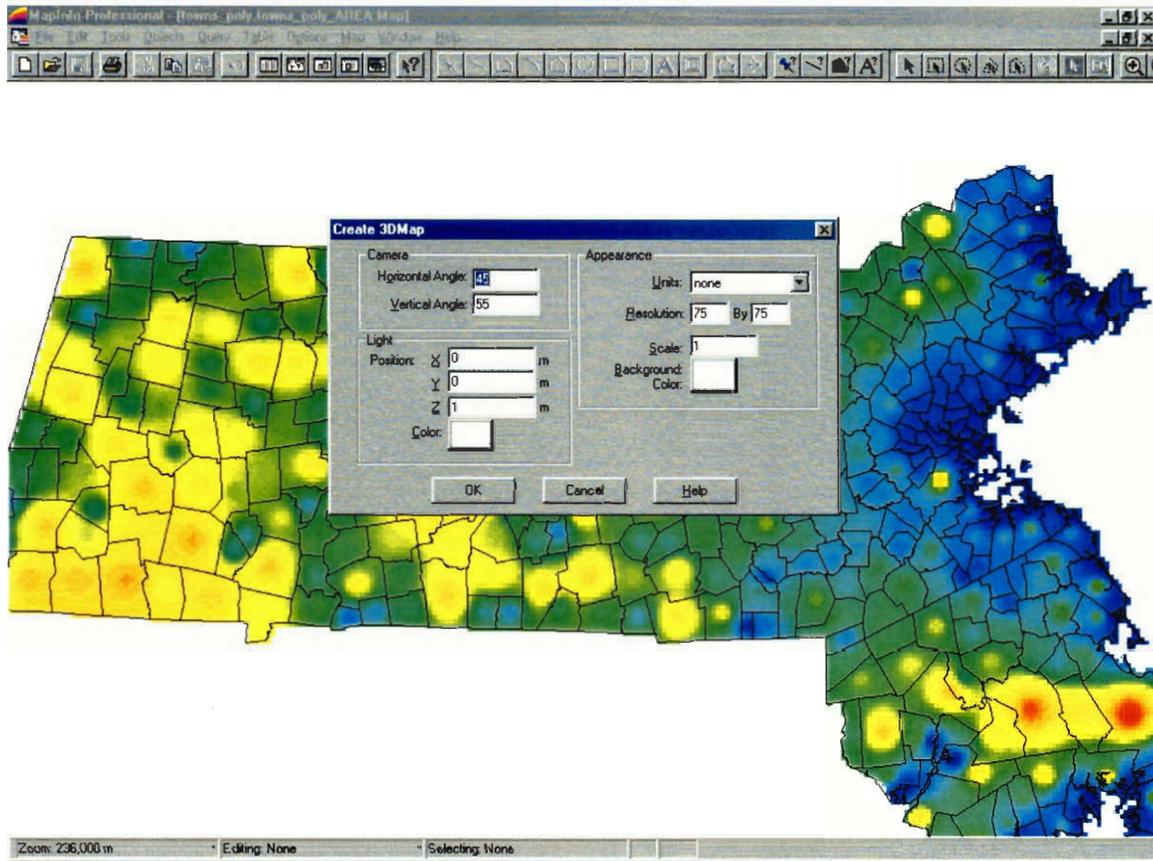
The third and final style of map is the three dimensional map. This map also requires two steps to create. You must first create a grid thematic map. This map differs from a normal thematic map because it blends values together to give an overall picture of an area, rather than one delineated by town boundaries. The map can be made to conform to a certain area by selecting a geographic table to limit the data displayed. For example, by providing geographic data for just Worcester County the data would only

display the data for that county. It will only truly be useful when the information for the entire Commonwealth is included or if a geographic table is split out for just Worcester County. A grid thematic map is created exactly the same way a normal thematic map is created, except that it now includes the option to limit the data to a certain geographic table. A good table to use is your geographic data, with or without your new columns. The grid thematic map will appear similar to the one shown in Figure 12.



*Figure 12 Grid Thematic Map of Population Change*

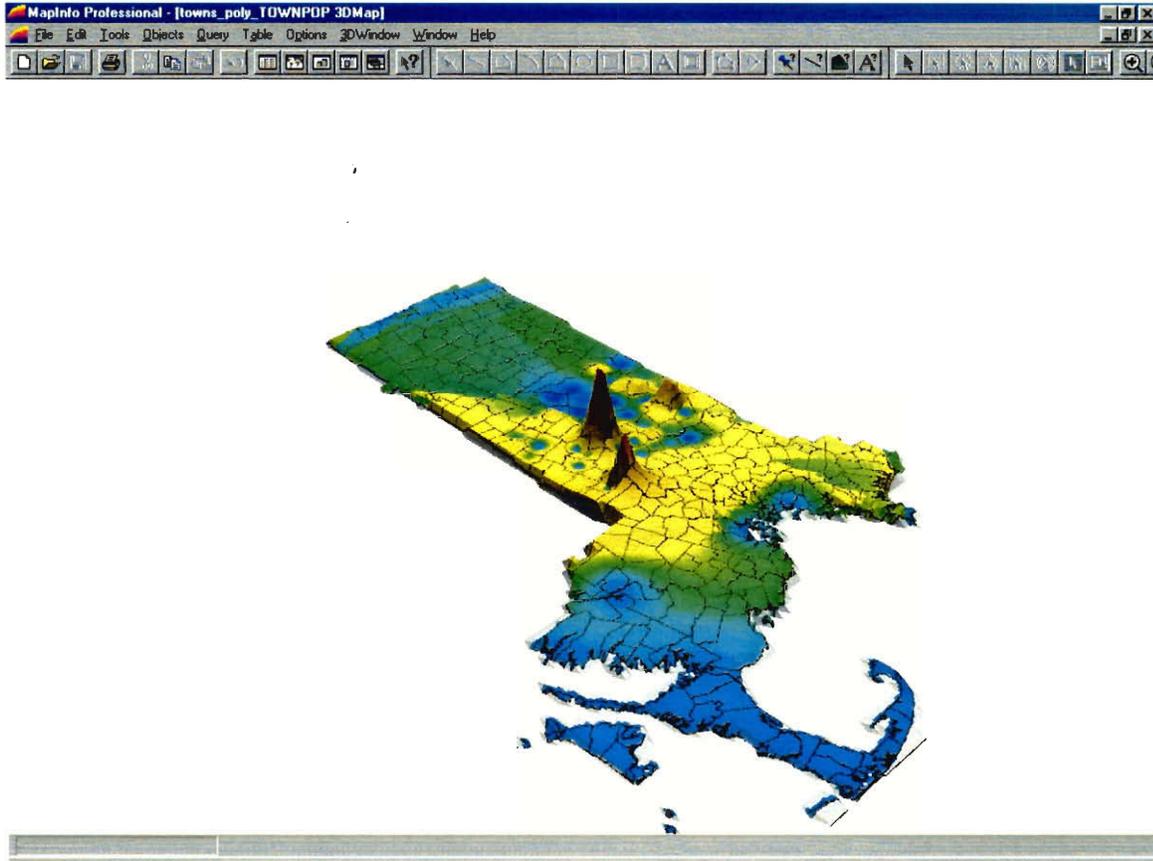
After creating the grid thematic map, select the 'Map' menu. For the first time the 'Create 3-D map' function will be enabled. Select this function and a new dialogue box will appear, as in Figure 13.



*Figure 13 Creating a Three-Dimensional Map*

As in a prism map, you can select the angle at which you wish the map to be generated. Selecting 'OK' will have MapInfo generate a three-dimensional map, which will resemble your prism map, only it will not be clipped to individual towns. This view is useful if you wish to view trends over a specific region, rather than individual towns. For instance, in

Figure 14, the increase in population in the southeastern and northern portions of Worcester County can easily be compared to the decrease in the western portion.



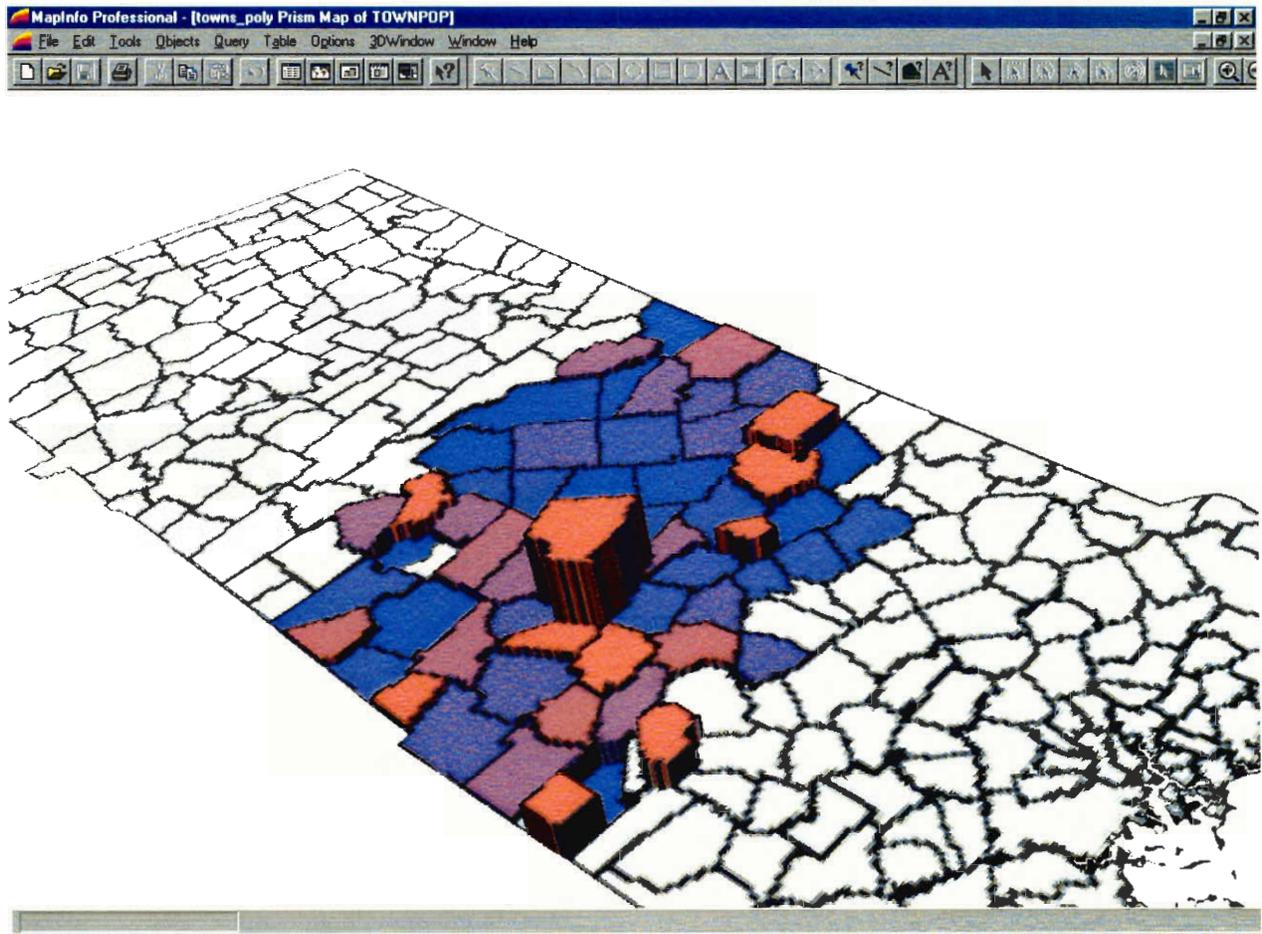
*Figure 14 Three-Dimensional Map of Changes of Population in Worcester County*

This might not be so easily seen in a prism map. The same data was used to generate both Figures 11 and 14. The changes in population are much more obvious when viewed in a three-dimensional map.

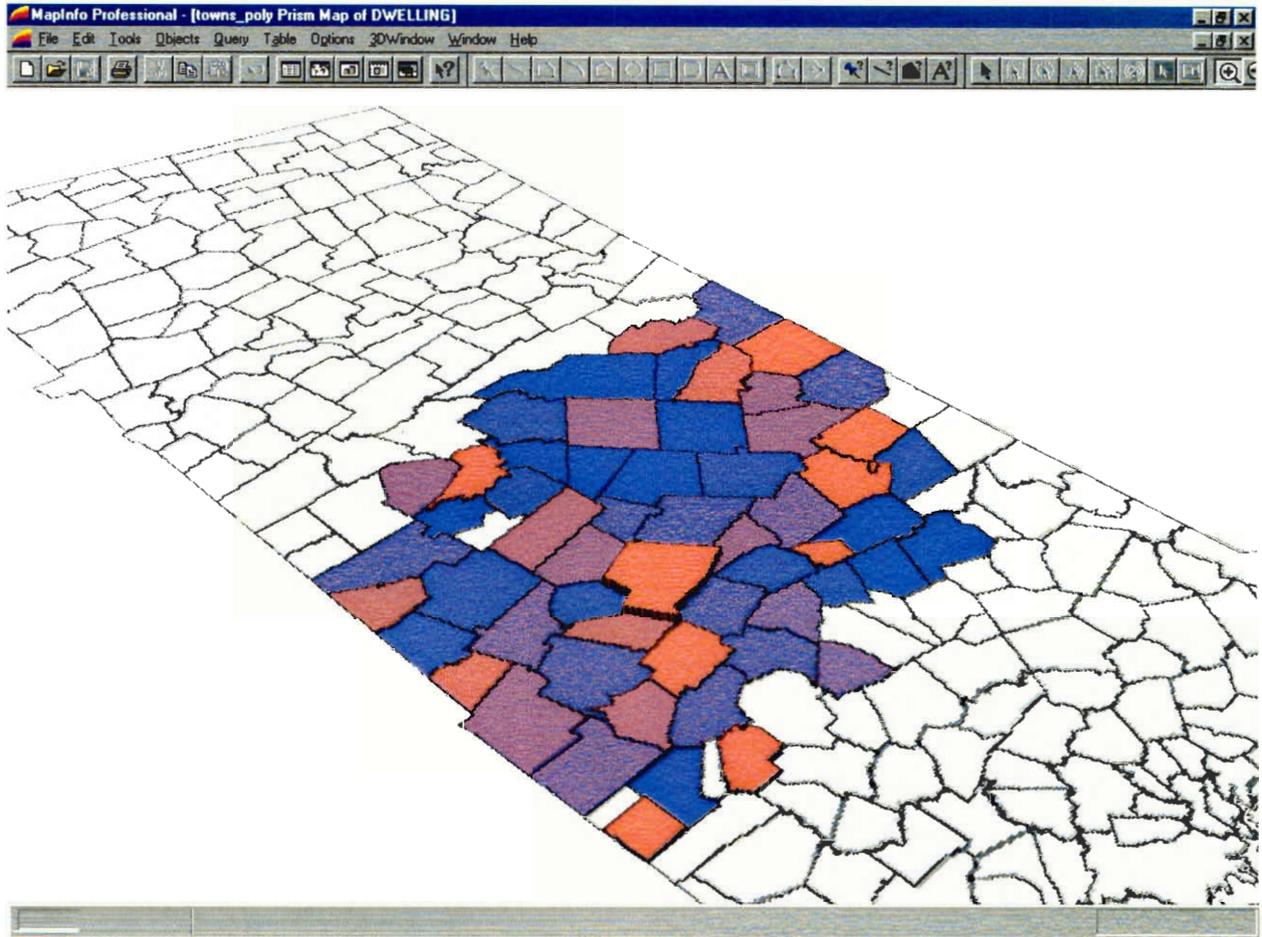
## 4. Applications

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With the data correctly formatted, and using the tools above, we can finally begin to organize the valuation returns into a graphical format. To illustrate how this can be useful; I did a brief analysis of the population and dwelling changes in Worcester County from 1841 to 1850. First, we join the temporary columns of population and dwellings to the geographic data. We now have a table from which we can generate a series of maps. We start with the creation of two thematic maps to show the two-dimensional representation of our data. These while useful do not provide a dramatic illustration of the differences. We then create a prism map from each thematic map to give a three-dimensional image. These provide a more useful tool for data analysis. Comparing these two maps, Figures 15, and 16, we can see that the towns that had an increase in population also had an increase in dwellings.



*Figure 15 Thematic Map Showing Change in Population in Worcester County*



*Figure 16 Thematic Map Displaying Change in Dwellings in Worcester County*

This simple analysis does not reveal any revolutionary new trends concerning life in the early nineteenth century, as one would expect an increase in population to result in an increase in dwellings. It does, however prove how this new format can be useful. By simply comparing the two maps, a quick conclusion can be drawn, rather than spending a large amount of time comparing the numerical values for each individual town.

## 4.2 Complex Application

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Now that we seen how a simple comparison can be made easier by using this graphical display, we can take apply our knowledge to a slightly more complex situation. For example, during the period 1811-1821, certain towns in Worcester County experienced an increase in the number of dwellings. This increase is likely due to an increase in population as we saw above. The question we are interested in here is where are these dwellings being built. Are they being built on previously unimproved land? Alternatively, are they being built on land that was previously deemed hopeless for any use? By constructing several maps using our new knowledge, we can examine this question more closely. Below, in Figure 17, is a map of the increase in dwelling across Worcester County. Towns with large increases are marked in red, while towns with large decreases are marked in blue.

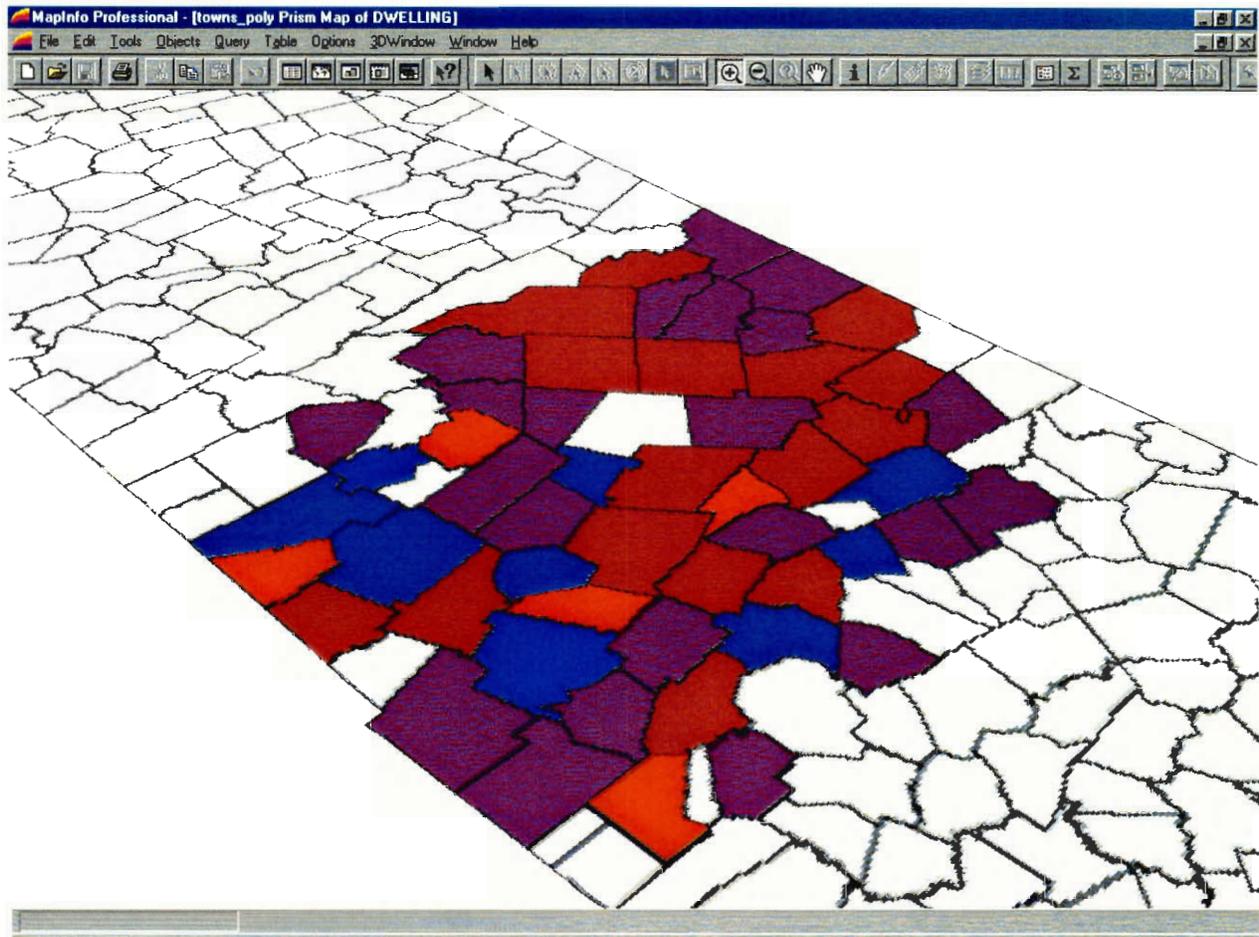


Figure 17 Change in Dwellings in Worcester County 1811-1821

Now that a baseline has been established, we can examine what the changes have been across Worcester County in hopeless and unimproved lands.

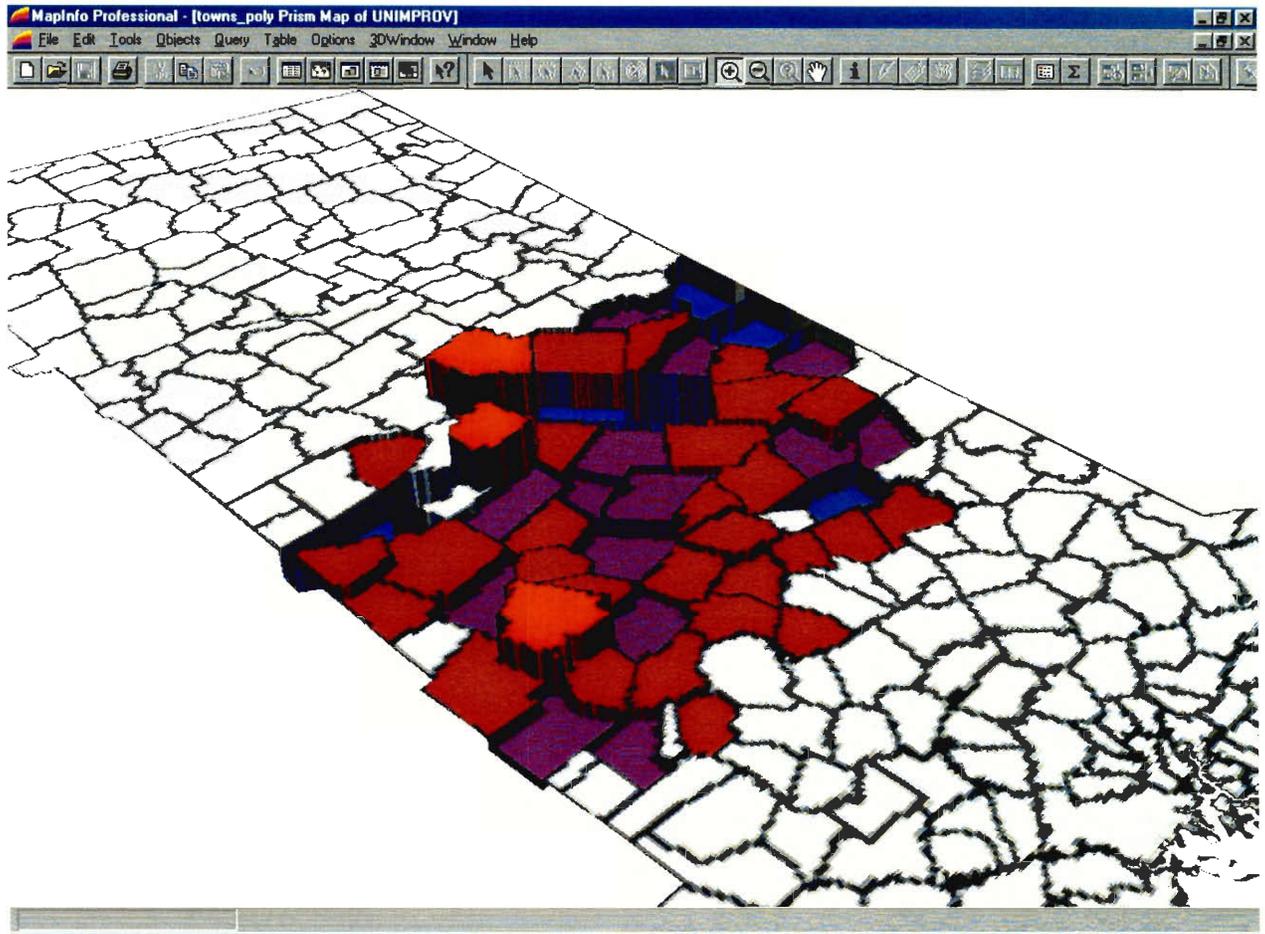


Figure 18 Change in Unimproved Land in Worcester County from 1811-1821

Here we can see that there was an increase in several towns in unimproved land, while the overall trend across the county was a decrease, likely due to expanding farms and dwellings. There does not seem to be a strong correlation between the decrease in unimproved land and an increase in dwellings.

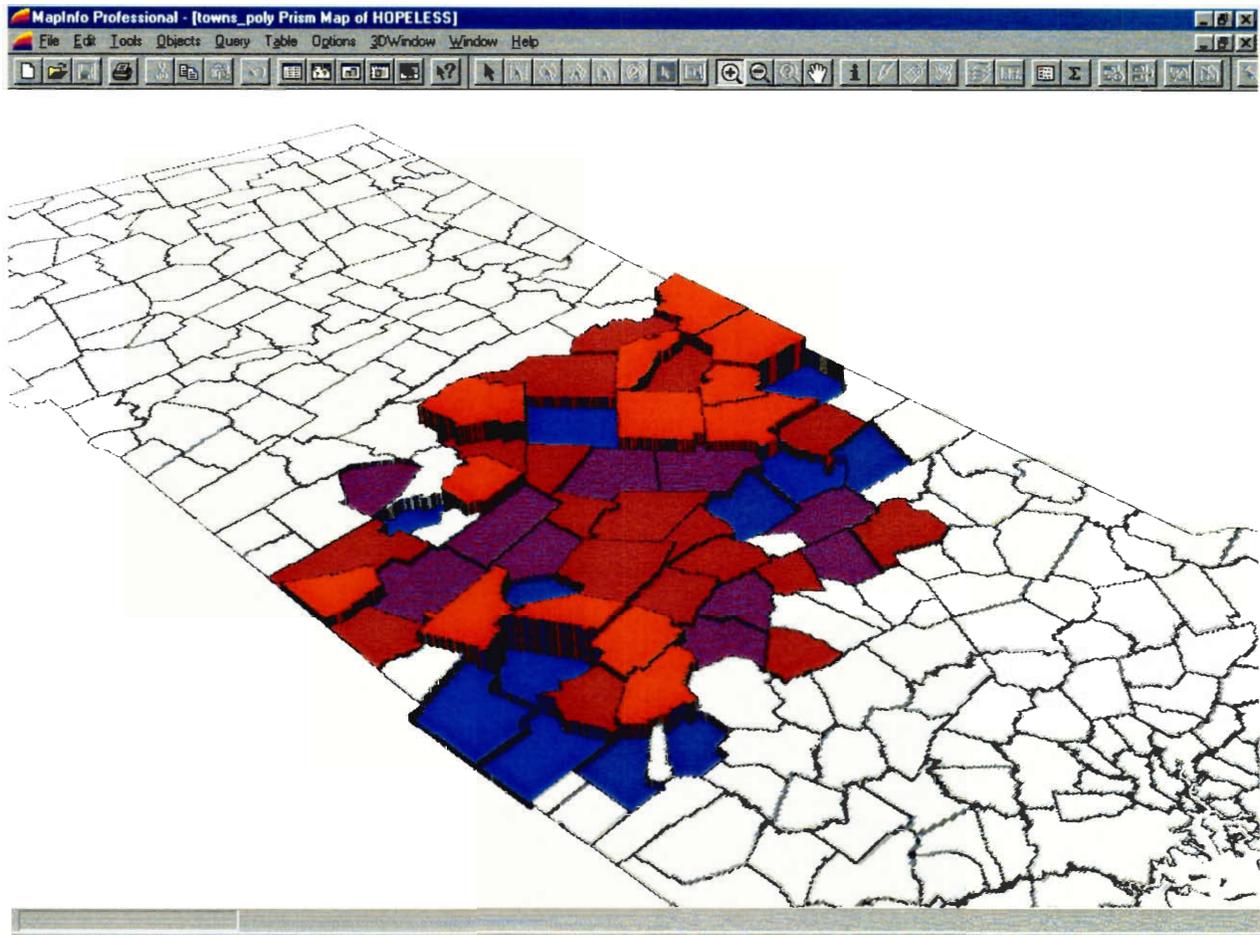


Figure 19 Change in Hopeless Land in Worcester County from 1811-1821

Above we can see there were actually some towns where the amount of land that was deemed hopeless for any use actually increased. However, we can also see, by comparing Figures 17 and 19, that there is a correlation between the decreasing unimproved land in the eastern portion of the county and the increasing number of dwellings in the same region. This correlation can be seen quickly and easily, especially compared to spending time doing a traditional town by town comparison.

## 5. Future Applications

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Now that the data has been organized and be displayed graphically in charts, graphs, or overlaid on maps, the question becomes 'What now?' Several different directions can be taken with this newly formatted and organized data. The first is to simply turn it back over to the Research Library at Old Sturbridge Village to be used in further historical research. In his article in the spring of 2001 edition of the Old Sturbridge Village Visitor, Jack Larkin examines many of the "infinite details" of rural New England. Changes such as the movement from oxen to horses as the primary working animals on farmland, and the decline in the popularity of pigs as livestock are merely two of the many transformation he touches on briefly. This brief article mentions the "...exhaustive analysis of the valuation returns between 1791 and 1860 for Central Massachusetts..." that the Old Sturbridge Village staff has performed. This analysis would have been simplified if the data was available in a graphical format, rather than having to be compared numerically.

While there has already been quite a bit of analysis done of the Worcester County and Central Massachusetts towns, further research could be performed in both the Western and Eastern towns. For example, was there a shift of population towards the cities in Central and Eastern Massachusetts, away from the more rural towns in the West, as time went on? Did farmland decrease just in and around the cities or did it decline across the entire Commonwealth? What industries sprang up and where? All of these questions and more could reveal more and more of the changes that nineteenth

century New England underwent. Determining the answers will be that much easier with a way to display the pertinent data graphically.

While this, new format and display were intended to be used as a new tool for historians, to limit it to that use only would ignore many other possibilities. The first possibility would be to create an interactive display, using a touch-screen or other interface. The display could be used as a tool alongside Old Sturbridge Village's static exhibits. Maps and graphs could be used within a multimedia display not only explaining the transitions that New England underwent in a text or audio format, but also in a visual one as well. The changeover from rye to wheat crops, the decline in the number of sheep as livestock and other facts could be included in a format that would present information to the visitors in an entertaining, yet educational manner. This would help to give the public an overall picture of the changing Commonwealth in the early nineteenth century, whereas the Village gives visitors a changing and detailed snapshot of the times.

### 5.3 Outside Applications

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The data could also be applied outside of Old Sturbridge Village. One possibility would be to create a tool similar to the interactive display but in an executable format. This program could be distributed to schools for use in teaching classes concerning local history and statistics. Students could get a visual and interactive lesson, rather than simply listening to a teacher or professor lecture on the subject. A similar program could be built as a research tool and given to libraries as a resource for students and

historians alike, or it could be installed in a server on the Internet, and be available to all.

This project serves as a prototype and was designed to be easily expanded. A basic format now exists for importing the valuation returns, or any historical data that can be organized in a spreadsheet, so that it can be overlaid on geographical information. There is no reason to limit this format to the remaining valuation returns from Old Sturbridge Village, although they are certainly the immediate project at hand. Data from other historical sources can easily be converted and used in a similar format. Using MapInfo's ability to import raster images, historical maps could be scanned and the data overlaid on historically correct maps, rather than on the modern ones obtained for this project. If data from specific towns exists, perhaps from town valuation returns, data can be overlaid on a map of the town to provide a picture of the town as it changed through history.

## 5. Results and Conclusions

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This project has established a baseline that can be used as a springboard for many other projects. The task of importing and converting a sub-set of the valuation returns from Old Sturbridge Village has been completed. The concept of overlaying the valuation returns onto geographical information has proven to be a useful one. From here, many different directions can be taken. A basic method for importing historical data, formatting and displaying it graphically has been successfully established. The interactive tools noted above could be created, or something entirely different could be done. However, data for the remainder of the Commonwealth of Massachusetts should be imported in the fashion described above, in order to finish creating a new tool for analysis of life in the early nineteenth century.

Microsoft Excel - year.xls

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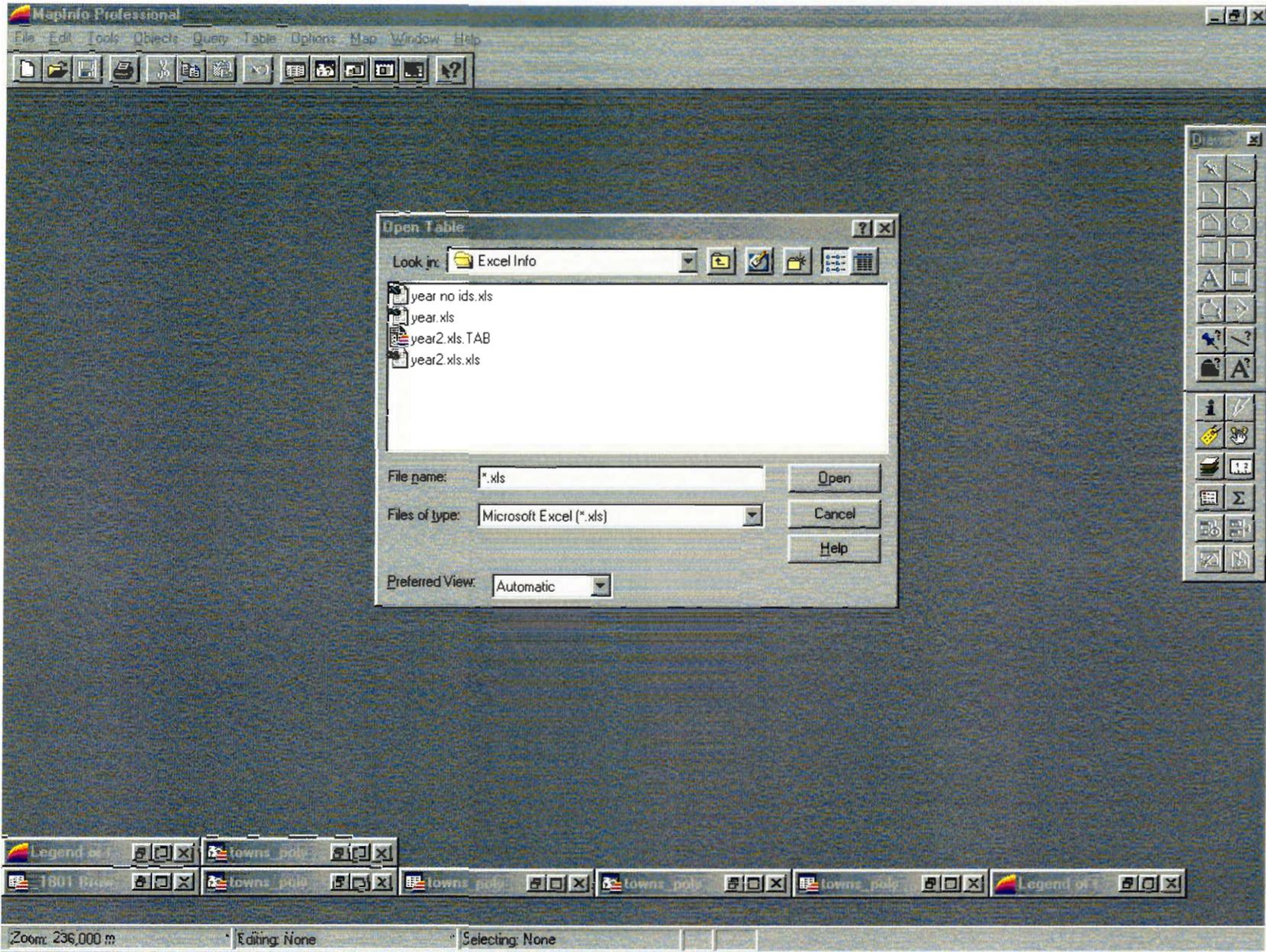
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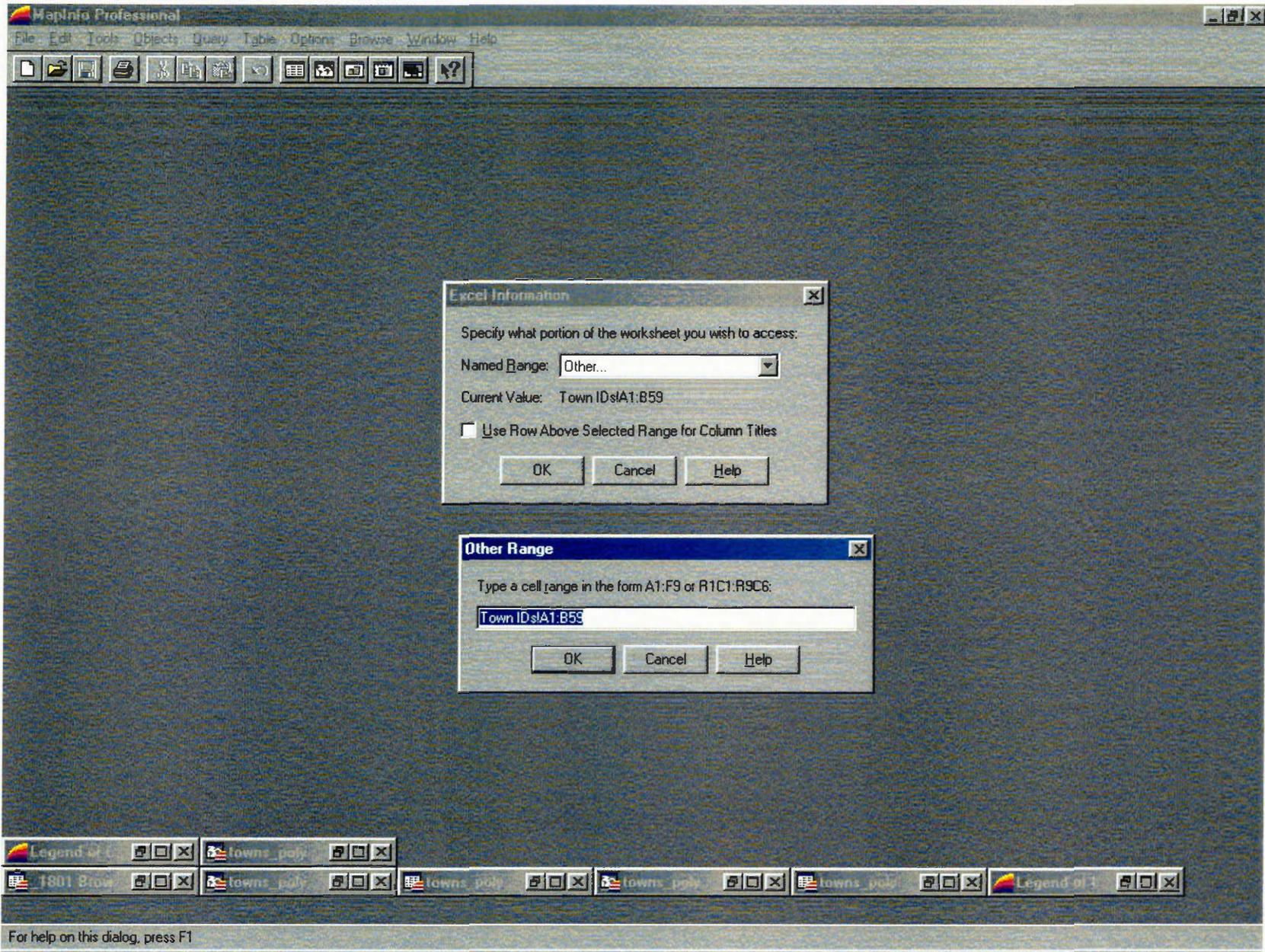
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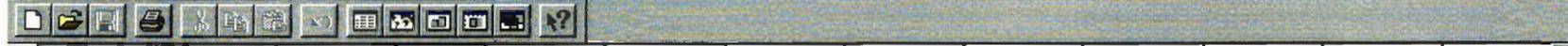
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122									
123									
124	% Changes								
125	TownID	ID	YEAR	TOWNNAME	TOWNAREA	TOWNPOP	POLLS	POLLSUPP	DWELLING
126	11		1850-1860	Ashburnh	0	233	96	0	5
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130	28		1850-1860	Berlin	0	240	83	2	5
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133	39		1850-1860	Boylston	0	11	-34	4	-
134	45		1850-1860	Brookfie	0	602	188	3	10
135	54		1850-1860	Charlton	0	32	21	-2	3
136	64		1850-1860	Clinton	0	746	283	2	17
137			1850-1860	Dana	0	34	7	-2	1
138	77		1850-1860	Douglas	0	564	64	-7	10
139	80		1850-1860	Dudley	0	293	36	-3	2
140	97		1850-1860	Fitchbur	0	2685	624	-3	41
141	103		1850-1860	Gardner	0	1113	307	1	19
142	110		1850-1860	Grafton	0	413	125	-6	10
143	124		1850-1860	Hardwick	0	-110	-29	4	-
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145	134		1850-1860	Holden	0	12	29	0	1

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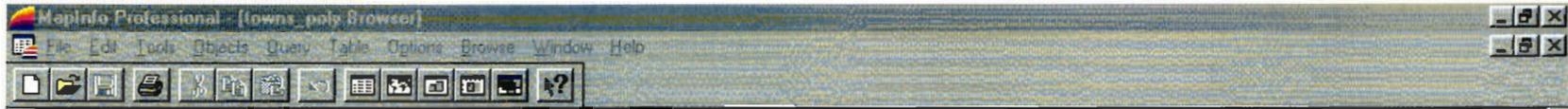
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<input type="checkbox"/>	10	1781	Charlton	27462	n/a	340	n/a	188	15	11	n/a	n/a	n/a	n/a	n/a
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<input type="checkbox"/>	14	1781	Dudley	22326	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	15	1781	Fitchbur		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
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<input type="checkbox"/>	28	1781	Millbury		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	29	1781	New Brai	13494	n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	30	1781	North Br		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	31	1781	Northbor		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	32	1781	Northbri		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a
<input type="checkbox"/>	33	1781	Colburn		n/a	0	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a







TownID	ID	YEAR	TOWNNAM	TOWNAREA	TOWNPOP	POLLS	POLLSUPP	DWELLING	SHOPNEAR	MISCSHOP	DISTILL	TANNERY
11	117	1,801	Ashburnh	24,992	994	214	1	140	0	9	0	
15	118	1,801	Athol	20,001	993	210	0	134	1	13	0	
17	119	1,801	Auburn	8,340	532	119	1	79	1	0	0	
21	120	1,801	Barre	27,730	1,937	368	1	210	1	2	0	
28	121	1,801	Berlin	7,986	590	120	1	80	1	10	0	
32	122	1,801	Blacksto	0	0	0	0	0	0	0	0	
34	123	1,801	Bolton	13,821	945	218	1	133	1	20	0	
39	124	1,801	Boylston	0	1,058	228	7	134	2	0	0	
45	125	1,801	Brookfie	43,506	3,284	676	1	421	7	50	0	
54	126	1,801	Charlton	27,462	2,120	456	3	289	2	27	1	
64	127	1,801	Clinton	0	0	0	0	0	0	0	0	
0	128	1,801	Dana	12,466	0	118	0	46	1	2	0	
77	129	1,801	Douglas	22,912	1,083	221	5	154	0	3	0	
80	130	1,801	Dudley	22,326	1,140	212	2	131	1	6	0	
97	131	1,801	Fitchbur	0	1,390	272	2	188	1	24	0	
103	132	1,801	Gardner	14,124	667	149	0	87	0	8	0	
110	133	1,801	Grafton	14,796	985	214	0	122	0	12	0	
124	134	1,801	Hardwick	26,641	1,727	246	2	213	0	2	0	
125	135	1,801	Harvard	16,341	1,319	327	0	178	8	41	0	
134	136	1,801	Holden	19,840	1,142	236	0	135	5	3	0	
140	137	1,801	Hubbards	22,540	1,113	242	0	127	0	1	0	
147	138	1,801	Lancaste	0	1,584	321	7	196	0	6	0	
151	139	1,801	Leiceste	15,694	1,103	229	1	133	1	1	0	
153	140	1,801	Leominst	18,603	1,486	298	3	187	0	4	0	
162	141	1,801	Lunenbur	17,494	1,243	261	1	170	3	19	0	
179	142	1,801	Mendon	0	1,628	299	8	195	4	17	0	
185	143	1,801	Millford	12,170	907	175	0	114	3	14	0	
186	144	1,801	Millbury	0	0	0	0	0	0	0	0	
202	145	1,801	New Brai	13,494	875	185	0	102	7	7	0	
212	146	1,801	North Br	0	0	0	0	0	0	0	0	
215	147	1,801	Northbor	11,630	698	147	2	86	2	6	0	
216	148	1,801	Northbri	10,590	544	116	0	75	0	3	0	
222	149	1,801	Oakham	13,552	801	188	1	98	2	10	0	



	AREA	PERIMETER	TOWNS_	TOWNS_ID	TOWN_ID	TOWN	FIPS_STCO	CCD_MC	FIPS_PLACE	POP80	POP90	ISLAND	POP_CH	FOURCOLO
<input type="checkbox"/>	41,372,808	33,680.65	2	1	259	SALISBURY	25,009	145	59245	6,745	6,882	0	137	4
<input type="checkbox"/>	35,563,040	26,562.35	3	2	7	AMESBURY	25,009	005	01185	14,563	14,997	0	434	1
<input type="checkbox"/>	23,010,216	20,072.93	4	3	180	MERRIMAC	25,009	090	40430	4,733	5,166	0	433	3
<input type="checkbox"/>	22,022,406	24,596.51	5	4	206	NEWBURYPORT	25,009	790	45245	16,545	16,317	0	-228	2
<input type="checkbox"/>	92,315,544	43,136.24	6	5	128	HAVERTHILL	25,009	710	29405	47,715	51,418	0	3,703	2
<input type="checkbox"/>	38,230,364	25,646.11	7							3,084	3,421	0	337	4
<input type="checkbox"/>	529,629.5	3,121.82	8							16,545	16,317	1	-228	2
<input type="checkbox"/>	216,076.28	1,958.31	9							16,545	16,317	1	-228	2
<input type="checkbox"/>	62,937,976	66,037.34	10							5,150	5,623	0	473	3
<input type="checkbox"/>	481,899.91	3,058.49	11							16,545	16,317	1	-228	2
<input type="checkbox"/>	5,357.18	416.593	12							16,545	16,317	1	-228	2
<input type="checkbox"/>	121,973.7	1,404.16	13							5,150	5,623	1	473	3
<input type="checkbox"/>	5,383.29	318.289	14							5,150	5,623	1	473	3
<input type="checkbox"/>	59,580,800	44,633.74	15							38,447	39,990	0	1,543	1
<input type="checkbox"/>	24,337,124	24,024.37	16							5,031	5,214	0	183	1
<input type="checkbox"/>	28,572.88	884.573	17							5,150	5,623	1	473	3
<input type="checkbox"/>	25,641.35	696.047	18							5,150	5,623	1	473	3
<input type="checkbox"/>	17,499.21	552.257	19							5,150	5,623	1	473	3
<input type="checkbox"/>	26,622.63	604.795	20							5,150	5,623	1	473	3
<input type="checkbox"/>	12,757.82	544.363	21							5,150	5,623	1	473	3
<input type="checkbox"/>	121,426,620	46,813.09	22							8,383	8,220	0	-163	4
<input type="checkbox"/>	99,418.11	1,345.28	23							5,150	5,623	1	473	3
<input type="checkbox"/>	33,162,780	25,538.8	24							1,756	1,745	0	-11	2
<input type="checkbox"/>	46,086,808	44,279.4	25							4,125	4,452	0	327	4
<input type="checkbox"/>	2,033,642.1	8,660.54	26							4,125	4,452	1	327	4
<input type="checkbox"/>	34,035,252	24,157.79	27							5,927	6,384	0	457	2
<input type="checkbox"/>	63,786,988	50,241.52	28							687	742	0	55	4
<input type="checkbox"/>	27,974,362	23,557.54	29							148	115	0	-33	1
<input type="checkbox"/>	5,000.06	299.687	30							4,125	4,452	1	327	4
<input type="checkbox"/>	24,312.08	719.703	31							4,125	4,452	1	327	4
<input type="checkbox"/>	62,159,736	39,745.13	32							337	378	0	41	3
<input type="checkbox"/>	64,475,116	33,837.87	33							536	716	0	180	2
<input type="checkbox"/>	112,751,660	46,878.57	34							1,574	1,757	0	183	4
<input type="checkbox"/>	74,000,000	30,000.00	35							24,000	20,000	0	1,000	4

**Update Column**

Table to Update: towns\_poly

Column to Update: Add new temporary column

Get Value From Table: 1831

Calculate: Value

of: TownID

Browse Results

MapInfo Professional - [towns\_poly.Browser]

File Edit Tools Objects Query Table Options Browse Window Help

AREA	PERIMETER	TOWNS_	TOWNS_ID	TOWN_ID	TOWN	FIPS_STCO	CCD_MC	FIPS_PLACE	POP80	POP90	ISLAND	POP_CH	FOURCOLO	
<input type="checkbox"/>	41,372,808	33,680.65	2	1	259	SALISBURY	25,009	145	59245	6,745	6,882	0	137	4
<input type="checkbox"/>	35,563,040	26,562.35	3	2	7	AMESBURY	25,009	005	01185	14,563	14,997	0	434	1
<input type="checkbox"/>	23,010,216	20,072.93	4	3	180	MERRIMAC	25,009	090	40430	4,733	5,166	0	433	3
<input type="checkbox"/>	22,022,406	24,596.51	5	4	206	NEWBURYPORT	25,009	790	45245	16,545	16,317	0	-228	2
<input type="checkbox"/>	92,315,544	43,136.24	6	5	128	HAVERHILL	25,009	710	29405	47,715	51,418	0	3,703	2
<input type="checkbox"/>	38,230,364	25,646.11	7						3,084	3,421	0	337	4	
<input type="checkbox"/>	529,629.5	3,121.82	8						16,545	16,317	1	-228	2	
<input type="checkbox"/>	216,076.28	1,958.31	9						16,545	16,317	1	-228	2	
<input type="checkbox"/>	62,937,976	66,037.34	10						5,150	5,623	0	473	3	
<input type="checkbox"/>	481,899.91	3,058.49	11						16,545	16,317	1	-228	2	
<input type="checkbox"/>	5,357.18	416.593	12						16,545	16,317	1	-228	2	
<input type="checkbox"/>	121,973.7	1,404.16	13						5,150	5,623	1	473	3	
<input type="checkbox"/>	5,383.29	318.289	14						5,150	5,623	1	473	3	
<input type="checkbox"/>	59,580,800	44,633.74	15						38,447	39,990	0	1,543	1	
<input type="checkbox"/>	24,337,124	24,024.37	16						5,031	5,214	0	183	1	
<input type="checkbox"/>	28,572.88	884.573	17						5,150	5,623	1	473	3	
<input type="checkbox"/>	25,641.35	696.047	18						5,150	5,623	1	473	3	
<input type="checkbox"/>	17,499.21	552.257	19						5,150	5,623	1	473	3	
<input type="checkbox"/>	26,622.63	604.795	20						5,150	5,623	1	473	3	
<input type="checkbox"/>	12,757.82	544.363	21						5,150	5,623	1	473	3	
<input type="checkbox"/>	121,426,620	46,813.09	22						5,150	5,623	1	473	3	
<input type="checkbox"/>	99,418.11	1,345.28	23						8,220	0	-163	4		
<input type="checkbox"/>	33,162,780	25,538.8	24						5,623	1	473	3		
<input type="checkbox"/>	46,086,808	44,279.4	25						1,745	0	-11	2		
<input type="checkbox"/>	2,033,642.1	8,660.54	26						4,452	0	327	4		
<input type="checkbox"/>	34,035,252	24,157.79	27						4,452	1	327	4		
<input type="checkbox"/>	63,786,988	50,241.52	28						6,384	0	457	2		
<input type="checkbox"/>	27,974,362	23,557.54	29						742	0	55	4		
<input type="checkbox"/>	5,000.06	299.687	30	29	254	ROWLEY	25,009	135	58405	4,125	4,452	1	327	4
<input type="checkbox"/>	24,312.08	719.703	31	30	254	ROWLEY	25,009	135	58405	4,125	4,452	1	327	4
<input type="checkbox"/>	62,159,736	39,745.13	32	31	253	ROWE	25,011	100	58335	337	378	0	41	3
<input type="checkbox"/>	64,475,116	33,837.87	33	32	130	HEATH	25,011	060	29650	536	716	0	180	2
<input type="checkbox"/>	112,751,660	46,878.57	34	33	66	COLRAIN	25,011	025	14885	1,574	1,757	0	183	4
<input type="checkbox"/>	74,000,000	20,000.00	35	34	240	MODELANDOVER	25,009	100	40000	24,000	20,000	0	1,100	1

**Update Column**

Table to Update: towns\_poly

Column to Update: Add new temporary column

Get Value From Table: \_1831

Calculate: Value

of: TownID

Browse Results

**Specify Join**

Join

where: TOWN\_ID from table towns\_poly

matches: TownID from table \_1831

records 1 - 34 of 631



### Create Thematic Map - Step 1 of 3

Type:  Template  Sort by Name  Sort by Time

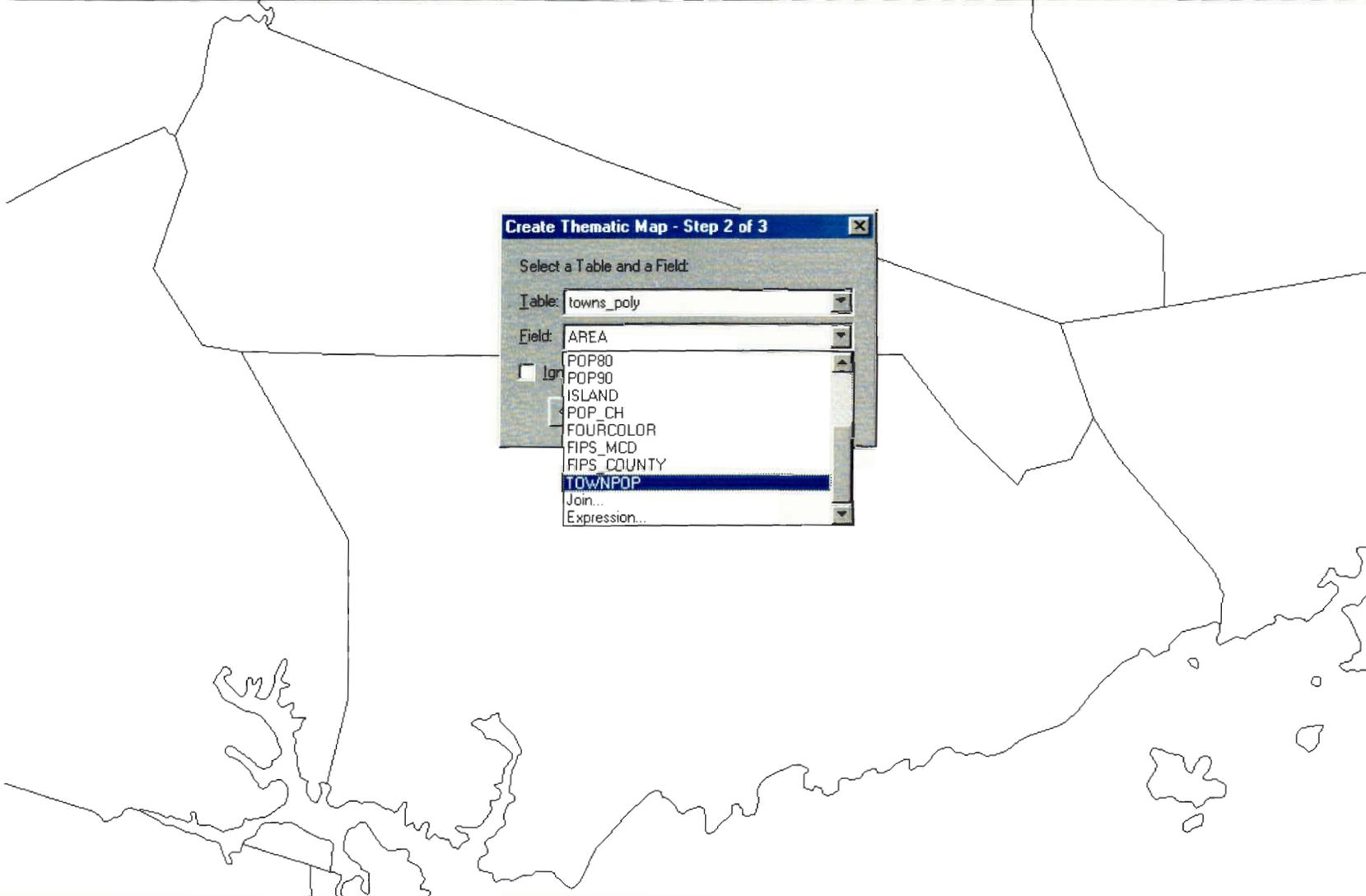
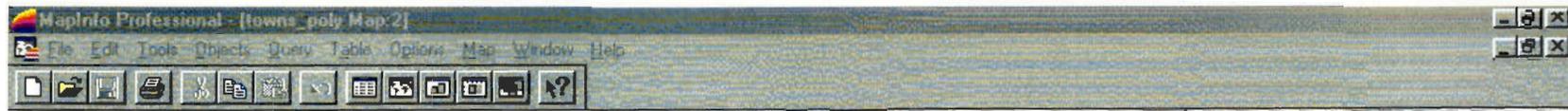
Preview:

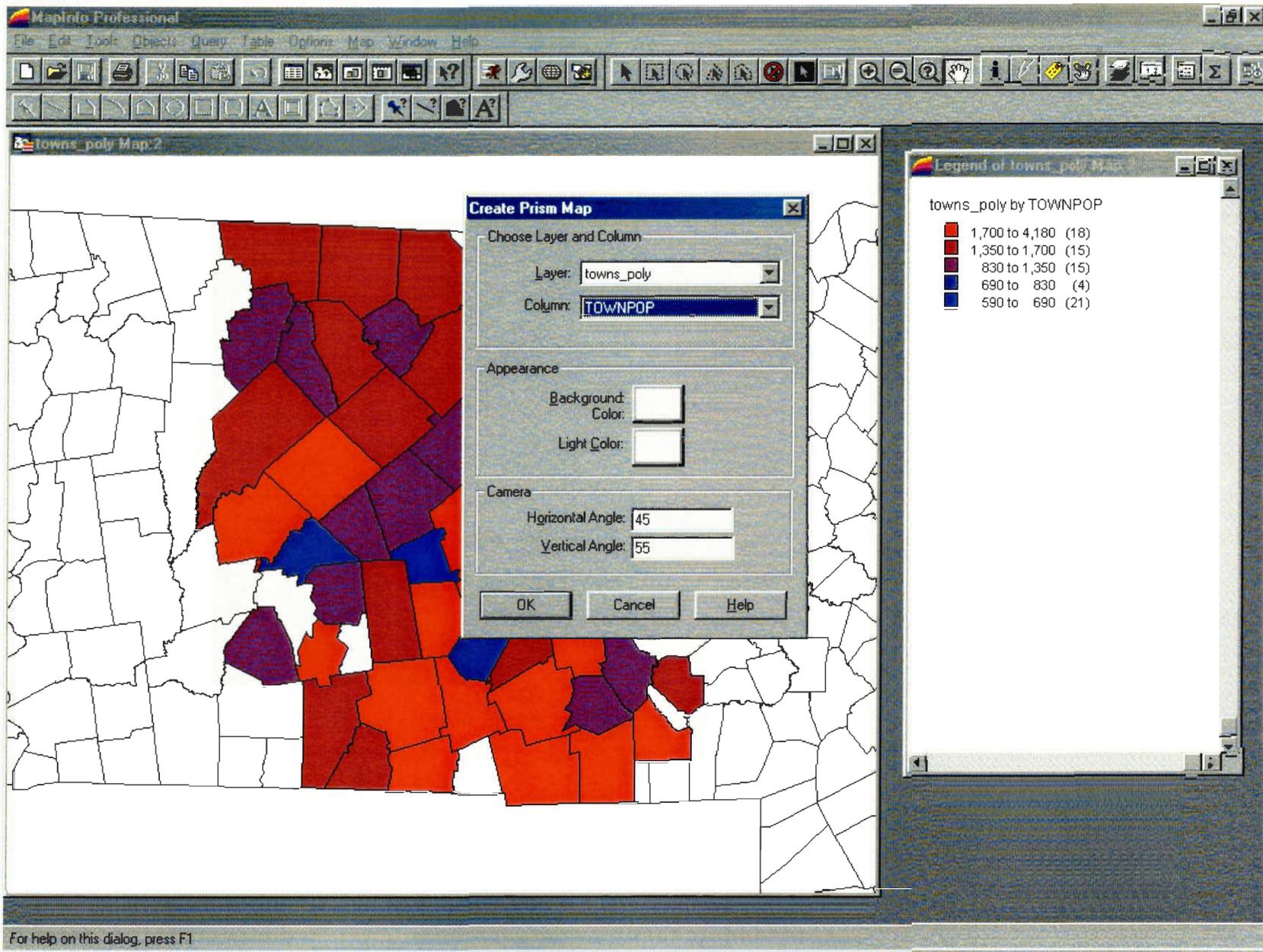
Title	
Subtitle	
<input type="checkbox"/> 100%	
<input type="checkbox"/> 75%	
<input type="checkbox"/> 50%	
<input type="checkbox"/> 25%	
<input type="checkbox"/> 0%	

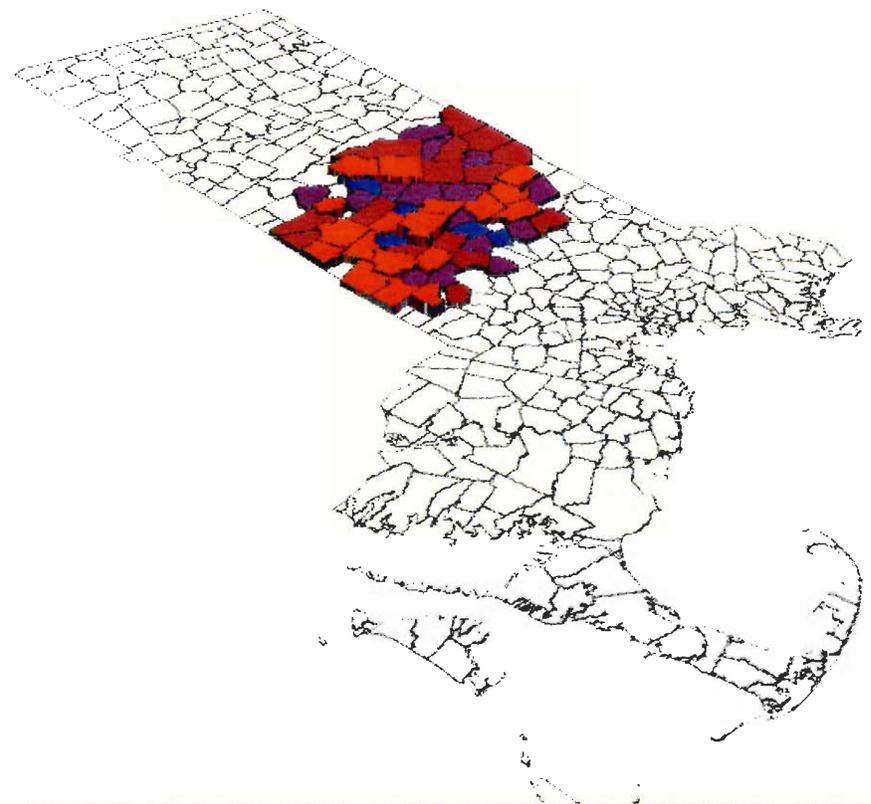
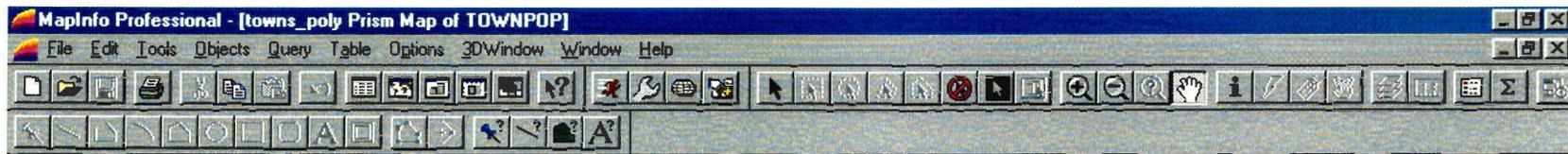
Use Customized Legend Text

Next > Cancel Help

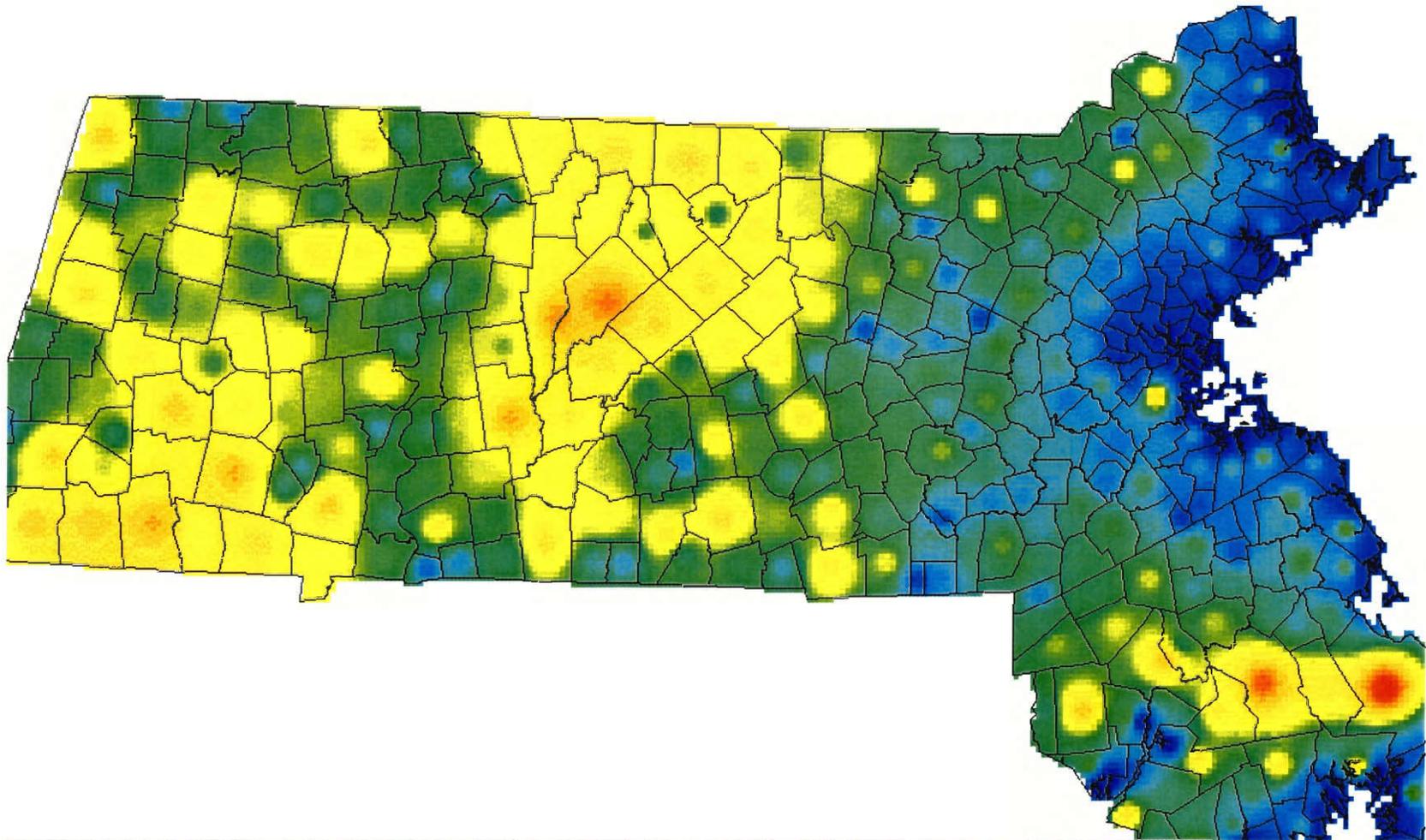
Zoom: 14,800 m    Editing: None    Selecting: None



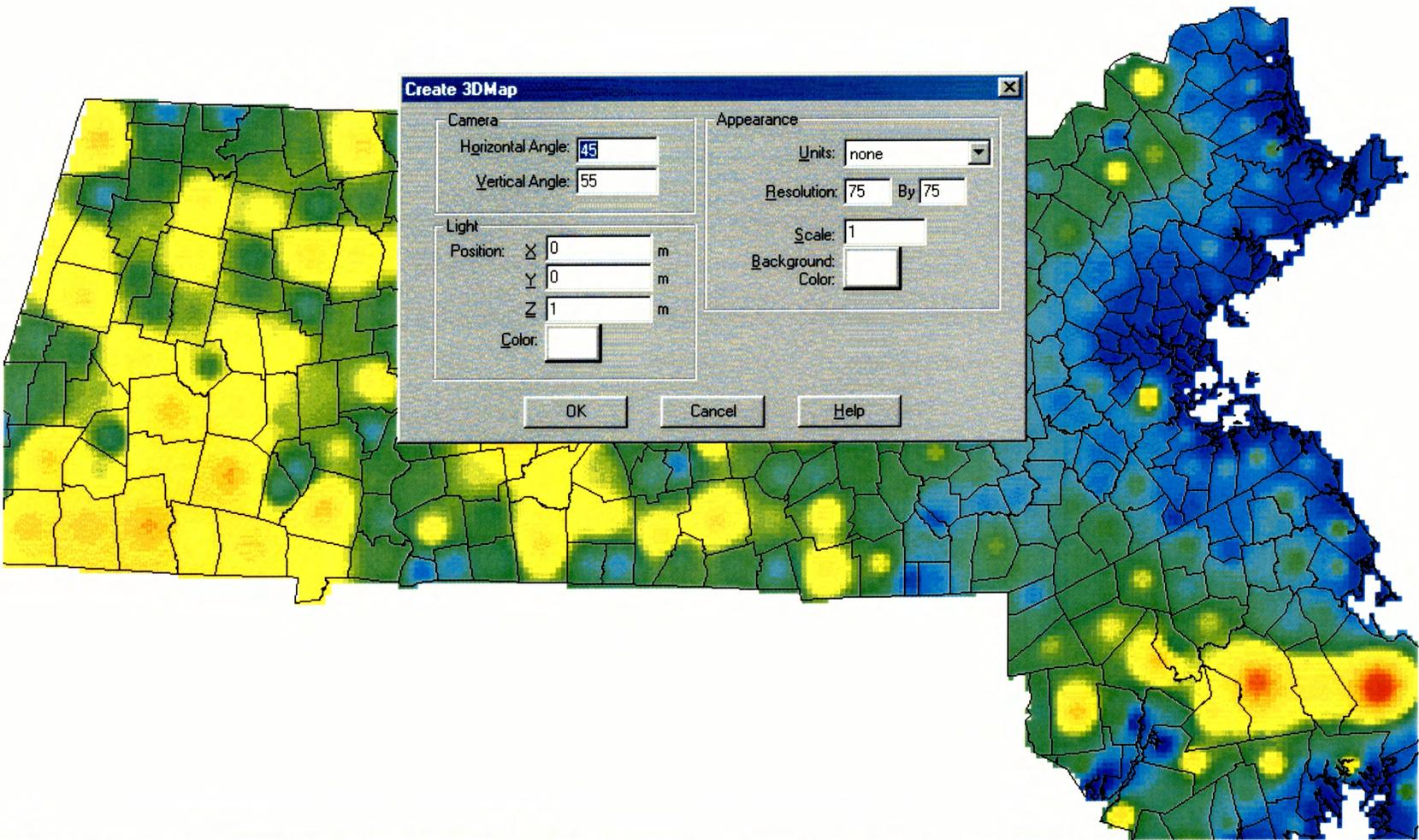
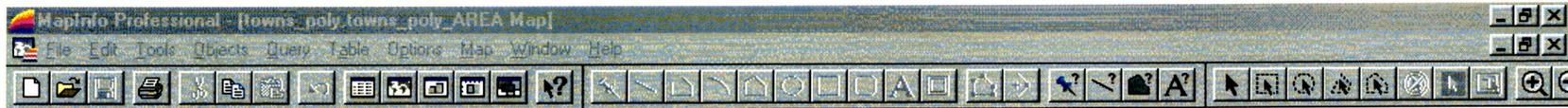




Toggle between wireframe and solid representation.



Zoom: 236,000 m    Editing: None    Selecting: None



Zoom: 236,000 m    Editing: None    Selecting: None

