Thematic Mapping of Multiple Variables

LandView's **Thematic Mapping** utility is designed to examine the spread of values within a single numerical data field in LandView Census. However, a LandView **Found Set** can also be based on two or more data variables, and this Found Set can be a thematic display in MARPLOT. An example of this is given in the LandView Tutorial. Pertinent excerpts from the tutorial are included below. This article extends the procedure to creating a complete thematic mapping of all Census Block Groups within a geography—the State of Virginia.

A concern of a number of federal agencies is Environmental Justice—a concept that people living in disadvantaged communities may not have the necessary political and social resources to resist unsolicited intrusions into their neighborhood. While definitions of Environmental Justice vary, two elements are common—minority status and poverty. Either can be a criterion, but both together identify the more disadvantaged communities. Assume that you want to identify such areas within your Home State. We will use Census Block Groups as identifying neighborhoods. We will define Minority Status as "Table DP-1—Race, One Race, White" being less than 50% of the population. We will define Poverty as "Table DP-3—Poverty Status in 1999, Families" being greater than 20%. Let us proceed to identify such areas within your Home State.

Since our definition of neighborhood is the Census Block Group, the 'Setup a **Find**' must start at the **Block Group** tab. Note that when looking at a State dataset, each State is represented by both a name and a Code. This Code is known as a FIPS Code, for Federal Information Process Standard. In your search at the Census Block Group level, you cannot use your State Name; you must use its Code. So, you will need to remember it.

Open the **Block Group** tab, and 'Setup a **Find**'[1]. In the State field at the top of table DP-1 enter your State's FIPS Code. In the table, find the "**One Race—White**" data field and move over to the Percent column. Enter "less than 50%", but this must be entered so that the computer will understand; your actual entry is "<50.00". (Note that the Symbols button to your left will open a palette of choices that you will find useful.) Now, open table DP-3 from the button box. Locate "**Poverty Status in 1999— Families**". In the Percent column, enter "greater than 20%" as ">20.00". Now, click the **Find** button and LandView will commence its search.[2]

You can now explore a third step in explicating the data—displaying the Found Set on a map in MARPLOT. The **Show on Map** button opens the dialogue box shown in Figure 17.

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1 It is not necessary to go to your Home State when accessing the **Block Groups** tab. Each LandView 'Find' reverts to the entire dataset. Each Find must identify all layers of Census geography necessary to appropriately identify the specific data subset. In this instance a State identification is needed to identify all Block Groups within the State.

[2] Each LandView search starts from the complete dataset, and there are more than 200,000 Census Block Groups records to be searched. Some LandView Searches are prolonged. **Indexed** fields are searched much more quickly. However, indexing all fields that might interest individual researchers would add immeasurably to data content of LandView. For purposes of the Tutorial, '**One Race—White**' and '**Poverty Status in 1999—Families**' have been specially indexed to speed this search. For more on indexing, see LandView Help, **Indexing LandView Files**.
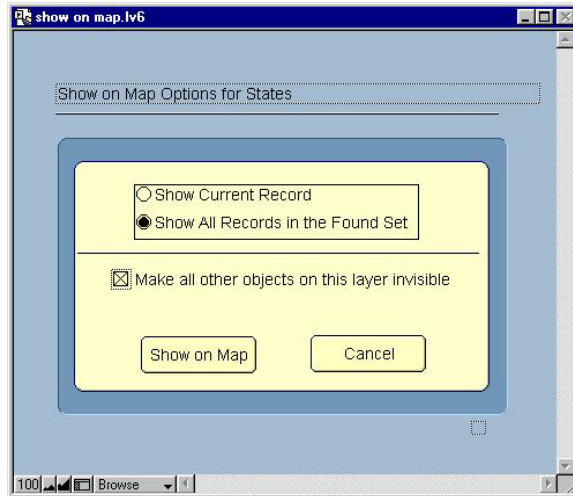
Figure 17. The Show on Map Dialogue

In the dialogue are several display options. In this case, we would like to 'Show **All Records**' and we would like to '**make invisible**' those objects not in our Found Set. On the other hand, if we had chosen to make all objects visible, MARPLOT would display the Found Set in **Select** mode and those objects not in the Found Set would display unselected. On **Show on MAP**, we move from the LandView application to MARPLOT. If MARPLOT is not running, the application opens. The map displays the Found Set. Some customizing of MARPLOT's layers is generally necessary to display the data in an appropriate geographic context. Figure 18 displays a Found Set for the State of Virginia with the State boundary in display mode to provide appropriate context.
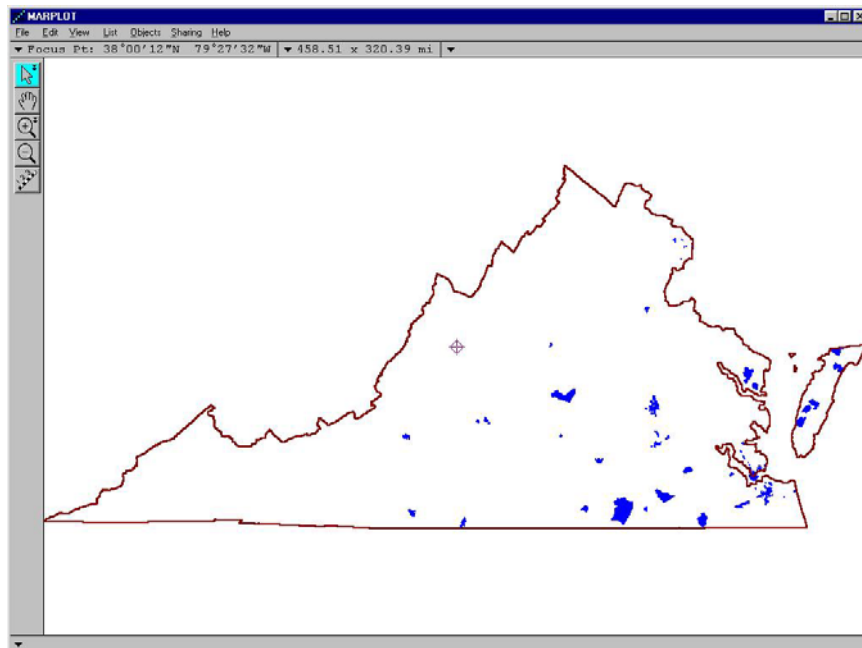

Figure 18. Census Block Groups in Virginia that Meet an Environmental Justice Concern

From here, we will build on what was presented in the tutorial . . .

First, though, we will need to make two modifications to our previous procedure. We will need our LandView Found Set in Select mode in MARPLOT, and this will require that we display the Found Set with the option in Figure 17 changed so as to not make all other objects invisible. This will cause the Found Set to display in Select mode in MARPLOT. Secondly, since we want a seamless dataset for the State of Virginia, we need to add a term to our search that will insure that Census Block Groups with a zero population are excluded from the search. Were this not done, such groups would meet the definition for a minority population. We will refer to this again as we proceed.

The identified set of map objects in the above example—Census Block Groups—do not remain in MARPLOT memory once the task has been accomplished and MARPLOT has turned to other tasks or is shutdown. If, tomorrow, we wished to show this same relationship, we would need to recreate our 'Setup a **Find**' and re-display the Found Set in MARPLOT. There are methods that can place this information in MARPLOT's memory and have it available for future use[3]. This article will explore copying the objects to a new MARPLOT layer that will contain just the found set. If all possible variations of the variables are examined and each variation is assigned to its own identified layer and if each layer is assigned its own distinctive display attributes, displaying all layers together would create a thematic display of Census Block Groups for the entire State of Virginia.

There are two MARPLOT Export formats—an **MIE** file and a **Simple Point Format**. Here, our concern is with the MIE files, since this fully replicates the boundaries of each Census Block Group. To export MARPLOT objects, the objects must either be **Selected** or be included in a MARPLOT Search Collection. Our method of showing the Found Set in MARPLOT places these objects in **Select** mode. The MenuBar command **File/Export . . .** creates the MIE file in a location of our choosing. We will name this file as *both.mie*, this to indicate that both minority status and poverty are concerns. During this procedure, we will create five similar files. Figure A. displays the names of the five files.

both.mie	454 KB	MIE File
minority.mie	1,501 KB	MIE File
No Test.mie	18,877 KB	MIE File
poverty.mie	1,056 KB	MIE File
zero.mie	7 KB	MIE File

Figure A. The Five MIE files to be Created in this Exercise.

An MIE file is a text file and it can be opened and edited with a text editor. MS Word Pad is suggested as having the necessary functionality. Do not use MS Word or Word Perfect. Such word processing applications frequently distort text files in a manner that makes them unworkable in MARPLOT. Figure B. displays *both.mie* as opened with WordPad. An MIE file displays three lines of **Word Wrapped** text for each map object. Users interested in the subject should consult MARPLOT Technical Documentation. However, our concern here is only with the three items of highlighted test shown on the second line.

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[3] Users interested in an alternate methodology should explore MARPLOT MenuBar **List/Copy** (the selected objects**) to Search Collection** and **Save Collection . . .**
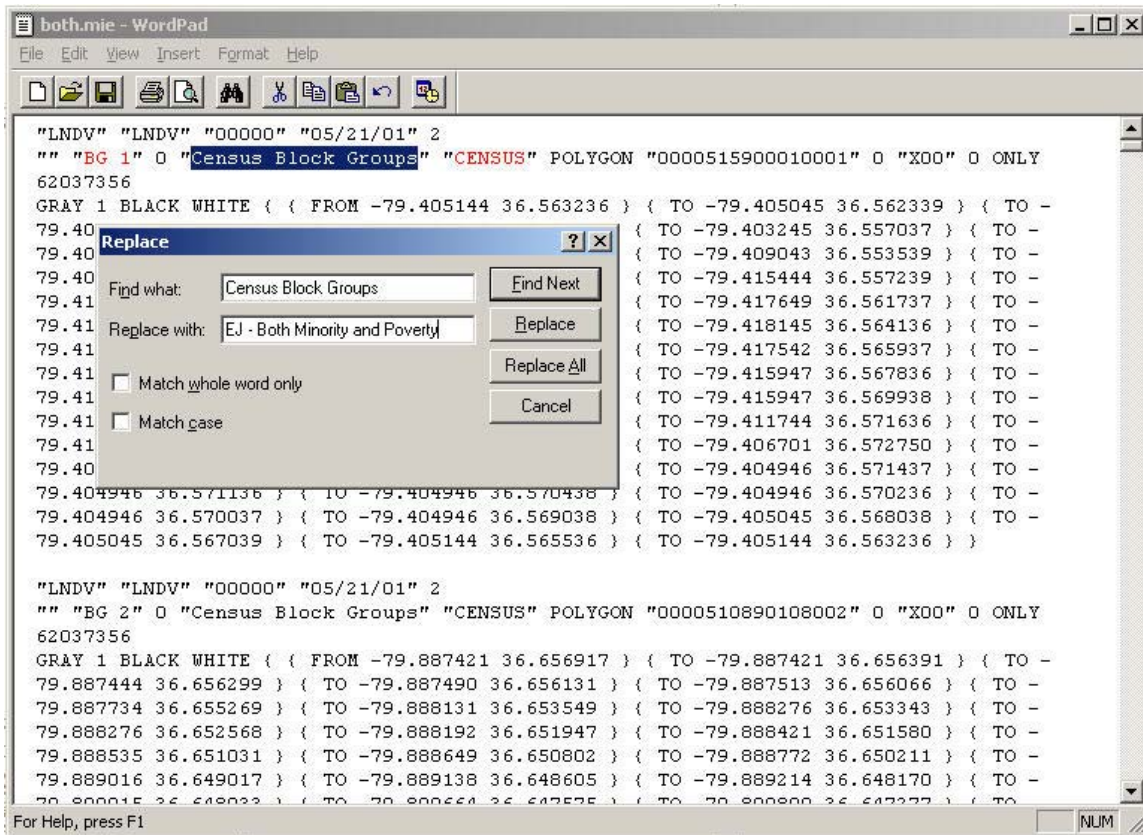
Figure B. The *both.mie* File Unedited

The first term, "BG 1" is the name of the map object, and this remains unchanged. The second term, "Census Block Groups" is the name of the layer containing the exported objects. The third term, "Census", is the name of the map containing the exported objects. We are about to edit this file, and, in the process, we will create a new file which, on MARPLOT Import, will recreate these map objects on a new layer and a new map.

With **Census Block Groups** in Select mode, open the **Edit/Find/Replace** dialogue. The '**Find what:**' is automatically entered. For '**Replace with:**', enter **EJ – Both Minority and Poverty**. The process is easier if your work completely inside of the quotation marks, which must remain. When ready, do a **Replace All**.

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both.mie - WordPad
File  Edit  View  Insert  Format  Help

"LNDV" "LNDV" "00000" "05/21/01" 2
"" "BG 1" 0 "EJ - Both Minority and Poverty" "EJ" POLYGON "0000515900010001" 0 "X00" 0
ONLY 62037356
GRAY 1 BLACK WHITE { { FROM -79.405144 36.563236 } { TO -79.405045 36.562339 } { TO -
79.404542 36.560836 } { TO -79.403847 36.558738 } { TO -79.403245 36.557037 } { TO -
79.406045 36.557037 } { TO -79.408516 36.554157 } { TO -79.409043 36.553539 } { TO -
79.409745 36.553337 } { TO -79.416443 36.556137 } { TO -79.415444 36.557239 } { TO -
79.417046 36.557537 } { TO -79.416749 36.561237 } { TO -79.417649 36.561737 } { TO -
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79.417847 36.564636 } { TO -79.417542 36.565036 } { TO -79.417542 36.565937 } { TO -
79.417542 36.566837 } { TO -79.415848 36.566936 } { TO -79.415947 36.567836 } { TO -
79.415947 36.568737 } { TO -79.415947 36.568836 } { TO -79.415947 36.569938 } { TO -
79.416047 36.570739 } { TO -79.413033 36.571369 } { TO -79.411744 36.571636 } { TO -
79.410531 36.571907 } { TO -79.409165 36.572204 } { TO -79.406701 36.572750 } { TO -
79.404946 36.573139 } { TO -79.404847 36.572536 } { TO -79.404946 36.571437 } { TO -
79.404946 36.571136 } { TO -79.404946 36.570438 } { TO -79.404946 36.570236 } { TO -
79.404946 36.570037 } { TO -79.404946 36.569038 } { TO -79.405045 36.568038 } { TO -
79.405045 36.567039 } { TO -79.405144 36.565536 } { TO -79.405144 36.563236 } } }

"LNDV" "LNDV" "00000" "05/21/01" 2
"" "BG 2" 0 "EJ - Both Minority and Poverty" "EJ" POLYGON "0000510890108002" 0 "X00" 0
ONLY 62037356
GRAY 1 BLACK WHITE { { FROM -79.887421 36.656917 } { TO -79.887421 36.656391 } { TO -
79.887444 36.656299 } { TO -79.887490 36.656131 } { TO -79.887513 36.656066 } { TO -
79.887734 36.655269 } { TO -79.888131 36.653549 } { TO -79.888276 36.653343 } { TO -
79.888276 36.652568 } { TO -79.888192 36.651947 } { TO -79.888421 36.651580 } { TO -
79.888535 36.651031 } { TO -79.888649 36.650802 } { TO -79.888772 36.650211 } { TO -
79.889016 36.649017 } { TO -79.889138 36.648605 } { TO -79.889214 36.648170 } { TO -

For Help, press F1                                                    NUM
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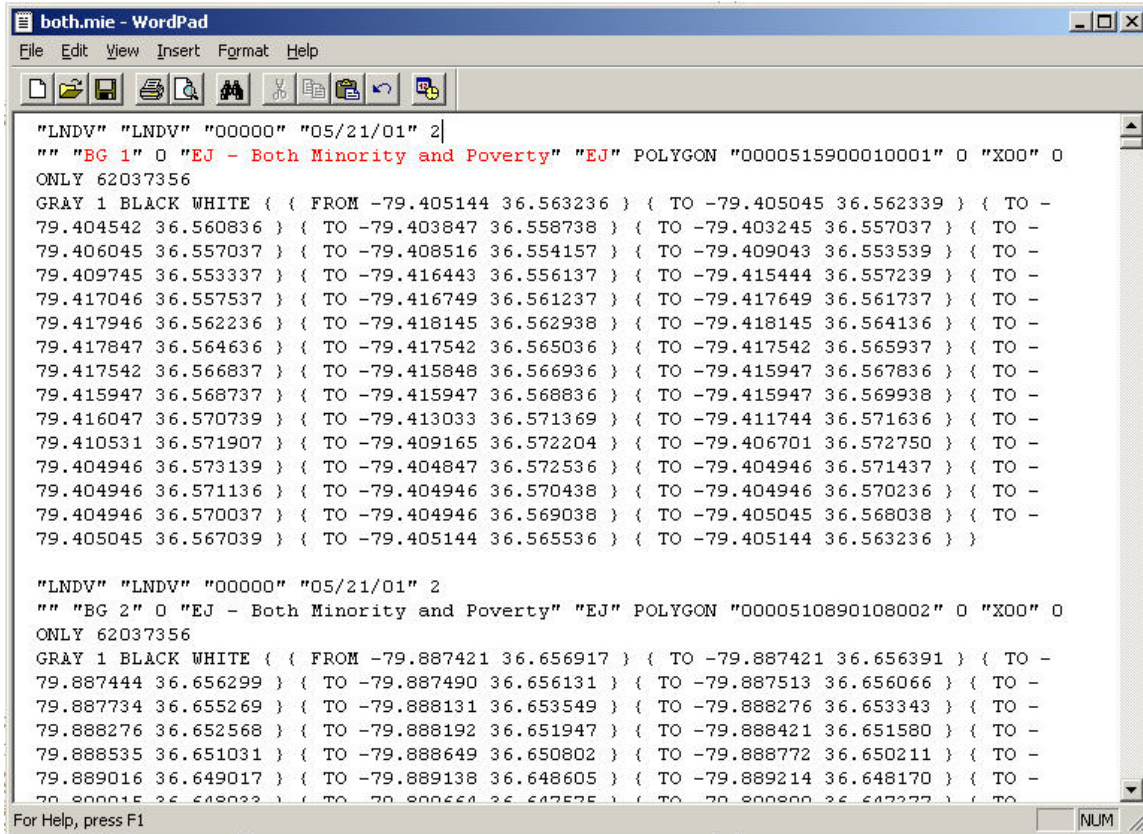
Figure C. The Edited *both.mie* File

Similarly, replace **Census** with **EJ**, the name of our new map containing the EJ layer set. We have now edited the MIE file to create both a new layer name and a new map name for each Census Block Group. The edited file is shown in Figure C.

Save and **Close** the file. Do a **File/Import . . .**

This same process must be completed for each of the identified MIE files. The table below provides the parameters needing for creating the Found Sets for each layer to be created in MARPLOT. As an absence of population within a Census Block Group can skew set definitions, the Zero Population search needs to be included. An examination of the separate layer definitions will show that all possible cases are included. The total objects on all layers should equal the total of Census Block Groups within the State.

MARPLOT Layer	Population	Minority	Poverty	File Name
EJ – Both Minority and Poverty	> 0	<50.00	>20.00	*both.mie*
EJ – Minority Only	>0	<50.00	<=20,00	*minority.mie*
EJ – Poverty Only	>0	>=50.00	>20.00	*poverty.mie*
EJ – No CBGs meet Tests	>0	>=50.00	<=20.00	*no test,mie*
EJ – Zero Population	0			*zero.mie*

Table A. Parameters Defining the Contents of Each EJ Layer

When all edited MIE files have been **Imported** back into MARPLOT, **Open List/Layer List . . .** You should show the five newly created layers grouped alphabetically under "EJ". You can create a new **Group** called **Environmental Justice** and move the layers into the Group. Use the **Graphic Override** mode, blue-blue, to customize the layers as shown in Figure D.
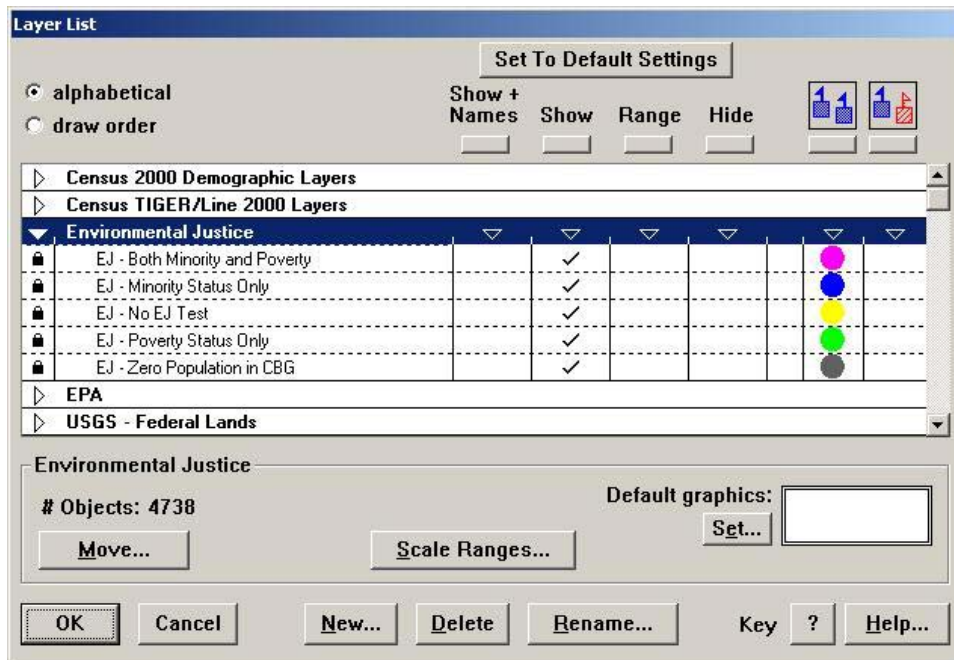

Figure D. The Environmental Justice Layer Group

When all files in the Group are place in **Show** mode, we can return to the MARPLOT screen with a Thematic representation of Environmental concerns in the State of Virginia. This is shown in Figure E.

Aside from creating a thematic map display for the State of Virginia, we have accomplished a second purpose which can be just as valuable as a technique. We can now go to any mapped point in the State of Virginia and immediately tell if that site is an Environmental Justice concern. In List/Layer List . . . , place the list in Draw Order and move all Environmental Justice layer to the bottom of the draw order. We can place these layers in Hide mode and do an Address Search. On plotting the address to the map, we now place the Environmental Justice layers in Show mode. From the position of the Focus Point and the EJ image underlying it, we know immediately if the site is a concern.
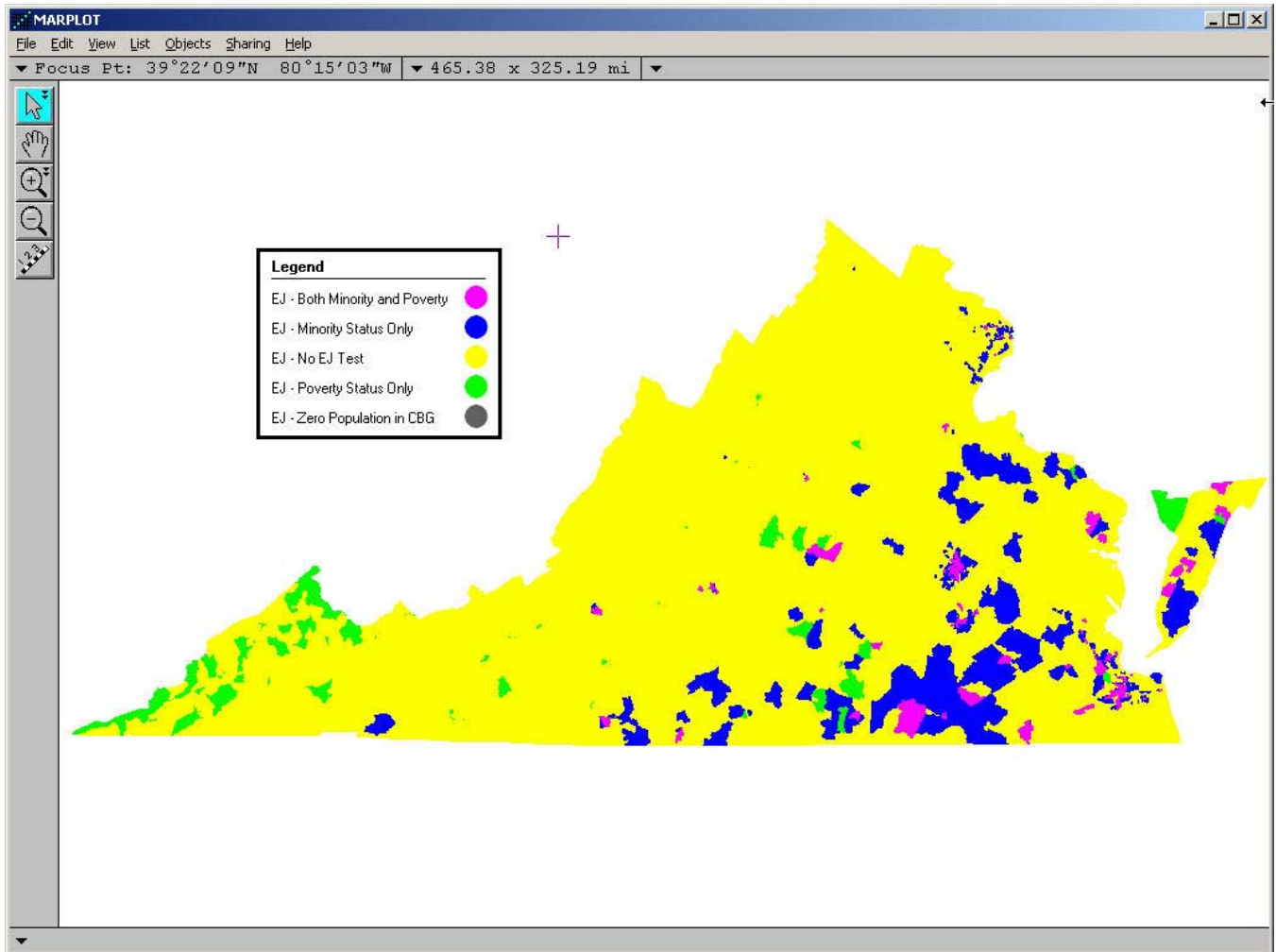
Figure E. A Thematic Map of Environmental Justice Concerns for the State of Virginia