

FILED IN CHAMBERS  
3/15/04  
Luther D. Thomas, Clerk  
By [Signature]  
Deputy Clerk

IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF GEORGIA  
ATLANTA DIVISION

SARA LARIOS, et al.,

Plaintiffs,

versus

CATHY COX,

Defendant.

CIVIL ACTION

NO. 1:03-CV-693-CAP

**APPENDIX TO  
REPORT AND RECOMMENDATION OF THE SPECIAL MASTER**

*Volume II*

Part I of II

Tab 16      Affidavit of Nathaniel Persily, J.D., Ph.D. (tabs A-Z)

**AFFIDAVIT OF NATHANIEL PERSILY, J.D., PH.D.**

Nathaniel Persily, first being duly sworn, deposes and says the following:

1. I am a citizen and resident of the State of Pennsylvania. I am an expert in reapportionment and districting matters. My curriculum vitae, which lists the cases in which I have been appointed by courts as an expert, is attached at Tab 11 to the Special Master's Report.

**BACKGROUND**

2. On March 1, 2004 the Three-Judge Panel (the "Court") composed of: the Honorable Stanley Marcus, Judge of the United States Court of Appeals for the Eleventh Circuit, the Honorable Charles A. Pannell, Jr., United States District Judge for the Northern District of Georgia, and the Honorable William C. O'Kelley, Senior United States District Judge for the Northern District of Georgia, entered an Order appointing Joseph Hatchett, former Chief Judge of the United States Court of Appeals for the Eleventh Circuit, as Special Master to advise and assist the Court in the preparation and recommendation of redistricting plans for both houses of the Georgia General Assembly.

3. I have reviewed the Order of the Court appointing the Special Master and have prepared this affidavit in accordance with the Order's instructions and the instructions I received from the Special Master.

4. The purposes of this affidavit are to inform the Court of the principles used in the preparation of the Special Master's Plans and to present a description and analysis of the plans that may aid the Court in evaluating them.

5. The data relied upon and analyzed here are of the kind usually relied upon by experts in this field to render opinions on the nature of redistricting of legislative districts.

6. In assisting the Special Master in the preparation of the Plan setting forth districts for both houses of the Georgia General Assembly, I consulted and worked closely with Patrick Egan, a Ph.D. Candidate in Political Science at the University of California at Berkeley who has extensive experience in crafting redistricting plans. (See Tab 12 to the Special Master's Report – Resume of Patrick Egan.)

7. I also consulted frequently with Professor Bernard Grofman, the nation's leading social scientist concerning redistricting issues relevant to Section Two and Section Five of the Voting Rights Act. (See Tab 13 to Special Master's Report – Resume of Bernard Grofman.)

8. In fashioning the Plan, the Special Master drew upon Mr. Egan's and my backgrounds and experience. In connection with the Plan's preparation, we reviewed various materials relating to the geography of Georgia and relied upon our combined prior redistricting experience to assist the Special Master.

9. I, along with Mr. Egan, relied upon the data and materials collected and made available to us by the Reapportionment Services Office of the Georgia General Assembly. We are particularly indebted to Blake Ussery, who produced no fewer than one hundred maps that aided us in the construction and presentation of our plans. Staff members Gina Shelton, Joe Stanton, and Rob Strangia provided much needed assistance in the production of the data and maps we used to construct the Special Master's Plan, as well as technical assistance with the computers, printers, plotters and various other machinery required to create a redistricting plan.

10. In the preparation of the Special Master's Plan, two desktop computers loaded with the software program "Maptitude for Redistricting" and the necessary data were made available to us in a conference room in the state Legislative Office Building. The GIS (Geographic Information System) database contained integrated polygon coverages of census geography, including county

boundaries, many city boundaries, Voting Districts (VTDs), and various census categories of geography, such as tracts and blocks.

### **PRINCIPLES OF THE SPECIAL MASTER'S PLAN**

11. In aiding the Special Master in the preparation of the Plan, we prepared the Plan with strict adherence to the applicable law. Specifically, the Principles involved in the analysis included adherence to:

- a. Constitutional requirements including the Fourteenth Amendment's one person, one vote requirement and its prohibition on racial gerrymandering; and
- b. Sections Two and Five of the Voting Rights Act.

12. After consulting with the Special Master, Mr. Egan and I endeavored to prepare single-member district plans for the Georgia House and Senate in which no district deviated from the ideal district size, according to 2000 Census figures, by more than one percent.

13. In assisting the Special Master with the preparation of the Plan, we attempted to adhere to several traditional redistricting principles as explained in the Court's Order, including the need for population equality across districts, the

compactness and contiguity of districts, and respect for the integrity of political subdivisions and communities of interest.

14. Most significant, however, was the Court's prohibition on our viewing any political data whatsoever, including the location of incumbents' residences. We did not and still do not know what impact the drawing of any particular district or the plans as a whole will have on individual incumbents or on the partisan composition of the General Assembly.

## **CONSTITUTIONAL REQUIREMENTS**

### **One Person, One Vote Requirement**

15. The population of Georgia according to the 2000 Census was 8,186,453.

16. There are 56 members of the Georgia Senate and 180 members of the Georgia House of Representatives. Therefore, in a single-member district plan for the Georgia General Assembly based on 2000 Census figures the ideal district size for a Senate district is 146,186.6 and the ideal district size for a House district is 45,480.3.

17. For a plan with no district having a greater than one percent deviation from the ideal population, no Senate district should contain more than

147,648 people or fewer than 144,724 people, and no House District should contain more than 45,935 people or fewer than 45,025 people, according to 2000 Census figures.

18. Mr. Egan and I conducted an initial review of the 2000 Census figures and the configuration of the existing and immediately preceding House and Senate districts. (I will refer to the plans struck down as unconstitutional by the Court in *Larios v. Cox* as the 2002 Plans and the plans immediately preceding the unconstitutional plans as the 2000 Plan in the Senate and the 1998 Plan in the House.) This analysis demonstrated that:

- a. Only five out of fifty-six districts in the 2002 Senate Plan and only one out of fifty-six districts in the 2000 Senate Plan (as overlaid onto 2000 Census data) contained population within one percent of the ideal population of a Senate district.
- b. Only eighteen of 180 members in the 2002 House Plan and only eleven of 180 members in the 1998 House Plan (as overlaid onto 2000 Census data) would represent districts within one percent of the ideal population of a House district. (Here, I refer to members instead of districts because 23 districts in the 2002 House Plan were multimember. The ideal district size for each of the 15 two-member

House districts in the 2002 Plan was 90,960.6; for each of the six three-member House districts the ideal district size was 136,440.9; and for each of the two four-member districts the ideal district size was 181,921.2.)

- c. Moreover, in the opinion of the Court in *Larios*, the deviations exhibited a distinct regional pattern, with South Georgia and inner city Atlanta districts tending to be underpopulated and with North Georgia districts and districts surrounding Atlanta tending to be overpopulated.

### **Prohibition on Racial Gerrymandering**

19. The Special Master's Plan was also to avoid any violation of the Fourteenth Amendment's prohibitions on certain types of racial gerrymandering as enunciated in *Mobile v. Bolden*, 446 U.S. 55 (1980), and its progeny and *Shaw v. Reno*, 509 U.S. 630 (1993) and its progeny.

## **VOTING RIGHTS ACT**

### **Section Two**

20. Pursuant to the Court's Order and applicable law, the Special Master's Plan was to comply with the prohibition on minority vote dilution

contained in Section Two of the Voting Rights Act of 1965 (VRA). Such vote dilution can occur through excessive concentration (“packing”) of minority voters as well as excessive dispersion (“cracking”) of minority voters.

### **Section Five**

21. Although maps drawn by federal courts need not be precleared according to Section Five of the VRA, we endeavored to create a plan that satisfied the retrogression requirement of Section Five and the applicable caselaw.

### **COMPACTNESS**

22. Pursuant to the Court’s Order and Special Master’s direction, we were to construct a plan comprised of districts that were relatively compact. While recognizing that district compactness would often be subordinated to requirements of equal population and the Voting Rights Act, as well as to the requirement that we respect often noncompact political subdivisions, the Special Master’s Plan attempts to create districts which do not appear visually noncompact. In addition, we evaluated our plans and compared them to their predecessors according to certain mathematical measures of compactness: in particular, the “smallest circle” test (also known as the “Roeck Test”), which compares the

district's area to that of the smallest circumscribing circle, and the "perimeter to area" test (also known as the "Polsby-Popper Test") which computes the ratio of the district's area to the area of a circle with the same perimeter as the district.

### **CONTIGUITY**

23. Contiguity of districts is a state constitutional requirement. In constructing the Special Master's Plan, we were to avoid any noncontiguous districts. However, because of the nature of Georgia topography contiguity by water was sometimes unavoidable, and because of the shape of some of Georgia's counties and cities some districts drawn on county or city lines were only point contiguous.

### **RESPECT FOR POLITICAL SUBDIVISIONS AND COMMUNITIES OF INTEREST**

24. Pursuant to the Court's Order and the Special Master's instruction, we were to construct a plan that respected political subdivisions and the communities comprised within them. Therefore, we attempted to avoid splitting counties and cities while recognizing that the legal and other requirements on the

plan—which were often more stringent than those governing the 2002 and 1998/2000 Plans—would require the splitting of many political subdivisions.

25. While many of Georgia’s cities are perfect circles, many are also bizarrely shaped and noncontiguous due to a series of annexations. See Exhibit D (maps of the towns of Alpharetta, Marietta, and Warner Robins). Some also cross county lines. Therefore, the requirement of respecting political subdivisions often conflicted with the other requirements placed on the plan.

#### **KEY FEATURES OF THE SPECIAL MASTER’S SENATE PLAN**

26. Maps of the Special Master’s Senate Plan are attached as Exhibit A. A detailed narrative describing the Special Master’s Senate Plan is attached as Exhibit E. A report indicating the counties and cities assigned to each Senate district is attached as Exhibit F.

#### **One Person, One Vote**

27. The Special Master’s Plan complies with the constitutional standard of one person, one vote.

28. No district in the Special Master's Senate Plan deviates from the ideal Senate District population of 146,186.6 by more than one percent. See Exhibit O.

29. A table indicating the relevant population figures from the Special Master's Plan and the 2000 and 2002 Plans (as overlaid onto 2000 Census data) is presented below. In addition, a histogram comparing the district deviations in the Special Master's Senate Plan and the 2002 Plan, and a histogram depicting the deviations in the 2000 Plan, are included below. The largest district in the Special Master's Senate Plan has a population of 147,589. It deviates from the ideal district size by 0.959% (representing 1,402 people). The smallest district in the Special Master's Senate Plan has a population of 144,802. It deviates from the ideal district size by -0.947% (representing 1,385 people). The average deviation in the Special Master's Senate Plan is 0.55%, and the total deviation is 1.91%.

## Population Statistics of Senate Plans

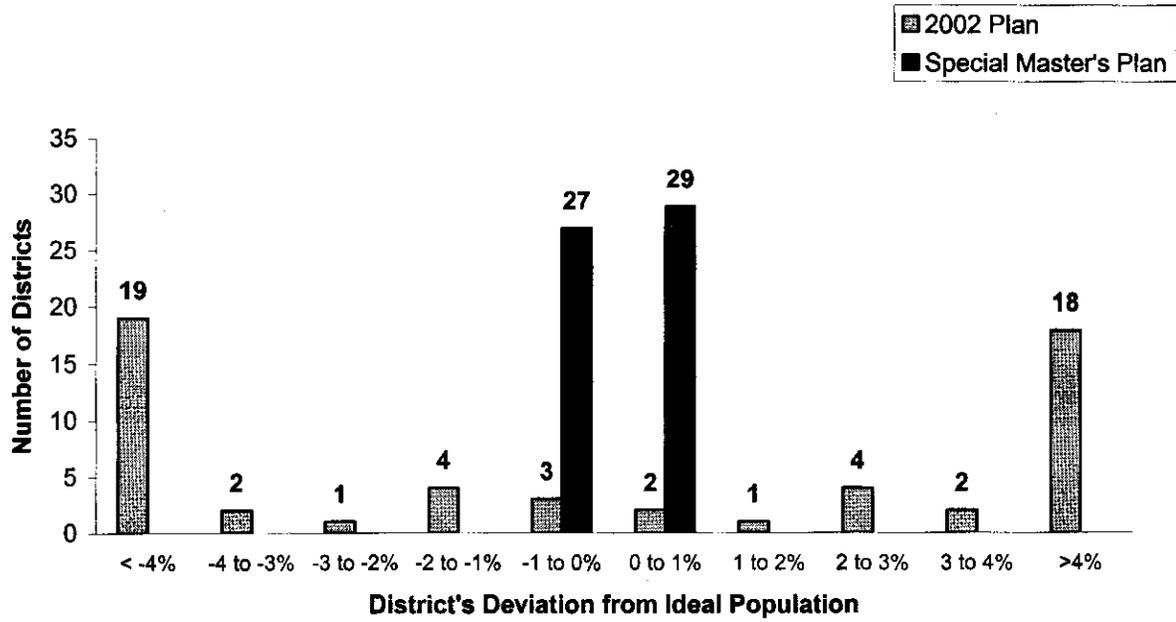
(Ideal District Population: 146,186.6)

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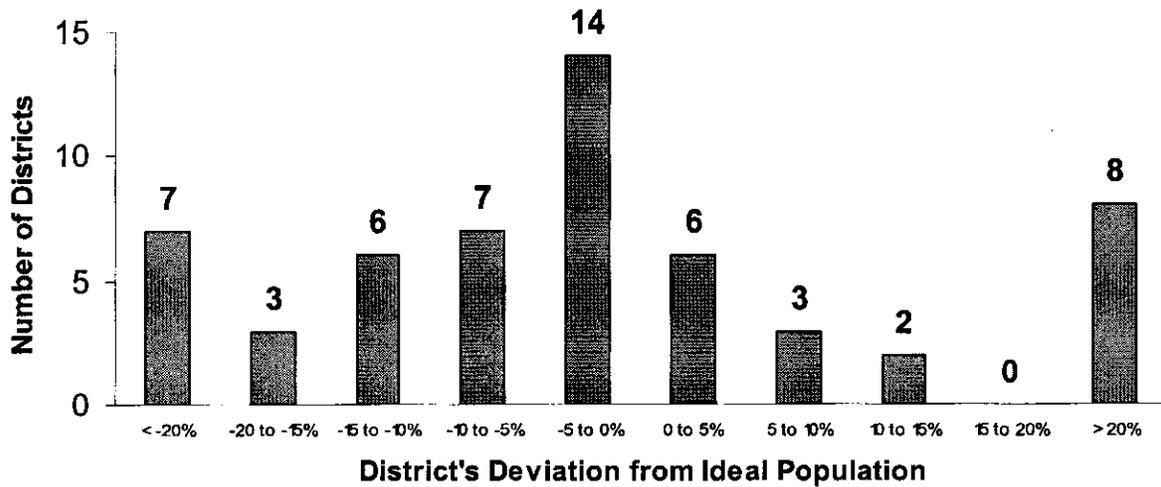
	Special Master's Plan	2002 Plan	2000 Plan
Average District Deviation from Ideal Population	0.55%	3.78%	14.3%
Total Deviation	1.91%	9.98%	141.7%
Population of Largest District (Difference from Ideal Population)	147,589 (1,402)	153,489 (7,302)	311,367 (165,180)
Population of Smallest District (Difference from Ideal Population)	144,802 (- 1,385)	138,894 (- 7,293)	104,303 (- 41,884)

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**Distribution of Population Deviations in Senate Plans**



**Distribution of Population Deviations in 2000 Senate Plan**



30. By way of comparison, the largest district in the 2002 Senate Plan had a population of 153,489 and a deviation of 4.99% (or 7,302 people). The smallest district had a population of 138,894 and a deviation of – 4.99% (or 7,302 people). The total deviation was 9.98% and the average deviation was 3.78%.

31. In addition, the Special Master's Plan avoids regional patterns in its deviations by placing every underpopulated district next to at least one overpopulated district. See Exhibits G and H.

### **Racial Gerrymandering**

32. All of the districts in the Special Master's Senate Plan and the plan as a whole abide by the prohibitions on racial gerrymandering set forth in *Mobile v. Bolden* and *Shaw v. Reno* and their progeny.

### **Voting Rights Act**

33. The distribution of the African-American population by district for the Special Master's Senate Plan, the 2002 Senate Plan and the 2000 Senate Plan are presented in Exhibit Q. Maps of the three plans color-themed by the African-American population in each district are presented in Exhibits M, N, S, T, U and V.

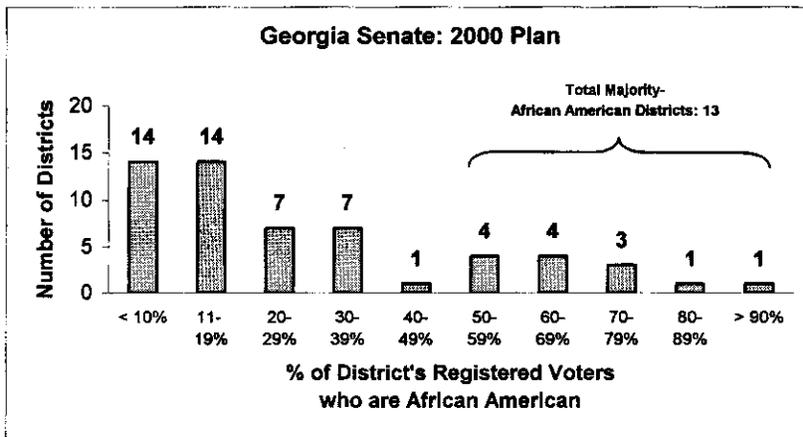
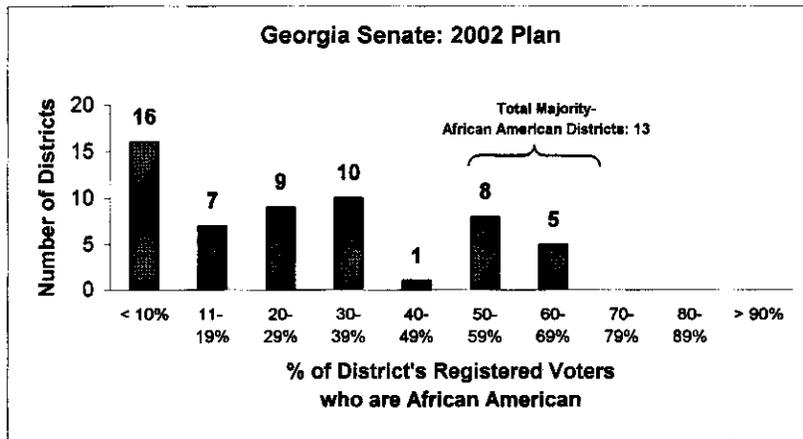
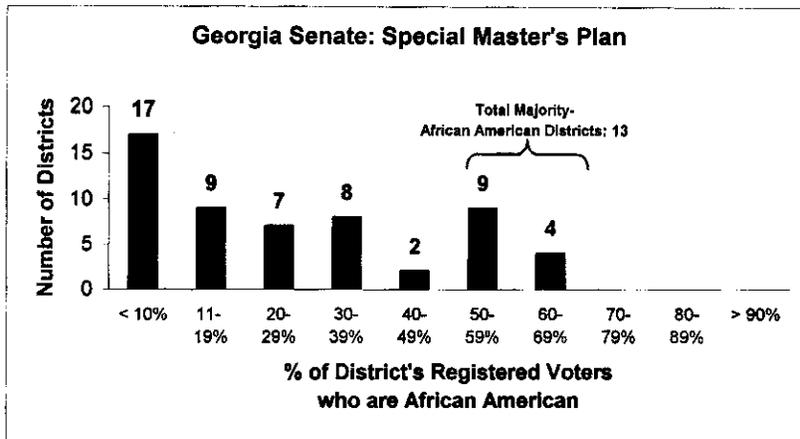
34. We concentrate here on the data concerning the 2002 African-American registered voter population (BREG), but similar data broken down by African-American voting age population (BVAP) are presented in Exhibit Q. The distribution of the African-American population among districts as revealed by the two statistics is comparable, and we paid attention to both statistics as we constructed our plans.

35. Evaluating districts based on registration data has several advantages over focusing on voting age population data. First, the BREG data are more recent than the BVAP data, which are now almost four years old. Second, the BVAP data include many people, such as prisoners, parolees, non-residents and non-citizens, who are prohibited from voting. For example, of the 80,863 Georgia residents of correctional institutions who are over the age of 18 counted in the 2000 Census, 49,905 were African American (a figure exceeding that needed for an entire House district). Using the BVAP statistic would therefore overcount and misrepresent the relative size of the African-American population that could participate in an election. Finally and perhaps most obvious, registered voters are more likely to vote than those who are merely age eligible, so therefore the BREG statistic is a more reliable predictor of the likely African-American turnout in a given election.

36. As in the 2002 Plan, the Special Master's Plan contains thirteen districts in which the majority of registered voters are African American: four that are between 60% and 69% African American and nine that are between 50 and 59% African American. Maintaining the same number of majority-African American districts was quite difficult given that all of the majority-African American districts were underpopulated in the 2002 Plan—and that some of these were the most underpopulated in the state.

37. The Special Master's Plan increases the number of districts in the 40% to 49% range from one under the 2002 Plan to two under the Special Master's Plan. It also drops the number of districts in the 30% to 39% range from ten under the 2002 Plan to eight. Therefore, the Special Master's Plan contains a total of twenty-three districts with an African-American registered voter population exceeding 30%, while the 2002 Plan contains twenty-four such districts. However, it should be noted that many of the 30% to 39% districts in the 2002 Plan are the most underpopulated and the most bizarrely shaped in the state. See Exhibit I. Histograms depicting the distribution of the African-American population in the Special Master's Plan and the 2000 and 2002 Plans are presented below.

## Distribution of African-American Population in Senate Plans



The Special Master's Plan also continues to preserve a number of districts in which Hispanics constitute more than 10% of the voting age population (VAP). Like the 2002 Plan, it contains one district with a Hispanic VAP exceeding 20% and five with a Hispanic VAP between 10% and 20%. Here we refer to voting age population, rather than Hispanic voter registration, because Georgia has only recently begun to collect data on voter registration for Hispanics. See Exhibit Y.

### **Compactness**

38. The Special Master's Senate Plan respects the value of compactness in the construction of districts.

39. With respect to compactness, the Special Master's Senate Plan is far superior to the 2002 Plan, which created several wildly shaped districts in the middle of the state. See Exhibit Z. The plan is also at least as respectful of compactness as the 2000 Plan even though the Special Master's Plan abided by a stricter standard of population equality, which naturally will cause districts to be somewhat less compact.

40. A comparison of the three plans according to the two compactness measures described earlier is presented below. Maptitude output

indicating scores for each district in the three plans is found in Exhibit R. (In this Exhibit, smallest circle scores are labeled “Roeck” and perimeter to area scores are labeled “Polsby-Popper.”) According to the smallest circle measure of compactness, the districts in the Special Master’s Plan receive a mean score of 0.43 with a standard deviation of 0.11. The range of the districts’ scores is 0.55, with the most compact district receiving a score of 0.69 and the least compact district receiving a score of 0.14.

41. In contrast, the mean of the 2002 Plan according to the smallest circle measure of compactness was 0.35 with a standard deviation of 0.12. The range of the districts’ scores is 0.43, with the most compact district receiving a score of 0.54 and the least compact district receiving a score of 0.11.

42. The mean of the 2000 Plan was 0.42 with a standard deviation of 0.10. The range of scores in that plan is 0.46, with the most compact district receiving a score of 0.64 and the least compact district receiving a score of 0.18.

43. According to the perimeter to area measure of compactness the Special Master’s Plan performs equally well. Its mean score under this measure is 0.28 with a standard deviation of 0.08 and a range of 0.45. Its most compact district receives a score of 0.55 and its least compact district receives a score of 0.10.

44. According to the perimeter to area measure of compactness the 2002 Plan, in contrast, has a mean score of 0.16 with a standard deviation of 0.08 and a range of 0.31. Its most compact district receives a score of 0.34 and its least compact district receives a score of 0.03.

45. According to the perimeter to area measure, the Special Master's Plan has a quite similar level of compactness to the 2000 Plan. The 2000 Plan has a mean score of 0.28 with a standard deviation of 0.09 and a range of 0.40. Its most compact district receives a score of 0.51 and its least compact district receives a score of 0.11.

### Measures of Compactness in Senate Plans

Measures of Compactness		Special Master's Plan	2002 Plan	2000 Plan
Smallest Circle measure	Mean	.43	.35	.42
	(SD)	(.11)	(.12)	(.10)
	Min	.14	.11	.18
	Max	.69	.54	.64
	Range	.55	.43	.46
Perimeter to Area measure	Mean	.28	.16	.28
	(SD)	(.08)	(.08)	(.09)
	Min	.10	.03	.11
	Max	.55	.34	.51
	Range	.45	.31	.40

## **Contiguity**

46. All of the districts in the Special Master's Senate Plan are contiguous as the criterion was defined above.

## **Respect for Political Subdivisions**

47. As with compactness, the constraints placed on the Special Master's Plan (such as a limit of a one percent deviation) that did not exist for the 2000 and 2002 Plans required the Special Master's Plan to split some political subdivisions that otherwise could have been kept whole or split by fewer districts were those constraints not in place. A comparison of the three plans with respect to preservation of county boundaries is presented below. See Exhibit R. (These calculations concerning all three plans were performed by Maptitude. We note here that Maptitude's calculations have produced some discrepancies with the figures on county splits cited in the Court's Opinion in *Larios v. Cox*. In order to maintain consistency, we thought it advisable to subject all three plans to the same computer test.)

48. The Special Master's Plan is far superior to the 2002 Plan with respect to county splits. Whereas the 2002 Plan split eighty-two counties, the Special Master's Plan splits only forty. Of those counties that the Special Master's

Plan splits, thirty-four are split by two districts, two are split by three districts, zero are split by four districts, and four are split by five or more districts.

49. In contrast, the 2002 Plan splits 82 counties: forty-eight are split by two districts, twenty-three are split by three districts, six are split by four districts, five are split by five or more districts.

50. The Special Master’s Plan fares less well against the 2000 Plan, which split only thirty counties, but this is due in large part, as mentioned above, to the more severe requirement of equipopulosity imposed on the Special Master’s Plan. Under the 2000 Plan, twenty-three are split by two districts, two are split by three districts, zero are split by four districts, four are split by five or more districts.

### Splits of Counties in Senate Plans

	Special Master’s Plan	2002 Plan	2000 Plan
Split counties	40 (25.2%)	82 (51.6%)	30 (18.9%)
Cases where a county is split among 2 districts	34	48	23
Cases where a county is split among 3 districts	2	23	2
Cases where a county is split among 4 districts	0	6	0
Cases where a county is split among 5 or more districts	4	5	4

51. As described in Exhibit E, the Special Master's Plan paid considerable attention to city and town boundaries as well, a difficult task given the strange shape of many of Georgia's cities and towns. A total of 55 incorporated areas throughout Georgia (as defined by the U.S. Census Bureau) are split in the Special Master's Plan; of these, 12 are splits that do not affect any population. See Exhibit F. This is a substantial improvement over the 2002 Plan, where 106 incorporated areas are split, 12 of which do not affect any population. Disregarding zero-population splits, the Special Master's Plan reduces splits of Georgia's cities and towns by 54 percent compared to the 2002 Plan.

### **KEY FEATURES OF THE SPECIAL MASTER'S HOUSE PLAN**

52. Maps of the Special Master's House Plan are attached as Exhibit AA. A detailed description of the Special Master's House Plan is attached as Exhibit CC.

#### **One Person, One Vote**

53. The Special Master's House Plan complies with the constitutional standard of one person, one vote.

54. No district in the Special Master's House Plan is more than one percent over or under the ideal Senate district population of 45,480.3 . See Exhibit DD.

55. A table indicating relevant population figures from the Special Master's Plan and the 2000 and 2002 Plans is presented below. In addition, a histogram comparing the district deviations in the Special Master's House Plan and the 2002 Plan, as well as a histogram depicting the deviations in the 2000 House Plan, are presented below. The largest district in the Special Master's House Plan has a population of 45,921 according to 2000 Census figures. It deviates from the ideal district population by 0.970% (representing 441 people). The smallest district has a population of 45,032. It deviates from the ideal district population by -0.985% (representing 448 people). The total deviation in the Special Master's House Plan is 1.95%, and the average deviation is 0.46%.

56. By way of comparison, the largest district in the 2002 House Plan (once district population is adjusted by number of legislators to account for multi-member districts) has a population of 47,750. It has a deviation of 4.99% (or 2,270 people) and the smallest district has a deviation of -4.99% (or 2,271 people). The total deviation is 9.98% and the average deviation is 3.47%.

57. In addition, the Special Master's Plan avoids regional patterns in its deviations by placing almost every underpopulated district next to at least one overpopulated district. See Exhibits GG and HH.

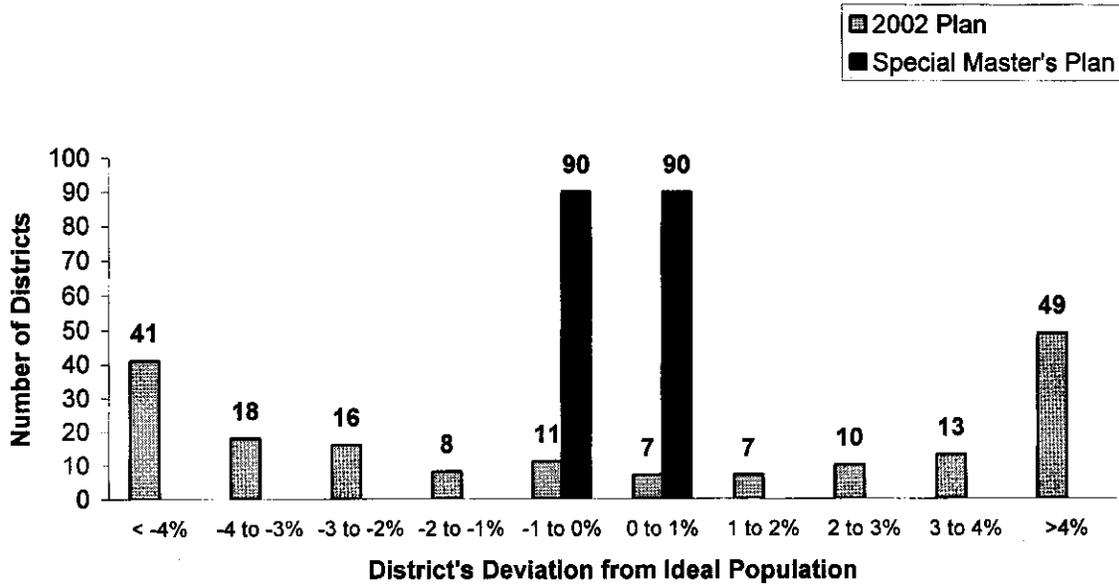
### Population Statistics of House Plans

(Ideal District Population: 45,480.3)

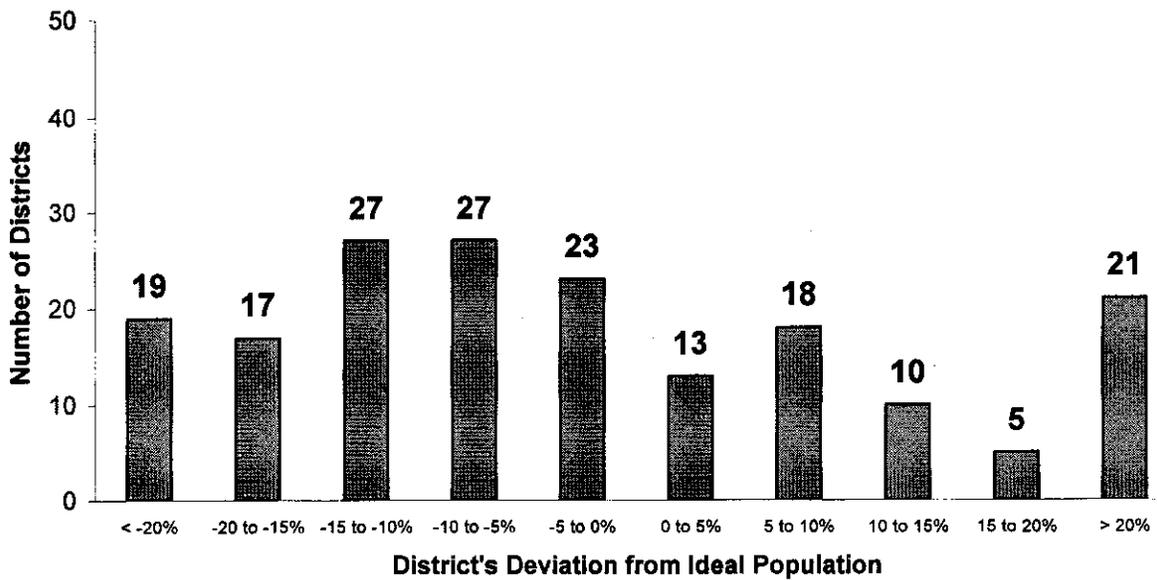
	Special Master's Plan	2002 Plan*	1998 Plan
Average District Deviation from Ideal Population	0.46%	3.47%	15.4%
Total Deviation	1.95%	9.98%	168.1%
Population of Largest District (Difference from Ideal Population)	45,921 (441)	47,750 (2,270)	107,426 (61,946)
Population of Smallest District (Difference from Ideal Population)	45,032 (- 448)	43,209 (- 2,271)	30,962 (- 14,518)

\* For purposes of these calculations, the population of multimember districts was divided by their number of members.

**Distribution of Population Deviations in House Plans**



**Distribution of Population Deviations in 1998 House Plan**



## **Racial Gerrymandering**

58. All of the districts in the Special Master's House Plan and the plan as a whole abide by the prohibitions on racial gerrymandering set forth in *Mobile v. Bolden* and *Shaw v. Reno* and their progeny.

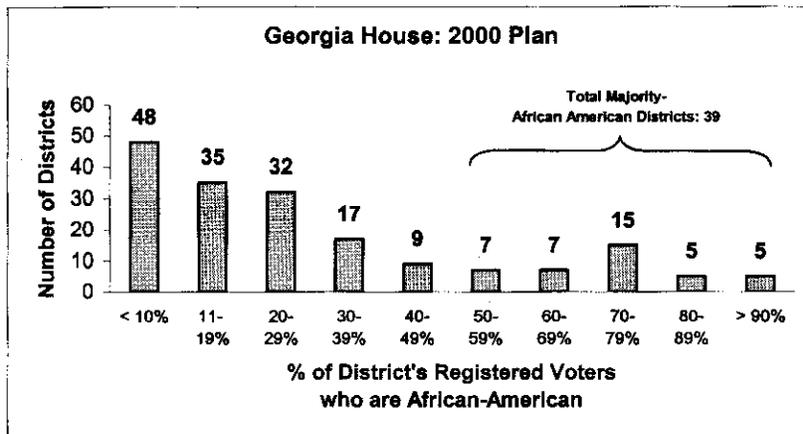
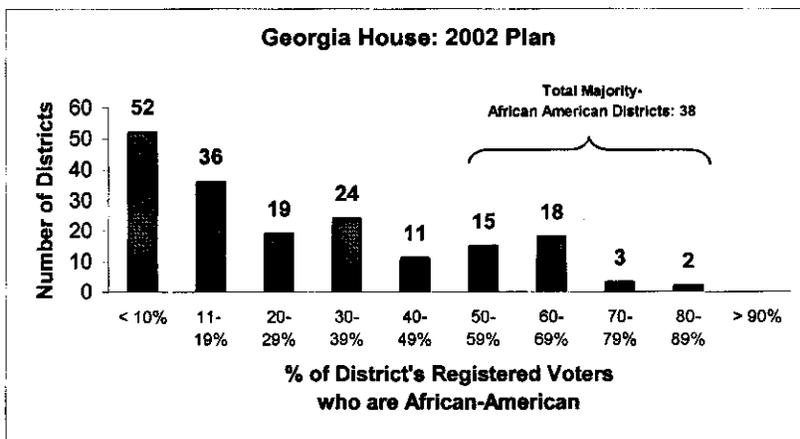
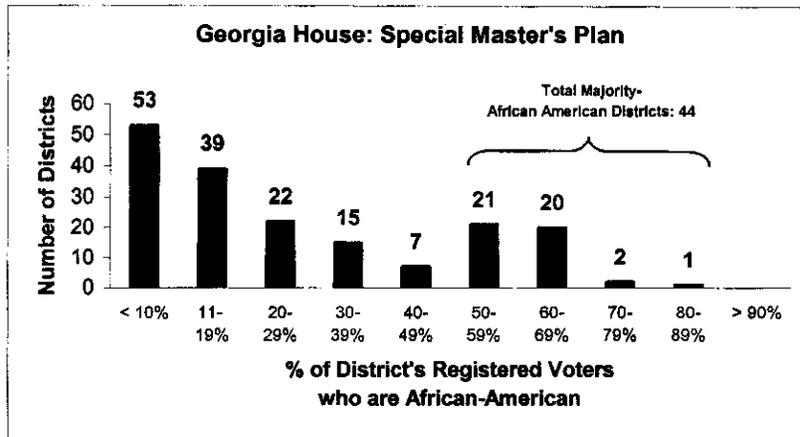
## **Voting Rights Act**

59. The distribution of the African-American population by district for the Special Master's House Plan, the 2002 Plan and the 1998 Plan are presented in Exhibit MM. Maps of the three plans color themed by district African-American population are presented in Exhibits OO, PP, SS, TT, UU, and VV. As with the Senate Plan, we concentrate here on the data concerning the African-American registered voter population (BREG), but similar data broken down by African-American voting age population (BVAP) are presented in Exhibit NN.

60. The Special Master's House Plan, like the 1998 Plan but unlike the 2002 Plan, is constituted entirely of single-member districts. In comparing the plans, we focus on the number of members that would be elected from districts of a given racial percentage, rather than on the number of districts. For example, we consider District 48 in the 2002 Plan, a four-member district, as comparable to four

districts, each with a Black registered voter percentage of 60.2% and a Black voting age population percentage of 61.1%. See Exhibits MM, YY and ZZ.

## Distribution of African-American Population in House Plans



61. The Special Master's House Plan contains forty-four districts in which the majority of registered voters are African American: one in which the percent of African-American registrants exceeds 80%, two in which the percent of African-American registrants is between 70% and 79%, twenty in which the percent of African-American registrants is between 60% and 69% and twenty-one in which the percent of African-American registrants is between fifty and fifty-nine percent. In contrast to the forty-four districts in the Special Master's Plan that had a majority of registered voters who are African American, the 2002 Plan had only 38 members elected from majority-African American districts and the 1998 Plan had only 39 such districts.

62. Indeed, the Special Master's Plan was able to achieve this despite the fact that most of the majority-African American districts in the 2002 Plan were severely underpopulated.

63. As depicted in the histograms, both the 2002 and 1998 Plans have more members elected from districts in the 30% to 49% range than does the Special Master's Plan. Whereas the Special Master's Plan has seven districts between 40% and 49% BREG, the 2002 Plan had eleven and the 1998 Plan had nine in that category. Whereas the Special Master's Plan has fifteen districts which are between 30% and 39% BREG, the 2002 Plan had twenty-four and the 1998

Plan had seventeen. Once again, however, the districts in the 30% to 49% range under the 2002 Plan were some of the most severely underpopulated in the state.

64. The Special Master's Plan also continues to preserve a number of districts in which Hispanics constitute a substantial percentage of the population. It contains one district with Hispanic voting age population (HVAP) exceeding 40%, two with HVAP between 30 and 39%, two with HVAP between 20 and 29% and ten with HVAP between 10% and 20%. This compares to the 2002 Plan, which has two members elected from districts with HVAP between 30 and 39%, four members from districts with HVAP between 20 and 29%, and twelve members elected from districts with HVAP between 10 and 19%. Here again we refer to voting age population rather than Hispanic voter registration because Georgia has only recently begun to collect data on voter registration for Hispanics. See Exhibit WW.

### **Compactness**

65. The Special Master's House Plan respects the value of compactness in the construction of districts.

66. Despite the fact that the Special Master's Plan contains thirty-three more districts than the 2002 Plan and abides by a stricter standard of

population equality, it nevertheless receives higher scores than the 2002 Plan according to the traditional measures of compactness. A comparison of the three plans according to the two compactness measures described previously is presented below. Maptitude output indicating scores for each district in the three plans is found in Exhibit XX. (In this Exhibit, smallest circle scores are labeled “Roeck” and perimeter to area scores are labeled “Polsby-Popper.”) According to the smallest circle measure of compactness, the districts in the Special Master’s Plan receive a mean score of 0.41 with a standard deviation of 0.11. The range is 0.46 with the most compact district receiving a score of 0.65 and the least compact district receiving a score of 0.19.

67. In contrast, the mean of the 2002 Plan according to the smallest circle measure of compactness was 0.38 with a standard deviation of 0.12. Its most compact district received a score of 0.60 and its least compact district received a score of 0.17, producing a range of 0.43. The mean of the 1998 Plan was 0.41 with a standard deviation of 0.10. The 1998 Plan’s most compact district received a score of 0.67 and its least compact district received a score of 0.14, producing a range of 0.53.

68. According to the perimeter to area measure of compactness the Special Master’s Plan performs equally well. Its mean under that score is 0.30 with

a standard deviation of 0.10 and a range of 0.53. Its most compact district receives a score of 0.62 and its least compact district receives a score of 0.09.

69. According to the perimeter to area measure of compactness the 2002 Plan, in contrast, has a mean score of 0.24 with a standard deviation of 0.10 and a range of 0.55. Its most compact district receives a score of 0.63 and its least compact district receives a score of 0.08.

70. According to the perimeter to area measure of compactness the 1998 Plan is quite similar to the Special Master's Plan. It has a mean score of 0.29 with a standard deviation of 0.10 and a range of 0.53. Its most compact district receives a score of 0.58 and its least compact district receives a score of 0.05.

### Measures of Compactness in House Plans

Measures of Compactness		Special Master's Plan	2002 Plan	1998 Plan
Smallest Circle measure	Mean	.41	.38	.41
	(SD)	(.11)	(.12)	(.10)
	Min	.19	.17	.14
	Max	.65	.60	.67
	Range	.46	.43	.53
Perimeter to Area measure	Mean	.30	.24	.29
	(SD)	(.10)	(.10)	(.10)
	Min	.09	.08	.05
	Max	.62	.63	.58
	Range	.53	.55	.53

### **Contiguity**

71. All of the districts in the Special Master's House Plan are contiguous as the criterion was defined above.

### **Respect for Political Subdivisions**

72. As with the Senate Plan, the constraints placed on the Special Master's House Plan, such as a limit of a one percent deviation, that did not exist for the 2000 and 2002 Plans required the plan to split some political subdivisions that otherwise could be kept whole or split by fewer districts were those restraints not in place. Also, the thirty-three additional districts in the Special Master's Plan, as compared to the 2002 Plan, made it more difficult to reduce the number of county splits. A comparison of the three plans with respect to preservation of county boundaries is presented below. A report disaggregating the districts by county is presented as Exhibit BB.

## Split Counties in House Plans

	Special Master's Plan	2002 Plan	1998 Plan
Split counties	77 (48.4%)	80 (50.3%)	64 (40.3%)
Cases where a county is split among 2 districts	36	39	37
Cases where a county is split among 3 districts	23	21	13
Cases where a county is split among 4 districts	7	7	5
Cases where a county is split among 5 or more districts	11	13	9

73. The Special Master's Plan splits seventy-seven counties. Of those counties that the Special Master's Plan splits, thirty-six are split by two districts, twenty-three are split by three districts, seven are split by four districts, eleven are split by five or more districts.

74. In contrast, under the 2002 Plan, eighty counties are split. Thirty-nine are split by two districts, twenty-one are split by three districts, seven are split by four districts, and thirteen are split by five or more districts.

75. The Special Master's Plan fares less well against the 1998 Plan, which split 64 counties, but this is due in large part, as mentioned above, to the more severe requirement of equipopulosity imposed on the Special Master's Plan and the desire in the Special Master's Plan to reduce the number of split cities and

towns. The 1998 Plan split sixty-four counties: thirty-seven are split by two districts, thirteen are split by three districts, five are split by four districts, and nine are split by five or more districts.

76. As described in Exhibit CC, the Special Master's Plan also paid considerable attention to city and town boundaries as well, a difficult task given the strange shape of many of Georgia's cities and towns. A total of 89 incorporated areas (as defined by the U.S. Census Bureau) are split in the Special Master's Plan; of these, 18 are splits that do not affect any population. This is a substantial improvement over the 2002 Plan, where 133 incorporated areas are split, 12 of which do not affect any population. Disregarding zero-population splits, the Special Master's Plan reduces splits of Georgia's cities and towns by 41 percent compared to the 2002 Plan. See Exhibit BB.

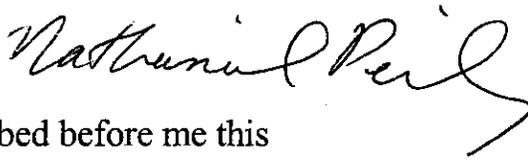
## **CONCLUSION**

77. In my professional opinion:

The Special Master's Plan adheres to all constitutional and statutory requirements and abides by the principles laid down in the Court's March 1, 2004 Order. The Special Master's Plan satisfies the need for population equality across districts, respects the compactness and contiguity of districts, and respects the integrity of political subdivisions.

Further affiant sayeth not.

Nathaniel Persily.



Sworn to and subscribed before me this

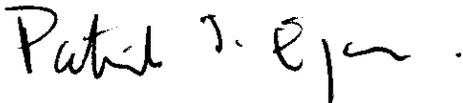
15<sup>th</sup> day of March, 2004.

Anne Maie Cauer

Notary Public

My commission expires: Nov. 12, 2007

I, Patrick Egan, having read the foregoing Affidavit of Nathaniel Persily, do hereby swear and affirm that the affidavit accurately sets forth the actions taken and conclusions adopted by me in conjunction with the work I performed at the behest of the Special Master.



Sworn to and subscribed before me this

15<sup>th</sup> day of March, 2004.

Anne Maie Cauer

Notary Public

My commission expires: Nov. 12, 2007