Calculating Deviations for House Redistricting

Background

An important underlying principle that governs redistricting that both the New Hampshire and United States Supreme Courts have recognized is the principle of "one person, one vote". "One person, one vote" means that the vote of each citizen, regardless of where they live, should have equal weight to that of others in electing government representation. Deviation calculations serve as a measure of how closely this principle is adhered to in a redistricting plan. There are different standards of adherence for Congressional and state legislative districts that the courts have established.

Congressional Districts – Strict Equality

Pursuant to a long line of United States Supreme Court rulings, Congressional districts must be as nearly equal in population as practicable and no level of population inequality is deemed too small for consideration. Congressional districts must be drawn on a strictly mathematical basis with the lowest possible deviation from the ideal population, though maintenance of municipal boundaries is allowed if consistently applied. The strict equality standard is based on Article I, Section 2, of the U.S. Constitution.

Legislative Districts - Substantial Equality

The U.S. Supreme Court has ruled that states have broader latitude in creating legislative districts. Such districts are to be drawn with an overriding objective of substantial equality of population among the various districts. In general terms, an overall range of 10% from the ideal population of a legislative district is considered likely to withstand judicial scrutiny, though this is not guaranteed (no safe harbor). Plans exceeding 10% have been deemed acceptable by the courts if the state shows that the overall range was necessary to implement a rational state policy such as preservation of political subdivision lines. The substantial equality standard used for establishing legislative districts is founded on the Equal Protection Clause of the 14th Amendment of the U.S Constitution.

Calculation Methodology

Ideal Population

The first step in calculating deviations is to determine the "ideal" population per representative which is equal to the state's population divided by the number of representatives. Based on 2000 census data, the ideal population for New Hampshire equaled 1,235,786 ÷ 400 = 3,089 residents per representative. All deviation measurements are based on the ideal population and express how far a district, county, or the overall plan varies from this ideal.

Individual Districts

The deviation for an individual district, which is composed of one or more towns[1] with one or more assigned legislative seats, can be expressed two ways.

ABSOLUTE DEVIATION = District Population – (Ideal Population x Number of reps.)
(+/- number of people result)

RELATIVE DEVIATION = Absolute Deviation ÷ (Ideal Population x Number of reps.)
(+/- percentage result)

To obtain an Absolute Deviation per representative, divide result by number of representatives. A positive result indicates that the district is underrepresented. A negative result means it is overrepresented.

Example:

Presently, Brookfield, Effingham and Wakefield comprise District No. 5 in Carroll County. The combined population of these 3 towns (based on 2000 census data) is 6,129 and there are 2 representatives for the district.

Absolute Deviation = 6,129 – (3,089 x 2) = -49 or -24.5 people per representative

Relative Deviation = -49 ÷ (3,089 x 2) = -0.0079 or **-0.79%** (*very close*)

County or the Whole State

Once the relative deviation of individual districts are calculated, the overall deviation of a county or the state can then be measured. This can be expressed as either the Relative Mean Deviation or the Overall Range Deviation.

RELATIVE MEAN DEVIATION = Sum of all Relative Deviations ÷ Number of Districts

OVERALL RANGE DEVIATION = Largest Positive Deviation + Largest Negative Deviation

(Negative numbers on right side of equations are converted to positive numbers in these calculations)

The Relative Mean Deviation is a measure of the average district deviation from the ideal, whereas the Overall Range Deviation is a measure of the largest difference in deviations among the districts. The Overall Range Deviation is the measurement most often relied upon as it indicates the greatest degree of separation in representation experienced by those living in different parts of the county or the whole state.

Combined Districts Using Floterials

A floterial or at-large district overlays two or more individual districts and is assigned one or more legislative seats. Floterials are created when the underlying districts have populations that exceed the ideal population (have positive absolute and relative deviations) and the excess can be "absorbed" by the floterial. However, floterial districts

[1] "Town" is used broadly to mean town, city, or ward of city.

are not actually assigned the excess population in that each voter living in a particular location that is encompassed by both a regular district and a floterial district will vote for all representative seats up for election in both districts.

There are different methods for calculating deviations when floterials are involved.

A. Aggregate Method

When the Legislature attempted to redistrict in 2001/2002 under HB 420 using floterials, it relied on what is know as the aggregate method for computing deviations. The aggregate method combines all the districts (both regular and floterial) into one for purposes of computation. The total population encompassed by the districts and the total number of legislative seats assigned to the districts (both regular and floterial) are the variables used in the computation.

Relative Deviation = (Total Population – Total Ideal Population) ÷ Total Ideal Population

Example:

The 2002 House redistricting bill put the towns of Alton, Barnstead and Gilford into single town districts. Alton and Barnstead were assigned one seat apiece and Gilford two. The three towns/districts were also placed into one floterial district with one seat.

	Pop.	Reps	
Alton	4,502	1	Deviation =
Barnstead	3,886	1	(15,191 – 15,445) ÷ 15,445 = -0.016 or **-1.6%**
Gilford	6,803	2	
float		1	
Total	15,191	5 x 3,089 = 15,445 (Ideal pop. for 5 reps)	

In the 2002 New Hampshire Supreme Court decision that redistricted the House of Representatives (Burling v. Chandler), the Court held that it is not appropriate to use the aggregate method with floterials, finding that it "masks substantial deviation from the one person/one vote principle." The House had used the aggregate method, in part, because the U.S. District Court for New Hampshire had previously found the use of floterials acceptable when it reviewed the New Hampshire House redistricting plan in 1982 (Boyer v. Gardner). The N. H. Supreme Court, however, felt that Boyer was not binding on it because it was basing its decision on the New Hampshire Constitution which it found to separately contain the one person/one vote principle.

A different method for calculating deviations that the court relied upon in doing its analysis is the component method.

B. Component Method

For purposes of computation, the component method apportions the representative seats assigned to the float district between the individual districts that are within the float. The apportionment is weighted based on the population percentage that an individual district makes up of the whole.

Example:

This example uses the same towns and data as in the earlier aggregate method example.

	Pop.	Seats	Ratio Share (Pop ÷ Total)	Adjusted Seats	Ideal Pop (Seats x 3089)	Absolute Deviation (Pop – Ideal)	Relative Deviation (Ab ÷ Ideal)
Alton	4,502	1	0.296	1.296	4,003	499	12.5%
Barnstead	3,886	1	0.256	1.256	3,880	6	0.15%
Gilford	6,803	2	0.448	2.448	7,562	-759	-10.0%
float		1					
Total	15,191	5					

C. Composite Method

Under the composite method, the ideal population for the districts is subtracted from the actual population of all of the affected towns to arrive at a "floterial population". The relative deviation of this floterial population is then calculated.

Example: (again using the same data)

Total Population of affected towns = 15,191

Ideal population x Number of non-floterial seats = Total Ideal

3089 x 4 = 12,356

Actual Total Population – Total Ideal Pop = Floterial Population

15,191 – 12,356 = 2,835

(Floterial Pop – Ideal Pop) ÷ Ideal Pop = Relative Deviation

(2,835 – 3,089) ÷ 3,089 = -0.0822 = **-8.22%**