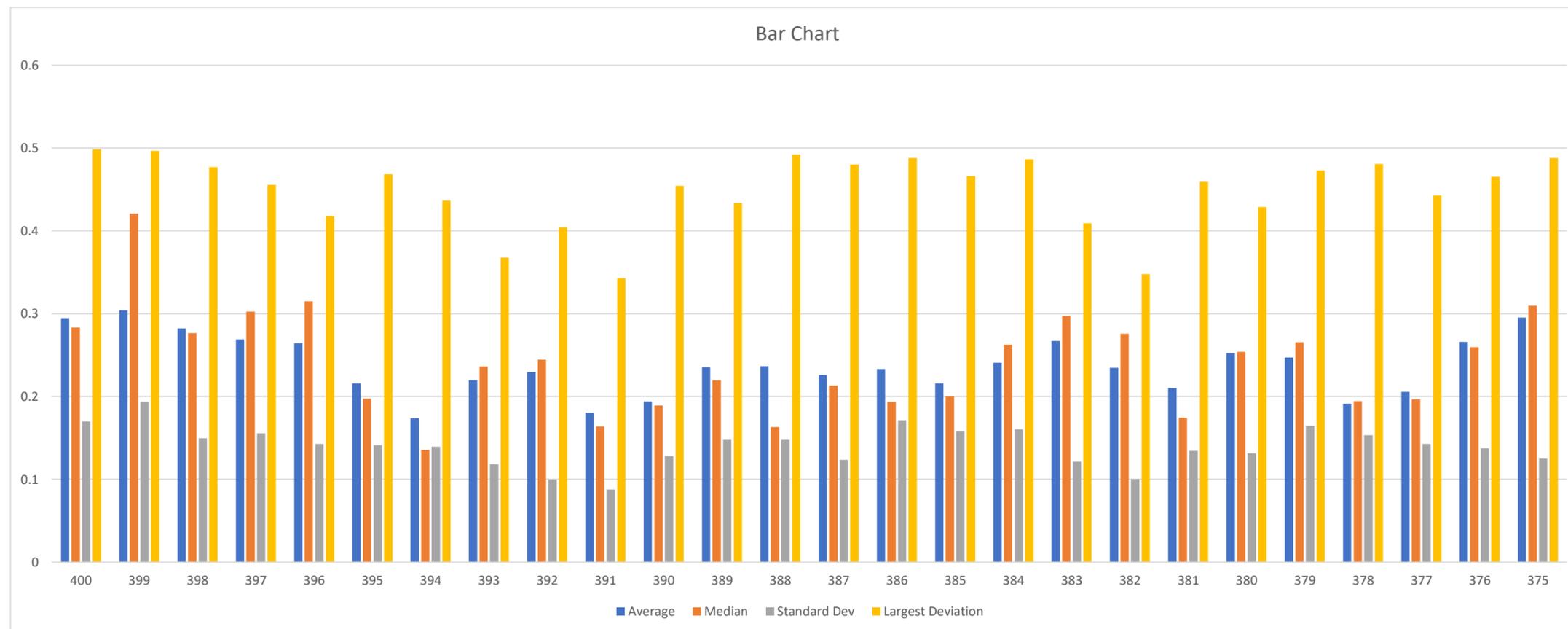
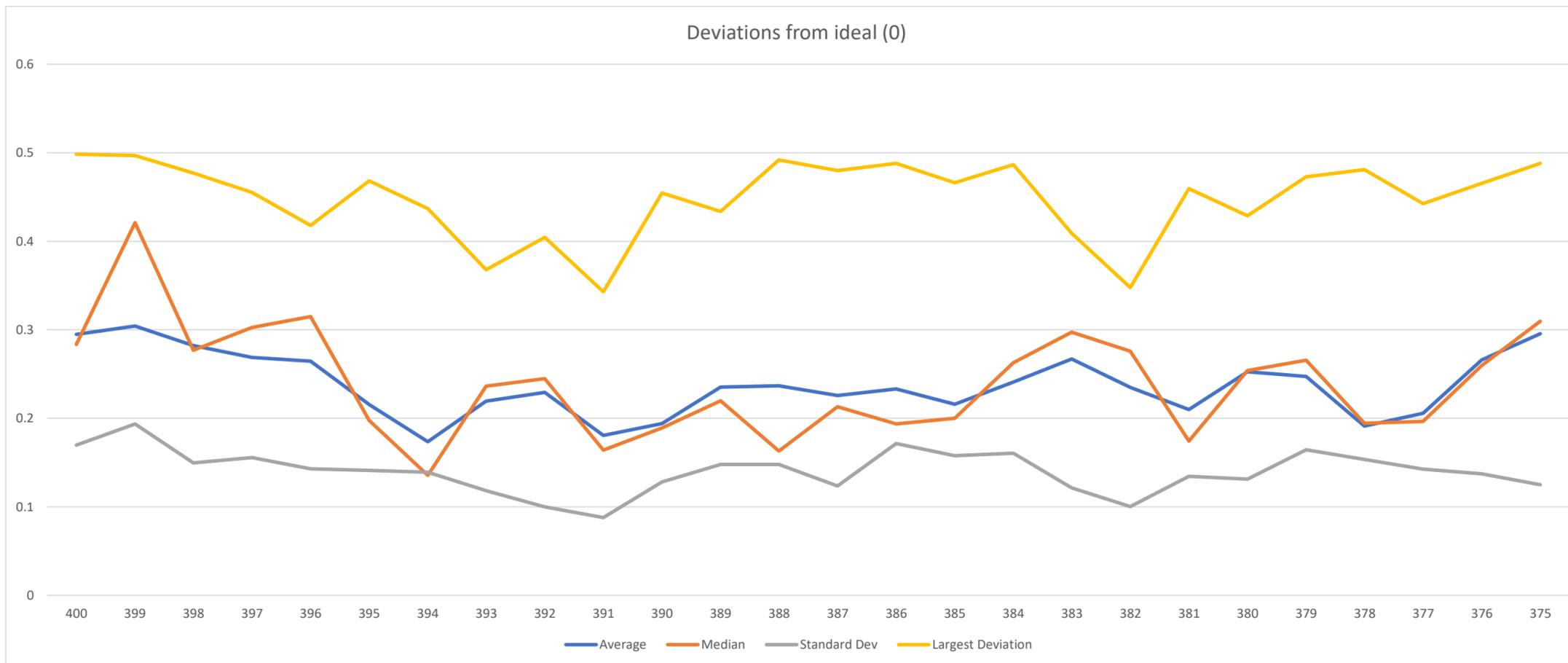


	400	399	398	397	396	395	394	393	392	391	390	389	388	387	386	385	384	383	382	381	380	379	378	377	376	375	
Belknap	63,705	18.49834	18.45209	18.40585	18.3596	18.31336	18.26711	18.22087	18.17462	18.12837	18.08213	18.03588	17.98964	17.94339	17.89714	17.8509	17.80465	17.75841	17.71216	17.66591	17.61967	17.57342	17.52718	17.48093	17.43469	17.38844	17.34219
Carroll	50,107	14.54982	14.51345	14.47707	14.4407	14.40432	14.36795	14.33157	14.2952	14.25882	14.22245	14.18608	14.1497	14.11333	14.07695	14.04058	14.0042	13.96783	13.93145	13.89508	13.8587	13.82233	13.78596	13.74958	13.71321	13.67683	13.64046
Cheshire	76,458	22.20149	22.14599	22.09049	22.03498	21.97948	21.92397	21.86847	21.81297	21.75746	21.70196	21.64646	21.59095	21.53545	21.47994	21.42444	21.36894	21.31343	21.25793	21.20243	21.14692	21.09142	21.03591	20.98041	20.92491	20.8694	20.8139
Coos	31,268	9.079446	9.056747	9.034049	9.01135	8.988651	8.965953	8.943254	8.920556	8.897857	8.875158	8.85246	8.829761	8.807063	8.784364	8.761665	8.738967	8.716268	8.693569	8.670871	8.648172	8.625474	8.602775	8.580076	8.557378	8.534679	8.511981
Grafton	91,118	26.45839	26.39224	26.3261	26.25995	26.19381	26.12766	26.06151	25.99537	25.92922	25.86308	25.79693	25.73078	25.66464	25.59849	25.53235	25.4662	25.40005	25.33391	25.26776	25.20162	25.13547	25.06932	25.00318	24.93703	24.87089	24.80474
Hillsborough	422,937	122.8103	122.5033	122.1963	121.8893	121.5822	121.2752	120.9682	120.6612	120.3541	120.0471	119.7401	119.4331	119.126	118.819	118.512	118.2049	117.8979	117.5909	117.2839	116.9768	116.6698	116.3628	116.0558	115.7487	115.4417	115.1347
Merrimack	153,808	44.662	44.55034	44.43869	44.32703	44.21538	44.10372	43.99207	43.88041	43.76876	43.6571	43.54545	43.43379	43.32214	43.21048	43.09883	42.98717	42.87552	42.76386	42.65221	42.54055	42.4289	42.31724	42.20559	42.09393	41.98228	41.87062
Rockingham	314,176	91.22886	91.00079	90.77272	90.54464	90.31657	90.0885	89.86043	89.63235	89.40428	89.17621	88.94814	88.72007	88.49199	88.26392	88.03585	87.80778	87.57971	87.35163	87.12356	86.89549	86.66742	86.43934	86.21127	85.9832	85.75513	85.52706
Strafford	130,889	38.00689	37.91188	37.81686	37.72184	37.62683	37.53181	37.43679	37.34177	37.24676	37.15174	37.05672	36.96171	36.86669	36.77167	36.67665	36.58164	36.48662	36.3916	36.29658	36.20157	36.10655	36.01153	35.91652	35.8215	35.72648	35.63146
Sullivan	43,063	12.50442	12.47316	12.4419	12.41064	12.37937	12.34811	12.31685	12.28559	12.25433	12.22307	12.19181	12.16055	12.12929	12.09803	12.06676	12.0355	12.00424	11.97298	11.94172	11.91046	11.8792	11.84794	11.81668	11.78542	11.75415	11.72289
Total	1,377,529																										

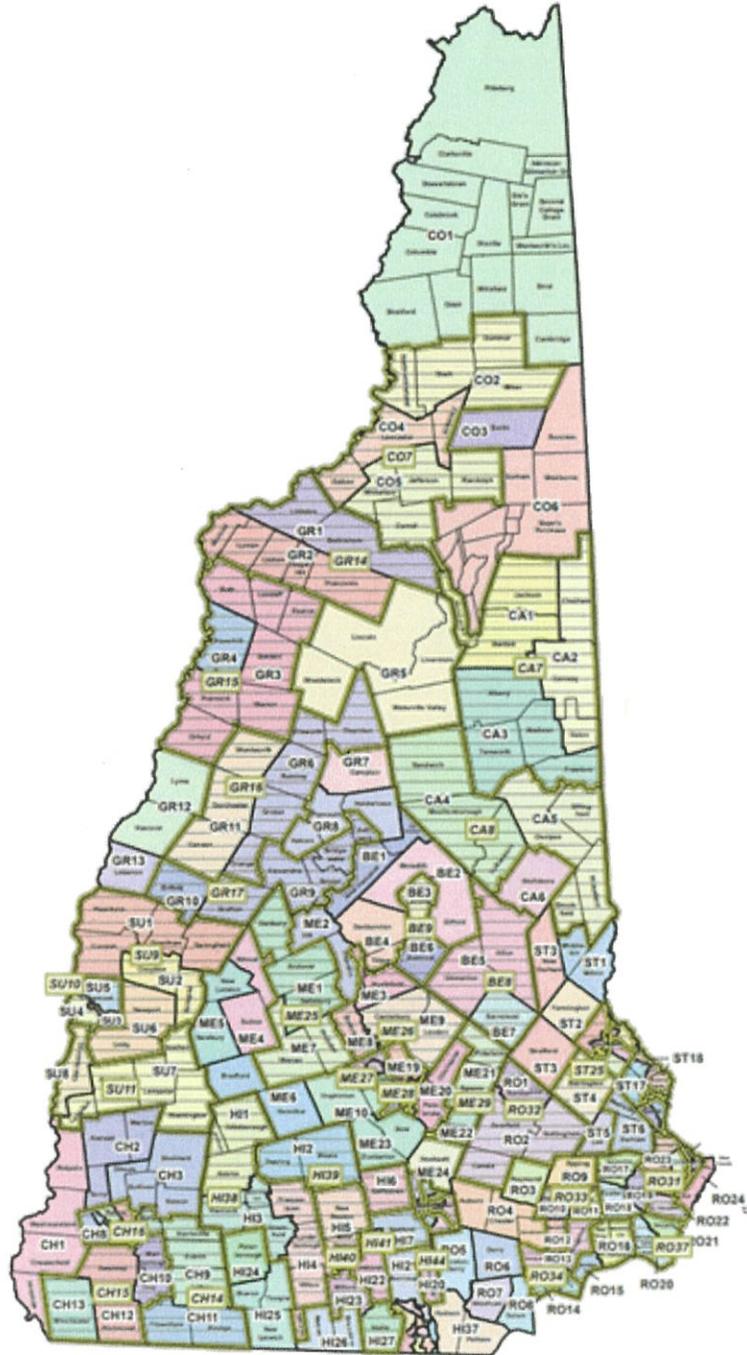
	400	399	398	397	396	395	394	393	392	391	390	389	388	387	386	385	384	383	382	381	380	379	378	377	376	375
Belknap	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17
Carroll	15	15	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cheshire	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	21	21	21	21	21	21	21	21	21
Coos	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Grafton	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	25	25	25	25	25	25	25	25	25	25
Hillsborough	123	123	122	122	122	121	121	121	120	120	120	119	119	119	119	118	118	118	117	117	117	116	116	116	115	115
Merrimack	45	45	44	44	44	44	44	44	44	44	44	43	43	43	43	43	43	43	43	43	43	42	42	42	42	42
Rockingham	91	91	91	91	90	90	90	90	89	89	89	89	88	88	88	88	88	87	87	87	87	86	86	86	86	86
Strafford	38	38	38	38	38	38	37	37	37	37	37	37	37	37	37	37	36	36	36	36	36	36	36	36	36	36

Sullivan	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Belknap	0.49834	0.452094	0.405848	0.359603	0.313357	0.267111	0.220865	0.174619	0.128373	0.082127	0.035882	0.010364	0.05661	0.102856	0.149102	0.195348	0.241593	0.287839	0.334085	0.380331	0.426577	0.472823	0.480931	0.434686	0.38844	0.342194
Carroll	0.450179	0.486554	0.477072	0.440697	0.404323	0.367948	0.331573	0.295199	0.258824	0.22245	0.186075	0.149701	0.113326	0.076952	0.040577	0.004202	0.032172	0.068547	0.104921	0.141296	0.17767	0.214045	0.250419	0.286794	0.323169	0.359543
Cheshire	0.201493	0.145989	0.090485	0.034981	0.020522	0.076026	0.13153	0.187033	0.242537	0.298041	0.353545	0.409048	0.464552	0.479944	0.42444	0.368937	0.313433	0.257929	0.202426	0.146922	0.091418	0.035914	0.019589	0.075093	0.130597	0.186101
Coos	0.079446	0.056747	0.034049	0.01135	0.011349	0.034047	0.056746	0.079444	0.102143	0.124842	0.14754	0.170239	0.192937	0.215636	0.238335	0.261033	0.283732	0.306431	0.329129	0.351828	0.374526	0.397225	0.419924	0.442622	0.465321	0.488019
Grafton	0.45839	0.392244	0.326098	0.259952	0.193806	0.12766	0.061514	0.004631	0.070777	0.136923	0.203069	0.269215	0.335361	0.401507	0.467653	0.466201	0.400055	0.333909	0.267763	0.201617	0.135471	0.069325	0.003179	0.062967	0.129113	0.195259
Hillsborough	0.189664	0.496689	0.196285	0.110741	0.417767	0.275207	0.031819	0.338844	0.35413	0.047104	0.259922	0.433052	0.126026	0.180999	0.488025	0.204949	0.102077	0.409103	0.283871	0.023155	0.33018	0.362794	0.055768	0.251258	0.441716	0.13469
Merrimack	0.338	0.449655	0.43869	0.327035	0.21538	0.103725	0.00793	0.119585	0.23124	0.342895	0.45455	0.433795	0.32214	0.210485	0.09883	0.012825	0.12448	0.236135	0.34779	0.459445	0.4289	0.317245	0.20559	0.093935	0.01772	0.129375
Rockingham	0.22886	0.000788	0.227285	0.455357	0.316571	0.088499	0.139573	0.367645	0.404283	0.17621	0.051862	0.279934	0.491994	0.263922	0.03585	0.192222	0.420295	0.351633	0.123561	0.104511	0.332583	0.439345	0.211273	0.0168	0.244872	0.472944
Strafford	0.006895	0.088122	0.18314	0.278157	0.373174	0.468191	0.436792	0.341774	0.246757	0.15174	0.056723	0.038295	0.133312	0.228329	0.323346	0.418364	0.486619	0.391602	0.296585	0.201567	0.10655	0.011533	0.083484	0.178502	0.273519	0.368536
Sullivan	0.495581	0.473158	0.441897	0.410636	0.379375	0.348114	0.316853	0.285592	0.254331	0.22307	0.191809	0.160548	0.129287	0.098026	0.066764	0.035503	0.004242	0.027019	0.05828	0.089541	0.120802	0.152063	0.183324	0.214585	0.245846	0.277107

	400	399	398	397	396	395	394	393	392	391	390	389	388	387	386	385	384	383	382	381	380	379	378	377	376	375
Average	0.294685	0.304204	0.282085	0.268851	0.264562	0.215653	0.173519	0.219437	0.22934	0.18054	0.194098	0.235419	0.236555	0.225866	0.233292	0.215958	0.24087	0.267015	0.234841	0.210021	0.252468	0.247231	0.191348	0.205724	0.266031	0.295377
Median	0.28343	0.42095	0.276691	0.302596	0.314964	0.197386	0.135551	0.236313	0.244647	0.163975	0.188942	0.219727	0.163125	0.21306	0.193718	0.200148	0.262663	0.297135	0.275817	0.174245	0.253925	0.265645	0.194457	0.196543	0.259682	0.30965
Standard Dev	0.169672	0.193558	0.149575	0.15563	0.142887	0.141289	0.139167	0.118353	0.099834	0.087792	0.12808	0.147781	0.147706	0.123638	0.171321	0.157734	0.160433	0.121391	0.100142	0.13444	0.131395	0.164491	0.153357	0.142703	0.137291	0.124891
Largest Deviation	0.49834	0.496689	0.477072	0.455357	0.417767	0.468191	0.436792	0.367645	0.404283	0.342895	0.45455	0.433795	0.491994	0.479944	0.488025	0.466201	0.486619	0.409103	0							



New Hampshire House of Representatives Floterial Districts Calculations



The History of the Floterial District

- After the 2000 Census, NH House maps were drawn using the Aggregate Method.
- In the 2002 NH Supreme Court decision *Burling v. Chandler*, the court ruled that the Aggregate Method was unconstitutional in that it “masks substantial deviation from the one person/one vote principle”.
- The court put forth the Component Method as a way to calculate floterial districts that would be constitutional.
- The court did not rule out other methodologies and only ruled that the Aggregate Method was not to be used.
- In finding the presented maps unconstitutional, the court changed the maps to not have any floterial districts for the 2002-2010 elections.
- In 2006 NH voted to add a constitutional amendment “to enable towns with sufficient population to have their own representative district and permits the use of floterial districts.”
- After the 2010 Census, NH House maps were drawn using the Component Method.
- 62 towns that were eligible for their own districts (e.g., towns with population size greater than or equal to the ideal population) were not given them mostly because of the limitations of the Component Method.

Methods for Calculating Floterial Districts

Aggregate Method

The Aggregate Method does not consider the deviation of the floterial district but instead calculates a single deviation value that covers all the districts under consideration and all of their seats combined. This method was ruled unconstitutional in 2002.

$$\text{Relative Deviation} = \frac{(\text{Population Total of Districts} - \text{Total Ideal Population})}{\text{Total Ideal Population}}$$

Example 1:

Ideal population per seat = 3,000

District A population = 5,000

District B population = 4,000

As you know the ideal population is approximately 3,444 for the 2020 mapping process. I'm using 3,000 to make it easier for readers to follow the calculations.

$$\text{Relative Deviation} = \frac{(9,000 - 9,000)}{9,000}$$

Relative Deviation = 0%

Component Method

The Component Method calculates a deviation value for each town under consideration separately, and then the aggregate deviation is found by taking the difference of the max and min among the towns. It does not factor in the deviations of the non-floterial districts. This is the method that was used in the 2010 NH House redistricting process.

Variables

P_A = Population of district A

P_T = Population total ($P_A + P_B + P_C \dots$)

S_A = Seats assigned to district A

S_F = Seats assigned to float district

IP_S = Ideal population per seat

AS_A = Adjusted seats of district A area

D_A = Deviation of district A area

Equations

$$AS_A = S_A + \left(\frac{P_A}{P_T} \times S_F \right)$$

$$D_A = \frac{\frac{P_A}{IP_S} - AS_A}{AS_A} \times 100$$

Example 1:

District A population = 5,000

District B population = 4,000

Floterial Deviation for District A

$$AS_A = 1 + \left(\frac{5,000}{9,000} \times 1 \right) = 1.556$$

$$D_A = \frac{\frac{5,000}{3,000} - 1.556}{1.556} \times 100 = 7.11\%$$

Floterial Deviation for District B

$$AS_B = 1 + \left(\frac{4,000}{9,000} \times 1 \right) = 1.444$$

$$D_B = \frac{\frac{4,000}{3,000} - 1.444}{1.444} \times 100 = -7.66\%$$

	District A Population	District A Deviation	District B Population	District B Deviation
Non-Floterial seat	3,000	0%	3,000	0%
Floterial seat	2,000	7.11%	1,000	-7.66%

The Component Method finds that the difference between the 2,000 people district A allocates to the floterial and the 1,000 people district B allocates is too large and thus not allowable.

Alternative Component Method

The Alternative Component Method calculates the deviation the same way as the Component Method but also considers the deviations of the non-floterial districts. The $\pm 5\%$ deviation is applied to not only the floterial seat but to the non-floterial seats as well. This is the method that is being proposed today.

Variables

P_A = Population of district A

P_T = Population total ($P_A + P_B + P_C \dots$)

S_A = Seats assigned to district A

S_F = Seats assigned to float district

IP_S = Ideal population per seat

AS_A = Adjusted seats of district A area

D_A = Deviation of district A area

LP_A = Lowest population from ideal allowable (-5% from ideal) for district A

HP_A = Highest population from ideal allowable (+5% from ideal) for district A

Equations

$$AS_A = S_A + \left(\frac{P_A}{P_T} \times S_F \right)$$

$$D_A = \frac{\frac{P_A}{LP_A \text{ to } HP_A} - AS_A}{AS_A} \times 100$$

Example 1:

± 5% from ideal population = ± 150 or 2,850 to 3,150

District A population = 5,000

District B population = 4,000

Floterial Deviation for District A

$$AS_A = 1 + \left(\frac{5,000}{9,000} \times 1 \right) = 1.556$$

$$D_A = \frac{\frac{5,000}{2,850 \text{ to } 3,150} - 1.556}{1.556} \times 100 = 12.82\% \text{ to } 2.08\%$$

Floterial Deviation for District B

$$AS_B = 1 + \left(\frac{4,000}{9,000} \times 1 \right) = 1.444$$

$$D_B = \frac{\frac{4,000}{2,850 \text{ to } 3,150} - 1.444}{1.444} \times 100 = -2.80\% \text{ to } -12.06\%$$

	District A Population	District A Deviation	District B Population	District B Deviation
Non-Floterial	3,150	5%	2,850	-5%
Floterial	1,850	2.08%	1,250	-2.80%

Factoring in the deviations of the non-floterial districts allows for these two districts to be included together in a floterial district.

Example 2:

District A population = 5,250

District B population = 3,750

Alternative Component Method

Floterial Deviation for District A

$$AS_A = 1 + \left(\frac{5,250}{9,000} \times 1 \right) = 1.583$$

$$D_A = \frac{\frac{5,250}{2,850 \text{ to } 3,150} - 1.583}{1.583} \times 100 = 16.37\% \text{ to } 5.29\%$$

Floterial Deviation for District B

$$AS_B = 1 + \left(\frac{3,750}{9,000} \times 1 \right) = 1.417$$

$$D_B = \frac{\frac{3,750}{2,850 \text{ to } 3,150} - 1.417}{1.417} \times 100 = -10.12\% \text{ to } -15.99\%$$

	District A Population	District A Deviation	District B Population	District B Deviation
Non-Floterial	3,150	5%	2,850	-5%
Floterial	2,100	5.29%	900	-10.12%

This example shows that the Alternative Component Method still considers the NH Supreme Court Ruling to allow for one person one vote and is not as flexible as the “Unconstitutional” Aggregate Method.

2020 House Maps using the Component Method

County	Violations	Necessary Violations	Unnecessary Violations
Belknap County	6	0	6
Carroll County	3	1	2
Cheshire County	8	0	8
Coos County	0	0	0
Grafton County	3	0	3
Hillsborough County	11	0	11
Merrimack County	10	2	8
Rockingham County	19	2	17
Strafford County	4	2	2
Sullivan County	3	0	3
Total	67	7	60

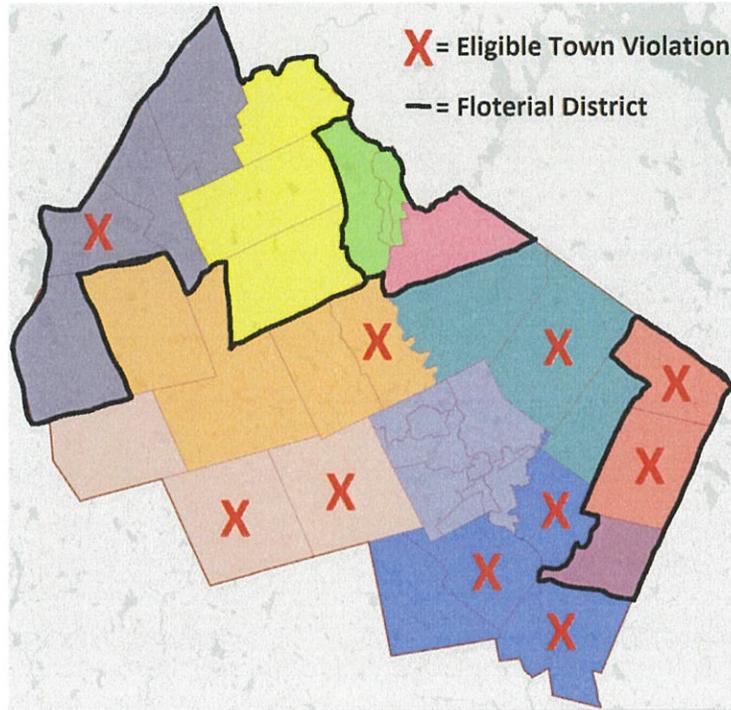
2020 House Maps using the Alternative Component Method

County	Violations	Necessary Violations	Unnecessary Violations
Belknap County	5	0	5
Carroll County	1	1	0
Cheshire County	0	0	0
Coos County	0	0	0
Grafton County	0	0	0
Hillsborough County	3	0	3
Merrimack County	2	2	0
Rockingham County	10	2	8
Strafford County	4	2	2
Sullivan County	1	0	1
Total	26	7	19

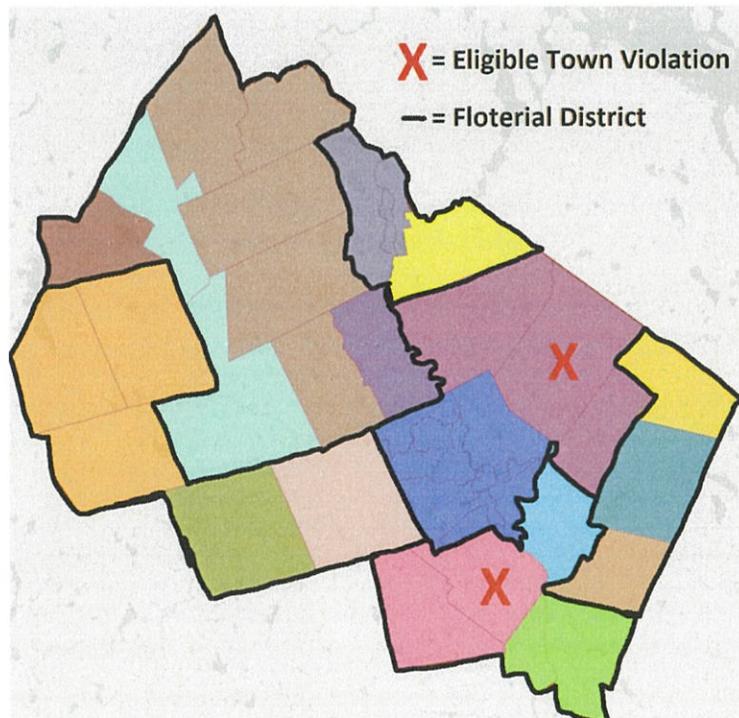
In these map examples 41 more towns could be given their own districts using the Alternative Component Method.

Merrimack County 2020 Maps

Component Method

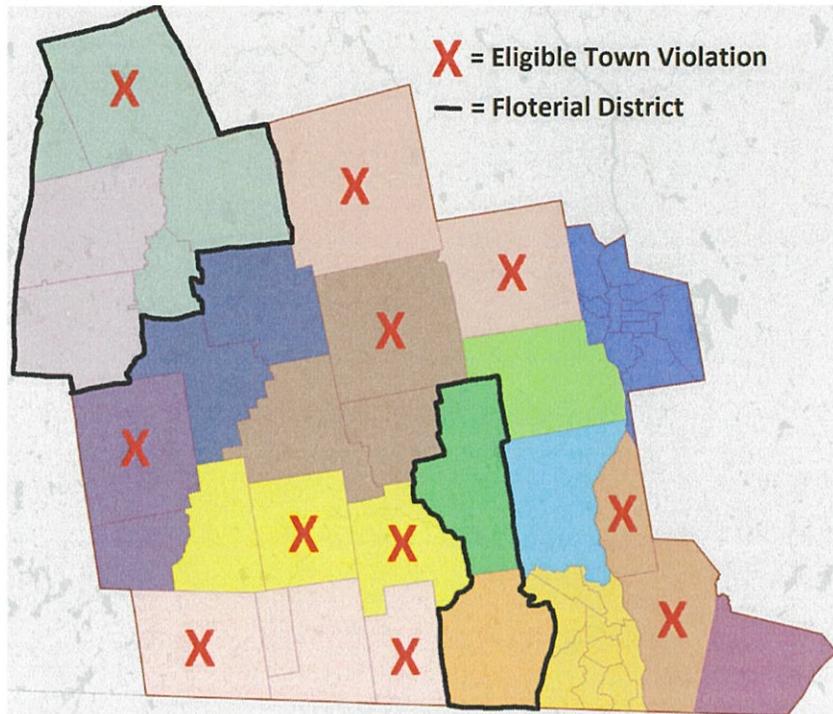


Alternative Component Method



Hillsborough County 2020 Maps

Component Method



Alternative Component Method

