# Who Uses Election Day Registration? A Case Study of the 2000 General Election in Anoka County, Minnesota

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*Keywords:* GIS, Voter Registration, Same Day Registration, Election Day Registration, Voter Turnout, Census Data

## Abstract

This paper examines the demographic make-up of census block groups with relation to the number of voters who used election day registration (EDR) in the 2000 general election in Anoka County, Minnesota. A demographic profile of EDR voters was developed via statistical analysis and geographic information science (GIS) applications. In order to build the demographic profiles, census demographic data at the block group level in Anoka County was compiled and compared to the EDR turnout in each block group using stepwise multiple linear regression analysis. The results of the statistical analysis were used to build a GIS model based on the demographic groups that were found to have a statistically significant relationship to EDR turnout. In all, 65 census demographic categories were analyzed, and in the end, six were found to be statistically significant enough to be used in the model.

## Introduction

### *Election Day Registration*

There are two main tasks a citizen must complete in order to participate in the democratic process in the United States: (1) They must register to vote and (2) They must vote—either by an absentee ballot, or by filling out a ballot at a designated polling place. Of these two tasks, the process of registering to vote is considered to be the most demanding of the voter (Wolfinger et al., 2002). In many states, registering to vote requires a separate trip to a county elections office. Typically, people live much closer to their local polling place than they do to their county elections office. As a result, registering to vote may require potential voters to take time off of work to go to the elections office to register (Wolfinger et al., 2002). Unlike voting, employers are usually not as flexible about employees taking time off of work to register to vote as they are to let their employees vote in a general election.

Aside from the extra time that it may take an individual to register to vote, registering holds no immediate gratification; there is not the same sense of civic accomplishment that is felt by some citizens when they vote (Highton, 2004).

The premise behind EDR is simple: allowing people to register the day of an election at their designated polling places will help eliminate some of the barriers that keep people from voting, thus, increasing voter turnout (Brians & Grofman, 2001). There are numerous studies to support this premise (Brians & Gorfman, 2001; Fitzgerald, 2003; Demos, 2005; Highton, 2004; Knack & White, 2000).

Although the goal of same day registration laws are aimed at increasing overall voter turnout, some studies have suggested that certain demographic groups seem to use EDR more than others. Fitzgerald found that young voters (18-24 years old) have a greater voter turnout increase when same day registration is implemented than any other group (2003). While Knack & White suggest that people who move more than the average citizen are also more likely to use same day registration (2000). Still other studies conclude that new citizens, people of color, young people and low-income people are the citizens that benefit the most from same day registration (Demos, 2005).

Minnesota Election Laws

Minnesota is one of only six states that currently allow election day registration, the other five include: Idaho, Maine, New Hampshire, Wisconsin and Wyoming. A glimpse at some of the voter turnout numbers from the 2004 election helps demonstrate just how effective EDR can be at helping increase voter turnout:
1) Over 14% more eligible voters cast ballots in EDR states than in non-EDR states: 72.5% of eligible voters in EDR states voted, compared with 58.2% in non-EDR states.
2) Four of the six states with EDR voted at higher rates than any other state. Minnesota, Wisconsin, Maine, and New Hampshire led the nation in voter participation (Demos, 2005).

In Anoka County, the subject area for this study, the Minnesota Secretary of State's Office governs election laws. There are three criteria for why a person must register to vote in Minnesota: 1) If a voter moved, 2) changed their name, or 3) hasn't voted in the last four years.

The laws for registering to vote in Minnesota as listed at the Minnesota Secretary of State's website (www.sos.state.mn.us) are as follows:

**201.061 REGISTRATION ON OR BEFORE ELECTION DAY.**
Subdivision 1. **Prior to election day.** At any time except during the 20 days immediately preceding any election, an eligible voter or any individual who will be an eligible voter at the time of the next election may register to vote in the precinct in which the voter maintains residence by completing a voter registration application as described in section 201.071, subdivision 1, and submitting it in person or by mail to the county auditor of that county or to the Secretary of State's Office.

Subd. 3. **Election day registration.** An individual who is eligible to vote may register on election day by appearing in person at the polling place for the precinct in which the individual maintains residence, by completing a registration application, making an oath in the form prescribed by the secretary of state and providing proof of residence. An individual may prove residence for purposes of registering by:

(1) presenting a driver's license or Minnesota identification card issued pursuant to section 171.07;

(2) presenting any document approved by the secretary of state as proper identification;

(3) presenting one of the following:

(i) a current valid student identification card from a postsecondary educational institution in Minnesota, if a list of students from that institution has been

prepared under section 135A.17 and certified to the county auditor in the manner provided in rules of the secretary of state; or

(ii) a current student fee statement that contains the student's valid address in the precinct together with a picture identification card; or

(4) having a voter who is registered to vote in the precinct sign an oath in the presence of the election judge vouching that the voter personally knows that the individual is a resident of the precinct. A voter who has been vouched for on election day may not sign a proof of residence oath vouching for any other individual on that election day.

**Data**

The first phase in this analysis involved gathering data and preparing it for statistical and spatial analysis. This involved three main steps: (1) Collecting data, (2) Geocoding addresses for voters that used EDR and (3) Preparing data tables for analysis.

***Data Collection***

Voter Data

Minnesota voter data was obtained from the Minnesota Secretary of State's office. The data included all the registered voters in Anoka County, the date the voter registered, and voter addresses, which, as will be explained later, is an essential component for determining the number of voters per block group. The data also included other attributes that were not needed in this study.

Voters that registered on November 7, 2000 were queried out from the rest of the registered voters to obtain a count of EDR voters.

Census Line Data

Census line data was obtained from the ESRI website (www.esri.com) and included: (a) U.S. Census Tiger road data for Anoka County for the year 2000, and (b) U.S. Census Tiger block group polygons for Anoka County for the year 2000. The block group polygons were used to establish the boundaries for the block groups in Anoka County.

Census Demographic Data

The census demographic data was obtained from the United States Census website American FactFinder (http://factfinder.census.gov). The data included census Summary Files 1 (SF1) and Summary Files 3 (SF3) for the year 2000. SF1 files consist of outputs that are the result of a count of the entire population of an area (block, block group, tract, etc.), but offer a limited number of demographic categories. SF3 files include a broader list of demographic categories, but the limitation with SF3 files is that they consist of a sample of the population—roughly 1 in 6 people in the population are sampled (US Census Bureau, 2002).

*Block Groups*

Block groups were used in this study, as opposed to census blocks or census tracts, as a means of utilizing the smallest possible area (to preserve homogeneity) without encountering statistical inaccuracies due to sampling errors with census SF3 files.

The block, because of its smaller size (geographic and population), would have presented a more homogenous

account of the population than block groups, but because blocks cannot be used with the SF3 data, they could not be used in this study. In fact, the block group is the smallest geographic area available for use with SF3 files (US Census Bureau, 2002).

Using census tracts for this study was also a consideration; because of its larger size, the census tract would offer even more statistical accuracy when using the SF3 files than block groups offer. But also due to the larger size of the census tract, the homogeneity of the population would be more likely to deteriorate.

*SF1 Files*

The SF1 demographic categories selected included: Non-white population (*population* refers to total block group population), number of households that are owner occupied (*households* refers to total households per block group), number of households that consist of married couples with children, and the number of households made up of married couples with no children. The total population and total households were also selected, but were only used to standardize the data (this will be explained further in the "Data Preparation" section of the paper).

*SF3 Files*

The SF3 demographic categories that were selected included: Educational attainment for the population 25 years old and above, linguistic isolation, median income, place of birth, number of people on public assistance, poverty ratio, rural verses urban, sex by age, average travel time to work by the population 16 years or older, and population 5 years and older that lived at a different residence in 1995.

Many of the SF3 categories included sub-groups that were excluded from the study (a more detailed explanation of this process will be included in the "Data Preparation" section of the paper).

***Geocoding Voter Addresses***

There were a total of 12,721 voters that used EDR in Anoka County for the 2000 general election. The address of each EDR voter was geocoded by using the voter data and the Tiger road data. All but twelve voter addresses were geocoded. The twelve voters that could not be matched had to be excluded from the study. ESRI's ArcView was used to complete the geocoding task. The addresses were geocoded using an address style of "US Streets With Zone," zip code was selected for "Zone," and the points were set back from the streets by 0.01 miles to assure that they did not fall on the border line of a block group (Figure 1).

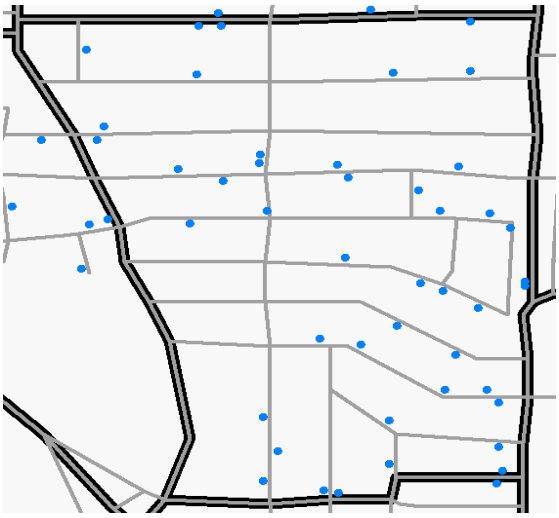

Figure 1. Figure 1 demonstrates the set back feature in geocodeing. The grey lines represent streets. The black lines represent block group boundaries. The gray/black lines represent streets that are also block group boarders. Notice the dots (EDR voters) are off set from the lines; this assures that the voters will not fall on a street/boundary and will instead be placed in the correct block group during analysis.

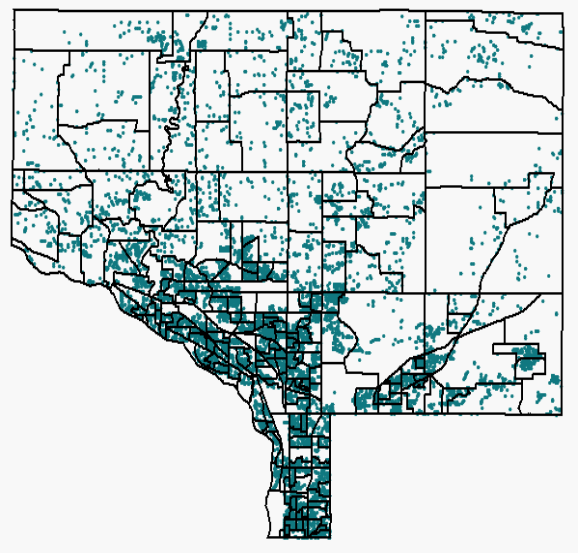

Figure 2. Geocoded EDR voter addresses in Anoka County for the 2000 general election. The black lines represent block group boundaries. The dots represent EDR voters.

Once the EDR voters were geocoded (Figure 2), an Avenue script called "pointstopoly" was used to calculate the number of points (voters who used EDR) in each block group. The totals were added as a field to the block group shapefile.

***Data Preparation: Census Data***

Since block groups can range from 800 to 3000 people (Arctur & Zeiler 2004), the totals for each category selected from the SF1 and SF3 files needed to be converted to percentages to avoid skewing the data toward block groups with larger populations. The percentages were calculated by dividing the total population for each block group by the totals from each category in a block group, and then multiplying by 100 (the total was multiplied by 100 to make the numbers easier to read). For example, the total number of households in block group 1 was divided by the total number of households that were owner occupied in block group 1, and then multiplied by 100. This was repeated for each block group. Five decimal places were preserved in the data table for each percentage calculated.

The EDR totals per block group were also converted to percentages by dividing the total number people in the block group that were of voting age--18 or older, by the total number of voters in the block group who used EDR; this number was also divided by 100 with five decimal places preserved.

SF3 Files

As mentioned earlier, many of the SF3 categories selected included sub-categories. Some of these sub-categories were combined to simplify the data. For example, educational attainment has sub-categories for last grade attended; this study has combined these into one category—No High School Diploma.

Some sub-categories were omitted due to irrelevance to the study. For example, the population that was below the voting age was excluded from the category of Sex By Age. Other data was omitted due to the specific nature of the data. For example, Place of Birth had sub-categories for specific regions of the United States, these were omitted in an effort to try and narrow the scope of the study.

The following is a list of the selected categories and their corresponding sub-categories that appear in the tables used for this study:

** Indicates combined subcategories*

**1) Educational Attainment by the Population 25 or Older** (The sub categories for educational attainment also have sub-categories for males, females and total--these sub-categories are included in this study): No High School Diploma*, High School Diploma, Some College or an

Associate's degree*, Bachelor's Degree, Post Bachelor's Degree*.

**2) Linguistic Isolation:** Language Other Than English is Spoken in the Household, Linguistically Isolated Household ("A household in which no person 14 years old and over speaks only English and no person 14 years old and over who speaks a language other than English, speaks English 'Very well' is classified as 'linguistically isolated'") (US Census Bureau, 2002). *(sub-categories have been omitted)*

**3) Median Income for 1999:** No sub-categories

**4) Place of Birth:** Born in Minnesota, Naturalized Citizen of the United States *(sub-categories have been omitted)*

**5) Number of Households on Public Assistance:** Number of Households That Received Public Assistance Income in 1999 *(sub-categories have been omitted)*

**6) Poverty Threshold Ratio:** Households Below Poverty*, Households At Poverty or 49 Percent Above*, Households 50 to 99 Percent Above Poverty*, Households 100 Percent of or Above Poverty*

**7) Rural Versus Urban:** Urban Total, Within Urban Areas, With in Urban Clusters, Rural, Rural Farms, Rural Non-Farms

**8) Sex By Age** (The sub-categories for Sex By Age also have sub-categories for males, females and total—these sub-categories are included in this study): 18 to 21 Years Old*, 22 to 29 Years Old*, 30 to 39 Years Old*, 40 to 49 Years Old*, 50 to 59 Years Old*, 60 Years Old or Older* *(sub-categories have been omitted)*

**9) Average Travel Time to Work—Population 16 years or older:** 0 to 14 Minutes*, 15 To 19 Minutes, 20 To 29 Minutes*, 30 To 39 Minutes*, 40 To 44 Minutes, 45 To 59 Minutes, 60 To 89 Minutes, Over 90 Minutes, Work at Home

**10) Population 5+ Years Old That Lived At a Different Residence in 1995:** *(sub-categories have been omitted)*

Once all the data was formatted and converted into percentages, the data was spatially joined to the block group shapefile and was ready to be analyzed.

## Methods

This section of the paper will focus on the basis for demographic group selections and the methods used to analyze the data.

### *Basis For Demographic Selection*

There were two criteria that were used in selecting demographic data to include in this study. The first criterion was based on the theories put forth by previous studies that were examined in preparation for this study. As mentioned earlier, some studies had suggested that young people, people of color, low income people, recent immigrants, people with language barriers and people who frequently move, were more likely to use EDR. It should be mentioned that these theories were used only as an entry point for selecting demographic categories, and the intention of including them in this study is not to prove or disprove them.

The following categories were selected based on the first criterion: Median Income, Sex By Age, Poverty Threshold Ratio, Number of Households on Public Assistance, Population 5+ Years Old That Lived At a Different Residence in 1995, Place of Birth, Linguistic

Isolation and Households That Are Owner Occupied.

The second criterion used to select demographic groups was based on the intuition of the author. The categories selected using the second criterion included: Average Travel Time to Work, Rural Versus Urban, Educational Attainment, Born in Minnesota (a sub-category of Place of Birth), and Married Couples With/Without Children.

***Analysis***

The analysis of the data included two steps: (a) Statistical analysis and (b) spatial analysis.

Statistical Analysis

The statistical analysis was conducted using the statistical analysis program SPSS. A stepwise multiple linear regression analysis was conducted on all of the demographic categories; the N value for the regression is represented by the number of block groups in Anoka County—230, the percent of the voting age population that used EDR per block group was the dependent variable and each demographic category was an independent variable.

A stepwise regression analysis steps through each independent variable to determine if it should be used in the multiple regression model. At each step it adds the most statistically significant independent variable (the one with the highest F statistic or lowest p-value) to the model and excludes the variables that are found to be statistically insignificant. This process terminates when there are no more variables left to verify.

There were a total of eight independent variables that were found to be statistically significant and initially included in the model. They are listed here in order of highest statistical significance to lowest: Married Couples With Children, Population 5+ Years Old That Lived At a Different Residence in 1995, Households That Are Owner Occupied, Males 50 to 59 years old, Travel Time to work of 30 to 39 Minutes, Females 18 to 21 years old, Males 22 to 29 years old, and Females 22 to 29 years old. The last two categories were manually excluded from further analysis by the author due to low R-squared values.

Spatial Analysis

The spatial analysis was conducted by creating a model in ArcView. The first step in this process was to create grids of each of the six demographic categories selected by the statistical analysis. Once the grids where created, the data needed to be simplified through a weighting system and reclassified so that the six grids could be combined into one grid that summarized the results of the statistical analysis. In order to simplify the grids, the author developed the following procedure:

**1)** The mean and standard deviation for each category was calculated.

**2)** An estimated weight system was devised based on the R-squared value from the stepwise multiple linear regression analysis and on the means and standard deviations that were calculated in step 1 of this process. For example, Married Couples With Children, which had a significantly higher R-squared value than the other five demographic categories, was broken down into 12 classes, each class representing roughly 0.5 standard deviations above the preceding class. Each class was assigned a value of 1 through 12, 1 being assigned the class with the lowest values, and 12 assigned to the class with the highest

values. This category was assigned 12 classes to increase the weight assigned to it. By comparison, Population 5+ Years Old That Lived At a Different Residence in 1995, which had the next highest R-squared value, but much lower than the R-squared value of Married Couples With Children, was broken down into only three classes, with each class being based on standard deviations from the mean.

It should be noted that Females 18 To 21 Years Old had a negative correlation with EDR. Therefore, this category was assigned a negative weighted value.

**3)** Once every category was simplified and reclassified, fields were added to the block group shapefile table so that the weighting system could be tested. The method for testing the weighting system involved calculating a total score for each block group. For example, if block group 1 had a weighted score of **5** for Married Couples With Children, **2** for Population 5+ Years Old That Lived At a Different Residence in 1995, **0** for Households That Are Owner Occupied, **1** for Males 50 to 59 years old, **0** for Travel Time to work of 30 to 39 Minutes, and **-1** for Females 18 to 21 years old, the total score for this block group would be **7** (5 + 2 + 0 + 1 + 0 + (-1) = 7).

**4)** Once total scores were calculated and added to the table, a simple regression analysis was conducted using an ArcView extension (Grid and Theme Regression (V 2.1)). Percent of voting age that used EDR was the dependent variable, and the total weighted score was the independent variable. The R-squared value for the simple regression analysis was compared to the cumulative R-squared value from the stepwise multiple linear regression. This procedure was conducted several times until the optimum weighted scores were achieved for each demographic category reclassification. In other words, the R-squared value for the simple linear regression was as close as possible to the R-squared value for the stepwise multiple linear regression. The final weighting system that resulted from this process is shown in appendix A.

Once appropriate weights were assigned to each grid classification, new grids were created for each of the 6 demographic categories using the reclassified weighted values.

Finally, the six reclassified grids were added together using ArcView's map calculator. The new grid reflected the results of the stepwise multiple linear regression that was performed on the data and was ready to be compared to a grid containing the actual EDR values to demonstrate the models predictive abilities.

**Results**

The analysis suggests that there is a strong relationship between high EDR and block groups that have demographic make up of a high percentage of (a) married couples with children, (b) residents that had moved since 1995, (c) owner occupied households, (d) males 50 to 59 years old, (e) people whose travel time to work was 30 to 39 minutes, and (f) a low percent of females 18 to 21 years old. Although all of these demographic groups combined help create the strongest predictor of EDR, married couples with children by itself is the strongest predictor, with residents who had moved since 1995 being a distant second, and the other four categories being significantly weaker predictors.

***Statistical Analysis***

As mentioned in the prior section, the stepwise multiple linear regression

produced eight demographic categories that were shown to be statistically significant, of those categories two were excluded. The six remaining categories had an adjusted R-squared value of 0.505. The adjusted R-squared value was used because it is slightly more accurate than the R-squared value in the stepwise regression. This is because the adjusted R-squared value does not increase unless the new variable being added to the model has real predictive ability (Zar, 1999). What the adjusted R-squared value tells us is that the model has the ability to account for or predict 50.5% of EDR in the block groups. Considering the infinite number of variables that could affect whether a potential voter will use EDR, an adjusted R-squared value of 0.505 is a very significant number. Stepping through the analysis reveals the change in the adjusted R-squared value for each demographic category (Table 1).

Table 1. R-squared values for the six demographic categories used in the analysis

| Categories | R-squared |
|---|---|
| Married/Children | .341 |
| Diff Residence 1995 | .081 |
| Owner Occupied | .040 |
| Males 50 to 59 | .018 |
| Travel Time 30 to 39 | .013 |
| Females 18 to 21 | .012 |
| **Total** | **.505** |

### *Spatial Analysis*

The spatial analysis that was performed on these statistics produced a spatial model that very closely matched the statistical analysis. The simple regression analysis that was performed in ArcView on the weighted classes produced a model that had an R-squared value of 0.462—a difference of only 0.043 from the adjusted R-squared value of 0.505 from the stepwise multiple linear regression (Figure 3).

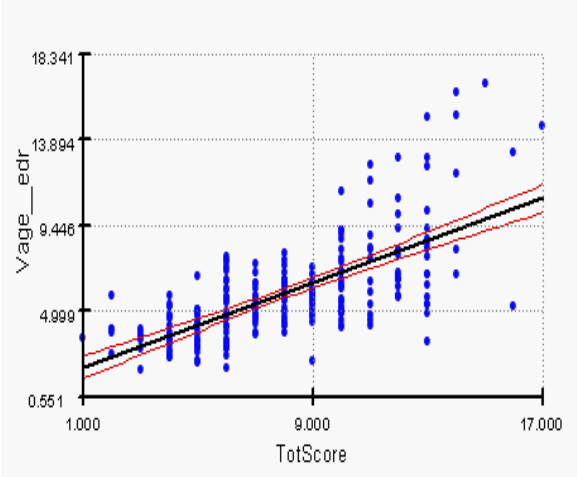


Figure 3. Scatter plot showing the results of the simple linear regression between EDR (dependent variable) and total weighted scores (independent variable). N= 230, R-Sq = .462, F-Value 196.14, P-Value = 0.0000000.

The analysis produced a clear visual perspective of EDR in Anoka County for the 2000 general election. By manipulating the class breaks in ArcView, one can quickly determine in which block groups the model was able to accurately predict EDR and which block groups the model poorly predicted. The model did a good job at predicting highest and lowest EDR rates (with a few exceptions), but as would be expected, did a poorer job of predicting EDR values that were closer to the mean; in particular, EDR values that were plus or minus 0.05 standard deviations from the mean.

Figure 4 is a spatial representation of the EDR model produced in Arcview's 3D Analyst. The block groups are extruded based on total weighted score—the higher the score, the more the block group is extruded. The color classes represent the percent of voting age population in each block group that used EDR. The class breaks can be read as follows: Yellow hues: -2.0 to –0.5 standard deviations from the mean, growing brighter as the values move

further from the mean; Gray: -0.5 to 0.5 standard deviation from the mean; Red hues: 0.5 to 2.0 standard deviations from the mean growing darker as the values move further from the mean. In other words, the model matched the actual EDR results where bright red Polygons are greatly extruded, bright yellow polygons are greatly depressed and the gray polygons are neither overly extruded nor overly depressed. Upon visual inspection there appear to be few, if any, bright red polygons that are depressed—indicating accurate prediction of high EDR by the model. But there does appear to be several gray polygons and a few light yellow polygons that are greatly extruded, or more extruded than should be predicted; this indicates a false prediction of high EDR turnout in these block groups. For the block groups that were poorly predicted, further analysis could be performed to try and determine what, if any, predictors are at work that were not examined in this study.

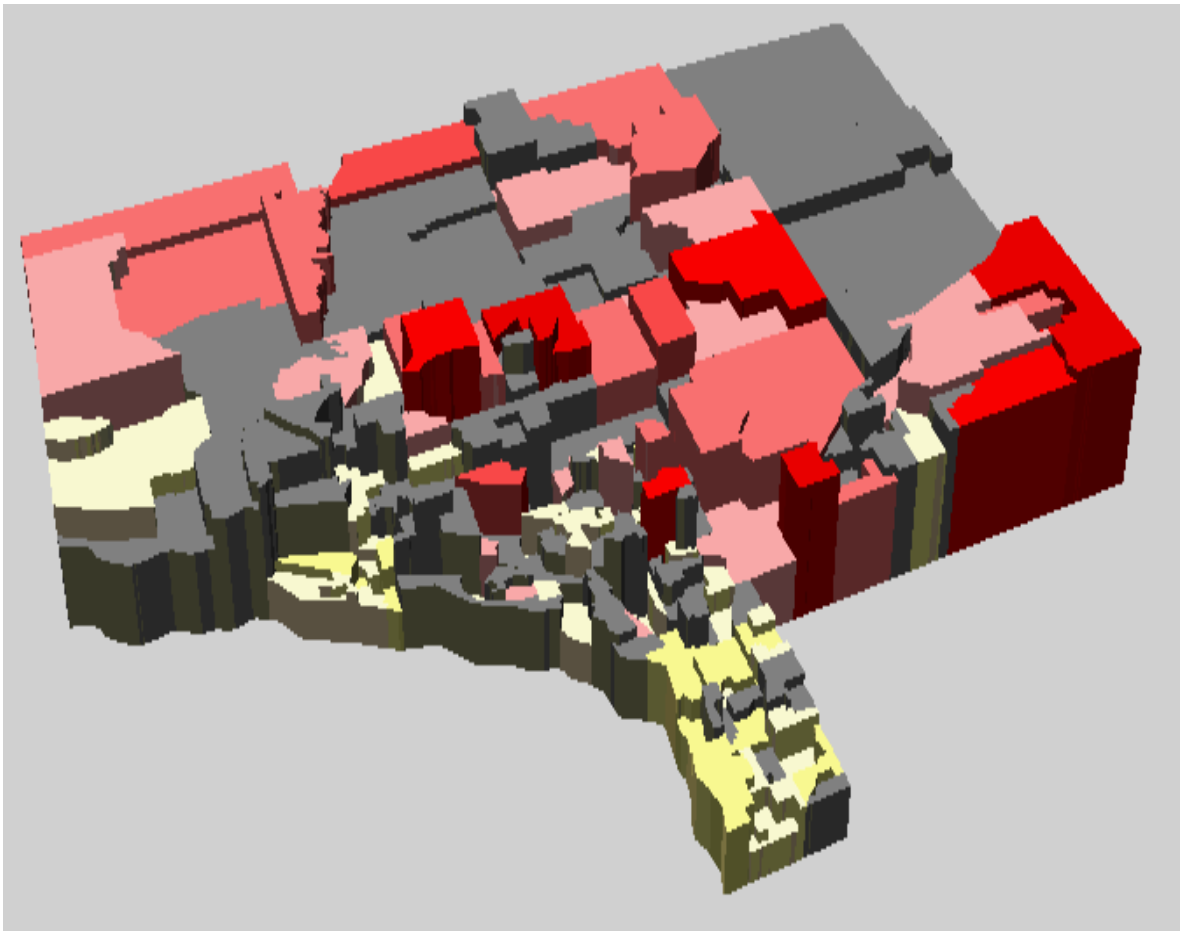

Figure 4. A spatial representation of the author's EDR model presented in ArcView 3D Analyst.

**Discussion**

There are many different ways to examine who uses EDR. For example, one may conduct a trend analysis to determine which group of voters has the greatest increase when EDR is first implemented in a state. Other studies may examine how election issues affect EDR. The author of this study chose to

examine which groups of voters used EDR in a very specific geographic area for one particular election. The results of this study should be viewed as a snap shot of a unique situation in time. Because of this, some questions should be raised concerning the broad application of these findings to other elections or other geographic areas—this is particularly important when considering the overall demographic make up of Anoka County. For example, naturalized citizens, and language isolation, are two categories that may have been missed by this analysis due to a very low percent of the population that fit into these categories. Do to situations such as this, it would be expected that a study of a different geographic area might yield very different results. But this should not lessen the potential significance of the study. Future studies involving different elections and different areas could apply the methods laid out here to help develop a more holistic and accurate description of who uses EDR. Some suggestions for further study include: (a) Applying this model to other counties in Minnesota and/or other states during the 2000 general election; (b) applying this model to Anoka County using a different election year; (c) a combination of different years and different counties and/or states.

**Acknowledgments**

I would like to thank the Resource Analysis staff at St. Mary's University of Minnesota for their help during this project, in particular the members of my committee: Dr. David McConville and John Ebert.

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Appendix A. Weighting System For Demographic Groups

Class weights for households—married with children

| Class Weight | Class Range | Approximate standard deviation from the mean |
|---|---|---|
| 1 | 6.73 – 11.53 | -2 to -2.5 |
| 2 | 11.53 – 16.33 | -1.5 to -2 |
| 3 | 16.33 – 21.13 | -1 to -1.5 |
| 4 | 21.13 – 25.93 | -0.5 to -1 |
| 5 | 25.93 – 30.74 | 0 to -0.5 |
| 6 | 30.74 – 35.54 | 0 to 0.5 |
| 7 | 35.54 – 40.34 | 0.5 to 1 |
| 8 | 40.34 – 45.14 | 1 to 1.5 |
| 9 | 45.14 – 49.94 | 1.5 to 2 |
| 10 | 49.94 – 54.75 | 2 to 2.5 |
| 11 | 54.75 – 59.55 | 2.5 to 3 |
| 12 | 59.55 – 64.35 | 3 to 3.5 |

Class weights for population 5+ years old that lived at a different residence in 1995

| Class Weight | Class Range | Approximate standard deviation from the mean |
|---|---|---|
| 0 | < 39.5 | < Mean |
| 2 | 39.5 – 64.67 | 0 to 1.5 |
| 3 | >64.67 | > 1.5 |

Class weights for Households that are owner occupied

| Class Weight | Class Range | Approximate standard deviation from the mean |
|---|---|---|
| 0 | <66.94 | < -1 |
| 1 | >66.94 | > -1 |

Appendix A (Continued). Weighting System For Demographic Groups

Class weights for males 50 to 59

| Class Weight | Class Range | Approximate standard deviation from the mean |
|---|---|---|
| 0 | <7.76 | < Mean |
| 1 | >7.76 | > Mean |

Class weights for travel time to work for population 16+ years old

| Class Weight | Class Range | Approximate standard deviation from the mean |
|---|---|---|
| 0 | <20.14 | < Mean |
| 1 | >20.14 | > Mean |

Class weights for females 18 to 21 years old

| Class Weight | Class Range | Approximate standard deviation from the mean |
|---|---|---|
| 0 | <3.16 | < Mean |
| -1 | >3.16 | > Mean |