

Data for 2011 Redistricting in Texas



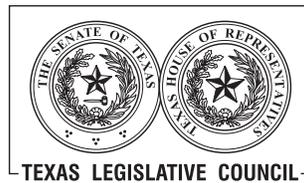
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Data for 2011 Redistricting in Texas

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Table of Contents

Preface	1
Population Data	3
Race and Ethnicity Classification	3
Citizenship Data.....	3
Population Reports.....	3
Geographic Data	5
Census Bureau Geographic Data	5
TIGER/Line Shapefile.....	5
Census 2010 Redistricting Data Program.....	5
District Modeling Units	6
Counties	6
Voting Tabulation Districts	6
Census Tracts	6
Census Block Groups.....	6
Census Blocks.....	6
City Limits	6
Census Designated Places.....	6
Reference Units.....	7
Current District Boundaries	7
County Election Precincts.....	7
Incumbent Locations.....	7
Road and Water Features	7
School Districts.....	7
User-defined Geography	7
Geography Reports	8
Compactness	8
Compactness Measures.....	8
Election Data	9
Election Returns.....	9
Voter Registration	10
Spanish Surname Voter Registration.....	10
Voter Turnout	11
Precinct Information	11

Candidate Information	11
Election Reports.....	11
Allocation.....	11
Limitations of the Allocated Data.....	12

Preface

Data for 2011 Redistricting in Texas was prepared to provide members of the legislature and other interested persons with the information about the data that will be available through the council's redistricting computer system and on maps and reports.

The publication describes the data that the Texas Legislative Council collects and prepares for redistricting, the sources of the data, and the methodology used by the council to link the various types of data used in the redistricting database. The data is presented in three sections: population data, geographic data, and election data. A brief description of the way the council presents the data on reports is covered at the end of each section.

For more information concerning redistricting data, contact the Texas Legislative Council at (512) 463-6622.

Debbie Irvine
Executive Director

Population Data

The State of Texas will use population data from the April 1, 2010, federal decennial census count for redistricting. On December 21, 2010, the United States Census Bureau delivered the state population totals to the president and, using a formula known as the method of equal proportions, the number of congressional seats that each state is apportioned for the next decade was determined. In accordance with Public Law 94-171, the bureau is required to provide the states with the official census population numbers needed for redistricting, including total and voting age population by race and ethnicity for every census geographic level, by April 1, 2011.

Race and Ethnicity Classification

The council groups the population data into five race and ethnicity categories for redistricting modeling and reporting: Black, Hispanic, Black+Hispanic, Anglo, and Other. “Black” encompasses all people identifying themselves as Black, African American, or Negro on the census questionnaire, even if they also identified themselves with other racial/ethnic groups. “Hispanic” encompasses all people identifying themselves as Hispanic, Latino, or Spanish origin, whatever their race. “Black+Hispanic” is a combined total of all those identifying themselves as Black and all those identifying themselves as Hispanic, adjusted so that those identifying themselves as both Black and Hispanic are not counted twice. “Anglo” includes all people who selected “White” as their only race and did not identify themselves as Hispanic, Latino, or Spanish origin. “Other” encompasses everyone who does not fall into any of the four classifications described above.

Citizenship Data

The Census Bureau may release citizenship estimates in a form useful for redistricting from its American Community Survey (ACS) for the five-year period 2005-2009 later this spring. If the council is able to convert the ACS data into a form that can be used reliably in redistricting and provide an estimate of citizenship before the end of the 2011 Regular Session, an addendum to the publication will be published explaining that additional data.

Population Reports

Council population reports are divided into two main categories: plan and non-plan. Plan reports provide information about the population of current and proposed redistricting plans, and they can be run for a single district, several districts, or all districts in a plan. Non-plan reports present data for other political subdivisions, such as counties, cities, voting tabulation districts (VTDs), and school districts.

Some of the plan reports include the percent by which each district’s total population deviates from the ideal district population, the total and voting age population, and the racial and ethnic composition of each district. The plan reports that list a district’s geographic components, such as counties, cities, VTDs, or school districts, provide the percent of that component that is in the district. For example, for a Central Texas senate district that is composed of all of some counties and part of Bexar County, the report would list the whole counties as 100 percent and the part of Bexar County as the percent that was in the district. Non-plan reports include the population totals and racial and ethnic composition for any or all counties or cities in the state, for all school districts in the state, or for all VTDs in a county. The reports use cities as they existed at the time of the 2010 census, but use precincts, VTDs, and school districts that are updated by the council periodically throughout the decade.

Geographic Data

The geographic data used in redistricting includes the census geography used as building blocks for districts, the county election precincts used to collect and report voter and election returns data, other geographic areas used for reference such as cities, school districts, and ZIP Codes, and the district assignments of the residence locations of incumbent members under proposed redistricting plans.

Census Bureau Geographic Data

The Texas Legislature uses census geography for modeling districts. Census geography does not change during the decade, and the bill text describes the districts in terms of these stable geographic units. Census geography traditionally included counties, census tracts, block groups, and census blocks defined by visible features (roads, rivers) to the extent possible. VTDs, groupings of census blocks that approximate election precincts, were added to the geography for the 1990s redistricting, and school district boundaries were added in 2000. In 2010, the Census Bureau added precinct boundaries submitted by the states to be used for VTDs, regardless of whether they followed physical features.

TIGER/Line Shapefile. During the 1980s, the Census Bureau digitized maps of the entire United States into a computerized geographic database, the Topographically Integrated Geographic Encoding and Referencing (TIGER) system, to help with the 1990 census. During the 1990s, the bureau added the Master Address File (MAF) to TIGER to improve the 2000 census. During the 2000s, the bureau continued to improve address files and street alignment, added congressional and state legislative district boundaries, and added election precinct boundaries to the MAF/TIGER database.

The TIGER/Line Shapefile, an extract of TIGER that includes nationwide block numbering, was developed for several purposes, including computerized redistricting. The TIGER/Line Shapefile contains all census-related map features such as roads, railroads, rivers, lakes, cities, and school districts. The file also contains related attributes (names, address ranges, and geographic relationships to other features) for each of the map features and contains geographic identification codes, such as county codes, city names, and tract and block numbers. The TIGER/Line Shapefile constitutes the foundation of the redistricting geographic database from which council staff extract county, VTD, tract, block group, and block boundaries to match with the Census Bureau's population data for use in the council's redistricting application (RedAppl).

Census 2010 Redistricting Data Program. An important aspect of the Census 2010 Redistricting Data Program is the use of VTDs to provide links among the census geography used to build districts, the census population data, which is reported by census block, and election data, which is reported by voting precinct.

Council staff work with the counties throughout the decade to build a precinct and VTD database for each election. Where the counties have drawn their precinct boundaries on visible features, VTDs match county election precincts exactly. Where the precinct boundaries are drawn on nonvisible features, for the corresponding VTD boundaries council staff select the census block boundaries that most closely follow the precinct boundaries. For 2010, the Census Bureau allowed states to submit their 2010 primary precinct boundaries, even if they were drawn on nonvisible features, for inclusion in the TIGER/Line database. Council staff create a 2010 general election VTD layer for the 2011 redistricting.

District Modeling Units

The council's redistricting application (RedAppl) allows users to combine various units of census geography into districts. Modeling units include counties, VTDs, census tracts, block groups, blocks, cities, and census designated places.

Counties. The state's 254 counties are the largest geographic units of the state that are used as district modeling units. A number of districts in the state consist entirely of whole counties.

Voting Tabulation Districts. The VTDs in the 2011 redistricting database closely correspond to the 8,336 precincts in effect for the 2010 general election. On the rare occasion that a precinct is in two noncontiguous pieces, it is a suffixed VTD in the database. For example, precinct 0001 would be VTD 0001a and VTD 0001b. If a 2010 general election precinct does not match any census geography, it is consolidated with an adjacent VTD. This situation is more likely to occur when precincts are added for new subdivisions that are not included in the census 2010 TIGER/Line block geography.

The 2010 general election VTDs in the council's redistricting geographic file are not the same as the 2010 primary VTDs in the Census Bureau's geographic file and do not correspond with the population data reported for the 2010 primary VTDs in the Census Bureau's PL 94-171 file. The legislative council will post 2010 general election VTD geography and population data that correspond to the 2010 general election VTDs in the 2011 redistricting database on the council's FTP site (<ftp://ftpgis1.tlc.state.tx.us/>).

Census Tracts. Approximately 5,265 census tracts have been delineated in Texas for the 2010 census. Census tracts are statistical subdivisions of counties delineated by local committees in accordance with Census Bureau guidelines for the purpose of collecting and presenting decennial census data. They are relatively stable from decade to decade and were designed to have homogeneous population characteristics, economic status, and living conditions at the time they were established. Tract boundaries generally follow visible features and contain between 1,200 and 8,000 people, with an optimum population size of 4,000.

Census Block Groups. Census block groups are defined as a cluster of census blocks within a census tract that have the same first digit of their 4-digit census block number. Texas has 15,811 block groups in the 2010 TIGER/Line Shapefile. Block groups never cross census tract boundaries but may cross other boundaries, such as city limits, school districts, and VTD boundaries. Block groups generally contain between 600 and 3,000 people, with an optimum population size of 1,500.

Census Blocks. The census block is the smallest unit of geography for which population data is collected and reported. Census blocks are bounded either by visible features, such as roads, rivers, or shorelines, or by nonvisible features, such as county lines, city limits, school district boundaries, or 2010 precinct/VTD boundaries. Texas has 914,231 census blocks in the 2010 TIGER/Line Shapefile. Blocks may or may not have population.

City Limits. City limits as of January 1, 2010, will be in the 2011 redistricting database. The accuracy of city limits in the redistricting database depends to a large extent on individual cities' participation in the 2010 Boundary and Annexation Survey, a survey of all incorporated places conducted by the Census Bureau to determine the correct legal limits of these areas. City limits that serve as census block boundaries can be used as district boundaries. Cities can be used as modeling units in RedAppl, displayed on maps, and listed by district in reports.

Census Designated Places. Census designated places (CDPs) are densely settled, unincorporated areas that are locally identified by name and for which the Census Bureau reports population. The boundaries of a CDP are established by the bureau in cooperation with state and local government officials. For the 2010 census, CDPs do not have to meet a population threshold

to qualify for tabulation of census data. The 2010 CDPs also will be modeling units in RedAppl and displayed on maps, as well as listed by district in reports.

Reference Units

In addition to the census geographic areas used for modeling, other geographic areas have been compiled for map orientation and reference purposes only, including current legislative, congressional, and State Board of Education (SBOE) districts, 2010 general election precincts, incumbent locations, road and water features, and school districts. RedAppl users also may import user-defined geography.

Current District Boundaries. Boundaries for congressional, state senate, state house of representatives, and SBOE districts in effect in 2010 are included in the geographic database. There may be some instances in which current district boundaries are approximated due to small spatial realignment corrections in the 2010 TIGER/Line Shapefile.

County Election Precincts. County election precincts are the geographic units established by county commissioners courts for the purpose of election administration. Precincts can be bounded by visible or nonvisible features. Under the Texas Election Code, precincts may not contain territory from more than one congressional, state senate, state house, or SBOE district. Council staff collect precinct changes from county officials before each statewide election to ensure that the link between geographic data and election and population data in the redistricting database is accurate. Precincts for the 2010 general election are displayed in RedAppl and on maps, but data are not reported for them in the redistricting reporting system. Special election reports containing election returns by precinct are available.

Incumbent Locations. The council includes incumbent residence locations for members of the 82nd Legislature, the 112th Congress elected from Texas, and the State Board of Education in the redistricting database to enable legislators to consider the effect of any proposed district boundary changes on incumbent representatives. These locations are identified in the redistricting database as census block locations. Neither the specific address nor the precise location of a member's residence within a block is indicated in RedAppl or on reports showing the incumbents who reside in each district in a proposed plan.

Council staff obtain most of these locations from the permanent address provided on the contest application form filed by candidates with the secretary of state. Members are contacted and asked to verify that the location shown on a map is correct.

Road and Water Features. Roads and road names can be displayed in RedAppl to assist with orientation within a county or counties. Water features should be used for general reference purposes only. Lakes and coastal bays use 2010 geography; rivers are based on 2000 geography.

School Districts. The 2010 TIGER/Line Shapefile contains 2009-2010 school year school districts and school district names. School district boundaries serve as census block boundaries, and population can be summed for them by block. The 2010-2011 school year school districts, prepared by council staff, are used as a reference layer in RedAppl, on maps, and in population data reports.

User-defined Geography. RedAppl allows users to import and overlay user-defined geography as reference layers so that they may view additional geographic data that they judge to be of value, such as a community of interest. The geography must be in a shapefile format and be in the same map projection as the RedAppl data. The map projection that the council uses is Texas Centric Mapping System/Lambert Conformal (TCMS/LC), which implements the North American Datum of 1983 (NAD83). The TCMS/LC is described in detail in the Texas Administrative Code at 1 T.A.C. Section 201.6.

Geography Reports

Generally, reports provide population or election data, or both, for districts and for various units of census and election geography. The reports that relate solely to geography include those listing components of districts, such as lists of VTDs, precincts, ZIP Codes, or school districts; plan checking reports that are used to verify that all of the census blocks in the state are included in the redistricting plan and that all of the districts are contiguous; and compactness reports.

Compactness. Neither Texas nor federal law expressly requires legislative, congressional, or SBOE districts to be compact. As a result of recent U.S. Supreme Court cases, legislatures attempting to comply with the Voting Rights Act must consider traditional criteria, such as respect for county lines and communities, contiguity, and compactness, while drawing districts that affect racial or language minority communities. Case law and legal and social science scholarship establish no preferred standard for measuring or evaluating district compactness.

There are three basic types of compactness measures used to analyze districts. These measures analyze the area, perimeter, and population of a district. Over 36 different variations of compactness measures exist, but no single measure of compactness is identified as the “best” measure. The measures presented in RedAppl and on reports can range from zero to one, with one indicating perfect compactness for the particular scale. The lower the score, the less compact the district.

Compactness Measures:

- **Area Dispersion:** This measure examines the relative degree to which a district’s area is compact when compared with the area of a similar compact figure. It is the ratio of the area of the district to the area of the smallest convex polygon that can enclose the district (imagine a rubber band stretched around the district). A district in the shape of a square would receive a perfect score of one using this measure. This measure penalizes a district that has long “fingers” or extensions that make it less compact because it requires a larger convex polygon to enclose the entire district, yet much of that polygon is empty.
- **Perimeter:** This measure compares the relative length of the perimeter of a district to its area. It is the ratio of the area of the district to the area of a circle with the same perimeter as the district. A perimeter-to-area measure penalizes a district’s compactness score whenever the boundaries are uneven or irregular: the more the boundary zigzags (for example, a river), the less compact the district under this measure.
- **Population:** This is a population-based compactness measure computed as the ratio of the population of the district to the population of all census blocks contained in the smallest convex polygon enclosing the district. The greater the population within the convex polygon that is not within the district, the less compact the district under this measure.

Election Data

Election data collected by the council include election returns, total and Spanish surname voter registration, voter turnout, and precinct and candidate information for all statewide elections from 1986 through the 2010 general election, selected county and city elections through the 2010 general election, and all special elections for state districted offices. For redistricting in 2011, election data from the 2002 through the 2010 elections will be available in RedAppl and election data from the 1996 through the 2010 elections will be available for maps and reports.

Election Returns

Returns are votes that were cast for each candidate in an election, reported by precinct. County election officials submit returns for state offices to the secretary of state, as required by the Texas Election Code. Some counties submit returns for local county offices to the secretary of state along with state office returns, although they are not required to do so.

The following election returns have been computerized for 2011 redistricting:

- Statewide office and statewide districted returns: 2002-2010 state Democratic and Republican primaries and runoffs and general elections are available in RedAppl, and 1996-2010 elections are available for maps and reports. Texas Legislative Council reports on elections held before 2008 generally do not include results for third-party, independent, or write-in candidates, unless the candidate received more than 5 percent of the vote in a 3-party contest or more than 10 percent of the vote in a 2-party contest. Beginning in 2008, results for all third-party and independent candidates are included, and the results for write-in candidates are summed and included as “write-in.” Complete official election results for all years are maintained by the secretary of state. Statewide offices include president, U.S. senator, governor, lieutenant governor, attorney general, comptroller, land commissioner, agriculture commissioner, railroad commissioner, supreme court justices, and court of criminal appeals justices; statewide districted offices include U.S. representative, State Board of Education, state senator, and state representative. All Texas counties are included in statewide elections, with two exceptions: party primaries are not held in every county, and runoffs are held in a county only if the county is eligible to vote in the contest involved in the runoff.
- Countywide office and county districted returns: 2008-2010 selected county elections in the 22 most populous counties (Bell, Bexar, Brazoria, Brazos, Cameron, Collin, Dallas, Denton, El Paso, Fort Bend, Galveston, Harris, Hidalgo, Jefferson, Lubbock, McLennan, Montgomery, Nueces, Smith, Tarrant, Travis, and Williamson) and a few 2002-2006 selected county elections in the largest counties are available in RedAppl; 1996-2010 selected county elections are available for maps and reports. Countywide offices include district judge, county judge, county court judges, district attorney, district clerk, county clerk, county treasurer, tax assessor-collector, and sheriff; county districted offices include county commissioners, justices of the peace, and constables.
- City returns: 2002-2010 selected city elections in the eight most populous cities (Arlington, Austin, Corpus Christi, Dallas, El Paso, Fort Worth, Houston, and San Antonio) and a few 1996-2000 city elections are available for maps and reports. City elections include contests for mayor and city council members. City elections are not included in RedAppl.

- Special elections: 1996-2010 special elections to fill vacancies for congressional and state legislative offices are available for reports only.

Precinct returns for each state and county election are entered independently by two council staff members. This double-entry process reduces the number of data entry errors. The totals obtained from the entered precinct data for state offices are then compared with county canvass totals provided by the secretary of state or, for local contests, with totals provided by local sources. If discrepancies exist, the totals are checked and county election officials are contacted before any differences are left in the system. Most differences in totals are small and none were great enough to change the outcome of any contest.

Voter Registration

Effective January 1, 2006, Section 18.061, Election Code, requires the secretary of state to maintain a statewide computerized voter registration list that serves as the single system for storing and managing the official list of registered voters in the state. The voter registration totals for state and county elections in the council's elections database are derived from the secretary of state's Statewide Voter Database. Registration for a city or special election is derived from the registration for the general or primary election nearest to the date of the given election.

Before January 1, 2006, Section 18.042, Election Code, required that the voter registrar from each county file a preelection registration statement with the secretary of state no later than 20 days before the date of a primary or general election for state and county offices. This statement included a report of the number of persons by precinct whose voter registration would be effective on election day. The voter registration totals for state and county elections in the council database before 2006 are derived from those county voter registration statements.

Chapter 15, Election Code, requires that county voter registrars maintain a suspense list containing the name of each voter who fails to respond within 30 days to a confirmation of residence notice that is sent when the registrar has reason to believe that a voter's current residence is different from that indicated on the registration records, or when a renewal registration certificate sent in an odd-numbered year is returned because the addressee has moved. Following the second general election that occurs after the date a voter's name is entered on the suspense list, the voter's registration is canceled by the registrar. Suspense information is collected by the secretary of state and included in the Statewide Voter Database.

Before 2011, council reports reflected non-suspense voter registration. Beginning in 2011, all council election reports will reflect total voter registration.

Spanish Surname Voter Registration

Spanish surname voter registration, also reported in the secretary of state's Statewide Voter Database, is generated using a comparison to the 2000 Census Bureau List of Spanish Surnames. While most sources agree that the match between people who have Spanish surnames and those who consider themselves Hispanic is relatively good in Texas (the Census Bureau estimates a 90 percent correlation for the state), the reported number of registered voters with Spanish surnames is not a precise measure of Hispanic voter registration. Some people who consider themselves Hispanic do not have surnames that are included in the Spanish surname file and will be missed by the Spanish surname matching technique. Others, who have surnames that are included in the Spanish surname file but do not consider themselves Hispanic, will be incorrectly counted as Hispanic registered voters.

Voter Turnout

Voter turnout is the number of registered voters who voted in a given election. Before 2010, the council reported the turnout by precinct from turnout information provided by the county election officials. County election officials sometimes reported early voting turnout separately from election day turnout and sometimes combined the two into one total. The council reported the election day and early voting turnout by precinct as one total. When reliable turnout figures could not be collected from a county, council staff estimated turnout by computing the largest number of votes cast for a single contest in each precinct and using that number as an estimate of precinct turnout. Beginning in 2010, the council will estimate all turnout in this manner.

Precinct Information

County precinct boundary changes and lists of precincts corresponding to the elections for which the council computerizes election returns are collected to ensure that the link between election data and geographic and population data is accurate.

Candidate Information

Candidate information that the council collects for redistricting includes the candidate's name, party affiliation (for partisan state and county elections only), and identification of incumbency.

Candidates are identified from lists obtained from the secretary of state or from local election officials. In the council database, a candidate's name is entered as it appears on the ballot. If different versions of a name are used by an individual in different elections, the name is standardized so that the candidate can be tracked across elections.

Council staff identifies incumbent state officials from various published sources, as well as canvass reports and letters of appointment from the governor. Incumbent local officials are identified in the system if that information is provided by local election officials.

Election Reports

Election reports include election returns by candidate, voter registration, Spanish surname voter registration, and turnout for an election and are available by district, county, or VTD. Election returns, voter registration, and voter turnout are captured in the council's election database by precinct or consolidated precinct in effect for the specific election. Counties may change the boundaries of voting precincts from one election to the next. Special reports of election returns by precinct can be produced, but returns are reported by VTD for proposed redistricting plans.

Council staff create a set of VTDs that corresponds to the set of precincts in effect for each election in the election database. To allow rapid correlation of election and population data with proposed districts for purposes of analysis, election data is allocated to 2010 census blocks and then summed to 2010 general election VTDs, counties, and districts. This data is available for use in RedAppl and for maps and reports produced by the council.

Allocation. For the 2011 redistricting, the election returns, registration, turnout, and precinct geography from 1996 through 2010 are correlated with population from the 2010 census. Because population data from earlier years are not used in the allocation, the allocated data will not exactly match the precinct level data from past elections. Used with a clear understanding of its limitations by those familiar with local circumstances, however, the data can be an effective tool for analysis of proposed districts and plans.

The allocation is accomplished through a three-step process: (1) allocating precinct-level voter registration (VR) using voting age population (VAP) from the most recent census, (2) allocating election returns using the allocated VR, and (3) allocating turnout using the allocated election returns. Using VR and returns for the subsequent allocation steps serves to control the allocated data to the precinct totals and to preserve the relationships among the data.

The first step consists of two parts, allocating Spanish surname VR using Hispanic VAP and allocating non-Spanish surname VR using non-Hispanic VAP. VR and Spanish surname VR are acquired from the secretary of state's Statewide Voter Database. The census blocks associated with a precinct are sorted in descending order by the allocation variable (in this case, non-Hispanic and Hispanic VAP), and the VR is allocated. The formula for calculating census block VR is:

$$\text{blockVR} = \frac{\text{blockVAP}}{\sum \text{blockVAP}} * \text{totalVR}$$

The result for each block is rounded to the nearest whole number and subtracted from the pool of remaining VR to be allocated. The block level VAP is also subtracted from the total VAP for the blocks comprising the precinct (denominator). This process is repeated recursively until all of the VR for a precinct is allocated.

If a precinct either has Spanish surname VR but no Hispanic VAP or has non-Spanish surname VR but no non-Hispanic VAP, the total VAP is used for the allocation. If the blocks comprising a precinct have no VAP but have election data, each block is assigned a value of one and the total for the blocks is assigned the total number of census blocks. For example, a precinct with 10 census blocks would have an allocation ratio of 1/10 for the first block, with 1/9 for the next iteration, etc. If a county reports election data as a county total, the data is allocated to census blocks as discussed above.

The second step calculates block level returns by the same method as above, using the allocated VR from the first step as the allocation variable. The final step calculates block level election turnout using the allocated returns from the second step.

Limitations of the Allocated Data. When using the allocated election data, several limitations of the data should be considered:

- Allocation based on voting age population assumes that all blocks within a precinct exhibited the same voting pattern, which is not likely to be the case.
- Using census data to allocate election data becomes less reliable as the date of the census data becomes progressively further from the date of the election.
- Election data for a small geographic unit such as a census block yields a very low confidence level. As with other statistical data, confidence levels increase as the blocks are aggregated into larger units such as counties or legislative districts.
- Election data is summed to the most recent VTDs in the council's redistricting application (RedAppl). For 2011, this will be the 2010 general election VTDs. VTDs and precincts from other election cycles will not exactly match the current VTDs.
- The more a VTD differs from the actual precinct, the more likely the allocated data for that VTD will differ from the election data for the actual precinct. In 2011, the 2010 general election VTDs will be a very close match to the 2010 general election precincts, but as new precincts are drawn through the coming decade, the chances that precinct geography will deviate from 2010 census geography will increase.