Methods for Calculating Deviation

Note: the House Redistricting Committee voted unanimously on July 18, 2001 to use the aggregate method for calculating deviation in the 2001-2002 redistricting process.

Although the principle of "one man; one vote" clearly governs any redistricting effort, there are different standards for establishing congressional and legislative districts.

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.

Legislative Districts – Substantial Equality

The Supreme Court has granted the states broader latitude for creating legislative districts. Such districts must 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. It should not be assumed, however, that any legislative redistricting plan with less than a 10% overall range is safe from a successful challenge. All plans must be drawn in good faith and adhere to a rational state policy.

Calculating Deviation for Individual Districts

ABSOLUTE DEVIATION = District Population – Ideal Population

RELATIVE DEVIATION = Absolute Deviation ÷ Ideal Population

Example:

In 1990, Center Harbor and Meredith comprised Belknap District 1. The combined population of these 2 towns was 5,833 and there were 2 representatives for the district. The ideal population for a district with 2 representatives was 5,546.

(5,833 – 5,546) ÷ 5,546 = 0.0517
therefore the relative deviation for Belknap District 1 was 5.17%

Calculation for All Districts within a County/in the State

Once the relative deviation of individual districts are calculated, the overall range deviation is calculated for the entire plan.

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

OVERALL RANGE DEVIATION = Largest Possible Deviation + Largest Negative Deviation

Both of these calculations ignore "+" and "-" signs

Calculating Deviation for Multiple Districts

At least three different methods for calculating deviations for legislative districts have been recognized. These are the aggregate method, the composite method and the true component method. These three methods are described below using the 1990 Census figures from the floterial district in Belknap County.

The 1991 House Redistricting Committee voted to use the aggregate method for calculating deviation for multiple districts. The committee cited two primary reasons for making this decision. First, the method was upheld in the Boyer v. Gardner decision and, second, the committee felt that this method served the constituents in a small state better since the use of floterials allows the smallest possible units individual representation.

A. Aggregate Method

Under the aggregate method, the same formula used for individual districts is used in calculating a single deviation for the floterial district combined with all of the districts included in the floterial district. This has been the traditional method used by the Supreme Court in examining challenged reapportionment plans. The U.S. District Court ruled in Boyer v. Gardner, that the aggregate method sufficiently reveals any defects that may exist in apportionment.

Belknap County has a total of 7 House districts. Districts 1 and 7 are independent districts. District 6 is an 8-town floterial district and Districts 2-5 are individual districts included in the floterial district. The ideal population for a House district was 2,773.

Total Population of 8 towns affected by floterial (counted once only) = 27,640
Total Seats 10
Total Ideal Population 27,730

The formula for calculating deviation using the **aggregate method** is:

(Total Population of All Districts – Total Ideal Population) ÷ Total Ideal Population

(27,640 – 27,730) ÷ 27,730 = -.00325
therefore the relative deviation for Belknap Districts 2-6 was -.325%

B. Composite Method

Under the composite method, the ideal population for the individual 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.

Total Population of affected towns = 27,640

Ideal population x Number of Non-floterial Seats = Total Ideal

2,773 x 9 = 24,957

Actual Total Population – Total Ideal Pop = Floterial Population

27,640 – 24,957 = 2,683

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

2,683 – 2,773 = -90 ÷ 2,773 = -.032 = 3.2%

C. True Component Method

The true component method shows the differences resulting from differential shares of floterial representation; numbers are so small that a large deviation doesn't represent many voters.

To Calculate Ratio Share

Divide the town population by the total population – this assigns each town their share of the floterial plus their dedicated seats – divide by total seats and convert to percentage

3,286 ÷ 27,640 = .1188 = 11.9%

To Calculate Deviation

Ratio Share + Other seats in Town = Adjusted Number of Seats 1 + .119 = 1.119
Town Pop ÷ Adjusted Seats = Component Population 3286 ÷ 1.119 = 2936.55
(Component Population – Ideal Population) ÷ Ideal Population =

2936.55 – 2773 = 163.55 ÷ 2773 = .0589 = 5.89%

Total Population of affected towns = 27,640

		Ratio Share	Adj # of Seats	Deviation
Alton	3286	11.9%	1.119	5.89%
Barnstead	3100	11.2%	1.112	.53%
Belmont	5796	21.0%	2.210	-5.42%
Gilford	5867	21.2%	2.212	-4.35%
Gilmanton	2609	9.4%	1.094	-14.0%
New Hampton	1606	5.8%	.724	-20.0%
Sanbornton	2136	7.7%	.743	3.67%
Tilton	3240	11.7%	.783	49.2%